

CHAPTER

23

Communications

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1 thru 25	Sep 05/2018		R 22	Sep 05/2018	
26	BLANK		R 23	Sep 05/2018	
23-CONTENTS			O 24	Sep 05/2018	
1	Jul 25/2018		O 25	Sep 05/2018	
2	Jul 25/2018		26	BLANK	
3	Jul 25/2018		23-11-00		
4	Jul 25/2018		1	May 05/2015	
5	Jul 25/2018		2	May 05/2015	
6	Jul 25/2018		3	May 05/2015	
7	Jul 25/2018		4	Sep 05/2017	
8	Jul 25/2018		5	May 05/2015	
9	May 05/2017		6	May 05/2015	
10	May 05/2017		7	May 05/2015	
11	May 05/2017		8	May 05/2015	
12	May 05/2017		9	May 05/2015	
13	May 05/2017		10	May 05/2015	
14	May 05/2017		11	May 05/2015	
15	May 05/2017		12	May 05/2015	
16	May 05/2018		13	May 05/2015	
17	May 05/2018		14	May 05/2015	
O 18	Sep 05/2018		15	May 05/2015	
O 19	Sep 05/2018		16	Sep 05/2017	
O 20	Sep 05/2018		17	May 05/2015	
21	Jul 25/2018		18	May 05/2015	

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19	May 05/2015		41	Jul 25/2018	
20	May 05/2015		42	Jul 25/2018	
21	May 05/2015		43	Jul 25/2018	
22	May 05/2015		44	Jul 25/2018	
23	May 05/2015		45	Jul 25/2018	
24	Sep 05/2017		46	Jul 25/2018	
25	May 05/2015		47	Jul 25/2018	
26	May 05/2015		48	BLANK	
27	May 05/2015		23-12-00		
28	May 05/2015		1	May 05/2015	
29	Sep 05/2016		2	May 05/2015	
30	Sep 05/2016		3	May 05/2015	
31	May 05/2015		4	May 05/2015	
32	May 05/2015		5	May 05/2015	
33	Jul 25/2018		6	May 05/2015	
34	Jul 25/2018		7	May 05/2015	
35	Jul 25/2018		8	May 05/2015	
36	Jul 25/2018		9	May 05/2015	
37	Jul 25/2018		10	May 05/2015	
38	Jul 25/2018		11	May 05/2015	
39	Jul 25/2018		12	May 05/2015	
40	Jul 25/2018		13	May 05/2015	
			14	May 05/2015	

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15	May 05/2015		37	May 05/2015	
16	May 05/2015		38	May 05/2015	
17	May 05/2015		39	May 05/2015	
18	May 05/2015		40	May 05/2015	
19	May 05/2015		41	May 05/2015	
20	May 05/2015		42	May 05/2015	
21	May 05/2015		43	May 05/2015	
22	May 05/2015		44	BLANK	
23	May 05/2016		23-15-00		
24	May 05/2015		1	May 05/2015	
25	May 05/2015		2	Jul 25/2018	
26	May 05/2015		3	Jul 25/2018	
27	May 05/2018		4	Jul 25/2018	
28	May 05/2018		5	Jul 25/2018	
29	May 05/2015		6	Jul 25/2018	
30	May 05/2015		7	Jul 25/2018	
31	May 05/2015		8	Jul 25/2018	
32	May 05/2015		9	Jul 25/2018	
33	Sep 05/2016		10	Jul 25/2018	
34	Sep 05/2016		11	Jul 25/2018	
35	May 05/2015		12	Jul 25/2018	
36	May 05/2015		13	Jul 25/2018	
			14	Jul 25/2018	

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15	Jul 25/2018		37	Jul 25/2018	
16	Jul 25/2018		38	Sep 05/2016	
17	Jul 25/2018		39	Sep 05/2016	
18	Jul 25/2018		40	Jul 25/2018	
19	Jul 25/2018		41	Jul 25/2018	
20	Jul 25/2018		42	Jul 25/2018	
21	Jul 25/2018		43	Jul 25/2018	
22	Jul 25/2018		44	Jul 25/2018	
23	Jul 25/2018		45	Jul 25/2018	
24	Jul 25/2018		46	Jul 25/2018	
25	Jul 25/2018		47	Jul 25/2018	
26	Sep 05/2016		48	Jul 25/2018	
27	Sep 05/2016		49	Jul 25/2018	
28	Jul 25/2018		50	Jul 25/2018	
29	Jul 25/2018		51	Jul 25/2018	
30	Jul 25/2018		52	Jul 25/2018	
31	Jul 25/2018		53	Jul 25/2018	
32	Jul 25/2018		54	BLANK	
33	Jul 25/2018		23-21-00		
34	Jul 25/2018		1	May 05/2015	
35	Jul 25/2018		2	May 05/2015	
36	Jul 25/2018		3	May 05/2015	
			4	May 05/2015	

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5	May 05/2015		9	May 05/2017	
6	May 05/2015		10	May 05/2017	
7	May 05/2015		11	Jan 05/2018	
8	May 05/2015		12	Jan 05/2018	
9	May 05/2015		13	Jan 05/2018	
10	May 05/2015		14	Jan 05/2018	
11	May 05/2015		15	Jan 05/2018	
12	May 05/2015		16	Jan 05/2018	
13	Jul 25/2018		17	May 05/2018	
14	Jul 25/2018		18	May 05/2018	
15	Jul 25/2018		19	Jan 05/2018	
16	Jul 25/2018		20	Jan 05/2018	
17	Jul 25/2018		21	Jan 05/2018	
18	BLANK		22	May 05/2017	
23-24-00			23	May 05/2017	
1	May 05/2015		24	Jan 05/2018	
2	May 05/2015		25	Jan 05/2018	
3	May 05/2015		26	Jan 05/2018	
4	Jan 05/2018		27	Jan 05/2018	
5	Jan 05/2018		28	Jan 05/2018	
6	Jan 05/2018		29	Jan 05/2018	
7	Jan 05/2018		30	Jan 05/2018	
8	May 05/2017				

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31	Sep 05/2016		13	Jul 25/2018	
32	Jan 05/2018		14	Jul 25/2018	
33	Jan 05/2018		15	Jul 25/2018	
34	May 05/2017		16	Jul 25/2018	
35	Jan 05/2018		17	Jul 25/2018	
36	Jan 05/2018		18	Jul 25/2018	
37	Jan 05/2018		19	Jul 25/2018	
38	Sep 05/2016		20	Jul 25/2018	
39	Sep 05/2016		21	Jul 25/2018	
40	BLANK		22	Jul 25/2018	
23-27-00			23	Jul 25/2018	
1	Sep 05/2016		24	May 05/2015	
2	Jul 25/2018		25	Jul 25/2018	
3	May 05/2015		26	Jul 25/2018	
4	May 05/2015		27	Jul 25/2018	
5	Jul 25/2018		28	Jul 25/2018	
6	Jul 25/2018		29	Jul 25/2018	
7	May 05/2015		30	Jul 25/2018	
8	May 05/2015		31	Jul 25/2018	
9	May 05/2015		32	Jul 25/2018	
10	May 05/2015		33	Jul 25/2018	
11	May 05/2015		34	Jul 25/2018	
12	Jul 25/2018				

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35	Jul 25/2018		57	Jul 25/2018	
36	Jul 25/2018		58	Jul 25/2018	
37	Jul 25/2018		59	Jul 25/2018	
38	Jul 25/2018		60	Jul 25/2018	
39	Jul 25/2018		61	Jul 25/2018	
40	Sep 05/2016		62	Jul 25/2018	
41	Jul 25/2018		63	Jul 25/2018	
42	Jul 25/2018		64	Jul 25/2018	
43	Jul 25/2018		65	Jul 25/2018	
44	Jul 25/2018		66	Jul 25/2018	
45	Jul 25/2018		67	Jul 25/2018	
46	Jul 25/2018		68	Jul 25/2018	
47	Jul 25/2018		69	Jul 25/2018	
48	Jul 25/2018		70	Jul 25/2018	
49	Jul 25/2018		71	Jul 25/2018	
50	Jul 25/2018		72	Jul 25/2018	
51	Jul 25/2018		73	Jul 25/2018	
52	Jul 25/2018		74	Jul 25/2018	
53	Jul 25/2018		75	Jul 25/2018	
54	Jul 25/2018		76	Jul 25/2018	
55	Jul 25/2018		77	Jul 25/2018	
56	Jul 25/2018		78	Jul 25/2018	
			79	Jul 25/2018	

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81	Jul 25/2018		8	May 05/2015	
82	Jul 25/2018		9	May 05/2015	
83	Jul 25/2018		10	May 05/2015	
84	Jul 25/2018		11	May 05/2015	
85	Jul 25/2018		12	May 05/2015	
86	Jul 25/2018		13	May 05/2015	
87	Jul 25/2018		14	May 05/2015	
88	Jul 25/2018		15	May 05/2015	
89	Jul 25/2018		16	Sep 05/2017	
90	Jul 25/2018		17	Sep 05/2017	
91	Jul 25/2018		18	May 05/2015	
92	Jul 25/2018		19	May 05/2015	
93	Jul 25/2018		20	May 05/2015	
94	Jul 25/2018		21	May 05/2015	
95	Jul 25/2018		22	May 05/2015	
96	BLANK		23	May 05/2015	
23-31-00			24	May 05/2015	
1	May 05/2015		25	May 05/2015	
2	May 05/2015		26	May 05/2015	
3	May 05/2015		27	May 05/2015	
4	May 05/2015		28	May 05/2015	
5	Sep 05/2016				
6	Sep 05/2016				

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29	May 05/2015		51	Jul 25/2018	
30	May 05/2015		52	Jul 25/2018	
31	May 05/2015		53	Jul 25/2018	
32	May 05/2015		54	Jul 25/2018	
33	Jul 25/2018		55	Jul 25/2018	
34	Jul 25/2018		56	Jul 25/2018	
35	Jul 25/2018		57	Jul 25/2018	
36	Jul 25/2018		58	BLANK	
37	Jul 25/2018		23-33-00		
38	Jul 25/2018		1	May 05/2015	
39	Jul 25/2018		2	May 05/2015	
40	Jul 25/2018		3	May 05/2015	
41	Jul 25/2018		4	May 05/2015	
42	Jul 25/2018		5	May 05/2015	
43	Jul 25/2018		6	May 05/2015	
44	Jul 25/2018		7	May 05/2015	
45	Jul 25/2018		8	May 05/2015	
46	Jul 25/2018		9	May 05/2015	
47	Jul 25/2018		10	May 05/2015	
48	Jul 25/2018		11	May 05/2015	
49	Jul 25/2018		12	May 05/2015	
50	Jul 25/2018		13	May 05/2015	
			14	May 05/2015	

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15	May 05/2015		38	May 05/2017	
16	May 05/2015		39	May 05/2017	
17	May 05/2015		40	May 05/2017	
18	May 05/2015		41	May 05/2017	
19	May 05/2015		42	May 05/2017	
20	May 05/2015		43	May 05/2017	
21	May 05/2015		44	May 05/2017	
22	May 05/2015		45	May 05/2017	
23	May 05/2015		46	May 05/2017	
24	May 05/2015		47	May 05/2017	
25	May 05/2015		48	May 05/2017	
26	May 05/2015		49	May 05/2017	
27	May 05/2015		50	May 05/2017	
28	May 05/2015		51	May 05/2017	
29	May 05/2015		52	May 05/2017	
30	May 05/2017		53	May 05/2017	
31	May 05/2018		54	May 05/2017	
32	May 05/2018		55	May 05/2017	
33	May 05/2018		56	May 05/2017	
34	May 05/2017		57	May 05/2017	
35	May 05/2017		58	May 05/2017	
36	May 05/2017		59	May 05/2017	
37	May 05/2017		60	May 05/2017	

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61	May 05/2017		21	May 05/2017	
62	BLANK		22	May 05/2017	
23-39-01			23	May 05/2017	
1	Sep 05/2016		24	May 05/2017	
2	Sep 05/2016		25	May 05/2017	
3	May 05/2015		26	May 05/2017	
4	Sep 05/2016		27	May 05/2017	
5	Sep 05/2016		28	May 05/2018	
6	Sep 05/2016		29	May 05/2018	
7	Sep 05/2016		30	May 05/2018	
8	May 05/2018		31	May 05/2018	
9	May 05/2018		32	May 05/2017	
10	May 05/2018		33	May 05/2017	
11	May 05/2018		34	May 05/2017	
12	May 05/2017		35	May 05/2017	
13	May 05/2017		36	May 05/2017	
14	May 05/2017		37	May 05/2017	
15	May 05/2017		38	May 05/2017	
16	May 05/2018		39	May 05/2017	
17	May 05/2018		40	May 05/2017	
18	May 05/2018		41	May 05/2017	
19	May 05/2018		42	May 05/2017	
20	May 05/2017				

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43	May 05/2017		65	May 05/2017	
44	May 05/2017		66	May 05/2018	
45	May 05/2017		67	May 05/2018	
46	May 05/2017		68	May 05/2018	
47	May 05/2017		69	May 05/2018	
48	May 05/2017		70	May 05/2017	
49	May 05/2017		71	May 05/2017	
50	May 05/2017		72	May 05/2017	
51	May 05/2017		73	May 05/2018	
52	May 05/2017		74	May 05/2018	
53	May 05/2018		75	May 05/2018	
54	May 05/2018		76	May 05/2018	
55	May 05/2018		77	May 05/2018	
56	May 05/2018		78	May 05/2018	
57	May 05/2018		79	May 05/2018	
58	Jul 25/2018		80	May 05/2017	
59	May 05/2017		81	May 05/2017	
60	Jul 25/2018		82	May 05/2017	
61	May 05/2017		83	May 05/2017	
62	Jul 25/2018		84	Jul 25/2018	
63	May 05/2017		85	May 05/2017	
64	May 05/2017		86	May 05/2017	

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87	May 05/2017		98.11	May 05/2017	
88	May 05/2017		98.12	May 05/2017	
89	May 05/2017		98.13	May 05/2017	
90	May 05/2017		98.14	May 05/2017	
91	May 05/2017		98.15	May 05/2017	
92	May 05/2017		98.16	May 05/2017	
93	May 05/2017		98.17	May 05/2017	
94	May 05/2017		98.18	May 05/2017	
95	May 05/2017		98.19	May 05/2017	
96	May 05/2017		98.20	May 05/2017	
97	May 05/2017		98.21	May 05/2017	
98	May 05/2017		98.22	May 05/2017	
98.1	May 05/2017		98.23	May 05/2017	
98.2	May 05/2017		98.24	May 05/2017	
98.3	May 05/2017		98.25	May 05/2017	
98.4	May 05/2017		98.26	May 05/2017	
98.5	May 05/2017		98.27	May 05/2017	
98.6	May 05/2017		98.28	May 05/2017	
98.7	May 05/2017		98.29	May 05/2017	
98.8	May 05/2017		98.30	Sep 05/2016	
98.9	May 05/2017		98.31	May 05/2017	
98.10	May 05/2017		98.32	May 05/2018	

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98.33	May 05/2018		98.55	May 05/2017	
98.34	May 05/2018		98.56	May 05/2017	
98.35	May 05/2018		98.57	May 05/2017	
98.36	May 05/2017		98.58	May 05/2017	
98.37	May 05/2017		98.59	May 05/2017	
98.38	May 05/2017		98.60	May 05/2017	
98.39	May 05/2017		98.61	May 05/2017	
98.40	May 05/2017		98.62	May 05/2017	
98.41	May 05/2017		98.63	May 05/2017	
98.42	May 05/2017		98.64	May 05/2017	
98.43	May 05/2017		98.65	May 05/2017	
98.44	May 05/2017		98.66	May 05/2017	
98.45	May 05/2017		98.67	May 05/2017	
98.46	May 05/2017		98.68	May 05/2017	
98.47	May 05/2017		98.69	May 05/2017	
98.48	May 05/2017		98.70	May 05/2018	
98.49	May 05/2017		98.71	May 05/2017	
98.50	May 05/2018		98.72	May 05/2017	
98.51	May 05/2017		98.73	May 05/2017	
98.52	May 05/2017		98.74	May 05/2017	
98.53	May 05/2017		98.75	May 05/2017	
98.54	May 05/2018		98.76	May 05/2017	

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98.77	May 05/2017		98.99	May 05/2017	
98.78	May 05/2017		98.100	May 05/2017	
98.79	May 05/2017		98.101	May 05/2017	
98.80	May 05/2017		98.102	May 05/2017	
98.81	May 05/2017		98.103	May 05/2017	
98.82	May 05/2018		98.104	May 05/2017	
98.83	May 05/2018		98.105	May 05/2017	
98.84	May 05/2018		98.106	May 05/2017	
98.85	May 05/2018		98.107	May 05/2017	
98.86	May 05/2017		98.108	May 05/2017	
98.87	May 05/2017		98.109	May 05/2017	
98.88	May 05/2017		98.110	May 05/2017	
98.89	May 05/2017		98.111	May 05/2017	
98.90	May 05/2018		98.112	May 05/2018	
98.91	May 05/2017		98.113	May 05/2017	
98.92	May 05/2018		98.114	May 05/2017	
98.93	May 05/2017		98.115	May 05/2017	
98.94	May 05/2018		98.116	May 05/2017	
98.95	May 05/2017		98.117	May 05/2017	
98.96	May 05/2017		98.118	May 05/2018	
98.97	May 05/2017		98.119	May 05/2017	
98.98	May 05/2018		98.120	May 05/2017	

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98.121	May 05/2017		98.143	May 05/2017	
98.122	May 05/2017		98.144	May 05/2017	
98.123	May 05/2017		98.145	May 05/2017	
98.124	May 05/2017		98.146	May 05/2017	
98.125	May 05/2017		98.147	May 05/2018	
98.126	May 05/2017		98.148	May 05/2018	
98.127	May 05/2018		98.149	May 05/2017	
98.128	May 05/2017		98.150	May 05/2018	
98.129	May 05/2018		98.151	May 05/2018	
98.130	May 05/2018		98.152	May 05/2018	
98.131	May 05/2018		98.153	May 05/2018	
98.132	May 05/2018		98.154	May 05/2017	
98.133	May 05/2017		98.155	May 05/2018	
98.134	May 05/2017		98.156	May 05/2018	
98.135	May 05/2017		98.157	May 05/2018	
98.136	May 05/2018		98.158	May 05/2018	
98.137	May 05/2017		98.159	May 05/2017	
98.138	May 05/2018		98.160	May 05/2017	
98.139	May 05/2017		98.161	May 05/2017	
98.140	May 05/2017		98.162	May 05/2017	
98.141	May 05/2017		98.163	May 05/2017	
98.142	May 05/2017		98.164	May 05/2017	

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98.165	May 05/2017		98.187	May 05/2018	
98.166	May 05/2017		98.188	May 05/2018	
98.167	May 05/2017		98.189	May 05/2018	
98.168	May 05/2017		98.190	May 05/2018	
98.169	May 05/2017		98.191	May 05/2018	
98.170	May 05/2017		98.192	May 05/2018	
98.171	May 05/2018		98.193	May 05/2018	
98.172	May 05/2018		98.194	May 05/2018	
98.173	May 05/2018		98.195	May 05/2018	
98.174	May 05/2018		98.196	May 05/2018	
98.175	May 05/2018		98.197	May 05/2018	
98.176	May 05/2018		98.198	May 05/2018	
98.177	May 05/2018		98.199	May 05/2018	
98.178	May 05/2018		98.200	May 05/2018	
98.179	May 05/2018		98.201	May 05/2018	
98.180	May 05/2018		98.202	May 05/2018	
98.181	May 05/2018		98.203	May 05/2018	
98.182	May 05/2018		98.204	May 05/2018	
98.183	May 05/2018		98.205	May 05/2017	
98.184	May 05/2018		98.206	May 05/2017	
98.185	May 05/2018		98.207	May 05/2017	
98.186	May 05/2018		98.208	May 05/2018	

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98.209	May 05/2017		3	May 05/2015	
98.210	May 05/2018		4	May 05/2015	
98.211	May 05/2017		5	May 05/2015	
98.212	May 05/2018		6	May 05/2015	
98.213	May 05/2017		7	May 05/2015	
98.214	May 05/2018		8	May 05/2015	
98.215	May 05/2018		9	May 05/2015	
98.216	May 05/2018		10	May 05/2015	
98.217	May 05/2018		11	May 05/2015	
98.218	May 05/2018		12	May 05/2015	
98.219	May 05/2017		13	May 05/2015	
98.220	May 05/2017		14	May 05/2015	
98.221	May 05/2017		15	May 05/2015	
98.222	May 05/2018		16	May 05/2015	
98.223	May 05/2017		17	May 05/2015	
98.224	May 05/2017		18	BLANK	
98.225	May 05/2018		23-42-00		
98.226	May 05/2018		1	May 05/2015	
98.227	May 05/2018		2	May 05/2015	
98.228	May 05/2018		3	May 05/2015	
23-41-00			4	May 05/2015	
1	May 05/2015		5	May 05/2015	
2	May 05/2015		6	May 05/2015	

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7	May 05/2015		O 29	Sep 05/2018	
8	May 05/2015		O 30	Sep 05/2018	
9	May 05/2018		O 31	Sep 05/2018	
R 10	Sep 05/2018		O 32	Sep 05/2018	
R 11	Sep 05/2018		O 33	Sep 05/2018	
O 12	Sep 05/2018		O 34	Sep 05/2018	
O 13	Sep 05/2018		O 35	Sep 05/2018	
O 14	Sep 05/2018		O 36	Sep 05/2018	
O 15	Sep 05/2018		O 37	Sep 05/2018	
O 16	Sep 05/2018		O 38	Sep 05/2018	
O 17	Sep 05/2018		O 39	Sep 05/2018	
O 18	Sep 05/2018		O 40	Sep 05/2018	
O 19	Sep 05/2018		O 41	Sep 05/2018	
O 20	Sep 05/2018		O 42	Sep 05/2018	
O 21	Sep 05/2018		O 43	Sep 05/2018	
O 22	Sep 05/2018		O 44	Sep 05/2018	
O 23	Sep 05/2018		O 45	Sep 05/2018	
O 24	Sep 05/2018		O 46	Sep 05/2018	
O 25	Sep 05/2018		O 47	Sep 05/2018	
O 26	Sep 05/2018		O 48	Sep 05/2018	
O 27	Sep 05/2018		O 49	Sep 05/2018	
O 28	Sep 05/2018		O 50	Sep 05/2018	

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O 51	Sep 05/2018		9	May 05/2015	
O 52	Sep 05/2018		10	May 05/2015	
O 53	Sep 05/2018		11	May 05/2015	
O 54	Sep 05/2018		12	May 05/2015	
O 55	Sep 05/2018		13	May 05/2015	
O 56	Sep 05/2018		14	May 05/2015	
O 57	Sep 05/2018		15	Jul 25/2018	
O 58	Sep 05/2018		16	Jul 25/2018	
O 59	Sep 05/2018		17	Jul 25/2018	
O 60	Sep 05/2018		18	Jul 25/2018	
O 61	Sep 05/2018		19	Jul 25/2018	
O 62	Sep 05/2018		20	BLANK	
63	May 05/2018		23-51-00		
64	BLANK		1	May 05/2015	
23-43-00			2	May 05/2015	
1	May 05/2015		3	May 05/2015	
2	May 05/2015		4	Jul 25/2018	
3	May 05/2015		5	May 05/2015	
4	May 05/2015		6	May 05/2015	
5	May 05/2015		7	May 05/2015	
6	May 05/2015		8	May 05/2015	
7	May 05/2015		9	May 05/2015	
8	May 05/2015		10	May 05/2015	

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23-51-00 (cont.)			23-51-00 (cont.)		
11	May 05/2015		33	Jul 25/2018	
12	May 05/2015		34	Jul 25/2018	
13	May 05/2015		35	Jul 25/2018	
14	Jul 25/2018		36	Jul 25/2018	
15	Jul 25/2018		37	Jul 25/2018	
16	Jul 25/2018		38	Jul 25/2018	
17	Jul 25/2018		39	Jul 25/2018	
18	Jul 25/2018		40	Jul 25/2018	
19	Jul 25/2018		41	Jul 25/2018	
20	Jul 25/2018		42	Jul 25/2018	
21	Jul 25/2018		43	Jul 25/2018	
22	Jul 25/2018		44	Jul 25/2018	
23	Jul 25/2018		45	Jul 25/2018	
24	Jul 25/2018		46	Jul 25/2018	
25	Jul 25/2018		47	Jul 25/2018	
26	Jul 25/2018		48	Jul 25/2018	
27	Jul 25/2018		49	Jul 25/2018	
28	Jul 25/2018		50	Jul 25/2018	
29	Jul 25/2018		51	Jul 25/2018	
30	Jul 25/2018		52	Jul 25/2018	
31	Jul 25/2018		53	Jul 25/2018	
32	Jul 25/2018		54	Jul 25/2018	

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23-51-00 (cont.)			23-71-00 (cont.)		
55	Jul 25/2018		17	Sep 05/2016	
56	BLANK		18	Sep 05/2016	
23-61-00			19	Sep 05/2016	
1	May 05/2015		20	Sep 05/2016	
2	May 05/2015		21	Sep 05/2016	
3	May 05/2015		22	Sep 05/2016	
4	BLANK		23	Sep 05/2016	
23-71-00			24	Sep 05/2016	
1	May 05/2015		25	Sep 05/2016	
2	May 05/2015		26	Sep 05/2016	
3	May 05/2015		27	Sep 05/2016	
4	May 05/2015		28	Sep 05/2016	
5	Sep 05/2016		29	Sep 05/2016	
6	Sep 05/2016		30	Sep 05/2016	
7	Sep 05/2016		31	Sep 05/2016	
8	Sep 05/2016		32	Sep 05/2016	
9	Sep 05/2016		23-75-00		
10	Sep 05/2016		1	May 05/2015	
11	Sep 05/2016		R 2	Sep 05/2018	
12	Sep 05/2017		R 3	Sep 05/2018	
13	Sep 05/2016		R 4	Sep 05/2018	
14	Sep 05/2016		R 5	Sep 05/2018	
15	Sep 05/2016		R 6	Sep 05/2018	
16	Sep 05/2016				

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23-75-00 (cont.)			23-75-00 (cont.)		
R 7	Sep 05/2018		A 29	Sep 05/2018	
R 8	Sep 05/2018		A 30	Sep 05/2018	
R 9	Sep 05/2018		A 31	Sep 05/2018	
R 10	Sep 05/2018		A 32	Sep 05/2018	
R 11	Sep 05/2018		A 33	Sep 05/2018	
R 12	Sep 05/2018		A 34	Sep 05/2018	
R 13	Sep 05/2018		A 35	Sep 05/2018	
R 14	Sep 05/2018		A 36	Sep 05/2018	
R 15	Sep 05/2018		A 37	Sep 05/2018	
R 16	Sep 05/2018		A 38	BLANK	
R 17	Sep 05/2018		23-82-00		
R 18	Sep 05/2018		1	May 05/2015	
R 19	Sep 05/2018		2	May 05/2015	
R 20	Sep 05/2018		3	May 05/2015	
R 21	Sep 05/2018		4	May 05/2015	
R 22	Sep 05/2018		5	May 05/2015	
R 23	Sep 05/2018		6	May 05/2015	
R 24	Sep 05/2018		7	May 05/2015	
A 25	Sep 05/2018		8	May 05/2015	
A 26	Sep 05/2018		9	May 05/2015	
A 27	Sep 05/2018		10	BLANK	
A 28	Sep 05/2018		23-91-00		
			1	May 05/2015	
			2	May 05/2015	

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23-91-00 (cont.)			23-91-00 (cont.)		
3	May 05/2015		25	May 05/2015	
4	May 05/2015		26	May 05/2015	
5	May 05/2015		27	May 05/2015	
6	May 05/2016		28	May 05/2015	
7	May 05/2015		29	May 05/2015	
8	May 05/2015		30	May 05/2015	
9	May 05/2015		31	May 05/2015	
10	May 05/2015		32	May 05/2015	
11	May 05/2015		33	May 05/2015	
12	May 05/2015		34	May 05/2015	
13	Sep 05/2016		35	May 05/2015	
14	Sep 05/2016		36	May 05/2015	
15	May 05/2015		37	May 05/2015	
16	May 05/2015		38	Sep 05/2016	
17	Sep 05/2016		39	Sep 05/2016	
18	Sep 05/2016		40	Sep 05/2016	
19	May 05/2015		41	Sep 05/2016	
20	May 05/2015		42	Sep 05/2016	
21	Sep 05/2016		43	Sep 05/2016	
22	May 05/2015		44	Sep 05/2016	
23	May 05/2015		45	Sep 05/2016	
24	May 05/2015		46	BLANK	

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23-93-00			23-93-00 (cont.)		
1	May 05/2015		25	May 05/2015	
2	May 05/2015		26	May 05/2015	
3	May 05/2015		27	May 05/2015	
4	May 05/2015		28	May 05/2015	
5	May 05/2015		29	May 05/2015	
6	May 05/2015		30	May 05/2015	
7	May 05/2015		31	May 05/2015	
8	May 05/2015		32	May 05/2015	
9	May 05/2015		33	May 05/2015	
10	May 05/2015		34	BLANK	
11	May 05/2015		23-94-10		
12	May 05/2015		1	May 05/2015	
13	May 05/2015		2	May 05/2015	
14	May 05/2015		3	May 05/2015	
15	May 05/2015		4	May 05/2015	
16	May 05/2015		5	May 05/2015	
17	May 05/2015		6	May 05/2015	
18	May 05/2015		7	May 05/2015	
19	May 05/2015		8	May 05/2015	
20	May 05/2015		9	May 05/2015	
21	May 05/2015		10	BLANK	
22	May 05/2015				
23	May 05/2015				
24	May 05/2015				

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23-11-00	HF SYSTEM - GENERAL DESCRIPTION	4	ARO ALL
23-11-00	HF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS	6	ARO ALL
23-11-00	HF SYSTEM - E6 RACK COMPONENT LOCATIONS	8	ARO ALL
23-11-00	HF SYSTEM - VERTICAL STABILIZER COMPONENT LOCATION	10	ARO ALL
23-11-00	HF SYSTEM - POWER INTERFACE	12	ARO ALL
23-11-00	HF SYSTEM - TUNING INTERFACE	14	ARO ALL
23-11-00	HF SYSTEM - RECEIVE/TRANSMIT INTERFACES	16	ARO ALL
23-11-00	HF SYSTEM - AIMS FAULT REPORTING AND TESTING INTERFACES	18	ARO ALL
23-11-00	HF SYSTEM - HF COMMUNICATION TRANSCEIVER	20	ARO ALL
23-11-00	HF SYSTEM - HF ANTENNA COUPLER	22	ARO ALL
23-11-00	HF SYSTEM - HF ANTENNA COUPLER ACCESS AND INSTALLATION	24	ARO ALL
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23-11-00	HF SYSTEM - NORMAL TUNING	34	ARO ALL
23-11-00	HF SYSTEM - HOME/RECEIVE FUNCTIONAL DESCRIPTION	36	ARO ALL
23-11-00	HF SYSTEM - TUNE FUNCTIONAL DESCRIPTION	38	ARO ALL
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23-11-00	HF SYSTEM - INTERFACES	46	ARO ALL
23-12-00	VERY HIGH FREQUENCY COMMUNICATION SYSTEM - INTRODUCTION	2	ARO ALL
23-12-00	VHF SYSTEM - GENERAL DESCRIPTION	4	ARO ALL
23-12-00	VHF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS	6	ARO ALL
23-12-00	VHF SYSTEM - MAIN EQUIPMENT CENTER COMPONENT LOCATIONS	8	ARO ALL
23-12-00	VHF SYSTEM - EXTERNAL COMPONENT LOCATIONS	10	ARO ALL
23-12-00	VHF SYSTEM - POWER INTERFACE	12	ARO ALL
23-12-00	VHF SYSTEM - TUNING INTERFACE	14	ARO ALL
23-12-00	VHF SYSTEM - VOICE RECEIVE/TRANSMIT INTERFACES	16	ARO ALL
23-12-00	VHF SYSTEM - DATA RECEIVE/TRANSMIT INTERFACES	18	ARO ALL
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23-12-00	VHF SYSTEM - RADIO TUNING PANEL	27	ARO ALL
23-12-00	VHF SYSTEM - AUDIO CONTROL PANEL	30	ARO ALL
23-12-00	VHF SYSTEM - TUNING FUNCTIONAL DESCRIPTION	33	ARO ALL
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HIGH FREQUENCY COMMUNICATION SYSTEM - INTRODUCTION

General

The high frequency (HF) communication system permits voice communication over longer distances than line-of-sight radio systems. The HF system is for communication with ground stations or with other airplanes during long over-water flights. The HF system operates in the HF aeronautical communication band between 2.000 MHz and 29.999 MHz.

- seq - sequence
- USB - upper side band

Long Range Communication

The HF system uses sky waves for long range communication. The HF signals pass into the ionized layers of the atmosphere. The ionized layers refract the signals toward the earth. The earth reflects the signals back toward the ionized layers. Sky wave distances depend upon frequency, time of day, and airplane altitude. Skips are the areas between sky waves reflections.

Short Range Communication

HF signals also go directly to ground stations and other airplanes.

Abbreviations and Acronyms

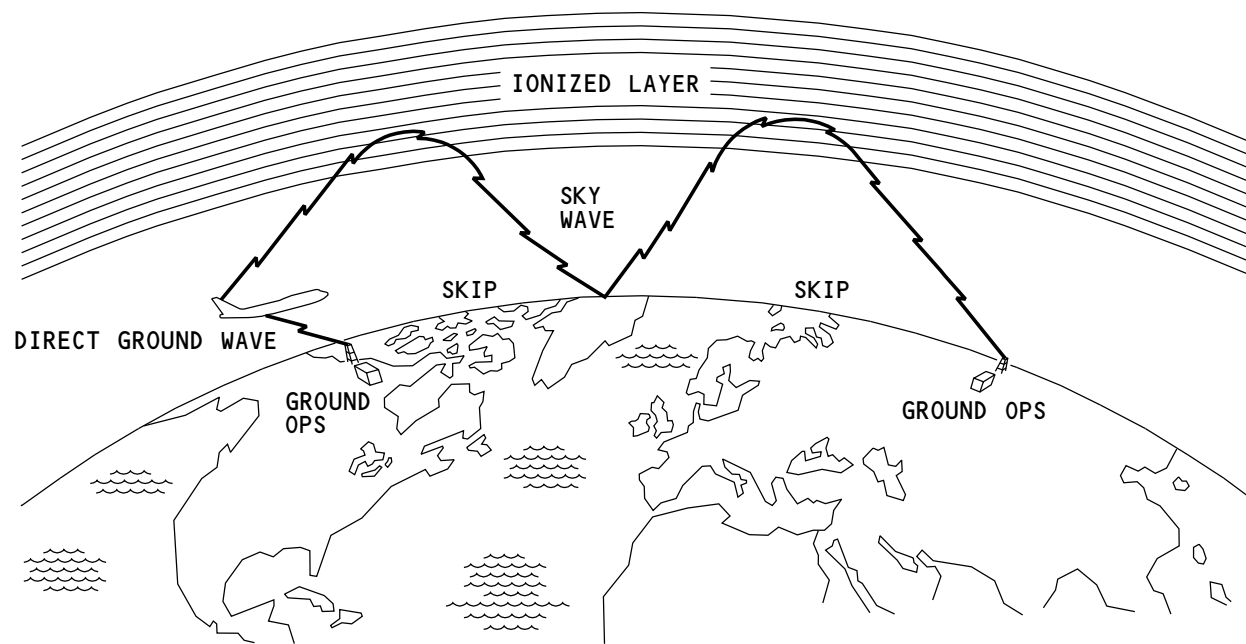
- ACP - audio control panel
- AM - amplitude modulation
- AMU - audio management unit
- CAPT - captain
- CMCF - central maintenance computing function
- CMCS - central maintenance computing system
- CSI - coaxial serial interface
- DFDAF - digital flight data acquisition function
- F/O - first officer
- F/OBS - first observer
- PSIGA - pounds per square inch gage absolute
- RTP - radio tuning panel
- sens - sensitivity

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HIGH FREQUENCY COMMUNICATION SYSTEM - INTRODUCTION

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HF SYSTEM - GENERAL DESCRIPTION

General

The HF communication system uses two HF systems. Each system has these components:

- A common HF antenna. The antenna transmits and receives RF signals in the HF range
- An HF antenna coupler. The antenna coupler matches the impedance of the antenna and transmission line to the output of the transceiver at the selected frequency
- An HF communication transceiver. The transceiver operates in the AM or upper side band (USB) mode.

The HF communication system also connects with the airplane information management system (AIMS) for these functions:

- Digital flight data acquisition function (DFDAF). The DFDAF in the AIMS cabinet receives the microphone PTT signal for input to the flight recorder
- Central maintenance computing function (CMCF). The CMCF gets fault reports from the HF system and records this information in a fault history. This shows the maintenance crew the faulty component or function.



DO NOT TRANSMIT WITH THE HF COMMUNICATION SYSTEM WHILE THE AIRPLANE IS REFUELED OR DEFUELED. AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE AIRPLANE.



MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

HF System Connections

The HF communication system connects with these components:

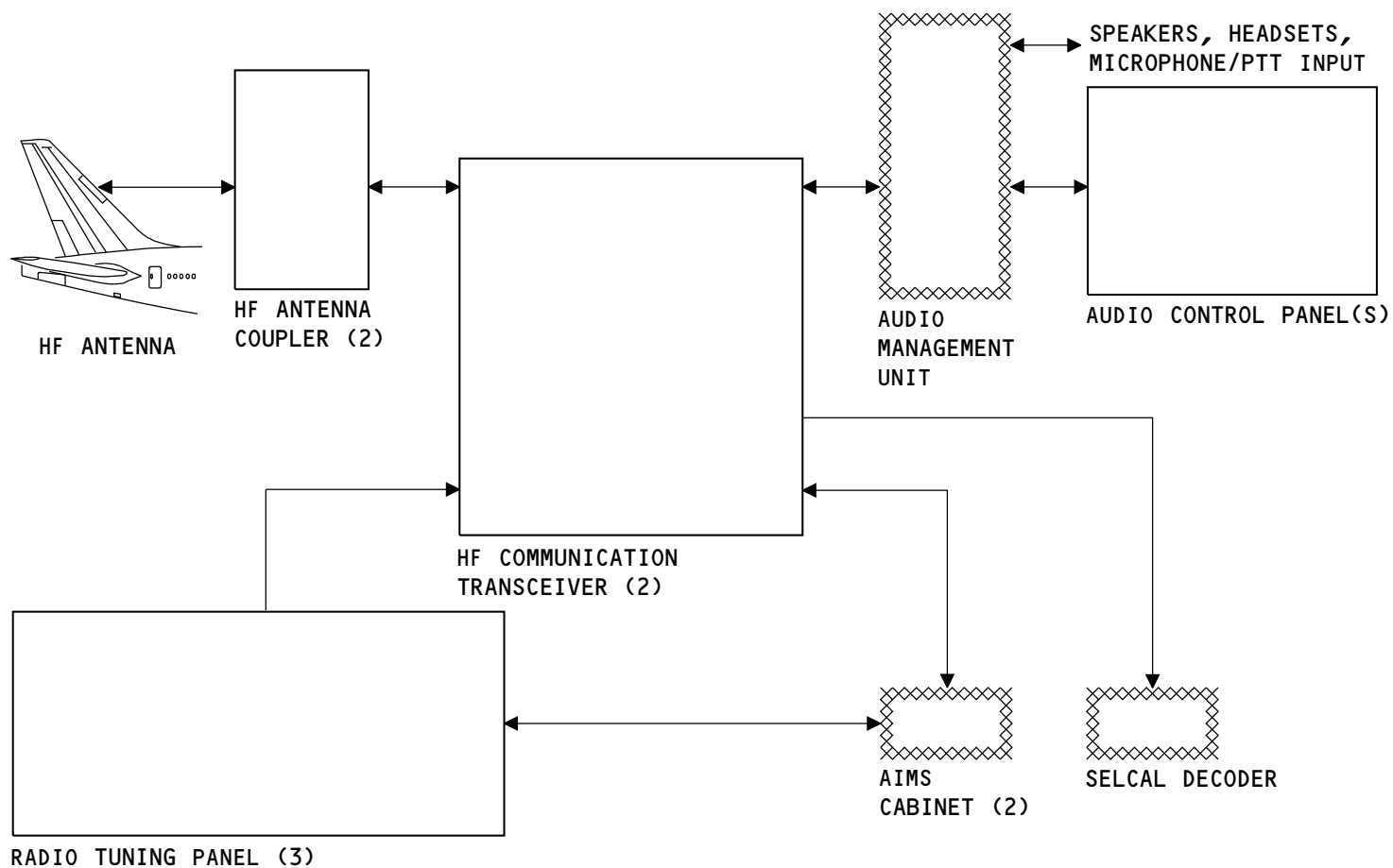
- Three radio tuning panels (RTPs). The RTPs send tuning data and mode information to the HF transceivers
- The audio management unit (AMU). Microphone audio and push-to-talk (PTT) discretes go to the transceiver through the AMU. Received audio goes from the transceiver to the speakers and headsets through the AMU
- The SELCAL decoder. The SELCAL decoder alerts the flight crew when the airplane receives a call.

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HF SYSTEM - GENERAL DESCRIPTION

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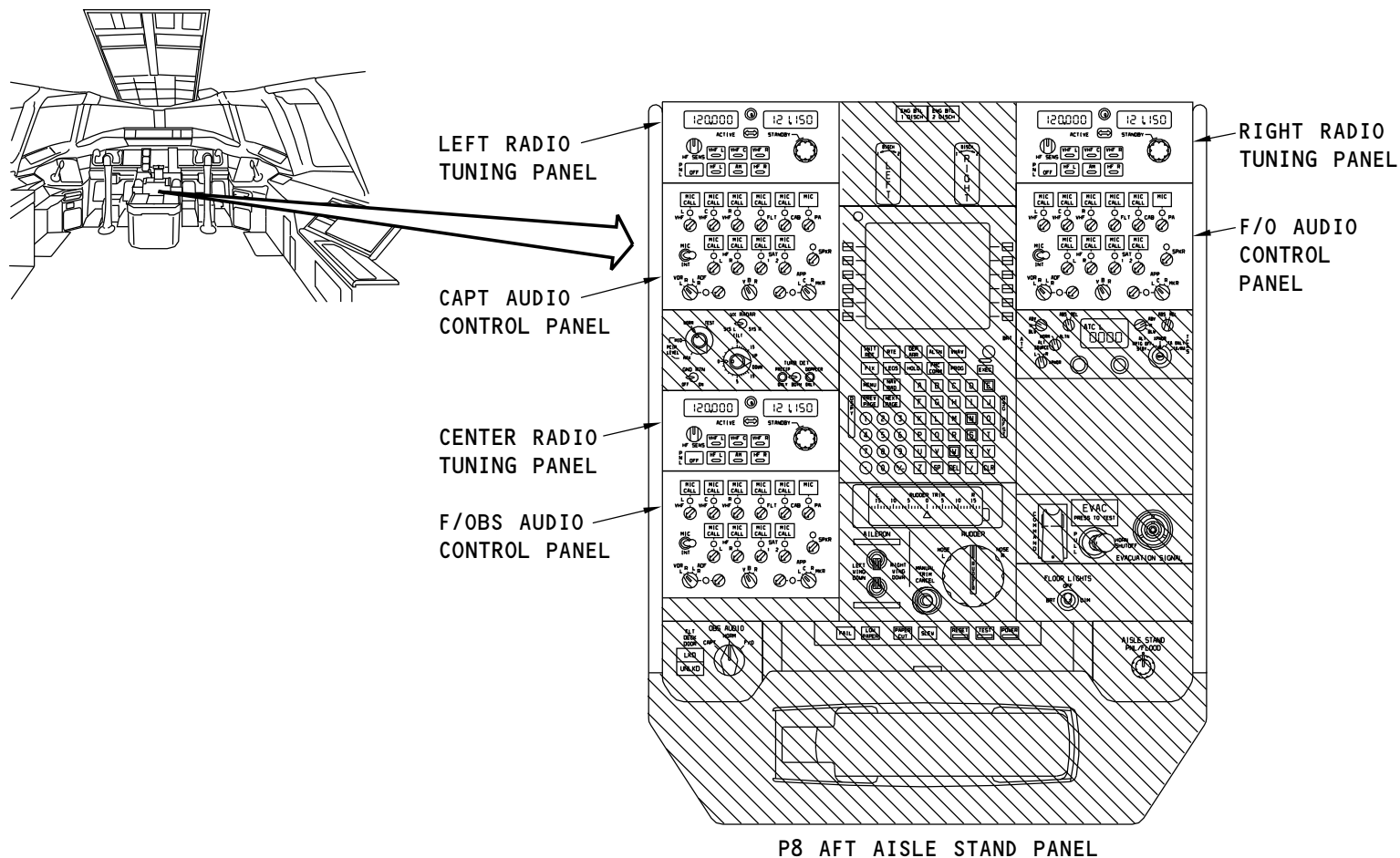
HF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS

HF Interface Component Locations

These are the components in the flight deck that have an interface with the HF communication system:

- Radio tuning panels (RTPs)
- Audio control panels (ACPs).

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HF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS

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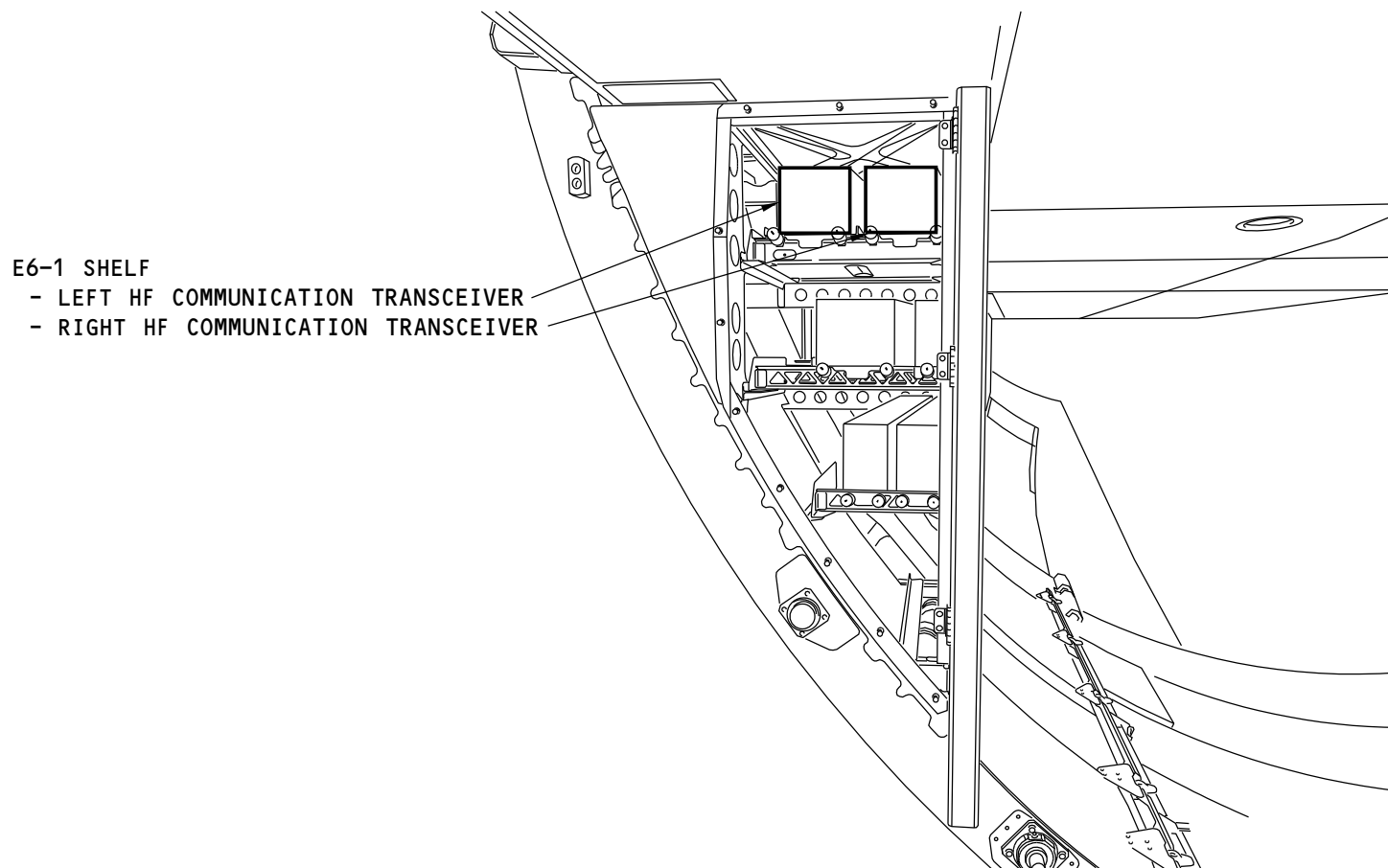
HF SYSTEM - E6 RACK COMPONENT LOCATIONS

HF System Component Locations

The HF communication transceivers are in the E6 rack.

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- E6-1 SHELF**
- LEFT HF COMMUNICATION TRANSCEIVER
 - RIGHT HF COMMUNICATION TRANSCEIVER

**AFT CARGO COMPARTMENT
(LOOKING AFT)**

HF SYSTEM - E6 RACK COMPONENT LOCATIONS

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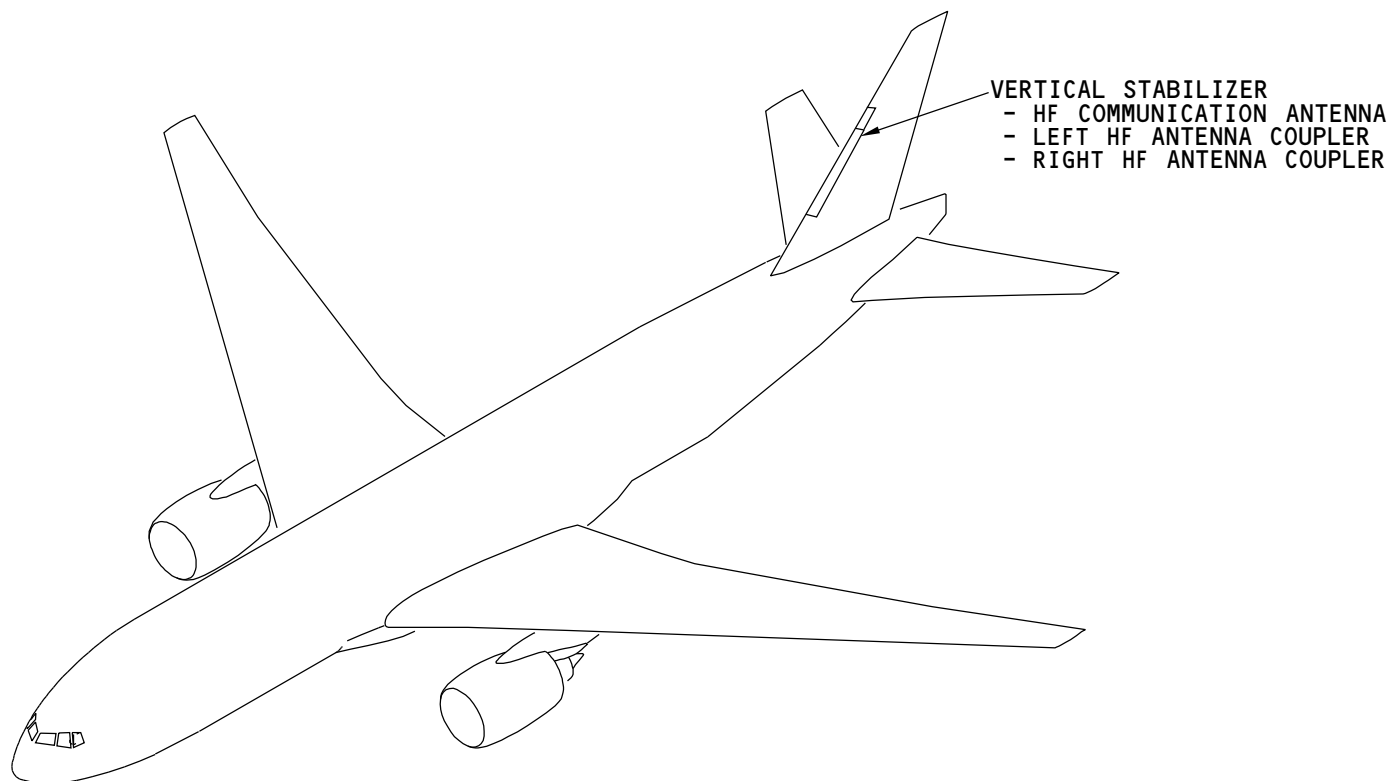
HF SYSTEM - VERTICAL STABILIZER COMPONENT LOCATION

HF System Component Locations

These are the three HF system components in the vertical stabilizer:

- HF communication antenna
- Two HF antenna couplers.

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HF SYSTEM - VERTICAL STABILIZER COMPONENT LOCATION

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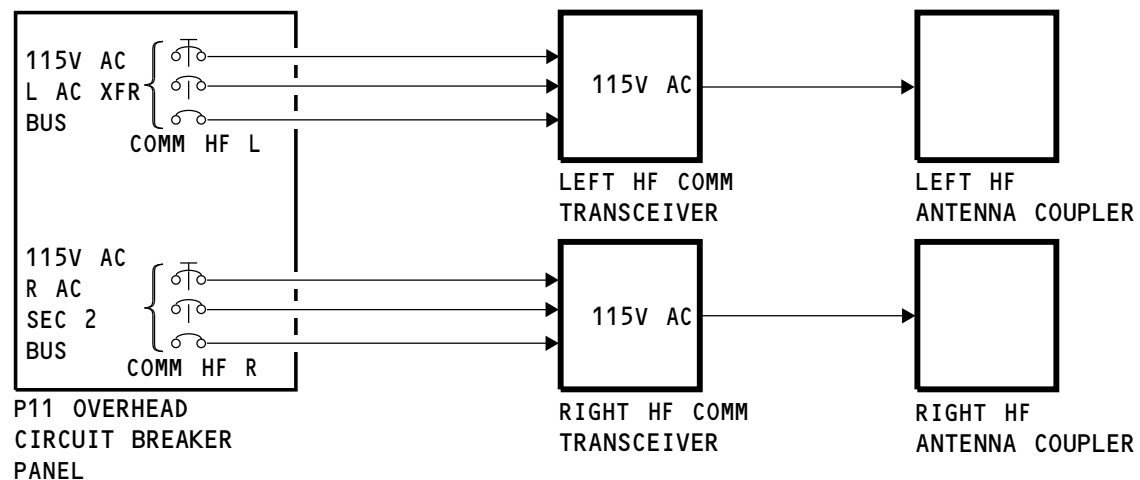
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**HF SYSTEM - POWER INTERFACE****General**

The left transfer bus sends 115v ac three-phase power to the left HF communication transceiver.

The left HF communication transceiver supplies 115v ac single phase to the left HF antenna coupler for operational power.

The right HF communication system is the same as the left, except that it uses power from the right ac sec 2 bus.



HF SYSTEM - POWER INTERFACE

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HF SYSTEM - TUNING INTERFACE

General

The HF communication system uses data buses to share tuning information between these:

- Radio tuning panels (RTPs)
- HF communication transceivers
- Airplane information management system (AIMS) cabinets.

Tuning Buses

The RTPs send tuning data to the HF communication transceivers. Any RTP can tune any transceiver.

Each RTP has these two ARINC 429 output buses:

- Tuning bus
- Crosstalk bus.

Both the left and right RTPs send tuning data to both HF communication transceivers and to the left and right AIMS cabinets.

The center RTP sends its tuning bus output to the left and right RTPs in case of failure.

Port Select Discrete

Each HF communication transceiver has two tuning data input ports, port A and port B. The transceiver uses the port select discrete to select its input port. A grounded port select discrete causes the transceiver to use port A. An open port select discrete causes the transceiver to use port B.

The port select discrete for the left HF communication transceiver comes from the left RTP. The port select discrete for the right HF transceiver comes from the right RTP.

Crosstalk Buses

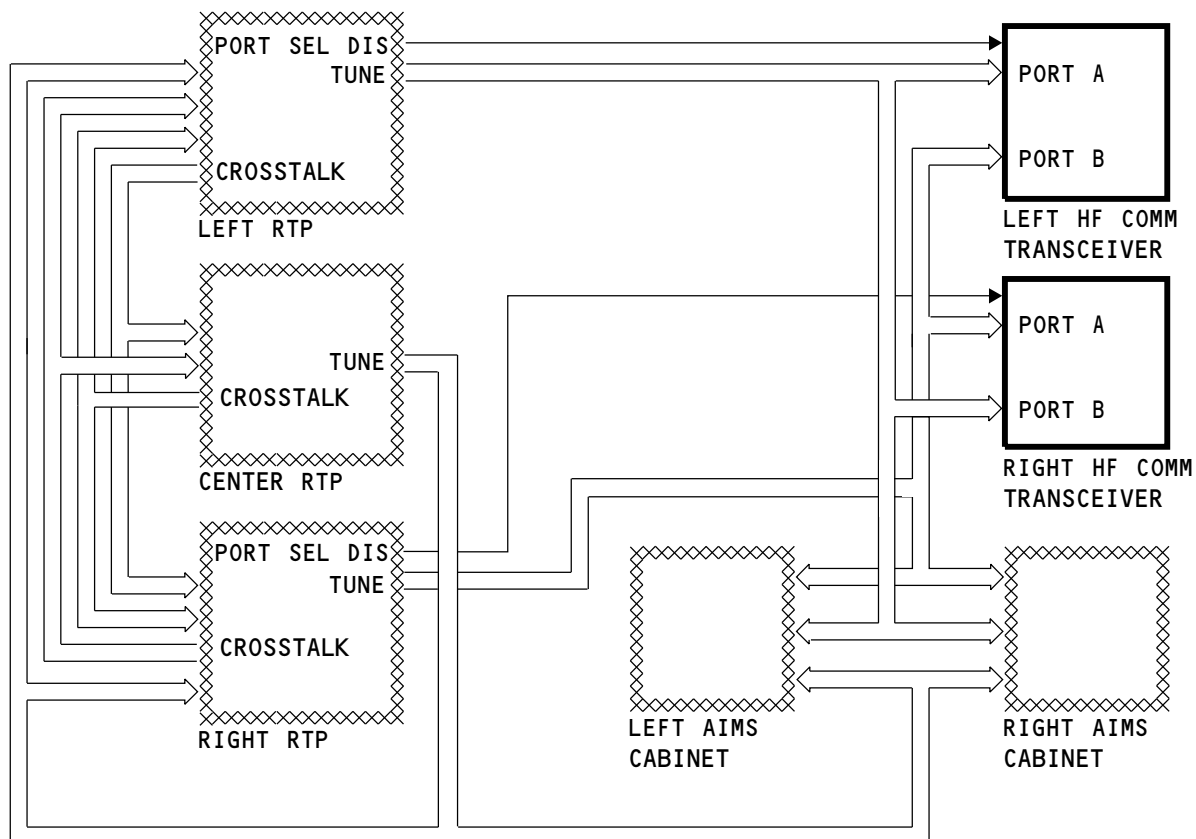
Each RTP sends tuning data to the other RTPs on crosstalk buses. Synchronized tuning data allows any RTP to tune any transceiver.

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HF SYSTEM - TUNING INTERFACE

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HF SYSTEM - RECEIVE/TRANSMIT INTERFACES

General

You use an audio control panel (ACP) to select an HF communication transceiver for voice communication. You use a radio tuning panel (RTP) to select a frequency or adjust HF sensitivity of the transceiver. A push-to-talk (PTT) signal from any mic switch activates the selected transceiver.

The transceiver connects to the antenna coupler with a coaxial serial interface (CSI). The CSI is a full duplex interface for frequencies and control signals.

Signal Flow - Transmit

You select a transmit switch on any ACP and push a mic switch to transmit. The audio management unit (AMU) sends the mic audio and the PTT signal to the selected HF transceiver. The transceiver changes the mic audio to an RF signal. The transceiver connects to the antenna coupler with a Coaxial Serial Interface (CSI). The CSI sends the RF signal and control data to the antenna coupler. Only one antenna coupler can transmit at a time. The antenna coupler sends the RF signal to the HF antenna. The HF antenna transmits the signal.

Signal Flow - Receive

The HF antenna receives RF signals and sends them to both HF antenna couplers. The antenna couplers send the RF signals to the HF communication transceivers. The transceivers change the RF signals to audio signals. The transceivers send the audio signals to the audio management unit (AMU).

The flight crew selects a receiver control switch on their ACP. The AMU sends the received audio to the flight crew stations.

The transceivers send received audio to the SELCAL decoder. The SELCAL decoder monitors the audio for an incoming call. It alerts the flight crew when the airplane receives a call.



DO NOT TRANSMIT WITH THE HF COMMUNICATION SYSTEM WHILE THE AIRPLANE IS REFUELED OR DEFUELED. AN EXPLOSION CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO THE AIRPLANE.



MAKE SURE PERSONNEL STAY A MINIMUM OF 6 FEET AWAY FROM THE VERTICAL STABILIZER WHEN THE HF SYSTEM TRANSMITS. RF ENERGY FROM THE HF COMMUNICATION ANTENNA CAN CAUSE INJURIES TO PERSONNEL.

The antenna coupler tunes itself to match the output impedance of the transceiver to the impedance of the transmission line at the selected frequency.

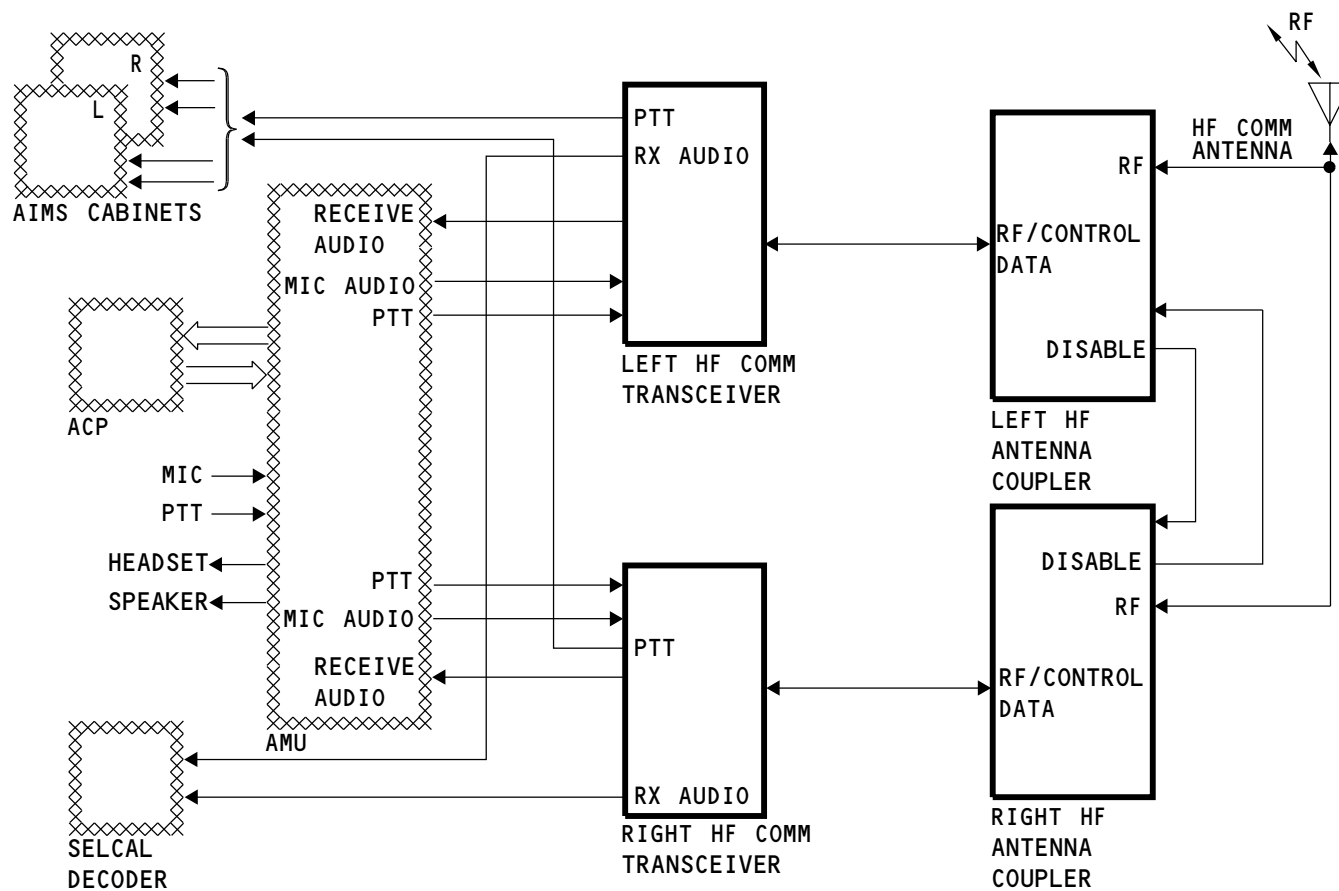
The PTT signal goes to the airplane information management system (AIMS) digital flight data acquisition function (DFDAF).

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HF SYSTEM - RECEIVE/TRANSMIT INTERFACES

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HF SYSTEM - AIMS FAULT REPORTING AND TESTING INTERFACES

General

The HF system sends fault information to the AIMS cabinets from three sources:

- HF communication transceivers
- HF antenna couplers
- Radio tuning panels (RTPs).

Transceiver and Antenna Coupler Interfaces

The HF communication transceivers send real time fault and status information to the AIMS cabinets. The fault information includes faults generated by the antenna couplers and the transceivers.

The air/ground relays send air/ground signals to the transceivers. The transceivers use these signals to keep flight leg faults in memory.

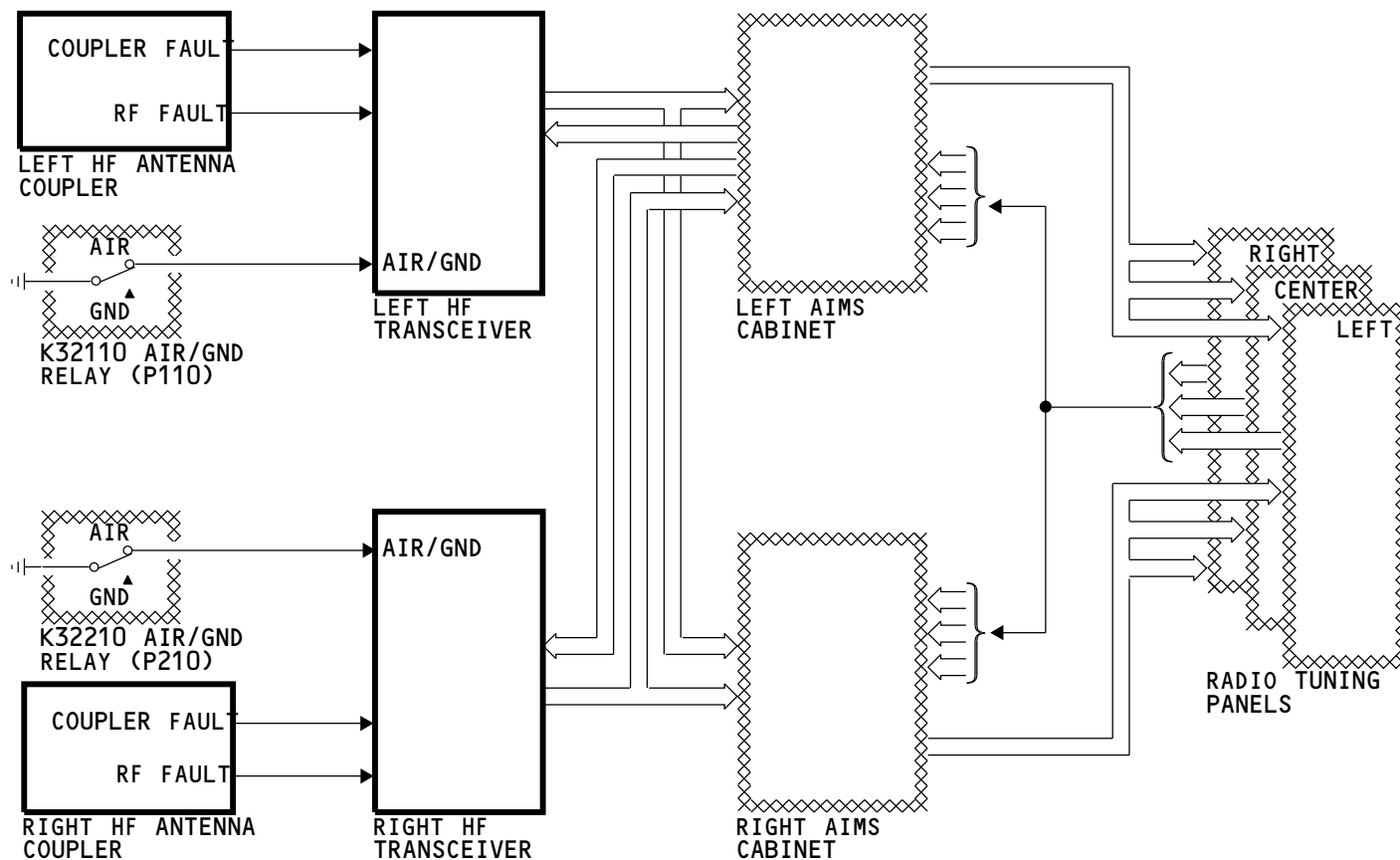
The left AIMS central maintenance computing function (CMCF) tests the HF transceivers during ground tests. The CMCF sends test requests to the HF transceivers. The HF transceivers give the test results to the CMCF. The right AIMS cabinet gives test information, if the left AIMS cabinet fails.

Radio Tuning Panel (RTP) Interfaces

Each RTP sends HF system fault/status information to both AIMS cabinets.

AIMS sends HF system fault/status to the RTPs.

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HF SYSTEM - AIMS FAULT REPORTING AND TESTING INTERFACES

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**HF SYSTEM - HF COMMUNICATION TRANSCEIVER****Purpose**

The HF communication transceiver changes RF signals to audio signals during receive operation, and changes audio signals to RF signals during transmit operation. The transceiver amplifies RF transmit signals.

Physical Description

The HF transceiver has these features:

- One KHz channel spacing
- A frequency range of 2.000 MHz to 29.999 MHz
- Maximum RF output power of 400 watts peak envelope power (USB), 125 watts (AM).

Operation - Controls and Indications

These are the three LED indicators and one push-button on the transceiver front panel:

- LRU FAIL indicator - comes on for a transceiver fault
- COUPLER FAIL indicator - comes on for an antenna coupler fault
- EXTERNAL INPUT FAIL indicator - comes on for an RTP tuning fault
- TEST switch - Initiates the transceiver self test.

The LED indicators come on to show failures.

Functional Description

The HF communication transceiver operates as a receiver/transmitter in the amplitude modulation (AM) or upper side band (USB) modes. The transceiver detects the voice audio from the carrier frequency during reception, and modulates the voice audio during transmission.

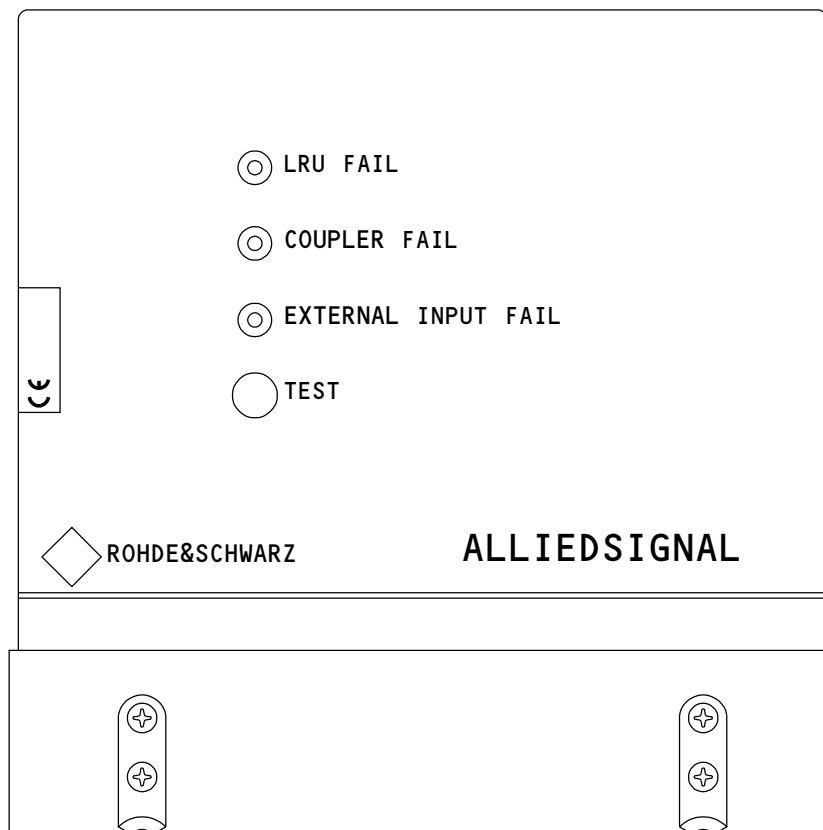
An internal blower cools the transmitter.

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HF SYSTEM - HF COMMUNICATION TRANSCEIVER

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**HF SYSTEM - HF ANTENNA COUPLER****Purpose**

The HF antenna coupler matches the impedance of the antenna and feedline with the output impedance of the transceiver at the selected frequency. This results in a voltage standing wave ratio (VSWR) of less than 1.3:1.

General Description

There are two connectors on the coupler:

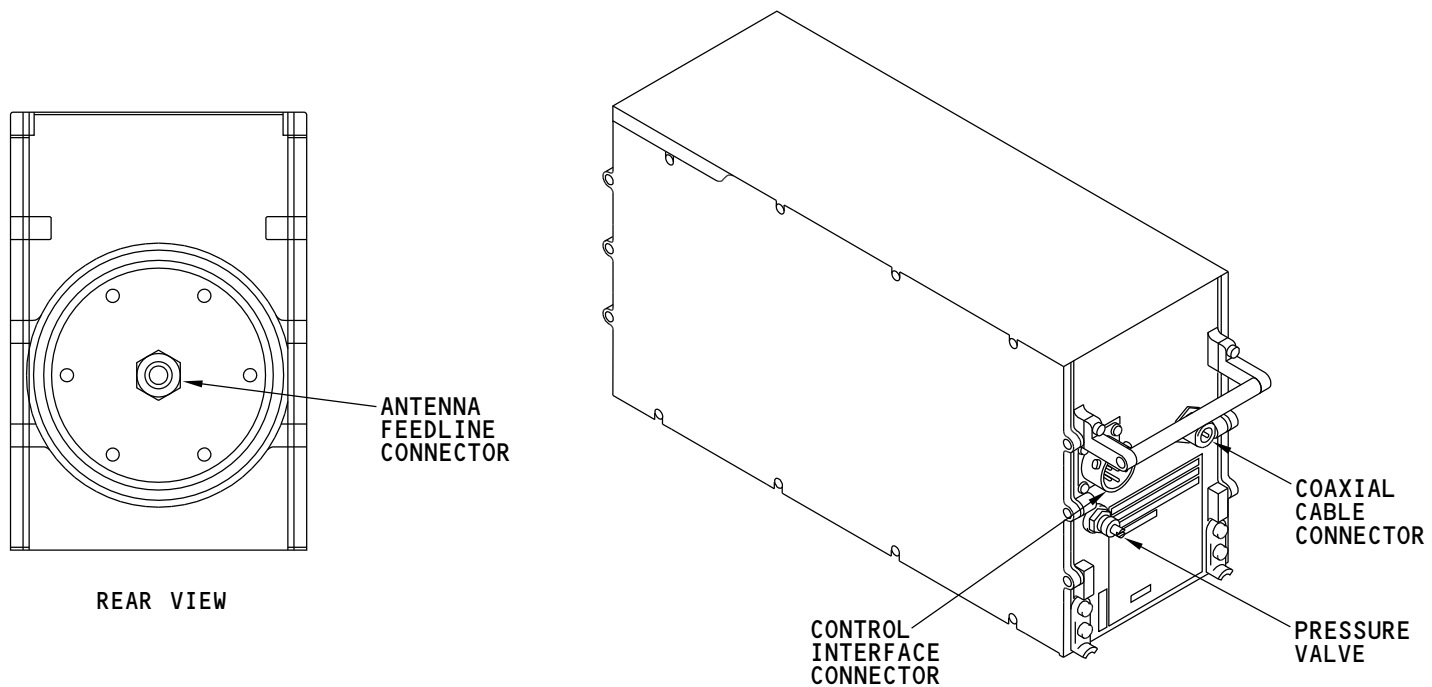
- Control interface
- Coaxial cable.

Dry air or nitrogen pressurizes the antenna coupler at five to seven PSIGA. Pressurization is through the pressure valve on the front of the coupler.

Functional Description

The coupler has tuning elements and control circuits. The coupler constantly monitors the RF transmissions to automatically adjust the tuning elements. Typical tuning time is two to seven seconds.

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HF SYSTEM - HF ANTENNA COUPLER

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HF SYSTEM - HF ANTENNA COUPLER ACCESS AND INSTALLATION

Installation

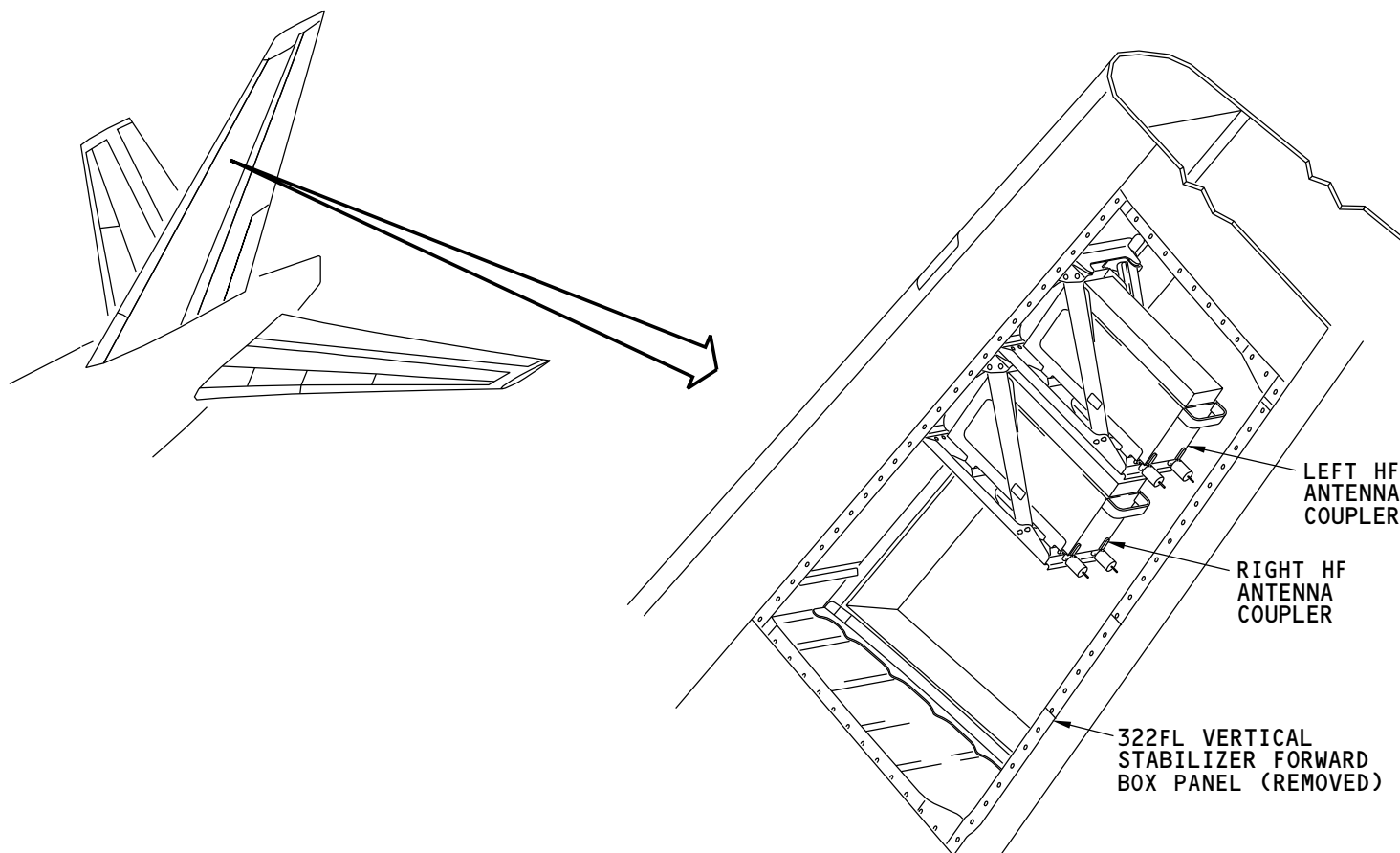
The two HF antenna couplers are in the vertical stabilizer at the top of the HF communication antenna. Each coupler is on a shelf. A coaxial cable and control interface cable connect to the coupler front panel.



YOU MUST PREPARE EACH HF ANTENNA COUPLER FOR THE REMOVAL, YOU CAN EASILY CAUSE DAMAGE TO INTERNAL PARTS OF THE HF ANTENNA COUPLER.

Access

A panel on the left side of the vertical stabilizer allows access to the antenna couplers.



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HF SYSTEM - HF ANTENNA COUPLER ACCESS AND INSTALLATION

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**HF SYSTEM - HF COMMUNICATION ANTENNA****Purpose**

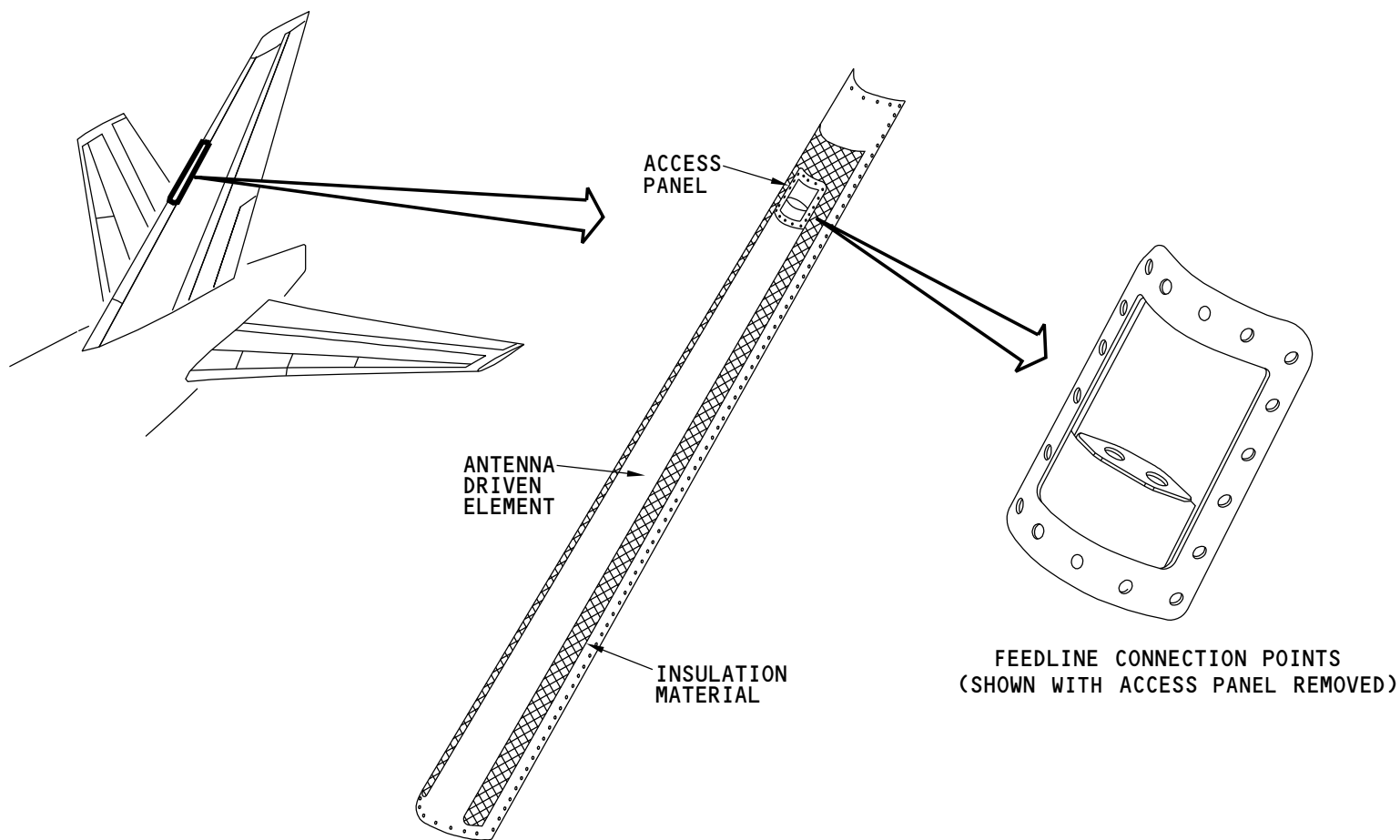
The HF communication antenna transmits and receives RF signals in the HF frequency range.

General Description

The antenna is a flush-mounted, slot-type antenna, approximately nine feet long. An inverted U-shaped insulation material on the leading edge of the vertical stabilizer surrounds the antenna driven element. The antenna insulation is composite material.

Location and Access

The HF antenna is a part of the leading edge of the vertical stabilizer. An access panel at the top of the antenna covers the connections to the antenna couplers.



HF SYSTEM - HF COMMUNICATION ANTENNA

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HF SYSTEM - RADIO TUNING PANEL

Purpose

Use the radio tuning panel (RTP) to select the modes of operation, and to select the active and standby frequencies for each communication radio. Each RTP sends tuning and mode information to these components:

- The communication radios
- The other two RTPs
- The airplane information management system (AIMS) cabinets.

Description

Each RTP has these features:

- Active and standby frequency windows
- A frequency transfer switch
- An offside tuning light
- Frequency selectors
- Radio tuning switches
- An AM switch
- A radio tuning panel off switch
- An HF sensitivity control.

Momentary switches have a light in them that comes on when the function is selected.

Controls and Indications

Push the radio tuning panel off switch to turn the RTP on. When the panel is on, the radio tuning panel off light goes off. When the RTP is off, the radio tuning panel off light comes on.

The active frequency window shows the frequency of the selected radio. The standby frequency window shows the frequency selected by the flight crew with the frequency selectors. The standby frequency window also shows auto-tune frequency information supplied by the AIMS cabinets during a data uplink.

You set the standby frequency with the frequency selectors. The outer knob adjusts the first three digits (10 MHz, 1 MHz and 100 KHz) in 100 KHz steps. The inner knob adjusts the fourth and fifth digits (10 KHz and 1 KHz) in 1 KHz steps.

The frequency transfer switch causes the active frequency to go to the standby frequency window, and the standby frequency to go to the active frequency window.

You use the radio tuning switches to select a radio. You select only one radio at a time. When a radio is selected, the light in the selected radio tuning switch comes on.

When you select an offside radio, two offside tuning lights come on. One light is on the RTP that the flight crew uses to make the selection. The other light is on the onside RTP of the selected radio.

The HF sensitivity control sets the RF sensitivity level of the onside HF transceiver. The left RTP sets the left HF sensitivity. The right RTP sets the right HF sensitivity. The center RTP HF sensitivity control does not connect to any transceiver.

Use the AM switch to operate the selected transceiver in the amplitude modulation (AM) mode. In the AM mode, the light in the AM switch comes on. If the AM switch is not selected, the HF communication transceiver operates in the upper side band (USB) mode.

When either HF transceiver is selected, the AM mode light indicates the last commanded mode of the selected transceiver. The mode of an HF transceiver will remain unchanged until the HF transceiver is selected by any RTP and commanded to change mode.

If the same HF transceiver is selected on more than one RTP, every RTP selecting that transceiver will show the same mode.

If either the left or right RTP is switched from HF to VHF, the AM light on that RTP will show the last commanded mode of the on-side transceiver.

When the center RTP is switched to VHF, the AM mode light will be off.

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HF SYSTEM - RADIO TUNING PANEL

After an HF transceiver is commanded to the AM mode, the AM mode light remains ON to serve as a reminder that if the HF transceiver is selected on any audio control panel, the HF transmission will still be in AM mode. Deselecting an HF transceiver at an RTP will not change the HF mode. The HF transceiver remains in the last commanded mode even when the RTP is subsequently used to tune VHF transceivers. The AM mode light also remains on because the HF AM switching function is inhibited when the RTP is selected to a VHF radio.

Push the radio tuning panel off switch to stop the operation of the RTP. When the RTP is off, the radio tuning panel off light comes on and all functions stop except these three:

- The frequency windows continue to show any current fault
- The RTP continues to receive 28v dc
- The RTP continues to send BITE information to the AIMS central maintenance computer function (CMCF).

BITE

The RTP tests itself continuously. The RTP shows PANEL FAIL in the two frequency windows if the RTP has an internal failure or if there is a system failure.

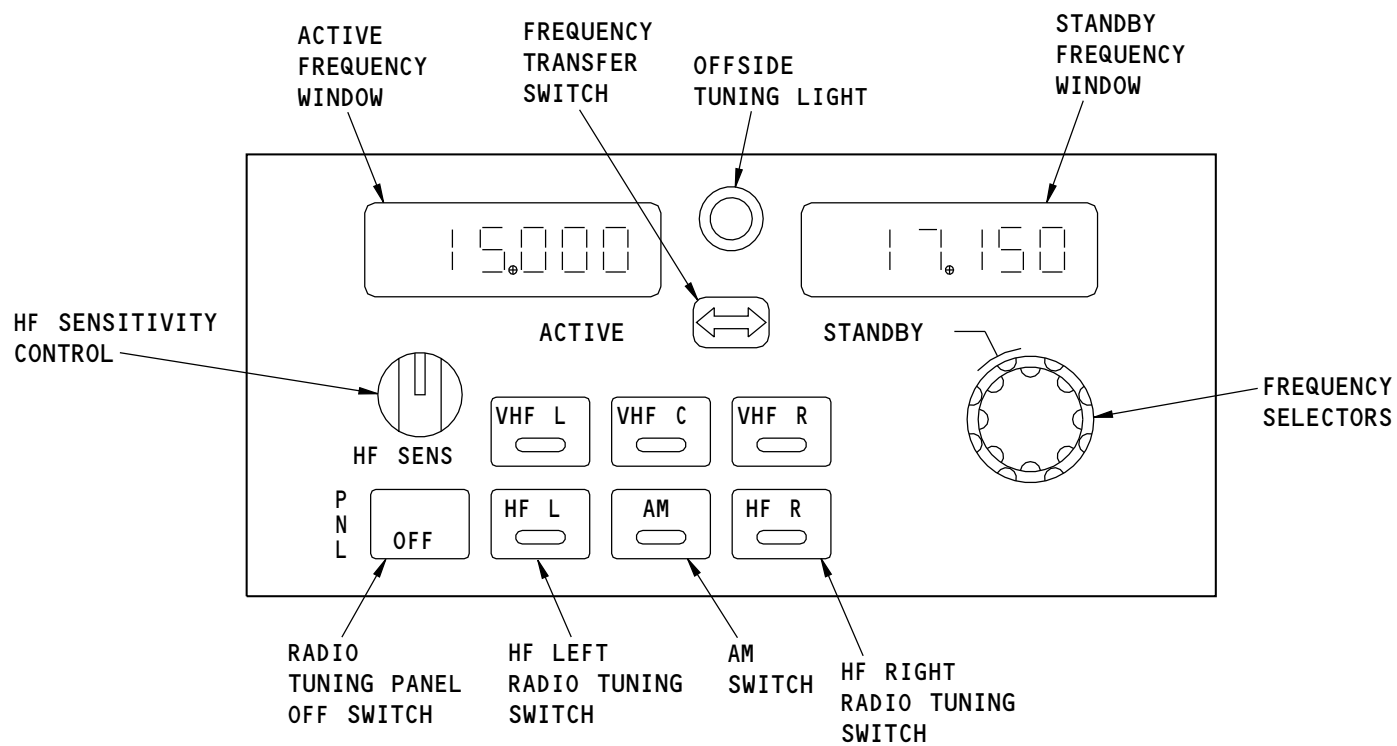
The two frequency display windows show all dashes if the flight crew selects a failed radio.

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HF SYSTEM - RADIO TUNING PANEL

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**HF SYSTEM - AUDIO CONTROL PANEL****General**

The audio control panel (ACP) supplies transmitter selection, receiver selection and volume control for the left and right HF transceivers.

The operator transmits on only one HF system at a time. The ACP permits the operator to listen to one or both HF systems at the same time.

Control and Indications

Push an HF receiver volume control to listen to an HF receiver. Rotate the receiver volume control for volume control. The receive light above the control shows green when a receiver volume control is on. Push both HF receiver volume controls to listen to both HF radios at the same time.

Push an HF transmitter select switch to select an HF transceiver for transmission. The mic light shows green to show the selected system. Push the mic/interphone switch to connect the microphone to the transceiver and to key the transceiver.

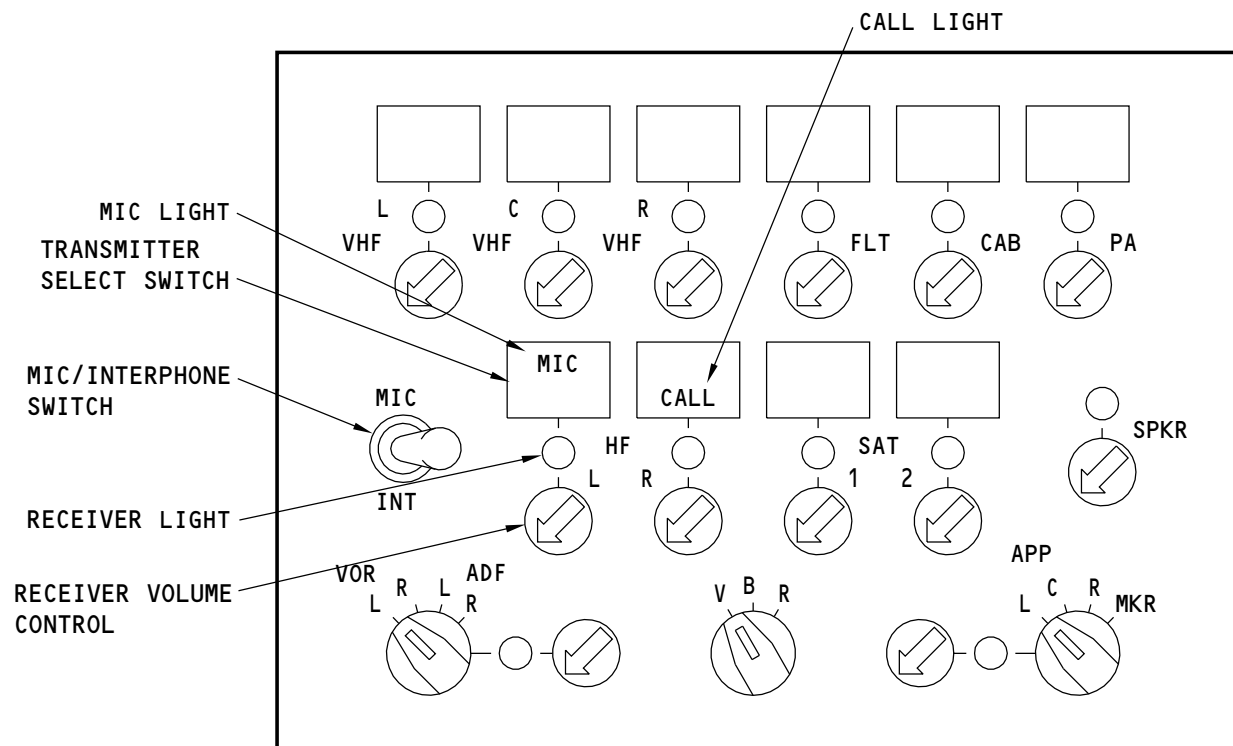
The call light comes on when the SELCAL system detects a call for the system.

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HF SYSTEM - AUDIO CONTROL PANEL

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**HF SYSTEM - NORMAL TUNING****General**

The HF communication system uses three radio tuning panels (RTPs). The RTPs share tuning data on crosstalk buses. This allows any RTP to tune any transceiver.

Normal Tuning

Under normal conditions, all three RTPs are on.

When the left RTP is on, it sends a grounded port select discrete to the left HF transceiver. The left transceiver uses port A as its input port when its port select discrete is a ground. Port A of the left transceiver connects to the left RTP. The left RTP supplies tuning data to the left HF transceiver.

The interface between the right HF transceiver and the right RTP is the same as the left.

Failure Modes

The RTPs do continuous BITE. If the BITE finds a failure, an internal RTP relay de-energizes. This causes the port select discrete to open and a tuning input bus connects through the relay to the output.

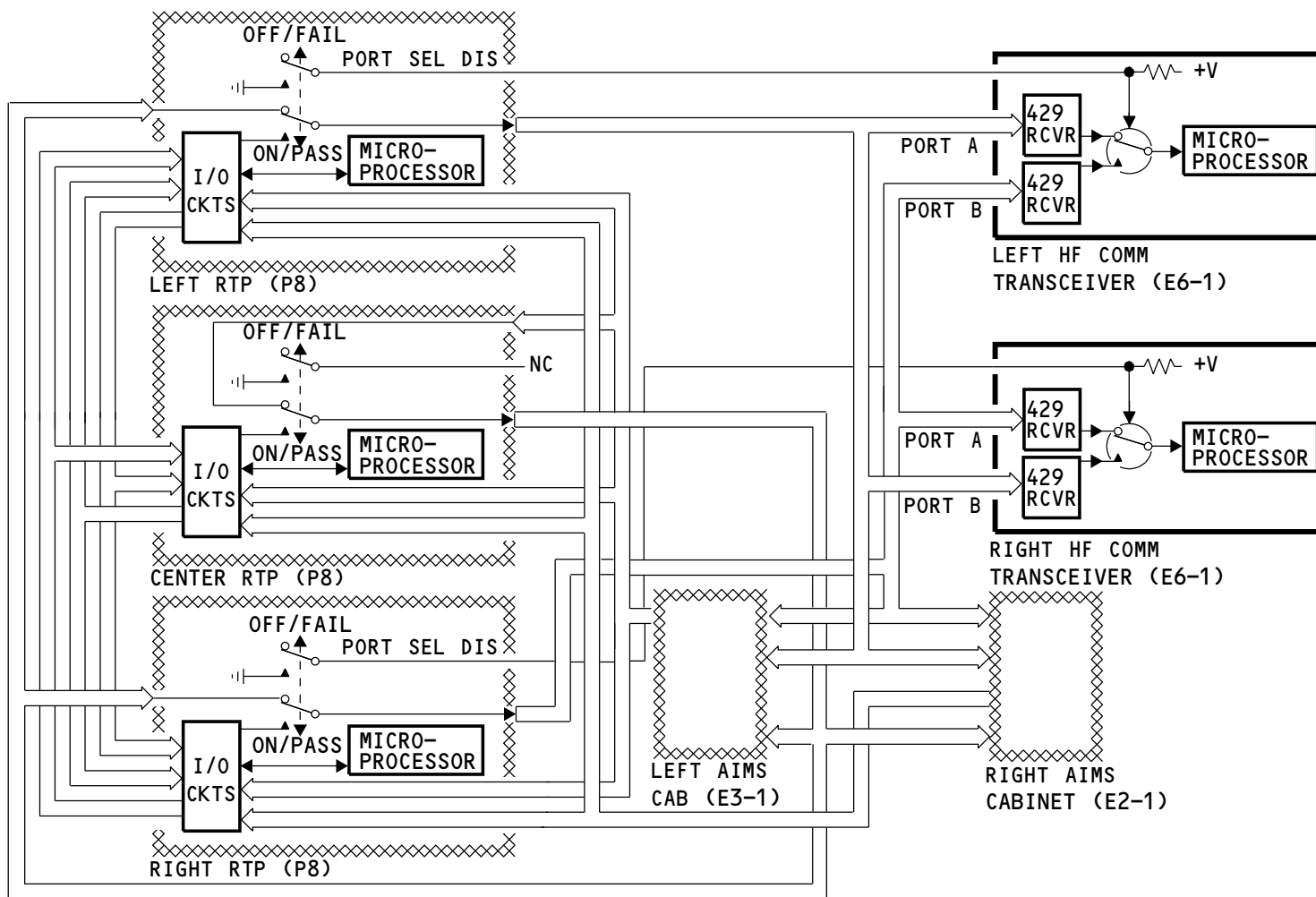
The AIMS cabinets send HF system fault/status to the RTPs.

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HF SYSTEM - NORMAL TUNING

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**HF SYSTEM - HOME/RECEIVE FUNCTIONAL DESCRIPTION****General**

The left and right HF systems are similar. This example shows the left system.

Receive/Standby Mode

During the receive/standby mode, relay K1 in the transceiver and K4 and K5 in the coupler de-energize. A received RF signal goes to an isolation amplifier and a discriminator in the coupler. The RF output from the coupler goes to the receiver section of the transceiver.

The receiver section has these functions:

- Amplifies the RF signal
- Mixes, filters, and processes the RF signal to make an intermediate frequency (IF) output.

The RTP controls RF sensitivity.

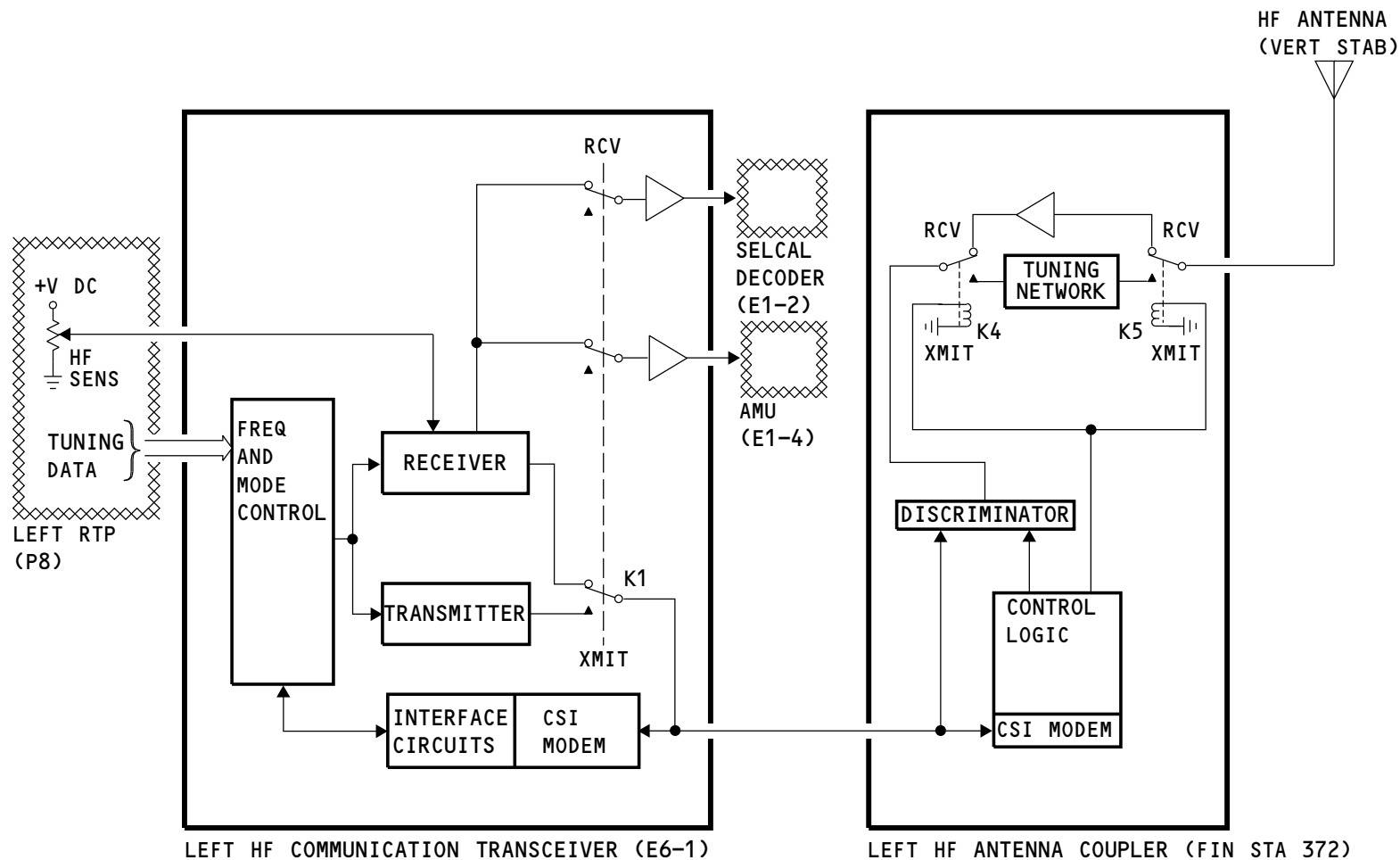
The receiver section sends received audio to the SELCAL decoder and to the AMU.

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HF SYSTEM - HOME/RECEIVE FUNCTIONAL DESCRIPTION

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HF SYSTEM - TUNE FUNCTIONAL DESCRIPTION

General

The tune sequence begins after you select a new frequency and key the mic.

The left and right HF systems are the same. This example shows the left system.

Tune Mode Initiation

You select the HF communication frequency on a radio tuning panel (RTP) and key the mic. The frequency information goes to the control circuits in the transceiver and new transmit frequency data goes to the coupler on a coaxial serial interface (CSI). The PTT signal from the mic starts the tune mode and a TUNE COMMAND goes to the coupler on the CSI.

The coupler control logic circuits energize relays K4 and K5.

The coupler control logic also sends a disable discrete to the right HF coupler.

The control logic circuits can start tuning only during these conditions:

- Ground on the PTT line
- No disable from the right coupler
- Control logic circuits receive a COUPLER KEY message from the transmitter on the coaxial serial line
- No coupler faults.

Tune Mode Operation

The coupler control logic sends a TUNE-IN-PROGRESS discrete to the tuning circuits when the coupler is in tune mode.

The control circuits in the transceiver energize relay K1 and tell the RF circuits to send a carrier in these conditions:

- There is a REQUEST TUNE RF message from the coupler
- There is a PTT signal
- There is no transceiver or coupler fault.

In the tune mode, the RF carrier contains no audio. Output power in the tune mode is 70 watts.

Because relay K1 energizes in the tune mode, the RF carrier goes to the coupler. The RF carrier goes through the discriminator, relay K4, the tuning elements and relay K5 to the antenna.

During tuning, the discriminator samples the RF carrier and sends analog signals to the coupler control logic circuits. The control logic circuits use the signals from the discriminator to generate controls for the tuning circuits. The tune mode continues until the impedance of the transceiver and the antenna are balanced for the selected frequency. When the impedance balances, an END OF TUNING message goes to the transmitter and RF tune power is turned off. The coupler returns to the receive mode.

If the tune mode does not end within 15 seconds, the coupler control logic sends a coupler fault to the transceiver.

Operate Mode (Receive)

When the tune mode ends, the HF system begins the operate (receive) mode. Relays in the transceiver and the antenna coupler return to the receive mode. Now the HF system is ready to transmit when it receives a PTT signal.

Key Event Output

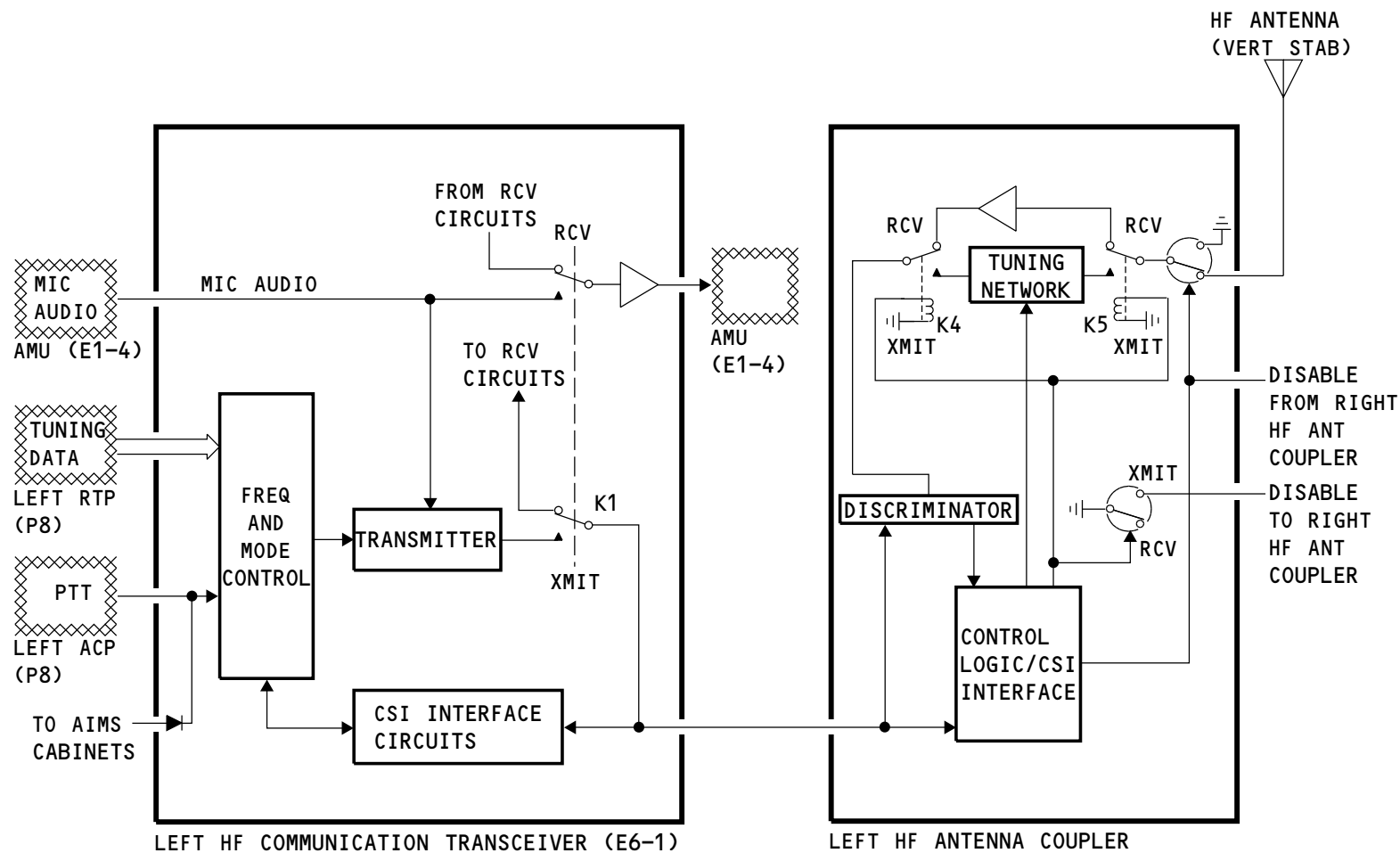
The PTT discrete goes to the AIMS cabinets for the digital flight data acquisition function (DFDAF).

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HF SYSTEM - TUNE FUNCTIONAL DESCRIPTION

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**HF SYSTEM - TRANSMIT FUNCTIONAL DESCRIPTION****General**

The transmit sequence can start after the tune sequence is complete. A PTT discrete starts a series of events in the transceiver and antenna coupler.

The left and right HF systems are the same. This example shows the left system.

Transmit Mode

In the receive/operate mode, the PTT discrete to the frequency mode control circuits start the transmit mode. The coaxial serial interface (CSI) circuits tell the coupler control logic circuits to energize relays K4 and K5. This connects the tuning elements in-line between the discriminator and the antenna.

The coupler control logic circuits connect a ground to disable the right HF coupler.

The coupler control logic circuits do this only during these conditions:

- No disable from the right coupler
- No coupler faults.

The control circuits in the transceiver energize relay K1 and tell the RF circuits to send a carrier in these conditions:

- There is no transceiver fault
- There is a ground on the PTT line.

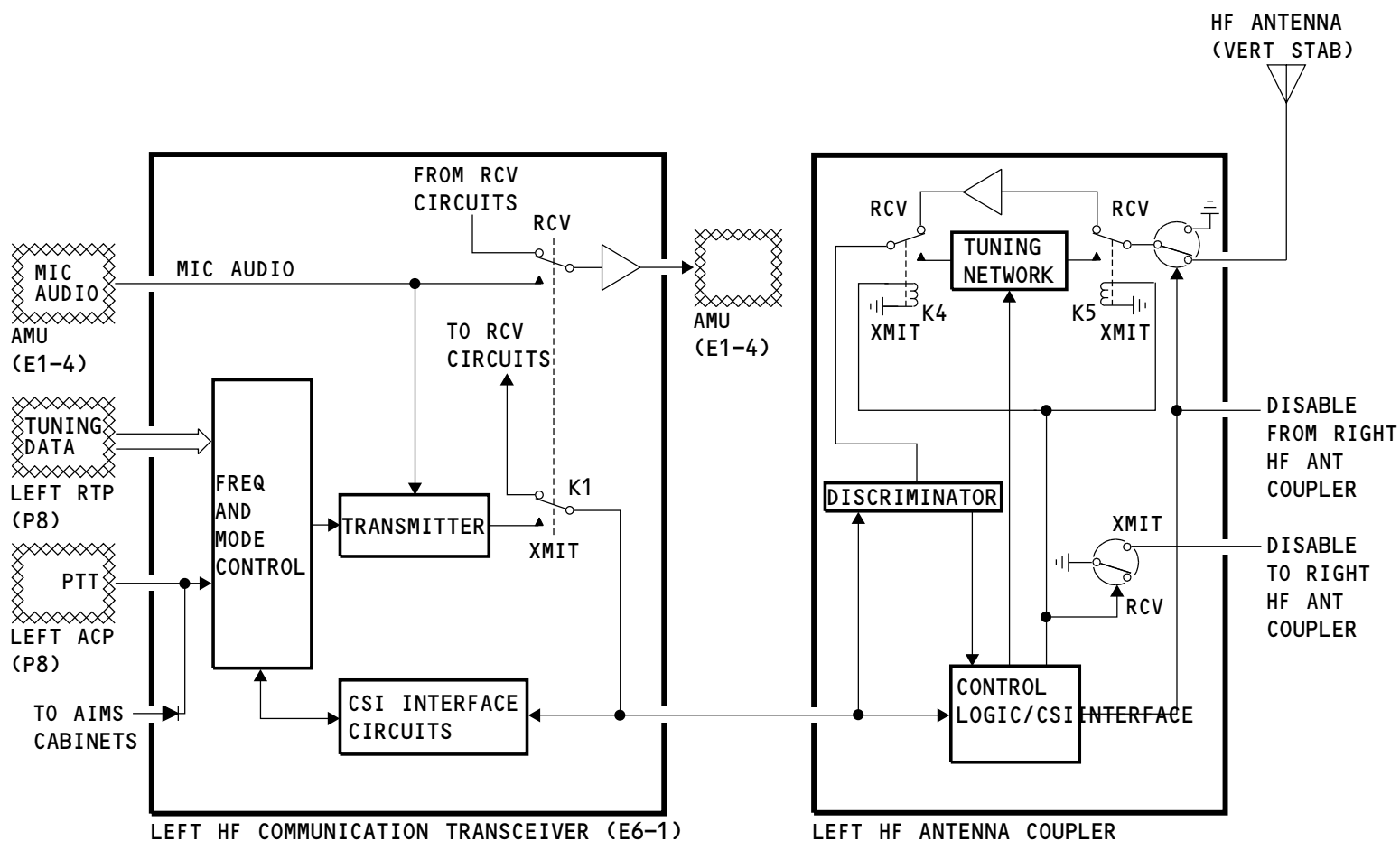
The RF circuits mix the carrier with mic audio. The RF signal is amplified and goes through the energized contacts of relay K1 to the discriminator in the antenna coupler. The RF signal then goes through relays K4 and K5 and the tuning elements to the antenna. The antenna transmits the RF signal.

Sidetone

Microphone audio goes to an audio amplifier. The amplified audio goes to the audio management unit for sidetone.

Key Event Output

The PTT discrete goes to the AIMS cabinet for the digital flight data acquisition function (DFDAF).



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HF SYSTEM - TRANSMIT FUNCTIONAL DESCRIPTION

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HF SYSTEM - FAILURE INFORMATION

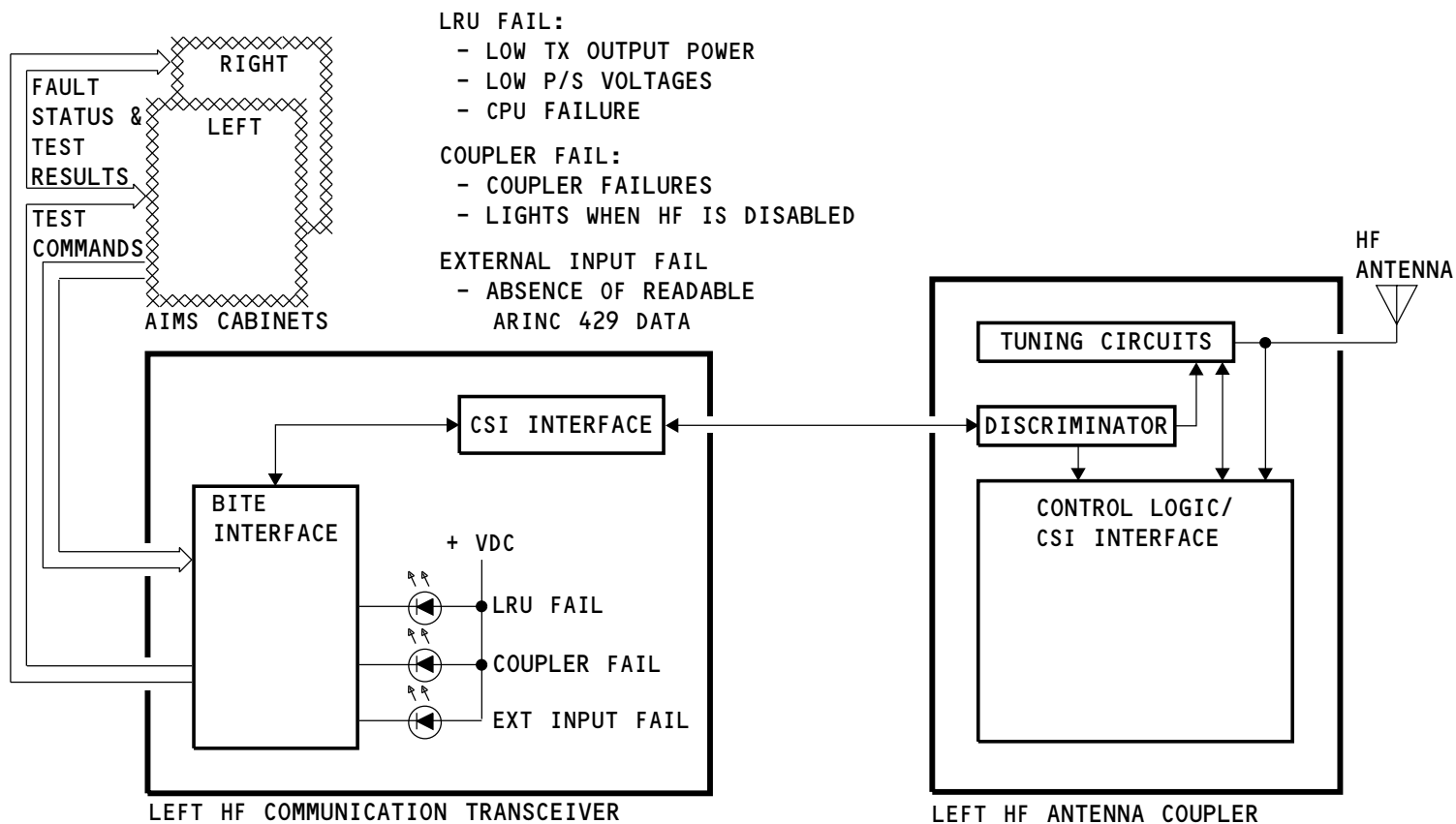
Real-Time Failures

The HF communication system sends real-time failure information to the AIMS central maintenance computing function (CMCF). AIMS receives four types of failure information from HF communication system sources:

- Transceiver failures - power supply outputs, frequency synthesizer operation, and output power level
- Antenna coupler failures - home/tune sequence faults, and coupler arcing
- RTP input failures - ARINC 429 frequency/mode data input
- Transmission line failures - circuitry which connects transceiver, coupler and antenna to the RF signal.

Ground Test Failures

The AIMS CMCF sends ground test commands to the HF communication transceiver. The transceiver sends the AIMS CMCF failure information for the transceiver and the active RTP input.



HF SYSTEM - FAILURE INFORMATION

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**HF SYSTEM - TESTING****General**

These are the tests for the HF communication system:

- Left HF communication system test
- Right HF communication system test.

HF Communication System Test

Select the system (left or right) for test.

This test makes sure that the HF communication system operates correctly. The approximate time to run the test is less than one minute. There are no airplane effects. There are no limitations or special requirements.

GROUND TESTS

SELECT ATA SYSTEM (55)

21 ENVIRONMENTAL CONTROL SYSTEM
21 CABIN PRESSURE CONTROL SYSTEM
21 CABIN TEMPERATURE CONTROL SYTEM
22 AUTOPILOT FLIGHT DIRECTOR SYSTEM
22 AIMS - AUTOTHROTTLE
23 HF COMMUNICATION SYSTEM
23 VHF COMMUNICATION SYSTEM
23 AIMS - DATA COMMUNICATIONS MANAGEMENT
23 DIGITAL CONTROL AUDIO SYSTEM

SELECT TEST TYPE

☒ SYSTEM TEST
☐ OPERATIONAL TEST
☐ LRU REPLACEMENT TEST

SELECT SYSTEM TEST (2)

LEFT HF COMMUNICATION SYSTEM

RIGHT HF COMMUNICATION SYSTEM

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST

(2)

LEFT HF COMMUNICATION SYSTEM
RIGHT HF COMMUNICATION SYSTEM

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HF SYSTEM - TESTING

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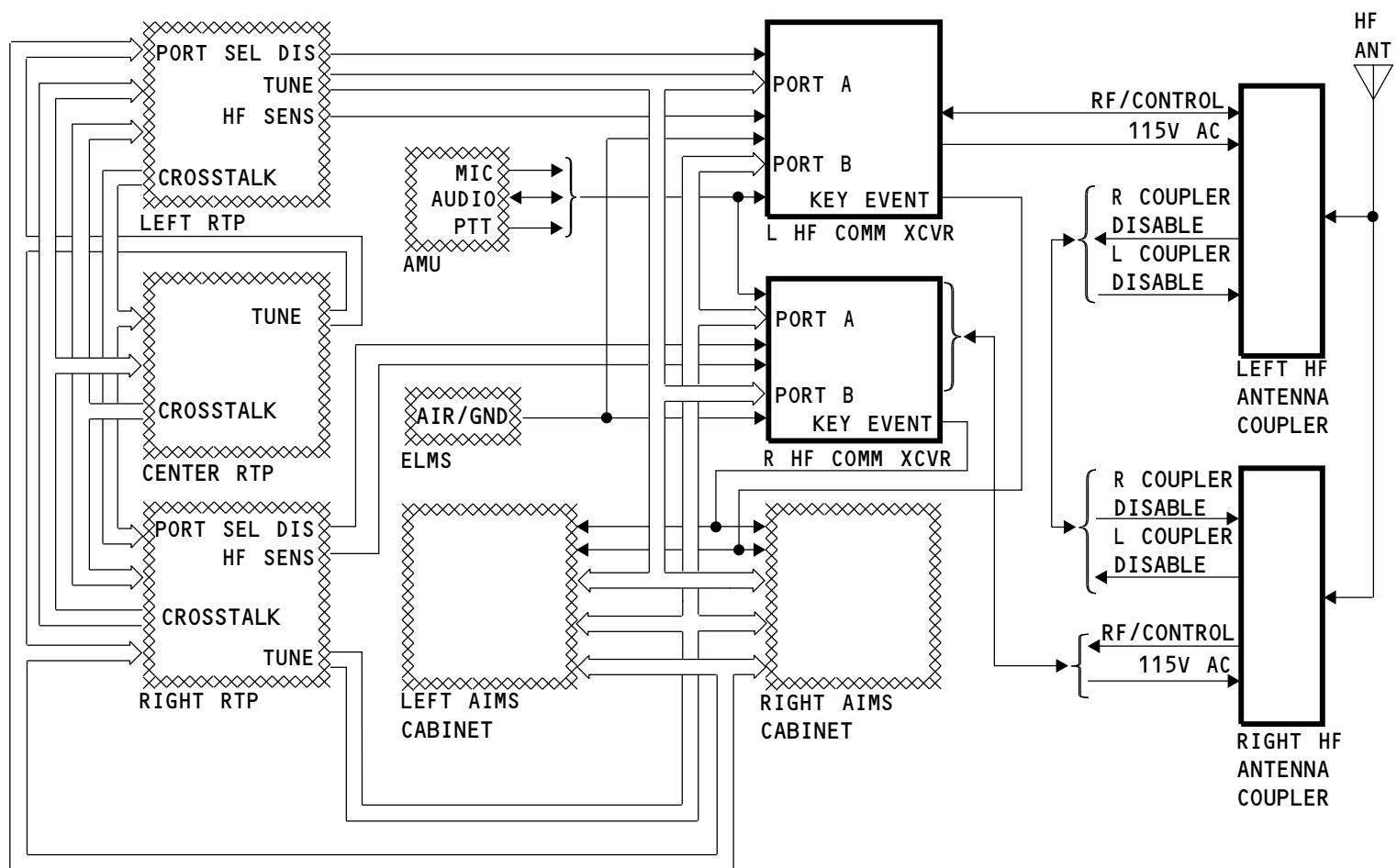


HF SYSTEM - INTERFACES

Reference Graphic

This graphic is for reference.

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HF SYSTEM - INTERFACES

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VERY HIGH FREQUENCY COMMUNICATION SYSTEM - INTRODUCTION

General

The very high frequency (VHF) communication system permits voice and data communication over line-of-sight distances. It permits communication between airplanes or between ground stations and airplanes.

The VHF system operates in the VHF aeronautical frequency range of 118.000 MHz to 136.992 MHz.

Abbreviations and Acronyms

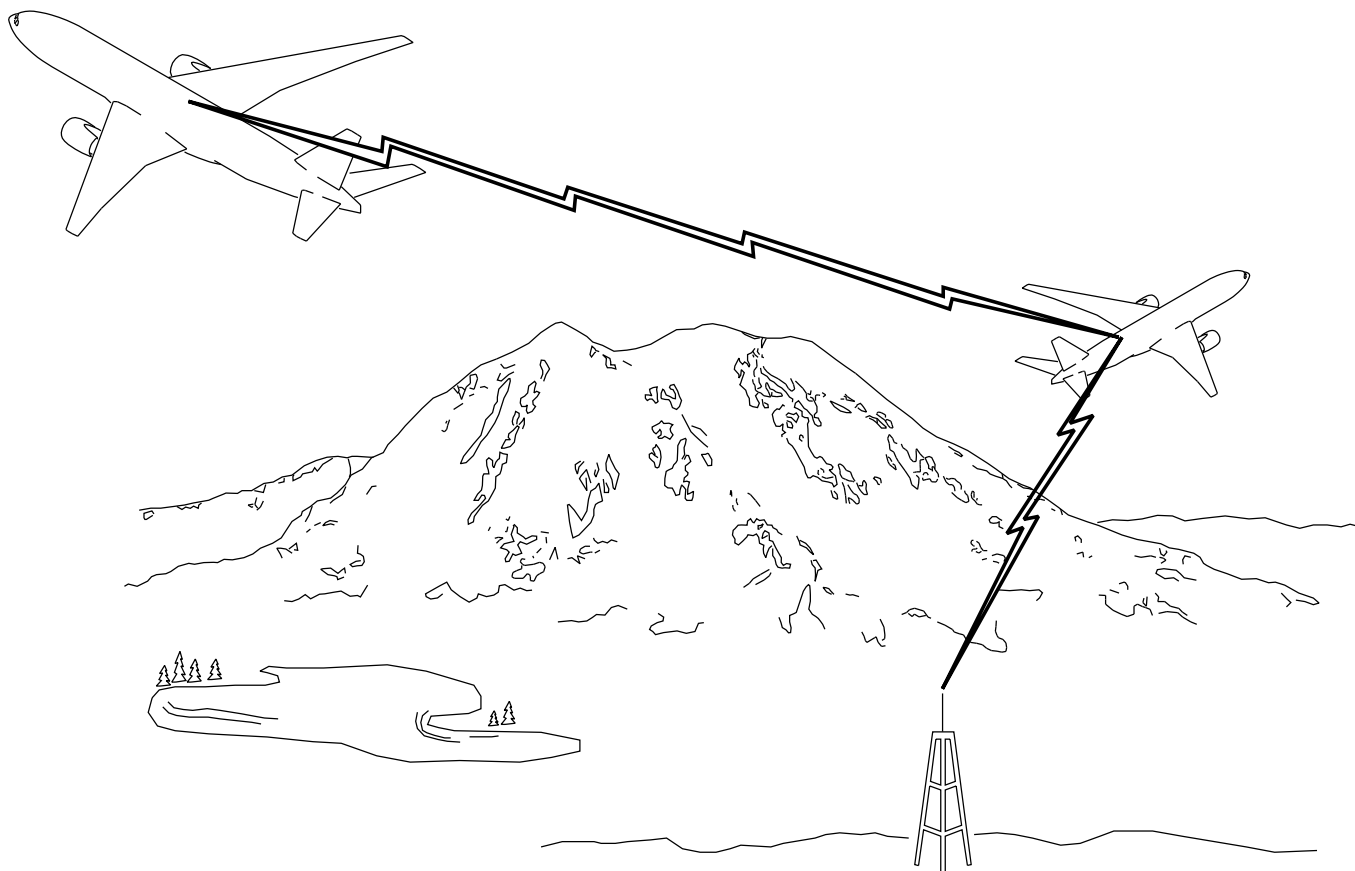
- ACP - audio control panel
- AIMS - airplane information management system
- AM - amplitude modulation
- AMU - audio management unit
- capt - captain
- CMCF - central maintenance computing function
- DCGF - data conversion gateway function
- DCMF - data communication management function
- DFDAF - digital flight data acquisition function
- ELMS - electrical load management system
- F/O - first officer
- F/OBS - first observer
- HF - high frequency
- MAT - maintenance access terminal
- pnl - panel
- PTT - push to talk
- RF - radio frequency
- RTP - radio tuning panel
- SSB - single side band
- VHF - very high frequency
- VSWR - voltage standing wave ratio

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VERY HIGH FREQUENCY COMMUNICATION SYSTEM - INTRODUCTION

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VHF SYSTEM - GENERAL DESCRIPTION

General

The VHF communication system uses three VHF systems. Each VHF system has:

- A VHF antenna
- A VHF communication transceiver.

General Description

The VHF communication system connects with:

- Three radio tuning panels (RTPs). The RTPs send tuning data to the VHF communication transceiver.
- The audio management unit (AMU). Microphone audio and mic switch discretes go to the VHF transceiver through the AMU. Receiver audio goes from the VHF communication transceiver to the speakers and headsets through the AMU.
- The SELCAL decoder. The SELCAL decoder starts an alert when a call comes in for that airplane.

The VHF communication system also connects with the airplane information management system (AIMS) for these functions:

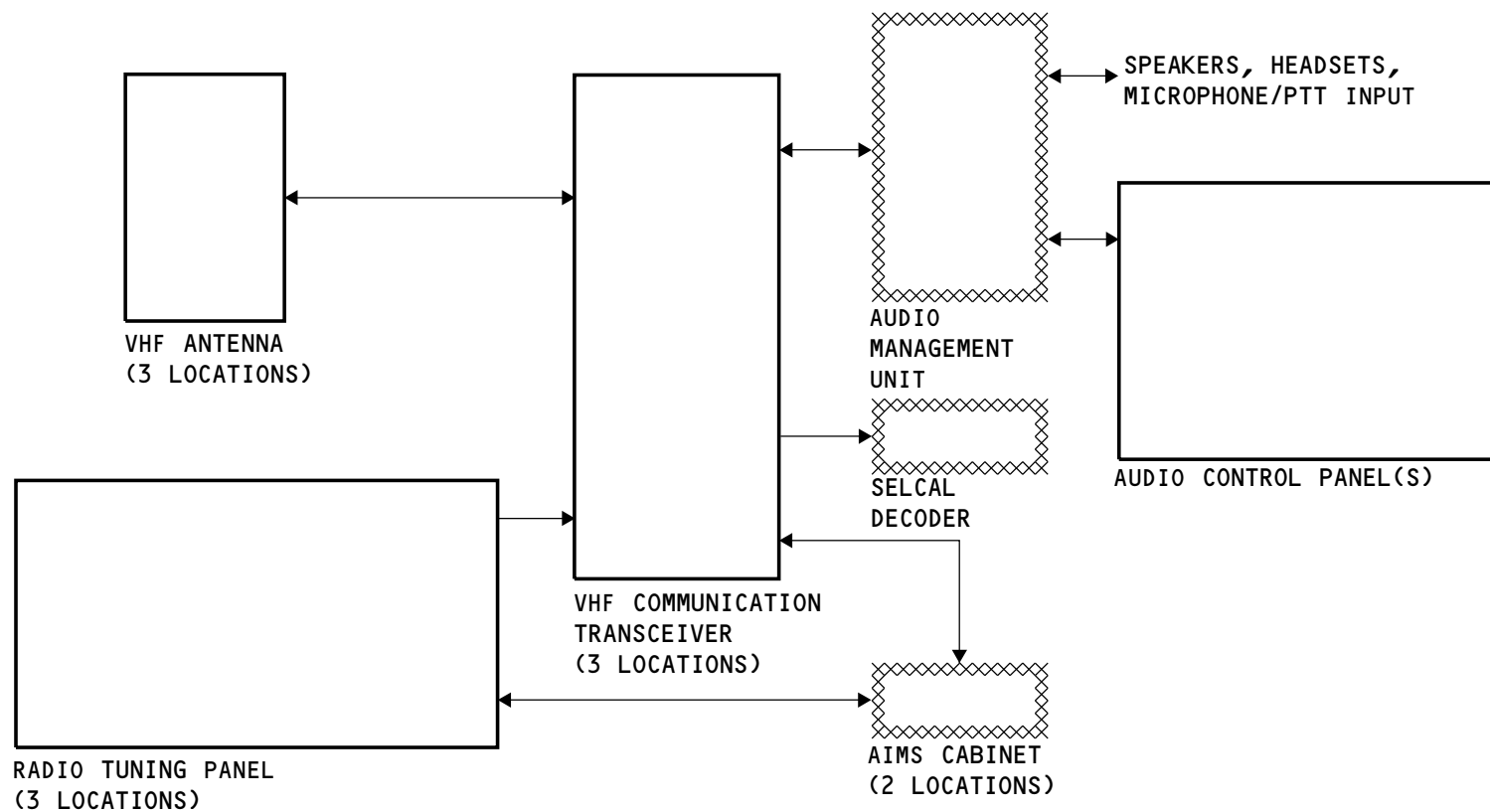
- Digital flight data acquisition function (DFDAF). The DFDAF in the AIMS cabinet receives the mic switch signals for input to the flight data recorder.
- Central maintenance computing function (CMCF). The CMCF gets fault reports from the VHF system and records this information in a fault history. This shows the maintenance crew the faulty component or function.
- Data conversion gateway function (DCGF). The VHF transceiver gets air/ground discretes from DCGF and uses its air/ground logic to define flight legs for its internal fault memory.
- Data communication management function (DCMF). The DCMF supplies data communications control and services for airplane air/ground datalink on the VHF system.

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VHF SYSTEM - GENERAL DESCRIPTION

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VHF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS

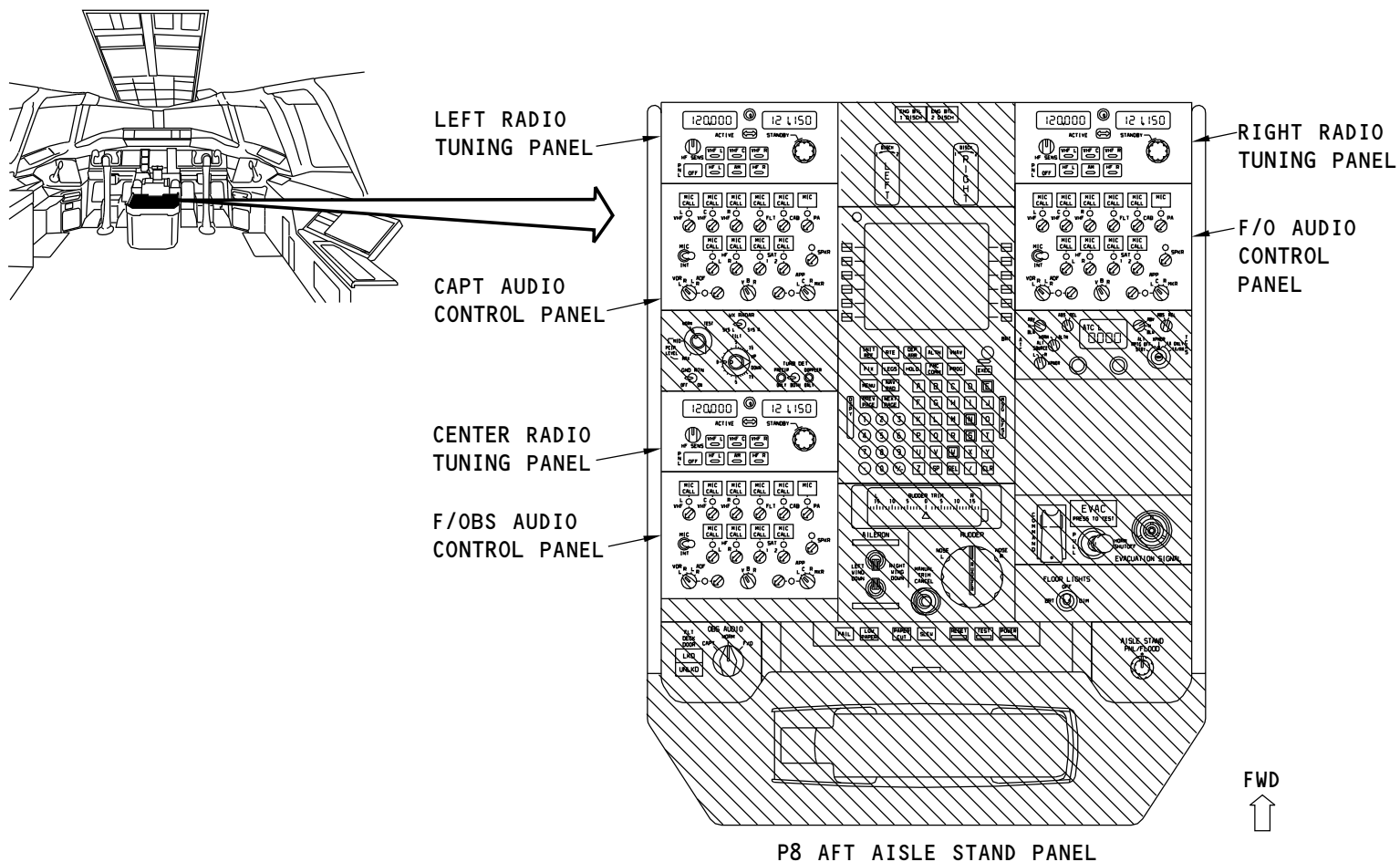
VHF System Component Locations

The radio tuning panels (RTPs) are in the aft aisle stand panel.

Other Systems Component Locations

The audio control panels (ACPs) are part of the flight interphone system. They have an interface with the VHF communication system.

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VHF SYSTEM - FLIGHT DECK COMPONENT LOCATIONS

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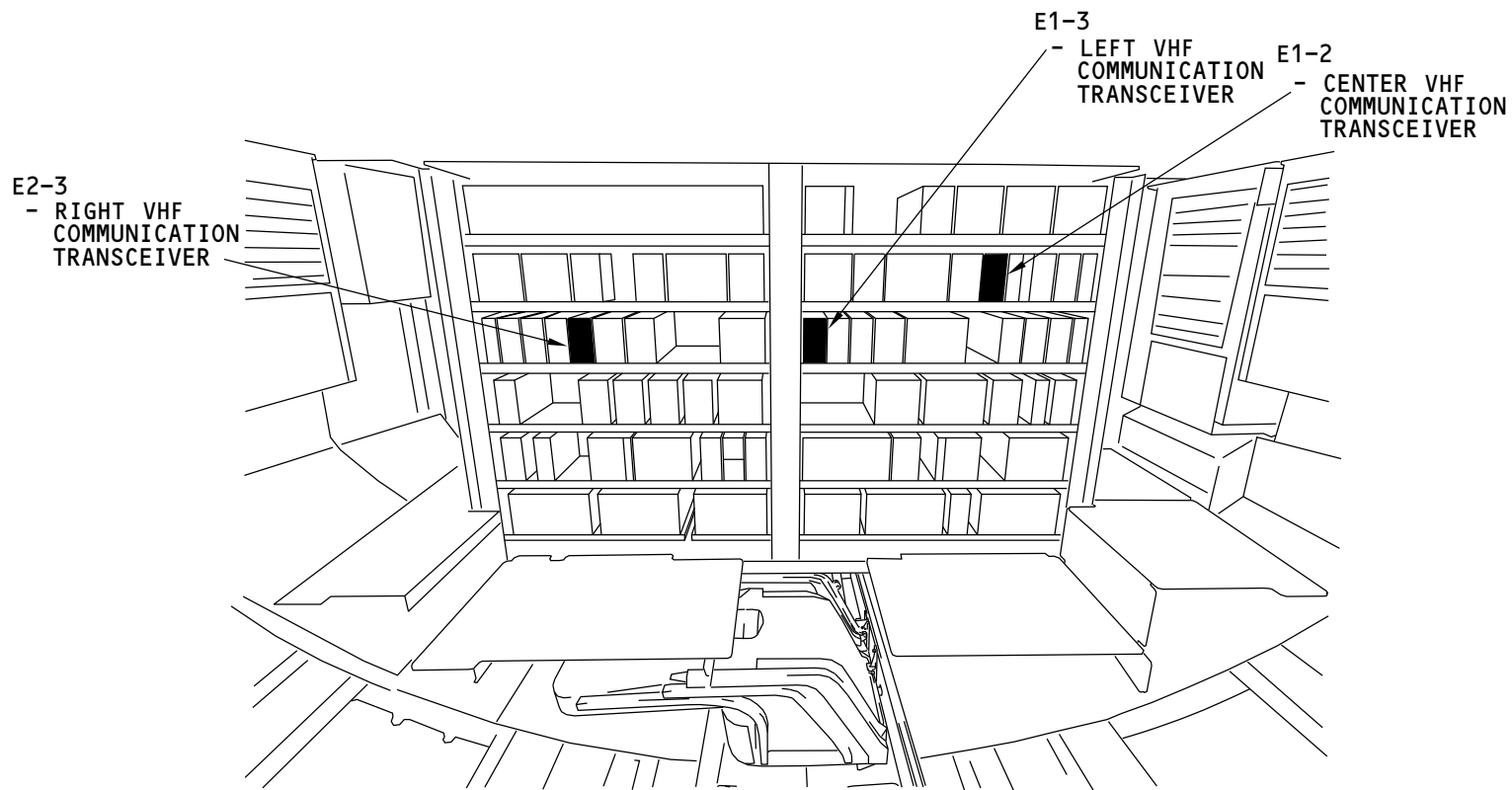


VHF SYSTEM - MAIN EQUIPMENT CENTER COMPONENT LOCATIONS

VHF Component Locations

The VHF communication transceivers are in the main equipment center.

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MAIN EQUIPMENT CENTER
(LOOKING AFT)

VHF SYSTEM - MAIN EQUIPMENT CENTER COMPONENT LOCATIONS

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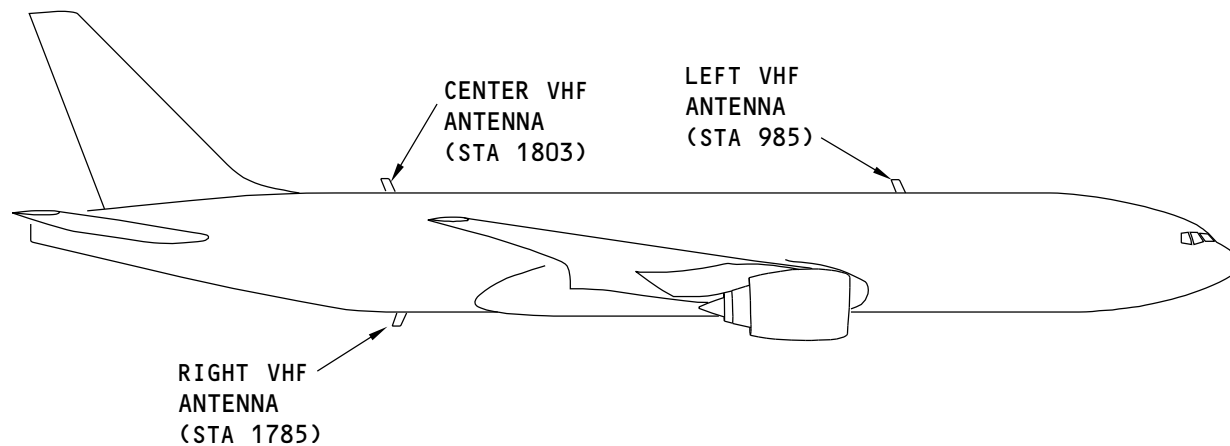


VHF SYSTEM - EXTERNAL COMPONENT LOCATIONS

VHF Component Locations

The three VHF antennas are on the upper and lower fuselage. The left and center antennas are on the upper fuselage. The right antenna is on the lower fuselage.

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VHF SYSTEM - EXTERNAL COMPONENT LOCATIONS

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VHF SYSTEM - POWER INTERFACE

General

The captain's flight instrument bus sends 28 VDC to:

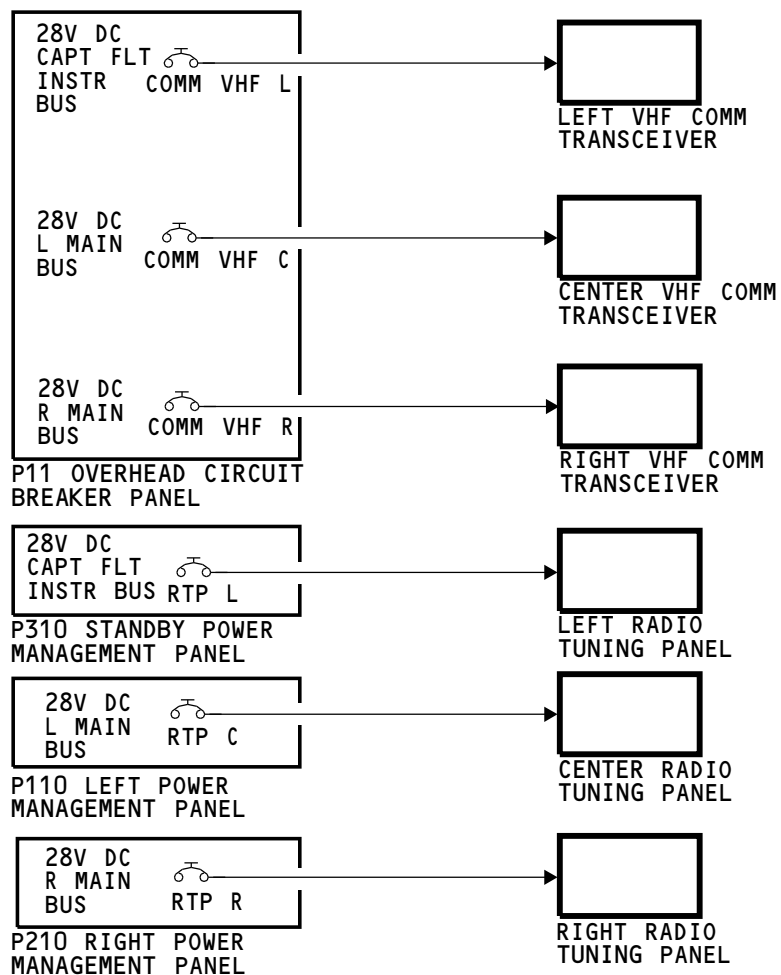
- The left VHF communication transceiver
- The left radio tuning panel (RTP).

The left main dc bus sends 28 VDC to:

- The center VHF communication transceiver
- The center RTP.

The right main dc bus sends 28 VDC to:

- The right VHF communication transceiver
- The right RTP.



VHF SYSTEM - POWER INTERFACE

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VHF SYSTEM - TUNING INTERFACE

General

The VHF communication system uses data buses to share tuning information between the radio tuning panels (RTPs), the VHF communication transceivers, and the airplane information management system (AIMS) cabinets.

Tuning Buses

The RTPs send tuning data to the VHF communication transceivers. Any RTP can tune any transceiver.

Each RTP has these two ARINC 429 output buses:

- Tuning bus
- Crosstalk bus.

Both the left and right RTPs send tuning data to all three transceivers and to the left and right AIMS cabinets.

The center RTP sends tuning data to the left and right RTPs and to the left and right AIMS cabinets.

Both the left and right AIMS cabinets send auto-tune data to all three RTPs.

Port Select Discrete

The left RTP sends a port select discrete to the left and center transceivers. The right RTP sends a port select discrete to the right transceiver.

Each transceiver has two tuning data input ports; port A and port B. The transceiver uses the port select discrete to select its input port. A grounded port select discrete causes the transceiver to use port A. An open port select discrete causes the transceiver to use port B.

Crosstalk Buses

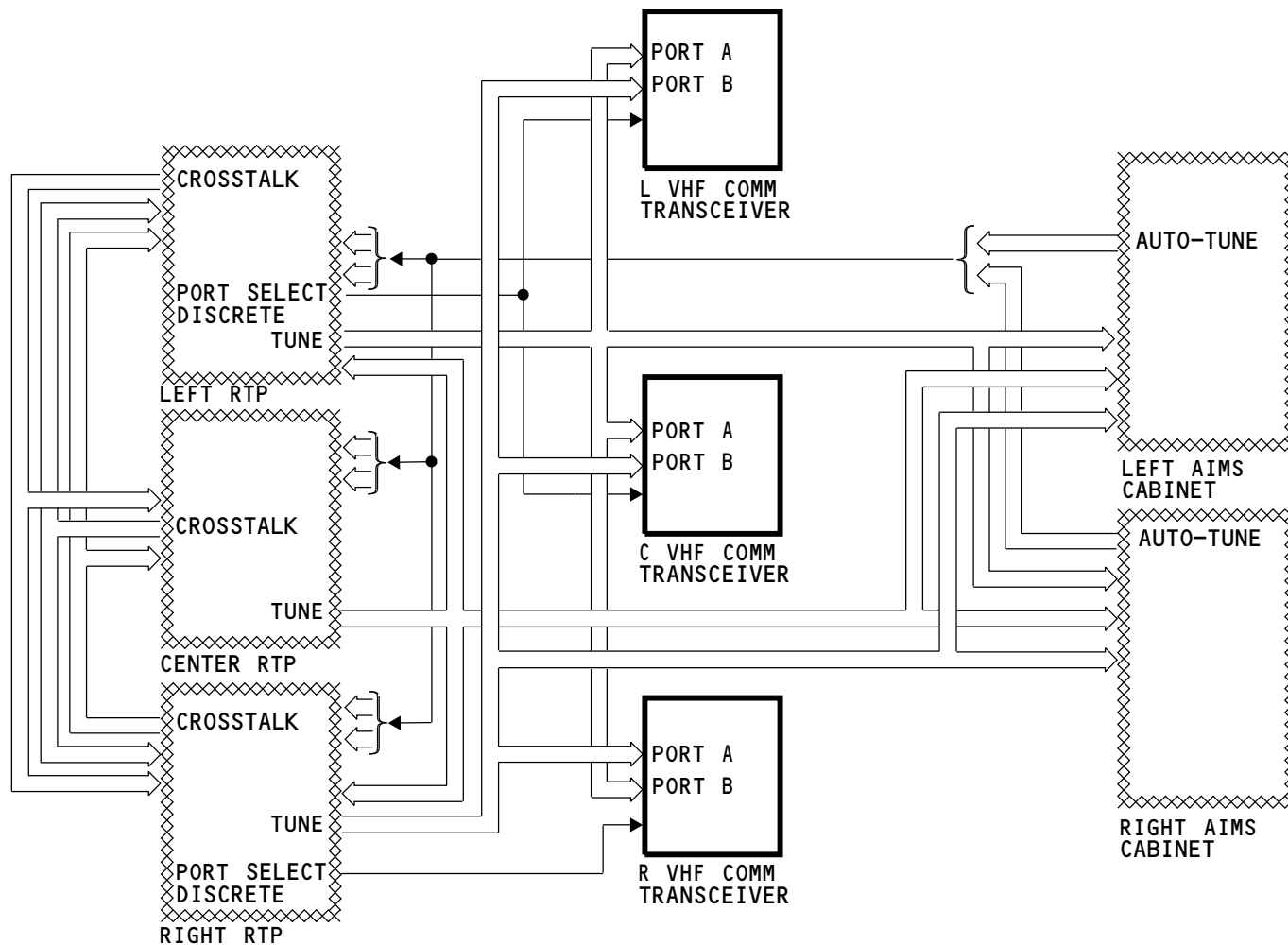
Each RTP sends tuning data to the other RTPs on crosstalk buses. This keeps the RTP tuning data synchronized and permits any RTP to tune any transceiver.

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VHF SYSTEM - TUNING INTERFACE

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**VHF SYSTEM - VOICE RECEIVE/TRANSMIT INTERFACES****General**

You use an audio control panel (ACP) to select a VHF communication transceiver for voice communication. You also use a radio tuning panel (RTP) to select a frequency for the transceiver. Any push to talk (PTT) signal activates the selected transceiver.

Signal Flow - Receive

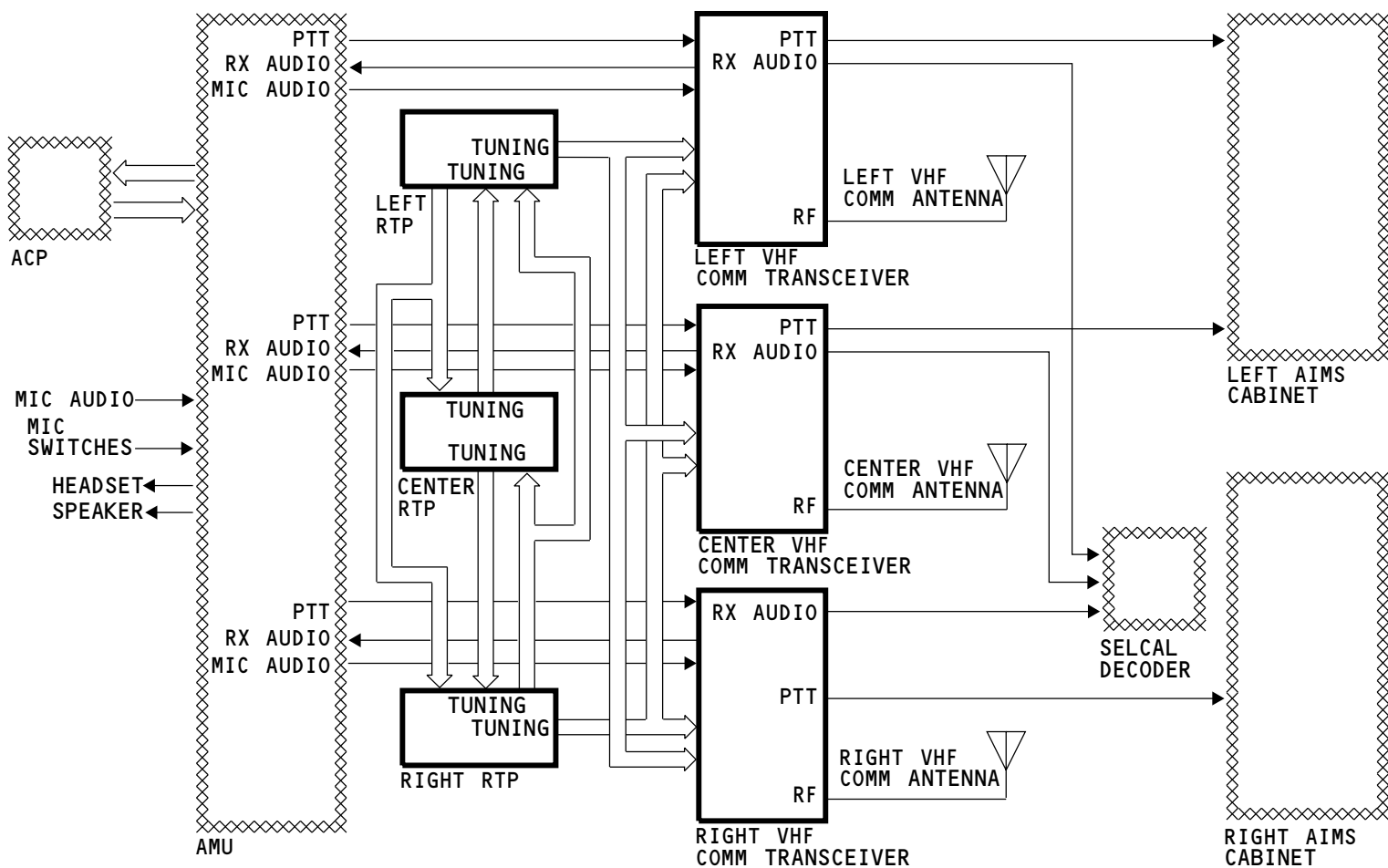
The VHF communication antennas receive RF signals and send them to the transceivers. The transceivers change the RF signals to audio signals and send them to the audio management unit (AMU). The AMU sends the audio signals to the headsets and speakers.

The transceiver sends received audio to the SELCAL decoder to monitor for selective call tones.

Signal Flow - Transmit

The AMU sends the mic audio and the mic switches signal to the selected transceiver. The transceiver changes the mic audio to an RF signal and sends it to the VHF antenna. The VHF antenna transmits the RF signal.

The transceiver sends key event (PTT) to the AIMS digital flight data acquisition function (DFDAF).



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VHF SYSTEM - VOICE RECEIVE/TRANSMIT INTERFACES

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VHF SYSTEM - DATA RECEIVE/TRANSMIT INTERFACES

General

To receive and transmit data, the VHF communication system uses the three radio tuning panels (RTPs) and only two VHF communication transceivers. These components continuously communicate with the airplane information management system (AIMS) during data communication.

Discrete Interfaces

The transceivers get a voice/data select signal from AIMS. The voice/data signal selects the voice or data transmission mode of the transceiver.

The selected transceiver receives a data keyline signal from AIMS. The data keyline signal starts the data transmission.

Tuning Interfaces

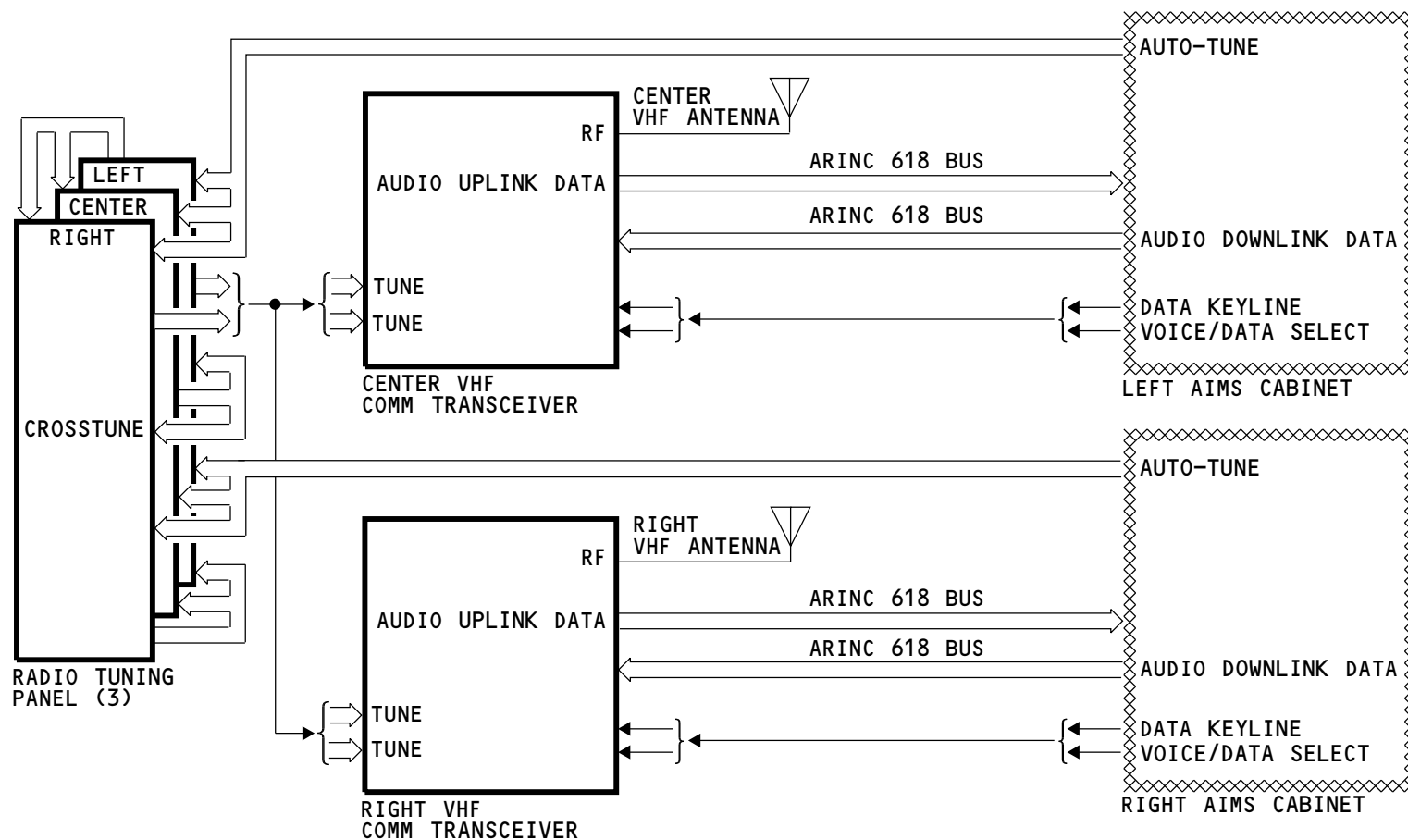
AIMS uses ARINC 429 buses to send auto-tuning frequencies to the left, right, and center RTPs. The RTPs send the tuning frequencies to the center transceiver or to the right transceiver.

Data Interface

The transceivers get audio uplink data from ground stations and send it to AIMS on ARINC 618 buses.

The AIMS data communication management function (DCMF) sends the audio downlink data to the transceivers on ARINC 618 buses. The transceivers send this data to the ground communication stations.

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VHF SYSTEM - DATA RECEIVE/TRANSMIT INTERFACES

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VHF SYSTEM - AIMS FAULT REPORTING AND TESTING INTERFACES

General

The VHF communication system sends fault information to the airplane information management system (AIMS) from the VHF transceivers and the radio tuning panels (RTPs).

VHF Communication Transceiver Interfaces

The transceivers send real time fault and status information to the AIMS cabinets.

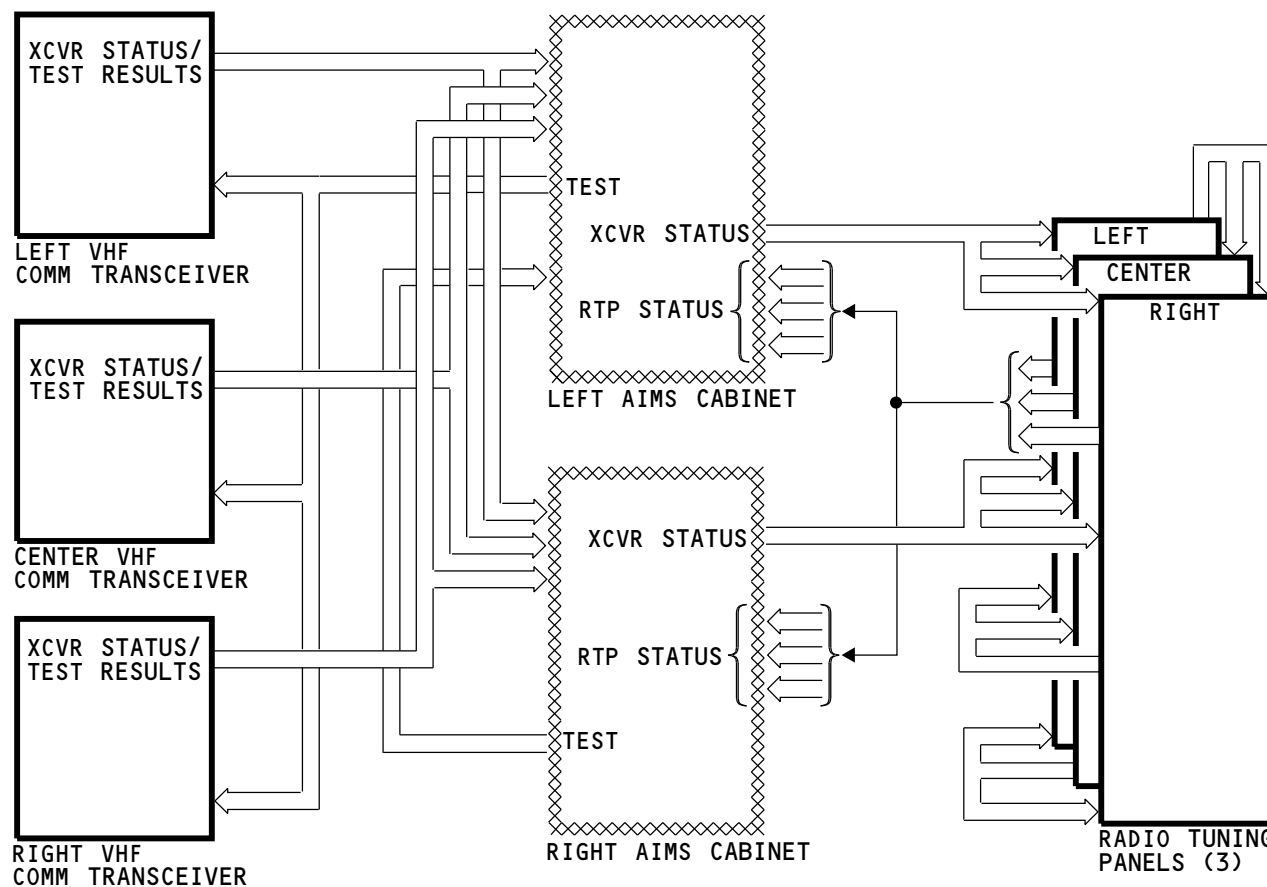
AIMS data conversion gateway function (DCGF) sends air/ground information to the transceiver.

The transceivers use the AIMS central maintenance computing function (CMCF) for on ground maintenance tests. The right AIMS cabinet CMCF sends ground maintenance test requests to the left AIMS cabinet. The left AIMS cabinet CMCF sends all test requests to the VHF transceivers. The transceivers return the test requests to the CMCF.

RTP Interfaces

The AIMS central maintenance computing function (CMCF) sends transceiver status to the RTPs.

The RTPs send fault status information to the AIMS cabinets.



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VHF SYSTEM - AIMS FAULT REPORTING AND TESTING INTERFACES

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VHF SYSTEM - VHF COMMUNICATION TRANSCEIVER

Purpose

The VHF communication transceiver changes RF signals to audio signals during receive and changes audio signals to RF signals during transmit.

General Description

The transceiver has:

- 8.33 KHz frequency spacing
- 118.000 MHz to 136.992 MHz frequency range
- 25 watts minimum output power.

Controls and Indications

The LCD display shows different displays for different conditions. These are some of the possible displays:

- Part number
- Software part number
- Unit status
- Discrete and ARINC 429 input status
- BITE results
- Maintenance help pages
- Software loading status.

The LCD display shows the function above each function switch. As the displays change, the functions of the switches may also change.

Maintenance technicians use the function switches to do these functions:

- Start tests
- Load software
- Read data from the transceiver memory.

The front panel of the transceiver has a flash memory access. Maintenance technicians put a credit card-sized flash memory card in this access. This allows them to upload data or download data from the transceiver to the flash memory card. The flash memory card is a high density, non-volatile memory device. It has a storage capacity of 20 megabytes. The two types of flash memory card are read only or read/write.

The read only flash memory cards load software into the transceiver memory. The read/write flash cards record faults from the transceiver memory or load special maintenance applications into the transceiver memory.

Phone and Mic Jacks

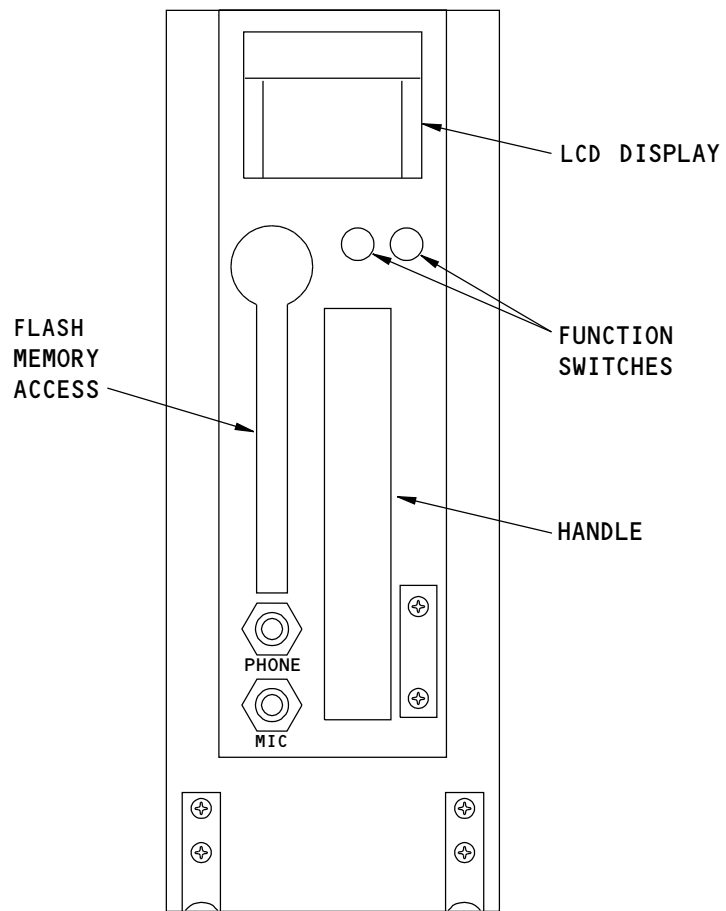
Phone and mic jacks give connection points for headphones and microphone.

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(EXAMPLE)

VHF SYSTEM - VHF COMMUNICATION TRANSCEIVER

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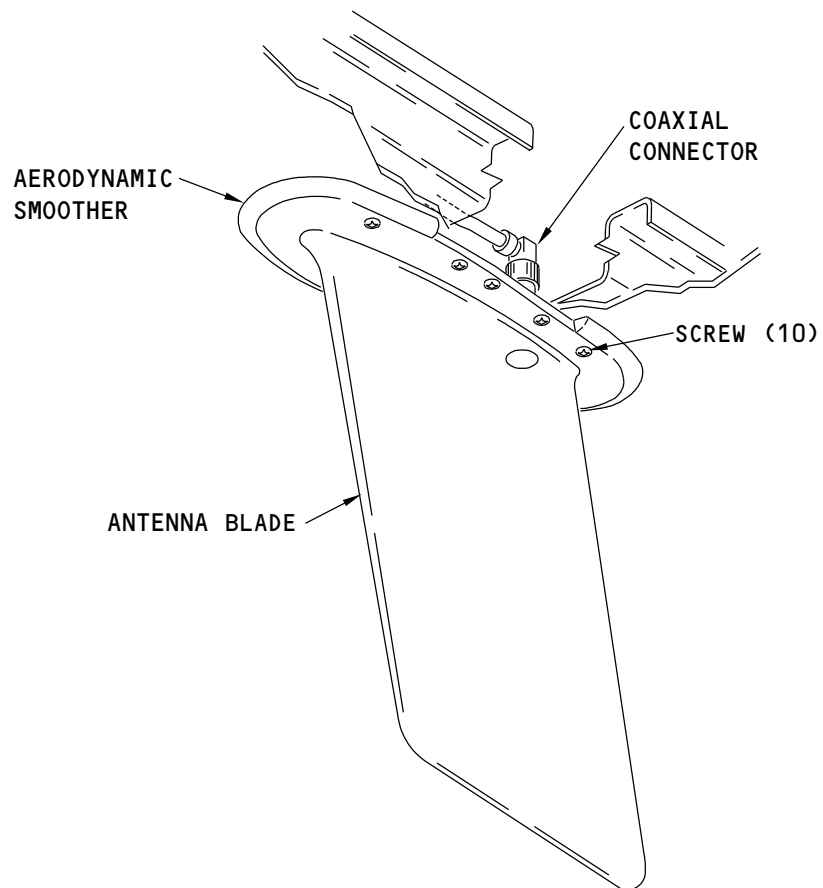
VHF SYSTEM - VHF COMMUNICATION ANTENNA

General Description

The VHF communication antenna receives and transmits RF signals in the VHF frequency range.

The antenna attaches with 10 screws. There is an aerodynamic smoother around the antenna base. An o-ring seals the coaxial connector.

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VHF SYSTEM - VHF COMMUNICATION ANTENNA

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VHF SYSTEM - RADIO TUNING PANEL

Purpose

The radio tuning panel (RTP) selects the modes of operation, and selects the active and standby frequencies for each communication radio. Each RTP sends tuning and mode information to:

- Communication radios
- Other two RTPs
- Airplane information management system (AIMS) cabinets.

Description

Each RTP has these features:

- Active and standby frequency windows
- Frequency transfer switch
- Offside tuning light
- Frequency selectors
- Radio switches
- AM switch
- RTP off (OFF) switch
- HF sensitivity (HF SENS) control.

The frequency windows show this additional information:

- Messages from selected radio systems
- Transfer frequencies from the AIMS data communication management function (DCMF).

Operation

When the RTP is off, the PNL OFF light comes on. Push the RTP OFF switch to turn the RTP on. When the RTP is on, the PNL OFF light goes off.

The active frequency window shows the current frequency of the selected radio. The standby frequency window shows the frequency that the flight crew selects with the frequency selectors. The standby frequency window also shows autotune frequency information from the AIMS cabinets during a voice uplink.

The flight crew sets the standby frequency with the frequency selectors. The first digit is always 1. The outer knob adjusts the second two digits (10 MHz and 1 MHz) in 1 MHz steps. The inner knob adjusts the fourth, fifth and sixth digits (100 KHz, 10 kHz, and 1 kHz) in 8.33 kHz steps. The RTP automatically selects 25 kHz spacing for 121.425 to 121.575 for the 121.5 MHz emergency frequency.

The frequency transfer switch causes the active and standby frequencies to change windows. The active frequency goes to the standby frequency window, and the standby frequency goes to the active frequency window.

You use the radio switches to select a radio. You select only one radio at a time. When a radio is selected, the light in the selected radio switch comes on.

When the flight crew selects an off-side radio, two offside tuning lights come on. One light is on the RTP that the flight crew uses to make the selection. The other light is on the onside RTP of the selected radio.

The HF SENS control sets the RF sensitivity level of the onside HF transceiver. The left RTP sets the left HF sensitivity. The right RTP sets the right HF sensitivity. The center RTP HF SENS control does not connect to any transceiver.

Use the AM switch to select between AM and SSB modulation modes for the selected HF transceiver. When you select AM mode, the light comes on in the AM mode switch on its onside RTP if any of these conditions exist:

- Flight crew selects any VHF communication transceiver while in the AM mode
- Flight crew selects the onside HF transceiver while in the AM mode.

The AM mode light bar goes off when the flight crew selects SSB mode.

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**VHF SYSTEM - RADIO TUNING PANEL**

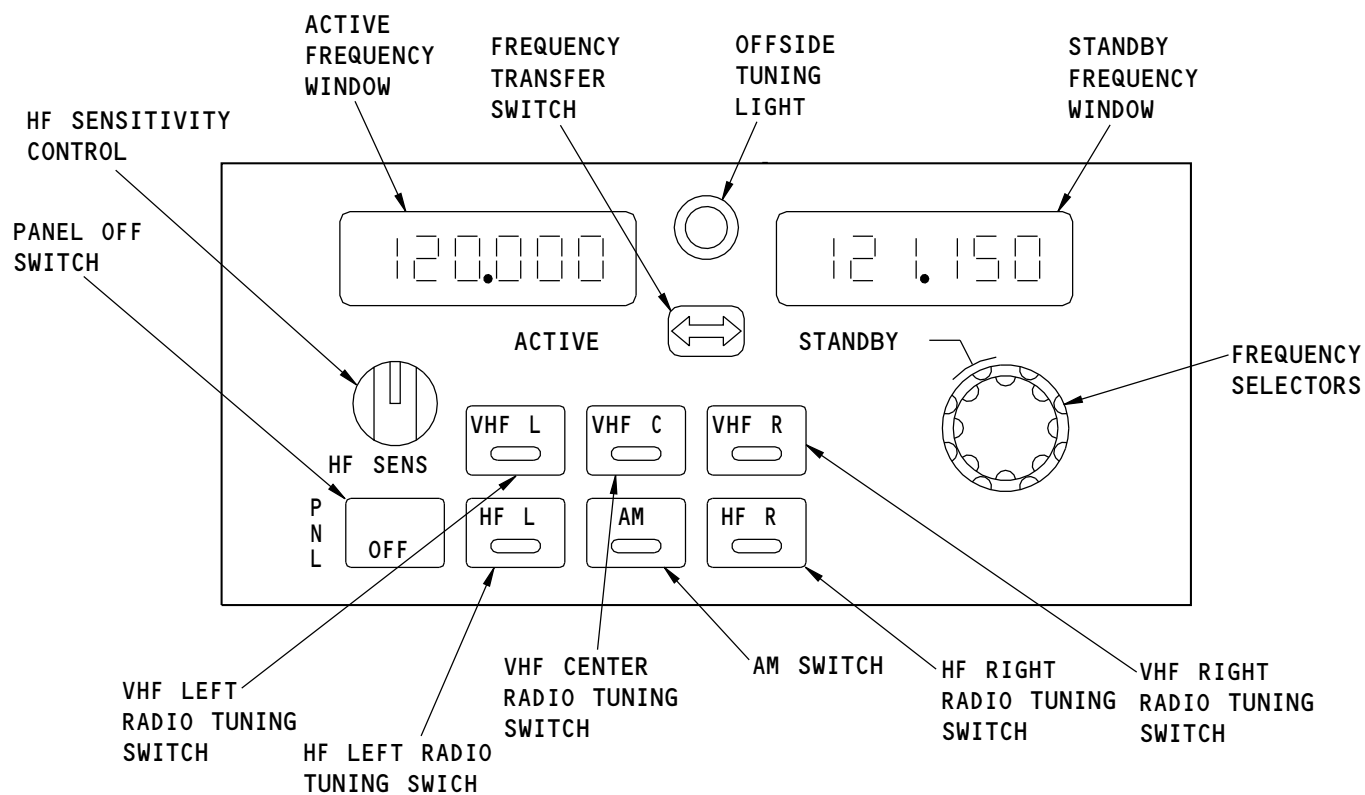
Push the PNL OFF switch to stop the operation of the RTP. When the RTP is off, the PNL OFF light comes on and all functions stop except these:

- Displays continue to show any current fault
- RTP continues to receive 28v dc
- RTP continues to send BITE information to the AIMS central maintenance computer function (CMCF).

BITE

The RTP does a test of itself continuously. The RTP shows PANEL FAIL in the two frequency display windows when the RTP has an internal failure or there is a system failure.

The two frequency windows show all dashes if the flight crew selects a failed radio.



VHF SYSTEM - RADIO TUNING PANEL

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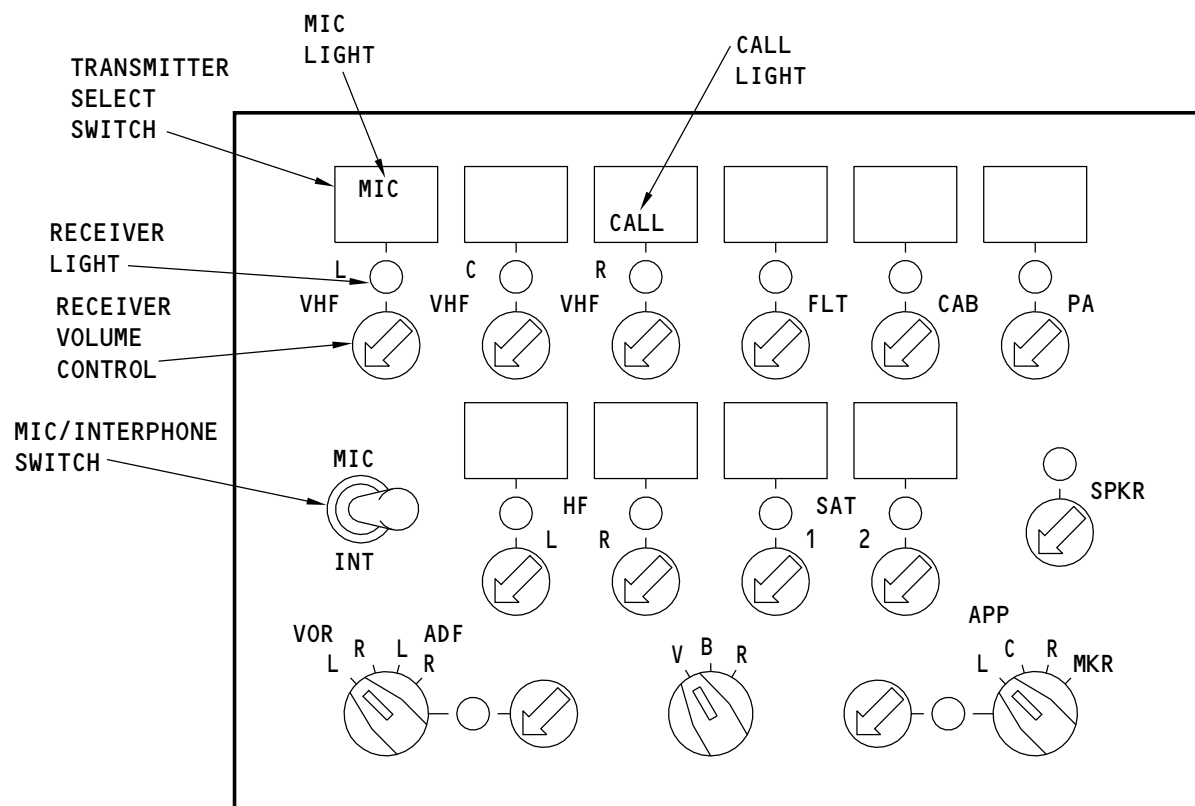
**VHF SYSTEM - AUDIO CONTROL PANEL****General Description**

The audio control panel (ACP) supplies transmitter selection, receiver selection and volume control for the left, center, or right VHF communication transceiver. The VHF controls are on the upper half of the ACP.

Control and Indications

Push a VHF receiver volume control to listen to a VHF receiver. Rotate the receiver volume control for volume control. The receiver light above the control shows green with the receiver control on.

Push a transmitter select switch to select a transceiver for transmission. The mic light shows green for the selected system. Push the mic/interphone switch to connect the microphone to the transceiver and key the transceiver.



VHF SYSTEM - AUDIO CONTROL PANEL

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VHF SYSTEM - TUNING FUNCTIONAL DESCRIPTION

General Description

During tuning, the radio tuning panel (RTP) sends signals to a selected transceiver, to the other two RTPs, and to the airplane information management system (AIMS). Each radio tuning panel (RTP) operates in the same way. This example shows the right RTP and the on-side transceiver.

Input Data Buses

The other two RTPs send tuning data on the crosstalk buses to RCVR 1 and RCVR 2 in the right RTP. The transceiver uses this data to tune the transceiver from an off-side RTP.

The AIMS cabinets send auto-tuning data on an auto-tune bus to RCVR 3 and RCVR 4. The RTP uses the auto-tune data to update the RTP standby frequency.

The ARINC 429 port relay in the right RTP selects either the right RTP or the center RTP as the source of tuning data. This goes to the port A input of the right VHF communication transceiver and the port B input of the left and center VHF communication transceivers. If the right RTP fails or is off, the center RTP tuning data goes to the tuning bus. The port select switch in the right communication transceiver then selects the port B input. The port B input is from the left RTP. This tuning bus input is from the left or center RTP. The ARINC 429 port relay in the left RTP determines this.

Discrete Inputs

The discrete input processor changes discrete inputs to digital data and sends it to the microprocessor. Discretes the RTP uses are:

- Program pins - gives position information of each RTP. This information tells the right RTP how to operate with respect to the other RTPs.
- Test (MD&T) - master dim and test input turns on all RTP front panel lights and annunciators
- Front panel switches-control switches on the RTP front panel.

Output Data Buses

The right RTP microprocessor sends tuning data to XMTR 1. It sends the data through the ARINC 429 port relay and, on the tuning bus, to port A of the right transceiver. The data goes through the port A ARINC 429 RCVR and through the closed port select switch to the microprocessor. It sends this tuning data to the frequency synthesizer to tune the transceiver.

Manual Tuning

The frequency selectors send frequency values to an encoder processor. The processor changes the values to digital data and sends it to the microprocessor. The microprocessor sends frequency window data to the LCD drivers and LCD displays. It also sends the frequency data through XMTR 1 to the right transceiver on the tuning bus.

The tuning data from the right RTP also goes to the left and center RTPs on the crosstalk bus.

The nonvolatile memory (NVM) keeps the tuning data when the RTP is off.

Auto Tuning

Auto-tune buses from AIMS carry tuning data to RCVR 3 and RCVR 4 in the right RTP. The RTP microprocessor uses the autotune data to update the RTP standby frequency. The microprocessor also energizes or de-energizes the ARINC 429 port relay. The port select relay sends an open or a ground to the right transceiver to select port A or port B for tuning data.

Default Tuning

When the right RTP is off, the ARINC 429 port relay de-energizes. The center RTP sends tuning data directly through the right RTP to the radios and to AIMS. The right VHF transceiver gets tuning data in port B from the left RTP.

Port Select

When the right RTP is on, the ARINC 429 port relay energizes. This causes:

- The right RTP XMTR 1 (transmitter 1) to supply tuning data to the right transceiver

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**VHF SYSTEM - TUNING FUNCTIONAL DESCRIPTION**

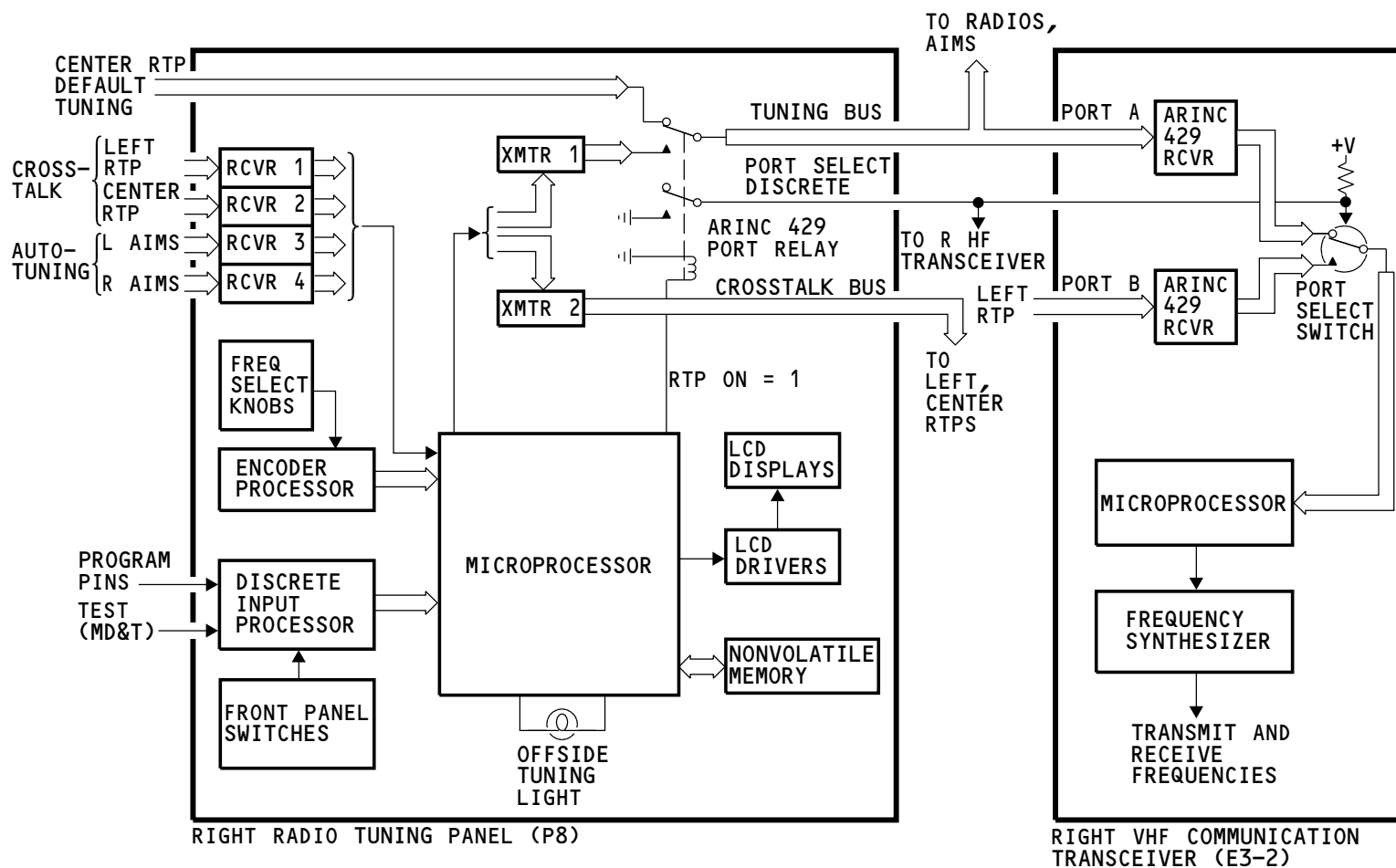
- A ground on the port select discrete.

When the right RTP is off, the ARINC 429 port relay de-energizes. This causes:

- An open on the port select discrete
- In the right transceiver, the port select switch relaxes
- The right transceiver then gets tuning data through port B.

This switching allows any RTP to provide tuning data to any transceiver if one or more RTPs are off.

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VHF SYSTEM - TUNING FUNCTIONAL DESCRIPTION

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VHF SYSTEM - RECEIVE MODE

General

The VHF antenna receives RF signals and sends them to the VHF communication transceiver through the coaxial cable. The transceiver processes the RF signal and sends the audio to the audio management unit (AMU), the airplane information management system (AIMS), and SELCAL decoder.

The three VHF communication systems operate in a similar way. The right VHF system is an example.

Receive Operation

The microprocessor sends the receive frequency to the frequency synthesizer. The frequency synthesizer sets the frequency of the AM receiver.

The microprocessor also sends a logic 1 to the transfer switch when the transceiver is in the receive mode. This closes the transfer switch and sends the received RF signal from the antenna to the AM receiver.

The AM receiver demodulates the RF input and detects the audio signal.

The audio output from the AM receiver goes to:

- Switch S1
- The squelch comparator
- The data output circuits.

The audio output circuits send the audio signal to the AMU and to the headphone jack.

The squelch comparator circuit compares the detected audio with a threshold value. If the level of the detected audio is greater than the threshold, the squelch circuits sends a ground to switch S1. Switch S1 closes and sends the audio to the audio output circuits.

The microprocessor changes the audio off signal to a logic 1 when the transceiver is in the data mode. This causes switch S1 to open and disable the audio output and the squelch comparator.

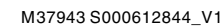
The data output circuits send unsquelched audio to the SELCAL decoder and to the right airplane information management system (AIMS) cabinets on an ARINC 618 bus.

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VHF SYSTEM - RECEIVE MODE

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VHF SYSTEM - TRANSMIT MODE

General

Audio signals from the audio management unit (AMU) and data (audio) from the airplane information management system (AIMS) go to the selected VHF transceiver. The transceiver processes the signals and sends them to the selected antenna for transmission.

The three VHF communication systems operate in a similar way. The right VHF system is an example.

Transmit Operation

During transmission, the microprocessor receives a push to talk (PTT) signal from the audio management unit (AMU) or a data key signal from AIMS. This causes the microprocessor to send a logic 0 to the transfer switch. The transfer switch connects the output of the transmit circuits to the VHF antenna.

The voice/data select discrete from AIMS determines the operation mode of the transceiver. A ground input sets the transceiver to the data mode. An open input sets the transceiver to the voice mode.

In the data mode, the microprocessor sets the audio off signal to a logic 1 to disable the sidetone.

Mic audio from the AMU or the data audio from AIMS go to the transmit circuits in the transceiver. The AIMS cabinet uses an ARINC 618 bus to send the data to the transceiver. The transmit circuits modulate the transmit frequency with the mic audio or the data audio. This makes an amplitude modulated RF signal. The signal goes to the directional coupler and transfer switch. The RF signal goes through the closed transfer switch and to the antenna. The antenna transmits the RF signal.

The RF output from the directional coupler also goes to the power monitor. The power monitor sends a logic 1 when the output power is greater than 15 watts.

The sidetone switch closes when the output power is greater than 15 watts and the transceiver is in the voice mode.

The sidetone switch closes and the mic audio goes to the AMU for the flight crew.

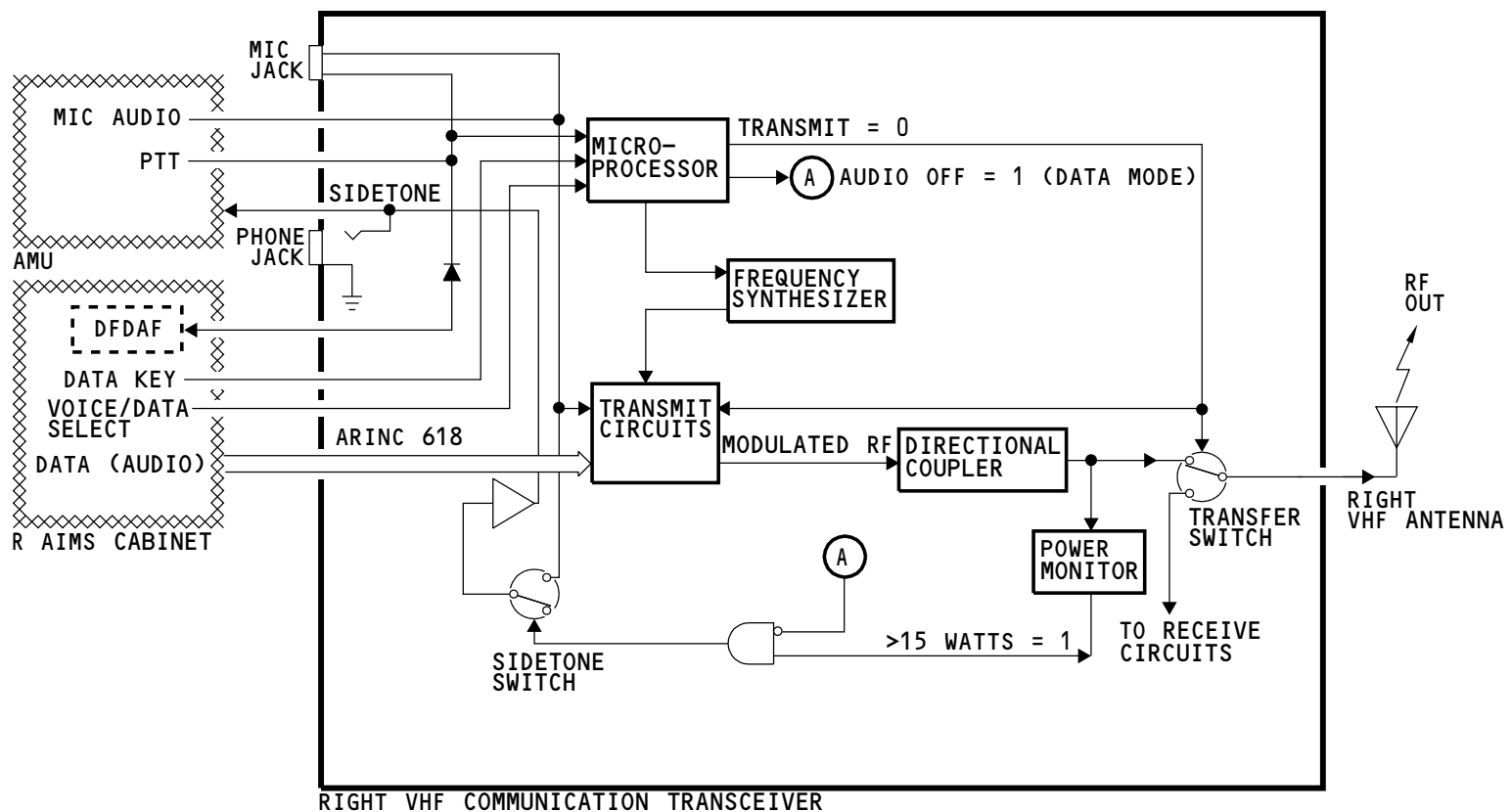
The PTT signal goes to the AIMS cabinet for the digital flight data acquisition function (DFDAF).

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VHF SYSTEM - TRANSMIT MODE

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**VHF SYSTEM - SYSTEM TESTS****General**

Use a maintenance access terminal (MAT) to do the system tests. These are the system tests for the VHF system:

- Center VHF communication system test
- Left VHF communication system test
- Right VHF communication system test.

VHF Communication System Test

Select the system (center, left or right) for test.

This test makes sure that the VHF communication system operates correctly. The approximate time to run the test is less than one minute. There are no airplane effects. There are no limitations or special requirements. To run the test select CONTINUE.

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GROUND TESTS

SELECT ATA SYSTEM (55)

- 22 AUTOPILOT FLIGHT DIRECTOR SYSTEM
- 23 AIMS DATA COMMUNICATION MANAGEMENT
- 23 HF COMMUNICATION SYSTEM
- 23 VHF COMMUNICATION SYSTEM**
- 23 SATELLITE COMMUNICATIONS (SATCOM) SYSTEM
- 23 DIGITAL CONTROL AUDIO SYSTEM
- 23 OVERHEAD PANEL ARINC 629 SYSTEM
- 24 ELMS P210 POWER MANAGEMENT PANEL
- 24 ELMS P110 POWER MANAGEMENT PANEL

SELECT TEST TYPE

☒ SYSTEM TEST

☐ OPERATIONAL TEST

☐ LRU REPLACEMENT TEST

SELECT SYSTEM TEST (3)

CENTER VHF COMMUNICATION SYSTEM

LEFT VHF COMMUNICATION SYSTEM

RIGHT VHF COMMUNICATION SYSTEM

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST (3)

CENTER VHF COMMUNICATION SYSTEM

LEFT VHF COMMUNICATION SYSTEM

RIGHT VHF COMMUNICATION SYSTEM

VHF SYSTEM - SYSTEM TESTS

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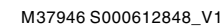


VHF SYSTEM - INTERFACES

Interfaces

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VHF SYSTEM - INTERFACES

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SATELLITE COMMUNICATIONS SYSTEM - INTRODUCTION

Purpose

The satellite communications (SATCOM) system uses ground stations and satellites to transmit and receive data and voice messages. SATCOM supplies higher quality data and voice message signals for passengers and crew, over longer distances than VHF/HF communication systems.

- NFS - network file server
- OMF - onboard maintenance function
- OMS - onboard maintenance system
- SATCOM - satellite communications
- SDU - satellite data unit

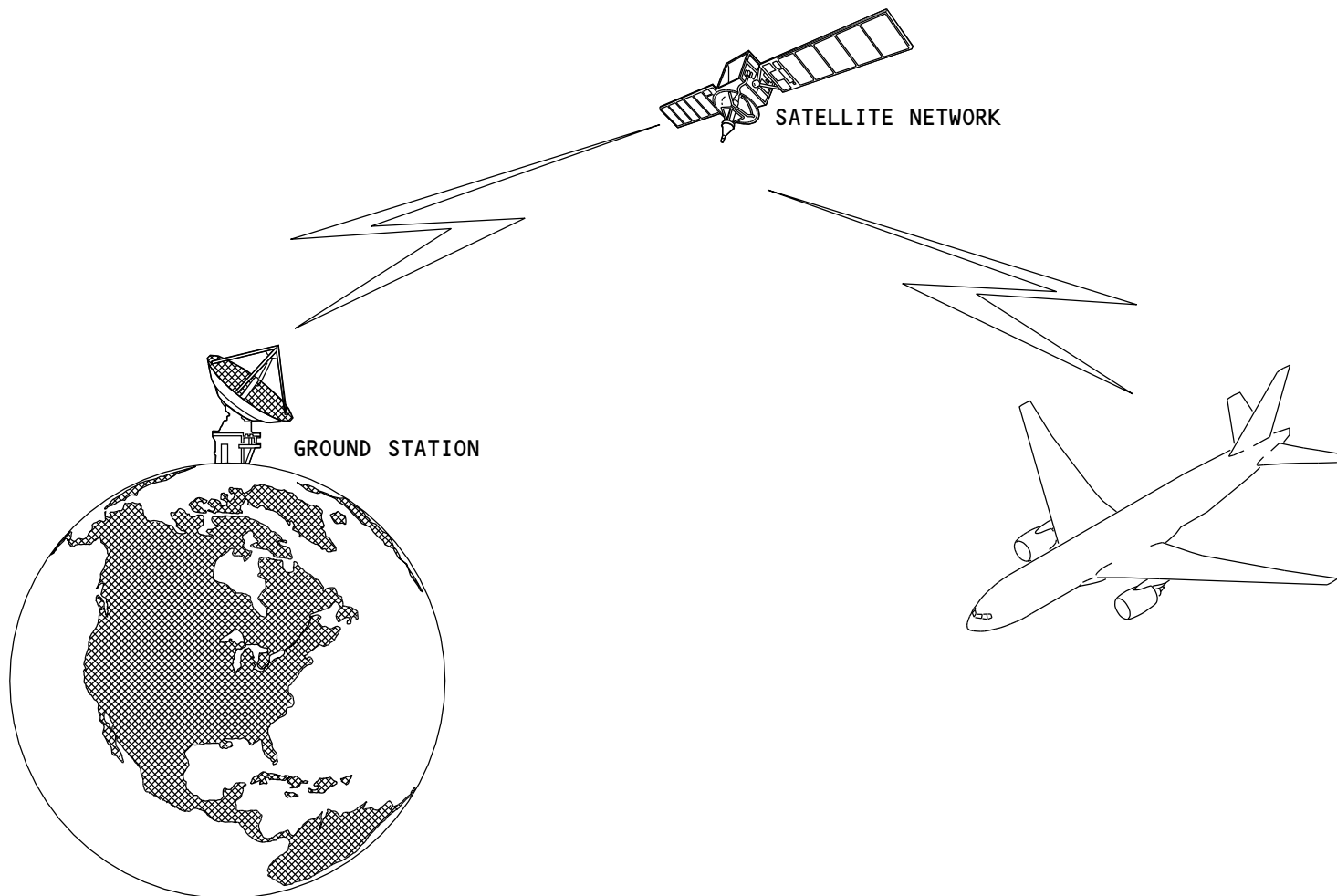
Abbreviations and Acronyms

- ACARS - aircraft communications addressing and reporting system
- ACP - audio control panel
- ADL - airborne data loading
- AIMS - airplane information management system
- AMU - audio management unit
- attn - attenuator
- BITE - built-in test equipment
- CCD - cursor control device
- CDU - control display unit
- CMCF - central maintenance computing function
- DCGF - data conversion gateway function
- DCMF - data communication management function
- DSP - display select panel
- EFB - Electronic Flight Bag
- GHz - gigahertz
- HGA - high gain antenna
- HPA - high power amplifier
- HSDU - high speed data unit
- I/O - input/output
- IF - intermediate frequency
- LNA/DIP - low noise amplifier/diplexer
- LSK - line select key
- MAT - maintenance access terminal
- MHz - megahertz

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SATELLITE COMMUNICATIONS SYSTEM - INTRODUCTION

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SATCOM SYSTEM - GENERAL DESCRIPTION

General

The satellite communications (SATCOM) system uses a satellite network, ground stations and airplane satellite communication equipment to transmit and receive data and voice messages.

There are two SATCOM systems installed on the airplane. The left SATCOM is for the flight communications and the right SATCOM system is for the In-Flight Entertainment (IFE) system (if applicable).

Only the left SATCOM system will be provided in this System Description Section (SDS). For the right SATCOM, the information can be found in SDS Chapter 44 for IFE system (if applicable).

The SATCOM system in the subsequent steps refers to the left SATCOM system.

Satellites

Satellites act as relay stations between the ground stations and the airplane.

Ground Station

The ground station connects the SATCOM system to the ground-based aircraft communications addressing and reporting system (ACARS) and public telephone networks.

Airplane SATCOM Equipment

These are the components of a SATCOM system:

- Satellite data unit (SDU)
- High Speed Data Unit
- Radio frequency attenuator (RF ATTN)
- Class A high power amplifier (HPA)
- Low noise amplifier/diplexer (LNA/DIP)
- Top mounted high gain antenna (HGA)

SATCOM System Connections

The airplane SATCOM equipment connects with:

- The control display units (CDUs). The SATCOM control and status pages on the CDU give flight crew control of the SATCOM system. These pages also give system status data.
- The audio management unit (AMU). Microphone audio and push-to-talk discretes go to the SDU through the AMU. Receive audio goes from the SDU to the speakers and headsets through the AMU.

AIMS Connections

The SATCOM system also connects with the airplane information management system (AIMS) for these functions:

- Data communication management function (DCMF). The DCMF supplies data communications control for airplane air/ground datalink over the SATCOM system.
- Central maintenance computing function (CMCF). The CMCF gets SATCOM system fault reports and writes this data in a fault history. This shows the maintenance crew the defective component or function. The maintenance access terminal (MAT) gives access to the CMCF for loading and updating SATCOM configuration data.
- Data conversion gateway function (DCGF). The DCGF changes inertial reference system data into ARINC 429 data for high gain antenna (HGA) beam steering. The DCGF also supplies international civil aviation organization (ICAO) addresses.

High Gain Antenna System

The high gain antenna system receives and transmits voice and data signals. A high power amplifier (HPA) sends transmit signals to the high gain antenna system. The antenna system sends receive signals to the satellite data unit (SDU). The antenna system has these components:

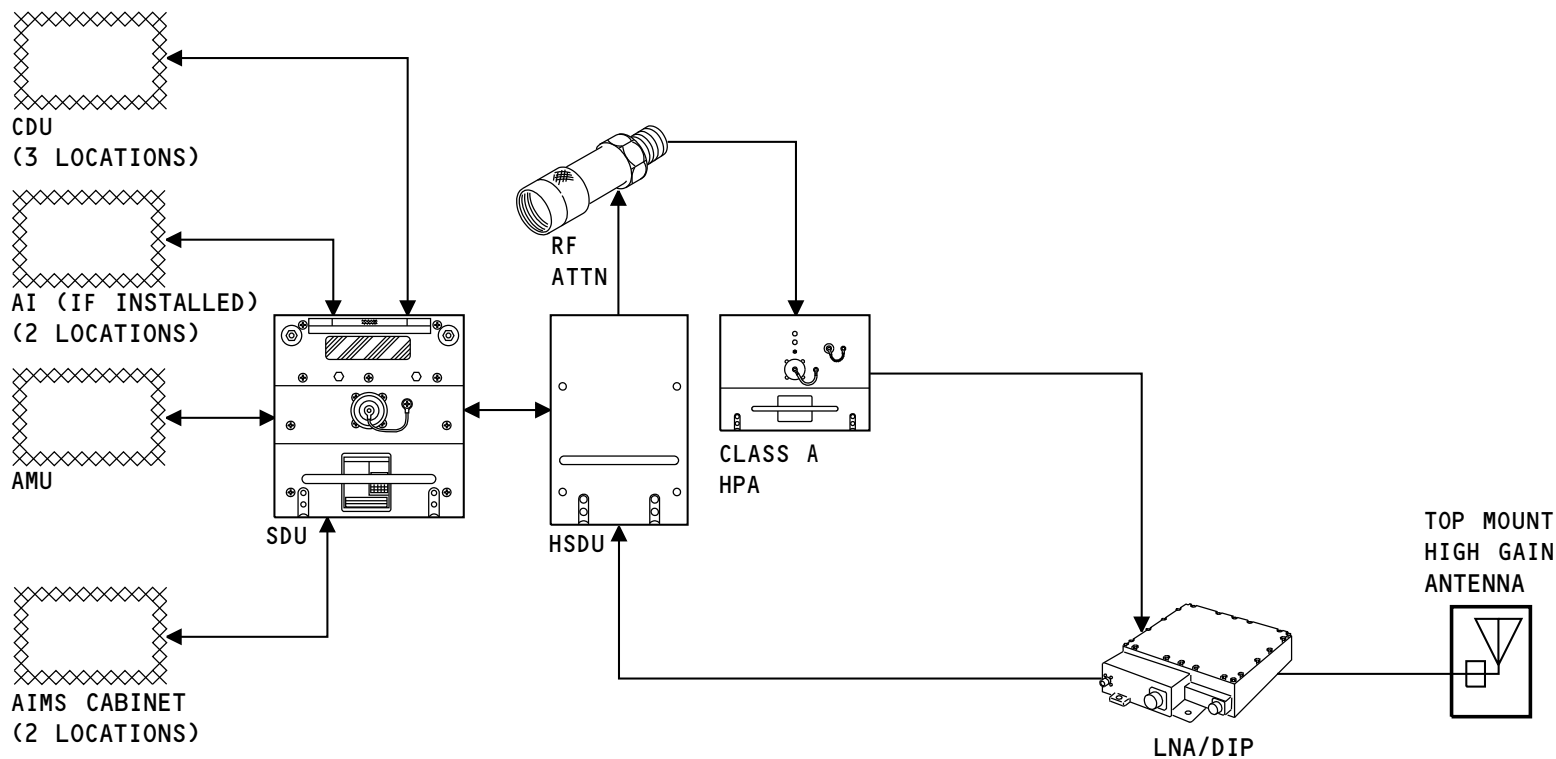
- High gain antenna
- Low noise amplifier/diplexer (LNA/DIP).

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SATCOM SYSTEM - GENERAL DESCRIPTION

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**SATCOM SYSTEM - COMPONENT LOCATIONS - 1****Cabin Overhead Area**

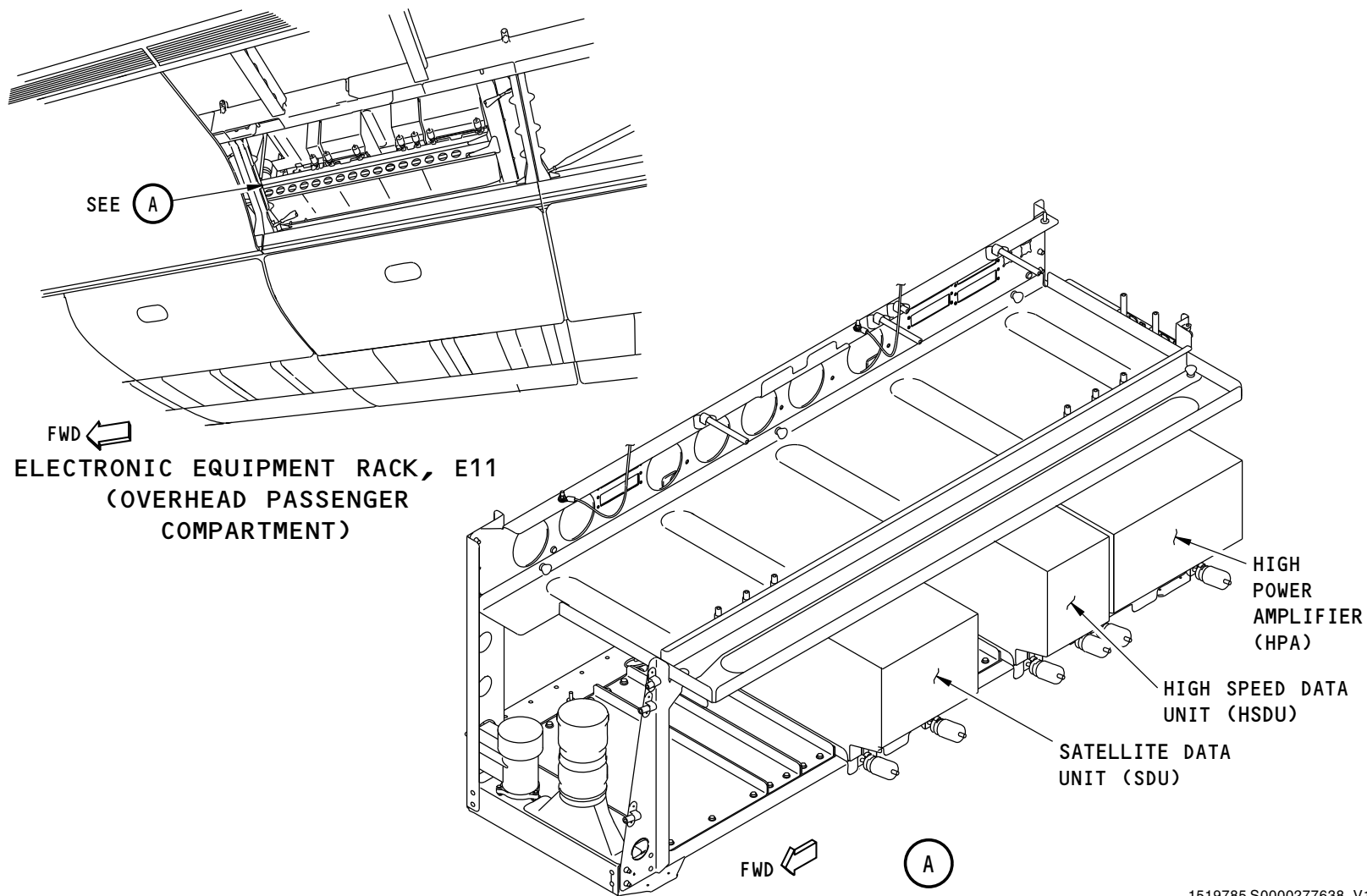
The E11 rack has these components for the SATCOM system:

- Satellite data unit (SDU)
- High Speed Data Unit (HSDU)
- Class A high power amplifier (HPA).
- Radio frequency attenuator (RF ATTN)

Access

Access to the E11 rack is through a ceiling panel on the left passenger compartment ceiling, at approximately station 1525.

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	D633W101-ARO



1519785 S0000277638_V1

SATCOM SYSTEM - COMPONENT LOCATIONS - 1

23-15-00

ARO ALL EFFECTIVITY

D633W101-ARO

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**SATCOM SYSTEM - COMPONENT LOCATIONS - 2****High Gain Antenna System**

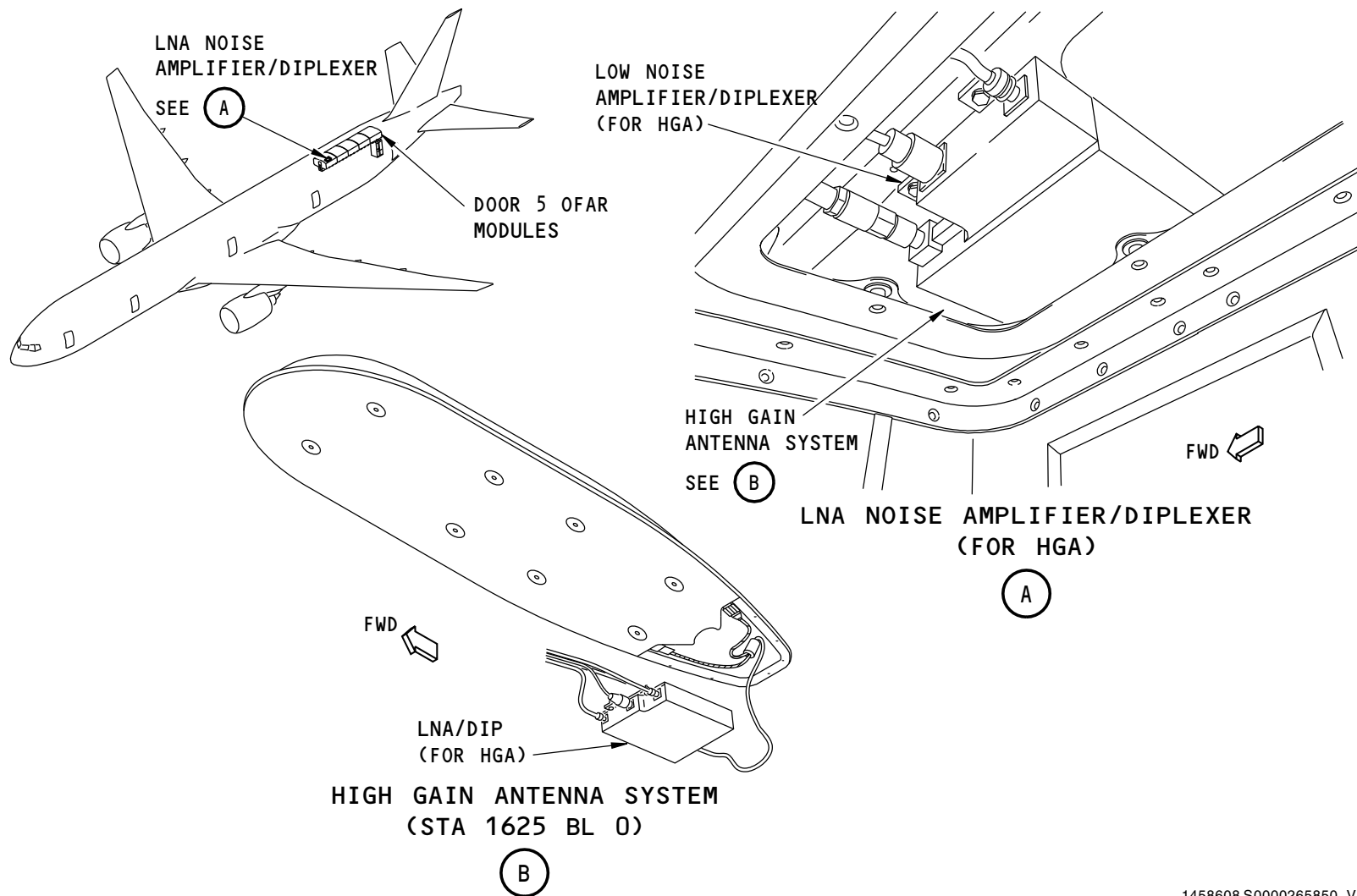
The SATCOM system has a top mounted high gain antenna system. The high gain antenna system has these components:

- High gain antenna (HGA) and its beam steering function
- Low noise amplifier/diplexer (LNA/DIP)

Access

Access to the antenna systems is through overhead panels in the passenger cabin.

ARO ALL	EFFECTIVITY



SATCOM SYSTEM - COMPONENT LOCATIONS - 2

1458608 S0000265850_V1

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ARO ALL EFFECTIVITY

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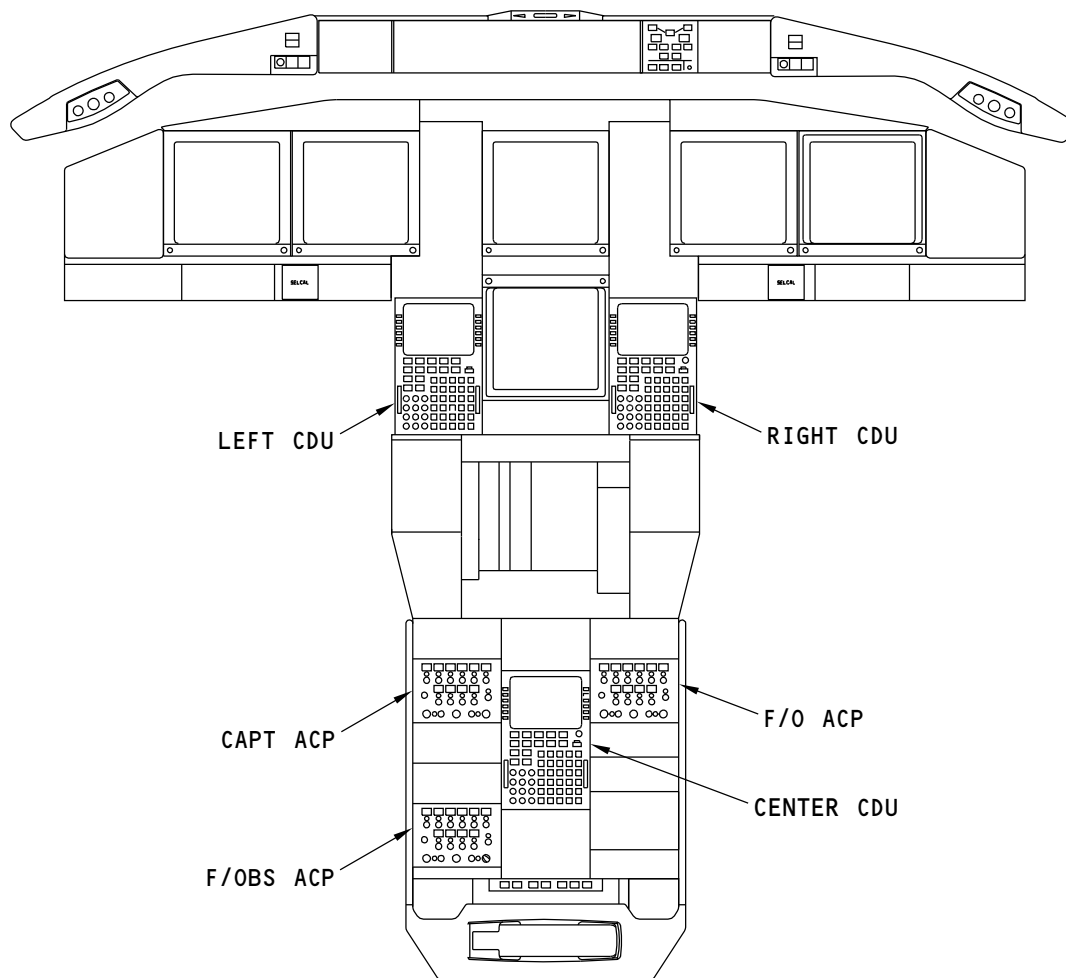
SATCOM SYSTEM - FLIGHT DECK INTERFACE COMPONENT LOCATIONS

Flight Deck Interface Components

These components in the flight deck have interfaces with the SATCOM system:

- left, center, and right control display units (CDUs)
- Captain (CAPT), first officer (F/O), and first observer (F/OBS) audio control panels (ACPs).

ARO ALL	EFFECTIVITY



SATCOM SYSTEM - FLIGHT DECK INTERFACE COMPONENT LOCATIONS

M37967 S000612914_V1

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SATCOM SYSTEM - POWER INTERFACE

Left Power Management Panel

The left main ac bus sends 115v ac to these units:

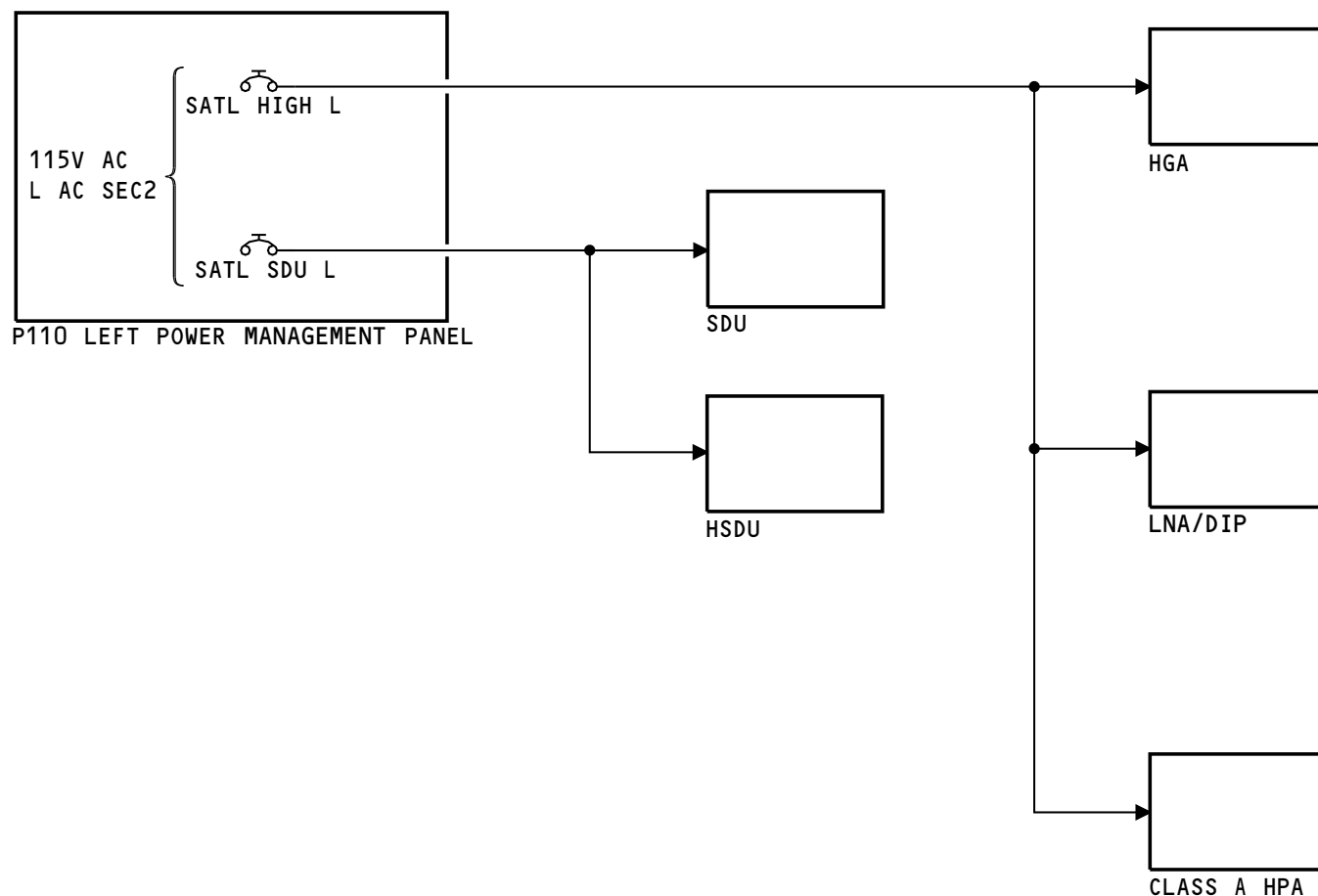
- Satellite data unit (SDU)

ARO 001, 002

- High speed data unit (HSDU).

ARO ALL

- Class A high power amplifier (HPA)
- Low noise amplifier/diplexer (LNA/DIP)
- High Gain Antenna (HGA)



1519687 S0000277651_V1

SATCOM SYSTEM - POWER INTERFACE

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**SATCOM SYSTEM - VOICE AND DATA TRANSMIT/RECEIVE INTERFACES****General**

The SATCOM system provides a total of seven classic channels (six voice, one data). In addition, the SATCOM system can provide additional four Swift64 or two SwiftBroadband high speed data channels (if applicable).

The control display units (CDUs) connect with the satellite data unit (SDU). The flight crew use the CDUs to control the SATCOM system.

Voice Operation

Audio control panels (ACPs) connect to the audio management unit (AMU) to control the voice signals from the flight deck to the SATCOM system.

The AMU connects with the SDU to send and receive audio signals for the flight crew.

ARO 001, 002

The HSDU interfaces with the in-flight entertainment (IFE) system (i.e. Aircraft Interface unit (AI) or Top Connect Server) through an Ethernet cable to send and receive of the voice signals for cellular communication services (i.e. Pico cell) (if installed).

ARO ALL**Data Operation**

The airplane information management system (AIMS) connects with the SDU to send and receive data signals.

ARO 001, 002

The HSDU interfaces with the in-flight entertainment (IFE) system (i.e. Aircraft Interface unit (AI) or Top Connect Server) through an Ethernet cable to send and receive of the high-speed data signals for the wireless internet services (if installed).

ARO ALL**Signal Flow - Receive**

The high gain antenna (HGA) receives radio frequency (RF) signals. It sends them to the LNA/Diplexer (LNA/DIP).

The LNA/DIP increases the power level of the received signals. The LNA/DIP sends the amplified RF signals through the high speed data unit (HSDU) to the satellite data unit (SDU).

The satellite data unit (SDU) receives the amplified signals and changes the RF signals to intermediate frequency (IF) signals and demodulates them. The demodulated signals are sent to the AMU, the AIMS cabinets, or the AI.

ARO 001, 002

The high speed data unit (HSDU) receives the RF signals and changes them to Ethernet signals and sends the data to the IFE system.

ARO ALL**Signal Flow - Transmit****ARO 001, 002**

The IFE system sends the transmit (Ethernet) signals to the HSDU. The HSDU changes the Ethernet signals to RF signals and sends it to the SDU.

ARO ALL

The AMU, AIMS or AI sends transmit signals to the SDU. The SDU modulates the signals and sends them to the HPA.

The HSDU sends the RF signals through the radio frequency attenuator to the high power amplifier (HPA).

The HPA increases signal strength and sends the signal to the low noise amplifier/diplexer (LNA/DIP).

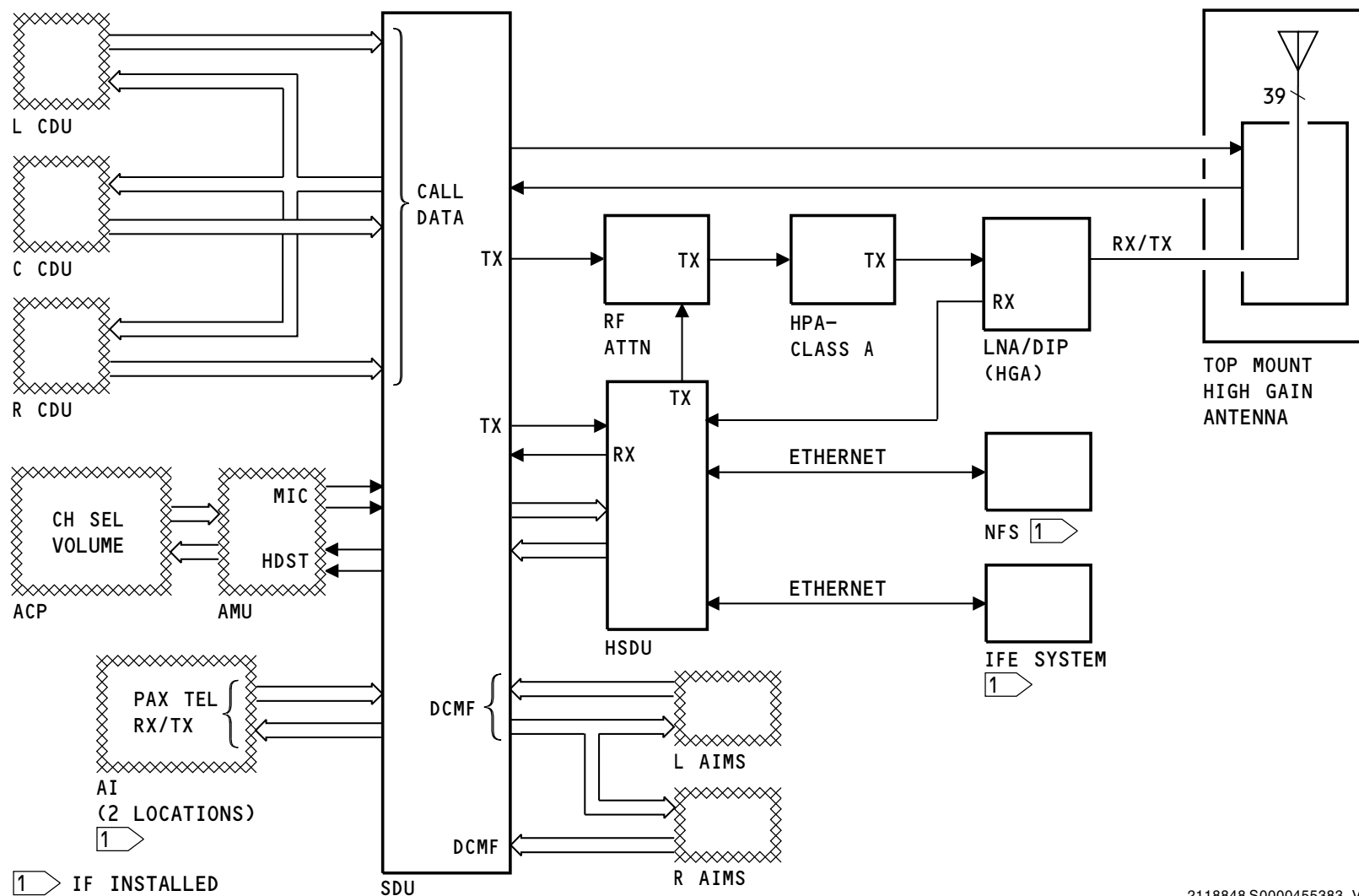
The LNA/DIP sends the RF signal to the top mounted high gain antenna (HGA). The HGA receives beam steering information from the satellite data unit (SDU). The HGA electronically steers the RF signals to the satellite by sending them through the antenna arrays in an aligned beam.

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ARO ALL	

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SATCOM SYSTEM - VOICE AND DATA TRANSMIT/RECEIVE INTERFACES

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SATCOM SYSTEM - CONTROL AND STATUS INTERFACES

General

The satellite data unit (SDU) supplies control and failure data for the SATCOM system.

These components have an interface with the SDU for control and status data:

- High power amplifier (HPA)
- Low noise amplifier/diplexers (LNA/DIPs)

ARO 001, 002

- High speed data unit (HSDU)

ARO ALL

- High gain antenna (HGA)
- Airplane information management system (AIMS)
- Control display units (CDUs)

High Power Amplifier

The high power amplifier (HPA) receives control signals from the SDU. The HPA receives the control signals to adjust the output of the transmit signals. The HPA sends BITE data to the SDU.

Low Noise Amplifier/Diplexer

The LNA/DIP receives on/off control from the high gain antenna (HGA). The LNA/DIP sends BITE data to the HGA.

ARO 001, 002**High speed data unit**

The high speed data unit receives status data and control signals from the SDU. The HSDU sends status, frequency and power control data to the SDU.

ARO ALL**High gain antenna (HGA)**

The top-mounted high gain antenna (HGA) contains an integrated beam steering function. The HGA receives the steering control signals from the SDU. The beam steering function maintains the transmitted beam performance with aircraft attitude rates of change. The HGA sends BSU BITE data to the SDU.

Airplane Information Management System (AIMS)

The central maintenance computing function (CMCF) in the airplane information management system (AIMS) receives SATCOM system BITE data from the SDU.

AIMS sends this data to the SDU:

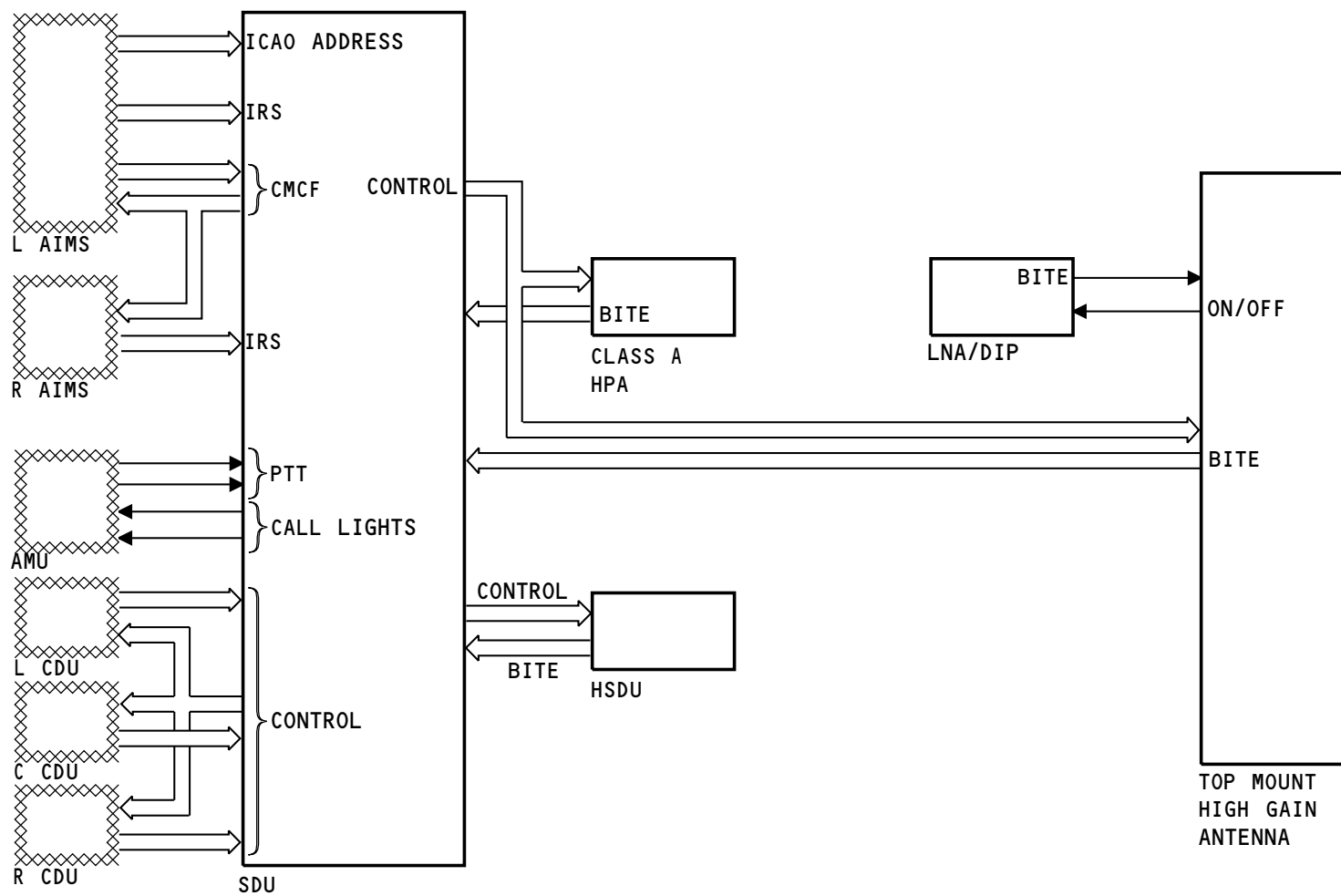
- International Civil Aviation Organization (ICAO) address
- Inertial reference data
- Software for system configuration
- Data load enable
- BITE commands.

Audio Management Unit

The audio management unit (AMU) sends PTT signals to the SDU. The SDU sends call light signals to the AMU.

Control Display Units

The flight crew uses the control display units (CDUs) to send control signals to the SDU for SATCOM system operation.



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SATCOM SYSTEM - CONTROL AND STATUS INTERFACES

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**SATCOM SYSTEM - SATELLITE DATA UNIT****Purpose**

The satellite data unit (SDU) is the system interface and controller for the SATCOM system. It contains system operation software. The SDU also contains position and frequency data for each satellite.

Physical Description

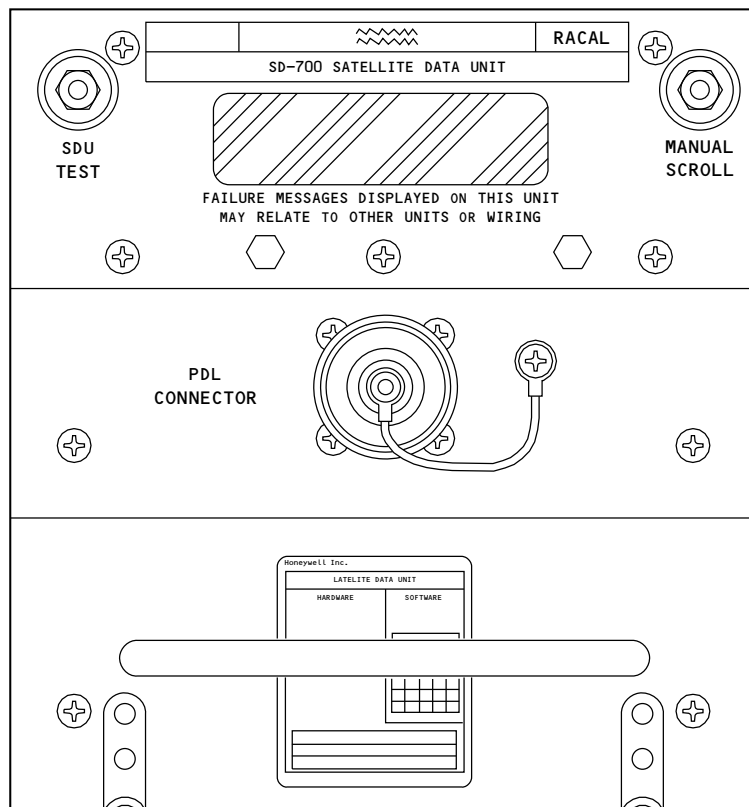
The SDU is a 6 MCU LRU and weighs 22 pounds.

The SDU has these controls and indicators on the front panel:

- SDU TEST switch - Push this button to start a SATCOM test.
- SYSTEM STATUS DISPLAY - this display lists the test failure messages, the system LRU part numbers, and the ORT identification.
- MANUAL SCROLL - push this button to scroll through the messages on the failure message display

The Satellite Data Unit (SDU) has these approximate physical characteristics:

- Height: 7.624 in. (19.36 cm)
- Width: 7.51 in. (19.08 cm)
- Depth: 15.26 in. (38.76 cm)
- Weight: 21.9 lb (9.9 kg)



SATCOM SYSTEM - SATELLITE DATA UNIT

W54283 S0000125902_V1

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**SATCOM SYSTEM - ATTENUATOR****Purpose**

The attenuator adjusts the radio frequency signal level to make the output from the RFU compatible to the input level needed for the HPA.

The attenuator adjusts the radio frequency signal level to make the output from the HSDU compatible to the input level needed for the SDU.

Physical Description

The attenuator has these properties:

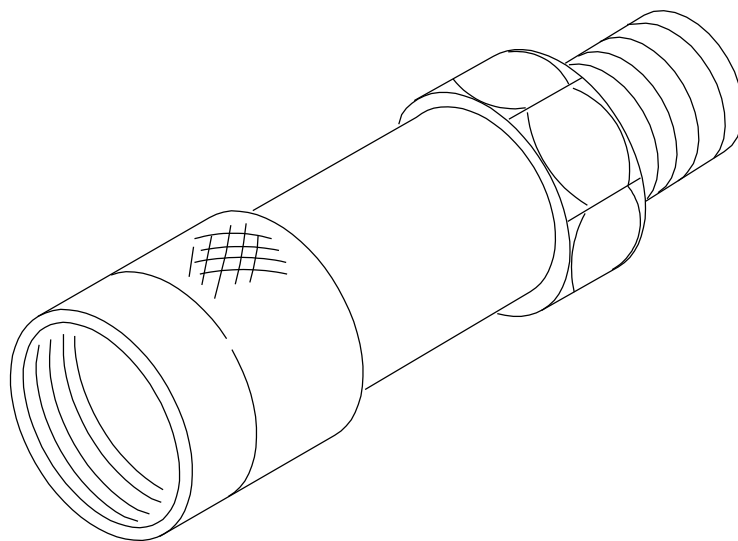
- Length - 2 inches
- Diameter - .5 inches
- Weight - 1.3 ounces.

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SATCOM SYSTEM - ATTENUATOR

M38023 S000612965_V2

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**SATCOM SYSTEM - LOW NOISE AMPLIFIER/DIPLEXER****Purpose**

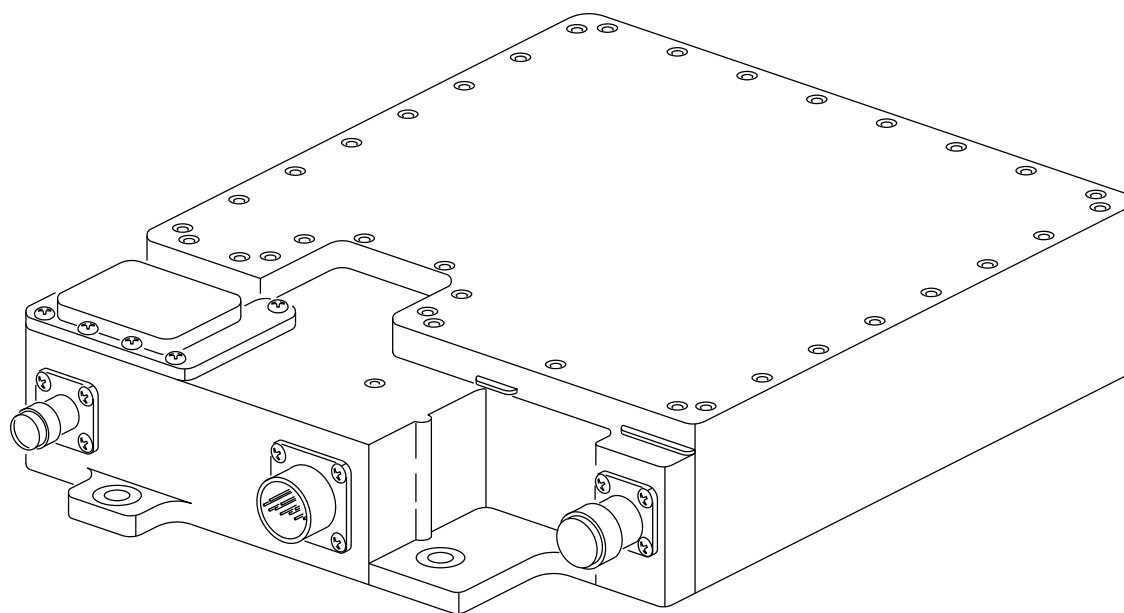
The low noise amplifier/diplexer (LNA/DIP) is a filter and an amplifier. It lets the SATCOM system receive and transmit signals at the same time. It also increases the strength of received low level satellite signals.

Physical Description

The LAN/DIP has these properties:

- Length - 11 inches
- Width - 7.8 inches
- Height - 2 inches
- Weight - 6.6 pounds.

ARO ALL	EFFECTIVITY
	D633W101-ARO



SATCOM SYSTEM - DIPLEXER/LOW NOISE AMPLIFIER

1581378 S0000298103_V1

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ARO ALL	EFFECTIVITY

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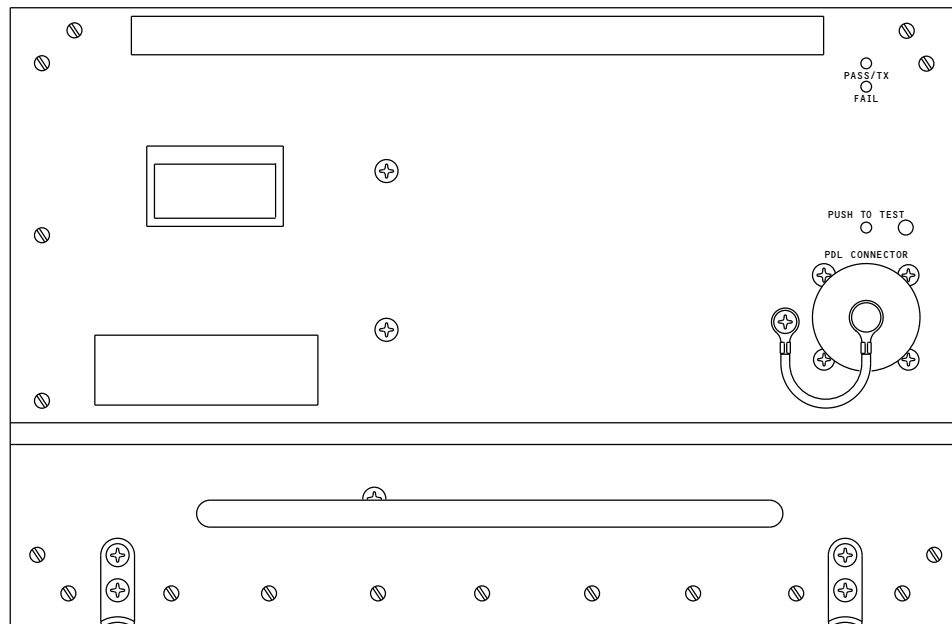
**SATCOM SYSTEM - HIGH POWER AMPLIFIER****Purpose**

The class A high power amplifier (HPA) increases the signal strength of transmit signals to the SATCOM antennas by as much as 60 watts.

Physical Description

The class A HPA is an 8 MCU LRU and weighs 32 pounds. It has these front panel controls and indicators:

- PASS LED - shows green after a test if there are no HPA failures
- FAIL LED - shows red after a test if there are HPA failures
- PUSH TO TEST switch - push this switch to start a test of the HPA.



SATCOM SYSTEM - HIGH POWER AMPLIFIER

1520456 S0000277829_V1

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**SATCOM SYSTEM - HIGH SPEED DATA UNIT****Purpose**

The high speed data unit interfaces with the SATCOM system to provide a two-way communications channel. This channel is used to send and receive data.

Physical Description

The high speed data unit (HSDU) has these approximate physical characteristics.

- Height: 7.64 in. (19.41 cm)
- Width: 4.88 in. (12.40 cm)
- Length 15.22 in. (38.66 cm)
- Weight: 15.4 lb (7.0 kg)

The high speed data unit (HSDU) has these front panel LED's:

- PASS: Shows green after a test, if no failures are detected in the HSDU.
- FAIL: Shows red after a test, if failures are detected in the HSDU.

The high speed data unit has the following button:

- PUSH TO TEST: Push this button to start a test of the HSDU.

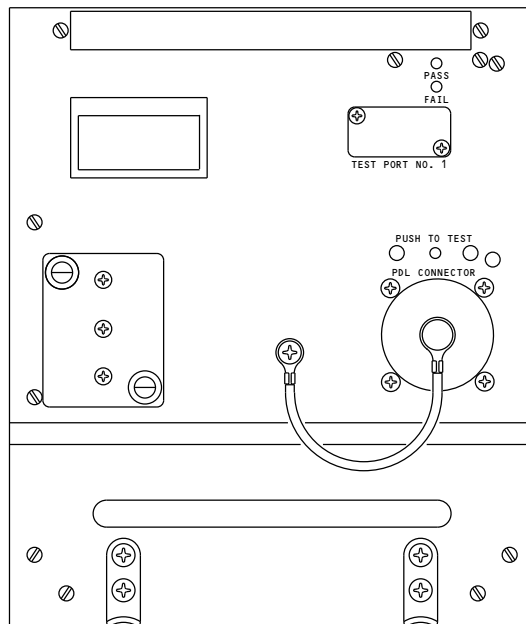
Front panel BITE test

Do the steps below to do a bite test of the HSDU at the front panel of the HSDU.

- Push and release the PUSH TO TEST button on the front panel of HSDU.
- Make sure the LEDs flashing on and off during the test.

- At the end of the test, make sure the PASS LED (green) comes on continuously for approximately 30 seconds and goes off.

NOTE: If the FAIL LED comes on continuously during the test, this shows that the HSDU finds at least one active continuous monitoring (CM) failure with its own Level I code. If the HSDU finds only functional test failures and no CM failure, the FAIL LED comes on continuously at the end of the test for approximately 30 seconds and then goes off.



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SATCOM SYSTEM - HIGH SPEED DATA UNIT

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**SATCOM SYSTEM - HIGH GAIN ANTENNA****Purpose**

The top mount high gain antenna (HGA) transmits and receives signals.

Functional Description

The HGA transmits signals from the low noise amplifier/diplexer (LNA/DIP). As the signal enters the antenna it goes through power divider/combiners. The signal divides into 32 identical signals. Each signal goes to an individual phase shift element. Each element phase shifts the signal. The phase shift aligns the signals in the antenna elements into a thin beam aimed at the satellite.

Physical Description

The HGA has an array of 32 elements in an aerodynamic dome.

The HGA has these properties:

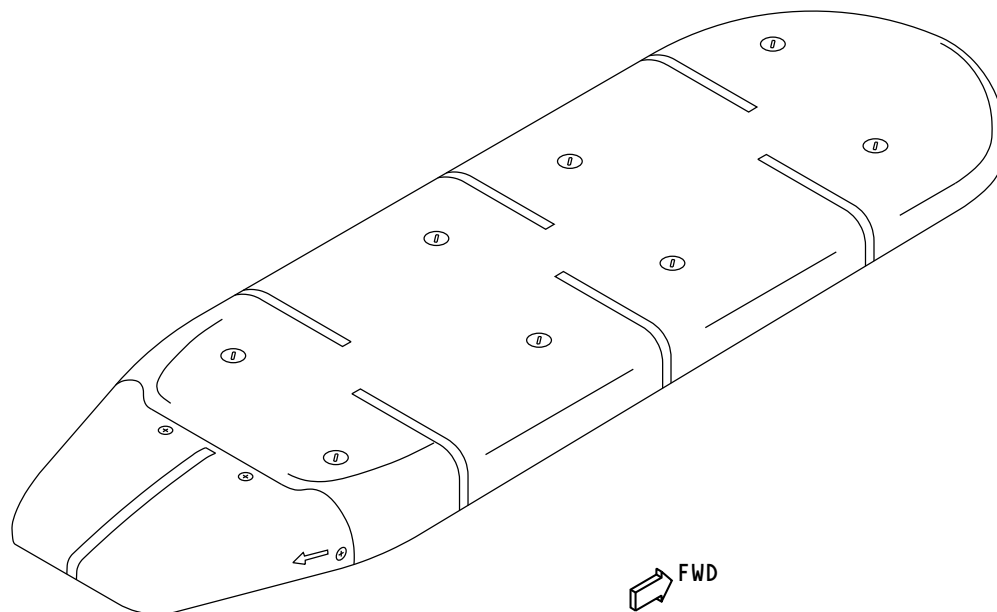
- Length: 41.34 in. (1050 mm)
- Height: 1.91 in. (48.4 mm)
- Width: 11.77 in. (299 mm)
- Weight: 22 lb (10 kg)

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SATCOM SYSTEM - HIGH GAIN ANTENNA

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**SATCOM SYSTEM - SATELLITE DATA UNIT FUNCTIONAL DESCRIPTION****General**

The satellite data unit (SDU) is the system interface and controller for the SATCOM system. It contains system operation programs.

The SDU has these components:

- Radio frequency module
- Seven modulator/demodulators (modems)
- ARINC 429 input/output (I/O)
- Audio interface
- System processor
- 10.08 MHz precision oscillator
- Front panel

The SDU supplies six voice communication channels and one data communication channel.

Radio Frequency Module

The radio frequency module (RFM) processes the transmit and receive data. The radio frequency module gets the radio frequency (RF) receive signals from the LNA/Diplexer. It changes the RF data to intermediate frequencies (IF) and sends them to the modems. The radio frequency module gets the IF transmit signals from the modems. It changes the IF signals to RF data and sends them to the HPA.

Modem

The modems demodulate the intermediate frequency signals from the radio frequency module. They change the inputs to digital and send them to the system processor. They also get digital data from the system processor, change it to IF and send it to the radio frequency module.

ARINC 429 Input/Output Circuits

The ARINC 429 input/output (I/O) circuits control the interface between SATCOM components and other systems.

The SDU gets manual commands and data entries from the control display units (CDUs) on the CDU buses. The SDU sends BITE status and system configuration data to the CDUs on the SDU bus.

The SDU gets the following data from AIMS:

- Airplane position (inertial reference system (IRS) bus from left and right AIMS cabinets)
- Airplane identification number and digital communication data (data communication management function (DCMF) bus from left and right AIMS cabinets)
- Date, time and flight data (CMCS left bus from left AIMS cabinet)
- ICAO Address and position data (GP#1 Bus from left AIMS cabinet)
- Data load data (data load bus from the left AIMS cabinet)
- Data load discrete (from the left AIMS cabinet)
- Control and BITE signals (central maintenance computer (CMC) bus from the left AIMS cabinet).

The SDU sends the following data to the AIMS cabinets:

- SDU status and BITE data (CMC bus to both left and right AIMS cabinets)
- Data load data (data load bus to left AIMS cabinet)
- Digital communication data (data communication management function (DCMF) bus to both left and right AIMS cabinets).

The SDU also sends and gets BITE and control data from these units:

- High power amplifier (HPA)

ARO 001, 002

- High speed data unit (HSDU).

ARO ALL

- High gain antenna (HGA) with integrated beam steering unit function.

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SATCOM SYSTEM - SATELLITE DATA UNIT FUNCTIONAL DESCRIPTION

ARO 001, 002

The SDU uses a cross talk bus to send and receive status and control signals to the HSDU.

ARO ALL

Audio Interface

The audio interface connects the SDU to the audio management unit (AMU). It changes the analog audio from the AMU to digital data for the SDU. It also changes the digital SDU data to analog voice signals for the AMU.

System Processor

The system processor controls all operations of the satellite data unit and operates the complete SATCOM system. It sends call lights signals to the AMU. The memory keeps data for:

- System operation
- Satellite identification
- Ground station identification
- Channel frequencies.

You use switch inputs from the front panel to make the processor start a test of the SDU. The processor sends display data to the front panel to show the status of the test.

10.08 MHz Precision Oscillator

The SATCOM system uses this oscillator as a precise reference for the modulation and demodulation of the RF signals. The SDU also uses it as its base reference frequency for the processor.

ARO 001, 002

High Speed Data Unit

The SDU connects with the HSDU to provide one channel of data. The SDU has the following interfaces with the HSDU: RF, Discrete & ARINC 429.

The RF interface is used to send data from the HSDU to the SDU. The Discrete interface is used by the SDU to enable or disable the HSDU. The ARINC 429 interface is used to send control and get status data from the HSDU.

ARO ALL

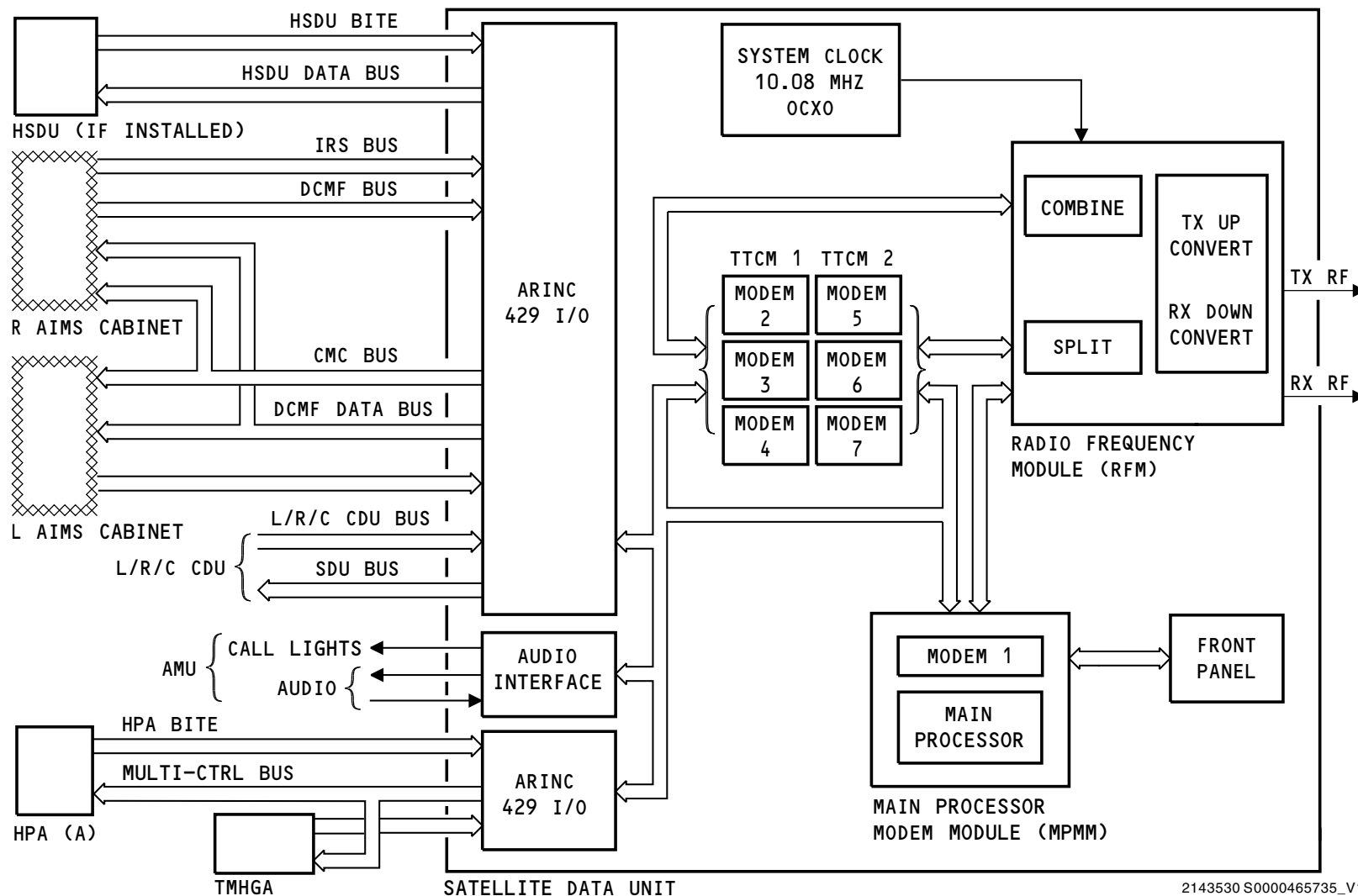
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SATCOM SYSTEM - SATELLITE DATA UNIT FUNCTIONAL DESCRIPTION

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**SATCOM SYSTEM - LOW NOISE AMPLIFIER/DIPLEXER FUNCTIONAL DESCRIPTION****General**

The low noise amplifier/diplexer (LNA/DIP) increases the strength and filters RF signals.

The LNA/DIP has these parts:

- Low noise amplifier
- Diplexer
- Transmit/receive switch
- BITE board.

Low Noise Amplifier

The low noise amplifier increases the strength of the received RF signals from the antennas and sends them to the satellite data unit (SDU).

Diplexer

The diplexer has two filters: one for the transmit signal and one for the receive signal. The transmit filter lets signals pass from the class A high power amplifier (HPA) to the top mount high gain antenna (HGA). The receive filter lets the signal pass from the HGA to the low noise amplifier. The filters prevent signal interference from other components.

Transmit/Receive Switch

The transmit/receive switch connects the diplexer to the HGA. In the transmit mode, it receives the RF signal from the transmit filter in the diplexer and sends it to the HGA. In the receive mode, it receives the RF signal from the HGA, and sends it to the receive filter in the diplexer.

BITE Board

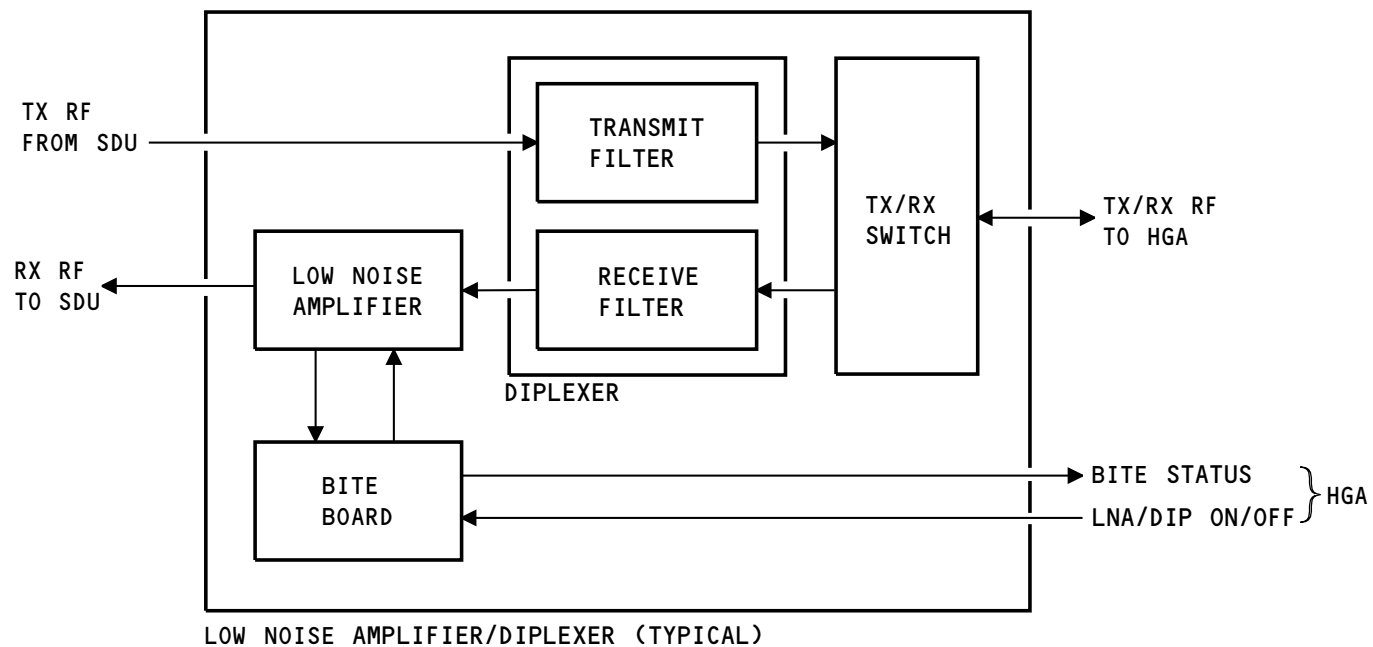
The BITE board monitors the LNA/DIP on/off signal. The LNA/DIP gets this signal from a HGA to turn on or turn off the LNA/DIP. The BITE board also monitors the amplifier current and sends failure data to the related HGA.

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SATCOM SYSTEM - LOW NOISE AMPLIFIER/DIPLEXER FUNCTIONAL DESCRIPTION

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**SATCOM SYSTEM - HIGH POWER AMPLIFIER FUNCTIONAL DESCRIPTION****General**

The class A high power amplifier (HPA) increases the signal strength of the RF signal. The HPA sends the RF signal to the low noise amplifier/diplexer (LNA/DIP) for the high gain antenna (HGA).

The HPA has these parts:

- RF assembly
- Input/output (I/O) processor
- Thermal monitor.

RF Assembly

The RF assembly also monitors the reflected power level, forward power level, and RF input power level. It sends this data to the I/O processor. The levels of these signals tell the I/O processor how to adjust the gain of the amplifier.

Input/Output Processor

The processor monitors:

- Reflected power
- Forward power
- RF power input
- Amplifier temperature
- Power supply operations.

In an over-temperature condition, the I/O processor sends output power control signals to the RF assembly. This decreases the output power and gives the amplifier circuits time to cool.

The processor sends HPA status to the SDU on an ARINC 429 data bus.

Thermal Monitor

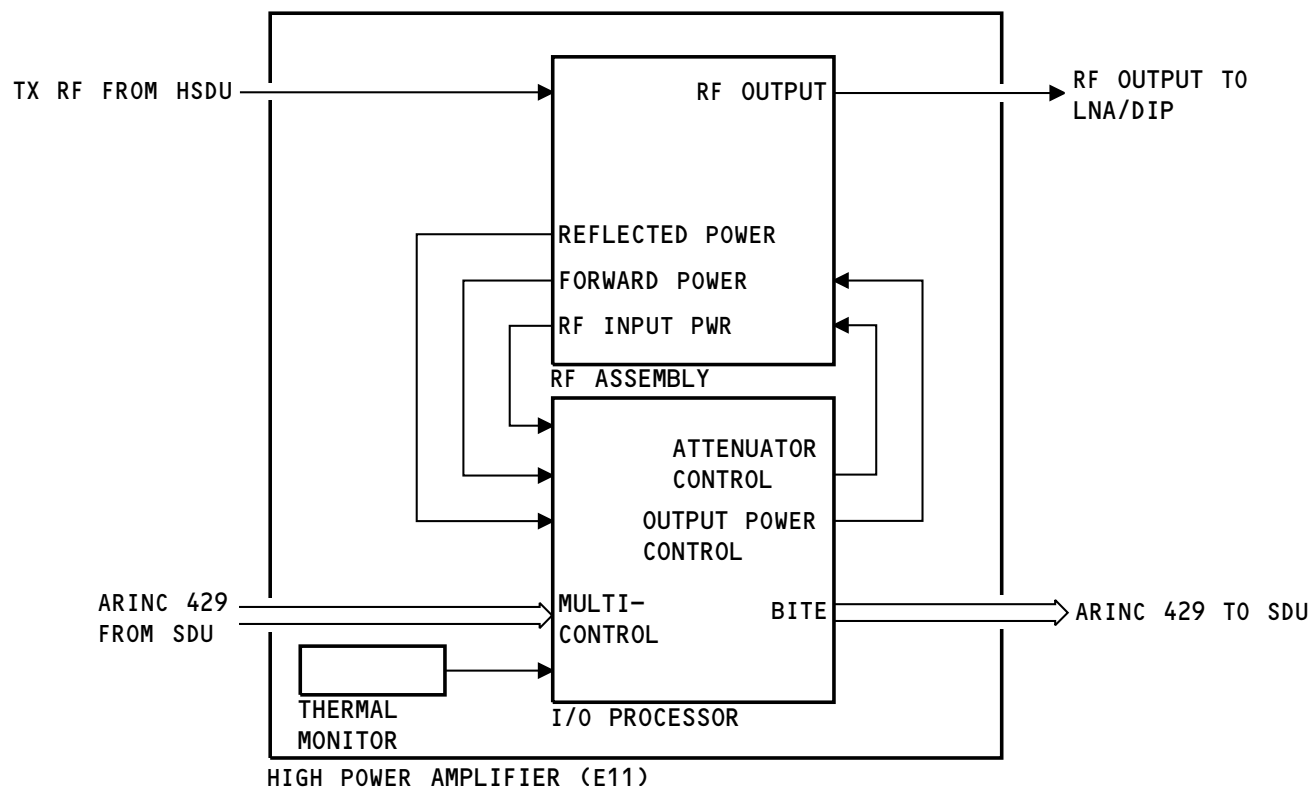
The thermal monitor tells the I/O processor of high temperature conditions in the HPA.

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SATCOM SYSTEM - HIGH POWER AMPLIFIER FUNCTIONAL DESCRIPTION

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SATCOM SYSTEM - HIGH SPEED DATA UNIT FUNCTIONAL DESCRIPTION

General

The high speed data unit (HSDU) interfaces with other components in the SATCOM system to provide a two-way communications channel. This channel is used to send and receive data signals.

The HSDU can support one of the following data channel service formats:

- Inmarsat 64 kbps packet services (MPDS).
- Inmarsat circuit mode services (M4).
- SwiftBroadband services.

The HSDU has these components:

- Control Processor
- Data Input/Output Module
- Configuration Data Module
- Channel Cards
- RF Module
- Power Supply Unit

Functional Description

The high speed data unit provides additional channels for high speed data services (Swift 64 or SwiftBroadband) to the SATCOM system. The numbers of additional channels are depending on the configuration of the SATCOM system:

- 4 channels of Swift 64
- 2 channels of swift 64 and 1 channel of SwiftBroadband
- 2 channels of SwiftBroadband

The HSDU has a transmit path and a receive path for data. For transmitting, the HSDU receives data from the Network File Sever (NFS) or the In-Flight Entertainment (IFE) system (i.e. Airplane Interface unit (AI) or Top Connect Server) via an Ethernet connection, changes the data to an RF signal and sends it to the SDU. The SDU sends the data to the SATCOM Network. For receiving, the LNA/DIP sends RF signals to the HSDU where it is changed to an Ethernet format and sent to the NFS or the IFE system.

The HSDU has the following types of interfaces.

- ARINC 429
- Discrete
- Radio Frequency (RF)
- Ethernet

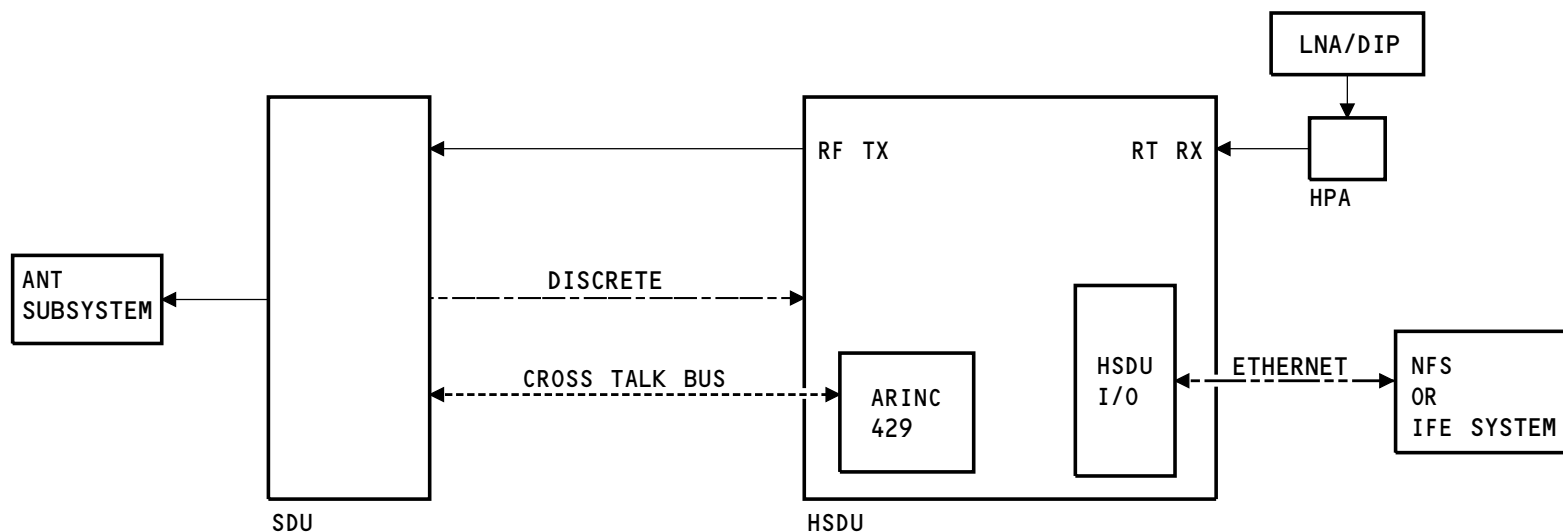
The ARINC 429 interface is used for a crosstalk bus between the SDU and the HSDU.

The Discrete interface is used to provide the status data of the HSDU and give the SDU the capability of enabling/disabling the transmit function of the HSDU.

The Radio Frequency RF interface is used to send and receive either M4 or MPDS data. For transmitting RF signals are sent to the SDU for transmission to the SATCOM network.

For receiving RF signals are sent from the LNA/DIP through HPA to the HSDU.

The Ethernet interface is used to send and receive data from the Network File Server or the IFE system.



LEGEND:

- RF
- - - - - ARINC 429
- - - DISCRETE
- - - ETHERNET

1521155 S0000277949_V3

SATCOM SYSTEM - HIGH SPEED DATA UNIT FUNCTIONAL DESCRIPTION

23-15-00

EFFECTIVITY
ARO 001, 002

D633W101-ARO

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**SATCOM SYSTEM - CONTROL AND STATUS PAGES****General**

The control display unit (CDU) has SATCOM pages that give control and status of the SATCOM system.

Satcom Main Menu

The SATCOM main menu shows:

- The name selected for call on channel 1 or 2.
- Call controls
- SATCOM directory access
- Log-on menu access
- CONFIG.
- Access to SATCOM submenus.

For each channel, SATCOM shows these items:

- Channel status
- Call connection commands
- Call disconnect commands
- The call destination name chosen from the directory.

SATCOM Submenu

The submenu shows the current log-on status of SATCOM. It also has selections to let you control the log-on and log-off. Other selections let you see the status of each channel and check the configuration of LRUs.

SATCOM Directory

The SATCOM directory pages show the labels for each phone number in the directory.

CHAN STATUS

The SAT CHANNEL STATUS page shows the status of a SATCOM channel.

ARO 001, 002

The SAT CHANNEL STATUS page also shows selection for HSD CHANNEL STATUS.

HSD CHANNEL STATUS

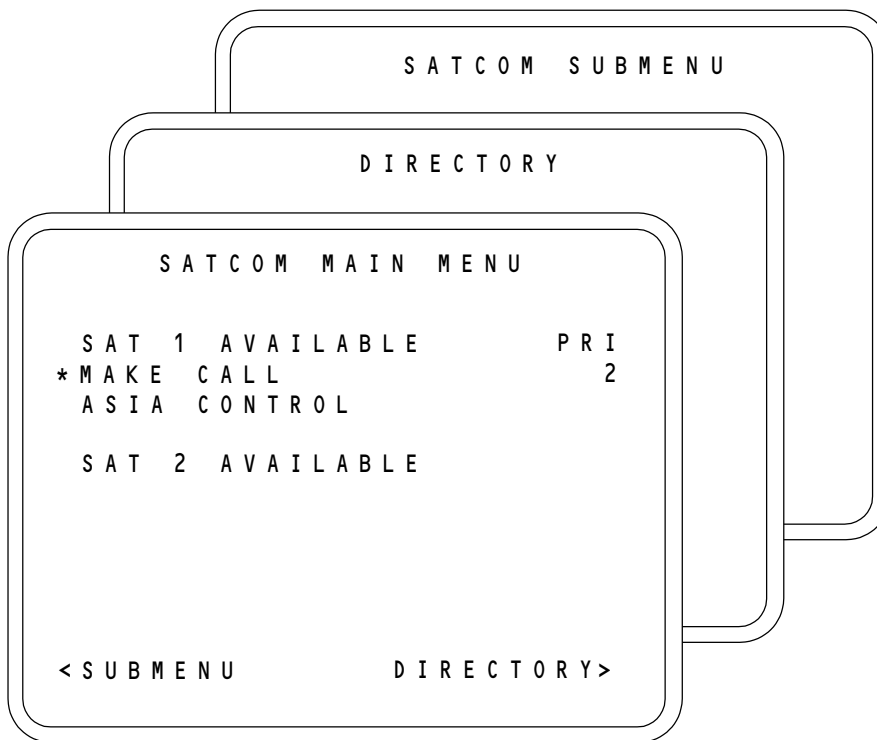
The HSD CHANNEL STATUS page shows “ready to connect” or “in use mpds”. This is to let you know that the HSDU is logged on and ready for high speed data operation (Swift64 or SwiftBroadband).

ARO ALL**23-15-00**

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SATCOM SYSTEM - CONTROL AND STATUS PAGES

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SATCOM SYSTEM - LOG ON

General

To use the SATCOM system, the airplane must log-on to a communication service company.

Automatic Log-On

An automatic log-on occurs when the system powers up. The SATCOM system uses satellite frequencies in memory to find a satellite transmit signal. When the SATCOM system finds an active frequency from the satellite, it locks on to it. The system then uses the satellite as a relay to log-on to a ground station.

After the airplane is logged on, the log-on data goes to all ground station networks so that any of the ground stations can locate a specified airplane SATCOM system.

Manual Log-On

Use the control display unit (CDU) to see the SATCOM main menu. Push the line select key (LSK) adjacent to SUBMENU. The submenu shows the log-on state and allows access to the log-on, status, and maintenance screens.

On the SATCOM submenu, push the LSK adjacent to LOG-ON. This shows the log-on screen for the SATCOM system.

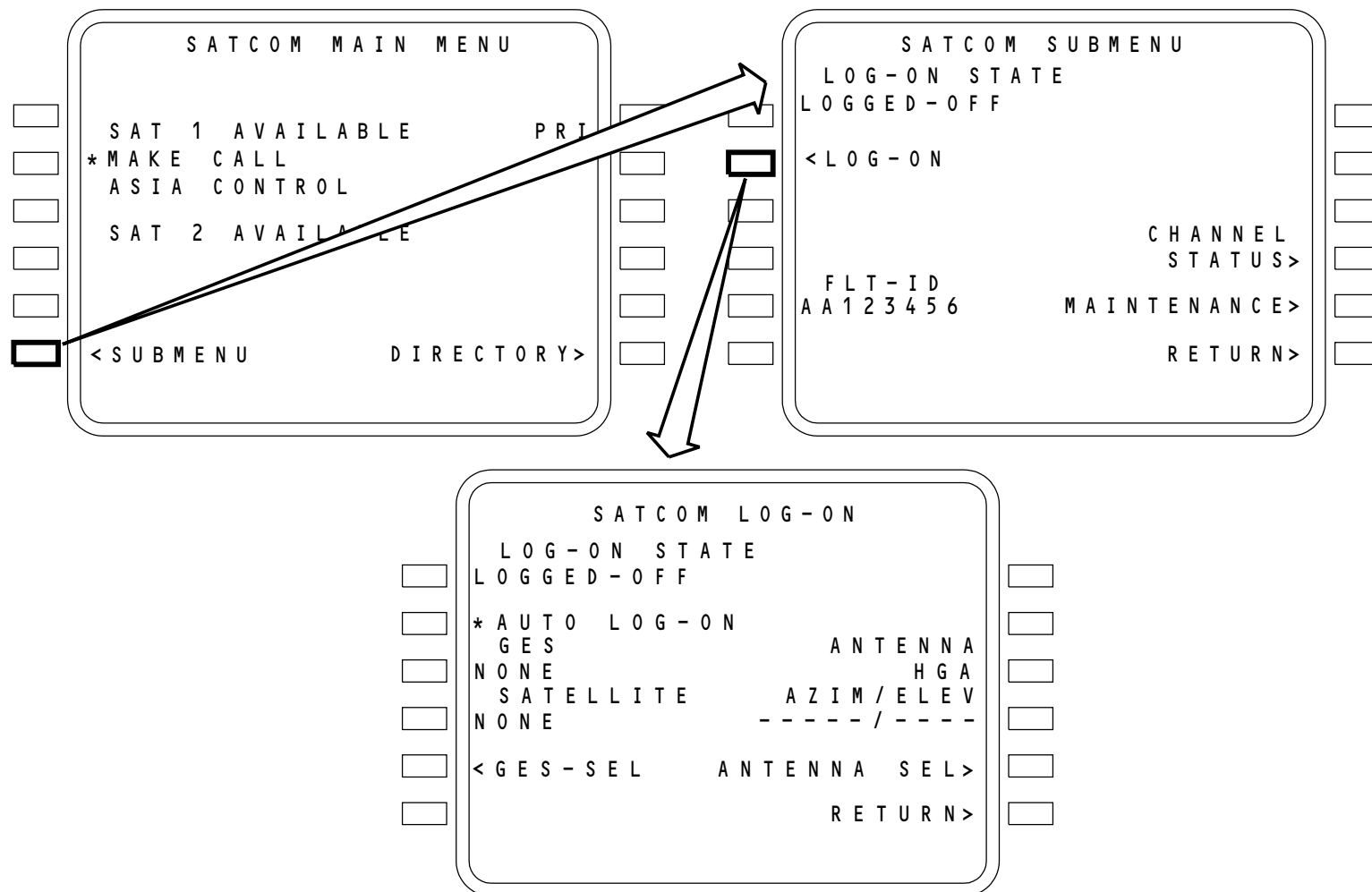
The SATCOM log-on screen shows these:

- The log-on state
- The ground earth station (GES) logged on
- The satellite in use.

If the system is logged off, select the LSK adjacent to *AUTO LOG-ON to make the system automatically log-on to a satellite and GES. You may also push the LSK adjacent to GES-SEL to show a list of ground earth stations. From this screen, you may select a GES and log-on.

An airplane can only log-on to one ground station at a time. However, the airplane does not have to get all communication services from that ground station. The airplane may use other links with other ground stations. A typical multi-ground station operation permits an airplane to do these functions:

- Keep data links with the airline operations base
- Talk to an air traffic control (ATC) center through the log-on ground station
- Operate passenger communications through a different ground station.



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SATCOM SYSTEM - LOG ON

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**SATCOM SYSTEM - VOICE OPERATIONS****General**

The flight crew uses the control display units (CDUs) and audio control panels (ACPs) to control the voice mode of the SATCOM system.

Outgoing Calls

Push a SATCOM transmitter select switch on the ACP. Adjust the volume with the related SAT receiver control.

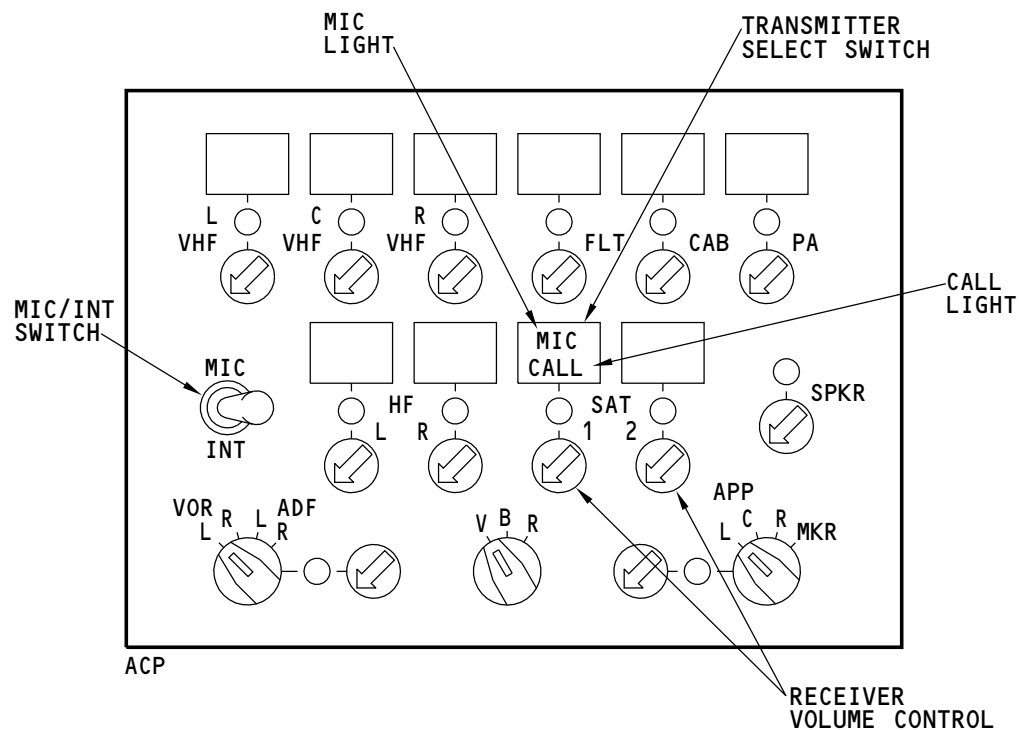
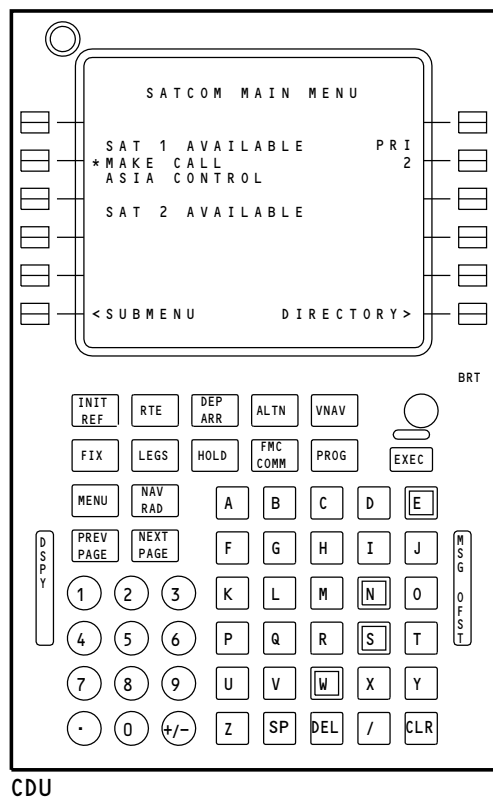
Push the MENU key on the CDU and then push the line select key (LSK) adjacent to <SAT. The SATCOM MAIN MENU shows on the CDU.

Push the LSK adjacent to DIRECTORY to show the categories of numbers (1 through 4). Push the adjacent LSK to show the list of numbers in the category. Push the LSK next to the name you want to call. The SATCOM system automatically starts the call and returns to the SATCOM MAIN MENU. When the call is connected to the called station, the related SAT CALL light comes on, the SELCAL message shows on EICAS, and you hear the ringback tone in the headset.

When the called party answers, you can push any MIC/interphone switch and speak into the microphone. You do not need to release the MIC/interphone switch to listen. When you finish the call, push the LSK adjacent to END CALL from the SATCOM-MAIN MENU.

SATCOM Voice Link

If the SATCOM voice link is not complete, EICAS shows the SATVOICE LOST message.



SATCOM SYSTEM - VOICE OPERATIONS

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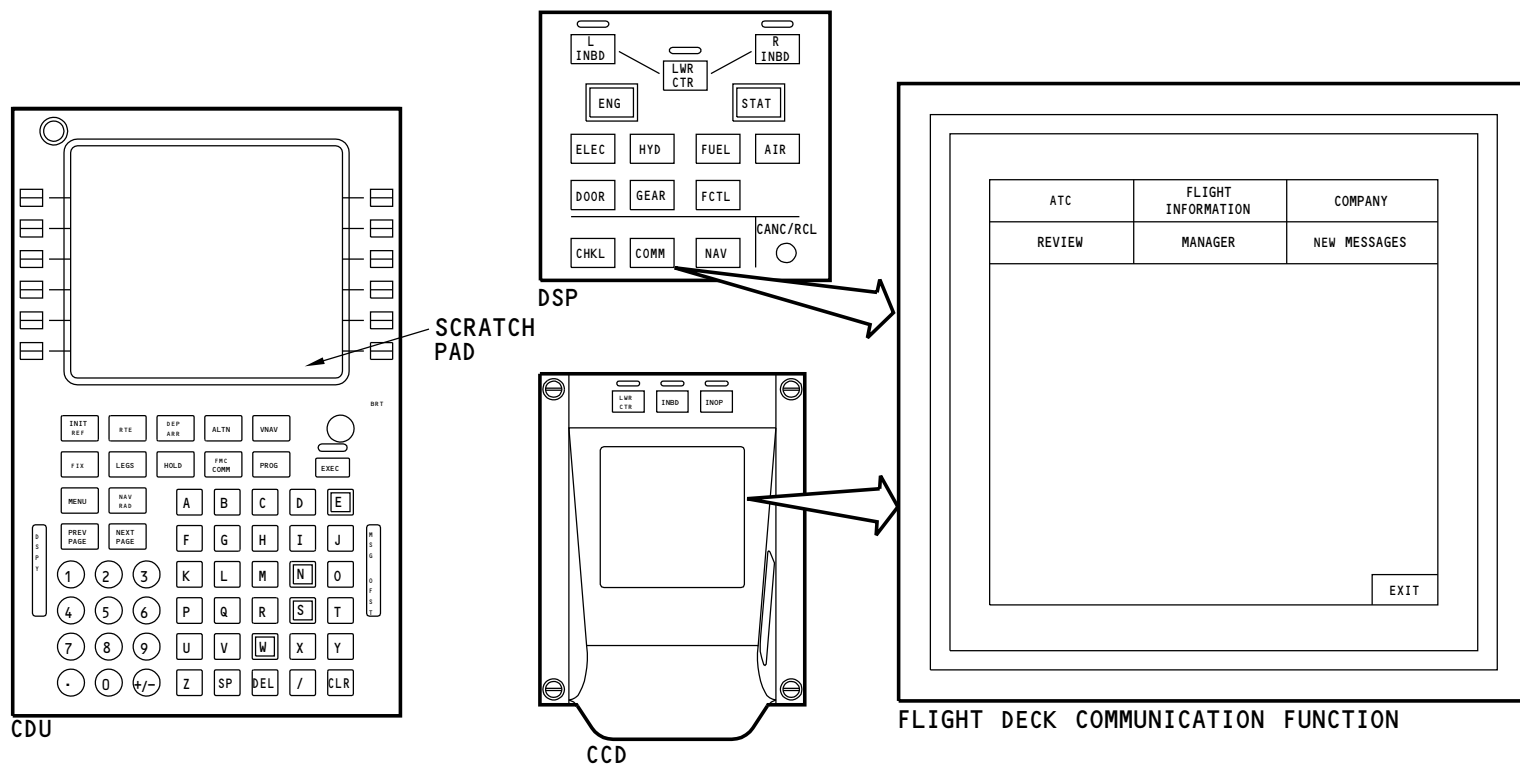
**SATCOM SYSTEM - DATA OPERATIONS****Outbound Datalink**

Push the COMM button on the display select panel (DSP) to access the flight deck communication function (FDCF). The communication page shows on the selected display unit.

Use the cursor control device (CCD) to select the MANAGER menu from the main menu. Select the ACARS menu. Use the ACARS menu to select SATCOM for downlink. Use the control display unit (CDU) keyboard and the FDCF COMPANY menu to send a free text message.

Inbound Data link

When the airplane receives a data message through SATCOM, a chime sounds and a COMM or PRINTER message shows on the EICAS display. The COMM EICAS message tells you to read the message on the communication page under the NEW MESSAGES menu. The PRINTER message tells you the message is on the flight deck printer.



SATCOM SYSTEM - DATA OPERATIONS

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**SATCOM SYSTEM - BITE****General**

The SATCOM system has interfaces with the central maintenance computer system (CMCS) through the airplane information management system (AIMS). Use the maintenance access terminal (MAT) or the control display unit (CDU) to do a test and to review SATCOM test data.

Built-In Test Equipment (BITE)

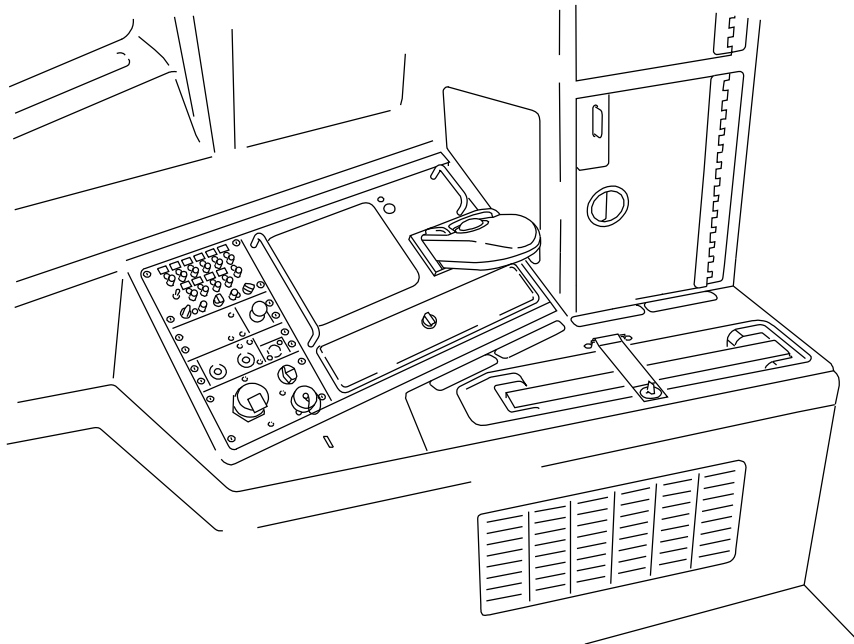
The SATCOM system has BITE to monitor line replaceable units (LRUs). At power-up, BITE automatically does a test of the system components. Use the MAT or SATCOM MAINTENANCE screen on the CDU to start a manual BITE test.

SATCOM reports all BITE-detected faults to the on-board maintenance system (OMS). Use the MAT to get access to the OMS to get fault data. Use the CDU to get access to BITE-detected faults and system failures in the satellite data unit (SDU).

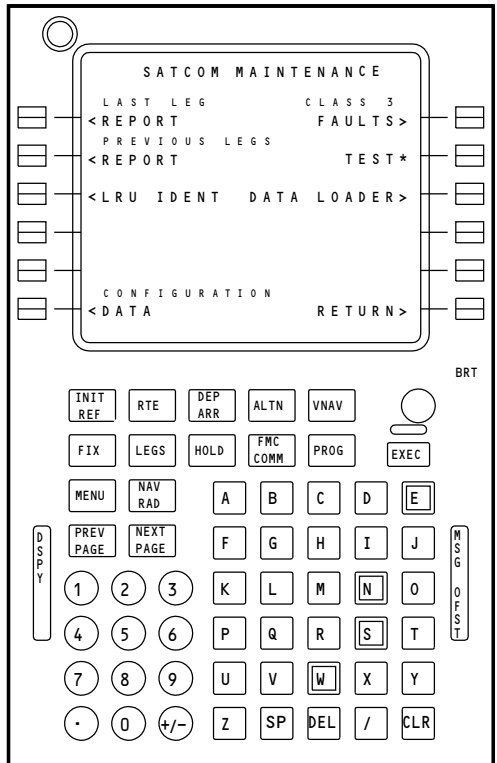
ARO ALL	EFFECTIVITY

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MAT



CDU

SATCOM SYSTEM - BITE

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**SATCOM SYSTEM - SYSTEM TESTS****General**

Use a maintenance access terminal to do the SATCOM system tests. To do a complete system test, you also need to make a call.

SATCOM System Test

The test does a check of the SATCOM system equipment and the data bus inputs to the system. The test takes between 2 and 5 minutes to complete. To run the test, select CONTINUE.

NOTE: All SATCOM communications stop during this test. If SATCOM communications are in progress, they are disconnected when you do this test.

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GROUND TESTS

SELECT ATA SYSTEM (55)

22 AUTOPILOT FLIGHT DIRECTOR SYSTEM
23 AIRS DATA COMMUNICATION MANAGEMENT
23 HF COMMUNICATION SYSTEM
23 VHF COMMUNICATION SYSTEM
23 SATELLITE COMMUNICATIONS (SATCOM) SYSTEM
23 DIGITAL CONTROL AUDIO SYSTEM
23 OVERHEAD PANEL ARINC 429 SYSTEM
24 ELMS P210 POWER MANAGEMENT PANEL
24 ELMS P110 POWER MANAGEMENT PANEL

SELECT TEST TYPE

SYSTEM TEST

OPERATIONAL TEST

ECCN DEPENDENT TEST

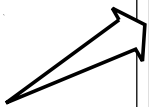
SELECT SYSTEM TEST (1)

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST (1)



SATCOM SYSTEM - SYSTEM TESTS

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**SATCOM SYSTEM - INTERFACE DIAGRAM****Interface Diagram**

C. For more details on the SATCOM System, refer to these wiring diagrams (WDM) and functional schematics (FS):

- WDM 23-15-12
- WDM 23-15-13
- WDM 23-15-15

ARO 001, 002

- WDM 23-15-17

ARO ALL

- FS 23-15-12
- FS 23-15-13
- FS 23-15-15

ARO 001, 002

- FS 23-15-17

ARO ALL**23-15-00****ARO ALL EFFECTIVITY**

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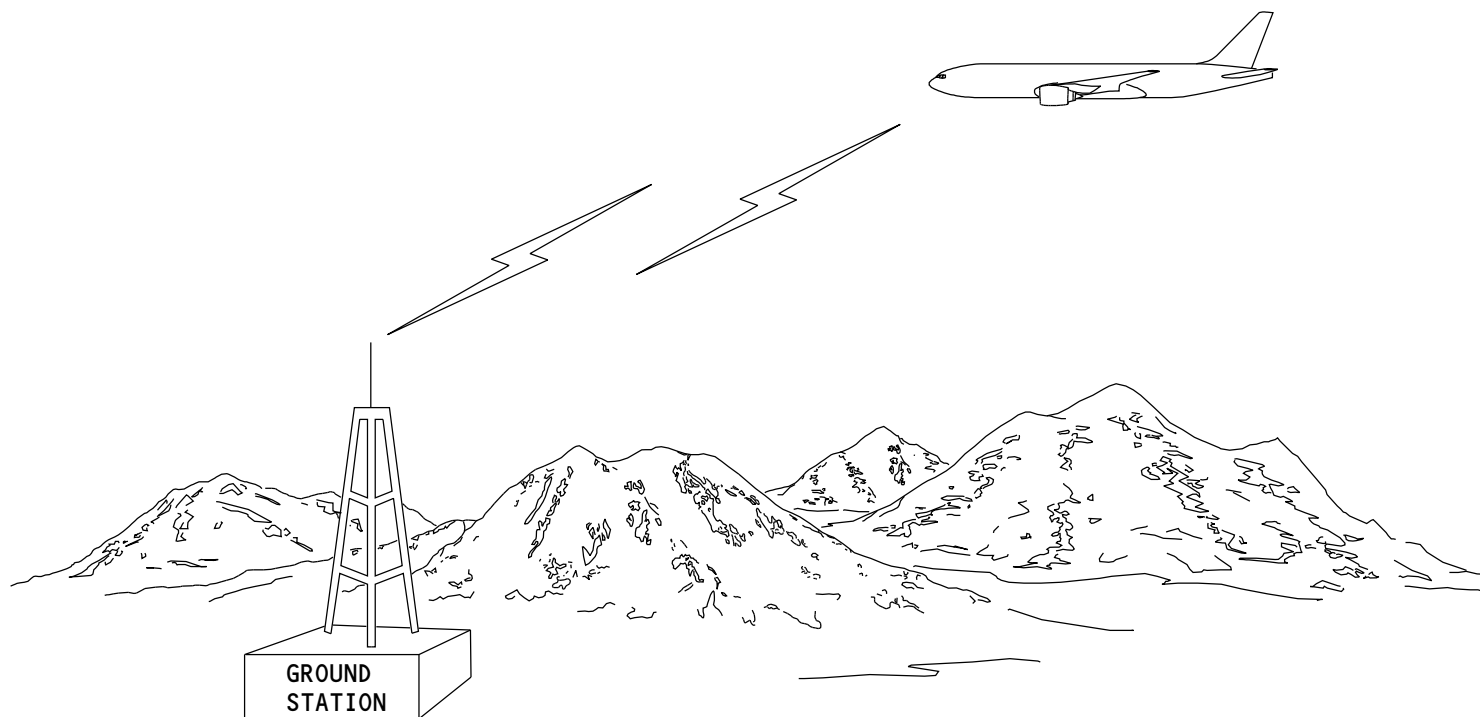
**SELCAL - INTRODUCTION****Purpose**

The selective calling (SELCAL) system tells the flight crew that there is a call from a ground station on a communication transceiver. Because the SELCAL system monitors all incoming signals, the flight crew does not need to continuously monitor the radio channels.

Abbreviations and Acronyms

- ACP - audio control panel
- AIMS - airplane information management system
- AMU - audio management unit
- COMM - communication
- HF - high frequency
- mic - microphone
- PDF - primary display function
- PTT - push to talk
- SELCAL - selective calling
- VHF - very high frequency
- WEU - warning electronic unit
- WES - warning electronic system

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SELCAL - INTRODUCTION

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SELCAL - GENERAL DESCRIPTION

General

Each airplane has a different SELCAL code. A ground station transmits this code with a signal to contact an airplane. When the airplane receives its SELCAL code, several flight deck indications come on to alert the flight crew.

HF and VHF Transceivers

The communication transceivers send received audio to the SELCAL decoder.

SELCAL Decoder

A SELCAL coding switch connects to the SELCAL decoder and gives each airplane its SELCAL code.

The SELCAL decoder monitors for audio tones. If the tones are the same as the code, the decoder sends a signal to the audio management unit.

Indications

The audio management unit (AMU) sends a signal to the AIMS cabinets. The AIMS primary display function (PDF) then makes a COMM medium message, SELCAL. The AIMS cabinets also send a chime request to the warning electronic units (WEUs). The WEUs make a chime signal and send it to the aural warning speakers.

The AMU also sends a signal to the audio control panels (ACPs). The ACPs turn on the call light for the transceiver that received the SELCAL code.

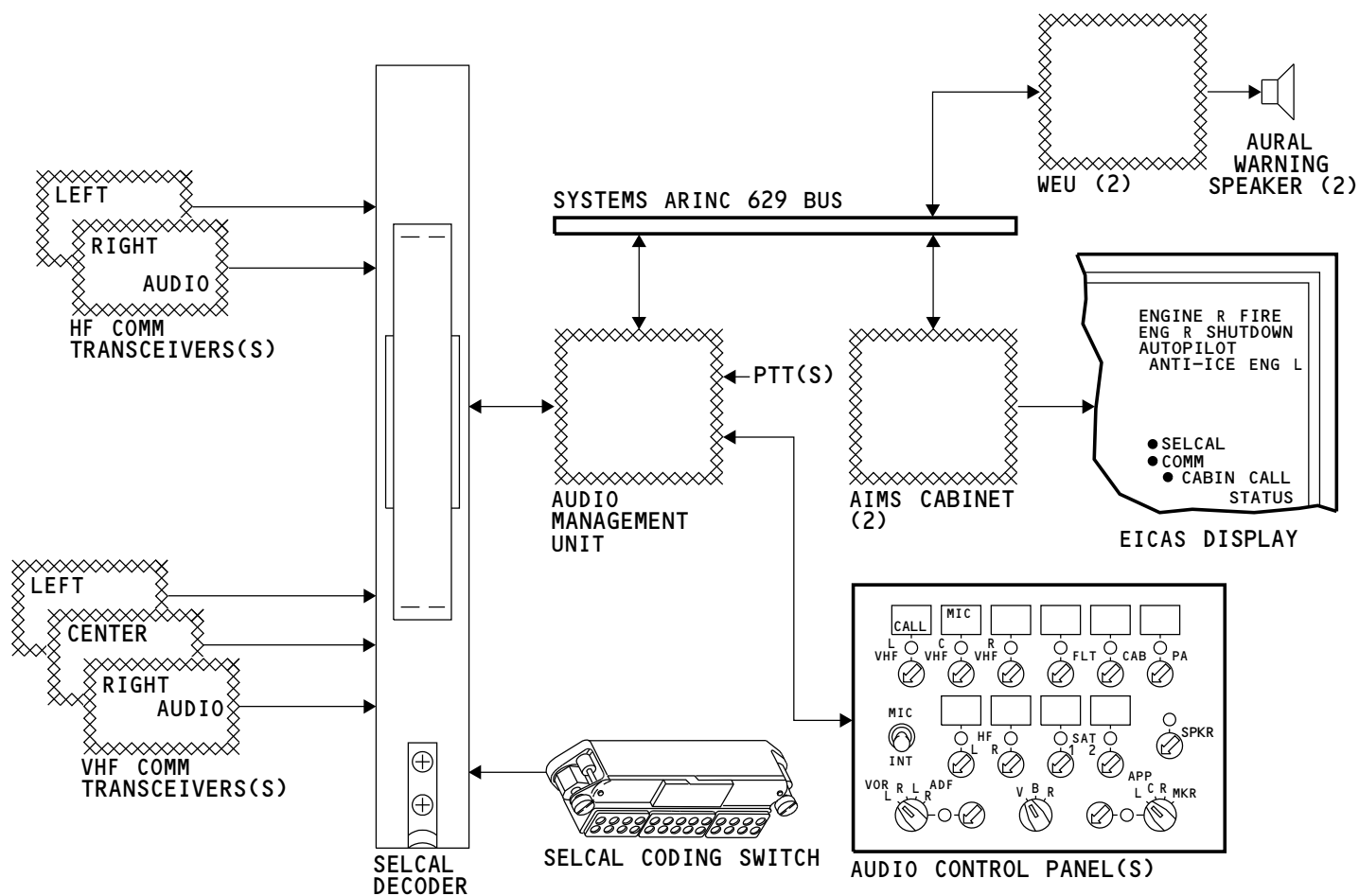
To reset the indications, push the CALL light on the audio control panel or push the mic switch for the related radio.

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SELCAL - GENERAL DESCRIPTION

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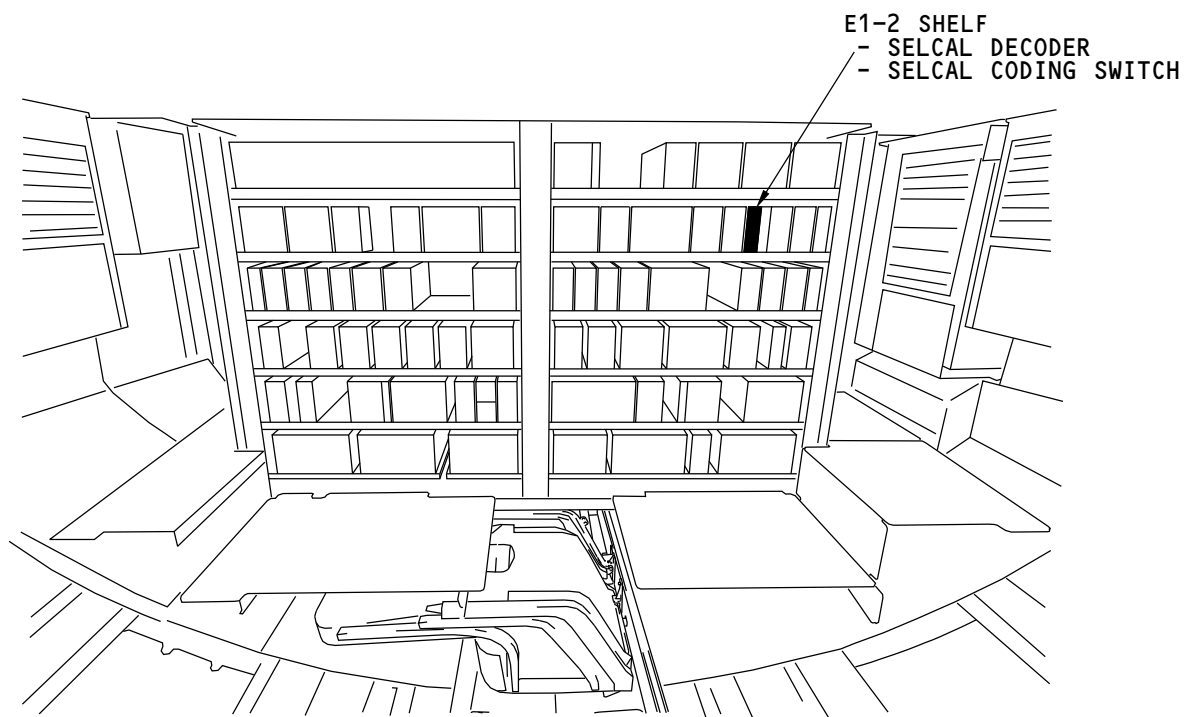


SELCAL - COMPONENT LOCATION

Main Equipment Center

The SELCAL decoder is in the main equipment center on the E1-2 rack. The SELCAL coding switch is on the rack behind the decoder.

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SELCAL - COMPONENT LOCATION

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**SELCAL - INTERFACES****Power**

The left main DC bus sends 28v dc power to the SELCAL decoder power supply.

Audio

The SELCAL decoder gets audio from the communication transceivers.

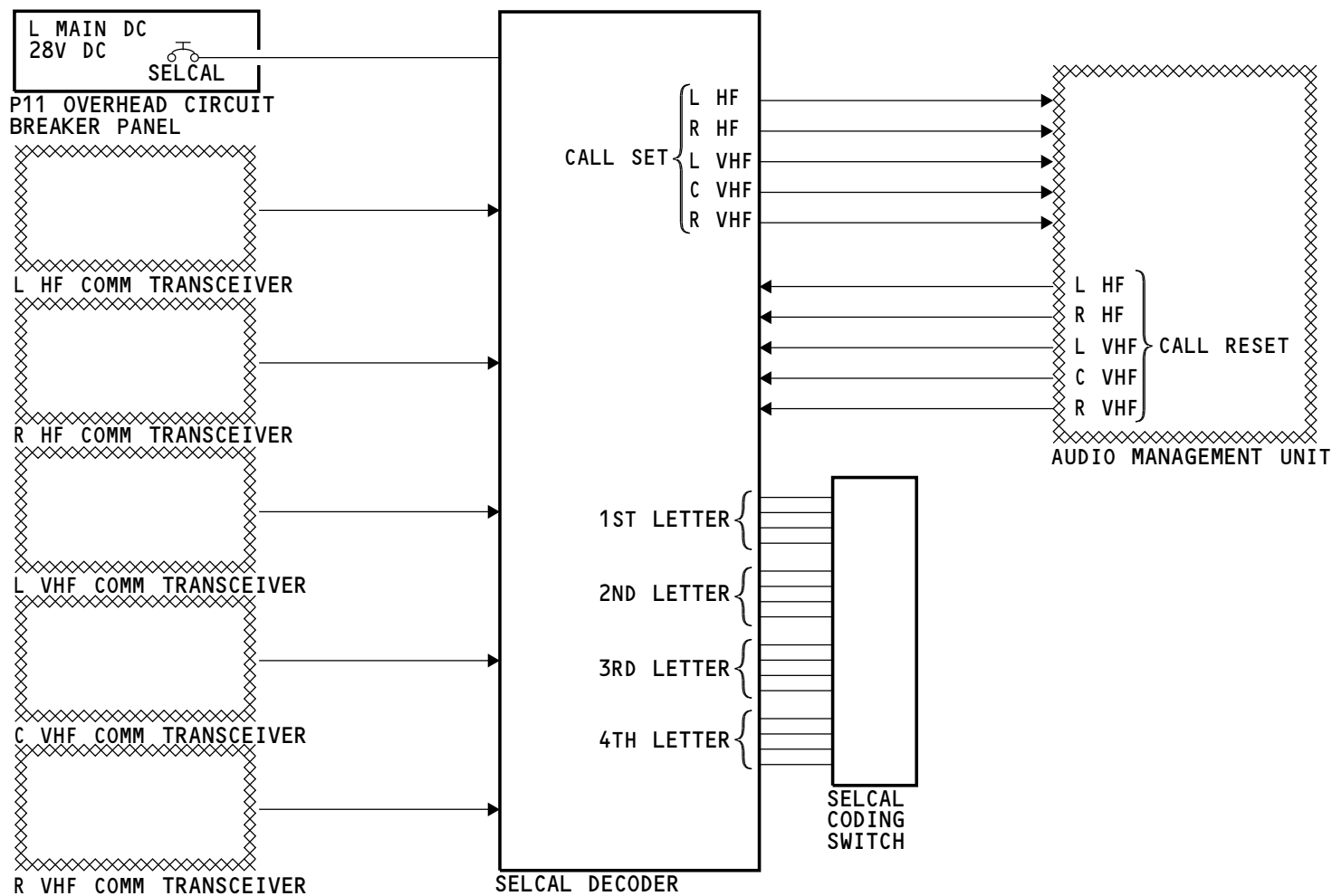
Discretes

The SELCAL decoder sends call set discretes to the audio management unit. There is a different discrete for each transceiver.

The audio management unit sends call reset discretes to the SELCAL decoder. There is a different discrete for each transceiver.

SELCAL Coding Switch

The SELCAL coding switch on the back of the decoder has 16 switches in groups of four. There are four letters in the SELCAL code. The positions of the switches in each group identify one of the four SELCAL code letters.



SELCAL - INTERFACES

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SELCAL - SELCAL DECODER

Purpose

The SELCAL decoder has these functions:

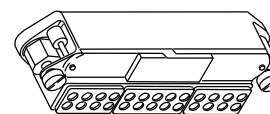
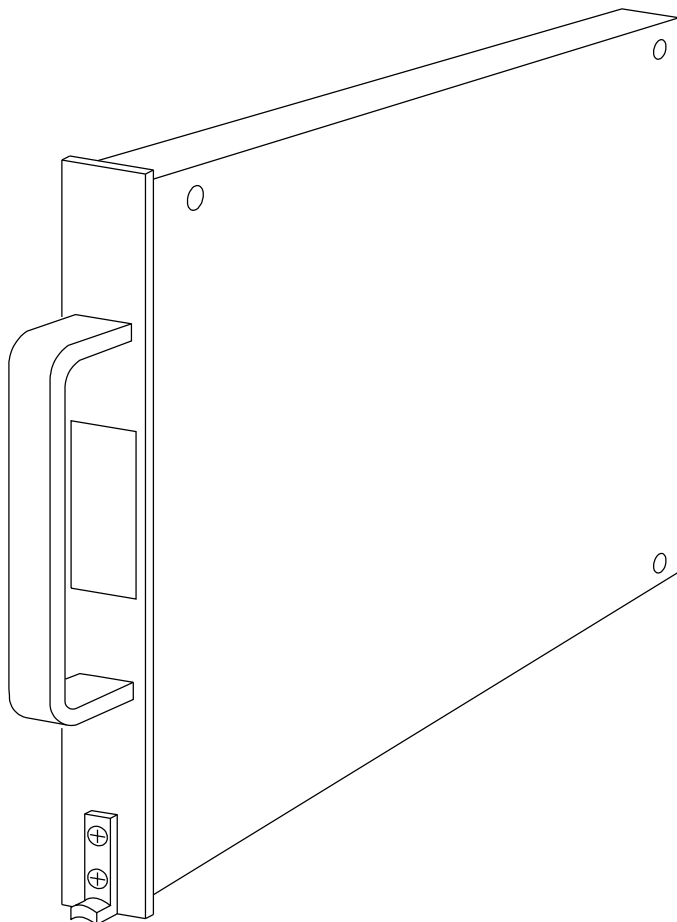
- Monitors audio from the communication transceivers
- Identifies the SELCAL signal that is the same as its code
- Causes flight deck indications for a call.

There are no lights or test switches on the SELCAL decoder front panel.

SELCAL Coding Switch

Switches inside of the SELCAL coding switch set the airplane's SELCAL code.

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SELCAL
CODING SWITCH

SELCAL - SELCAL DECODER

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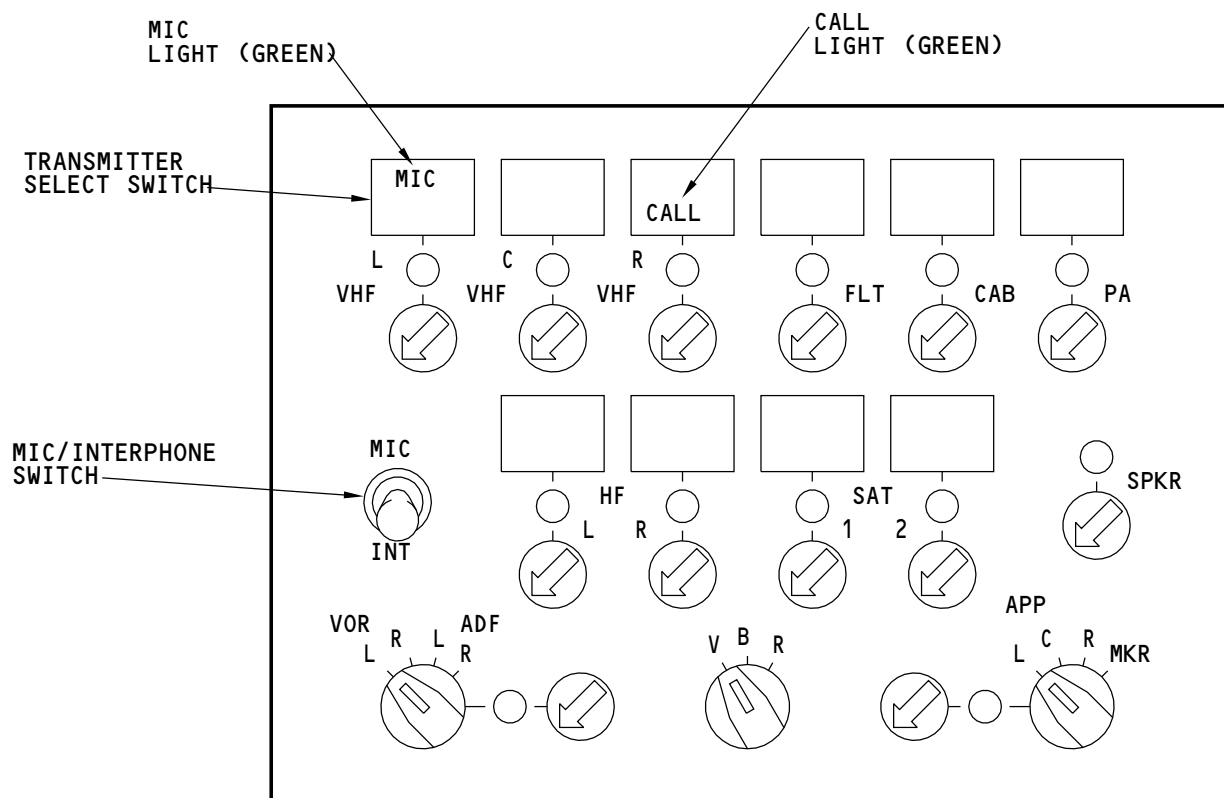
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**SELCAL - ACP CALL LIGHTS AND RESET SWITCHES****Control and Indications**

On the audio control panel, a transmitter select switch CALL light comes on when the SELCAL decoder gets a SELCAL signal.

To make the CALL light go off, push the transmitter select switch. If the MIC light for that transmitter select switch is on, push any mic switch or that transmitter select switch to reset the call light.

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SELCAL - ACP CALL LIGHTS AND RESET SWITCHES

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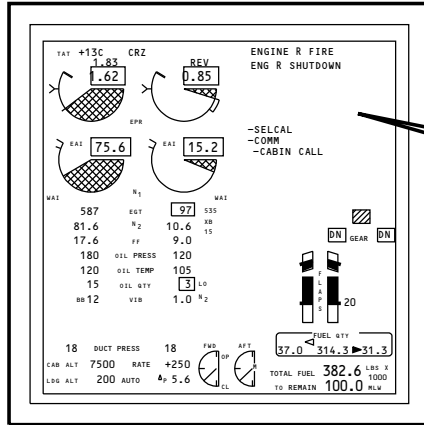
**SELCAL - ALERT MESSAGE AND AURAL****Indications**

An alert message shows when the SELCAL decoder gets a SELCAL signal. The alert message, SELCAL, is a comm medium message. With the comm medium message there is a high/low chime from the aural warning speakers.

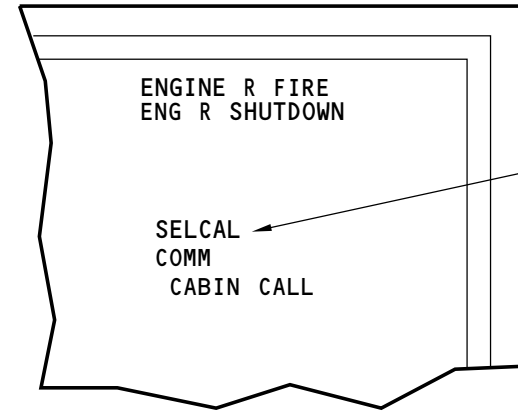
Training Information Point

The same comm medium message, SELCAL, also shows when the SATCOM system receives a call.

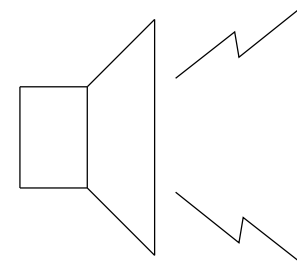
ARO ALL	EFFECTIVITY
	D633W101-ARO



EICAS DISPLAY



COMM MEDIUM
MESSAGE



HIGH/LOW
CHIME

AURAL WARNING SPEAKERS

SELCAL - ALERT MESSAGE AND AURAL

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SELCAL - FUNCTIONAL DESCRIPTION

General

The SELCAL decoder has these components:

- A microprocessor
- Decoders - channels 1-5
- An output driver.

Two channels are shown in detail. Internal details of the other channels are the same.

Power Up

The microprocessor reads the SELCAL code from the SELCAL coding switch at power-up. The microprocessor uses the code data to control the input to the filter clock generator. The filter clock generator sets the filters to monitor for the tone frequencies.

Call Set

The SELCAL signal is two, one-second bursts of audio. Each burst contains two of the four SELCAL audio tones. Each communication transceiver sends audio signals to the related decoder channel. Two channels send tone signals to the same decoder. The microprocessor controls the switching between two channels. The switched input line sends its audio tones to both the letter 1 and 3 filter and the letter 2 and 4 filter. A tone that is the same frequency as the filter will pass through the filter to the tone detector.

When the one tones passes through one of the filters, the signal goes to the level detector. The level detector makes sure the signal level is sufficient. If the signal level is sufficient, a high level goes to the AND gate. If both tones agree with the code for the airplane, the AND gate sends a high signal to the microprocessor. The microprocessor changes the filters to monitor for tones 3 and 4. If tones 3 and 4 also agree with the code for the airplane, the microprocessor sets the output driver to turn on the call indications for the radio that received the tones. The call indications are a chime, a comm medium message on the EICAS display and a call light on the audio control panel.

If tones 3 and 4 did not match within a specified amount of time, the microprocessor resets the filters to monitor for the first two tones of the sequence.

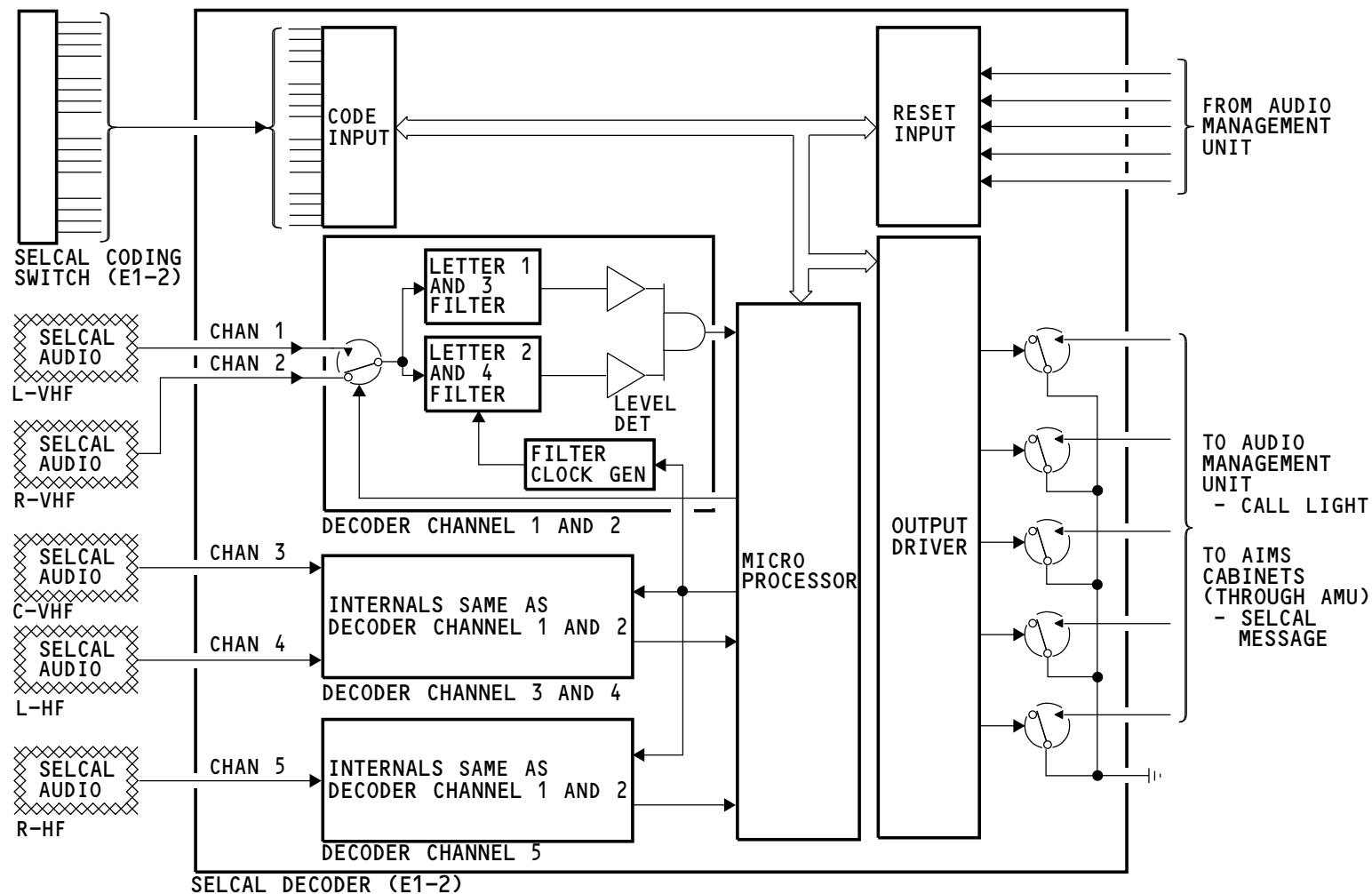
Call Reset

When the flight crew answers the call by pressing the transmitter select switch on the audio control panel, the audio management unit applies a ground to the reset input of the SELCAL decoder. This tells the microprocessor to reset the output driver. When the signal on the output driver is removed, the comm medium message on EICAS and the call light on the audio control panel go off.

Training Information Point

The SELCAL decoder reads the SELCAL coding switch at power-up. If the SELCAL decoder reads data for two tones that are the same, the SELCAL decoder uses the drivers to turn on all call lights. To clear these call lights, remove power, change the SELCAL coding switch to the correct code and then apply the power again.

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SELCAL - FUNCTIONAL DESCRIPTION

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**EMERGENCY LOCATOR TRANSMITTER - INTRODUCTION****General**

The emergency locator transmitter (ELT) system automatically sends emergency signals when it senses a large change in the airplane velocity.

The flight crew can start the ELT manually at the flight deck with a switch on a control panel.

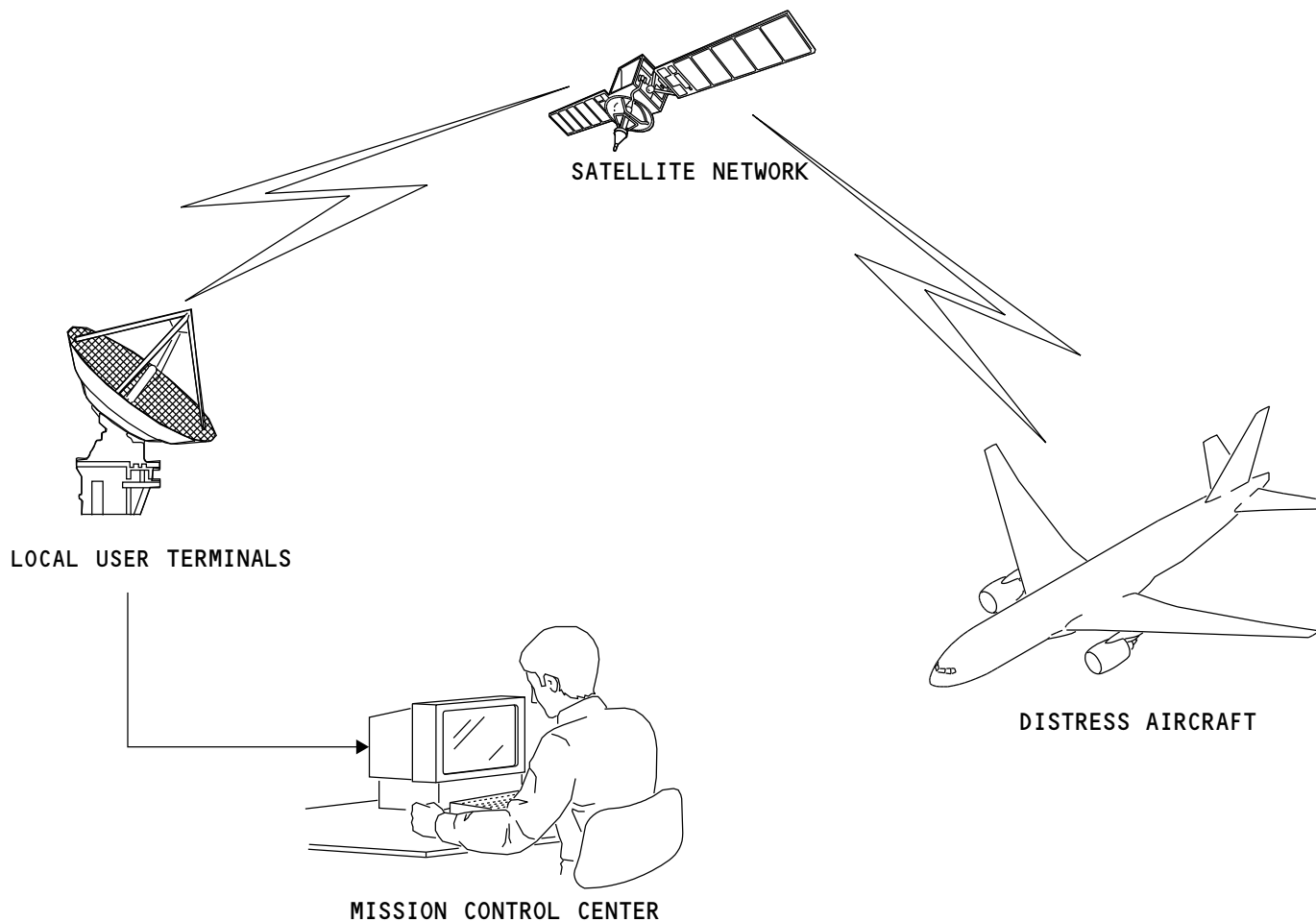
The ELT sends homing signals to search and rescue crews on the VHF and UHF emergency channels.

The ELT also sends emergency signals to satellite receivers. The satellite receivers send this information to ground stations to calculate the location of the emergency signals.

Abbreviations and Acronyms

- AIMS - airplane information management system
- ELT - emergency locator transmitter
- EICAS - engine indication and crew alerting system
- MCC - mission control center
- MHz - megahertz
- PSM - programmable switch module
- SRSAT - search and rescue satellite aided tracking

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EMERGENCY LOCATOR TRANSMITTER - INTRODUCTION

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EMERGENCY LOCATOR TRANSMITTER - GENERAL DESCRIPTION

General**ARO 001-016**

The ELT transmitter sends a swept tone on the VHF and UHF emergency channels (121.5 and 243.0 MHz). It also sends digital data every 50 seconds on the 406 MHz channel.

ARO 017-999

The ELT transmitter sends a swept tone on the VHF and UHF emergency channels (121.5 MHz). It also sends digital data every 50 seconds on the 406 MHz channel.

ARO ALL

Satellites send the received signal to a ground station. The ground station uses the phase shift between the ELT and the satellite to find the approximate location of the ELT. The ground station sends this information to the mission control center (MCC). The MCC sends alert data to a rescue coordination center (RCC).

Components

The ELT system has these components:

- ELT
- Airplane identification module (AIM)
- Program switch module
- Control panel

ARO 001-016

- Blade antenna.

ARO 017-999

- Fin/Rod antenna.

ARO ALLELT Connections

The ELT connects a ground to the airplane information management system (AIMS) when it turns on and during a self test. The ground from the ELT tells AIMS to show an ELT ON advisory message on the EICAS display.

The ELT gets control information from the ELT control panel. The control panel sends discrete signals to the ELT to turn the ELT on manually. It also sends a discrete signal to turn off the ELT if it starts to transmit accidentally. To start a self test of the ELT, move the RESET/ARMED/ON switch to the RESET position momentarily.

The ELT sends the frequency outputs to a blade antenna.

ARO 001-016

The antenna sends the 121.5/243.0 MHz and 406.025 MHz transmit signals.

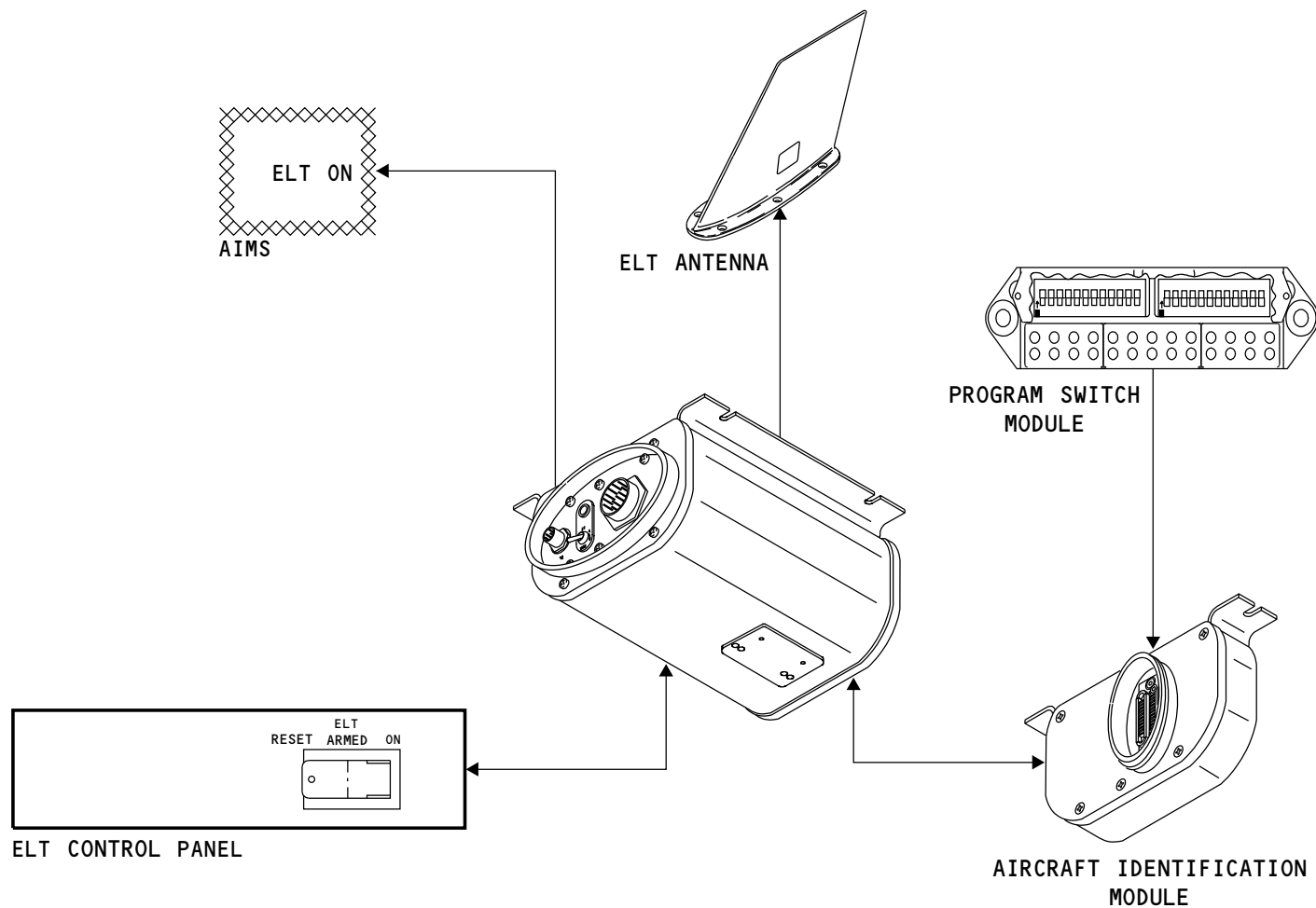
ARO 017-999

The antenna sends the 121.5 MHz and 406.025 MHz transmit signals.

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EMERGENCY LOCATOR TRANSMITTER - GENERAL DESCRIPTION

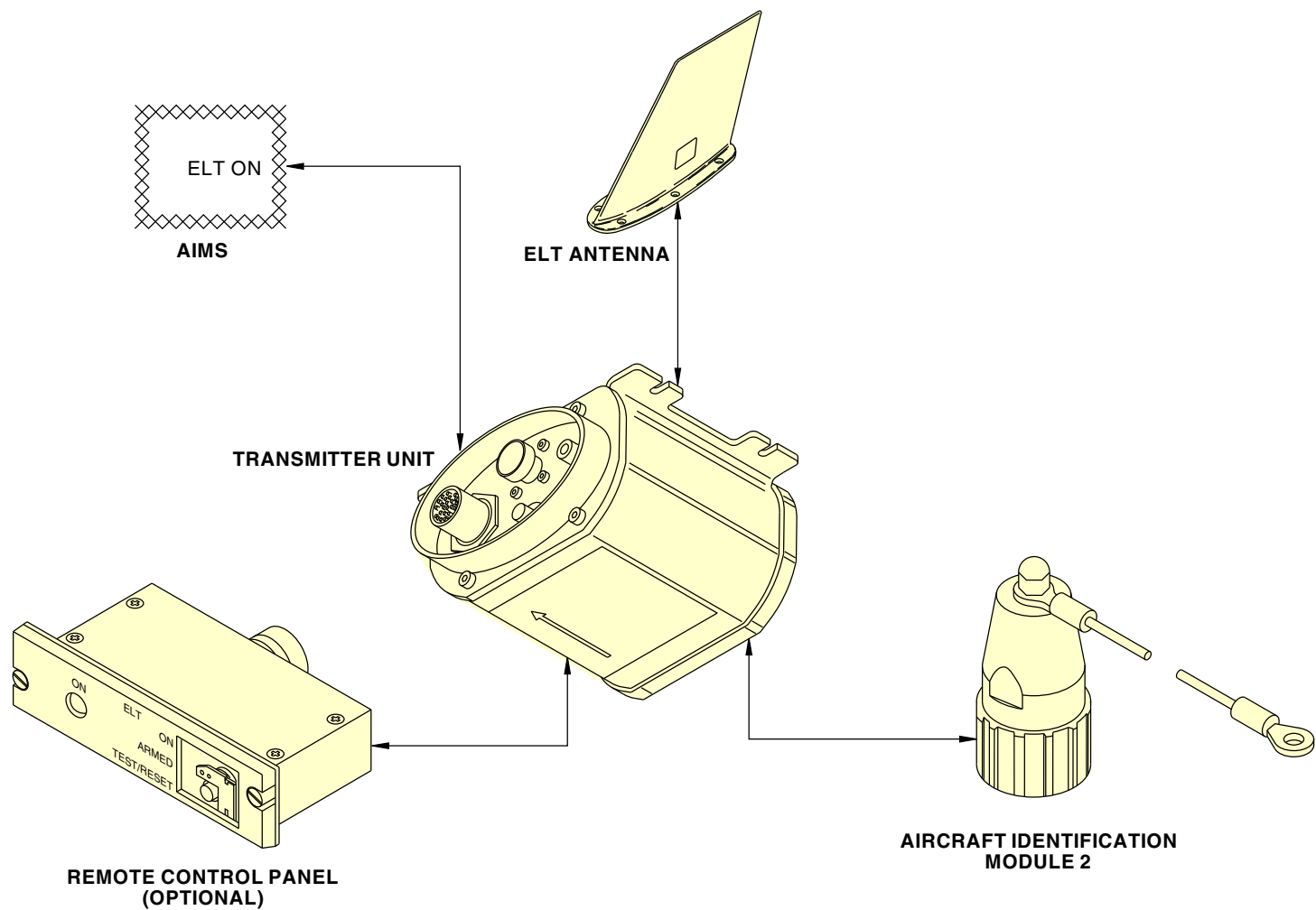
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EMERGENCY LOCATOR TRANSMITTER - GENERAL DESCRIPTION

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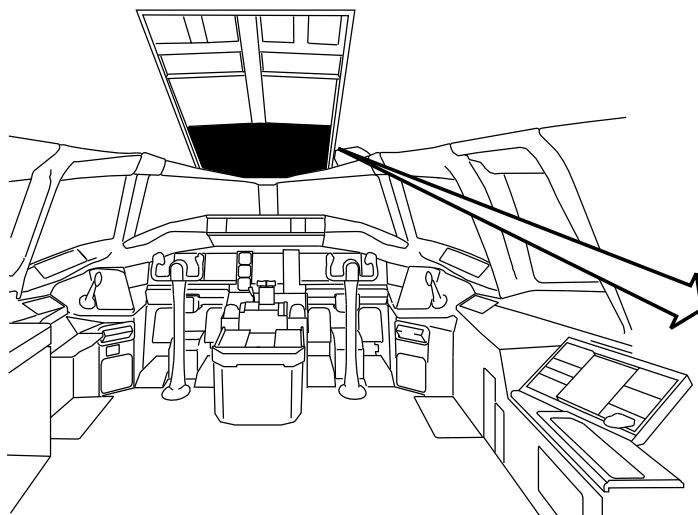


EMERGENCY LOCATOR TRANSMITTER - COMPONENT LOCATIONS - 1

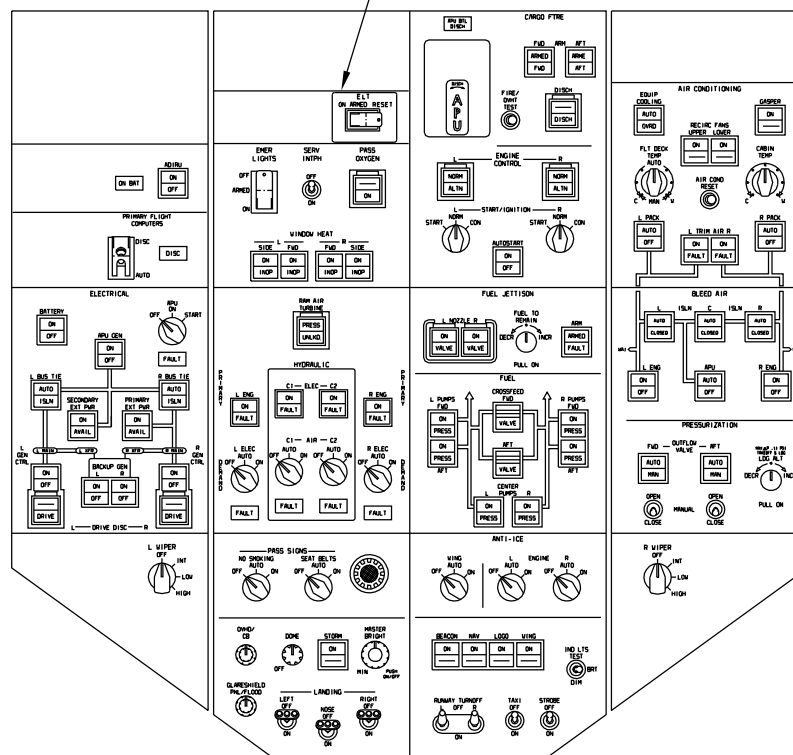
General

The emergency locator transmitter control panel is in the flight deck on the P5 overhead panel.

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P5 OVERHEAD PANEL
- EMERGENCY LOCATOR
TRANSMITTER CONTROL
PANEL



EMERGENCY LOCATOR TRANSMITTER - COMPONENT LOCATIONS - 1

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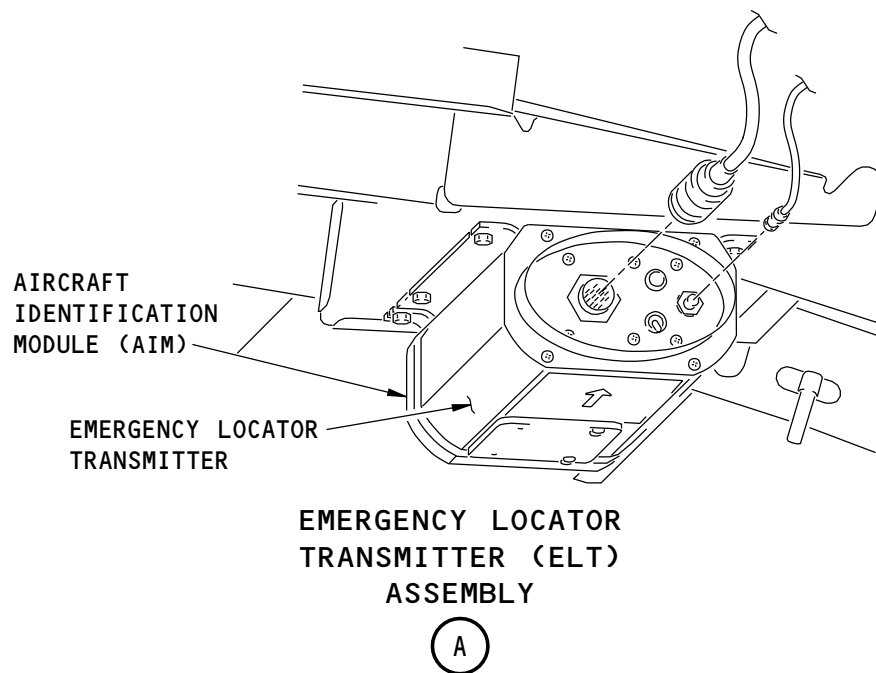
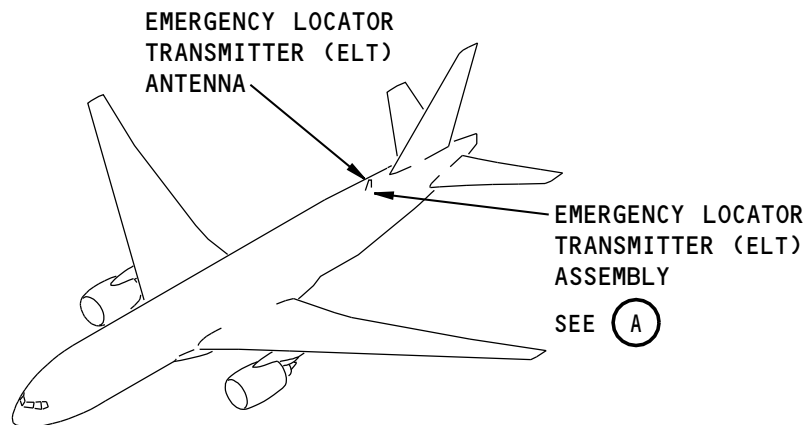
EMERGENCY LOCATOR TRANSMITTER - COMPONENT LOCATIONS - 2

General

The emergency locator transmitter (ELT) and the Aircraft Identification module (AIM) are in the passenger cabin above the cabin ceiling panels.

The ELT antenna is above the Emergency Locator Transmitter (ELT) on the outside of the aircraft.

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EMERGENCY LOCATOR TRANSMITTER - COMPONENT LOCATIONS - 2

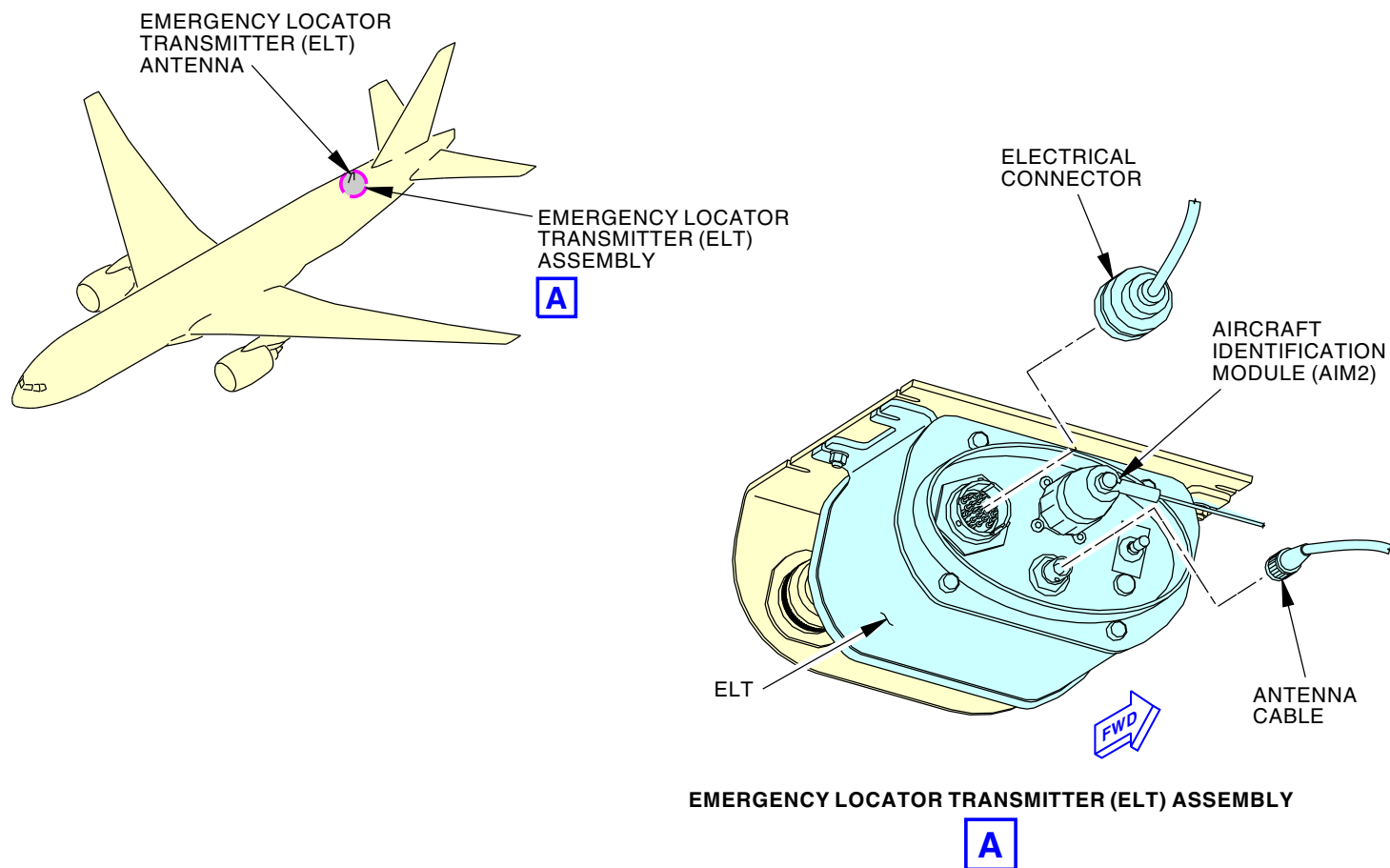
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**EMERGENCY LOCATOR TRANSMITTER - INTERFACE****Power**

The ELT control panel gets 0-5v ac from the master dim and test for the panel lights.

ARO 001-016

The emergency locator transmitter (ELT) uses an internal battery pack. The battery pack has five lithium manganese dioxide cells. The cells connect in series to supply the ELT.

ARO 017-999

The emergency locator transmitter (ELT) uses an internal battery pack. The battery pack has two lithium manganese dioxide cells. The cells connect in series to supply the ELT.

ARO ALL**Emergency Locator Transmitter Control Panel**

You use the ELT control panel to turn on the ELT or to reset it to the armed mode if there is an accidental activation.

Aircraft Identification Module

The aircraft identification module (AIM) has an EEPROM that holds the 406 MHz aircraft data message. When the AIM connects to the transmitter, the 406 MHz message automatically downloads into the transmitter.

Emergency Locator Transmitter

The ELT supplies these signals:

- ELT ON
- RF OUT

ARO 001-016

When the ELT is on, it sends a discrete to AIMS. The EICAS display shows the ELT ON advisory message.

The ELT has two transmitter sections, one for the 121.5/243.0 MHz signal and one for the 406 MHz signal. The two transmitter sections send the RF emergency signals to the ELT antenna on one transmission line.

ARO 017-999

The ELT has two transmitter sections, one for the 121.5 MHz signal and one for the 406 MHz signal. The two transmitter sections send the RF emergency signals to the ELT antenna on one transmission line.

ARO ALL

The ELT receives these signals:

- EXT ON
- RESET 1 and RESET 2

The EXT ON signal from the control panel manually starts the transmitter.

The reset signals stop the transmitter if it accidentally starts.

You can hardware select the G-switch to either the North American specification (FAA) or the European specification (JAA).

ELT Antenna

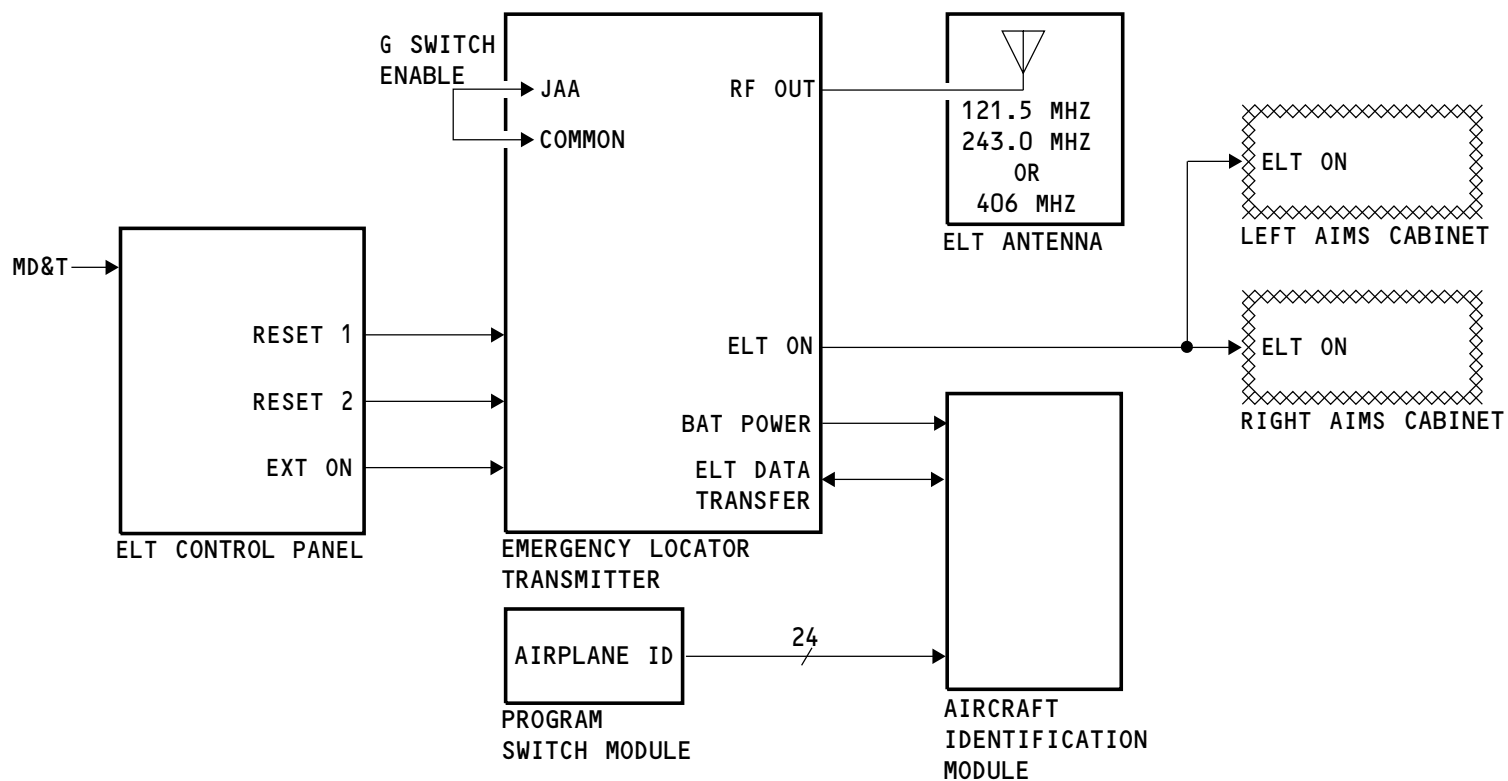
The ELT antenna sends the emergency signals on the VHF and UHF frequencies.

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EMERGENCY LOCATOR TRANSMITTER - INTERFACE

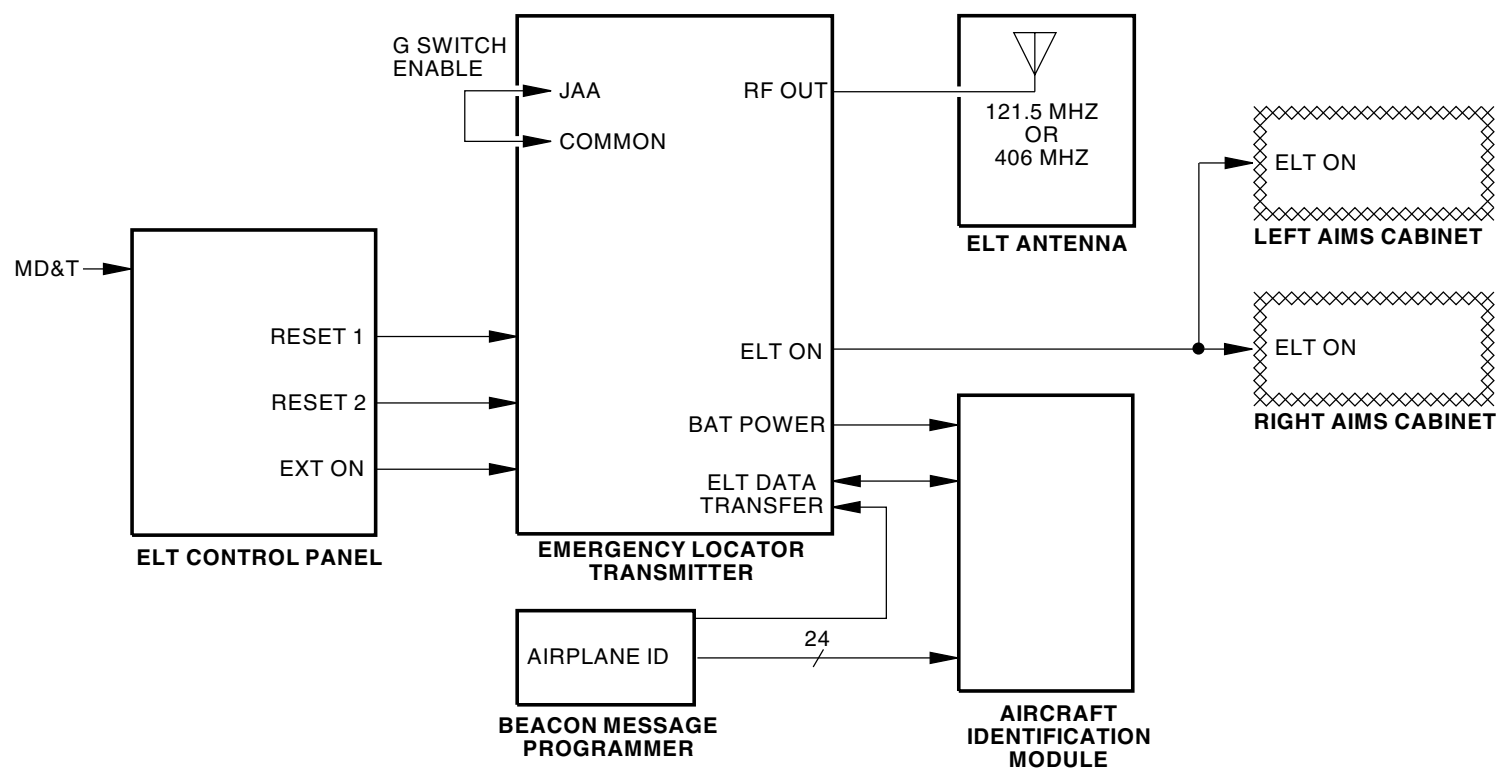
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Jan 05/2018



EMERGENCY LOCATOR TRANSMITTER - INTERFACE

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Jan 05/2018

**EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER****Purpose**

When manually or automatically activated, the emergency locator transmitter (ELT) transmits this information:

- 406 MHz aircraft data
- 121.5 MHz homing signal

ARO 001-016

- 243 MHz homing signal.

The ELT transmits a message on 406 MHz once every 50 seconds in 440 ms pulses.

ARO 017-999

The ELT transmits a message on 406 MHz once every 50 seconds in 440 ms pulses and 520 ms pulses.

ARO 001-016

The ELT also transmits on 121.5 MHz and 243 MHz continuously except during the 406 MHz transmission. It continues to transmit until the batteries can no longer supply power.

ARO ALL**Physical Description**

The ELT has these physical characteristics:

ARO 001-016

- Length - 257 mm (10.14 inches)
- Width - 166 mm (6.54 inches)
- Height - 92 mm (3.62 inches)
- Weight - 3.0 kg (6.6 lbs)

ARO 017-999

- Length - 155 mm (6.10 inches)

- Width - 166 mm (6.54 inches)
- Height - 88 mm (3.47 inches)
- Weight - 1.6 kg (3.52 lbs)

ARO 001-016

The transmitter does not use aircraft power but has an internal battery pack. The battery pack has five, lithium manganese dioxide batteries connected in series.

ARO 017-999

The transmitter does not use aircraft power but has an internal battery pack. The battery pack has two, lithium manganese dioxide batteries connected in series.

ARO ALL**Functional description****ARO 001-016**

The transmitter uses an integrated G-switch to detect a crash and automatically transmits three separate output signals at 121.5 Mhz, 243 MHz, and 406 MHz frequencies.

ARO 017-999

The transmitter uses an integrated G-switch to detect a crash and automatically transmits three separate output signals at 121.5 Mhz, and 406 MHz frequencies.

ARO ALL

You can set (hardware select) the G-switch to the North American (FAA) or European (JAA) specification.

The transmitter can transmit the 406 MHz digital message using one of these protocols:

- Serialized aviation user protocol
- Aviation user protocol

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ARO ALL EFFECTIVITY

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**EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER**

- 24-bit aircraft address number
- Aircraft operator designator number and serial number
- Serial number protocol

Front panel

The transmitter front panel has a LED and a toggle switch.

The toggle switch has these positions:

- OFF
- ARM
- TX

When you set the switch to OFF, there is no power from the battery pack to the transmitter. The transmitter can not sense a crash or transmit a rescue signal. Also, the transmitter can not do a self test in this mode.

When you set the switch to ARM, the transmitter can detect an activation signal from the G-switch or the ELT control panel. The transmitter also can do a self-test.

ARO 001-016

When you set the switch to TX, the transmitter sends 121.5/243 MHz and 406 MHz rescue signals to the antenna and the LED blinks continuously.

ARO 017-999

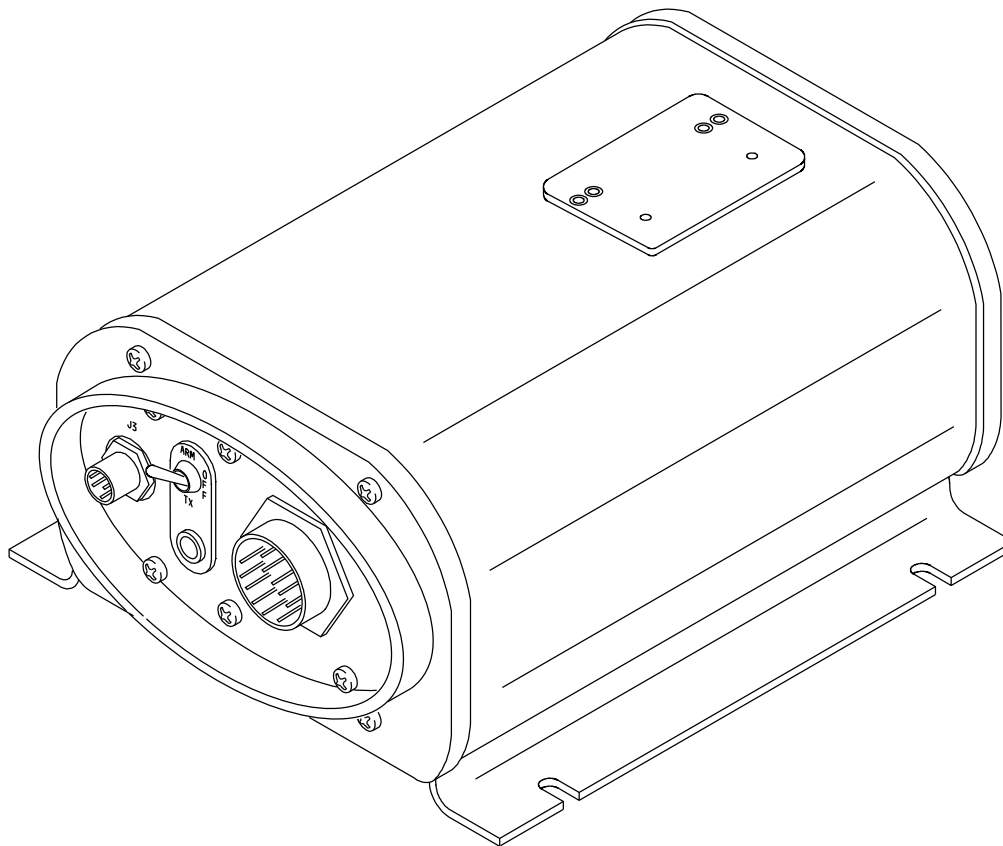
When you set the switch to TX, the transmitter sends 121.5 MHz and 406 MHz rescue signals to the antenna and the LED blinks continuously.

ARO ALL**23-24-00**

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EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER

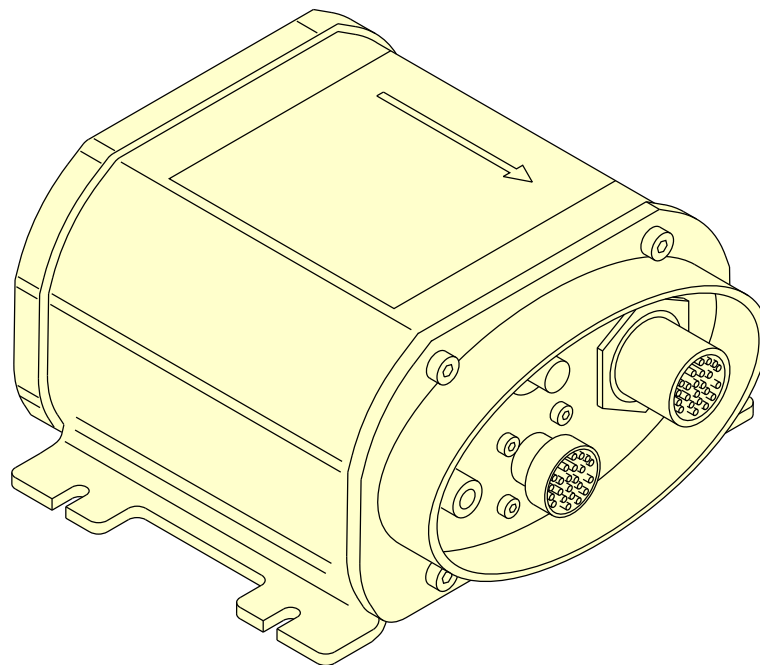
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ARO 001-016

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TRANSMITTER UNIT

EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER

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**EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER CONTROL PANEL****Purpose**

You use the emergency locator transmitter (ELT) control panel for these purposes:

- Turn on the ELT
- Reset the ELT after activation
- Set the ELT for automatic operation.

Controls and Indications

The ELT control panel has a RESET/ARMED/ON switch guarded in the ARMED position.

The RESET position is spring-loaded to ARMED. Use this position to stop the ELT after accidental activation.

Set the switch to ARMED for normal operation. In this mode, the ELT starts automatically if it senses a sudden and extreme decrease in speed.

Set the switch to ON to manually turn on the ELT.

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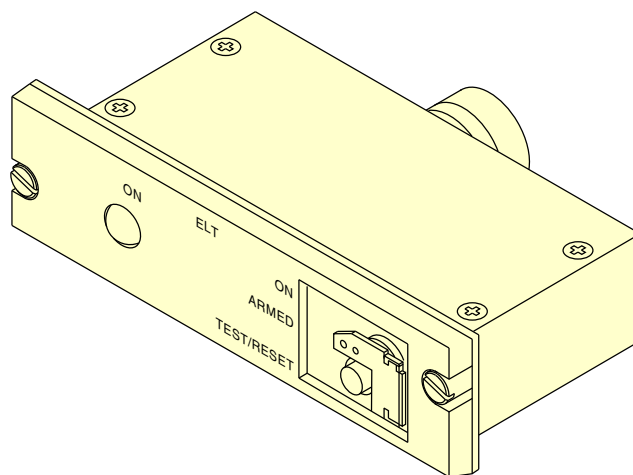
EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER CONTROL PANEL

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**REMOTE CONTROL PANEL
(OPTIONAL)**

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EMERGENCY LOCATOR TRANSMITTER - EMERGENCY LOCATOR TRANSMITTER CONTROL PANEL

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**EMERGENCY LOCATOR TRANSMITTER - AIRCRAFT IDENTIFICATION MODULE****Purpose**

The aircraft identification module (AIM) loads aircraft specific data into the transmitter. It is not necessary to re-program the transmitter.

During the self-test, the AIM downloads the aircraft identification code into the transmitter. It also makes sure the data transferred correctly.

Power

The AIM gets battery power from the transmitter.

ARO 001-016**Physical description**

The AIM case is made of an aluminum alloy.

The AIM has these properties:

- Length - 1.81 inches (46 mm)
- Width - 6.54 inches (166 mm)
- Height - 3.43 inches (87 mm)
- Weight - 1.1 lbs (0.5 kg).

ARO 017-999**Physical description**

The AIM case is made of an aluminum alloy.

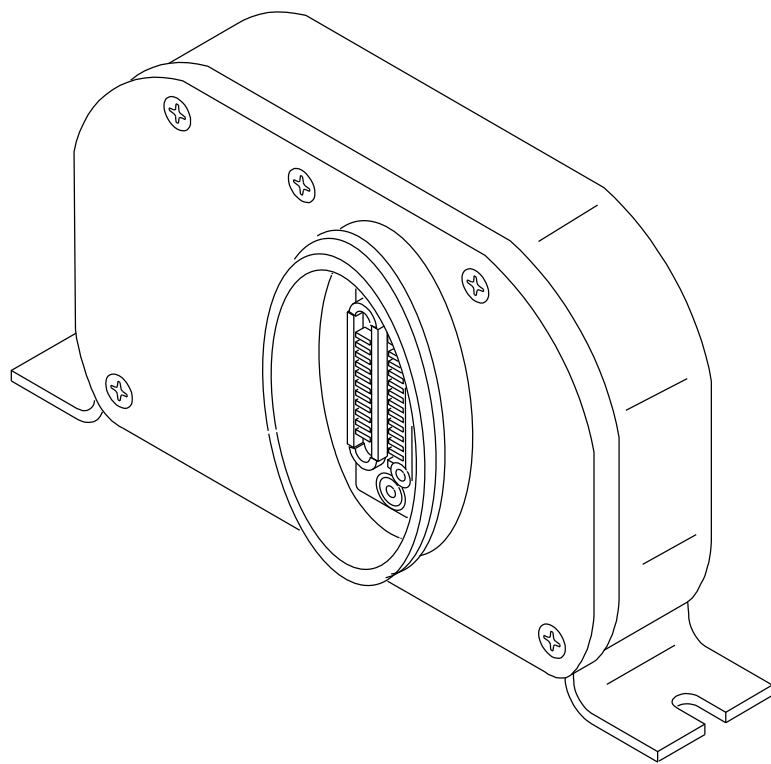
The AIM has these properties:

- Length - 60 mm (2.36 in.)
- Width - 26.5 mm (1.04 in.)
- Weight - 0.085 kg (0.19 lb.).

ARO ALL**23-24-00****ARO ALL EFFECTIVITY**

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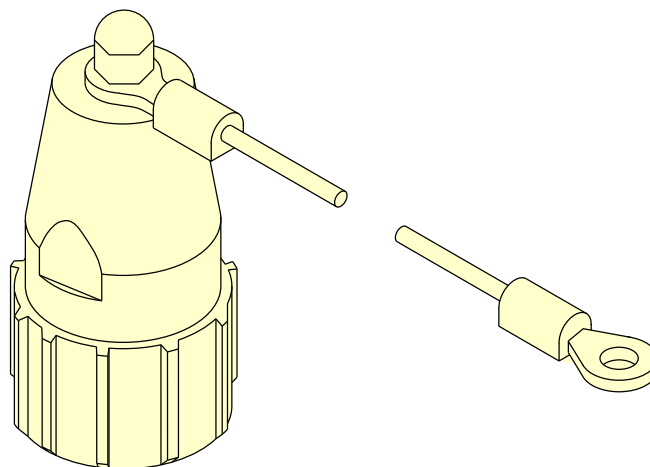
EMERGENCY LOCATOR TRANSMITTER - AIRCRAFT IDENTIFICATION MODULE

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**AIRCRAFT IDENTIFICATION
MODULE 2**

EMERGENCY LOCATOR TRANSMITTER - AIRCRAFT IDENTIFICATION MODULE

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EMERGENCY LOCATOR TRANSMITTER - ANTENNA

Purpose**ARO 001-016**

The emergency locator transmitter (ELT) antenna transmits 406 Mhz, 121.5 Mhz, and 243 Mhz signals.

ARO 017-999

The emergency locator transmitter (ELT) antenna transmits 406 Mhz, and 121.5 Mhz.

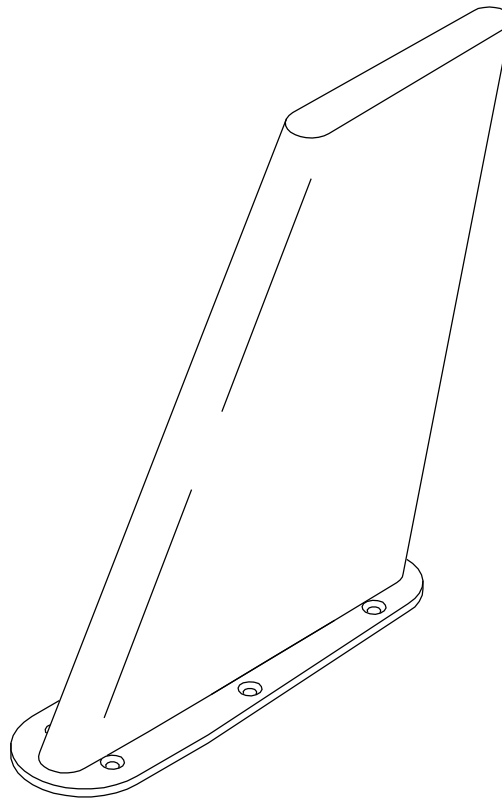
ARO ALLPhysical Description

The ELT antenna is an external blade antenna.

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EMERGENCY LOCATOR TRANSMITTER - ANTENNA

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EMERGENCY LOCATOR TRANSMITTER - FUNCTIONAL DESCRIPTION

General

The emergency locator transmitter (ELT) transmits distress signals to satellites. The ELT has these components:

ARO 001-016

- 121.5/243 MHz card

ARO 017-999

- 121.5 MHz card

ARO ALL

- 406 MHz card
- Antenna coupling unit
- I/O and xmtr control
- G-switch
- ON light
- ELT switch
- Battery pack

ARO 001-016

121.5/243 MHz Card

The 121.5/243 MHz card generates the 121.5 MHz and the 243 MHz signals. These signals are Amplitude-Modulated, swept-frequency signals. Then, these signals go to the antenna coupling unit.

ARO 017-999

121.5 MHz Card

The 121.5 MHz card generates the 121.5 MHz signal. This signal is an Amplitude-Modulated, swept-frequency signal. Then, this signal goes to the antenna coupling unit.

ARO 001-016

406 MHz Card

The 406 MHz card generates the 406.025 MHz phase modulated signal. This signal sends to an amplification circuit and the antenna coupling unit. It contains an EEPROM that stores the data for the transmitted message.

ARO 017-999

406 MHz Card

The 406 MHz card generates the 406.040 MHz phase modulated signal. This signal sends to an amplification circuit and the antenna coupling unit. It contains an EEPROM that stores the data for the transmitted message.

ARO 001-016

Antenna Coupling Unit

The antenna coupling unit (ACU) combines the three RF output signals from the 121.5/243 and 406 cards into one RF signal. Then, this signal goes to the antenna through a low-loss coaxial cable. The ACU matches the impedance of each RF output signal to the input impedance of the antenna.

ARO 017-999

Antenna Coupling Unit

The antenna coupling unit (ACU) combines the two RF output signals from the 121.5 and 406 cards into one RF signal. Then, this signal goes to the antenna through a low-loss coaxial cable. The ACU matches the impedance of each RF output signal to the input impedance of the antenna.

ARO ALL

I/O and XMTR Control

Externally, the I/O and XMTR control logic supplies these interfaces:

- The ELT unit and the aircraft.
- The ELT unit and the ELT control panel.

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**EMERGENCY LOCATOR TRANSMITTER - FUNCTIONAL DESCRIPTION**

- The ELT unit and the aircraft identification module (AIM).

Internally, the I/O and XMTR control logic supplies these interfaces:

- The control and the data lines to the EEPROM on the 406 MHz card.
- The +5 volt power to the 406 MHz card.
- The I/O and XMTR control receives power from the power card. Then, it distributes the necessary power to all other cards in the ELT unit.

Normal Operation

During normal operation, the ELT control panel is in the ARMED position and the ELT transmitter front panel switch is in the ARM position. While in this condition, the ELT can detect an activation signal from either the G-switch, the control panel or the ELT front panel switch. The EICAS message and the ELT front panel light do not show.

ON Operation

To go from normal (ARM) to ON operation, the ELT needs a change of switch position from one of these sources:

- G switch
- Control panel switch
- ELT front panel switch

Upon crash, the ELT is automatically activated by the G-switch.

The control panel switch lets you manually start ELT transmission. When you put the control panel switch to ON, an EXT ON signal goes from the control panel to the ELT. This signal manually starts the transmitter from the control panel.

The ELT front panel switch also lets you manually start the transmitter. You do this when you put the front panel switch to Tx.

ARO 001-016

In this mode, the ELT transmits 121.5/243 and 406 MHz signals to the antenna.

ARO 017-999

In this mode, the ELT transmits 121.5 and 406 MHz signals to the antenna.

ARO ALL

The first 406 MHz pulse will be transmitted approximately 50 seconds after activation, then subsequently at 50 second intervals.

Self-Test

A self-test of the ELT is activated by moving the ELT switch on the ELT front panel from the OFF position to the ARM position.

ARO 014-999

The self-test passes when the LED on the ELT front panel flashes Three times.

ARO 001-013

The self-test passes when the LED on the ELT front panel flashes One time.

ARO 017-999

The self-test passes when the LED on the ELT front panel flashes the correct number of times. ()

ARO 001-016**Programming**

The ELT receives the programmed 406 MHz message from the AIM.

ARO 017-999**Programming**

The ELT receives the programmed 406 MHz message from the AIM and the Beacon Message Programmer.

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EMERGENCY LOCATOR TRANSMITTER - FUNCTIONAL DESCRIPTION

ARO ALL

Reset

The RESET 1 and RESET 2 inputs from the control panel let you turn off the transmitter when it comes on accidentally. These inputs turn off the transmitter when you put the control panel switch from ARM to RESET and immediately back to ARM.

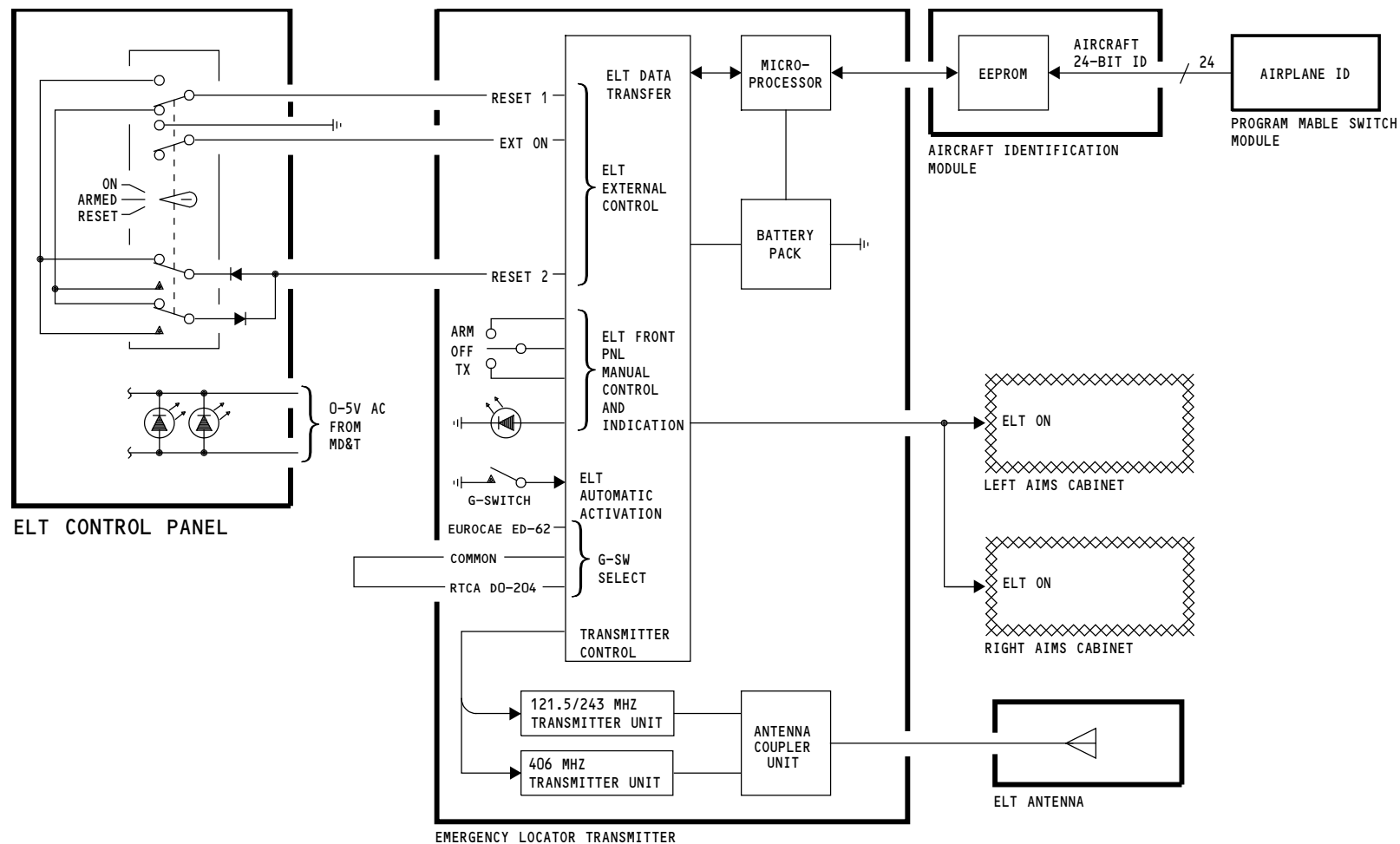
You can also turn off the transmitter when you put the ELT front panel switch from ARM to OFF and immediately back to ARM.

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EMERGENCY LOCATOR TRANSMITTER - FUNCTIONAL DESCRIPTION

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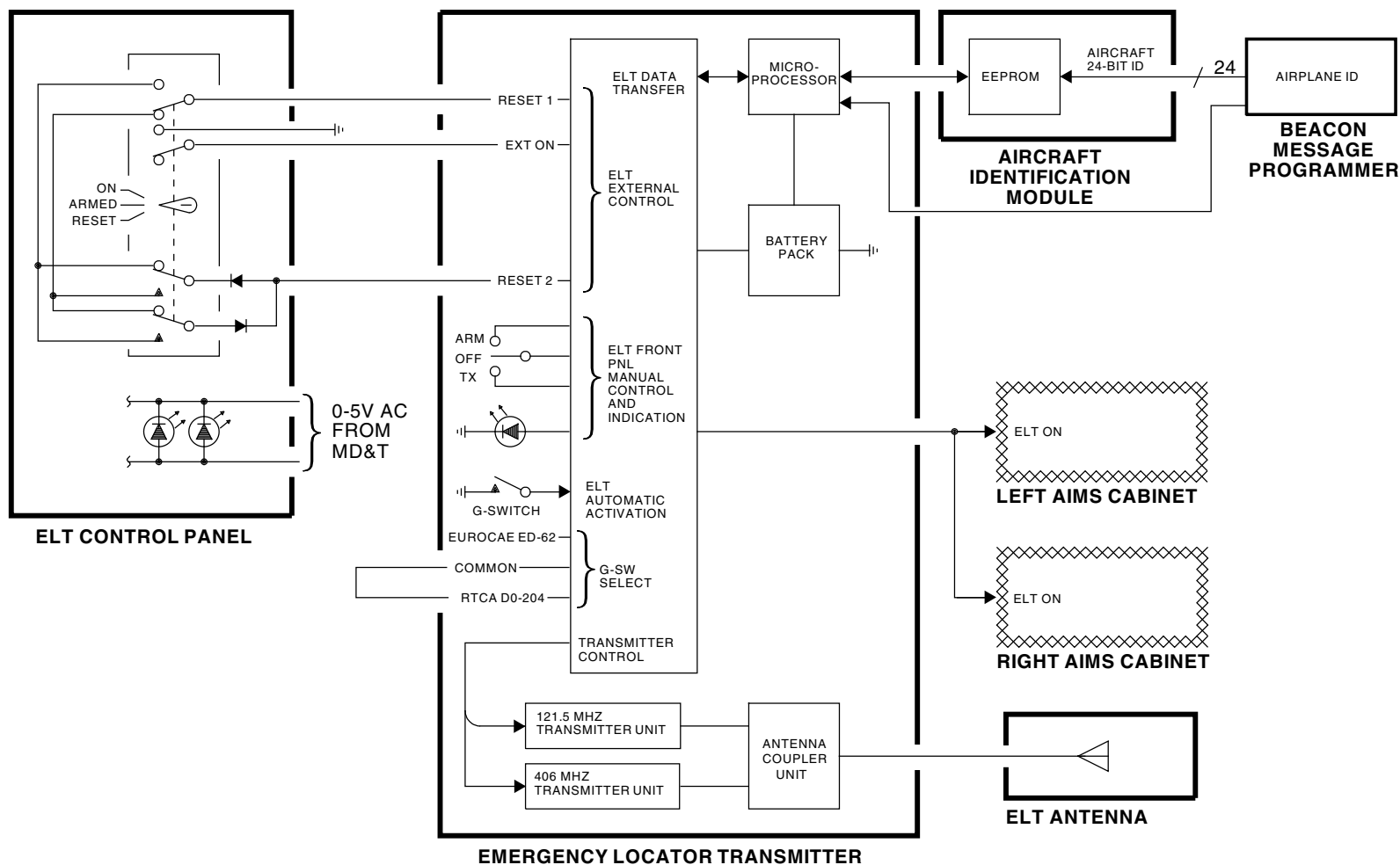
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EMERGENCY LOCATOR TRANSMITTER - FUNCTIONAL DESCRIPTION

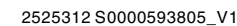
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EMERGENCY LOCATOR TRANSMITTER - REGISTRATION

Purpose

The digital message transmitted by a 406 MHz ELT includes a unique identification code. Contact information for the owner of the ELT is maintained in an international database which associates this information with the identification code. It is therefore important to register an ELT, and re-register each time the contact information changes.

ELT registration aids the Search and Rescue (SAR) agencies in the event of ELT activation. The registration information is an important tool to assist the SAR agencies in locating and quickly responding to you or your aircraft. Failure to register your ELT may delay a rescue response. Accurate, up-to-date registration information will also be used to conserve resources by helping to eliminate false alert deployments, as an inadvertent activation can be resolved with a phone call when the ELT is properly registered.

Hex ID Code

The 406 MHz ELT is programmed with a unique hex ID code (i.e., registration code) that is transmitted to the SAR satellite system.

This code provides the information that follow:

- Unique aircraft or ELT identification
- Country of origin
- Latitude and longitude position data, if equipped with a navigation interface device

Registration Information

The registration Information can be found in COSPAS-SARSAT documents G.005 and S.007 for information regarding ELT programming and registration. These documents are available at www.cospas-sarsat.org.

Responsibility

It is the responsibility of the aircraft owner to register the ELT.

- If an ELT is moved to a different aircraft (i.e., an aircraft other than the one it was originally installed on), and/or the aircraft is registered in a new country, the ELT must be re-registered.

- If the aircraft is registered in a new country, the ELT must be re-registered.
- The product label must re-marked with the new HEX ID code to indicate new programming, if applicable.

ELT Registration Information

The following information is required when registering an ELT:

- The unique Hex ID code printed on the ELT product label
- Aircraft type, and registration number
- Owner's name
- Address
- Telephone number

The information (i.e., address, telephone number, etc.), filed as part of the registration process, should be kept up to date.

Where to Register

In the United States, the National Oceanic and Atmospheric Administration (NOAA) is the registration agency. The NOAA ELT registration web site: www.beaconregistration.noaa.gov.

In other countries, the national civil aviation authority in the applicable country should be contacted to obtain registration information.

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DATA COMMUNICATION MANAGEMENT SYSTEM - INTRODUCTION

General

The data communications management system (DCMS) supplies a common interface for AIMS functions and other systems that need to exchange data. The DCMS has these functions:

- Data communications management function (DCMF)
- Flight deck communication function (FDCF).

Abbreviations and Acronyms

- ACARS - aircraft communications addressing and reporting system
- ACMF - airplane condition monitoring function
- AIMS - airplane information management system
- AMI - airline modifiable information
- APL - airplane
- ARINC - Aeronautical Radio, Inc.
- ATC - air traffic control
- ATIS - automatic terminal information service
- auto - automatic
- BITE - built-in test equipment
- CCD - cursor control device
- CDU - control display unit
- CMCF - central maintenance computing function
- COMM - communication
- CPDLC - controller/pilot datalink communication
- CPI - communication program interface
- CPM - core processor module
- DCMF - data communication management function
- DCMS - data communication management system
- DFDAF - digital flight data acquisition function
- DLGF - data load gateway function
- DSP - display select panel

- EICAS - engine indication and crew alerting system
- ETA - estimated time of arrival
- FDCF - flight deck communication function
- FMCF - flight management computing function
- GBST - ground base software tool
- GSP - ground service provider
- ICAO - International Civil Aviation Organization
- info - information
- I/O - input/output
- IOM - input/output module
- ISO - International Standards Organization
- LAN - local area network
- LRU - line replaceable unit
- MAT - maintenance access terminal
- MCP - mode control panel
- MFD - multi-function display
- MTF - maintenance terminal function
- NOTAMS - notice to airmen
- OPC - operational program configuration
- OPS - operational program software
- OSI - open systems interconnection
- PCM - power conditioning module
- PDF - primary display function
- PDS - primary display system
- PIIC - passenger inflight information computer
- PLAN - Planenet local area network
- PMAT - portable maintenance access terminal
- pri - primary
- PROC - processor
- RTP - radio tuning panel

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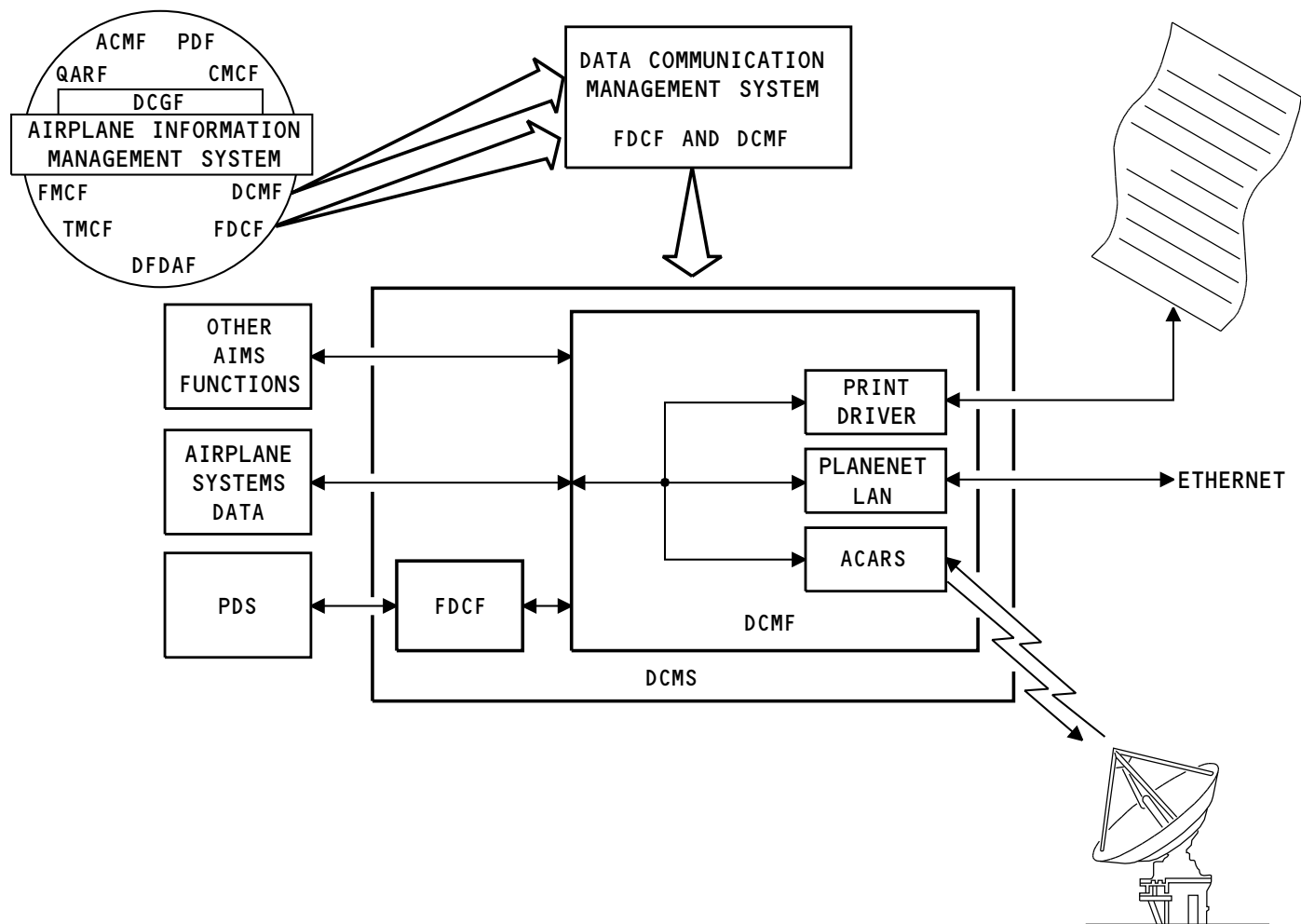
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DATA COMMUNICATION MANAGEMENT SYSTEM - INTRODUCTION

- SATCOM - satellite communication
- sec - secondary
- sw - switch
- SDU - satellite data unit
- VHF - very high frequency
- xcvr - transceiver
- xpdr - transponder



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DATA COMMUNICATION MANAGEMENT SYSTEM - INTRODUCTION

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DCMS - GENERAL DESCRIPTION

General

The data communication management system (DCMS) manages analog and digital data in many different formats. It divides the work into these two functions:

- Data communication management function (DCMF)
- Flight deck communication function (FDCF).

The DCMF manages the radio hardware interfaces and internal processing. The FDCF controls the flight deck interface and passes it on to the DCMF.

DCMF

The Data Communication Management Function (DCMF) provides data communication control and services for airplane air/ground data link communications and for internal airplane communications between AIMS functions and other onboard systems. DCMF also provides an internal airplane communications interface between AIMS functions and PlaneNet member systems over a 10 base T Ethernet interface. Finally, DCMF provides the interface between AIMS functions and the onboard flight deck printer(s). Specific applications that utilize DCMF communication services are Software Dataloading (from the MAT or PMATs), the Maintenance Terminal Function (MTF) for communications between CMCF or ACMF and the MAT, PMATs, or optional Side Displays, and PlaneNet member system BITE for CMCF fault reporting.

The DCMF supplies the protocols and manages data for these sub-functions:

- ACARS datalink sub-function
- Print driver sub-function.
- PlaneNet sub-function

Data link communication between the airplane and the ground uses the standard Aircraft Communications Addressing and Reporting System (ACARS) character oriented-communications network. DCMF facilitates ACARS communication between AIMS functions (ACMF, CMCF, FDCF, FMCF, and Display Functions) and the ACARS Ground Service Provider (GSP) or between the Cabin Management System (CMS) and the ACARS GSP. The aircraft communications addressing and reporting system (ACARS) datalink sub-function manages flight plan and maintenance data between the airplane and the ground service provider (GSP). The ACARS datalink sub-function connects to these components of other systems:

- Satellite data unit (SDU)
- Center and right VHF communication transceivers
- Left, center and right radio tuning panels (RTPs).

The print driver sub-function manages all print requests for the DCMS. It sends data from the DCMS to the flight compartment printer, and sends print job status and any fault data back to the DCMS.

The PlaneNet communication sub-function provides a data transport service function that provides two-way, reliable, end-to-end data transport communications between AIMS functions and PlaneNet member systems. PlaneNet systems include the:

- Portable Maintenance Access Terminal (PMAT)
- Maintenance Access Terminal (MAT)
- Two flight deck Side Displays (optional).

FDCF

The FDCF supplies an operator interface for the DCMS. You use these components to make inputs to the FDCF:

- Display select panel (DSP)
- Multi-function display (MFD)
- Control display units (CDU)
- Cursor control devices (CCD)
- Accept/reject/cancel switches.

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**DCMS - GENERAL DESCRIPTION**

The DSP controls which display unit shows the MFD. You use the DSP to select the COMM MFD display.

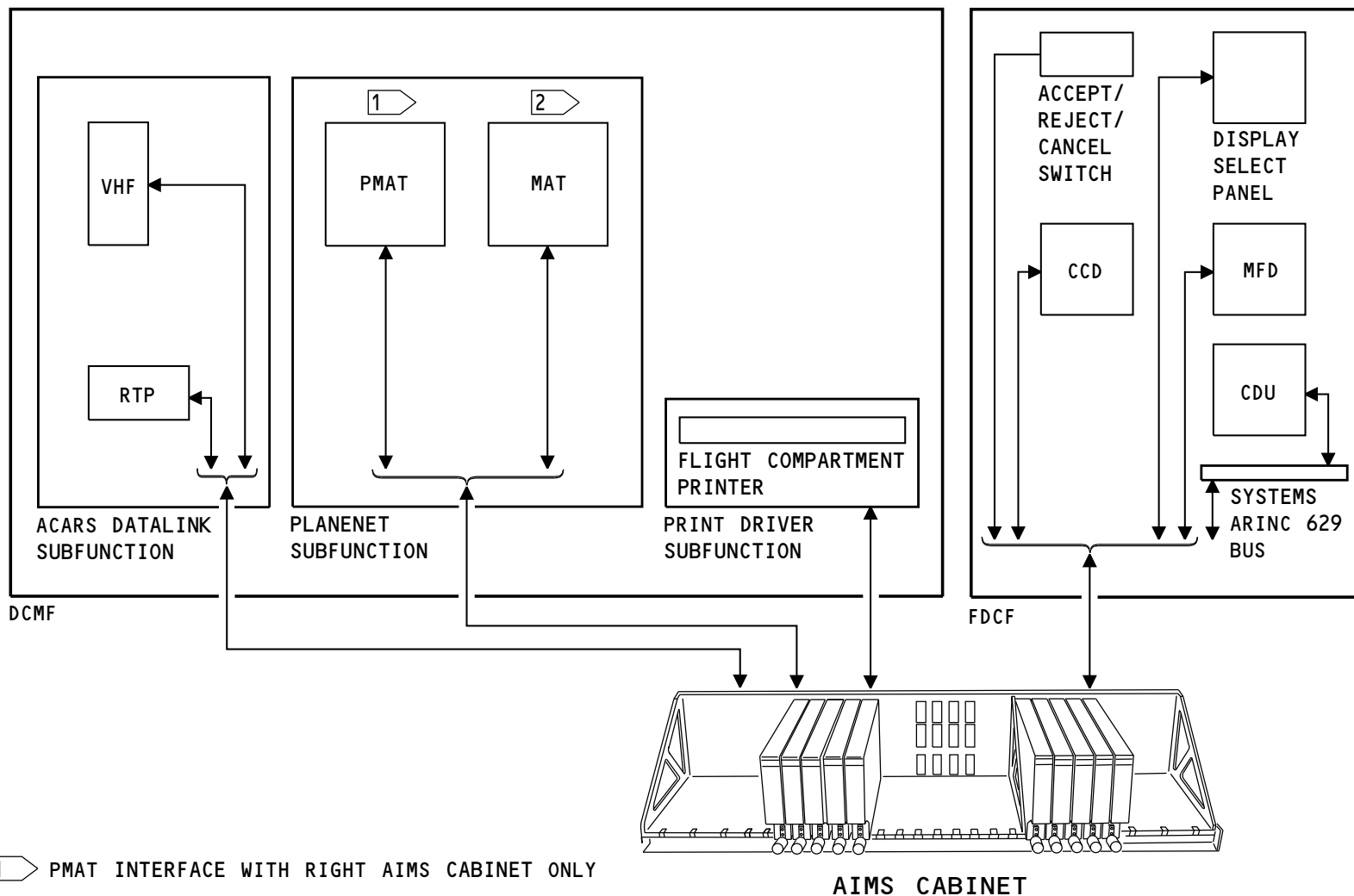
When you select the COMM display on the DSP, the MFD shows the FDCF main menu.

You use the CDUs to enter text to the FDCF displays. After you type text in the CDU scratch pad you use the CCD select switch to move it to the FDCF display.

You also use the CCDs to select menu items, buttons, and text boxes on the FDCF displays.

You use the accept/reject/cancel switches to accept, reject, or cancel messages that show on the FDCF displays.

When an uplinked message is selected by a member of the flight crew, it is displayed on the multi-function display (excluding those messages that are sent to the FMC). The multi-function display provides access to the FDCF. The FDCF uses the cursor control device for cursor movement on the multi-function display and the CDU keyboard for text entry. The flight deck communication function will use a menu system on the multi-function display to view messages intended for the flight crew which have been sent to the airplane from the airline. In addition, flight deck communications provides the flight crew the capability to create messages to be sent to the airline. the flight deck communications function will also facilitate communications between the airplane and Air Traffic Control or Flight Information Services. Airline messages handled by FDCF are modifiable by the airline using the ground based software tool.



- 1 PMAT INTERFACE WITH RIGHT AIMS CABINET ONLY
- 2 MAT INTERFACE WITH LEFT AIMS CABINET ONLY

DCMS - GENERAL DESCRIPTION

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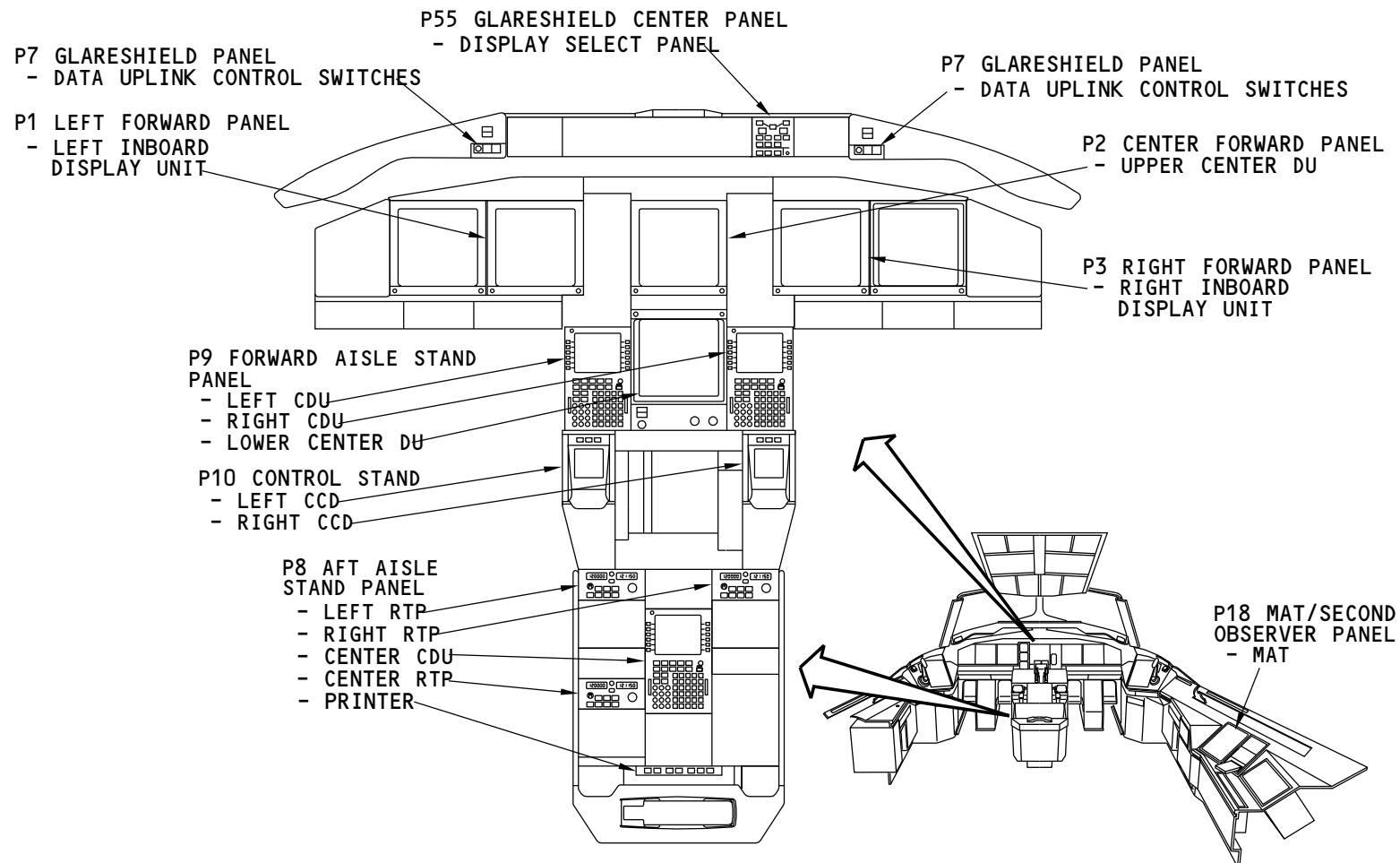
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**DCMS - COMPONENT LOCATIONS - FLIGHT DECK****Flight Deck Components**

These are the DCMS related components in the flight deck:

- Left data uplink control switches
- Right data uplink control switches
- Left inboard display unit (DU), (MFD)
- Right inboard DU (MFD)
- Upper center DU
- Lower center DU (MFD)
- Display select panel
- Left cursor control device (CCD)
- Right CCD
- Left control display unit (CDU)
- Right CDU
- Center CDU
- Left radio tuning panel (RTP)
- Right RTP
- Center RTP
- Maintenance access terminal (MAT).



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DCMS - COMPONENT LOCATIONS - FLIGHT DECK

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DCMS - COMPONENT LOCATIONS - MAIN EQUIPMENT CENTER

DCMS Component Locations

The DCMS components in the main equipment center are the data communication management function (DCMF) and flight deck communication function (FDCF) software in the AIMS cabinets.

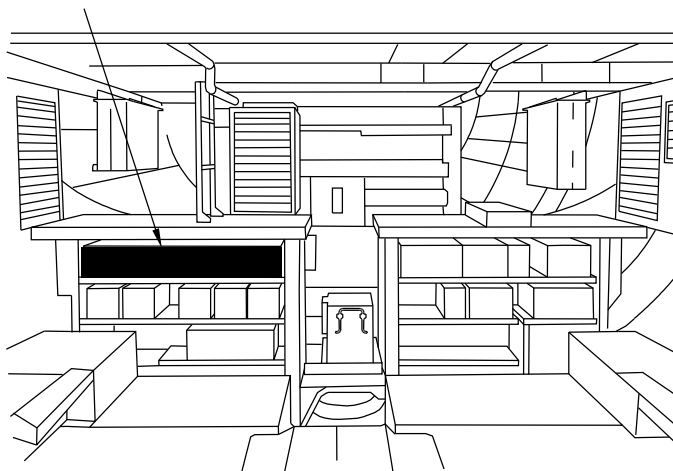
The DCMF and FDCF are in the AIMS core processor module/communications (CPM/Comm) in both the left and right AIMS cabinets.

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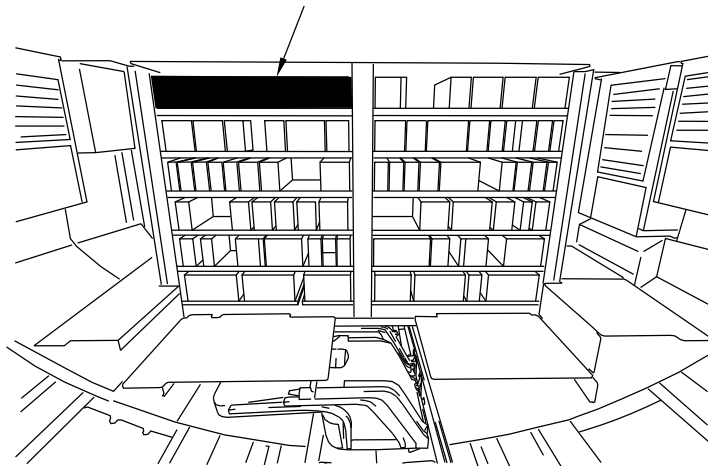
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**E3-1 SHELF
- LEFT AIMS CABINET**



**E3 RACK
(LOOKING FORWARD)**

**E2-1 SHELF
- RIGHT AIMS CABINET**



**E2 RACK
(LOOKING AFT)**

DCMS - COMPONENT LOCATIONS - MAIN EQUIPMENT CENTER

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DCMS - ARINC 429 INPUTS AND ARINC 618 INTERFACES**General**

The data communication management function (DCMF) receives data on low speed and high speed ARINC 429 buses. It also receives and sends data on ARINC 618 buses.

Input Components

These components exchange data with the DCMF:

- Satellite data unit (SDU)
- Flight deck printer
- Inflight entertainment system
- left, center, and right radio tuning panels (RTP)
- Center and right VHF communication transceivers (VHF).

Satellite Data Unit

The SDU sends ground service provider (GSP) data to the DCMF on a high speed ARINC 429 bus.

The SDU data goes to IOM (M003) and IOM (M004) in the left AIMS cabinet, and IOM (M008) and IOM (M009) in the right AIMS cabinet.

Flight Compartment Printer

The flight compartment printer sends status and error data to the DCMF on a high speed ARINC 429 bus.

Printer data goes to IOM (M009) in both AIMS cabinets.

Inflight Entertainment System

The inflight entertainment system sends data to the DCMF on a high speed ARINC 429 bus. The DCMF sends this data to the GSP. The data is downlink data.

Inflight entertainment system data goes to IOM (M009) in both AIMS cabinets.

Radio Tuning Panels

The RTPs send tuning data and broadcast status data to the DCMF and the flight deck communication (FDCF) on low speed ARINC 429 buses.

Left RTP data goes to IOM (M004) in the left AIMS cabinet and IOM (M003) in the right AIMS cabinet. Center RTP data goes to IOM (M008) in both cabinets. Right RTP data goes to IOM (M003) in the left AIMS cabinet and IOM (M004) in the right AIMS cabinet.

VHF Communication Transceivers

The DCMF receives and sends GSP data to the VHF transceivers on ARINC 618 data buses.

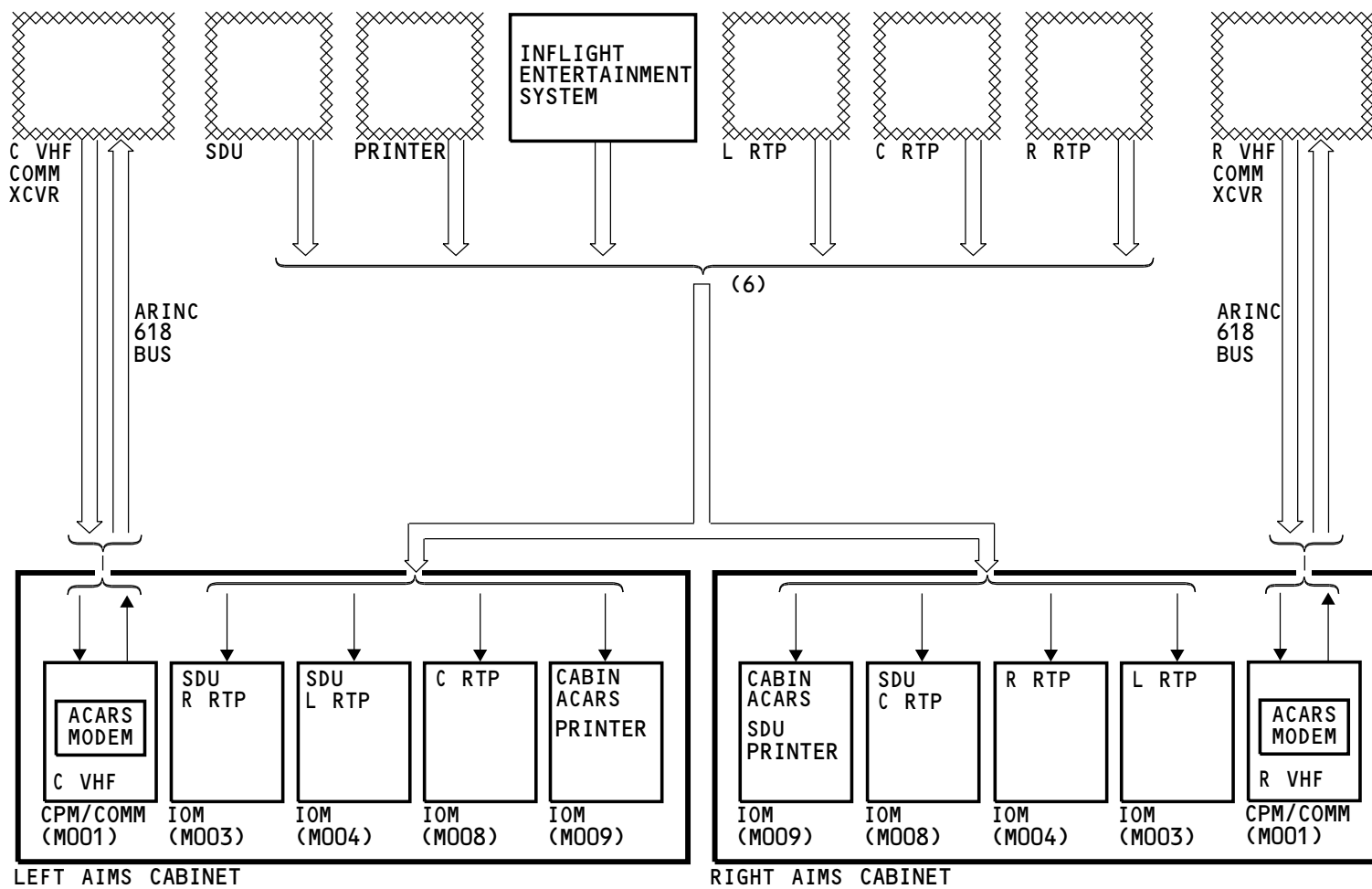
The center VHF exchanges data with the ACARS modem in the left CPM/Comm. The right VHF exchanges data with the ACARS modem in the right CPM/Comm. The DCMF does not interface with the left VHF transceiver.

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DCMS - ARINC 429 INPUTS AND ARINC 618 INTERFACES

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DCMS - ARINC 429 INTERFACES - OUTPUTS**General**

The data communication management function (DCMF) uses the DCMF bus and the general purpose bus 2 to send data.

Each bus takes data from one of two IOMs in each cabinet. Each bus uses a source select relay to get data from one of two IOMs in each cabinet if necessary.

DCMF Bus

The source select relay for the DCMF bus energizes when the DCMF sends a signal. This causes data to come from IOM (M009). When the DCMF causes the source select relay to relax, data comes from IOM (M003).

The DCMF bus is a high speed ARINC 429 bus. It sends data from the left and right AIMS cabinets to the:

- Satellite data unit (SDU)
- Inflight entertainment system
- Flight compartment printer.

The DCMF sends downlink data through the SDU to the ground service provider (GSP).

The DCMF controls the print requests it receives from other AIMS functions. It sends print controls and data to the printer.

General Purpose Bus 2

Fault detection and switch logic in IOM (M003) energizes the source select relay. This causes the source select relay to use general purpose bus 2 data from IOM (M003). When the fault detection and switch logic causes the source select relay to relax, data comes from IOM (M004).

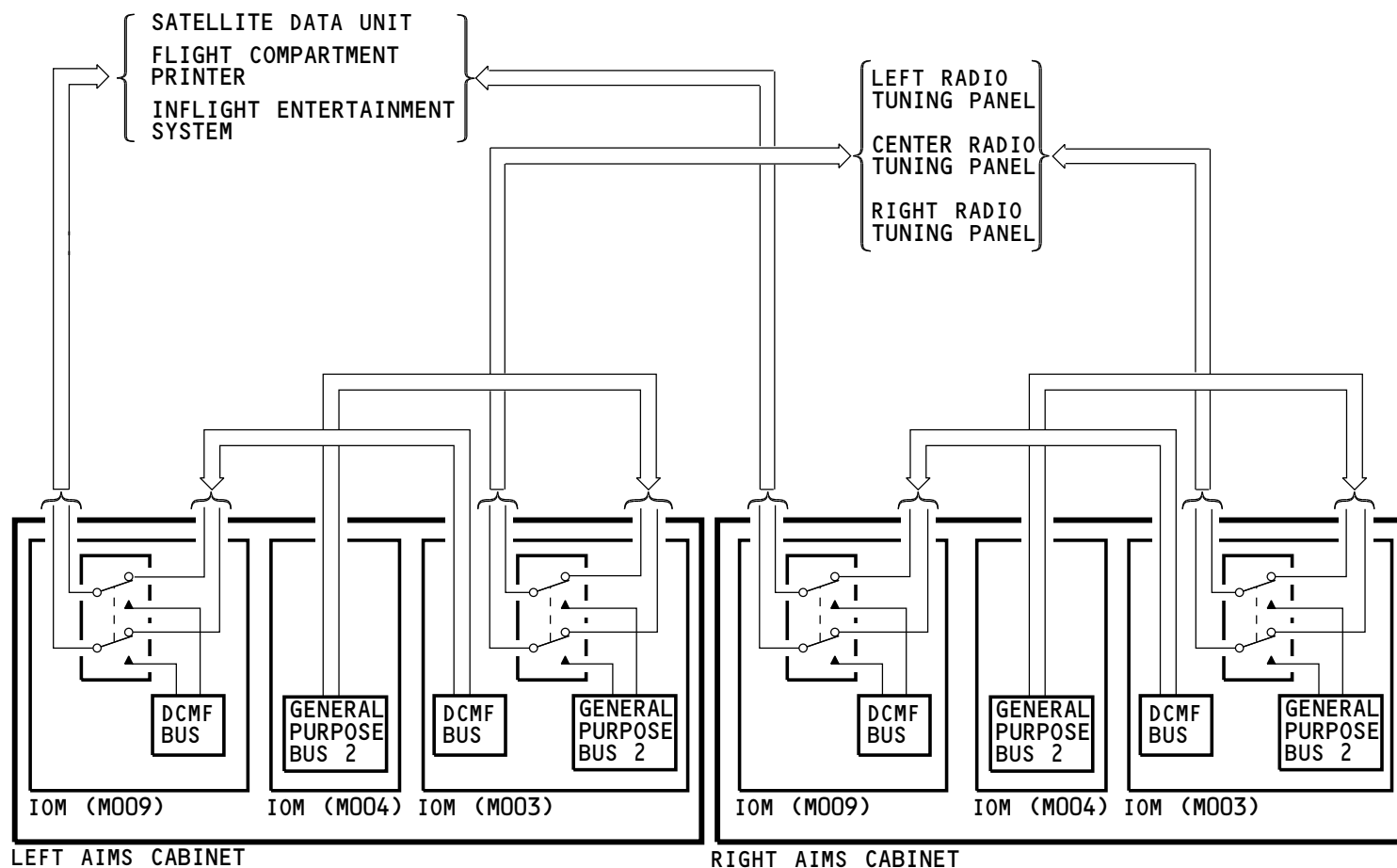
The general purpose bus 2 is a low speed ARINC 429 bus. It sends tuning data and broadcast status data to the RTPs.

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DCMS - ARINC 429 INTERFACES - OUTPUTS

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**DCMS - INTERCABINET ETHERNET INTERFACES****Intercabinet Interface**

The DCMF and FDCF exchange data across the airplane information management system (AIMS) intercabinet ethernet buses.

The DCMF data includes the:

- Inputs to each DCMF
- Status and control information from each DCMF.

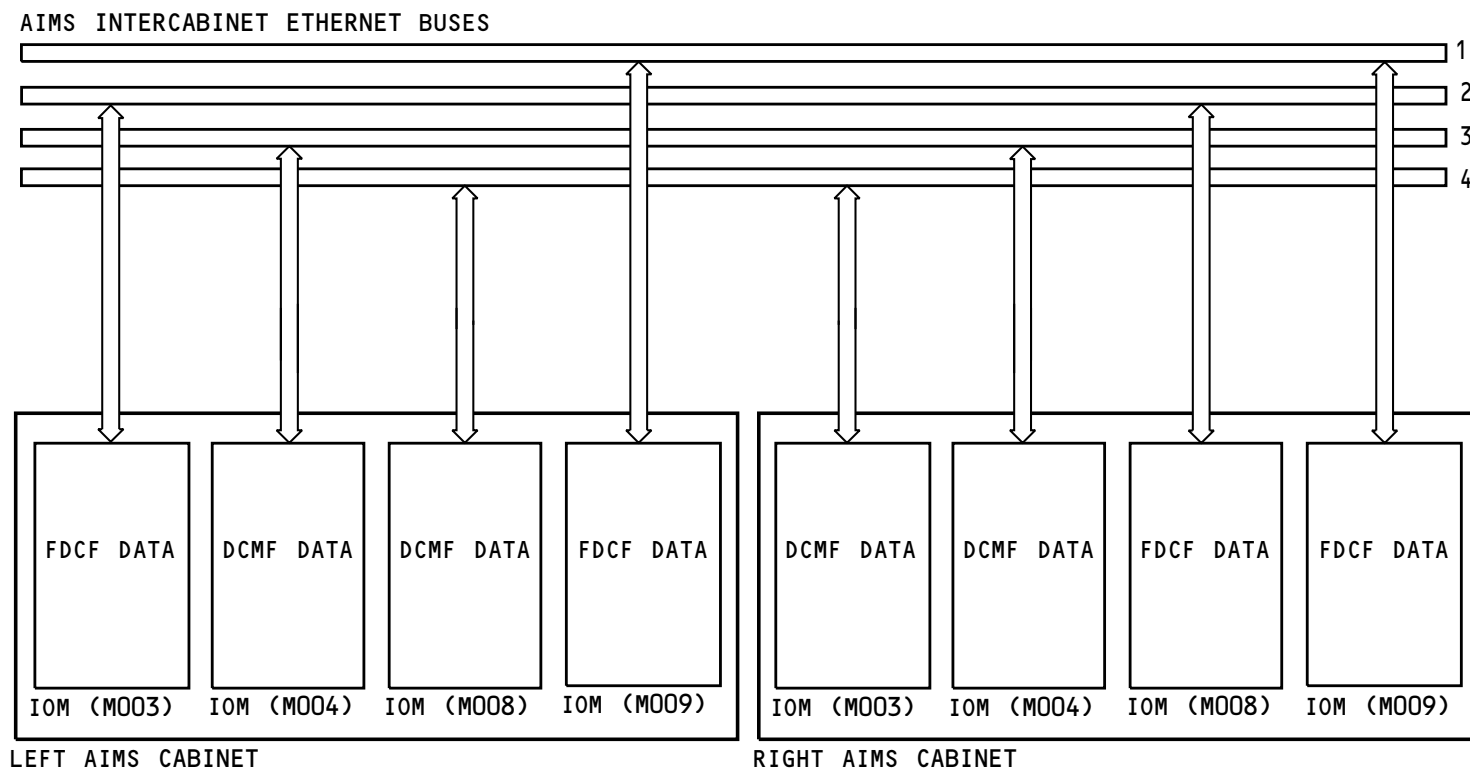
The DCMFs use this data to keep synchronized and to monitor their operation.

The FDCF data includes:

- FDCF-related display information
- FDCF-related central maintenance information
- FDCF-related DCMF information
- FDCF-redundancy information.

The FDCFs use this data to keep synchronized and to monitor their operation.

For more information on AIMS functions, see 31-41-00.



DCMS - INTERCABINET ETHERNET INTERFACES

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**DCMS - PLANENET LAN AND DISCRETE INTERFACES****PLANENET Interfaces**

The PlaneNet local area network (LAN) is characterized as a point to point 10 Base T Ethernet network which provides connectivity between the various LRUs in PlaneNet. The DCMF in the CPM/COMM has the communication protocols that permit the AIMS functions to communicate with the PlaneNet LAN.

Discrete Interfaces

The DCMF uses the data key line to key the VHF communication transceiver. When the DCMF keys the transceiver, the DCMF sends the downlink message to the VHF communication transceiver.

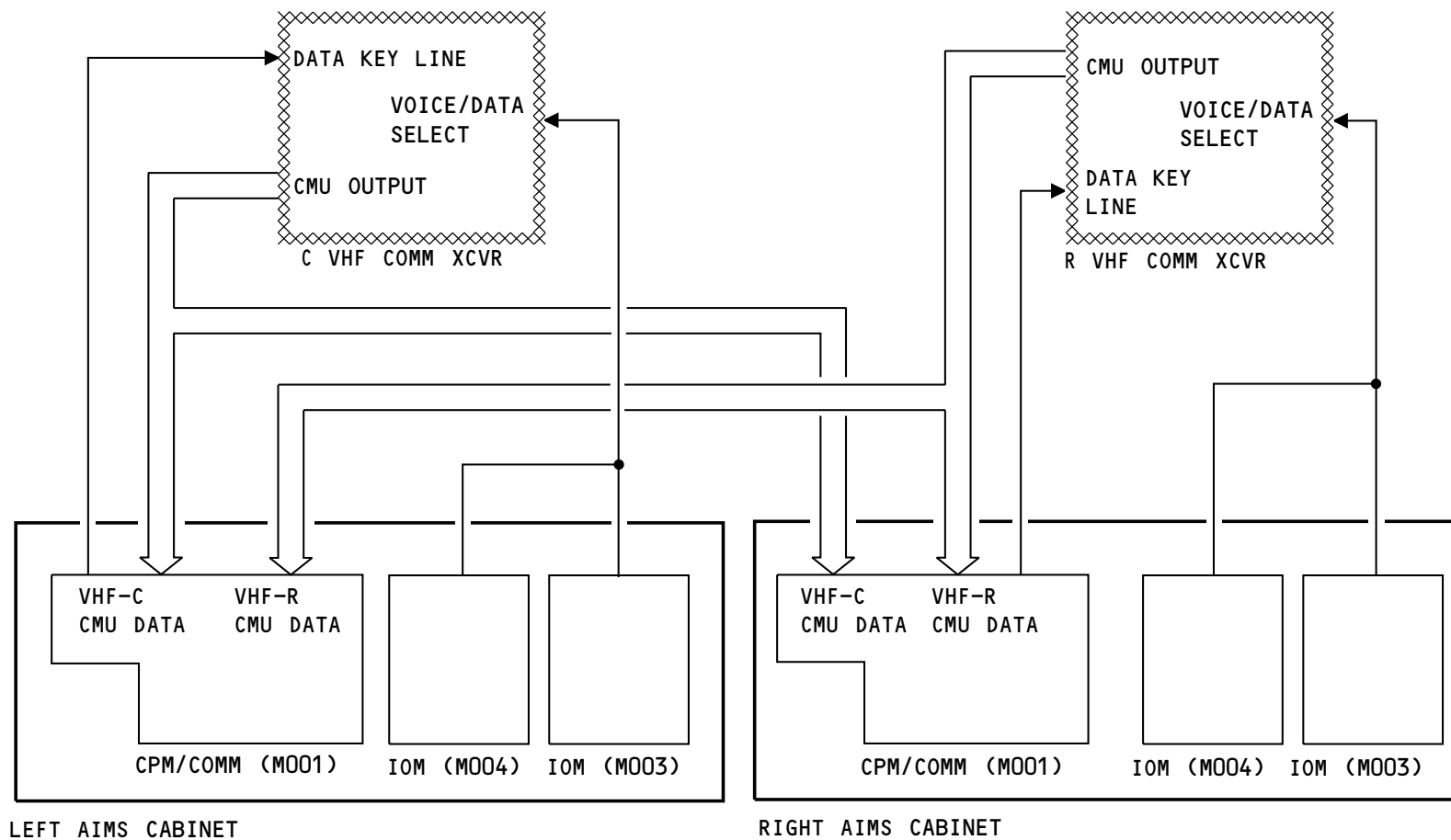
The DCMF uses the voice/data select to set the VHF communication transceiver to the data signal mode. At power-up, the DCMF sets the center VHF communication transceiver to the data signal mode. If the center VHF communication transceiver fails, the DCMF selects SATCOM for data transmissions. If SATCOM fails, the DCMF selects the right VHF communication transceiver for data transmissions.

The left VHF communication transceiver is voice only.

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DCMS - PLANENET LAN AND DISCRETE INTERFACES

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**DCMS - FDCF DISPLAY OVERVIEW****General**

The FDCF displays show on a multifunction display (MFD). The FDCF receives messages from the airline's ground station and sends them to the PDS to show on the MFD. The flight crew can also send messages to the airline's ground station.

To show the FDCF main menu bar, select COMM on the display select panel (DSP).

These are the six menu selections that show on the FDCF main menu bar:

- ATC
- FLIGHT INFORMATION
- COMPANY
- REVIEW
- MANAGER
- NEW MESSAGES.

Buttons show at the bottom of the display to give the flight crew control.

ATC

The air traffic control (ATC) menu shows all of the displays the flight crew uses to communicate with the ATC system.

Flight Information

The FLIGHT INFORMATION selection is not available now. There is no response when the crew puts the CCD cursor in this menu selection.

COMPANY

The COMPANY menu shows all customer configured downlink messages.

REVIEW

The flight crew uses the REVIEW menu to look at uplink or downlink messages. Uplink messages show here after the crew accepts or rejects them. Messages that do not require an accept or reject also show here.

MANAGER

The MANAGER menu shows status information and supplies controls for flight deck communication external support devices. In the MANAGER menu, pages show for:

- The radios
- The flight compartment printer
- Message configuration
- Datalink configuration.

NEW MESSAGES

The NEW MESSAGES menu shows the new messages that require flight crew review. The new messages usually come from the airline ground station. They may also be messages that the flight crew enters.

Buttons

The flight crew uses the buttons to control the flight deck communication function (FDCF) displays. Each FDCF display causes different buttons to show.

The ACCEPT, REJECT, and CANCEL buttons on the FDCF display do the same functions as the ACCEPT, REJECT, and CANCEL switches on the P7 glareshield panel.

These buttons can show on the FDCF displays:

- ACCEPT
- SEND
- LOAD FMC
- PRINT
- PRINT LIST
- RESET
- STANDBY
- RETURN
- APPEND

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DCMS - FDCF DISPLAY OVERVIEW

- REJECT REASONS
- REJECT
- CANCEL
- EXIT
- EXIT MENU.

The ACCEPT button shows when a received message requires an accept or reject response and all pages of the message have been displayed.

The SEND button shows when all required data for the message has been entered and all pages have been displayed.

The LOAD FMC button shows when the air traffic control (ATC) system sends a flight plan modification. The flight crew uses this button to send the modified flight plan to the flight management computing function (FMC).

The PRINT button shows when a page has the capability to be printed and the printer is available.

The PRINT LIST button is available for the REVIEW or NEW MESSAGES pages when a list shows. This lets the flight crew print multiple messages.

The RESET button shows when a downlink message is displayed. This clears the message text.

The STANDBY button lets the flight crew tell the ATC that the ATC message is in review.

The RETURN button shows when a review message page, a downlink message page, or a manager page shows. This returns you to the previous list box page or menu.

The APPEND button shows if the received message has the capability for the crew to add information and downlink a response message. The APPEND button shows only if all pages have been shown.

The REJECT REASONS button shows when a received message requires an accept or reject response and all pages of the message have been shown. A list of reject reasons shows when you select this button.

The REJECT button shows when a received message requires an accept or reject response and all pages of the message have been shown. The message is rejected when the flight crew selects this button.

The CANCEL button shows when a received message does not require a response or the received message has been accepted or rejected.

The EXIT button shows when the downlink page or manager page shows.

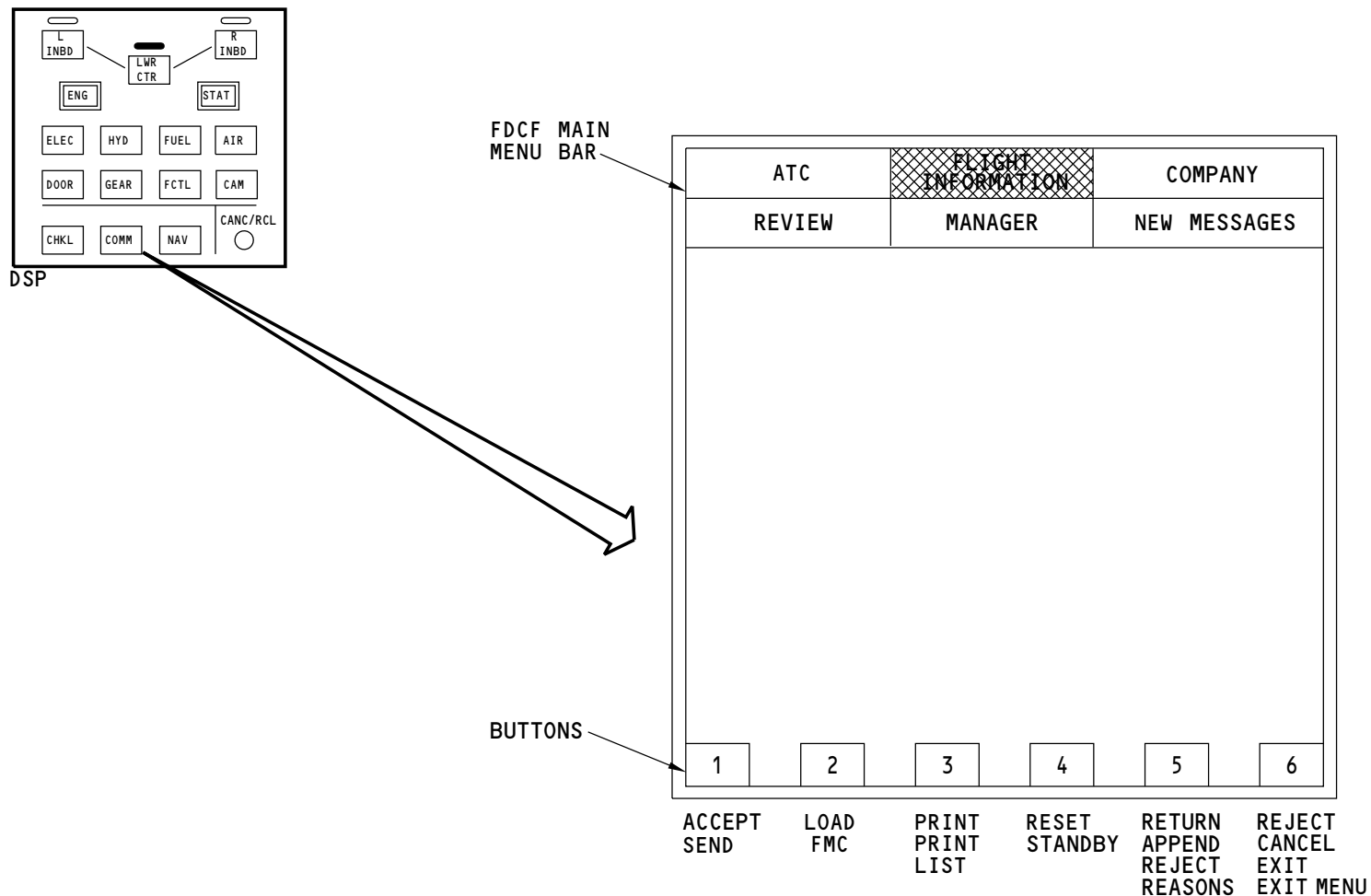
The EXIT MENU button shows when a menu shows. The EXIT MENU button takes you back to the FDCF main menu screen.

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DCMS - FDCF DISPLAY OVERVIEW

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**DCMS - FDCF INFORMATION MESSAGES****General**

During the uplink or downlink mode, information messages show on the display. The information box and the button show at the bottom of the display and hides other data. Information messages show in the box as the flight crew looks at the uplink or downlink message text. Information messages occur either as a result of flight crew action or automatically.

Uplink Information Messages

When you select the ACCEPT button on the MFD or the glareshield, one of these information messages show:

- ACCEPTING
- ACCEPTED
- NO ACCEPT.

ACCEPTING shows after crew selects ACCEPT and until the ACCEPT uplink is successful or the flight crew selects EXIT INFO.

ACCEPTED shows that the uplink is successful and shows when the flight crew selects EXIT INFO.

NO ACCEPT shows when the uplink queue is full or the crew selects EXIT INFO.

When you select the REJECT button on the MFD or the glareshield, one of these information messages show:

- REJECTING
- REJECTED
- NO REJECT.

REJECTING shows after the crew selects REJECT and until the REJECT uplink is successful or the flight crew selects EXIT INFO.

REJECTED shows that the uplink is successful and shows when the flight crew selects EXIT INFO.

NO REJECT shows when the uplink queue is full or the crew selects EXIT INFO.

When you select the PRINT button on the MFD, one of these information messages show:

- MESSAGE TO PRINTER 1
- NO PRINT.

MESSAGE TO PRINTER 1 shows when the print format goes to the primary flight compartment printer. It shows until the flight crew selects EXIT INFO or until NO PRINT occurs.

NO PRINT shows when the print format cannot be sent to the flight compartment printer. It shows until the flight crew selects EXIT INFO.

INVALID DATA shows when the uplink has invalid data.

DATALINK LOST FOR THIS MESSAGE tells the flight crew that the datalink to respond to this message is not available. This type of information message requires a flight crew response. It shows until the flight crew makes a response. EXIT INFO then causes the message to go away.

INCOMPLETE MESSAGE shows when the flight crew receives an uplink with mandatory data fields blank. The message shows until the flight crew selects EXIT INFO.

Downlink Information Messages

When you select the PRINT button on the MFD, one of these information messages show:

- MESSAGE TO PRINTER 1
- NO PRINT.

MESSAGE TO PRINTER 1 shows when the print format goes to the flight compartment printer. It shows until the flight crew selects EXIT INFO or NO PRINT occurs.

NO PRINT shows when the print format cannot be sent to the flight compartment printer. It shows until the flight crew selects EXIT INFO.

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**DCMS - FDCF INFORMATION MESSAGES**

When you select the SEND button on the MFD, one of these information messages show:

- SENDING
- SENT
- NO SEND.

SENDING shows until the downlink is successful or the flight crew removes the response from the downlink list or the flight crew selects EXIT INFO.

SENT shows that the downlink is successful. It shows until the flight crew selects EXIT INFO.

NO SEND shows when the flight crew deletes the response from the downlink list. It shows until the crew selects EXIT INFO.

UPLINK INFORMATION MESSAGES

ACCEPT

ACCEPTING
ACCEPTED
NO ACCEPT

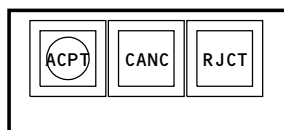
REJECT

REJECTING
REJECTED
NO REJECT

PRINT

MESSAGE TO PRINTER 1
NO PRINT

INVALID DATA
DATALINK LOST FOR THIS MESSAGE
INCOMPLETE MESSAGE



P55 PANEL (2)

DOWNLINK INFORMATION MESSAGES

PRINT

MESSAGE TO PRINTER 1
NO PRINT

SEND

SENDING
SENT
NO SEND

INVALID ENTRY
DATALINK LOST FOR THIS MESSAGE

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
(UPLINK OR DOWNLINK MESSAGE TEXT)		
INFORMATION BOX		
		EXIT INFO

BUTTON

DCMS - FDCF INFORMATION MESSAGES

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DCMS - FDCF ATC MENU

General

You select COMM on the display select panel to show the FDCF main menu bar. Select ATC to show the ATC menu.

The ATC menu gives you access to ATC format displays and sub-menus to communicate with the ATC. You can transmit messages and reports from the displays.

These are the displays you can select from the ATC menu:

- Altitude request
- Route request
- Speed request
- Clearance request
- When can we expect
- Voice contact request
- Logon/status
- Emergency report
- Position report
- Free text message.

You can also select the ATC requested reports sub-menu.

Use the cursor control device to highlight and select a display or sub-menu.

Altitude Request Display

The flight crew can make altitude requests from this display.

Route Request Display

The flight crew can make route requests from this display.

Speed Request Display

The flight crew can make speed requests from this display.

Clearance Request Display

The flight crew can request clearances from this display.

When Can We Expect Display

The flight crew can request schedule information about altitude, speed, and route changes on this display.

Voice Contact Request Display

The flight crew can request voice contact with the ATC on this display.

Logon/Status Display

The flight crew uses this display to connect to the ATC.

Emergency Report Display

The flight crew can report an emergency on this display.

ATC Requested Reports Sub-menu Display

The ATC can request reports from the flight crew. This display shows a list of the reports that have been requested. If no reports have been requested this selection is cyan and cannot be selected.

Position Report Display

The flight crew can report position information on this display.

Free Text Message Display

The flight crew can use this display to make free text messages and send them to the ATC.

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ATC MENU DISPLAY

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DCMS - FDCF ATC MENU

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2	0.0000	0.0000
3	0.0000	0.0000
4	0.0000	0.0000
5	0.0000	0.0000
6	0.0000	0.0000
7	0.0000	0.0000
8	0.0000	0.0000
9	0.0000	0.0000
10	0.0000	0.0000
11	0.0000	0.0000
12	0.0000	0.0000
13	0.0000	0.0000
14	0.0000	0.0000
15	0.0000	0.0000
16	0.0000	0.0000
17	0.0000	0.0000
18	0.0000	0.0000
19	0.0000	0.0000
20	0.0000	0.0000
21	0.0000	0.0000
22	0.0000	0.0000
23	0.0000	0.0000
24	0.0000	0.0000
25	0.0000	0.0000
26	0.0000	0.0000
27	0.0000	0.0000
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29	0.0000	0.0000
30	0.0000	0.0000
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33	0.0000	0.0000
34	0.0000	0.0000
35	0.0000	0.0000
36	0.0000	0.0000
37	0.0000	0.0000
38	0.0000	0.0000
39	0.0000	0.0000
40	0.0000	0.0000
41	0.0000	0.0000
42	0.0000	0.0000
43	0.0000	0.0000
44	0.0000	0.0000
45	0.0000	0.0000
46	0.0000	0.0000
47	0.0000	0.0000
48	0.0000	0.0000
49	0.0000	0.0000
50	0.0000	0.0000
51	0.0000	0.0000
52	0.0000	0.0000
53	0.0000	0.0000
54	0.0000	0.0000
55	0.0000	0.0000
56	0.0000	0.0000
57	0.0000	0.0000
58	0.0000	0.0000
59	0.0000	0.0000
60	0.0000	0.0000
61	0.0000	0.0000
62	0.0000	0.0000
63	0.0000	0.0000
64	0.0000	0.0000
65	0.0000	0.0000
66	0.0000	0.0000
67	0.0000	0.0000
68	0.0000	0.0000
69	0.0000	0.0000
70	0.0000	0.0000
71	0.0000	0.0000
72	0.0000	0.0000
73	0.0000	0.0000
74	0.0000	0.0000
75	0.0000	0.0000
76	0.0000	0.0000
77	0.0000	0.0000
78	0.0000	0.0000
79	0.0000	0.0000
80	0.0000	0.0000
81	0.0000	0.0000
82	0.0000	0.0000
83	0.0000	0.0000
84	0.0000	0.0000
85	0.0000	0.0000
86	0.0000	0.0000
87	0.0000	0.0000
88	0.0000	0.0000
89	0.0000	0.0000
90	0.0000	0.0000
91	0.0000	0.0000
92	0.0000	0.0000
93	0.0000	0.0000
94	0.0000	0.0000
95	0.0000	0.0000
96	0.0000	0.0000
97	0.0000	0.0000
98	0.0000	0.0000
99	0.0000	0.0000
100	0.0000	0.0000

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**DCMS - FDCF ATC LOGON/STATUS DISPLAY****General**

The ATC Logon/Status menu selection gives the flight crew access to the ATC Logon/Status display. The cursor shows on this selector if an ATC connection has not been established.

Logon/Status Display

The flight crew must enter this information:

- ATC ICAO identifier
- Flight number.

Enter the ATC ICAO identifier in the Logon To boxes.

You can enter the flight number on this display or into the FMC. If you enter it into the FMC, the boxes on this display change to the flight number.

Use the cursor control device to select and activate the send selection.

This information shows after the system makes an ATC connection:

- Active center
- Next center
- ATC connection established
- Logon to (dashes)
- Flight number (no boxes)
- ATC datalink off selector.

The tail number and airline always show.

The ATC ground stations update the active center automatically as the flight continues.

The next center shows when the next ATC station on the flight plan makes a connection.

To request any ATC center available, the flight crew enters the ATC ICAO in the Logon To dashes and selects send.

The flight crew selects the ATC datalink off box on the display to disconnect from the ATC. After selection of the ATC datalink off box, a confirm box will show. You must select the confirm box to complete the ATC disconnect.

EICAS Displays

EICAS shows this information after the system makes an ATC connection:

- ATC COMM ESTABLISHED
- Station ICAO
- Time of the connection
- Cancel.

The flight crew can remove the EICAS ATC connection display with the cancel switch on the glareshield. This action moves the message into the review area of the flight deck comm displays.

Abnormal EICAS Displays

EICAS shows RELOGON TO ATC COMM if there is no connection within 10 minutes of a logon request. This message shows in the ATC field on EICAS.

An EICAS advisory ATC DATALINK LOST shows when an ATC connection is lost.

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
ATC		
ALTITUDE REQUEST	WHEN CAN WE EXPECT	EMERGENCY REPORT
ROUTE REQUEST	VOICE CONTACT REQUEST	ATC REQUESTED REPORTS
SPEED REQUEST	LOGON / STATUS	POSITION REPORT
CLEARANCE REQUEST		FREE TEXT MESSAGE

FDCF ATC MENU

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z LOGON/STATUS		
ACTIVE CENTER:KZSE		
NEXT CENTER:		
ATC CONNECTION: ESTABLISHED		
LOGON TO: - - - -		
FLIGHT NUMBER:XXXXX		
TAIL NUMBER:N77701 AIRLINE: XX		
☐ ATC DATALINK OFF	☐ CONFIRM OFF	
SEND	RETURN	EXIT

FDCF ATC LOGON/STATUS DISPLAY

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z LOGON/STATUS		
ACTIVE CENTER:		
NEXT CENTER:		
ATC CONNECTION: NOT ESTABLISHED		
LOGON TO:		
FLIGHT NUMBER:		
TAIL NUMBER:N77701 AIRLINE: XX		
SEND	RETURN	EXIT

FDCF ATC LOGON/STATUS DISPLAY

SENDING	EXIT INFO
SENT	EXIT INFO
INFO BLOCK	
ATC COMM ESTABLISHED	
WITH KZSE	
1234Z	CANCEL

EICAS ATC DISPLAY AREA

DCMS - FDCF ATC LOGON/STATUS DISPLAY

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		COMPANY
REVIEW	MANAGER	NEW MESSAGES
ALTITUDE REQUEST	WHEN CAN WE EXPECT	EMERGENCY REPORT
ROUTE REQUEST	VOICE CONTACT REQUEST	ATC REQUESTED REPORTS
SPEED REQUEST	LOGON / STATUS	POSITION REPORT
CLEARANCE REQUEST		FREE TEXT MESSAGE

FDCF ATC MENU

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z ATC LOGON/STATUS		
ACTIVE CENTER:		
NEXT CENTER:		
ATC CONNECTION: NOT ESTABLISHED		
MAX UPLINK DELAY: --- SEC		
LOGON TO: KOAK		
FLIGHT NUMBER: BOE456		
TAIL NUMBER: N7771 AIRLINE: B		
SEND	RESET	RETURN EXIT

FDCF ATC LOGON/STATUS DISPLAY

		COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z LOGON/STATUS		
ACTIVE CENTER:		
NEXT CENTER:		
ATC CONNECTION: NOT ESTABLISHED		
LOGON TO: [] [] [] []		
FLIGHT NUMBER: [] [] [] [] [] [] [] []		
TAIL NUMBER: N77701 AIRLINE: XX		
SEND	RETURN	EXIT

FDCF ATC LOGON/STATUS DISPLAY

SENDING	EXIT INFO
SENT	EXIT INFO
INFO BLOCK	
ATC COMM ESTABLISHED	
WITH KZSE	
1234Z	CANCEL

EICAS ATC DISPLAY AREA

DCMS - FDCF ATC LOGON/STATUS DISPLAY

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DCMS - FDCF - NEW MESSAGES

General

Selection of the NEW MESSAGE menu item shows a list box of new messages sent by the ground system and received by the airplane. From this list box, the operator can select the message to view.

If there are no new messages in the main menu, the new message item will be inhibited (black background with cyan text and cyan menu item outline). If there are new messages, but the main menu new messages items has not been selected, the main menu new message item will have a background with white text and white menu item outline. If selected, the main menu new message item will have a green background with white text and white menu item outline.

The New Message List Box is sorted similar to EICAS messages. New messages show in order so that high priority is at the top and low priority is at the bottom. The newest messages also show newest to oldest in the priority level. There are three priority levels: COMM Medium, COMM Low, and COMM None. ATC messages use COMM Medium Alerts with the text "ATC." COMM High messages are not used until datalink is established in the terminal area. New Messages list box items for ATC uplinks show the ATC nomenclature on the first line of the list box title. Flight information uses the COMM Medium Alert but will not have nomenclature with the message. Company New Messages do not show any nomenclature on the first line of the list box title. This lets the pilot see the difference between ATC messages and other messages such as ARINC and Company.

A COMM or ATC message on the EICAS display tells the crew when there is a new message. To go to the FDCF main menu, select COMM on the display select panel (DSP). This causes the FDCF main menu to show with the oldest, highest priority new message on the selected multi-function display (MFD). To see the new message queue (called the New Message List Box), the crew selects the NEW MESSAGES menu on the FDCF main menu. The messages show by the levels of medium and low. ATC messages are medium messages and show above medium COMM messages. Within each level, the messages show in order of time. The flight crew then selects a message to see the message content.

The ATC message text also shows on the EICAS display below the primary engine data.

When a new ATC uplink message arrives, the flight crew is alerted by an ATC visual cue on the EICAS display and by an aural high/low chime. New ATC messages are retained in the New message queue until selected for review by the flight crew. Once the flight crew has reviewed an ATC message, completed the response (accept or reject), if required, and the message is removed from the display, it is transferred to the review category.

Uplink messages in the New Message List Box are time stamped upon receipt and displayed in reverse chronological order (newest to oldest). The New Message List Box includes ATC, Flight Information and AOC (airline company) new uplink messages where the ATC messages have priority over Flight Information and AOC messages in the order of listing (i.e. ATC messages are listed ahead of AOC messages).

For an ATC uplink message, if the difference between the time of origin of the message and the time stamp exceeds the MAX UPLINK DELAY set on the LOGON/STATUS page, an UPLINK DELAY EXCEEDED message will be displayed preceding the uplink message. This will occur on the EICAS Data Block as well as the NEW MESSAGES display.

If there is no new message alert, the FDCF inhibits the NEW MESSAGES menu selection.

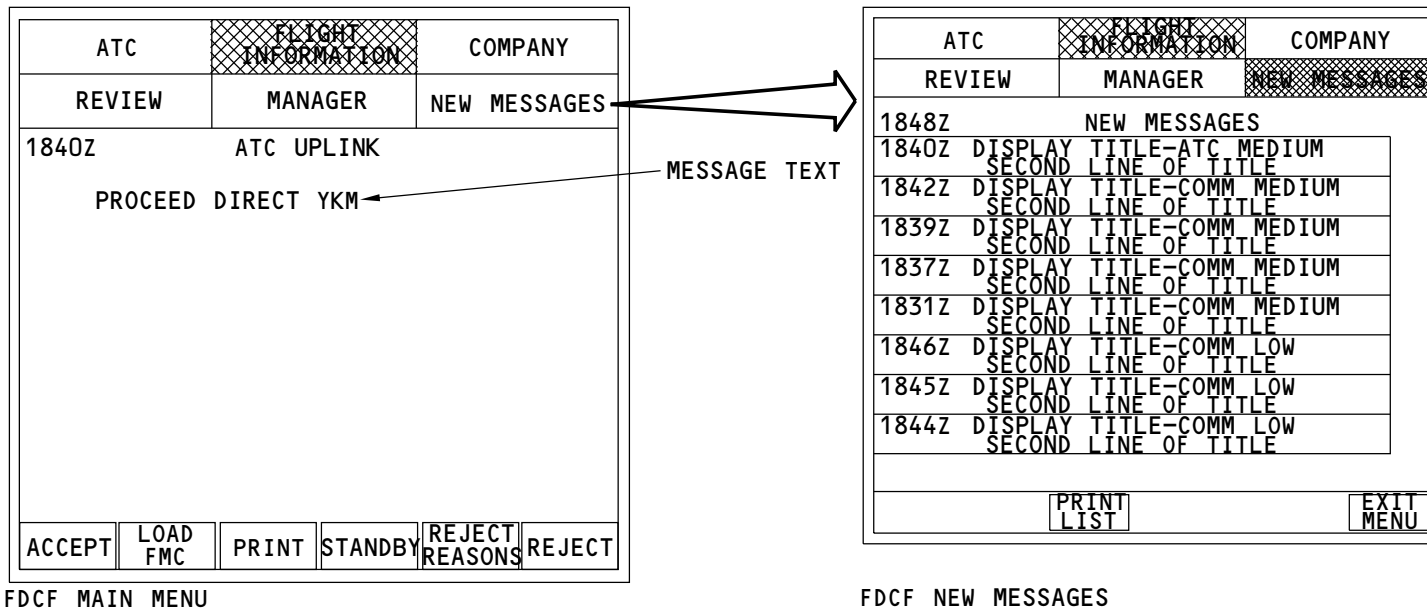
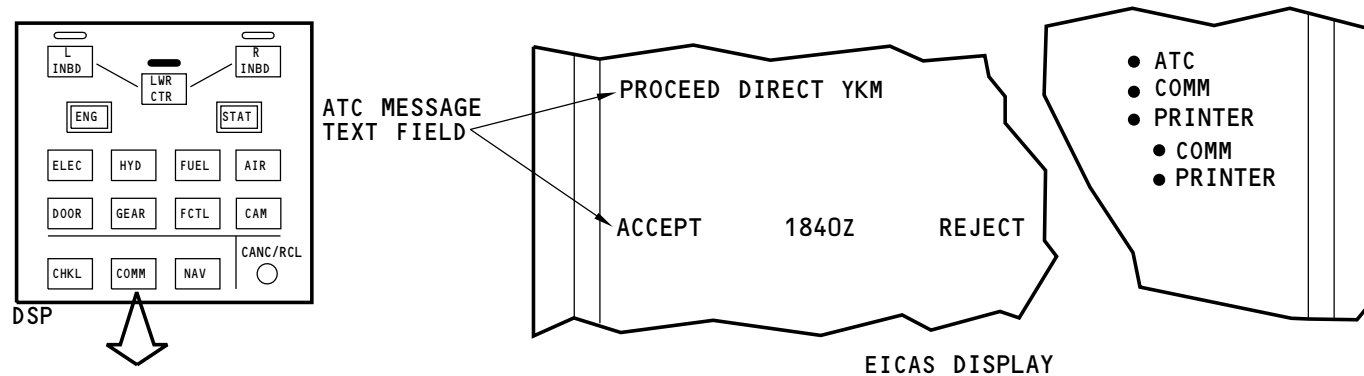
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DCMS - FDCF NEW MESSAGES

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DCMS - FDCF NEW MESSAGES - UPLINK OPERATION

General

The new message operation of the FDCF system is the messages uplinked from the Company ground system or the Air Traffic System to the airplane. The AOC messages are reports from the ground systems to the flight crew requesting information. Examples of these types of messages are weight manifest reports from the ground or a message to the flight crew that information needs to be included in a report. Another example is general text that shows a gate assignment has changed. Because every airline has different operational requirements for AOC messages, the new message and the new message display is defined by the airline when they use the GBST (Ground Based Software Tool).

ATC Uplinks are free-text uplinks. Examples of these messages are CLEARED TO (altitude) and CONFIRM WHEN LEVEL (altitude). The display of these messages is similar to the display of AOC messages. The crew action is the same except ATC messages show on the upper EICAS display in the ATC datalink block.

Flight information uplinks are character-oriented uplinks in ARINC 623. Examples of these messages are ATIS messages, Oceanic Clearances and Departure Clearances. The display of these messages is very similar to the display of AOC messages. These messages do not show on the upper EICAS in the ATC datalink block.

Operation

The data that follows is an example to describe how the flight crew receives a new message. This helps explain how the flight crew reacts to a messages from the ground.

STEP 1 - The company ground system prepares a message and sends that message to the airplane. The FDCF function receives the message and tells EICAS to put up the appropriate message. The EICAS message can be a .COMM or a .PRINTER depending on whether the message is to be viewed on the COMM display or sent directly to the printer. It is possible that the crew hears a high-low chime with the message. These features are optional and are programmed by the GBST. For this example, assume a .COMM was displayed. When the flight crew sees the .COMM EICAS message, they select the COMM button on the DSP to view the uplinked message.

NOTE: For ATC datalink, the EICAS message .ATC would be displayed with a chime. The uplink would be displayed in the EICAS ATC datalink block. It would also be displayed on the MFD if the COMM button was selected. For Flight Information datalink, the EICAS message .COMM would be displayed with a chime. The uplink will only be accessible via the MFD.

STEP 2 - The new message may be displayed immediately (if it's the only or highest priority message) when COMM is selected. Assume the message is displayed immediately. The flight crew can then act on the message depending on the command buttons programmed for the display. Assuming the command buttons are ACCEPT/REJECT/APPEND, the flight crew could accept the message by using the CCD and the selection switch. Once the flight crew accepts the message, the information box is displayed showing the status of the acceptance. Once the ground system has acknowledged the accept, "ACCEPTING" changes to "ACCEPTED". At this time, the message is placed into review (GBST definable). The flight crew must manually remove this message from the display.

NOTE: The flight crew can also use the glareshield command buttons (ACCEPT/REJECT/CANCEL) instead of those displayed on the MFD display to act on a message. For AOC datalink and Flight Information messages, the uplink message must be viewed on the MFD for the glareshield buttons to work. For the ATC displays, the glareshield buttons can be used whenever the ATC uplink is viewed in the EICAS datalink block.

**DCMS - FDCF NEW MESSAGES - UPLINK OPERATION**

Step 2 is only one possible operation of accepting a message. The flight crew could reject the message or select APPEND, if applicable. Rejecting the message is very similar in operation to accepting except the ground system is notified that the flight crew rejected a message. If the APPEND command button is selected, a downlink display appears. The flight crew enters the proper information and sends the message. Sending the append display supplies the ground system information on why the uplinked message was rejected.

The uplink display could be equipped with a CANCEL command button instead of the ACCEPT/REJECT/CANCEL command button. When the flight crew selects cancel, no message is sent to the ground. The message is automatically put into review (GBST definable) and a new message comes up on the display if one exists.

ALTERNATE STEP - Instead of acting on a specific new message that is displayed automatically by pressing the COMM button on the DSP, the flight crew could select the NEW MESSAGE Menu. The NEW MESSAGE menu brings up a new message list box with all the new messages received by the FDCF but not yet acted on by the flight crew. Using the CCD, the flight crew selects the message they would like to view. The new message is identical to that message that would appear on the MFD when the COMM button on the DSP is pressed. ACCEPT, REJECT, APPEND and CANCEL operate the same way when the new message goes into review. ATC messages in the New Message List box are identified with the text "ATC" after the title.

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DCMS - FDCF NEW MESSAGES - CREW RESPONSE TO AN UPLINK

GENERAL

If the displayed uplink message requires a response, STANDBY, ACCEPT, and REJECT (if rejecting a message is appropriate) command buttons will be displayed on the ATC UPLINK displays once all the pages are viewed. Transmission of the STANDBY response will not close the message. The flight crew must transmit an ACCEPT or REJECT response in order to close the message. The crew must clear the information message in order to gain access to the ACCEPT and/or REJECT command buttons.

STANDBY

To transmit STANDBY in response to an ATC Uplink Message, the crew actions are in this sequence:

- The crew selects the NEW MESSAGE main menu item. The NEW MESSAGE list box will be displayed.
- Then, the crew selects the list box of the message which corresponds to the uplink to be viewed. This action results in display of the HHMMz ATC UPLINK display corresponding to the selected list box item. The EICAS data block will then display this message and will not be cleared until the message is acted on or another uplink display is selected via the NEW MESSAGE list box.
- Then, the crew selects the STANDBY command button. If there is more than one page for the uplink message, all pages must be viewed before the STANDBY command button will be displayed. This action results in transmission of the STANDBY downlink message. The information message SENDING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message SENT will be displayed.

ACCEPT

The steps that follow are to ACCEPT an ATC Uplink Message. If the uplink message that the crew would like to accept is displayed in it's entirely on the EICAS ATC Data Block, the crew can accept the message by selecting the ACCEPT glareshield button.

- The crew selects the NEW MESSAGE main menu item. The NEW MESSAGE list box will be displayed.
- Then, the crew selects the list box of the message which corresponds to the uplink to be viewed. This action results in display of the HHMMz ATC UPLINK display corresponding to the selected list box item. The EICAS data block will then display this message and will not be cleared until the message is acted on or another uplink display is selected via the NEW MESSAGE list box.
- Then, the crew selects the ACCEPT command button. If there is more than one page for the uplink message, all pages must be viewed before the ACCEPT command button will be displayed. This action results in transmission of the acceptance response downlink message. The information message ACCEPTING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message ACCEPTED will be displayed.

REJECT

The steps that follow are to REJECT an ATC Uplink Message. If the uplink message that the crew would like to accept is displayed in it's entirely on the EICAS ATC Data Block, the crew can accept the message by selecting the REJECT glareshield button.

- The crew selects the NEW MESSAGE main menu item. The NEW MESSAGE list box will be displayed.
- Then, the crew selects the list box of the message which corresponds to the uplink to be viewed. This action results in display of the HHMMz ATC UPLINK display corresponding to the selected list box item. The EICAS data block will then display this message and will not be cleared until the message is acted on or another uplink display is selected via the NEW MESSAGE list box.

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DCMS - FDCF NEW MESSAGES - CREW RESPONSE TO AN UPLINK

- Then, the crew selects the REJECT command button. If there is more than one page for the uplink message, all pages must be viewed before the REJECT command button will be displayed. This action results in transmission of the reject response downlink message. The information message REJECTING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message REJECTED will be displayed. The display is automatically cleared 5 seconds after the REJECT command button is selected.

To REJECT an ATC Uplink Message and include the DUE TO AIRCRAFT PERFORMANCE reason, the sequence is as follows.

- The crew selects the NEW MESSAGE main menu item. The NEW MESSAGE list box will be displayed.
- Then, the crew selects the list box of the message which corresponds to the uplink to be viewed. This action results in display of the HHMMz ATC UPLINK display corresponding to the selected list box item. The EICAS data block will then display this message and will not be cleared until the message is acted on or another uplink display is selected via the NEW MESSAGE list box.
- Then, the crew selects the REJECT REASON command button. If there is more than one page for the uplink message, all pages must be viewed before the REJECT REASON command button will be displayed.
- The crew selects the DUE TO PERFORMANCE exclusive selector button. The message element DUE TO AIRCRAFT PERFORMANCE will be appended to the downlink message.
- Finally, the crew selects the REJECT command button. This action results in transmission of the reject response downlink message. The information message REJECTING will be displayed until the network acknowledgment is received. When the acknowledgment is received the information message REJECTED will be displayed. The display is automatically cleared 5 seconds after the REJECT command button is selected.

ATC	FLIGHT INFORMATION	COMPANY		
REVIEW	MANAGER	NEW MESSAGES		
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330				
ACCEPT	PRINT	STANDBY	REJECT REASONS	REJECT

SELECT STANDBY
COMMAND BUTTON

ATC	FLIGHT INFORMATION	COMPANY	
REVIEW	MANAGER	NEW MESSAGES	
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330			
SENT			EXIT INFO

STANDBY RESPONSE TO AN UPLINK
(EXAMPLE)

STANDBY RESPONSE TO AN UPLINK

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ATC	FLIGHT INFORMATION	COMPANY		
REVIEW	MANAGER	NEW MESSAGES		
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330				
ACCEPT	PRINT	STANDBY	REJECT REASONS	REJECT

SELECT ACCEPT
COMMAND BUTTON

ATC	FLIGHT INFORMATION	COMPANY		
REVIEW	MANAGER	NEW MESSAGES		
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330				
ACCEPTED				EXIT INFO

ACCEPT RESPONSE TO AN UPLINK
(EXAMPLE)

ACCEPT RESPONSE TO AN UPLINK

2270361 S0000510641_V1

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ATC	FLIGHT INFORMATION	COMPANY		
REVIEW	MANAGER	NEW MESSAGES		
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330				
ACCEPT	PRINT	STANDBY	REJECT REASONS	REJECT

SELECT REJECT
COMMAND BUTTON

ATC	FLIGHT INFORMATION	COMPANY		
REVIEW	MANAGER	NEW MESSAGES		
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330				
REJECTED				EXIT INFO

REJECT RESPONSE TO AN UPLINK
(EXAMPLE)

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REJECT RESPONSE TO AN UPLINK

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ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234z ATC UPLINK CLIMB TO AND MAINTAIN FL330		
ACCEPT	PRINT	STANDBY
REJECT REASONS	REJECT	

SELECT REJECT
COMMAND BUTTON

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234z REJECT REASONS REASON FOR REJECTING CLEARANCE ☒ DUE TO AIRCRAFT PERFORMANCE ☐ DUE TO WEATHER ☐ NOT CONSISTENT, PLEASE RE-SEND CLEARANCE FREE TEXT: _____ _____ _____		
REJECTING		EXIT INFO

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234z REJECT REASONS REASON FOR REJECTING CLEARANCE ☒ DUE TO AIRCRAFT PERFORMANCE ☐ DUE TO WEATHER ☐ NOT CONSISTENT, PLEASE RE-SEND CLEARANCE FREE TEXT: _____ _____ _____		
RETURN		REJECT

SELECT REJECT
COMMAND BUTTON

REJECT WITH REASONS RESPONSE TO AN UPLINK
(EXAMPLE)

REJECT WITH REASONS RESPONSE TO AN UPLINK

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**DCMS - FDCF REVIEW MENU****General**

The REVIEW menu is available when one of these conditions exist:

- There is a message sent to the ground
- There was a message received from the ground and shown
- There was a weather message received from the ground and shown.

The REVIEW menu shows these sub-menus:

- ATC UPLINKS
- ATC DOWNLINKS
- FLIGHT INFORMATION
- SENT
- RECEIVED
- WEATHER.

Select the EXIT MENU button to return to the FDCF main menu.

Sub-Menus

The ATC UPLINKS sub-menu shows a list of ATC messages received from the ground.

The ATC DOWNLINKS sub-menu shows a list of ATC messages sent to the ground.

The FLIGHT INFORMATION sub-menu is not available now.

The SENT sub-menu shows a list of messages sent to the ground.

The RECEIVED sub-menu shows a list of messages received from the ground.

The WEATHER sub-menu shows a list of weather messages received from the ground.

Each sub-menu shows this information for the each listed message:

- Time
- Title

- Status.

Each sub-menu has these buttons:

- PRINT LIST
- RETURN
- EXIT MENU.

Select PRINT LIST to print all of the messages in the list.

Select RETURN to return to the REVIEW menu.

Select EXIT MENU to return to the main FDCF main menu.

View Message

Do these steps to see a message:

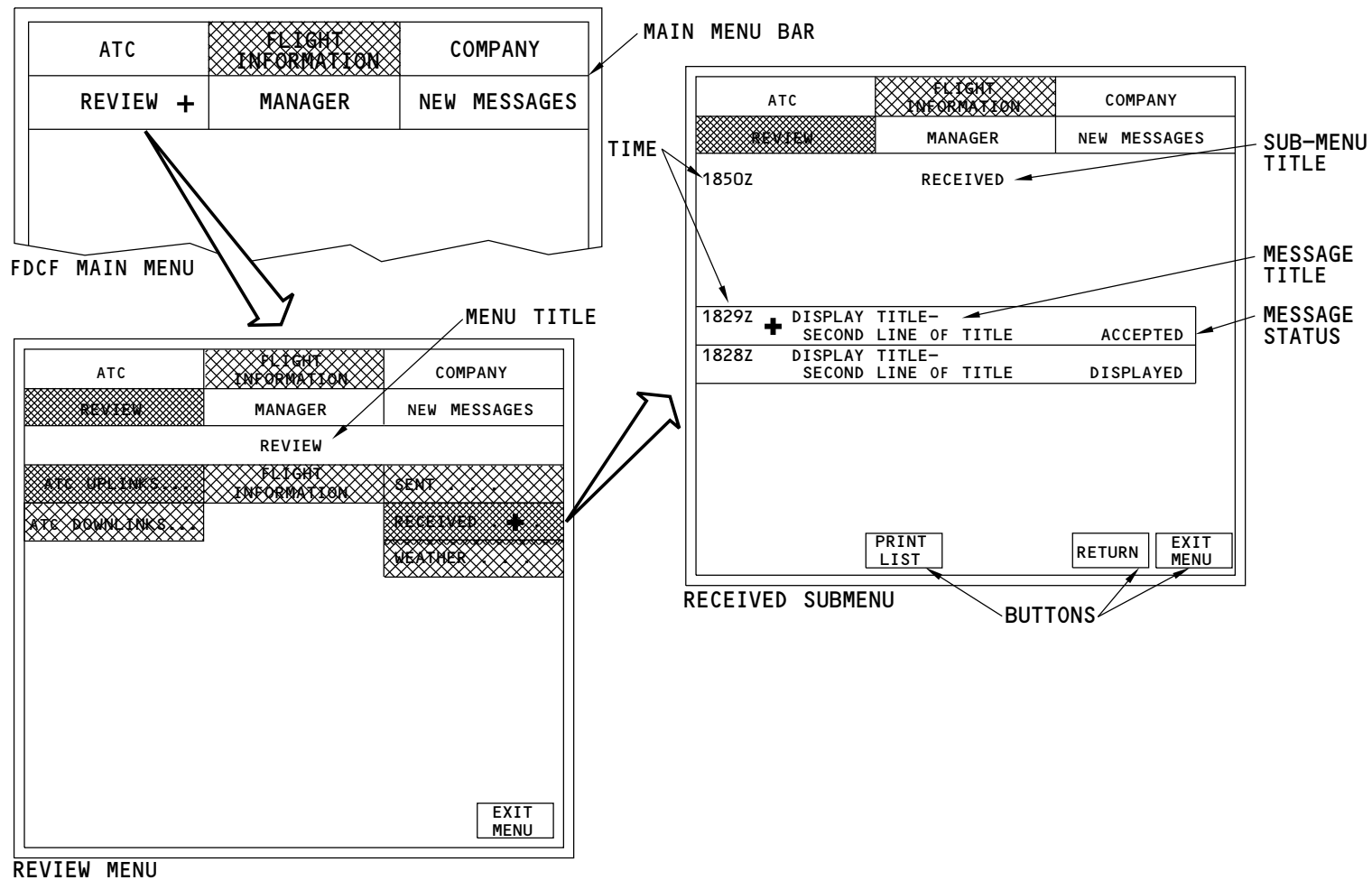
- Move the cursor over the message
- Activate the message with the CCD cursor select switch.

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DCMS - FDCF REVIEW MENU

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DCMS - FDCF COMPANY MENU

General

The COMPANY menu gives you access to company format displays and sub-menus to downlink. You can transmit messages and data from a display. you can select the company menu anytime.

These are the displays you can select from the company menu:

- Flight initialization
- Diversion
- Estimated time of arrival (ETA)
- Flight times
- Departure report
- Position report
- Arrival report
- Message to ground
- Voice contact request
- Weather requests
- Maintenance report
- Miscellaneous codes
- Situation.

These are the sub-menus you can select from the company menu:

- Delay reports
- Crew requests.

Use the cursor control device to highlight and select a display or sub-menu.

Flight Initialization Display

The flight crew can initialize flight plan data from a single location on this display.

Diversion Report Display

The flight crew uses the diversion report display to tell the airline the ETA at the diversion destination.

Estimated Time of Arrival Display

The flight crew uses the estimated time of arrival display to tell the airline the planned ETA at the destination airport.

Flight Times Display

The flight crew uses the flight times display to show the OUT, OFF, ON, and IN times. This shows the fuel on board and boarded fuel for the current and previous flights.

Departure Report Display

The flight crew uses the departure report display to send information that shows on the flight times display and additional information that relates to a departure.

Position Report Display

The flight crew uses the position report display to send this information:

- Position information
- Current position
- Flight level
- Next position
- Other performance data.

Arrival Report Display

The flight crew uses the arrival report display to send information that shows on the flight times display and additional information that relates to an arrival.

Message To Ground Display

The flight crew uses the message to ground display to send free text messages to a selected ground station.

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DCMS - FDCF COMPANY MENU

Voice Contact Request Display

The flight crew uses the voice contact request display to start voice contact with a selected ground station.

Weather Requests Display

The flight crew uses the weather request display to request weather information from the airline host or ground service provider.

Maintenance Report Display

The flight crew uses the maintenance report display to enter codes and/or free text about maintenance problems for transmissions to the ground.

Miscellaneous Codes Display

The airline uses the miscellaneous codes display to support new display functions.

Situation Display

The flight crew uses the situation display to tell the ground station of an emergency situation.

Delay Reports Sub-menu

The flight crew uses the delay reports sub-menu to tell the airline of a departure, takeoff, or enroute delay.

Crew Requests Sub-Menu

When you select the crew requests box, the crew requests sub-menu shows. The crew requests sub-menu shows more display selections.

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ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES

FDCF MAIN MENU

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
COMPANY		
FLIGHT INITIALIZATION	TAKEOFF REPORT	WEATHER REQUESTS
DELAY REPORTS	POSITION REPORT	CREW REQUESTS ...
DIVERSION	ARRIVAL REPORT	MAINTENANCE REPORT
ETA	MESSAGE TO GROUND	MISCELLANEOUS CODES
FLIGHT TIMES	VOICE CONTACT REQUEST	SITUATION
EXIT MENU		

FDCF COMPANY MENU

DCMS - FDCF COMPANY MENU

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DCMS - FDCF FLIGHT INITIALIZATION DISPLAY**General**

The flight initialization display is a typical display that you can select from the COMPANY menu.

The flight initialization display gives a single location for the flight crew to enter flight plan data. The flight crew can send this data while the airplane is on the ground or in the air.

You can initialize this information from this display:

- Flight number
- Date
- Departure station identifiers
- Destination station identifiers
- First alternate station
- Second alternate station
- Flight plan time
- Fuel on board
- Boarded fuel
- Payroll numbers (captain, F/O, and 3 observers).

These three buttons show at the bottom of the display:

- SEND
- RETURN
- EXIT.

The flight crew can do a manual flight initialization. To do this, they complete the flight initialization pages and select SEND.

To request an auto-initialization, the flight crew enters or confirms the flight number and schedule date. The flight crew then selects SEND to transmit the flight initialization message. This causes the ground to update the flight initialization display.

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ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
COMPANY		
FLIGHT INITIALIZATION	TAKEOFF REPORT	WEATHER REQUESTS
DELAY REPORTS	POSITION REPORT	CREW REQUESTS ...
DIVERSION	LANDING REPORT	MAINTENANCE REPORT
ETA	MESSAGE TO GROUND	MISCELLANEOUS CODES
FLIGHT TIMES	VOICE CONTACT REQUEST	SITUATION
EXIT MENU		

FDCF COMPANY MENU

MAIN TITLE

1234Z FLIGHT INITIALIZATION

CREW PAYROLL NUMBERS

CAPTAIN: -----

FIRST OFFICER: -----

DISPLAY TITLE

1234Z FLIGHT INITIALIZATION

FLIGHT NUMBER:----- DATE: --

DEPARTURE STATION: ----

DESTINATION STATION:----

ALTERNATE STATION 1:----

ALTERNATE STATION 2:----

FLIGHT PLAN TIME --:--

FUEL ON BOARD: ---.-

BOARDED FUEL: -----

1

2

EXIT

1

2

SEND RETURN EXIT

INITIALIZATION PAGE 1 OF 2

BUTTONS

DCMS - FDCF FLIGHT INITIALIZATION DISPLAY

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DCMS - FDCF DELAY REPORTS SUB-MENU

General

The flight crew uses the DELAY REPORT sub-menu to tell the airline of a departure, takeoff, or enroute delay. You select it from the COMPANY menu. Three exclusive selectors show on the DELAY REPORT display. These are the displays you can select from the DELAY REPORT display:

- DEPARTURE DELAY
- TAKEOFF DELAY
- ENROUTE DELAY.

These three buttons show at the bottom of the display.

- SEND - sends the downlink message
- RETURN - takes you back to the COMPANY menu
- EXIT - takes you back to the MAIN menu.

DEPARTURE DELAY

The DEPARTURE DELAY display shows the estimated out time. It also shows these exclusive-selectors:

- AIRPORT CONGESTION
- MECHANICAL PROBLEM
- LATE CREW ARRIVAL
- LATE AIRCRAFT
- OTHER
- LATE/MISSING PASSENGER
- LOADING
- ATC HOLD
- WEATHER.

TAKEOFF DELAY

The TAKEOFF DELAY display shows the estimated off time and these exclusive selectors:

- AIRPORT CONGESTION
- MECHANICAL PROBLEM
- ATC HOLD
- WEATHER
- OTHER.

ENROUTE DELAY

The ENROUTE DELAY display shows the estimated on time and these exclusive selectors:

- ATC HOLD
- ATC RE-ROUTING
- WEATHER / HEADWINDS
- PERFORMANCE LIMITS
- POOR FLIGHT LEVEL
- OTHER.

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
COMPANY		
FLIGHT INITIALIZATION	TAKEOFF REPORT	WEATHER REQUESTS
DELAY REPORTS	POSITION REPORT	CREW REQUESTS ...
DIVERSION	LANDING REPORT	MAINTENANCE REPORT
ETA	MESSAGE TO GROUND	MISCELLANEOUS CODES
FLIGHT TIMES	VOICE CONTACT	SITUATION

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGE
1234Z DELAY REPORT		
◇ DEPARTURE DELAY	◇ TAKEOFF DELAY	◇ ENROUTE DELAY
FUEL ON BOARD: ---.-		
ESTIMATED ON TIME:---:--		
SELECT DELAY REASON:		
◇ AIRPORT CONGESTION		

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z DELAY REPORT		
◇ DEPARTURE DELAY	◇ TAKEOFF DELAY	◇ ENROUTE DELAY
FUEL ON BOARD: ---.-		
ESTIMATED ON TIME:---:--		
SELECT DELAY REASON:		
◇ AIRPORT CONGESTION		
◇ LATE/MISSING PSN		
◇ MECHANICAL PROBLEM		
◇ LOADING		
◇ LATE CREW ARRIVAL		
◇ ATC HOLD		
◇ LATE AIRCRAFT		
◇ WEATHER		
◇ OTHER -----		
SEND RETURN EXIT		

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z DELAY REPORT		
◇ DEPARTURE DELAY	◇ TAKEOFF DELAY	◇ ENROUTE DELAY
FUEL ON BOARD: ---.-		
ESTIMATED ON TIME:---:--		
SELECT DELAY REASON:		
◇ ATC HOLD		
◇ ACT RE-ROUTING		
◇ WEATHER / HEADWINDS		
◇ PERFORMANCE LIMITS		
◇ POOR FLIGHT LEVEL		
◇ OTHER -----		
SEND RETURN EXIT		

DCMS - FDCF DELAY REPORTS SUB-MENU

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DCMS - FDCF CREW REQUESTS SUB-MENU

General

When you select the crew requests box, the CREW REQUESTS sub-menu shows these display selections:

- WEIGHT AND BALANCE
- FLIGHT PLAN
- Airline traffic information system (ATIS)
- CLEARANCE
- FLIGHT RELEASE
- Notice to Airmen (NOTAMS)
- RE-CLEARANCE
- GATE ASSIGNMENT.

When you make a selection, the display shows information and entry fields.

Each display has buttons to downlink and uplink messages and information.

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ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
COMPANY		
FLIGHT INITIALIZATION	TAKEOFF REPORT	WEATHER REQUESTS
DELAY REPORTS	POSITION REPORT	CREW REQUESTS
DIVERSION	LANDING REPORT	MAINTENANCE REPORT
ETA	MESSAGE TO GROUND	MISCELLANEOUS CODES
FLIGHT TIMES	VOICE CONTACT REQUEST	SITUATION
EXIT MENU		

FDCF COMPANY MENU

SUB-MENU
TITLE

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
COMPANY		
CREW REQUESTS		
WEIGHT & BALANCE	CLEARANCE	RE-CLEARANCE
FLIGHT PLAN	FLIGHT RELEASE	GATE ASSIGNMENT
ATIS	NOTAMS	
EXIT MENU		

CREW REQUESTS SUB-MENU

DCMS - FDCF CREW REQUESTS SUB-MENU

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DCMS - FDCF MANAGER MENU

General

The MANAGER menu selection gives the flight crew access to these manager sub-menus:

- ACARS
- VHF
- SATCOM
- Automatic dependent surveillance (ADS)
- System information
- Printer
- Automatic messages
- Master.
- HF

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES

FDCF MAIN MENU

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
MANAGER		
ACARS	SYSTEM INFORMATION	
VHF	PRINTER	
SATCOM 1	AUTOMATIC MESSAGES	
ADS 2	MASTER	
HF 3		
EXIT MENU		

FDCF MANAGER MENU

- 1 IF SATCOM DATALINK INSTALLED
- 2 IF ADS FUNCTION INSTALLED
- 3 IF HF DATALINK INSTALLED

DCMS - FDCF MANAGER MENU

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DCMS - FDCF ACARS SUB-MENU

ACARS Sub-menu Page One

Page one of the ACARS sub-menu lets the flight crew select the ACARS frequency and scan rate. It also lets the flight crew set the secondary frequency. To do this, type the frequency into the CDU scratch pad. Use the cursor control device (CCD) to highlight the box prompts. Use the CCD cursor select switch to select the secondary frequency.

The RETURN and EXIT buttons show on the display.

ACARS Sub-menu Page Two

Page two of the ACARS sub-menu lets the flight crew select the ACARS mode of transmission. The selections are:

- VHF enable
- SATCOM enable
- HF enable

Page two of the ACARS sub-menu shows ACARS status messages. The status message field holds the 25 most recent messages. The newest messages show first. The possible ACARS messages are:

- NO ACARS LINK
- ACARS LINK ESTABLISHED
- ACARS VHF MODE.
- ACARS SATCOM MODE
- ACARS HF MODE.

The RETURN and EXIT buttons show on the display.

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ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
MANAGER		
ACARS	SYSTEM INFORMATION	
VHF	PRINTER	
SATCOM	AUTOMATIC MESSAGES	
ADS	MASTER	
HF		
EXIT MENU		

FDCF MANAGER MENU

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z ACARS		
131.500 2 SEC 132.750 2 SEC 129.450 2 SEC 135.100 2 SEC SECONDARY FREQUENCY		
RETURN		EXIT

PAGE ONE

BOX PROMPTS

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z ACARS		
☒ VHF ENABLE ☒ SATCOM ENABLE ☒ HF ENABLE STATUS MESSAGE FIELD		
RETURN		EXIT

PAGE TWO

BUTTONS

DCMS - FDCF ACARS SUB-MENU

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DCMS - FDCF COMMUNICATION SUB-MENUS**SATCOM Sub-menu**

The SATCOM sub-menu lets the flight crew see the SATCOM STATUS messages. The status message field holds the 25 most recent messages. The newest messages show first. These are the possible SATCOM messages:

- NO SATCOM LINK
- SATCOM LINK ESTABLISHED
- SATCOM FAILURE
- SATCOM NORMAL.

The RETURN and EXIT buttons show on the display.

VHF Sub-menu

The VHF sub-menu lets the flight crew set the radio transmission mode and select the VHF radio as the default data radio (right or center only). The graphic shows the power up default selections.

The sub-menu also shows VHF status messages. The status message field holds the 25 most recent messages. The newest messages show first. These are the possible VHF messages:

- NO VHF LINK
- VHF LINK ESTABLISHED
- VHF RADIO FAILURE
- VHF RADIO NORMAL.

The RETURN and EXIT buttons show on the display.

HF Sub-menu

The VHF sub-menu lets the flight crew set the radio transmission mode and select the HF radio as the default data radio (left or right). The graphic shows the power up default selections.

The sub-menu also shows HF status messages. The status message field holds the 25 most recent messages. The newest messages show first. These are the possible HF messages:

- HF LINK ESTABLISHED
- NO HF LINK
- HF DATA MODE RADIO FAILURE
- HF DATA MODE RADIO NORMAL

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
MANAGER		
ACARS	SYSTEM	
VHF	PRINTER	
SATCOM 1	AUTOMATIC MESSAGES	
ADS	MASTER	
HF 2		
EXIT MENU		

FDCF MANAGER MENU
(EXAMPLE)

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z VHF		
◆ DEFAULT RADIO CENTER	◆ DEFAULT RADIO RIGHT	
◆ DEFAULT RADIO MODE DATA	◆ DEFAULT RADIO MODE VOICE	

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z SATCOM		
1		
2		
JRN EXIT		

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1234Z HF		
◆ DEFAULT RADIO LEFT	◆ DEFAULT RADIO RIGHT	
◆ DEFAULT RADIO MODE: DATA	◆ DEFAULT RADIO MODE: VOICE	
STATUS MESSAGE FIELD		
1		
2		
RETURN EXIT		

(EXAMPLE)

BUTTONS

1 IF SATCOM DATALINK INSTALLED

2 IF HF DATALINK INSTALLED

DCMS - FDCF COMMUNICATION SUB-MENUS

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DCMS - FDCF ADS SUB-MENU

ADS Sub-menu

The ADS sub-menu lets the flight crew arm the automatic dependent surveillance (ADS) system or turn it off. It also shows the status messages for the ADS system.

The RETURN and EXIT buttons show on the display.

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ATC		COMPANY
REVIEW		NEW MESSAGES
ACARS	SYSTEM INFORMATION	
VHF	PRINTER	
SATCOM 1	AUTOMATIC MESSAGES	
ADS	MASTER	
HF 2		
		EXIT MENU

FDCF MANAGER MENU

ATC		COMPANY
REVIEW		NEW MESSAGES
1234Z ADS		
◆ ADS ARM	◇ ADS OFF	
↑		
STATUS MESSAGE FIELD		
↓		
		RETURN EXIT

BUTTONS

1 IF SATCOM DATALINK INSTALLED

2 IF HF DATALINK INSTALLED

DCMS - FDCF ADS SUB-MENU

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**DCMS - FDCF PRINTER AND AUTOMATIC MESSAGES SUB-MENUS****Printer Sub-menu**

The printer sub-menu lets the flight crew send future uplink company messages to the printer. You can not print messages that do not have a print format. Uplink messages with a print format go to the printer when you select the COMPANY MESSAGES FUTURE button. They do not show on the display.

The printer sub-menu also shows printer status messages. The possible messages are:

- PRINTER NOT OPERABLE
- PRINTER OPERABLE
- PRINT BUFFER FULL
- COMPANY FUTURE MESSAGES TO PRINTER-ON
- COMPANY FUTURE MESSAGES TO PRINTER-OFF.

The status message field holds the 12 most recent messages. The newest messages show first.

The RETURN and EXIT buttons show on the display.

Automatic Messages Sub-menu

The automatic messages sub-menu controls the FDCF downlink message function. The flight crew must confirm the AUTOMATIC MESSAGE OFF selection. To do this, select the CONFIRM OFF selector. A check mark in the button box and the AUTOMATIC MESSAGE OFF shows.

These are the automatic status messages that show:

- AUTOMATIC MESSAGES ON
- AUTOMATIC MESSAGES OFF.

The RETURN and EXIT buttons show on the display.

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ATC		COMPANY
REVIEW		NEW MESSAGES
ACARS		
SYSTEM INFORMATION		
VHF		
PRINTER		
SATCOM 1		
AUTOMATIC MESSAGES		
ADS 2		
MASTER		
HF 3		
EXIT MENU		

FDCF MANAGER MENU
(EXAMPLE)

ATC		COMPANY
REVIEW		NEW MESSAGES
1234Z PRINTER		
☒ COMPANY MESSAGES FUTURE		

ATC		COMPANY
REVIEW		NEW MESSAGES
1234Z AUTOMATIC MESSAGES		
☒ AUTOMATIC MESSAGES OFF		
☐ CONFIRM OFF		
STATUS MESSAGE FIELD		
1		
2		
RETURN EXIT		

- 1 IF SATCOM DATALINK INSTALLED
- 2 IF ADS FUNCTION INSTALLED
- 3 IF HF DATALINK INSTALLED

DCMS - FDCF PRINTER AND AUTOMATIC MESSAGES SUB-MENUS

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**DCMS - FDCF SYSTEM INFORMATION AND MASTER SUB-MENUS****System Information Sub-menu**

The system information sub-menu gives the flight crew a central location to see all manager status messages. The most recent 100 messages show at the top of the list.

The RETURN and EXIT buttons show on the display.

Master Sub-menu

The flight crew uses the master sub-menu to do a data link system reset of the FDCF system.

The flight crew resets the data link system and then confirms the reset. This action:

- Sets airline parameters to their power-up configuration
- Sets downlink displays to their power-up configuration
- Clears EICAS COMM alerts
- Clears REVIEW messages
- Clears MANAGER messages.

The FDCF does an automatic data link system reset 10 minutes after last engine shutdown and first passenger door open.

The data link system reset causes the DATA LINK SYSTEM - RESET status message.

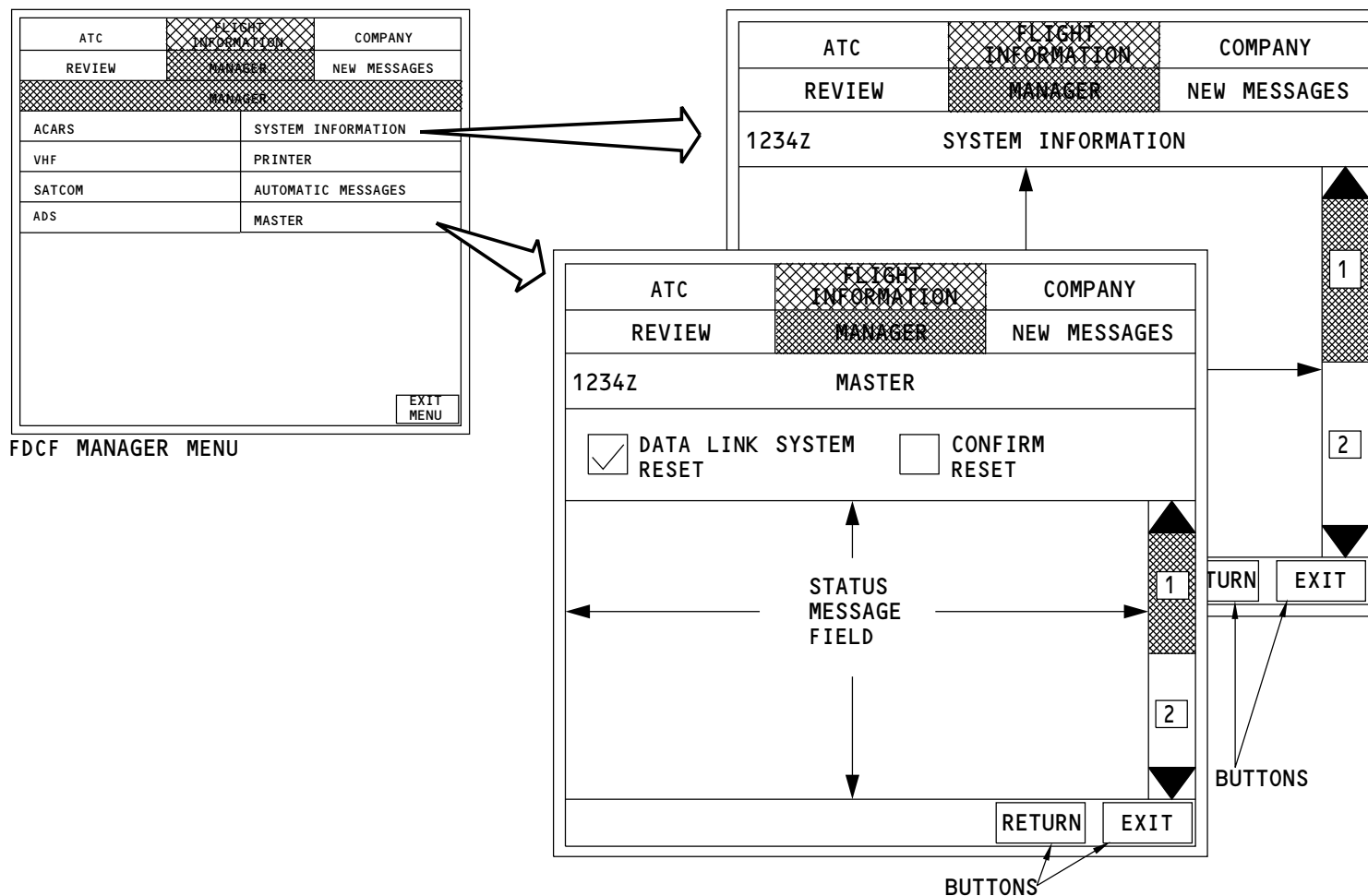
The RETURN and EXIT buttons show on the sub-menu.

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DCMS - FDCF SYSTEM INFORMATION AND MASTER SUB-MENUS

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DCMS - DCMF FUNCTIONAL DESCRIPTION

General

The DCMF function runs on the AIMS Core Processor Module (CPM) called the CPM/COMM. The CPM/COMM is a specially configured CPM designed to support data communications. The CPM/COMM Module is one of four CPM Line Replaceable Modules (LRMs) installed in the AIMS Cabinet. The CPM/COMM LRM unique communication configuration includes a modem for the VHF radios, which is part of the DCMF ACARS Data Link Function and a node processor (NP) that supports the DCMF (Ethernet LAN) PlaneNet Interface Function. DCMF is installed in both the AIMS left and right cabinets and includes a Redundancy Management Function to allow the secondary DCMF module (CPM/COMM) to take over if the primary DCMF module fails.

The primary sub-functions of the DCMF are:

- ACARS datalink
- PlaneNet interface
- Print driver.

Other sub-functions of the DCMF are:

- Communications program interface (CPI)
- Initialization
- BITE
- Redundancy management.

ACARS Datalink Sub-function

The aircraft communications and reporting system (ACARS) permits communication of data between airplane systems and ground systems. The ACARS has airborne subsystems and ground station networks. The ground network is made up of subscriber airlines, aviation authorities, and other users.

The DCMF supplies the airplane part of ACARS. The ACARS sub-function controls air/ground file transfers and onboard message routing. The message routing process supplies uplink message routing to onboard systems. It downlinks message routing to the ACARS ground service providers (GSP) through VHF or SATCOM. The ACARS datalink sub-function uses information within each uplink to send the message to the applicable system. The ACARS datalink sub-function also routes downlinks to the path set by the flight deck crew and airplane systems.

The flight crew sets the datalink path through the MANAGER menu of the AIMS flight deck communications function (FDCF). The path preferences are:

- VHF
- SATCOM
- Auto.

The power-up default selection is auto. When the auto path is set, the ACARS sub-function uses a preference table for internal downlink routing to select a communications transceiver.

PlaneNet Interface Sub-function

The PlaneNet interface sub-function supplies the communications protocols that permit AIMS functions to send data to and receive data from member systems on the avionics local area network (AVLAN). AVLAN systems include the:

- Left and right AIMS cabinets
- Maintenance Access Terminal (MAT)
- Portable Maintenance Access Terminal (PMAT)

These AIMS functions use the DCMF to exchange data through the AVLAN:

- Central maintenance computing function (CMCF)
- Maintenance terminal function (MTF).

The DCMF has redundancy management that sends data to the CMCFs in both AIMS cabinets. The CMCF also gives data load access and control to install LRU/LRM software for DCMF normal operation.

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DCMS - DCMF FUNCTIONAL DESCRIPTION

MTF provides communications between CMCF or ACMF and the AVLAN systems.

The BITE for AVLAN systems also uses the DCMF to report faults to the CMCF.

Print Driver Sub-function

The print driver sub-function transfers AIMS data to the flight compartment printer. The print driver sub-function sends data to and receives data from AIMS functions to:

- Spool a print job
- Send data to the flight compartment printer
- Send printer and job status and fault data back to the AIMS function.

Communications Program Interface (CPI) Sub-function

The communications program interface sub-function of the DCMF supplies a common interface for data communications between other AIMS functions and these DCMF sub-functions:

- ACARS datalink
- PlaneNet interface
- Printer driver.

The CPI supplies a common protocol across the AIMS backplane bus for data transfer.

Initialization Sub-function

The initialization sub-function of the DCMF has these two parts:

- Software installation checks
- Power interrupt processing.

The initialization sub-function does software installation checks on the DCMF software components during initialization. These components are the:

- Operational program configuration (OPC)
- Operational program software (OPS)
- Airline modifiable information (AMI).

Power interrupt processing reacts to primary power system interrupts in different ways. The reaction depends on the length of the interrupt and if the airplane is on the ground or in the air. The power interrupt groups are:

- Short term power interrupt (<500 ms)
- Warm start (≥ 500 ms and < 5 s)
- Cold start (≥ 5 s and airplane in air)
- Complete power loss.

BITE Sub-function

The DCMF BITE sub-function monitors the DCMF in the left and right CPM/Comm and the related hardware units use that the DCMFs use. The related hardware units that the DCMFs use are the LAN circuit card assembly (CCA) and the VHF modem in each CPM/Comm module. When the system first gets power, the power-up BITE test makes sure that the DCMF works correctly. During normal operation, the BITE continuously monitors the condition of the DCMF for redundancy management.

Redundancy Management Sub-function

The redundancy management sub-function of the DCMF does these four things:

- DCMF selection as primary at power-up
- Primary to secondary DCMF transfer
- External hardware monitors
- Datalink monitors.

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DCMS - DCMF FUNCTIONAL DESCRIPTION

The redundancy management function makes sure that one of the two DCMFs is primary and one is secondary. The primary DCMF does:

- All air/ground communications
- Maintenance of AVLAN connections to AIMS functions within its cabinet
- Monitors condition and status of the secondary DCMF.

The secondary DCMF does the same functions as the primary, but it does not handle air/ground communications.

The secondary DCMF takes over for the primary DCMF if it fails or if the flight crew changes the default VHF communications transceiver. The secondary DCMF monitors the intercabin status messages from the primary DCMF. The primary DCMF uses the results of the monitors and other conditions to change to the secondary DCMF. The DCMF monitors this hardware for correct operation:

- Left, center, and right RTPs
- Center and right VHF comm xcvs
- The SDU
- Flight compartment printer.

The DCMF monitors the condition of the VHF and SATCOM datalinks. The DCMF sends messages to the PDF for flight crew notification when the condition of the VHF or SATCOM systems change.

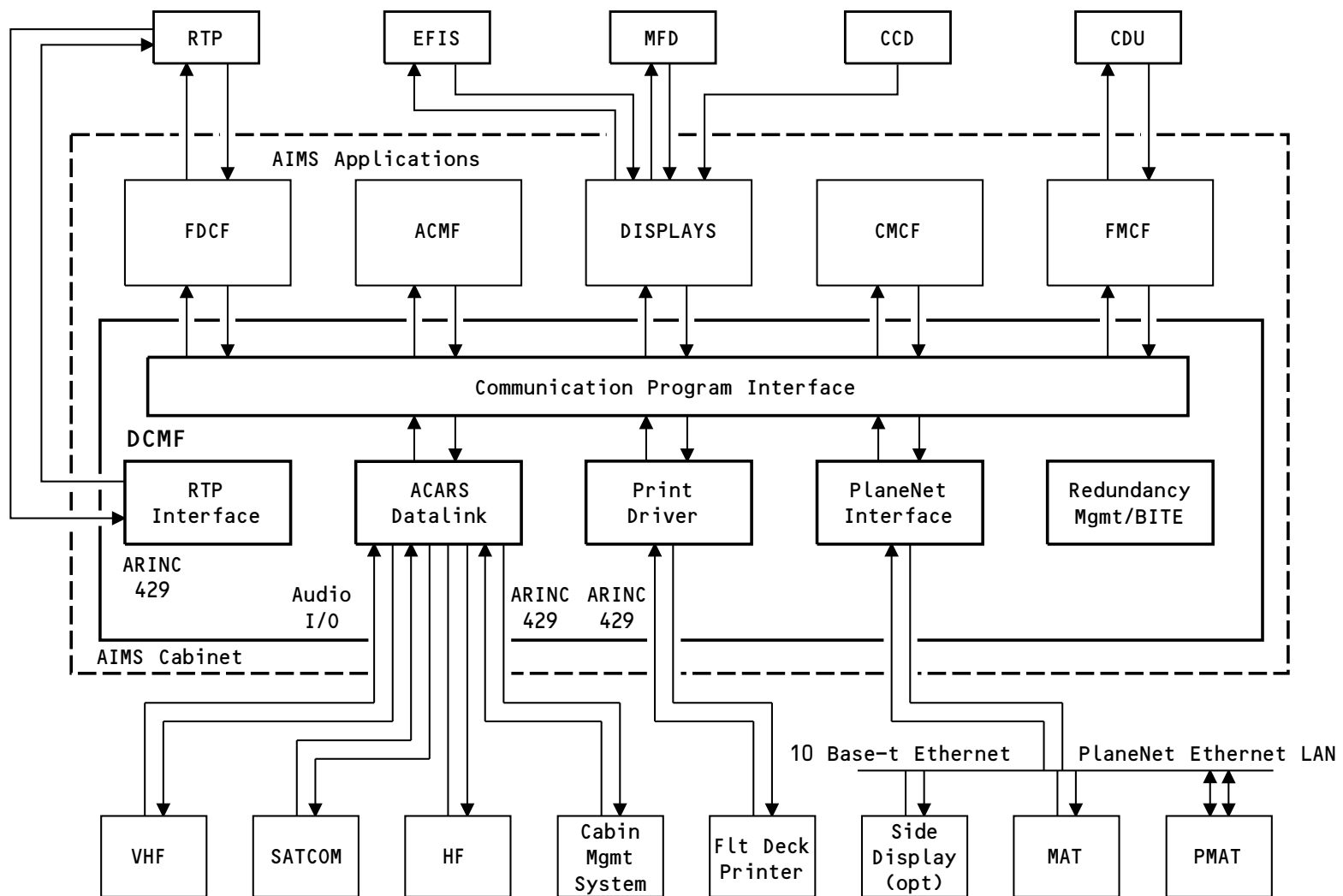
Functional Description

An internal communications interface over 10BASE-T Ethernet Local Area Network (LAN) is provided by the Node Processor (NP) that uses DCMF to facilitate communications between AIMS functions and PlaneNet member systems. Also, DCMF provides the interface between AIMS functions and the onboard flight deck printers. The NP in the CPM/COMM supports the DCMF (Ethernet LAN) PlaneNet Interface Function. The PlaneNet server systems (MAT and PMAT) applications use Ethernet Lan 10BASE-T utilizing ARINC 615A loader to communicate with the CPM/COMM module via the NP. The Node Processor transports the data via MBM (Message Buffer Memory) to the COMM module using TCP/IP protocol (Transmission Control Protocol/Internet Protocol). The DCMF interface in the Node Processor supports PlaneNet data communications. DCMF interface in the Node Processor uses Ethernet LAN 10BASE-T at the physical and data link layers of TCP/IP protocol, a Connectionless Network Protocol (CLNP) at the IP layer, and a Connection Oriented Transport Protocol (COTP) at TCP layer. Together these PlaneNet communication protocols form a data transport service function that provides two-way, reliable, end-to-end data communications between AIMS application functions and PlaneNet member systems.

DCMS - DCMF FUNCTIONAL DESCRIPTION

Physically, the Node Processors (in the left and the right AIMS cabinets) are interconnected as point-to-point scheme to each other and to the member systems of PlaneNet (MAT) via Ethernet V2 and 10Base-T as Link Layer using TCP/IP protocol. The communication connection between PlaneNet member systems and Node Processor is established utilizing socket. Socket is a method of communication between a client program and a server program in a network. PlaneNet systems use “stream socket” to achieve highly reliable connection-oriented communication to member systems. DCMF interface within Node processor is composed of ten UNIX processes. Nine processes are used to maintain each TCP/IP connection and one process is for CMC server to listen for incoming CMC connections from MAT and PMAT. DCMF interface performs the role of connection management. 10BASE-T transfers bits of information using Manchester coding at the rate of 10 Mbps. It also sends link pulses to maintain the validity of the link and the availability of the medium. The following characteristics of the 10BASE-T have been implemented:

- Supports traffic at 10 Mbps in system configurations using full duplex communications.
- Couples the Physical Signaling sublayer to the baseband twisted wire link.
- Provides for operating over at least 100 meters of twisted wire without a repeater.
- Permits the LRU to confirm operation of the Medium Attachment Unit and availability of the medium.
- Supports point-to-point interconnection between Medium Attachment Units.



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DCMF - FUNCTIONAL DESCRIPTION

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DCMS - FUNCTIONAL DESCRIPTION - ACARS DATALINK SUB-FUNCTION

General

The ACARS datalink sub-function requires air/ground communications. The VHF, HF or SATCOM path of the DCMF does the air/ground communications.

The AIMS functions send downlink data to the ACARS datalink sub-function for delivery to the ground service provider (GSP). Usually, the AIMS function keeps a copy of the data until the ACARS datalink sub-function sends a notice of successful delivery to the GSP. The ACARS datalink sub-function also tells the AIMS function that sends the data of unsuccessful downlink attempts.

If the air/ground link with the GSP is broken, the ACARS datalink sub-function sends any data waiting for the downlink back to the sending function. The ACARS datalink sub-function rejects all downlink attempts until it restores a link.

The ACARS datalink sub-function sends uplink messages to the datalink functions. If all of the messages arrive successfully, the ACARS datalink sub-function supplies an indication.

These are the parts of the ACARS datalink sub-function:

- Communication Program Interface (CPI)
- ACARS router
- Redundancy management
- Williamsburg protocol
- ACARS air/ground protocol
- RTP interface
- Modem.

Communications Program Interface

The communications program interface (CPI) supplies a link between the DCMF and AIMS internal functions.

ACARS Router

The ACARS router routes messages for both downlinks and uplinks. For downlinks, the ACARS router receives data, through the CPI and sends the data to the GSP through VHF, HF or SATCOM. The ACARS router uses these to set the downlink path:

- Path inputs
- Inputs from the flight crew
- Choice of the function that sends the data.

For uplinks, the ACARS router receives data from the VHF, HF or SATCOM transceiver and assigns a destination. It sends the data to the CPI protocol function for final delivery to AIMS functions. The ACARS router uses the ACARS label and optional sublabel in the uplink to set the onboard destination.

Redundancy Management

The redundancy management makes sure the preferred data communications path is available. The data communications modes are:

- VHF
- SATCOM
- HF
- Auto.

The flight crew uses a FDCF manager menu to select one of these modes. The center VHF communication transceiver is the default data radio when the DCMF first gets power. This occurs when the data communications mode is auto. This also makes the left DCMF the primary DCMF and the right DCMF, secondary.

Williamsburg Protocol

Each Williamsburg Protocol uses the Williamsburg file transfer protocol. It uses a hi-speed ARINC 429 to exchange data with the SDU and/or HFDR. Supplement 14 to ARINC Specification 429 defines the Williamsburg file transfer protocols.

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DCMS - FUNCTIONAL DESCRIPTION - ACARS DATALINK SUB-FUNCTION

The Williamsburg protocol also supplies SATCOM or HF path status to the ACARS router. The ACARS router uses this information to determine the appropriate path for download data.

ACARS Air/Ground Protocol

The ACARS air/ground protocol makes and maintains VHF communications. To do this, the ACARS air/ground protocol uses a database of ACARS VHF frequencies to tune the data radio. This database is airline modifiable information (AMI).

The ACARS air/ground protocol tunes the default VHF communications transceiver to one of the available VHF frequencies for two minutes. If, after that time, the ACARS air/ground protocol can not establish a VHF link, the ACARS air/ground protocol tunes the default radio to the next VHF frequency. This procedure continues until VHF communications are successful.

The flight deck communications function (FDCF) and RTPs receive the VHF data frequency from the ACARS air/ground protocol.

To downlink data, the ACARS air/ground protocol divides the data into smaller blocks. It sends the smaller blocks to the modem. If the GSP successfully receives the downlink data, the ACARS air/ground protocol makes a downlink message acknowledgment. The protocol then sends the acknowledgment to the original function.

For uplinks, the ACARS air/ground protocol makes sure the received data is for an onboard system. It then sends the data to the ACARS router for routing to the destination function.

RTP Interface

The DCMF sends the configuration and health status of the VHF/HF radios to the RTP.

The RTPs use the health status to tell the flight crew the status of the radios (i.e. Normal or Failed).

The configuration information is used when the flight crew selects the VHF/HF radio that is currently being used for data communications. When the flight crew selects the VHF/HF radio that is currently being used for data communications, the RTP will display the word "DATA" in the active window.

The DCMF transmits data frequency tuning words to the RTPs.

The RTP integrates the data frequency words received from DCMF with the voice frequency words it generates to prevent the data communication system from interrupting with the voice communication system.

For VHF datalink, each RTP transmits the current VHF voice frequencies and new VHF voice/data configuration to the RTP interface. The RTP interface receives, stores, and transmits the voice frequencies back to the RTPs. This RTP interface keeps the active DCMF in synchronization with the RTPs. The RTP interface uses the VHF voice/data configuration command it receives from the RTP to configure the default VHF radio.

For HF datalink, data frequencies are contained in the HF data radios (HFDR). The RTPs will indicate the commanded data mode to the HFDRs, and the HFDR will initiate scanning of the frequencies programmed into the HFDR.

Modem

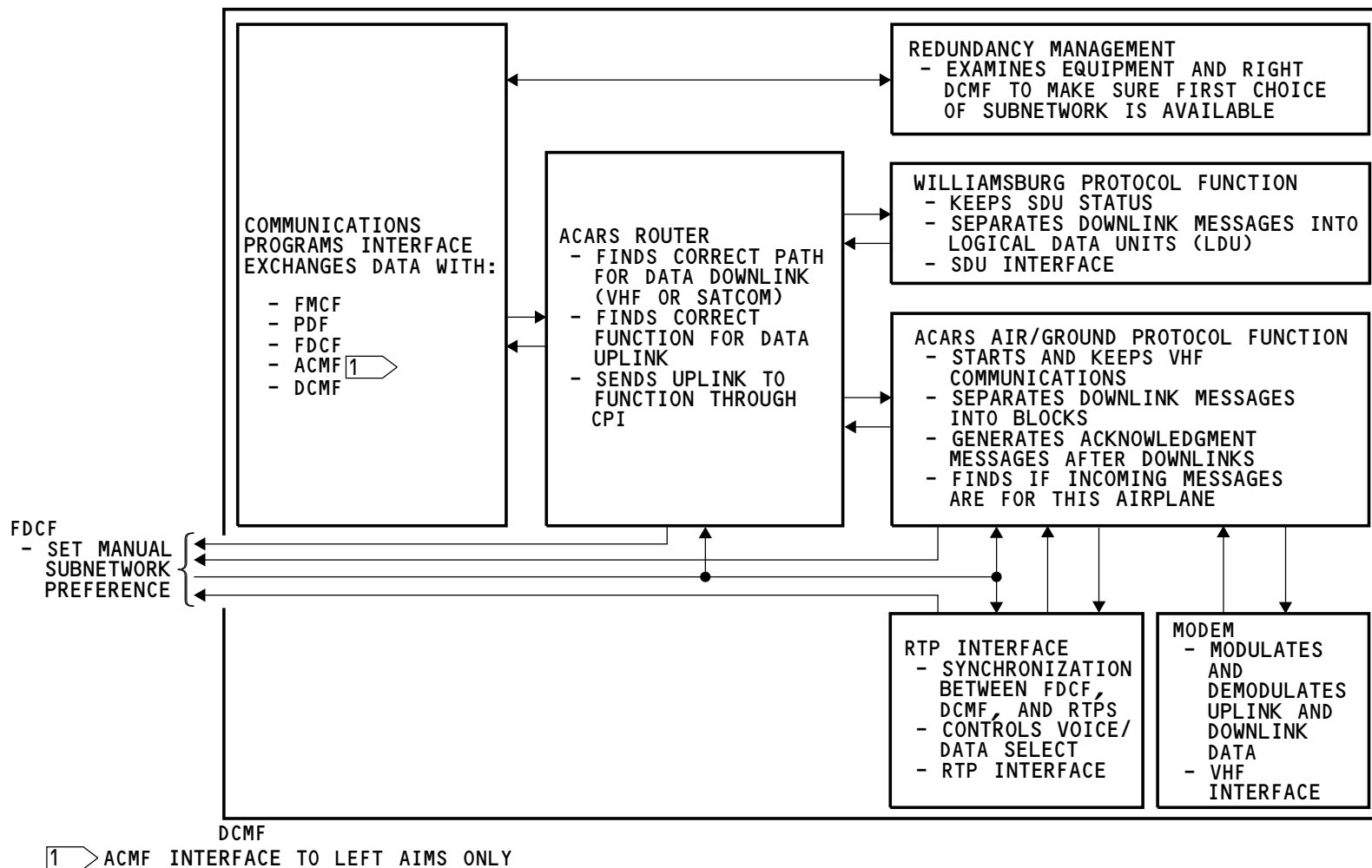
For downlink data, the modem modulates a digital bit stream into an audio signal that is compatible with the VHF communication transceiver. For uplink data, the modem demodulates the received audio signal into a digital bit stream.

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DCMS - FUNCTIONAL DESCRIPTION - ACARS DATALINK SUB-FUNCTION

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**DCMS - FUNCTIONAL DESCRIPTION - OLAN INTERFACE SUB-FUNCTION****General**

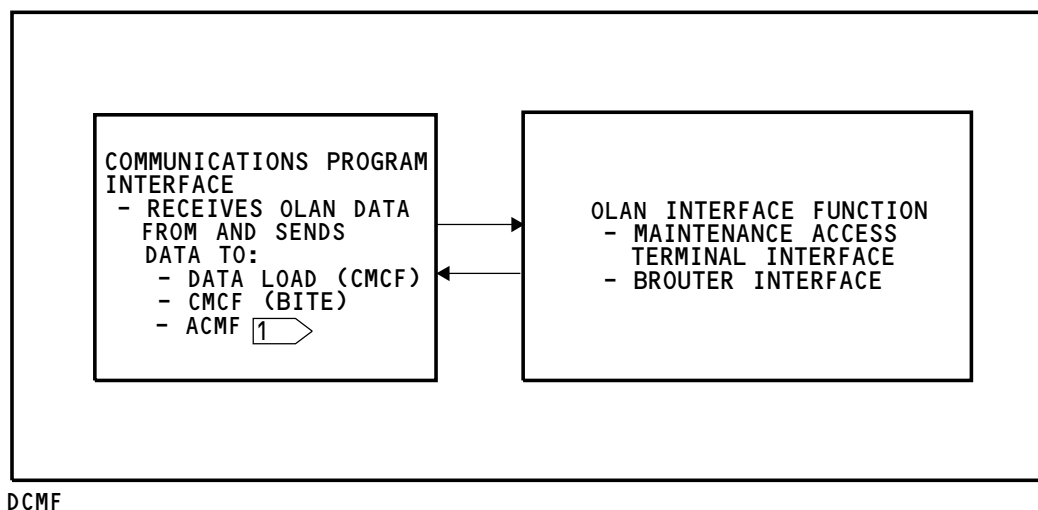
The OLAN interface sub-function is the four layer stack responsible for data communication between the AIMS functions and the OLAN systems.

The OLAN communication protocols use the International Standards Organization (ISO) Open Systems Interconnection (OSI) reference model. OSI is a data communications model which divides different communications duties into different levels or layers. Each layer supplies services to the next layer above it. A set of layers is a stack.

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 ACMF INTERFACE TO LEFT AIMS ONLY

DCMS - FUNCTIONAL DESCRIPTION - OLAN INTERFACE SUB-FUNCTION

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DCMS - FUNCTIONAL DESCRIPTION - PRINT DRIVER SUB-FUNCTION**General**

The print driver sub-function transfers print jobs from AIMS functions to the flight compartment printer. The print driver sub-function receives data from and sends data to AIMS functions to:

- Process print jobs
- Communicate job status and errors.

Process Print Jobs

The print driver sub-function exchanges data with AIMS functions through the communications program interface (CPI). AIMS functions send data to the print driver sub-function to print. The print driver sets print jobs in this order:

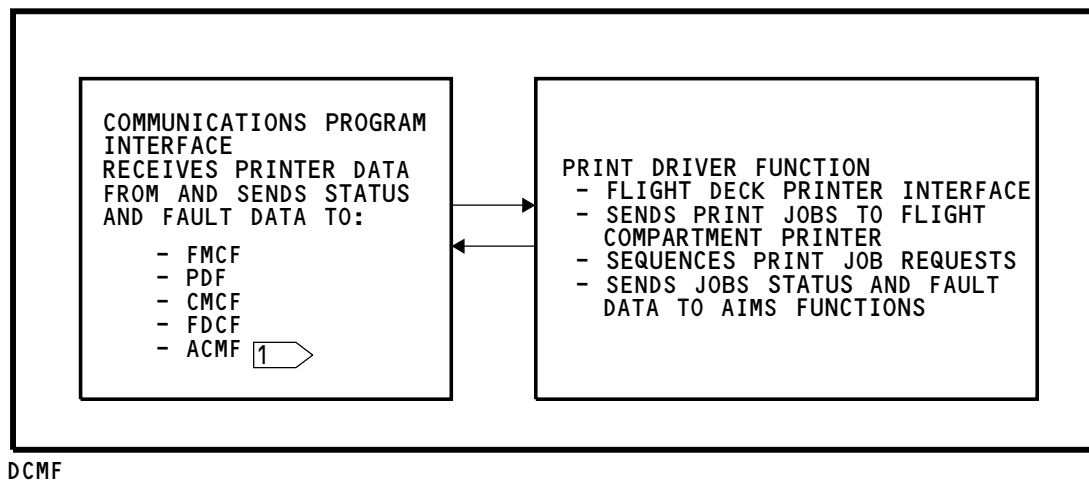
- Flight deck communication function (FDCF)
- Central maintenance computing function (CMCF)
- Airplane condition monitoring function (ACMF)
- Multi-function display (MFD).

If the printer is busy, the AIMS functions store print jobs and send them again when the printer is ready.

Communications

The print driver sub-function sends the print job status to the original function until the print job is complete. If data communications fail between the print driver sub-function and the flight compartment printer, the print driver sub-function rejects print jobs not complete. It then sends the reject status to the original function. The print driver sub-function does not accept any print jobs until data communications to the flight compartment printer are valid.

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¹ ACMF INTERFACE TO LEFT AIMS ONLY

DCMS - FUNCTIONAL DESCRIPTION - PRINT DRIVER SUB-FUNCTION

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DCMS - FDCF FUNCTIONAL DESCRIPTION

General

The flight deck communication function (FDCF) gives the flight crew access to data communication menus and their displays. The FDCF uses instructions in software and hardware to do this. The flight crew uses the menus and displays to do these tasks:

- Downlink messages
- Uplink messages
- Review messages
- Select a medium to transmit/receive and print messages.

The FDCF has inputs, outputs, and these sub-functions to give the flight crew access to the FDCF menus and to control the displays:

- Inputs
- Display/switch interface
- FDCF main sub-functions
- Redundancy management
- BITE
- Airline modifiable information (AMI)
- Communications program interface (CPI) input/output (I/O).

Inputs

The FDCF uses inputs and the DCMF interfaces to do the FDCF sub-functions. These components send input data:

- CDU'S
- DSP
- CCD'S
- ACCEPT switch
- REJECT switch
- CANCEL switch
- RTP'S.

Display/Switch Interfaces

The display/switch interfaces convert the inputs to a format that the FDCF can use. Inputs show in order of time. The new format goes to the main FDCF sub-functions.

Main FDCF

The main FDCF lets the flight crew make menu selections. These are the main FDCF sub-functions:

- Main menus
- Sub-menus
- Up/downlink displays on a multifunctional display (MFD)
- Decode uplink and downlink messages
- Logic units
- Communication alerts.

The main menus sub-function uses the DSP COMM selection to show the FDCF main menu. This gives access to the sub-menus. The FDCF main menu has four sub-menus:

- Review
- Manager
- Company
- New messages.

The sub-menus sub-function uses the CCD selection to show a sub-menu. This gives access to a display for flight crew control and entry.

The up/downlink sub-function gives the flight crew control to receive, send messages, and make entries on a display. The flight crew uses the CCD to make selections on a display. To make an entry on a display, the flight crew uses the CDU scratch pad to type the message. They use the CCD to transfer the scratch pad data to a data field in the selected MFD. Data transfer occurs when you select box prompts or a line with dashes on the the MFD.

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DCMS - FDCF FUNCTIONAL DESCRIPTION

The decoding sub-function decodes the uplink messages and codes the downlink messages. This process is necessary to support these display features:

- Buttons that show in the display
- Data fields for entry
- Information that shows in the information display box.

The logic unit sub-function uses CDU, panel, and switch inputs to support display formats. It also uses the decoding sub-function to make sure that certain buttons and fields are active or not active on a display.

The communications alerts sub-function receives inputs from the decoding sub-function. It uses a look up table to send communication alerts to the PDF for visual and aural flight deck alerts.

Redundancy Management

The redundancy management of the FDCF does these tasks:

- Selects a primary FDCF at power-up
- Transfers a primary FDCF to secondary
- Monitors the datalink interface.

The redundancy management makes sure that one of the two FDCFs is primary and one is secondary at power-up. To do this, the primary FDCF:

- Remembers which FDCF was primary at last power-on
- Monitors the condition and status of the secondary FDCF.

The secondary FDCF does the same functions as the primary.

The primary-to-secondary FDCF transfer occurs when the primary FDCF fails. The secondary FDCF monitors the intercabin status messages from the primary FDCF during normal operation. The primary FDCF uses the results of the monitors and power conditions to change to the secondary FDCF.

The secondary FDCF also takes over when a datalink interface is lost.

BITE

The FDCF BITE monitors the hardware and software of the FDCF in the left and right CPM/Comm. When the system first gets power, the power up BITE test makes sure that the FDCF works correctly. During normal operation, the BITE monitors the condition of the FDCF for redundancy management.

Airline Modifiable Information (AMI)

The airline can use a ground base software tool (GBST) to re-configure the FDCFs.

Communications Program Interfaces (CPI) I/O

The communications program interfaces of the FDCF supplies a common interface for data communications in the AIMS cabinets. To do this, the CPI supplies a common protocol for the AIMS backplane bus for data transfer. This supports the FDCF intracabinet data exchanges.

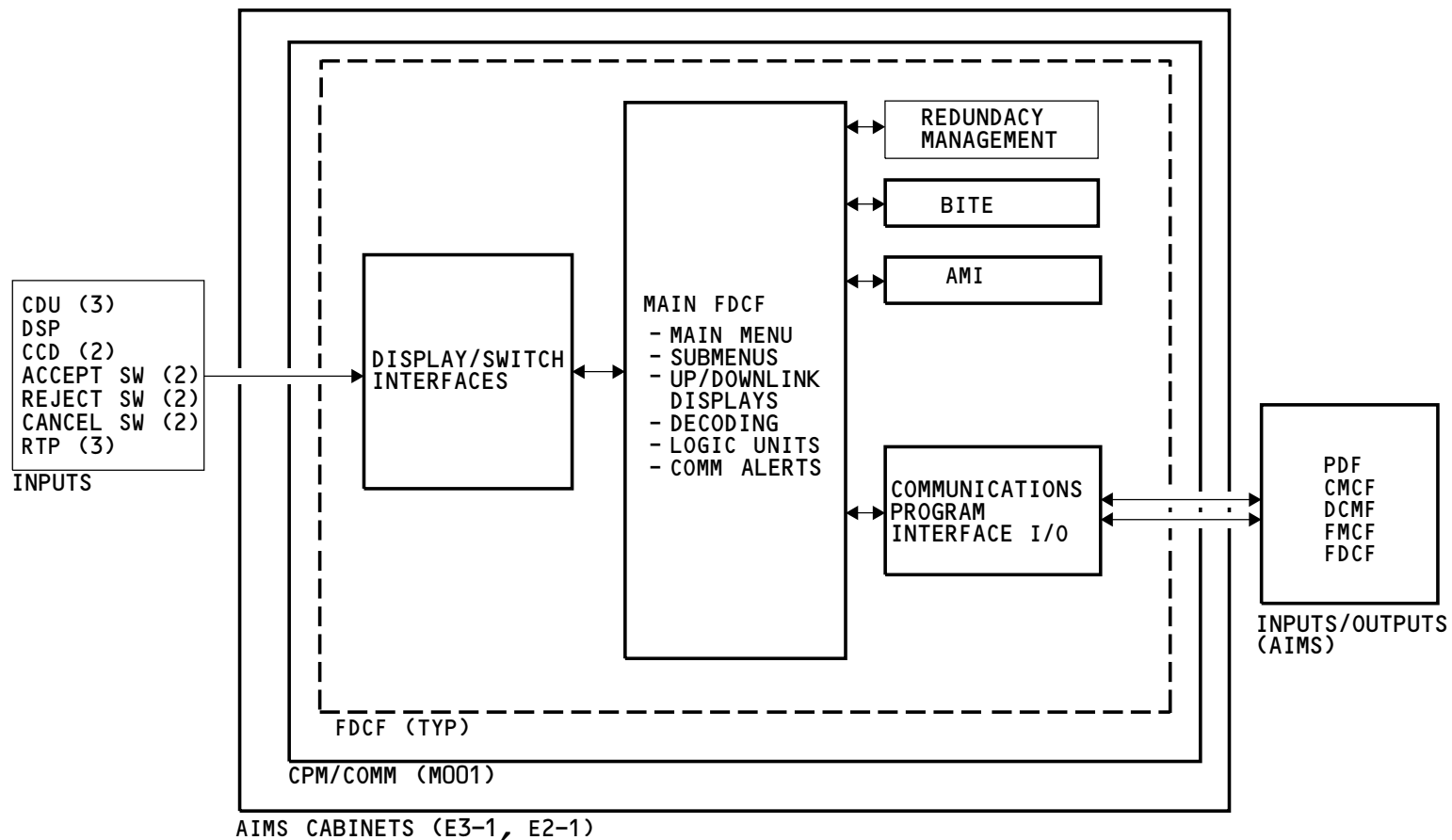
The CPI I/O of the FDCF supplies a common interface for data communications to the other AIMS cabinet. The primary and secondary FDCFs exchange data for redundancy management. To do this, the CPI supplies a common protocol for the intercabin buses 1 and 2.

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DCMS - FDCF FUNCTIONAL DESCRIPTION

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**DCMS - DCMF AND FDCF AIRLINE MODIFIABLE INFORMATION****General**

The data communication management system (DCMS) has a data communication management function (DCMF) and a flight deck communication function (FDCF). Together the two make up the functionality of ACARS. The design of the 777 airplane lets the airlines customize certain functions in the DCMS. You customize these functions through airline modifiable information (AMI). You use the ground based software tool (GBST) to make the modifications.

The DCMF comes with a default values AMI. The default values AMI has values that determine these:

- VHF data frequencies
- ACARS reject message formats
- Uplink message routing.

The FDCF comes with a baseline AMI. The baseline AMI defines these:

- Baseline flight deck communication display formats
- Basic screen reports
- Downlink messages and formats
- Uplink messages and formats
- Logic units and parameter definitions.

DCMF VHF Data Frequency Selection Tables

The default VHF data frequency selection table includes this information:

- Frequencies
- Scan times
- A prekey length
- An enable/disable trigger.

These are the default frequencies:

- 131.550 (ARINC and Australia)
- 131.725 (SITA)

- 131.475 (Canada)
- 131.450 (Japan).

You can enter up to 15 total frequencies in the table. The valid frequency range is 118.000 to 136.992 megahertz.

The default scan time for all frequencies is 126 seconds. You can change the scan time to any rate between 10 and 600 seconds.

The default prekey length is 75 milliseconds. The valid prekey lengths are 53 to 190 milliseconds in increments of one millisecond.

The default setting for the trigger is enable. You can set this to disable.

ACARS Reject Message

The ACARS reject message format has 69 characters and an HX label that identifies the reject message. Characters 1-10 contain a standard header. Character 11 has the slash character. Characters 12-18 contain the ATA/IATA address. Character 19 has a period. You can not modify these characters.

Characters 20-69 contain the first 50 characters of the uplink message and label HX identifies the downlink as a reject. You can modify these characters.

DCMF Uplink Routing Tables

The default values are a table of predefined labels and sublabels that control the destination of uplink messages. These are the valid destinations:

- FDCF
- CMCf
- ACMF
- FMCF.

The DCMF routes the message according to the default table. This table is not modifiable. An uplink message routes to a destination defined in the modifiable AMI file only if it is not already defined by the hardcoded table.

This is the hardcoded table:

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DCMS - DCMF AND FDCF AIRLINE MODIFIABLE INFORMATION

Label/Sublabel	Destination
51/none	FDCF
52/none	FDCF
54/none	FDCF
C1/none	FDCF
H1/CF	CMCF
H1/HF	ACMF
H1/W0	FMCF
H1/W1	FMCF
H1/W2	FMCF
A1/none	FDCF
A7/none	FDCF
RA/-1	FDCF
RA/-2	FDCF
RA/-3	FDCF
RA/-4	FDCF
RA/-5	FDCF
RA/-6	FDCF
RA/-7	FDCF

FDCF Display Formats

The FDCF baseline AMI provides a generic display menu structure. This structure meets the needs of most airlines. You can modify the basic structure or develop a custom AMI to meet specific needs.

FDCF Screen Reports

The FDCF baseline AMI provides generic screen reports. These reports meet the needs of most airlines. You can modify the basic screen reports or develop a custom AMI to meet specific needs.

Downlink Messages and Formats

The baseline AMI contains the Company Menu which you use to select the downlink formats. This section provides the downlink display, encoding, and print format definitions required to show, send, and print specific messages.

These are the downlink messages available in the baseline AMI:

- Flight initialization display
- Flight auto-Initialization request display and downlink message
- Delay report display and downlink message
- Diversion report display and downlink message
- Estimated time of arrival display and downlink message
- Departure report display and downlink message
- Position report display and downlink message
- Arrival report display and downlink message
- Message to ground display and downlink message
- Voice contact request display and downlink message
- Weather request display and downlink message
- Weight and balance request display and downlink message
- Clearance request display and downlink message
- Re-clearance request display and downlink message
- Flight plan request display and downlink message
- Flight release request display and downlink message
- Gate assignment request display and downlink message
- ATIS request display and downlink message
- NOTAMS request display and downlink message
- Maintenance deport display and downlink message

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DCMS - DCMF AND FDCF AIRLINE MODIFIABLE INFORMATION

- Miscellaneous codes report display and downlink message
- Situation report display and downlink message
- Invalid reject message
- Unable to process reject message
- Unknown reject message
- Flight times display (OOOI).

You can modify the AMI to add or delete existing messages.

FDCF Uplink Messages and Formats

These are the uplink messages and formats available with the baseline AMI:

- Flight initialization uplink
- Free text uplink
- Crew advisory uplink
- Weather report uplink
- Weight and balance uplink
- Clearance uplink
- Re-clearance uplink
- Flight plan uplink
- Flight release uplink
- Gate assignment uplink
- VHF voice contact uplink
- Display command uplink
- Standard printer with Alert uplink
- Command/response uplink
- Acknowledgment of rejected uplink message.

You can modify the AMI to add or delete existing messages.

FDCF Logic Units and Airplane Parameters

The baseline AMI provides these logic units:

- OOOI initialization and state logic
- OUT event
- OFF event
- ON event
- IN event
- Return to gate event
- Diversion report logic
- End of flight.

Also, there is a list of airplane parameters available in the baseline AMI. The baseline AMI makes use of only a few of these parameters. You can modify the logic units and the airplane parameters.

DCMS DEFAULT VALUES AND BASELINE AMI	
DCMF DEFAULT VALUES	FDCF BASELINE AMI
VHF DATA FREQUENCY SELECTION TABLE	GENERIC MENU STRUCTURE
ACARS REJECT MESSAGE FORMAT	SCREEN REPORTS
HARDCODED UPLINK ROUTER TABLE	DOWNLINK MESSAGES AND FORMATS
	UPLINK MESSAGES AND FORMATS

DCMS MODIFIABLE FUNCTIONS	
DCMF MODIFIABLE FUNCTIONS	FDCF MODIFIABLE FUNCTIONS
FREQUENCY SELECTION TABLE	UPLINK DECODING DEFINITIONS
ACARS REJECT MESSAGE FORMAT	UPLINK DISPLAY DEFINITIONS
HARDCODED UPLINK ROUTER TABLE	DOWNLINK ENCODING DEFINITIONS
	DOWNLINK DISPLAY DEFINITIONS
	DOWNLINK QUEUE STRUCTURE
	PRINT FORMAT DEFINITIONS
	REPORT TRIGGERS
	PARAMETER DEFINITIONS

DCMS - DCMF AND FDCF AIRLINE MODIFIABLE INFORMATION

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**DCMS - DCMF OPERATIONAL TESTS****General**

You can do DCMF operational tests from the MAT. These are the operational tests for the DCMF:

- Left DCMF - FDDI (fiber digital data interface) LAN reset
- Left DCMF - modem reset
- Right DCMF - FDDI LAN reset
- Right DCMF - modem reset.

Left DCMF - FDDI LAN Reset

This test makes sure that the left AIMS cabinet can exchange data on the avionic local area network (AVLAN). The time for this test is about one minute.

Left DCMF - Modem Reset

This test makes sure that the DCMF modem in the left AIMS cabinet operates correctly. The test stops ACARS communication. The time for this test is about one minute.

Right DCMF - FDDI LAN Reset

This test makes sure that the right AIMS cabinet can exchange data on the AVLAN. The time for this test is about one minute.

Right DCMF - Modem Reset

This test makes sure that the DCMF modem in the right AIMS cabinet operates correctly. The test stops ACARS communication. The time for this test is about one minute.

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GROUND TESTS

SELECT ATA SYSTEM (55)

21 ENVIRONMENTAL CONTROL SYSTEM
22 AIMS - AUTOTHROTTLE
22 AUTOPILOT FLIGHT DIRECTOR SYSTEM
23 AIMS - DATA COMMUNICATION MANAGEMENT
23 HF COMMUNICATION SYSTEM
23 VHF COMMUNICATION SYSTEM
23 SATELLITE COMMUNICATION (SATCOM) SYSTEM
23 DIGITAL CONTROL AUDIO SYSTEM
23 OVERHEAD PANEL ARINC 629 SYSTEM

SELECT TEST TYPE

SYSTEM TEST
OPERATIONAL TEST
SERVO MEASUREMENT TEST

SELECT OPERATIONAL TEST (4)

LEFT DCMF - FDDI LAN RESET
LEFT DCMF - MODEM RESET
RIGHT DCMF - FDDI LAN RESET
RIGHT DCMF - MODEM RESET

CONTINUE

HELP

GO BACK

SELECT OPERATIONAL TEST

(4)

LEFT DCMF - FDDI LAN RESET
LEFT DCMF - MODEM RESET
RIGHT DCMF - FDDI LAN RESET
RIGHT DCMF - MODEM RESET

DCMS - DCMF OPERATIONAL TESTS

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**PASSENGER ADDRESS SYSTEM - INTRODUCTION****Purpose**

The passenger address system (PAS) lets the crew send announcements and other audio to the passenger cabin.

Announcement Types

The PAS sends these types of audio to the cabin:

- Flight crew announcements
- Flight attendant announcements
- Video system audio
- Boarding music.

The PAS also makes chime sounds.

Abbreviations and Acronyms

- AIMS - airplane information management system
- AMU - audio management unit
- ASG - ARINC signal gateway
- ASP - attendant switch panel
- BGM - boarding music
- CACP - cabin area control panel
- CAH - cabin attendant handset
- CCP - cabin control panel
- CIS - cabin interphone system
- CMCF - central maintenance computer function
- CSCP - cabin system control panel
- CSMU - cabin system management unit
- CSS - cabin services system
- FCR - flight crew rest
- FSEU - flap/slat electronics unit
- IFE - in-flight entertainment
- NVM - nonvolatile memory

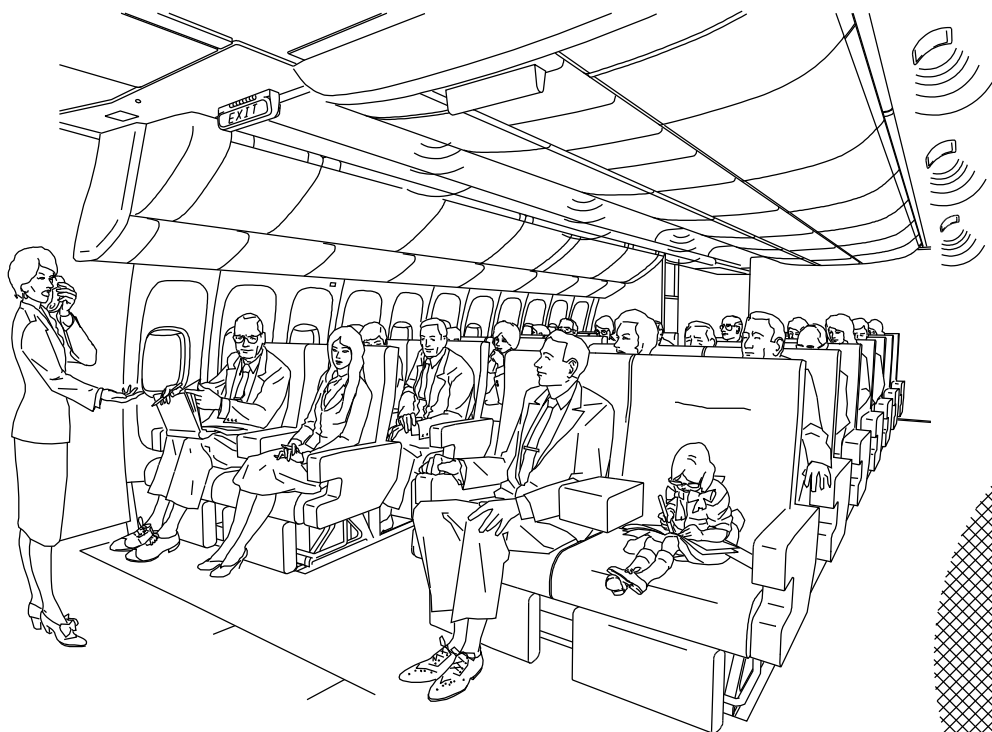
- OPAS - overhead panel ARINC 629 system
- PA - passenger address
- PA/CI - passenger address/cabin interphone
- PAS - passenger address system
- PSEU - proximity sensor electronics unit
- PTT - push to talk
- SDM - speaker drive module
- WES - warning electronic system
- ZMU - zone management unit

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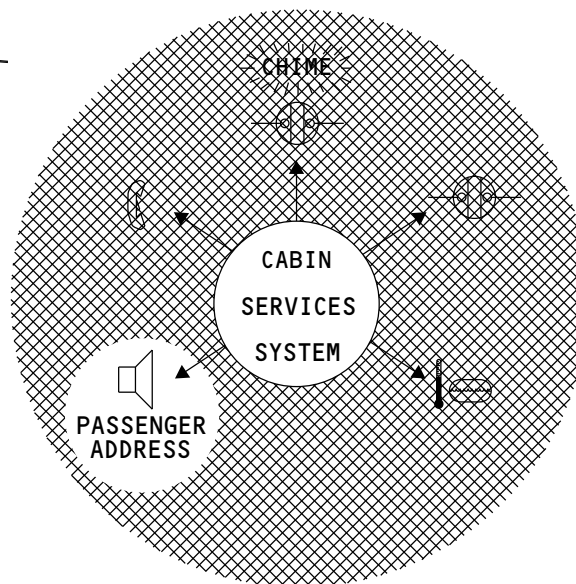
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- CREW ANNOUNCEMENTS
- VIDEO SYSTEM AUDIO
- BOARDING MUSIC
- CHIMES



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PASSENGER ADDRESS SYSTEM - INTRODUCTION

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PAS - GENERAL DESCRIPTION

General

The passenger address system (PAS) receives audio inputs and sends them to the passenger cabin. The cabin can have as many as six passenger address areas.

The PAS has interfaces with the in-flight entertainment (IFE) system on ARINC 628 head-end buses for PAS functions.

Components

The PAS uses these components:

- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs)
- Zone management units (ZMUs)
- Cabin attendant handsets (CAHs)
- Cabin speakers.

These other components and systems connect to the PAS:

- Audio management unit (AMU)
- Left systems ARINC 629 bus
- In-flight entertainment (IFE) system
- Cabin system management unit (CSMU)
- Right systems ARINC 629 bus
- Attendant switch panel (ASP)
- Cabin control panels (CCPs).

Audio Inputs

All passenger address audio goes to the PA/CI controller.

The flight crew uses the flight interphone system to make announcements. The announcement audio goes from the AMU to the PA/CI controller.

The flight attendants use CAHs to make announcements.

Priorities

The PAS has these priorities:

- 1 - From flight interphone system
- 2A - Direct access
- 2B - From cabin interphone system
- 3 - Video system audio
- 4 - Boarding music.

Audio Outputs

The PA/CI controller selects the audio with the highest priority and digitizes it. It sends the digital signal to the SDMs through up to 5 “zone” outputs. The SDMs change the signal to analog and send it to up to four speakers.

NOTE: The PA/CI “zone” outputs correspond to physical areas in the airplane. Do not confuse the PA/CI zones with passenger service zones that are established by the cabin service system (CSS).

The PA/CI controller also sends the announcement audio to the IFE system. This system then sends the audio over the passenger entertainment system so the passengers hear the announcement on their headphones.

The PAS also makes a chime sound for attendant calls and passenger information signs. The PA/CI controller sends chime control signals to the SDMs.

Volume Control

The configuration database gives the normal volume level. The PAS makes automatic adjustments based on flight data inputs. In addition, flight attendants use the CCPs to adjust the volume manually.

Pause Signals

When an announcement goes to all areas, the CSMU sends a pause signal to the IFE system.

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**PAS - GENERAL DESCRIPTION****Other Interfaces**

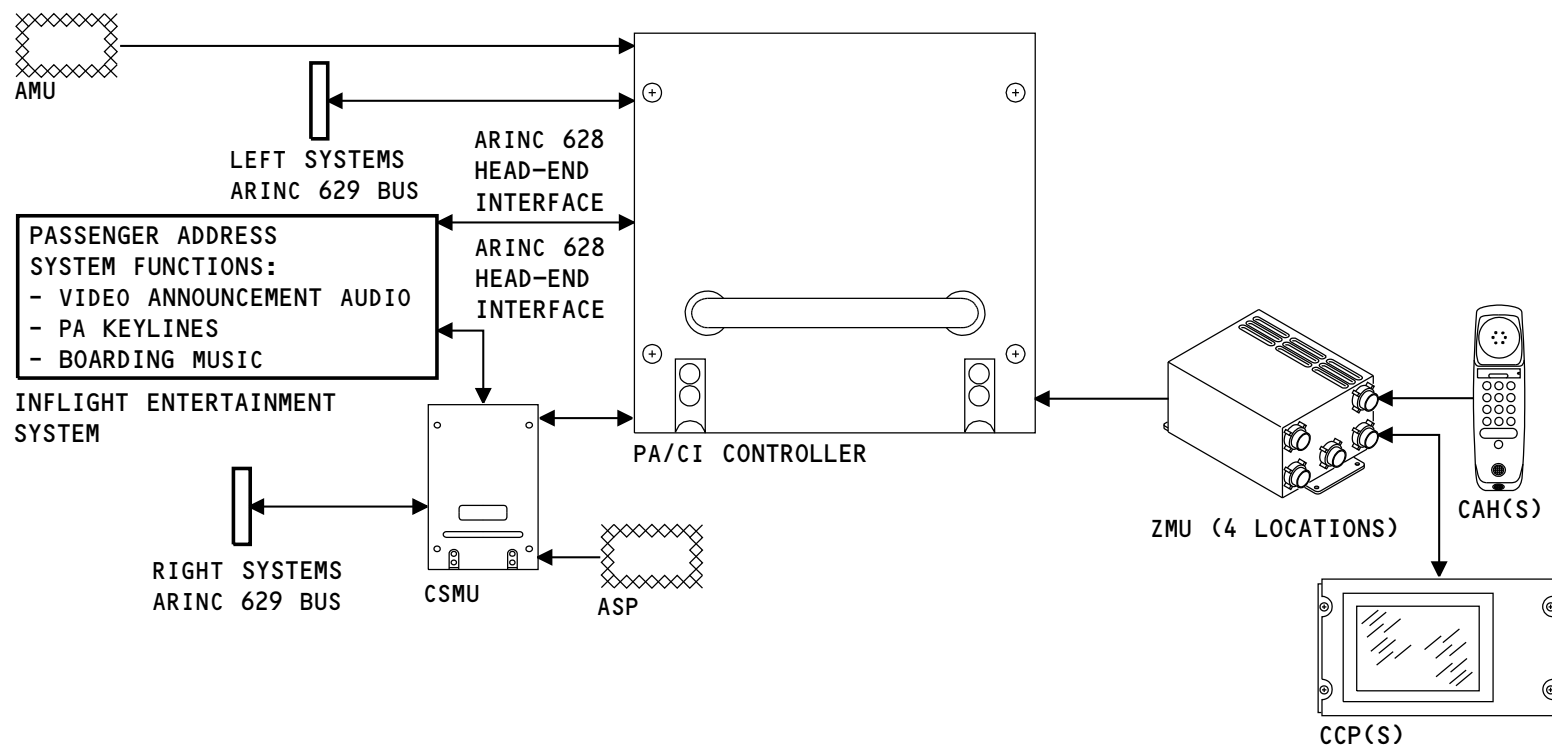
The PA/CI controller has an interface with the left systems ARINC 629 bus. It uses airplane system data to adjust volume and to control chime sounds.

You use the cabin control panels (CCPs) to control the PAS. A CCP operates as a cabin area control panel (CACP) or as a cabin system control panel (CSCP), depending upon its configuration.

The PA/CI controller has an alternate passenger address controller. If there is a failure on the normal passenger address controller, the flight attendants get a message on the cabin control panels (CCPs). The flight attendant pushes a button on the attendant switch panel (ASP) to select the alternate passenger address controller.

The CSMU sends the passenger address controller selection to the PA/CI controller. You use the CSCP to do tests and install software.

The CSMU connects to the IFE system with an ARINC 628 head-end interface. It sends airplane system data and cabin services system (CSS) configuration data to the IFE system.



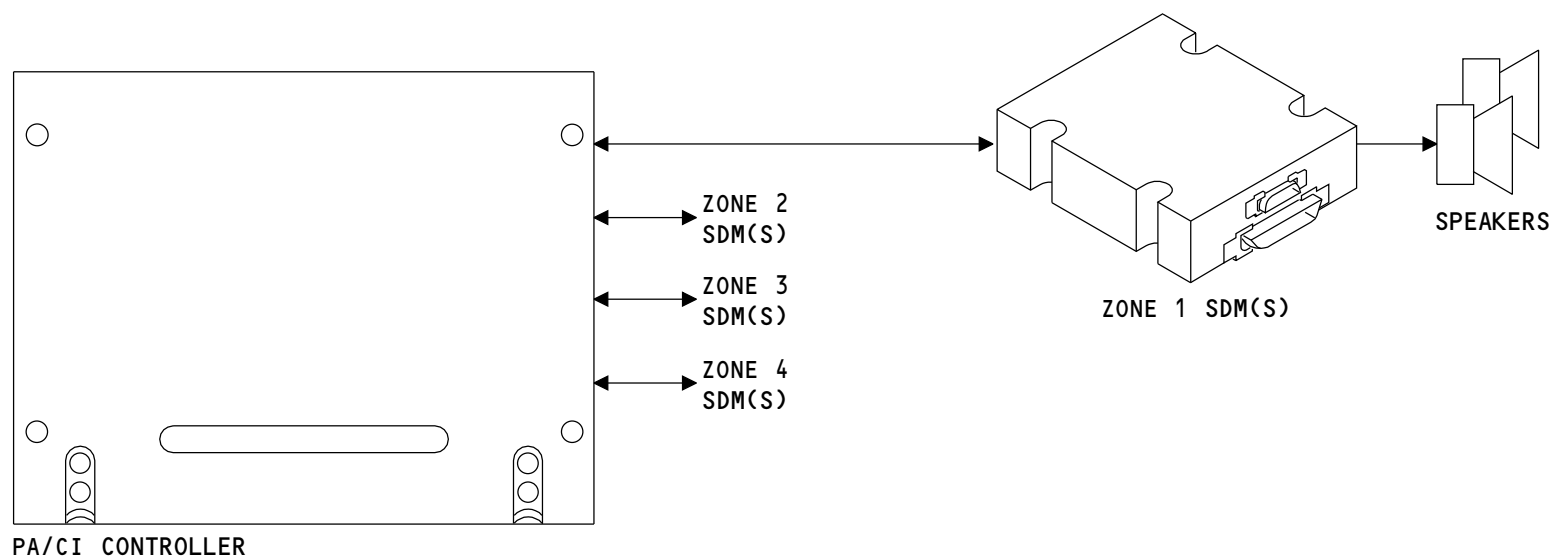
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PAS - GENERAL DESCRIPTION

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PA/CI SDM AND SPEAKER OUTPUTS
PAS - GENERAL DESCRIPTION

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**PAS - COMPONENT LOCATIONS****PAS Components**

These are the types of passenger address system (PAS) components in the cabin and crown:

- Speaker drive modules (SDMs)
- Speakers
- PA NORM/ALT switch.

There are four columns of SDMs.

The PAS component in the main equipment center is the passenger address/cabin interphone (PA/CI) controller.

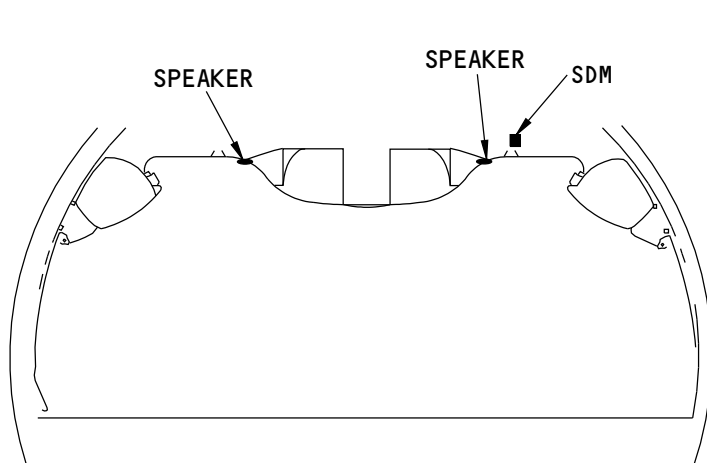
Other Components

These are the other CSS components in the cabin:

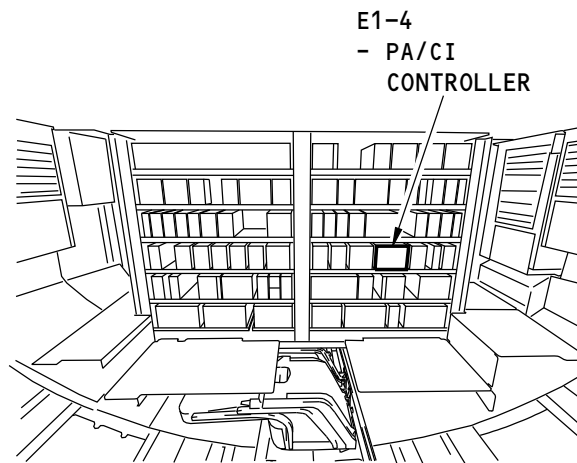
- Cabin system control panel (CSCP)
- Cabin area control panels (CACPs).

You find the exact locations of the components with the wiring diagram and functional schematic.

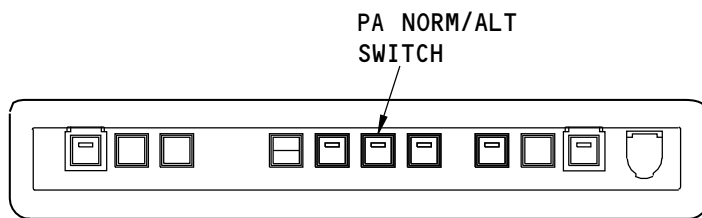
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**PASSENGER COMPARTMENT
(VIEW IN THE AFT DIRECTION)**



MAIN EQUIPMENT CENTER



ATTENDANT SWITCH PANEL DOOR 2 LEFT

PAS - COMPONENT LOCATIONS

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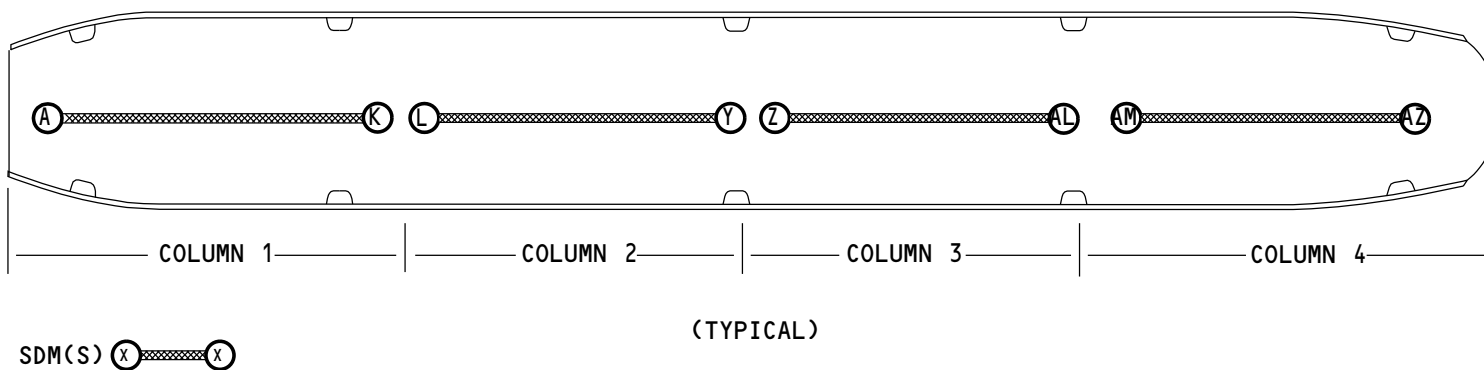


PAS - COMPONENT LOCATIONS 2

PAS Components

The speaker drive modules (SDM)s are in four columns down the center of the airplane.

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PAS - COMPONENT LOCATIONS 2

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**PAS - POWER INTERFACES****General**

Circuit breakers in two panels control power to the passenger address system.

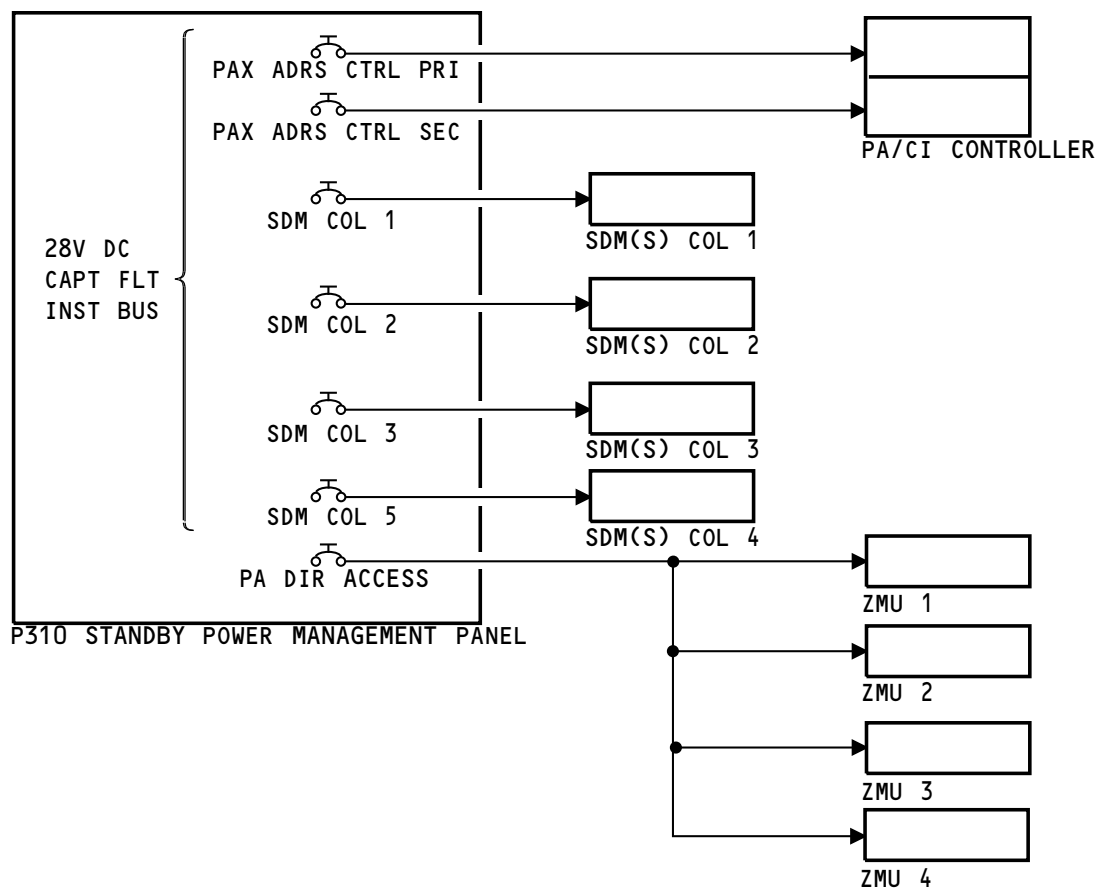
Standby Power Management Panel

The passenger address/cabin interphone (PA/CI) controller uses two 28v dc inputs for the passenger address function. One input supplies power to the normal passenger address controller. The other supplies power to the alternate passenger address controller.

There is a circuit breaker for each column of speaker drive modules (SDMs).

The zone management units (ZMUs) get 28v dc for the circuitry that does the direct access function.

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PAS - POWER INTERFACES

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**PAS - PRIORITY 1, 2A, AND 2B INTERFACES****General**

The passenger address system accepts and sends announcements at these levels of priority:

- Flight interphone (priority 1)
- Direct access (priority 2A)
- Cabin interphone (priority 2B)
- Video system audio (priority 3)
- Boarding music (priority 4).

Announcements from the flight crew and attendants have the three highest priority levels.

Priority 1 - Flight Interphone

The flight crew normally uses the flight interphone system to make passenger address announcements. The audio management unit (AMU) sends microphone audio and PTT to the passenger address/cabin interphone (PA/CI) controller. The PA/CI controller sends sidetone back to the AMU.

Priority 2A - Direct Access

Flight attendants normally use the cabin interphone system (CIS) to make PA announcements.

The direct access function lets attendant announcements go around the CIS circuits and connect directly to the PAS. They use direct access if there is a failure of the CIS.

Only three of the cabin attendant handsets (CAHs) have the direct access function. They are at door 1 left, door 2 left and door 4 left.

To make a direct access announcement, you push a direct access switch on the cabin attendant handset (CAH) cradle. This energizes a relay in the ZMU and sends the audio past the CIS circuits to the PA/CI controller.

Priority 2B - Cabin Interphone

Flight attendants normally use the CIS to make passenger address (PA) announcements. They use any CAH to make an announcement and select a PA area. The attendant dials a PA code. This connects the mic and PTT to the CIS circuits in the zone management unit (ZMU).

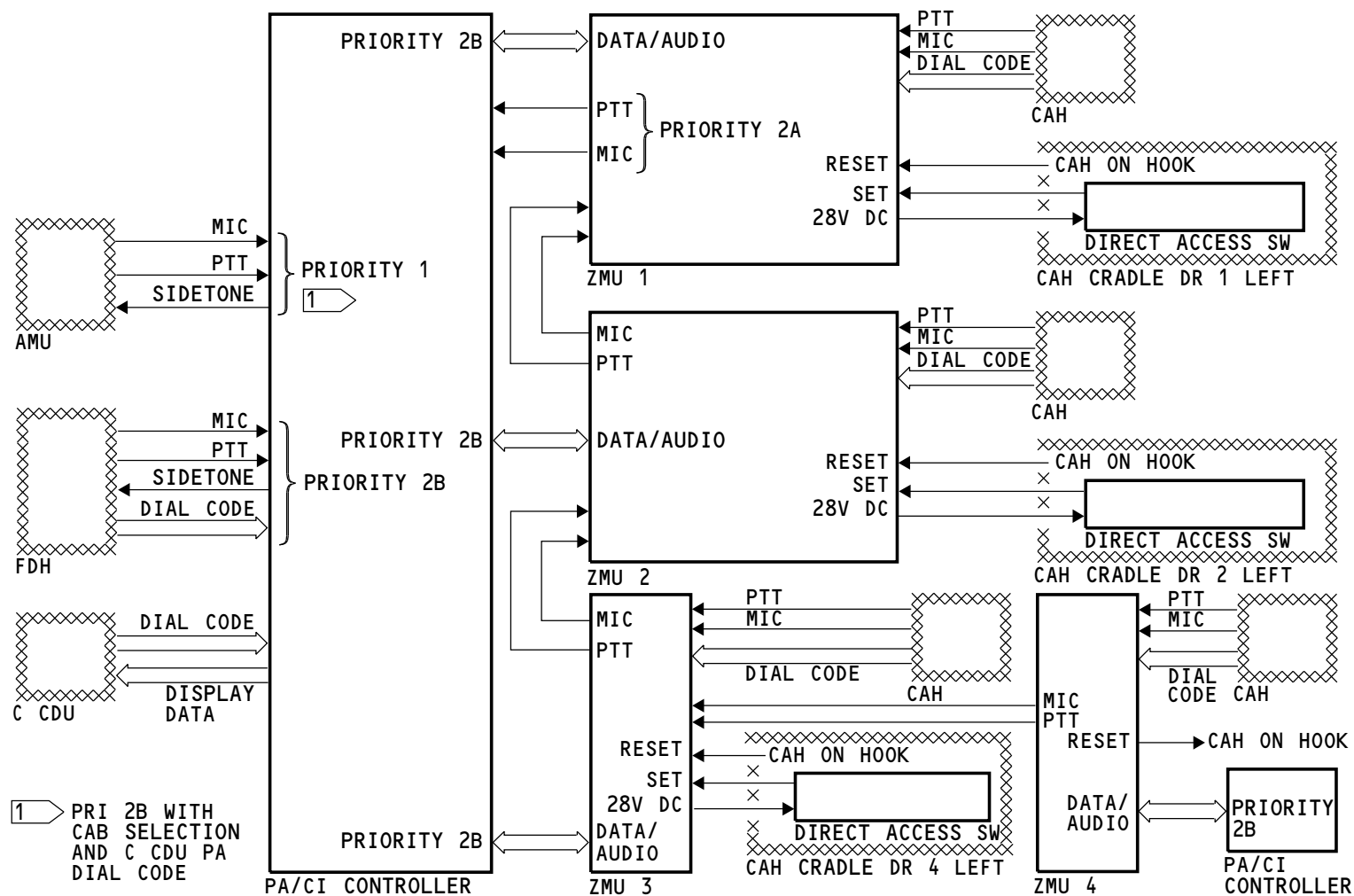
The flight crew also uses the cabin interphone system to make announcements in a selected area. To do this, the flight crew uses either the flight deck handset (FDH) or the flight interphone system. To use the flight interphone system, they dial the area on the center control display unit (CDU).

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PAS - PRIORITY 1, 2A, AND 2B INTERFACES

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**PAS - PRIORITY 3 AND 4 INTERFACES****General**

These two lower priorities are for video audio and boarding music.

Priority 3A - Recorded Announcements

During a priority 1, 2A, or 2B announcement to all areas, the PA/CI controller sends a pause signal to stop the recorded announcement.

Priority 3B - Video Audio

The IFE system sends video audio to the PA/CI controller. The IFE system has a separate audio output and separate keyline for each video area. Attendants use the IFE system to select the video.

The cabin system management unit (CSMU) sends cabin services system (CSS) configuration data to the IFE system. This data includes video audio areas definition.

Priority 4 - Boarding Music

The IFE provides boarding music and its keyline to the PA/CI controller. The boarding music is controlled by the IFE controller or the CSCP/CACP.

Chimes

The PAS makes chimes for these functions:

- Passenger to attendant calls
- Cabin interphone calls
- Passenger information signs.

The PA/CI controller gets chime data for passenger to attendant calls from the ZMUs on the intersystem bus.

The passenger address function of the PA/CI controller gets cabin interphone call chime data from the cabin interphone function of the PA/CI controller.

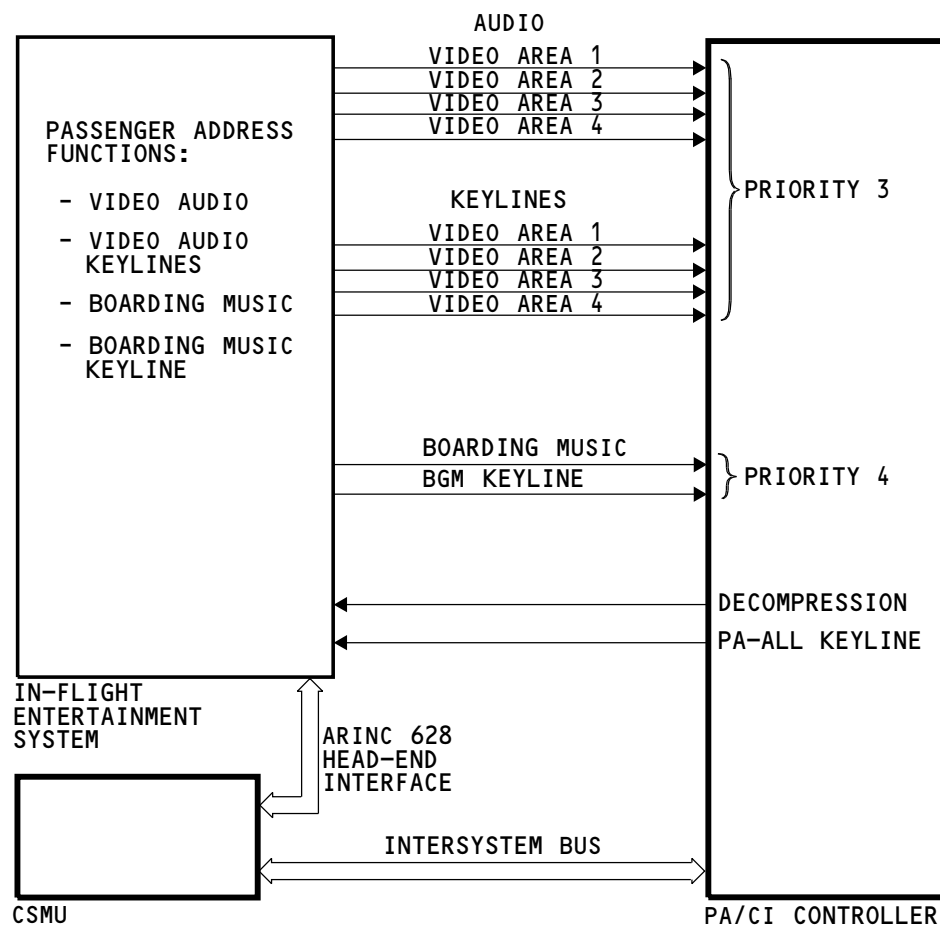
The passenger information sign chime data comes from different airplane systems.

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PAS - PRIORITY 3 AND 4 INTERFACES

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PAS - OUTPUT INTERFACES

General

The passenger address/cabin interphone (PA/CI) controller gets all audio inputs. It selects the input with the highest priority and sends it to speaker drive modules (SDMs) and to the in-flight entertainment (IFE) system.

Speaker Drive Modules

There are four columns of SDMs in the cabin, one column for each zone. There can be as many as 25 SDMs in each column. Usually, each column has ten to thirteen SDMs.

The PA/CI controller selects the audio with the highest priority. The controller digitizes the audio and sends it to the SDMs.

The speaker drive module changes digital audio to analog audio. The PAS can have up to six passenger address (PA) areas. The SDM changes the audio for each speaker assigned to an area. Each SDM controls up to four speakers.

The PAS uses the token signal for software installation.

In-flight Entertainment System

The in-flight entertainment (IFE) system sends passenger entertainment audio to the cabin. When a PA all area announcement occurs, the PA/CI controller sends the PA audio to the IFE system. The passengers hear the announcement in their headphones.

The PA/CI controller has seven keylines to the IFE system, one for each PA area and one for a PA-all area announcement.

Pause Signals

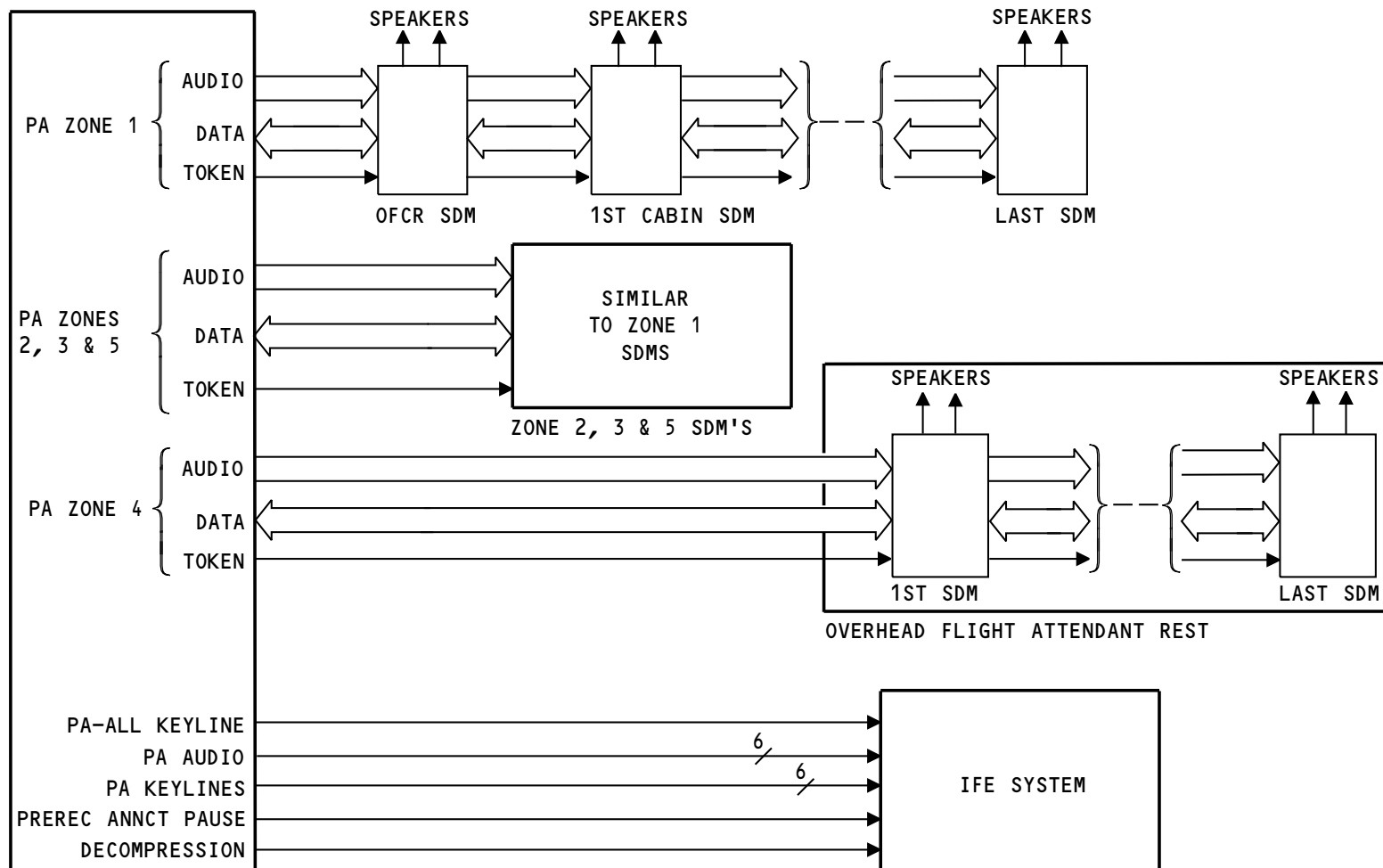
During an all area announcement, the PA/CI controller sends a PA-all keyline signal to the IFE system.

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PA/CI CONTROLLER

NOTE: REFER TO SCHEMATICS AND WIRING DIAGRAMS FOR SDM NUMBERS, POSITION, SEQUENCE & REFERENCE SYMBOL.

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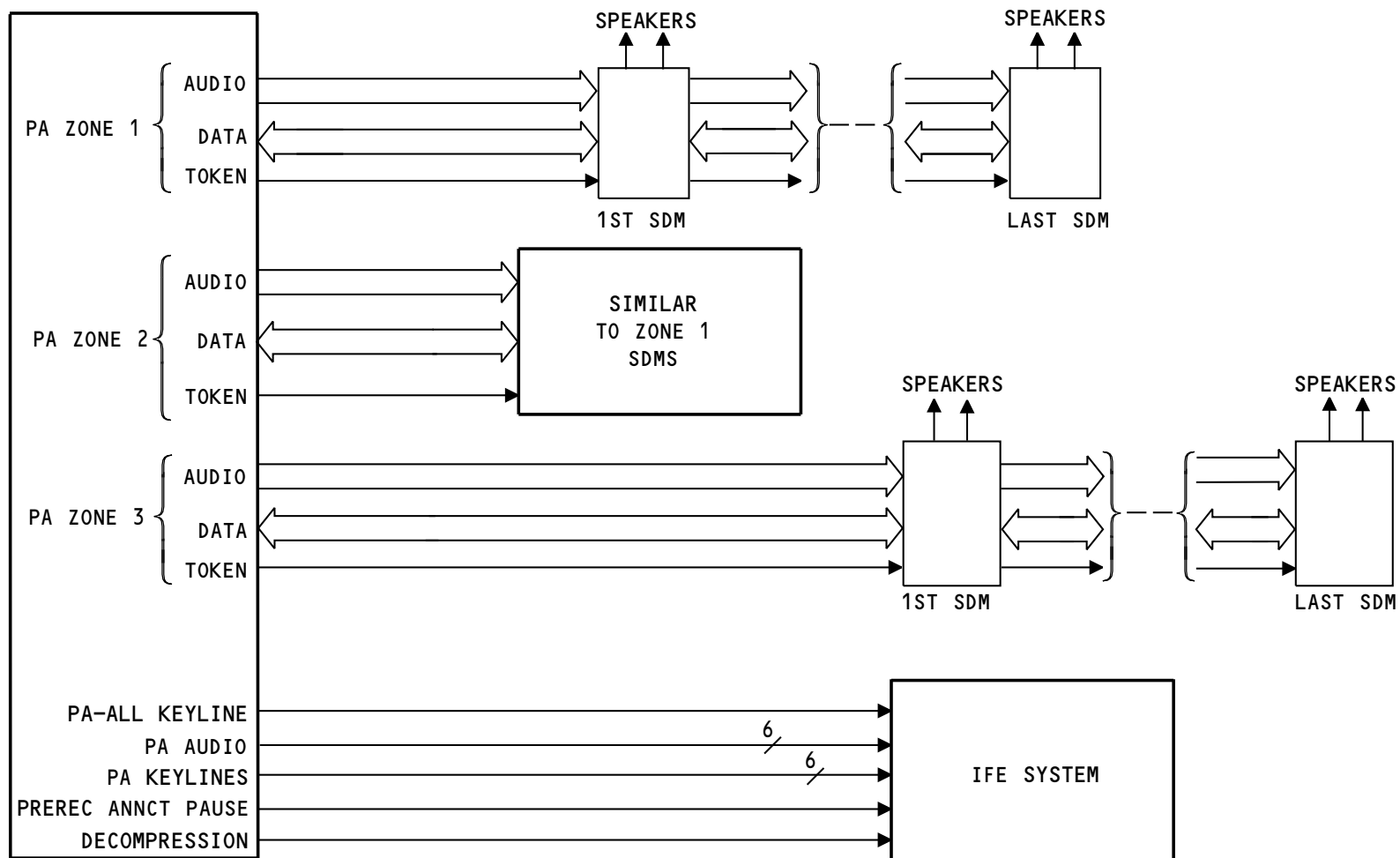
PAS - OUTPUT INTERFACES

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PA/CI CONTROLLER

NOTE: REFER TO SCHEMATICS AND WIRING DIAGRAMS FOR SDM NUMBERS, POSITION, SEQUENCE & REFERENCE SYMBOL.

1908950 S0000353503_V1

PAS - OUTPUT INTERFACES

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PAS - AIRPLANE SYSTEMS AND CSMU INTERFACES

General

The passenger address/cabin interphone (PA/CI) controller has interfaces with different airplane systems and with the cabin system management unit (CSMU).

Airplane Systems

The PA function of the PA/CI controller receives inputs from these airplane systems on the left systems ARINC 629 bus:

- ARINC signal gateway (ASG) card
- Proximity sensor electronics unit (PSEU)
- Overhead panel ARINC 629 system (OPAS)
- Flap/slat electronics unit (FSEU)
- Warning electronic system (WES)
- Airplane information management system (AIMS)
- Electrical load management system (ELMS).

The PA/CI controller uses these inputs to make chimes when the FASTEN SEAT BELTS and NO SMOKING signs go on or off. The PA/CI controller also uses airplane system data to adjust volume levels. The PA/CI controller uses flight data to set volume levels.

CSMU

There are two passenger address controllers in the PA/CI controller. They are normal and alternate. Only one controller operates at a time. If the normal controller fails, the crew selects the alternate controller at the attendant switch panel (ASP). The ASP sends a discrete to the cabin system management unit (CSMU). The CSMU sends a discrete to the PA/CI controller. The PA/CI controller then changes to the alternate PA controller.

The PA/CI controller also sends and receives data on the intersystem bus. The CSMU sends software installation data and test commands on the intersystem bus. The PA/CI controller sends fault status and test results to the CSMU on the intersystem bus.

The CSMU receives the same inputs from airplane systems on the right system ARINC 629 bus as the PA/CI controller does on the left systems ARINC 629 bus. If the left systems ARINC 629 bus fails, the PA function of the PA/CI controller gets right systems ARINC 629 bus information from the CSMU on the intersystem bus.

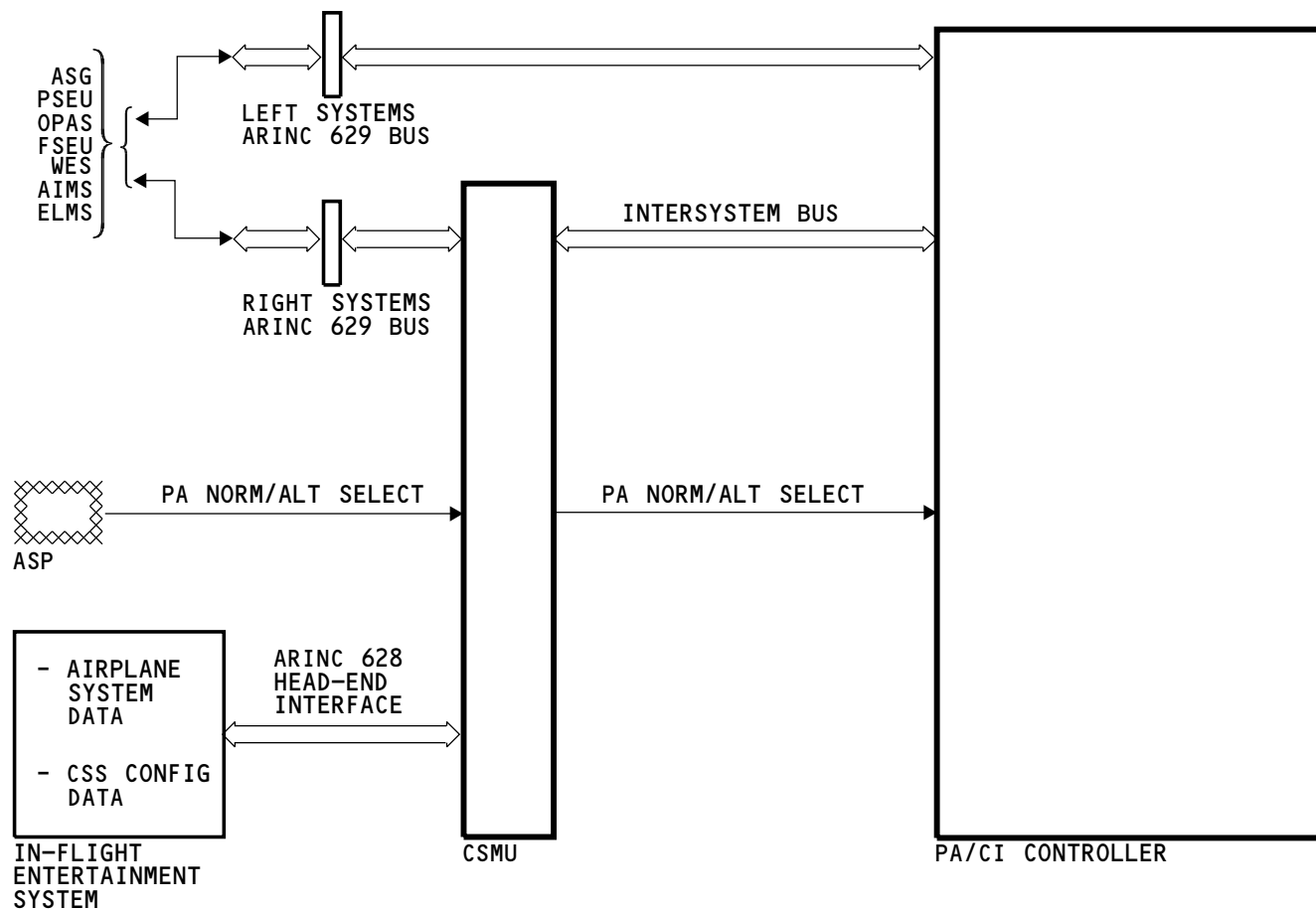
The CSMU sends airplane system data and cabin services system (CSS) configuration data to the in-flight entertainment (IFE) system.

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PAS - AIRPLANE SYSTEMS AND CSMU INTERFACES

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**PAS - SPEAKER DRIVE MODULE****Purpose**

The speaker drive modules (SDMs) send passenger address (PA) audio to the PA speakers.

Physical Description

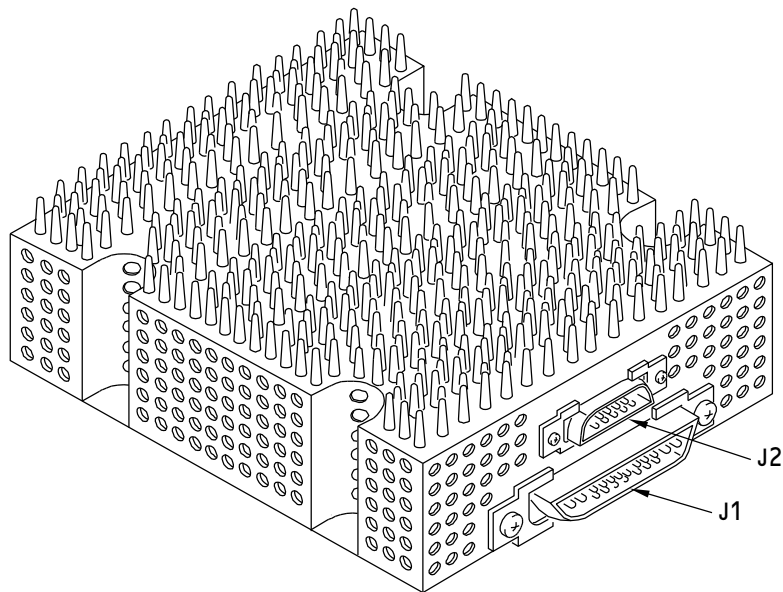
An SDM is about six inches wide and seven inches long. It weighs about one and a half pounds.

Functional Description

The SDMs get digital audio from the PA/CI controller and change it to analog audio. Each SDM can control as many as four speakers independently.

The SDMs also have a chime generator to make chime sounds.

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PAS - SPEAKER DRIVE MODULE

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**PAS - SPEAKERS****Purpose**

The speakers produce the passenger address audio in the passenger cabin.

Locations

Most speakers are in the ceiling panels over the passenger seats and aisles. There are also speakers in the galleys, above the doors, and in each lavatory.

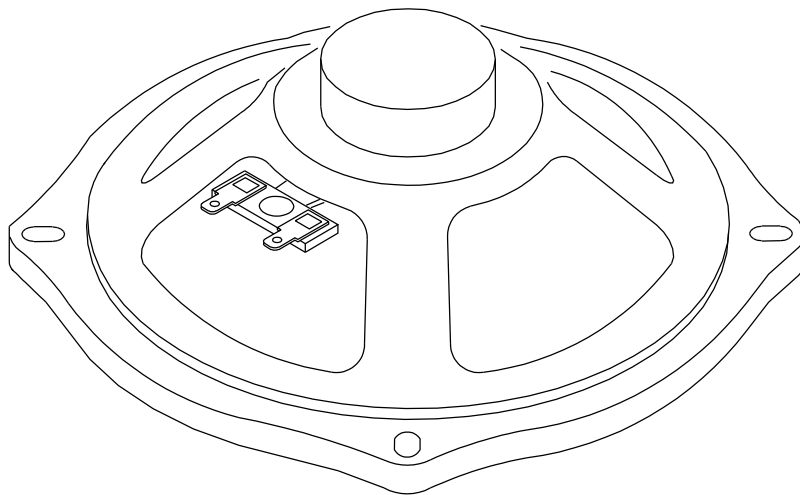
Functional Description

The speakers get audio signals from the speaker drive modules (SDMs). They change the electrical signal into an acoustic signal.

Training Information Point

A dot on one speaker terminal identifies it as positive. Connect the red lead to the positive terminal.

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CABIN SPEAKER

PAS - SPEAKERS

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**PAS - SDM AND SPEAKER INSTALLATION****SDM Installation**

The speaker drive modules (SDMs) are above the cabin ceiling panels on the left side of the stow bin support assembly. Four screws attach the SDM to the support assembly.

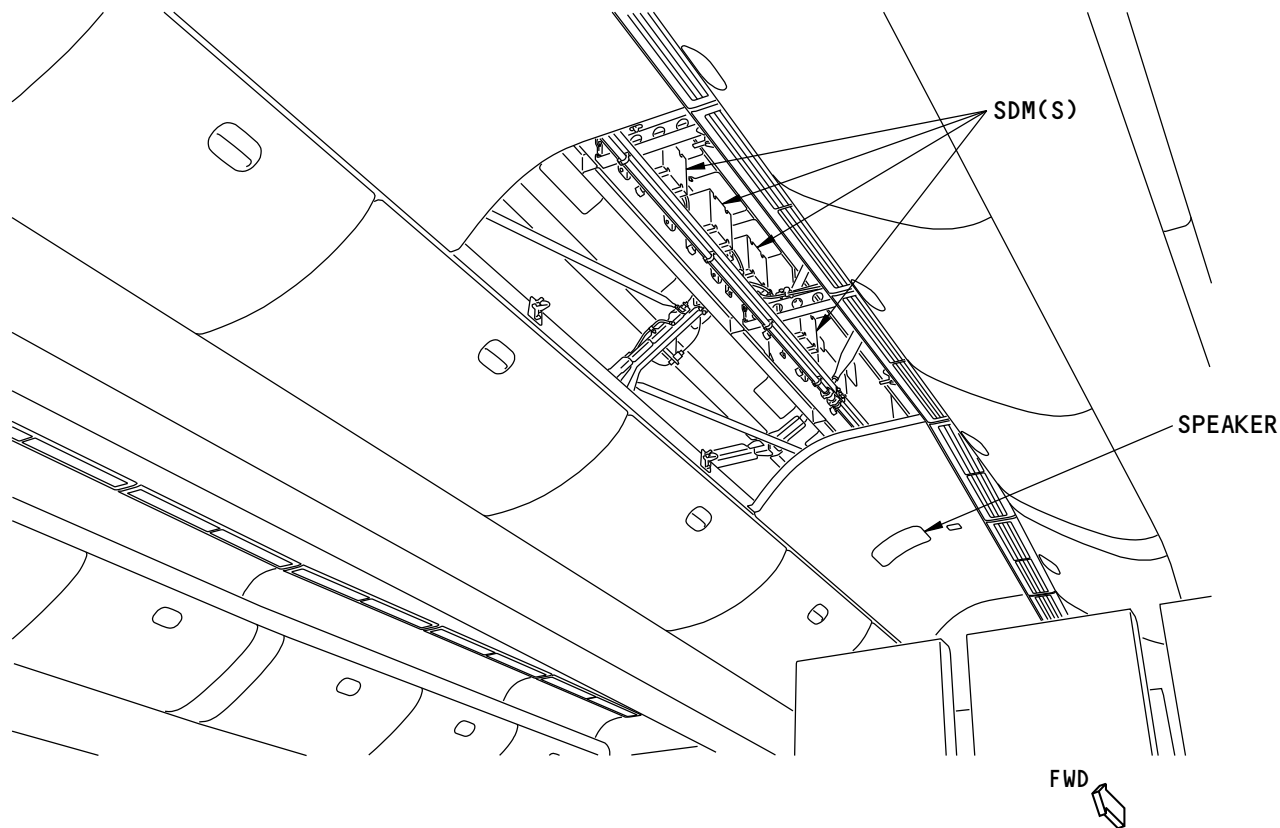
Training Information Point

You must remove ceiling panels to get access to a SDM.

Speakers

Most speakers are in the overhead panels. There are also speakers in the galleys and lavatories.

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PAS - SDM AND SPEAKER INSTALLATION

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**PAS - FLIGHT INTERPHONE ANNOUNCEMENT - OPERATION****General**

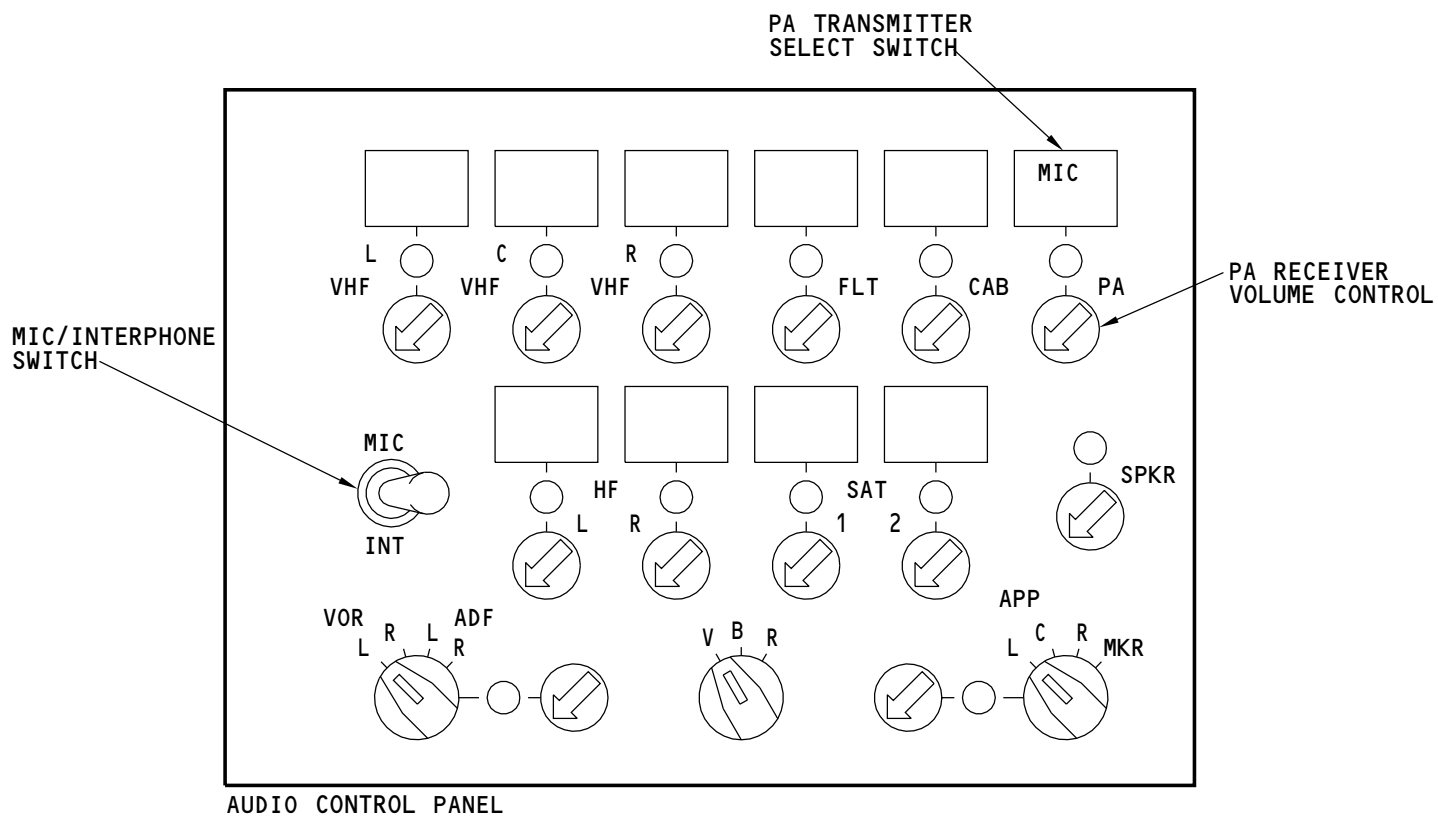
The audio control panel (ACP) lets the flight crew make priority 1 announcements.

Control and Indications

Push the PA receiver switch to listen to PA audio. The green PA receiver light above the receiver volume control comes on when the PA receive is on.

Push the PA transmitter select switch to make a priority 1 announcement. The white MIC light comes on. Push the MIC/interphone switch to connect the microphone to the PA/CI controller.

Priority 1 announcements go to all passenger address areas.



PAS - FLIGHT INTERPHONE ANNOUNCEMENT - OPERATION

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**PAS - DIRECT ACCESS FUNCTIONAL DESCRIPTION****General**

Flight attendants normally make PA announcements through the cabin interphone system (CIS) (priority 2B). If the CIS has a failure, attendants can make direct access announcements (priority 2A). Direct access announcements go around the CIS.

CIS Announcements

When an attendant selects a passenger address dial code, the CIS circuits in the zone management unit (ZMU) send digital audio to the PA/CI controller. The cabin interphone controller (CIC) sends the audio to the passenger address controller (PAC) in the PA/CI controller.

Direct Access

Three of the cabin attendant handsets (CAHs) have the direct access function. They are at door 1 left, door 2 left, and door 4 left. The handset at door 1 left connects to ZMU 1. The handset at door 2 left connects to ZMU 2. The handset at door 4 left connects to ZMU 3.

A momentary DIRECT ACCESS switch is on the front of the CAH cradle. When you push the switch, 28v dc goes through the contacts to the relay in the zone management unit (ZMU). The relay energizes. The 28v dc goes through the reset line and latches the relay in the energized position.

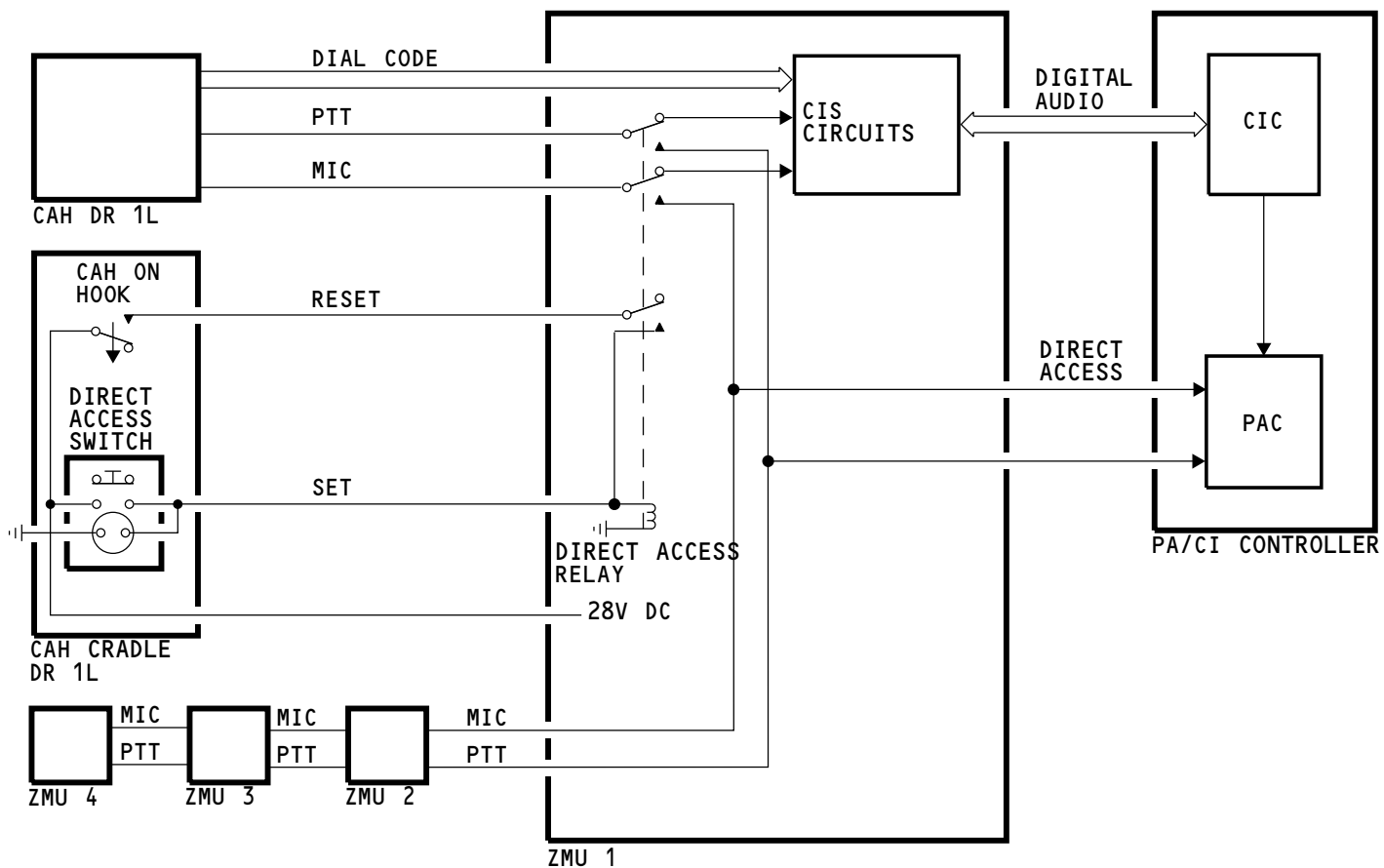
When the relay energizes, the CAH microphone audio and PTT signals go around the CIS circuits. In each ZMU, the direct access mic and PTT signals from the CAH mix with the signals from the previous ZMU. The direct access outputs from ZMU 1 connect directly to the PAC in the PA/CI controller.

When the CAH goes back in the cradle, it opens the CAH on hook switch. When the CAH on hook switch opens, this deenergizes the direct access relay.

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PAS - DIRECT ACCESS FUNCTIONAL DESCRIPTION

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**PAS - DIRECT ACCESS AND CABIN INTERPHONE ANNOUNCEMENT - OPERATION****General**

You use cabin attendant handsets (CAHs) for both direct access and cabin interphone announcements.

Cabin Interphone

Flight attendants normally use the cabin interphone system (CIS) to make PA announcements (priority 2B). They can use any CAH to make a CIS announcement.

CIS announcements go to selected PA areas or all areas. To select a PA area, dial the code. These are typical PA dial codes:

- Area 1 - 41
- Area 2 - 42
- Area 3 - 43
- Area 4 - 44
- Area 5 - 45
- Area 6 - 46
- All areas - 40
- Priority all areas - 47.

To make a CIS announcement, dial the code for the area and push the PTT. To end the announcement, either push the RESET button or put the handset back in the cradle.

Direct Access

Flight attendants use CAHs at doors 1 left, 2 left, and 4 left to make direct access announcements (priority 2A).

The direct access CAH cradle has a PA switch. To make a direct access announcement, push the PA switch. Then push and hold the PTT. This connects the CAH microphone to the PA/CI controller.

Direct access announcements go to all PA areas.

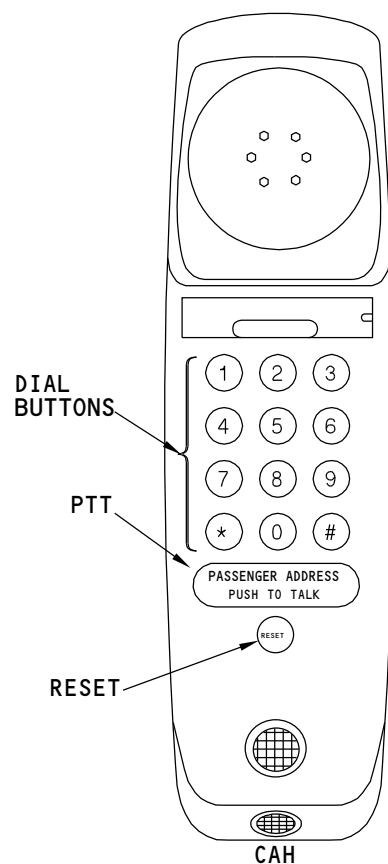
To end the direct access announcement, put the handset back in the cradle.

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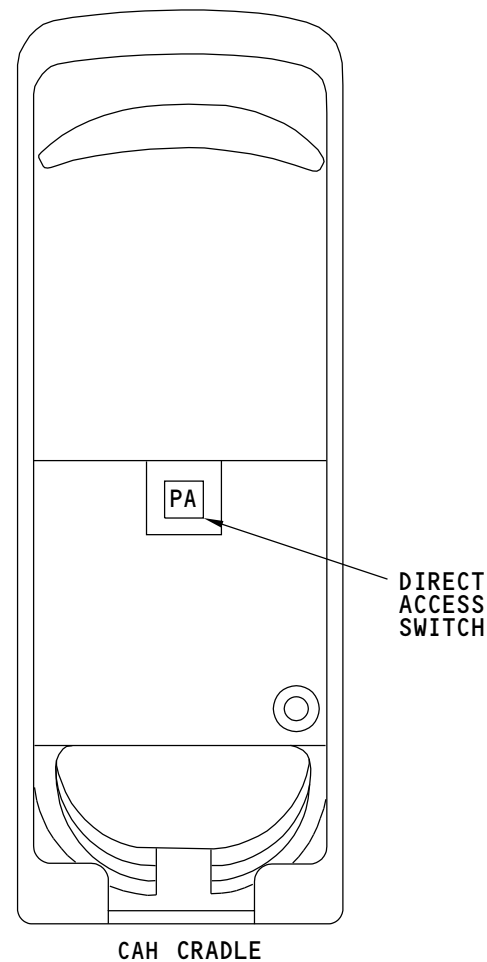
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PA DIAL CODES (TYPICAL)

AREA 1 - 41
 AREA 2 - 42
 AREA 3 - 43
 AREA 4 - 44
 AREA 5 - 45
 AREA 6 - 46
 ALL AREAS - 40
 PRIORITY ALL AREAS - 47



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PAS - DIRECT ACCESS AND CABIN INTERPHONE ANNOUNCEMENT - OPERATION

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PAS - CONFIGURATION DATABASE PROGRAMMED ITEMS

General

The configuration database supplies details of the system operation. For the PAS, the database gives configuration data for:

- Speaker drive modules (SDMs)
- Speakers
- Passenger address areas
- Volume
- Chimes.

SDMs and Speakers

The configuration database identifies the number of SDMs and speakers. It assigns as many as four speakers to a SDM and identifies the type of announcements each speaker transmits.

The database also identifies the location of each component.

Speaker Mute Assignments

When an attendant makes an announcement, the PAS mutes up to three nearby speakers. This prevents speaker feedback. The configuration database assigns the speakers to a cabin attendant handset.

Passenger Address Areas

The PAS can have up to six passenger address areas. The configuration database assigns each speaker to a PA area.

Announcement Types for Each Speaker

The configuration database identifies the announcement types (priority 1, 2A, 2B, 3, 4) each speaker plays.

Volume Control Areas

The PAS adjusts the volume in an area. The configuration database identifies the speakers assigned to a volume control area.

Volume Reference Level

The PAS uses a volume reference level to adjust the volume above or below reference level. The reference level is the normal in-flight volume. The configuration database gives the reference level.

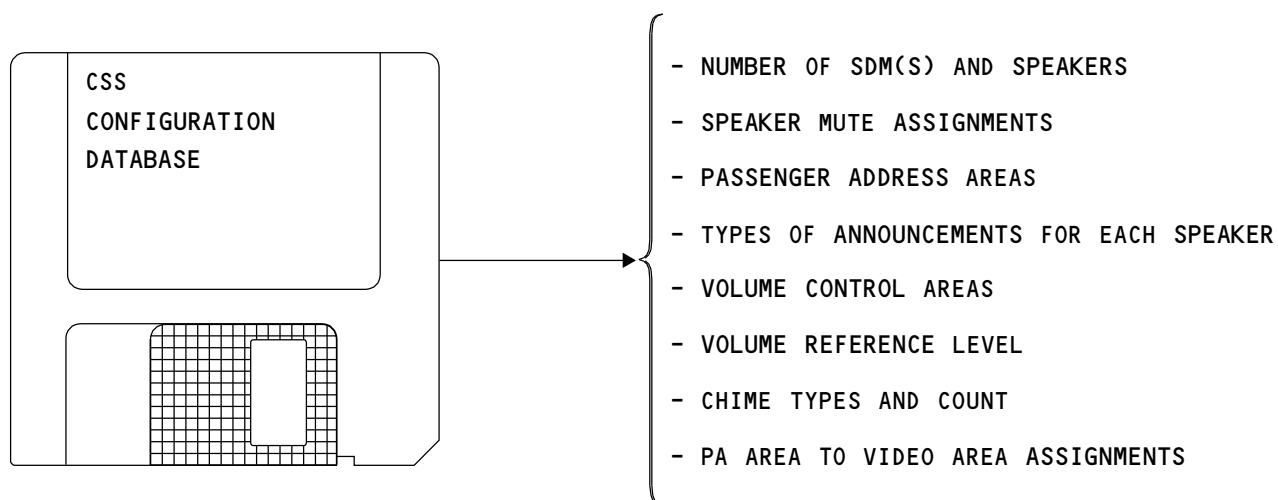
Chimes Types and Count

The configuration database identifies the types of chimes the PAS makes for each chime condition. It also identifies the number of chimes for each chime condition.

PA Area to Video Area Assignment

The configuration database matches PA areas to video areas. The configuration database assigns each PA area to one video area. It assigns each video area to one or more PA areas.

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PAS - CONFIGURATION DATABASE PROGRAMMED ITEMS

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**PAS - PASSENGER ADDRESS FAILURE MESSAGE****Operation**

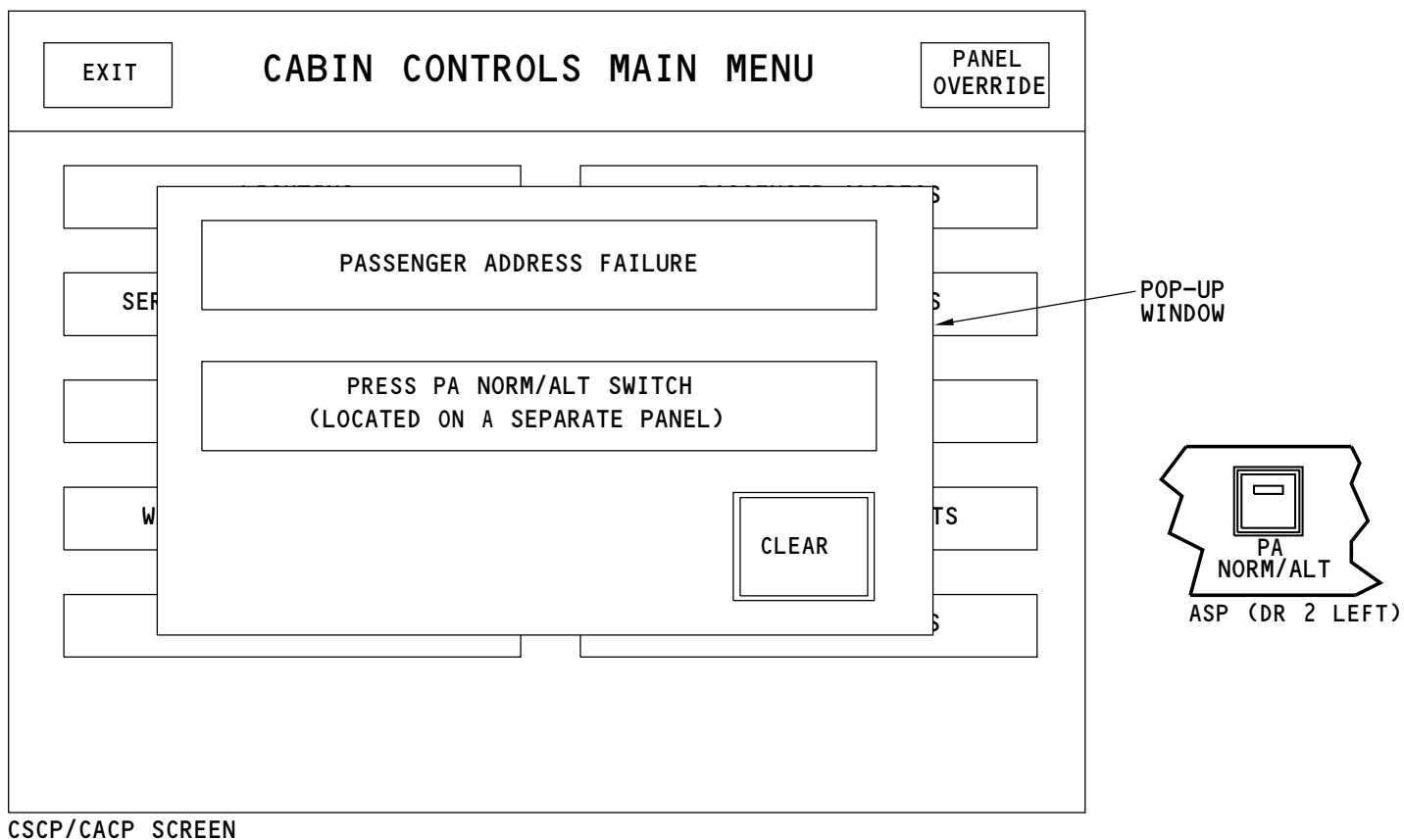
The passenger address controller (PAC) of the PA/CI controller has continuous BITE. If the BITE finds a failure, the PAC sends a message to the cabin system control panel (CSCP) and the cabin area control panels (CACPs). This causes the CSCP and all CACPs to show a PA failure message on a pop-up window.

The pop-up window tells the flight attendants to push the PA NORM/ALT switch.

To clear the pop-up window, touch CLEAR or push the PA NORM/ALT switch. The PA NORM/ALT switch makes the alternate PAC operational. The PA NORM/ALT switch is on the attendant switch panel (ASP) at door 2 left.

The PAC also sends a message to the AIMS for both EICAS and the central maintenance computing function (CMCF).

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PAS - PASSENGER ADDRESS FAILURE MESSAGE

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**PAS - NORMAL/ALTERNATE PAC SELECTION FUNCTIONAL DESCRIPTION****General**

The PA/CI controller has two passenger address controllers (PACs): normal and alternate. Only one PAC operates at a time. Usually the normal PAC operates. If the normal PAC fails, the flight attendants select the alternate PAC from the attendant switch panel (ASP).

The cabin system management unit (CSMU) and the zone management units (ZMUs) monitor the status of active PAC on the intersystem bus. If the active PAC fails, a pop-up window shows on the cabin system control panel (CSCP) and cabin area control panels (CACPs).

Operation

The PA NORM/ALT switch is an alternate action switch. It sends a discrete signal to the CSMU.

The CSMU controls the signal. During normal operation, the switch signal goes through a switch in the CSMU to the PA/CI controller. When you test or install software, the CSMU controls the signal to the PA/CI controller.

Normal PAC

With the switch in the normal position, an open signal goes to the PA/CI controller. This causes the PA/CI to use the normal PAC. The alternate PAC is off.

Alternate PAC

When you push the switch in, a ground signal goes to the PA/CI controller. Also, the LED in the switch comes on. A ground signal causes the PA/CI controller to use the alternate PAC. The normal PAC is off.

Training Information Point

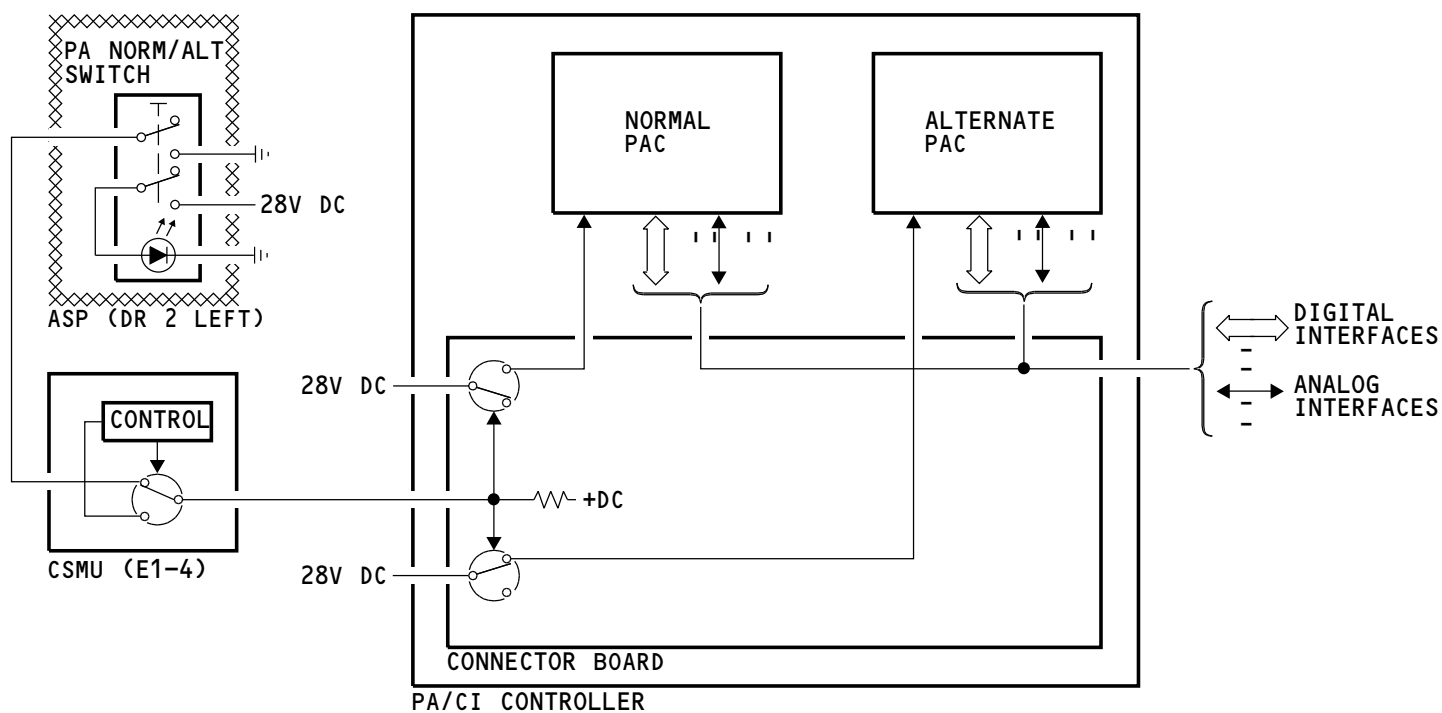
Because only one PAC operates at a time, you can use the PA NORM/ALT switch to help isolate passenger address system problems. If the problem goes away when the other PAC is active, the problem is in the PA/CI controller.

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PAS - NORMAL/ALTERNATE PAC SELECTION FUNCTIONAL DESCRIPTION

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PAS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION

General

The PA/CI controller has two passenger address controllers (PACs), normal and alternate. Only one PAC operates at a time.

The PAC receives all PAS audio inputs. It continuously selects the highest priority input and sends it to the passenger cabin.

Audio Inputs

All audio goes to an audio switch matrix in the PAC. Priority 2B inputs go to the cabin interphone controller (CIC) in the PA/CI controller. The CIC sends audio to the PAC.

The PAS can have as many as six passenger address (PA) areas. Priority 1, 2A, and 4 announcements go to all PA areas. Priority 1 and 2A have one audio input each. Priority 4 has two inputs. Priority 2B and 3 go to selectable PA areas.

There are four priority 3 inputs and six priority 2B inputs. The priority 3 inputs can go to one or more PA areas. Each priority 2B input can go to only one PA area.

PTT and Keyline Inputs

The PTT and keyline inputs tell the PAC when an audio input is active. The PTTs and keylines go to a discrete input buffer. The discrete input buffer sends the data to the microprocessor.

The discrete output buffer sends PA keylines to the in-flight entertainment (IFE) system for PA area announcements.

Audio Outputs

The microprocessor gets the PTT and keyline data. The microprocessor sends selection data to the audio switching matrix. The audio switching matrix sends the audio on the applicable channel or channels. Each channel is for a PA area. An announcement for PA area 1 goes out on channel 1. Announcements for areas 2, 3, 4, 5, and 6 go out on their related channels. If an announcement goes to all PA areas, it goes out on all channels.

The microprocessor uses configuration database information from non-volatile memory (NVM) to determine PA area assignments.

The six channels of PA audio go to the IFE system for the entertainment audio. This permits the passengers to hear the announcement on their entertainment headphones.

All six channels go to an analog to digital (A/D) converter. The A/D converter digitizes the six channels of audio and sends it to the speaker drive modules (SDMs).

There are four columns of SDMs in the cabin, one for each zone. The PAC has a separate output for each column.

Volume Control

The PAS automatically adjusts the volume in the cabin. The microprocessor in the PAC calculates the correct volume for different volume zones. It sends the volume data to the SDMs. The SDMs adjust the volume. The PAC uses these four types of data to calculate the volume:

- Configuration database
- Flight data
- Manual adjustment.

The configuration database gives the volume reference level for in-flight operation. All adjustments to the volume are from the in-flight operation reference level.

The PAC makes automatic adjustments based on flight data inputs.

The PAC uses the data to calculate any adjustment and sends the data to the applicable SDMs.

The PAC decreases the PA volume when the airplane is on the ground. It increases the volume as flight data changes. This is the data it uses and their effect on volume:

- On ground, engines off (-6dB)
- On ground, engines on (-2dB)
- In air (0dB)

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PAS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION

- Maximum operating speed: (+2dB)
- Decompression: (+8dB).

The PA/CI controller gets the flight data on the left ARINC 629 systems bus from these:

- Airplane information management system (AIMS)
- ARINC signal gateway (ASG) card
- Warning electronic system (WES).

The CACPs and CSCP permit flight attendants to make manual adjustments to the volume. The PAC does not permit manual adjustment to lower the volume below the reference level.

Chimes

The PAS makes chime sounds for:

- Cabin interphone calls
- Passenger to attendant calls
- Lavatory to attendant calls
- Passenger information signs.

The PAC controls the chimes. The PAC uses data from the configuration database in NVM for the type of chime. These are the types of chimes:

- Hi
- Lo
- Hi/lo
- Lo/hi.

It uses data from different systems and makes a decision when to make a chime. The PAC sends chime data to the SDMs. The SDMs make the chime sound and send it to the speakers.

When a cabin interphone call occurs, the CIC sends the data to the PAC. The PAC sends the data to the applicable SDM or SDMs.

When there is a passenger to attendant or lavatory to attendant call, the applicable zone management unit (ZMU) sends the data to the PA/CI controller on the intersystem bus.

When the FASTEN SEAT BELTS or NO SMOKING signs go on or off, the PAS makes a chime. The PAC uses data from the left ARINC 629 systems bus to monitor the signs. These are the systems that supply data related to the passenger information logic:

- Airplane information management system (AIMS)
- Electrical load management system (ELMS)
- Flap/slat electronics unit (FSEU)
- Overhead panel ARINC 629 system (OPAS)
- Proximity sensor electronics unit (PSEU).

Discrete Outputs

The PA/CI controller controls software installation of the SDMs. The PA/CI controller sends a token discrete to the first SDM in a column during software installation.

A pause signal goes to the IFE system to pause the recorded announcements during higher priority all area announcements.

The PA/CI controller sends a pause signal to the IFE system to pause the entertainment audio during an all area PA announcement.

CSMU Interface

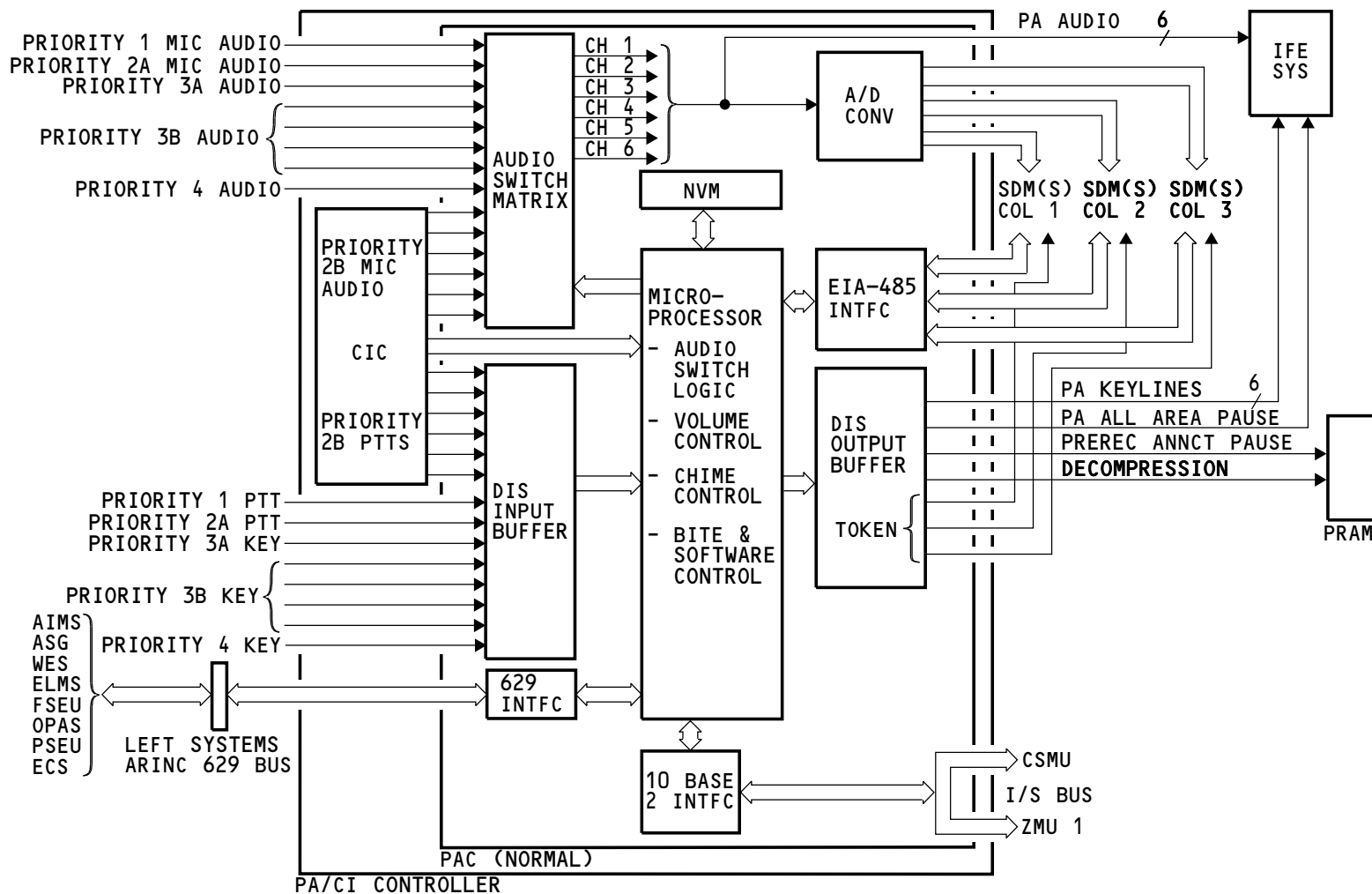
The PA/CI controller and cabin system management unit (CSMU) use the intersystem bus for test and software installation data. They also share system data.

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PAS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION

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**PAS - SDM FUNCTIONAL DESCRIPTION****General**

The speaker drive modules (SDMs) get digital audio from the PA/CI controller. They change the digital signal to analog and send it to one or two speakers.

Speaker Drive Module

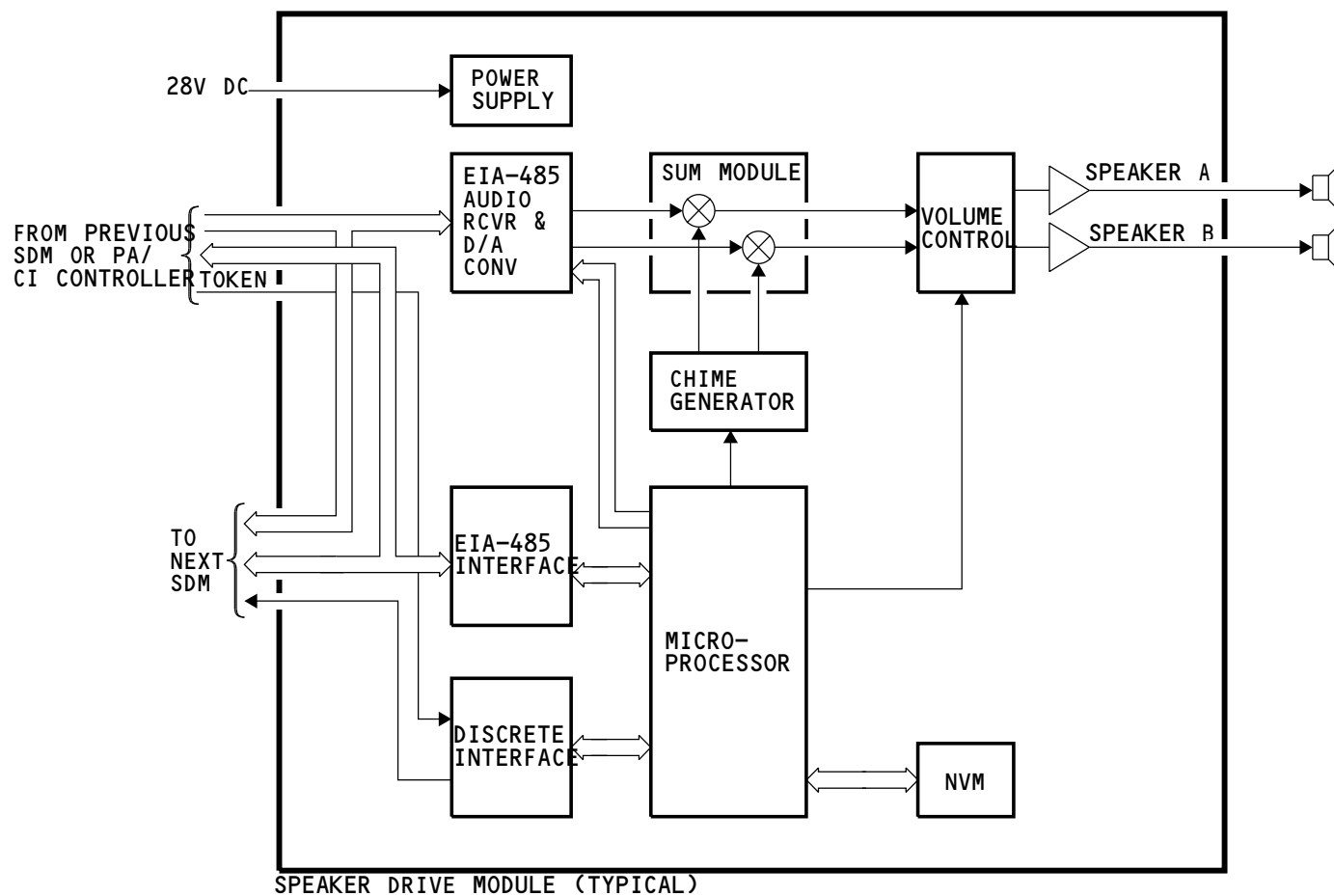
The PA/CI controller sends up to six channels of PA audio to the SDMs on an EIA-485 bus. The audio receiver and D/A converter change the digital signal to analog. Input to the D/A converter from the microprocessor includes data from the configuration database in nonvolatile memory (NVM). The configuration database gives the correct channel for each speaker.

Chime and volume data from the PA/CI controller go to the EIA-485 interface. The EIA-485 interface sends the data to the microprocessor.

When a chime condition occurs, the microprocessor sends a signal to the chime generator. The chime generator makes the correct type of chime sound and sends it to the sum module. The sum module mixes the signal with the audio for the applicable speaker. The sum module sends the audio to the level controller.

The microprocessor sends a signal to the volume controller to set the correct volume. The volume controller sets the volume for each speaker and sends the audio through an amplifier to the speaker.

The discrete interface gets a token discrete during the software installation process. After the software is installed, the microprocessor sends the discrete to the next SDM.



PAS - SDM FUNCTIONAL DESCRIPTION

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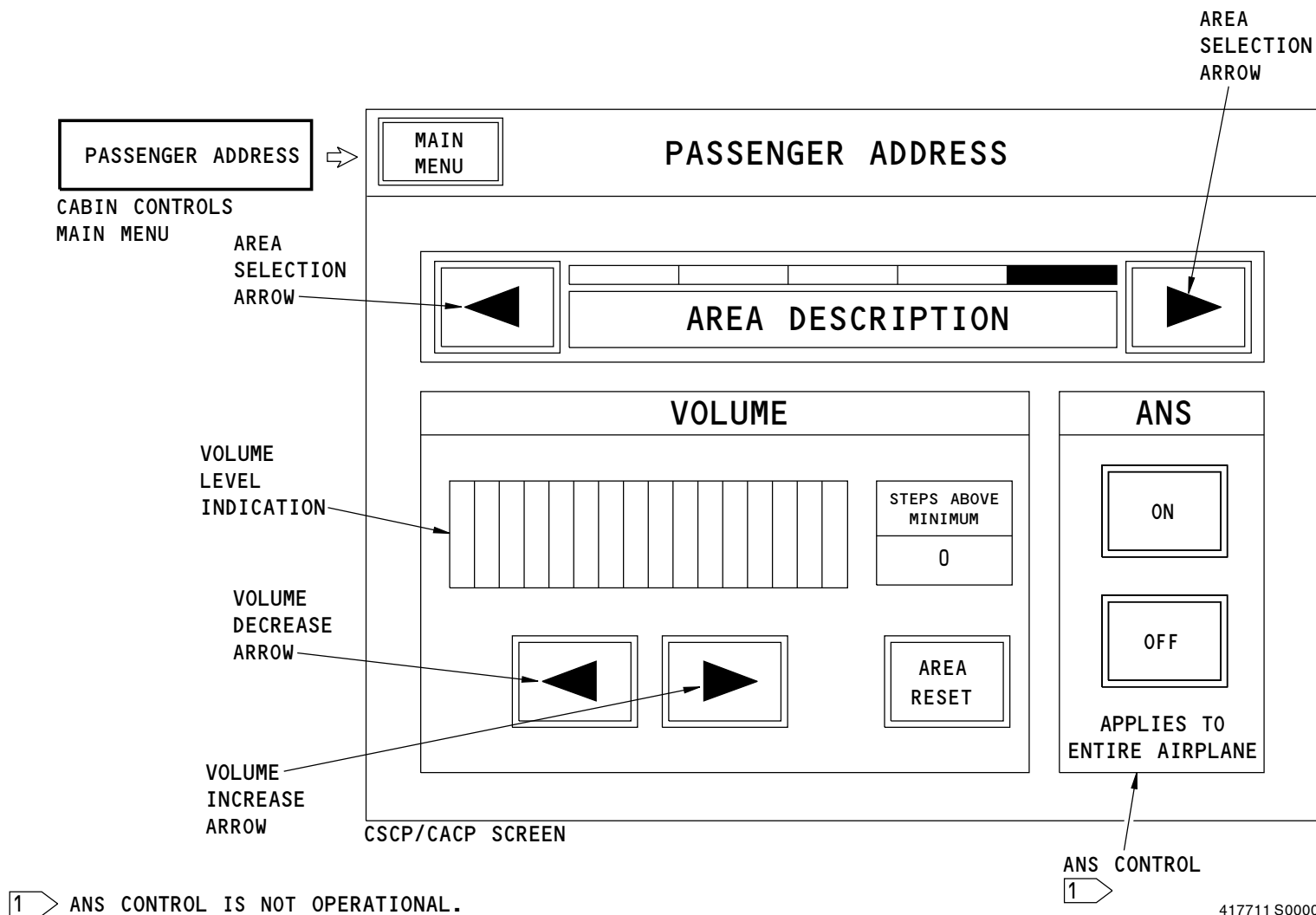


PAS - PASSENGER ADDRESS CONTROL SCREEN

General

The passenger address screen permits you to adjust the PA volume.

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PAS - PASSENGER ADDRESS CONTROL SCREEN

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**PAS - NOISE GENERATION****General**

Use the command output - speaker drive module (SDM) screen to make PAS noise for audio tests.

Access

Use these steps on the CSCP to select the screen:

- Touch CABIN MAINTENANCE on the CSCP main menu
- Touch CABIN TESTS on the cabin maintenance menu
- Touch ENGINEERING TESTS on the cabin tests menu
- Touch COMMAND OUTPUT on the engineering tests menu
- Touch SPEAKER DRIVE MODULE (SDM) on the command output menu.

Command Output - Speaker Drive Modules Screen

Touch the column select arrows to select one or all columns (zones).

Touch the SDM select arrows to select one or more SDMs.

Touch SPEAKER 1 ON and SPEAKER 2 ON to cause the SDMs to make noise.

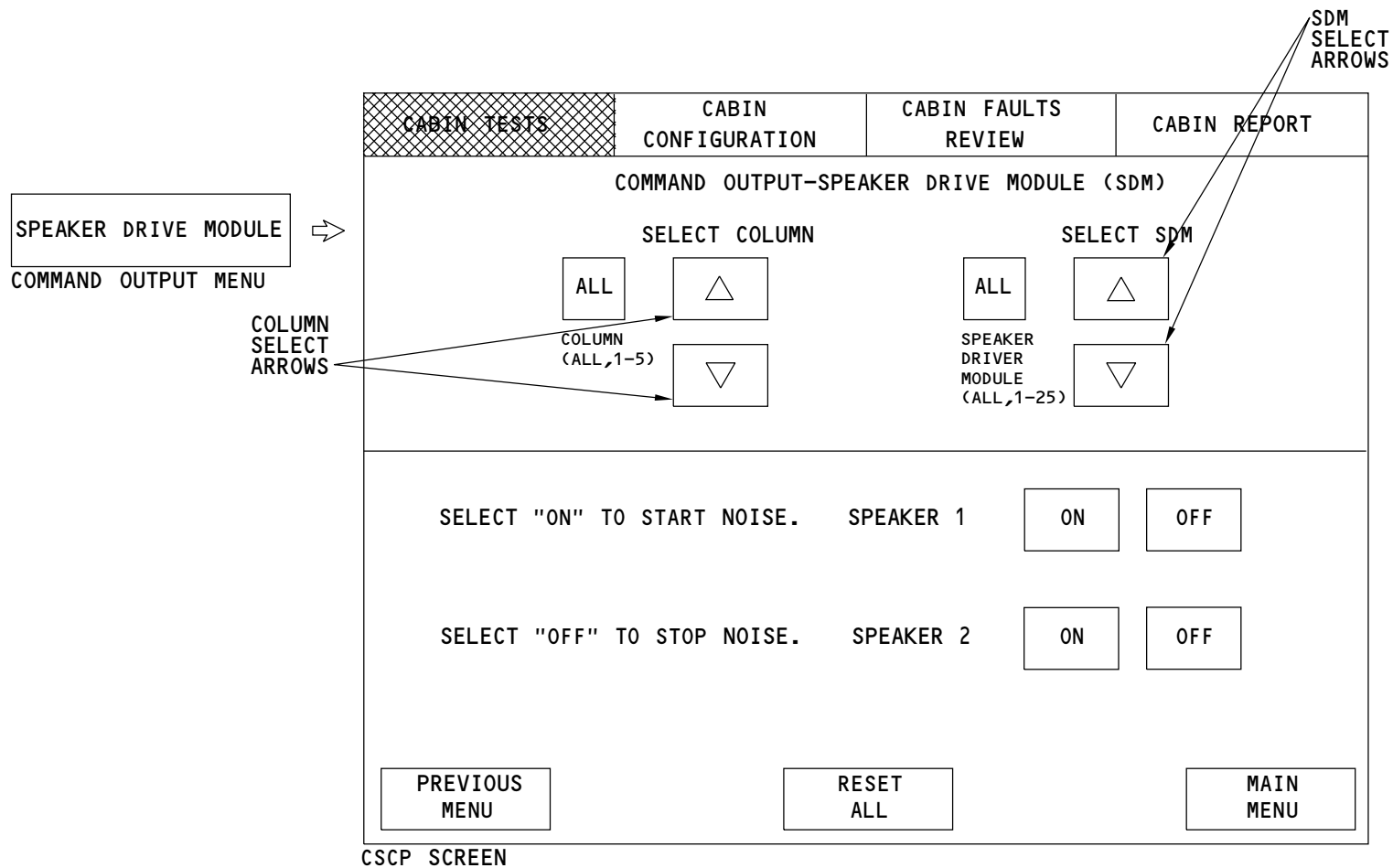
Touch RESET ALL to stop the random noise.

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CSCP SCREEN

PAS - NOISE GENERATION

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**PAS - CABIN TESTS****General**

Use the cabin system control panel (CSCP) to do the cabin test for the passenger address system (PAS).

See the cabin services system (CSS) section for more information about tests (SECTION 23-39).

Quick Test

Use quick test to quickly find major faults. This test does a check of these PAS components:

- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs).

This test collects continuous monitor data for as long as 20 seconds. The CSCP shows the failures.

To start a quick test, touch START QUICK TEST.

All Test

Use all test for a more complete test. All test starts a complete BITE of the system. The screen shows all the failures the BITE finds.

To start an all test, touch START ALL TEST.

Engineering Tests

Use engineering tests for more detailed tests.

Touch ENGINEERING TESTS to show the engineering tests menu.

Lamps Test

The lamps test does not do a test of the PAS.

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
START QUICK TEST ENGINEERING TESTS ... START ALL TEST LAMPS TEST			
MAIN MENU			

CABIN SYSTEM CONTROL PANEL

PAS - CABIN TESTS

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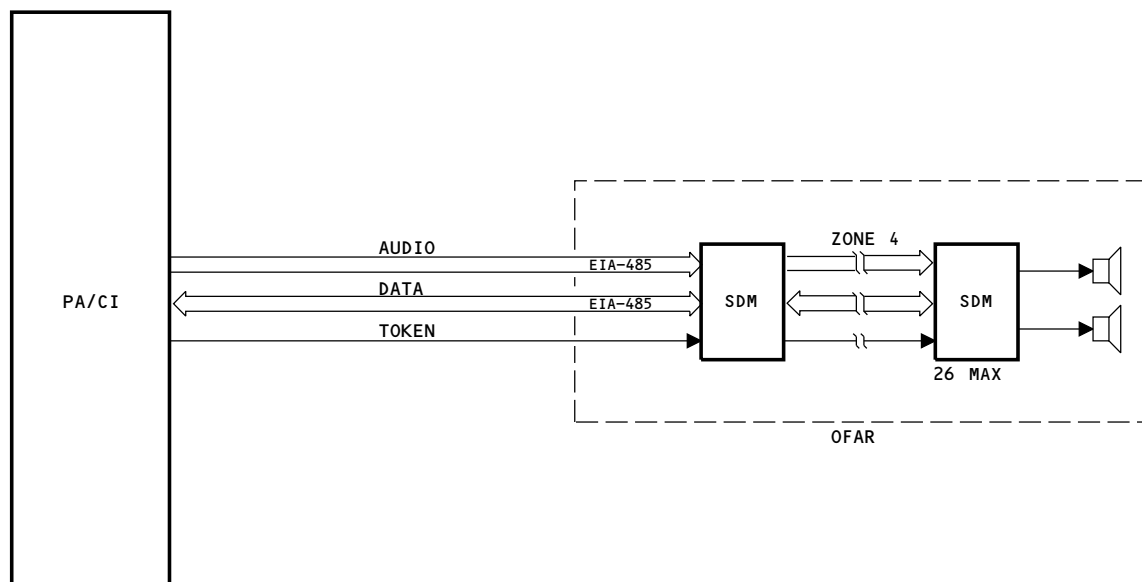


PAS - INTERFACE DIAGRAM

Interface Diagram

This interface diagram is for reference purposes.

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PAS INTERFACE - OFAR

PAS - INTERFACE DIAGRAM

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**PASSENGER SERVICE SYSTEM - INTRODUCTION****Introduction**

The passenger service system (PSS) has these three functions:

- Lets passengers call flight attendants for cabin service
- Gives passengers control of reading lights
- Shows passengers information on cabin signs.

The flight attendants use the PSS to do these functions:

- Turn off passenger to attendant call chimes
- Control passenger reading lights.

Abbreviations and Acronyms

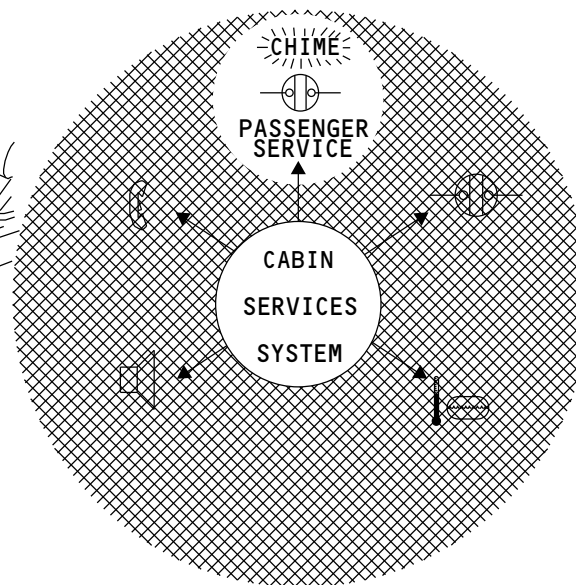
- AIMS - airplane information management system
- CACP - cabin area control panel
- CCP - cabin control panel
- CSS - cabin services system
- CSCP - cabin system control panel
- CSMU - cabin system management unit
- ELMS - electrical load management system
- FSEU - flap/slat electronics unit
- IFE - in-flight entertainment
- I/S BUS - intersystem bus
- OEU - overhead electronics unit
- OPAS - overhead panel ARINC 629 system
- PA/CI - passenger address/cabin interphone
- pax - passenger
- PIS - passenger information sign
- PSEU - proximity sensor electronics unit
- PSS - passenger service system
- PSU - passenger service unit
- ZMU - zone management unit

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PASSENGER SERVICE SYSTEM - INTRODUCTION

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PSS - GENERAL DESCRIPTION

General

The passenger services system (PSS) has head-end and zone interfaces with the in-flight entertainment (IFE) system for PSS functions.

The PSS gets inputs from the left and right systems ARINC 629 buses and flight attendants to control passenger information signs.

The PSS also gets data from passengers to control reading lights and attendant call lights.

The PSS sends configuration database information and status information to the IFE.

Components

These are the main components of the passenger service system (PSS):

- Zone management units (ZMUs)
- Cabin control panels (CCPs)
- Overhead electronics units (OEUs)

These other systems and components connect with the PSS:

- Cabin system management unit (CSMU)
- Passenger address/cabin interphone (PA/CI) controller
- Right and left systems ARINC 629 buses
- Lavatory modules
- Reading and call lights.

Passenger Service/Entertainment On/Off

Attendants may use the CCPs to enable or disable the reading lights and attendant call lights. They may also use a panel to turn off the attendant call and reading lights.

Passenger Information Signs

The PSS gets inputs from other systems to control passenger information signs. The OEUs send signals to control these types of signs:

- Lavatory
- Return to seat
- Fasten seat belts
- No smoking.

Reading Light Control

Passengers use controls at their seat to control reading lights. The reading light selection goes through the IFE seat components to the ZMU. The ZMU sends the on or off signal to an OEU to control the reading light.

Passenger to Attendant Call

Passengers use controls at their seat to call a flight attendant. When the passenger pushes the attendant call button:

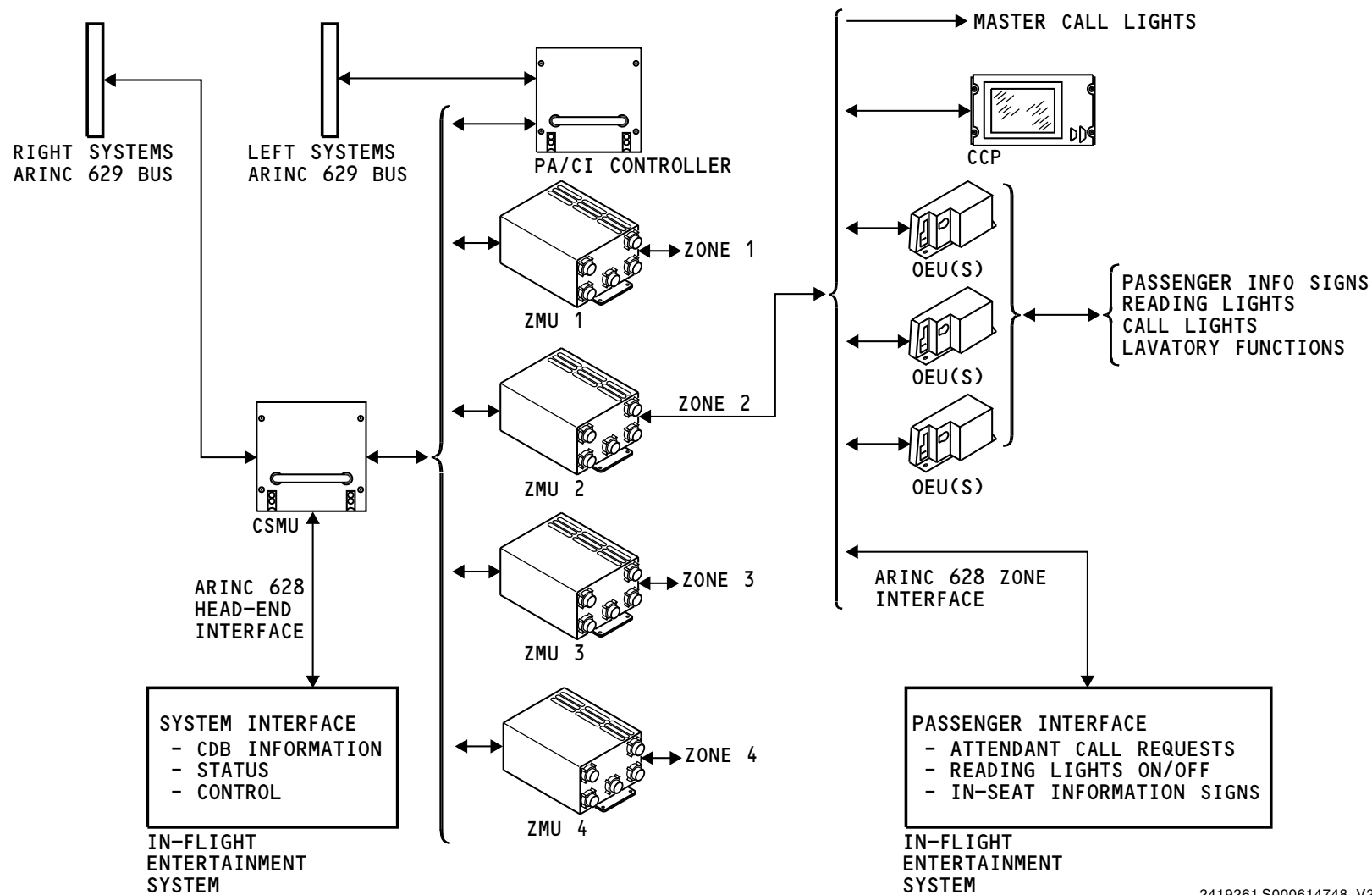
- A row call light in the passenger service unit (PSU) comes on
- A master call light at an attendant station comes on
- The passenger address system makes a chime.

Chime Cut-Off Function

Attendants use the CCPs to disable the chime related to a passenger-to-attendant call. Each CCP controls the chimes in an area identified by the configuration database.

Lavatory Functions

The lavatories connect with OEUs for lavatory to attendant calls and lavatory status signals.



PSS - GENERAL DESCRIPTION

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**PSS - COMPONENT LOCATION****General**

Passenger service system (PSS) components are in the main equipment center and the cabin area.

Cabin Components

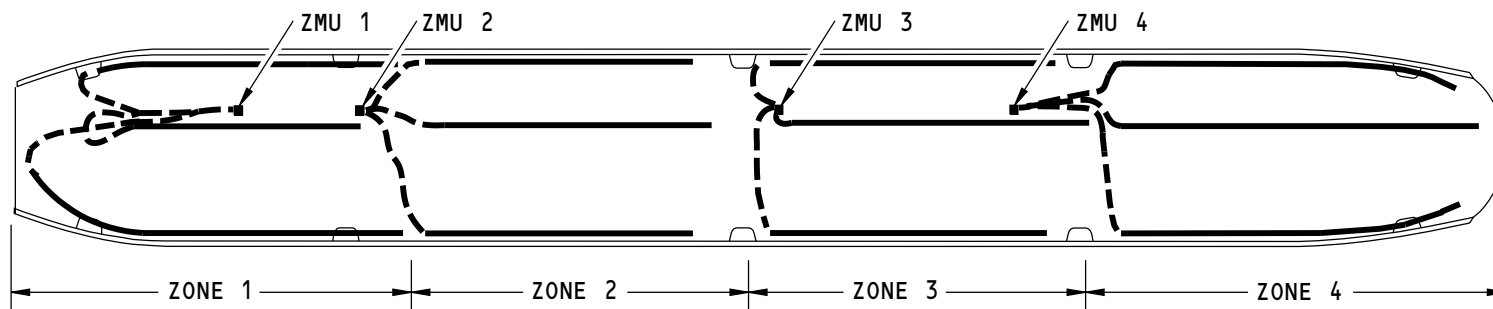
These components are in the cabin:

- Zone management units (ZMUs)
- Overhead electronics units (OEUs)
- Cabin system control panel (CSCP)
- Cabin area control panels (CACPs).

Main Equipment Center

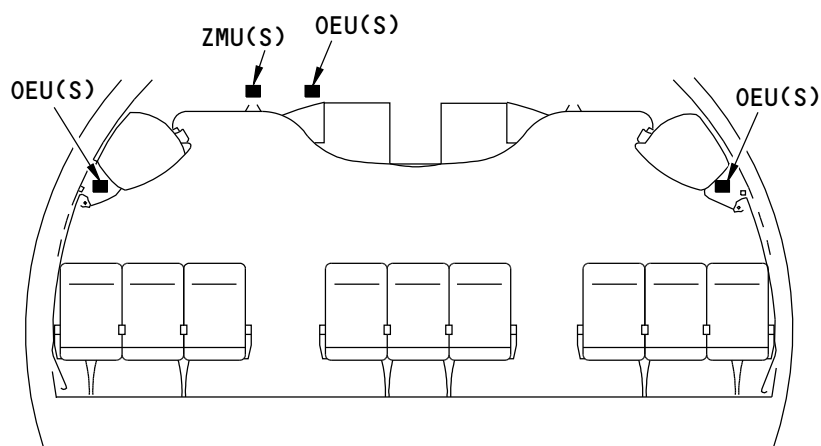
The cabin system management unit (CSMU) and the passenger address/cabin interphone (PA/CI) controller are on the E1-4 shelf in the main equipment center.

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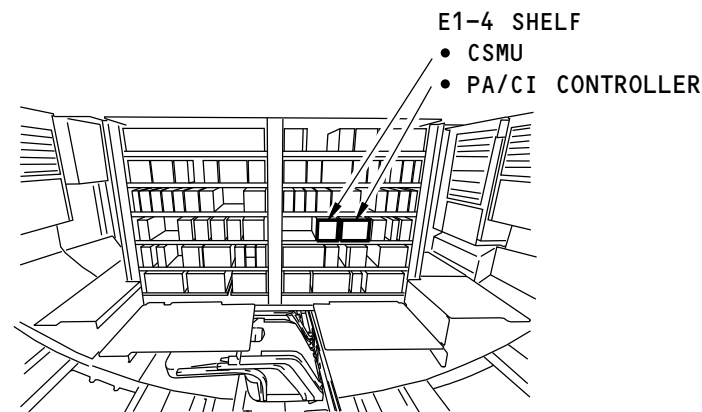


LEGEND:

OEU(S) ———



(VIEW IN THE AFT DIRECTION)



**MAIN EQUIPMENT CENTER
(VIEW IN THE AFT DIRECTION)**

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PSS - COMPONENT LOCATION

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PSS - POWER INTERFACE - ZONE 1**General**

Circuit breakers on the right and left power management panels control power to these zone 1 components:

- Zone management unit (ZMU) 1
- Overhead electronics units (OEU).

The P210 right power management panel has the PAX MASTER CALL LT circuit breaker.

The P110 left power management panel has these components:

- ZONE MGMT UNIT 1 circuit breaker
- OEU ZONE1 XFER BUS circuit breaker
- OEU ZONE1 MAIN BUS circuit breaker.

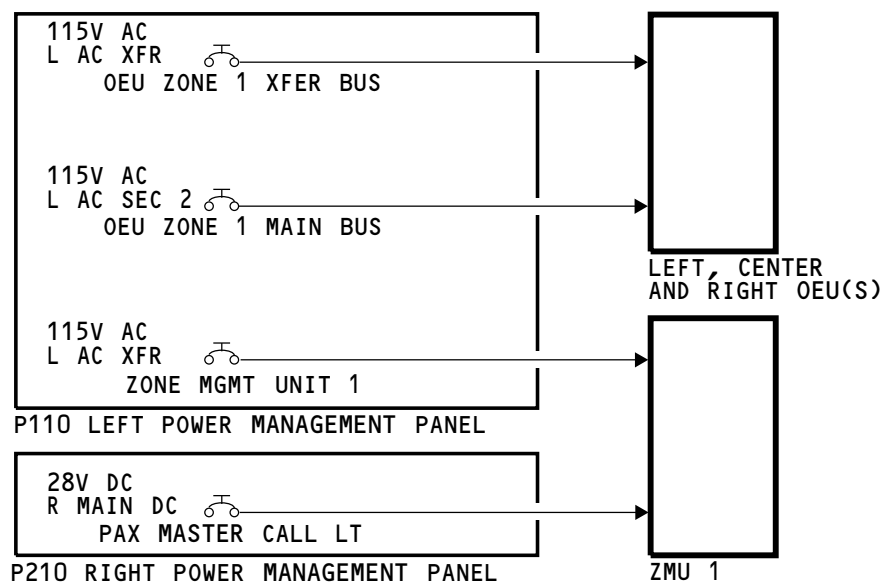
P210 Right Power Management Panel

The PAX MASTER CALL LT circuit breaker connects 28v dc to the ZMU.

P110 Left Power Management Panel

The ZONE MGMT UNIT 1 circuit breaker connects 115v ac to the ZMU.

The OEU ZONE1 XFER BUS and OEU ZONE1 MAIN BUS circuit breakers each connect 115v ac power to all three columns of OEUs.



PSS - POWER INTERFACE - ZONE 1

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PSS - POWER INTERFACE - ZONE 2**General**

Circuit breakers on the right power management panel control power to these zone 2 components:

- Zone management unit (ZMU) 2
- Overhead electronics units (OEUs).

The P210 right power management panel has these components:

- PAX MASTER CALL LT circuit breaker
- ZONE MGMT UNIT 2 circuit breaker
- OEU ZONE2 LEFT MAIN BUS circuit breaker
- OEU ZONE2 CENTER MAIN BUS circuit breaker
- OEU ZONE2 RIGHT MAIN BUS circuit breaker
- OEU ZONE2 XFER BUS circuit breaker.

P210 Right Power Management Panel

The PAX MASTER CALL LT circuit breaker connects 28v dc to ZMU 2. The ZONE MGMT UNIT 2 circuit breaker connects 115v ac to the ZMU.

These circuit breakers each connect 115v ac power to a column of OEUs:

- OEU ZONE2 LEFT MAIN BUS to the left OEUs
- OEU ZONE2 CENTER MAIN BUS to the center OEUs
- OEU ZONE2 RIGHT MAIN BUS to the right OEUs.

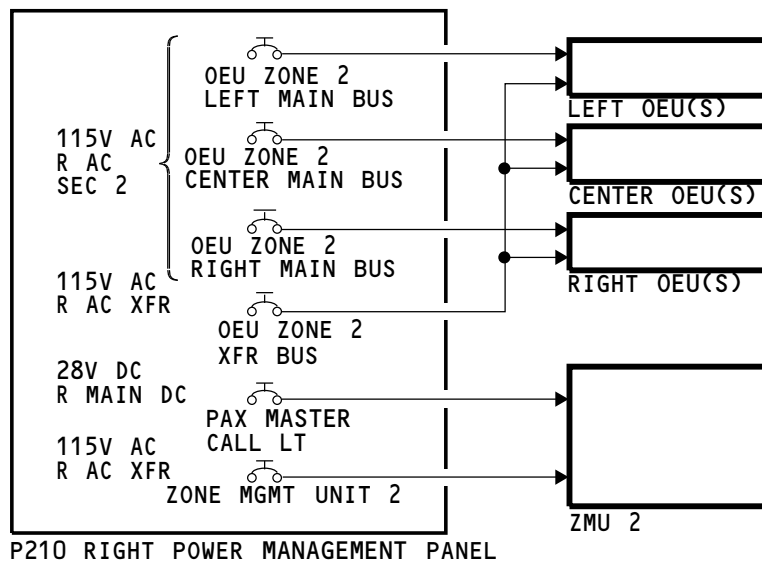
The OEU ZONE2 XFER BUS circuit breaker connects 115v ac power to all of the OEUs in zone 2.

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PSS - POWER INTERFACE - ZONE 2

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PSS - POWER INTERFACE - ZONE 3**General**

Circuit breakers on the left and right power management panels control power to these zone 3 components:

- Zone management unit (ZMU) 3
- Overhead electronics units (OEUs).

The P110 left power management panel has these components:

- ZONE MGMT UNIT 3 circuit breaker
- OEU ZONE3 LEFT MAIN BUS circuit breaker
- OEU ZONE3 CENTER MAIN BUS circuit breaker
- OEU ZONE3 RIGHT MAIN BUS circuit breaker
- OEU ZONE 3 XFER BUS circuit breaker

The PAX MASTER CALL LT circuit breaker is on the P210 right power management panel.

P110 Left Power Management Panel

The ZONE MGMT UNIT 3 circuit breaker connects 115v ac to the ZMU.

These circuit breakers each connect 115v ac power to a column of OEUs:

- OEU ZONE 3 LEFT MAIN BUS to the left OEUs
- OEU ZONE 3 CENTER MAIN BUS to the center OEUs
- OEU ZONE 3 RIGHT MAIN BUS to the right OEUs.

The OEU ZONE 3 XFER BUS circuit breaker connects 115v ac power to all of the OEUs in zone 3.

P210 Right Power Management Panel

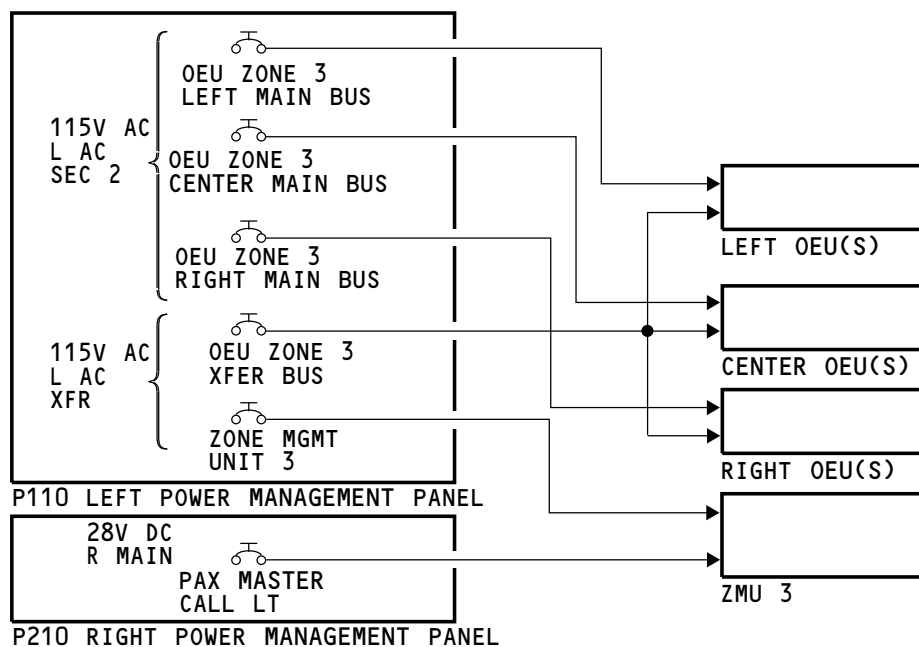
The PAX MASTER CALL LT circuit breaker connects 28v dc to the ZMU.

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PSS - POWER INTERFACE - ZONE 3

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PSS - POWER INTERFACE - ZONE 4**General**

Circuit breakers on the left and right power management panels control power to these zone 4 components:

- Zone management unit (ZMU) 4
- Overhead electronics units (OEUs).

The P110 left power management panel has these components:

- ZONE MGMT UNIT 4 circuit breaker
- OEU ZONE 4 LEFT MAIN BUS circuit breaker
- OEU ZONE 4 CENTER MAIN BUS circuit breaker
- OEU ZONE 4 RIGHT MAIN BUS circuit breaker
- OEU ZONE 4 XFER BUS circuit breaker

The PAX MASTER CALL LT circuit breaker is on the P210 right power management panel.

P110 Left Power Management Panel

The ZONE MGMT UNIT 4 circuit breaker connects 115v ac to the ZMU.

These circuit breakers each connect 115v ac power to a column of OEUs:

- OEU ZONE 4 LEFT MAIN BUS to the left OEUs
- OEU ZONE 4 CENTER MAIN BUS to the center OEUs
- OEU ZONE 4 RIGHT MAIN BUS to the right OEUs.

The OEU ZONE 4 XFER BUS circuit breaker connects 115v ac power to all of the OEUs in zone 4.

P210 Right Power Management Panel

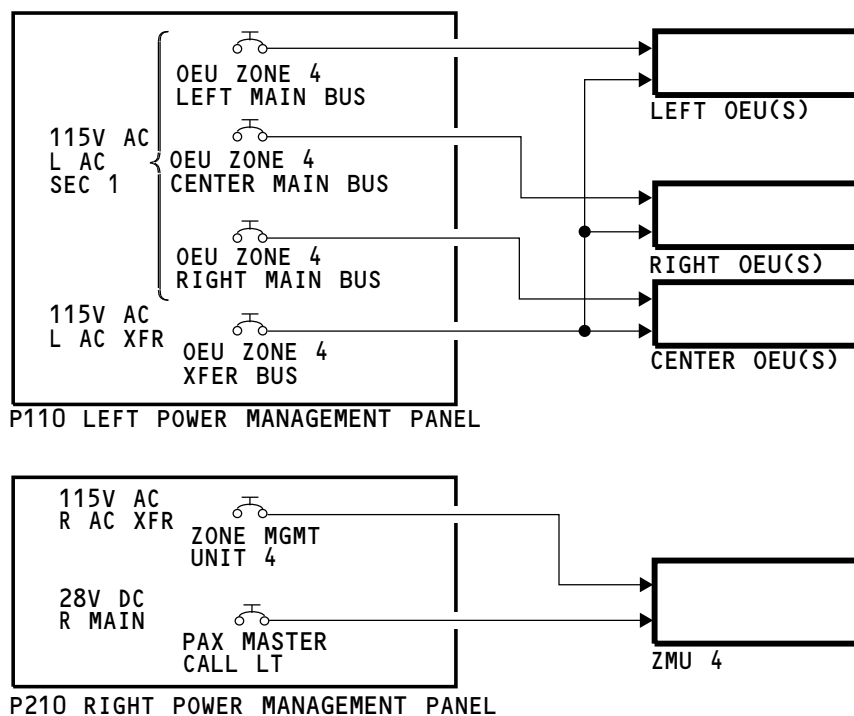
The PAX MASTER CALL LT circuit breaker connects 28v dc to the ZMU.

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PSS - POWER INTERFACE - ZONE 4

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PSS - INTERFACES

General

The passenger service system (PSS) uses an ARINC 629 interface and an in-flight entertainment (IFE) system ARINC 628 head-end interface to get data from other systems. An intersystem (I/S) bus connects the three cabin zones. Other buses connect the other PSS components.

The passenger interface for PSS is through an IFE system ARINC 628 zone interface.

The diagram shows zone 1 interfaces. The other zones are the same.

ARINC 629

The passenger address/cabin interphone (PA/CI) controller connects to the left systems ARINC 629 bus. The cabin system management unit (CSMU) connects to the right systems ARINC 629 bus. The PA/CI and CSMU get data from these systems to control the passenger information signs:

- Airplane information management system (AIMS)
- Electrical load management system (ELMS)
- Overhead panel ARINC 629 system (OPAS)
- Flap/slat electronics unit (FSEU)
- Proximity sensor electronics unit (PSEU).

ARINC 628 Interface

PSS sends smoking area information and a no smoking signal to the IFE system on the ARINC 628 head-end interface.

The passenger interface for PSS is through an ARINC 628 zone interface to the IFE system. PSS gets attendant call requests and reading light inputs. PSS sends reset information and seat call status on the zone interface.

Intersystem Bus

Each of these components connects to the intersystem bus to control PSS functions:

- CSMU

- PA/CI controller
- Zone management units (ZMUs).

The intersystem bus passes through the components it connects. A failure of any component cannot cause a failure of the bus.

Other Buses

The cabin control panel (CCP) sends command signals to the ZMU on a panel bus. The ZMU sends display data to the CCP.

The ZMUs get commands and data from the I/S bus to control data to the OEUs and IFE. Each ZMU has an EIA-485 bus to each column of overhead electronics units (OEUs).

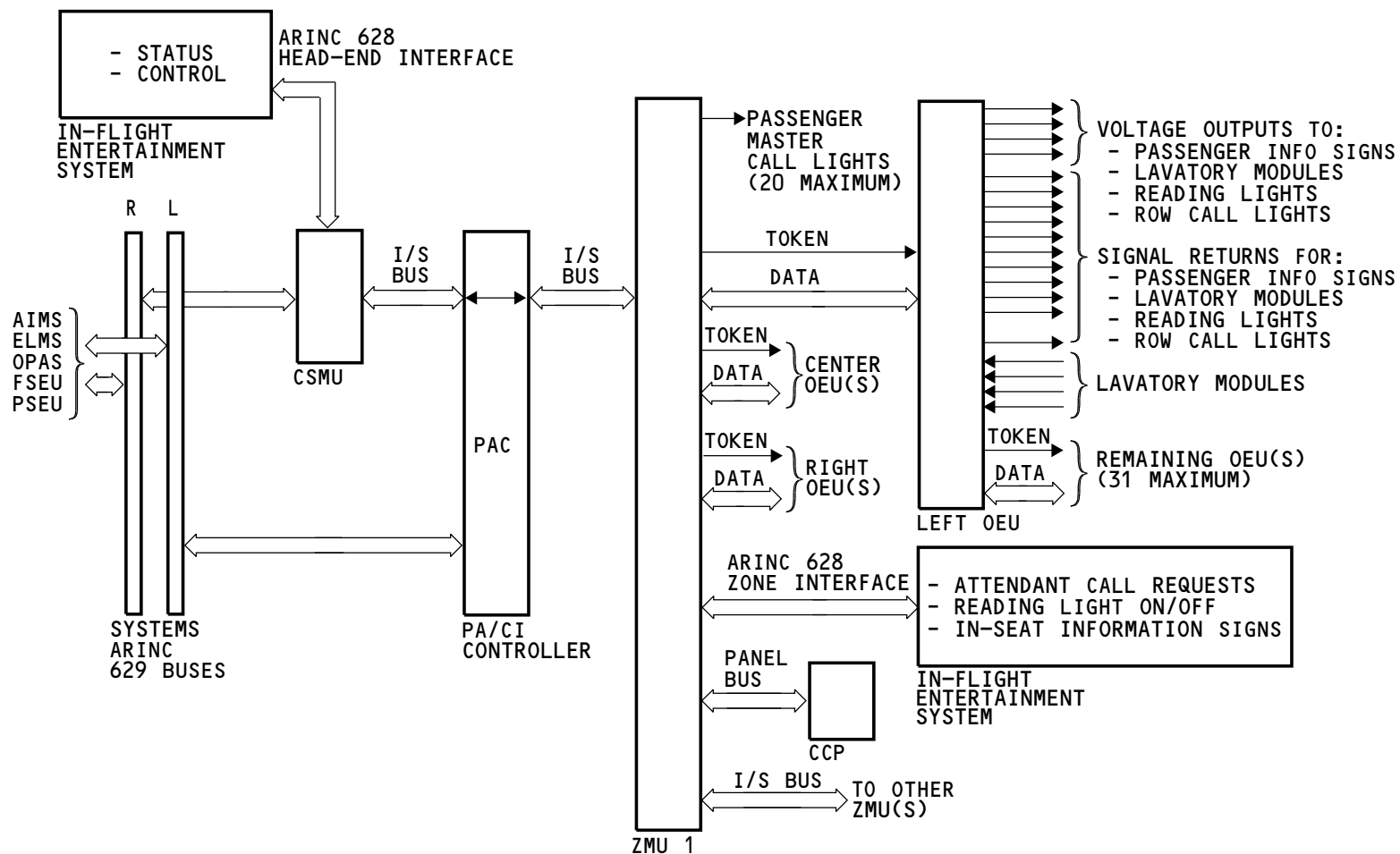
Discretes

Each ZMU can control as many as 20 passenger master call lights. The ZMU also sends a token signal to each column of OEUs for software installation.

Each OEU has four voltage outputs and twelve signal returns. The OEU controls the signal returns for these passenger service items:

- Passenger information signs
- Return to seat and lock door signs in the lavatories
- Reading lights
- Row call lights.

Each OEU has four inputs to monitor signals from lavatory modules.



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PSS - INTERFACES

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PSS - OVERHEAD ELECTRONICS UNIT**General**

The overhead electronics units (OEU) control these components:

- Reading lights
- Call lights
- Passenger information signs.

They also monitor signals from lavatories and waste tanks.

Physical Description

The OEU weighs 1.7 pounds. It has these dimensions:

- Length - 8.7 inches
- Width - 2.75 inches
- Height - 4 inches.

The OEU has three connectors. J1 is the voltage and data bus input/output. It receives data from the ZMU or another OEU and sends it to the next OEU through the same connector. For correct operation, install a jumper plug when you remove an OEU.

J2 provides voltage and signal outputs.

J3 provides voltage and signal outputs and gets discrete inputs.

Functional Description

The OEUs change 115v ac power to these voltages:

- 28v ac for lavatory and passenger information signs
- 12v ac for reading lamps
- 5v ac for row call lights.

The OEUs get signals from the ZMU to control these PSS related items:

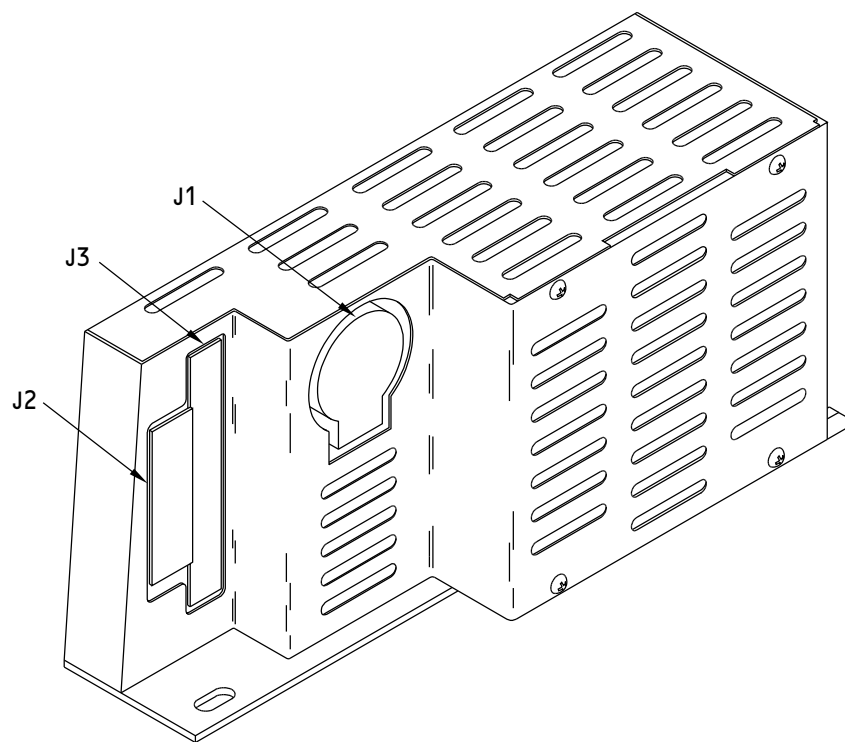
- Reading lights
- Call lights
- Passenger information signs.

The OEUs monitor lavatory-to-attendant calls and door latch discretes from the lavatory modules.

These systems and components also connect to OEUs:

- Lavatory and crew rest smoke detectors
- Water and waste system
- Cabin lighting system.

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PSS - OVERHEAD ELECTRONICS UNIT

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**PSS - OEU INSTALLATION - PASSENGER SERVICE UNITS****General**

There are overhead electronics units (OEUs) above the right center storage bins and in the outboard passenger service units (PSUs). There are also OEUs in other cabin locations. Three screws attach the OEU to a panel.

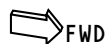
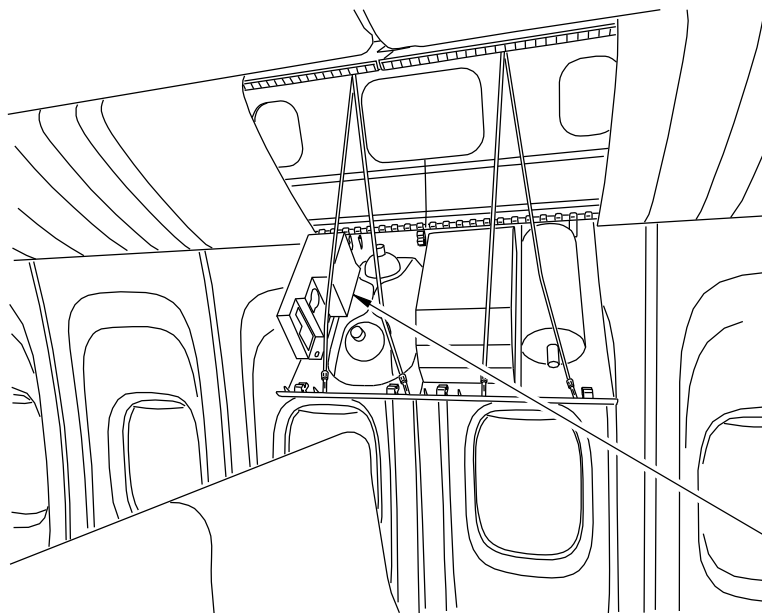
Center OEUs

The Center PSU Overhead Electronics Units (OEU) are above the ceiling, installed on the right side of the center storage bin support structure.

Outboard PSU

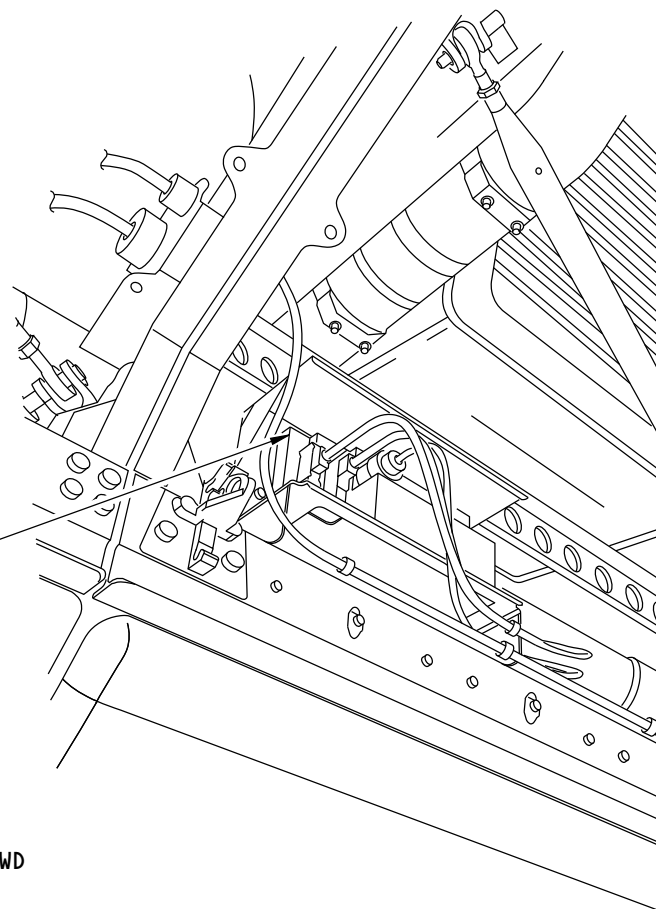
The left and right OEUs are on outboard PSUs.

Release the panel latches and lower the PSU. The OEU is on the PSU panel.



OUTBOARD PSU
(EXAMPLE)

OVERHEAD
ELECTRONIC
UNIT



OVERHEAD ELECTRONIC UNIT FOR CENTER PSU
(EXAMPLE)

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PSS - OEU INSTALLATION - PASSENGER SERVICE UNITS

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**PSS - OEU INSTALLATION - LAVATORIES AND LOWERED CEILING AREAS****General**

There are overhead electronics units (OEUs) in these locations:

- Each lavatory
- Above each passenger door
- Some lowered ceiling panels.

The diagram shows a typical lavatory and typical door area with lowered ceiling panels.

Lavatories

The lavatory OEUs mount to a passenger service unit (PSU) rail adjacent to the lavatory.

Training Information Point

You must remove ceiling panels adjacent to the lavatory to get to the OEU.

Overdoor Panels

Panels over each passenger door have an OEU.

Release the latches of the overdoor panel and lower it to get access to the OEU.

Lowered Ceiling Panels

The flight deck aisle access panel (near door 1 left) and a lowered ceiling panel at door 4 left have OEUs.

Training Information Point

Lower the flight deck aisle access panel to get access to the OEUs in the door 1 area.

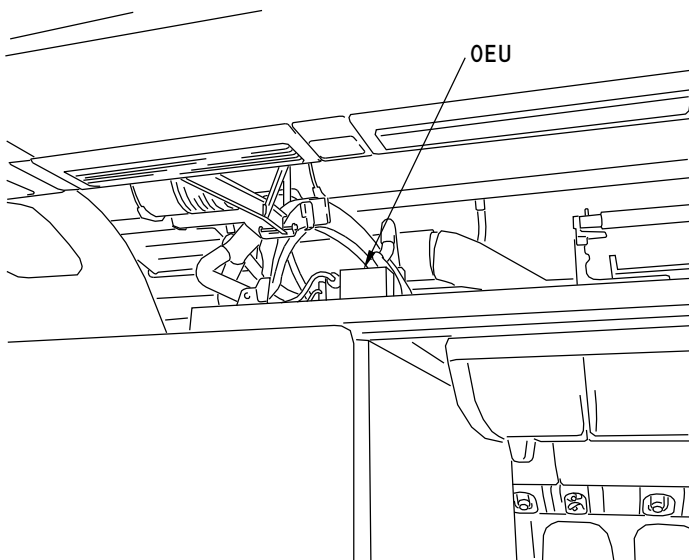
Release the latches of the door 4L overdoor panel and lower it to get access to the OEU on the lowered ceiling panel.

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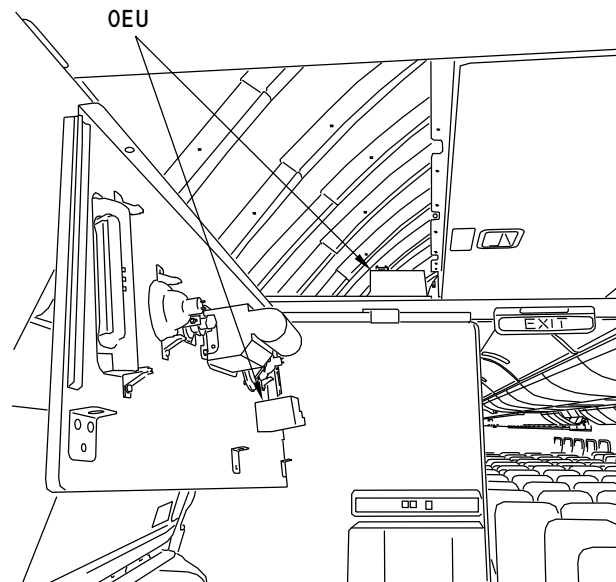
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TYPICAL LAVATORY MODULE



TYPICAL LOWERED CEILING AND OVERDOOR PANEL

PSS - OEU INSTALLATION - LAVATORIES AND LOWERED CEILING AREAS

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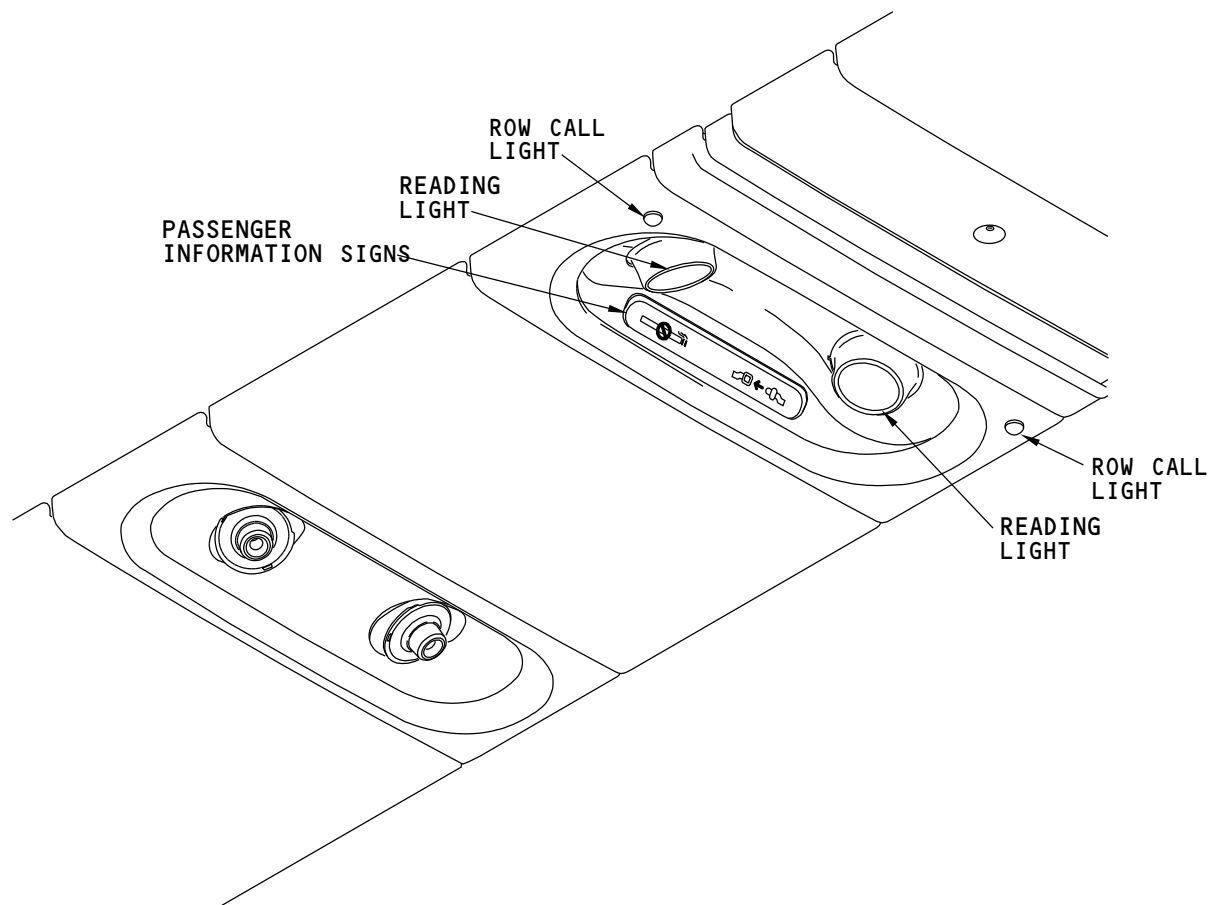
PSS - PASSENGER SERVICE UNIT

General

The passenger service unit (PSU) has these passenger service system items:

- Row call lights
- Reading lights
- Passenger information signs.

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PSS - PASSENGER SERVICE UNIT

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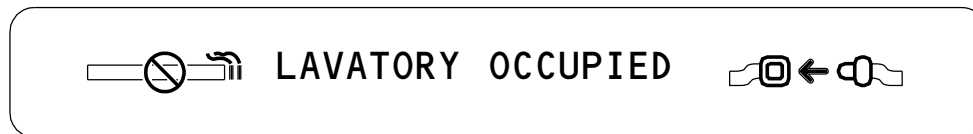
PSS - PASSENGER INFORMATION SIGNS

General

The passenger information signs show passengers these PSS conditions:

- No smoking
- Lavatory occupied
- Fasten seat belt.

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TYPICAL PASSENGER INFORMATION SIGN

PSS - PASSENGER INFORMATION SIGNS

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PSS - TYPICAL LAVATORY COMPONENTS

General

These lavatory components send and get signals through an overhead electronics unit (OEU):

- Lavatory call light/reset switch
- Return to seat sign
- Lavatory call switch
- Lock door sign
- Lavatory door latch.

Lavatory Call Light/Reset Switch

The lavatory call light comes on when you push the lavatory call switch. Attendants push this light/switch to cancel lavatory calls.

Return to Seat Sign

The return to seat sign comes on when the fasten seat belt signal is active and cabin pressure is normal.

Lavatory Call Switch

Passengers use the lavatory call switch to call an attendant. The lavatory call switch makes the PSS do these things:

- The lavatory call light outside the lavatory comes on
- A lavatory master call light at an attendant station comes on
- A signal goes to the passenger address system for a chime.

Lock Door Sign

The lock door sign is on when the lavatory door is not locked.

Lavatory Door Latch

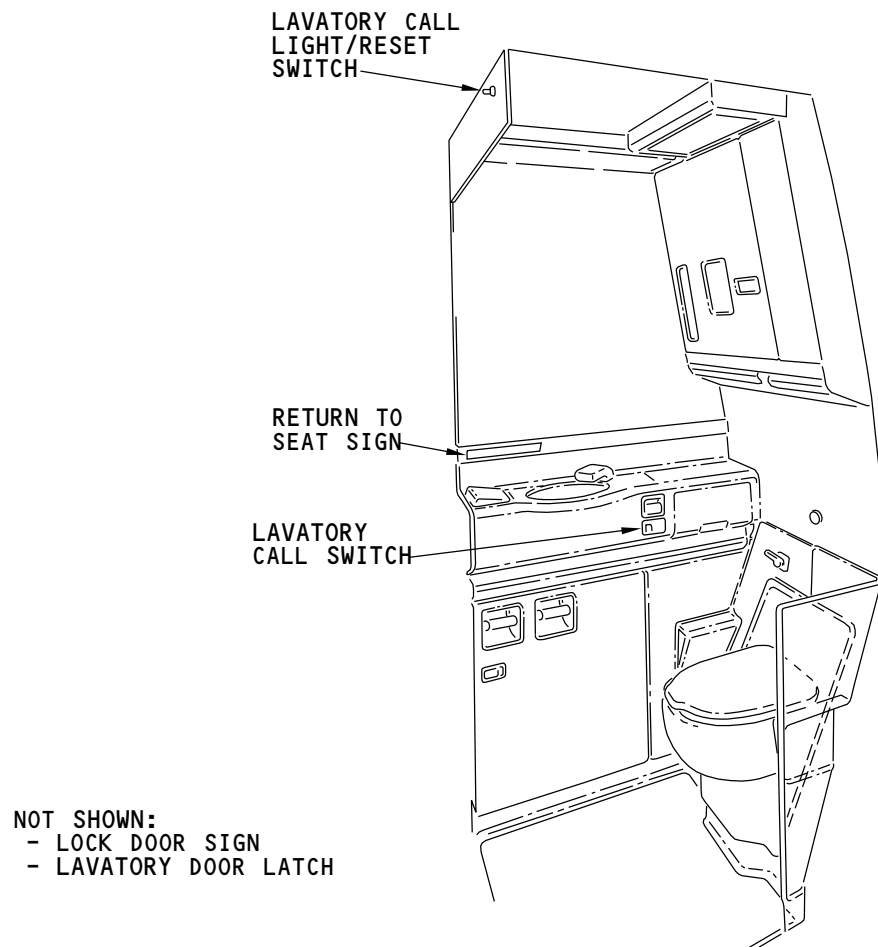
The lavatory door latch sends a signal to the PSS to make the lock door sign go off and a lavatory occupied sign come on.

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PSS - TYPICAL LAVATORY COMPONENTS

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PSS - CONFIGURATION DATABASE PROGRAMMED ITEMS

General

The cabin service system (CSS) configuration database supplies details of the CSS operation. For the PSS, the database gives configuration data for these items:

- Master call light assignments
- Row call light assignments
- Lavatory call light assignments
- Reading light assignments
- Chime mute areas
- Passenger information sign control
- Panels for PSS on/off control
- OEU configuration.

Master Call Light Assignments

A passenger-to-attendant call or lavatory call makes a master call light come on. The configuration database specifies which master call lights come on in an area.

Row and Lavatory Call Light Assignments

The database specifies the relation of the attendant call button on each passenger control unit and the adjacent row call light on a passenger service unit.

The database also specifies which lavatory call light comes on when a passenger makes a call from a lavatory.

Reading Light Assignments

When a passenger pushes a reading light switch on the passenger control unit (PCU), a reading light comes on. The configuration database specifies which reading light comes on or goes off.

Chime Mute Areas

The configuration database specifies the chime mute areas for cabin control panels (CCPs).

Passenger Information Sign Control

The database specifies the conditions that control all of the passenger information signs.

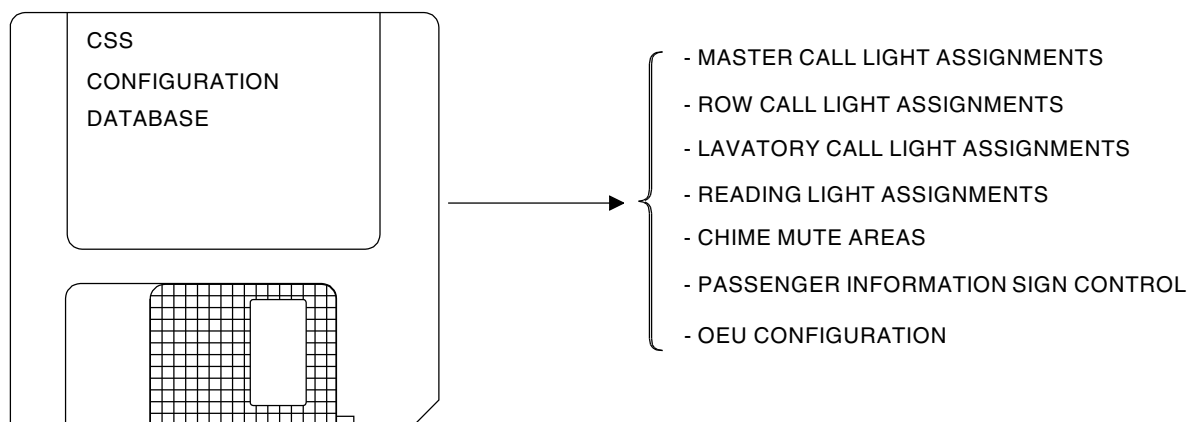
Panels for PSS On/Off Control

The configuration database specifies which control panels can turn the passenger service system on and off.

OEU Configuration

The database specifies how many OEUs are in each column. It also tells which components connect to each OEU.

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PSS - CONFIGURATION DATABASE PROGRAMMED ITEMS

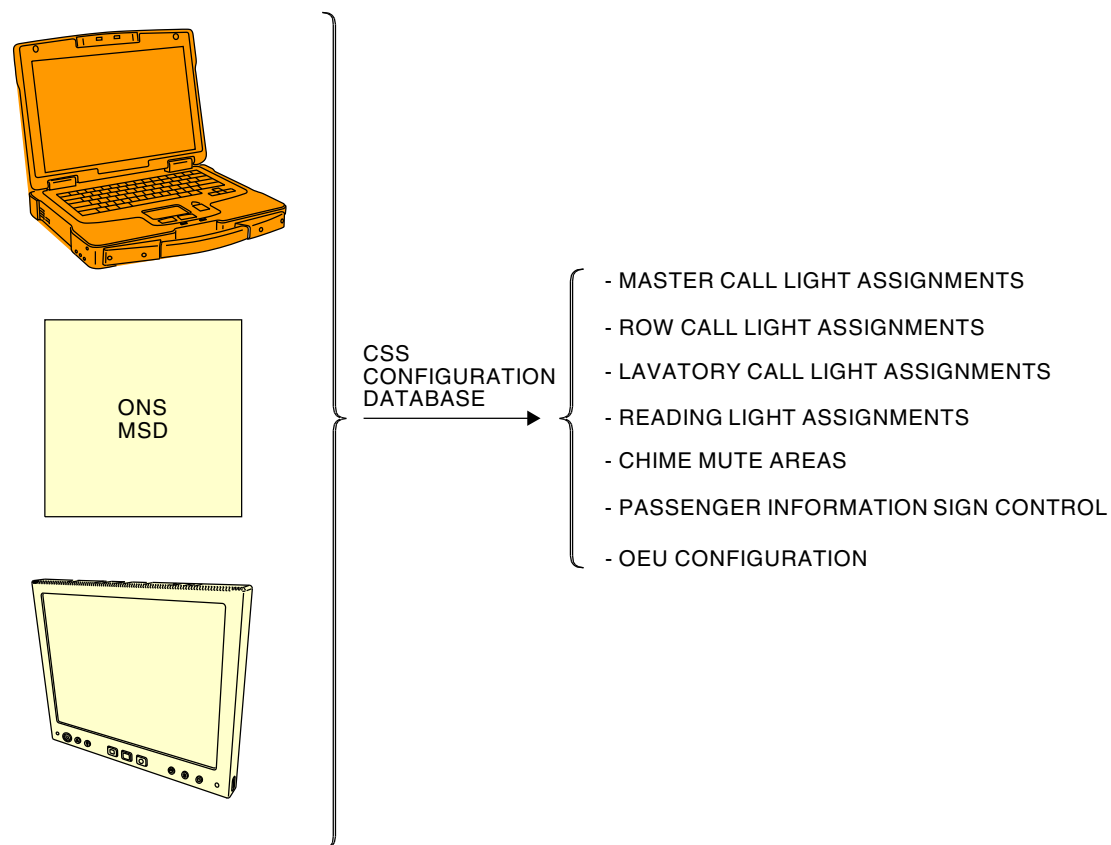
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PSS - CONFIGURATION DATABASE PROGRAMMED ITEMS

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May 05/2018

**PSS - ZONE MANAGEMENT UNIT - FUNCTIONAL DESCRIPTION****General**

The zone management units (ZMUs) make master call lights come on and go off. The ZMUs use the configuration database to control data to and from these units:

- A cabin area control panel (CACP) - 10 base T data
- All in-flight entertainment (IFE) system components in a zone - EIA-485 data
- All OEUs in a zone - EIA-485 data.

Discretes

Each ZMU can control as many as 20 PSS master call lights. The location of the ZMU and the configuration database specifies which master call lights a ZMU controls. The ZMU uses 28v dc from the right main bus to turn on the lights.

Intersystem Bus

The ZMU uses a 10 base 2 bus interface to get no smoking and fasten seat belt on/off signals from the intersystem (I/S) bus. The cabin system management unit (CSMU) sends the ZMU configuration database and operational software data on this bus when necessary. A jumper wire in the connector to ZMU 3 terminates the intersystem bus.

The ZMU also uses the I/S bus to send signals to the passenger address system for chimes.

Panel Bus

Each ZMU has a 10 base T bus interface for a cabin control panel (CCP). Attendants use the CCP to control these PSS functions:

- Smoking areas
- Chime cutoff areas
- Passenger reading lights
- Lavatory inoperative signs
- PSS on/off.

The ZMU sends active passenger-to-attendant calls and lavatory waste tank status to the CCP.

EIA-485 Bus Data

Each ZMU has an EIA-485 bus interface for each column of OEUs.

The IFE system sends passenger-to-attendant call and reading light on/off selections to the ZMU.

The ZMU sends data to the OEUs to control:

- Attendant call and reading lights
- Lavatory information signs
- Passenger information signs.

The ZMU gets lavatory data from OEUs on the lavatory modules.

Token Interfaces

When you install software, the ZMUs send a token signal to an OEU. This signal enables units to accept the software installation data on the data bus.

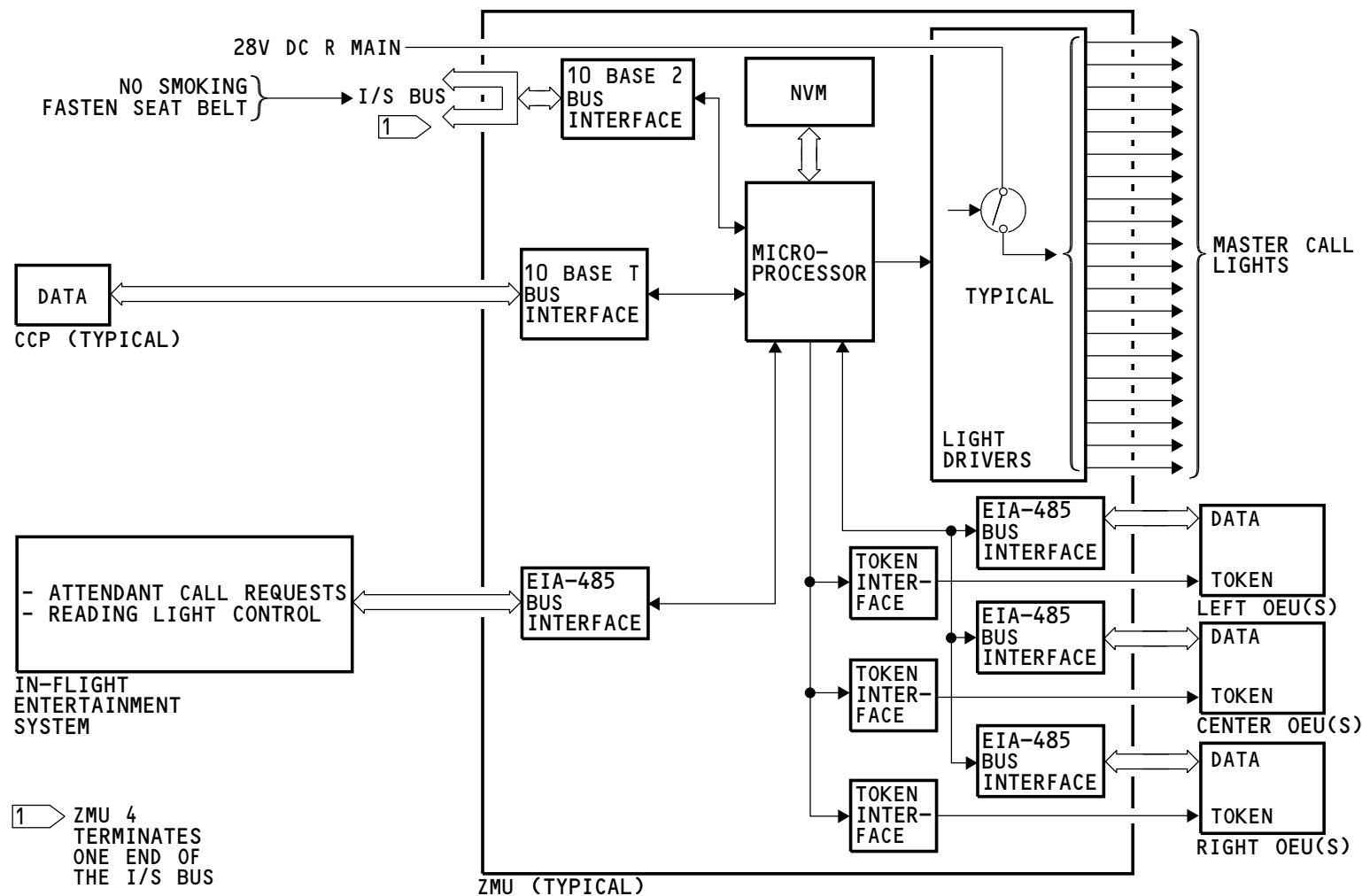
The OEUs get the signal from a token interface in the ZMU.

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PSS - ZONE MANAGEMENT UNIT - FUNCTIONAL DESCRIPTION

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May 05/2017

PSS - OVERHEAD ELECTRONICS UNIT - FUNCTIONAL DESCRIPTION

General

The overhead electronics units (OEU) send data to and get data from an EIA-485 data bus. The zone management unit (ZMU) transmits and receives data from all OEUs in a zone.

The OEUs send discretes to and get discretes from these units:

- lavatory modules
- Passenger information signs
- Reading light panels.

OEUs also send discretes to and get discretes from other systems:

- Water and waste system
- Cabin lighting system
- Smoke detection system for lavatory and crew rest areas.

The configuration database and location of the OEU specifies which discretes each OEU controls.

Data

The OEUs control light driver circuits with data from the ZMU on the EIA-485 data bus. The OEUs send monitored discrete condition and failure status to the ZMU.

The ZMU gets data from other cabin services system (CSS) components and sends it to the OEUs. OEUs use this data to control lights. The ZMU gets data from these items:

- Intersystem bus
- Cabin control panel (CCP)
- Passenger reading light and attendant requests from the in-flight entertainment (IFE) system.

The ZMU gets configuration database and operational software data from the intersystem bus and sends it to the OEUs when necessary.

The first OEU of each column gets a token signal from the ZMU. The OEUs use this signal for software installation.

Discrete Inputs

An OEU can have as many as four discrete and two analog inputs. The passenger service system monitors inputs from the waste tank logic control modules and the lavatory modules.

The waste tank logic control module sends a signal to an OEU when the waste tank for a lavatory group is full. The OEU sends this data to the ZMU. The ZMU then sends a signal to the correct OEU to make a LAV INOP sign come on.

The lavatory module gets a discrete return from an OEU. The lavatory connects the return to the OEU when any of these are set:

- Call switch
- Call reset switch
- Door latch.

The OEU uses the door latch discrete to control the LOCK DOOR and LAV OCCUPIED signs. The LAV OCCUPIED sign comes on only when all lavatory doors in an area are locked. The configuration database specifies the lavatories in an area.

The OEU controls the attendant call light and call reset light with the call switch and call reset switch signals.

Outputs

The configuration database tells each OEU which outputs to use. OEUs can send signals to these units:

- Passenger information signs
- Lavatory modules
- Reading light panels.

Each OEU has these light driver circuits:

- Six high current outputs - for the lavatory indication lights in passenger information signs or for reading lights

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**PSS - OVERHEAD ELECTRONICS UNIT - FUNCTIONAL DESCRIPTION**

- Four medium current outputs - for the no smoking and fasten seat belt signs and for the return to seat and lock door signs in the lavatories
- Two low current outputs - for the call and call reset lights in the lavatories or for row call lights.

The OEUs change 115v ac from the transfer bus to two 28v ac lamp voltage supplies. One output goes to the lavatory module. The other output goes to the passenger information signs and the no smoking/fasten seat belt lights in the reading light panel.

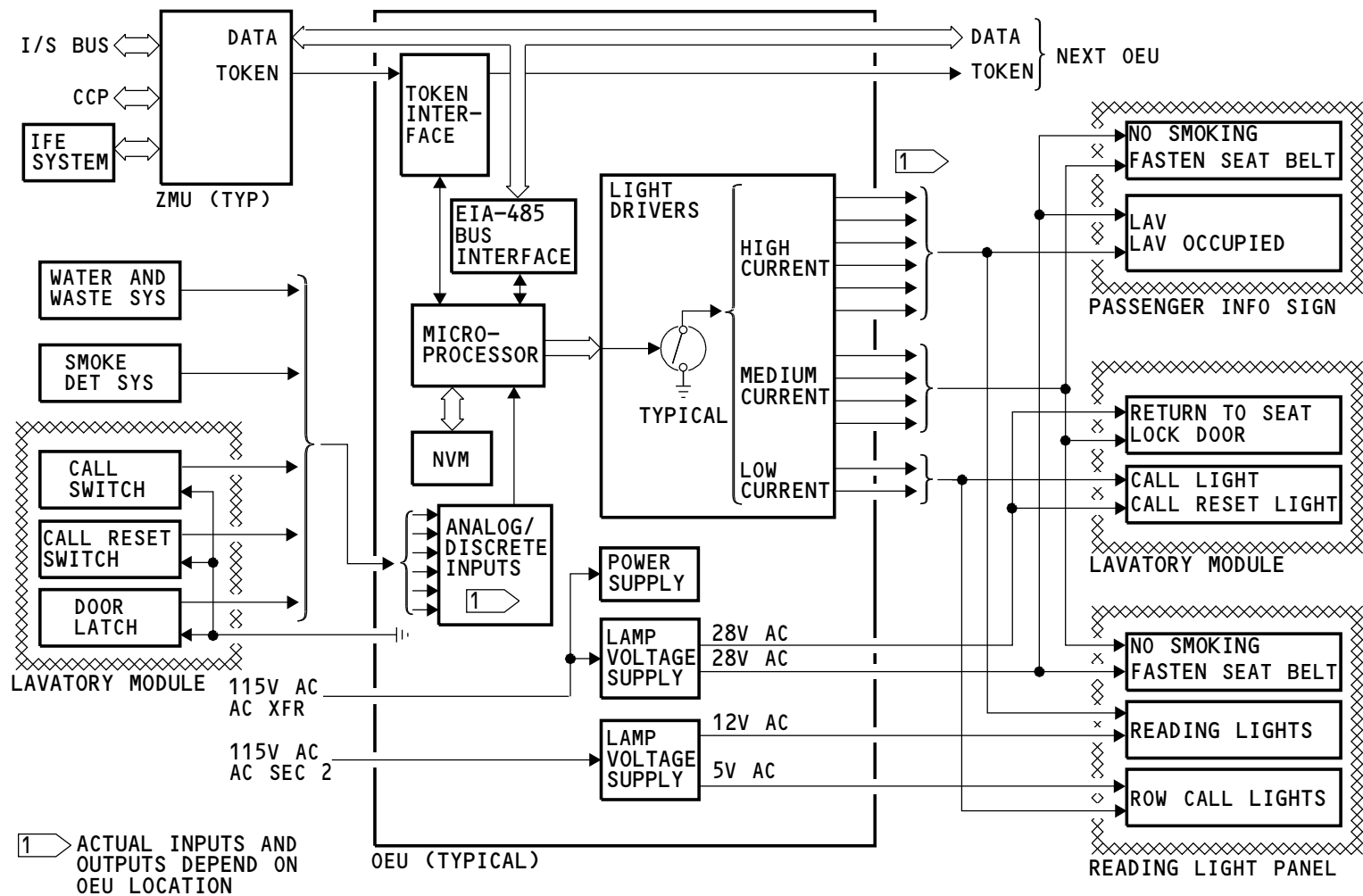
The OEUs change 115v ac from the main bus to 5v ac for row call lights and 12v ac for the reading lights.

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PSS - OVERHEAD ELECTRONICS UNIT - FUNCTIONAL DESCRIPTION

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PSS - PASSENGER INFORMATION SIGN LOGIC

General

The passenger address/cabin interphone (PA/CI) controller controls the data for the passenger information signs. It gets information from these units on the left systems ARINC 629 bus:

- Airplane information management system (AIMS) - airplane altitude and cabin pressure data
- Electrical load management system (ELMS) - passenger oxygen deployed signals
- Flap/slat electronics unit (FSEU) - flap handle position
- Overhead panel ARINC 629 system (OPAS) - flight deck no smoking and seat belts selector positions
- Proximity sensor electronics unit (PSEU) - landing gear position.

If the PA/CI fails, the cabin system management unit (CSMU) controls the data for the passenger information signs. The CSMU uses the same data from the right systems ARINC 629 bus.

The PA/CI controller or CSMU sends passenger information sign on/off commands to the ZMUs on the intersystem bus.

Fasten Seat Belt

The fasten seat belt signs come on when the flight crew sets the seat belts selector on the flight deck passenger signs module to ON.

The fasten seat belt signs also come on when the flight crew sets the seat belts selector to AUTO and any one of these conditions occur:

- Passenger oxygen is deployed
- The landing gear is not up and locked
- The flap lever is not in the retracted position
- Airplane altitude is below 10,300 feet (input from the configuration database)
- Cabin altitude is above 10,000 feet.

The fasten seat belt signs also come on if the passenger oxygen is deployed.

Return to Seat

The return to seat signs in the lavatories come on when the fasten seat belt signs come on. They do not come on if passenger oxygen is deployed.

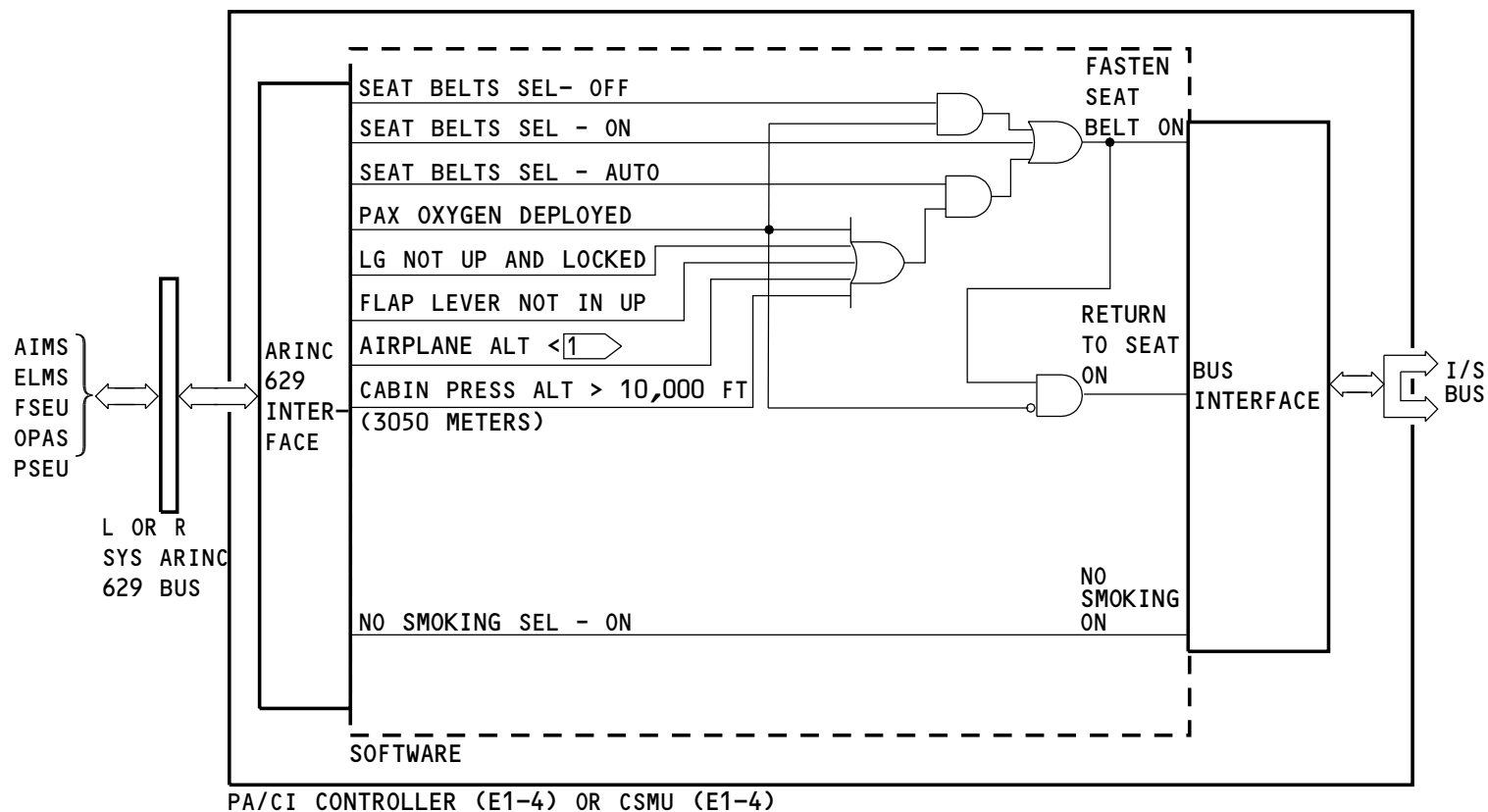
No Smoking

All of the no smoking signs are set to be on all of the time.

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1 ALTITUDE SET BY THE CONFIGURATION DATABASE
(10,300 FEET, 3142 METERS TYPICAL VALUE)

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PSS - PASSENGER INFORMATION SIGN LOGIC

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**PSS - OPERATION - CABIN CONTROLS MAIN MENU SCREEN****General**

Attendants use the cabin controls main menu on the cabin system control panel (CSCP) or cabin area control panels (CACPs) to select screens that control PSS functions. Touch any one of these to show PSS related screens:

- LIGHTING
- SERVICE CALL/CHIME CONTROL
- SMOKING ASSIGNMENTS.

Access

Touch CABIN CONTROLS on the CSCP main menu to show this screen.

On the CACP, the cabin controls main menu is the highest level menu. It shows automatically when you apply power to the CSS.

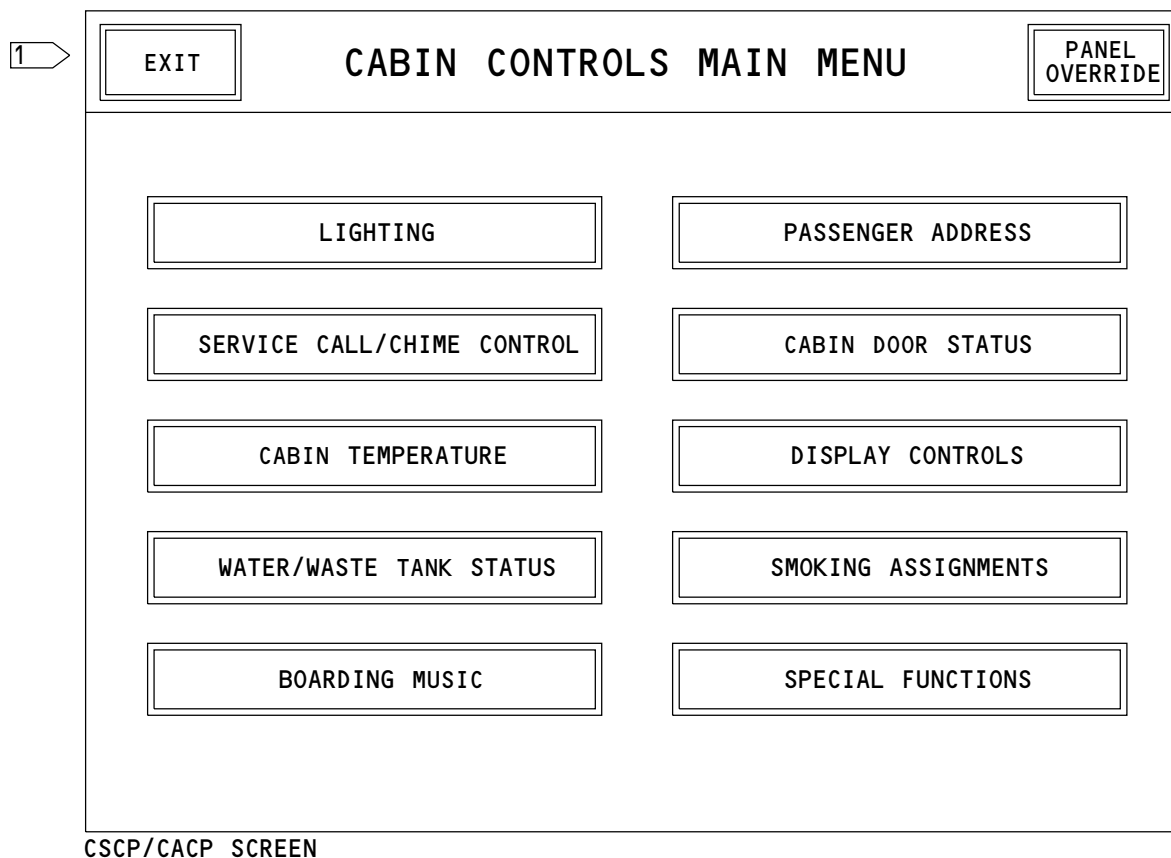
The CACPs do not have the EXIT selection.

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1 THE EXIT SELECTION
IS NOT ON THE CACP.

PSS - OPERATION - CABIN CONTROLS MAIN MENU SCREEN

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**PSS - OPERATION - LIGHTING MENU SCREEN****General**

Attendants use the lighting menu on the cabin system control panel (CSCP) or cabin area control panels (CACPs) to select the reading lights control screen.

Access

Touch the LIGHTING selection on the cabin controls main menu to show this screen.

Controls and Indications

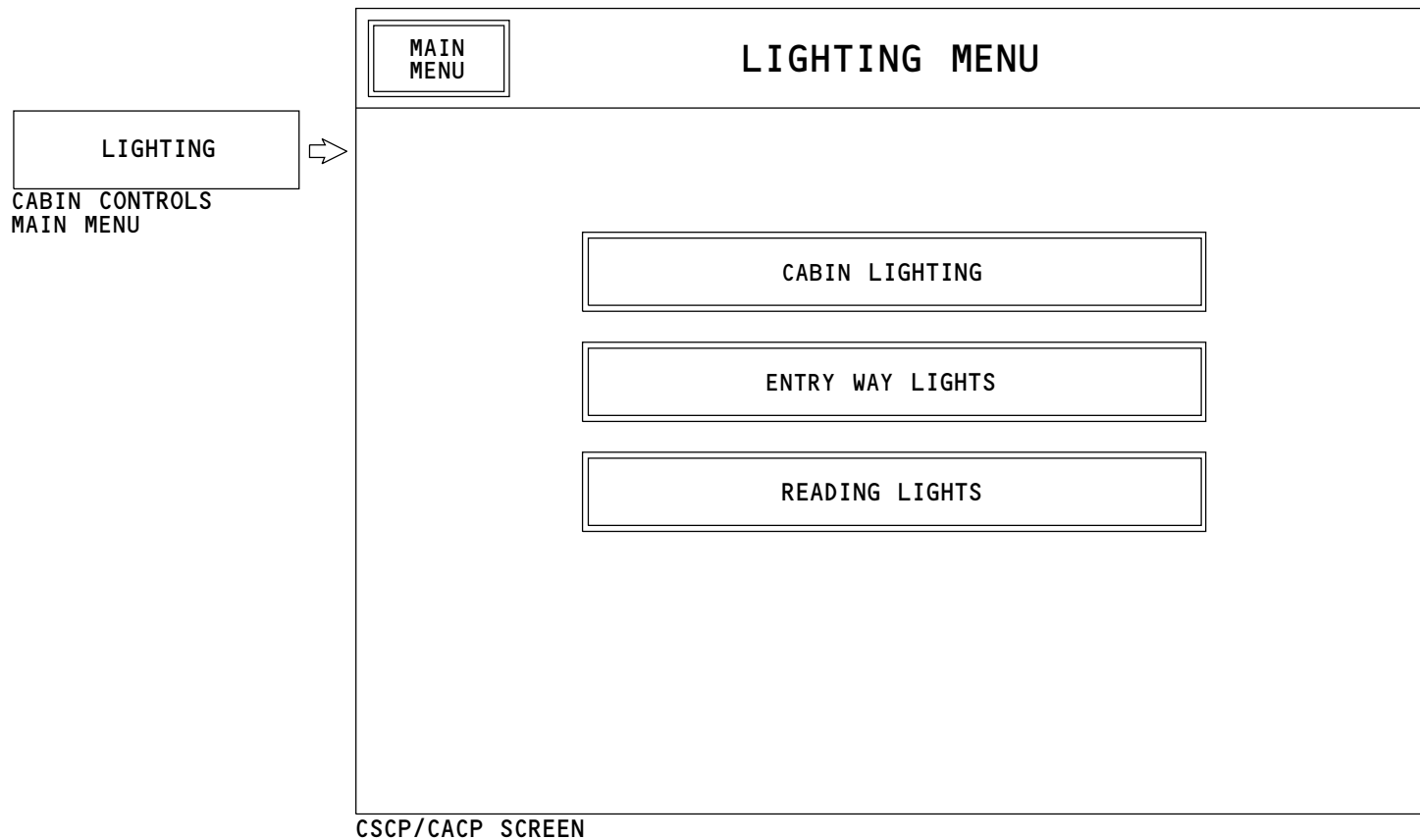
Touch READING LIGHTS to show the screen you use to control passenger reading lights.

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PSS - OPERATION - LIGHTING MENU SCREEN

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**PSS - OPERATION - READING LIGHTS SCREEN****General**

You use the reading lights screen to control the passenger reading lights.

Access

Touch LIGHTING on the cabin controls main menu. Then touch READING LIGHTS to show the reading lights screen.

Controls and Indications

Use the left and right arrows to select the cabin area. The space between the arrows shows the selected cabin area description.

Use the selections below the cabin area description to control the reading lights.

Latched Mode Operation

Touch NORMAL to let the passengers control their reading lights.

Touch OFF or ON to turn all reading lights in the selected area off or on. The screen selection shows green and the reading lights stay in the commanded mode until you make another selection.

Momentary Mode Operation

Touch ON or OFF to turn all reading lights in the selected area on or off. The screen selection changes to green for one-half second and the reading lights go to the commanded mode.

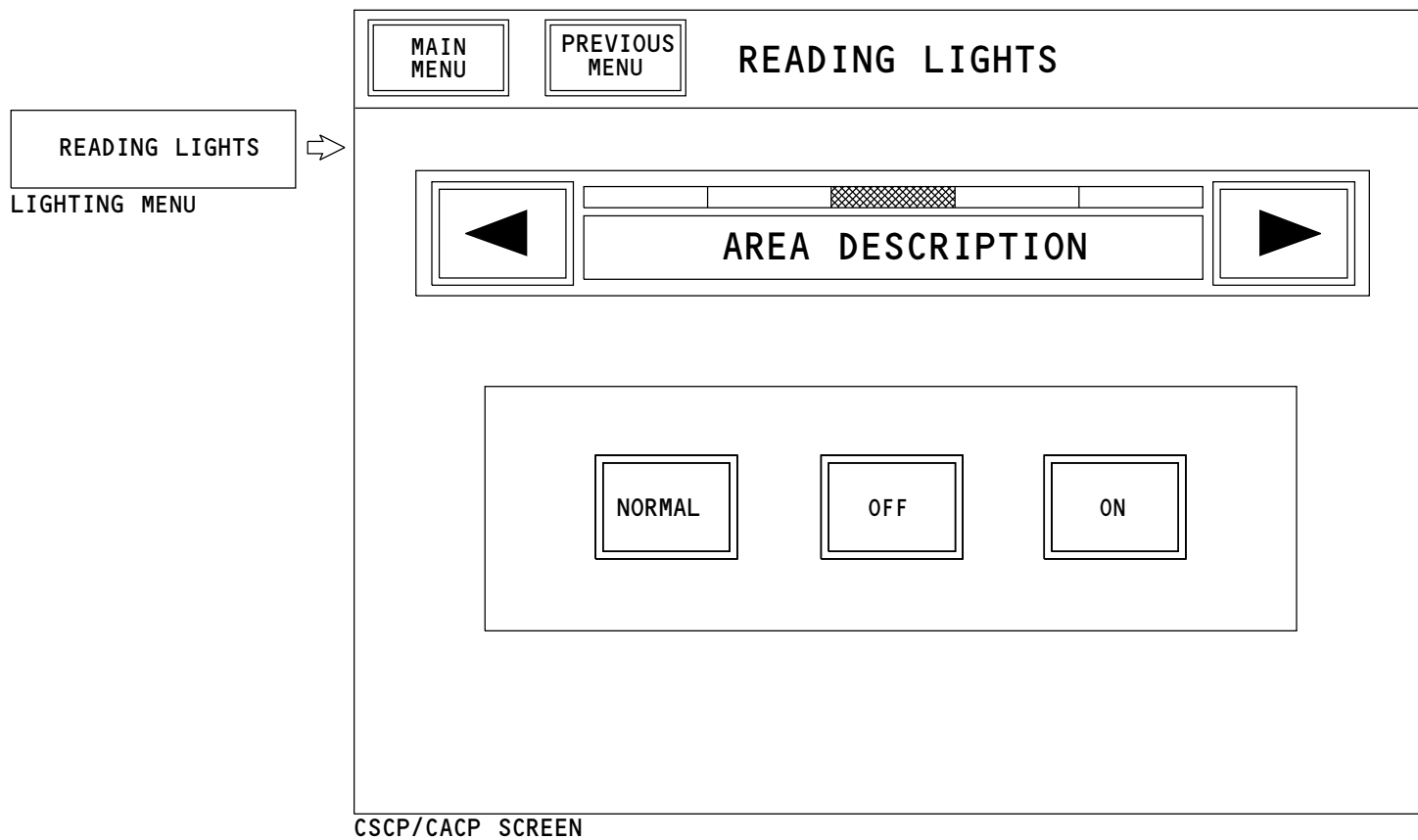
After one-half second, passengers can control their reading lights and the NORMAL selection on the panel changes to green.

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PSS - OPERATION - READING LIGHTS SCREEN

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**PSS - OPERATION - SERVICE CALL/CHIME CONTROL MENU SCREEN****General**

Attendants use the service call/chime control menu to select a screen that shows passenger calls. They can also select screens to control chimes.

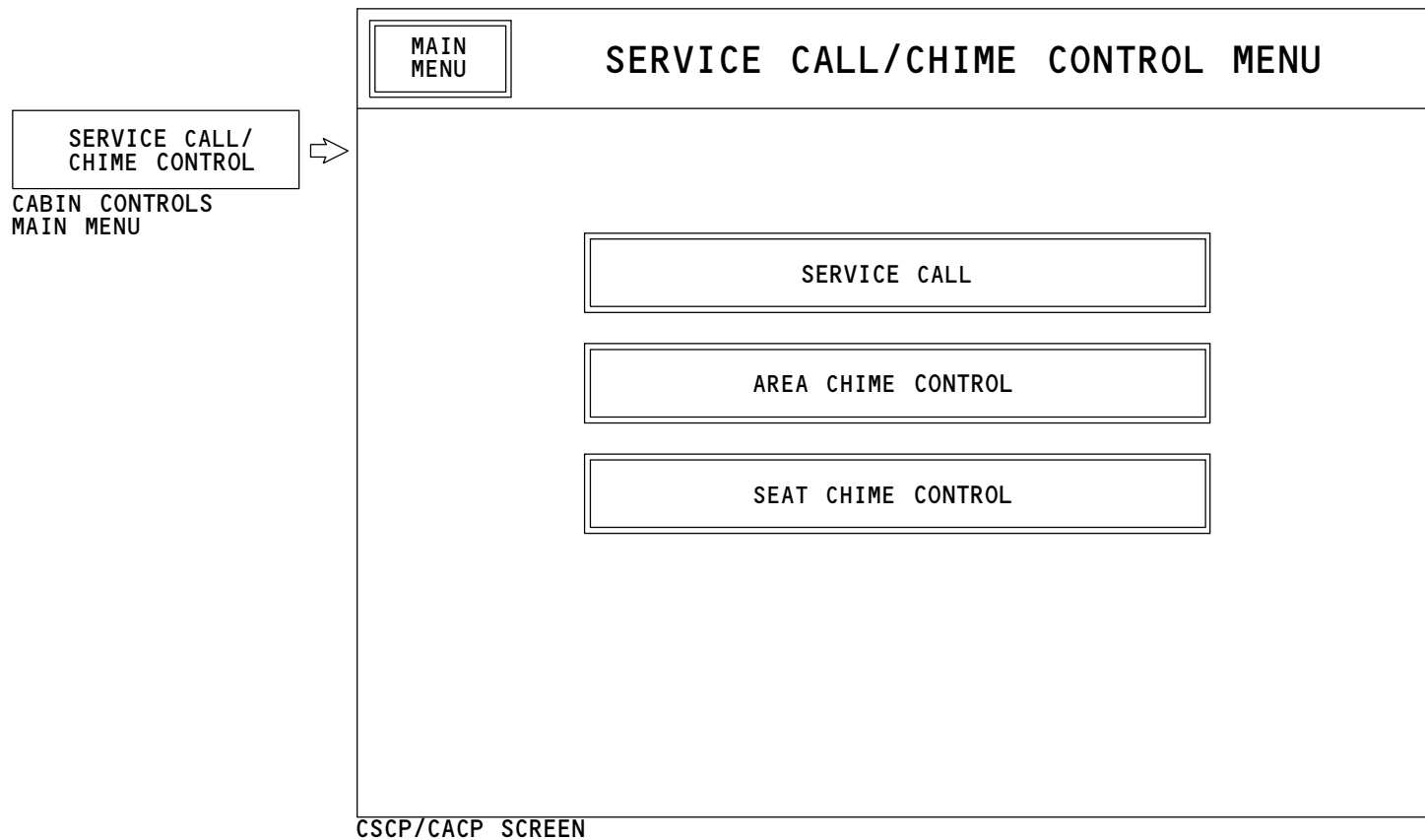
Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu to show this screen.

Controls and Indications

Touch these selections to go to the screen that controls the related function:

- SERVICE CALL - to see passenger call data
- AREA CHIME CONTROL - to disable passenger-to-attendant chimes in a selected area
- SEAT CHIME CONTROL - to disable each passenger-to-attendant chime.



PSS - OPERATION - SERVICE CALL/CHIME CONTROL MENU SCREEN

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**PSS - OPERATION - SERVICE CALL SCREEN****General**

Attendants use the service call screen to see active passenger-to-attendant calls and lavatory calls.

Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch SERVICE CALL to show this screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

The active seat calls and active lavatory calls areas on the screen show all active calls from the selected cabin area. The data on the display shows the locations of the calls in the order they were received.

Use the up and down arrows to scroll through the data in the active calls area.

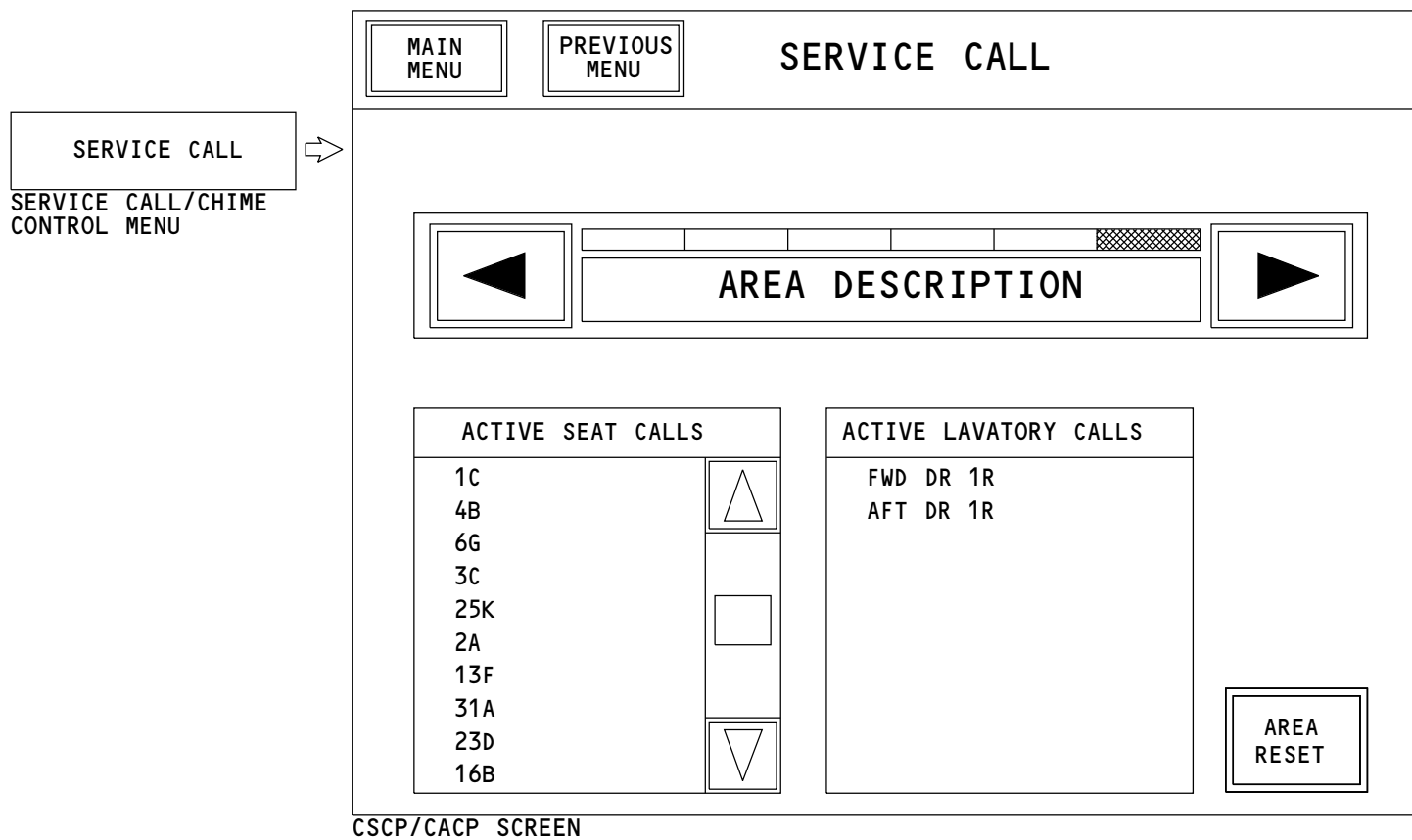
Touch AREA RESET to cancel all active calls for the selected area.

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PSS - OPERATION - SERVICE CALL SCREEN

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**PSS - OPERATION - AREA CHIME CONTROL SCREEN****General**

Attendants use the area chime control screen to disable the passenger-to-attendant chimes in selected areas of the cabin.

Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch AREA CHIME CONTROL on the service call/chime control menu to show this screen.

Controls and Indications

Touch the left or right arrow to select a cabin area. The space between the two arrows shows the cabin area description.

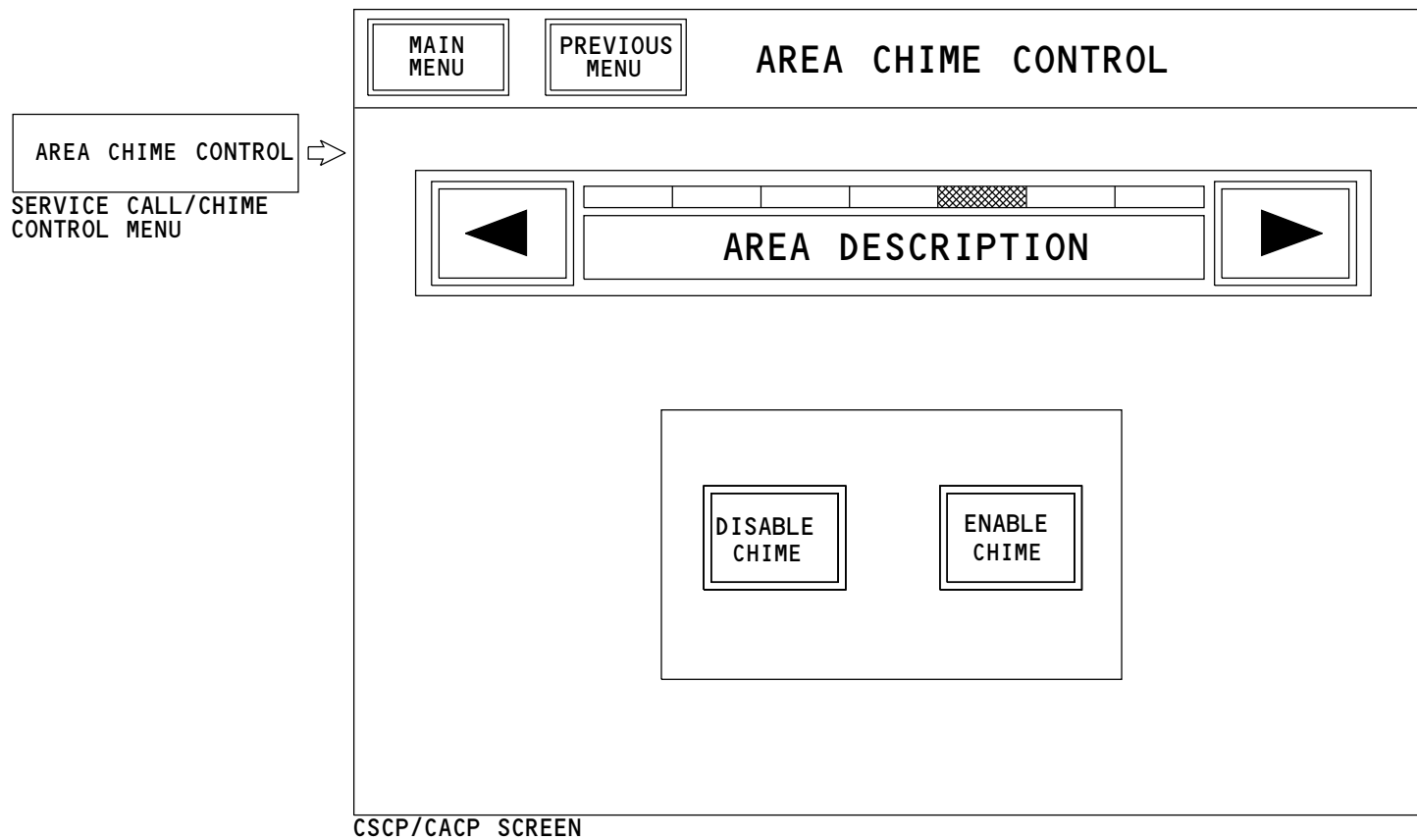
Touch ENABLE CHIME or DISABLE CHIME to enable or disable the passenger-to-attendant call chime for the selected area. These selections change to green to show the condition of the selected area.

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PSS - OPERATION - AREA CHIME CONTROL SCREEN

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**PSS - OPERATION - SEAT CHIME CONTROL SCREEN****General**

Attendants use the seat chime control screen to disable the passenger-to-attendant chimes at selected seats in the cabin.

Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch SEAT CHIME CONTROL to show this screen.

Controls and Indications

The configuration data base defines the row numbers and seat letters.

Touch the row select numbers and seat select letters to select seats. You must select the row before selecting a seat. If you only select a row and do not select any seats, the chime is enabled or disabled for all seats in the row.

The row/seat window above the numbers shows the selection.

Touch ENABLE CHIME or DISABLE CHIME to enable or disable the passenger-to-attendant call chime for the selected seats. Touch clear to clear the row/seat display.

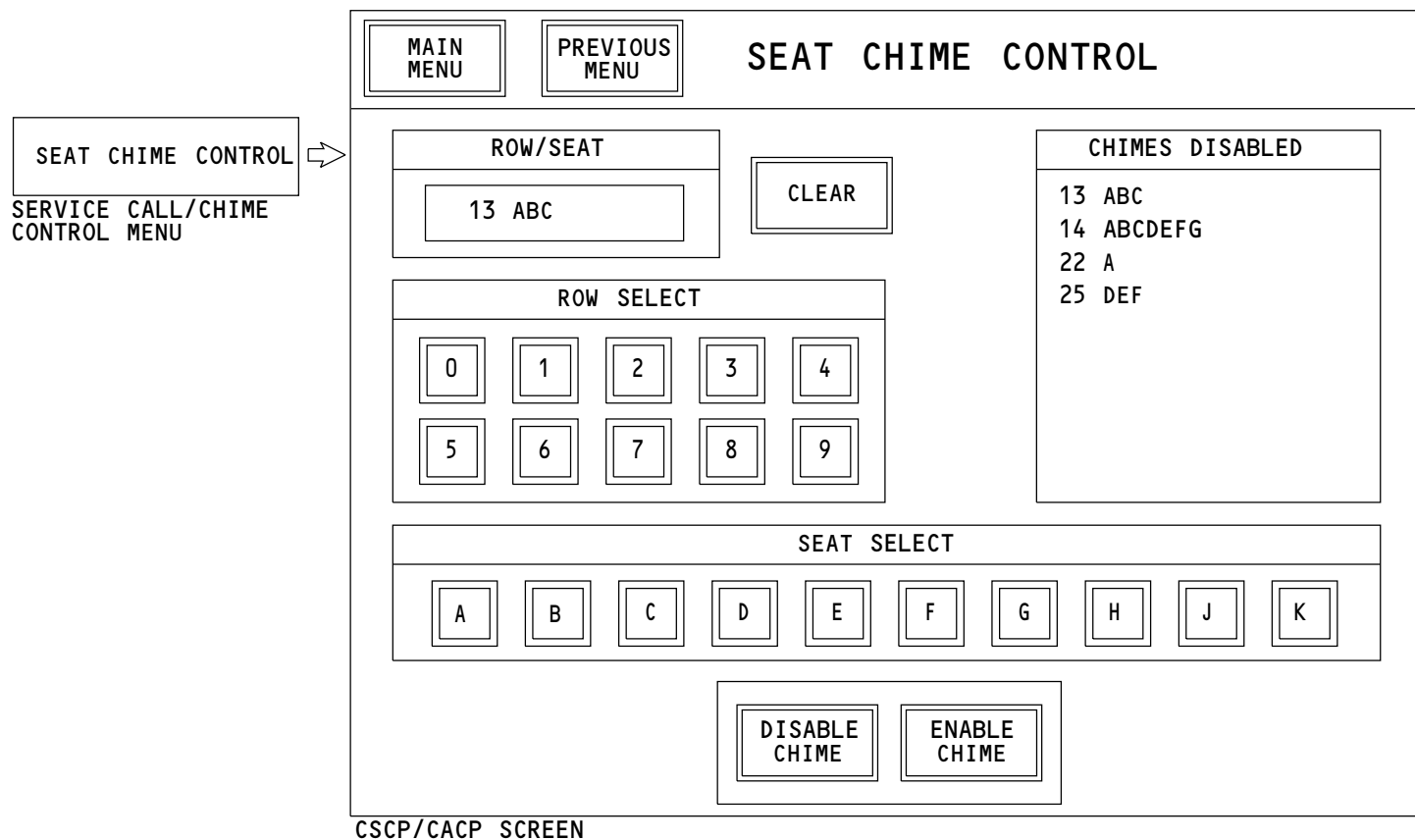
The chimes disabled window shows all seats that have chimes disabled. Use the up and down arrows to scroll through the data.

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CSCP/CACP SCREEN

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PSS - OPERATION - SEAT CHIME CONTROL SCREEN

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**PSS - OPERATION - SMOKING ASSIGNMENTS SCREEN****General**

Attendants use the smoking assignments screen to make changes to the smoking areas.

Access

Touch SMOKING ASSIGNMENTS on the cabin controls main menu to show this screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

Use the smoking row select up and down arrows to select a begin and end seat row. Use the selections in the seat column select area to select columns. If you do not select a column, any changes affect all columns.

Touch SMOKING or NO SMOKING to make the selected seats as smoking or no smoking.

The smoking seats area of this display shows all assigned smoking seats in the selected cabin area. Use the up and down arrows to scroll through the list.

Touch AREA RESET to cancel all changes to the selected area. Smoking seat assignments return to those identified by the configuration database.

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SMOKING ASSIGNMENTS →
CABIN CONTROLS
MAIN MENU

MAIN MENU

SMOKING ASSIGNMENTS

◀

AREA DESCRIPTION

▶

SMOKING ROW SELECT

BEGIN

▼

1

▲

END

▼

14

▲

SEAT COLUMN SELECT

LEFT

CENTER

RIGHT

SMOKING SEATS

1 ABC

2 ABC

3 ABCDEFG

4 HJK

5 DEFG

6 DEFG

7 DEFG

8 DEFG

9 DEFG

10 DEFG

▲

▼

SMOKING

NO SMOKING

AREA RESET

CSCP/CACP SCREEN

PSS - OPERATION - SMOKING ASSIGNMENTS SCREEN

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**PSS - CABIN TESTS****General**

Use the cabin system control panel (CSCP) to do the cabin test for the passenger service system (PSS).

See the cabin services system (CSS) section for more information about tests (SECTION 23-39).

Quick Test

Use quick test to quickly find major faults. This test does a check of these PSS components:

- Passenger address/cabin interphone (PA/CI) controller
- Cabin system management unit (CSMU)
- Zone management units (ZMUs)
- Overhead electronics units (OEU).

This test collects continuous monitor data for as long as 20 seconds. The CSCP shows the failures.

To start a quick test, touch START QUICK TEST.

All Test

Use all test for a more complete test. All test starts a complete BITE of the system. The screen shows all the failures the BITE finds.

To start an all test, touch START ALL TEST.

Engineering Tests

Use engineering tests for more detailed tests.

Touch ENGINEERING TESTS to show the engineering tests menu.

Lamps Test

The lamps test does not test the PSS.

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
START QUICK TEST ENGINEERING TESTS ... START ALL TEST LAMPS TEST			
MAIN MENU			

CABIN SYSTEM CONTROL PANEL

PSS - CABIN TESTS

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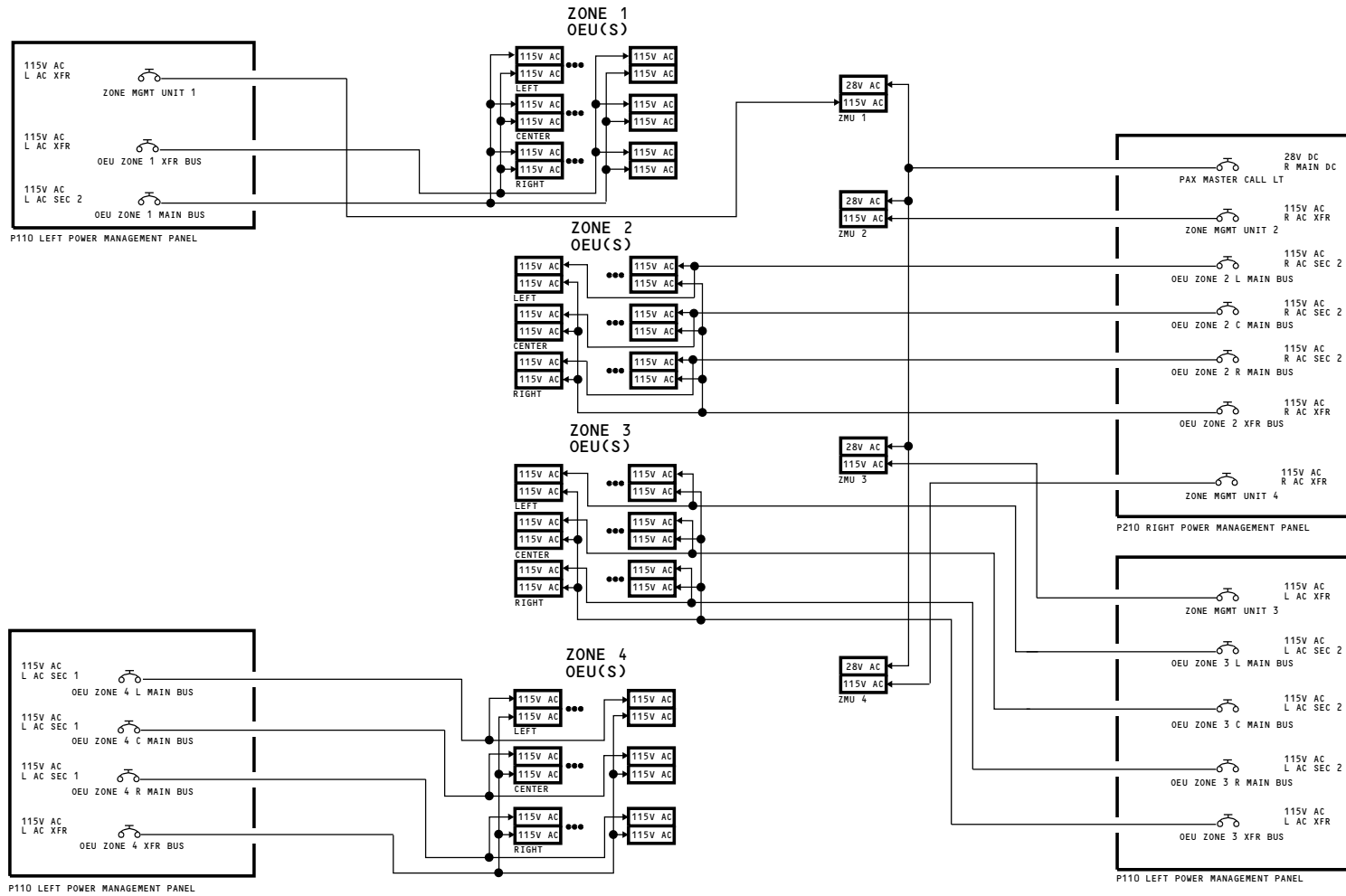


PSS - POWER INTERFACE

Power Interface

This power interface is for reference purposes.

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	D633W101-ARO



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PSS - POWER INTERFACE

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	D633W101-ARO



CABIN SERVICES SYSTEM - INTRODUCTION

General

The cabin services system (CSS) is an integrated system that combines these systems:

- Passenger address
- Cabin interphone
- Passenger service
- Cabin lighting
- Monitor and control.

Passenger Address System

The flight crew and cabin attendants use the passenger address system (PAS) to make announcements to the passengers. The PA audio goes to speakers in the passenger cabin.

Cabin Interphone System

The flight crew and cabin attendants use the cabin interphone system (CIS) to speak with each other. They use handsets in the cabin and flight deck.

Passenger Service System

Passengers use the passenger service system (PSS) to control reading lights and to call attendants. The PSS also controls the passenger information signs.

Cabin Lighting System

The cabin lighting system (CLS) controls the passenger cabin illumination.

Monitor and Control Functions

The CSS has interfaces with other airplane systems for different functions. Flight attendants use CSS control panels to select monitor and control functions. These are some of the CSS monitor and control functions:

- Cabin temperature selection
- Potable water status

- Cabin door status.

Abbreviations and Acronyms

- AIMS - airplane information management system
- AMU - audio management unit
- annct - announcement
- ASG - ARINC signal gateway
- ASP - attendant switch panel
- BFE - buyer furnished equipment
- CACP - cabin area control panel
- CAH - cabin attendant handset
- CCP - cabin control panel
- CDG - configuration database generator
- CDU - control display unit
- CIC - cabin interphone controller
- CIS - cabin interphone system
- CLS - cabin lighting system
- CSCP - cabin system control panel
- CSMU - cabin system management unit
- CSS - cabin services system
- ECS - environmental control system
- ELMS - electrical load management system
- FDH - flight deck handset
- FSEU - flap/slat electronics unit
- IFE - in-flight entertainment
- MCU - modular concept unit
- MMC - mass memory card
- OEU - overhead electronics unit
- OPAS - overhead panel ARINC 629 system
- PA - passenger address

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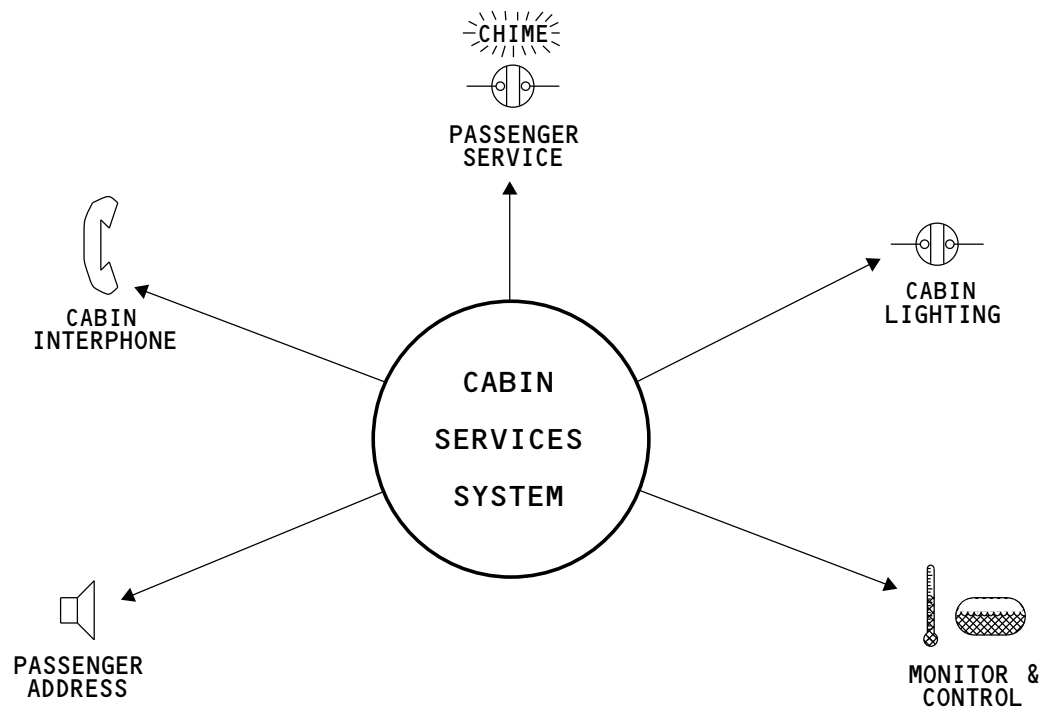
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CABIN SERVICES SYSTEM - INTRODUCTION

- PA/CI - passenger address/cabin interphone
- PAC - passenger address controller
- PAS - passenger address system
- pax - passenger
- PSEU - proximity sensor electronics unit
- PSS - passenger service system
- PTT - push to talk
- RF - radio frequency
- SDM - speaker drive module
- SFE - seller furnished equipment
- WES - warning electronic system
- ZMU - zone management unit



CABIN SERVICES SYSTEM - INTRODUCTION

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CSS GENERAL - INTRODUCTION TO ARINC 628

General

ARINC 628 gives design guidance for the development, installation, and certification of new cabin systems.

The cabin system has two parts, the cabin services system (CSS) and the in-flight entertainment (IFE) system.

The CSS has these basic systems and functions:

- Cabin interphone system (CIS)
- Passenger address system (PAS)
- Passenger service system (PSS)
- Cabin lighting system (CLS)
- Monitor and control functions (MCF).

The IFE system provides passenger entertainment and may have optional capabilities including in-seat passenger telephone.

ARINC 628 has four parts. Each part gives design guidance in a different part of the cabin system.

ARINC 628 Part 1 - Peripherals

Part 1 of the ARINC 628 specification defines standards for the interfaces between the IFE systems main controller(s) and the head-end equipment. These are examples of head-end equipment:

- Audio entertainment player (AEP)
- Video entertainment player (VEP)
- Passenger in-flight information computer (PIIC)
- Prerecorded announcement machine (PRAM).

ARINC 628 Part 2 - Seat Interfaces

Part 2 of the ARINC 628 specification defines standards for the interfaces between the seat peripherals and the seat-end equipment. These are examples of seat peripherals:

- Passenger control units (PCU)

- Passenger headphones
- Seat video displays (SVD)
- Passenger telephone handsets.

Seat-end equipment are equipment installed on the bottom of the seat group such as a seat electronics box (SEB).

ARINC 628 Part 3 - In-Flight Entertainment Interfaces

Part 3 of the ARINC 628 specification defines standards for the interfaces between the IFE system and other airplane systems.

ARINC 628 Part 4 - Cabin Distribution System

Part 4 of the ARINC 628 specification defines standards for an in-flight entertainment cabin distribution system (CDS). The CDS consists of some or all of these networks:

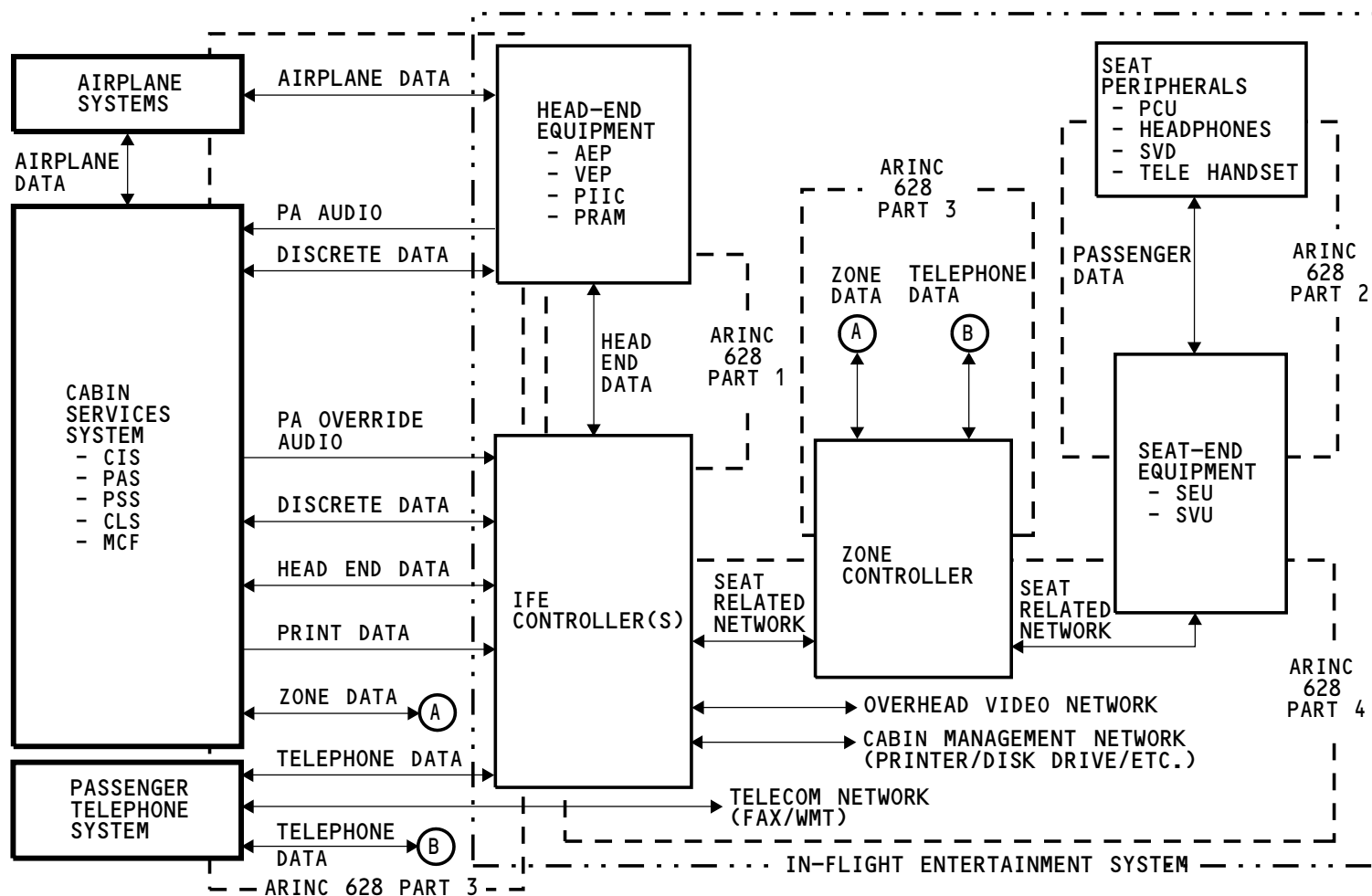
- A seat related network. This network distributes audio and video signals to each passenger seat and handles all passenger service functions. The network can also distribute data for functions like passenger telephone, games, and interactive services.
- An overhead video network. This network distributes video signals and control data such as monitor on/off and video select commands to the overhead display units.
- A cabin management network. This network provides a connection to printers, fixed or handheld terminals, data storage units, etc.
- A telecom network. This network provides for bidirectional voice and fax communication. The network is used for dedicated telephone/fax stations which are not integrated into the seat related network.

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CSS GENERAL - INTRODUCTION TO ARINC 628

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**CABIN SERVICES SYSTEM - GENERAL DESCRIPTION****General**

You use cabin control panels (CCPs) to operate the CSS. The hardware configuration of a CCP tells it to operate as a cabin area control panel (CACAP) or a cabin system control panel (CSCP).

The CSS uses a configuration database to define the cabin interior. You change the configuration database to agree with changes in the cabin interior.

Operation

Maintenance personnel use the CSCP to test and to program the CSS. Flight attendants use the CSCP and the CACPs to select light settings and other monitor and control functions. The CSCP also has a mass storage device to keep program data and test results.

The cabin system management unit (CSMU) sends test commands. It also has interfaces with other airplane systems for some CSS functions.

The passenger address/cabin interphone (PA/CI) controller controls the passenger address and cabin interphone functions. It controls routing of cabin interphone calls. The PA/CI controller gets passenger address audio inputs and sends them through the speaker drive modules (SDMs) to cabin speakers.

There are four zone management units (ZMUs). The ZMUs control these zones:

- ZMU 1 controls zone 1
- ZMU 2 controls zone 2
- ZMU 3 controls zone 3
- ZMU 4 controls zone 4.

In each zone, the ZMUs connect to these three types of LRUs:

- Overhead electronics units (OEUs)
- Cabin attendant handsets (CAHs)
- Cabin control panels (CCPs).

The OEUs control lights and passenger information signs. They also receive inputs from other cabin systems.

Flight attendants use CAHs to talk on the cabin interphone and to make passenger address announcements.

Flight attendants use the CACPs to select cabin light settings, set some passenger service functions and operate the monitor and control functions.

The ZMUs also have an interface with the in-flight entertainment system. The passengers use controls at the passenger seat to control reading lights and make attendant calls.

The CSS components operate together in five subsystems.

Passenger Address System (PAS)

The PA/CI controller gets audio inputs from different sources. It selects the highest priority audio, digitizes it and sends it to the SDMs and the in-flight entertainment system. The SDMs change the signal back to analog and send it to one or two speakers. The inflight entertainment system overrides entertainment audio at the passenger seat with PA audio.

The PAS also supplies chimes to the cabin.

Cabin Interphone System (CIS)

CAHs connect to ZMUs to send and receive audio and dial codes. The ZMUs have a digital interface with the PA/CI controller. The PA/CI controller makes the connection between attendant stations.

When a station gets a call, the PAS makes a chime and the ZMU makes a master call light come on.

The flight crew interface to the CIS is almost the same, except the flight interphone system and flight deck handset connect directly to the PA/CI controller.

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**CABIN SERVICES SYSTEM - GENERAL DESCRIPTION****Passenger Service System (PSS)**

Passengers use controls at the passenger seat to control reading lights and to call attendants. The passenger selections go to the ZMU over an ARINC 628 zone interface. The ZMU sends the data to an OEU. The OEU makes a reading light or row call light come on. For an attendant call, the ZMU also makes a master call light come on. The PAS makes a chime sound.

Cabin Lighting System (CLS)

The CLS uses these four types of lights:

- Sidewall wash lights
- Indirect ceiling lights
- Direct ceiling lights
- Night lights.

Flight attendants use the CACPs to select light settings. The CACPs send the selection to the ZMUs. The ZMUs send signals to the OEUs which make the applicable lights go on or off.

Monitor and Control Functions

The CSS monitors many other cabin systems. This gives the flight attendants a central location to select cabin controls. Attendants use the CSCP and CACPs for monitor and control functions.

The monitor function shows information only. These are some of the monitored systems:

- Potable water status
- Waste tank status
- Cabin door status
- Smoke detectors.

The control function permits both display and selection. These are some of the systems controlled by the CSS:

- Cabin temperature selection

- Air/ground communication.

CSS Maintenance

Maintenance personnel use the cabin system control panel (CSCP) to test and to install software in the CSS. The CSCP has a touch sensitive screen for selections.

The CSCP sends test selections to the CSMU. The CSMU sends the test selection to the CSS components. The CSCP keeps test results in memory and shows them on the screen.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

To transfer new software parts (phase 1 dataload) to the CSS, you can use a maintenance laptop (ML) connected to the CCP, cabin port, or the flight deck port using an Ethernet cable or using the maintenance access terminal (MAT) in the flight deck.

ARO 001-015 PRE SB 777-23-0369

The CSCP has a disk drive. You use the CSCP to install software for the configuration database and LRU operational programs.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

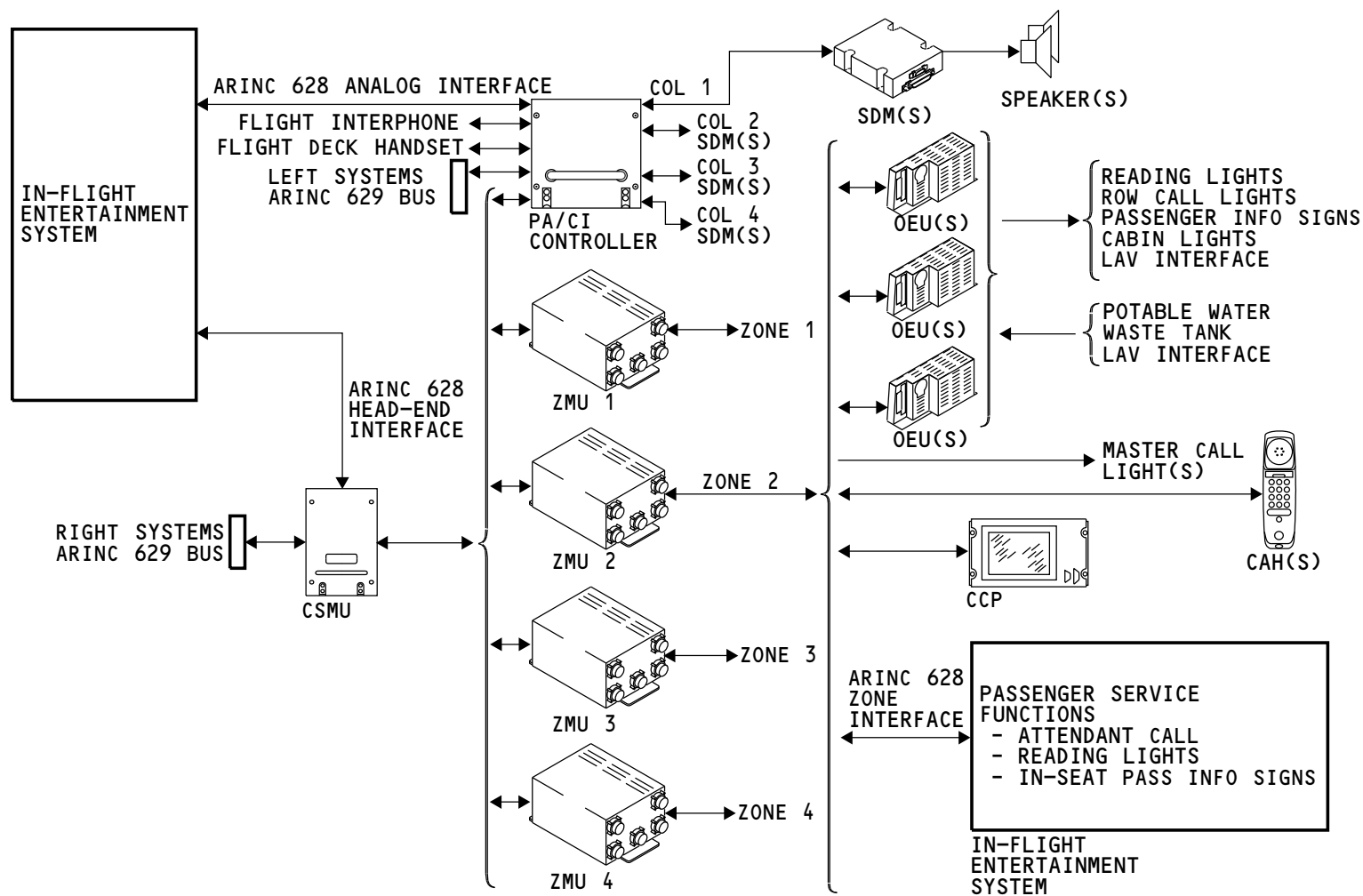
The CSCP has an RJ45 port for maintenance laptop (ML) access for software part management. It also has USB ports to save reports.

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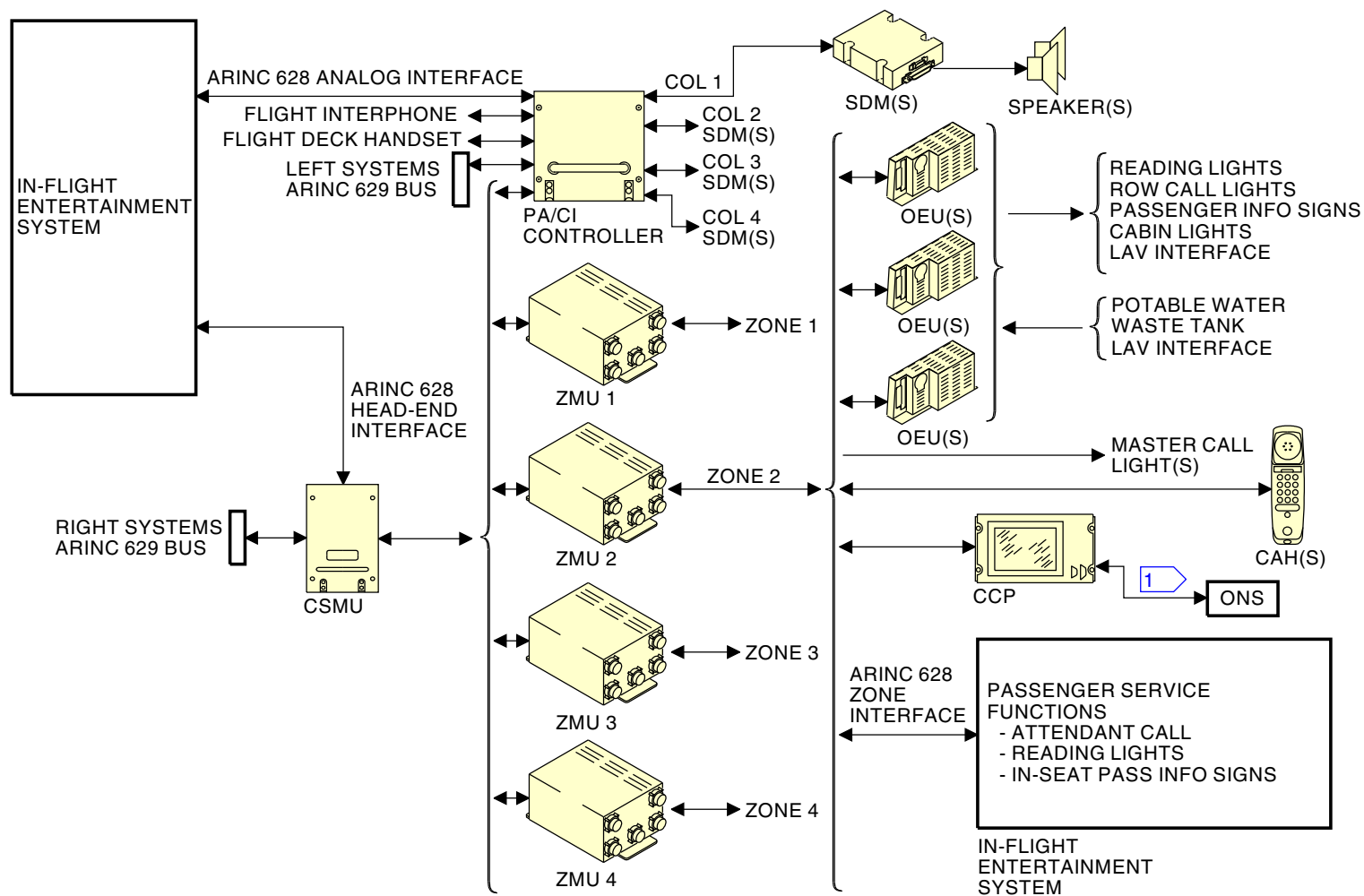
CABIN SERVICES SYSTEM - GENERAL DESCRIPTION

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ARO 001-015 PRE SB 777-23-0369

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1 ONS CONNECTS TO THE CSCP ONLY.

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CABIN SERVICES SYSTEM - GENERAL DESCRIPTION

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CSS GENERAL - COMPONENT LOCATIONS**General**

CSS components are in the main equipment center and the cabin area.

A typical passenger cabin has these four zones:

- Zone 1 starts at the forward part of the cabin and ends at door 2
- Zone 2 is between doors 2 and 3
- Zone 3 is between doors 3 and 4
- Zone 4 is from door 4 to the aft end of the cabin.

Cabin Components

These components are above the cabin ceiling panels:

- Zone management units (ZMUs)
- Speaker drive modules (SDMs)
- Overhead electronics units (OEUs)

These components are in the passenger cabin:

- Overhead electronics units (OEUs) (in the passenger service units)
- A cabin system control panel (CSCP)
- Cabin area control panels (CACPs)
- Cabin attendant handsets (CAHs) (near each door).

The CSCP is in the VCC/Purser work station or on a closet door or partition wall near the door in the passenger cabin (refer to System Schematic Manual 23-33-02).

The CACPs are on closet doors or partition wall near the door in the passenger cabin (refer to System Schematic Manual 23-33-03).

NOTE: Airplane wiring diagrams and functional schematics refer to both the CSCP and the CACP as cabin control panels (CCP).

Main Equipment Center Components

These components are in the main equipment center:

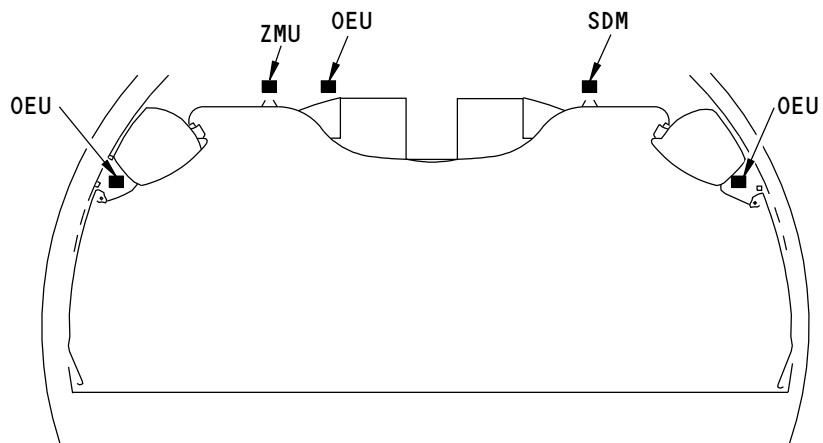
- Cabin system management unit (CSMU)
- Passenger address/cabin interphone (PA/CI) controller.

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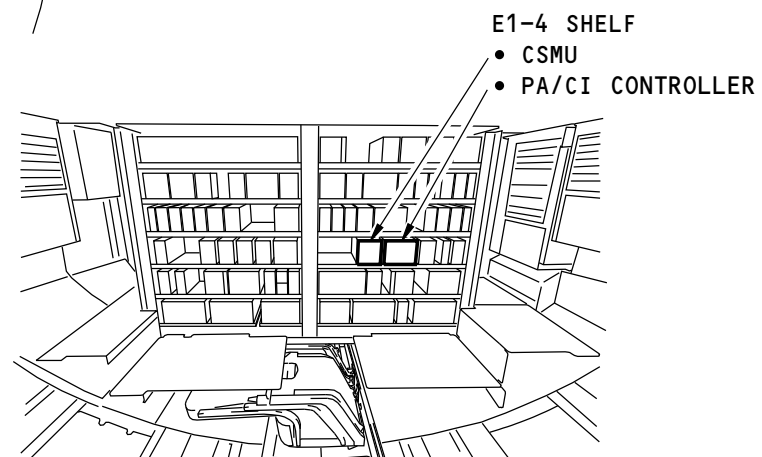
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(VIEW IN THE AFT DIRECTION)



MAIN EQUIPMENT CENTER
(VIEW IN THE AFT DIRECTION)

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CSS GENERAL - COMPONENT LOCATIONS

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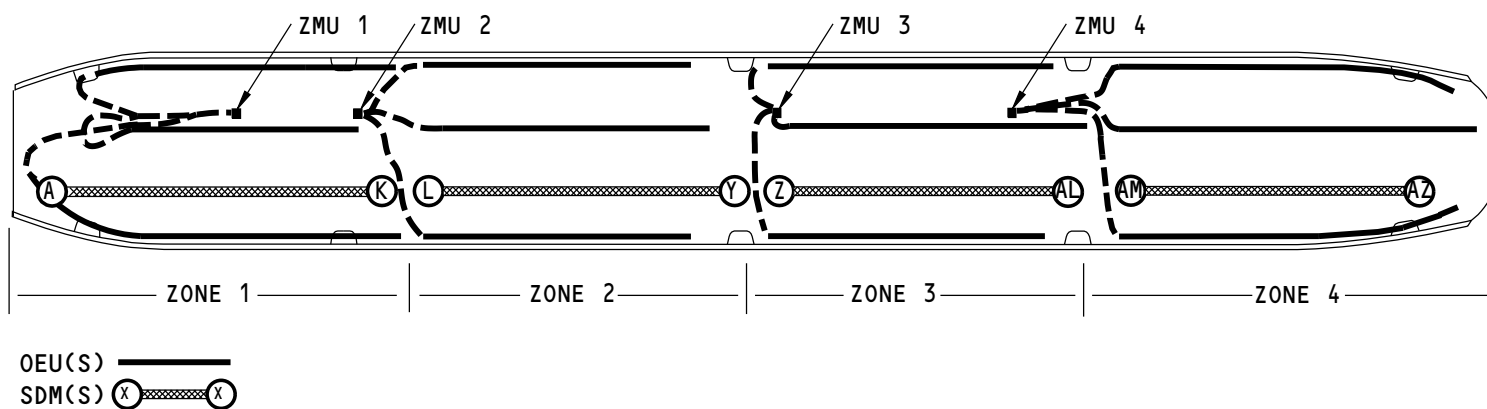
**CSS GENERAL - COMPONENT LOCATIONS 2****General**

CSS components are in the main equipment center and the cabin area. The cabin diagram shows a typical configuration.

The passenger cabin has four zones:

- Zone 1 starts at the forward part of the cabin and ends at door 2
- Zone 2 is between doors 2 and 3
- Zone 3 is between doors 3 and 4
- Zone 4 is from door 4 to the aft end of the cabin.

Each zone has three columns of overhead electronics units (OEUs) and one column of speaker driver modules (SDMs).



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CSS GENERAL - COMPONENT LOCATIONS 2

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**CSS GENERAL - CONFIGURATION DATABASE GENERATOR****General**

The CSS uses a database to identify the interior configuration and optional features of the system. The database software has programmable selections that permit changes to the interior configuration and optional features.

Many CSS components keep configuration data in nonvolatile memory. If you replace a component, you must install the configuration database.

The database controls many functions, including:

- Passenger seating area
- Cabin light levels
- Passenger address areas
- Cabin interphone handset locations and dial codes
- CSCP and CACP screen selections.

Configuration Database Generator

The configuration database generator (CDG) is a software tool that operates on a personal computer. Boeing uses the CDG to write the original configuration database.

ARO 001-015 PRE SB 777-23-0369

Boeing copies the database onto 3 1/2 inch floppy diskettes and carries them to the airplane to install into the CSS.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Boeing copies the database onto a maintenance laptop (ML) for loading onto the CSCP via the onboard network system (ONS), or directly from the ML.

ARO ALL

The airline engineering organization also has a copy of the Boeing CDG. If the airline chooses to change the interior configuration or change an optional feature, they change the configuration database using the CDG.

ARO 001-015 PRE SB 777-23-0369

They copy the new database to a floppy disk and carry it to the airplane to install it into the CSS.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

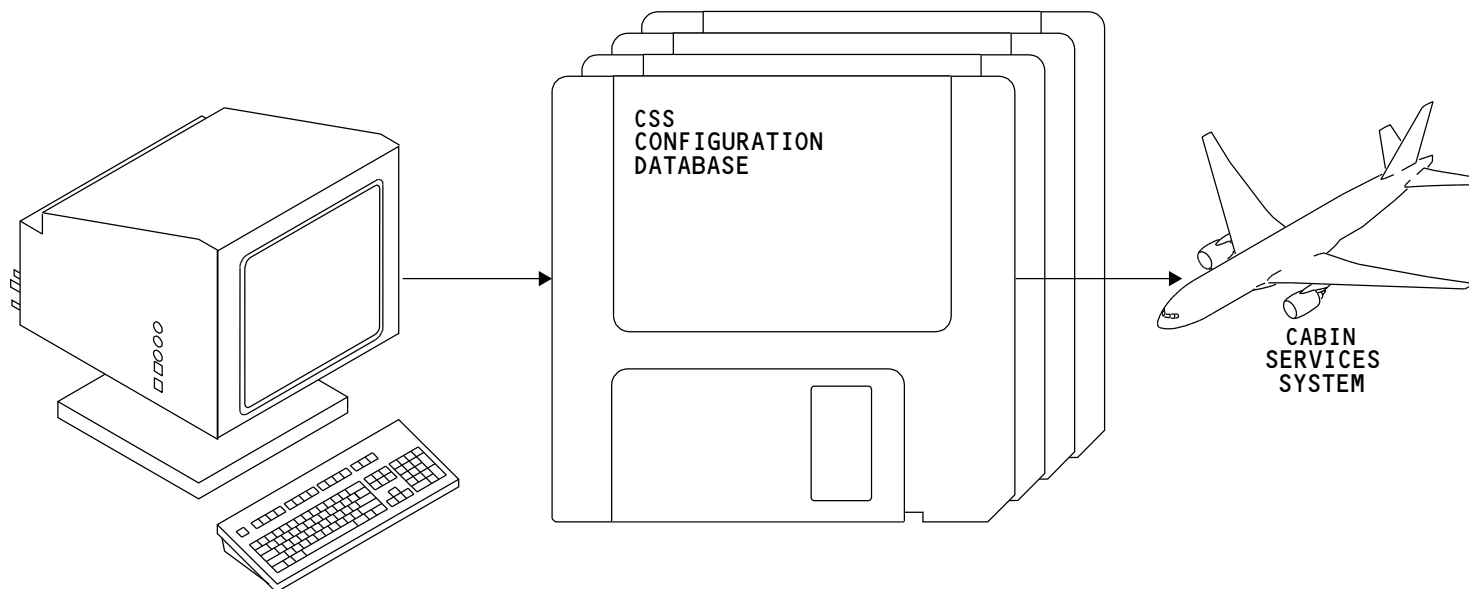
They copy the new database onto a ML for loading onto the CSCP via the ONS, or directly from the ML.

ARO ALL**23-39-01**

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CSS GENERAL - CONFIGURATION DATABASE GENERATOR

M39340 S000615939_V1

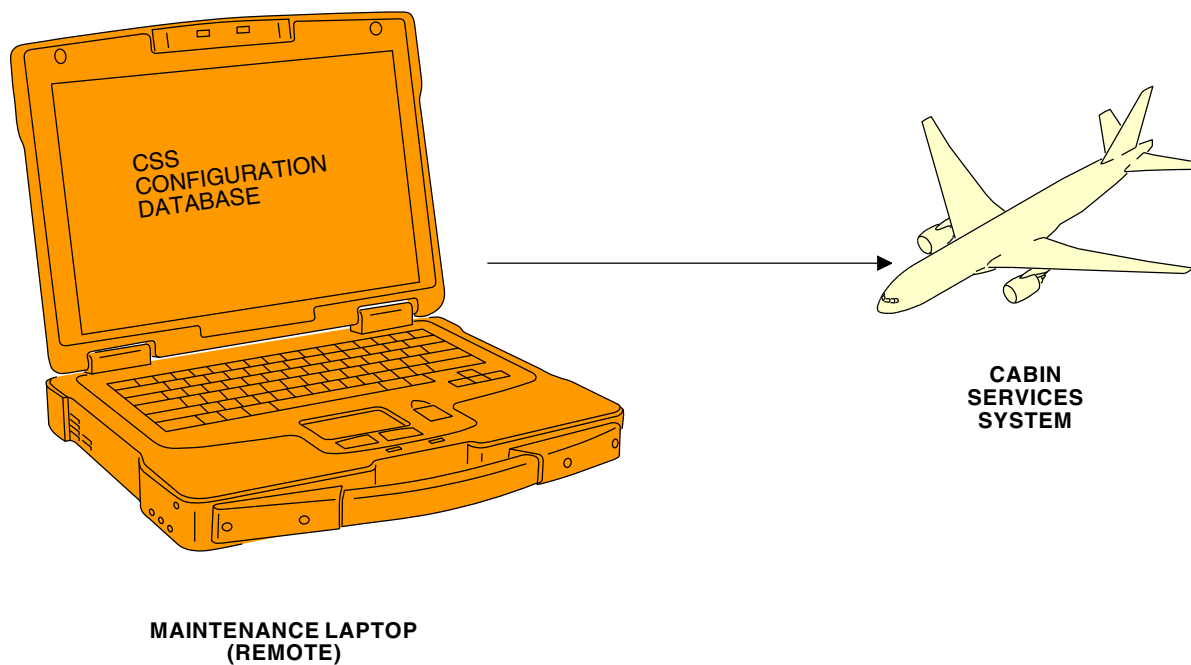
23-39-01

EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

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CSS GENERAL - CONFIGURATION DATABASE GENERATOR

2560769 S0000610350_V1

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ARO 016-999; ARO 001-015 POST SB 777-23-0369

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CSS GENERAL - CDG - SYSTEM WIDE CONTROLS DEFINITION WINDOW

General

The system wide controls definition screen controls cabin operation and environmental control settings. Five selection boxes show the controls settings.

Airplane Model

This box shows the airplane model that uses the configuration database.

Lavatory Controls

These are the selections for lavatory controls:

- Lav signs. Toggle makes the lav sign come on when the lavatory is not occupied and go off when the lavatory is in use. Steady keeps the lav sign on at all times. The occupied sign comes on in both modes whenever the lavatory is occupied.
- Lav call reset. Switch panel resets the lavatory call at the CSCP/CACPs and at the lavatory. Switch only resets at the lavatory.
- Lav lights door open state. Shows the level of the lavatory lights when the lavatory door is open and the airplane is in the air. The lights are always on bright when the lavatory door is open and the airplane is on the ground.

Reading Light Control

This box selects the type of reading light control available from the CSCP/CACP reading light screen. These are the selections for reading light controls:

- Latched gives the passengers control of their reading lights only when the attendant selects NORMAL.
- Momentary makes reading lights come on or go off when the attendant selects ON or OFF. In momentary mode, control of reading lights immediately returns to the passengers.

Reset Control and EICAS Reporting

Auto reset of chime suppression resets any passenger-to-attendant chime disables when the airplane is on the ground.

Lav smoke detector reset and crew smoke detector reset allows attendants to manually reset the smoke detectors.

The activate EICAS reporting boxes let EICAS show messages for lavatory smoke and crew rest area smoke.

Display light faults selection lets the continuous monitor test show failures of some cabin lights.

Other Controls

The fasten seat belt return to seat altitude box shows the altitude at which the FASTEN SEAT BELT and RETURN TO SEAT signs automatically come on or go off.

Speaker attenuation controls the volume of speakers surrounding a handset or a chime. This is done to decrease microphone feedback during announcements.

The panel time out value box sets the time that the CSCP/CACP screen goes blank if there are no screen selections made.

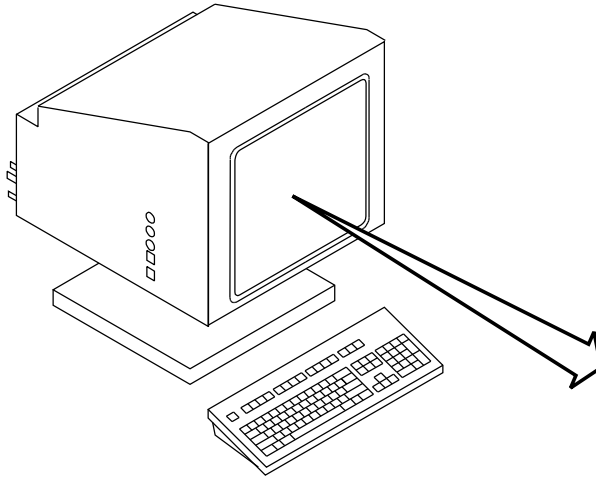
The time required to run an all test box shows the time required on the CSCP maintenance screens to do a complete CSS BITE.

23-39-01

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CDG-2371-DOC-295-60 (V002) - SYSTEMWIDE CONTROLS DEFINITION			
FILE EDIT VIEW DATA UTILITIES HELP			
AIRPLANE ☐ 777-300 MODEL ☒ 777-200			
LAV SIGNS ☐ TOGGLE ☒ STEADY	LAV CALL RESET ☒ SWITCH+PANEL ☐ SWITCH ONLY	LAV LIGHTS DOOR OPEN STATE ☒ OFF ☐ DIM	READING LIGHT CONTROL ☒ LATCHED ☐ MOMENTARY
☒ AUTO RESET OF CHIME SUPPRESSION ☒ LAV SMOKE DETECTOR RESET ☒ CREW REST SMOKE DETECTOR RESET ☒ ACTIVATE EICAS REPORTING FOR LAV SMOKE ☒ ACTIVATE EICAS REPORTING FOR CREW REST SMOKE ☒ DISPLAY LIGHT FAULTS			
FASTEN SEAT BELT RETURN TO SEAT ALTITUDE		10000	
SPEAKER ATTENUATION		2	
PANEL TIME-OUT VALUE		180	
TIME REQUIRED TO RUN ALL TEST		2	
ACCEPT CANCEL HELP			
SELECT THIS BUTTON IF THE AIRPLANE MODEL IS 777-300.			INSERT

TYPICAL

CSS GENERAL - CDG - SYSTEM WIDE CONTROLS DEFINITION WINDOW

M39341 S000615940_V1

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CSS GENERAL - CDG - SEAT DEFINITION WINDOW

General

The seat definition window defines and describes each seating area on the airplane.

Area Number

The first column lists the seating area numbers. There can be as many as eight seating areas.

Start Row/End Row

These columns give the first and last row number for each seating area.

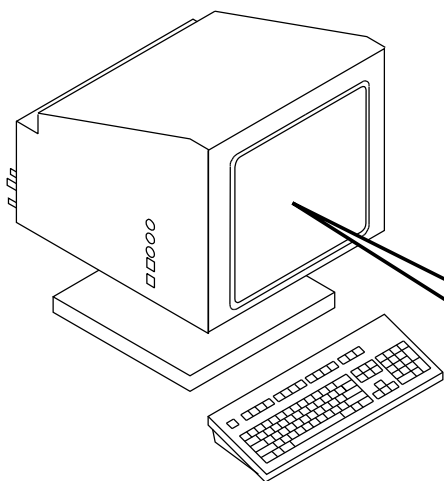
Seat Area Description

This column gives a name for each seating area. This name shows on the CSCP/CACPs in the area descriptions.

Seat Configuration

The seat configuration button gives access to a window that allows a letter assignment for each seat in each row.

EFFECTIVITY	
ARO ALL	



CDG-2371-DOC-295-60 (V002) - SEAT DEFINITION			
FILE EDIT VIEW DATA UTILITIES HELP			
AREA NO.	START ROW	END ROW	SEAT AREA DESCRIPTION
1	1	5	FIRST CLASS
2	6	18	BUSINESS CLASS
3	19	38	ECONOMY
4			
5			
6			
7			
8			

TYPE THE NUMBER OF THE FIRST ROW (1-99, #1-#9, OR BLANK) OF THIS SEATING AREA.

TYPICAL

CSS GENERAL - CDG - SEAT DEFINITION WINDOW

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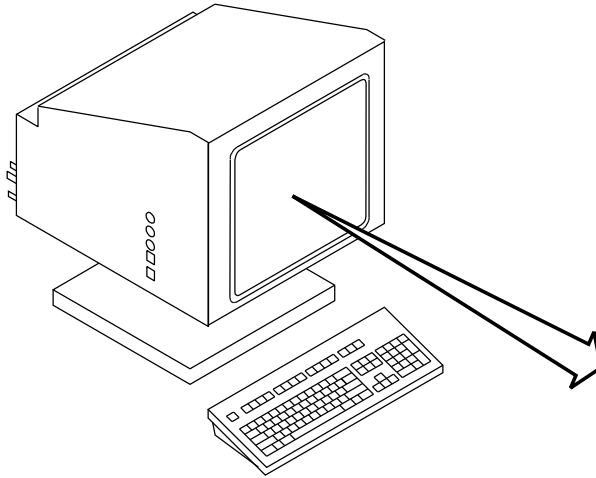


CSS GENERAL - CDG - OEU QUANTITY WINDOW

General

The overhead electronics unit (OEU) quantity window shows the number of OEUs for each zone management unit (ZMU) column.

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CDG-2371-DOC-295-60 (V002) - OEU QUANTITY

FILE EDIT VIEW DATA UTILITIES HELP

OEUS ON	NUMBER OF	OEUS ON	COLUMN
	1	2	3
ZMU 1	5	6	5
ZMU 2	11	18	11
ZMU 3	10	17	10
ZMU 4	0	0	0
ZMU 5	0	0	0

ACCEPT

CANCEL

HELP

TYPE THE NUMBER OF OEUS (0-31) ON COLUMN 1 FOR THIS ZMU.

INSERT

TYPICAL

CSS GENERAL - CDG - OEU QUANTITY WINDOW

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CSS GENERAL - CDG - HANDSET DEFINITION WINDOW

General

The handset definition window allows you to define the configuration for the flight deck and cabin interphone handsets.

Handset

Shows the dial code assigned to a handset. Also shows the ZMU and port number that the handset connects to. All this information is assigned on another screen.

In Config

Shows whether a handset is in the configuration database. X enters the handset into the configuration database.

All Call

Determines whether this handset is called whenever the dial code for an all-call is activated.

Attn All Call

Determines whether this handset is called whenever the dial code for an attendant all-call is activated.

Conference Call

Determines whether this handset is called whenever the dial code assigned to this conference call is activated.

External Line-Output

Determines whether this handset can access an external line circuit to make a telephone connection through the gatelink connector.

External Line-Input

Determines whether this handset can receive external phone calls through the gatelink connector.

Priority Handset

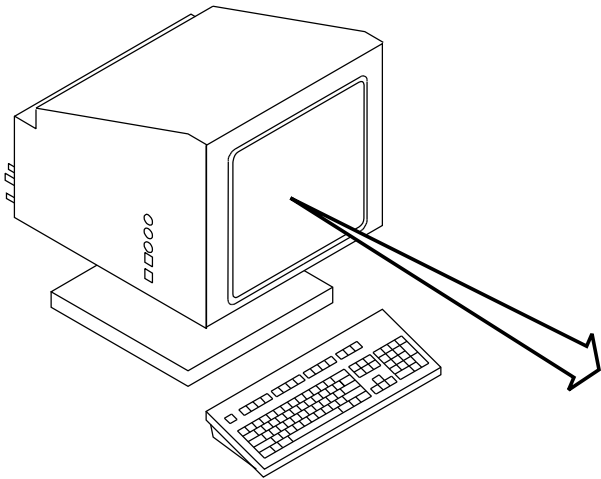
Determines whether this handset can receive priority calls from the flight deck. Only one handset can receive priority calls.

Description

The description button gives access to a window that allows you to enter a location description for each handset. The description shows on CSCP maintenance screens when a fault is detected in the handset.

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CDG-2371-DOC-295-60 (V002) - HANDSET DEFINITION

FILE EDIT VIEW DATA UTILITIES HELP

HANDSET	IN CONFIG	ALL CALL	ATTN ALL CALL	CONFERENCE CALL								EXTERNAL LINE		PRIORITY HANDSET	
				1	2	3	4	5	6	7	8	OUTPUT 1	INPUT 2		
FLIGHT DECK HANDSET		☒	☐	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐	
CAH<11>ZMU 1 PORT 1	☒	☒	☒	☒	☒	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒
CAH< >ZMU 1 PORT 2	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CAH<21>ZMU 1 PORT 3	☒	☐	☒	☒	☒	☐	☐	☐	☐	☐	☐	☒	☒	☐	☐
CAH< >ZMU 1 PORT 4	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CAH< >ZMU 1 PORT 5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CAH<12>ZMU 2 PORT 1	☒	☒	☒	☐	☒	☒	☐	☐	☐	☐	☐	☒	☒	☐	☐
CAH<22>ZMU 2 PORT 2	☒	☒	☒	☐	☐	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐
NONE											☐	☐	☐	☐	☐

ACCEPT

CANCEL

HELP

DESCRIPTION

SELECT THIS BOX TO INCLUDE THIS HANDSET IN "ALL CALL" CONFERENCE CALLS.

INSERT

TYPICAL

CSS GENERAL - CDG - HANDSET DEFINITION WINDOW

M39344 S000615943_V1



CSS GENERAL - INSTALL CONFIGURATION DATABASE

General

Boeing engineering writes and loads the initial configuration database. Airline engineering may change the configuration database using the configuration database generator (CDG).

ARO 001-015 PRE SB 777-23-0369

The engineers copy the database to floppy diskettes.

You must load the diskettes to install the new database.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

The engineers copy the database to the maintenance laptop (ML).

You must transfer the database from the ML to the panel before installation.

ARO ALL**Database Transfer (Phase 1 Load)****ARO 001-015 PRE SB 777-23-0369**

The cabin system control panel (CSCP) has a disk drive. Put a floppy diskette in the disk drive to load it into the CSCP. The CSCP keeps the configuration database on a mass storage device.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

The cabin system control panel (CSCP) has a mass storage and an RJ45 port. Parts can be transferred to a CSCP via the connection to the ONS using either a maintenance laptop (ML) or the maintenance access terminal (MAT) in the flight deck. Parts can also be transferred to the CSCP mass storage via a ML and an Ethernet cable connected to the CSCP's RJ45 port or the cabin port.

ARO ALL

Installation of data to the CSCP mass storage is called a phase 1 load.

Database Installation (Phase 2 load)

When the configuration database is in the CSCP, you use selections on the CSCP screen to install it in the CSS.

Many CSS components use the configuration database to operate. If you replace a component, you must use the CSCP to send database information to the new component. Because the configuration database is normally in CSCP memory, you only need to use a CSCP screen selection to install the database.

Installation of data to the CSS components is called a phase 2 load.

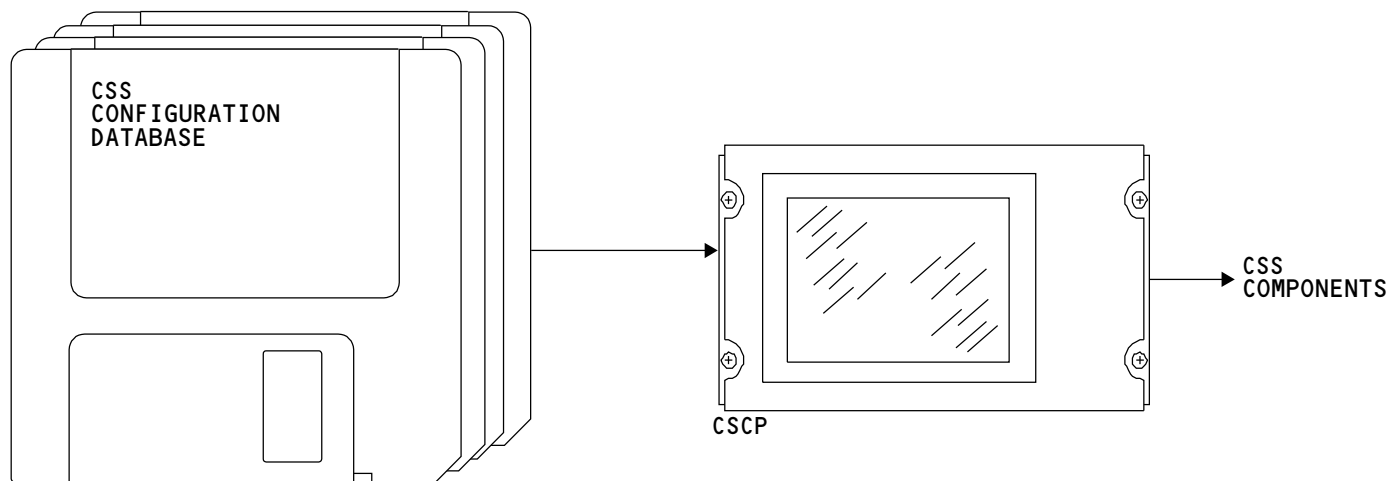
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CSS GENERAL - INSTALL CONFIGURATION DATABASE

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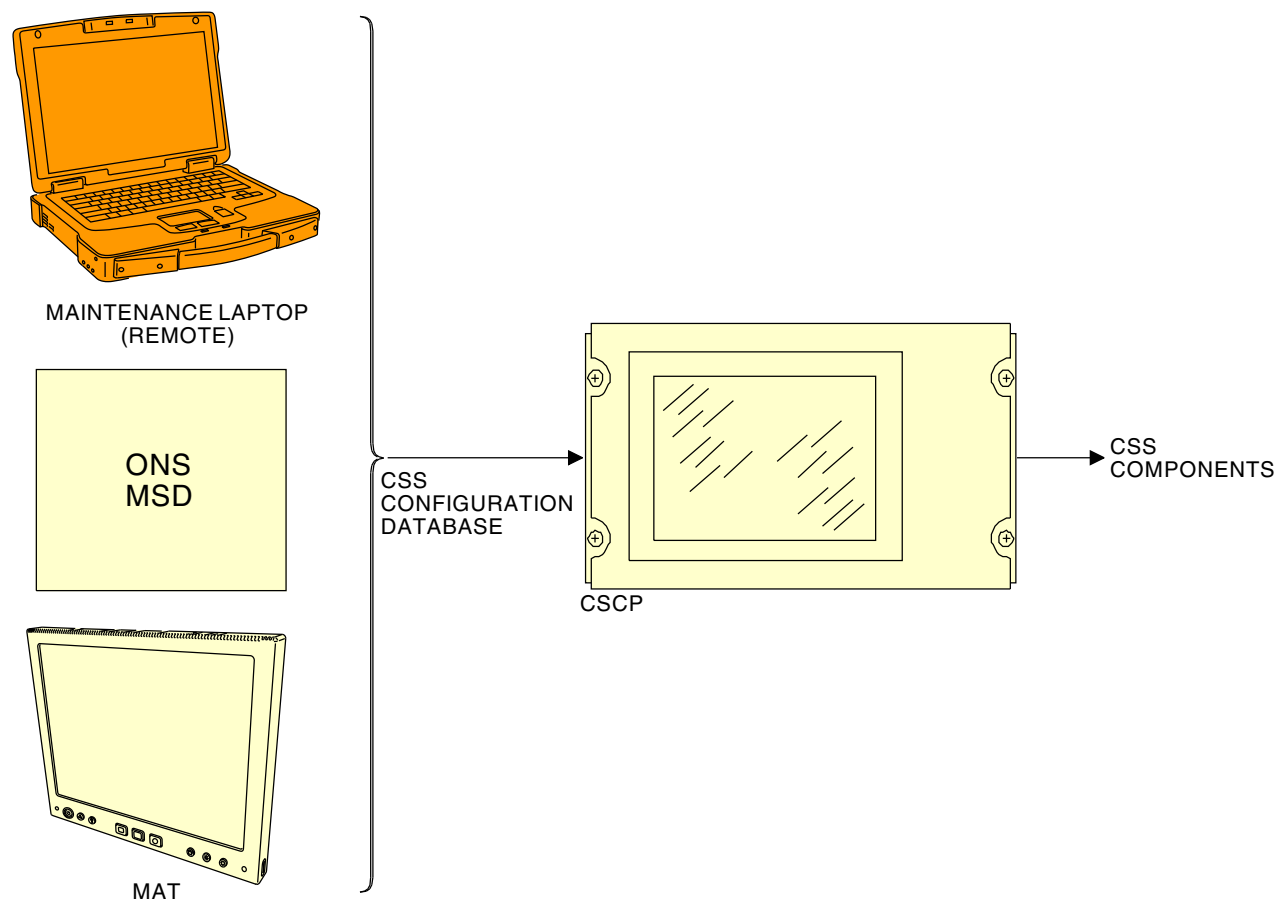
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CSS GENERAL - INSTALL CONFIGURATION DATABASE

2561178 S0000610418_V1

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**CSS GENERAL - OPERATIONAL PROGRAMS****General**

The CSS components use special software for internal operation. The operational program controls the basic functions of the LRU. The LRU operational programs are not part of the configuration database.

Operational Software Installation

The LRU manufacturer normally installs the operational program. A service bulletin may require you to install new operational programs.

You can select an LRU operational program from CSCP memory and install it in the LRU.

These LRUs have operational programs:

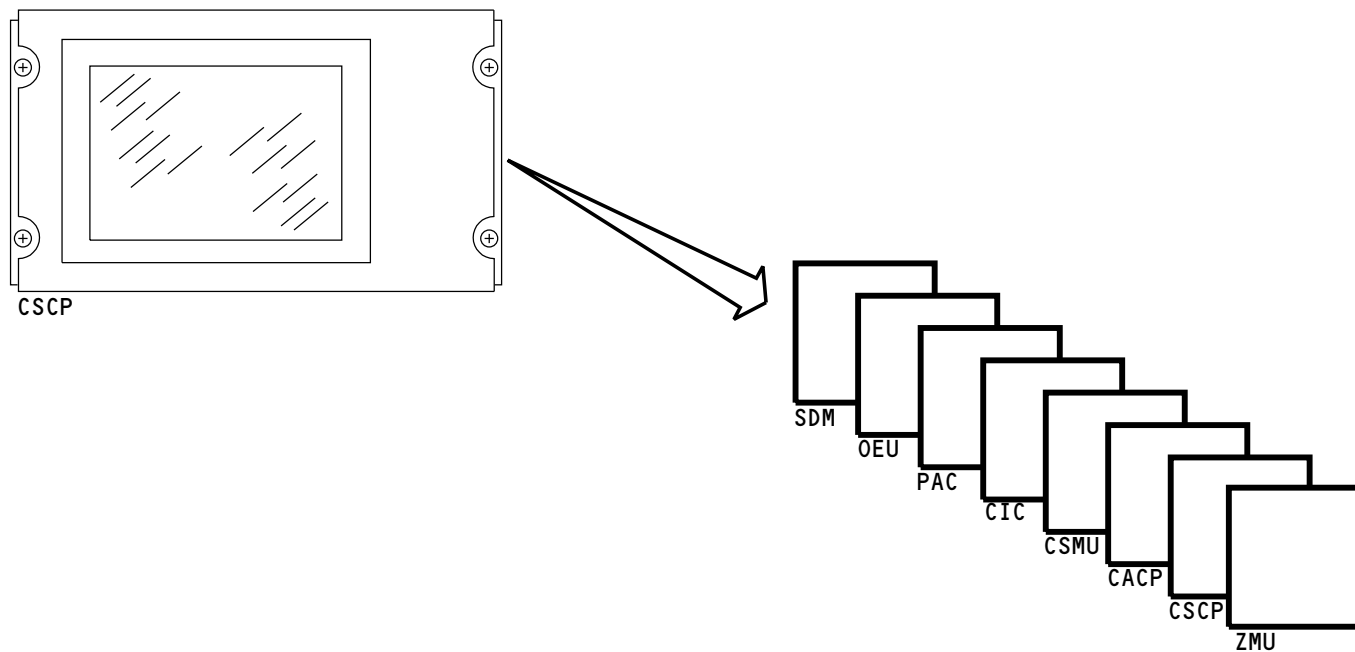
- Cabin system management unit (CSMU)
- Cabin system control panel (CSCP)
- Passenger address controller (PAC) - part of the passenger address/cabin interphone (PA/CI) controller
- Cabin interphone controller (CIC) - part of the PA/CI controller
- Zone management units (ZMUs)
- Cabin area control panels (CACPs)
- Overhead electronics units (OEU's)
- Speaker drive modules (SDMs).

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CSS GENERAL - OPERATIONAL PROGRAMS

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CSS GENERAL - POWER INTERFACE**General**

Power for the cabin services system (CSS) comes through these three power management panels:

- P110 left power management panel
- P210 right power management panel
- P310 standby power management panel.

Circuit breakers control power to these CSS core components:

- Cabin system management unit (CSMU)
- Cabin system control panel (CSCP)
- Cabin area control panels (CACPs)
- Passenger address/cabin interphone (PA/CI) controller.

P110 Left Power Management Panel

The CAB SYS MGMT UNIT circuit breaker connects 115v ac power to the CSMU and the CSCP.

P210 Right Power Management Panel

The AREA CONTROL PANELS circuit breaker connects 115v ac power to all CACPs.

P310 Standby Power Management Panel

These circuit breakers connect 28v dc to the PA/CI controller:

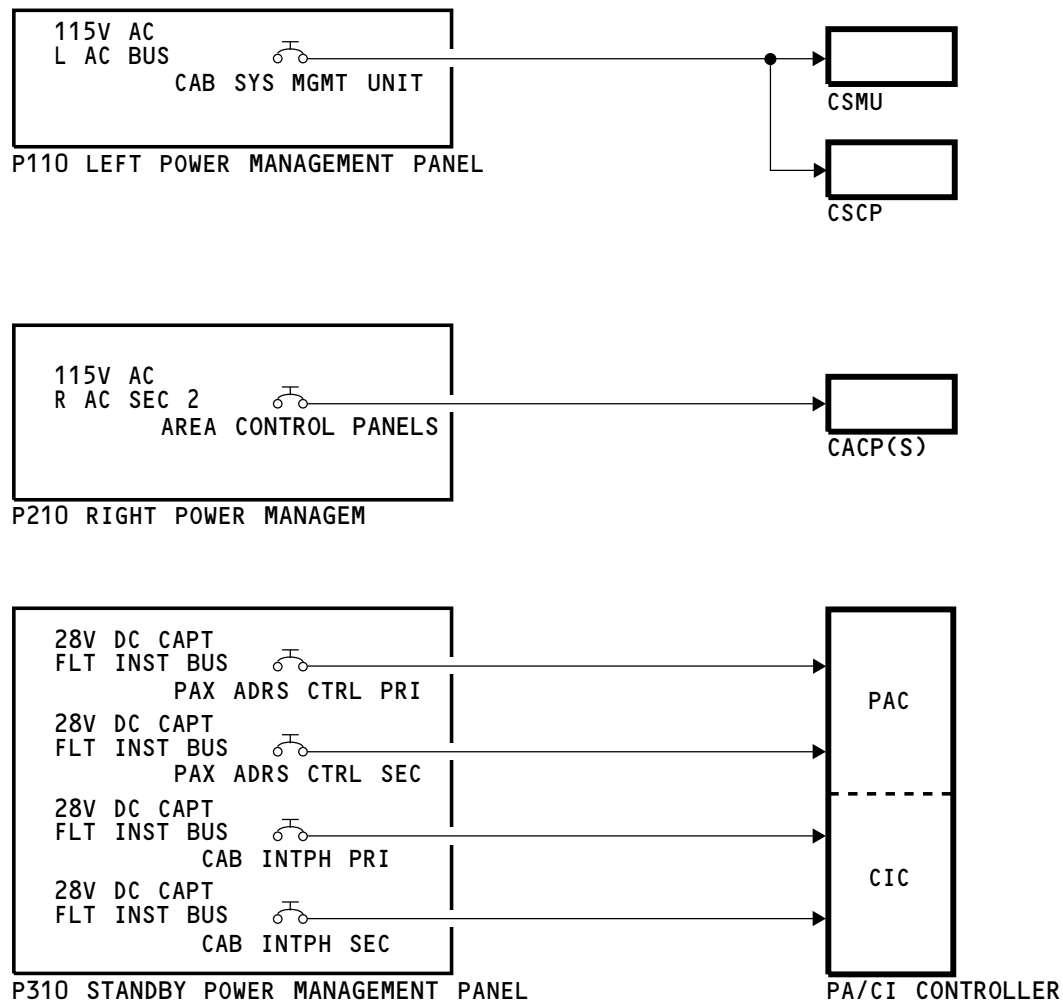
- PAX ADRS CTRL PRI
- PAX ADRS CTRL SEC
- CAB INTPH PRI
- CAB INTPH SEC.

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CSS GENERAL - POWER INTERFACE

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CSS GENERAL - POWER INTERFACE - ZONE 1

General

Components on the left, right, and standby power management panels control power to these zone 1 LRUs:

- Left, center, and right overhead electronics units (OEU)
- Zone management unit (ZMU) 1
- Speaker drive modules (SDMs).

Components

The P110 left power management panel has these components:

- OEU ZONE1 MAIN BUS circuit breaker
- OEU ZONE1 XFER BUS circuit breaker
- ZONE MGMT 1 circuit breaker.

The P210 right power management panel has the PAX MASTER CALL LT circuit breaker.

The P310 standby power management panel has these components:

- PA DIR ACCESS circuit breaker
- CAB INTPH ZMUS circuit breaker
- SDM COL 1 circuit breaker.

Overhead Electronics Unit Power

The OEU ZONE 1 MAIN and OEU ZONE 1 XFER circuit breakers connect 115v ac power to the left, center and right OEUs.

Zone Management Unit Power

These circuit breakers connect power to ZMU 1:

- ZONE MGMT UNIT 1 - 115v ac
- PA DIR ACCESS - 28v dc
- CAB INTPH ZMUS - 28v dc
- PAX MASTER CALL LT - 28v dc.

Speaker Drive Module Power

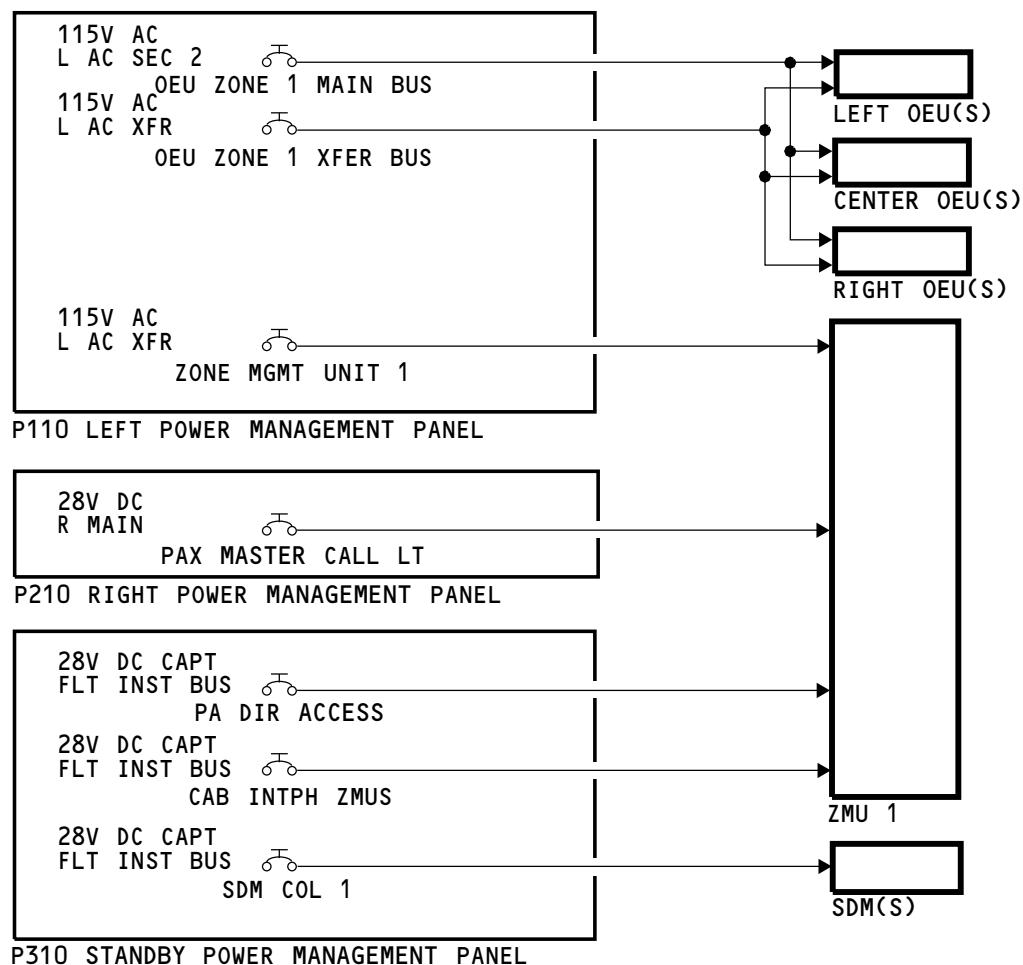
The SDM COL 1 circuit breaker connects 28v dc to all SDMs in zone 1.

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CSS GENERAL - POWER INTERFACE - ZONE 1

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CSS GENERAL - POWER INTERFACE - ZONE 2**General**

Components on the right and standby power management panels control power to these zone 2 LRUs:

- Left, center, and right overhead electronics units (OEUs)
- Zone management (ZMU) unit 2
- Speaker drive modules (SDMs).

Components

The P210 right power management panel has these components:

- OEU ZONE2 LEFT MAIN BUS circuit breaker
- OEU ZONE2 CENTER MAIN BUS circuit breaker
- OEU ZONE2 RIGHT MAIN BUS circuit breaker
- OEU ZONE2 XFER BUS circuit breaker
- ZONE MGMT UNIT 2 circuit breaker
- PAX MASTER CALL LT circuit breaker.

The P310 standby power management panel has these components:

- PA DIR ACCESS circuit breaker
- CAB INTPH ZMUS circuit breaker
- SDM COL 2 circuit breaker.

Overhead Electronics Unit Power

These circuit breakers connect 115v ac to the OEUs:

- OEU ZONE2 LEFT MAIN BUS to the left column of OEUs
- OEU ZONE2 CENTER MAIN BUS to the center column of OEUs
- OEU ZONE2 RIGHT MAIN BUS to the right column of OEUs
- OEU ZONE2 XFER BUS to all OEUs.

Zone Management Unit Power

These circuit breakers connect power to ZMU 2:

- ZONE MGMT UNIT 2 - 115v ac
- PAX MASTER CALL LT - 28v dc
- PA DIR ACCESS - 28v dc
- CAB INTPH ZMUS - 28v dc.

Speaker Drive Module Power

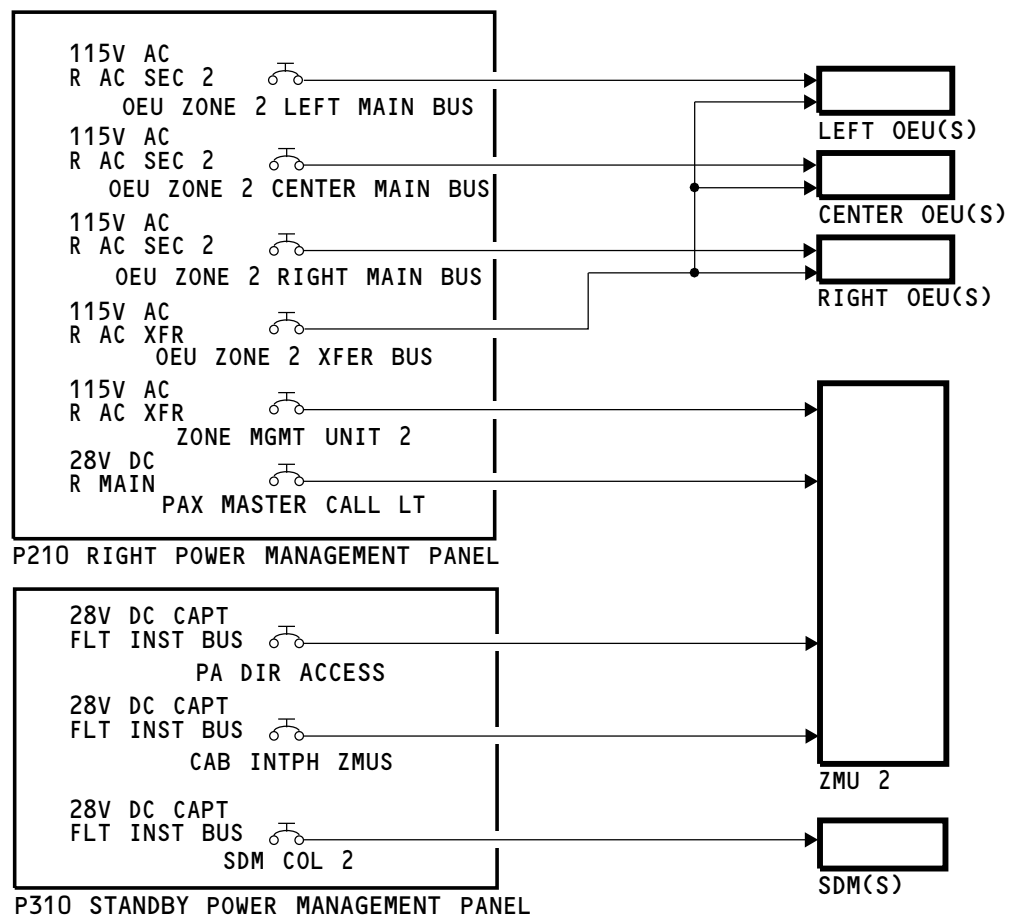
The SDM COL 2 circuit breaker connects 28v dc to all SDMs in zone 2.

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CSS GENERAL - POWER INTERFACE - ZONE 2

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CSS GENERAL - POWER INTERFACE - ZONE 3**General**

Components on the left, right, and standby power management panels control power to these zone 3 LRUs:

- Left, center, and right overhead electronics units (OEUs)
- Zone management unit (ZMU) 3
- Speaker drive modules (SDMs).

Components

The P110 left power management panel has these components:

- OEU ZONE3 LEFT MAIN BUS circuit breaker
- OEU ZONE3 CENTER MAIN BUS circuit breaker
- OEU ZONE3 RIGHT MAIN BUS circuit breaker
- OEU ZONE3 XFER BUS circuit breaker
- ZONE MGMT UNIT 3 circuit breaker.

The P210 right power management panel has the PAX MASTER CALL LT circuit breaker.

The P310 standby power management panel has these components:

- PA DIR ACCESS circuit breaker
- CAB INTPH ZMUS circuit breaker
- SDM COL 3 circuit breaker.

Overhead Electronics Unit Power

These circuit breakers connect 115v ac to the OEUs:

- OEU ZONE3 LEFT MAIN BUS to the left column of OEUs
- OEU ZONE3 CENTER MAIN BUS to the center column of OEUs
- OEU ZONE3 RIGHT MAIN BUS to the right column of OEUs
- OEU ZONE3 XFER BUS to all OEUs.

Zone Management Unit Power

These circuit breakers connect power to ZMU 3:

- ZONE MGMT UNIT 3 - 115v ac
- PAX MASTER CALL LT - 28v dc
- PA DIR ACCESS - 28v dc
- CAB INTPH ZMUS - 28v dc.

Speaker Drive Module Power

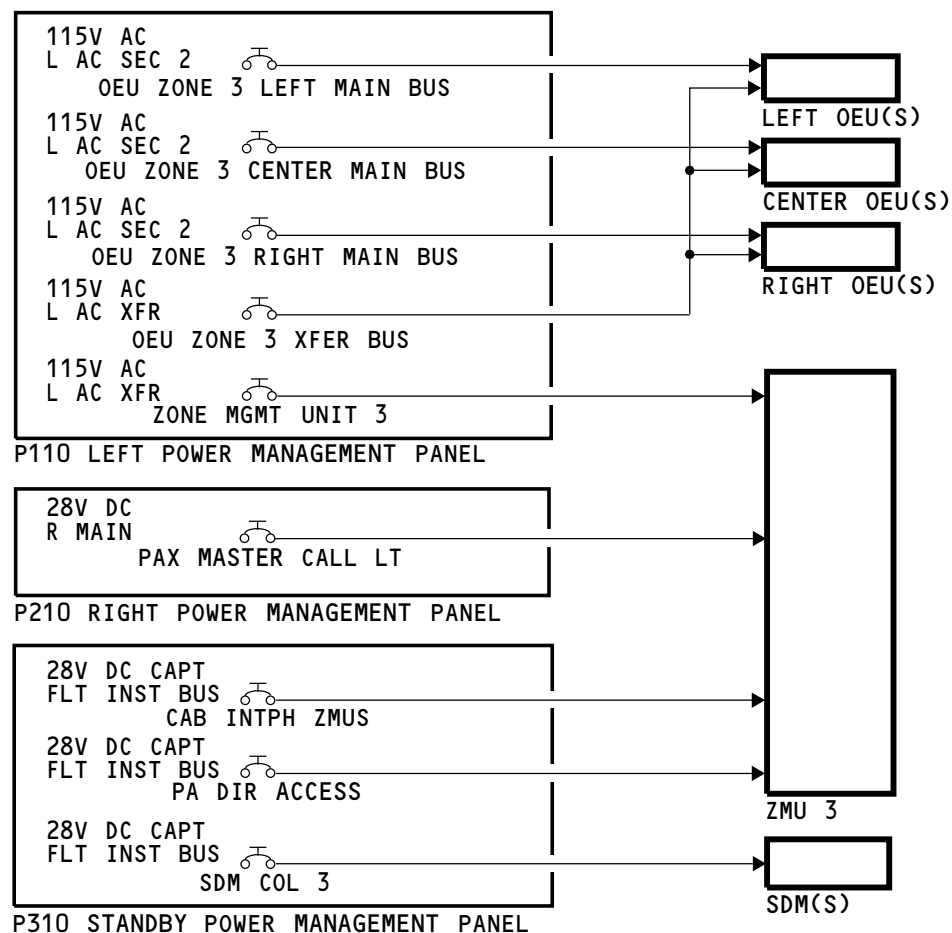
The SDM COL 3 circuit breaker connects 28v dc to all SDMs in zone 3.

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CSS GENERAL - POWER INTERFACE - ZONE 3

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CSS GENERAL - POWER INTERFACE - ZONE 4**General**

Components on the left, right, and standby power management panels control power to these zone 3 LRUs:

- Left, center, and right overhead electronics units (OEUs)
- Zone management unit (ZMU) 4
- Speaker drive modules (SDMs).

Components

The P110 left power management panel has these components:

- OEU ZONE4 LEFT MAIN BUS circuit breaker
- OEU ZONE4 CENTER MAIN BUS circuit breaker
- OEU ZONE4 RIGHT MAIN BUS circuit breaker
- OEU ZONE4 XFER BUS circuit breaker

The P110 left power management panel has these components:

- PAX MASTER CALL LT circuit breaker.
- ZONE MGMT UNIT 4 circuit breaker.

The P310 standby power management panel has these components:

- PA DIR ACCESS circuit breaker
- CAB INTPH ZMUS circuit breaker
- SDM COL 5 circuit breaker.

Overhead Electronics Unit Power

These circuit breakers connect 115v ac to the OEUs:

- OEU ZONE4 LEFT MAIN BUS to the left column of OEUs
- OEU ZONE4 CENTER MAIN BUS to the center column of OEUs
- OEU ZONE4 RIGHT MAIN BUS to the right column of OEUs
- OEU ZONE4 XFER BUS to all OEUs.

Zone Management Unit Power

These circuit breakers connect power to ZMU 3:

- ZONE MGMT UNIT 4 - 115v ac
- PAX MASTER CALL LT - 28v dc
- PA DIR ACCESS - 28v dc
- CAB INTPH ZMUS - 28v dc.

Speaker Drive Module Power

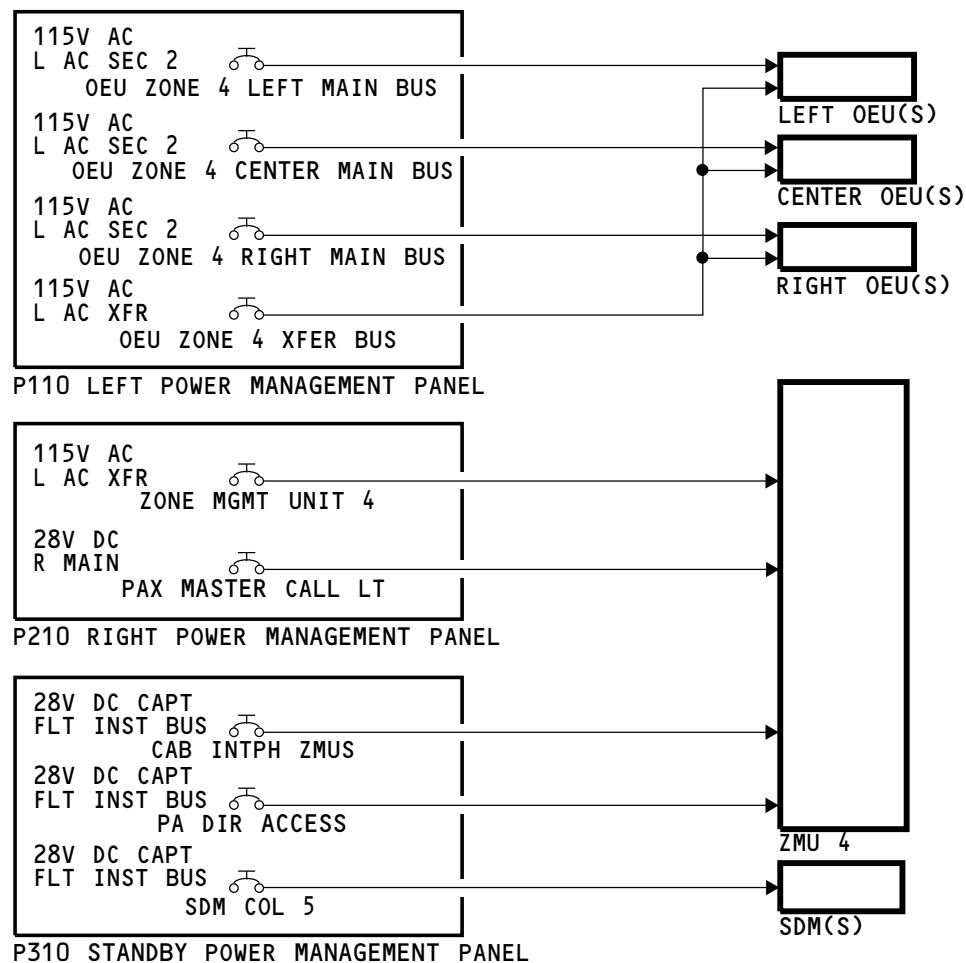
The SDM COL 5 circuit breaker connects 28v dc to all SDMs in zone 4.

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CSS GENERAL - POWER INTERFACE - ZONE 4

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CSS GENERAL - SYSTEM INTERFACES

General

The CSS uses different buses and interfaces to send data between the CSS components. These are the interfaces with the main CSS components:

- Intersystem (I/S) bus
- Cabin interphone (CI) bus
- Passenger address/cabin interphone (PA/CI) bus.

Intersystem Bus

The intersystem bus is the primary bus the CSS uses to send and get data.

The CSMU, passenger address/cabin interphone (PA/CI) controller, and zone management units (ZMUs) all send and receive data on the intersystem bus.

The intersystem bus passes through the components it connects. Thus, a failure of a component does not cause a failure of the bus.

The intersystem bus uses the IEEE 802.3 10 base 2 data standard for data transfer.

Each cabin control panel (CCP) can send and get commands and data from a related ZMU. The ZMUs change 10 base 2 data from the intersystem bus and send it to the CCP.

Passenger Address/Cabin Interphone (PA/CI) Bus

The passenger address controller gets and sends data on the intersystem bus. The cabin interphone controller does not have an interface with the intersystem bus. Any information the CIC needs from the intersystem bus is sent over the PA/CI bus from the PAC.

Cabin Interphone (C/I) Bus

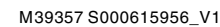
A cabin interphone bus goes from the CIC to each of the ZMUs. These are the main communication busses for the cabin interphone system. A failure of the intersystem bus would have very little effect on the cabin interphone system. Likewise, a failure of a cabin interphone bus would have very little effect on the passenger address system.

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CSS GENERAL - PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER INTERFACES**General**

The passenger address/cabin interphone (PA/CI) controller connects to other CSS components and audio systems to control passenger address and cabin interphone audio.

The PA/CI controller has two passenger address controllers (normal and alternate) and two cabin interphone controllers (normal and alternate). Only one passenger address controller and one cabin interphone controller operate at a time.

CSMU

The cabin system management unit (CSMU) selects which controller is operational. If a normal controller fails, you select the alternate controller from a switch on an attendant switch panel (ASP). The ASP sends a signal to the CSMU. The CSMU sends the signal to the PA/CI controller.

The cabin system management unit (CSMU) sends a keyline to tell the PAC when there is boarding music audio.

The PA/CI controller sends cabin interphone controller (CIC) BITE status to the CSMU using a health discrete. The PA/CI controller sends passenger address controller (PAC) BITE status to the CSMU using the intersystem bus.

The PA/CI controller and CSMU send data on the intersystem bus.

Airplane Systems Interfaces

The PA/CI controller has interfaces with airplane systems on the left system ARINC 629 bus. The system interfaces are:

- Environmental control system (ECS)
- ARINC signal gateway (ASG) card
- Proximity sensor electronics unit (PSEU)
- Overhead panel ARINC 629 system (OPAS)
- Flap/slat electronics unit (FSEU)
- Electrical load management system (ELMS)
- Warning electronic system (WES)

- Airplane information management system (AIMS).

CDU, AMU, and FDH Interfaces

The flight crew uses the flight interphone system to talk on the passenger address system and cabin interphone system. The audio management unit (AMU) supplies the interface to the PA/CI controller. The center control display unit (CDU) sends dial data and shows call information. The flight crew uses the flight deck handset (FDH) to talk.

AIMS Interfaces

The PA/CI controller sends call signals to the AIMS for these four conditions:

- Cabin call
- Cabin ready
- Cabin alert
- Ground call.

IFE System Interfaces

The in-flight entertainment system sends these signals to the passenger address/cabin interphone (PA/CI) controller:

- Boarding music
- Video entertainment audio
- Video in use.

The IFE system also sends keylines to tell the PAC when an audio signal is present.

The PA/CI controller sends these signals to the IFE system:

- PA override audio
- PA override keylines
- PA-All keyline
- Decompression.

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**CSS GENERAL - PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER INTERFACES****Speaker Drive Module Interfaces**

There are four columns of speaker drive modules (SDMs), one column for each zone. The PA/CI controller sends digitized passenger address audio to the SDMs. The data format uses the EIA-485 data standard. Another EIA-485 bus is for data between the SDMs and PA/CI controller.

The PA/CI controller sends a token signal during configuration database installation.

Zone Management Unit Interfaces

The PA/CI controller receives mic audio and a PTT signal from zone management unit (ZMU) 1 for the passenger address direct access input. It sends and receives digital audio for the cabin interphone system. The cabin interphone bus uses the EIA-485 data format. The passenger address controller and cabin interphone controller send these signals to each other. The cabin interphone controller gets attendant announcements and sends them to the passenger address controller.

The PA/CI controller also connects to the other ZMUs on the cabin interphone buses.

The PA/CI controller uses the intersystem bus between the CSMU and ZMU 1.

Panel Interfaces

The PA/CI controller sends a signal to the P310 standby power management panel for a ground crew call.

The P40 service and APU shutdown panel sends a signal to the PA/CI controller when the ground crew calls the flight deck.

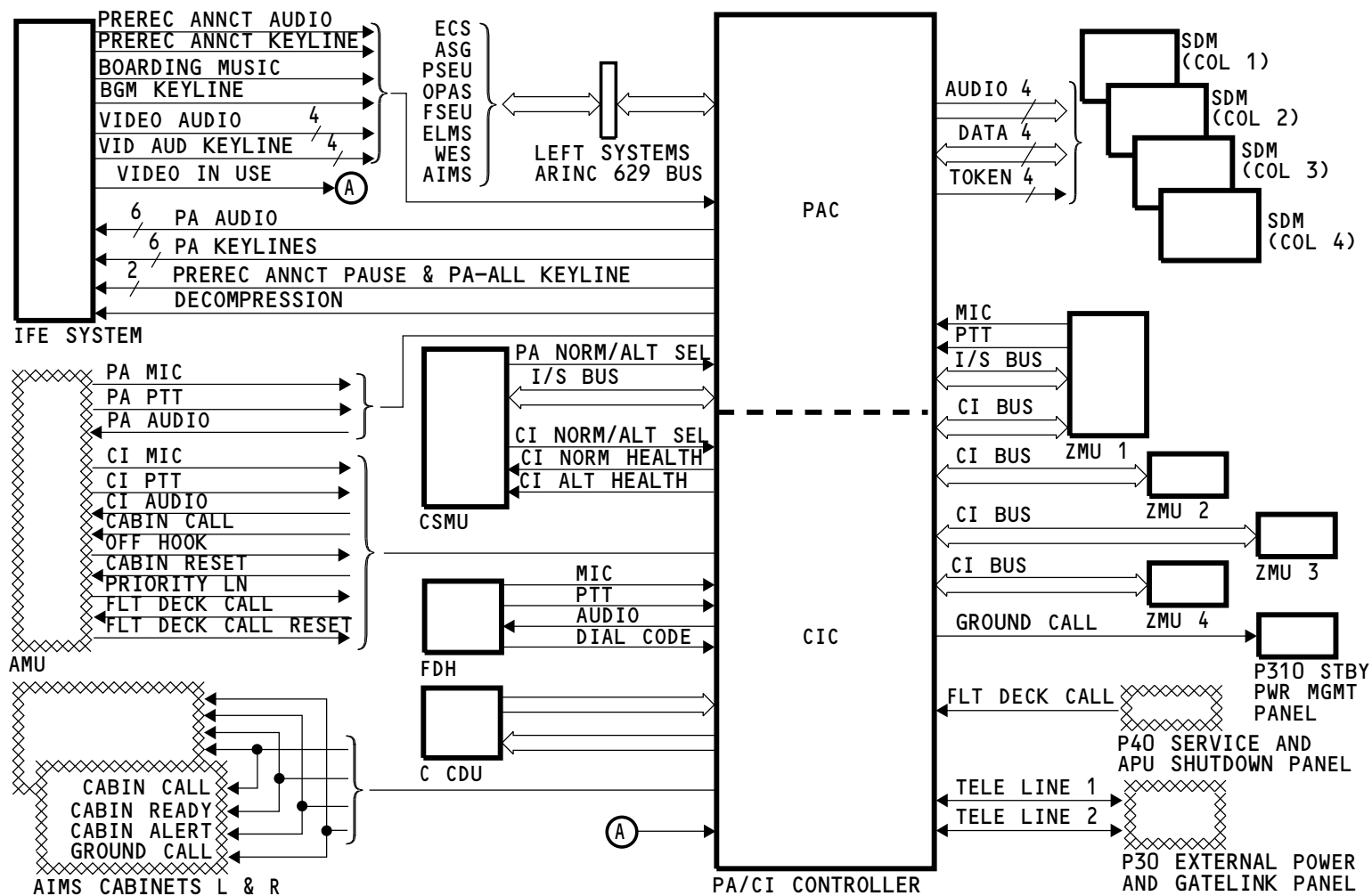
The P30 external power and gatelink panel has two telephone jacks. They connect to the PA/CI controller.

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CSS GENERAL - PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER INTERFACES

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**CSS GENERAL - ZONE MANAGEMENT UNIT 1 INTERFACES****General**

The zone management unit (ZMU) controls the cabin components connected to it. It is also an interface between cabin components and other main controllers.

Passenger Address/Cabin Interphone Controller Interfaces

The bus interfaces between the passenger address/cabin interphone (PA/CI) controller and ZMU 1 are the intersystem bus and the cabin interphone bus. The intersystem bus supplies a data interface for primary CSS components. It uses a 10 base 2 data format. The cabin interphone bus is for the cabin interphone function. It uses an EIA-485 data format.

ZMU 1 sends analog audio and a PTT signal to the PA/CI controller for the passenger address direct access function.

Zone Management Unit Interfaces

The intersystem bus from ZMU 1 connects to ZMU 2 which also connects to ZMU 3. Each ZMU uses the data from this bus to control their related zone components.

The ARINC 628 zone interface bus provides an interface with the in-flight entertainment system for passenger service functions.

ZMU 2 sends analog microphone audio and a PTT signal to ZMU 1 for the passenger address direct access function. ZMU 2 also gets audio and a PTT signal from ZMU 3 to send to ZMU 1. ZMU 1 sends the signals to the PA/CI controller.

Cabin Attendant Handset Interfaces

Attendants use the cabin attendant handsets (CAHs) for cabin interphone calls and passenger address announcements. Each ZMU connects to as many as five CAHs. The CAH sends microphone audio, a PTT, and dialing signals to the ZMU. The ZMU sends receive audio to the CAH.

Each ZMU can have only one passenger address direct access interface. Attendants use the CAH that has a direct access button on the handset cradle to energize a relay in the ZMU. The interface between the cradle and the ZMU is a power signal, set signal, and reset signal.

Master Call Light Interfaces

Each ZMU controls as many as 30 master call lights. Ten master call lights are for cabin interphone calls. Twenty master call lights are for passenger to attendant calls.

Overhead Electronics Unit Interfaces

Each ZMU connects to three columns of overhead electronics units (OEUs). The data bus uses an EIA-485 type of data format.

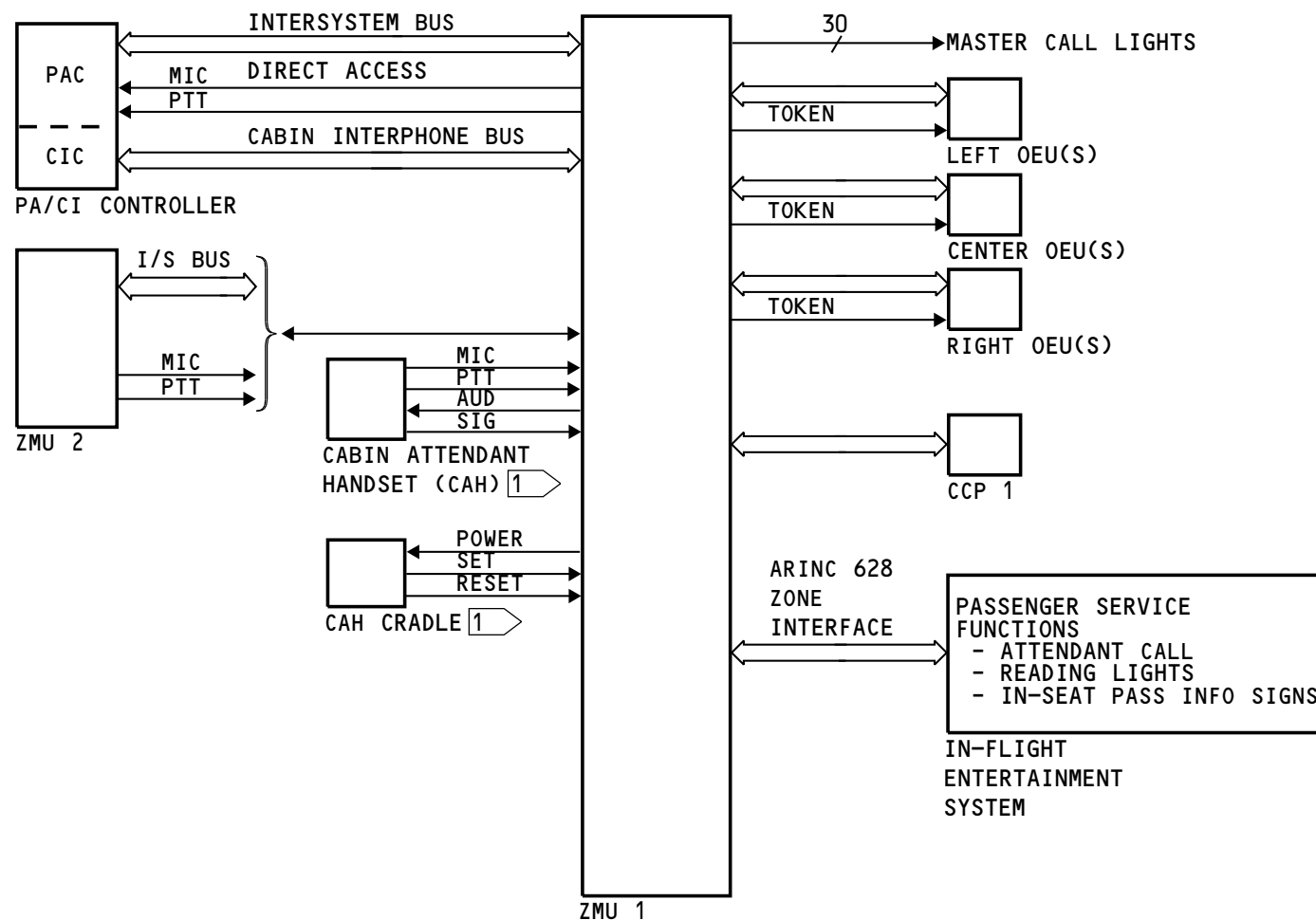
OEUs control lights and passenger information signs. They also monitor different inputs. The token signal is for test and software installation.

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1 UP TO FIVE CAHs MAY BE CONNECTED TO EACH ZMU

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CSS GENERAL - ZONE MANAGEMENT UNIT 1 INTERFACES

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CSS GENERAL - CABIN CONTROL PANEL

Purpose

You use the cabin control panels (CCPs) to operate the CSS. The hardware configuration of a CCP tells it to operate as a cabin area control panel (CACP) or a cabin system control panel (CSCP).

Flight attendants use the CSCP or the CACPs to control CSS functions. Maintenance personnel use the CSCP to do tests and to install software.

Physical Description**ARO 001-015 PRE SB 777-23-0369**

The CCP weighs 13 pounds. These are the dimensions:

- Length - 16.5inches
- Width - 10.4inches
- Height - 3.3inches.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

The CCP weighs 13.2 pounds. These are the dimensions:

- Length - 16.3inches
- Width - 10.8inches
- Height - 2.4inches.

ARO ALL

The front panel has these items:

- Touch-sensitive flat panel screen to select all functions

ARO 001-015 PRE SB 777-23-0369; AIRPLANES WITH CCP 285W0863-1

- LED to show too cold condition

ARO 001-015 PRE SB 777-23-0369; AIRPLANES WITH CCP 285W0863-2 THROUGH -999

- LED to show failure of panel lamp

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- Solid LED to show out-of-range temperature condition
- Flashing LED to show an internal fault has initiated CCP
- Switch S1 for CSCP/CACP configuration

ARO ALL

- Connector J1 for 115v ac power input and connection to the zone management unit (ZMU) panel bus
- Connector J2 for an RS-232 interface jack for shop maintenance functions

ARO 001-015 PRE SB 777-23-0369

- Connector J3 for 10-base-T network interface

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- Connector J4 for RJ45 interface jack for maintenance laptop (ML) access
- Connectors J5 and J6 for USB ports for saving reports

ARO ALL**Functional Description**

Attendants make selections on the touch screen to control these CSS functions:

- Cabin lighting
- Passenger services
- Cabin environment.

Training Information Point**ARO 001-015 PRE SB 777-23-0369**

The mass memory card and the floppy disk drive are line replaceable.

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CSS GENERAL - CABIN CONTROL PANEL

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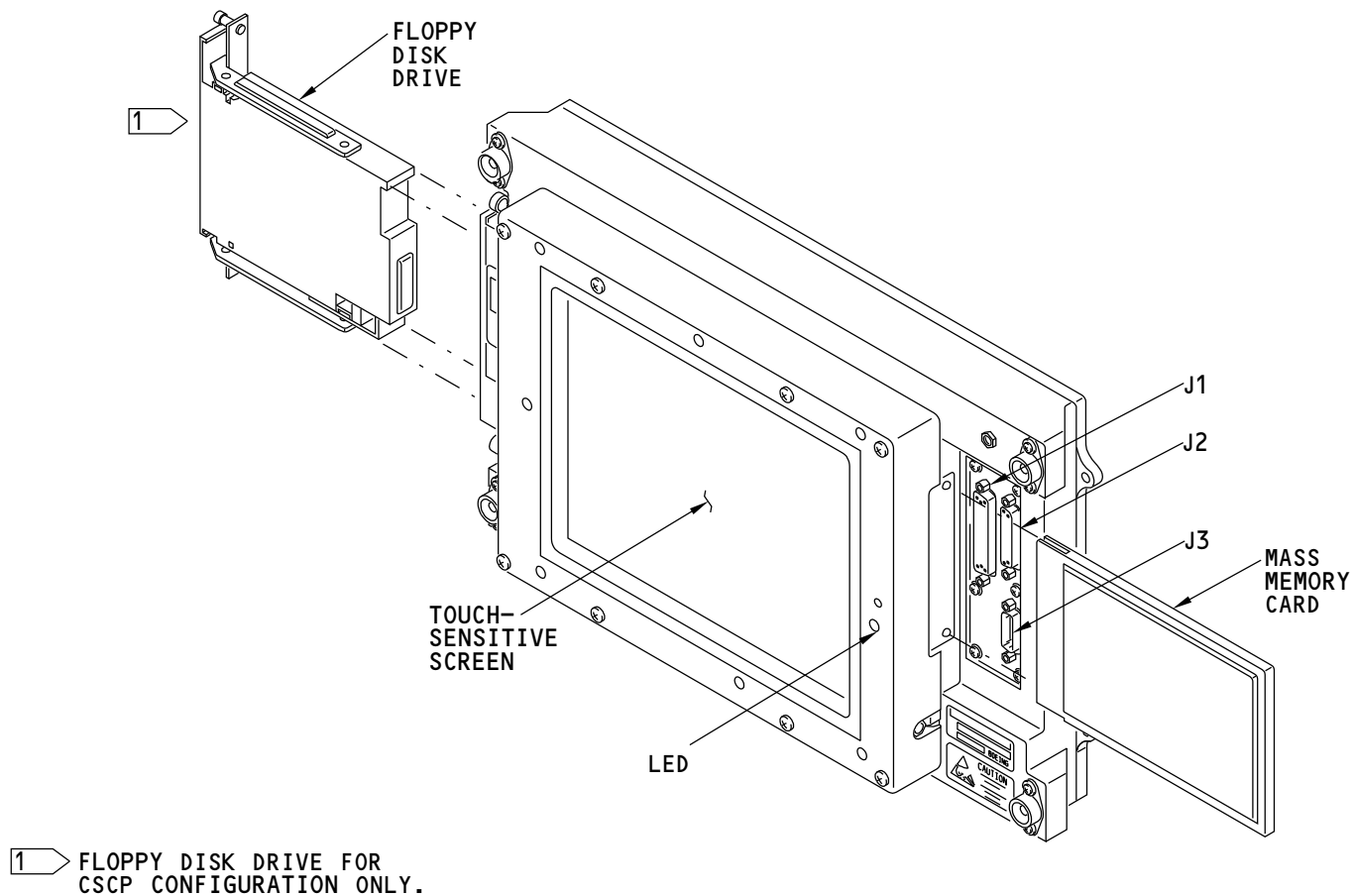
The S1 switch on the left side of the CCP must be set correctly to either CSCP or CACP per configuration for successful operation.

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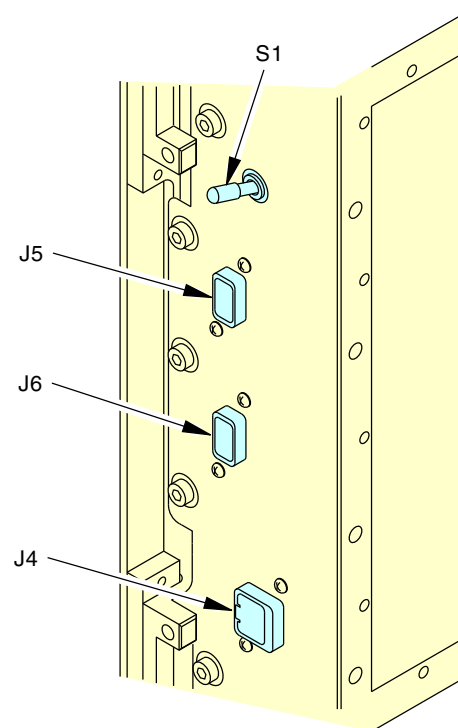
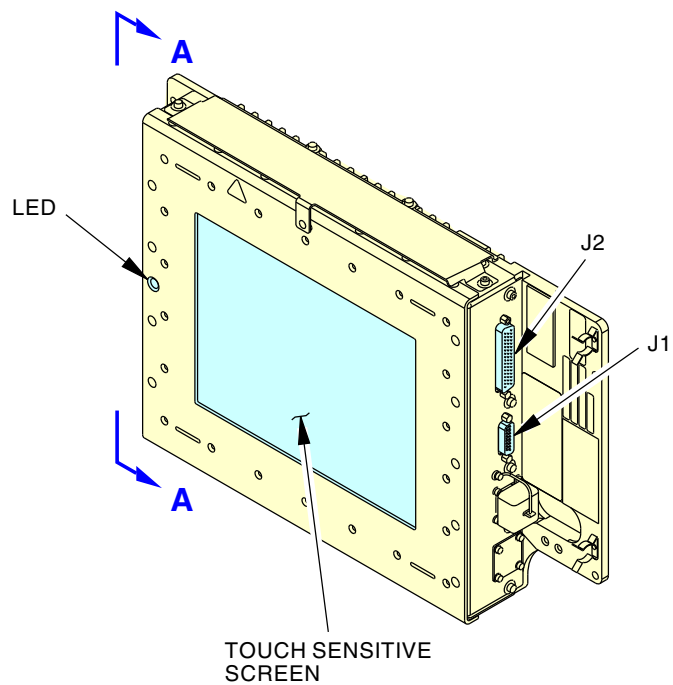
CSS GENERAL - CABIN CONTROL PANEL

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CSS GENERAL - CABIN CONTROL PANEL

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**CSS GENERAL - CABIN SYSTEM MANAGEMENT UNIT****Purpose**

The cabin system management unit (CSMU) supplies an interface between CSS LRUs and other airplane systems.

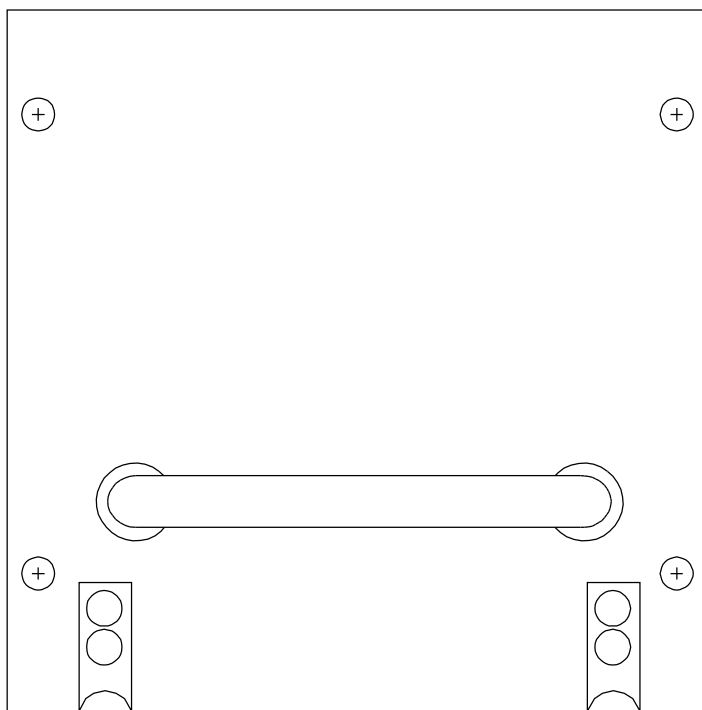
Physical Description

The CSMU is a 6 MCU LRU and weighs approximately 12 lb (5 kg).

Functional Description

The CSMU does these functions:

- Gets CSS database and operational program software from the cabin system control panel (CSCP) and sends it to other CSS LRUs
- Sends data to and gets data from the right systems ARINC 629 bus (temperature control, maintenance information, etc.).



CSS GENERAL - CABIN SYSTEM MANAGEMENT UNIT

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**CSS GENERAL - PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER****Purpose**

The passenger address/cabin interphone (PA/CI) controller permits announcements on the passenger address system. It also permits attendants to make station to station calls and calls to the flight deck.

Physical Description

The PA/CI controller is an 8 MCU LRU and weighs 21 lb (10 kg).

Functional Description

The PA/CI controller has two passenger address controllers and two cabin interphone controllers. Each controller uses different circuits in the LRU. Only one passenger address controller and one cabin interphone controller operates at a time. If a controller fails, you can select the alternate controller.

The PA controller does these functions:

- Digitizes six PA channels for audio output
- Sends PA override signals to the in-flight entertainment (IFE) system (overrides passenger entertainment audio when necessary)
- Calculates the volume for each speaker
- Receives audio inputs from the flight interphone system, direct access, cabin interphone controller, and IFE system (prerecorded announcements, video audio, boarding music)
- Controls the logic for the passenger information signs
- Has an interface with the left systems ARINC 629 bus.

The cabin interphone controller does these functions:

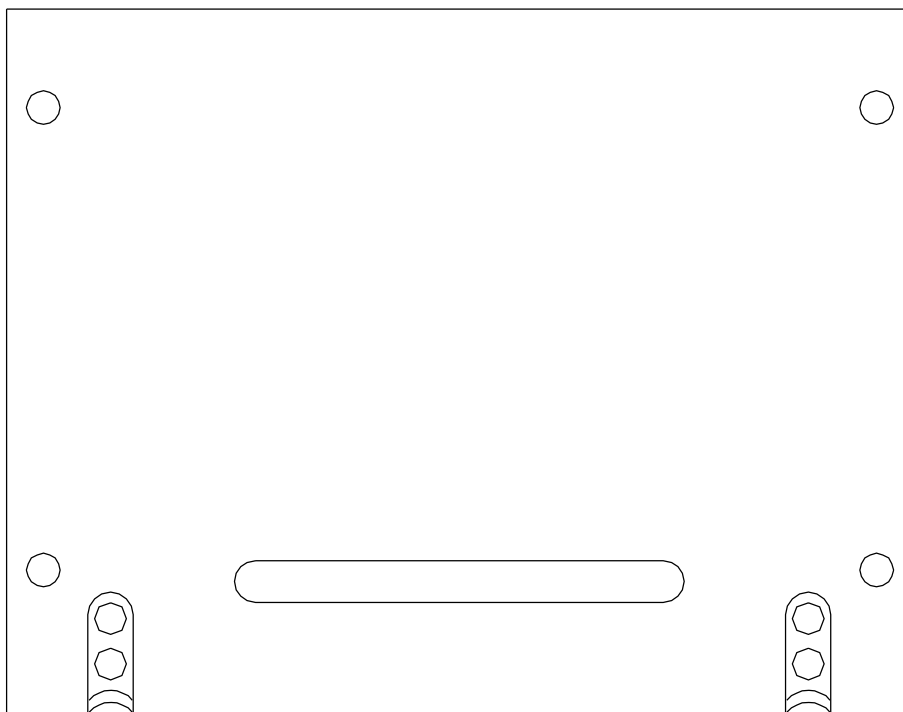
- Makes digital connections between stations
- Sends audio tones to off-hook handsets
- Sends audio sidetone to the flight deck
- Processes ground crew calls
- Has interfaces with the flight deck, flight interphone system, and AIMS.

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CSS GENERAL - PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER

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CSS GENERAL - ZONE MANAGEMENT UNIT**Purpose**

The zone management units (ZMUs) primarily control passenger service and cabin lighting. They have interfaces with these components:

- Passenger address/cabin interphone (PA/CI) controller
- Cabin area control panels (CACPs)
- Cabin attendant handsets (CAHs)
- Overhead electronics units (OEUs).

Physical Description

The ZMU weighs 12 lb (5 kg). These are the dimensions:

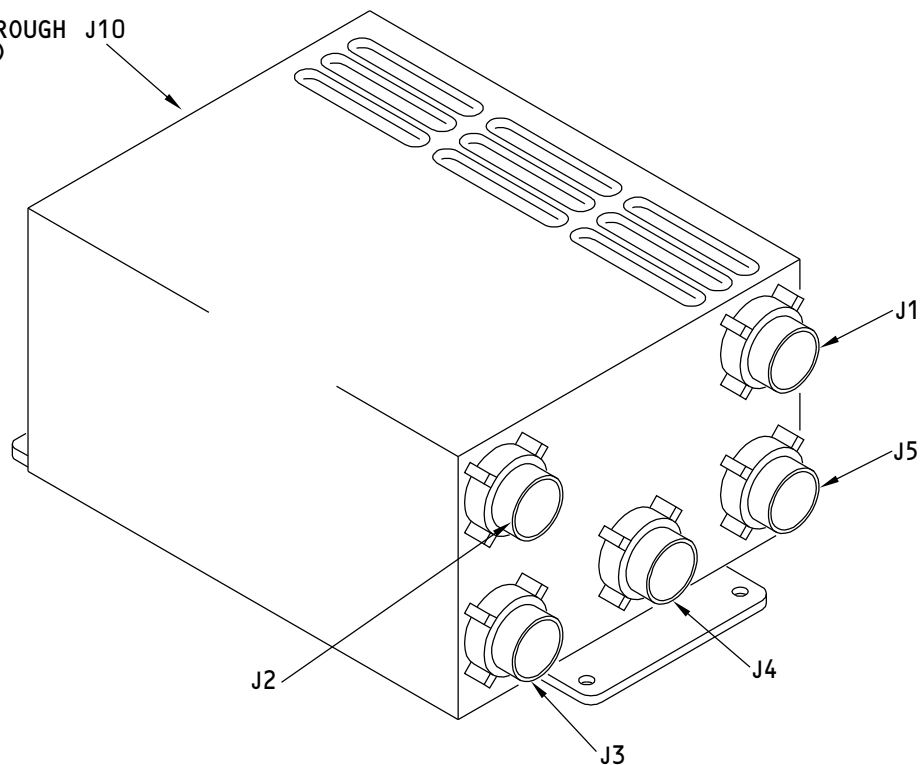
- Length - 10.3 in. (26.2 cm)
- Width - 8 in. (20 cm)
- Height - 5.8 in. (14.7 cm).

Functional Description

Each ZMU does these functions:

- Does bus conversion from 10BASE-2 to 10BASE-T for as many as three cabin area control panels
- Has interfaces for as many as five handsets and three columns of OEUs
- Controls as many as 30 master call lights
- Routes PA direct access signals.

CONNECTORS J6 THROUGH J10
(ON BACK OF UNIT)



CSS GENERAL - ZONE MANAGEMENT UNIT

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**CSS GENERAL - ZONE MANAGEMENT UNIT INSTALLATION****General**

The ZMUs are above the cabin ceiling on the right side of the stow bin ladder assembly. Four screws attach the ZMU to the ladder assembly.

Training Information Point

You remove ceiling panels to get access to a ZMU.

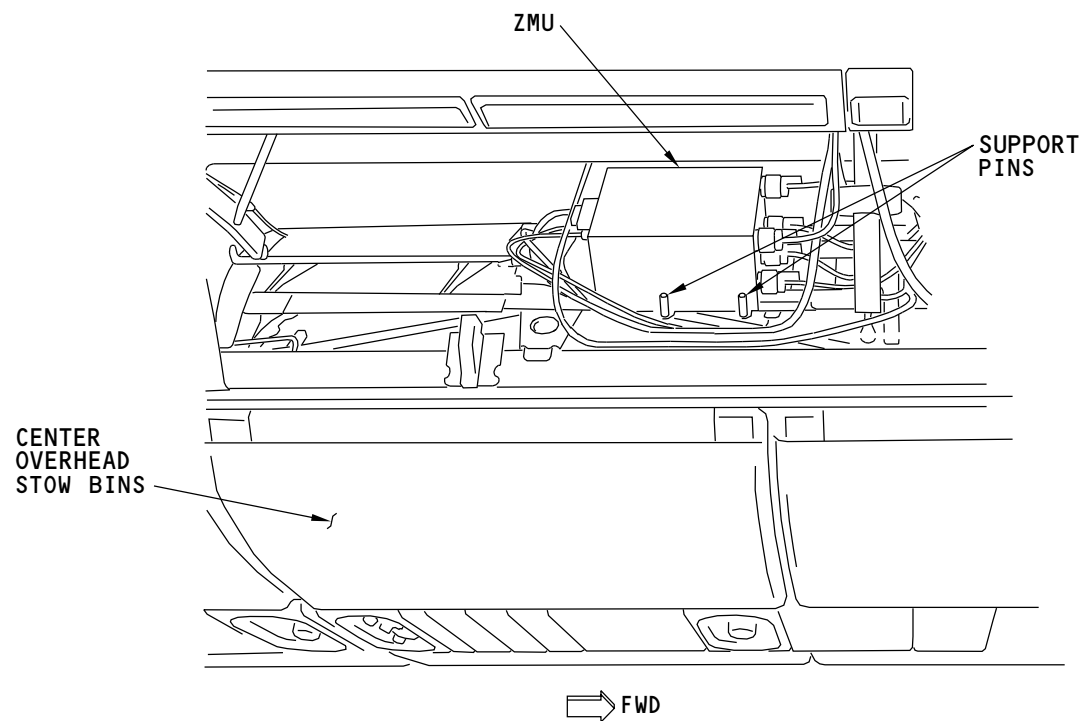
Training Information Point

There are support pins to hold the ZMU during removal and installation.

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(LOOKING INBOARD FROM RIGHT SIDE)
(TYPICAL INSTALLATION)

CSS GENERAL - ZONE MANAGEMENT UNIT INSTALLATION

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CSS GENERAL - CABIN CONTROL PANEL FUNCTIONAL DESCRIPTION

General

You use the cabin control panels (CCPs) to operate the CSS. The hardware configuration of a CCP tells it to operate as a cabin area control panel (CACP) or a cabin system control panel (CSCP).

ARO 001-015 PRE SB 777-23-0369

The CSCP configuration has a floppy disk drive (FDD) and an 85 megabyte mass memory card (MMC). The CACP configuration has a 20 megabyte MMC and no FDD.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Each CCP has a mass storage to keep software parts. Parts can be transferred (phase 1 load) to the CCPs via maintenance laptop (ML) or onboard network system (ONS).

ARO ALLController

It controls tests and software installation in the CSS components. It also controls selection of normal CSS functions such as lighting, monitor and control, and passenger services.

Display

The CCP display is a touch-sensitive screen. The display shows menus for control of the CSS.

ARO 001-015 PRE SB 777-23-0369Mass Memory Card

The CCP uses a mass memory card (MMC) to keep software. The mass memory card is a solid state data storage device. The MMC keeps operational software and data from the configuration database (CDB). The CDB data in the CCP tells the CCP which screen selections it may show. The mass memory card is line replaceable.

Floppy Disk Drive

The FDD is only used in the CSCP. You use the FDD to install the database software and operational software into the MMC. The FDD also saves report data from the CSS on to a floppy disk.

ARO 016-999; ARO 001-015 POST SB 777-23-0369Mass Storage Device

The CCP has a mass storage device to keep software. The mass storage keeps operational software and data from the configuration database (CDB). The CDB data in the CCP tells the CCP which screen selections it may show.

USB Port

The USB ports are only used in the CSCP. You use the USB ports to save report data from the CSS on to a USB drive. USB drives cannot be read from, only written to, so software parts cannot be loaded via USB drive.

ARO ALLInterfaces

The CCP sends and receives data on the intersystem bus. This includes these functions:

- Test commands
- Programming
- Normal CSS selections.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

The CSCP is also connected to the ONS for uplinking parts and downlinking reports.

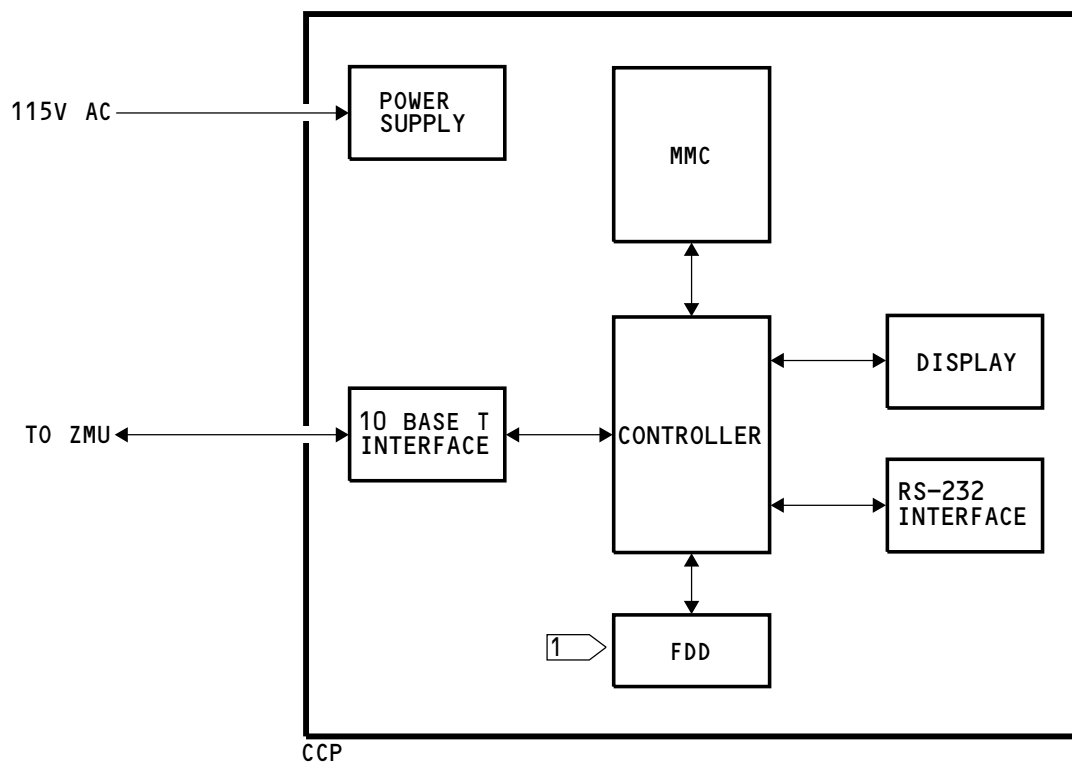
The CCP has an RJ45 port for directly-connecting a ML for part management and installation.

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1 FLOPPY DISK DRIVE FOR CSCP CONFIGURATION ONLY.

CSS GENERAL - CABIN CONTROL PANEL FUNCTIONAL DESCRIPTION

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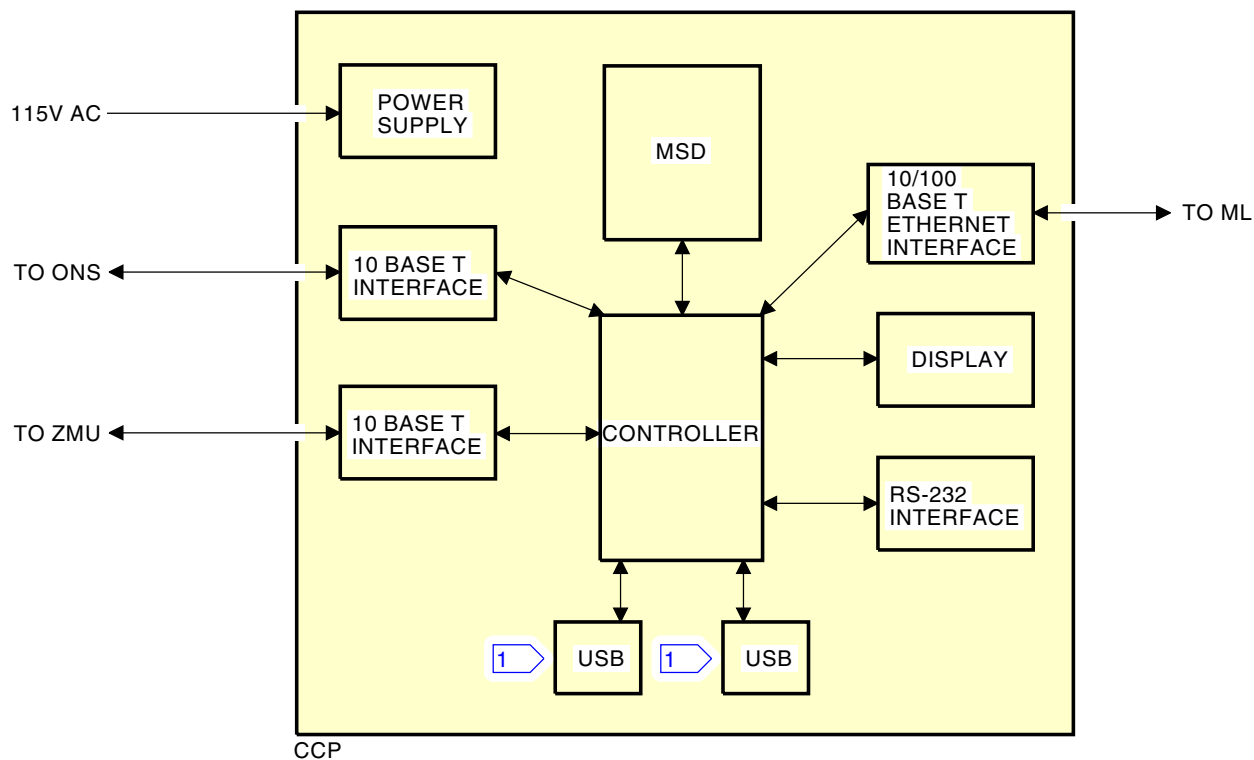
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1 USB DRIVE FOR CSCP CONFIGURATION ONLY.

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**CSS GENERAL - CABIN SYSTEM MANAGEMENT UNIT - FUNCTIONAL DESCRIPTION****General**

The cabin system management unit (CSMU) gets the CSS database and operational software from the CSCP and sends it to other CSS LRUs. The CSMU has these:

- Controller
- Discrete buffer
- Interface circuits.

The CSMU gets 115v ac power from the left ac transfer bus.

Controller

The controller uses operational software to control these functions of the CSMU:

- CSS database and operational software routing from the CSCP to other CSS LRUs
- Discrete input and output control.

Data Bus Interfaces

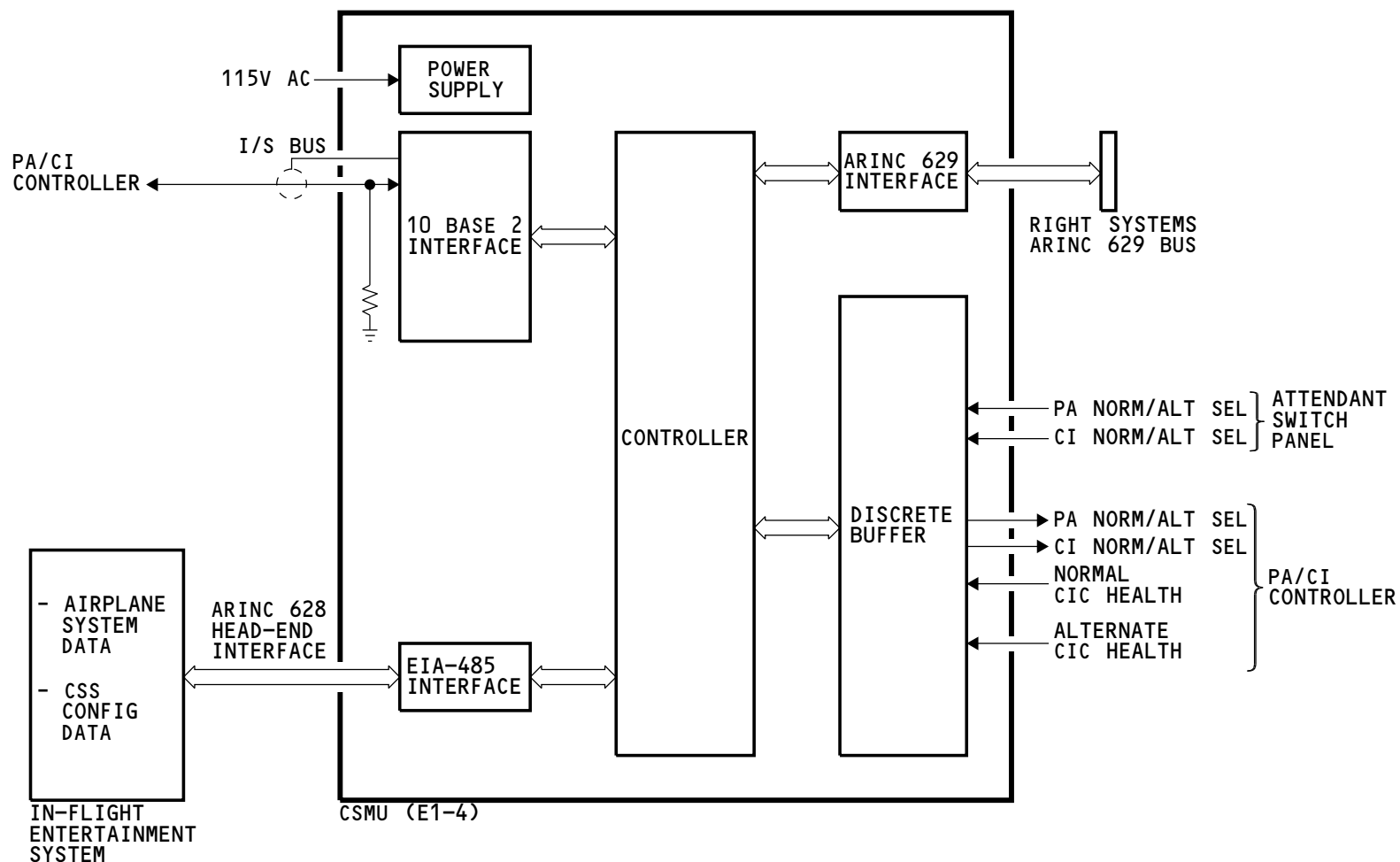
The CSMU uses these data bus interfaces:

- 10 base 2 - sends data to and gets data from the intersystem (I/S) bus. Because the CSMU is at one end of intersystem bus, it has a termination resistor to prevent noise on the bus
- ARINC 629 - sends data to and gets data from the right systems ARINC 629 bus to let the CSS communicate with other airplane systems
- ARINC 628 - sends data to and gets data from the in-flight entertainment system.

Discrete Buffer

The discrete buffer interface sends and gets discrete signals from other components. It gets normal or alternate controller selections for the passenger address system and cabin interphone system from the attendant switch panel. It controls which cabin interphone controller and which passenger address controller is operational. The CSMU also gets a BITE discrete from the normal and alternate cabin interphone controllers.

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CSS GENERAL - CABIN SYSTEM MANAGEMENT UNIT - FUNCTIONAL DESCRIPTION

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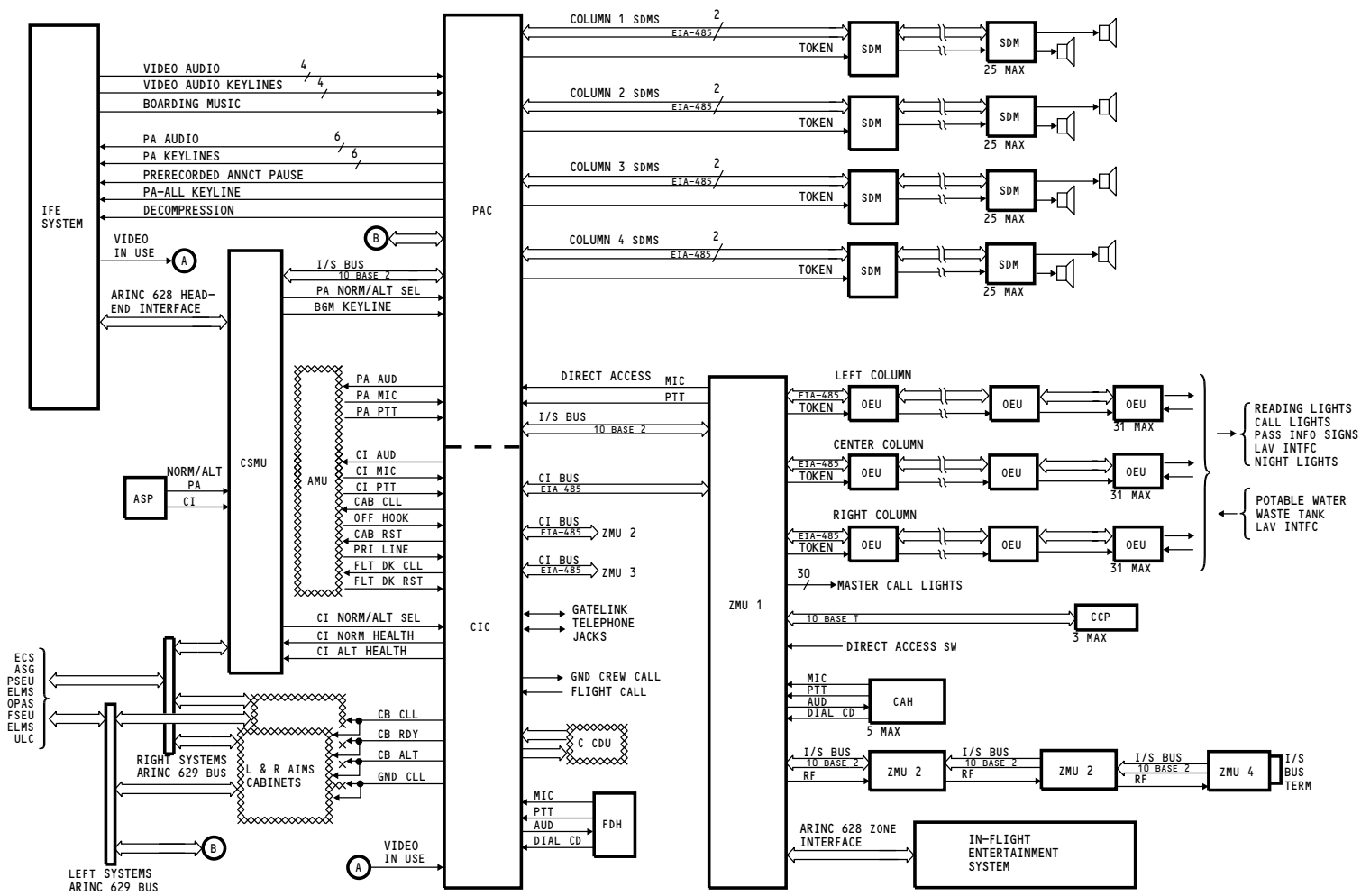


CSS GENERAL - INTERFACE DIAGRAM

Interface Diagram

This interface diagram is for reference only.





CSS GENERAL - INTERFACE DIAGRAM

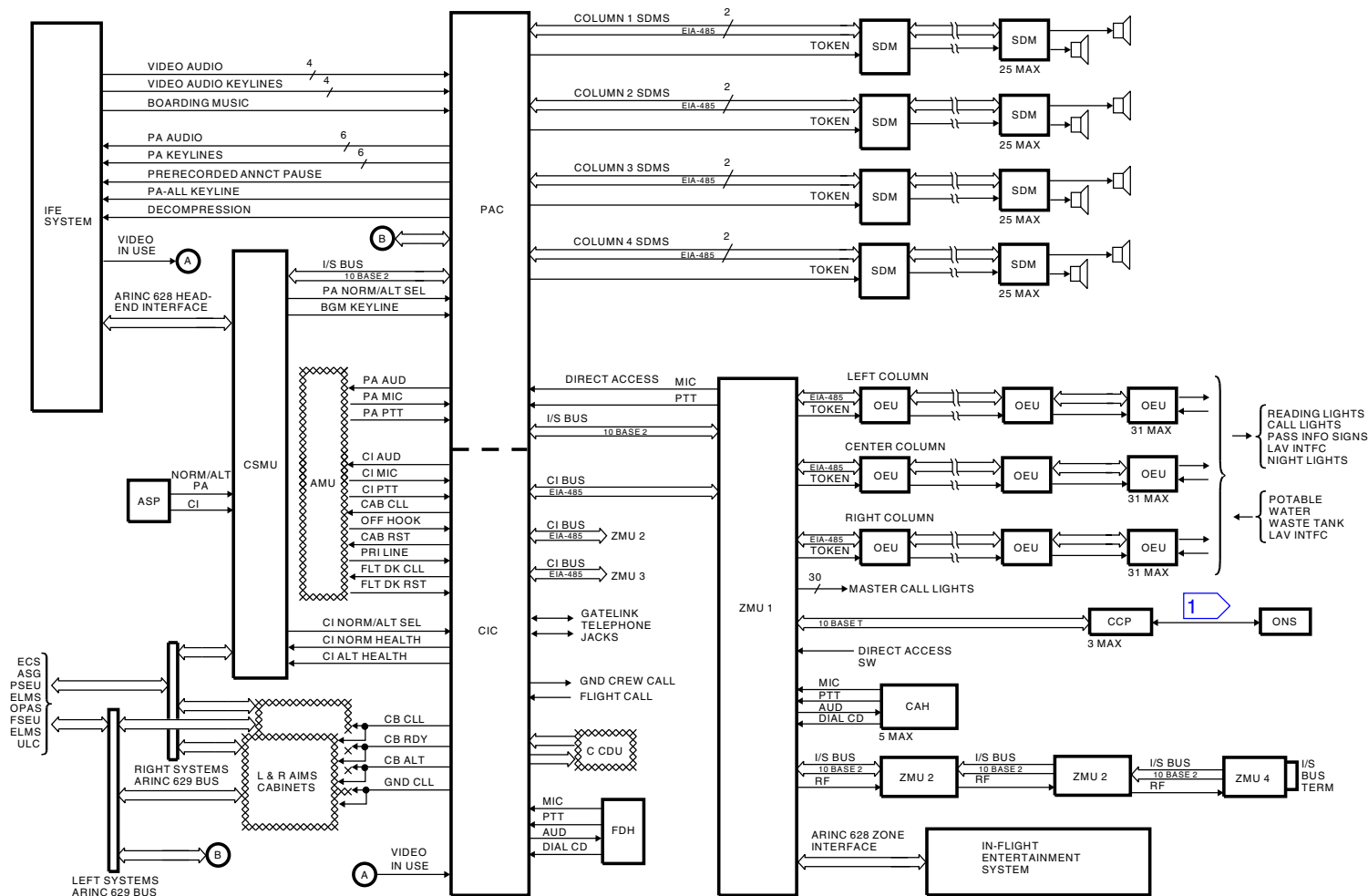
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1 ONS CONNECTS TO THE CSCP ONLY.

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CSS GENERAL - INTERFACE DIAGRAM

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CSS GENERAL - CSCP/CACP CONFIGURATIONS

General

The cabin system control panel (CSCP) and cabin area control panels (CACPs) must have the correct hardware configuration for them to operate.

If a panel does not have the correct configuration at power up, a screen shows to tell you a possible cause.

Panel Configurations**ARO 001-015 PRE SB 777-23-0369**

For correct configuration, a CSCP must have an 85 megabyte mass memory card (MMC) and a floppy disk drive installed.

A CACP configuration must have a 20 megabyte MMC and no floppy disk drive installed.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

For correct configuration, a CSCP must have its S1 switch to "CSCP" mode.

A CACP configuration must have its S1 switch to "CACP" mode.

ARO 001-015 PRE SB 777-23-0369**Indications**

Any one of these screens may show when you apply power to the system and a panel is not in the correct configuration or there is a failure:

- Mass memory card missing or failed
- Incorrect configuration - Example 1
- Incorrect configuration - Example 2.

The screen shows the possible causes of the failure. It also gives you a maintenance message number for you to use with the fault isolation manual.

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BOEING STANDARD INTERFACE BOOT LOADER, VERSION: 1.1
CHECKING HW CONFIGURATION
FATAL MASS MEMORY CARD (MMC) IS MISSING OR FAILED.
MAINTENANCE MESSAGE NUMBER 23-04058

MMC MISSING
OR FAILED

BOEING STANDARD INTERFACE BOOT LOADER, VERSION: 1.1
CHECKING HW CONFIGURATION
HW FOUND: 20 MEG MASS MEMORY CARD, FLOPPY DISK DRIVE
FATAL THIS PANEL IS NOT IN CORRECT CONFIGURATION.
MASS MEMORY CARD (MMC) IS NOT CORRECT
- OR -
FLOPPY DISK DRIVE SHOULD BE REMOVED.
MAINTENANCE MESSAGE NUMBER 23-04059

INCORRECT CONFIGURATION -
EXAMPLE 1

BOEING STANDARD INTERFACE BOOT LOADER, VERSION: 1.1
CHECKING HW CONFIGURATION
HW FOUND: 85 MEG MASS MEMORY CARD
FATAL THIS PANEL IS NOT IN CORRECT CONFIGURATION.
MASS MEMORY CARD (MMC) IS NOT CORRECT
- OR -
FLOPPY DISK DRIVE IS MISSING OR FAILED.
MAINTENANCE MESSAGE NUMBER 23-04060

INCORRECT CONFIGURATION -
EXAMPLE 2

CSCP/CACP

CSS GENERAL - CSCP/CACP CONFIGURATIONS

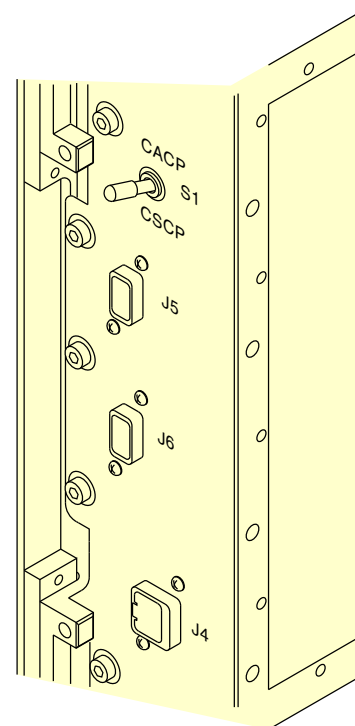
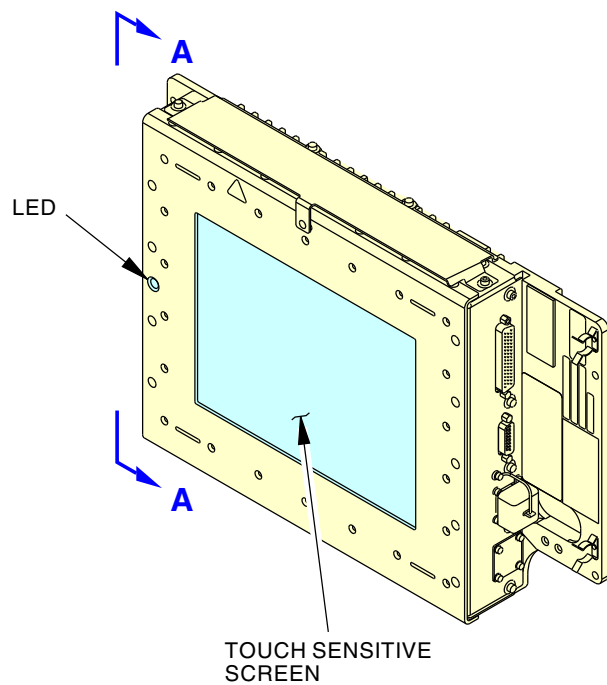
M39425 S000616023_V1

23-39-01

EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

D633W101-ARO

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A-A

CSS GENERAL - CSCP/CACP CONFIGURATIONS

2573414 S0000618373_V1

23-39-01

EFFECTIVITY
ARO 016-999; ARO 001-015 POST SB 777-23-0369

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CSS GENERAL - CSCP/CACP SCREENS MENU TREE

General

The cabin system control panel (CSCP) and cabin area control panels (CACPs) selection screens are menu driven. To access a control screen, you may have to use one or more menu screens.

Because of selections made in the configuration database generator or airline equipment options, some menu selections will not operate.

Main Menu

The main menu shows only on the CSCP. You can select CABIN CONTROLS or CABIN MAINTENANCE from this screen.

The CABIN CONTROLS selection permits you to monitor and control cabin functions.

The CABIN MAINTENANCE selection shows the cabin maintenance menu. See the CSS test and software installation section for additional data.

Cabin Controls Main Menu

The cabin controls main menu shows on both the CSCP and CACPs. The cabin controls main menu is the highest level menu on the CACPs. It shows when power is supplied to the CSS.

Most selections on the cabin controls main menu cause a control screen to show. These are the control screen selections:

- CABIN TEMPERATURE
- BOARDING MUSIC
- PASSENGER ADDRESS
- SMOKING ASSIGNMENTS
- CABIN DOOR STATUS
- SPECIAL FUNCTIONS
- DISPLAY CONTROLS.

Other selections cause a sub-menu to show. These are the selections that have sub-menus:

- LIGHTING
- SERVICE CALL/CHIME CONTROL
- WATER/WASTE TANK STATUS.

Sub-menus

The lighting menu selections are:

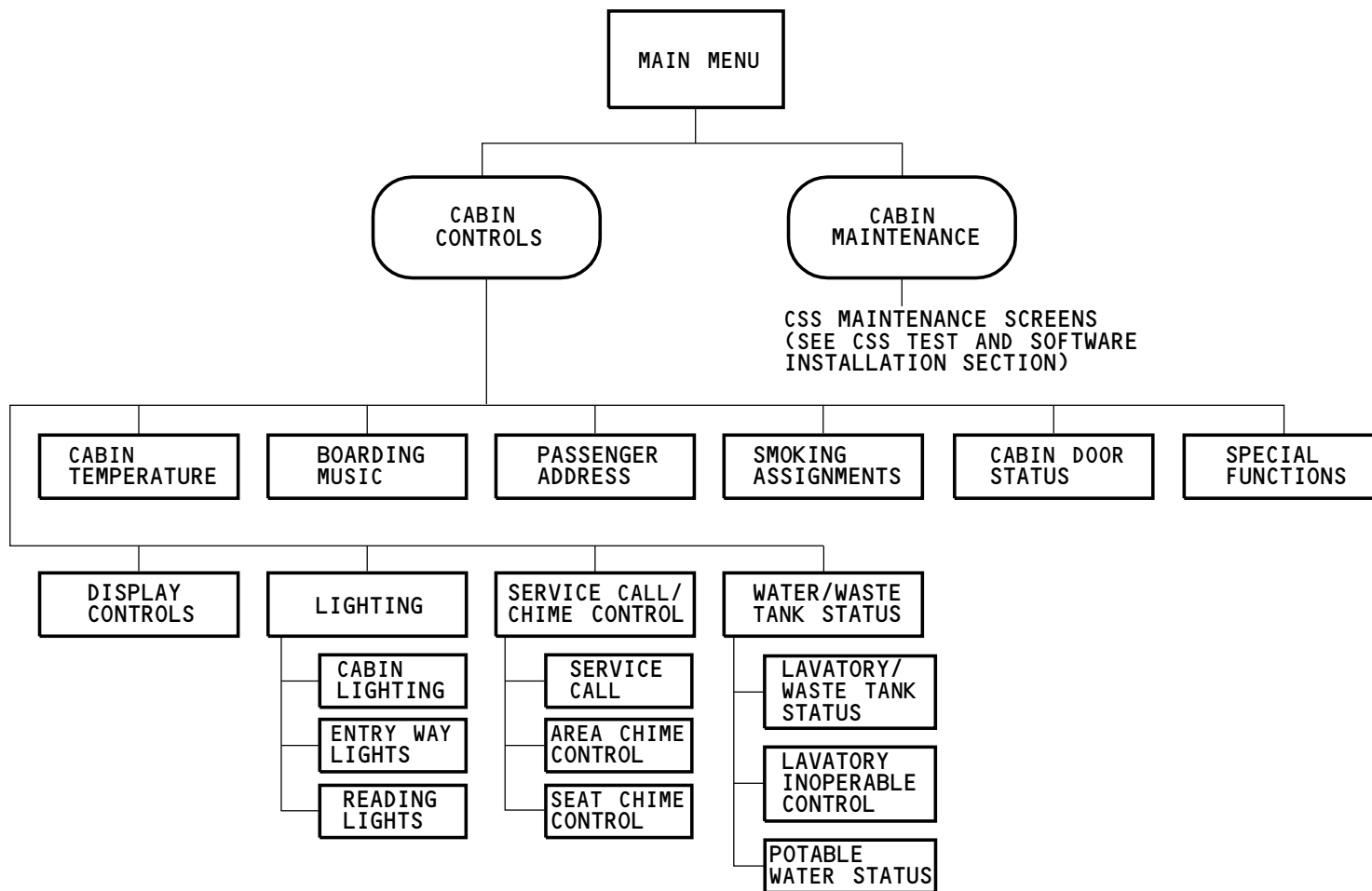
- CABIN LIGHTING
- ENTRY WAY LIGHTS
- READING LIGHTS.

The service call/chime control menu selections are:

- SERVICE CALL
- AREA CHIME CONTROL
- SEAT CHIME CONTROL.

The water/waste tank status menu selections are:

- LAVATORY/WASTE TANK STATUS
- LAVATORY INOPERABLE CONTROL
- POTABLE WATER STATUS.



CSS GENERAL - CSCP/CACP SCREENS MENU TREE

M39426 S000616024_V1

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**CSS GENERAL - MAIN MENU****General**

This main menu only shows on the cabin system control panel (CSCP). It shows automatically when you apply power to the CSS.

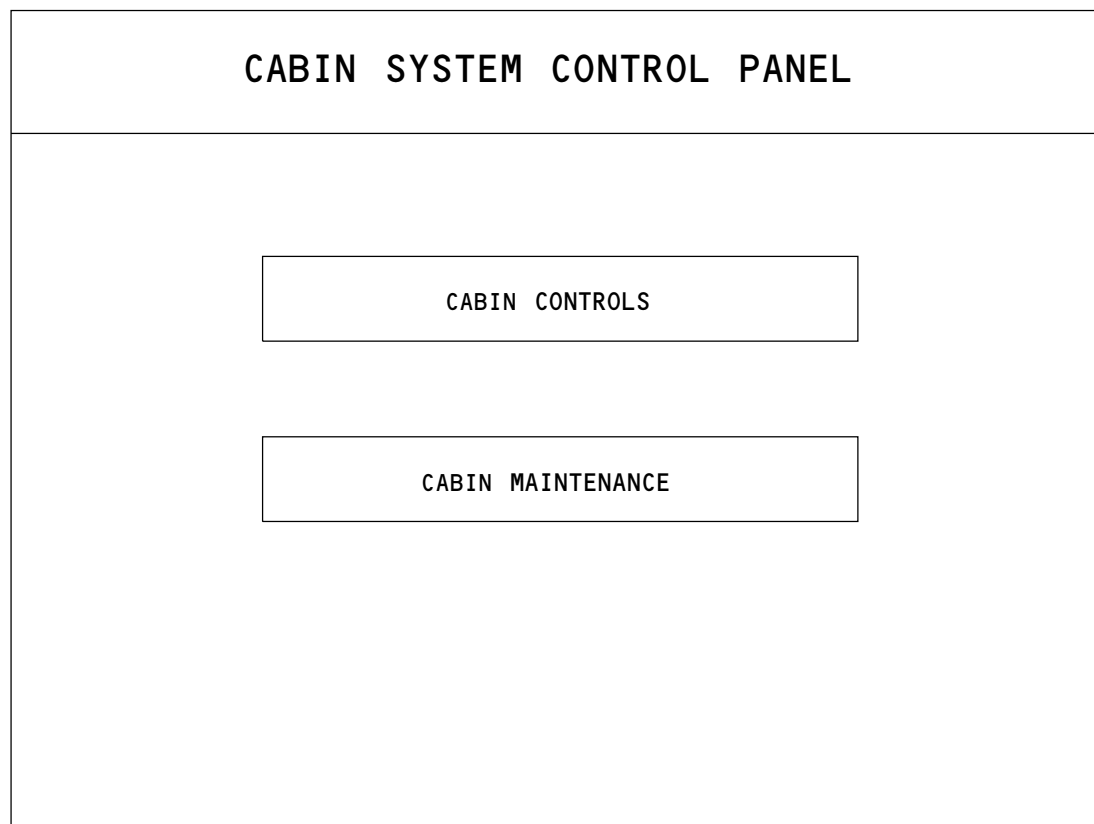
Cabin Controls

You use the CABIN CONTROLS selection to control these CSS core functions:

- Cabin lighting
- Passenger service
- Passenger address
- Monitor and control.

Cabin Maintenance

Use the CABIN MAINTENANCE selection to control maintenance related functions such as testing and software installation.



CSCP SCREEN

CSS GENERAL - MAIN MENU

M39427 S000616025_V1

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CSS GENERAL - CABIN CONTROLS MAIN MENU

General

Attendants use the cabin controls main menu to select CSS core functions.

Access

Touch CABIN CONTROLS on the cabin system control panel (CSCP) main menu to show this screen.

On the cabin area control panels (CACPs), the cabin controls main menu is the highest level menu. It shows automatically when you apply power to the CSS.

The CACPs do not have the EXIT selection.

Controls and Indications

The cabin controls screens on the CSCP and CACPs may be different. Some selections may be available on one panel but not on another. The configuration database controls the selections that show on each screen.

Normally, the CACPs control only given seating areas of the cabin. The configuration database identifies the areas each CACP controls. The PANEL OVERRIDE selection lets the selected CACP control all areas.

The LIGHTING selection controls cabin illumination and reading lights.

The SERVICE CALL/CHIME CONTROL selection gives information on passenger-to-attendant calls. It also permits the attendants to disable the passenger-to-attendant chimes.

Use the CABIN TEMPERATURE selection to control the cabin temperature.

The WATER/WASTE TANK STATUS selection supplies data on potable water level status and waste tank status. It also gives selection for lavatory inoperable controls.

Attendants use the BOARDING MUSIC selection to control boarding music.

The PASSENGER ADDRESS selection supplies passenger address volume control.

The CABIN DOOR STATUS supplies data for door positions (open or closed).

The DISPLAY CONTROLS selection supplies panel brightness controls and panel lockout control.

Use the SMOKING ASSIGNMENTS selection to control smoking area selections.

The SPECIAL FUNCTIONS selection gives on/off control of items identified by the configuration database.

NOTE: Not all airlines have this Special Functions button on their cabin Control Main Menu.

For those airplanes that have this Special Functions button, the Special Function screen allows the operator to turn the night lights on and off manually, particularly on the ground with the Parking Brake set which will increase the bulb life.

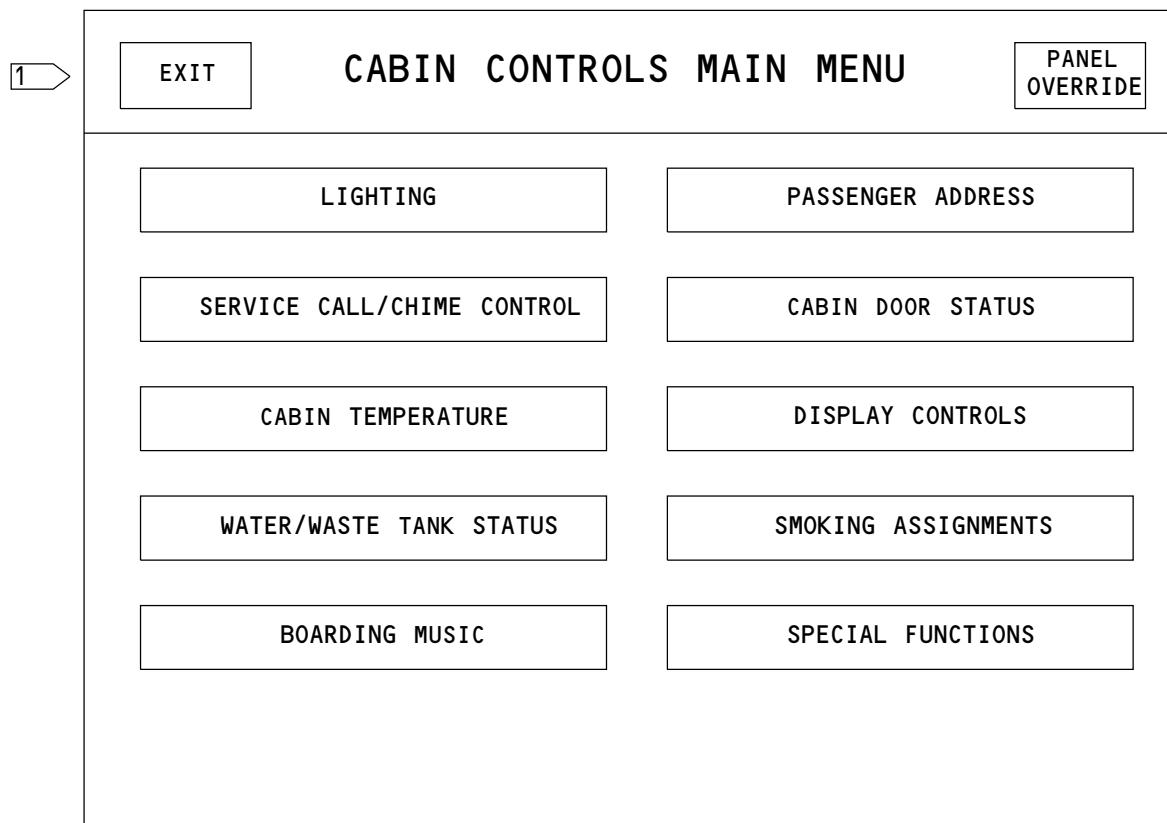
When the Special Functions button is selected the panel will display 4 buttons for Night Light control over Areas 1, 2, 3, and 4. Selection of the button for Area 1 will control the night lights ON/OFF for Area 1 and so on for the other areas.

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CSCP/CACP SCREEN

1 THE EXIT SELECTION
IS NOT ON THE CACP.

CSS GENERAL - CABIN CONTROLS MAIN MENU

M39428 S000616026_V1

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**CSS GENERAL - LIGHTING MENU SCREEN****General**

Attendants use the lighting menu on the cabin system control panel (CSCP) or cabin area control panels (CACPs) to select screens that show lighting controls.

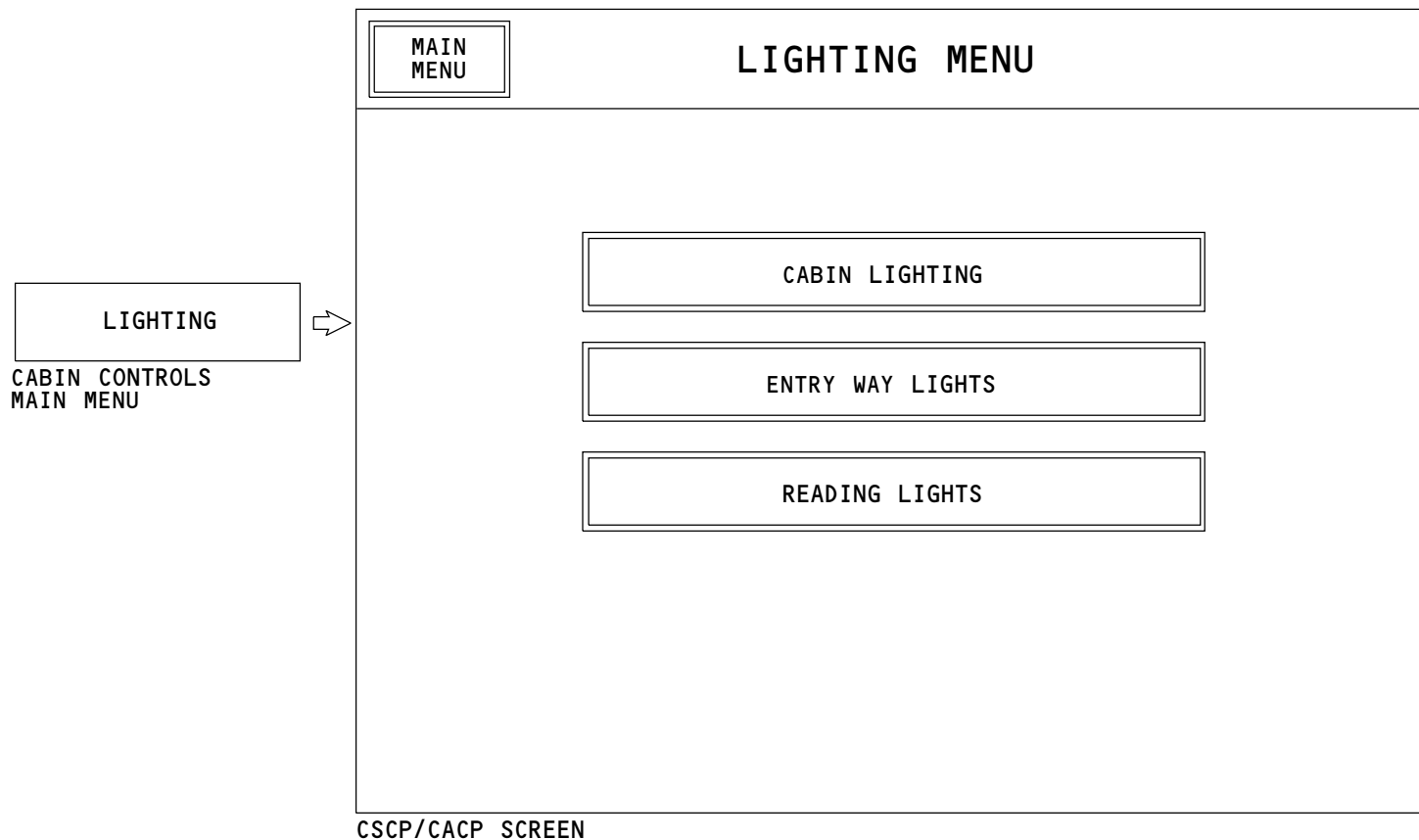
Access

Touch LIGHTING on the cabin controls main menu to show this screen.

Controls and Indications

Touch these selections to go to the screen that controls the related function:

- CABIN LIGHTING - to control the cabin lights
- ENTRY WAY LIGHTS - to control the entry lights
- READING LIGHTS - to control passenger reading lights.



CSS GENERAL - LIGHTING MENU SCREEN

M39429 S000616027_V1

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**CSS GENERAL - CABIN LIGHTING SCREEN****General**

You use the cabin lighting screen to operate the passenger compartment lights.

Access

Touch LIGHTING on the cabin controls main menu. Then touch CABIN LIGHTING to show the cabin lighting screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

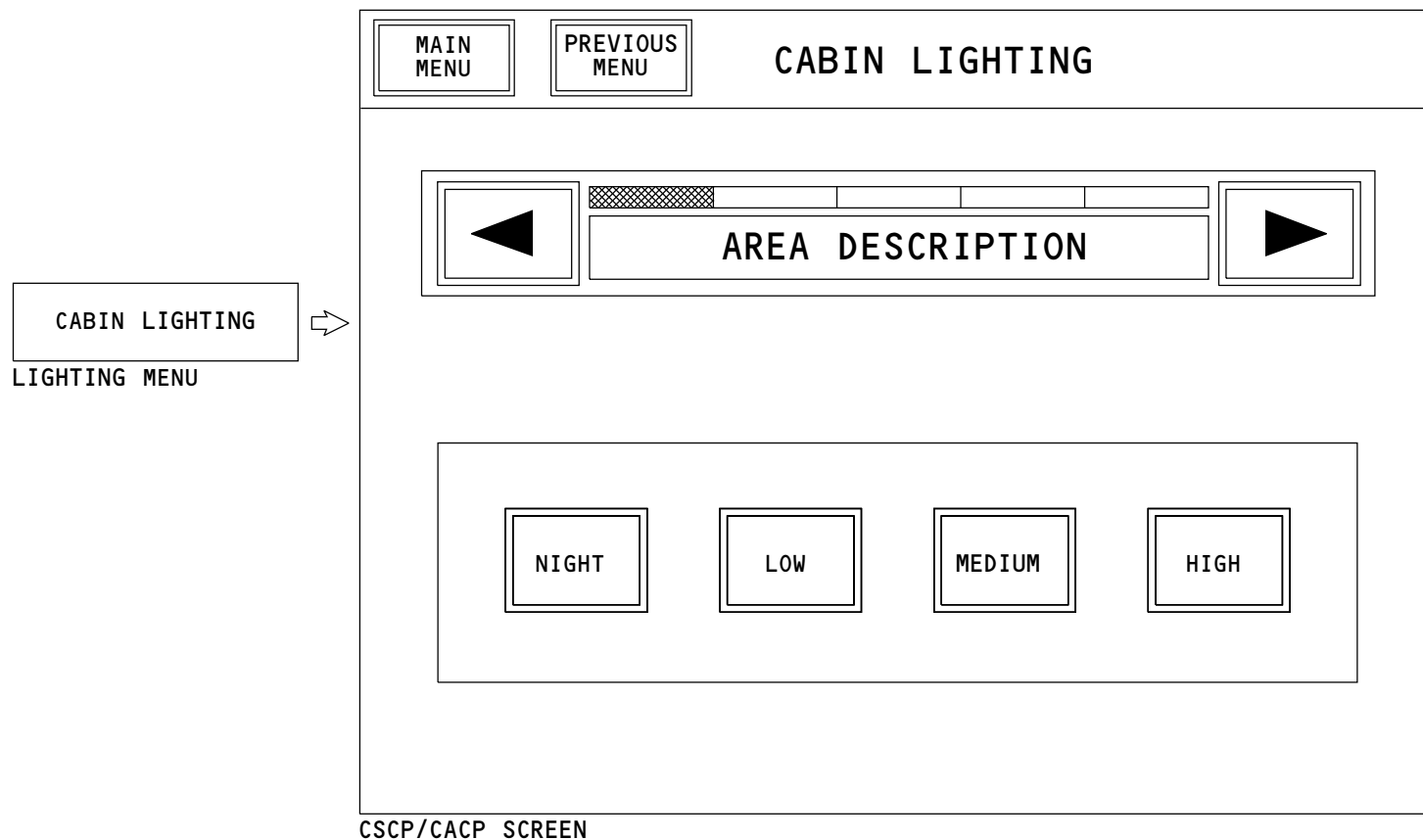
Use the selections below the cabin area description to control the lighting level.

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CSS GENERAL - CABIN LIGHTING SCREEN

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**CSS GENERAL - ENTRY WAY LIGHTS SCREEN****General**

You use the entry way lights screen to operate the entry lights.

Access

Touch LIGHTING on the cabin controls main menu. Then touch ENTRY WAY LIGHTS to show the entry way lights screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

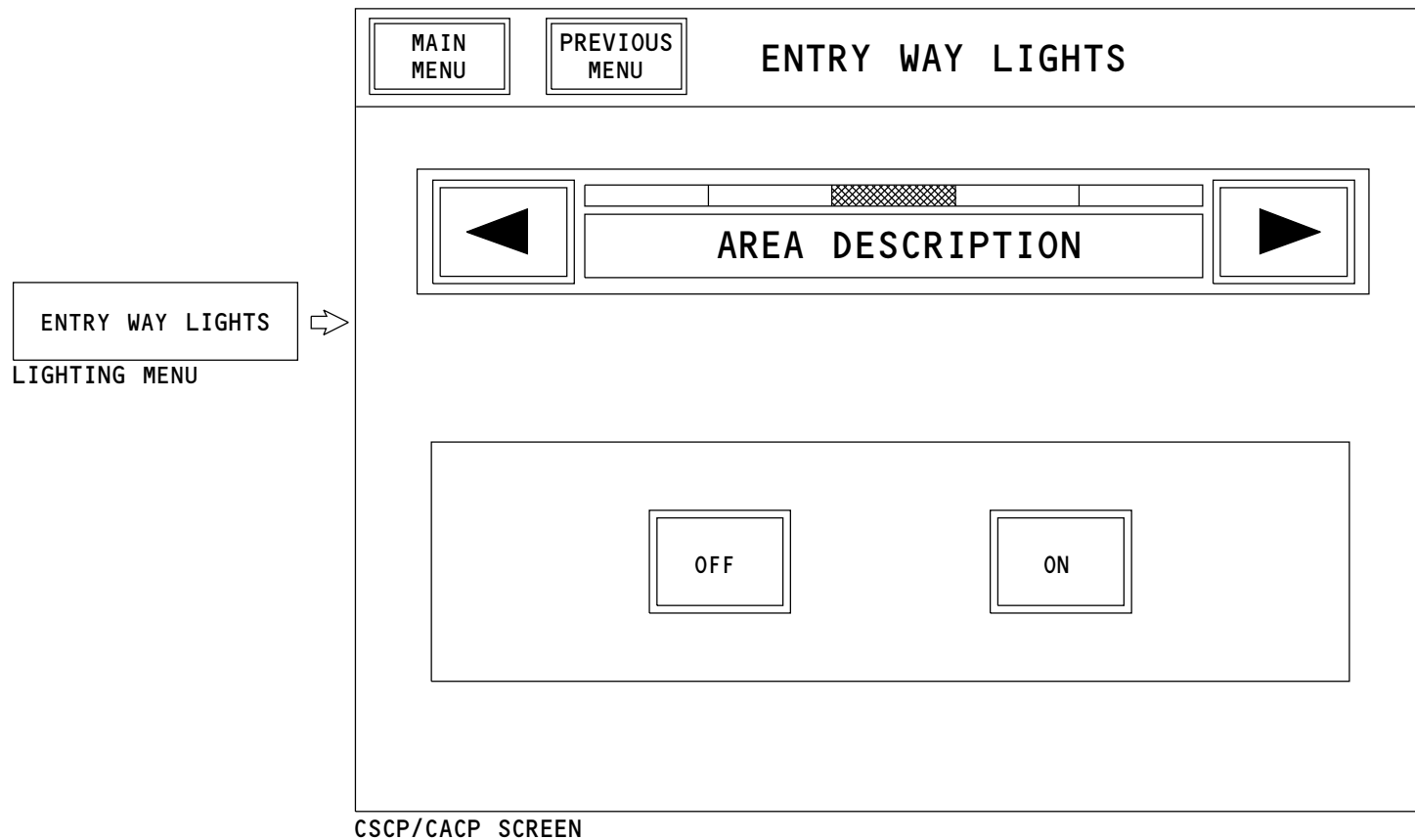
Use the selections below the cabin area description to make the lights come on or go off.

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CSS GENERAL - ENTRY WAY LIGHTS SCREEN

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**CSS GENERAL - READING LIGHTS SCREEN****General**

You use the reading lights screen to control the passenger reading lights.

Access

Touch LIGHTING on the cabin controls main menu. Then touch READING LIGHTS to show the reading lights screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

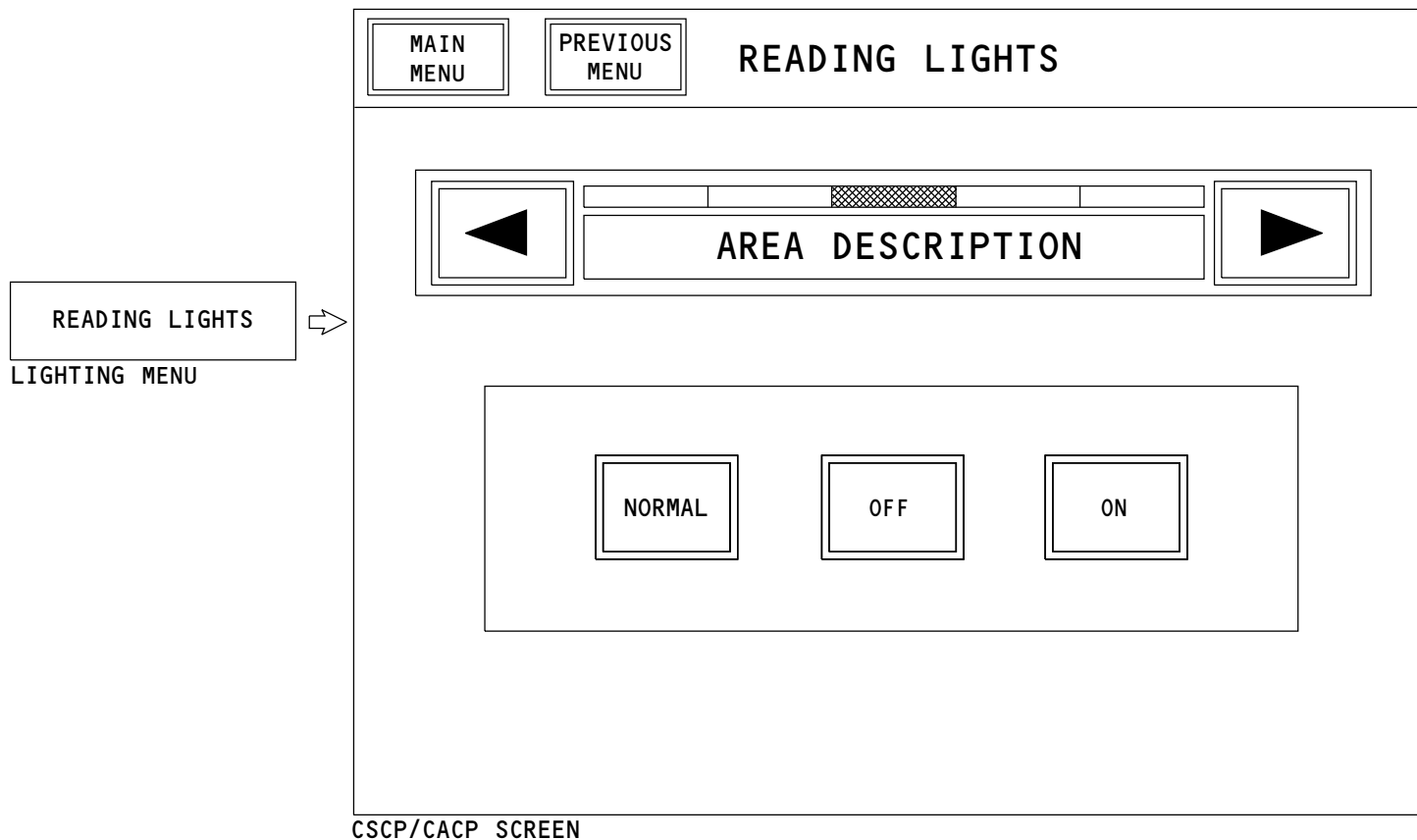
Use the selections below the cabin area description to control the reading lights. Normal gives reading light control to the passenger control units.

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CSS GENERAL - READING LIGHTS SCREEN

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**CSS GENERAL - SERVICE CALL/CHIME CONTROL MENU SCREEN****General**

Attendants use the service call/chime control menu to select a screen that shows passenger calls. They can also select screens to control chimes.

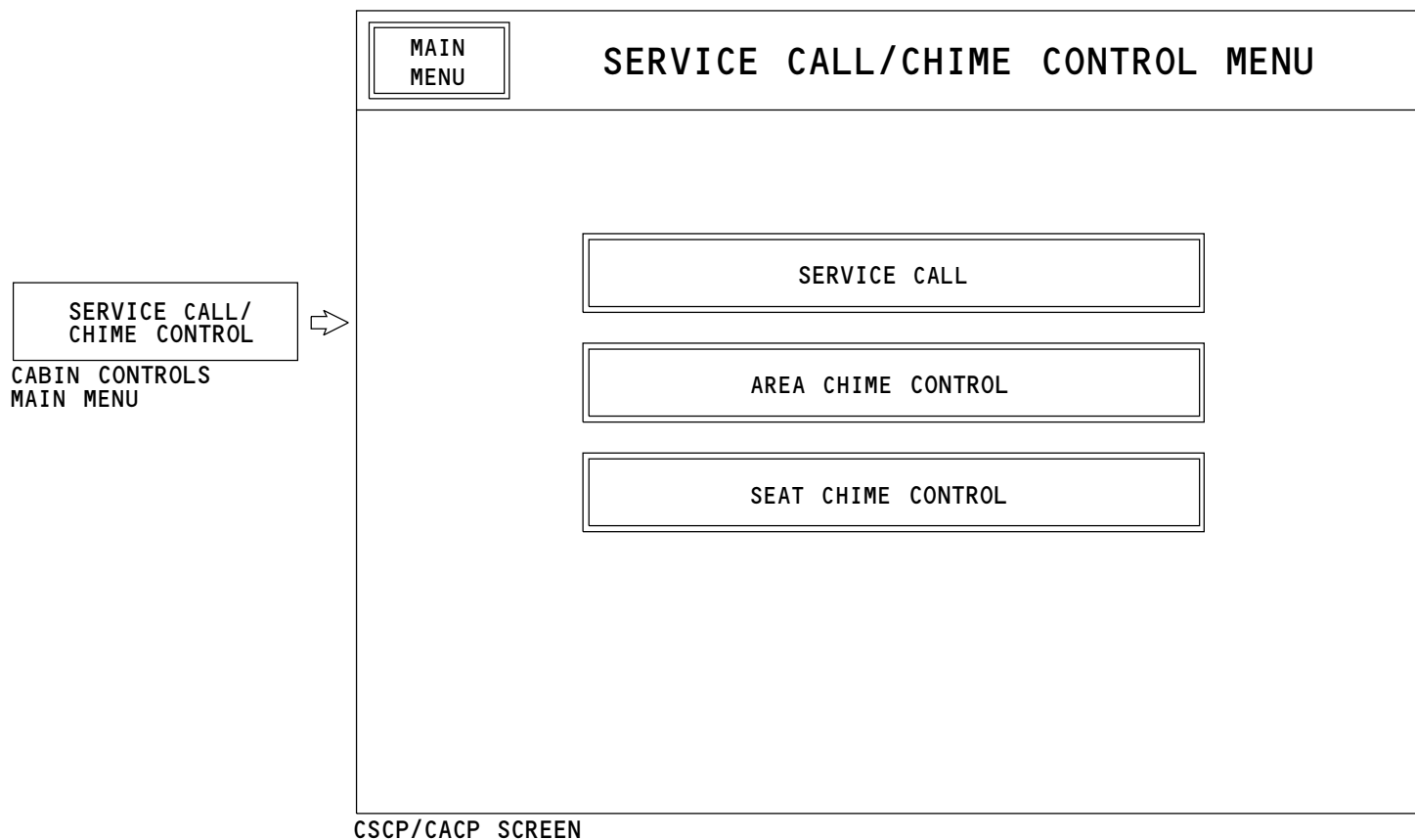
Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu to show this screen.

Controls and Indications

Touch these selections to go to the screen that controls the related function:

- SERVICE CALL - to see passenger call data
- AREA CHIME CONTROL - to disable passenger-to-attendant chimes in a selected area
- SEAT CHIME CONTROL - to disable each passenger-to-attendant chime.



CSS GENERAL - SERVICE CALL/CHIME CONTROL MENU SCREEN

M39430 S000616031_V1

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**CSS GENERAL - SERVICE CALL SCREEN****General**

Attendants use the service call screen to see active passenger-to-attendant calls and lavatory calls.

Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch SERVICE CALL to show this screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

The active seat calls and active lavatory calls areas on the screen show all active calls from the selected cabin area.

Use the up and down arrows to scroll through the data in the active calls area.

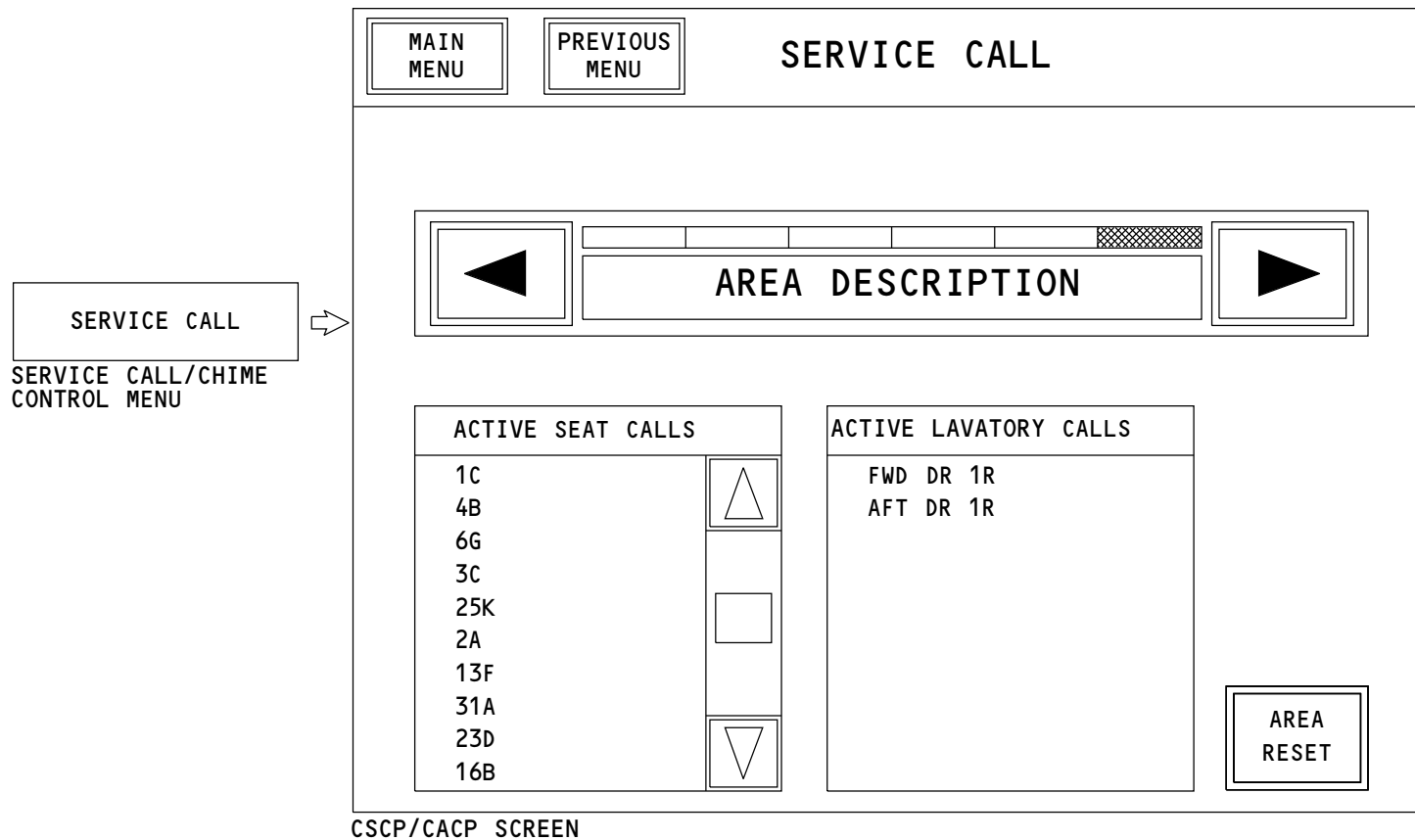
Touch AREA RESET to cancel all active calls for the selected area.

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CSS GENERAL - SERVICE CALL SCREEN

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**CSS GENERAL - AREA CHIME CONTROL SCREEN****General**

Attendants use the area chime control screen to disable the passenger-to-attendant chimes in selected areas of the cabin.

Access

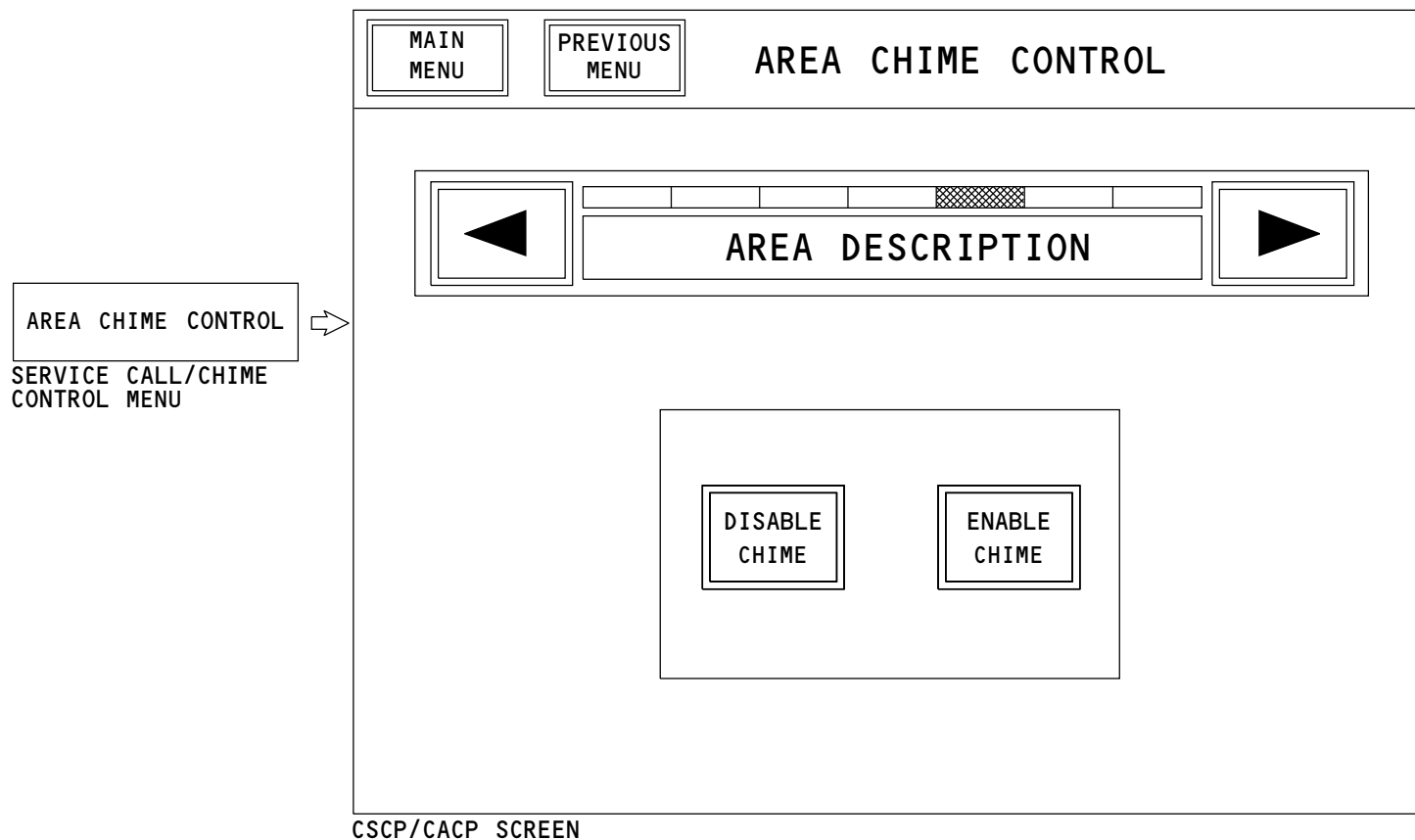
Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch AREA CHIME CONTROL to show this screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

Touch ENABLE CHIME or DISABLE CHIME to enable or disable the passenger-to-attendant call chime for the selected area.

ARO ALL	EFFECTIVITY



CSCP/CACP SCREEN

CSS GENERAL - AREA CHIME CONTROL SCREEN

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**CSS GENERAL - SEAT CHIME CONTROL SCREEN****General**

Attendants use the seat chime control screen to disable the passenger-to-attendant chimes in selected areas of the cabin.

Access

Touch SERVICE CALL/CHIME CONTROL on the cabin controls main menu. Then touch SEAT CHIME CONTROL to show this screen.

Controls and Indications

Touch the row select numbers and seat select letters to select seats. The row/seat window above the numbers shows the selection.

Touch ENABLE CHIME or DISABLE CHIME to enable or disable the passenger-to-attendant call chime for the selected seats. Touch clear to clear the row/seat display.

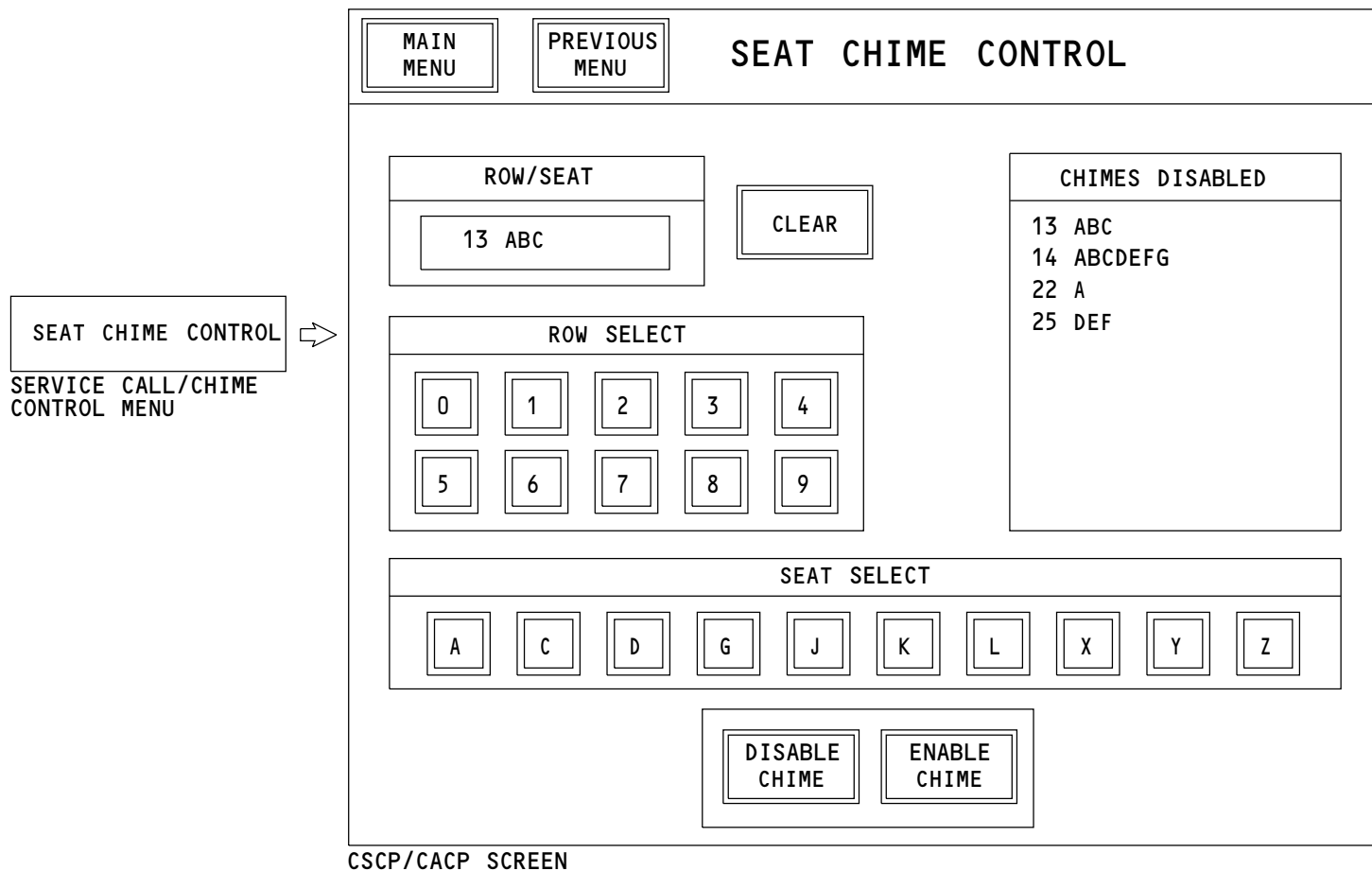
The chimes disabled window shows all seats that have chimes disabled. Use the up and down arrows to scroll through the data.

23-39-01

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CSCP/CACP SCREEN

M39431 S000616034_V1

CSS GENERAL - SEAT CHIME CONTROL SCREEN

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**CSS GENERAL - CABIN TEMPERATURE SCREEN****General**

Attendants use the cabin temperature screen to set temperatures for each passenger zone.

Access

Touch CABIN TEMPERATURE on the cabin controls main menu to show this screen.

Controls and Indications

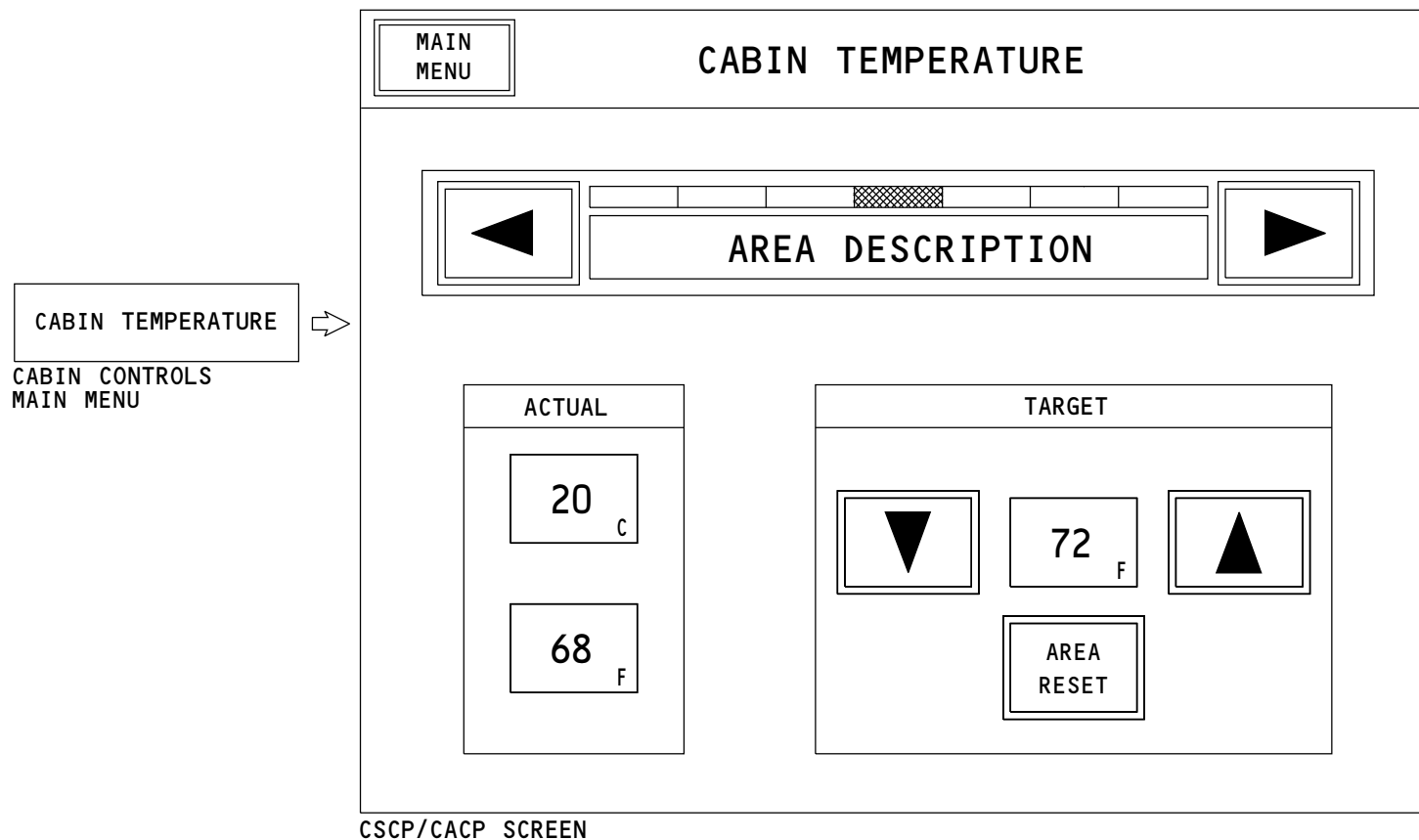
Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

The temperature of the selected area shows in Celsius and Fahrenheit in the lower left area of the screen.

Touch the up and down arrows in the lower right area of the screen to select the target temperature.

Touch AREA RESET to reset the area to the default temperature that is set on the flight deck controller.

ARO ALL	EFFECTIVITY



CSS GENERAL - CABIN TEMPERATURE SCREEN

M40099 S000616035_V1

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**CSS GENERAL - WATER/WASTE TANK STATUS MENU SCREEN****General**

You use the water/waste tank status menu screen to select screens that show water and waste tank data.

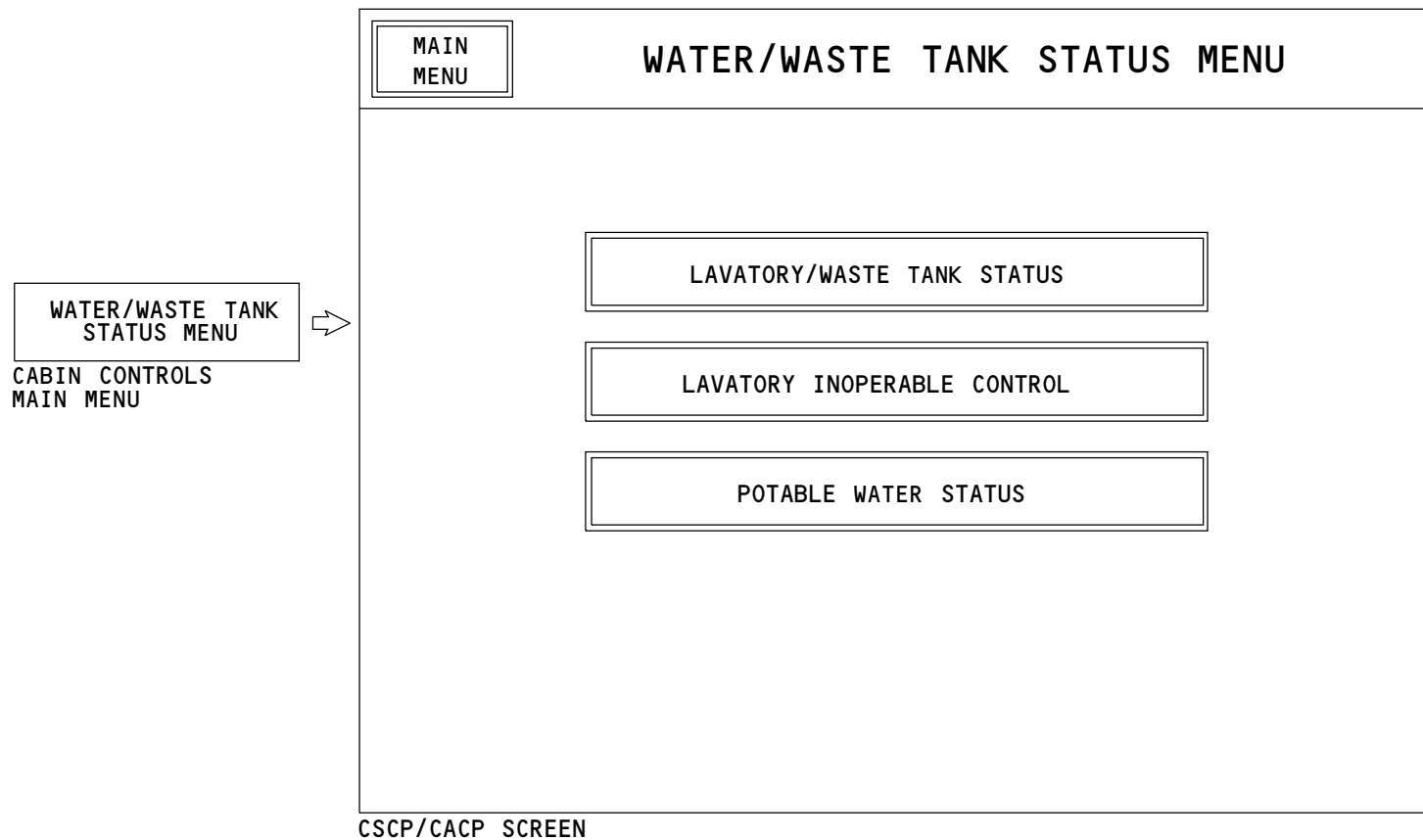
Access

Touch WATER/WASTE TANK STATUS on the cabin controls main menu to show this screen.

Controls and Indications

Touch these selections to go to the screen that controls the related function:

- LAVATORY/WASTE TANK STATUS - to see the condition of the lavatories and waste tanks
- LAVATORY INOPERABLE CONTROL - to control the condition of the lavatories
- POTABLE WATER STATUS - to see the condition of the potable water tanks.



CSS GENERAL - WATER/WASTE TANK STATUS MENU SCREEN

M39432 S000616036_V1

23-39-01

ARO ALL	EFFECTIVITY
	D633W101-ARO

**CSS GENERAL - LAVATORY/WASTE TANK STATUS SCREEN****General**

You use the lavatory/waste tank status screen to see the condition of the lavatories and waste tanks.

Access

Touch WATER/WASTE TANK STATUS on the cabin controls main menu. Then touch LAVATORY/WASTE TANK STATUS to show this screen.

Controls and Indications

The lavatories area of the screen shows lavatory locations and conditions. The area to the right of the lavatories shows the related waste tank and its level.

ARO ALL	EFFECTIVITY

LAVATORY/WASTE
TANK STATUS
→
WATER/WASTE TANK
STATUS MENU

MAIN MENU

PREVIOUS MENU

LAVATORY/WASTE TANK STATUS

LAVATORIES	WASTE TANK 1																		
FWD DR 1L VACANT AFT DR 1R OCCUPIED FWD DR 2L VACANT FWD DR 3R INOP	<table> <tr> <td>E</td><td>1/8</td><td>1/4</td><td>3/8</td><td>1/2</td><td>5/8</td><td>3/4</td><td>7/8</td><td>F</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F									
E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F											
LAVATORIES	WASTE TANK 2																		
FWD DR 1R OCCUPIED AFT DR 2R VACANT DR 3 CTR L VACANT FWD DR 4R VACANT	<table> <tr> <td>E</td><td>1/8</td><td>1/4</td><td>3/8</td><td>1/2</td><td>5/8</td><td>3/4</td><td>7/8</td><td>F</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F									
E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F											
LAVATORIES	WASTE TANK 3																		
DR 3 CTR R INOP FWD DR 4L INOP AFT DR 4L INOP DR 4 CTR INOP	<table> <tr> <td>E</td><td>1/8</td><td>1/4</td><td>3/8</td><td>1/2</td><td>5/8</td><td>3/4</td><td>7/8</td><td>F</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F									
E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F											

CSCP/CACP SCREEN

CSS GENERAL - LAVATORY/WASTE TANK STATUS SCREEN

M40100 S000616037_V1

23-39-01-614

ARO ALL

EFFECTIVITY

D633W101-ARO

23-39-01

**CSS GENERAL - LAVATORY INOPERABLE CONTROL SCREEN****General**

You use the lavatory inoperable control screen to control the status of the lavatories.

Access

Touch WATER/WASTE TANK STATUS on the cabin controls main menu. Then touch LAVATORY INOPERABLE CONTROL to show this screen.

Controls and Indications

The screen shows the lavatories and assigned waste tanks. The status area of the screen shows the condition of each lavatory.

Touch OP or INOP to make the lavatory show operational or inoperative on the lavatory/waste tank status screen.

Use the up and down arrows on the right side of the display to scroll the lavatory data up and down.

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LAVATORY INOPERABLE
CONTROL
WATER/WASTE TANK
STATUS MENU



MAIN MENU

PREVIOUS MENU

LAVATORY INOPERABLE CONTROL

LAVATORY	WASTE TANK	STATUS		
FWD DR 1R	1	INOP	OP	▲
FWD DR 1L	2	INOP	FULL TANK	□
FWD DR 1 CTR	1	INOP	OP	
FWD DR 2R	3	INOP	OP	
AFT DR 2R	2	INOP	FULL TANK	▼

CSCP/CACP SCREEN

M39433 S000616038_V1

CSS GENERAL - LAVATORY INOPERABLE CONTROL SCREEN

23-39-01

ARO ALL

EFFECTIVITY

D633W101-ARO

**CSS GENERAL - POTABLE WATER STATUS SCREEN****General**

You use the potable water status screen to see the condition of the potable water tanks.

Access

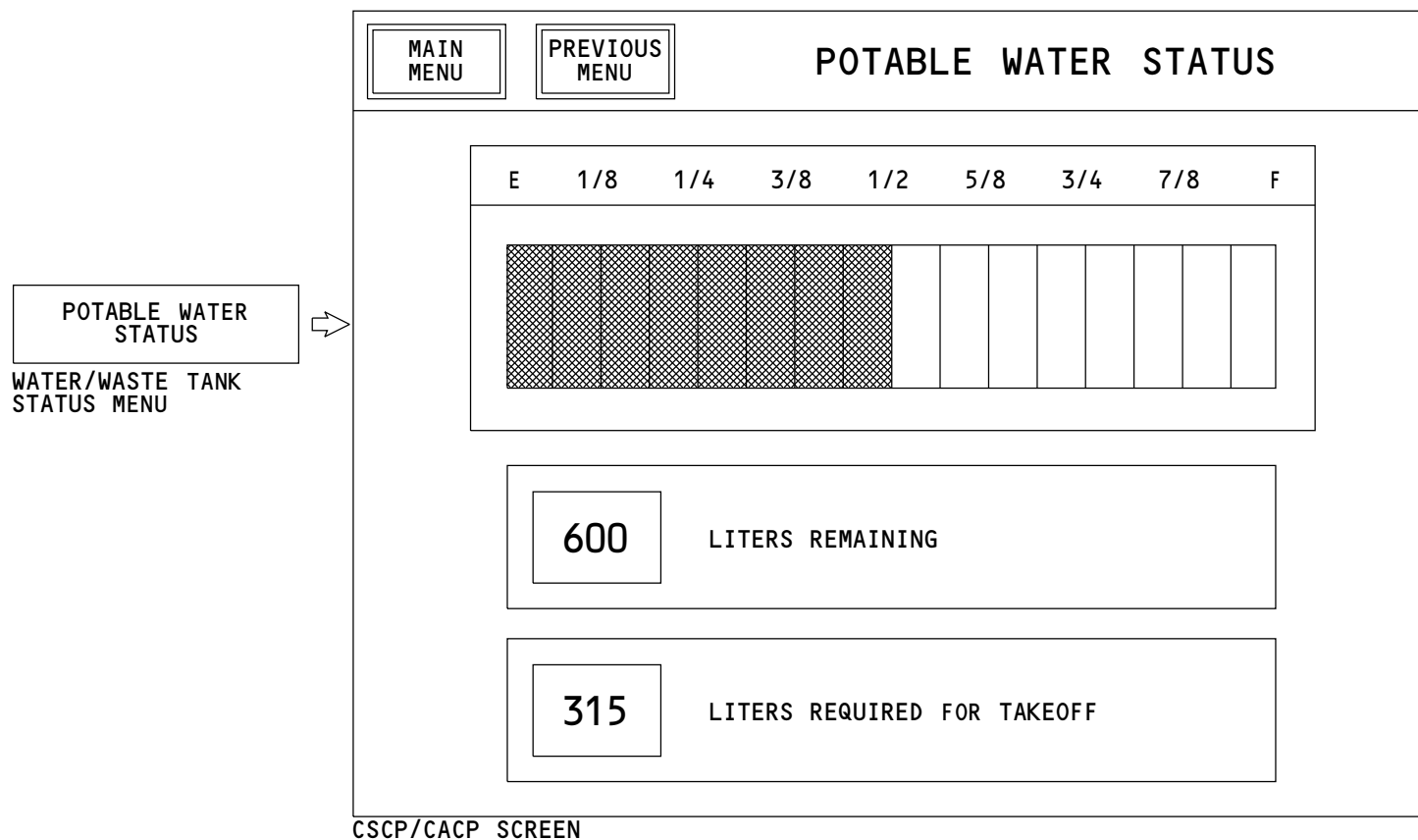
Touch WATER/WASTE TANK STATUS on the cabin controls main menu. Then touch POTABLE WATER STATUS to show this screen.

Controls and Indications

The potable water status screen shows the total amount of water in the tanks. It also shows how much water must be in the tanks for takeoff.

The airplane holds approximately 1237.8 liters of potable water. Each segment is approximately 77.4 liters.

ARO ALL	EFFECTIVITY



CSS GENERAL - POTABLE WATER STATUS SCREEN

M40104 S000616042_V1

23-39-01

ARO ALL EFFECTIVITY

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**CSS GENERAL - BOARDING MUSIC SCREEN****General**

Attendants use the boarding music screen to select boarding music.

Access

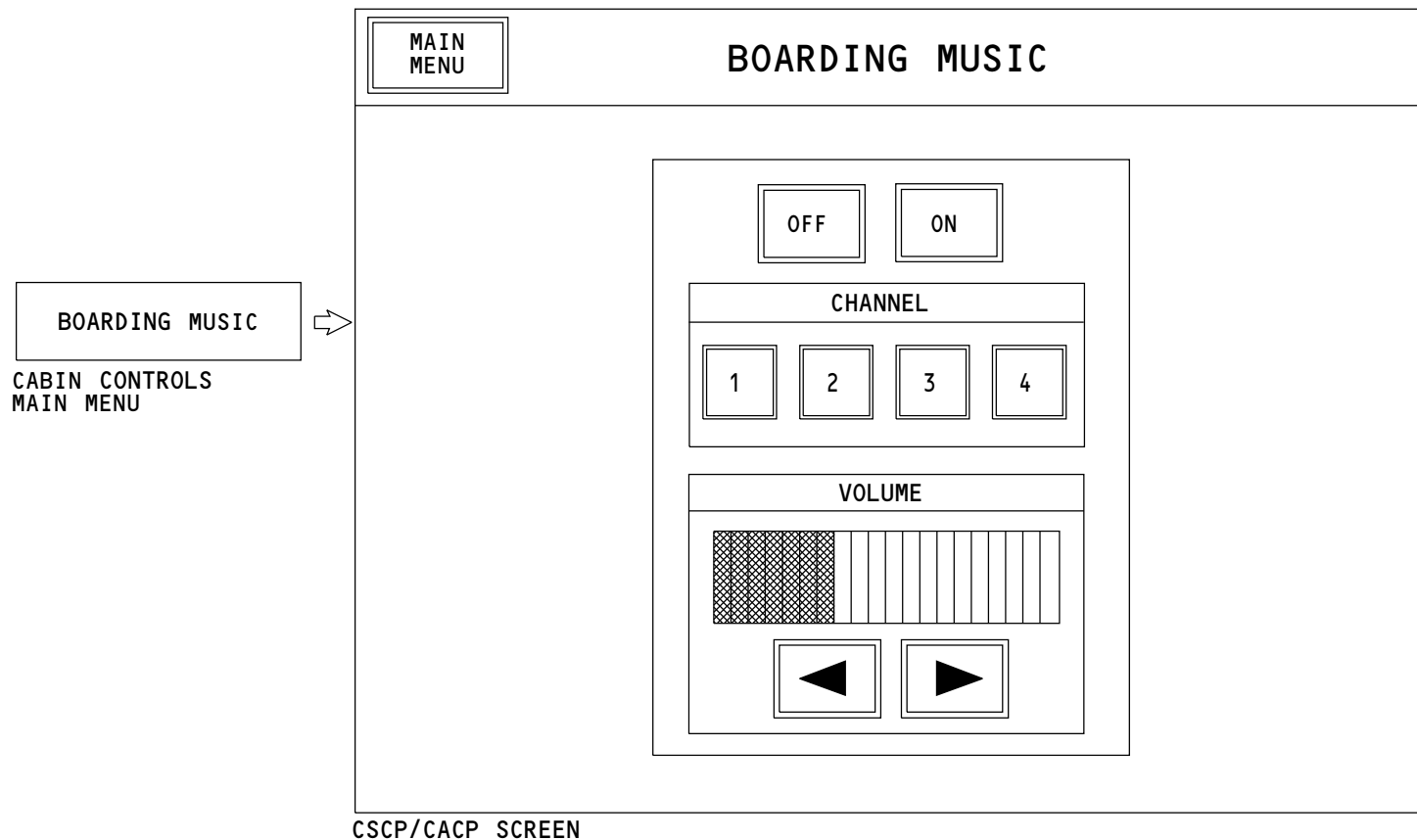
Touch BOARDING MUSIC on the cabin controls main menu to show this screen.

Controls and Indications

Touch ON or OFF to cause the boarding music to come on or go off.

Touch 1, 2, 3, or 4 to select a channel.

The volume indication shows the current volume. Touch the left arrow to decrease the volume. Touch the right arrow to increase the volume.



CSS GENERAL - BOARDING MUSIC SCREEN

M40105 S000616043_V1

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23-39-01-617

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**CSS GENERAL - PASSENGER ADDRESS SCREEN****General**

Attendants use the passenger address screen to adjust the passenger address volume.

Access

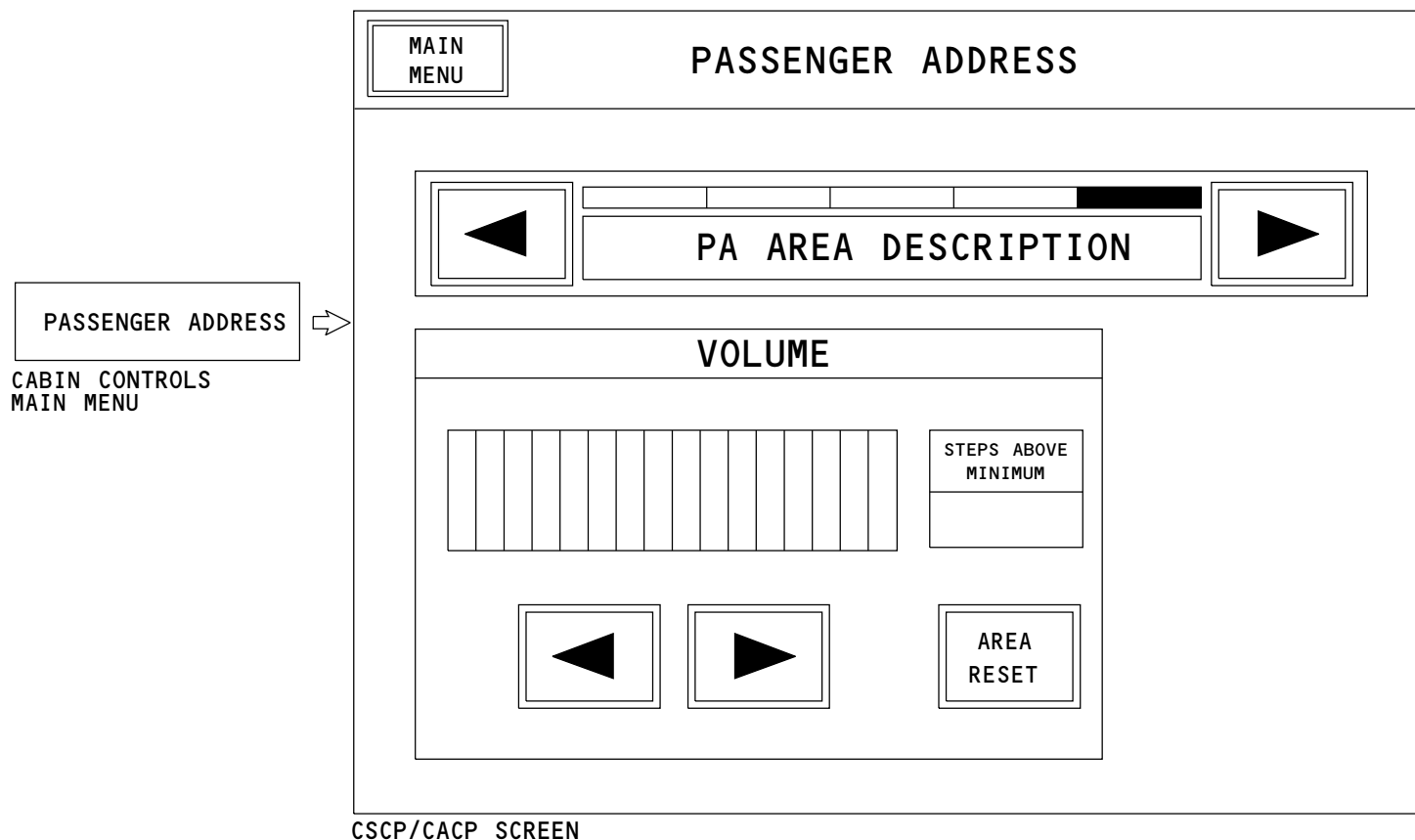
Touch PASSENGER ADDRESS on the cabin controls main menu to show this screen.

Controls and Indications

Use the left and right arrows to select the cabin areas. The space between the arrows shows the selected cabin area description.

Use the left and right arrows in the volume area to control the amount of increase in volume above the reference level. The number of steps above minimum you select shows in the steps above minimum area. Touch AREA RESET to return the volume to the reference level.

ARO ALL	EFFECTIVITY



CSS GENERAL - PASSENGER ADDRESS SCREEN

418452 S0000136566_V1

23-39-01

ARO ALL EFFECTIVITY

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CSS GENERAL - CABIN DOOR STATUS SCREEN

General

Attendants use the cabin door status screen to see if the doors are locked or not locked.

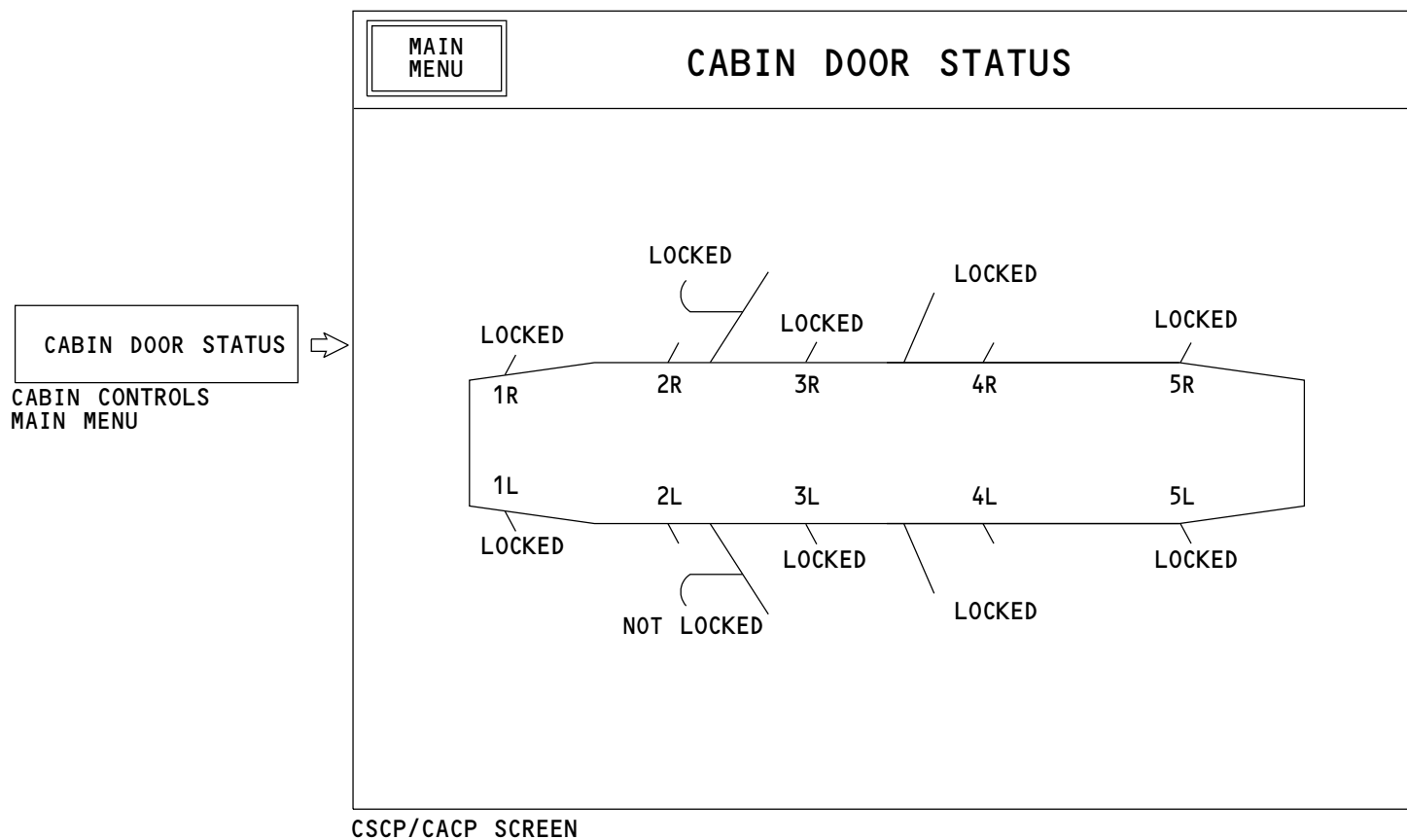
Access

Touch CABIN DOOR STATUS on the cabin controls main menu to show this screen.

Controls and Indications

The cabin door status screen shows the locked/not locked status of the cabin doors.

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CSS GENERAL - CABIN DOOR STATUS SCREEN

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**CSS GENERAL - DISPLAY CONTROLS SCREEN****General**

You use the display controls screen to adjust the panel brightness and clean the display.

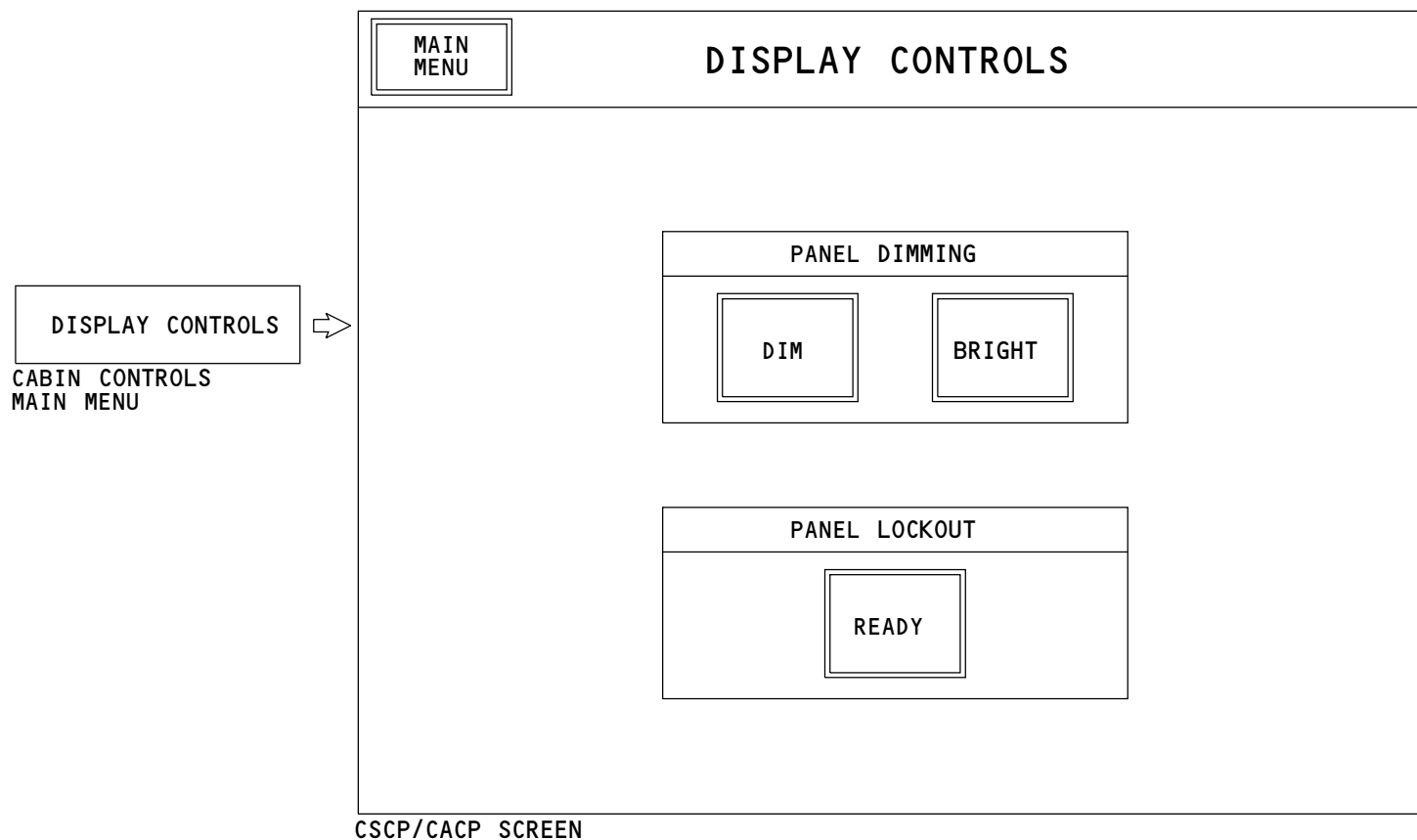
Access

Touch DISPLAY CONTROLS on the cabin controls main menu to show the display controls screen.

Controls

The panel dimming selections control the screen brightness. Touch DIM to decrease the brightness. Touch BRIGHT to increase the brightness.

Touch the panel lockout selection to stop panel operation for 30 seconds. A 30 second timer shows on the screen. You can not make screen selections while the panel is locked out. You can clean the screen while the panel is locked out.



CSS GENERAL - DISPLAY CONTROLS SCREEN

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CSS GENERAL - POP-UP WINDOWS**General**

The CSS shows pop-up windows on the CSCP and CACPs for important system messages. These windows show on top of the active window.

There are three types of pop-up windows:

- Alert messages
- Function lockout messages
- Error messages.

Alert Messages

The alert messages tell the flight attendants that a condition requires action. These conditions cause alert messages:

- Lavatory smoke detection
- Passenger address controller failures
- Cabin interphone controller failures
- Waste tank full
- Less than 1/4 tank of potable water.

Function Lockout Messages

Function lockout messages tell the flight attendants some functions may not operate because of system conditions. These conditions cause function lockout messages:

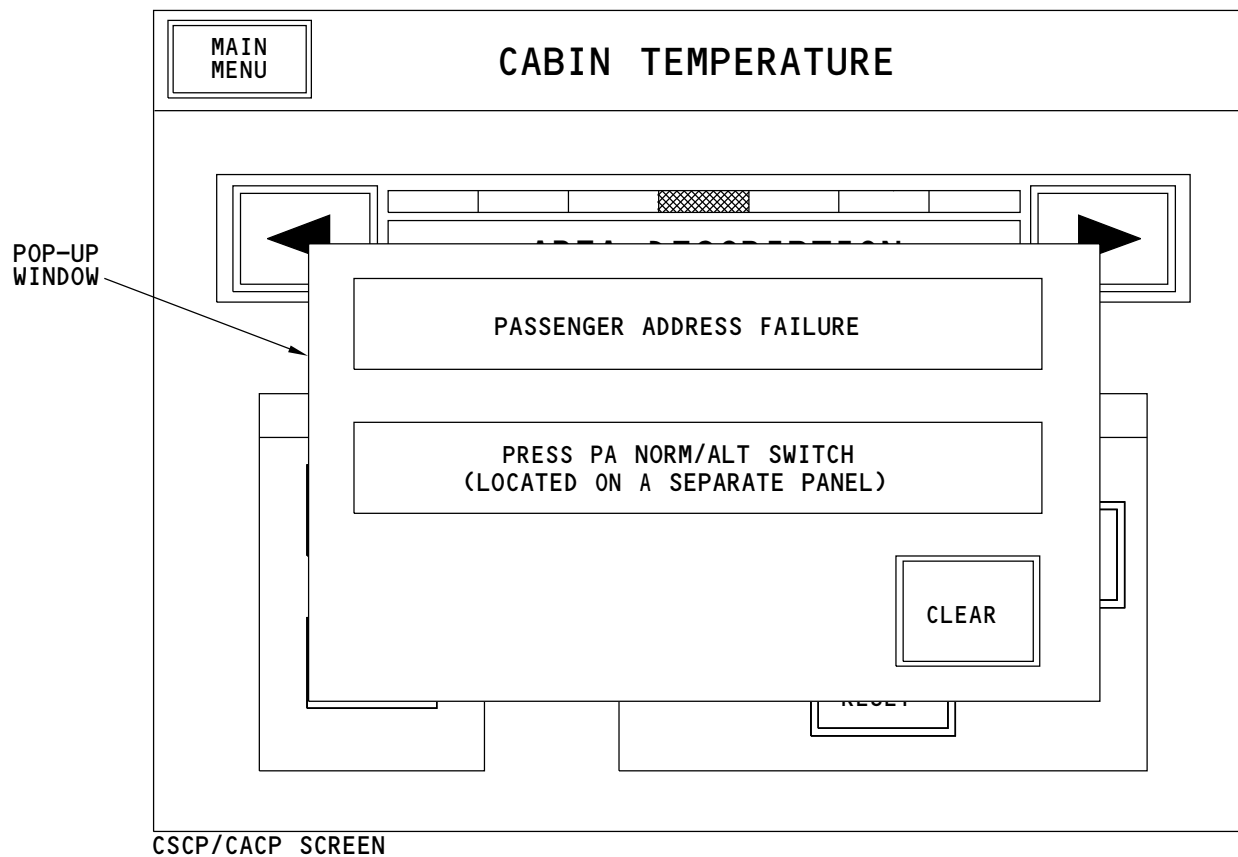
- Cabin decompression
- Loss of ground service bus power
- Loss of data from the environmental control system.

Error Messages

When a system does not respond to a selection, an applicable message shows.

Clearing Pop-up Windows

Touch CLEAR to remove the pop-up window from the display.



CSS GENERAL - POP-UP WINDOWS

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**CSS TEST AND SOFTWARE INSTALLATION - INTRODUCTION****General**

You do most cabin services system (CSS) maintenance functions from the cabin system control panel (CSCP).

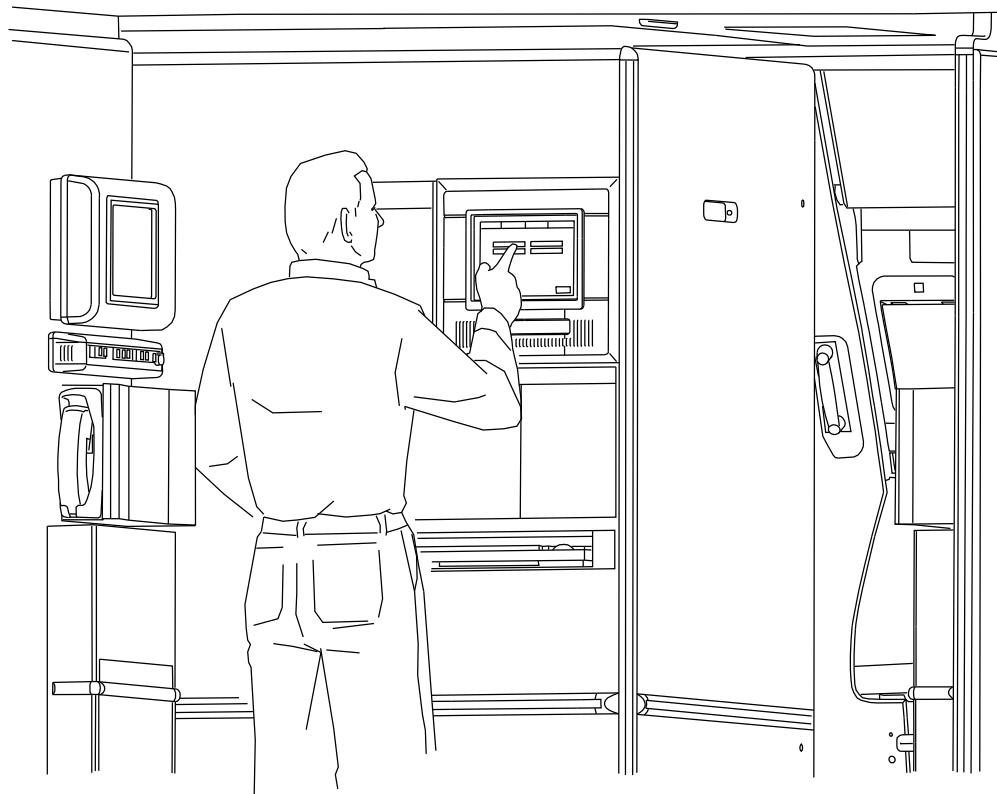
CSS maintenance includes two general areas; tests and software installation.

Tests

You use the CSCP to do tests and review failure data. BITE and continuous fault monitor are the two primary types of tests.

Software Installation

You use the CSCP to install software in the CSS. Software operation functions include software installation and configuration checks.



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CSS TEST AND SOFTWARE INSTALLATION - INTRODUCTION

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**CSS TEST AND SOFTWARE INSTALLATION - REQUEST FOR PASSWORD DIALOGUE WINDOW****General**

For some CSS maintenance functions, you may need to enter a password. The configuration database controls which functions require passwords.

A dialogue window shows automatically when you make a selection that requires a password.

Controls and Indications

The request for password dialogue window tells you to enter a password for a selection you made on a previous screen. It also shows a keypad that looks like telephone keys.

Use the keys on the keypad to enter your password. An asterisk shows in the area above the keypad for each key you select.

After you enter your password, touch CONTINUE to go to the function you selected. If you enter a wrong password, an access denied dialogue window shows.

Touch CANCEL to stop password selections and return to the previous screen.

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT

SECURITY VERIFICATION REQUIRED. USE THE KEYPAD TO ENTER
YOUR PASSWORD. THEN SELECT THE CONTINUE BUTTON.

* * *

1	ABC 2	DEF 3
GHI 4	JKL 5	MNO 6
PRS 7	TUV 8	WXY 9
*	0	#

CONTINUE

CANCEL

CSCP SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - REQUEST FOR PASSWORD DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MAIN MENU****General**

You use the cabin system control panel (CSCP) cabin maintenance main menu to select all maintenance functions.

Access

Touch CABIN MAINTENANCE on the CSCP main menu to show the cabin maintenance main menu.

Controls

Touch any of these four selections at the top of this screen to do the related function:

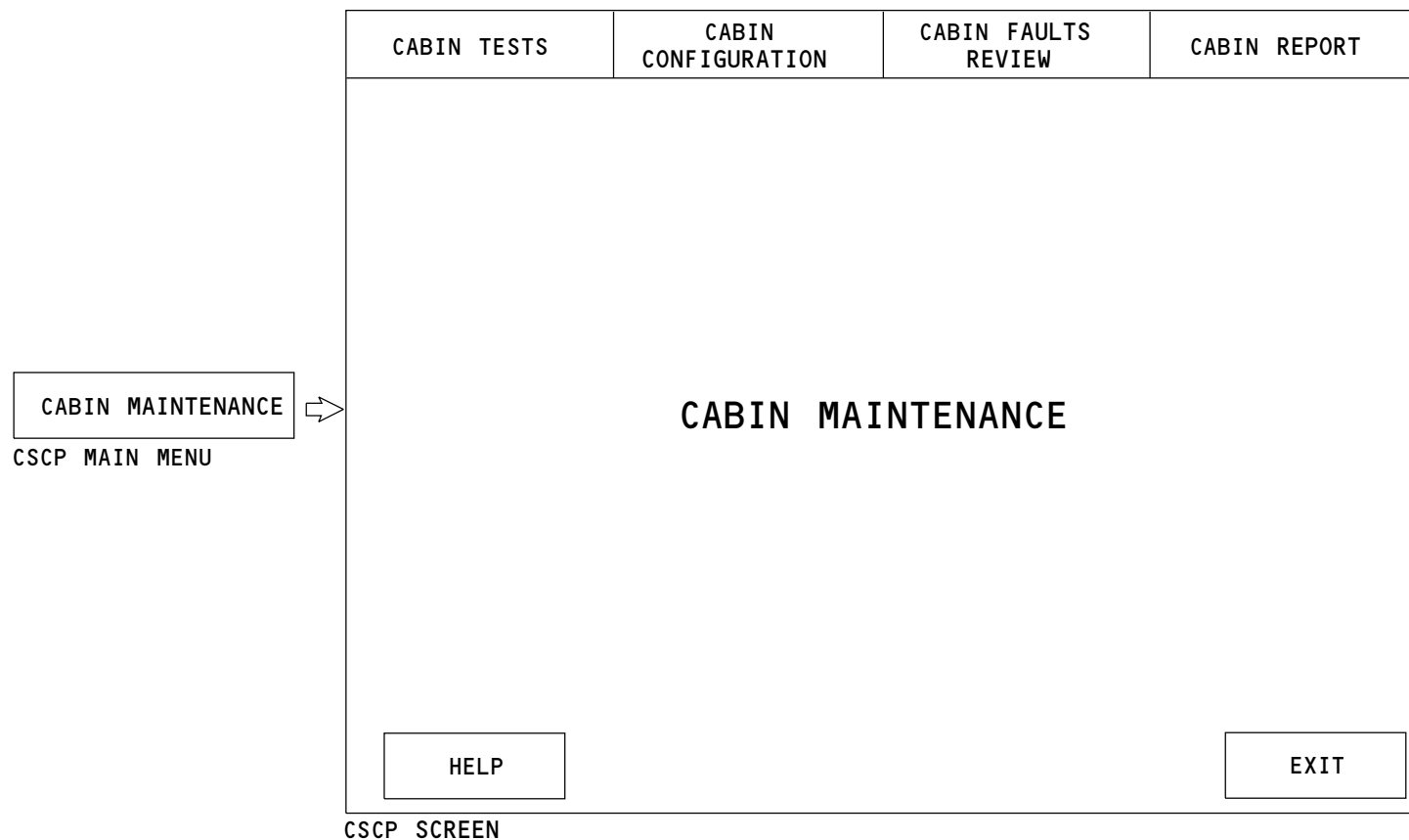
- CABIN TESTS - start CSS tests and monitor test results
- CABIN CONFIGURATION - install software and see LRU hardware and software part numbers
- CABIN FAULTS REVIEW - review failure data including faults related to CSS flight deck effects
- CABIN REPORT - send fault and part number data to a cabin printer.

The four selections show at the top of all maintenance screens. You can select any of the four selections from any maintenance screen (except for dialogue windows).

Touch these selections at the bottom of the screen to do the related function:

- HELP - to go to the cabin maintenance menu tree. The menu tree shows cabin maintenance selections and gives access to additional data on cabin maintenance functions
- EXIT - to go back to the CSCP main menu.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MAIN MENU

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CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE

General

The cabin maintenance menu tree gives you data for all the available selections on the maintenance menus.

Because of selections made in the configuration database generator or airline equipment options, some menu selections will not operate.

Access

To show the cabin maintenance menu tree, touch HELP on the cabin maintenance main menu.

Controls and Indications

The selections at the top of the menu tree show general data about these four top-level selections available on all maintenance screens:

- Cabin Tests
- Cabin Configuration
- Cabin Faults Review
- Cabin Report.

Cabin Tests

The Cabin Tests selection shows you general data about the different tests of the CSS. Touch any of the four selections below Cabin Tests to see the help screen for that function.

These are the four cabin tests:

- Quick test; collects real-time failures for 20 seconds and shows them on the screen.
- All test; starts a full BITE of the CSS. The CSCP shows all failures the BITE finds.
- Engineering tests have a special use. Different functions have different engineering tests.
- Lamps test; lets you control cabin lights. It lets you visually check the operation of the lamps.

Cabin Configuration

The Cabin Configuration selection shows you general data about software installation and configuration checks of the CSS. Touch any of the three selections below Cabin Configuration to see the help screen for that function.

These are the three cabin configuration functions:

- You can select and install a configuration database in the CSS components.
- A software management menu lets you install operational programs in CSS LRUs and remove and load software programs in the CSCP memory.
- Use the configuration check to see the LRU part number data of CSS components installed in the airplane.

Cabin Faults Review

This selection shows you general data about faults review screens. Touch any of the six selections below Cabin Faults Review to see the help screen for that function.

These are the different types of review screens:

- The quick test faults review shows the results of the last quick test.
- The all test faults review shows the results of the last all test.
- A data installation faults review screen shows the results of the last software installation.
- The flight deck effects faults (active) screen shows active CSS related flight deck effects (FDEs). The CSCP shows all active CSS related FDEs and the failure that caused the FDE.
- The flight deck effects faults (history) screen shows CSS related flight deck effects (FDEs) in memory. The CSCP shows as many as 99 of the last CSS related FDEs and the failures that caused each FDE.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE

Cabin Report Menu

This selection tells you how to make a paper copy of the faults results and configuration data. Touch any of the eight selections below cabin report to see the help screen for that function.

These are the different reports:

- A fault summary report that shows maintenance message numbers and the number of times they have occurred.
- A quick test faults report that shows the results of the last quick test.
- A report of the results of the last all test.
- A data installation report that contains failure descriptions from the last configuration database or operational program installation.
- A list of active CSS related FDEs and maintenance messages.
- A list all CSS related FDEs and maintenance messages in memory (history).
- A CSS configuration report that lists the hardware and software part numbers of the CSS related items installed in the airplane.
- The CSS configuration summary report shows part number data for CSS components.

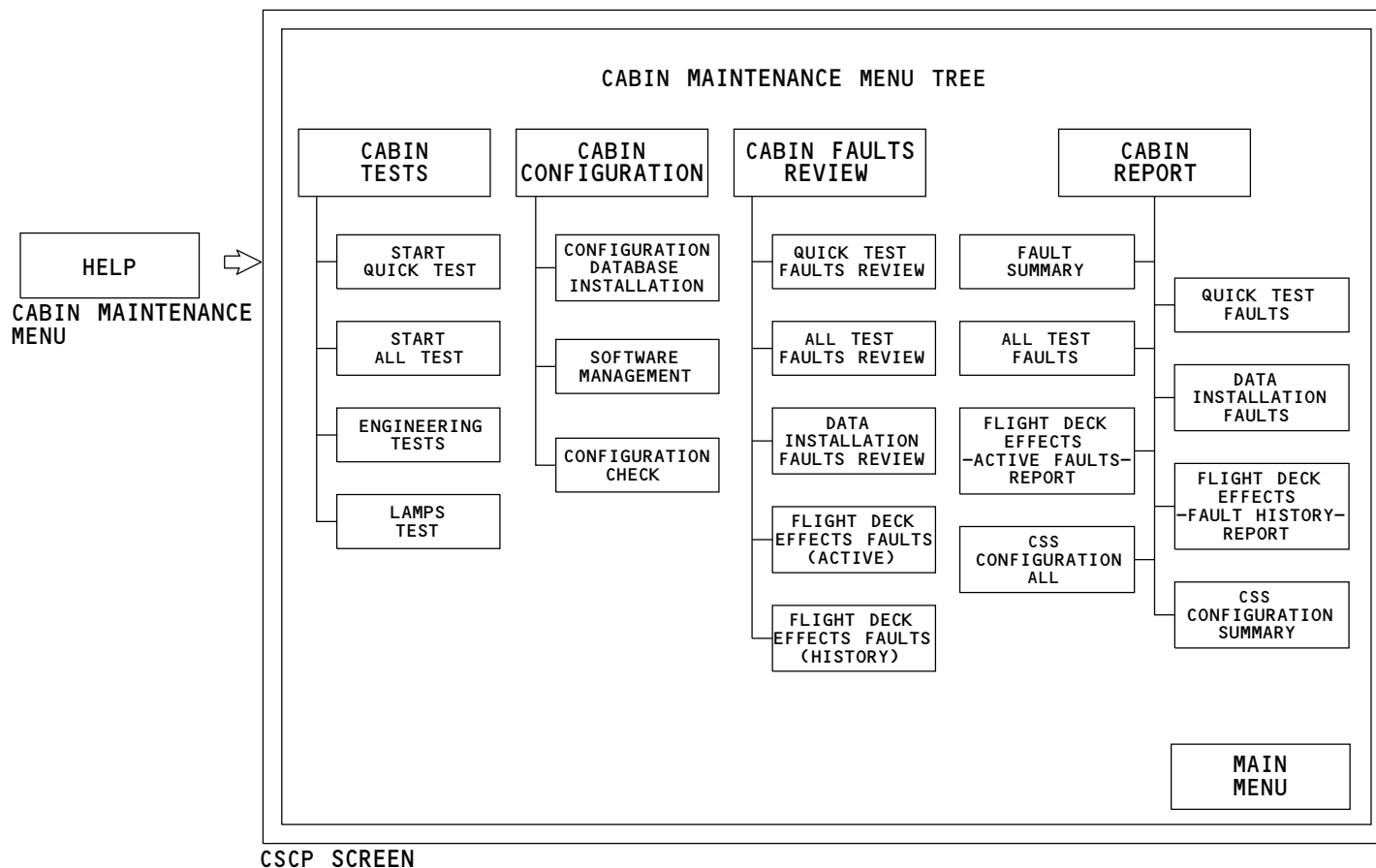
ARO 016-999; ARO 001-015 POST SB 777-23-0369

- A bus capture log contains the last capture of bus data on the CSS internal bus.
- An engineering log consists of previous copies of quick test faults, all test faults, data installation faults, configuration, and flight deck effects - history - fault reports and web server request and web server error logs.

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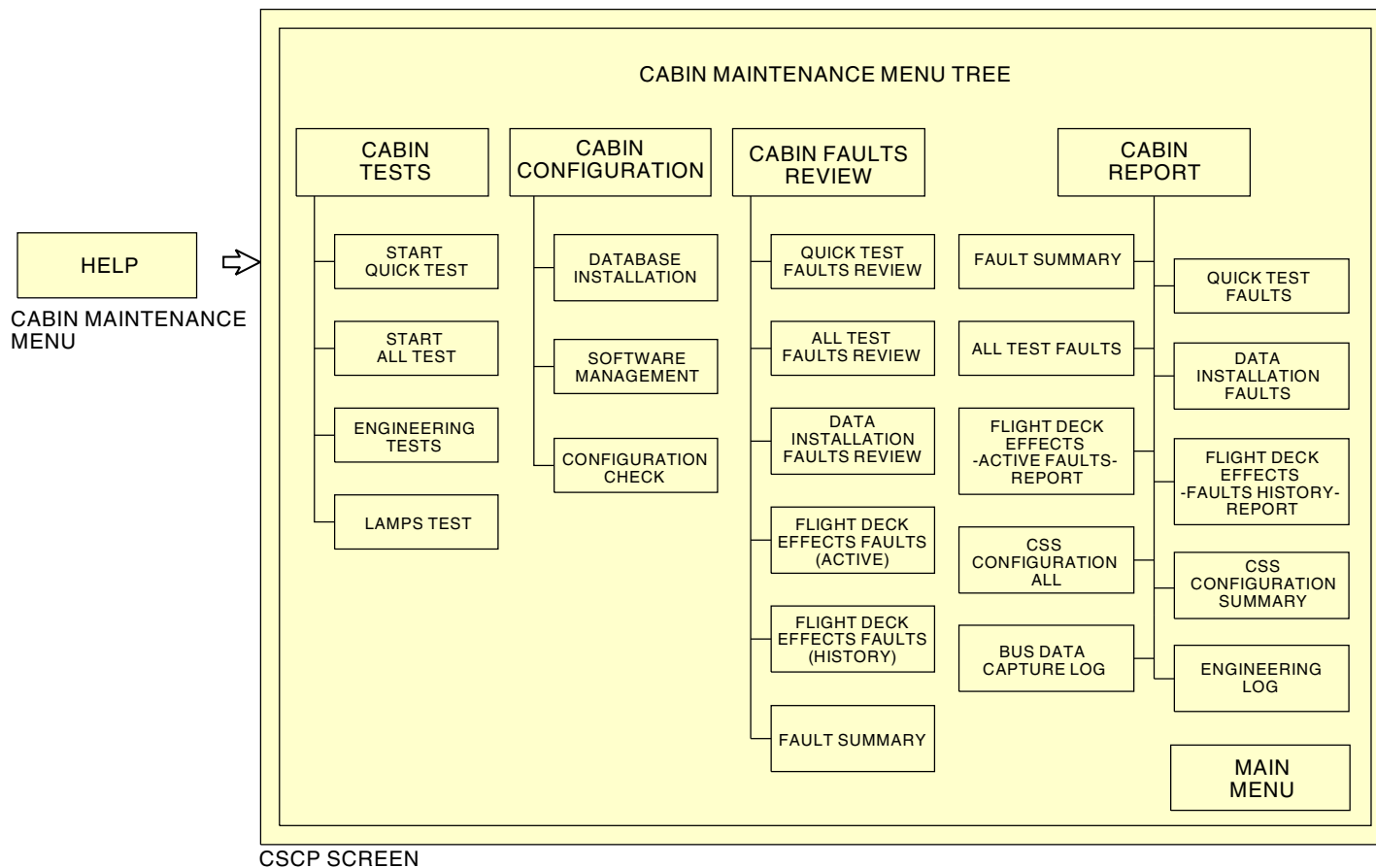
CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE

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CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE

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**CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE HELP WINDOW****General**

The help menu tree dialogue windows give you data for the selection that was made on the cabin maintenance menu tree help window.

Access

To show the help menu tree dialogue window:

- Touch HELP on the cabin maintenance main menu
- Make a selection on the cabin maintenance menu tree.

Controls and Indications

The screen shows data for the selected function. If there is more data than fits in the window, use the up and down arrows at the right of the display to show more. The square in the scroll bar between the arrows shows the location of the displayed data in the data field.

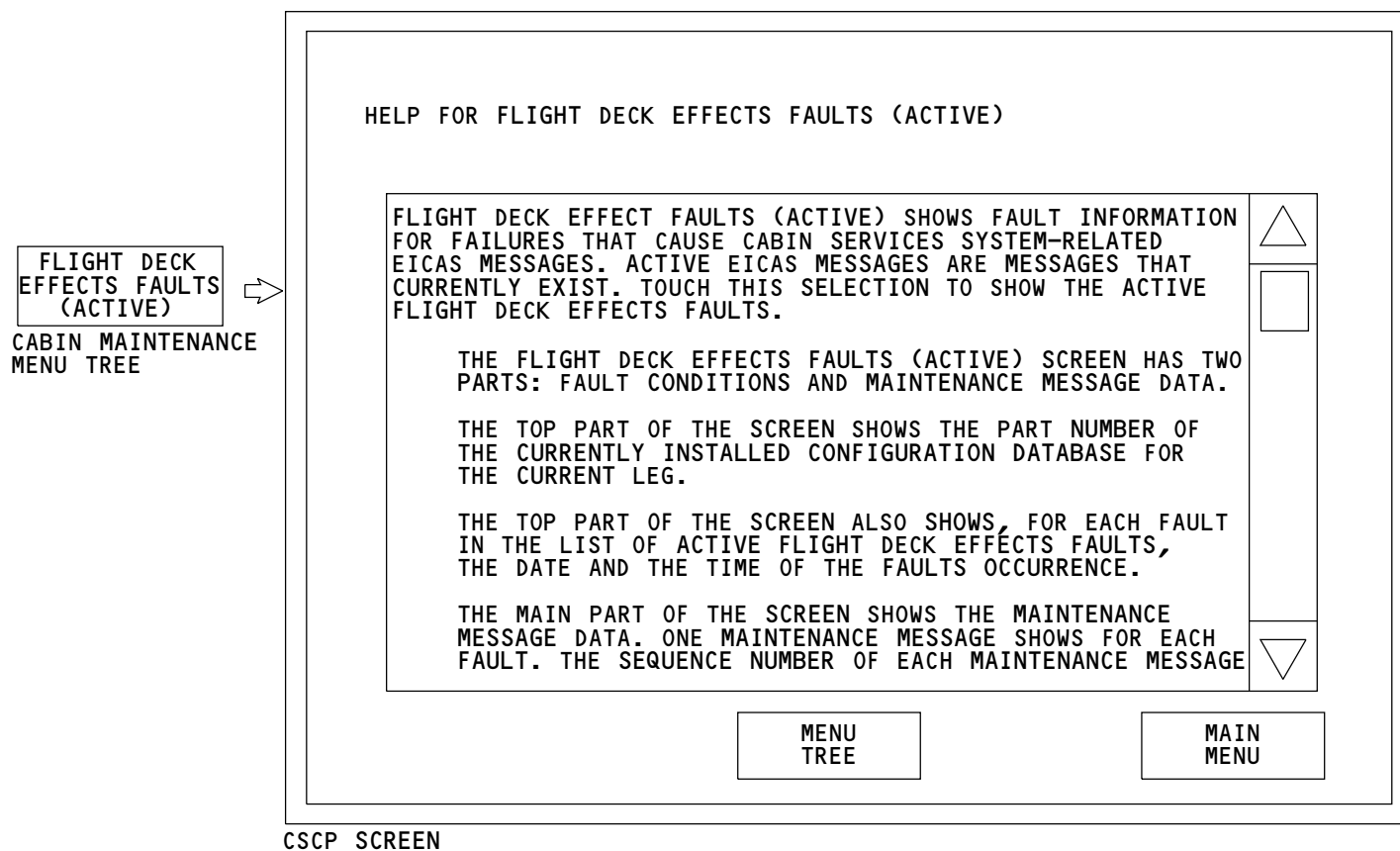
Touch MENU TREE to return to the menu tree.

Touch MAIN MENU to show the cabin maintenance main menu.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN MAINTENANCE MENU TREE HELP WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - CABIN TESTS MENU****General**

You use the cabin tests menu to start tests of the CSS. There are four selections on the cabin tests menu:

- START QUICK TEST
- START ALL TEST
- ENGINEERING TESTS
- LAMPS TEST.

Access

Touch CABIN TESTS on any maintenance screen to go directly to the cabin tests menu.

Quick Test

You use a quick test to find major faults or during a turn-around. To start a quick test, touch START QUICK TEST. The test may operate for as long as 20 seconds and then shows the results.

All Test

You use an all test for a more complete test. Normally you use an all test when the airplane is in for overnight service. To start an all test, touch START ALL TEST. The test operates for approximately two minutes then shows the results.

Engineering Tests

Touch ENGINEERING TESTS to show the engineering tests menu.

Lamps Test

Touch LAMPS TEST to show the lamps test control screens.

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
START QUICK TEST ENGINEERING TESTS ... START ALL TEST LAMPS TEST			
			MAIN MENU

CSCP SCREEN

M40109 S000616055_V1

CSS TEST AND SOFTWARE INSTALLATION - CABIN TESTS MENU

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST EXPLANATION DIALOGUE WINDOW****General**

The quick test explanation window tells you what the quick test does.

Access

This window shows automatically when you touch START QUICK TEST.

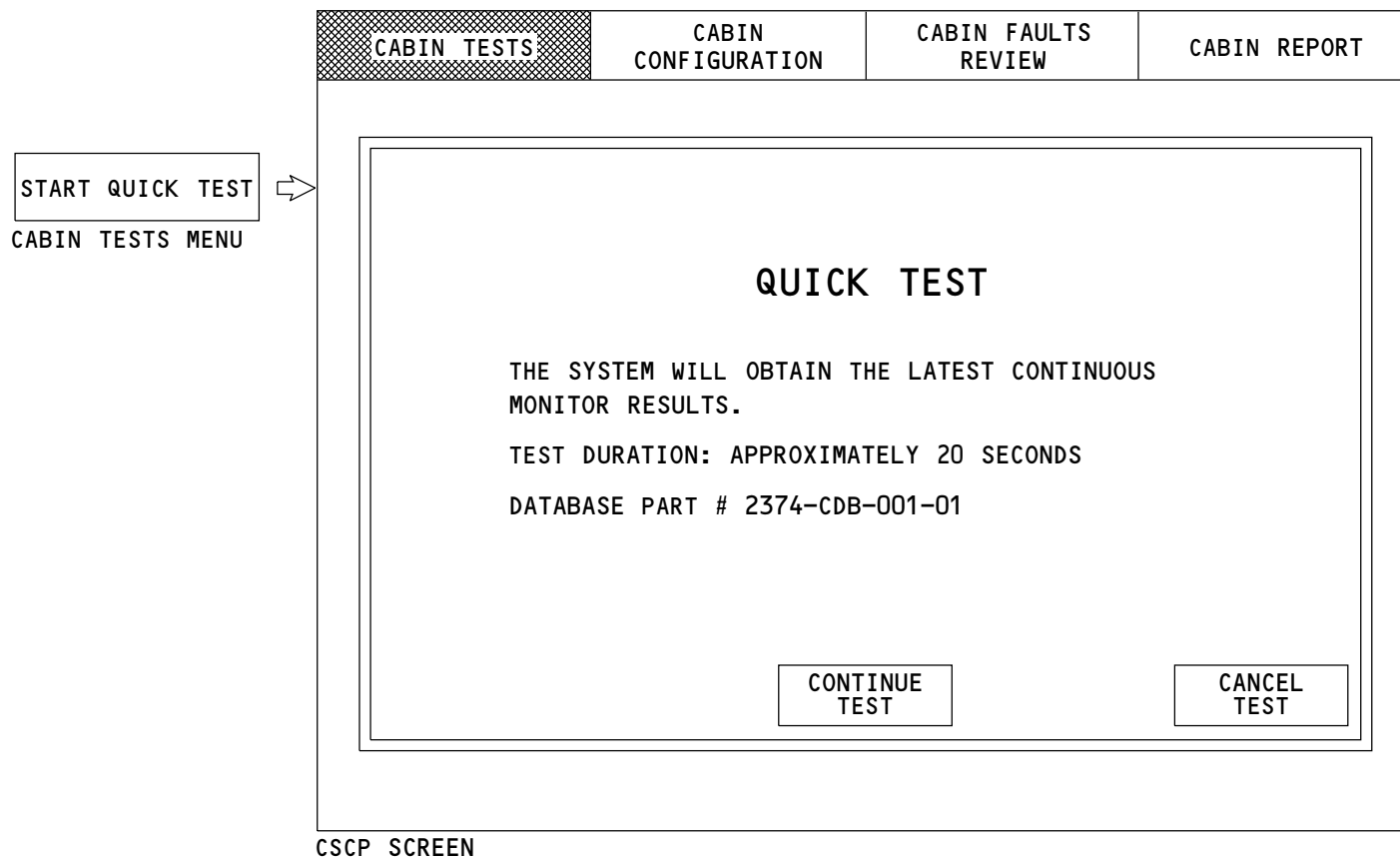
Controls and Indications

The window gives you information on the quick test. It also shows the configuration database part number.

To start the test, touch CONTINUE TEST.

To stop the test, touch CANCEL TEST.

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST EXPLANATION DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST OPERATING DIALOGUE WINDOW****General**

During the quick test, the cabin system control panel (CSCP) shows the quick test operating window.

Controls and Indications

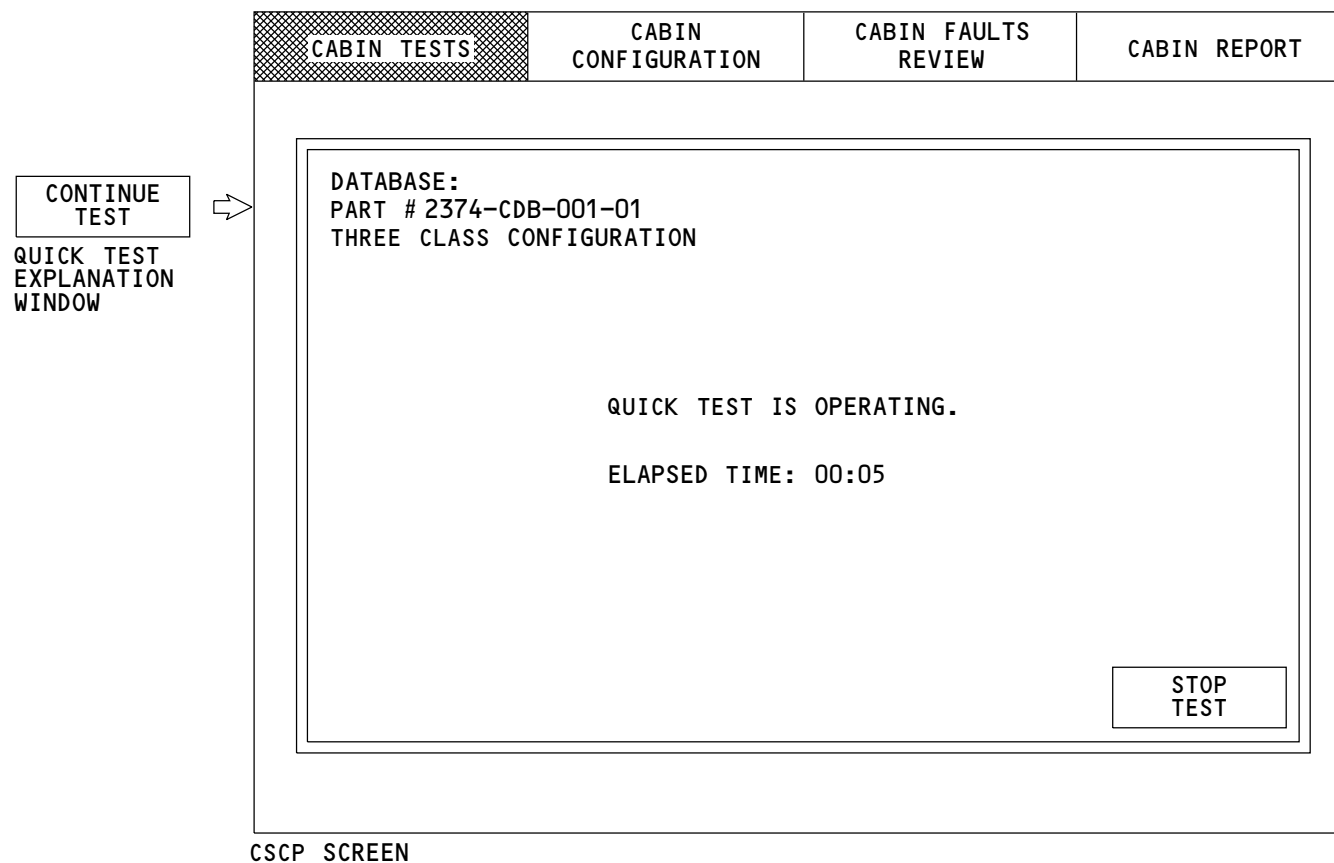
The elapsed time indication shows the time counted from the start of the test. The test may take as long as 20 seconds.

To stop the test, touch STOP TEST.

Operation

During normal operation, the CSS components monitor their operation. They send failure data to the cabin system management unit (CSMU). During the quick test, the CSMU collects failure data. The CSMU sends the results to the CSCP.

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST OPERATING DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST COMPLETE - NO FAULTS SCREEN****General**

The quick test complete with no faults screen shows if the test found no failures.

Access

The screen shows automatically when the test is complete.

Controls and Indications

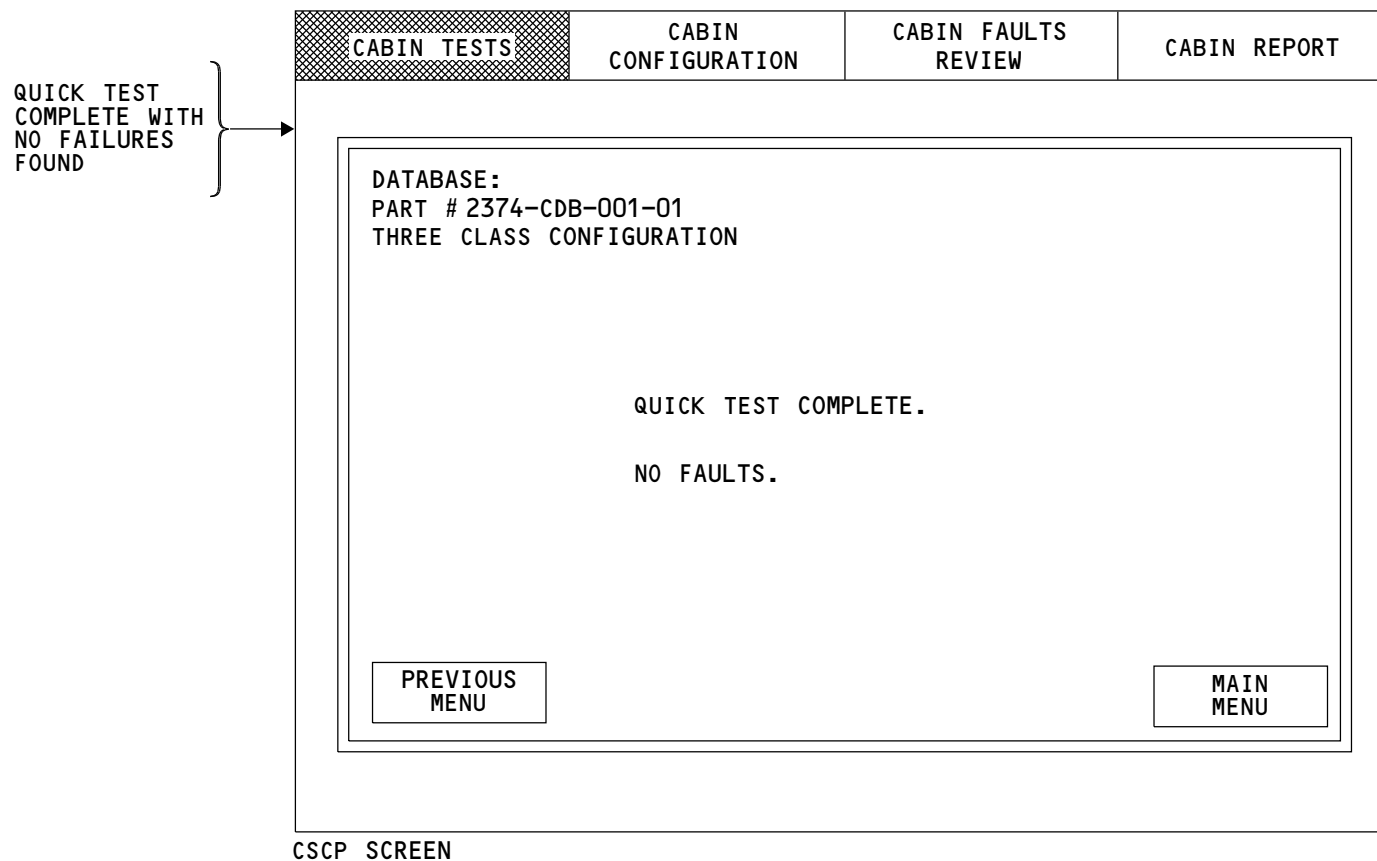
The screen shows the active database part number and description in the upper left corner.

Touch PREVIOUS MENU to show the cabin tests menu.

Touch MAIN MENU to show the cabin maintenance main menu.

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST COMPLETE - NO FAULTS SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FAULTS REVIEW SCREEN****General**

You use the quick test faults review screen to identify failures from the last quick test.

Access

If a quick test finds any failures, this screen shows automatically when the test is complete. To start a quick test:

- Touch CABIN TESTS on any maintenance screen
- Touch START QUICK TEST on the cabin tests menu
- Touch CONTINUE TEST on the quick test explanation window.

You can also select this screen from the cabin faults review menu if there were faults. First touch CABIN FAULTS REVIEW at the top of any maintenance screen. Then touch QUICK TEST FAULTS REVIEW.

Controls and Indications

To show failure data, make a selection and then select CONTINUE.

Selections that have no faults show as gray text and are not selectable.

To see all failures, select ALL UNITS. This will deselect any other selections. When you select any other LRU, it deselects ALL UNITS.

Touch an LRU selection to enable it, touch it again to deselect it. You may select or deselect any combination of LRUs.

CONTINUE selects the fault results screen.

Touch PREVIOUS MENU to show the cabin tests menu or cabin faults review menu.

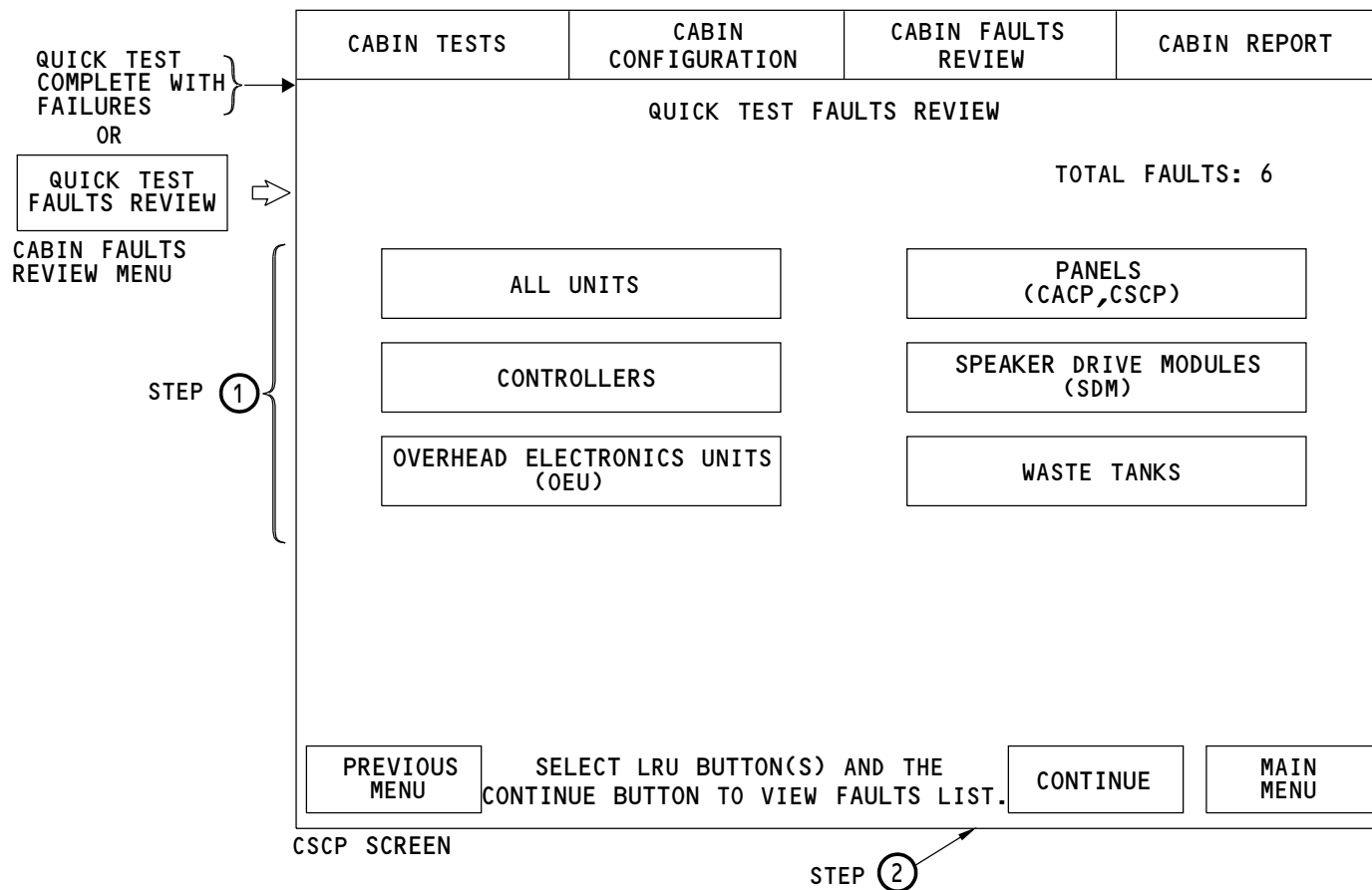
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FAULTS REVIEW SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FAULT RESULTS SCREEN****General**

You use the quick test fault results screen to see failures found during the last quick test.

Access

You can select this screen from the quick test faults review screen. The faults review screen shows at the end of a quick test. To start a quick test:

- Touch CABIN TESTS on any maintenance screen
- Touch START QUICK TEST on the cabin tests menu
- Touch CONTINUE TEST on the quick test explanation window
- Touch ALL UNITS or an LRU type and then touch CONTINUE on the faults review screen.

You can also select the quick test fault results screen from the cabin faults review menu. To show the quick test faults review screen:

- Touch CABIN FAULTS REVIEW at the top of any maintenance screen
- Touch QUICK TEST FAULTS REVIEW on the cabin faults review menu
- Touch ALL UNITS or touch an LRU type on the quick test faults review screen
- Touch CONTINUE on the quick test faults review screen.

Controls and Indications

These are the three parts of the screen:

- Test conditions
- Maintenance message data
- Selection controls.

Test Conditions

The test conditions part of the screen shows this test data:

- Test type (quick test or all test)

- The configuration database part number installed at the time of the test.
- The date and time of the test
- The type of LRUs selected from the faults review screen
- The sequence of each maintenance message in the list of messages for the selected LRU type.

There is a HELP selection on the left. Touch HELP for data on how to use the screen.

Maintenance Message Data

Each page shows one maintenance message. The maintenance message shows data about each failure. There are three parts to the message:

- Fault description
- Maintenance message number
- Recommended maintenance action.

The fault description identifies the failure condition detected by the test. It also identifies the component that found the fault.

You use the maintenance message number to find the corrective action in the fault isolation manual (FIM).

Some faults show as Latched. Most Latched faults are faults the system detects at power up. Some major faults are also latched during continuous monitor. Latched means the fault will stay in system memory until you take corrective action.

The recommended maintenance action identifies all the possible components or conditions that could cause the fault. The most probable cause shows first and the least probable cause shows last.

Each screen shows one maintenance message. Touch the down arrow to access additional messages. Touch the up arrow to return through the message list. The square on the scroll bar shows your position in the message list.

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FAULT RESULTS SCREEN****Selection Controls**

Touch PREVIOUS MENU to show the cabin tests menu.

Touch PREVIOUS SCREEN to show the quick test faults review screen.

Touch SHOW LOCATION to show a visual reference of a defective component. If there is more than one defective component in the list of possible causes, another screen shows to let you select a component. Another screen will then show you the location of the component you selected.

Touch UNIT USAGE to show the components controlled by the defective component. If there is more than one defective component in the list of possible causes, another screen shows to let you select a component. Another screen will then show you the unit usage of the component you selected.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a diskette in the CSCP disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the printer for a paper copy.

Touch MAIN MENU to show the cabin maintenance menu.

Training Information Point

To determine if a fault is still active you must do a new test.

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ALL UNITS

AND

CONTINUE

}

⇒

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT	
HELP QUICK TEST FAULT RESULTS DATABASE PART # 2374-CDB-001-01 UNITS SELECTED: ALL OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 AND ALL SUBSEQUENT OEUS IN COLUMN DO NOT RESPOND. DETECTED BY: ZONE MANAGEMENT UNIT (ZMU) 1 MAINTENANCE MESSAGE: 23-03402 RECOMMENDED MAINTENANCE ACTION: LATCHED POSSIBLE CAUSES: 1) WIRING 2) OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 LOCATED AT: SEAT 6E, CENTER PASSENGER SERVICE UNIT (PSU) 3) OVERHEAD ELECTRONICS UNIT (OEU) 1-2-5 LOCATED AT: SEAT 7E, CENTER PASSENGER SERVICE UNIT (PSU) 4) SEE FAULT ISOLATION MANUAL (FIM) △ ▽				TEST DATE: 01JUN95 TEST TIME: 08:05Z FAULT NUMBER: 1 OF 8
PREVIOUS MENU PREVIOUS SCREEN		SHOW LOCATION UNIT USAGE SAVE PRINT MAIN MENU		

CSCP SCREEN

M39443 S000616060_V2

CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FAULT RESULTS SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - SELECT LRU DIALOGUE WINDOW****General**

The select LRU dialogue window lets you select an LRU to see its unit usage or location.

Access

This screen shows when you touch SHOW LOCATION or UNIT USAGE on any fault results screen and there is more than one defective unit in the list of possible causes.

Controls and Indications

Touch any LRU selection and then touch the CONTINUE SELECTION to go to a screen that shows the usage or location for the LRU. You can select only one LRU at a time. If you make another selection, the first selection is deselected.

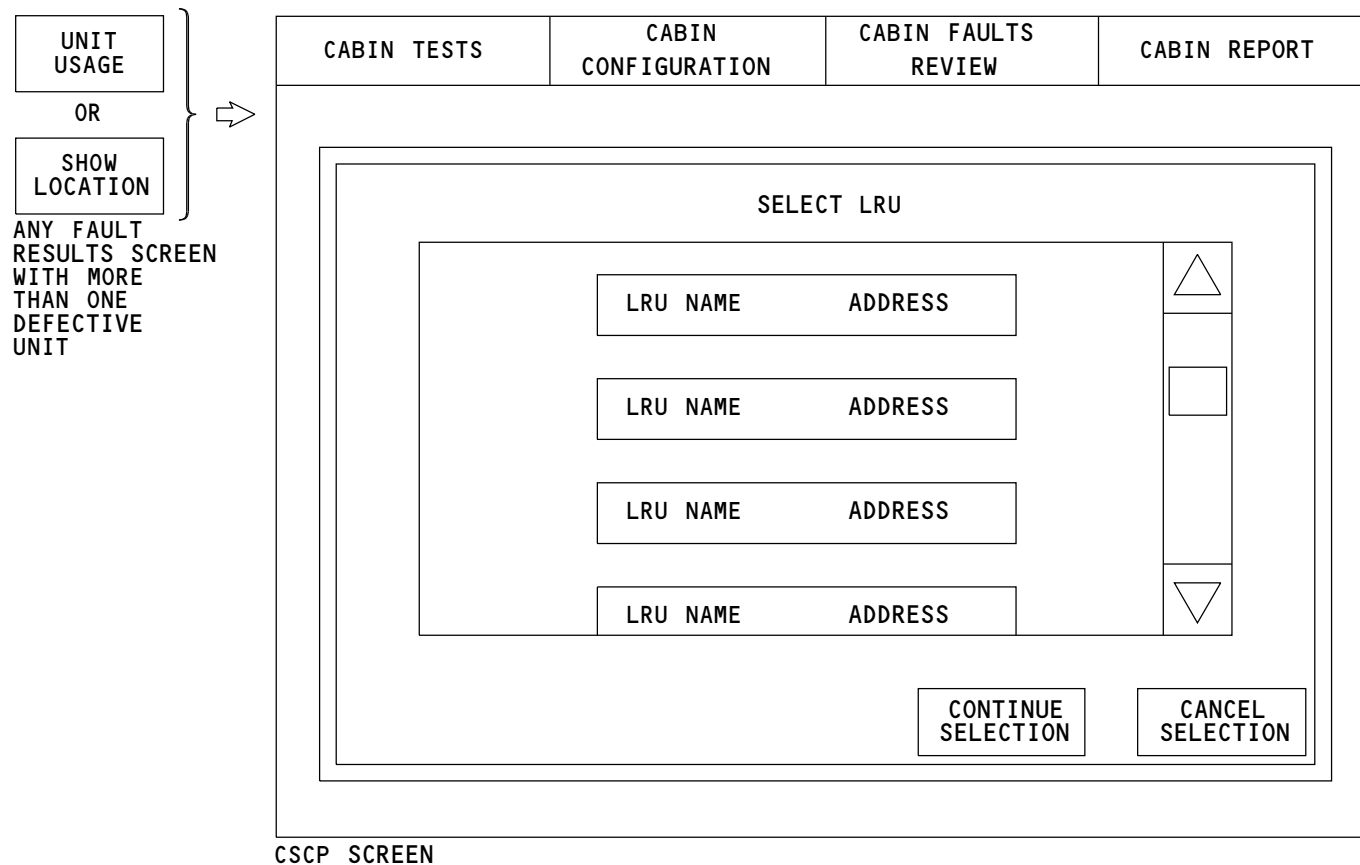
Touch CANCEL SELECTION to stop any selections and return to the previous screen.

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CSS TEST AND SOFTWARE INSTALLATION - SELECT LRU DIALOGUE WINDOW

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CSS TEST AND SOFTWARE INSTALLATION - FAULT RESULTS WITH UNIT USAGE WINDOW

General

The unit usage window shows the components controlled by a defective component.

Access

This window shows as an extension of the fault results screen. You select the fault results screen from the quick test faults review screen. The faults review screen shows at the end of a quick test.

To start a quick test:

- Touch CABIN TESTS on any maintenance screen
- Touch START QUICK TEST on the cabin tests menu
- Touch CONTINUE TEST on the quick test explanation window.

To show the quick test fault results screen:

- Touch CABIN FAULTS REVIEW at the top of any maintenance screen
- Touch QUICK TEST FAULTS REVIEW on the cabin faults review menu
- Touch ALL UNITS or touch an LRU type on the quick test faults review screen
- Touch CONTINUE on the quick test faults review screen.

To show the unit usage window, touch UNIT USAGE at the bottom of the screen. If there was more than one defective LRU in the list of possible causes, another screen shows to let you select the component.

Controls and Indications

The fault description identifies the failure condition detected by the test. It also identifies the component that found the fault.

You use the maintenance message number to find the corrective action in the fault isolation manual (FIM).

Touch HELP to show a screen that gives you data about the fault results screens.

Use the up and down arrows at the right of the unit usage window to scroll through the data. A scroll box between the arrows shows your position in the data list.

Touch PREVIOUS MENU to return to the quick test faults review screen.

Touch PREVIOUS SCREEN to return to the quick test fault results screen without the unit usage window.

Touch SHOW LOCATION to go to the LRU location screen.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to save all of the unit usage data to a floppy diskette in the CSCP disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE to save all of the unit usage data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to print all of the unit usage data to a cabin printer.

Touch MAIN MENU to return to the cabin maintenance menu.

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UNIT
USAGE

QUICK TEST FAULT
RESULTS SCREEN

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
QUICK TEST FAULT RESULTS			
HELP DATABASE PART # 2374-CDB-001-01		TEST DATE: 01JUN95 TEST TIME: 08:05Z FAULT NUMBER: 1 OF 8	
		UNITS SELECTED: ALL	
OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 AND ALL SUBSEQUENT OEUS IN COLUMN DO NOT RESPOND. DETECTED BY: ZONE MANAGEMENT UNIT (ZMU) 1		USAGE: 1 OF 3 ▲ ▼	
MAINTENANCE MESSAGE: 23-03402			
OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 USAGE			
J2-01: NOT USED J2-02: NOT USED J2-03: READING LIGHT 6D J2-04: READING LIGHT 6E J2-05: READING LIGHT 6F J2-06: NIGHT LIGHT J2-07: LAV OCCUPIED SIGN J2-08: LAV SIGN		▲ ▼	
PREVIOUS MENU	PREVIOUS SCREEN	SHOW LOCATION	SAVE
		PRINT	MAIN MENU

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - FAULT RESULTS WITH UNIT USAGE WINDOW

M39445 S000616062_V1

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23-39-01

**CSS TEST AND SOFTWARE INSTALLATION - SHOW LRU LOCATION SCREEN****General**

The LRU location screen shows where the defective component is installed.

Access

You select this screen from the maintenance message on the fault results screen. Select the fault results screen from the quick test faults review screen. The faults review screen shows at the end of a quick test.

To start a quick test:

- Touch CABIN TESTS on any maintenance screen
- Touch START QUICK TEST on the cabin tests menu
- Touch CONTINUE TEST on the quick test explanation window.

To show the quick test faults review screen:

- Touch CABIN FAULTS REVIEW at the top of any maintenance screen
- Touch QUICK TEST FAULTS REVIEW on the cabin faults review menu
- Touch ALL UNITS or touch an LRU type on the quick test faults review screen
- Touch CONTINUE on the quick test faults review screen.

Touch SHOW LOCATION on the fault results screen to show the location screen. If there was more than one defective LRU in the list of possible causes, another screen shows to let you select the component.

You can also show this screen if you select SHOW LOCATION on the fault results screen with unit usage.

Controls and Indications

The screen shows a plan view of the airplane. An asterisk (*) shows the component location. The text below the airplane tells you the location.

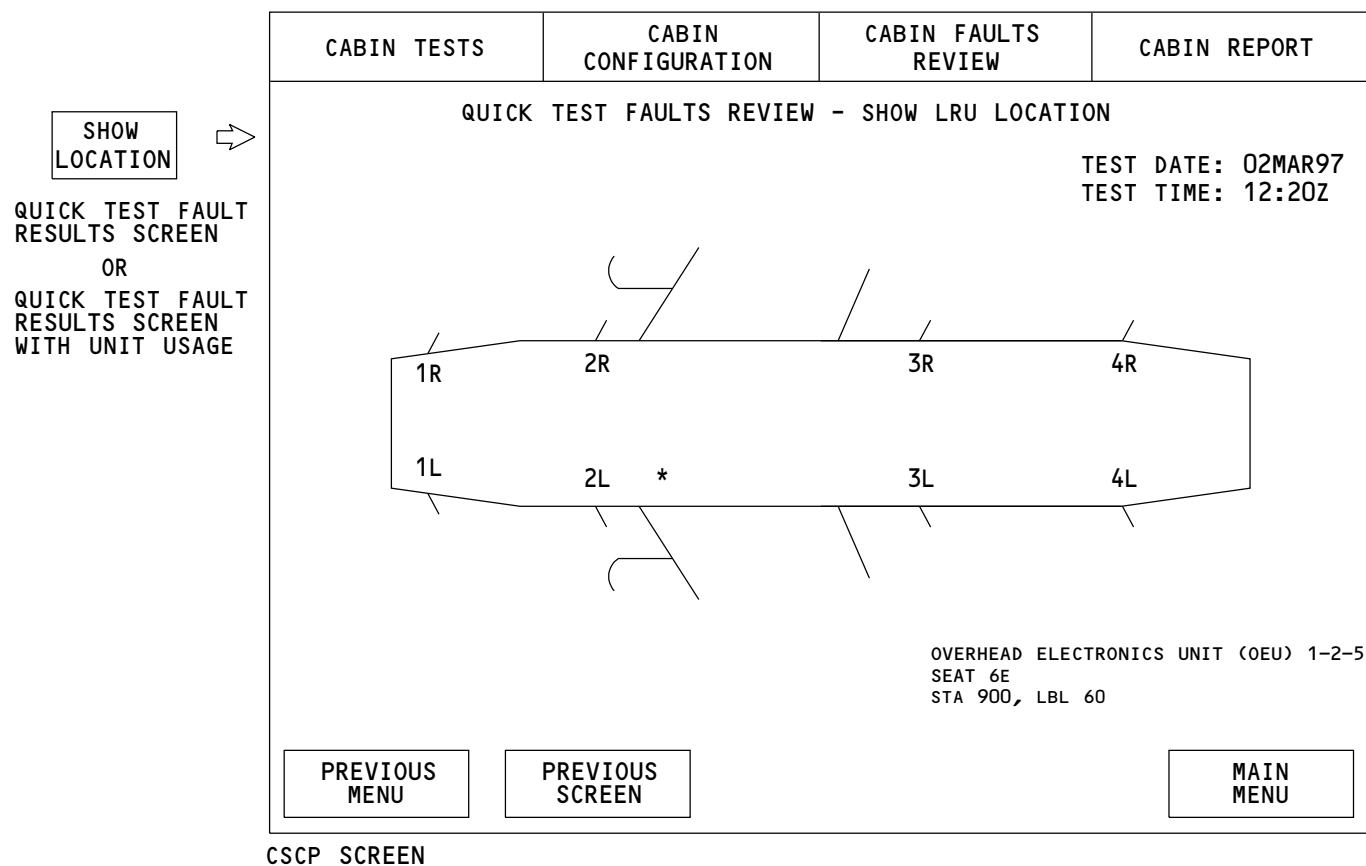
Touch PREVIOUS MENU to return to the tests menu.

Touch PREVIOUS SCREEN to return to the fault results screen.

Touch MAIN MENU to return to the cabin maintenance menu.

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CSCP SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - SHOW LRU LOCATION SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FUNCTIONAL DESCRIPTION**General**

The quick test is a check of the overall condition of the CSS. The cabin system management unit (CSMU) monitors the data from other CSS LRUs for as long as 20 seconds. The CSMU sends all of the data to the cabin system control panel (CSCP). The CSCP keeps failure data in nonvolatile memory (NVM) to display on the screen.

Components

All the CSS components that use microprocessors have continuous fault monitor circuits. These components use microprocessors:

- Cabin system control panel (CSCP)
- Cabin system management unit (CSMU)
- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs)
- Zone management units (ZMUs)
- Overhead electronics units (OEUs)
- Cabin area control panels (CACPs).

Operation

The fault monitor circuits constantly check system operation. The fault monitor circuits check for internal operation and digital inputs.

The CSMU gets this failure data from the ZMUs and PA/CI controller.

Each ZMU sends its own internal failures and failure data from its OEUs and CACP on the intersystem (I/S) bus. If a ZMU does not get data from one of its LRUs or the data is out of tolerance, the ZMU sends a failure message for that LRU.

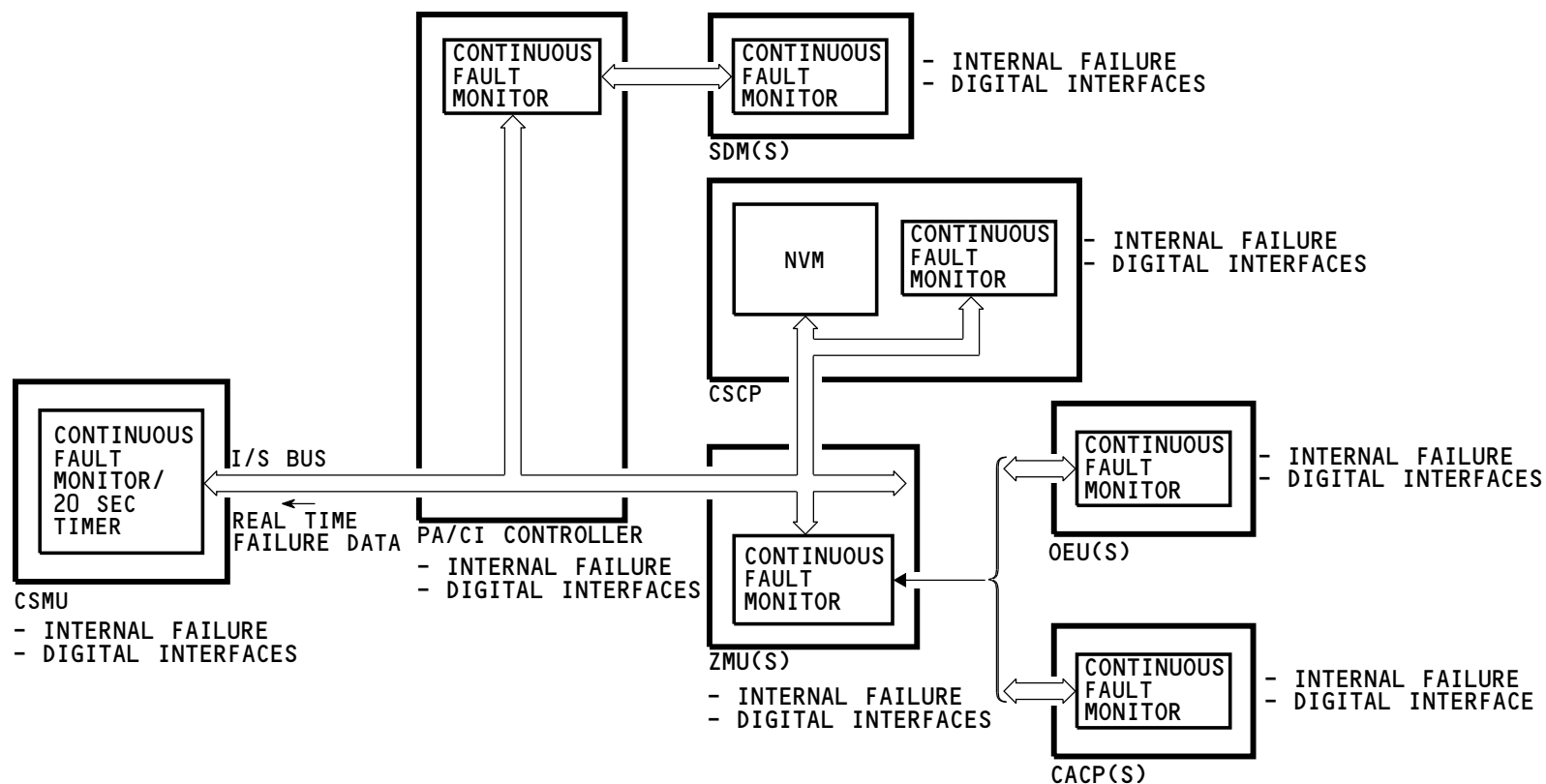
The PA/CI controller sends failure data from SDMs and its own internal failures on the intersystem bus. If the PA/CI does not get data from the SDM or it is out of tolerance, the PA/CI sends a failure message for that SDM.

Fault Processing

The CSMU sends all fault data to the CSCP. The CSCP processes all fault data and stores it in memory.

The CSCP looks at the fault data to identify if multiple fault indications can be from one failure. If it is, the CSCP combines the fault indications into one maintenance message. This procedure is called fault consolidation.

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M39448 S000616065_V2

CSS TEST AND SOFTWARE INSTALLATION - QUICK TEST FUNCTIONAL DESCRIPTION

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST DIALOGUE WINDOW****General**

The all test dialogue window tells you about the all test.

Access

This window shows automatically when you touch START ALL TEST on the cabin tests menu.

Controls and Indications

The all test dialogue window gives you data about the all test. It also shows the active configuration database part number.

To start the test, touch CONTINUE TEST.

To stop the test, touch CANCEL TEST.

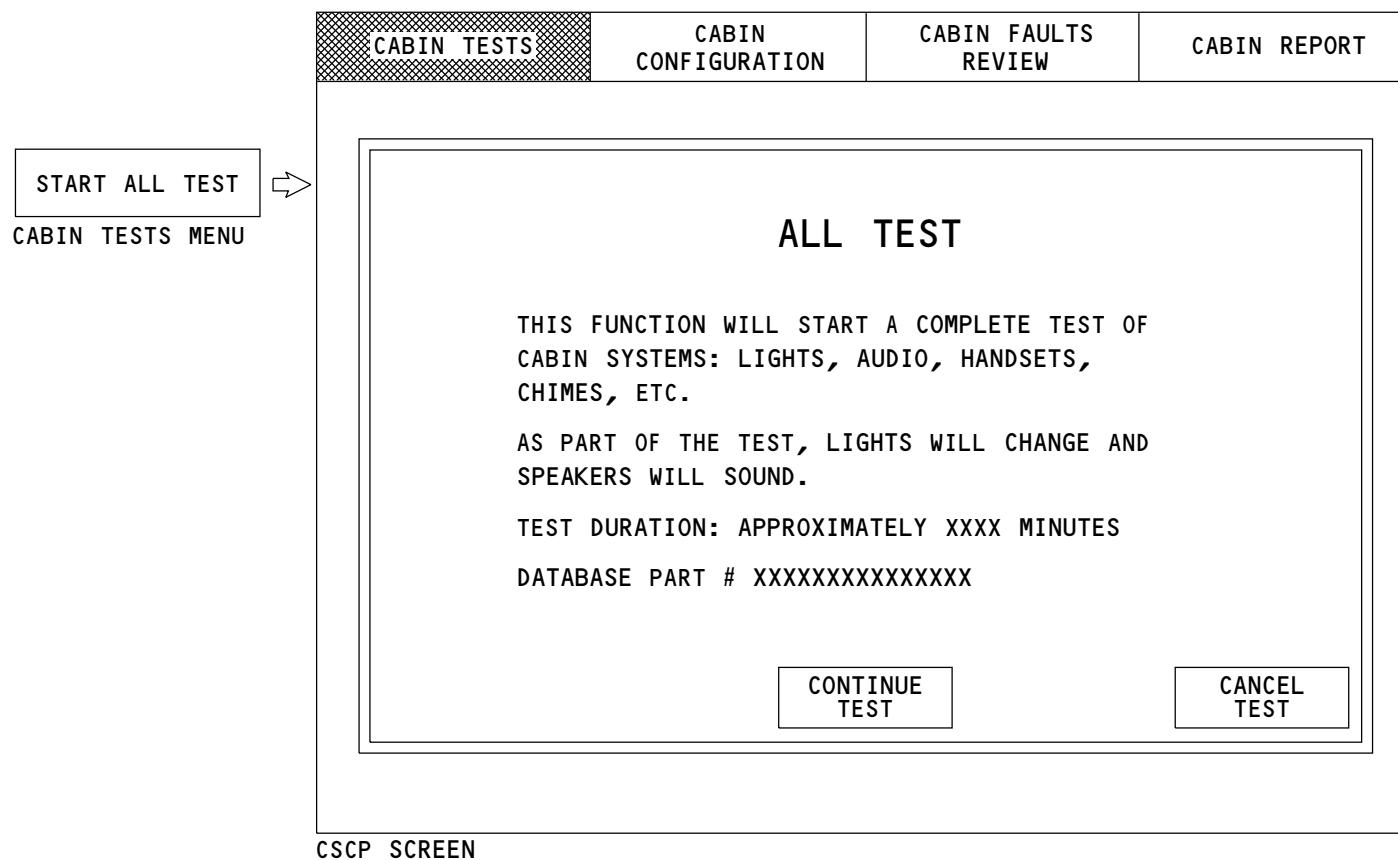
Training Information Point

The all test makes noise and flashes lights in the cabin. You should not do this test with passengers on board.

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CSS TEST AND SOFTWARE INSTALLATION - ALL TEST DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST OPERATING DIALOGUE WINDOW****General**

During the all test, the cabin system control panel (CSCP) shows the all test operating window.

Access

This screen shows when you make these selections:

- Touch START ALL TEST on the cabin tests main menu
- Touch CONTINUE TEST on the all test explanation window.

Controls and Indications

The elapsed time indication shows the time from the start of the test. The test lasts about two minutes.

To stop the test, touch STOP TEST.

Operation

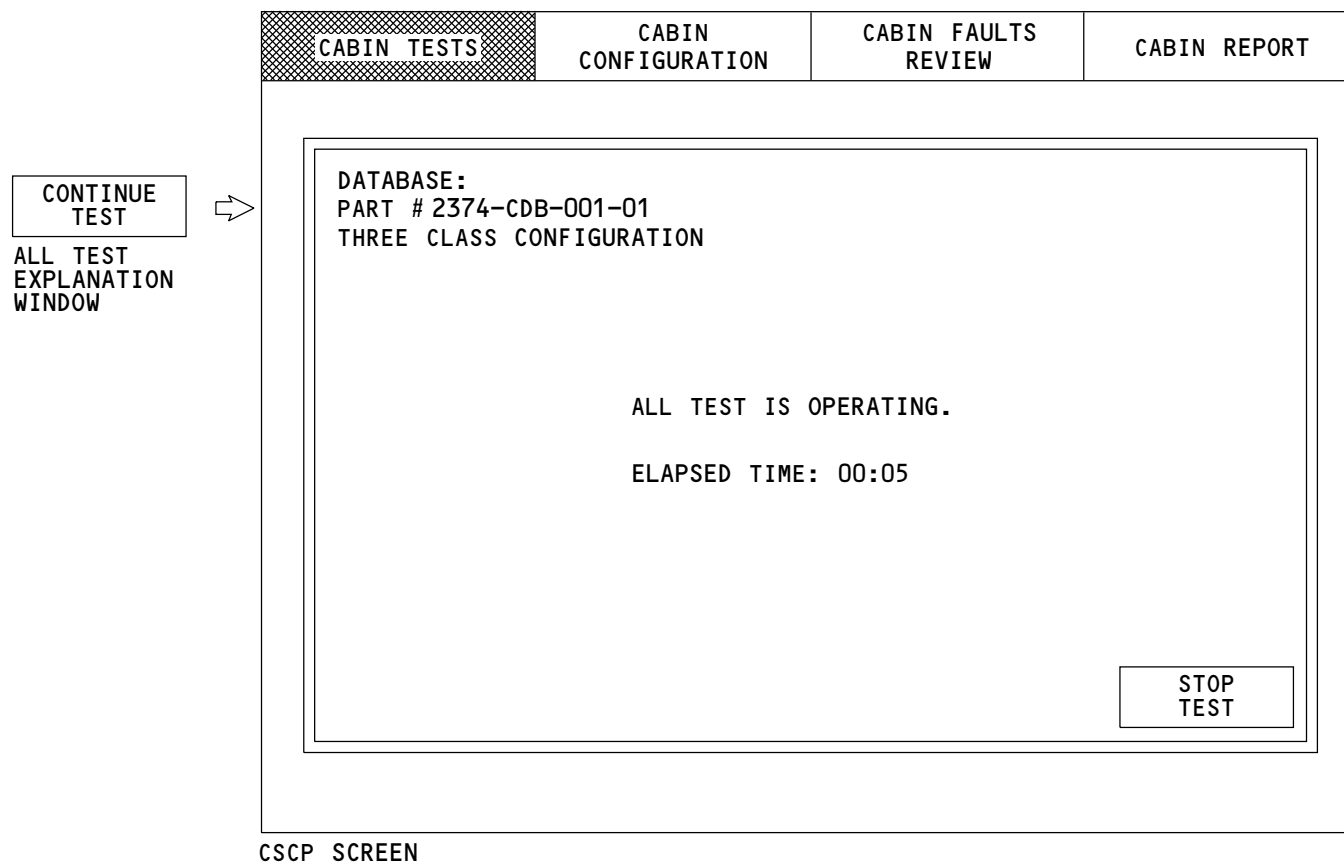
The all test starts a full BITE of the CSS. All CSS components do a test of their internal operations. They also check their interfaces. Components that control lamps check for opens or shorts. Speaker drive modules also check speakers for opens or shorts.

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CSS TEST AND SOFTWARE INSTALLATION - ALL TEST OPERATING DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST COMPLETE - NO FAULTS****General**

The all test complete no faults screen shows that the test found no failures.

Access

The screen shows automatically when the all test is complete.

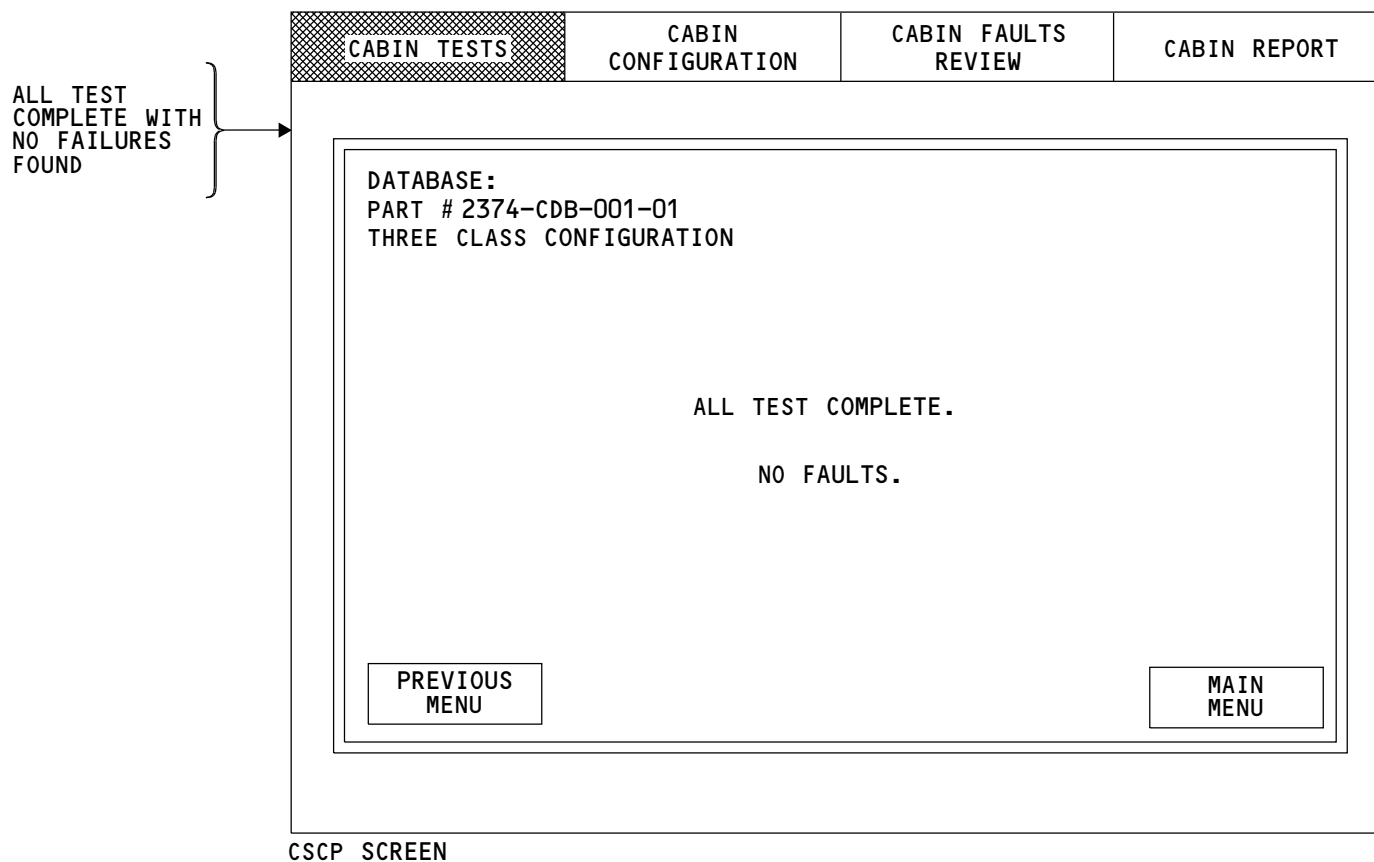
Controls and Indications

If the system passes the test, ALL TEST COMPLETE - NO FAULTS shows.

If there are failures, the CSCP shows the all test faults review screen.

Touch PREVIOUS MENU to show the cabin tests menu.

Touch MAIN MENU to show the cabin maintenance main menu.



M40115 S000616068_V1

CSS TEST AND SOFTWARE INSTALLATION - ALL TEST COMPLETE - NO FAULTS

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FAULTS REVIEW SCREEN****General**

You use the all test faults review screen to identify failures found during the last all test.

Access

If an all test finds any failures, the all test faults review screen shows automatically when the test is complete. To start an all test:

- Touch CABIN TESTS on any maintenance screen
- Touch START ALL TEST on the cabin tests menu
- Touch CONTINUE TEST on the all test explanation window.

You can also select the all test faults review screen from the cabin faults review menu. To show the all test faults review screen, first touch CABIN FAULTS REVIEW at the top of any maintenance screen. Then touch ALL TEST FAULTS REVIEW.

Controls and Indications

To show all failures, touch ALL UNITS. The selection shows green. After you touch ALL UNITS, touch CONTINUE. To show the failures of one LRU type, touch the LRU type and then touch CONTINUE.

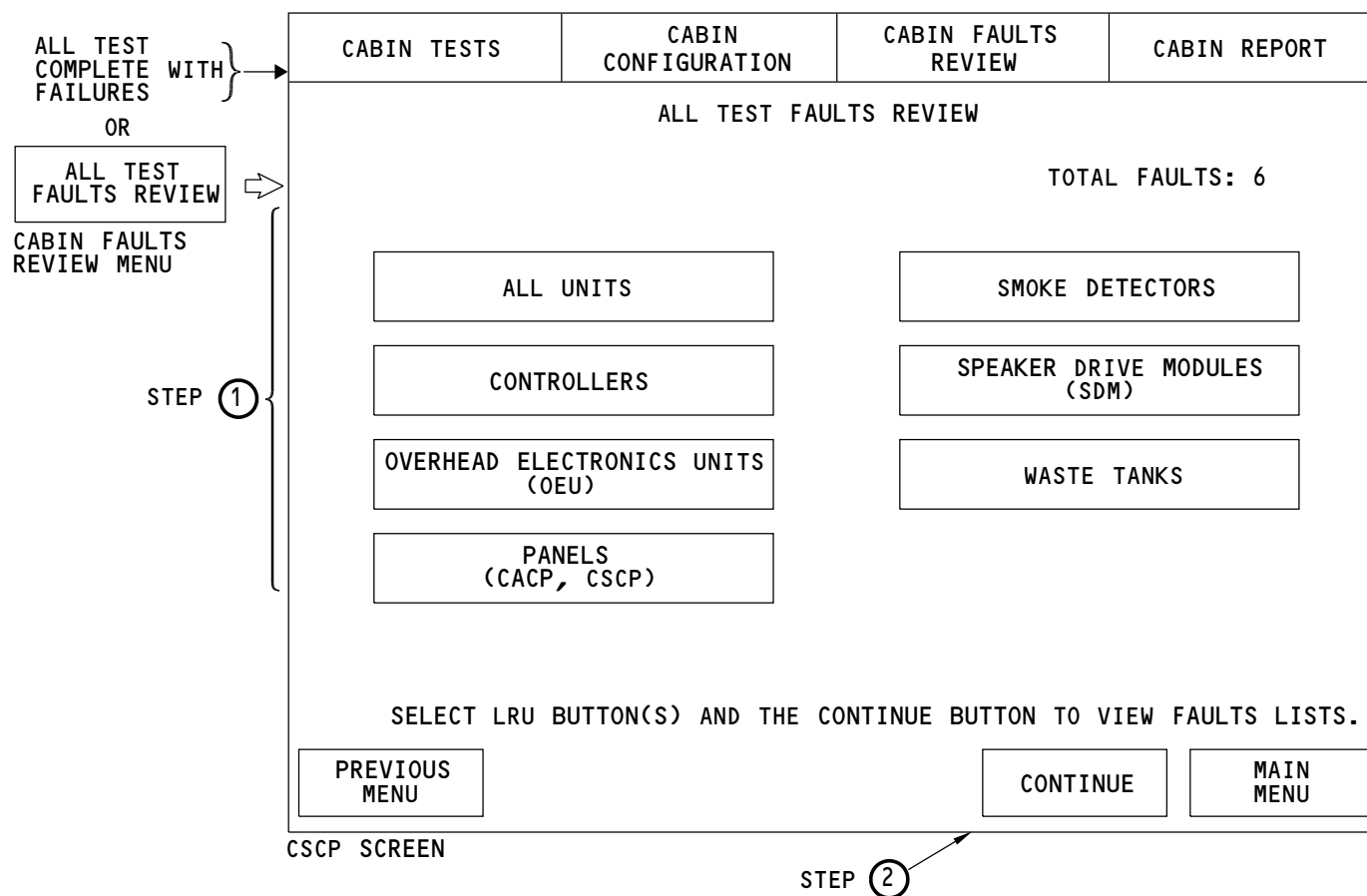
If you touch PREVIOUS MENU, the cabin faults review menu shows if you used that selection to see this screen. The cabin tests menu shows if you did a test.

Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FAULTS REVIEW SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FAULT RESULTS SCREEN****General**

You use the all test fault results screen to see failures found during the last all test.

Access

You select the fault results screen from the all test faults review screen. The faults review screen shows at the end of an all test. To start an all test:

- Touch CABIN TESTS on any maintenance screen
- Touch START ALL TEST on the cabin tests menu
- Touch CONTINUE TEST on the all test explanation window
- Touch ALL UNITS or an LRU type and then touch CONTINUE on the faults review screen.

You can also select the all test fault results screen from the cabin faults review menu. To show the all test faults review screen:

- Touch CABIN FAULTS REVIEW at the top of any maintenance screen
- Touch ALL TEST FAULTS REVIEW on the cabin faults review menu
- Touch ALL UNITS or touch an LRU type on the all test faults review screen
- Touch CONTINUE on the all test faults review screen.

Controls and Indications

These are the three parts of the screen:

- Test conditions
- Maintenance message data
- Selection controls.

Test Conditions

The test conditions part of the screen shows this test data:

- Test type (quick test or all test)

- The configuration database part number installed at the time of the test
- The date and time of the test
- The type of LRUs selected from the faults review screen
- The sequence of each maintenance message in the list of messages for the selected LRU type.

There is a HELP selection on the left. Touch HELP for data on how to use the screen.

Maintenance Message Data

Each page shows one maintenance message. The maintenance message shows data about each failure. There are three parts to the maintenance message:

- Fault description
- Maintenance message number
- Recommended maintenance action.

The fault description identifies the failure condition detected by the test. It also identifies the component that finds the fault.

You use the maintenance message number to find the corrective action in the fault isolation manual (FIM).

The recommended maintenance action identifies all the possible components or conditions that could cause the fault. The most probable cause shows first and the least probable cause shows last.

Each screen shows one maintenance message. Touch the down arrow to access additional messages. Touch the up arrow to return through the message list. The square on the scroll bar shows your position in the message list.

Selection Controls

Touch PREVIOUS MENU to show the cabin tests menu.

Touch PREVIOUS SCREEN to show the all test fault review screen.

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**CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FAULT RESULTS SCREEN**

Touch SHOW LOCATION to show a visual reference of the defective component. If there is more than one LRU in the list of possible causes, another screen shows to let you select an LRU.

Touch UNIT USAGE to show the components controlled by the defective component. If there is more than one LRU in the list of possible causes, another screen shows to let you select an LRU.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a diskette in the CSCP disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the printer for a paper copy.

Touch MAIN MENU to show the cabin maintenance menu.

Training Information Point

To determine if a fault is still active you must do a new test.

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ALL UNITS

AND

CONTINUE

} →

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
ALL TEST FAULT RESULTS			
HELP	DATABASE PART # 2374-CDB-001-01 TEST DATE: 01JUN95 TEST TIME: 08:05Z FAULT NUMBER: 1 OF 8 UNITS SELECTED: ALL OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 AND ALL SUBSEQUENT OEUS IN COLUMN DO NOT RESPOND. DETECTED BY: ZONE MANAGEMENT UNIT (ZMU) 1 MAINTENANCE MESSAGE: 23-03402 RECOMMENDED MAINTENANCE ACTION: POSSIBLE CAUSES: 1) WIRING 2) OVERHEAD ELECTRONICS UNIT (OEU) 1-2-4 LOCATED AT: SEAT 6E, CENTER PASSENGER SERVICE UNIT (PSU) 3) OVERHEAD ELECTRONICS UNIT (OEU) 1-2-5 LOCATED AT: SEAT 7E, CENTER PASSENGER SERVICE UNIT (PSU) 4) SEE FAULT ISOLATION MANUAL (FIM)		
PREVIOUS MENU PREVIOUS SCREEN SHOW LOCATION UNIT USAGE SAVE PRINT MAIN MENU			

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FAULT RESULTS SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FUNCTIONAL DESCRIPTION**General**

The all test does a complete check of the CSS. You use the cabin system control panel (CSCP) to start the test and see the results.

To do an all test, at least one of these conditions must be true:

- Airplane is on ground
- Parking brake is set
- At least one passenger door is open.

Components

All the CSS components that use microprocessors have BITE circuits. These components use microprocessors:

- Cabin system control panel (CSCP)
- Cabin system management unit (CSMU)
- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs)
- Zone management units (ZMUs)
- Overhead electronics units (OEU's)
- Cabin area control panels (CACPs).

Operation

The BITE circuits check system operation. They do a complete test of internal operation and check interfaces. The BITE circuits also do a test of connected components that do not have a microprocessor.

The CSMU sends BITE commands to the PA/CI controller and ZMUs on the intersystem (I/S) bus. The CSMU gets failure data from the LRUs and sends them to the CSCP. The CSCP processes the data and keeps it in nonvolatile memory (NVM). You review the failure data at the CSCP on the all test fault results screen.

The PA/CI controller sends BITE commands to its SDMs. It sends failure data from SDMs and its own internal failures to the CSMU on the I/S bus. If the PA/CI does not get data from the SDM or it is out of tolerance, the PA/CI sends a failure message for that SDM.

Each ZMU sends BITE commands to its connected components. A ZMU sends its own internal failures and failure data from its OEUs and CACP to the CSMU on the I/S bus. The ZMUs also check the cabin attendant handsets (CAHs) and master call lights. If a ZMU does not get data from one of its LRUs or the data is out of tolerance, the ZMU sends a failure message for that LRU.

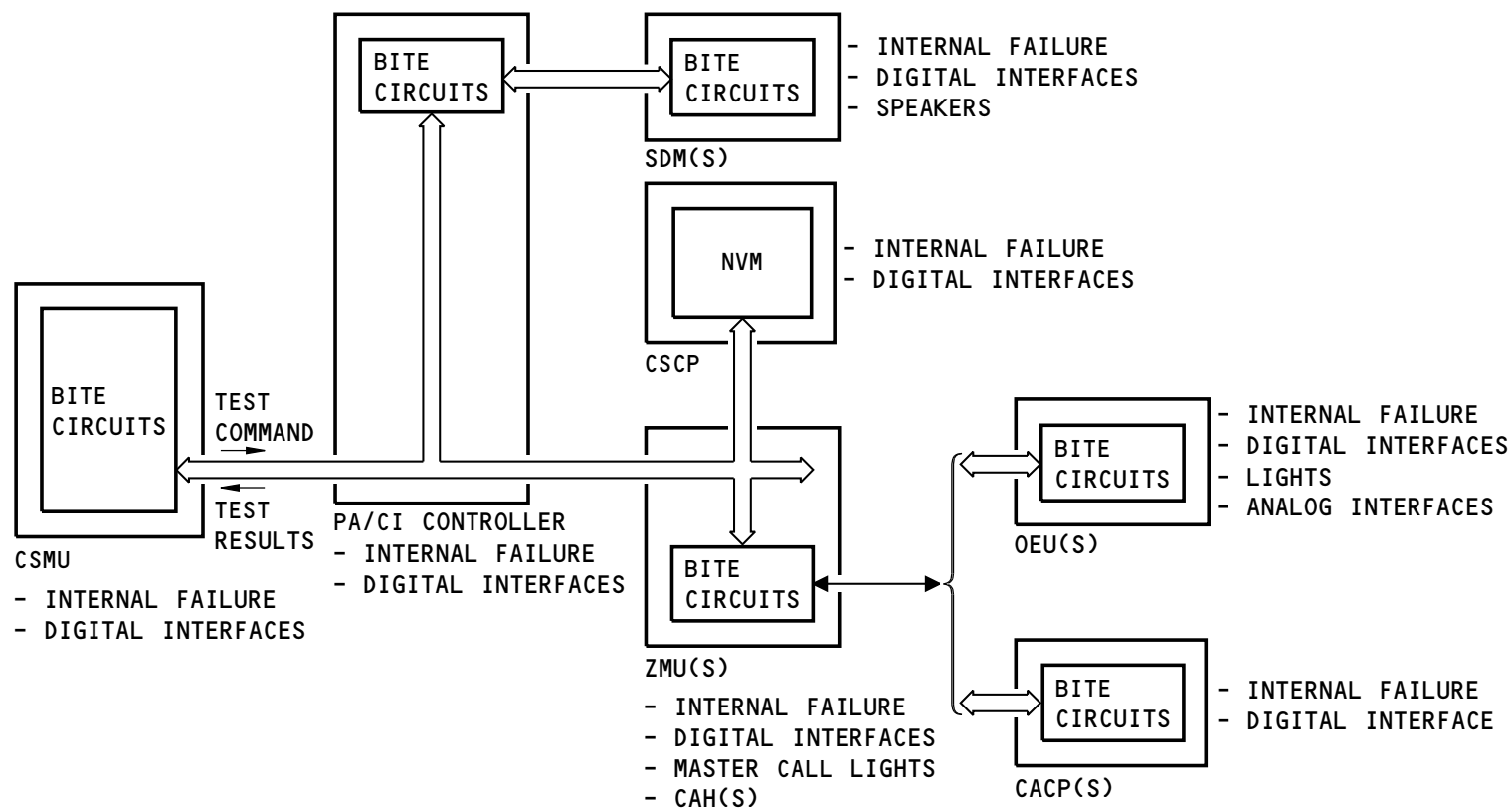
The SDMs do a test of the speakers. The SDMs send failure data to the PA/CI controller.

The OEUs do a test of all lights and ballasts they control. They also check their discrete and analog inputs such as smoke detectors and tank sensors.

Fault Processing

The CSMU sends all fault data to the CSCP. The CSCP processes all fault data and stores it in memory.

The CSCP looks at the fault data to identify if multiple fault indications can be from one failure. If it is, the CSCP combines the fault indications into one maintenance message. This procedure is called fault consolidation.



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CSS TEST AND SOFTWARE INSTALLATION - ALL TEST FUNCTIONAL DESCRIPTION

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CSS TEST AND SOFTWARE INSTALLATION - LAMPS TEST SCREEN - PAGE 1

General

The lamps test screen lets you control lights controlled by the CSS. You use this to see the operation of the lamps. There are two pages to the lamps test screen.

Access

To show the page one of the lamps test screen, touch CABIN TESTS at the top of any maintenance screen, then touch LAMPS TEST on the cabin tests menu.

Controls and Indications

Touch ON next to ALL to set all lights controlled by the CSS to on. The selection shows green. Touch OFF to set them all to off.

To check a type of light, touch one of the selections next to the name of a light type. All of the selected lights change to the set condition. The selection shows green.

Touch NEXT PAGE to show page two of the lamps test screen.

When you touch RESET ALL, it shows green. Then touch any other screen selection, except NEXT PAGE, to put all lights back to their initial condition.

Touch PREVIOUS MENU to show the cabin tests menu.

Touch MAIN MENU to show the cabin maintenance menu.

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LAMPS TEST

➡

ALL

ON

OFF

CABIN TESTS MENU

LAMPS TEST

Page 1 of 2

LIGHTS

Indirect Ceiling	BRIGHT	DIM	OFF
Direct Ceiling Fluorescent	BRIGHT	DIM	OFF
Direct Ceiling Incandescent	BRIGHT	DIM	OFF
Sidewall	BRIGHT	DIM	OFF
Lavatory	BRIGHT	DIM	OFF
Entry Way	ON		OFF

Passenger Master Call	ON	OFF
Reading	ON	OFF
Passenger Row Call	ON	OFF
Night	ON	OFF
Cabin Interphone Master Call	ON	OFF
Lavatory Master Call	ON	OFF

PREVIOUS MENU

NEXT PAGE

RESET ALL

MAIN MENU

CSCP SCREEN

M40116 S000616073_V2

CSS TEST AND SOFTWARE INSTALLATION - LAMPS TEST SCREEN - PAGE 1

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CSS TEST AND SOFTWARE INSTALLATION - LAMPS TEST SCREEN - PAGE 2

General

Page two of the lamps test screen shows more light selections.

Access

To show page two of the lamps test screen:

- Touch CABIN TESTS at the top of any maintenance screen
- Touch LAMPS TEST on the cabin tests menu
- Touch NEXT PAGE on page 1 of the lamps test screen.

Controls and Indications

Touch one of the selections next to the name of a light type. All of the selected lights change to the set condition. The selection shows green.

Touch PREVIOUS PAGE to show page 1 of the lamps test screen.

When you touch RESET ALL, it shows green. Then touch any other screen selection, except PREVIOUS PAGE, to put all lights back to their initial condition.

Touch PREVIOUS MENU to show the cabin tests menu.

Touch MAIN MENU to show the cabin maintenance menu.

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CABIN TESTS

CABIN CONFIGURATION

CABIN FAULTS REVIEW

CABIN REPORT

NEXT PAGE

➔

PAGE 2 OF 2

LAMPS TEST

SIGNS

NO SMOKING	ON	OFF
FASTEN SEAT BELT	ON	OFF
RETURN TO SEAT	ON	OFF
LAVATORY	ON	OFF

SWITCH LIGHTS

LAVATORY CALL INDICATOR	ON	OFF
LAVATORY CALL INDICATOR RESET	ON	OFF

MISCELLANEOUS LIGHTS

LAVATORY OCCUPIED	ON	OFF
LAV LOCK DOOR	ON	OFF
LAVATORY INOPERABLE	ON	OFF
OTHER	ON	OFF
SPECIAL FUNCTION	ON	OFF

PREVIOUS MENU

PREVIOUS PAGE

RESET ALL

MAIN MENU

CSCP SCREEN

M40118 S000616074_V1

CSS TEST AND SOFTWARE INSTALLATION - LAMPS TEST SCREEN - PAGE 2

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**CSS TEST AND SOFTWARE INSTALLATION - LAMPS STATES RESET WINDOW****General**

The lamps states reset window tells you the light settings selected on the lamps test screen will be cancelled.

Access

The lamps states window shows when you touch RESET ALL and select a different screen than the lamps test screens.

Controls

Touch CONTINUE SELECTION to cancel the light selections set by the lamps test.

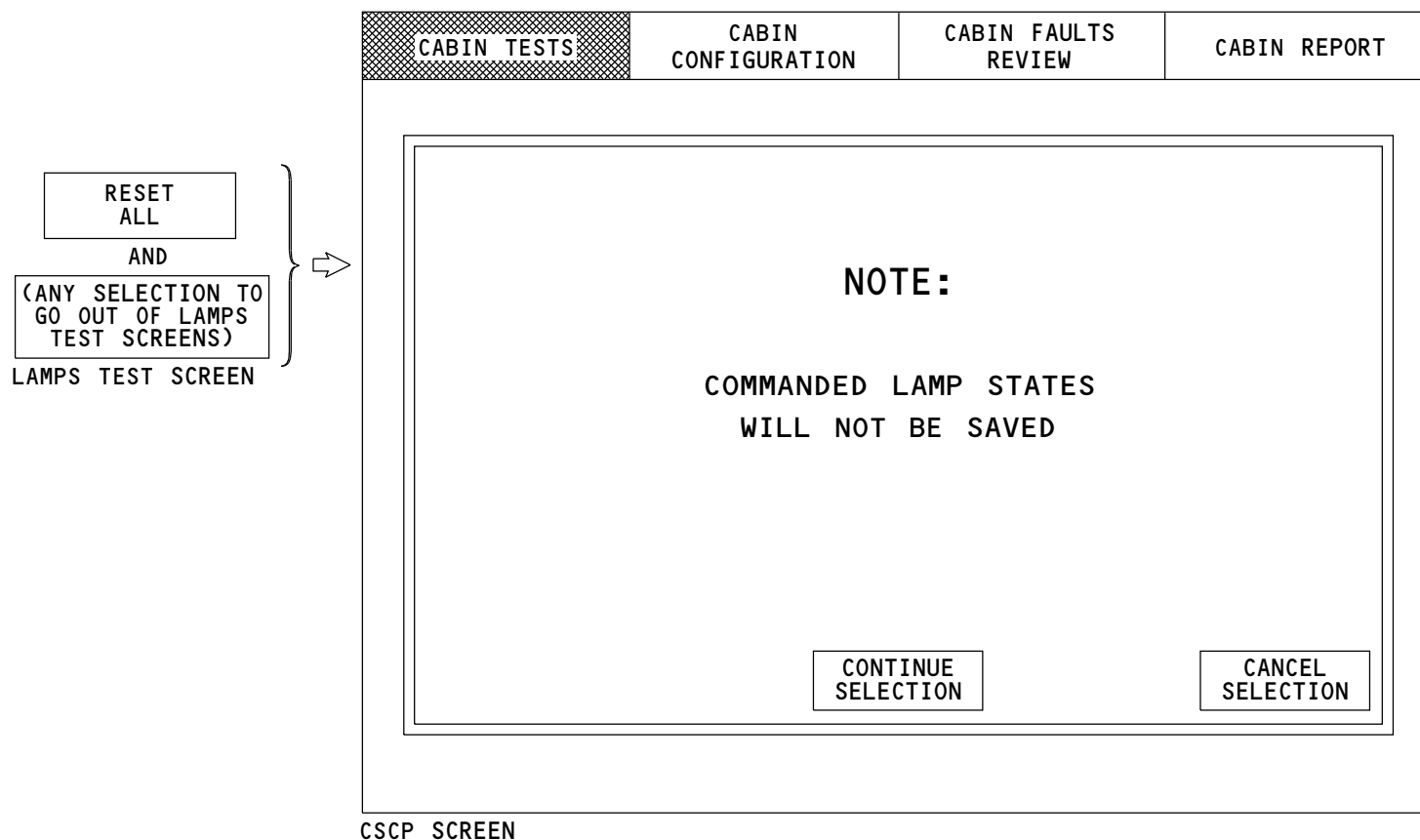
Touch CANCEL SELECTION to show the lamps test screen.

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CSS TEST AND SOFTWARE INSTALLATION - LAMPS STATES RESET WINDOW

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CSS TEST AND SOFTWARE INSTALLATION - ENGINEERING TESTS MENU TREE

General

Each engineering test is for a special use. You normally use engineering tests for detailed troubleshooting.

The engineering tests menu has these selections:

- INPUT/OUTPUT MONITOR
- COMMAND OUTPUT
- SHOP FAULTS
- INSTALL ADDRESSES
- EXTENDED CABIN FAULTS REVIEW.

Sub-Menus

These four selections have sub-menus:

- INPUT/OUTPUT MONITOR
- COMMAND OUTPUT
- SHOP FAULTS
- EXTENDED CABIN FAULTS REVIEW.

You use the input/output monitor to examine the condition of all the interfaces to a selected LRU. The input/output monitor menu gives selections for the LRUs you can monitor.

You use command output to set an output from an LRU. This lets you make sure the output is operational. The command output menu shows the LRUs for which you can set outputs.

You use shop faults to show the details of LRU internal failures. The shop faults menu shows from which LRU you can get shop fault data.

You use the extended cabin faults review to review test and installation faults. The menu gives selections for the tests and installation fault screens you can see.

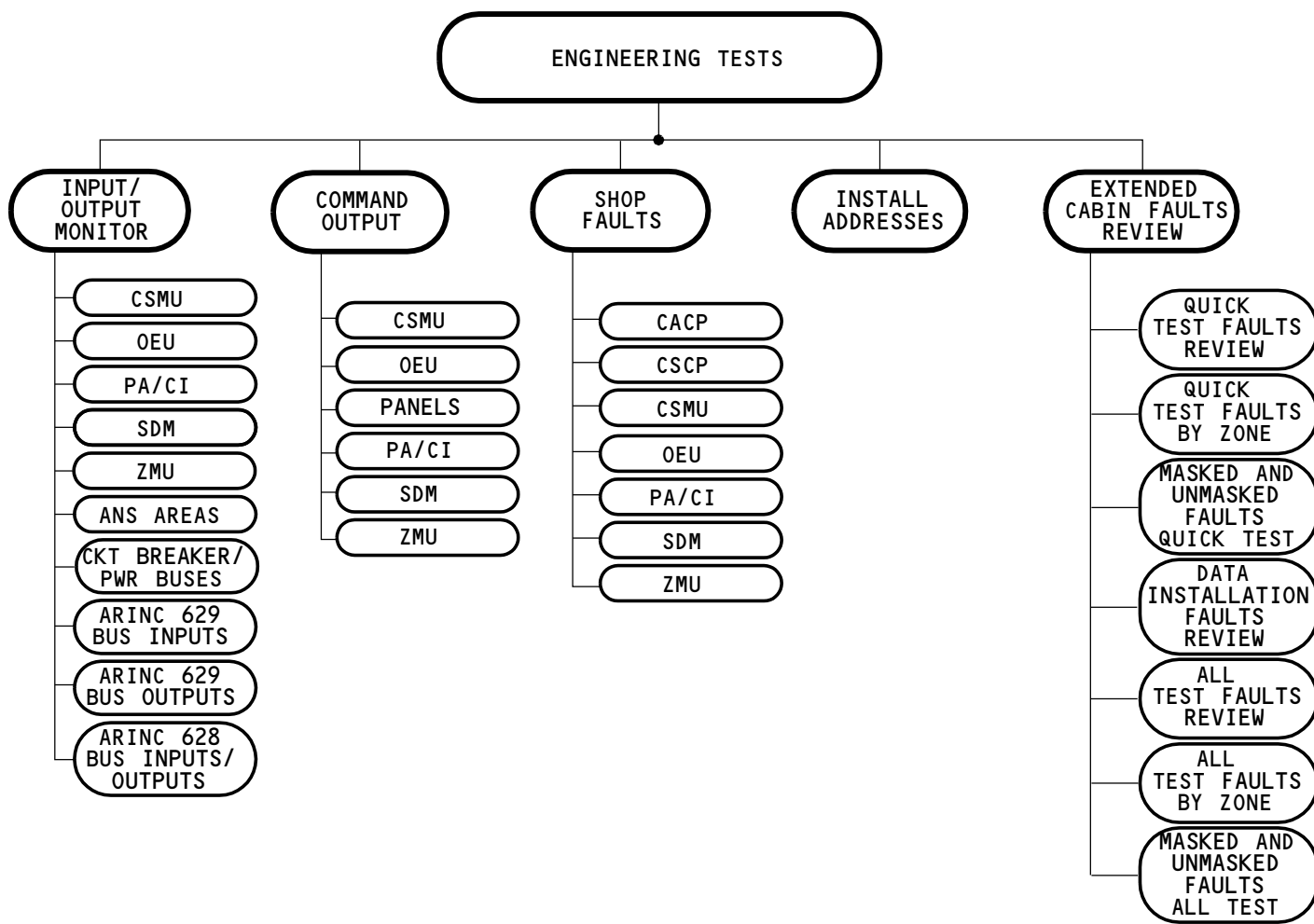
You use install addresses to do engineering tests without a configuration database installed.

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CSS TEST AND SOFTWARE INSTALLATION - ENGINEERING TESTS MENU TREE

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CSS TEST AND SOFTWARE INSTALLATION - ENGINEERING TESTS MENU

General

You use the engineering tests menu for detailed trouble-shooting.

Access

To show the engineering test menu, touch CABIN TESTS at the top of any maintenance screen, then touch ENGINEERING TESTS on the cabin tests menu.

Controls and Indications

These selections cause other menus to show:

- INPUT/OUTPUT MONITOR
- COMMAND OUTPUT
- SHOP FAULTS
- EXTENDED CABIN FAULTS REVIEW.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- CAPTURE BUS LOG

ARO ALL

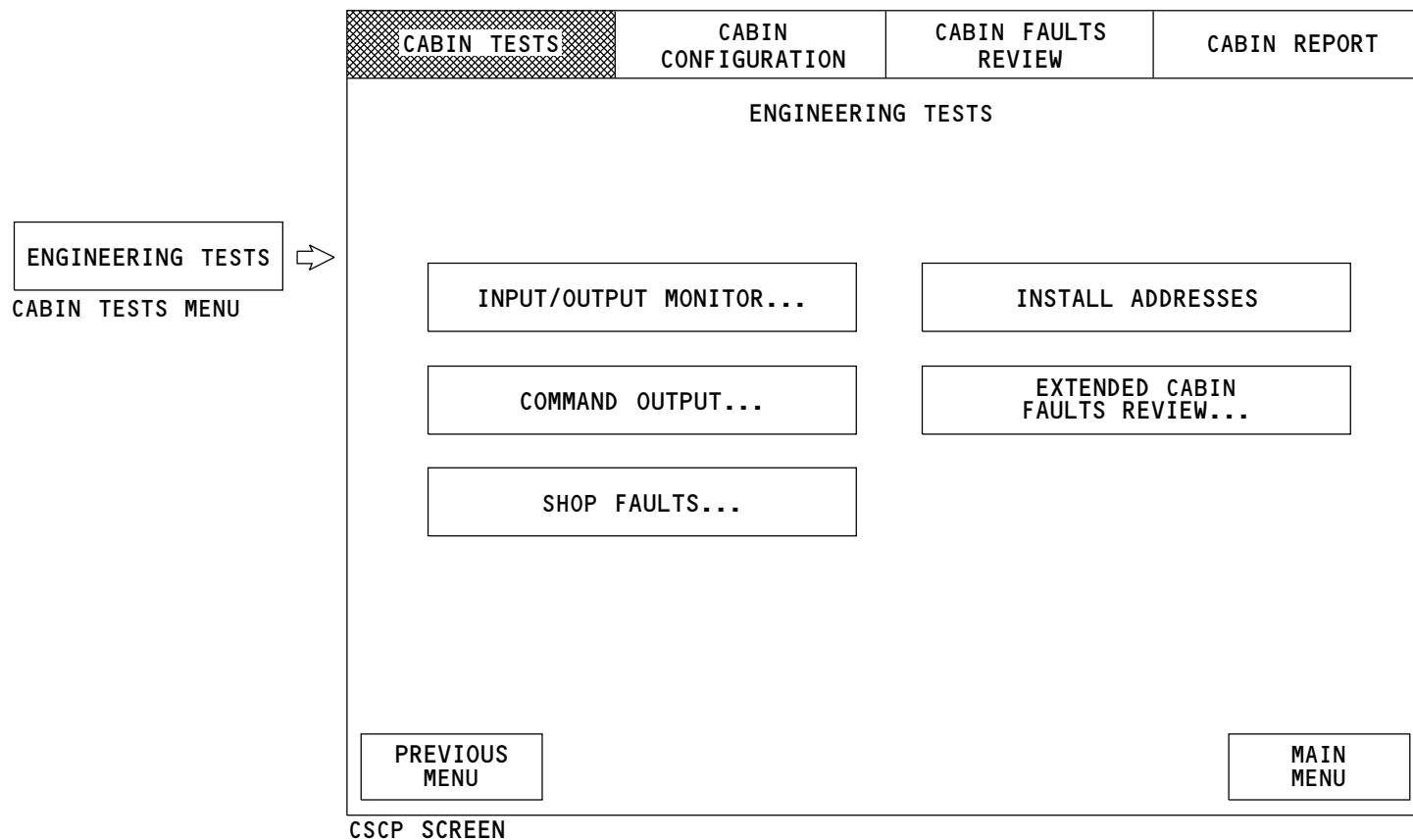
Touch PREVIOUS MENU to show the cabin maintenance menu.

Touch MAIN MENU to show the cabin maintenance menu.

23-39-01**ARO ALL** EFFECTIVITY

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M40120 S000616077_V2

CSS TEST AND SOFTWARE INSTALLATION - ENGINEERING TESTS MENU

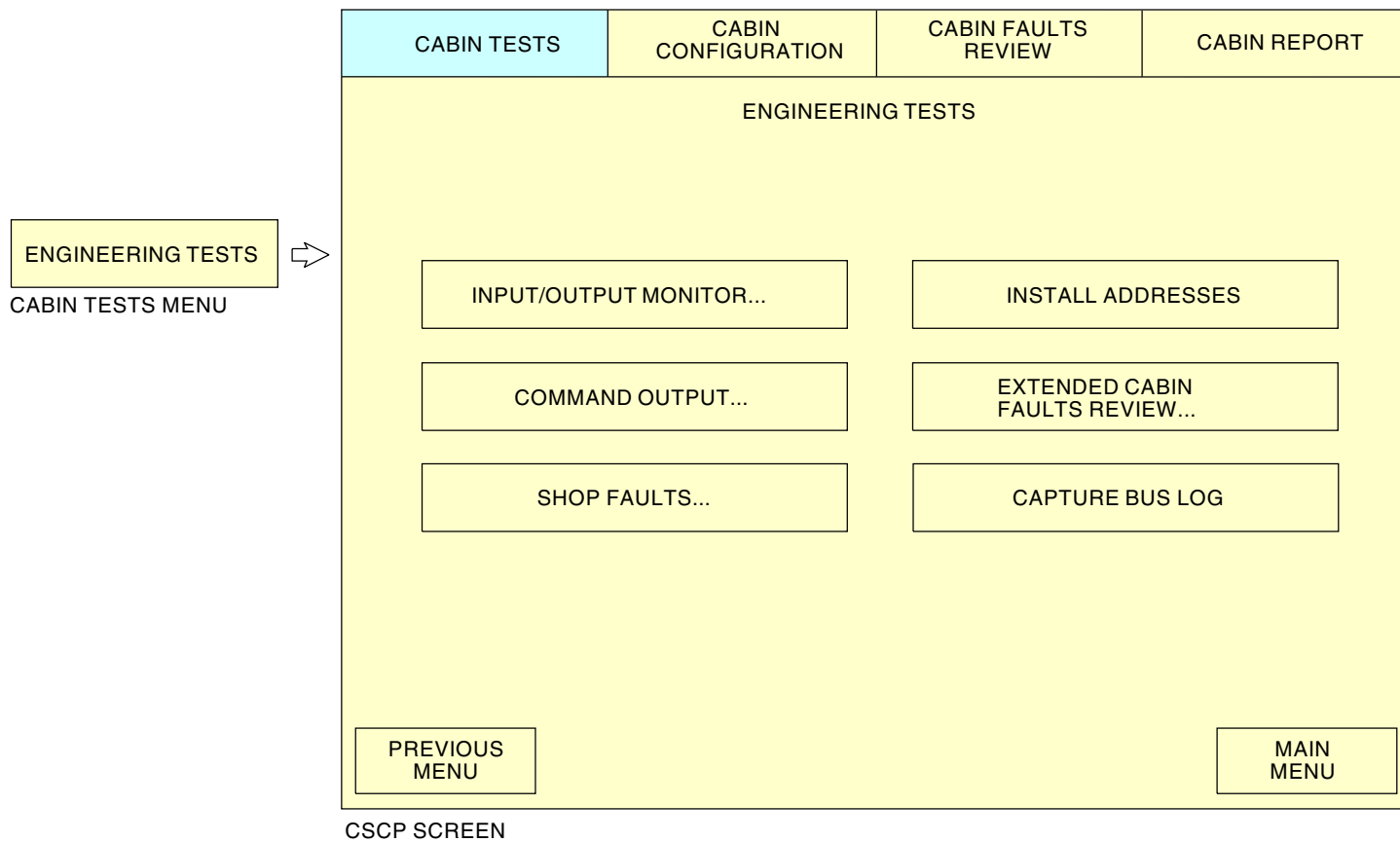
23-39-01

EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

D633W101-ARO

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2561196 S0000610981_V1

CSS TEST AND SOFTWARE INSTALLATION - ENGINEERING TEST MENU

23-39-01

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ARO 016-999; ARO 001-015 POST SB 777-23-0369

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR MENU****General**

You use the input/output monitor tests to examine the condition of the interfaces to a CSS component. You use the input/output monitor menu to select the type of component.

Access

To show the input/output monitor menu:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu.

Controls and Indications

You can monitor the interfaces to these components:

- Cabin system management unit (CSMU)
- Overhead electronics units (OEU)
- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs)
- Zone management units (ZMUs)

To select a component, touch the applicable selection.

You can also monitor the position of CSS circuit breakers and the condition of the connected power bus.

You can also monitor the inputs and outputs of the ARINC 629 and ARINC 628 data buses.

Touch PREVIOUS MENU to show the engineering tests menu.

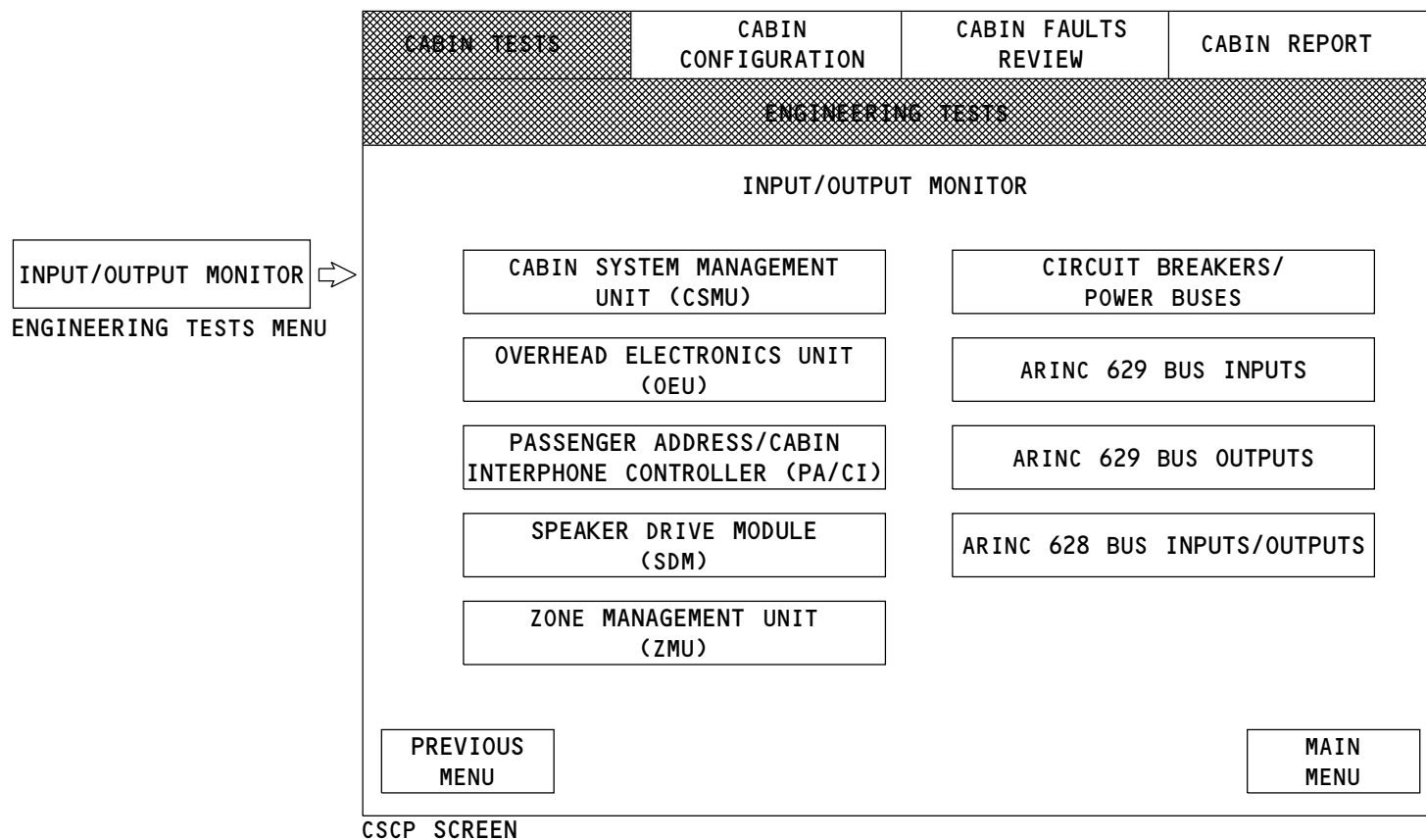
Touch MAIN MENU to show the cabin maintenance menu.

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418472 S0000136633_V1

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR MENU

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - OEU SELECTION****General**

You use the input/output monitor - OEU test to examine the condition of the interfaces to an overhead electronics unit (OEU). You use the input/output monitor - OEU selection screen to select the OEU.

Access

To show this screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch OVERHEAD ELECTRONICS UNIT (OEU) on the input/output monitor menu.

Controls and Indications

To select an OEU, first select a zone with the up or down arrow below Select Zone. The CSS can have as many as five zones (one for each zone management unit).

After you select a zone, select a column. Each zone has three columns (1 for left, 2 for center, and 3 for right). To select a column, touch the up or down arrows under Select Column.

After you select a column, select an OEU. The OEU number relates to the sequence in the column. The first OEU in a column is number one, the second is number two. To select an OEU, touch the up or down arrows under Select OEU. The CSS can have as many as 31 OEUs in a column.

After you select an OEU, touch CONTINUE to show the input/output monitor - OEU screen.

Touch PREVIOUS MENU to show the input/output monitor menu.

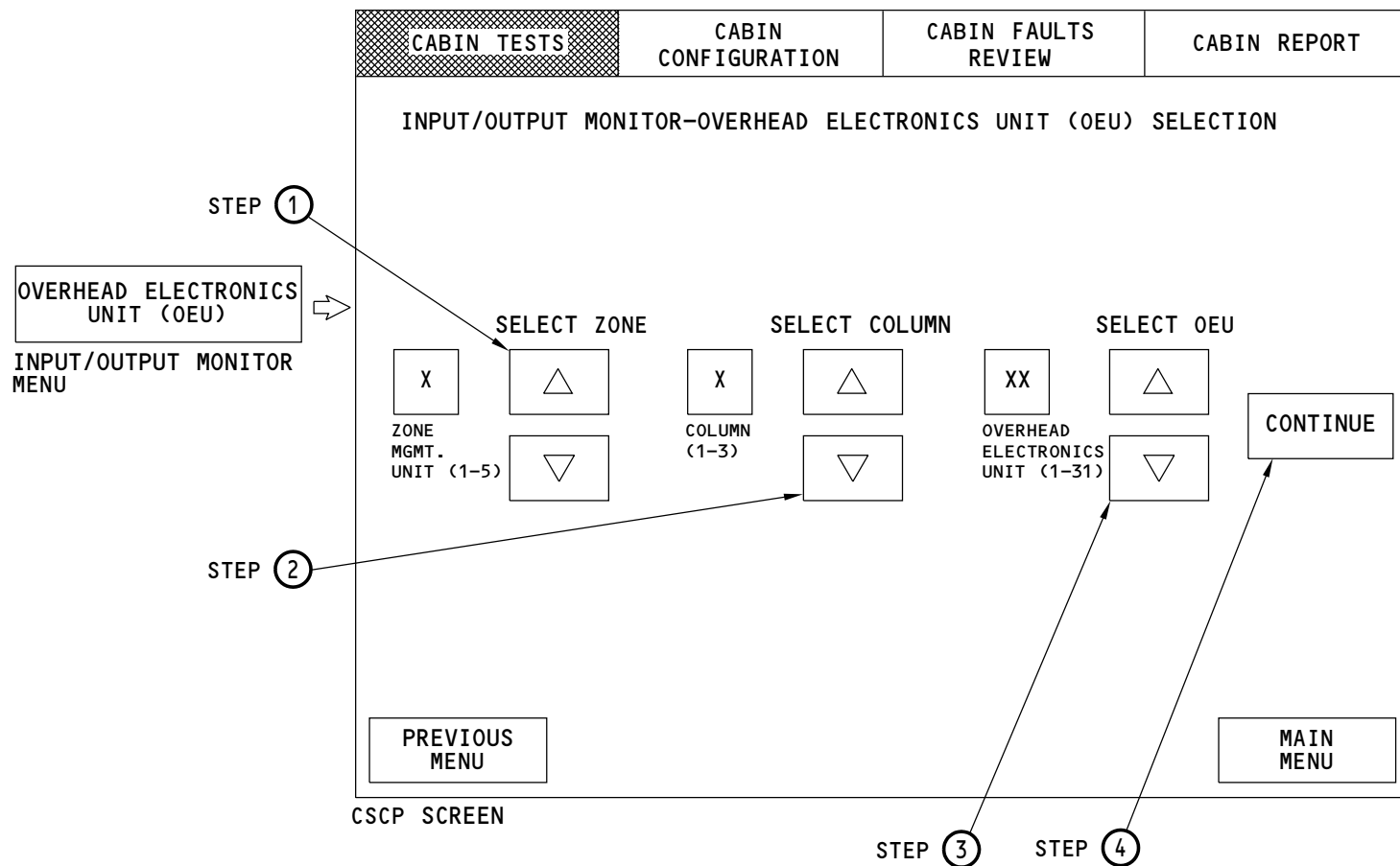
Touch MAIN MENU to show the cabin maintenance menu.

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M40125 S000616081_V1

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - OEU SELECTION

23-39-01-679

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - OEU SCREEN****General**

You use this screen to examine the condition of the interfaces of an overhead electronics unit (OEU).

Access

To show the input/output monitor - OEU screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch OVERHEAD ELECTRONICS UNIT (OEU) on the input/output monitor menu
- Select an OEU and touch CONTINUE on the OEU selection screen.

Controls and Indications

The screen shows the time at the top.

The OEU data window show the OEU address and location.

The OEU data window gives this data for each OEU interfaces:

- Input (IN) or output (OUT)
- Connector pin number
- Type of interface (analog, discrete, shop, token, or lamp control)
- The condition of the interface (voltage, ground or open, active or not active).

Touch PREVIOUS MENU to show the input/output monitor menu.

Touch PREVIOUS SCREEN to show the OEU selection screen.

Touch FREEZE so the screen does not change if the condition of an interface changes.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE ALL to send the data to a floppy diskette in the cabin system control panel (CSCP) disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT ALL to send the data to the cabin printer.

Touch MAIN MENU to show the cabin maintenance menu.

23-39-01

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ARO ALL	

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SELECT AN OEU
AND
CONTINUE
OEU SELECTION
SCREEN

CABIN TESTS		CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT																																																																											
INPUT/OUTPUT MONITOR - OVERHEAD ELECTRONIC UNIT (OEU)																																																																															
TIME: 12:25Z																																																																															
<table border="1"> <thead> <tr> <th>OEU</th> <th>OEU 1-3-08</th> <th>OEU R OUTBOARD PSU - SEAT 6</th> </tr> </thead> <tbody> <tr> <th>INPUT/OUTPUT</th> <th>PIN #</th> <th>DESCRIPTION</th> <th>STATE</th> </tr> <tr> <td>IN</td> <td>J3-07</td> <td>ANALOG 1</td> <td>4.8 VOLTS</td> </tr> <tr> <td>IN</td> <td>J3-09</td> <td>ANALOG 2</td> <td>0.2 VOLTS</td> </tr> <tr> <td>IN</td> <td>J3-11</td> <td>DISCRETE INPUT 1</td> <td>GROUND</td> </tr> <tr> <td>IN</td> <td>J3-12</td> <td>DISCRETE INPUT 2</td> <td>OPEN</td> </tr> <tr> <td>IN</td> <td>J3-13</td> <td>DISCRETE INPUT 3</td> <td>OPEN</td> </tr> <tr> <td>IN</td> <td>J3-14</td> <td>DISCRETE INPUT 4</td> <td>GROUND</td> </tr> <tr> <td>IN</td> <td>J3-20</td> <td>SHOP MODE 0</td> <td>OPEN</td> </tr> <tr> <td>IN</td> <td>J3-37</td> <td>SHOP MODE 1</td> <td>OPEN</td> </tr> <tr> <td>IN</td> <td>J1-01</td> <td>TOKEN IN</td> <td>NOT ACTIVE</td> </tr> <tr> <td>OUT</td> <td>J1-02</td> <td>TOKEN OUT</td> <td>NOT ACTIVE</td> </tr> <tr> <td>OUT</td> <td>J2-01</td> <td>HIGH CURRENT PORT 1</td> <td>GROUND</td> </tr> <tr> <td>OUT</td> <td>J2-02</td> <td>HIGH CURRENT PORT 2</td> <td>OPEN</td> </tr> <tr> <td>OUT</td> <td>J2-03</td> <td>HIGH CURRENT PORT 3</td> <td>OPEN</td> </tr> <tr> <td>OUT</td> <td>J2-04</td> <td>HIGH CURRENT PORT 4</td> <td>GROUND</td> </tr> <tr> <td>OUT</td> <td>J2-05</td> <td>HIGH CURRENT PORT 5</td> <td>OPEN</td> </tr> <tr> <td>OUT</td> <td>J2-06</td> <td>HIGH CURRENT PORT 6</td> <td>GROUND</td> </tr> <tr> <td>OUT</td> <td>J2-07</td> <td>LOW CURRENT PORT 7</td> <td>OPEN</td> </tr> </tbody> </table>					OEU	OEU 1-3-08	OEU R OUTBOARD PSU - SEAT 6	INPUT/OUTPUT	PIN #	DESCRIPTION	STATE	IN	J3-07	ANALOG 1	4.8 VOLTS	IN	J3-09	ANALOG 2	0.2 VOLTS	IN	J3-11	DISCRETE INPUT 1	GROUND	IN	J3-12	DISCRETE INPUT 2	OPEN	IN	J3-13	DISCRETE INPUT 3	OPEN	IN	J3-14	DISCRETE INPUT 4	GROUND	IN	J3-20	SHOP MODE 0	OPEN	IN	J3-37	SHOP MODE 1	OPEN	IN	J1-01	TOKEN IN	NOT ACTIVE	OUT	J1-02	TOKEN OUT	NOT ACTIVE	OUT	J2-01	HIGH CURRENT PORT 1	GROUND	OUT	J2-02	HIGH CURRENT PORT 2	OPEN	OUT	J2-03	HIGH CURRENT PORT 3	OPEN	OUT	J2-04	HIGH CURRENT PORT 4	GROUND	OUT	J2-05	HIGH CURRENT PORT 5	OPEN	OUT	J2-06	HIGH CURRENT PORT 6	GROUND	OUT	J2-07	LOW CURRENT PORT 7	OPEN
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PREVIOUS MENU	PREVIOUS SCREEN	FREEZE	SAVE ALL	PRINT ALL																																																																											
MAIN MENU																																																																															

CSCP SCREEN

M40126 S000616082_V1

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - OEU SCREEN

23-39-01

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT MONITOR - CKT BREAKER/POWER BUS****General**

You use this screen to examine the position of CSS circuit breakers and the condition of the power buses.

Access

To show the input monitor-circuit breaker/power buses screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch CIRCUIT BREAKER/POWER BUSES on the input/output monitor menu.

Controls and Indications

The screen shows the time at the top.

The power buses off data window shows the electrical power buses that have no power. The scroll bar shows on the right of the window when the number of buses off is more than the window can show.

The circuit breakers off data window shows the CSS circuit breakers that are out. The scroll bar shows on the right of the window when the number of circuit breakers out is more than the window can show.

The passenger entertainment/service power shows OFF when the seat power is off.

Touch PREVIOUS MENU to show the input/output monitor menu.

Touch FREEZE so the screen does not change when the condition of an interface changes.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE ALL to send the data to a floppy diskette in the cabin system control panel (CSCP) disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

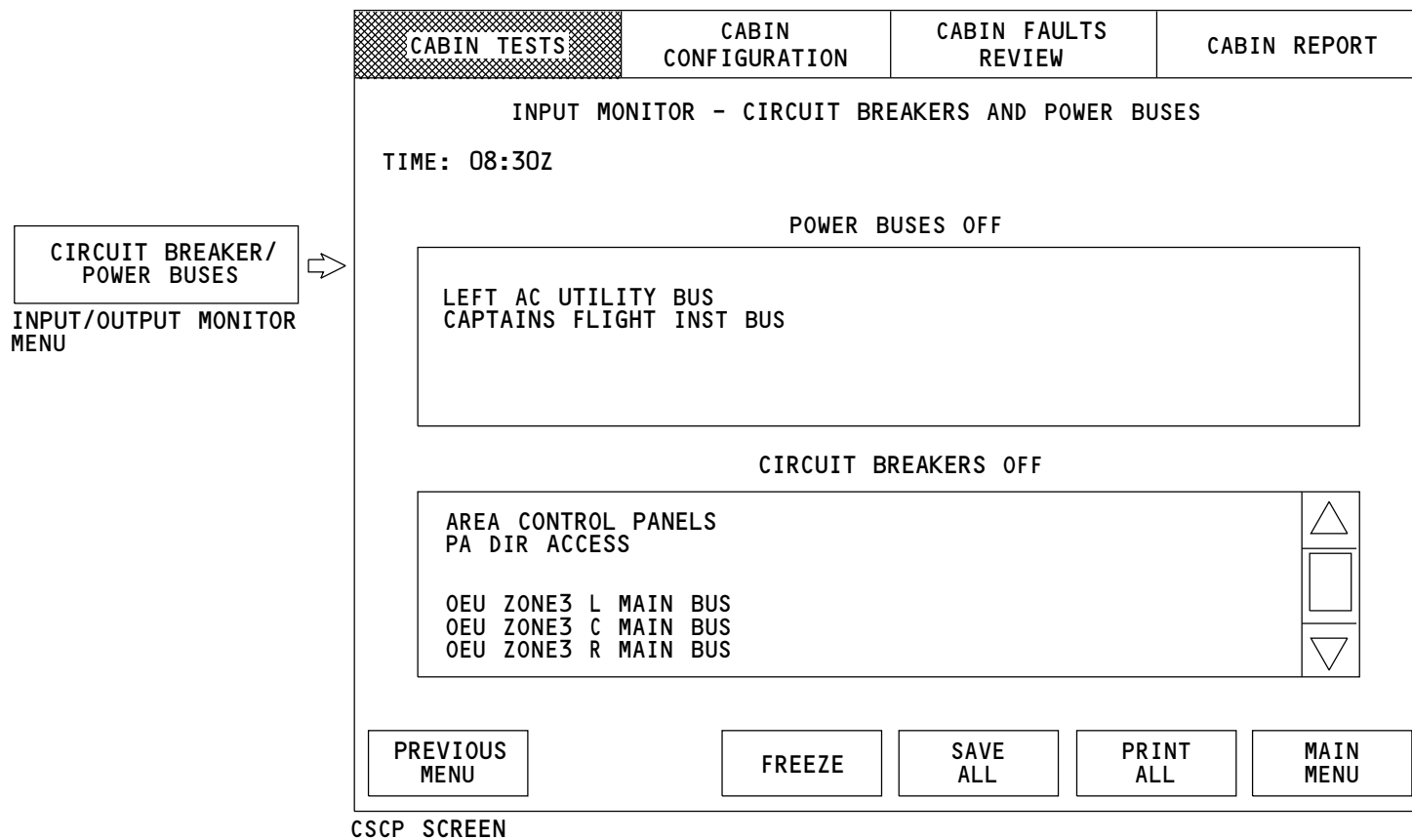
Touch PRINT ALL to send the data to the cabin printer.

Touch MAIN MENU to show the cabin maintenance menu.

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M40127 S000616083_V2

CSS TEST AND SOFTWARE INSTALLATION - INPUT MONITOR - CKT BREAKER/POWER BUS

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT MONITOR - ARINC 629 INPUTS****General**

You use the input monitor-ARINC 629 inputs screen to examine the data on the left and right systems ARINC 629 data buses.

Access

To show this screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch INPUTS next to ARINC 629 BUS on the input/output monitor menu.

Controls and Indications

The screen shows the time at the top.

Touch HELP for more information on this screen.

The data window shows CSS related data on the left and right systems ARINC 629 buses.

Each row shows data for one ARINC 629 word. The word label shows at the left in hexadecimal format. The signal name shows adjacent to the label. The bus name shows adjacent to the signal name (LEFT for left systems ARINC 629 bus, RIGHT for right systems ARINC 629 bus). The word data shows on the right.

To show more data, touch the up or down arrow. The box shows your position in the data list.

Touch PREVIOUS MENU to show the input/output monitor menu.

Touch FREEZE so the screen does not change when the condition of the data changes.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE ALL to send the data to a floppy diskette in the cabin system control panel (CSCP) disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT ALL to send the data to the cabin printer for a paper report.

Touch MAIN MENU to show the cabin maintenance menu.

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CABIN TESTS

CABIN CONFIGURATION

CABIN FAULTS REVIEW

CABIN REPORT

INPUT MONITOR - ARINC 629 BUS

HELP

TIME: 08:30Z

LABEL	SIGNAL	BUS	STATE
408	AIRCRAFT IDENTIFICATION	RIGHT	N13628
FED	AIRPLANE ALTITUDE	LEFT	208FT
FED	AIRPLANE ALTITUDE	RIGHT	210FT
F82	AIR/GROUND	LEFT	ON GROUND
F82	AIR/GROUND	RIGHT	ON GROUND
E95	CABIN DOOR 4L	LEFT	CLOSED
E95	CABIN DOOR 4L	RIGHT	CLOSED
E95	CABIN DOOR 3L	LEFT	CLOSED
E95	CABIN DOOR 3L	RIGHT	CLOSED

PREVIOUS MENU

FREEZE

SAVE ALL

PRINT ALL

MAIN MENU

ARINC 629
BUS INPUTS

➡

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - INPUT MONITOR - ARINC 629 INPUTS

M40128 S000616084_V1

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SELECTION SCREEN****General**

You use this screen to examine the condition of the ARINC 628 data bus interfaces.

Access

To show the input/output monitor - ARINC 628 bus selection screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch ARINC 628 BUS INPUTS/OUTPUTS on the input/output monitor menu.

Controls and Indications

The left part of this screen shows the available ARINC 628 bus selections.

The first time you show this screen, the bus selection at the top of the list will automatically be selected. If you made bus selection during a previous operation, it will be selected when you return to this screen. Use the up or down arrows at the right of the window to change the bus selection.

The area to the right of the bus selections shows the messages available for the selected bus. The operation of this window is the same as for the bus selections.

Touch CONTINUE to go to a screen that shows the data for the message you selected.

Touch PREVIOUS MENU to show the input/output monitor menu.

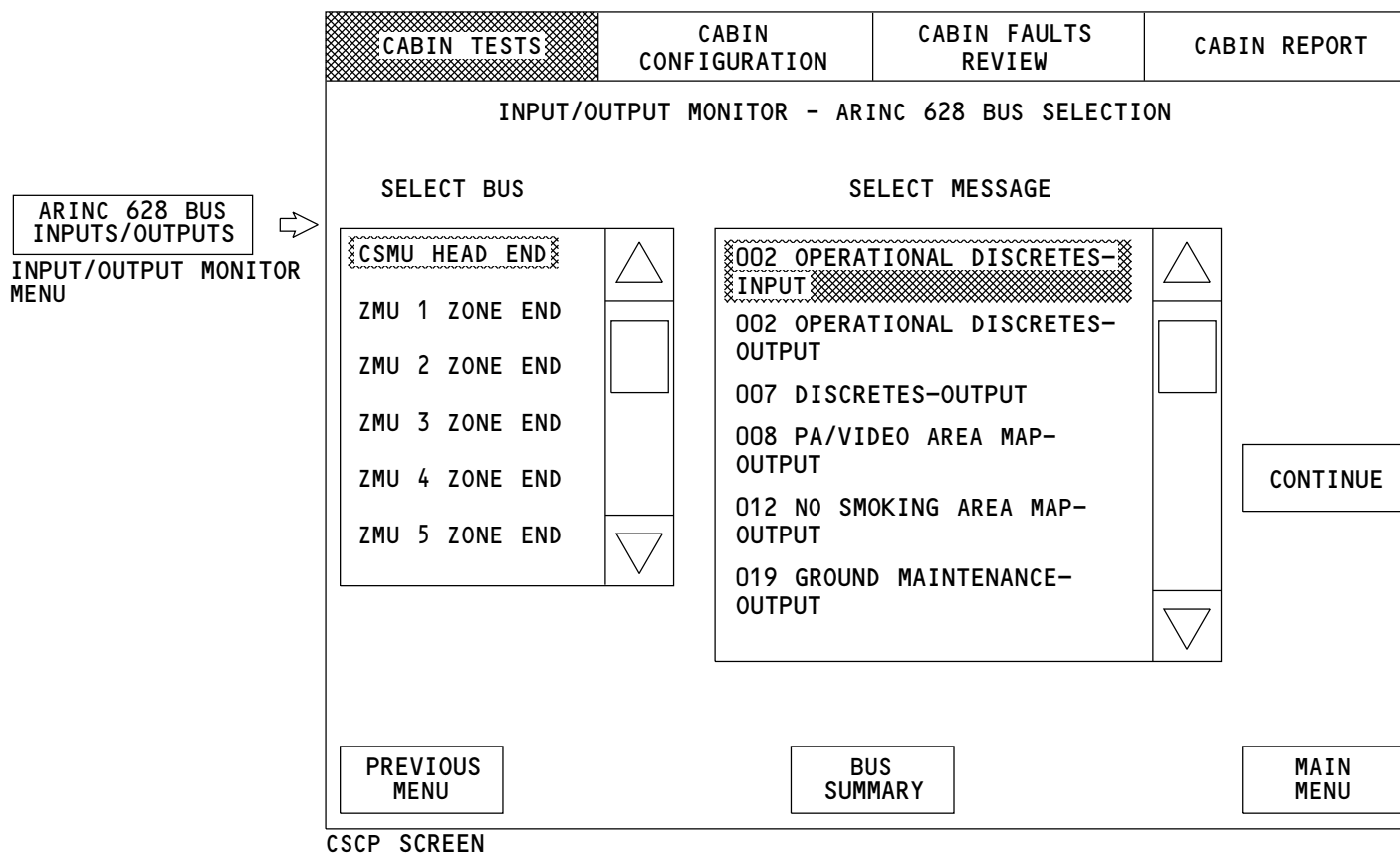
Touch BUS SUMMARY to show a summary of the ARINC 628 data buses.

Touch MAIN MENU to show the cabin maintenance menu.

23-39-01

ARO ALL	EFFECTIVITY

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M40129 S000616085_V1

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SELECTION SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SCREEN****General**

You use this screen to examine the data of an ARINC 628 message you selected on the previous screen.

Access

To show the input/output monitor - ARINC 628 bus screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch ARINC 628 BUS INPUTS/OUTPUTS on the input/output monitor menu
- Select a bus and message and touch CONTINUE on the ARINC 628 bus selection screen.

Controls and Indications

The screen shows this data at the top:

- The current time
- Activity count - shows how many times the selected message has been on the data bus since this screen was activated
- Bus - shows the bus you selected on the previous screen
- Message - shows the message you selected.

The data in the center of the screen has two areas. The top of the screen shows the command sent and the bottom shows the response. This data updates each second.

Touch PREVIOUS MENU to show the input/output monitor menu.

Touch PREVIOUS SCREEN to show the ARINC 628 bus selection screen.

Touch FREEZE so the screen does not change if the condition of an interface changes.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE ALL to send the data to a floppy diskette in the cabin system control panel (CSCP) disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT ALL to send the data to the cabin printer.

Touch MAIN MENU to show the cabin maintenance menu.

23-39-01

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SELECT A BUS AND
MESSAGE
AND
CONTINUE
ARINC 628 BUS
SELECTION SCREEN

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT																								
INPUT/OUTPUT MONITOR - ARINC 628 BUS																											
TIME: 12:25Z		ACTIVITY COUNT: 0003																									
BUS: CSMU HEAD END		MESSAGE: 002 OPERATIONAL DISCRETES-OUTPUT																									
COMMAND <table> <thead> <tr> <th>OFFSET (HEX):</th> <th>DATA (HEX):</th> </tr> </thead> <tbody> <tr> <td>000000</td> <td>1CEA FF00 0143 C585 D000 95F3 FFFF FFFF</td> </tr> <tr> <td>000010</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000020</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000030</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000040</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> </tbody> </table> RESPONSE <table> <thead> <tr> <th>OFFSET (HEX):</th> <th>DATA (HEX):</th> </tr> </thead> <tbody> <tr> <td>000000</td> <td>1CEA FF00 0143 C585 D000 95F3 FFFF FFFF</td> </tr> <tr> <td>000010</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000020</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000030</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> <tr> <td>000040</td> <td>FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000</td> </tr> </tbody> </table>				OFFSET (HEX):	DATA (HEX):	000000	1CEA FF00 0143 C585 D000 95F3 FFFF FFFF	000010	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000020	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000030	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000040	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	OFFSET (HEX):	DATA (HEX):	000000	1CEA FF00 0143 C585 D000 95F3 FFFF FFFF	000010	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000020	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000030	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000	000040	FFAA FF00 0143 FFFF 95F3 FFFF FFFF D000
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PREVIOUS MENU	PREVIOUS SCREEN	FREEZE	SAVE ALL																								
		PRINT ALL	MAIN MENU																								

CSCP SCREEN

M40130 S000616086_V1

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SCREEN

23-39-01

ARO ALL EFFECTIVITY

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**CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SUMMARY SCREEN****General**

You use this screen to see a summary of the ARINC 628 data buses.

Access

To show the input/output monitor - ARINC 628 bus summary screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INPUT/OUTPUT MONITOR on the engineering tests menu
- Touch ARINC 628 BUS INPUTS/OUTPUTS on the input/output monitor menu
- Select a BUS SUMMARY on the ARINC 628 bus selection screen.

Controls and Indications

The screen shows the time at the top. There is also a HELP selection. Touch HELP to show a screen that gives more information about this screen.

The center of the screen shows data for the ARINC 628 buses. The screen data updates each second. This screen has these columns of information:

- Bus - lists the data buses in alphanumeric order
- Command number - shows the most recent command message sent on the related bus
- Response number - shows the most recent response for the related command
- Response status - shows the status for the related message; valid, invalid, or checksum error
- Error count - shows the total number of errors for the related message. The count will be 0 when the screen first shows.

Touch PREVIOUS MENU to show the input/output monitor menu.

Touch PREVIOUS SCREEN to show the ARINC 628 bus selection screen.

Touch RESET COUNT to set the error count for the messages to 0.

Touch MAIN MENU to show the cabin maintenance menu.

23-39-01

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CABIN TESTS

CABIN CONFIGURATION

CABIN FAULTS REVIEW

CABIN REPORT

INPUT/OUTPUT MONITOR - ARINC 628 BUS SUMMARY

TIME: 12:25Z

HELP

BUS	COMMAND NUMBER	RESPONSE NUMBER	RESPONSE STATUS	ERROR COUNT
CSMU HEAD END	002	002	ACTIVE	0002
ZMU 1 ZONE END	019	019	ACTIVE	0000
ZMU 2 ZONE END	032	032	CKSUM	0032
ZMU 3 ZONE END	151	151	INACTIVE	0000
ZMU 4 ZONE END	LRU NOT RESPONDING			
ZMU 5 ZONE END	LRU NOT RESPONDING			

PREVIOUS MENU

PREVIOUS SCREEN

RESET COUNT

MAIN MENU

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - INPUT/OUTPUT MONITOR - ARINC 628 BUS SUMMARY SCREEN

M40131 S000616087_V1

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**CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT MENU****General**

You use command output to manually set the outputs of CSS components.
You use the command output menu to select the type of component.

Access

To show the command output menu:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch COMMAND OUTPUT on the engineering tests menu.

Controls and Indications

You can set outputs to these components:

- Cabin system management unit (CSMU)
- Overhead electronics units (OEUs)
- Panels (CACP, CSCP)
- Passenger address/cabin interphone (PA/CI) controller
- Speaker drive modules (SDMs)
- Zone management units (ZMUs).

To select a component, touch the applicable selection.

Touch PREVIOUS MENU to show the engineering tests menu.

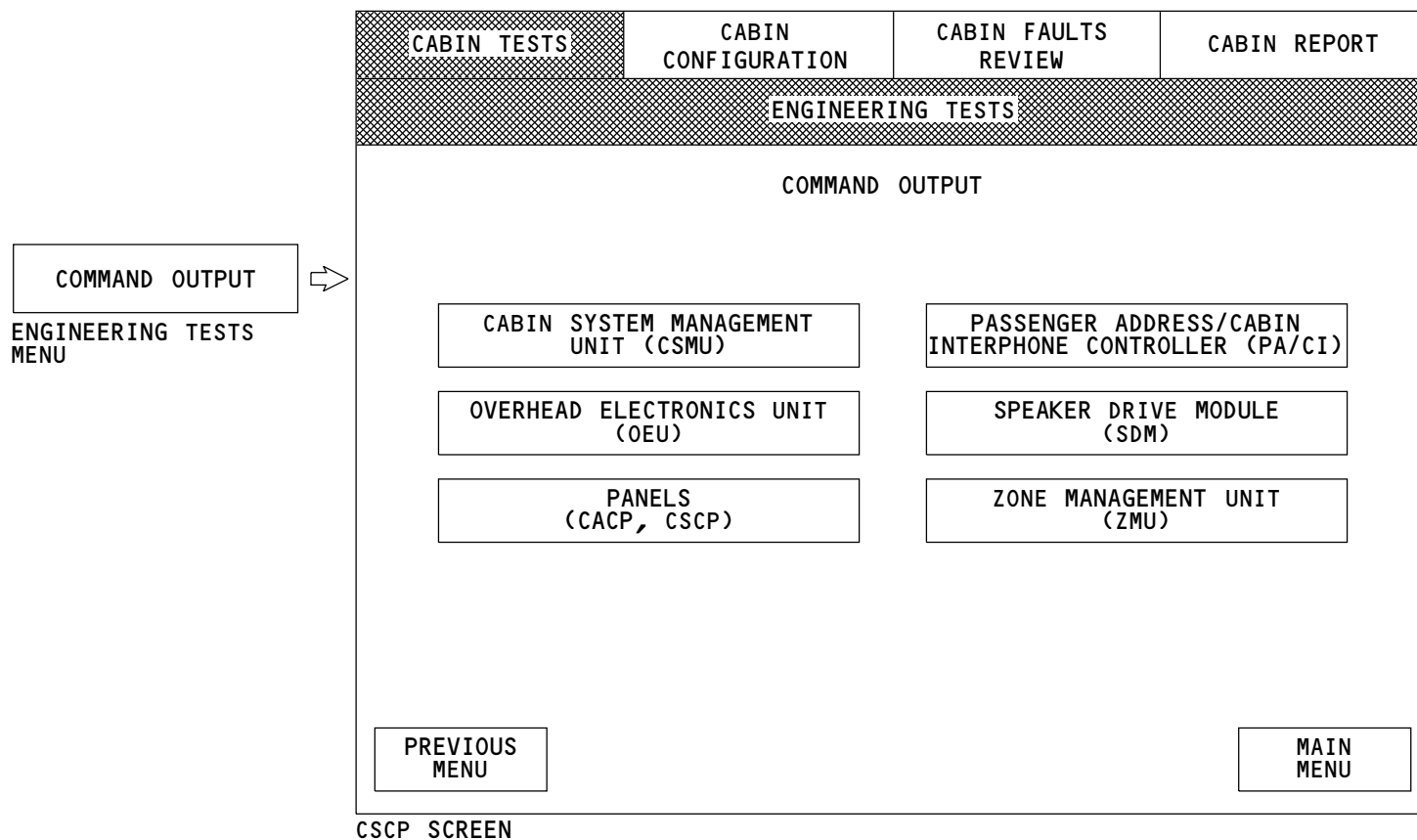
Touch MAIN MENU to show the cabin maintenance menu.

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CSCP SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT MENU

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**CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT - OEU****General**

You use the command output - OEU screen to set outputs of an overhead electronics unit (OEU).

Access

To show the command output menu:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch COMMAND OUTPUT on the engineering tests menu
- Touch OVERHEAD ELECTRONICS UNIT (OEU) on the command output menu.

Controls and Indications

You use the upper section of the screen to select an OEU.

To select an OEU, first select a zone with the up or down arrow below Select Zone. The CSS can have as many as five zones (one for each zone management unit).

After you select a zone, select a column. Each zone has three columns (1 for left, 2 for center, and 3 for right). To select a column, touch the up or down arrows under Select Column.

After you select a column, you select an OEU. The OEU number is its sequence in the column. The first OEU in a column is number 1, the second is number two. To select an OEU, touch the up or down arrows under Select OEU. The CSS can have as many as 31 OEUs in a column.

You use the lower left section of the screen to set a port output. There are twelve ports on an OEU. Touch the up or down arrows to select a port. The selected port number and connector pin number show next to the arrows. If you select all ports, ALL shows. After you select a port, touch either GROUND or OPEN to set the output.

You use the lower right section of the screen to set a ballast output. There are four ballasts to an OEU. You select a ballast in the same way that you select a port.

Touch PREVIOUS MENU to show the command output menu.

Touch RESET ALL to set the ports and ballasts back to their initial condition.

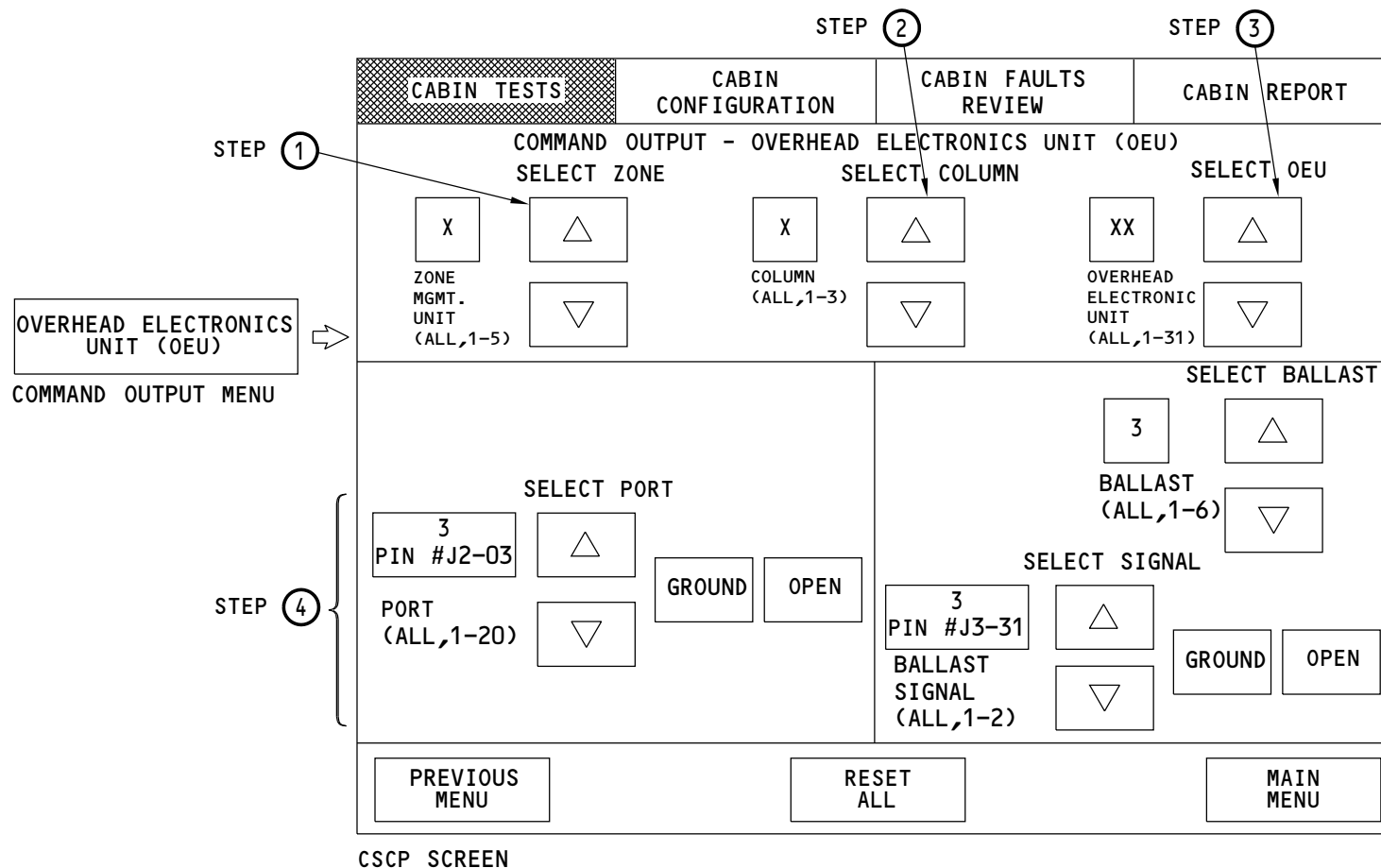
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT - OEU

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**CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT - SDM****General**

You use the command output - SDM screen to cause the speaker drive modules (SDMs) to make noise.

Access

To show the command output menu:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch COMMAND OUTPUT on the engineering tests menu
- Touch SPEAKER DRIVE MODULE (SDM) on the command output menu.

Controls and Indications

Touch the column select arrows to select one or all columns (zones). There can be as many as five columns.

Touch the SDM select arrows to select one or more SDMs. There can be as many as 25 SDMs in a column.

Touch SPEAKER 1 ON and SPEAKER 2 ON to cause the SDMs to make noise. Each SDM has one or two speakers.

Touch RESET ALL to stop the random noise.

Touch PREVIOUS MENU to show the command output menu.

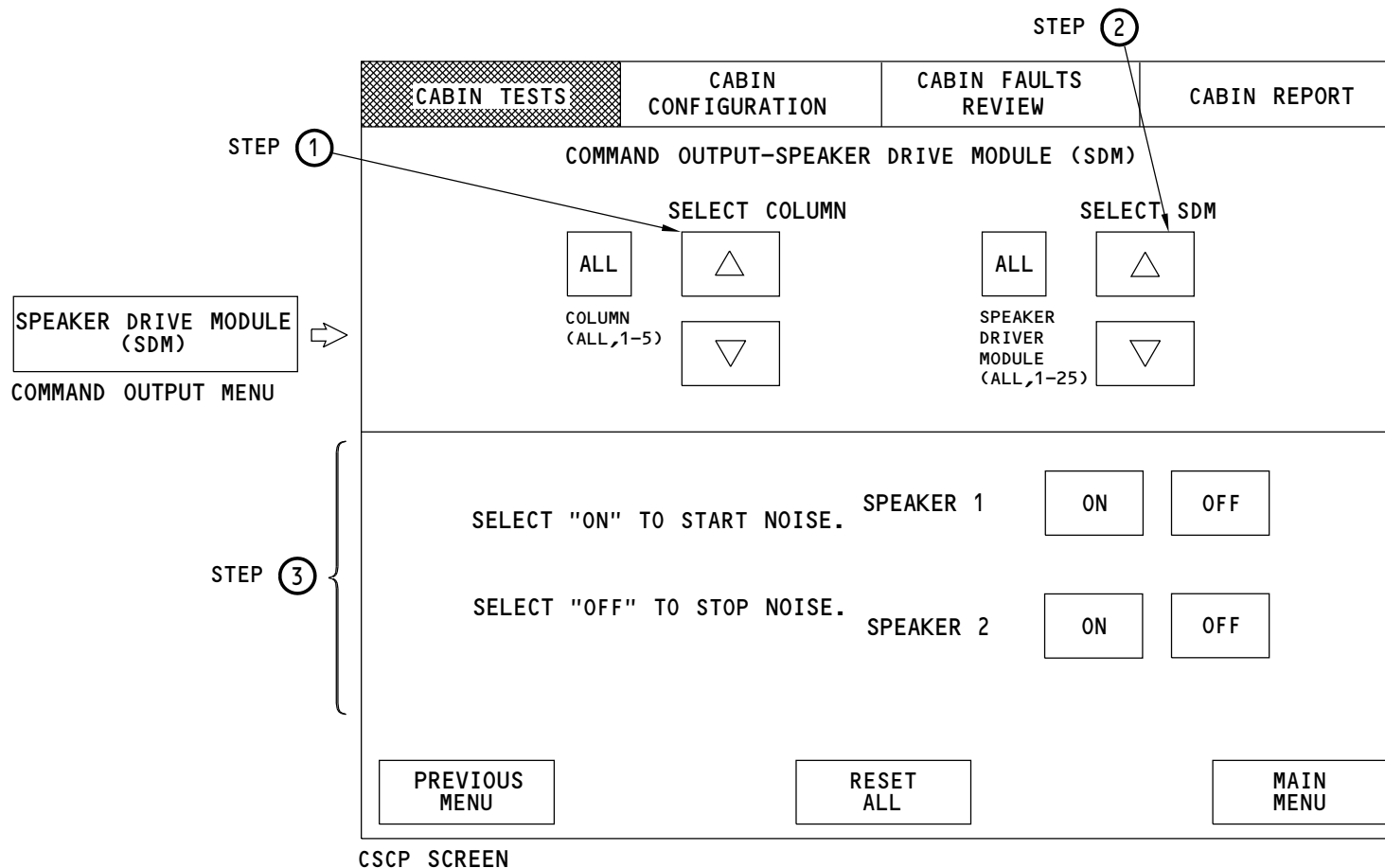
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - COMMAND OUTPUT - SDM

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**CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS MENU****General**

You use the shop faults test to show failure data for CSS components. You use the shop faults menu to select the type of component.

Access

To show the shop faults menu:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch SHOP FAULTS on the engineering tests menu.

Controls and Indications

You can get shop faults for these components:

- Cabin area control panels (CACPs)
- Cabin interphone controller (CIC)
- Cabin system control panel (CSCP)
- Cabin system management unit (CSMU)
- Overhead electronics units (OEUs)
- Passenger address controller (PAC)
- Speaker drive modules (SDMs)
- Zone management units (ZMUs).

To select a component, touch the applicable selection.

Touch PREVIOUS MENU to show the engineering tests menu.

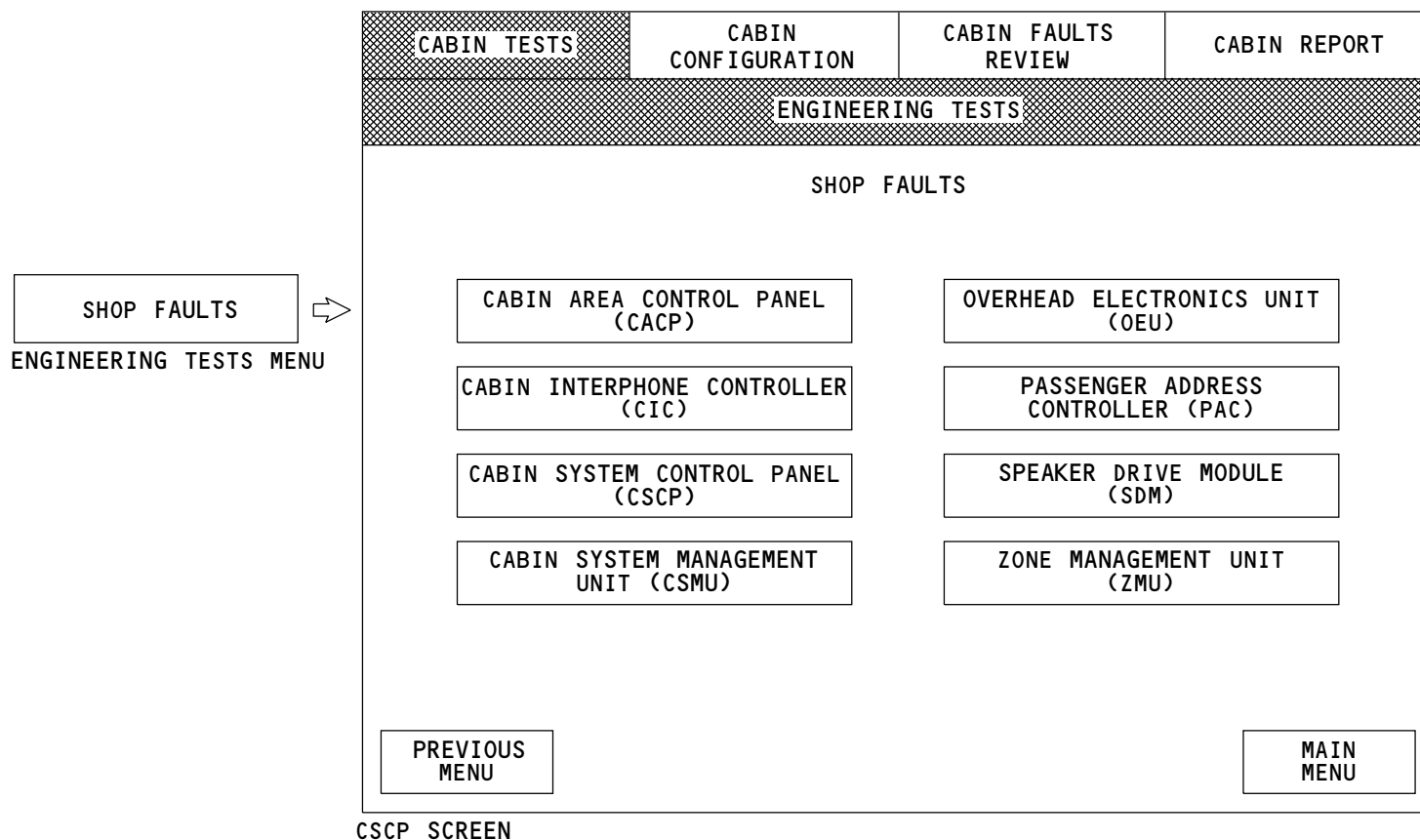
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS MENU

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**CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS - OEU SELECTION****General**

You use the shop faults - OEU selection screen to select and show internal failure data of overhead electronics units (OEUs).

Access

To show the shop faults - OEU selection screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch SHOP FAULTS on the engineering tests menu
- Touch OVERHEAD ELECTRONICS UNIT (OEU) on the shop faults menu.

Controls and Indications

To select an OEU, first select a zone. Touch the up or down arrow in the select zone area. The CSS can have as many as five zones (one for each zone management unit).

After you select a zone, select a column. Touch the up or down arrow in the select column area. Each zone has as many as three columns of OEUs.

- Select 1 for the left column
- Select 2 for the center column
- Select 3 for the right column.

After you select a column, select an OEU. The OEU number shows the sequence of the OEU in the column. The first OEU in a column is number 1, the second is number two. Touch the up or down arrows in the selected OEU area. The CSS can have as many as 31 OEUs in a column.

After you select an OEU, touch CONTINUE to show the shop faults - OEU screen.

Touch PREVIOUS MENU to show the shop faults menu.

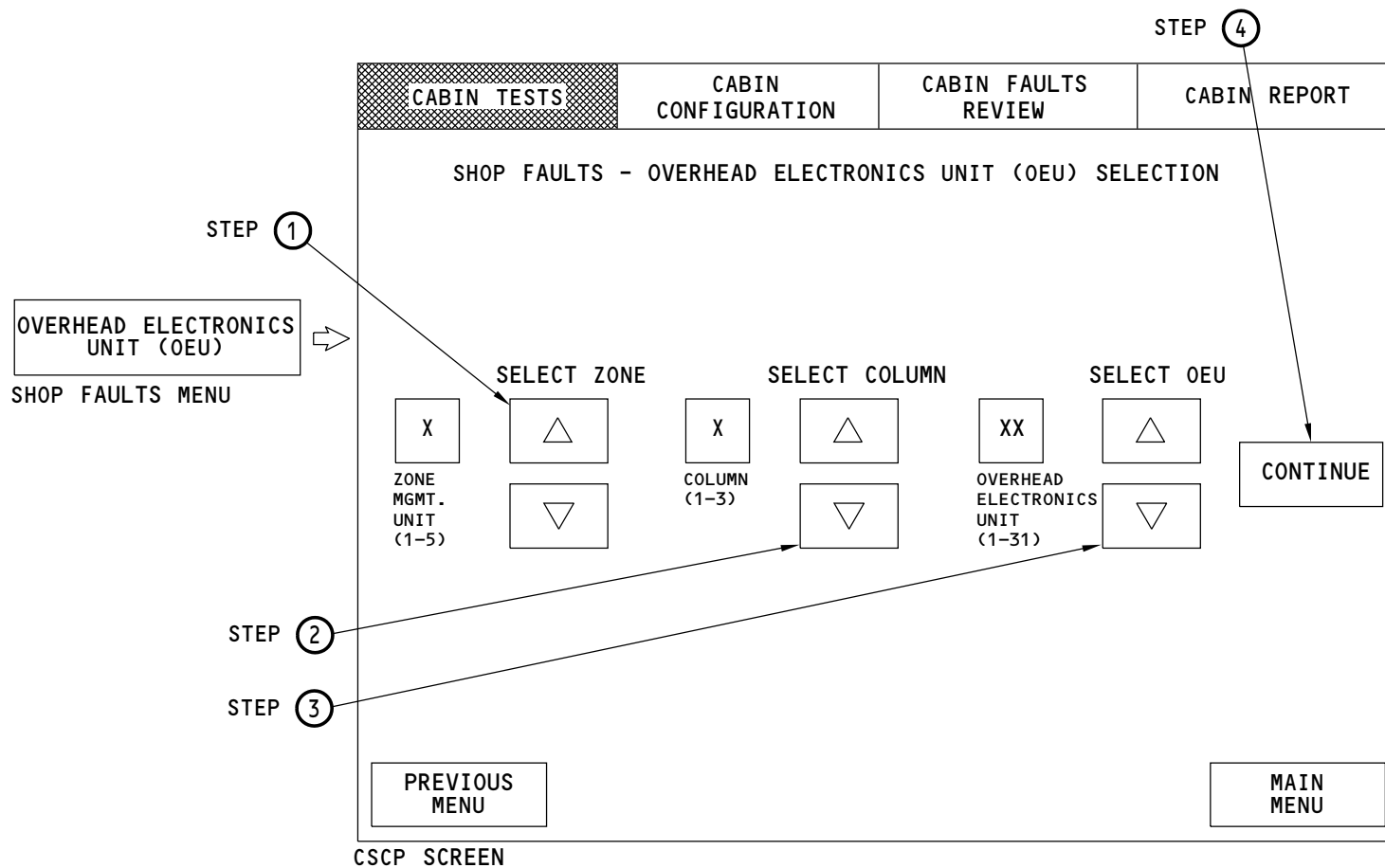
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS - OEU SELECTION

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CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS - OEU DATA

General

You use the shop faults - OEU screen to show internal failure data for an overhead electronics unit (OEU).

Access

To show this screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch SHOP FAULTS on the engineering tests menu
- Touch OVERHEAD ELECTRONICS UNIT (OEU) on the shop faults menu
- Select an OEU and touch CONTINUE on the OEU selection screen.

Controls and Indications

The top part of the display shows data about the OEU operation. Total operating hours is the time the OEU has been on since installation. The warm start counter shows the number of short term power interrupts. The cold start counter shows the number of long term power interrupts.

The top part of the data window shows the selected OEU and its location.

The data window shows the shop fault data. Each fault message has this data:

- FAULT TYPE shows the failure
- FLIGHT PHASE shows on which flight phase the failure occurred
- NUMBER OF OCCURRENCES shows how many times the failure occurred
- ACTIVE/INACTIVE - ACTIVE shows that the failure is occurring now. INACTIVE shows that the failure has gone away
- AIRCRAFT IDENTIFIER shows on which airplane the unit was installed when the failure occurred
- FIRST OCCURRENCE shows when the failure initially occurred.

Use the up and down arrows at the right of the unit usage window to scroll through the data. A scroll box between the arrows shows the location of the data on the display in relation to all of the data in the list.

Touch PREVIOUS MENU to show the shop faults menu.

Touch PREVIOUS SCREEN to show the OEU selection screen.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a diskette in the cabin system control panel (CSCP) disk drive.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the cabin printer.

Touch MAIN MENU to show the cabin maintenance menu.

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SELECT AN OEU
AND

CONTINUE

OEU SELECTION
SCREEN

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT									
SHOP FAULTS - OVERHEAD ELECTRONICS UNIT												
TOTAL OPERATING HOURS: 2088												
WARM START COUNTER: 11												
COLD START COUNTER: 51												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">LRU</th> <th style="width: 30%;">LRU ADDRESS</th> <th style="width: 40%;">LRU LOCATION</th> </tr> </thead> <tbody> <tr> <td colspan="3"> FAULT TYPE: DIGITAL TO ANALOG CONV FAILURE - CHANNEL 1 FLIGHT PHASE: ENROUTE NUMBER OF OCCURRENCES: 3 ACTIVE/INACTIVE: NOT ACTIVE AIRCRAFT IDENTIFIER: 138 FIRST OCCURRENCE: 28JUL95 08:31:22 </td> </tr> <tr> <td colspan="3"> FAULT TYPE: PROCESSOR ACTIVITY FAILURE FLIGHT PHASE: POWER ON NUMBER OF OCCURRENCES: 1 ACTIVE/INACTIVE: ACTIVE AIRCRAFT IDENTIFIER: 138 FIRST OCCURRENCE: 15JUL95 02:15:27 </td> </tr> </tbody> </table>			LRU	LRU ADDRESS	LRU LOCATION	FAULT TYPE: DIGITAL TO ANALOG CONV FAILURE - CHANNEL 1 FLIGHT PHASE: ENROUTE NUMBER OF OCCURRENCES: 3 ACTIVE/INACTIVE: NOT ACTIVE AIRCRAFT IDENTIFIER: 138 FIRST OCCURRENCE: 28JUL95 08:31:22			FAULT TYPE: PROCESSOR ACTIVITY FAILURE FLIGHT PHASE: POWER ON NUMBER OF OCCURRENCES: 1 ACTIVE/INACTIVE: ACTIVE AIRCRAFT IDENTIFIER: 138 FIRST OCCURRENCE: 15JUL95 02:15:27			△ ▽
LRU	LRU ADDRESS	LRU LOCATION										
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CSCP SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - SHOP FAULTS - OEU DATA

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**CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - WILL OVERWRITE DIALOGUE WINDOW****General**

You use the install addresses function to install software addresses to CSS LRUs. This is for trouble-shooting problems in the configuration database. It lets you use the engineering tests without a configuration database.

When you install the addresses it replaces any addresses that were installed by the configuration database.

Access

To show this window:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INSTALL ADDRESSES on the engineering tests menu.

Controls and Indications

The window shows information about the function.

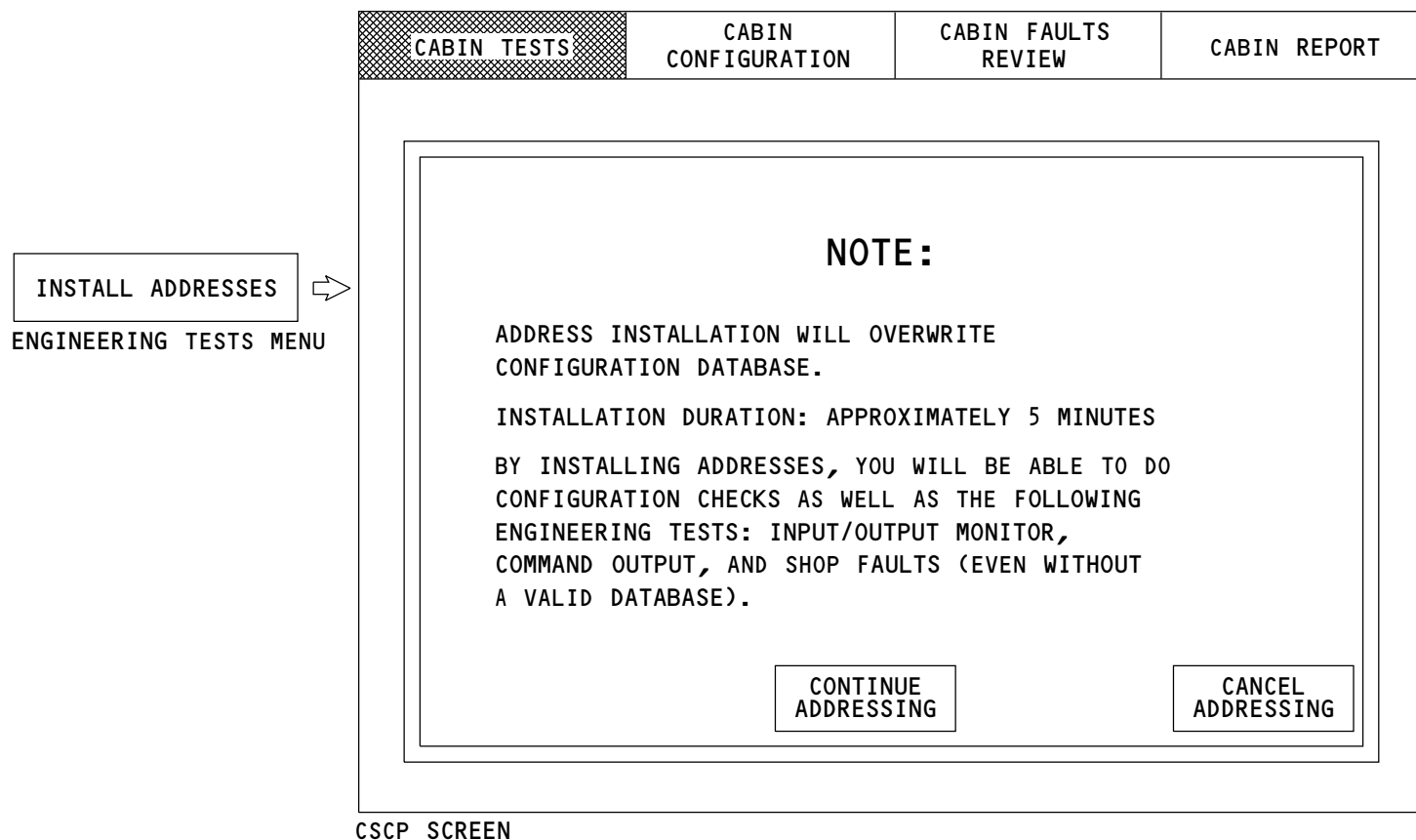
Touch CONTINUE ADDRESSING to install addresses.

Touch CANCEL ADDRESSING to show the engineering tests menu.

23-39-01

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D633W101-ARO



M40138 S000616094_V1

CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - WILL OVERWRITE DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - OPERATING DIALOGUE WINDOW****General**

This dialogue window shows while the CSS gives new addresses to the units.

Access

To show this window:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INSTALL ADDRESSES on the engineering tests menu
- Touch CONTINUE ADDRESSING on the installed addresses will overwrite dialogue window.

Controls and Indications

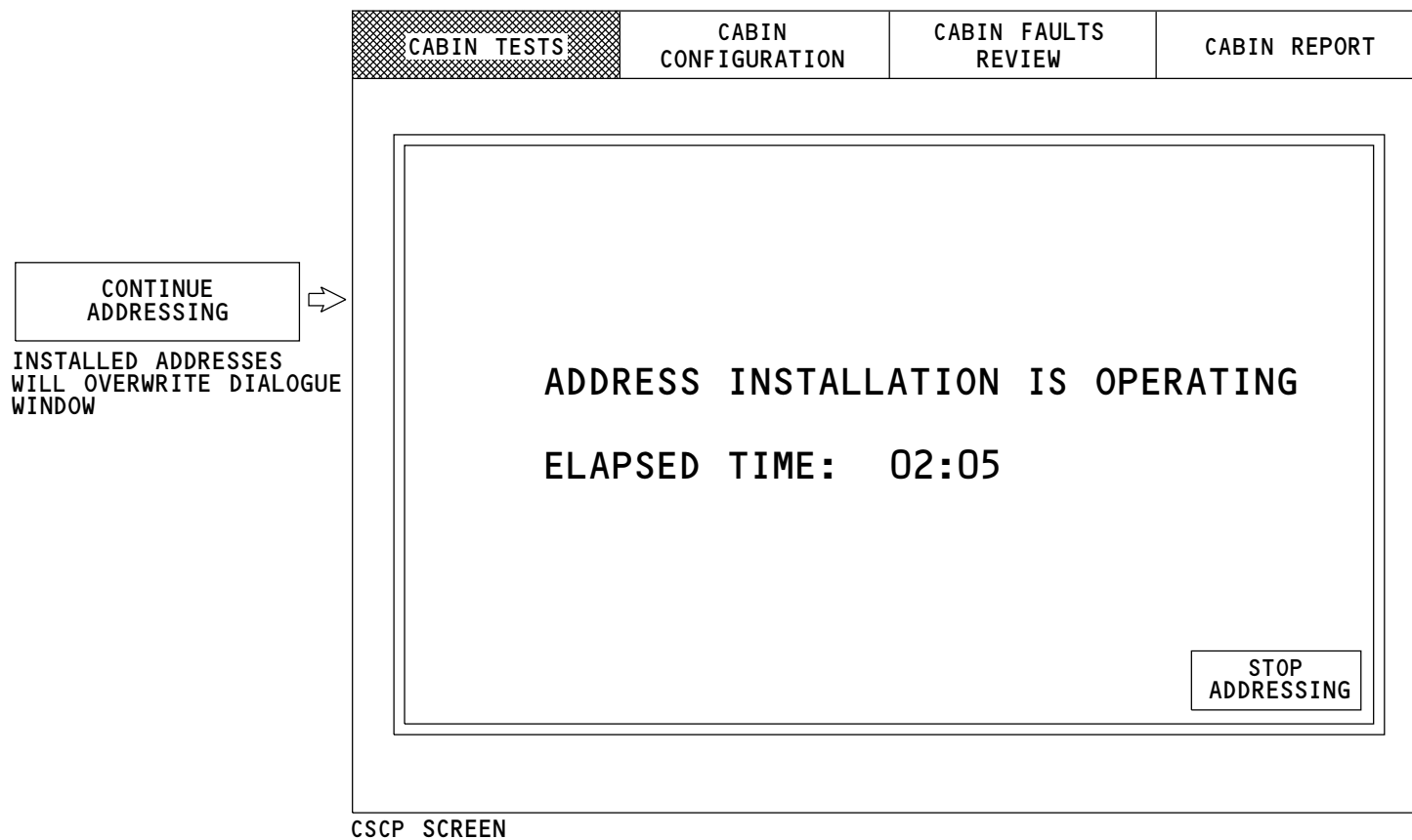
The window shows the elapsed time while the CSS installs addresses.

Touch STOP ADDRESSING to stop the function.

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M40139 S000616095_V2

CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - OPERATING DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - ADDRESS INSTALLATION COMPLETE****General**

The address installation complete screen shows the number of LRUs for which the CSS installed addresses. The install address function gives addresses to all of these CSS components:

- Cabin area control panels (CACPs)
- Overhead electronics units (OEUs)
- Speaker drive modules (SDMs).

The addresses are not related to the configuration database.

Access

The address installation complete screen shows automatically when the install addresses function is complete. To install addresses:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INSTALL ADDRESSES on the engineering tests menu
- Touch CONTINUE ADDRESSING on the installed addresses will overwrite dialogue window.

Controls and Indications

The CSS can have as many as five zones (one for each zone management unit). Usually the CSS has three zones.

The numbers adjacent to the zones show how many LRUs are in that area. These groups of numbers show the related data:

- Panels port - shows a number for each ZMU panel connection. This usually shows the number of CACPs. Each zone can have as many as three CACPs but usually has one
- Overhead electronics unit - shows a number for each column of OEUs. The CSS can have as many as 31 OEUs in each column. The actual number is usually less
- Speaker drive module - shows the number of speaker drive modules in the zone.

The PREVIOUS MENU and MAIN MENU selections cause the new addresses installed dialogue window to show.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE PAGE to send the data to a diskette in the cabin system control panel (CSCP).

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE PAGE to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT PAGE to get a printout of the data.

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CABIN TESTS

CABIN
CONFIGURATION

CABIN FAULTS
REVIEW

CABIN REPORT

ADDRESS INSTALLATION COMPLETE

DATE: 04/03/93
TIME: 08:30Z

THE NUMBER OF UNITS ADDRESSED ARE LISTED BELOW:

	PANELS PORT	OVERHEAD ELECTRONICS UNIT	SPEAKER DRIVE MODULE
ZONE 1	01 00 00	04 07 06	10
ZONE 2	01 00 00	14 16 14	13
ZONE 3	01 00 00	09 12 10	10
ZONE 4	00 00 00	00 00 00	00
ZONE 5	00 00 00	00 00 00	00

PREVIOUS
MENU

SAVE
PAGE

PRINT
PAGE

MAIN
MENU

CSCP SCREEN

INSTALL ADDRESSES
COMPLETE }

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CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDRESSES - ADDRESS INSTALLATION COMPLETE

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**CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDR - NEW ADDRESSES INSTALLED DIALOGUE WINDOW****General**

The new addresses installed dialogue window tells you that address installation is complete.

Access

To show this dialogue window:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch INSTALL ADDRESSES on the engineering tests menu
- Touch CONTINUE ADDRESSING on the installed addresses will overwrite dialogue window
- Touch MAIN MENU or PREVIOUS MENU on the address installation complete screen.

Controls and Indications

Touch CONTINUE SELECTION to go to the selection.

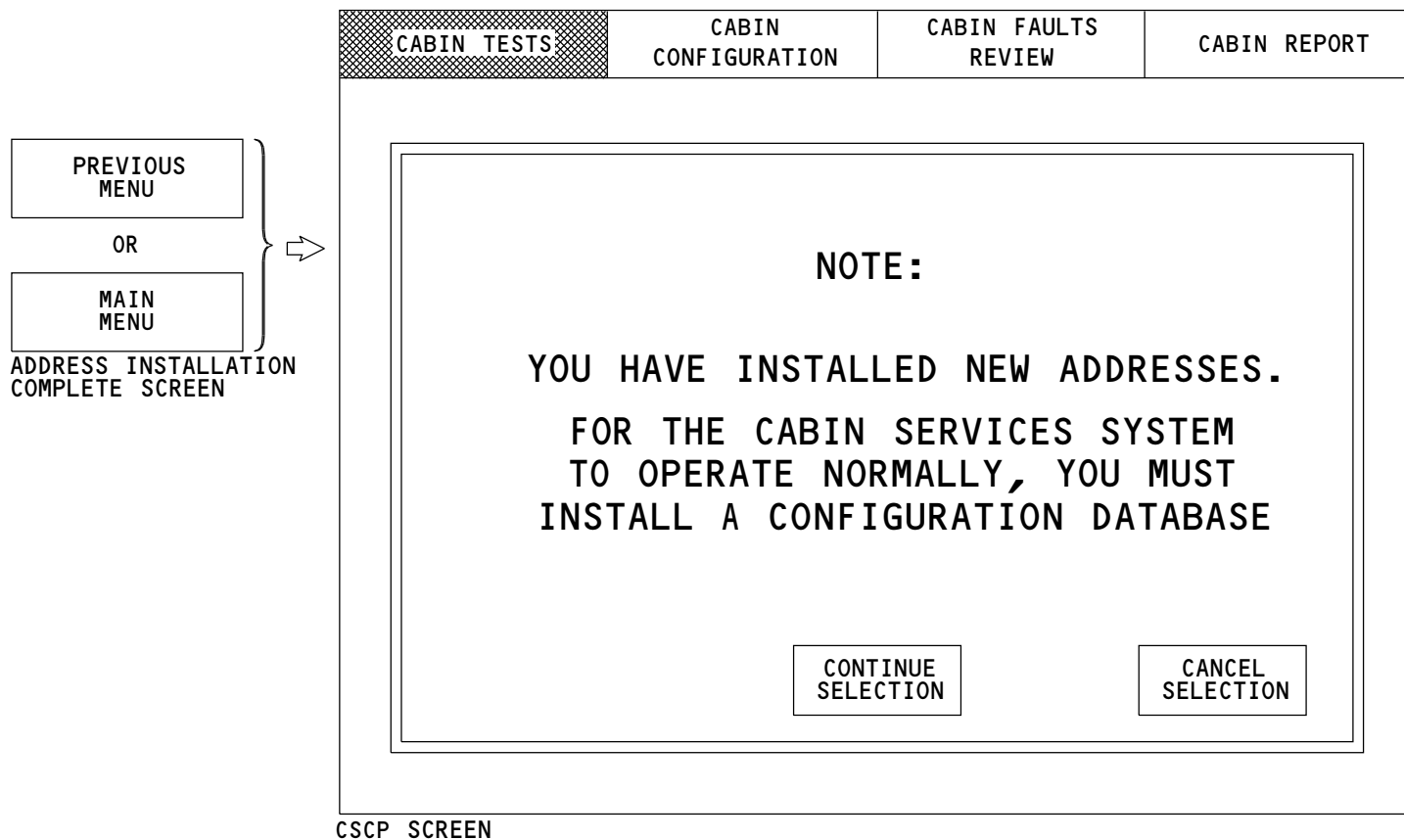
Touch CANCEL SELECTION to show the address installation complete screen.

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CSS TEST AND SOFTWARE INSTALLATION - INSTALL ADDR - NEW ADDRESSES INSTALLED DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - EXTENDED CABIN FAULTS REVIEW MENU****General**

You use the extended cabin faults review menu to show failure data for the CSS. These are the seven selections on the extended cabin faults review menu:

- QUICK TEST FAULTS REVIEW
- QUICK TEST FAULTS REVIEW BY ZONE
- MASKED AND UNMASKED FAULTS REVIEW (QUICK TEST)
- DATA INSTALLATION FAULTS REVIEW
- ALL TEST FAULTS REVIEW
- ALL TEST FAULTS REVIEW BY ZONE
- MASKED AND UNMASKED FAULTS REVIEW (ALL TEST).

Access

To show the extended cabin faults review menu, do this:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS
- Touch EXTENDED CABIN FAULTS REVIEW.

Quick Test Faults Review

Touch QUICK TEST FAULTS REVIEW to show the faults review screen from the last quick test. See the quick test description for more information.

Quick Test Faults Review by Zone

Quick test faults review by zone is the same as quick test faults review but you can look at faults for a specified zone. You use this when you do trouble-shooting within a cabin zone.

Masked and Unmasked Faults Review (Quick Test)

Normally, quick test only shows unmasked faults. Masked faults are faults that do not normally show because the configuration database prevents them. Touch MASKED AND UNMASKED FAULTS REVIEW (QUICK TEST) to show both masked and unmasked faults from the last quick test.

Data Installation Faults Review

Touch DATA INSTALLATION FAULTS REVIEW to show an installation fault results screen from the last database or operational program installation. For more information on data installation, see the database or operational program installation description.

All Test Faults Review

Touch ALL TEST FAULTS REVIEW to show the faults review screen from the last all test. See the all test description for more information.

All Test Faults Review by Zone

All test faults review by zone is the same as all test faults review but you can look at faults for a specific zone. You use this when you do trouble-shooting within a cabin zone.

Masked and Unmasked Faults Review (All Test)

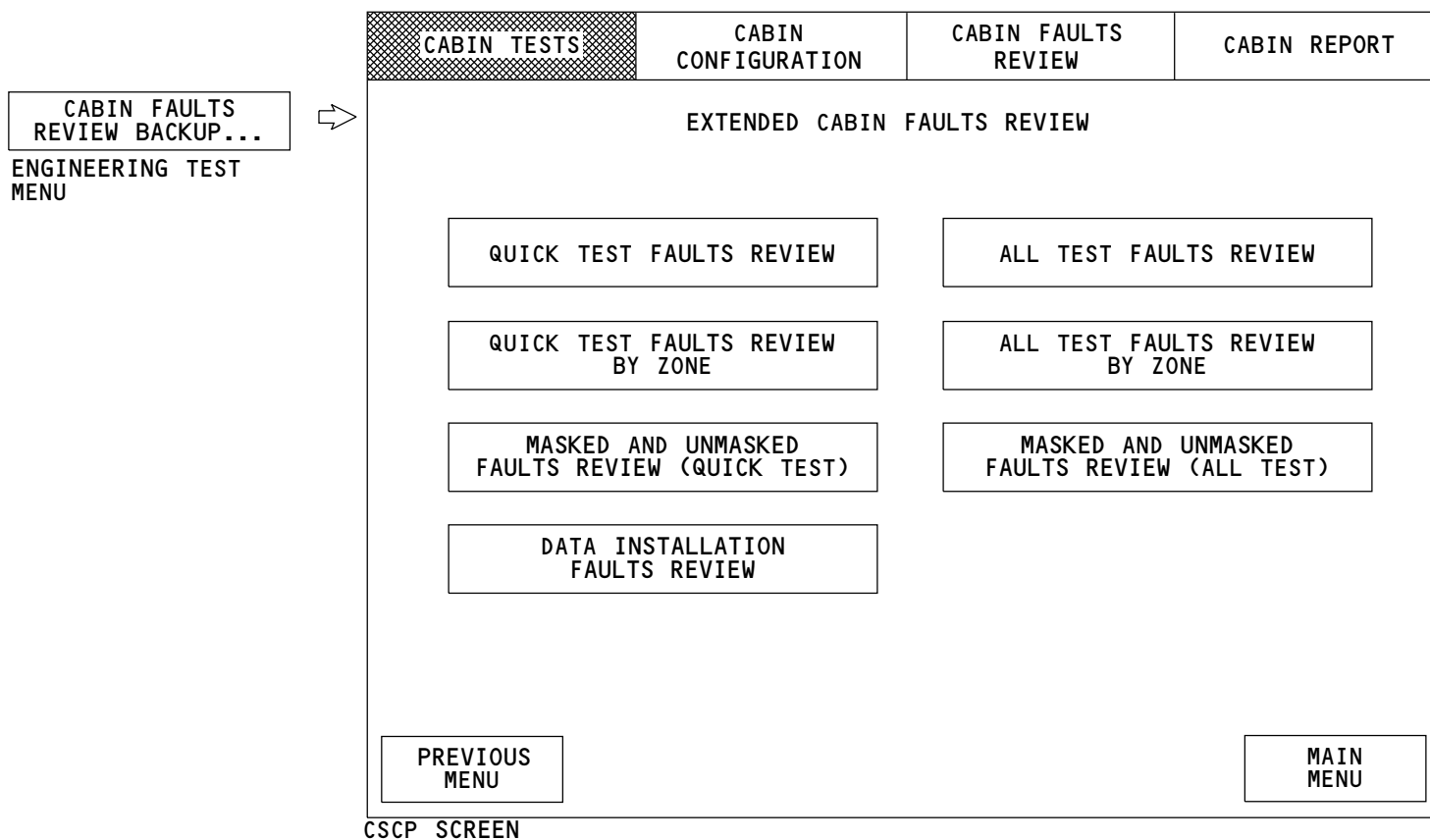
Normally, all test only shows unmasked faults. Masked faults are faults that do not normally show because the configuration database prevents them. Touch MASKED AND UNMASKED FAULTS REVIEW (ALL TEST) to show both masked and unmasked faults from the last all test.

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CSS TEST AND SOFTWARE INSTALLATION - EXTENDED CABIN FAULTS REVIEW MENU

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**CSS TEST AND SOFTWARE INSTALLATION - QUICK TESTS FAULTS REVIEW BY ZONE****General**

You use quick test faults review by zone to show failures from the last quick test for each cabin zone.

An equivalent function is available for all test review when you select all test review by zone.

Access

To show this screen:

- Touch CABIN TESTS on any maintenance screen
- Touch ENGINEERING TESTS on the cabin test menu
- Touch QUICK TEST FAULTS REVIEW BY ZONE on the engineering tests menu.

Controls and Indications

You use the upper selections to select a zone. The selection shows green.

After you select a zone and an LRU type, touch CONTINUE to show the quick test fault results screens for the selected cabin zone.

Touch PREVIOUS MENU to show the engineering tests menu.

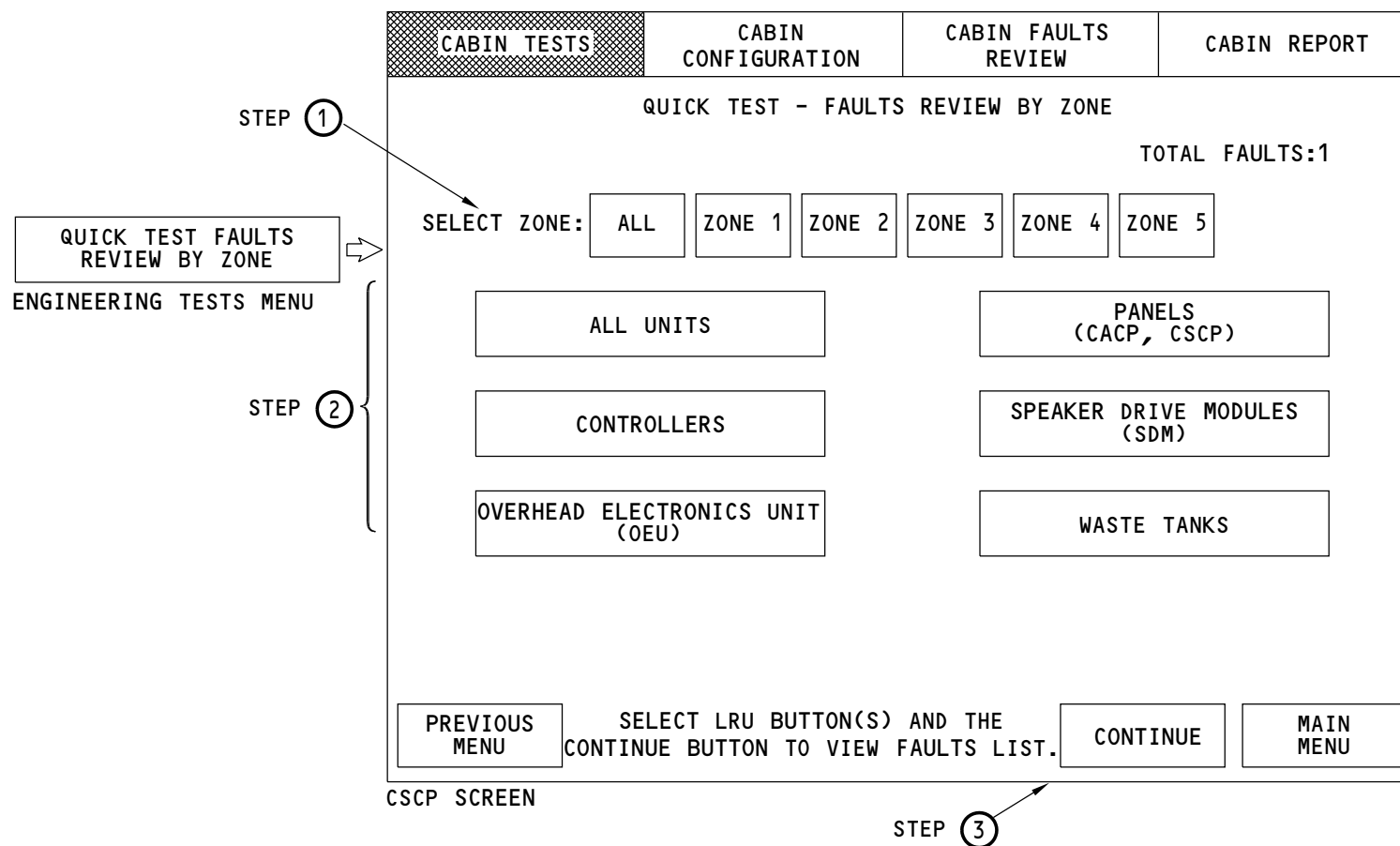
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - QUICK TESTS FAULTS REVIEW BY ZONE

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**CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU TREE****General**

You use the cabin system control panel (CSCP) for CSS maintenance procedures.

Use the cabin configuration menu to install software and check the configuration of components in the CSS. The cabin configuration menu has three selections:

- CONFIGURATION DATABASE INSTALLATION
- SOFTWARE MANAGEMENT
- CONFIGURATION CHECK.

Configuration Database Installation

Touch CONFIGURATION DATABASE INSTALLATION to install a configuration database.

The configuration database installation window shows the part number and version number of the active database. It also gives you alternative selections for installing the database.

After you install a database, one of two screens shows on the CSCP. Installation complete with no faults shows if the installation is good. If there are faults, a faults results screen shows them.

Software Management

You use the SOFTWARE MANAGEMENT selection to install operational programs. The SOFTWARE MANAGEMENT selection shows the software management menu. It has these selections:

ARO 001-015 PRE SB 777-23-0369

- OPERATIONAL PROGRAM SOFTWARE INSTALLATION
- INSTALL DATA FROM FLOPPY DISK DRIVE
- LIST OF FILES ON FLOPPY DISKETTE
- DISK MAINTENANCE
- SOFTWARE IN MASS STORAGE.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- OPERATIONAL PROGRAM SOFTWARE INSTALLATION
- LIST OF FILES ON USB MEMORY
- MASS STORAGE MANAGEMENT
- SOFTWARE IN MASS STORAGE

ARO ALL

Select OPERATIONAL PROGRAM SOFTWARE INSTALLATION to install software in selected LRUs. Installation of operational program software is almost the same as the configuration database installation.

ARO 001-015 PRE SB 777-23-0369

LIST OF FILES ON FLOPPY DISKETTE shows you all of the software files on any disk you have in the CSCP disk drive.

Select INSTALL DATA FROM FLOPPY DISK DRIVE to install configuration database or operational software from a floppy disk in the CSCP disk drive.

DISK MAINTENANCE lets you remove database or operational programs from the system.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

LIST OF FILES ON USB MEMORY shows you all the software files on any USB drive you have in the CSCP ports.

Select MASS STORAGE MANAGEMENT to display a list of all databases and operational programs on the CSCP mass storage device, and be able to delete individual parts.

ARO ALL

SOFTWARE IN MASS STORAGE lets you see the software files in the CSCP mass storage.

Configuration Check

The configuration check lets you see the current configuration of selected LRUs installed in the airplane.

23-39-01

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ARO ALL	

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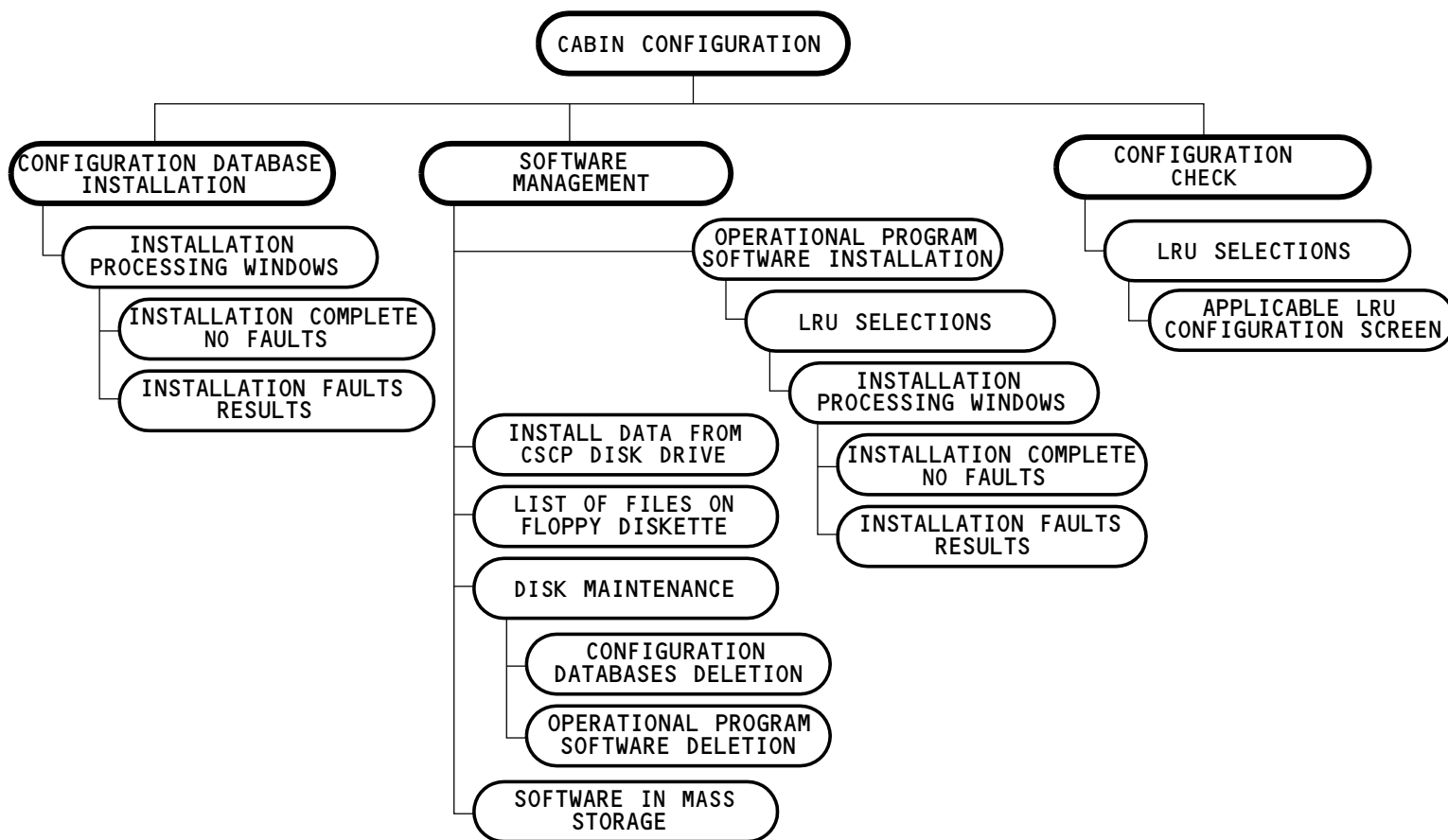
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CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU TREE

You can use the configuration check to see all hardware/software part numbers related to a selected LRU.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU TREE

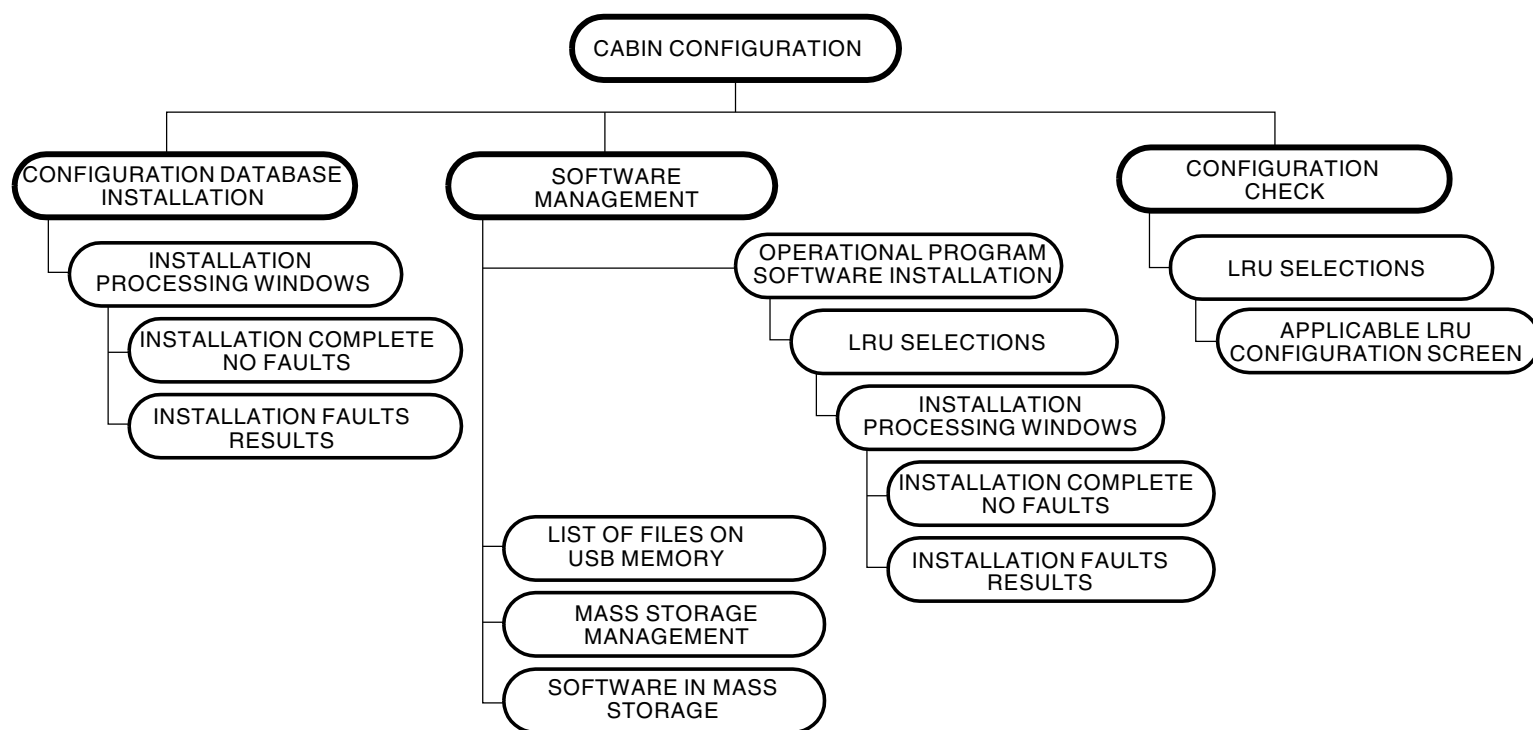
23-39-01

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ARO 001-015 PRE SB 777-23-0369

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2560839 S0000611003_V1

CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU TREE

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**CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU****General**

You use the cabin configuration menu to install software and check the configuration of components in the CSS. These are the three selections:

- CONFIGURATION DATABASE INSTALLATION
- SOFTWARE MANAGEMENT
- CONFIGURATION CHECK.

Access

Touch CABIN CONFIGURATION on any maintenance screen to show the cabin configuration menu.

Configuration Database Installation

When you touch CONFIGURATION DATABASE INSTALLATION, a processing screen shows while the CSS installs addresses to the core components. Then the configuration database installation screen shows.

The configuration database installation screen shows the part number and version number of the active database. It gives you selections you use to install a configuration database.

Software Management

Software management lets you install operational programs in selected LRUs.

ARO 001-015 PRE SB 777-23-0369

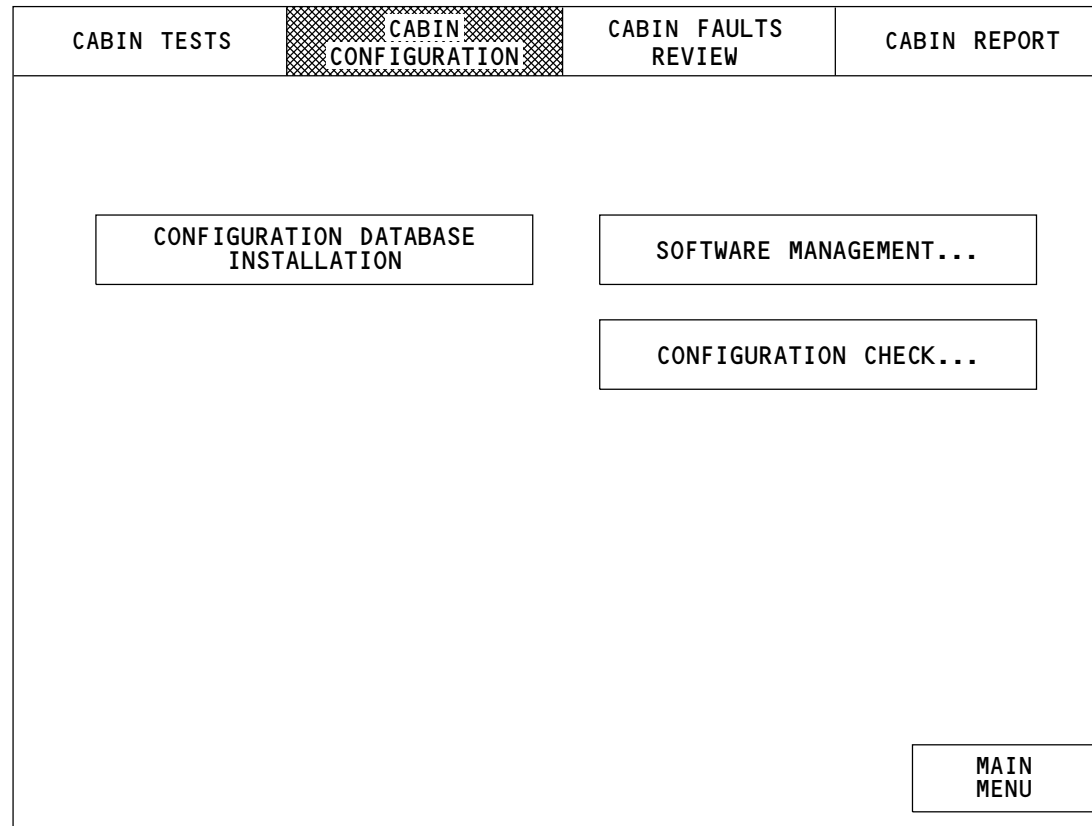
You can also list disk files and control database and operational software programs installed in the cabin system control panel (CSCP).

ARO 016-999; ARO 001-015 POST SB 777-23-0369

You can also manage parts staged on the cabin system control panel (CSCP) mass storage and list files stored on a USB device.

ARO ALL**Configuration Check**

The configuration check lets you see the current LRU configuration of the CSS. It also shows you if the installed LRUs can operate with each other.



CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - CABIN CONFIGURATION MENU

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ARO ALL	EFFECTIVITY

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23-39-01

**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION****General**

The configuration database installation window shows the active CSS database. It also gives you selections to install a database.

Access

Touch these selections to show the configuration database installation screen:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION DATABASE INSTALLATION on the cabin configuration menu.

Controls and Indications

This window shows the part number and version of the database installed. Below the part number is the title of the database.

Touch INSTALL to install the database shown on the screen. After you touch INSTALL, a dialogue window shows to tell you that the database installation is operating.

You can not select INSTALL if the current database is not in the cabin system control panel (CSCP) mass storage.

Touch MORE SELECTIONS to see other databases that may be available.

ARO ALL	EFFECTIVITY

CABIN TESTS
CABIN
CONFIGURATION
CABIN FAULTS
REVIEW
CABIN REPORT

CONFIGURATION DATABASE INSTALLATION

DATABASE CURRENTLY INSTALLED IN THE CABIN SYSTEM:

PART #

2374-CDB-001-01

VERSION #

A

THREE CLASS CONFIGURATION

SELECT INSTALL BUTTON TO INSTALL DATABASE.

PREVIOUS
MENU

MORE
SELECTIONS

INSTALL

MAIN
MENU

CSCP SCREEN

CONFIGURATION DATABASE
INSTALLATION

➔

CABIN CONFIGURATION MENU

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION

M40145 S000616102_V1

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION - MULTIPLE DATABASES****General**

This configuration database installation screen shows as many as six databases in the cabin system control panel (CSCP) memory.

Access

Touch one of these to show the configuration database installation screen for multiple databases:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION DATABASE INSTALLATION on the cabin configuration menu
- MORE SELECTIONS on the first configuration database installation screen.

Controls and Indications

This screen shows the part numbers and versions of all databases stored in memory in the CSCP. Below each part number is the database type.

In this example, the upper left database area shows that the active database is not in the CSCP memory. You use other screens to delete programs from memory.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - go to the cabin configuration menu
- INSTALL - install the selected database

ARO 001-015 PRE SB 777-23-0369

- SAVE PAGE - save the contents of this screen to a floppy diskette in the CSCP disk drive

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE PAGE - save the contents of this screen to the USB drive in the CSCP ports.

ARO ALL

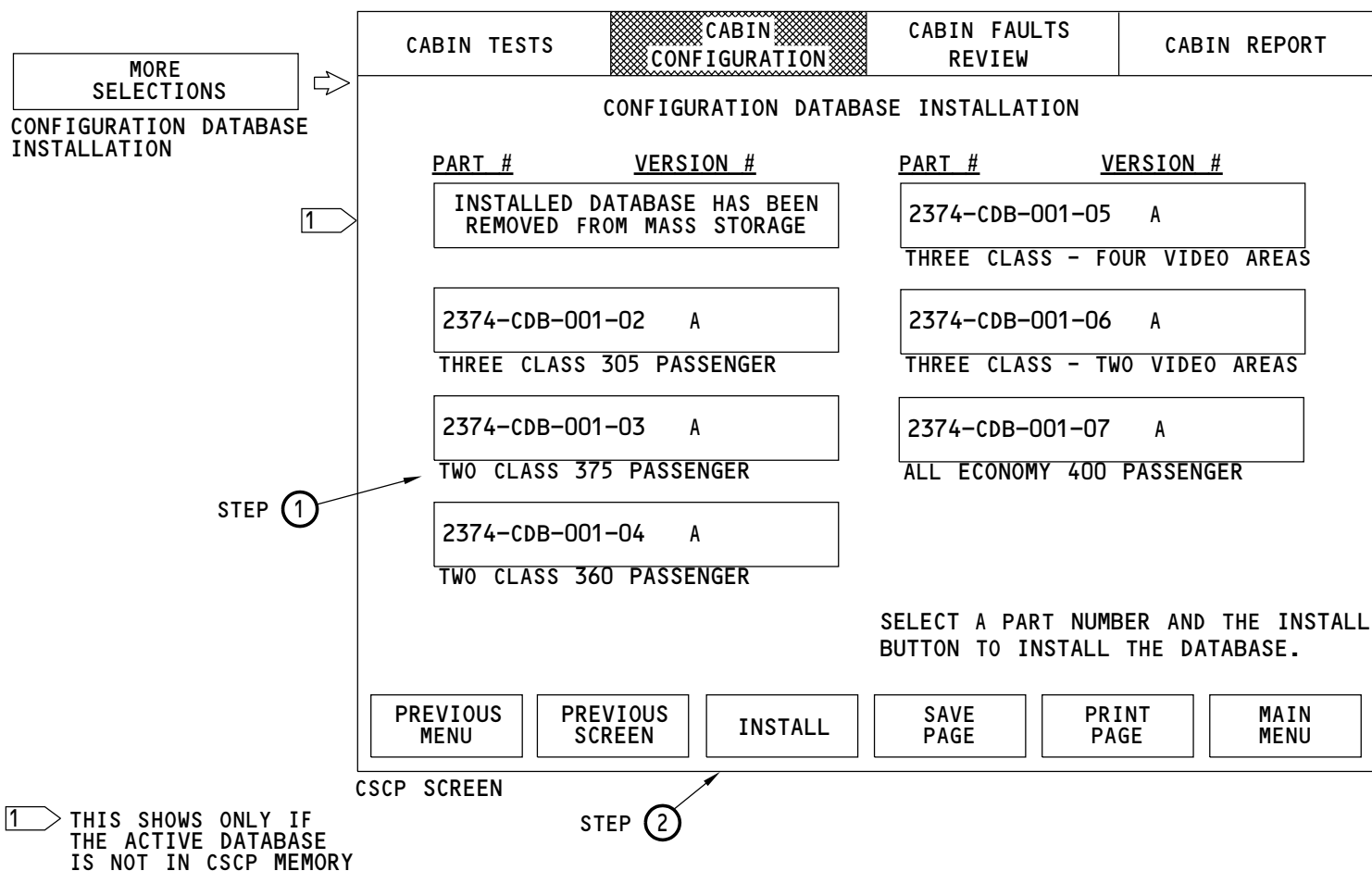
- PRINT PAGE - print the contents of this screen on the cabin printer
- MAIN MENU - return to the cabin maintenance main menu.

Database Installation

Touch the database part number on the screen to select it. The part number you select changes to green and the INSTALL selection at the bottom of the screen becomes active.

Touch INSTALL to install the database. After you touch INSTALL, a screen shows to tell you that the configuration database installation is operating.

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ARO ALL	D633W101-ARO



M40146 S000616103_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION - MULTIPLE DATABASES

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ARO ALL EFFECTIVITY

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**CSS TEST AND SOFTWARE INSTALLATION - DATABASE DISCREPANCY DIALOGUE WINDOW****General**

The database discrepancy dialogue window tells you that the database you selected is different from the active one.

Access

This screen shows automatically when you select a database different from the one installed in the cabin system control panel (CSCP) memory. It shows after you touch INSTALL on the configuration database installation screen.

Controls and Indications

This screen shows the part number of the database you selected. It also shows the part number of the active database.

Touch any of these selections at the bottom of the screen to do the related function:

- CONTINUE INSTALLATION - to install the database

ARO 001-015 PRE SB 777-23-0369

- SAVE PAGE - to save the contents of this screen to a floppy diskette in the CSCP disk drive

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE PAGE - save the contents of this screen to the USB drive in the CSCP ports.

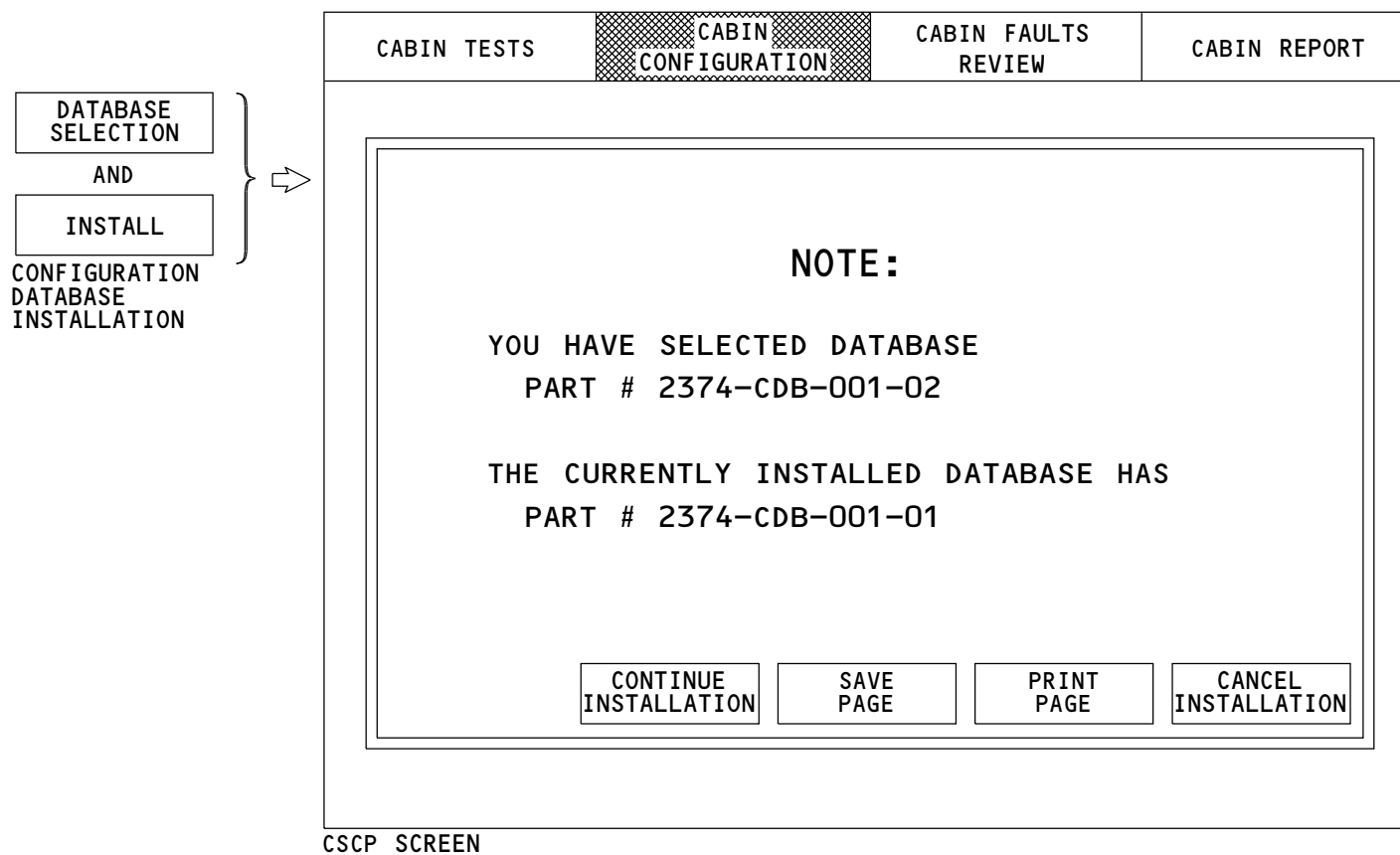
ARO ALL

- PRINT PAGE - to print the contents of this screen on the cabin printer
- CANCEL INSTALLATION - to cancel installation and return to the configuration database installation screen.

23-39-01**ARO ALL** EFFECTIVITY

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CSS TEST AND SOFTWARE INSTALLATION - DATABASE DISCREPANCY DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION IS OPERATING****General**

The configuration database installation is operating screen shows when you install a configuration database.

Access

This screen shows automatically when you select a database and touch INSTALL on the configuration database installation screen.

It also shows if you touch CONTINUE INSTALLATION on the database discrepancy screen.

Controls and Indications

The part number and description of the database show in the top-left part of the window.

The center of the window shows you that the database is being installed and the elapsed time. This area also shows the approximate installation time.

Touch STOP INSTALLATION to cancel the database installation. When you stop in the middle of the installation, only some of the CSS components may get the database. A window shows you that stopping the installation may make the system not operate.

When the installation is done, one of two screens will show. The configuration database installation complete screen shows if there are no faults. The database installation fault results screen shows if there are faults.

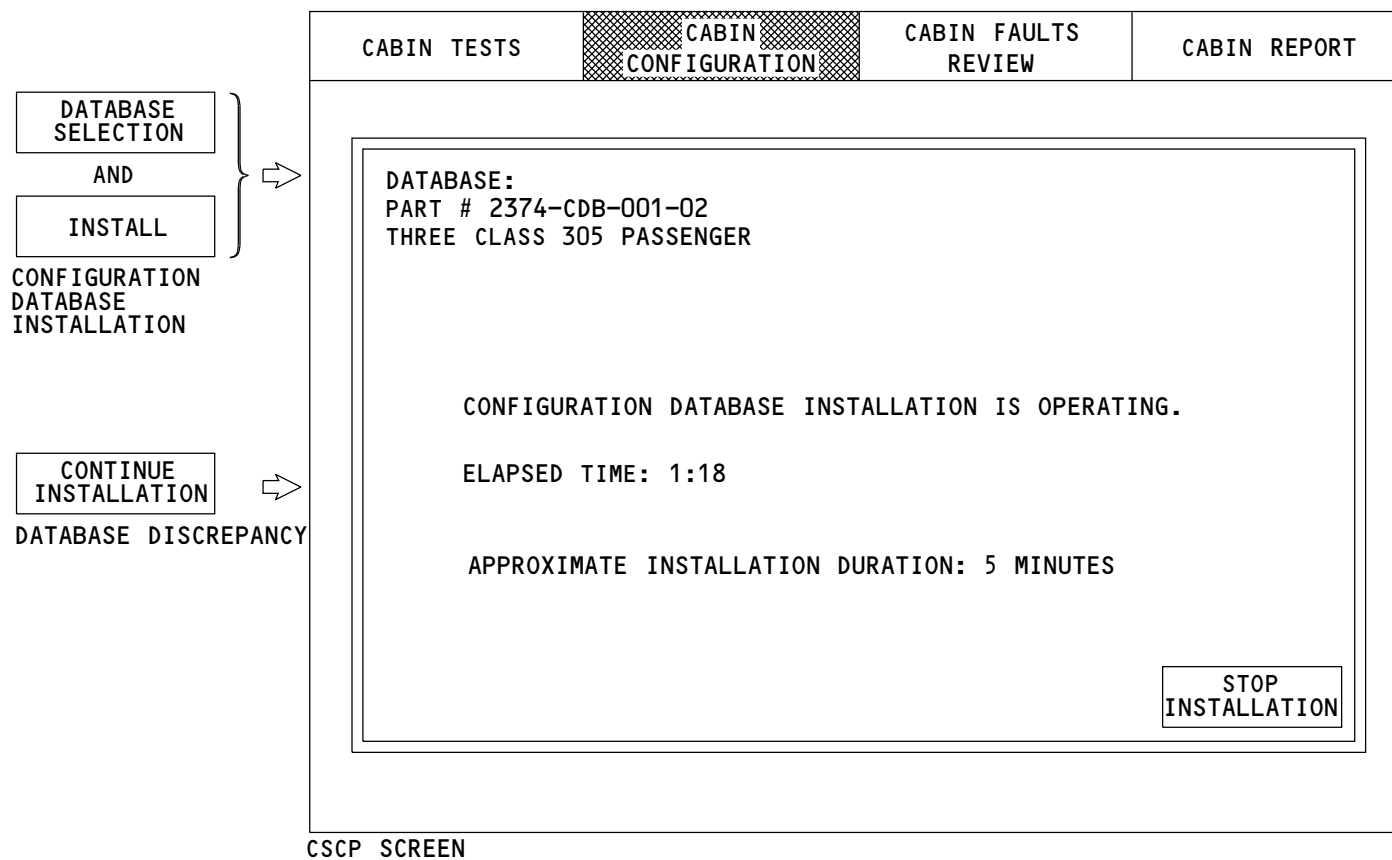
All of the faults results screens work in the same way as in the CSS test section.

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION IS OPERATING

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION STOP****General**

The configuration database installation stop screen shows when you cancel a configuration database installation.

Access

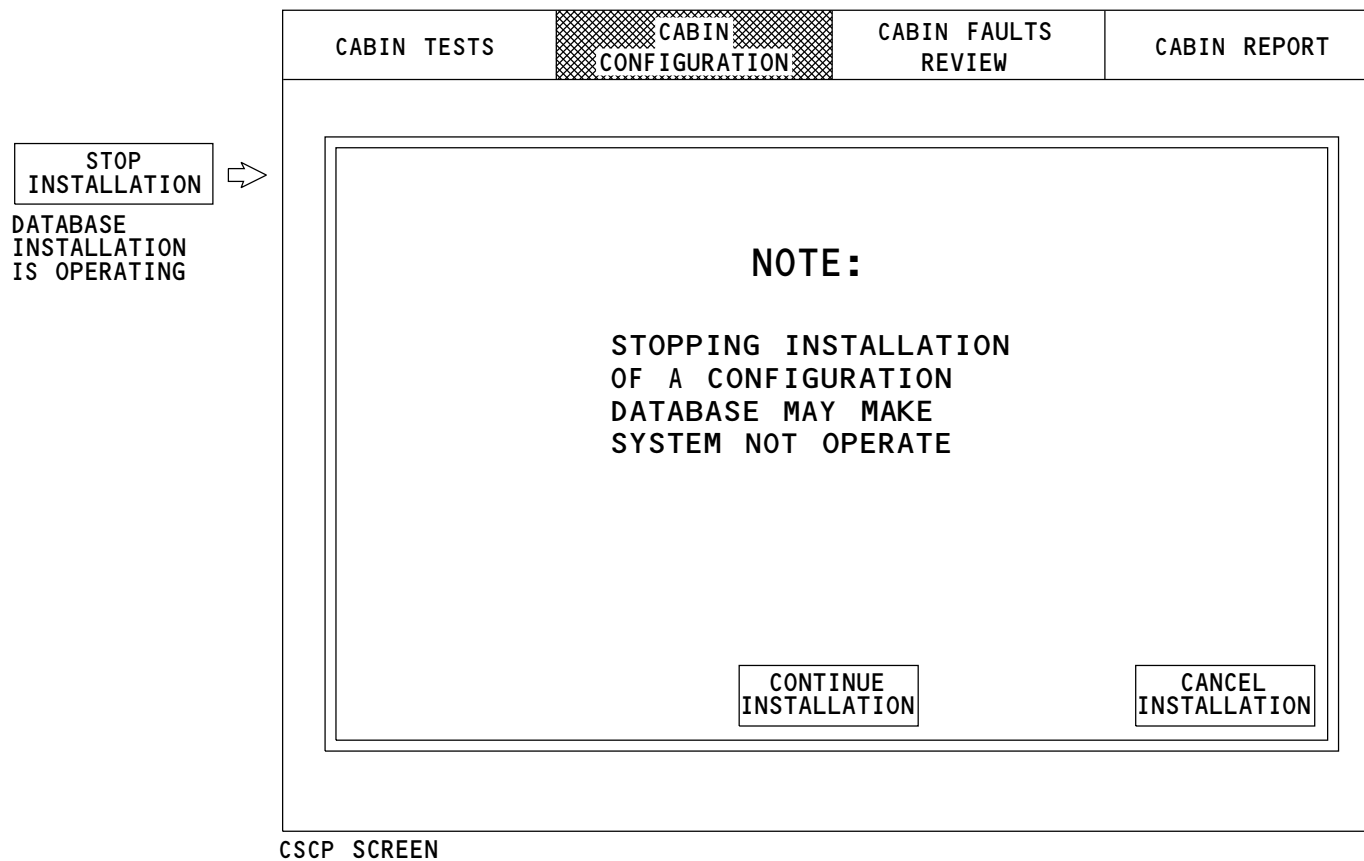
This screen shows when you touch STOP INSTALLATION on the database installation is operating screen.

Controls and Indications

The message tells you that if you cancel the installation, the CSS may not operate.

Touch CONTINUE INSTALLATION to install the remaining part of the database and show the database installation is operating screen.

Touch CANCEL INSTALLATION to stop the installation. A screen shows to tell you that the installation is being stopped. After the installation stops, the cabin configuration menu shows.



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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION STOP

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION COMPLETE****General**

The configuration database installation complete screen automatically shows at the end of a database installation.

Access

This screen shows when you select a database and touch INSTALL on the configuration database installation screen.

It also shows if you touch CONTINUE INSTALLATION on the database discrepancy screen.

Controls and Indications

The part number and description of the database show in the top-left part of the window.

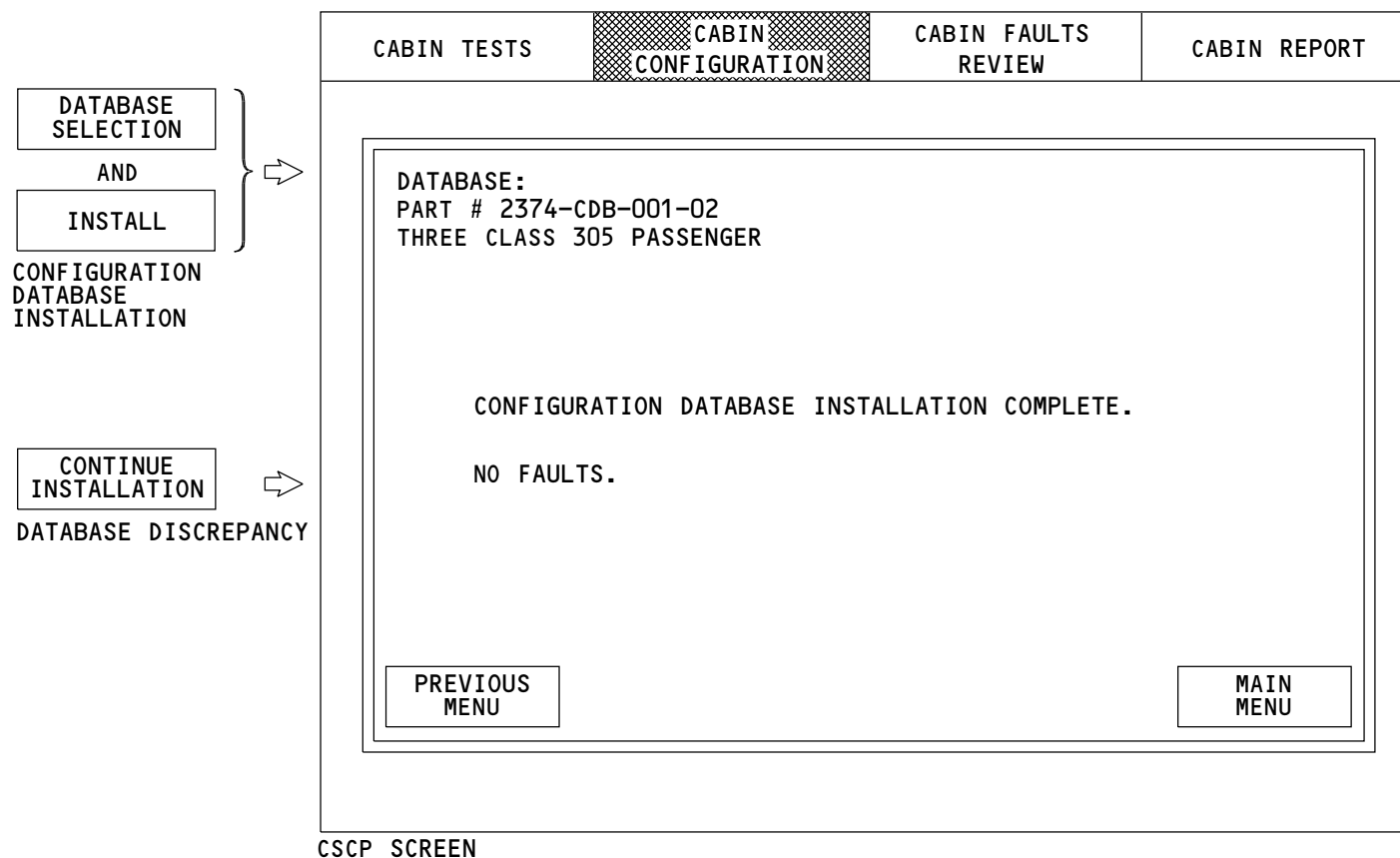
The center of the window shows you that the database is complete and there were no faults.

Touch PREVIOUS MENU to show the cabin configuration menu.

Touch MAIN MENU to show the cabin maintenance main menu screen.

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M40150 S000616107_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE INSTALLATION COMPLETE

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CSS TEST AND SOFTWARE INSTALLATION - INSTALLATION FAULT RESULTS

General

This screen automatically shows when you install a configuration database and there are failures.

Access

Touch these selections to show the configuration database installation fault results screen:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION DATABASE INSTALLATION on the cabin configuration menu
- Select a database on the configuration database installation screen and touch INSTALL.

This screen shows automatically at the end of the installation. It also shows after you touch CLEAR SCREEN on the operational program software conflict screen.

Controls and Indications

These are the three parts of the screen:

- Installation conditions
- Maintenance message data
- Selection controls.

Installation Conditions

The test conditions part of the screen shows this test data:

- The configuration database part number installed at the time of the installation.
- The date and time of the installation.
- The sequence of each maintenance message in the list of messages.

There is a HELP selection on the left. Touch HELP for information on how to use the screen.

Maintenance Message Data

Each page shows one maintenance message. The maintenance message shows data about each failure. There are three parts to the maintenance message:

- Fault description
- Maintenance message number
- Recommended maintenance action.

The fault description identifies the failure condition detected by the installation. It also identifies the component that found the fault.

You use the maintenance message number to find the corrective action in the fault isolation manual (FIM).

The recommended maintenance action identifies all the possible components or conditions that could cause the fault. The most probable cause shows first and the least probable cause shows last.

Each screen shows one maintenance message. Use the up and down arrows at the far right of the screen to show the previous or next message. The square on the scroll bar shows your position in the message list.

Selection Controls

To show a visual reference of the defective component, touch SHOW LOCATION.

To show the components controlled by the defective component, touch UNIT USAGE.

Touch PREVIOUS MENU to show the cabin configuration menu.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a diskette in the CSCP disk drive.

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CSS TEST AND SOFTWARE INSTALLATION - INSTALLATION FAULT RESULTS

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE ALL to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the printer for a paper copy.

Touch MAIN MENU to show the cabin maintenance menu.

ARO ALL	EFFECTIVITY

INSTALLATION COMPLETE
WITH FAILURES
FOUND

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
CONFIGURATION DATABASE INSTALLATION FAULT RESULTS HELP DATABASE PART # 2374-CDB-001-01 INSTALL DATE: 01JUN95 INSTALL TIME: 08:05Z FAULT NUMBER: 1 OF 1 OVERHEAD ELECTRONICS UNIT (OEU) 3-3-8 PROGRAM LINE OUTPUT CIRCUIT IS OPEN. DETECTED BY: OVERHEAD ELECTRONICS UNIT (OEU) 3-3-8 MAINTENANCE MESSAGE: 23-03429 RECOMMENDED MAINTENANCE ACTION: POSSIBLE CAUSES: - OVERHEAD ELECTRONICS UNIT (OEU) 3-3-8 LOCATED AT: SEAT 38F, RIGHT PASSENGER SERVICE UNIT (PSU) - OVERHEAD ELECTRONICS UNIT (OEU) 3-3-7 LOCATED AT: SEAT 36F, RIGHT PASSENGER SERVICE UNIT (PSU) - WIRING			

CSCP SCREEN

M40151 S000616108_V1

CSS TEST AND SOFTWARE INSTALLATION - INSTALLATION FAULT RESULTS

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CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE MANAGEMENT MENU

General

You use this screen to install and remove software programs from the cabin system control panel (CSCP) memory. You also use it to install operational data in LRUs.

Access

Touch these selections to show the software management menu:

- CABIN CONFIGURATION on any cabin maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu.

Controls and Indications

Touch OPERATIONAL PROGRAM SOFTWARE INSTALLATION to install LRU operational programs from the CSCP memory. One of these screens shows after you touch the selection:

- The operational program software installation menu if there are no failures
- An intrusive function not available dialogue window if the airplane is not in the correct condition for an installation
- A breakers/buses off dialogue window to show any open CSS circuit breakers or power buses that are off
- The OMS report is processing dialogue window if the onboard maintenance system has requested information from the CCP.

ARO 001-015 PRE SB 777-23-0369

Touch LIST OF FILES ON FLOPPY DISKETTE to show a list of the files on a floppy diskette in the CSCP disk drive. If you did not put the diskette in the disk drive, a dialogue window will tell you to do so.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch LIST OF FILES ON USB MEMORY show a list of the files on a USB drive in the CSCP USB ports. If you did not put the USB drive in the USB ports, a dialogue window will tell you to do so.

ARO 001-015 PRE SB 777-23-0369

Touch INSTALL DATABASE FROM FLOPPY DISK DRIVE to install a configuration database from a diskette into CSCP memory. A screen shows to tell you that the data installation is operating.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch MASS STORAGE MANAGEMENT to display a list of all databases and operational programs on the CSCP mass storage device, and be able to delete individual parts.

ARO 001-015 PRE SB 777-23-0369

Touch DISK MAINTENANCE to show a disk maintenance menu. This lets you remove configuration databases from the CSCP memory.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SOFTWARE IN MASS STORAGE to see the software files in the CSCP mass storage.

ARO ALL

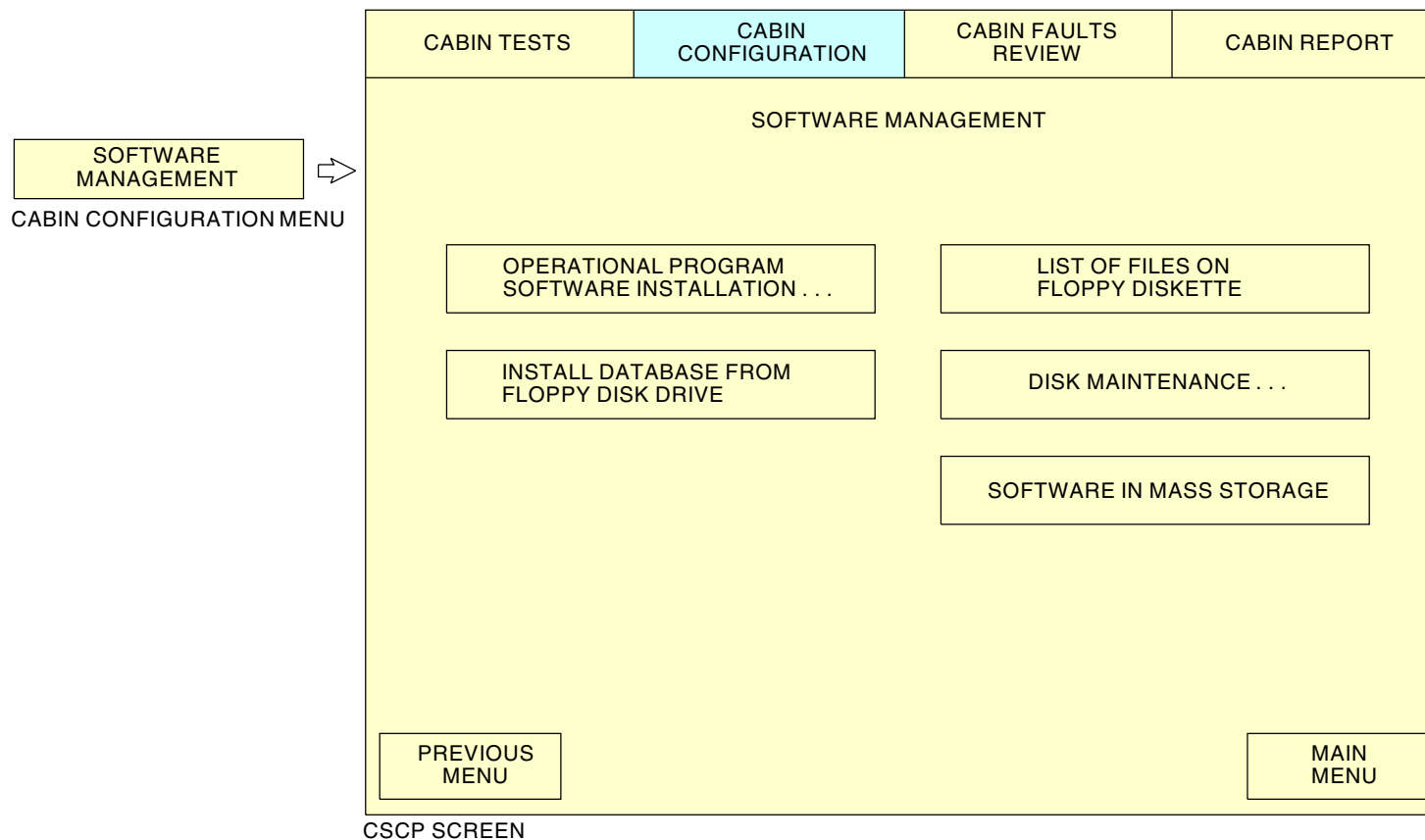
Touch PREVIOUS MENU at the bottom of the screen to return to the cabin configuration menu. Touch MAIN MENU to return to the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE MANAGEMENT MENU

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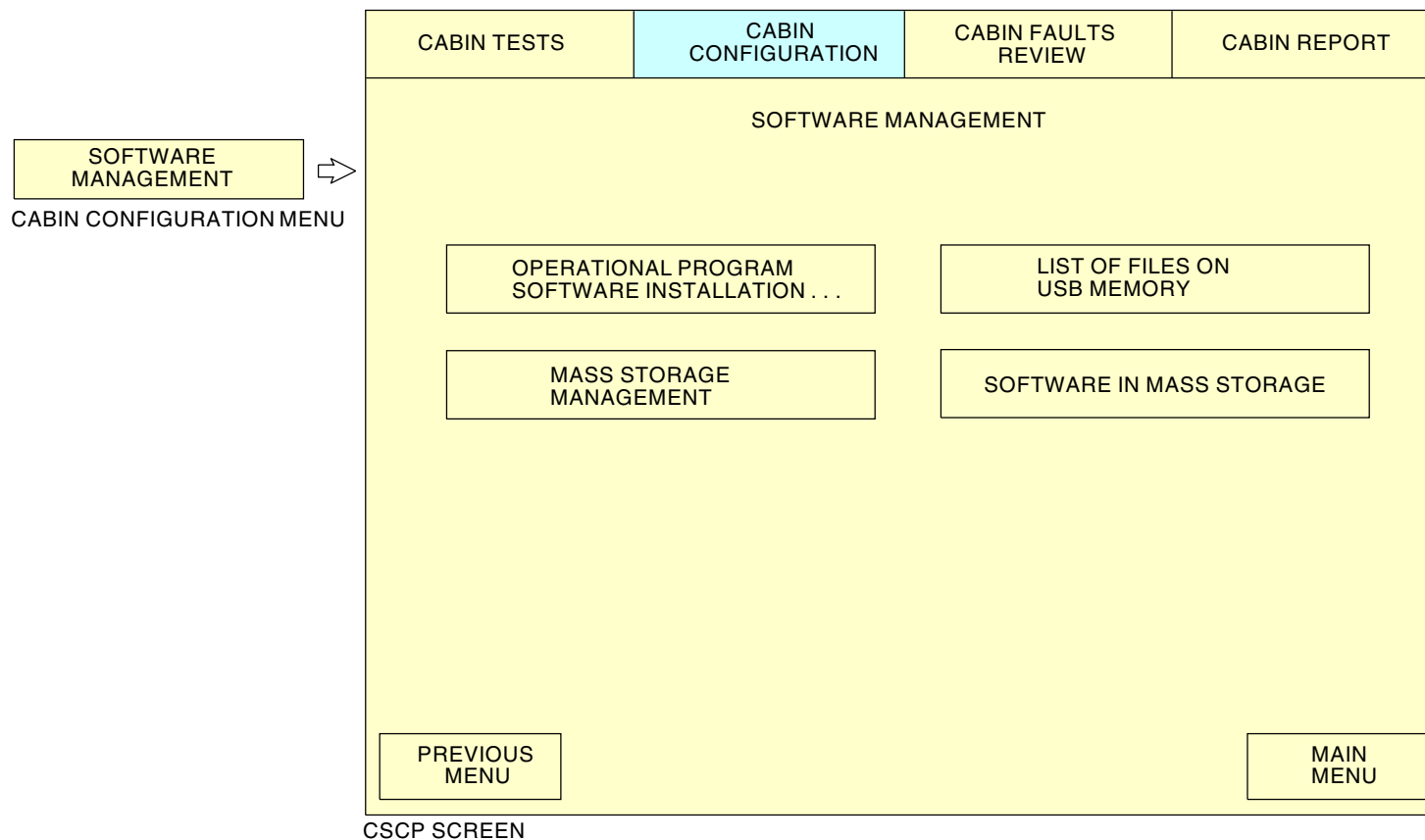
23-39-01

EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

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CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE MANAGEMENT MENU

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**CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION MENU****General**

You use the operational program software installation menu to install operational program software in CSS LRUs. The cabin system control panel (CSCP) mass storage keeps the operational programs.

Access

Touch these selections to show this menu:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch OPERATIONAL PROGRAM SOFTWARE INSTALLATION on the software management menu.

Controls and Indications

Touch any one of the LRU selections to start installation of the related operational software. The operational program software installation screen for that LRU will show to let you install the program.

A screen may show to tell you that an LRU that controls the LRU you selected does not have its operational software installed.

Touch PREVIOUS MENU to go to the software management menu.

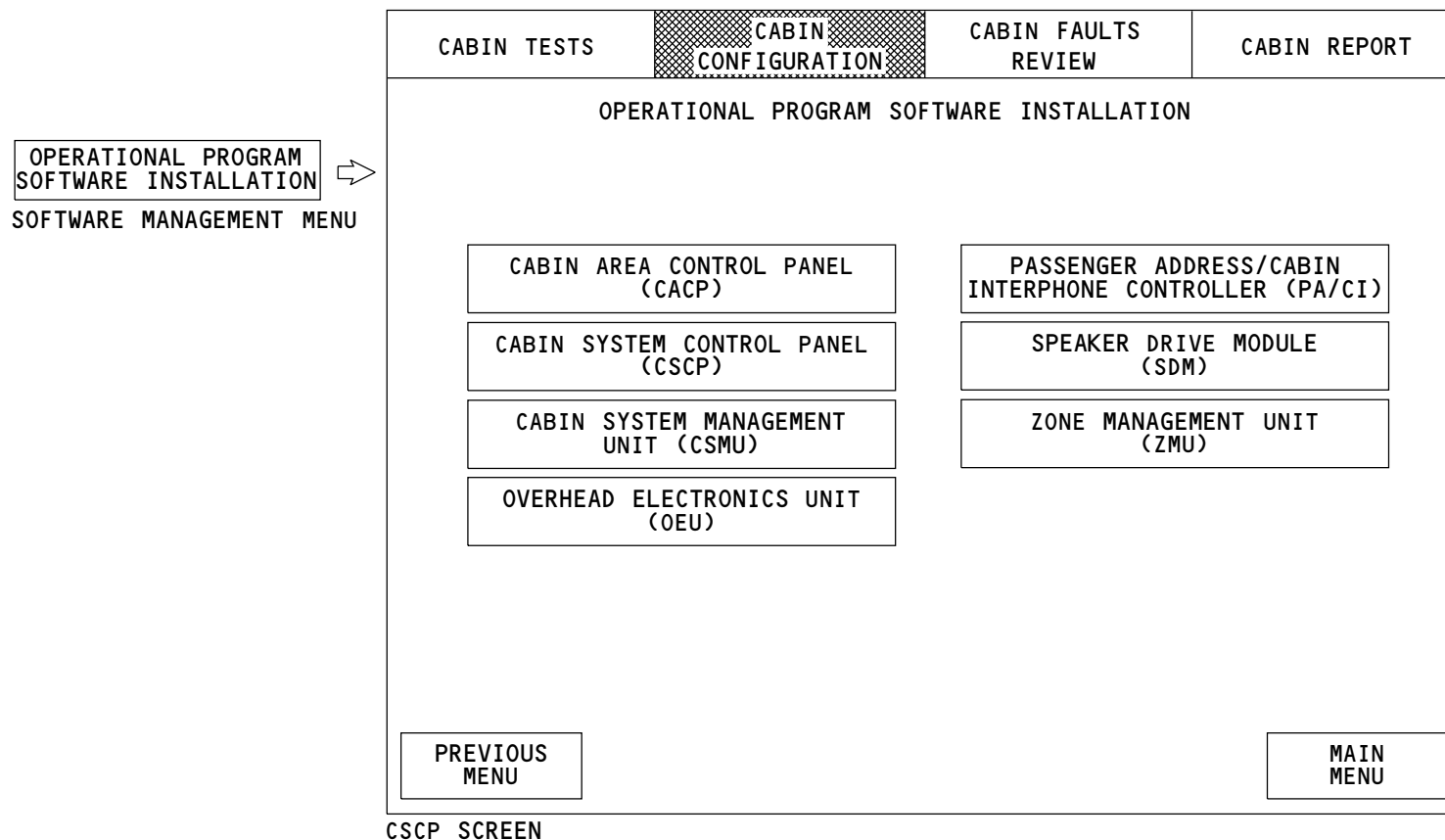
Touch MAIN MENU to go to the cabin maintenance main menu.

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M40154 S000616111_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION MENU

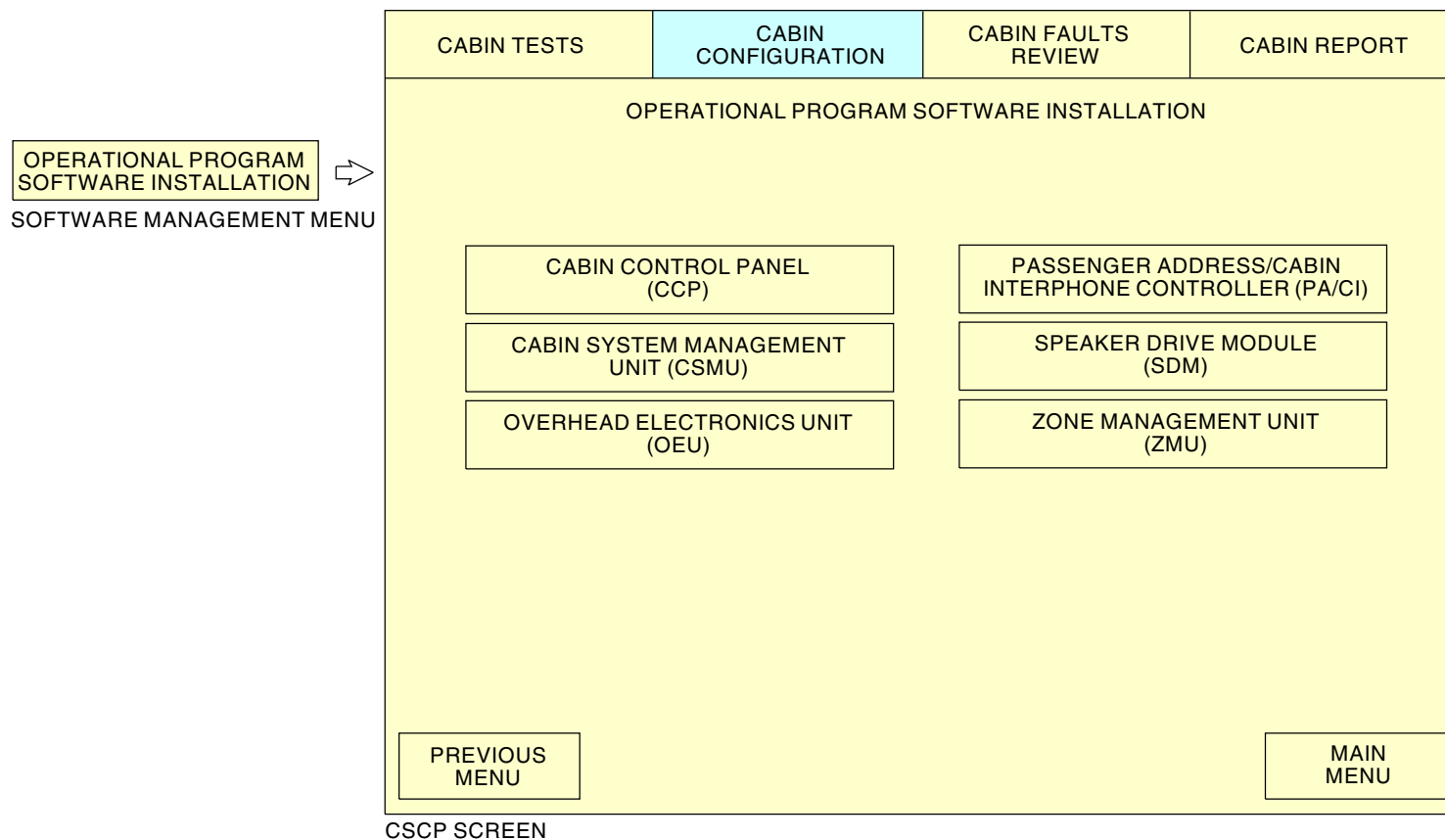
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EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

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2560840 S0000611028_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION MENU

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ARO 016-999; ARO 001-015 POST SB 777-23-0369

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CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION SCREEN

General

Use this screen to select and install operational program software in LRUs. The diagram shows a typical installation screen for an overhead electronics unit (OEU). Other LRU screens are similar.

Access

Touch these selections to show the operational program software installation screen:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- OPERATIONAL PROGRAM SOFTWARE INSTALLATION on the software management menu.
- Touch any LRU selection on the operational program software installation menu.

Controls and Indications

The selected LRU shows in the screen title.

Use the up and down arrows on the left side of the screen to select applicable hardware part numbers.

Each hardware part number has a list of related software part numbers. The recommended software part number for the LRU automatically shows green when the screen first comes on. Touch any of the software part numbers to select them. You can select only one software part number for each LRU part number.

Use the up and down arrows on the right side of the screen to scroll through the software part numbers.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to return to the operational program software installation menu
- INSTALL - to install the operational program software you selected on the screen

ARO 001-015 PRE SB 777-23-0369

- SAVE - to save the entire list of hardware and software part numbers to a CSCP floppy diskette

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE - save the entire list of hardware and software part numbers to the USB drive in the CSCP ports.

ARO ALL

- PRINT - to print the entire list of hardware and software part numbers to the cabin printer
- MAIN MENU - to return to the cabin maintenance main menu.

If the software you select is not the recommended part number, a preferred software dialogue window shows when you touch INSTALL. If there are no problems, a normal installation dialogue window shows.

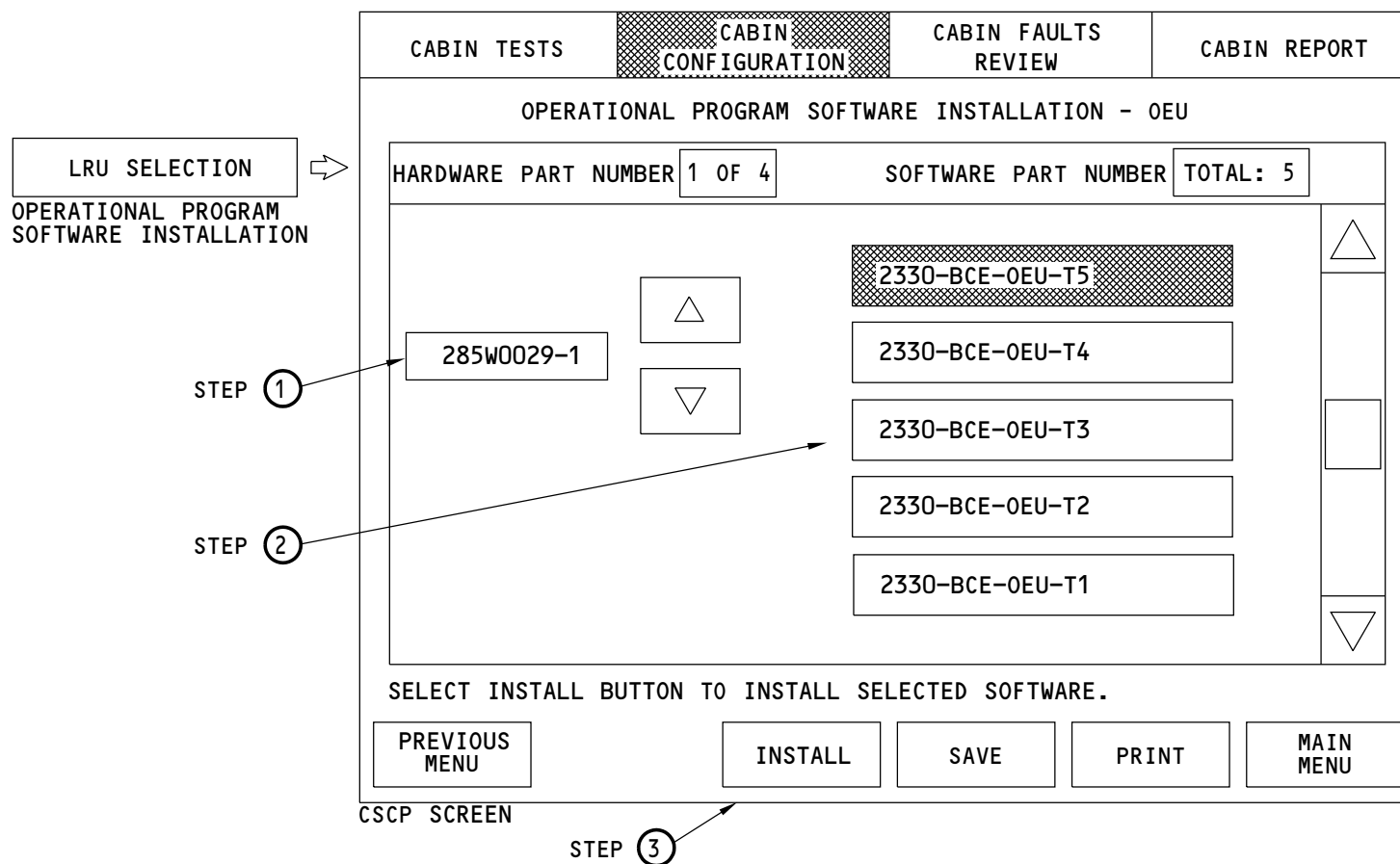
ARO 016-999; ARO 001-015 POST SB 777-23-0369**Training Information Point**

You will save a significant amount of time by following the steps to complete phase 1 load and phase 2 load of CCP operational program software (OPS) to each cabin area control panel (CACP) by directly connecting the maintenance laptop (ML) to each CACP.

ARO ALL**23-39-01**EFFECTIVITY
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CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - PREFERRED SOFTWARE DIALOGUE WINDOW****General**

This screen shows if you install operational software and did not select the recommended software part numbers for an LRU.

Access

This screen shows if you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch OPERATIONAL PROGRAM SOFTWARE INSTALLATION on the software management menu.
- Touch any LRU selection on the operational program software installation menu
- Select any software part number on the operational program software installation screen that does not show green when the screen first comes into view and touch INSTALL.

Controls and Indications

Touch CONTINUE INSTALLATION to install the operational program software. A window shows to tell you that the software installation is operating.

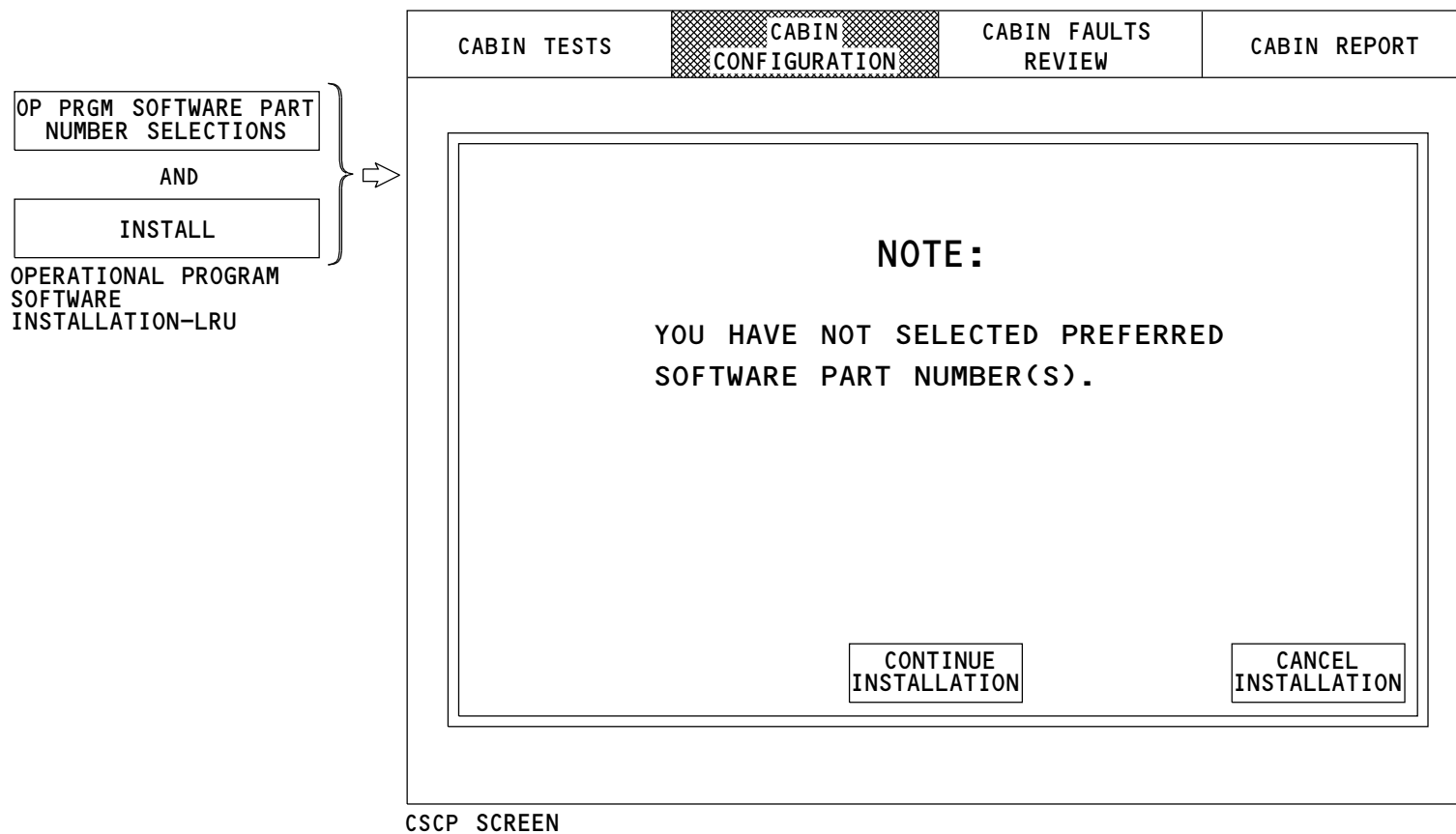
Touch CANCEL INSTALLATION to stop the installation and return to the operational program software installation screen for the LRU.

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CSS TEST AND SOFTWARE INSTALLATION - PREFERRED SOFTWARE DIALOGUE WINDOW

M40156 S000616113_V2

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**CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION IS OPERATING****General**

This screen shows when you install operational software.

Access

This screen shows when you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch OPERATIONAL PROGRAM SOFTWARE INSTALLATION on the software management menu.
- Touch any LRU selection on the operational program software installation menu
- Select the software part number on the operational program software installation screen and touch INSTALL.

This screen also shows when you select the recommended software part numbers and touch INSTALL on the operational program software installation screen for an LRU.

This screen will show when you select CONTINUE INSTALLATION from the preferred software dialogue window.

Controls and Indications

The center of the window shows you that the operational software is being installed and the elapsed time.

Touch STOP INSTALLATION to cancel the operational program software installation. A window shows you that stopping the installation may stop the system operation.

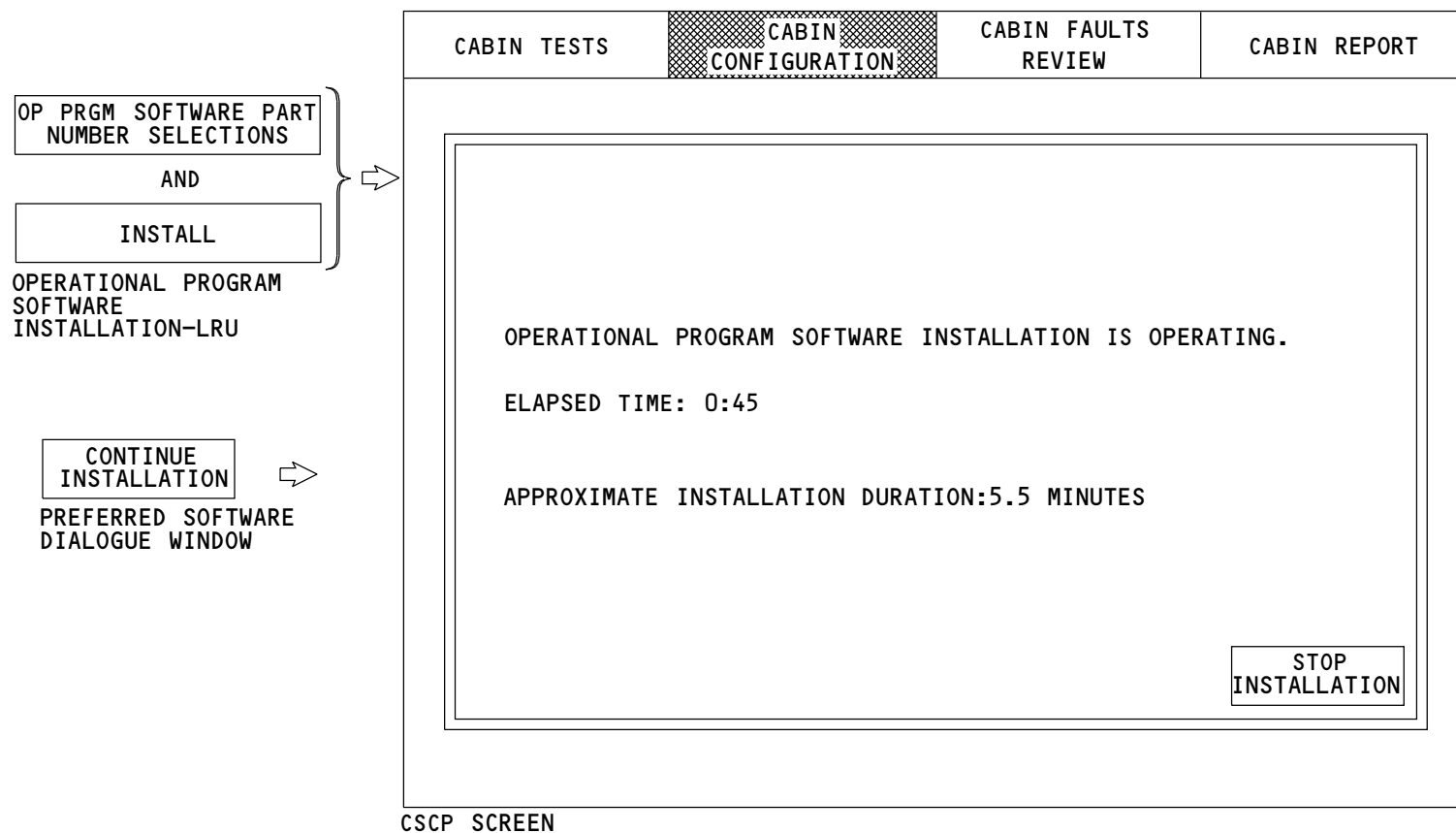
When the installation is done, one of two screens shows. The operational program software installation complete screen shows if there were no faults. The database installation fault results screen shows if there were faults. The installation fault results screen is the same as the one for the configuration database installation.

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M40157 S000616114_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION IS OPERATING

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**CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION STOP****General**

The operational program software installation stop screen shows if you cancel installation of an operational program.

Access

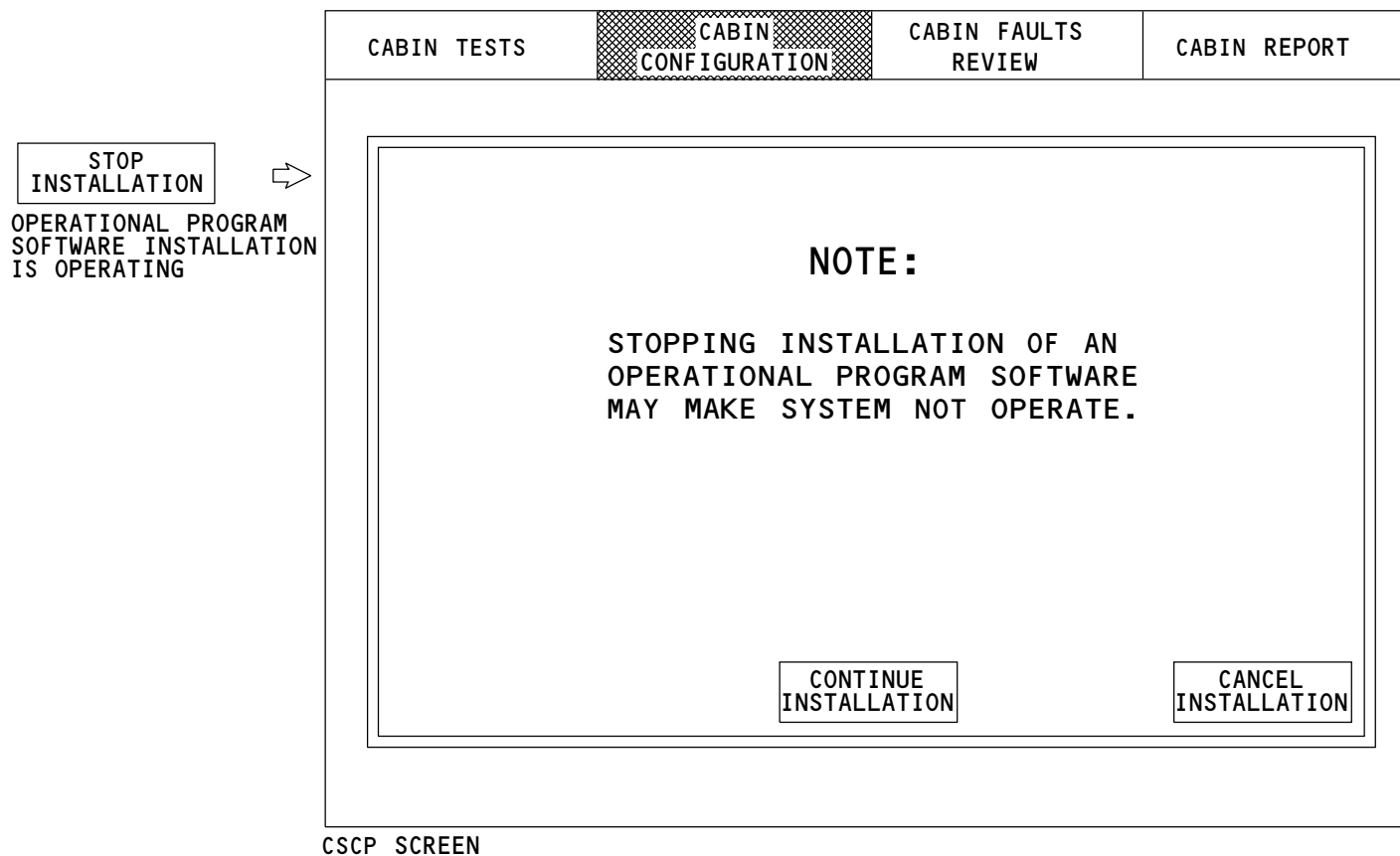
This screen shows when you touch STOP INSTALLATION on the installation is operating screen.

Controls and Indications

The message tells you that if you cancel the installation, the CSS may not operate.

Touch CONTINUE INSTALLATION to install the remaining part of the operational program and show the normal installation is operating dialogue screen.

Touch CANCEL INSTALLATION to stop the installation. A screen shows to tell you that the installation is being stopped. After the installation stops, the install database dialogue window shows.



M40158 S000616115_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION STOP

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**CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION IS COMPLETE****General**

This screen automatically shows when you install operational software and there are no failures.

Access

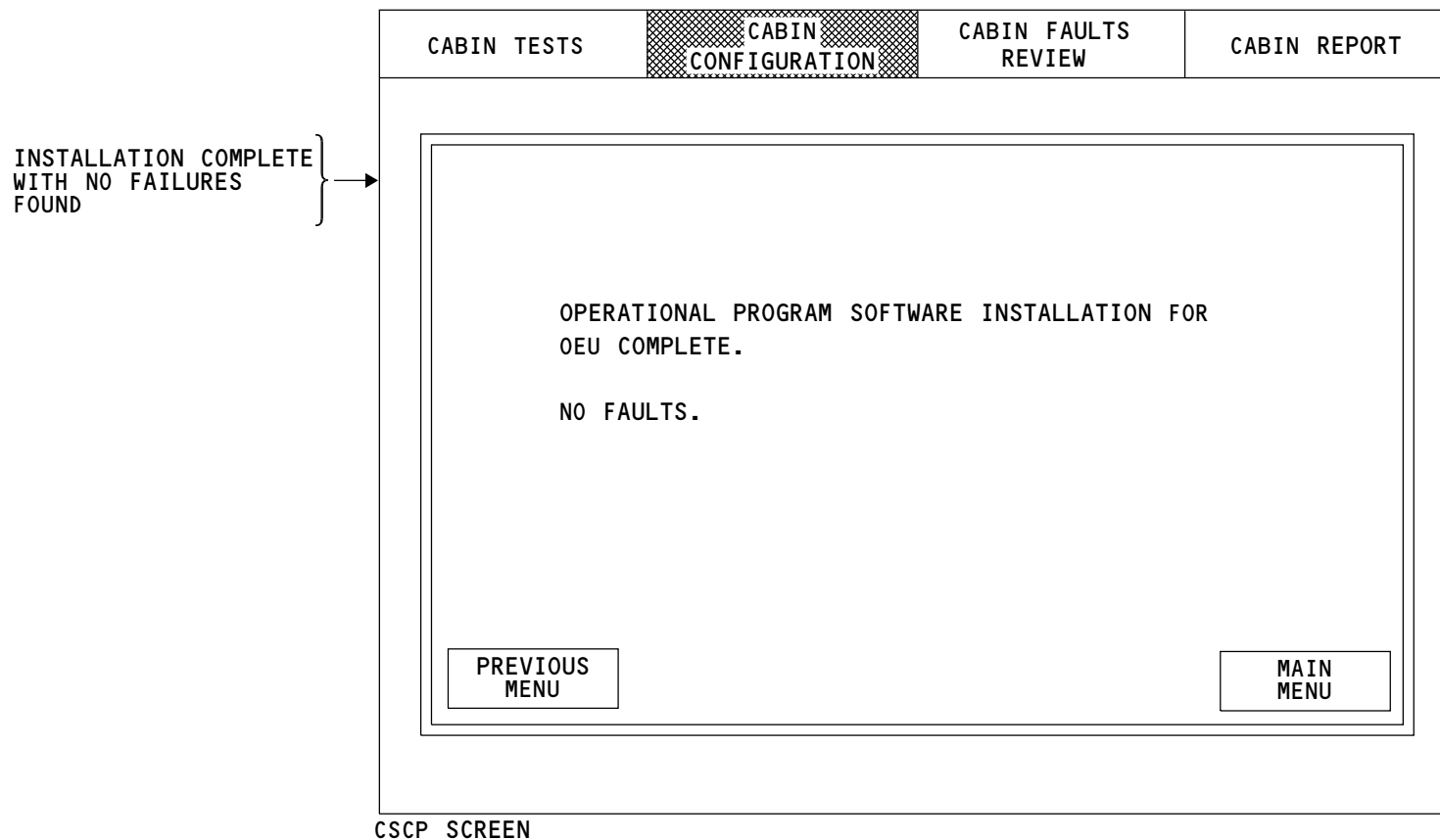
This screen shows when you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch OPERATIONAL PROGRAM SOFTWARE INSTALLATION on the software management menu
- Touch any LRU selection on the operational program software installation menu
- Select the software part number on the operational program software installation screen and touch INSTALL.

This screen shows automatically at the end of the installation.

Controls and Indications

When you touch PREVIOUS MENU or MAIN MENU, another dialogue window shows to tell you to install the configuration database.



M40159 S000616116_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE INSTALLATION IS COMPLETE

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**CSS TEST AND SOFTWARE INSTALLATION - INSTALL DATABASE DIALOGUE WINDOW****General**

The install database dialogue window tells you to install the configuration database after you have installed any necessary operational program software.

Access

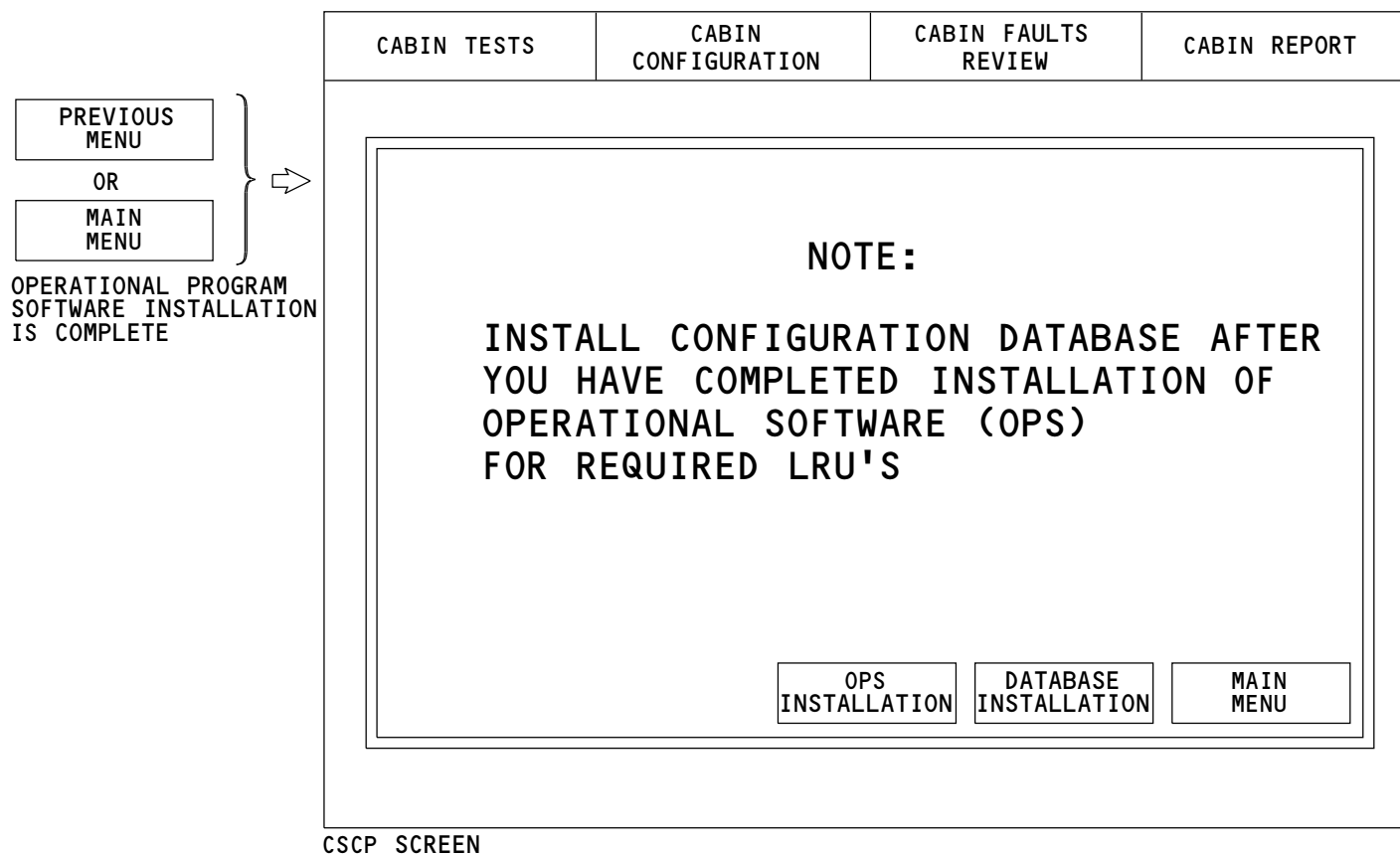
This screen shows automatically when you select PREVIOUS MENU or MAIN MENU on the operational program software installation is complete screen.

Controls and Indications

Touch any of these selections at the bottom of the screen to do the related function:

- OPS INSTALLATION - to return to the operational program software installation menu
- DATABASE INSTALLATION - to show the configuration database installation screen
- MAIN MENU - to return to the cabin maintenance main menu.

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CSS TEST AND SOFTWARE INSTALLATION - INSTALL DATABASE DIALOGUE WINDOW

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CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE INSTALLATION FUNCTIONAL DESCRIPTION

General

Software controls all cabin services system (CSS) functions. A configuration database and operational program software for the LRUs control the different systems that use the CSS.

The configuration database tells the CSS the cabin layout and customer options. Programmers use a configuration database generator on a computer to write this software. These are some of the items the configuration database identifies:

- Call light assignments
- Passenger information sign control
- The number and configuration of LRUs in the CSS
- Passenger address configuration
- Chime types and assignments
- Cabin interphone configuration.

Software Installation

ARO 001-015 PRE SB 777-23-0369

The mass memory card in the cabin system control panel (CSCP) has all of the software programs. You use screens on the CSCP to install the configuration database and operational program software in CSS LRUs. These CSS components require the configuration database for operation:

ARO 016-999; ARO 001-015 POST SB 777-23-0369

The mass storage device in the cabin system control panel (CSCP) has all of the software programs. You use screens on the CSCP to install the configuration database and operational program software in CSS LRUs. These CSS components require the configuration database for operation:

ARO ALL

- Cabin system control panel (CSCP)
- Cabin system management unit (CSMU)
- Passenger address/cabin interphone (PA/CI) controller

- Speaker drive modules (SDMs)
- Cabin area control panel (CACP)
- Zone management units (ZMUs)
- Overhead electronics units (OEUs).

Token Process

The PA/CI controller and ZMUs each use a data bus to load the SDMs and OEUs. The PA/CI controller and the ZMUs use a token signal to start the sequence of data installation to these LRUs.

The token process enables each LRU to accept the data it needs. You start the token process when you install a configuration database or operational program software from the CSCP.

The PA/CI controller and the ZMUs send a token to the first LRU in each column. When the first LRU reads and accepts its data, it passes the token to the second LRU. When all the LRUs receive the token and accept their data, the token process is complete.

Configuration Database

You must install the configuration database after you replace any of these LRUs:

- CSCP
- CACPs
- CSMU
- ZMUs
- PA/CI controller
- SDMs
- OEUs.

You also install the configuration database if you install operational program software. Use screens on the CSCP to start the configuration database installation.

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**CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE INSTALLATION FUNCTIONAL DESCRIPTION**

The CSCP sends configuration data to these components in this order:

- CSCP
- CSMU
- ZMUs (in sequence)
- PAC (normal)
- SDMs
- CIC (normal)
- PAC (alternate)
- CIC (alternate)
- CACPs (in sequence)
- OEUs (by zone).

The LRU sends failure data back to the CSMU. The CSMU sends the failure data to the CSCP display.

After the data load, the LRU re-initializes itself and returns to normal operations.

Operational Program Software

Use the CSCP to start the operational program software installation. You can install data in only one LRU type at a time. Each LRU type has its own screen for you to select software part numbers.

The CSCP uses a panel bus to send data to the CSMU. The CSMU checks the operational program software to see where to send it. The CSMU puts it on the intersystem (I/S) bus for the other LRUs.

The PA/CI controller looks at the data on the bus to see if it is for itself or for the SDMs. If the data is for any of the SDMs, the PA/CI controller temporarily keeps the data in its random access memory (RAM). The PA/CI controller uses a data bus to send operational program software to all SDMs in a column at the same time. Each SDM makes a decision to install the data in its non-volatile memory (NVM).

Each ZMU does a check of the data to see if it is for itself or any of its OEUs or the CACP. Data loads to the OEUs or the CACP are almost the same as for the SDMs.

At the start of the installation, each LRU of the type you select does a check of its software part number to see if it already has the software in NVM. If it does not or if the software is failed, the LRU puts the data in NVM.

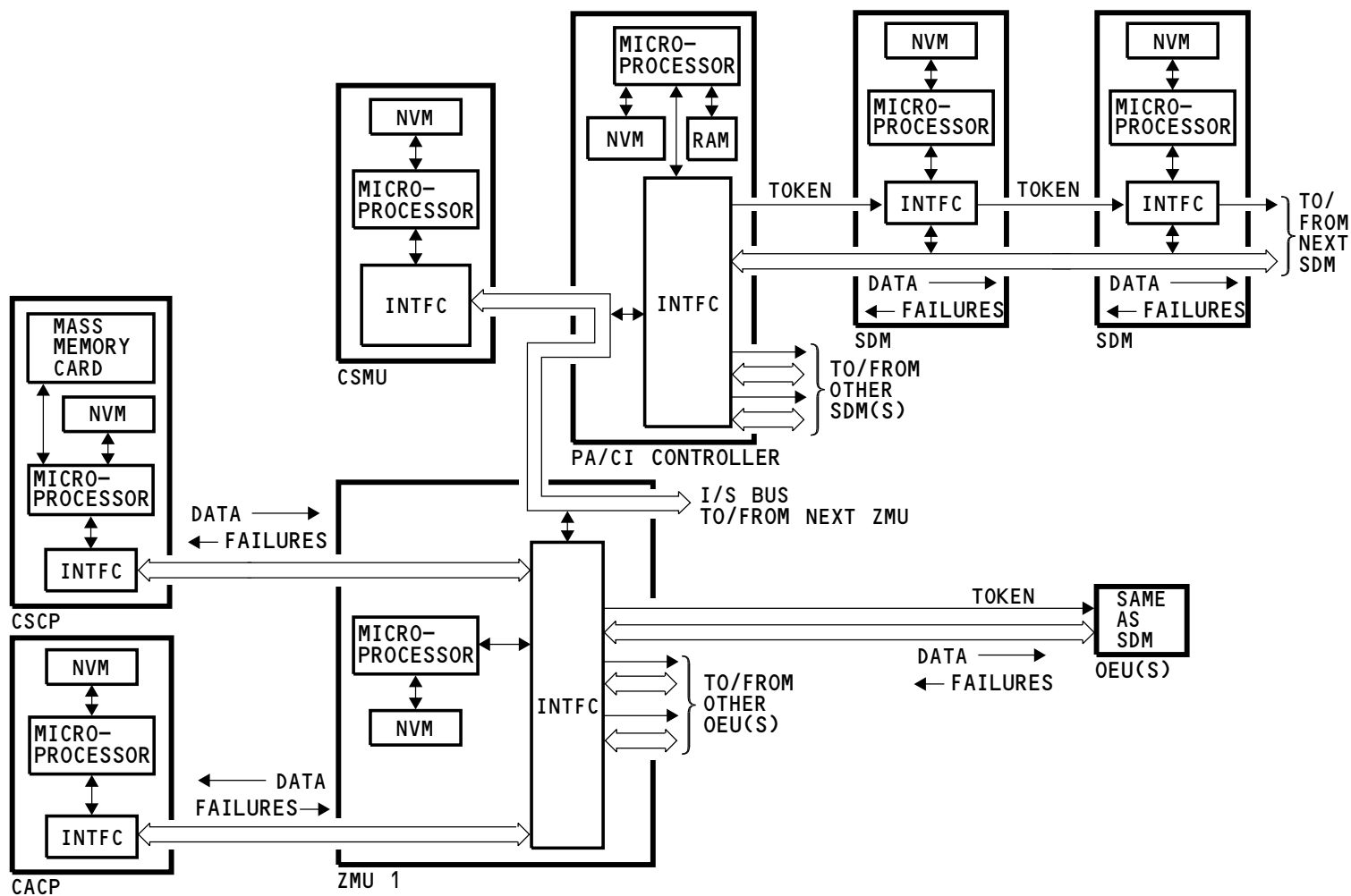
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M39456 S000616118_V2

CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE INSTALLATION FUNCTIONAL DESCRIPTION

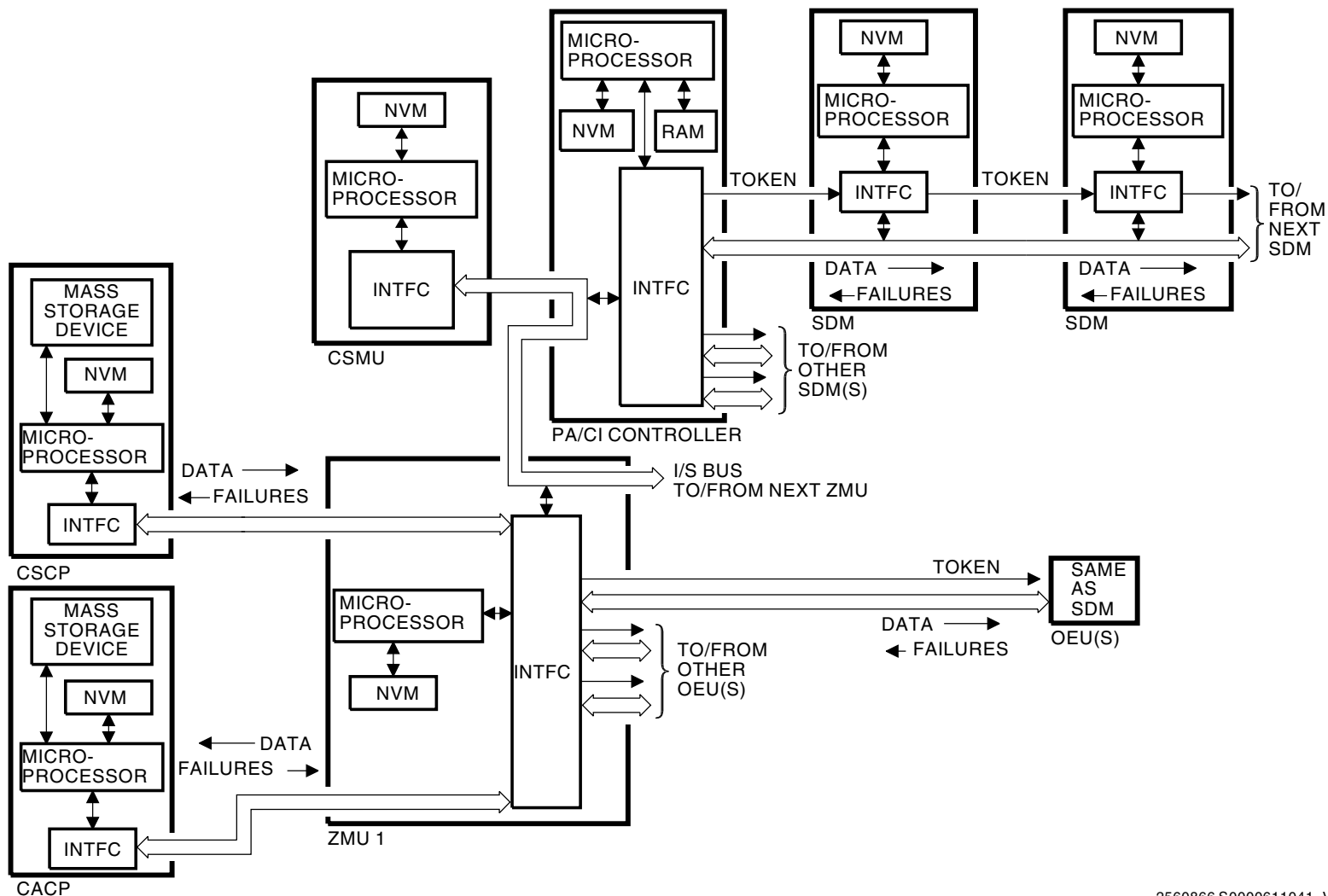
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2560866 S0000611041_V1

CSS TEST AND SOFTWARE INSTALLATION - SOFTWARE INSTALLATION FUNCTIONAL DESCRIPTION

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**CSS TEST AND SOFTWARE INSTALLATION - LIST OF FILES ON FLOPPY DISKETTE****General**

This screen shows you a list of files on a floppy diskette installed in the cabin system control panel (CSCP) disk drive.

Access

Touch these selections to see the software files of a floppy diskette:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- LIST OF FILES ON FLOPPY DISKETTE on the software management menu.

An insert diskette dialogue window may show if you did not put a diskette in the disk drive.

Controls and Indications

The screen shows an alphabetical list of files on the diskette. It also shows the size of each file and the date of the last change. When the list has more than eleven files, you use the up and down arrows at the right of the screen to scroll through the list.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to go to the software management menu
- SAVE - to save the screen data to a floppy diskette in the CSCP disk drive
- PRINT - to print the screen data to the cabin printer
- MAIN MENU - to go to the cabin maintenance main menu.

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LIST OF FILES ON FLOPPY DISKETTE
SOFTWARE MANAGEMENT MENU

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT						
LIST OF FILES ON FLOPPY DISKETTE									
<table border="1"> <thead> <tr> <th>FILE NAME</th> <th>SIZE</th> <th>LAST MODIFIED DATE</th> </tr> </thead> <tbody> <tr> <td>2374CDG00101.CXY</td> <td>1250124</td> <td>01MAY96</td> </tr> </tbody> </table>				FILE NAME	SIZE	LAST MODIFIED DATE	2374CDG00101.CXY	1250124	01MAY96
FILE NAME	SIZE	LAST MODIFIED DATE							
2374CDG00101.CXY	1250124	01MAY96							
PREVIOUS MENU	SAVE	PRINT	MAIN MENU						

CSCP SCREEN

M40160 S000616120_V2

CSS TEST AND SOFTWARE INSTALLATION - LIST OF FILES ON FLOPPY DISKETTE

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**CSS TEST AND SOFTWARE INSTALLATION - LIST OF FILES ON USB MEMORY****General**

This screen shows you a list of files on a USB drive installed in the cabin system control panel (CSCP) USB ports.

Access

Touch these selections to see the software files of a USB drive:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- LIST of FILES ON USB MEMORY on the software management menu

An insert USB drive dialogue window may show if you did not put a USB drive in a CSCP USB port.

Controls and Indications

This screen shows an alphabetical list of files on the USB drive. It also shows the size of each file and the date of the last change. When the list has more than eleven files, you use the up and down arrows at the right of the screen to scroll through the list.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to go to the software management menu
- SAVE - to save the screen data to a USB drive in the CSCP USB ports
- PRINT - to print the screen data to the cabin printer
- MAIN MENU - to go to the cabin maintenance main menu.

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LIST OF FILES ON
USB MEMORY
SOFTWARE MANAGEMENT
MENU

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT						
LIST OF FILES ON USB MEMORY									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">FILE NAME</th> <th style="width: 20%;">SIZE</th> <th style="width: 47%;">LAST MODIFIED DATE</th> </tr> </thead> <tbody> <tr> <td>2374CDG00101.CXY</td> <td>1250124</td> <td>01MAY96</td> </tr> </tbody> </table>				FILE NAME	SIZE	LAST MODIFIED DATE	2374CDG00101.CXY	1250124	01MAY96
FILE NAME	SIZE	LAST MODIFIED DATE							
2374CDG00101.CXY	1250124	01MAY96							
PREVIOUS MENU SAVE PRINT MAIN MENU									

CSCP SCREEN

2560842 S0000611086_V1

CSS TEST AND SOFTWARE INSTALLATION - LIST OF FILES ON USB MEMORY

23-39-01

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE MAXIMUM NUMBER****General**

This screen may show automatically when you install data from a floppy diskette to the cabin system control panel (CSCP) memory.

This screen shows only if there are six databases in memory and the data on the diskette is a configuration database.

Access

This screen may show when you make these selections:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- INSTALL DATA FROM CSCP DISK DRIVE on the software management menu.

Controls and Indications

The top part of the screen shows the part number of the configuration database on the floppy diskette.

The center part of the screen shows a list of the databases in the CSCP memory. It also shows the currently installed database. Use the up and down arrows at the right of the list to scroll through the list.

To install the database from the floppy diskette, touch one of the configuration databases in the list and then touch OVERWRITE at the bottom of the screen. The overwriting configuration database window shows to permit you to cancel the operation or to continue.

Touch these other selections at the bottom of the screen to do the related function:

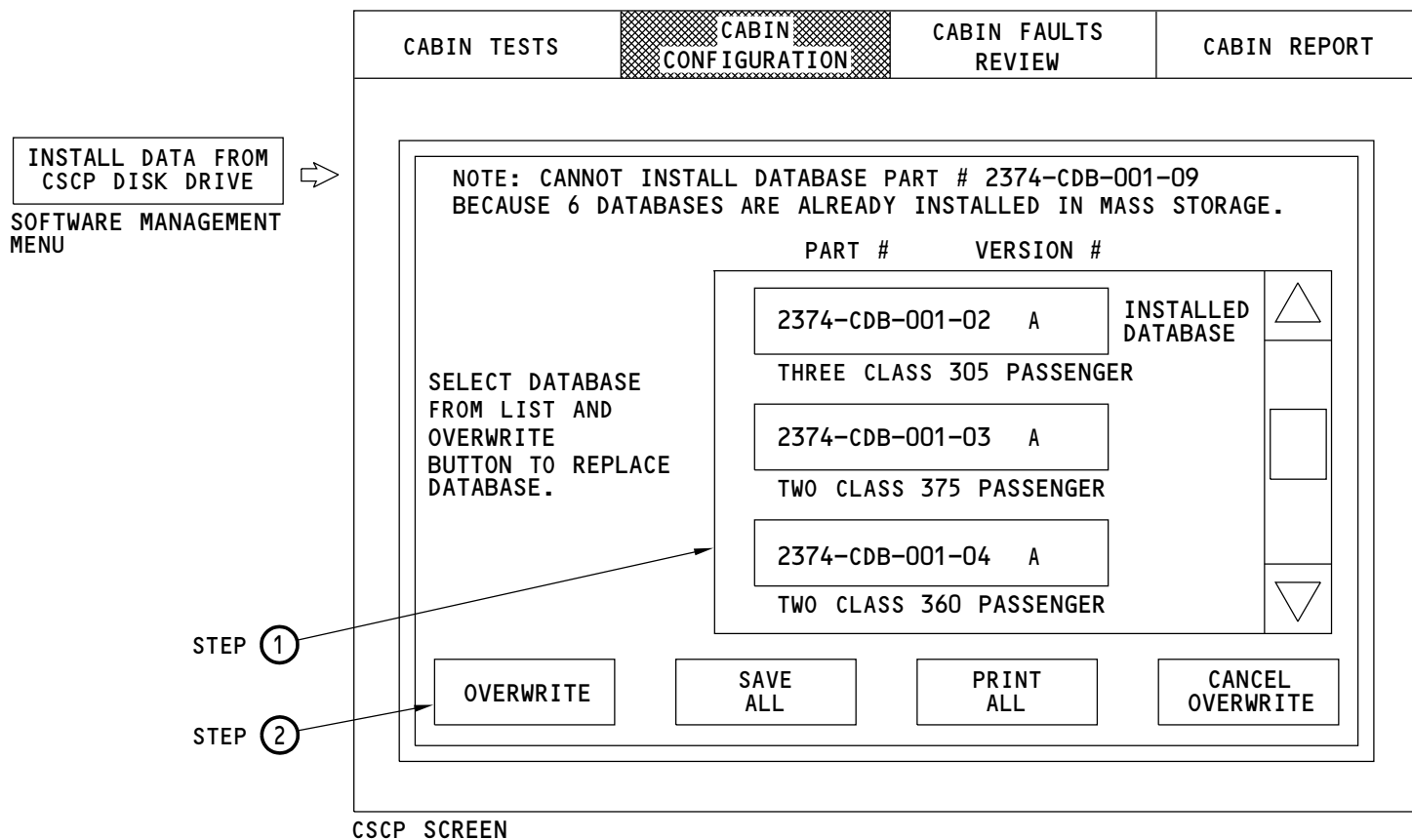
- SAVE - to save the screen data to a floppy diskette
- PRINT - to print the screen data to the cabin printer
- CANCEL OVERWRITE - to return to the software management menu.

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M40161 S000616121_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE MAXIMUM NUMBER

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**CSS TEST AND SOFTWARE INSTALLATION - OVERWRITING CONFIGURATION DATABASE DIALOGUE WINDOW****General**

This screen shows automatically when you need to replace a configuration database in the cabin system control panel (CSCP) memory with one from a floppy disk.

Access

This screen shows if you make these selections:

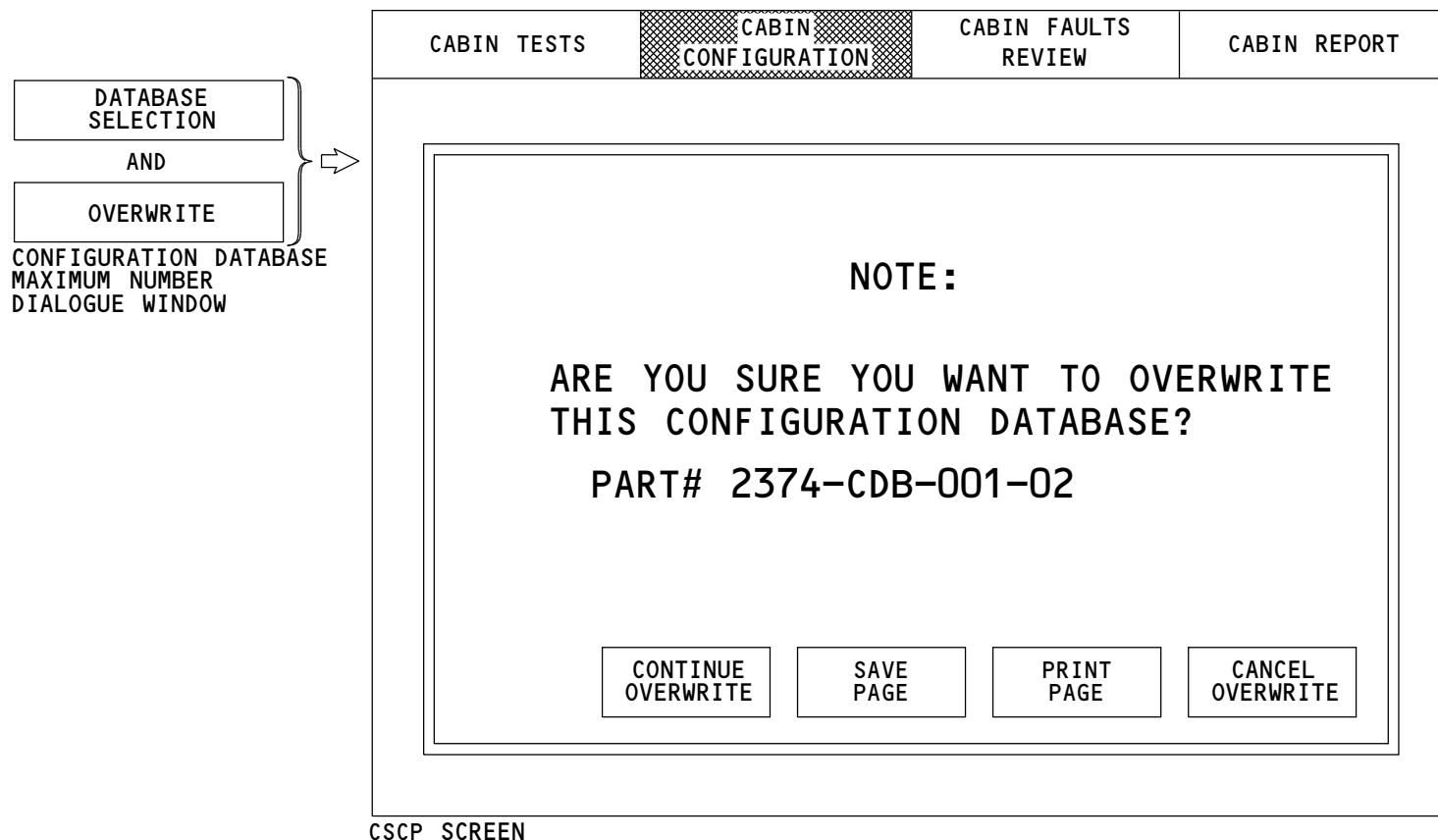
- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch INSTALL DATA FROM FLOPPY DISK DRIVE on the software management menu
- Select any database on the configuration database maximum number dialogue window and touch OVERWRITE.

Controls and Indications

The screen shows the part number of the database you selected to overwrite.

Touch one of these selections at the bottom of the screen to do the related function:

- CONTINUE OVERWRITE - to delete the selection and replace it with the configuration database on the floppy disk
- SAVE PAGE - to store the screen data to floppy diskette
- PRINT PAGE - to print the screen data on the cabin printer
- CANCEL OVERWRITE - to cancel overwriting and return to the configuration database maximum number dialogue window.



M40162 S000616122_V2

CSS TEST AND SOFTWARE INSTALLATION - OVERWRITING CONFIGURATION DATABASE DIALOGUE WINDOW

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**CSS TEST AND SOFTWARE INSTALLATION - DATA INSTALLATION IS OPERATING FROM DISK DRIVE****General**

This screen shows automatically when you install data from a floppy diskette to the cabin system control panel (CSCP) memory.

Access

Touch these selections to show the data installation is operating from disk drive screen:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- INSTALL DATA FROM FLOPPY DISK DRIVE on the software management menu.

Controls and Indications

The screen shows you the part number of the diskette in the disk drive. It also shows if the diskette is one of a number of diskettes in a set.

The elapsed time shows during the installation.

Touch STOP INSTALLATION to stop the installation of the data and return to the software management menu.

When the installation is complete, an insert next diskette dialogue window may show if it is necessary to use more than one diskette to install the data.

After you load all of the necessary data, a screen shows to tell you the installation is complete.

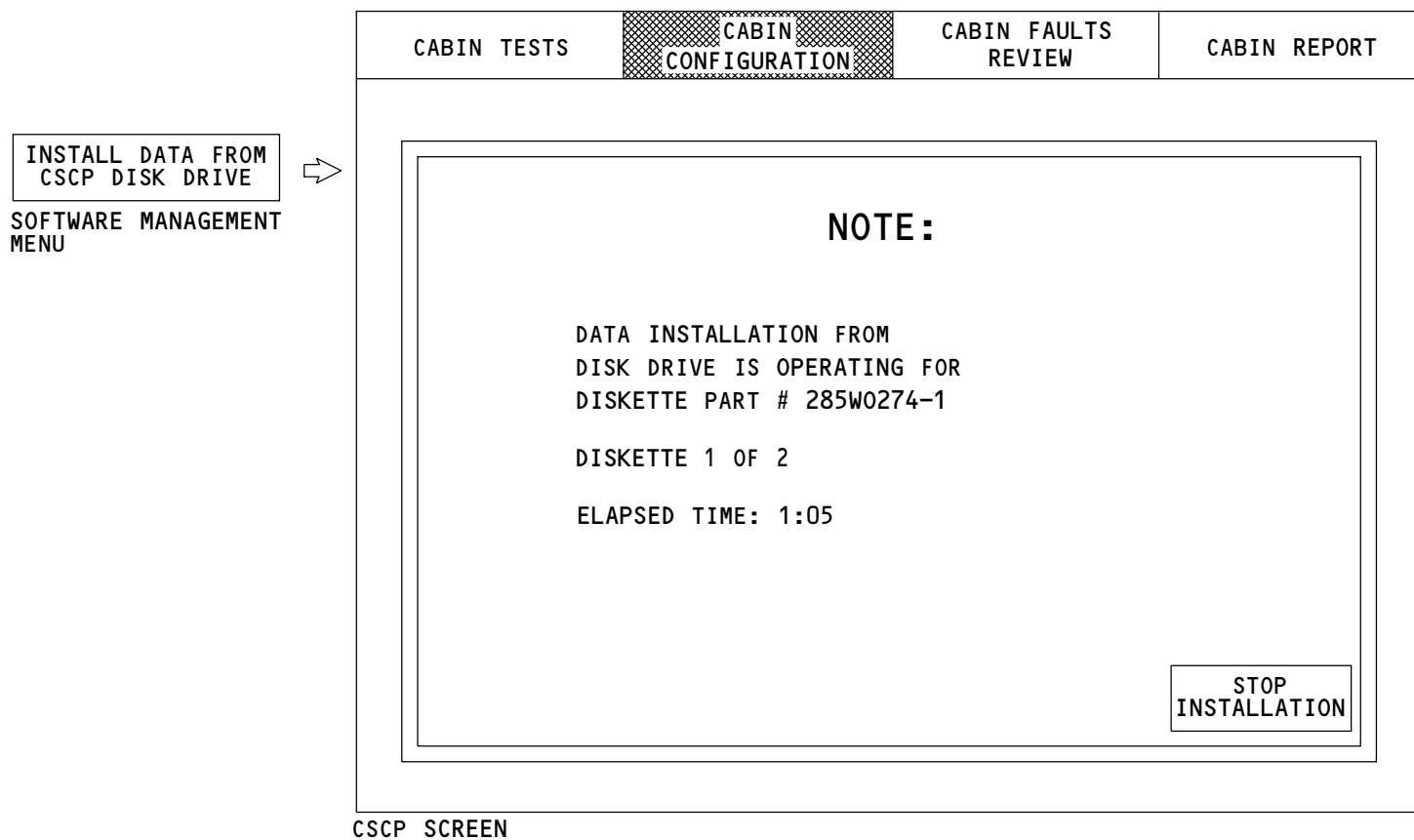
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M40163 S000616123_V1

CSS TEST AND SOFTWARE INSTALLATION - DATA INSTALLATION IS OPERATING FROM DISK DRIVE

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CSS TEST AND SOFTWARE INSTALLATION - DISK MAINTENANCE

General

This screen gives you selections to delete software from the cabin system control panel (CSCP) memory.

Access

Touch these selections to show the disk maintenance menu:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- DISK MAINTENANCE on the software management menu.

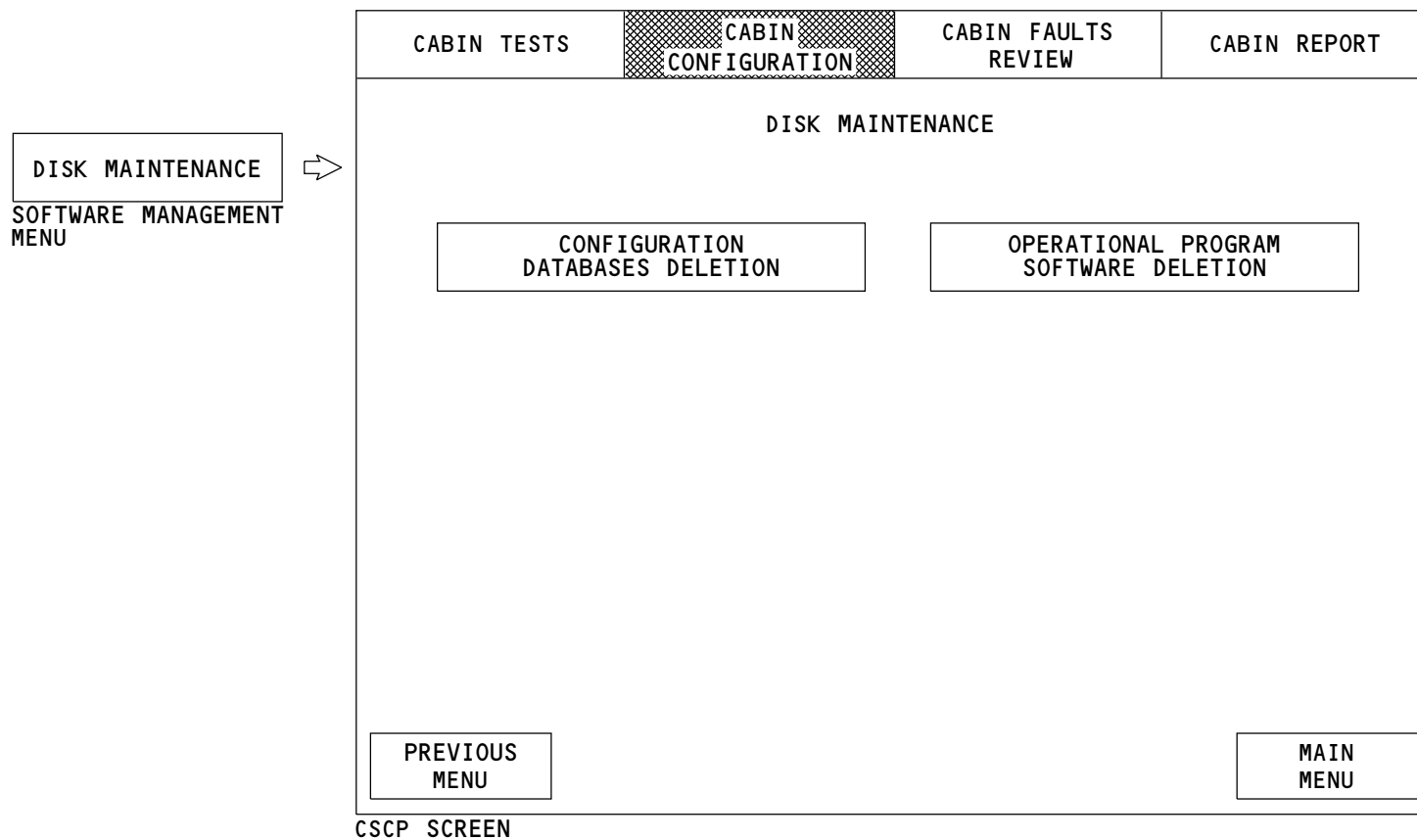
Controls and Indications

Touch CONFIGURATION DATABASES DELETION to show a screen that lets you remove databases from CSCP memory.

Touch OPERATIONAL PROGRAM SOFTWARE DELETION to show a screen that lets you remove LRU operational software from the CSCP memory.

Touch PREVIOUS MENU to return to the software management menu.

Touch MAIN MENU to return to the cabin maintenance menu.



CSS TEST AND SOFTWARE INSTALLATION - DISK MAINTENANCE

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**CSS TEST AND SOFTWARE INSTALLATION - MASS STORAGE MANAGEMENT****General**

This screen gives you selections to delete software from the cabin system control panel (CSCP) memory.

Access

Touch these selections to show the mass storage management menu:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- MASS STORAGE MANAGEMENT on the software management menu.

Controls and Indications

Touch the arrow buttons to scroll through the list of different software parts stored on the CSCP mass storage to view part numbers and corresponding file sizes.

Touch DELETE next to the corresponding software part that you want to remove from the CSCP mass storage.

Touch PREVIOUS MENU to return to the software management menu.

Touch MAIN MENU to return to the cabin maintenance menu.

**MASS STORAGE
MANAGEMENT**

➔

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
MASS STORAGE MANAGEMENT			
SOFTWARE	SIZE KBYTES		
SOFTWARE DESCRIPTION: 23 OVERHEAD ELECTRONICS UNIT OPS			△
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	□
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
SOFTWARE DESCRIPTION: 23 SPEAKER DRIVE MODULE OPS			
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
SOFTWARE DESCRIPTION: 23 OVERHEAD ELECTRONICS UNIT OPS			▽
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
DATABASE DESCRIPTION: CAL/UAL ZA 291 DUAL			
SOFTWARE PART NUMBER: XXXXX-XXXX-XXXX	XXX.XXX	DELETE	
DATABASE DESCRIPTION: CAL/UAL ZA 292 DUAL			
AVAILABLE CSCP DISK SPACE IN KBYTES	XXX.XXX	TO DELETE SOFTWARE, SELECT APPLICABLE DELETE BUTTON.	
PREVIOUS MENU	SAVE ALL		PRINT ALL
			MAIN MENU

CSCP SCREEN

2561049 S0000611097_V1

CSS TEST AND SOFTWARE INSTALLATION - MASS STORAGE MANAGEMENT

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASES IN MASS STORAGE****General**

This screen gives you selections to remove configuration databases from the cabin system control panel (CSCP) memory.

Access

Touch these selections to show the configuration databases in mass storage screen:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- DISK MAINTENANCE on the software management menu
- CONFIGURATION DATABASES DELETION on the disk maintenance menu.

Controls and Indications

The screen shows as many as six database selections. If the operating database is not in the CSCP memory, the first selection on the top left of the screen shows you that it was removed.

To remove a database from memory, first touch the database selection and then touch DELETE at the bottom of the screen. You can select only one database at a time.

After you touch DELETE, one of two screens will show. If you selected the active database, a dialogue window warns you that you are deleting the current database. If you select any other database, a dialogue window asks you if you want to delete the database.

Touch any of these other selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to return to the disk maintenance menu
- SAVE PAGE - to save the screen data to a floppy diskette
- PRINT PAGE - to print the screen data to the cabin printer
- MAIN MENU - to return to the cabin maintenance menu.

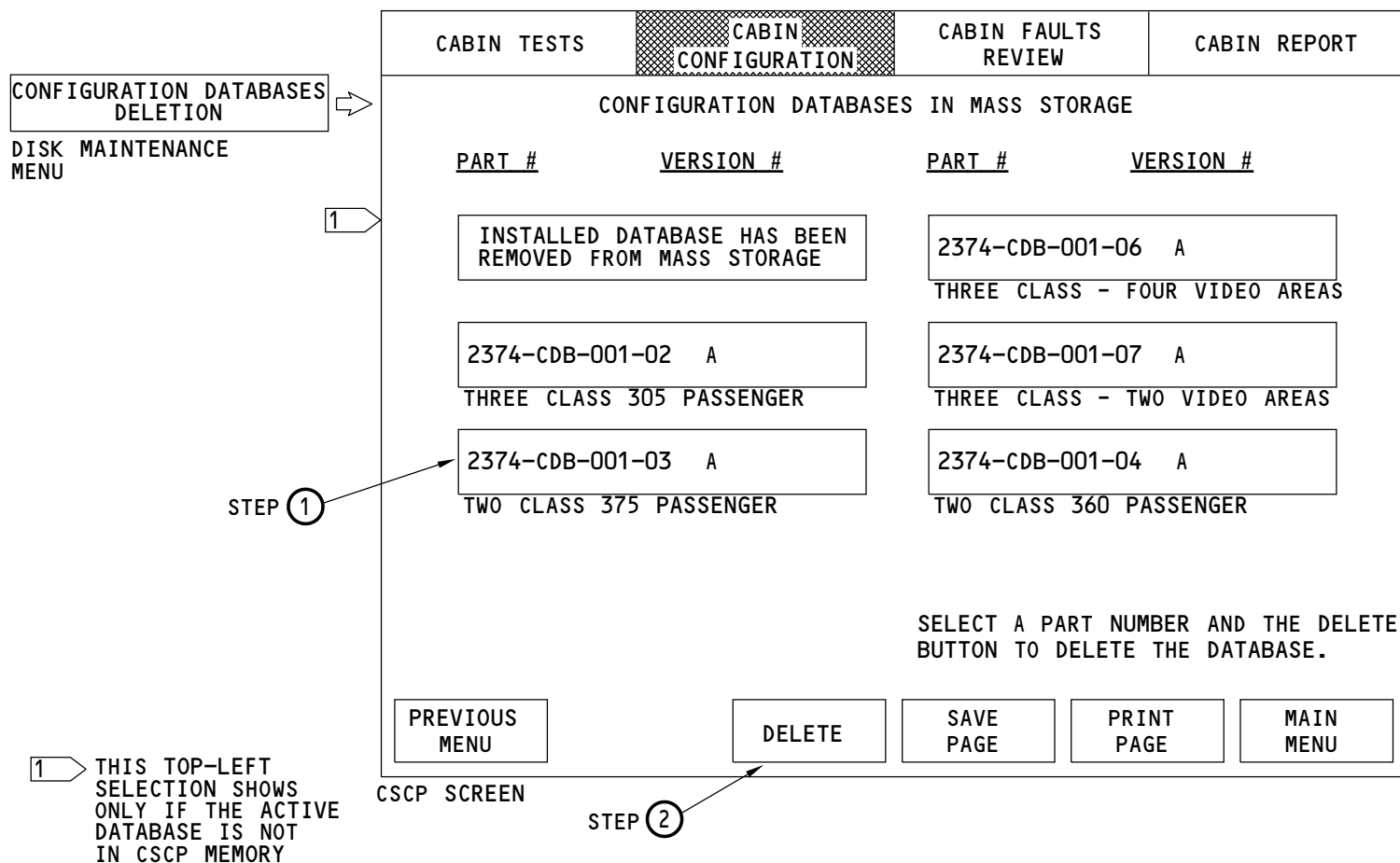
23-39-01

EFFECTIVITY
ARO 001-015 PRE SB 777-23-0369

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M40165 S000616125_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASES IN MASS STORAGE

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**CSS TEST AND SOFTWARE INSTALLATION - CURRENT CONFIGURATION DATABASE DELETION****General**

This screen shows automatically when you want to remove the operating database from the cabin system control panel (CSCP) memory.

Access

This screen shows if you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu

ARO 001-015 PRE SB 777-23-0369

- Touch DISK MAINTENANCE on the software management menu
- Touch CONFIGURATION DATABASES DELETION on the disk maintenance menu
- Select the currently installed database on the configuration databases in mass storage screen and touch DELETE.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- Touch MASS STORAGE MANAGEMENT on the software management menu
- Find the currently installed database in the list of software parts on the mass storage management screen and touch the corresponding DELETE button.

ARO ALL**Controls and Indications**

The screen shows the part number of the database you selected on the configuration databases in mass storage screen.

Touch one of these selections at the bottom of the screen to do the related function:

- CONTINUE DELETION - to delete the selection and show the deleting configuration database window

ARO 001-015 PRE SB 777-23-0369

- SAVE PAGE - to store the screen data to floppy diskette

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE PAGE - to store the screen data to the USB drive in CSCP USB ports

ARO ALL

- PRINT PAGE - to print the screen data on the cabin printer

ARO 001-015 PRE SB 777-23-0369

- CANCEL DELETION - to cancel deleting and return to the configuration databases in mass storage screen.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

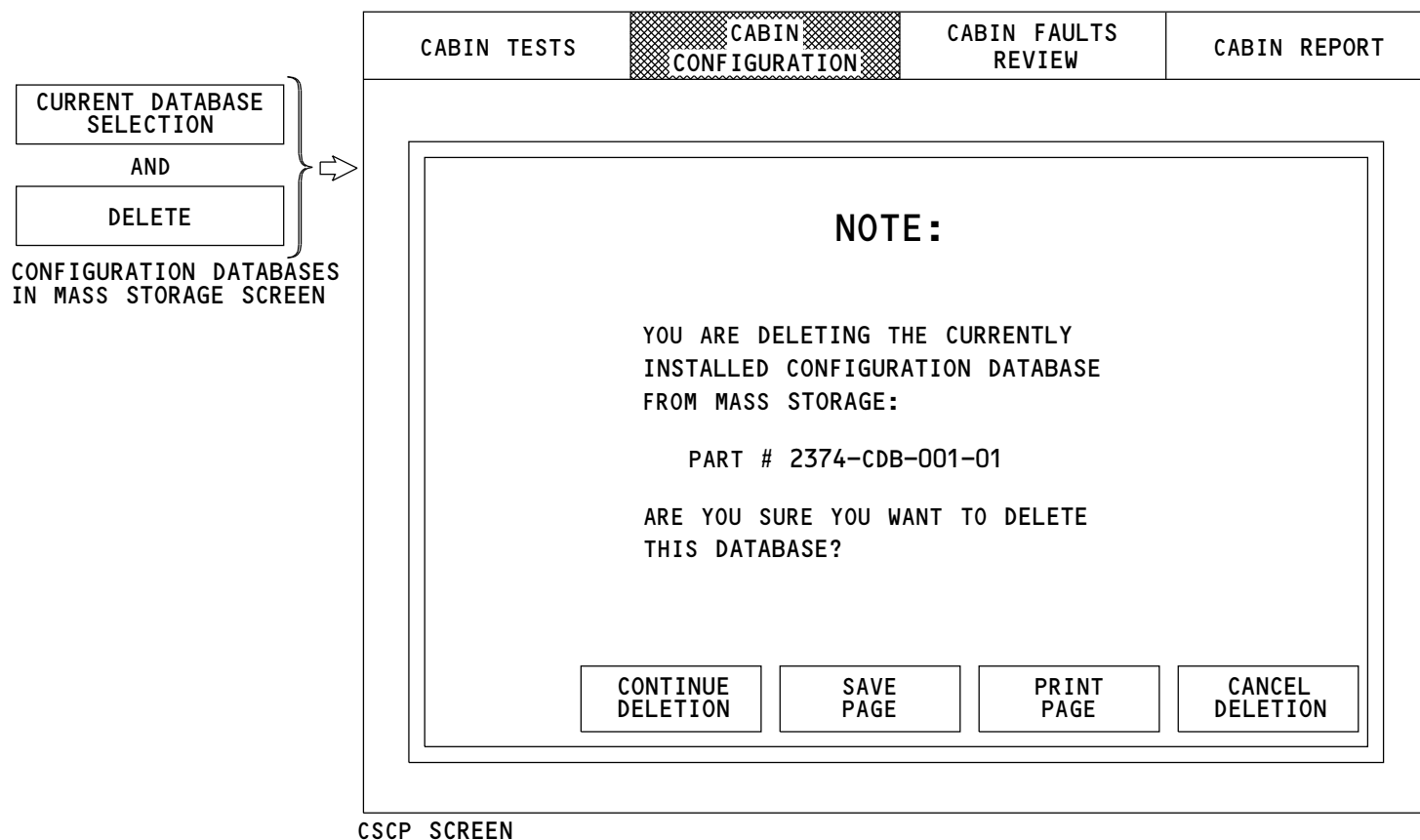
- CANCEL DELETION - to cancel deleting and return to the mass storage management screen.

ARO ALL**23-39-01**

ARO ALL	EFFECTIVITY

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M40166 S000616126_V1

CSS TEST AND SOFTWARE INSTALLATION - CURRENT CONFIGURATION DATABASE DELETION

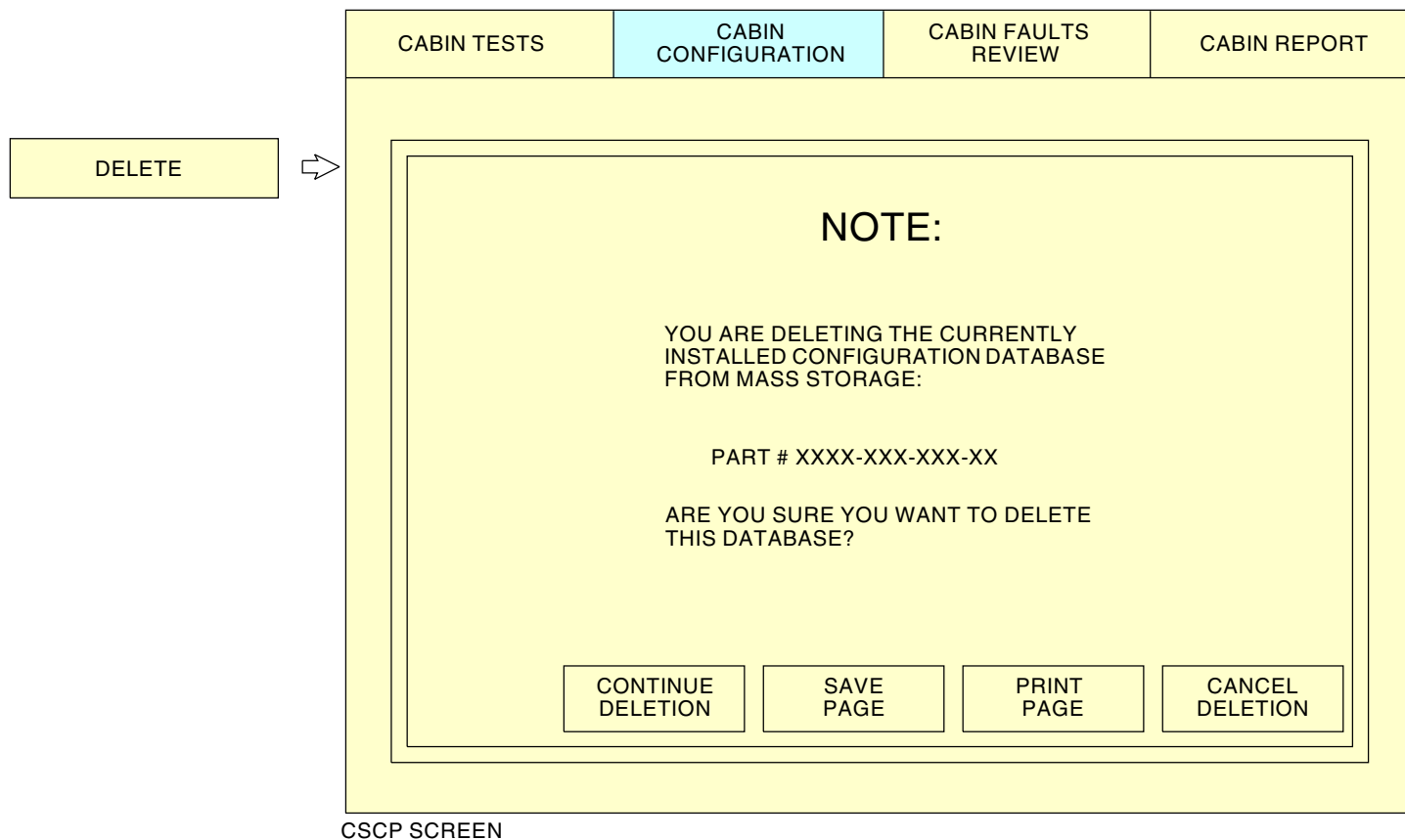
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CSS TEST AND SOFTWARE INSTALLATION - DELETING INSTALLED DATABASE

2560857 S0000611110_V1

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ARO 016-999; ARO 001-015 POST SB 777-23-0369

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE DELETION****General**

This screen shows automatically when you remove a configuration database from the cabin system control panel (CSCP) memory.

Access

This screen shows if you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch DISK MAINTENANCE on the software management menu
- Touch CONFIGURATION DATABASES DELETION on the disk maintenance menu
- Select any database other than the currently installed database on the configuration databases in mass storage screen and touch DELETE.

This screen also shows when you touch CONTINUE DELETION on the deleting current configuration database window.

Controls and Indications

The screen shows the part number of the database you selected to delete.

Touch one of these selections at the bottom of the screen to do the related function:

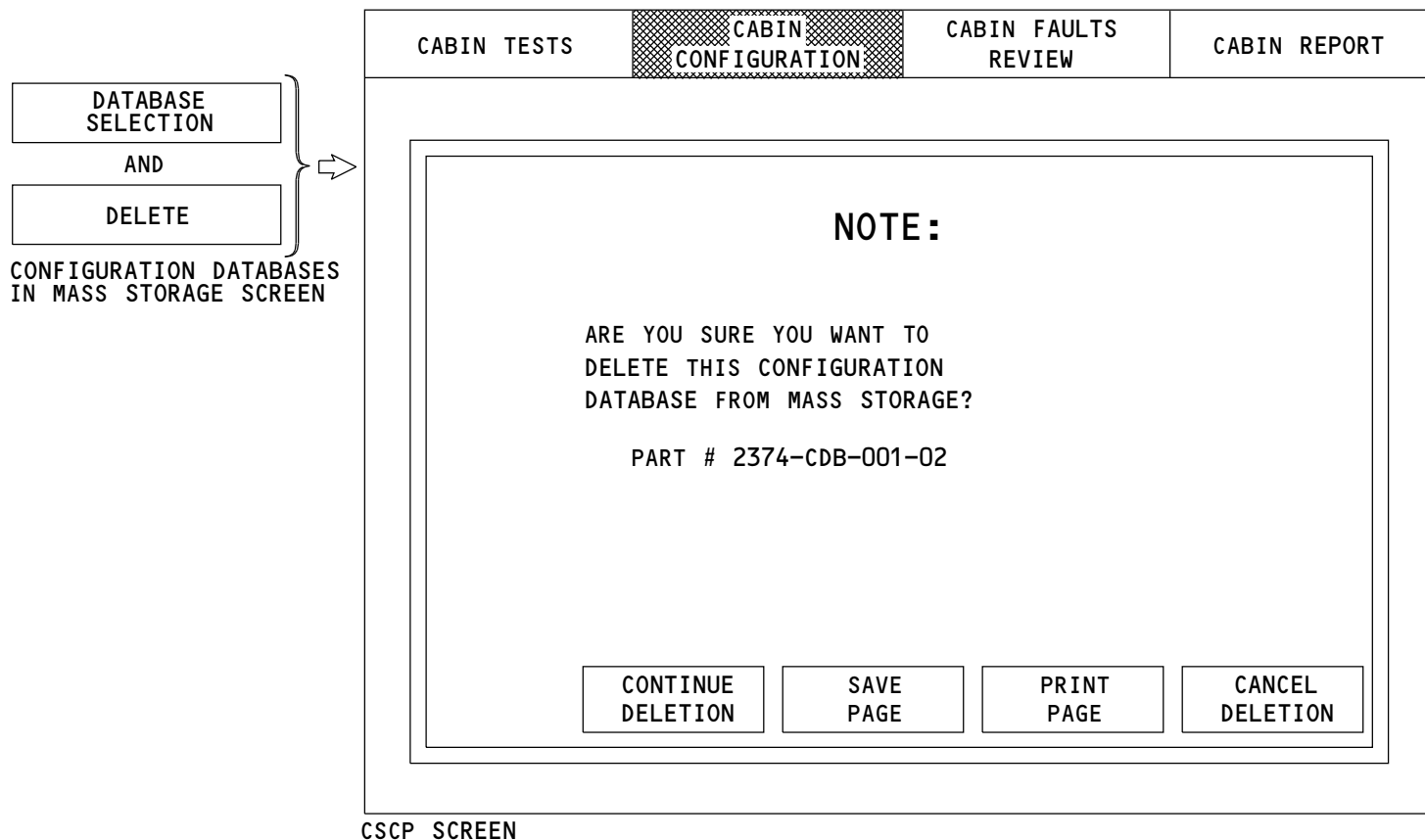
- CONTINUE DELETION - to delete the selection and show the deleting configuration databases in mass storage screen. The screen data will not have the database you deleted
- SAVE PAGE - to store the screen data to floppy diskette
- PRINT PAGE - to print the screen data on the cabin printer
- CANCEL DELETION - to cancel deleting and return to the configuration databases in mass storage screen.

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION DATABASE DELETION

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**CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE IN MASS STORAGE****General**

This screen gives you selections to remove LRU operational program software from the cabin system control panel (CSCP) memory.

- SAVE - to save the screen data to floppy diskette
- PRINT - to print the screen data to the cabin printer
- MAIN MENU - to go to the cabin maintenance menu.

Access

Touch these selections to show the operational program software in mass storage screen:

- CABIN CONFIGURATION on any maintenance screen
- SOFTWARE MANAGEMENT on the cabin configuration menu
- DISK MAINTENANCE on the software management menu
- OPERATIONAL PROGRAM SOFTWARE DELETION on the disk maintenance menu
- Touch any LRU selection on the operational program software deletion screen.

Controls and Indications

There are two operational program softwares appear on the screen:

- AREA LIGHTING CONTROLLER (ALC)
- LIGHT FIXTURE (LF)

To delete the software, touch one of these selections to select and then touch DELETE.

After you touch DELETE, one of two screens will show. A dialogue window may show to tell you that you are removing the only operational program software for that LRU type. Another dialogue window shows to ask if you want to delete the software you selected.

Touch any of these other selections at the bottom of the screen to do the related function:

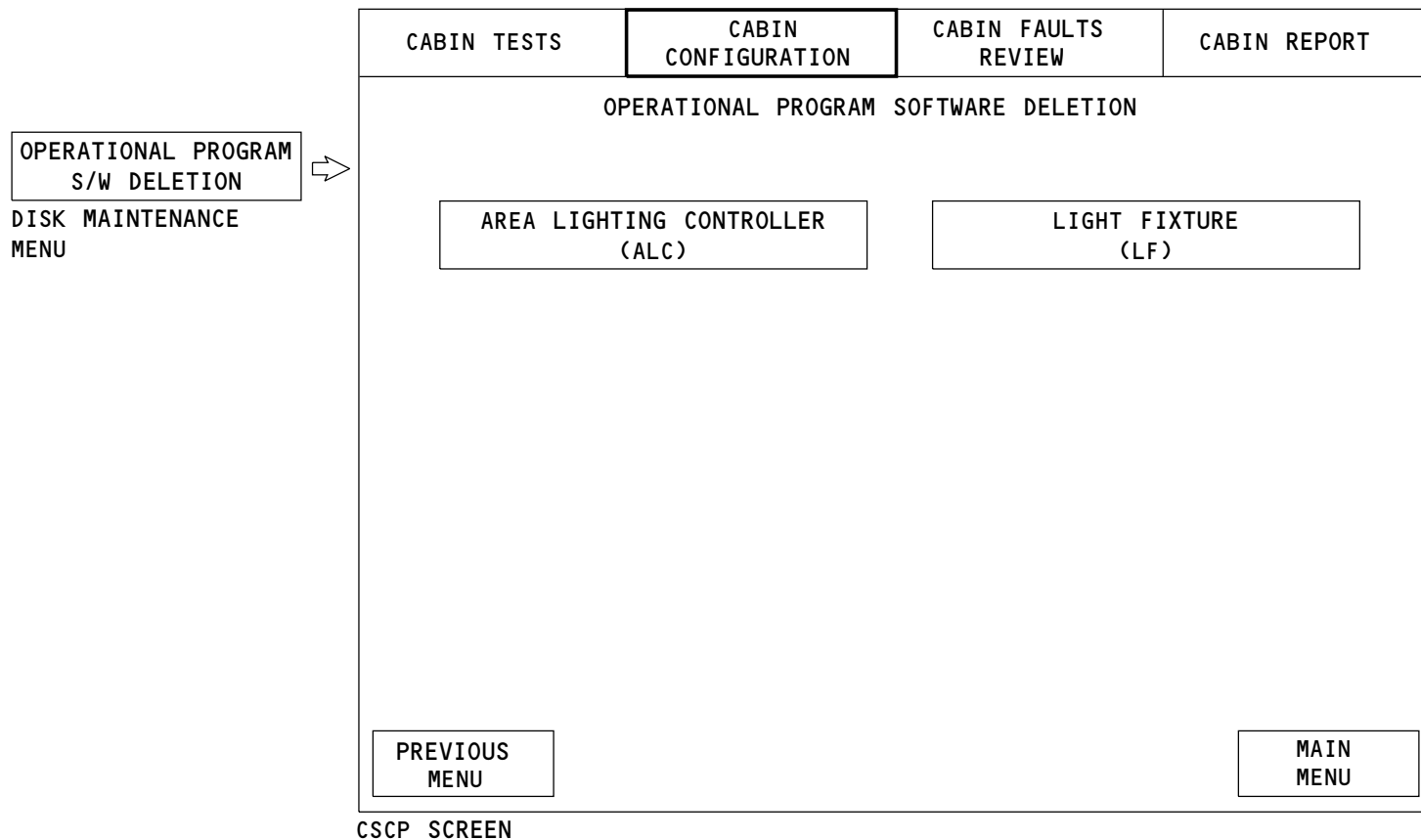
- PREVIOUS MENU - to go to the disk maintenance menu
- PREVIOUS SCREEN - to go to the operational program software deletion screen

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D61741 S0000161222_V1

CSS TEST AND SOFTWARE INSTALLATION - OPERATIONAL PROGRAM SOFTWARE IN M

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**CSS TEST AND SOFTWARE INSTALLATION – DELETING SOFTWARE****General**

This screen shows automatically when you remove a configuration database from the cabin system control panel (CSCP) memory.

Access

This screen shows if you make these selections:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch SOFTWARE MANAGEMENT on the cabin configuration menu
- Touch MASS STORAGE MANAGEMENT on the software management screen
- Select any software part other than the currently installed database in the list on the mass storage management screen and touch DELETE.

Controls and Indications

The screen shows the part number of the software part you selected to delete.

Touch one of these selections at the bottom of the screen to do the related function:

- CONTINUE DELETION – to delete the selection and show the mass storage management screen. The screen data will not have the part you deleted
- SAVE PAGE – to store the screen data to a USB drive in the CSCP USB ports
- PRINT PAGE – to print the screen data on the cabin printer
- CANCEL DELETION – to cancel deleting and return to the configuration databases in mass storage screen.

MASS STORAGE
MANAGEMENT
SOFTWARE MANAGEMENT
MENU

CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT

NOTE:

ARE YOU SURE YOU WANT TO DELETE THIS
SOFTWARE PART?

PART # XXXXXXXXXXXXXXXX

CONTINUE
DELETION

SAVE
PAGE

PRINT
PAGE

CANCEL
DELETION

CSCP SCREEN

2560831 S0000611127_V1

CSS TEST AND SOFTWARE INSTALLATION - DELETING SOFTWARE

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK MENU****General**

You use the configuration check menu to select screens that show the current CSS LRU configurations. This menu also has selections to make sure the installed LRUs can operate with each other.

Access

Touch these selections to show the configuration check menu:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION CHECK on the cabin configuration menu.

Controls and Indications

Touch any one of these multiple-LRU selections to show a screen with selections to get configuration data for the LRU type:

- CABIN AREA CONTROL PANEL (CACP)
- OVERHEAD ELECTRONICS UNIT (OEU)
- SPEAKER DRIVE MODULE (SDM)
- ZONE MANAGEMENT UNIT (ZMU).
- AREA LIGHTING CONTROLLER (ALC)
- LIGHTING FIXTURE (LF)

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch any of these collective-LRU selections to show the related configuration screen:

- CSS CONFIGURATION ALL
- CSS CONFIGURATION SUMMARY

ARO ALL

Touch any of these single-LRU selections to show the related configuration screen. A no response from selected LRU dialogue window may show if the LRU is not active:

- CABIN SYSTEM CONTROL PANEL (CSCP)

- CABIN SYSTEM MANAGEMENT UNIT (CSMU)
- PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER (PA/CI).

Touch PREVIOUS MENU to return to the cabin configuration menu.

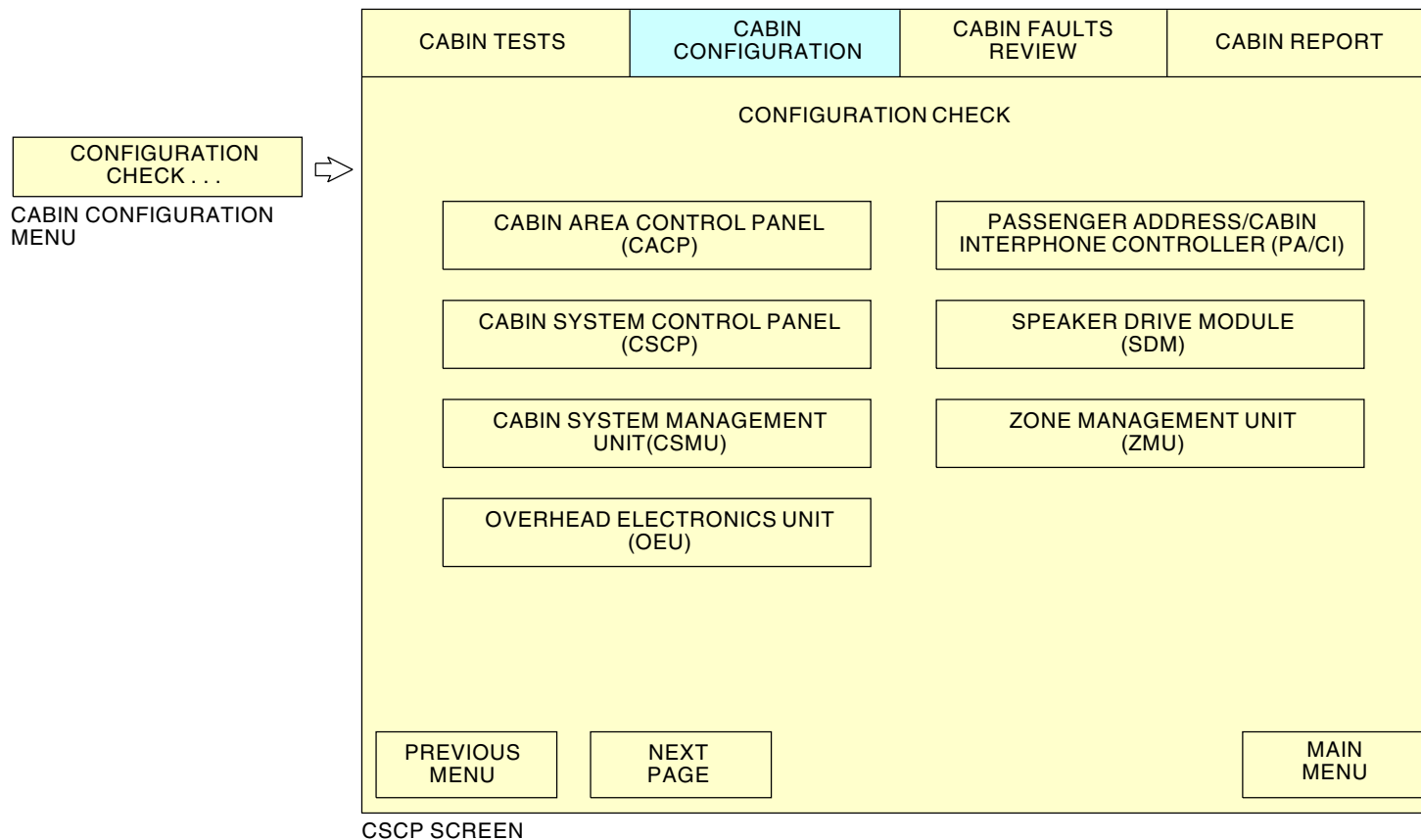
Touch MAIN MENU to return to the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK MENU

M40172 S000616132_V2

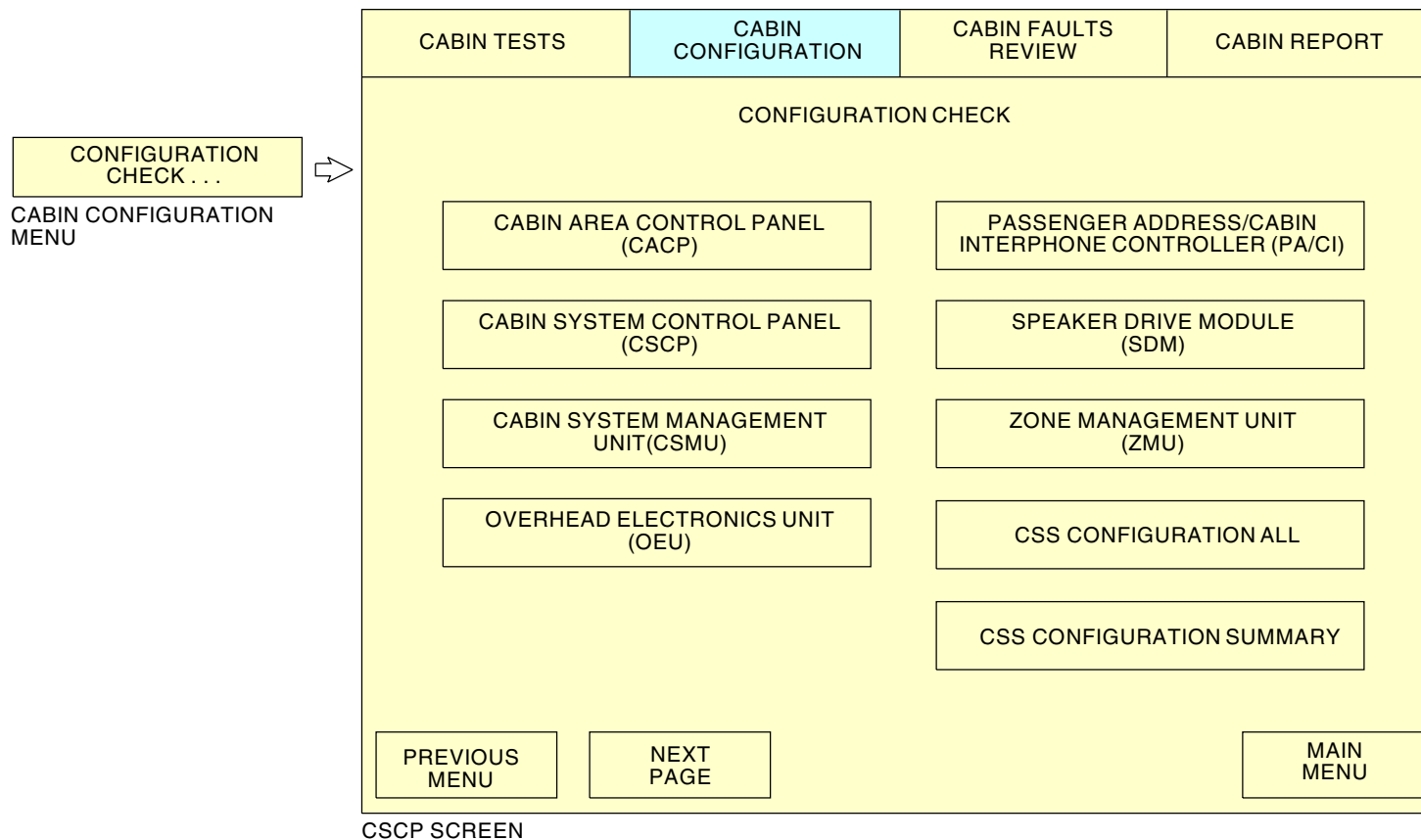
23-39-01

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ARO 001-015 PRE SB 777-23-0369

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK MENU

2561235 S0000611134_V1

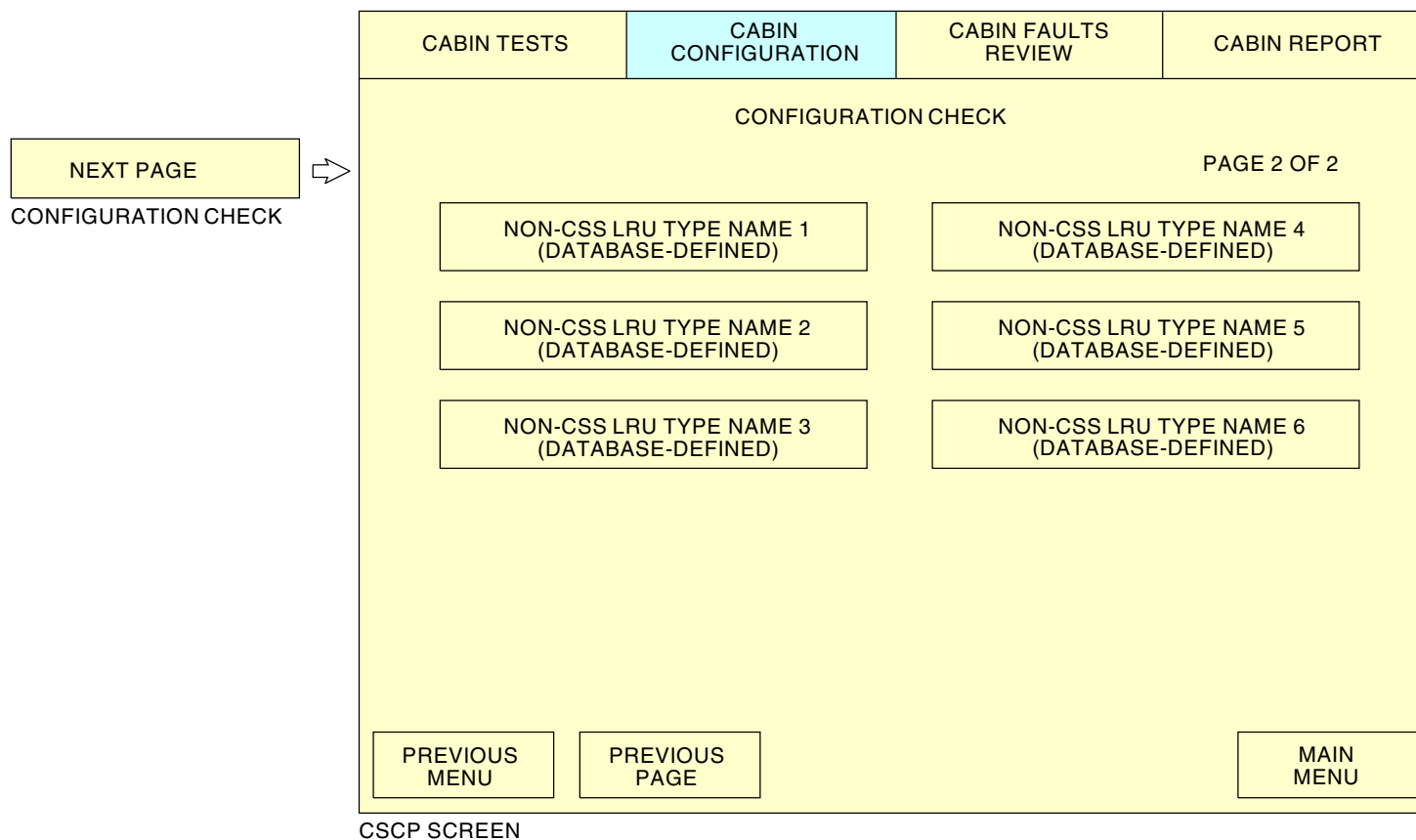
23-39-01

EFFECTIVITY
ARO 016-999; ARO 001-015 POST SB 777-23-0369

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK MENU

2561236 S0000611135_V1

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**CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SELECTION SCREEN****General**

This configuration check - LRU selection screen is applicable to multiple-LRU types. It permits you to select any or all LRUs of a single type and get configuration data.

Access

Touch these selections to show a configuration check screen for an LRU:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION CHECK on the cabin configuration menu
- Touch an LRU selection on the configuration check menu.

Controls and Indications

This screen shows the overhead electronics unit (OEU) selection. Screens for other LRUs are almost the same.

The controls on the screen permit you to make any of these selections:

- One OEU in a column of a zone
- All OEUs in a column of a zone
- All OEUs in a zone
- All OEUs in the system.

Use the up and down arrows on the left side of the screen to select any one or all of the CSS zones. The zone number you select shows to the left of the arrows.

Use the up and down arrows in the center of the screen to select any one or all of the columns of the selected zone. The column number you select shows to the left of the arrows.

Use the up and down arrows on the right side of the screen to select any one or all of the OEUs in the selected column. The OEU you select shows to the left of the arrows.

After you make the selections, touch CONTINUE to get the configuration. If any LRU does not respond, a dialogue window shows you which ones. If all LRUs are active, the configuration check screen for the LRU type shows.

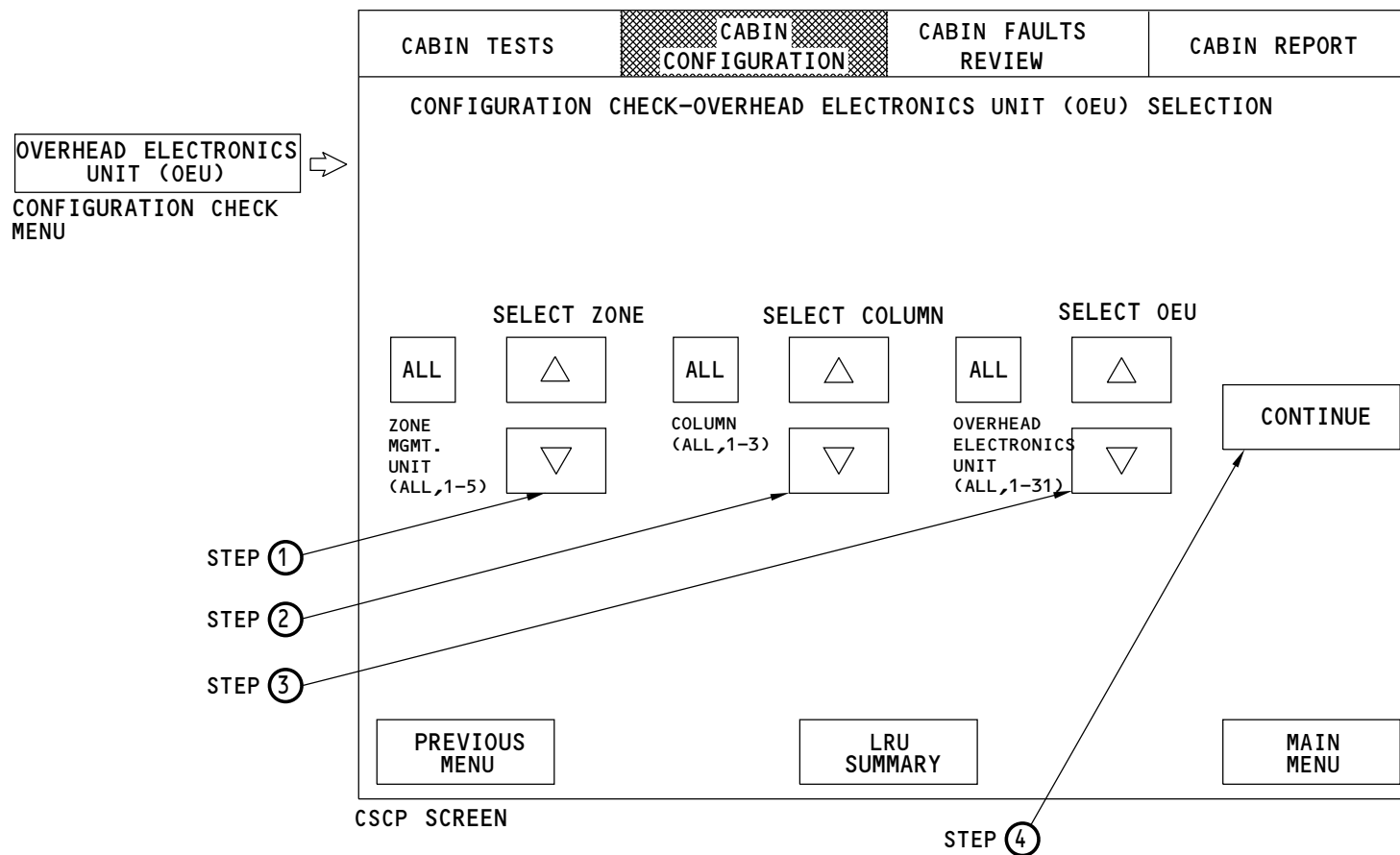
Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to return to the configuration check menu
- LRU SUMMARY - to see a screen that shows the number of OEUs in each column and zone
- MAIN MENU - to return to the cabin maintenance menu.

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M40173 S000616133_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SELECTION SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SUMMARY SCREEN

General

This screen shows how all LRUs of the type you selected are configured in the CSS. This screen shows the overhead electronics unit (OEU) summary. This screen for other LRUs is almost the same.

Access

Touch these selections to show the configuration check - LRU summary screen:

- CABIN CONFIGURATION on any maintenance screen
- CONFIGURATION CHECK on the cabin configuration menu
- an LRU selection on the configuration check menu
- LRU SUMMARY on the configuration check - LRU selection screen.

Controls and Indications

This summary screen shows the number of OEUs in each column of a related zone. The first number shows how many OEUs are assigned to the column by the database. The second number shows how many of the LRUs are operating. Because there are only three zones, ZMU 4 and ZMU 5 should all be zero.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to return to the configuration check menu
- PREVIOUS SCREEN - to return to the configuration check - LRU selection screen

ARO 001-015 PRE SB 777-23-0369

- SAVE PAGE - to save the data on the screen to a cabin system control panel (CSCP) floppy diskette

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE PAGE - save the data on the screen to the USB drive in the cabin system control panel (CSCP) ports

ARO ALL

- PRINT PAGE - to print the data on the screen to the cabin printer
- MAIN MENU - to return to the cabin maintenance menu.

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LRU
SUMMARY

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CABIN TESTS
CABIN
CONFIGURATION
CABIN FAULTS
REVIEW
CABIN REPORT

CONFIGURATION CHECK - OVERHEAD ELECTRONICS UNIT (OEU) SUMMARY

	COLUMN 1	COLUMN 2	COLUMN 3
ZMU 1	8/6	7/6	8/7
ZMU 2	11/11	22/22	11/11
ZMU 3	12/12	17/17	10/10
ZMU 4	0/0	0/0	0/0
ZMU 5	0/0	0/0	0/0

FIRST NUMBER = NUMBER OF OEUS PER DATABASE

SECOND NUMBER = NUMBER OF OEUS RESPONDING

PREVIOUS
MENU

PREVIOUS
SCREEN

SAVE
PAGE

PRINT
PAGE

MAIN
MENU

CSCP SCREEN

M40174 S000616134_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SUMMARY SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - NO RESPONSE FROM SELECTED LRU SCREEN****General**

This screen shows when one or more LRUs do not operate.

Access

This screen shows automatically after you make the LRU selections and touch CONTINUE on the configuration check - LRU selection screen. It shows only if one or more of the LRUs you select do not operate.

Controls and Indications

This example shows overhead electronics units (OEUs) that are not operating. Screens for other LRUs are equivalent.

If the list of LRUs is longer than the display, use the up and down arrows at the right to scroll through the list.

Touch any of these selections at the bottom of the screen for the related function:

ARO 001-015 PRE SB 777-23-0369

- SAVE ALL - to save the entire contents of both windows to a floppy diskette in the cabin system control panel (CSCP)

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE ALL - save the entire contents of both windows to the USB drive in the cabin system control panel (CSCP) ports

ARO ALL

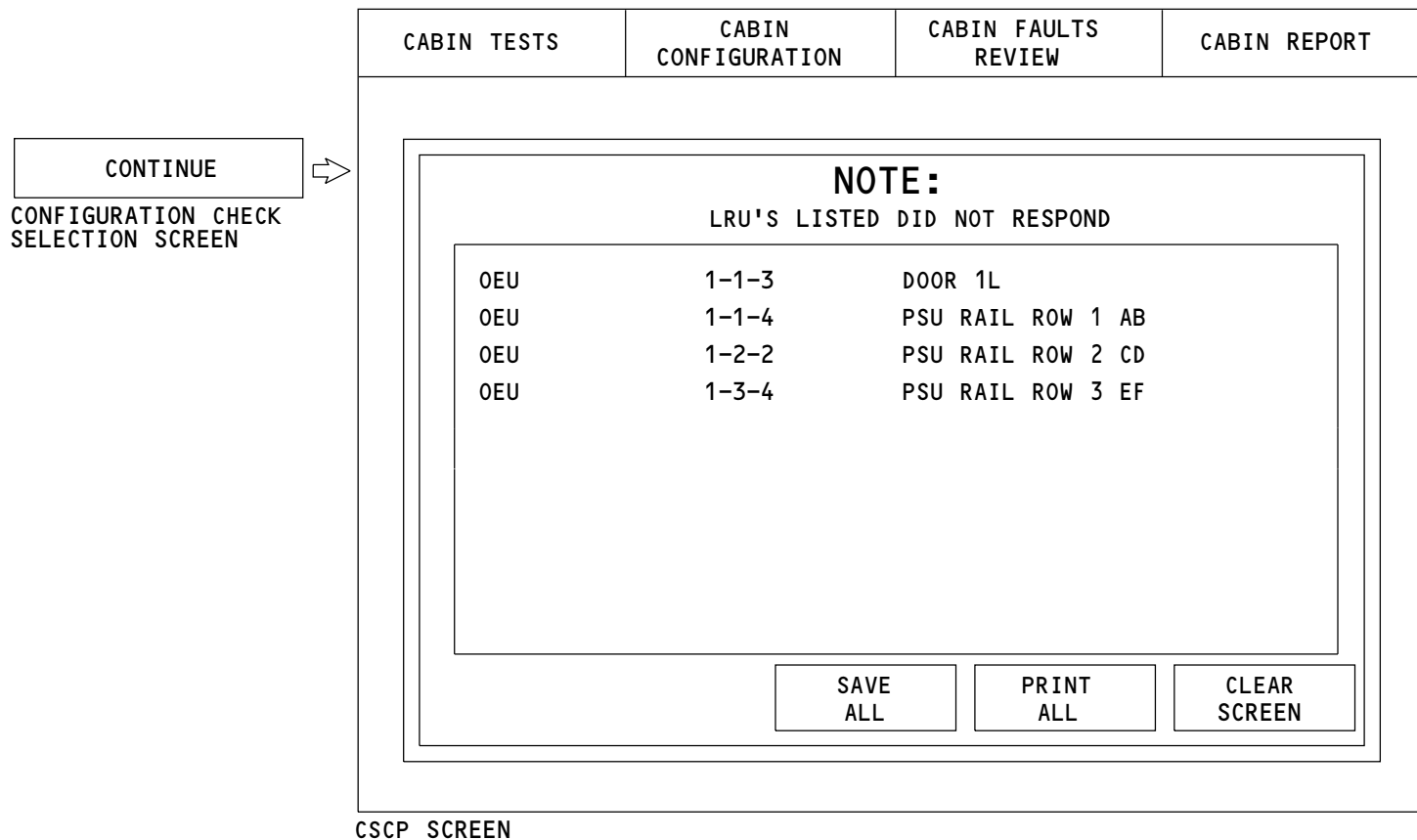
- PRINT ALL - to print the entire contents of both windows to the cabin printer
- CLEAR SCREEN - to return to the configuration check selection screen.

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CSCP SCREEN

M39458 S000616135_V1

CSS TEST AND SOFTWARE INSTALLATION - NO RESPONSE FROM SELECTED LRU SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SCREEN

General

This screen shows the configuration of the LRUs of the type you selected with other screens.

Access

To show the LRU configuration check screen:

- Touch CABIN CONFIGURATION on any maintenance screen
- Touch CONFIGURATION CHECK on the cabin configuration menu
- Touch an LRU selection on the configuration check menu
- Make the necessary selections for the LRU and touch CONTINUE on the configuration check - LRU selection screen.

Controls and Indications

The screen shows each LRU of the type you selected on the configuration check selection screen. It shows these items for each LRU:

- The LRU name
- The address assigned by the configuration database
- LRU location
- The serial number of the unit
- The hardware part number
- The software part number of the operation program software installed
- The database part number and version number of the configuration database installed.

Use the up and down arrows at the right of the window to scroll through the data.

Touch any of these selections at the bottom of the screen to do the related function:

- PREVIOUS MENU - to return to the configuration check menu
- PREVIOUS SCREEN - to return to the configuration check - LRU selection screen

ARO 001-015 PRE SB 777-23-0369

- SAVE - to save the data to a cabin system control panel (CSCP) floppy diskette

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- SAVE - save the data to the USB drive in the cabin system control panel (CSCP) ports

ARO ALL

- PRINT - to print the data to the cabin printer
- MAIN MENU - to return to the cabin maintenance menu.

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LRU
SELECTIONS

AND

CONTINUE

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➔

CABIN TESTS
CABIN
CONFIGURATION
CABIN FAULTS
REVIEW
CABIN REPORT

CONFIGURATION CHECK - OVERHEAD ELECTRONICS UNIT

OEU 1-1-1 FORWARD LAV

HARDWARE PART # 285W0029-1 SERIAL # D000021

SOFTWARE PART # 2330-BCE-OEU-T1

DATABASE PART # 2374-CDB-001-01 VERSION # A

OEU 1-1-2 FLIGHT DECK AISLE
LOWERED CEILING

HARDWARE PART # 285W0029-101 SERIAL # D000042

SOFTWARE PART # 2330-BCE-OEU-T2

DATABASE PART # 2374-CDB-001-01 VERSION # A

OEU 1-1-3 PSU
ROW 1, SEATS AB

HARDWARE PART # 285W0029-201 SERIAL # D000011

SOFTWARE PART # 2330-BCE-OEU-T3

DATABASE PART # 2374-CDB-001-01 VERSION # A

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PREVIOUS
MENU

PREVIOUS
SCREEN

SAVE

PRINT

MAIN
MENU

CSCP SCREEN

M40175 S000616136_V1

CSS TEST AND SOFTWARE INSTALLATION - CONFIGURATION CHECK - LRU SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - CABIN FAULTS REVIEW MENU

General

You use the cabin faults review menu to show failure data for the CSS. These are the five selections on the cabin faults review menu:

- QUICK TEST FAULTS REVIEW
- ALL TEST FAULTS REVIEW
- DATA INSTALLATION FAULTS REVIEW
- FLIGHT DECK EFFECTS FAULTS (ACTIVE)
- FLIGHT DECK EFFECTS FAULTS (HISTORY)

ARO 016-999; ARO 001-015 POST SB 777-23-0369

- FAULT SUMMARY

ARO ALL

Access

Touch CABIN FAULTS REVIEW on any maintenance screen to show the cabin faults review menu.

Quick Test Faults Review

Touch QUICK TEST FAULTS REVIEW to show the faults review screen from the last quick test. See the quick test description for more information.

All Test Faults Review

Touch ALL TEST FAULTS REVIEW to show the faults review screen from the last all test. See the all test description for more information.

Data Installation Faults Review

Touch DATA INSTALLATION FAULTS REVIEW to show an installation fault results screen from the last database or operational program installation. For more information on data installation see the database or operational program installation description.

Flight Deck Effects Faults (Active)

Touch FLIGHT DECK EFFECTS FAULTS (ACTIVE) to show CSS failures that cause EICAS messages. The screen shows all active CSS related EICAS messages and related maintenance messages.

Flight Deck Effects Faults (History)

The flight deck effects faults (history) screen is the same as flight deck effects faults (active) screen except it also has EICAS related failures kept in memory. It can keep as many as 99 failures in non-volatile memory.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Fault Summary

Touch FAULT SUMMARY to show the number of occurrences corresponding to each maintenance message number.

ARO ALL

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT

QUICK TEST FAULTS REVIEW

FLIGHT DECK EFFECTS FAULTS (ACTIVE)

ALL TEST FAULTS REVIEW

FLIGHT DECK EFFECTS FAULTS (HISTORY)

DATA INSTALLATION FAULTS REVIEW

STOP PRINT

MAIN MENU

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - CABIN FAULTS REVIEW MENU

M40177 S000616138_V1

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EFFECTIVITY
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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
QUICK TEST FAULTS REVIEW FLIGHT DECK EFFECTS FAULTS (ACTIVE) ALL TEST FAULTS REVIEW FLIGHT DECK EFFECTS FAULTS (HISTORY) DATA INSTALLATION FAULTS REVIEW FAULT SUMMARY			
		STOP PRINT	MAIN MENU

CSCP SCREEN

CSS TEST AND SOFTWARE INSTALLATION - CABIN FAULT REVIEW MENU

2560848 S0000611248_V1

23-39-01

EFFECTIVITY
ARO 016-999; ARO 001-015 POST SB 777-23-0369

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**CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (ACTIVE) SCREEN****General**

You use the flight deck effects faults (active) screen to show failures that cause CSS related EICAS messages. Active EICAS messages are messages that currently show on EICAS.

Access

To show the flight deck effects faults (active) screen:

- Touch CABIN FAULTS REVIEW on any maintenance screen
- Touch FLIGHT DECK EFFECTS FAULTS (ACTIVE) on the cabin faults review menu.

Controls and Indications

These are the three parts of the screen:

- Fault conditions
- Maintenance message data
- Selection controls.

Fault Conditions

The fault conditions part of the screen shows this fault data:

- Screen title - FLIGHT DECK EFFECTS (FDE) FAULTS (ACTIVE)
- The configuration database part number currently installed
- The date and time of the fault
- The sequence of each maintenance message in the list of messages.

Flight Deck Effects

The data window shows maintenance messages for each flight deck effect. The bottom line of the data window shows the EICAS message. These are the two EICAS status messages that can occur because of CSS failures:

- PASSENGER ADDRESS - Caused by a failure of the active passenger address controller. It can also occur if two adjacent speaker drive modules have a failure.
- CABIN INTERPHONE - Caused by a failure of the active cabin interphone controller. It can also occur if a zone management unit fails, or if two cabin attendant handsets fail in the same zone.

Maintenance Message Data

Each page shows one maintenance message. The maintenance message shows data about each failure. These are the three parts to the maintenance message:

- Fault description
- Maintenance message number/fault activity level
- Recommended maintenance action.

The fault description identifies the failure condition detected by the continuous BITE. It also identifies the component that found the fault.

There is one maintenance message number for every maintenance message. You use the maintenance message number to find the corrective action in the fault isolation manual (FIM). Some maintenance messages show Latched. latched means the fault will stay in the system until you take corrective action.

The recommended maintenance action identifies all the possible components or conditions that could cause the fault. The most probable cause shows first and the least probable cause shows last.

Each screen shows one maintenance message. Use the up or down arrow at the right of the screen to scroll through the messages. The square on the scroll bar shows your position in the message list.

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**CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (ACTIVE) SCREEN****Selection Controls**

Touch PREVIOUS MENU to show the cabin faults review menu.

Touch SHOW LOCATION to show a visual reference of the defective component.

Touch UNIT USAGE to show the components controlled by the defective component.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a floppy diskette in the CSCP.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the printer for a paper copy.

Touch MAIN MENU to show the cabin maintenance menu.

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CABIN TESTS
CABIN CONFIGURATION
CABIN FAULTS REVIEW
CABIN REPORT

FLIGHT DECK EFFECTS FAULTS (ACTIVE)

CABIN FAULTS REVIEW MENU

POSSIBLE STATUS MESSAGES:

- PASSENGER ADDRESS
- CABIN INTERPHONE

HELP

FLIGHT DECK EFFECTS (FDE) FAULTS (ACTIVE)

DATABASE PART # 2374-CDB-001-00

FAULT DATE: 01JUN95

FAULT TIME: 10:25Z

FAULT NUMBER: 1 OF 2

SPEAKER DRIVE MODULE (SDM) 2-3 AUDIO OUTPUT CIRCUIT IS FAILED.

DETECTED BY: PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER (PRIMARY PAC)

MAINTENANCE MESSAGE: 23-03303

LATCHED

RECOMMENDED MAINTENANCE ACTION:

POSSIBLE CAUSES:

- 1) SPEAKER DRIVE MODULE 2-3
LOCATED AT SEAT 18D, STOW BIN SUPPORT ASSEMBLY.
- 2) SPEAKER 17
LOCATED AT: ROW 18, LEFT AISLE OVERHEAD PANEL.
- 3) WIRING

FLIGHT DECK EFFECT: PASSENGER ADDRESS EICAS STATUS

PREVIOUS MENU

SHOW LOCATION

UNIT USAGE

SAVE

PRINT

MAIN MENU

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CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (ACTIVE) SCREEN

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**CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (HISTORY) SCREEN****General**

You use the flight deck effects faults (history) screen to show failures that cause CSS related EICAS messages.

The flight deck effects faults (history) is the same as flight deck effects faults (active) except that it shows all faults in memory. The CSS can keep as many as 99 faults in non-volatile memory.

Access

To show the flight deck effects faults (history) screen, do this:

- Touch CABIN FAULTS REVIEW on any maintenance screen
- Touch FLIGHT DECK EFFECTS FAULTS (HISTORY) on the cabin faults review menu.

Controls and Indications

These are the three parts of the screen:

- Fault conditions
- Maintenance message data
- Selection controls.

Fault Conditions

The fault conditions part of the screen shows this fault data:

- Screen title - FLIGHT DECK EFFECTS (FDE) FAULTS (HISTORY)
- PRESENT LEG shows if the fault occurred on the current flight leg
- The configuration database part number installed at the time of the fault
- The date and time of the fault
- The number of times the fault occurred during the flight leg. If the number of occurrences is more than one, the fault is an intermittent fault
- The flight phase when the fault occurred
- The sequence of each maintenance message in the list of messages.

The flight phase shows the part of flight in which the fault first occurred. These are the possible flight phases:

- Power on
- Engine start
- Taxi out
- Takeoff
- Initial climb
- Climb
- Enroute
- Descent
- Approach
- Go around
- Flare
- Rollout
- Taxi in
- Shutdown
- Maintenance.

Flight Deck Effects

The data window shows maintenance messages for each flight deck effect. The bottom line of the data window shows the EICAS message. These are the two EICAS status messages that can occur because of CSS failures:

- PASSENGER ADDRESS - Caused by a failure of the active passenger address controller. It can also occur if two adjacent speaker drive modules have a failure.
- CABIN INTERPHONE - Caused by a failure of the active cabin interphone controller. It can also occur if a zone management unit fails or if two cabin attendant handsets fail in the same zone.

EFFECTIVITY	
ARO ALL	

**CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (HISTORY) SCREEN****Maintenance Message Data**

Each page shows one maintenance message. The maintenance message shows data about each failure. These are the three parts to the maintenance message:

- Fault description
- Maintenance message number
- Recommended maintenance action.

The fault description identifies the failure condition detected by the continuous BITE. It also identifies the component that found the fault.

There is one maintenance message number for every maintenance message. You use the maintenance message number to find the corrective action in the fault isolation manual (FIM). Some maintenance messages show Latched. Latched means the fault will stay in the system until you take corrective action.

The recommended maintenance action identifies all the possible components or conditions that could cause the fault. The most probable cause shows first and the least probable cause shows last.

Each screen shows one maintenance message. Touch the down arrow to access additional messages. Touch the up arrow to return through the message list. The square on the scroll bar shows your position in the message list.

Selection Controls

Touch PREVIOUS MENU to show the cabin faults review menu.

Touch SHOW LOCATION to show a visual reference of the defective component.

Touch UNIT USAGE to show the components controlled by the defective component.

ARO 001-015 PRE SB 777-23-0369

Touch SAVE to send the data to a floppy diskette in the CSCP.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

Touch SAVE to send the data to the USB drive in the CSCP ports.

ARO ALL

Touch PRINT to send the data to the printer for a paper copy.

Touch MAIN MENU to show the cabin maintenance menu.

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CABIN TESTS
CABIN CONFIGURATION
CABIN FAULTS REVIEW
CABIN REPORT

FLIGHT DECK EFFECTS
FAULTS (HISTORY)

CABIN FAULTS REVIEW
MENU

HELP

FLIGHT DECK EFFECTS (FDE) FAULTS (HISTORY)

DATABASE PART # 2144-BCE-123-45
NUMBER OF OCCURRENCES IN LEG: 3 TIMES
OCCURRED IN PHASE: CRUISE

FAULT DATE: 02MAR94
FAULT TIME: 12:20Z
FAULT NUMBER: 3 OF 25

SPEAKER DRIVE MODULE (SDM) 1-1 IS NOT RESPONDING

DETECTED BY: PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER (NORMAL PAC)

MAINTENANCE MESSAGE: 23-12345

RECOMMENDED MAINTENANCE ACTION:

POSSIBLE CAUSES:

- 1) SPEAKER DRIVE MODULE (SDM) 1-1
LOCATED AT: SEAT 4A
- 2) PASSENGER ADDRESS/CABIN INTERPHONE CONTROLLER (NORMAL PAC)
LOCATED AT: MAIN EQUIPMENT CENTER, E1-4 SHELF
- 3) WIRING

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FLIGHT DECK EFFECT: PASSENGER ADDRESS EICAS STATUS NOTE: TWO SDMS CAUSED THIS FDE

PREVIOUS
MENU

SHOW
LOCATION

UNIT
USAGE

SAVE

PRINT

MAIN
MENU

CSCP SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - FLIGHT DECK EFFECTS FAULTS (HISTORY) SCREEN

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CSS TEST AND SOFTWARE INSTALLATION - CABIN REPORT MENU

General

You use the cabin report menu to make a paper copy or digital copy of fault results and configuration data. For a paper copy, the CSS sends the data to the cabin printer.

ARO 001-015 PRE SB 777-23-0369

For a digital copy, the CSS sends the data to a diskette in the cabin system control panel (CSCP).

ARO 016-999; ARO 001-015 POST SB 777-23-0369

For a digital copy, the CSS sends the data to a USB drive in the cabin system control panel (CSCP) USB ports or downlinks a copy to the onboard network system (ONS).

ARO ALL**Access**

Touch CABIN REPORT on any maintenance screen to show the cabin report menu.

Fault Summary

The fault summary report shows maintenance message numbers and the number of times they have occurred.

Quick Test Faults

The quick test faults report contains test data and all maintenance messages from the last quick test.

All Test Faults

The all test faults report contains test data and all maintenance messages from the last all test.

Data Installation Faults

The data installation report contains failure descriptions from the last configuration database installation or operational program installation.

Flight Deck Effects-Active Faults-Report

The flight deck effects-active report contains CSS EICAS messages and related maintenance messages for active EICAS messages.

Flight Deck Effects-Fault History-Report

The flight deck effects-fault history report contains CSS EICAS messages and their related maintenance message for EICAS messages stored in non-volatile memory.

CSS Configuration All

The CSS configuration report shows part number data for CSS components. The list includes these items for each component:

- Hardware part number
- Software part number
- Database part number
- Database version number
- Serial number
- Name, address, and location
- Report date, time, and title.

CSS Configuration Summary

The CSS configuration summary report shows part number data for CSS components. The list includes these items for each component:

- Hardware part number
- Software part number
- LRU type name
- Report date, time, and title.

ARO 016-999; ARO 001-015 POST SB 777-23-0369**Bus Capture Log**

The bus capture log contains a capture of bus data on the CSS internal bus.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN REPORT MENU

ARO 016-999; ARO 001-015 POST SB 777-23-0369 (Continued)

Engineering Log

The engineering log report consists of:

- the latest twenty (20) copies of the following:

- Quick Test Faults Reports
- All Test Faults Reports
- Data Installation Faults Reports
- Configuration Report - All Reports

a copy of the following:

- The Flight Deck Effects - History - Fault Report
- Web Server Request Log
- Web Server Error Log.

ARO ALL**Cabin Report Menu Controls**

ARO 001-015 PRE SB 777-23-0369

To select a report, touch the report selection. The selection becomes green and the SAVE ALL and PRINT ALL selection show in dark print. Touch SAVE ALL to send the data to a diskette in the CSCP. Touch PRINT ALL to send the report to the cabin printer.

ARO 016-999; ARO 001-015 POST SB 777-23-0369

To select a report, touch the report selection. The selection becomes green and the DISPLAY, DOWNLINK, SAVE ALL, and PRINT ALL selections show in dark print. Touch DISPLAY to show the most recently run report. Touch DOWNLINK to send a copy to the ONS. Touch SAVE ALL to save the report to a USB drive in the CSCP USB ports. Touch PRINT ALL to send the report to the cabin printer.

ARO ALL

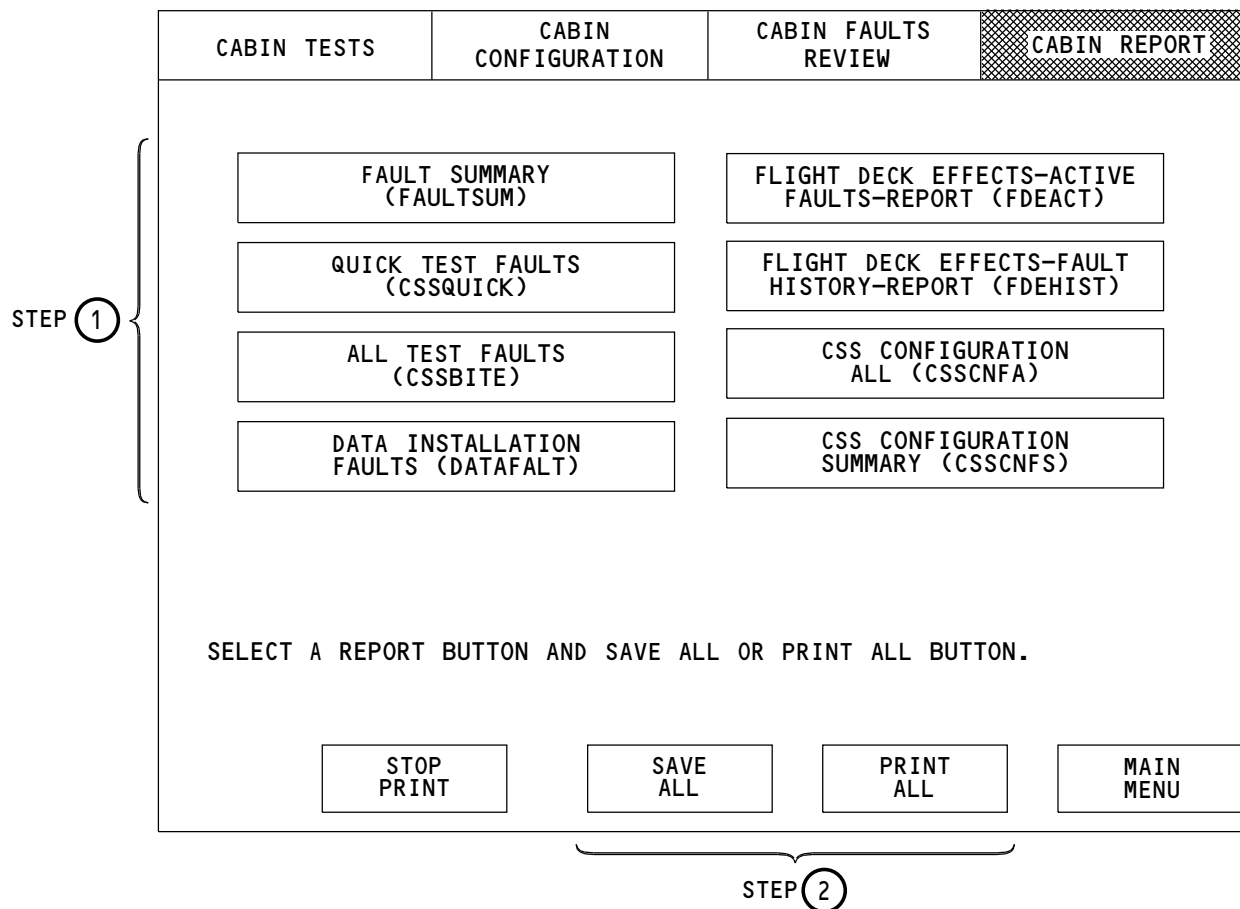
Touch MAIN MENU to show the cabin maintenance menu.

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CSS TEST AND SOFTWARE INSTALLATION - CABIN REPORT MENU

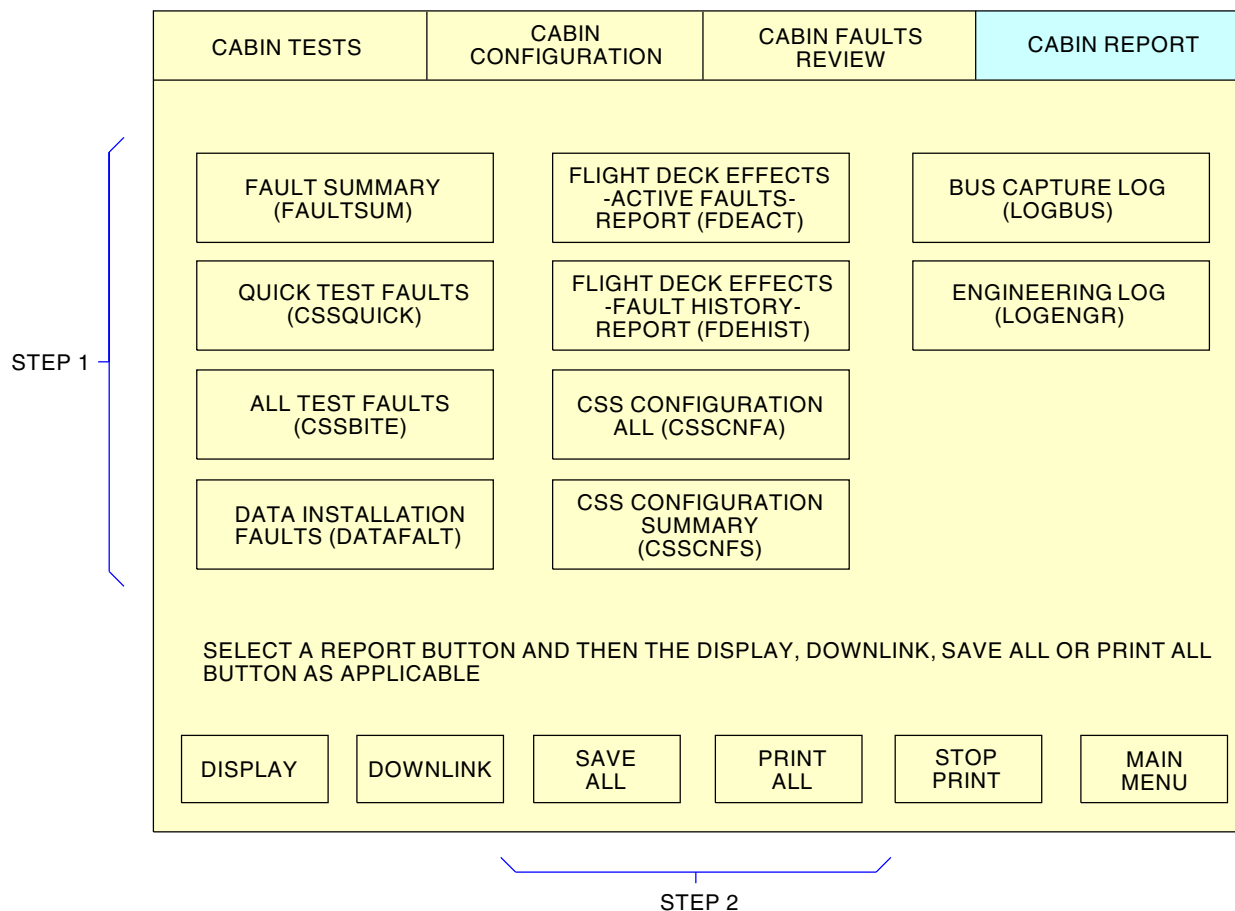
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ARO 001-015 PRE SB 777-23-0369

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CSS TEST AND SOFTWARE INSTALLATION - CABIN REPORT MENU

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ARO 016-999; ARO 001-015 POST SB 777-23-0369

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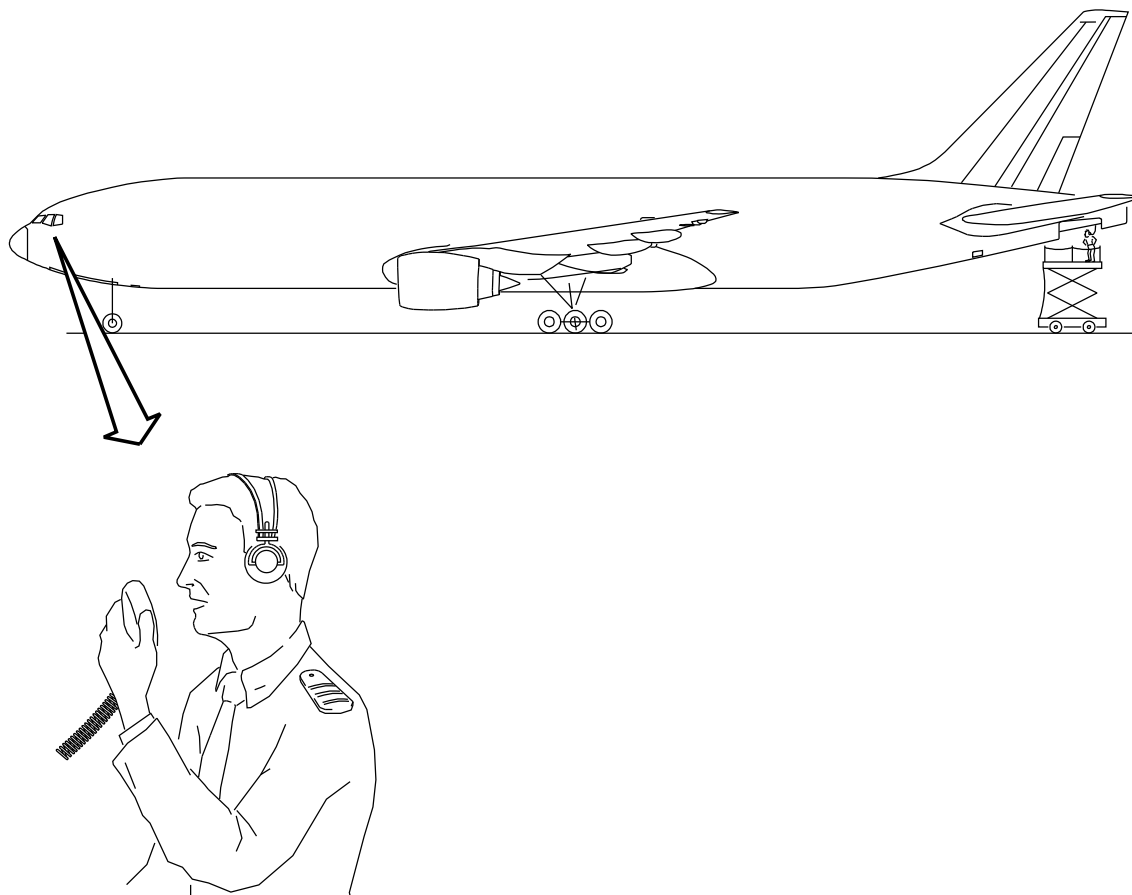
**SERVICE INTERPHONE SYSTEM - INTRODUCTION****General**

The ground crew uses the service interphone system to talk to each other and to the flight crew. There are service interphone jacks at different places on the airplane.

The service interphone system is part of the digital control audio system (DCAS).

Abbreviations and Acronyms

- AIMS - airplane information management system
- AMU - audio management unit
- capt - captain
- DCAS - digital control audio system
- elec - electric
- flt - flight
- fwd - forward
- inst - instrument
- intph - interphone
- MEC - main equipment center
- MIC - microphone
- sta - station
- wxr - weather radar
- xcvr - transceiver



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SERVICE INTERPHONE SYSTEM - INTRODUCTION

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**SERVICE INTERPHONE SYSTEM - GENERAL DESCRIPTION****General**

The service interphone jacks are in three groups:

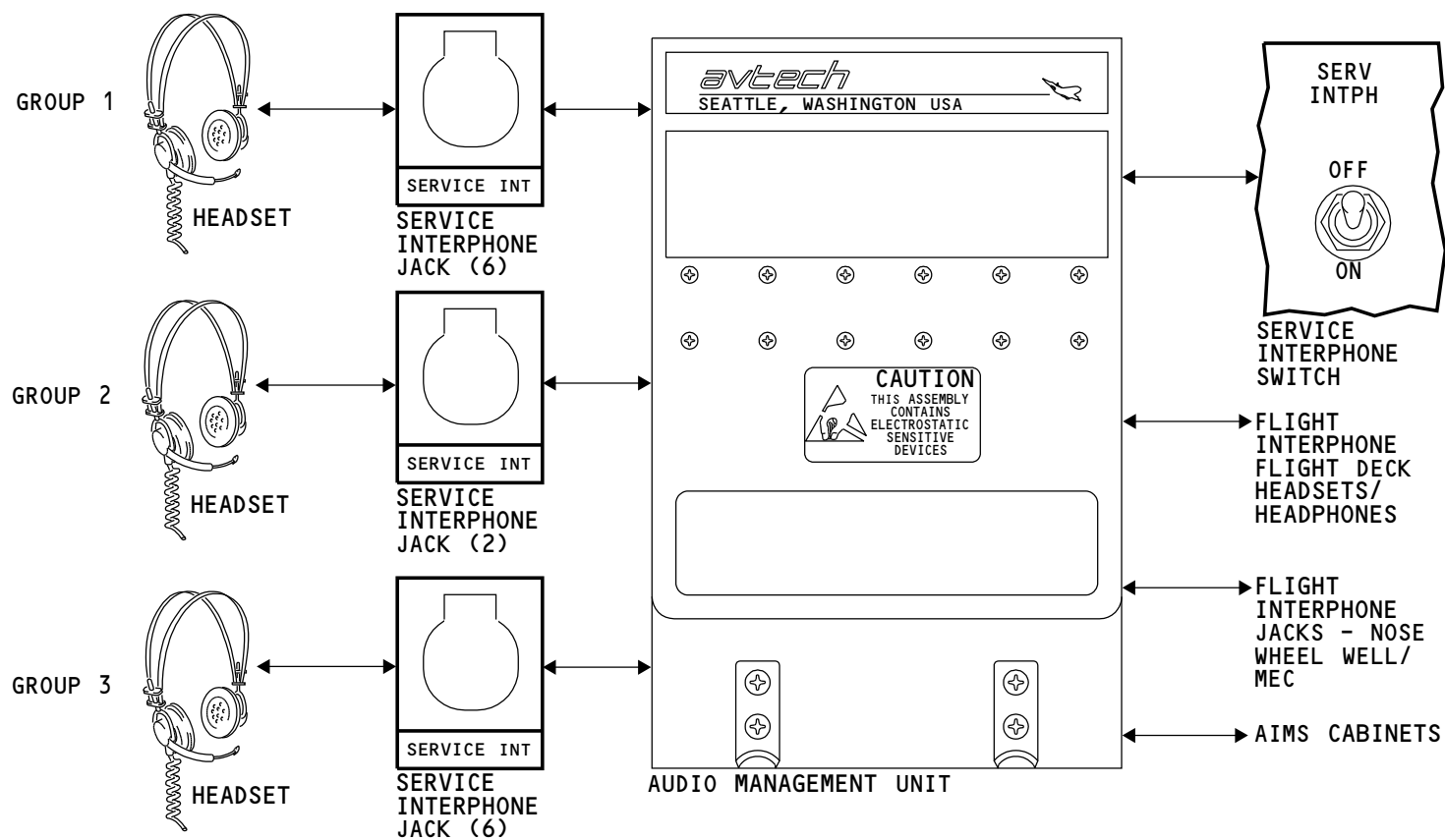
- Service interphone 1
- Service interphone 2
- Service interphone 3.

Each group sends a single audio input to the audio management unit (AMU).

The AMU mixes the audio from all three groups. It sends this mixed audio back to the headsets in all groups.

The AMU mixes the service interphone audio with the flight interphone audio if the service interphone switch is in the ON position.

The AMU sends fault data to AIMS over an ARINC 629 bus.



M39461 S000616145_V1

SERVICE INTERPHONE SYSTEM - GENERAL DESCRIPTION

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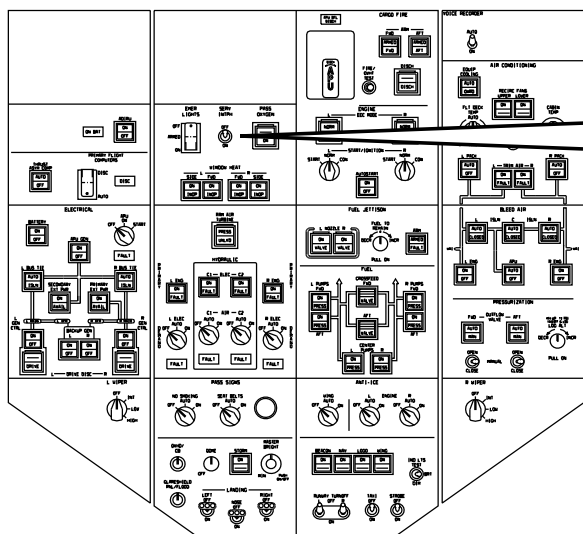
SERVICE INTERPHONE SYSTEM - COMPONENT LOCATIONS

Service Interphone Component Locations

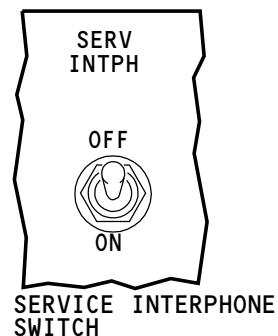
These components connect to the service interphone system:

- Service interphone switch on the flight deck
- Audio management unit (AMU) in the main equipment center (MEC).

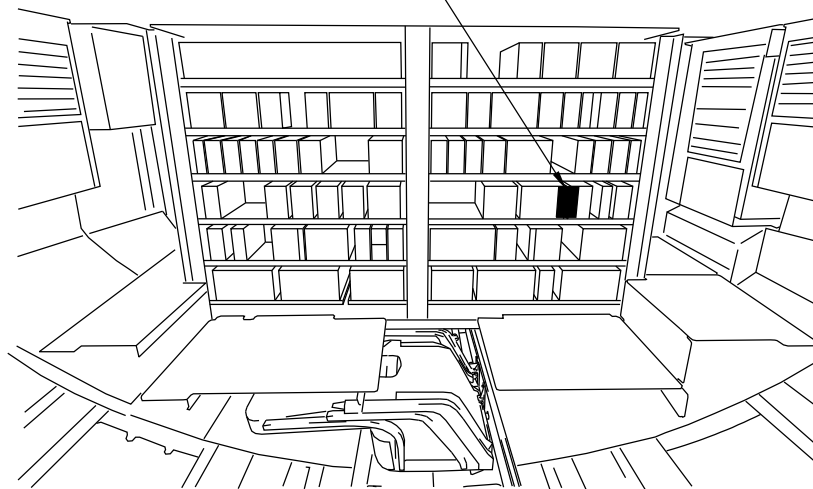
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FLIGHT DECK
P5 OVERHEAD PANEL



E1-4 SHELF
- AUDIO MANAGEMENT UNIT



MAIN EQUIPMENT CENTER

SERVICE INTERPHONE SYSTEM - COMPONENT LOCATIONS

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**SERVICE INTERPHONE SYSTEM - JACK LOCATIONS****Jack Locations**

The service interphone jacks in group one are in these locations:

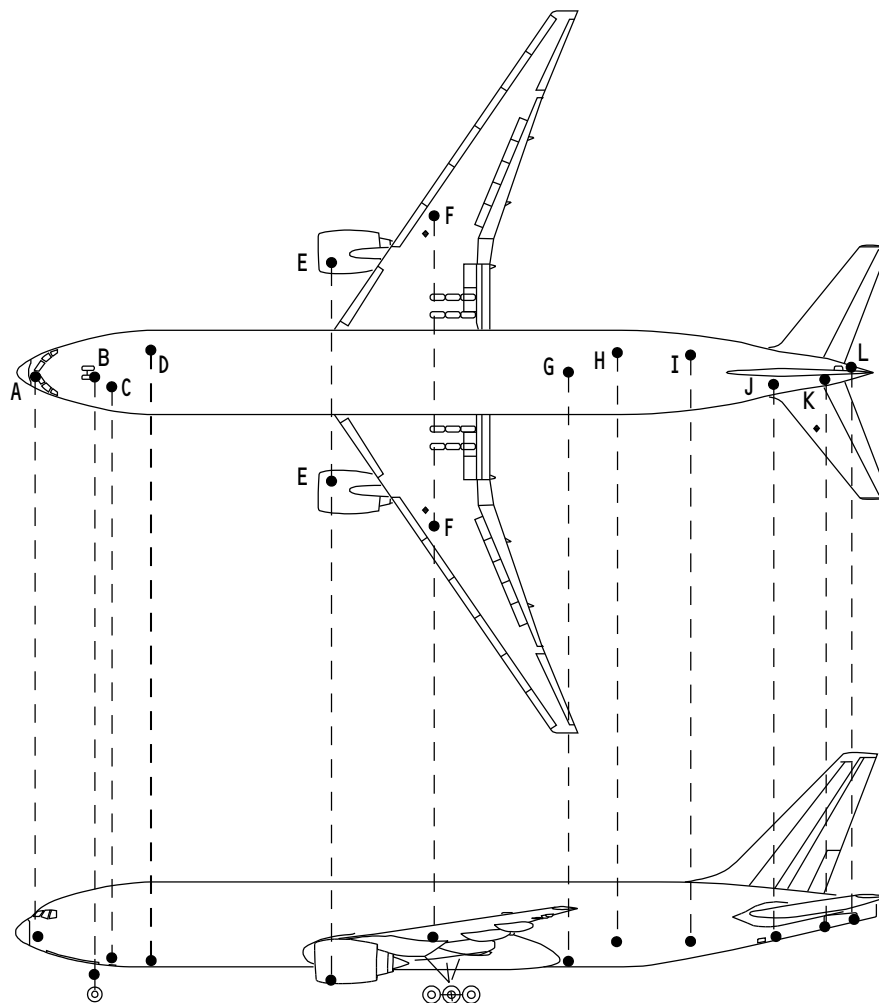
- Adjacent to the weather radar transceiver (location A)
- P40 service and APU shutdown panel (location B)
- E3 rack in the main equipment center (location C)
- P35 forward cargo handling accessory panel (location D)
- Left refuel station (location F)
- P56 wheel well electrical service panel (location G).

The service interphone jacks in group two are in these locations:

- Left and right engine nacelles (location E)
- Cabin equipment center (location M)

The service interphone jacks in group three are in these locations:

- Right refuel station (location F)
- Aft cargo handling (location H)
- Bulk cargo area access (location I)
- Forward tail cone (location J)
- Mid tail cone (location K)
- APU compartment (location L).



SERVICE INTERPHONE SYSTEM - JACK LOCATIONS

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SERVICE INTERPHONE SYSTEM - INTERFACES

Power

Power connects to the service interphone circuits for these conditions:

- When the tow switch is on, the DC TOWING RELAY connects 28v dc from the TOW INTPH GND circuit breaker
- When the ground handling bus has power, the DC TOWING RELAY connects 28v dc from the INTPH GND circuit breaker
- When the captain flight instrument bus has power, 28v dc connects from the INTERPHONE SERV circuit breaker.

Jacks

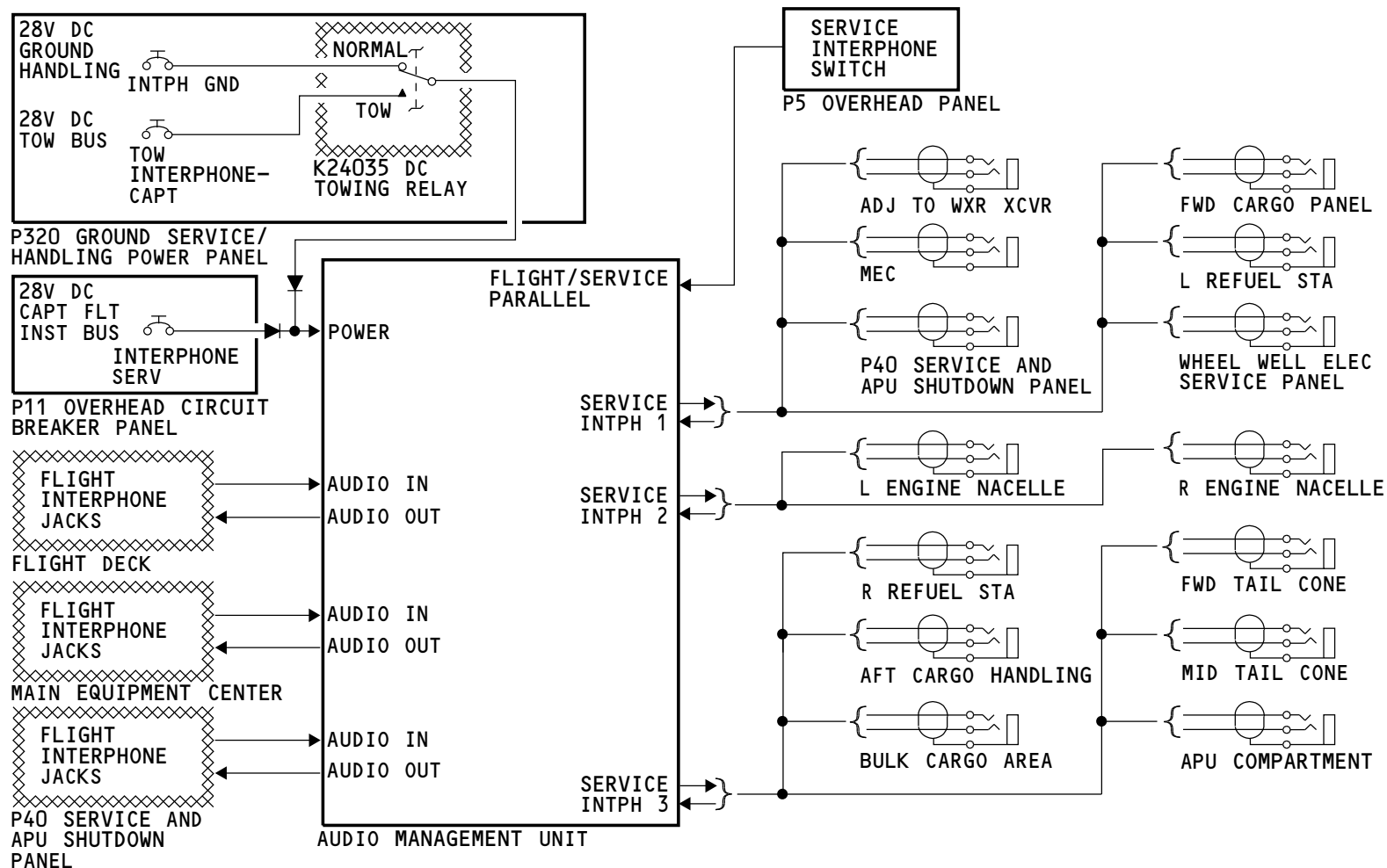
The jacks are in these three groups:

- Service interphone 1
- Service interphone 2
- Service interphone 3.

Service Interphone Switch

If you put the service interphone switch in the ON position, the service interphone system connects to these flight interphone components:

- Flight deck flight interphone jacks
- Main equipment center flight interphone jack
- P40 service and APU shutdown panel flight interphone jack.



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SERVICE INTERPHONE SYSTEM - INTERFACES

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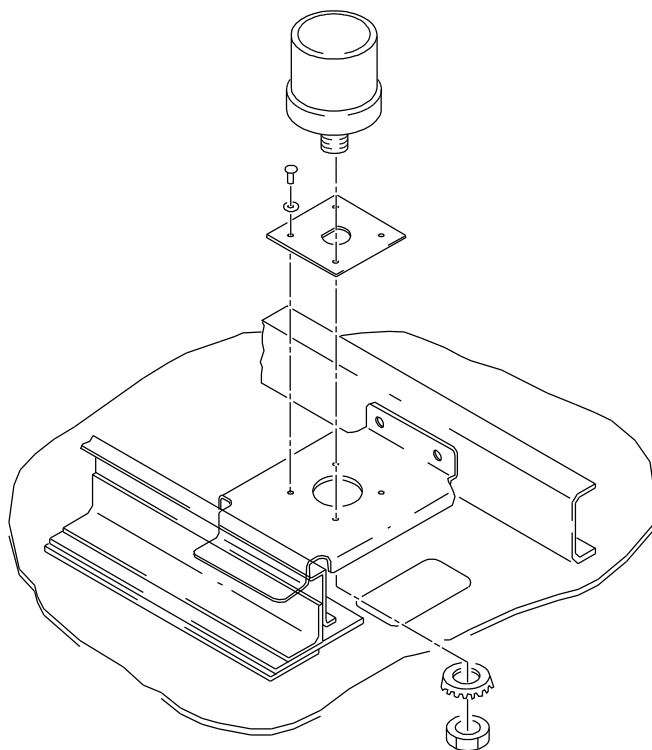
SERVICE INTERPHONE SYSTEM - JACK AND HEADSET

Purpose

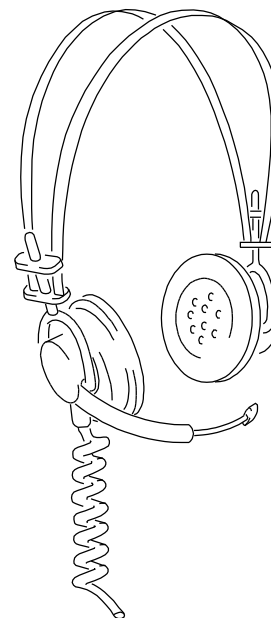
The ground crew uses the service interphone jacks to talk to each other and the flight crew. The jacks attach by a nut and washer.

The service interphone headset is a boom microphone and headphone. The headset permits hands-free operation.

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JACK (TYPICAL)



HEADSET

SERVICE INTERPHONE SYSTEM - JACK AND HEADSET

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**SERVICE INTERPHONE SYSTEM - TEST****General**

Use the digital control audio system test to test the service interphone system.

Digital Control Audio System Test

This test verifies the operation of the digital control audio system. The digital control audio system includes the service interphone system.

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GROUND TESTS

SELECT ATA SYSTEM (55)

- 23 VHF COMMUNICATION SYSTEM
- 23 SATELLITE COMMUNICATIONS (SATCOM) SYSTEM
- 23 DIGITAL CONTROL AUDIO SYSTEM**
- 24 MAIN AC ELECTRICAL POWER GENERATION SYSTEM
- 24 BACKUP (VSCF) ELECTRIC POWER SYSTEM (BEPS)

SELECT TEST TYPE

- ☒ SYSTEM TEST
- ☐ OPERATIONAL TEST
- ☐ DU REPLACEMENT TEST

SELECT SYSTEM TEST

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST

DIGITAL CONTROL AUDIO SYSTEM

CMCS GROUND TEST SELECTION DIALOG BOX

SERVICE INTERPHONE SYSTEM - TEST

M40183 S000616158_V2

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**SERVICE INTERPHONE SYSTEM - FUNCTIONAL DESCRIPTION****General**

The audio management unit (AMU) controls all service and flight interphone audio signals. The service interphone circuits are on the connector board of the audio management unit (AMU). Service interphone circuits have amplifiers for output audio. The AMU uses the service interphone switch position to send signals through either or both interphone systems.

Operation

The connector board mixes the three service interphone microphone inputs. This audio signal goes to switches S1 and S2. If the service interphone switch is OFF, the audio goes through switch S1 to the service interphone jacks.

If the service interphone switch is ON, the audio goes through switch S2 and connects with these audio signals:

- Flight interphone ground crew mic
- Flight interphone main equipment center mic
- Flight interphone station cards mic.

This audio then goes to:

- The flight interphone station cards
- The flight interphone main equipment center audio jack
- The flight interphone ground crew audio jack
- Switch S3.

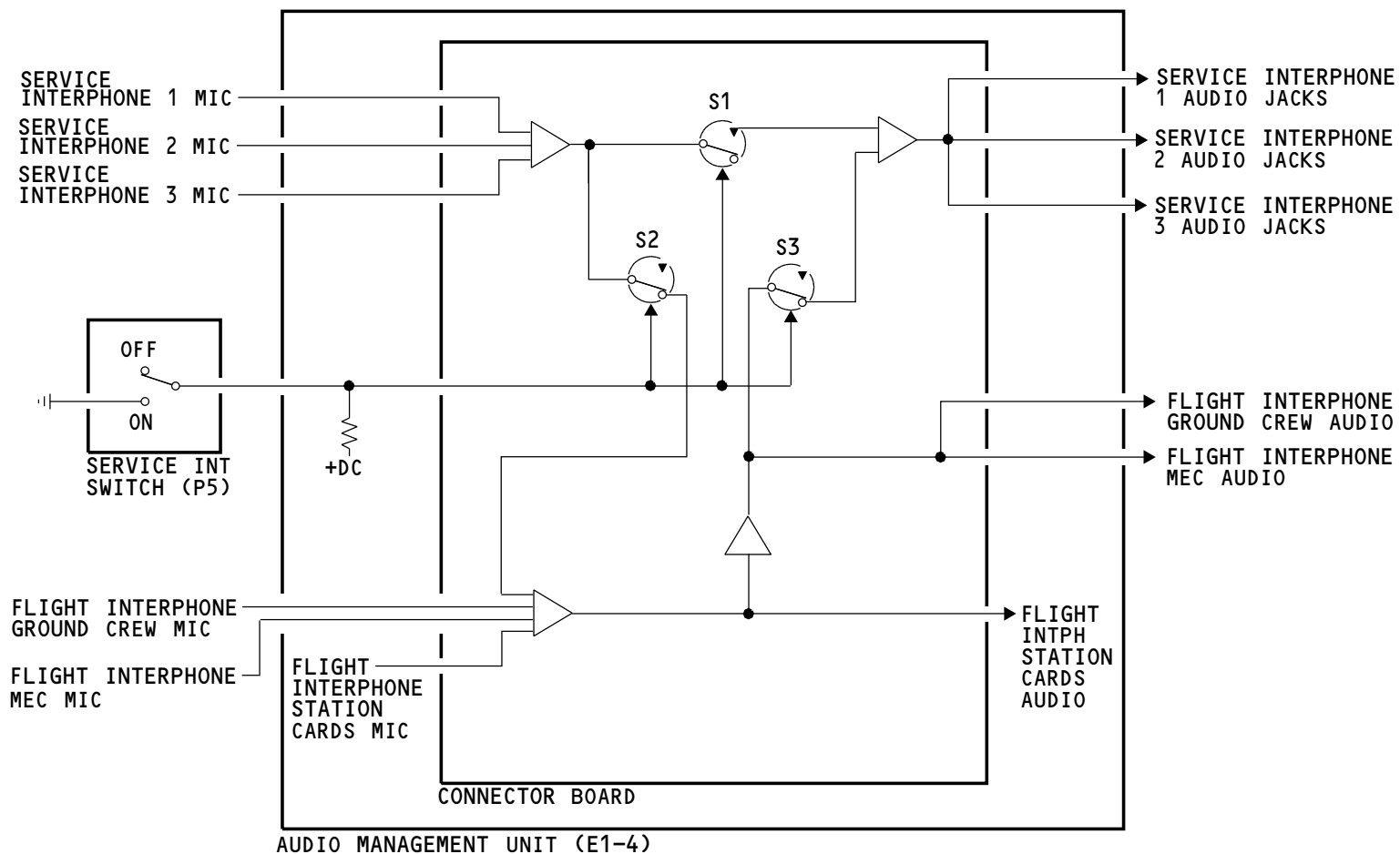
Switch S3 sends the audio to the service interphone jacks.

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SERVICE INTERPHONE SYSTEM - FUNCTIONAL DESCRIPTION

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**CABIN INTERPHONE SYSTEM - INTRODUCTION****Purpose**

Flight attendants use the cabin interphone system (CIS) to speak with each other and the pilots.

The CIS is like a telephone system which uses handsets and dial codes.

Abbreviations and Acronyms

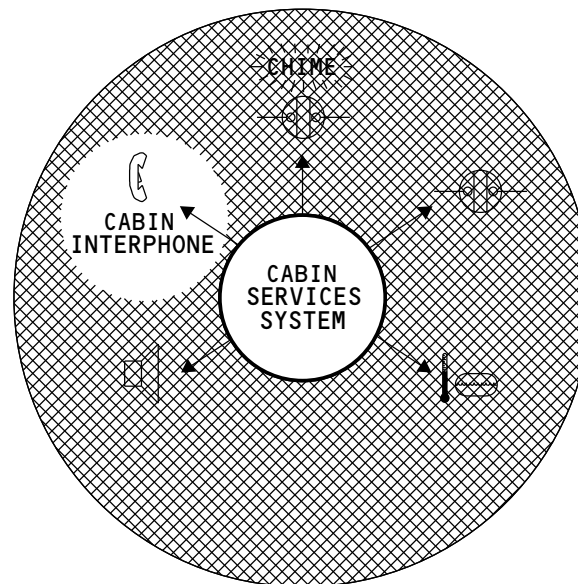
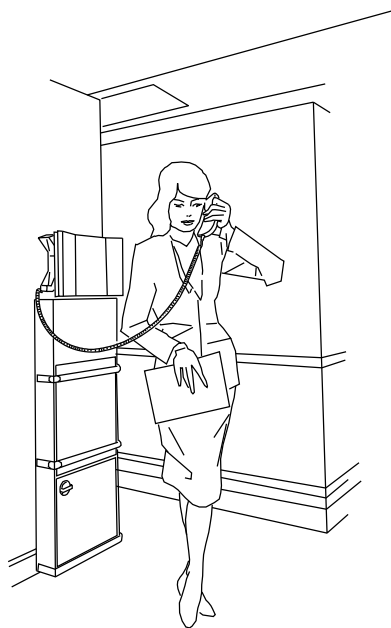
- AMU - audio management unit
- ASP - attendant switch panel
- alt - alternate
- aud - audio
- CACP - cabin area control panel
- CAH - cabin attendant handset
- CCP - cabin control panel
- CIC - cabin interphone controller
- CIS - cabin interphone system
- CDU - control display unit
- CSCP - cabin system control panel
- CSMU - cabin system management unit
- CSS - cabin services system
- dr - door
- FCR - flight crew rest
- FDH - flight deck handset
- FSEU - flap/slat electronics unit
- PA/CI - passenger address/cabin interphone
- PAC - passenger address controller
- PAS - passenger address system
- PTT - push to talk
- ZMU - zone management unit

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CABIN INTERPHONE SYSTEM - INTRODUCTION

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CIS - GENERAL DESCRIPTION

General

Flight attendants and the flight crew speak with each other on the CIS.

All audio signals go through the passenger address/cabin interphone (PA/CI) controller. The PA/CI controller is the primary component of the CIS.

Flight Deck

The flight deck has a flight deck handset (FDH) that connects to the PA/CI controller. The flight crew uses the FDH to dial flight attendant stations and to talk to flight attendants.

The flight crew can also use the flight interphone system to talk on the CIS. They use the center control display unit (CDU) to call the attendant station. The audio management unit (AMU) connects the PA/CI controller to the flight crew headsets. The center CDU also shows incoming call information.

The PA/CI sends call alert signals to the AIMS cabinets. The AIMS shows EICAS messages for calls to the flight deck.

Cabin

Each attendant station has a cabin attendant handset (CAH). The flight attendants use the CAHs to talk to each other and the flight crew. They use dial code keys on the CAH to call other stations.

The CAHs connect to zone management units (ZMUs) for audio and dial codes. The ZMUs have a digital interface with the PA/CI controller. The ZMUs digitize the signal from the CAH and send it to the PA/CI controller. The PA/CI controller makes the connection between stations. The ZMU changes the signal back to analog and sends it to the CAH.

When an attendant station gets a call, the passenger address system (PAS) makes a chime. The ZMU causes a master call light to come on at the attendant station.

Other Interfaces

The PA/CI controller sends fault information on the left systems ARINC 629 bus. It also uses airplane systems information for some functions.

You use the cabin control panels (CCPs) to control the CIS. A CCP operates as a cabin area control panel (CACP) or as a cabin system control panel (CSCP), depending upon its configuration.

The PA/CI controller has two cabin interphone controllers, normal and alternate. If the normal cabin interphone controller fails, the flight attendants get a message on the cabin control panels (CCPs). The flight attendants use the attendant switch panel (ASP) to select the alternate controller.

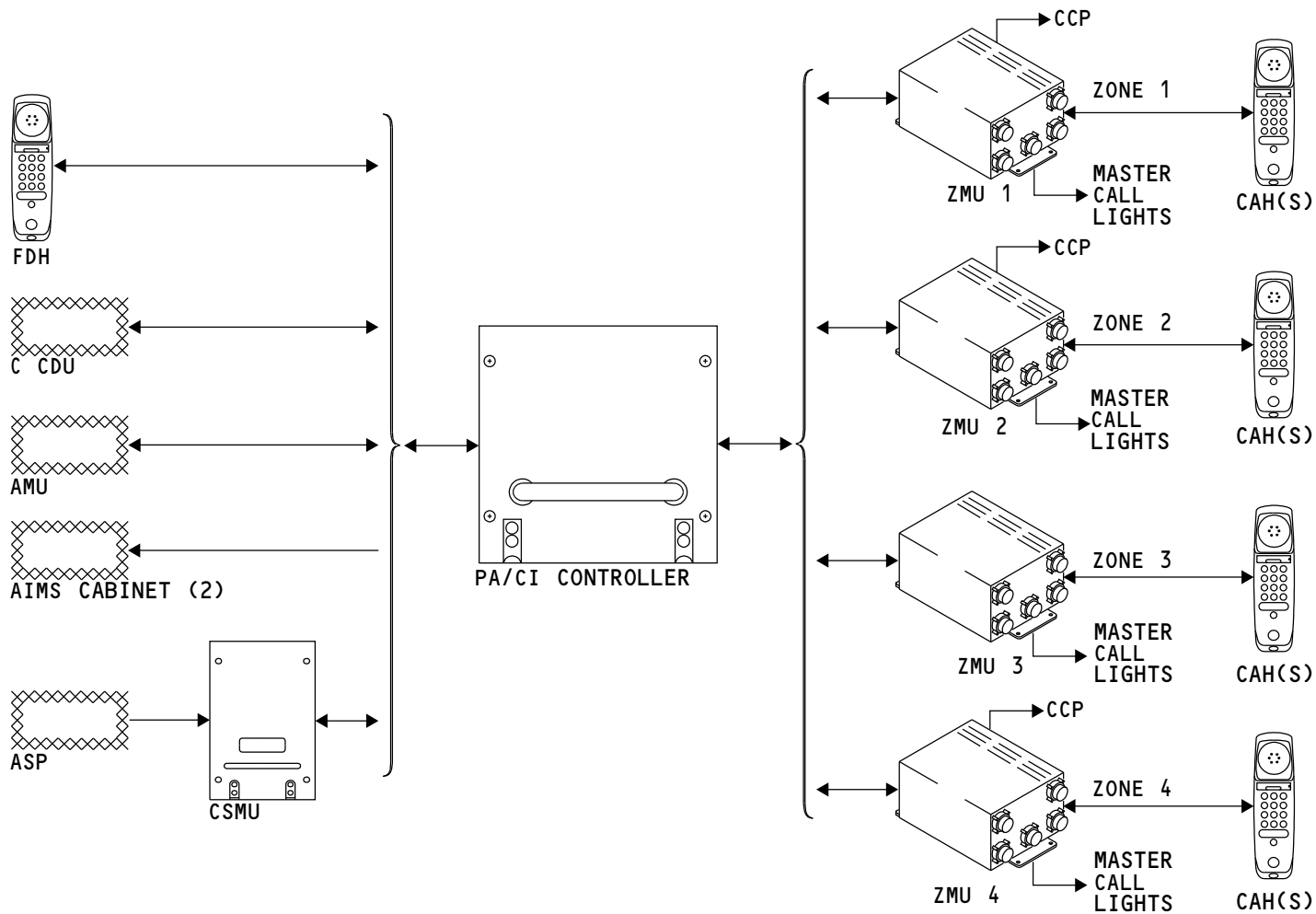
You use the cabin system control panel (CSCP) to test and install software into the CIS.

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CIS - GENERAL DESCRIPTION

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**CIS - COMPONENT LOCATIONS - CABIN AND MAIN EQUIPMENT CENTER****Cabin**

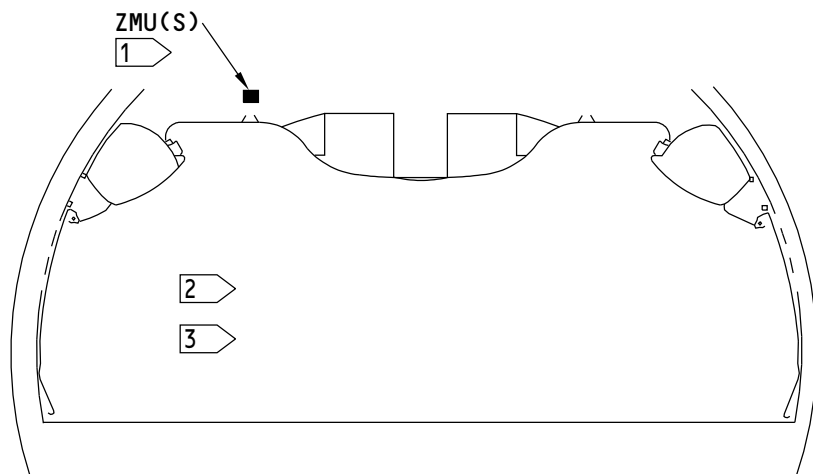
The cabin attendant handsets (CAHs) are at each attendant station seat.
The CI NORM/ALT switch is on the attendant switch panel (ASP) at door 2 left.

There is one CAH in the flight crew rest (FCR).

The zone management units (ZMUs) are above the passenger cabin area on the stow bin ladder assembly.

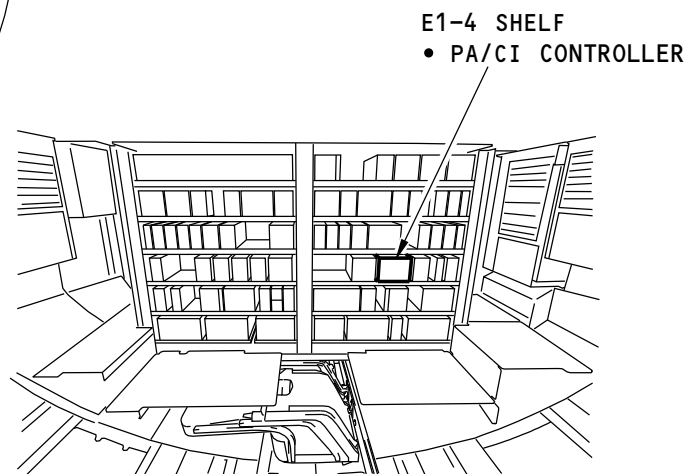
The passenger address/cabin interphone (PA/CI) controller is in the main equipment center (MEC).

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(VIEW IN THE AFT) DIRECTION

- 1 THERE IS ONE ZMU IN EACH ZONE.
- 2 CABIN ATTENDANT HANDSETS ARE AT EACH ATTENDANT STATION.
- 3 THE CI NORM/ALT SWITCH IS AT DOOR 2 LEFT.



MAIN EQUIPMENT CENTER

CIS - COMPONENT LOCATIONS - CABIN AND MAIN EQUIPMENT CENTER

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**CIS - COMPONENT LOCATIONS - FLIGHT DECK AND P30****Flight Deck**

The flight deck handset (FDH) and center control display unit (CDU) are on the aft aisle stand panel.

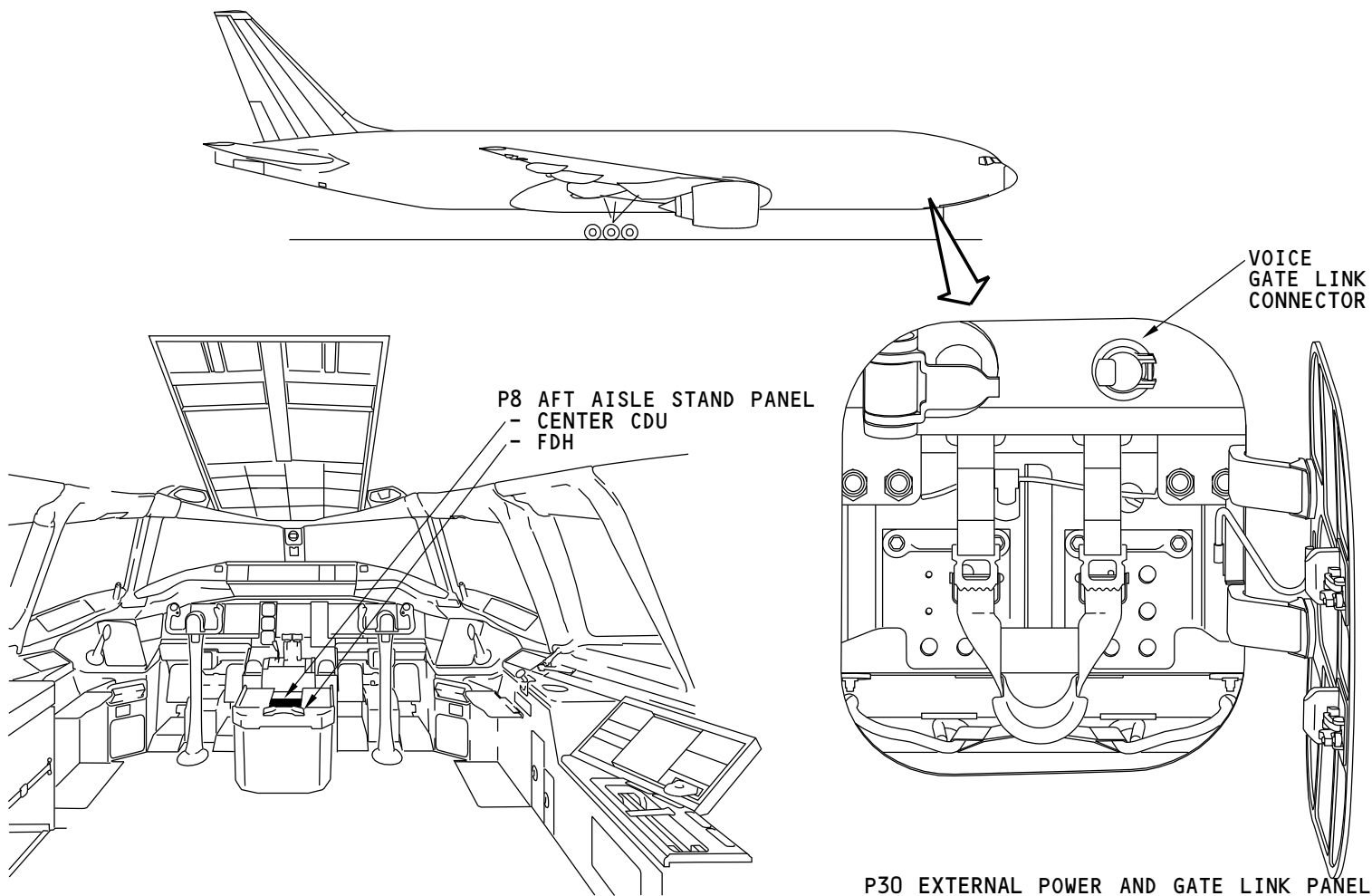
P30 External Power and Gate Link Panel

The external power and gate link panel has two telephone jacks on it. The jacks connect the passenger address/cabin (PA/CI) controller to land telephone networks.

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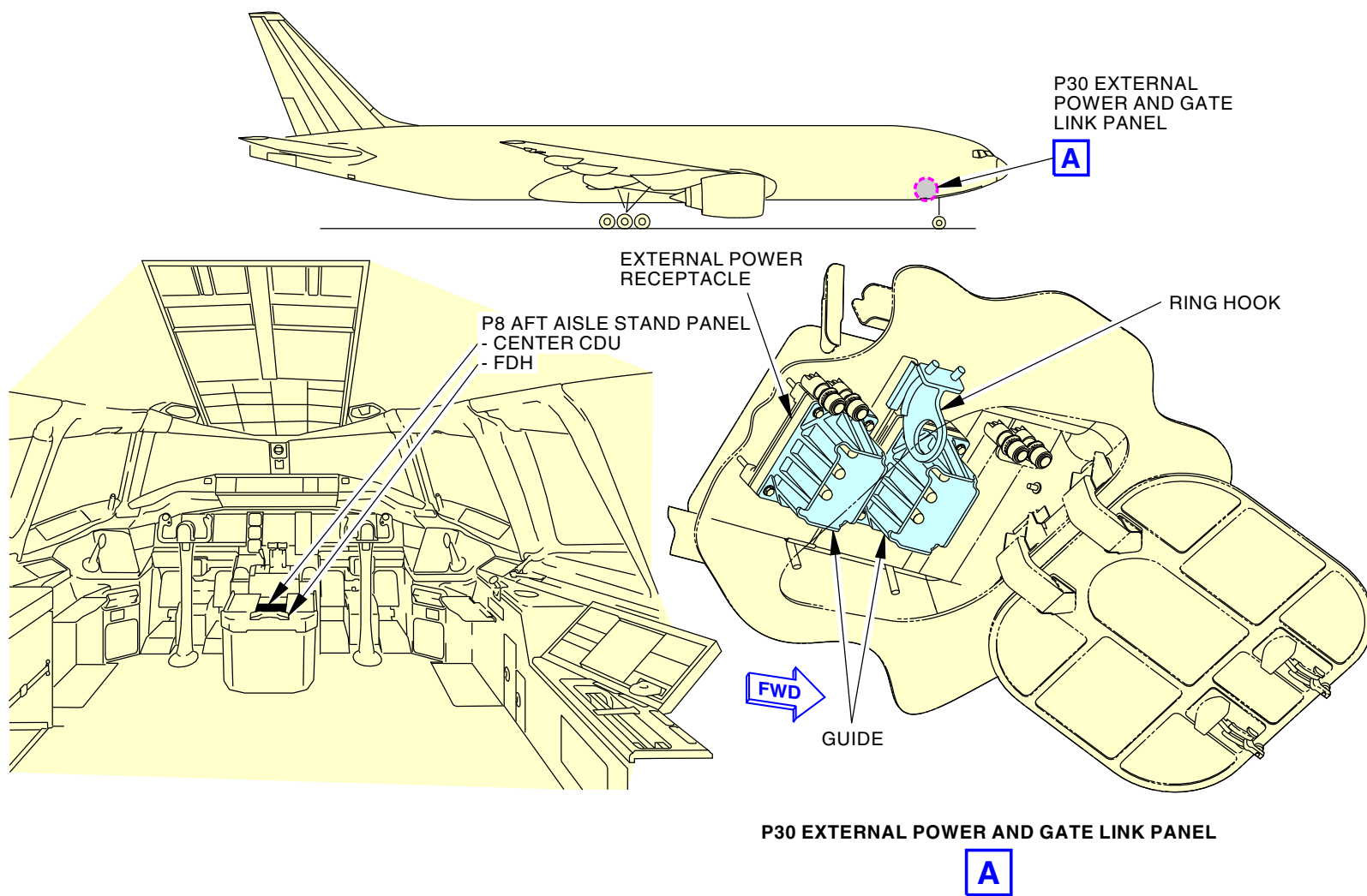
CIS - COMPONENT LOCATIONS - FLIGHT DECK AND P30

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CIS - COMPONENT LOCATIONS - FLIGHT DECK AND P30

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**CIS - POWER INTERFACE****General**

The standby power management panel has three circuit breakers that connect power to the CIS components.

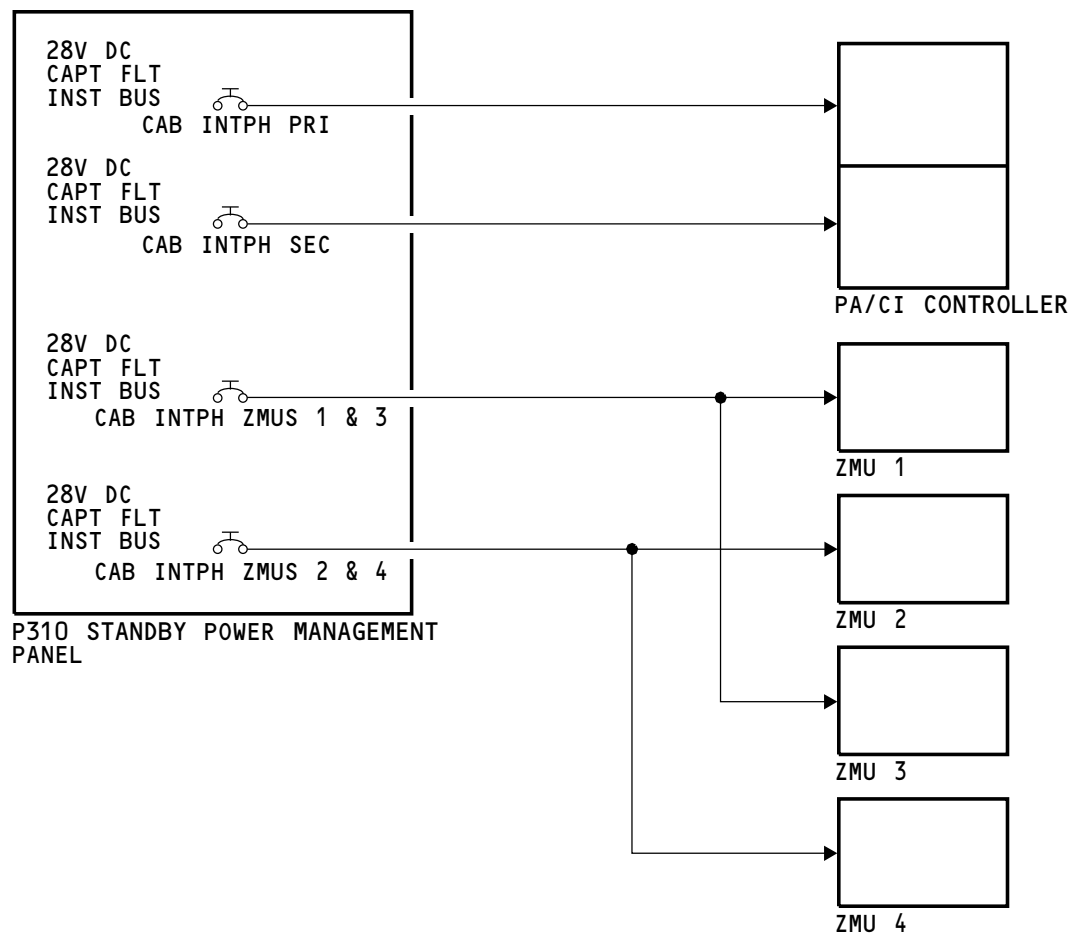
PA/CI Controller

The passenger address/cabin interphone (PA/CI) controller uses two 28 volt inputs for the cabin interphone function. One input supplies power to the normal cabin interphone controller. The other supplies power to the alternate cabin interphone controller.

ZMUs

The zone management units (ZMUs) get 28v dc for their cabin interphone circuits.

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CIS - POWER INTERFACE

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CIS - PA/CI CONTROLLER INTERFACES

General

The passenger address/cabin interphone (PA/CI) controller has interfaces to connect the flight attendant and flight crew stations.

Flight Crew

The flight crew can use the flight deck handset (FDH) or the flight interphone system to talk on the cabin interphone system (CIS).

The FDH sends mic audio and dial code signals to the PA/CI controller. It also sends a push to talk (PTT) for passenger address announcements. The PA/CI controller sends receiver audio to the FDH.

To use the flight interphone system, the flight crew selects a dial code on the center control display unit (CDU). The center CDU shows call messages and data from the PA/CI controller.

The audio management unit (AMU) sends and receives the audio from the PA/CI controller. It also sends a PTT.

The in-flight entertainment system (IFE) sends a signal to the CSMU when the video system is on. The CSMU sends the signal to the center CDU to show VIDEO IN USE. The PA/CI controller also sends a signal to show PA IN USE when the passenger address system is on.

When a call goes to the flight deck, the PA/CI controller:

- Sends a cabin call discrete to the AMU
- Sends a discrete to the AIMS cabinets
- Shows a message on the center CDU.

The audio control panel (ACP) call lights come on. The AMU controls the call lights. When a pilot selects CAB on an ACP, the AMU sends an off-hook signal to the PA/CI controller. The PA/CI controller sends a cabin reset signal to the AMU. The call lights go off.

To make a priority line call, push the CAB transmit switch twice. The AMU sends a priority line signal to the PA/CI controller. The priority line call goes to a station defined by the configuration database.

When the ground crew calls the flight deck from the service and APU shutdown panel, the flight crew gets a call light on their ACPs and a message on EICAS. The PA/CI controller sends a flight deck call signal to the AMU. It also sends a signal to the AIMS cabinets. When a pilot selects FLT on an ACP, the AMU sends a flight deck reset signal to the PA/CI controller. This ends the flight call signal.

Cabin

The PA/CI controller connects to the zone management units (ZMUs) to connect cabin handsets. Each ZMU has a digital interface with the PA/CI controller. The ZMU sends digital audio and dial codes to the PA/CI controller. The PA/CI controller makes the internal connection and sends digital audio to the ZMU. It also sends cabin interphone master call light data to the ZMUs.

External Panels

When the ground crew calls the flight deck, the P40 service and APU shutdown panel sends a signal to the PA/CI controller. When the flight crew calls the ground crew, the PA/CI controller sends a signal to the standby power management panel. This causes the ground crew call horn to sound.

There are two telephone lines that connect to the P30 external power and gate link panel. This permits the cabin interphone system to connect to public telephone systems.

CSMU

The cabin system management unit (CSMU) sends and gets both test and software installation data on the intersystem bus from the PA/CI controller.

The PA/CI controller has two cabin interphone controllers, normal and alternate. Only one operates at a time. If the normal controller fails, flight attendants select the alternate from the attendant switch panel (ASP).

Each controller monitors its operation. If it finds a failure, it sets a discrete. The discrete is a health discrete and it goes to the CSMU. The CSMU and the PA/CI controller send the failure information on the intersystem bus. The cabin system control panel and cabin area control panels show a failure message.

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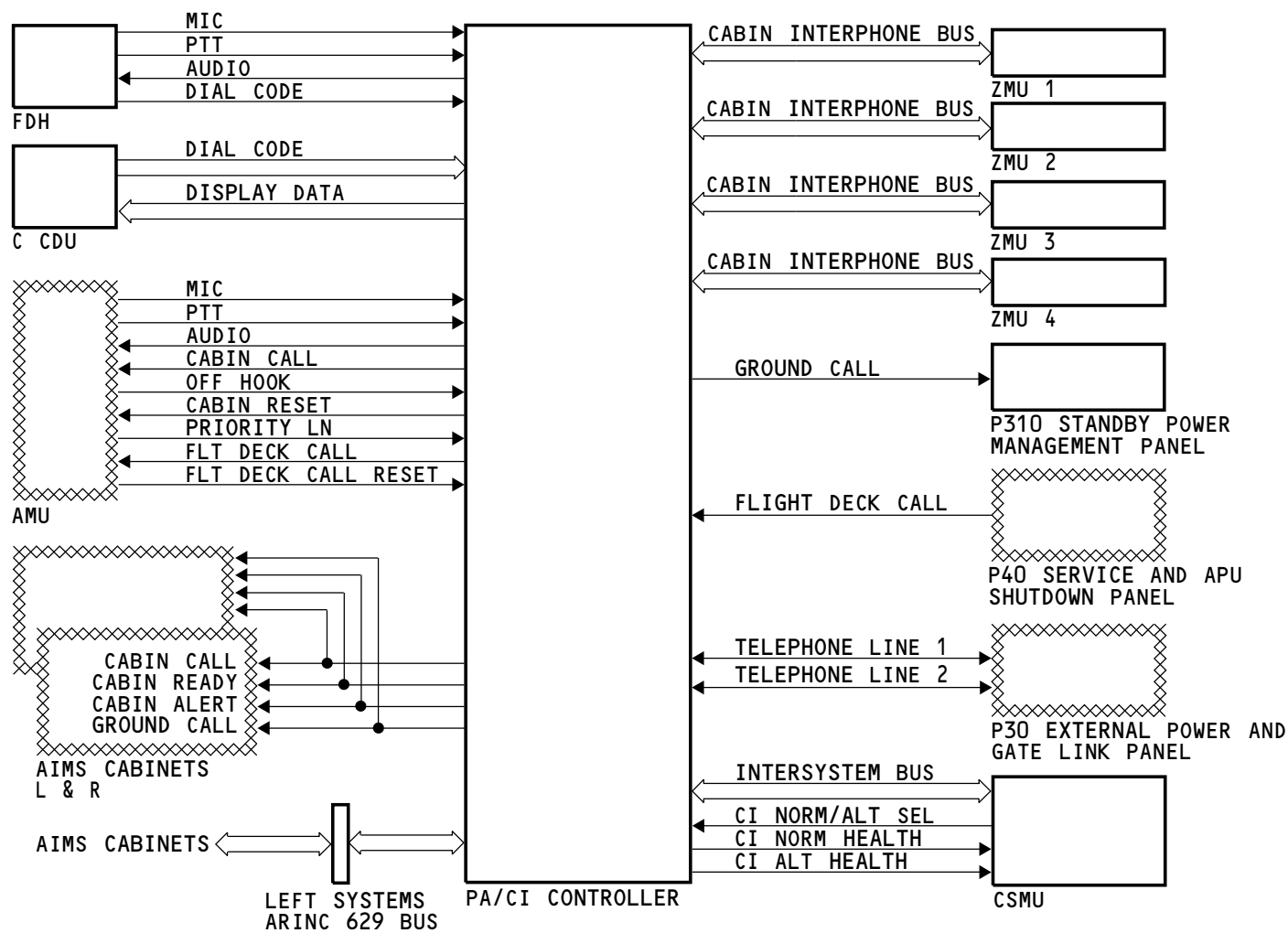
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**CIS - PA/CI CONTROLLER INTERFACES**

The PA/CI controller sends failure data to the AIMS on the left systems ARINC 629 bus. The CSMU also sends failure information to the AIMS when either cabin interphone controller fails.



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CIS - PA/CI CONTROLLER INTERFACES

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**CIS - ZMU INTERFACES****General**

The zone management units (ZMUs) supply an interface between the passenger address/cabin interphone (PA/CI) controller and the cabin attendant handsets (CAHs).

The ZMUs digitize analog audio from the CAHs. They change digital audio from the PA/CI controller to analog.

ZMU Interfaces

The ZMU gets microphone audio and dial codes from a CAH. It also gets a PTT for passenger address announcements. The ZMU digitizes the inputs and sends the data to the PA/CI controller.

The PA/CI controller makes the internal connection between the calling CAH and the called CAH. It sends the digital audio to the applicable ZMU. The ZMU changes the audio back to analog and sends it to the CAH.

The PA/CI controller also sends data to the ZMU. An incoming call makes the master call light come on.

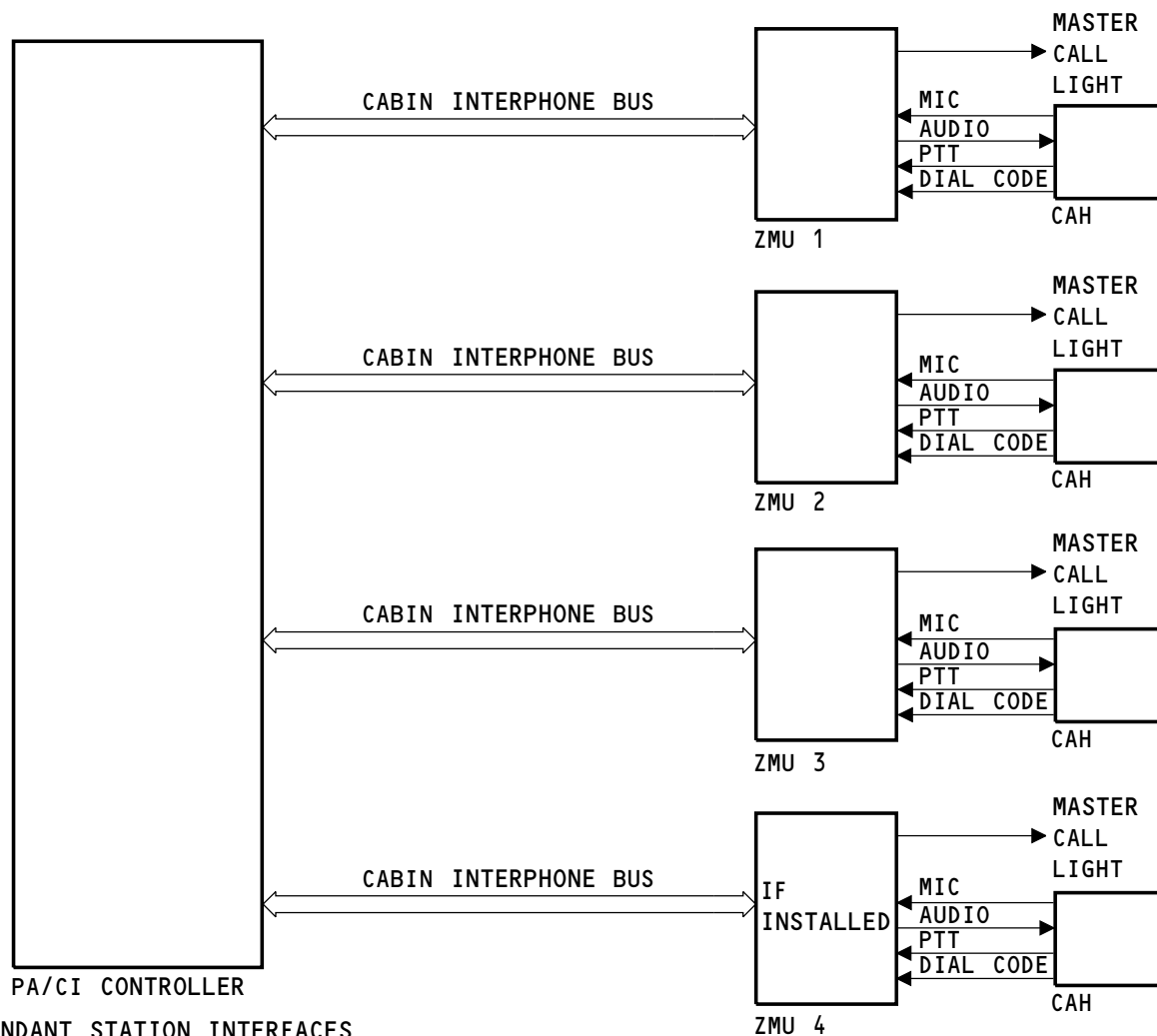
The interfaces for all of the CAHs operate in the same way.

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NOTE: ALL ATTENDANT STATION INTERFACES
ARE EQUIVALENT TO DOOR 1 LEFT.

CABIN INTERPHONE SYSTEM - ZMU INTERFACES

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**CIS - CABIN ATTENDANT HANDSET/FLIGHT DECK HANDSET****Purpose**

The crew uses cabin attendant handsets (CAH) and the flight deck handset (FDH) to speak with each other. They also use them to make an announcement on the passenger address system.

Physical Description

The CAH and the FDH are the same.

The CAH/FDH is like a telephone handset. It has these features:

- Earpiece
- Microphone
- Standard 12 digit keypad
- Reset switch.

It also has a PTT switch for use with the passenger address system.

The back of each handset has a directory that shows all the dial codes.

The CAH and FDH cradles contain a magnet used to open an off-hook switch in the handset while the handset is in the cradle.

Location

There is a CAH on the attendant seat at each door. The FDH is on the aisle stand in the flight deck.

Operation

All calls use a two digit dial code. To make a call, push the first key of the code, then push the second.

Functional Description

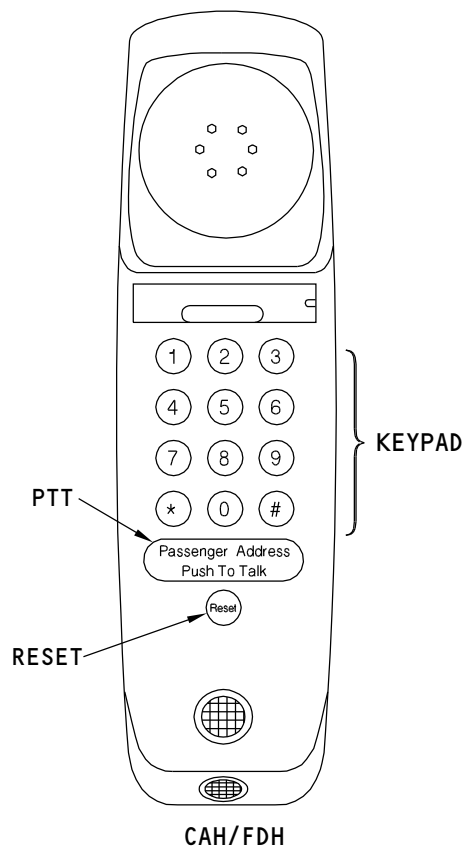
The CAH/FDH sends and receives analog audio. It also sends dial codes and a PTT signal.

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CIS - CABIN ATTENDANT HANDSET/FLIGHT DECK HANDSET

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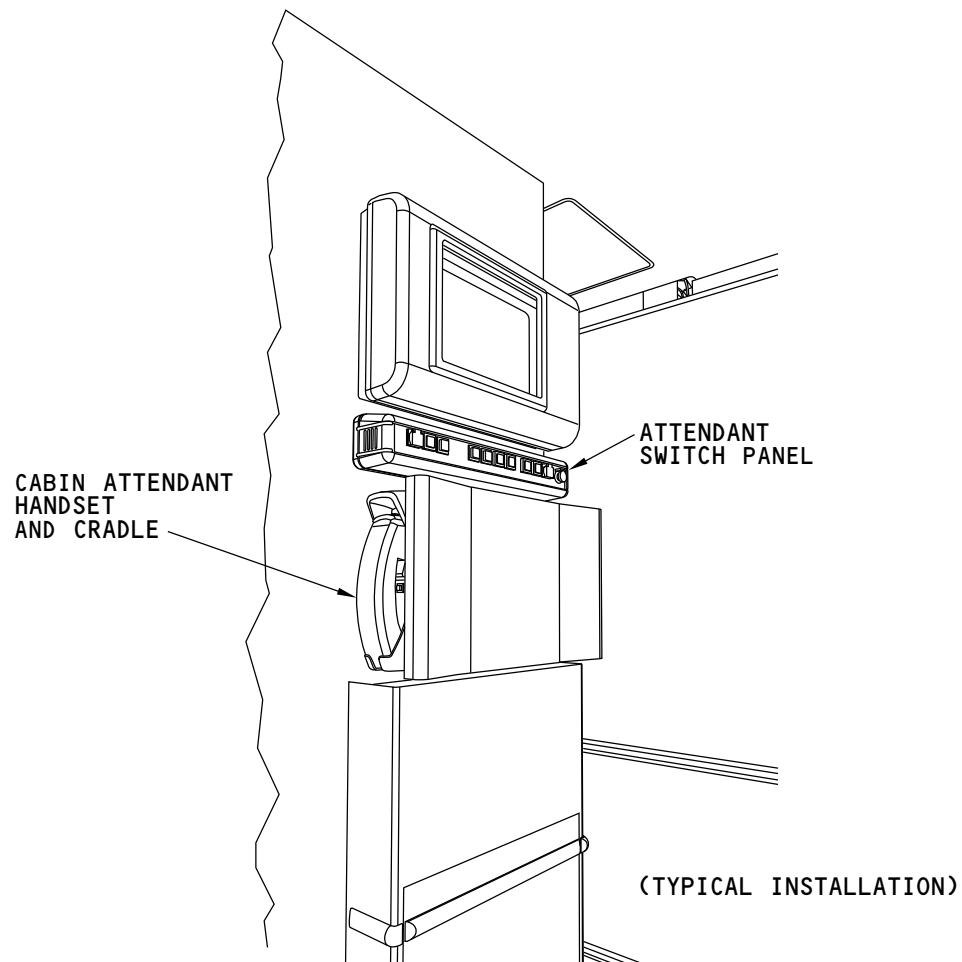
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**CIS - CAH AND ASP INSTALLATION****Cabin Attendant Handsets**

The cabin attendant handsets (CAHs) are at the attendant seats at each door. The cradle and CAH is behind the headrest of the seat.

Attendant Switch Panel

The attendant switch panel (ASP) is at door 2 left. It has the cabin interphone normal/alternate switch on it.



CIS - CAH AND ASP INSTALLATION

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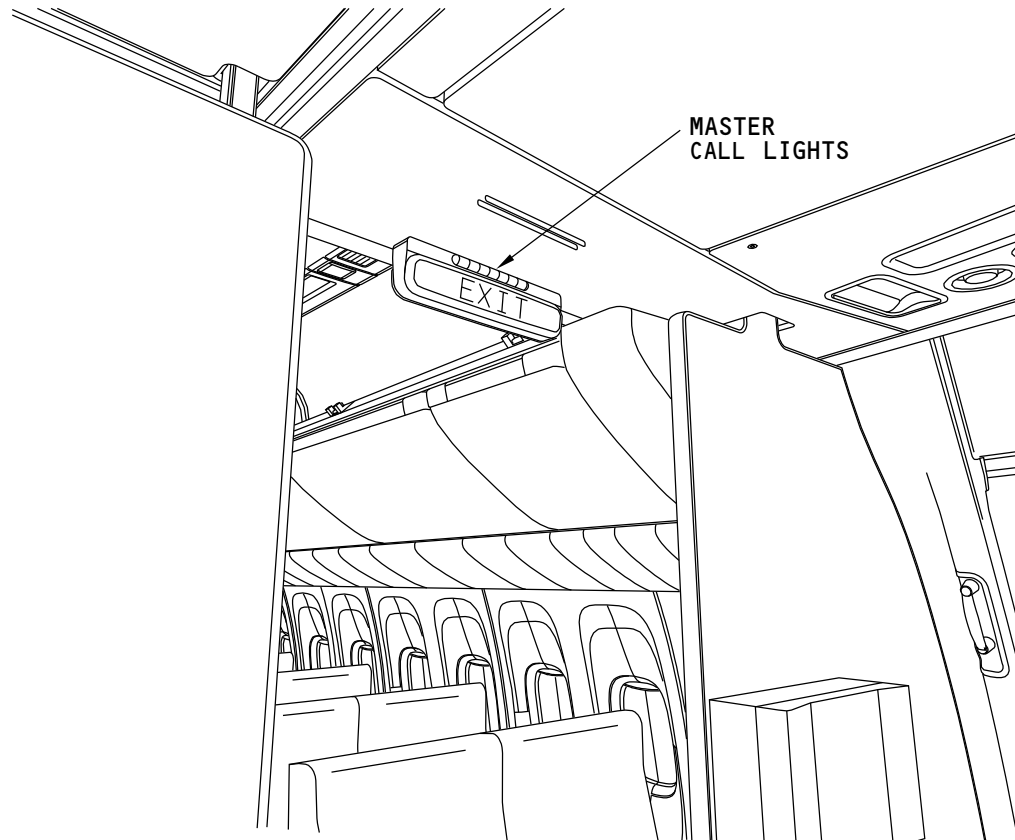
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**CIS - MASTER CALL LIGHTS****Operation**

When an attendant gets a cabin interphone call, a pink master call light comes on. The call light is on the EXIT sign module near the station that gets the call.

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CIS - MASTER CALL LIGHTS

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**CIS - CABIN INTERPHONE FAILURE MESSAGE****General**

Each cabin interphone controller (CIC) of the PA/CI controller monitors its internal operation. If it finds a failure, it sends a message to the cabin system control panel (CSCP) and the cabin area control panels (CACPs). The CSCP and all the CACPs show a pop up window.

Message

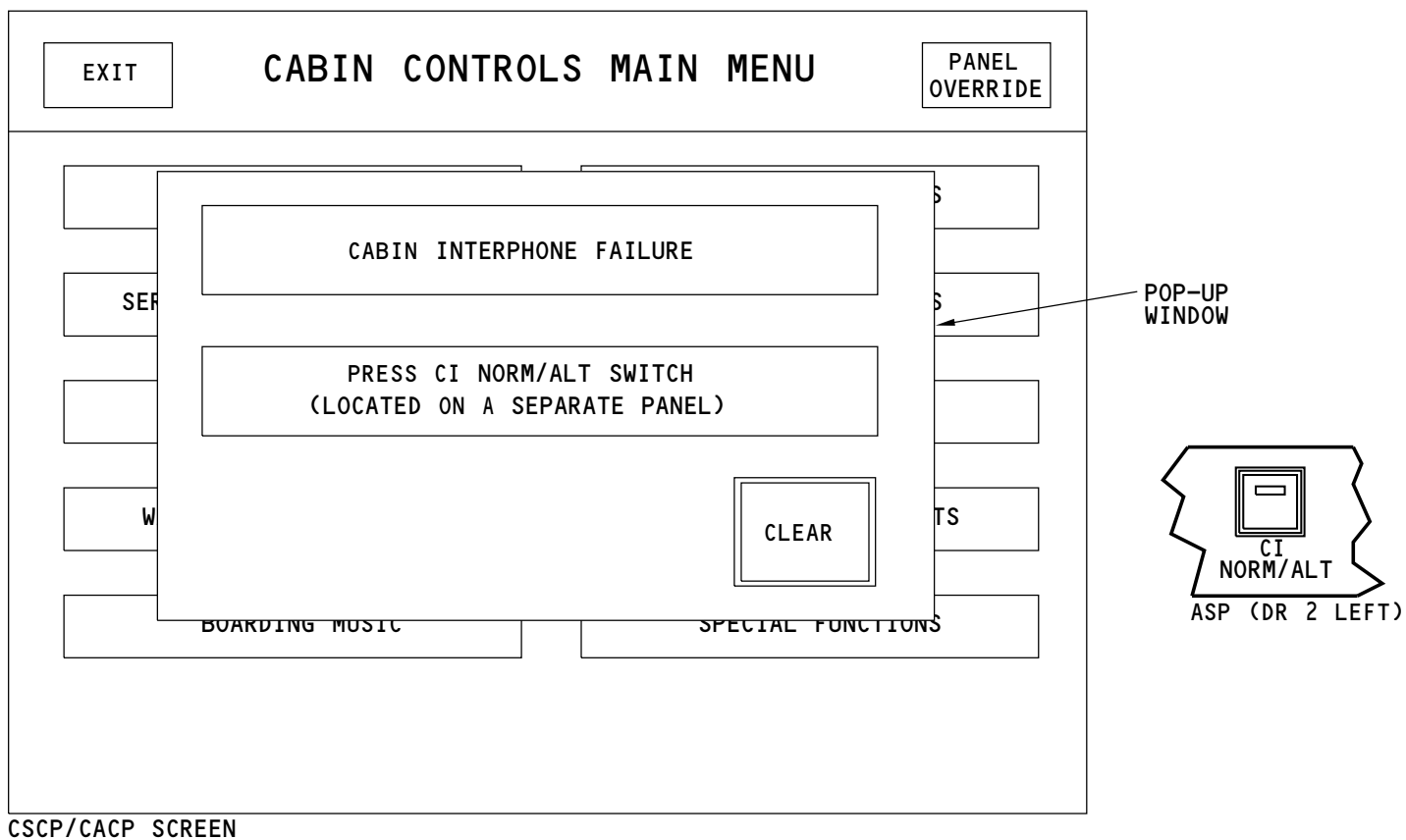
The pop up window tells the flight attendants to push the CI NORM/ALT switch.

To clear the window, touch CLEAR or push the CI NORM/ALT switch. The CI NORM/ALT switch is on the attendant switch panel at door 2 left.

If you touch CLEAR and do not push the CI NORM/ALT switch, the CSCP and CACPs show this message at the bottom of the screen - CABIN INTERPHONE FAILURE Press CI NORM/ALT Switch. The message goes away when you push the CI NORM/ALT switch.

The CIC also sends a message to the AIMS for both EICAS and the central maintenance computing function (CMCF).

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CIS - CABIN INTERPHONE FAILURE MESSAGE

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**CIS - NORMAL/ALTERNATE CIC FUNCTIONAL DESCRIPTION****General**

The PA/CI controller has two cabin interphone controllers (CICs), normal and alternate. Only one CIC operates at a time. If the normal CIC fails, the flight attendants select the alternate CIC. They do this from a switch on the attendant switch panel (ASP).

The interfaces to both CICs are the same.

Operation

The CI NORM/ALT switch is an alternate action switch. It sends a discrete signal to the cabin system management unit (CSMU).

During normal operation, the switch signal goes through a switch in the CSMU to the PA/CI controller. When you install software or test the system, the CSMU controls the selection of normal or alternate CIC.

Normal CIC

With the switch in the normal position, an open signal goes to the PA/CI controller. This causes the PA/CI to use the normal CIC. The alternate CIC is off.

Alternate CIC

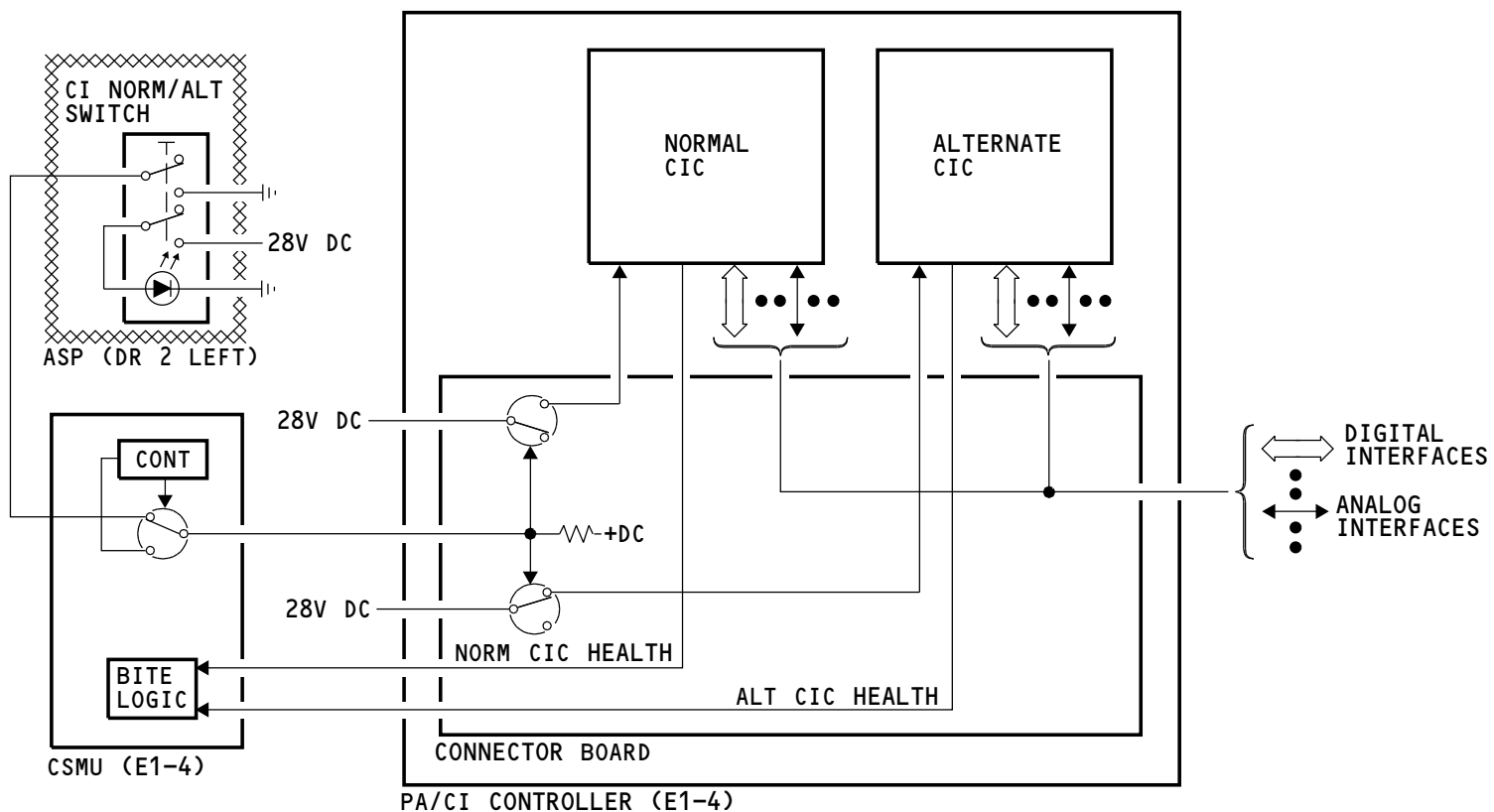
When you push the switch in, a ground signal goes to the PA/CI controller. The LED in the switch comes on. A ground signal causes the PA/CI controller to use the alternate CIC. The normal CIC is off.

Health Signals

Both CICs monitor their operation. Each CIC sends a health discrete to the CSMU. If the CIC finds a failure, it sets the health discrete. The CSMU sends a message to the CSCP and CACPs. The CSMU also sends a signal to the AIMS.

Training Information Point

Because only one CIC operates at a time, you can use the CI NORM/ALT switch to help isolate cabin interphone system problems. If the problem goes away when the other CIC is active, the problem is in the PA/CI controller.



CIS - NORMAL/ALTERNATE CIC FUNCTIONAL DESCRIPTION

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CIS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION

General

The passenger address/cabin interphone (PA/CI) controller has two cabin interphone controllers (CICs) that control the cabin interphone system. Only one CIC operates at a time. Each controller does these functions:

- Receives call inputs
- Makes the connection between stations
- Makes handset tones
- Sends call alert signals
- Sends passenger address audio to the passenger address system.

Flight Deck Handset

The flight crew uses either the flight deck handset (FDH) or the flight interphone system to talk on the CIS.

The FDH sends mic, PTT, and dial codes to the PA/CI controller. The PA/CI controller sends call audio to the FDH.

Audio Management Unit

The flight crew also uses the flight interphone system to talk on the CIS. The audio management unit (AMU) connects the flight interphone system to the PA/CI controller. The AMU sends microphone audio. It receives call audio.

The audio signals from the FDH and AMU add together and go to the switch network. The switch network sends the receive audio to both the FDH and AMU.

The PA/CI controller sends a cabin call signal to the AMU when the flight deck gets a call. The AMU uses it to set a call light on the audio control panels (ACPs). When the flight crew answers the call using the flight interphone system, the AMU sends an off-hook signal to the PA/CI controller. The PA/CI controller makes the call connection and sends a cabin call reset signal.

If the flight crew pushes the CAB transmitter select switch twice in one second, the AMU sends a priority line signal to the PA/CI controller. The PA/CI controller makes a call to the priority handset.

When you push the FLIGHT DECK CALL switch on the service and APU shutdown panel, a signal goes to the PA/CI controller. The PA/CI controller sends a flight deck call signal to the AMU. The AMU uses it to set a call light on the ACPs. When the flight crew answers the call, the AMU sends a flight deck call reset signal to the AMU.

Control Display Unit

If the flight crew uses the flight interphone system to make a call, they use the center control display unit (CDU) to select a station. The CDU sends the dial code to the PA/CI controller.

The PA/CI controller sends display data to the CDU.

External Power and Gate Link Panel

The external power and gate link panel connects the PA/CI controller to land telephone lines.

Service and APU Shutdown Panel

The ground crew uses the service and APU shutdown panel to call the flight deck.

Standby Power Management Panel

The standby power management panel gets a ground call signal from the PA/CI controller to sound the ground crew call horn.

Zone Management Units

The zone management units (ZMUs) connect the PA/CI controller to the cabin attendant handsets (CAHs). The ZMUs send digital audio and dial codes to the PA/CI controller. The CIC uses the dial codes to make connections and make tones. The CIC sends digital audio and call light data to the ZMUs.

The EIA-485 interface sends the digital audio to the digital to analog (D/A) converter. The EIA-485 interface sends the dial codes to the microprocessor.

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CIS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION**A/D and D/A Converter**

The D/A converter changes the digital audio from the ZMUs to analog and sends it to the switch network. The analog to digital (A/D) converter digitizes the audio signal from the switch network and sends it to the EIA-485 interface.

Switch Network

The switch network makes the connection between stations. The microprocessor sends data to the switch network to make connections as stations come off-hook.

When the second station in a call goes off-hook, the microprocessor stops the tone generator. The switch network makes the connection between the stations. If more than two stations are in a call, the switch network adds them to the connection as they come off-hook.

Tone Generator

The CIC makes tones to show the status of a call. They are:

- Dial tone
- Ring-back
- Busy signal (normal)
- Busy signal (fast).

When a handset goes off-hook, the tone generator makes a dial tone. When you dial a code, and the other station is on-hook, the tone generator makes a ring-back. If the station is off-hook the tone generator makes a normal busy signal. If the dial code is an incorrect code, it makes a fast busy signal.

Passenger Address Controller

The CIC supplies passenger address announcements to the passenger address controller (PAC). It sends as many as six channels of audio to the PAC. It also sends a PTT for each channel.

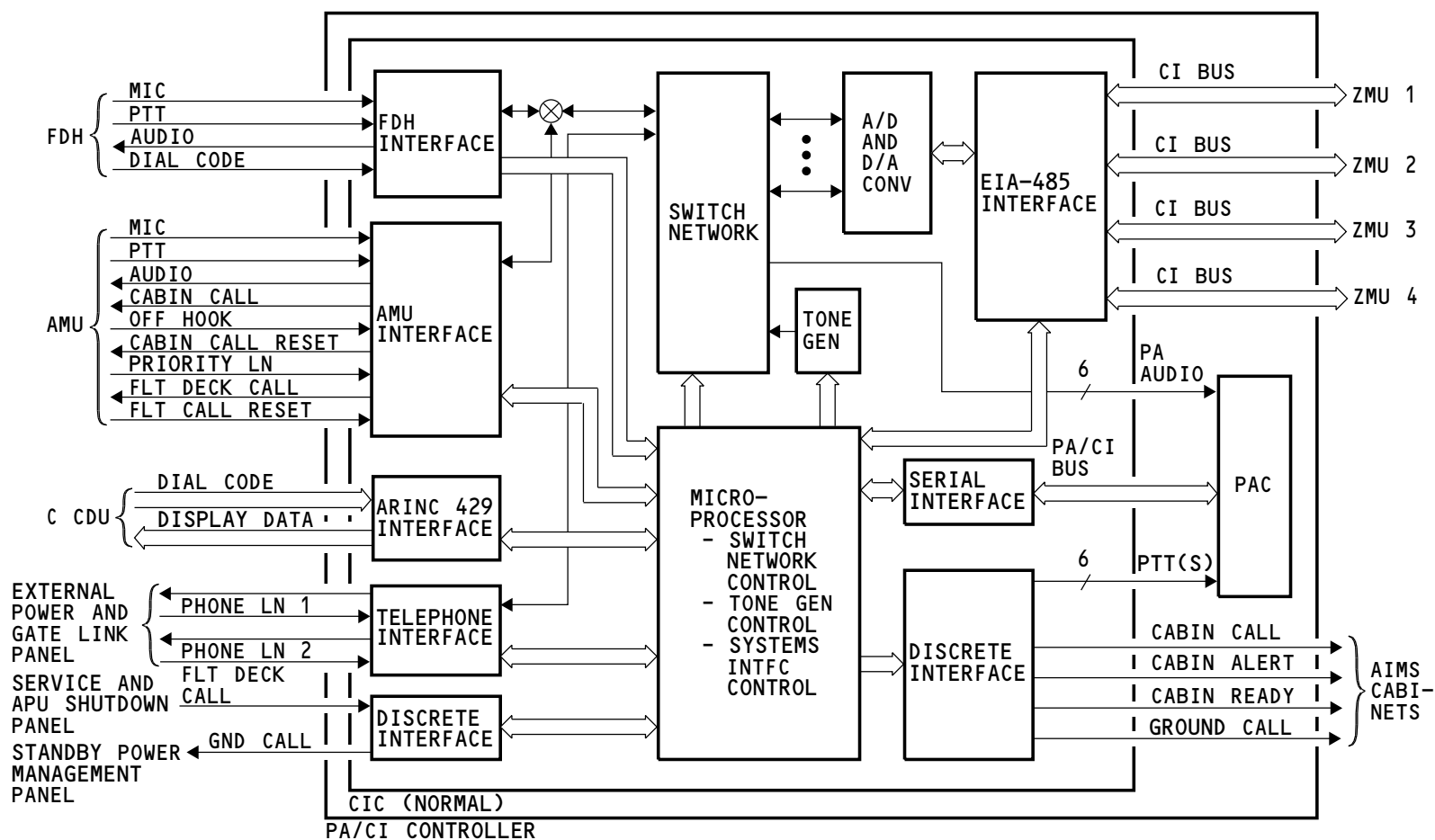
The PAC uses an ARINC 629 interface and the intersystem bus to send and receive data from other airplane systems and other CMS components. Because the CIC does not have the same interface, it uses the PAC to send and receive data from other systems. The PA/CI bus supplies the interface between the CIC and PAC.

AIMS

When a call goes to the flight deck, the PA/CI controller sends a signal to the AIMS cabinets. These are the call alert signals:

- Cabin call (for normal flight deck calls)
- Cabin alert (for pilot alert call)
- Cabin ready (for cabin ready code)
- Ground call (for ground crew call to flight deck).

The AIMS uses the signals to alert the flight crew with an EICAS message and a chime.



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CIS - PA/CI CONTROLLER FUNCTIONAL DESCRIPTION

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CIS - ZMU AND CAH FUNCTIONAL DESCRIPTION

General

The zone management units (ZMUs) supply an interface between the passenger address/cabin interphone (PA/CI) controller and the cabin attendant handsets (CAHs). The ZMUs also control the master call lights.

Each ZMU can connect to as many as five CAHs.

Zone Management Unit

The ZMU has circuits for the CIS. The ZMU digitizes CAH mic audio and changes PA/CI controller call audio to analog.

The ZMU receives data and digital audio from the PA/CI controller. The EIA-485 interface sends the digital audio to the multiplexer/demultiplexer. The multiplexer/demultiplexer isolates the different channels of audio. It sends each channel to the applicable CAH interface.

The CAH interface has a digital to analog (D/A) converter that changes the digital audio to analog. The CAH interface sends the analog signal to the CAH.

The CAH sends mic audio to the ZMU. The CAH interface has an analog to digital (A/D) converter that digitizes the audio signal. The digital signal goes to the multiplexer. The CAH interface also supplies the bias voltage for the CAH microphone.

The CAH sends dial codes and a PTT to the ZMU. The CAH interface has a PTT/dial code interface that digitizes the inputs. It sends the data to the multiplexer/demultiplexer.

The multiplexer/demultiplexer adds the signals together and sends it to the EIA-485 interface. The EIA-485 interface sends it to the PA/CI controller.

Each ZMU connects to one CAH that supplies a direct access input to the passenger address system. Normally the mic audio and PTT go through the direct access relay to the CAH interface. The direct access function sends the mic and PTT to the passenger address system.

Master Call Lights

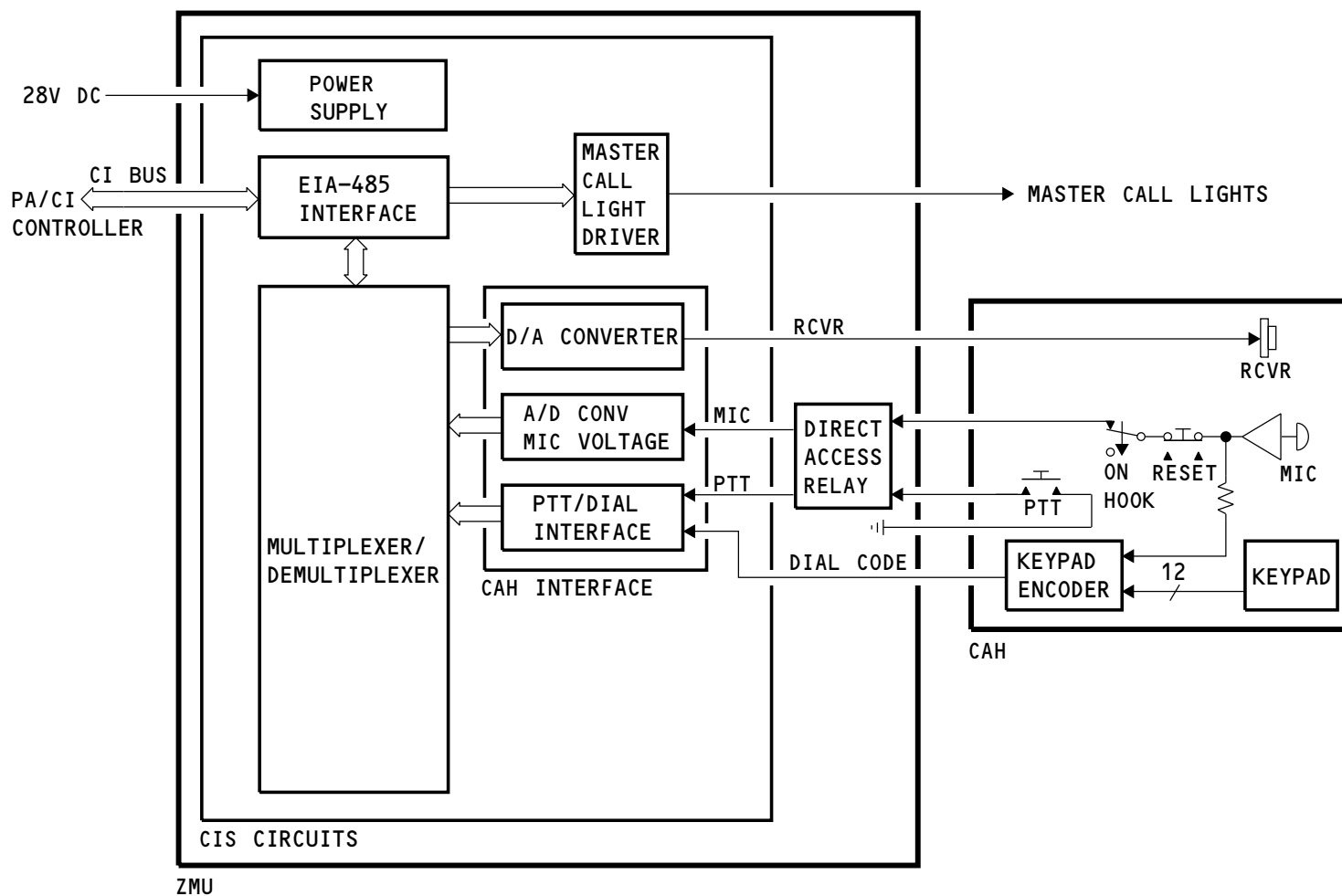
The ZMU controls the master call lights. The EIA-485 interface isolates call light on/off data from the PA/CI controller. The EIA-485 interface sends the data to the master call light driver. The master call light driver controls the lights.

Cabin Attendant Handset

The CAH gets receiver audio from the ZMU. Mic audio goes through an amplifier. It passes through the RESET switch and on-hook switch. The RESET and on-hook switches stop the call.

The PTT sends a ground signal to the ZMU. It is for passenger address announcements.

The CAH keypad has twelve momentary switches. They send signals to the keypad encoder. The keypad encoder sends dial code signals to the ZMU. The keypad encoder gets power from the mic line.



CIS - ZMU AND CAH FUNCTIONAL DESCRIPTION

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CIS - TYPES OF CALLS

General

The CIS has different types of calls between cabin interphone stations. A station is any station with a cabin attendant handset (CAH) or the flight deck handset (FDH). The flight crew can also use the flight interphone system for CIS calls.

Call Types

The CIS has these three basic types of calls:

- Pilot alert call
- Conference call
- Station-to-station call.

Pilot Alert

The flight attendants use the pilot alert call to tell the flight crew about an emergency. A pilot alert replaces all other calls to the flight deck. Any CAH can make a pilot alert call.

Conference Calls

A conference call connects a group of stations in one CIS call. The stations connect to the same line. Each conference call has one dial code for all stations included in the conference call.

Station-to-Station Calls

A station-to-station call is a normal two way call. Any station can make a call to any other station with a two-digit dial code. After you make a station-to-station call, you can add one or two more stations to the connection.

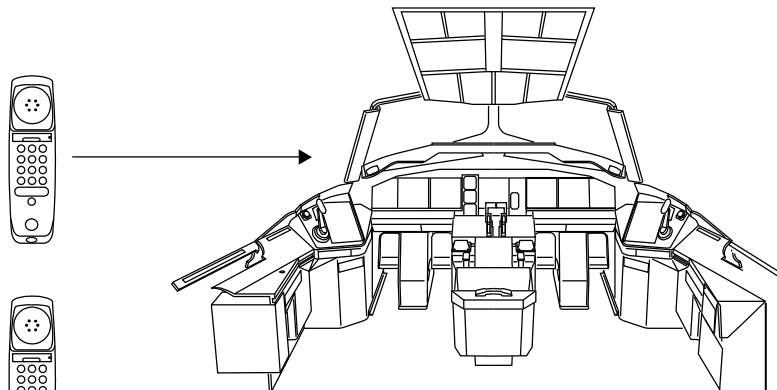
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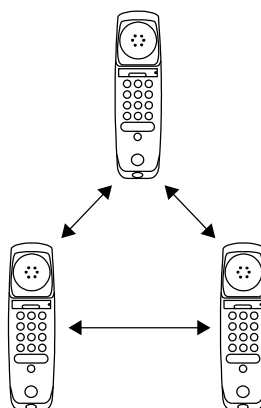
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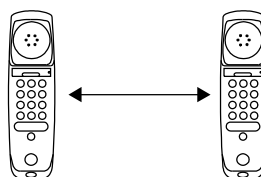
- PILOT ALERT CALL:



- CONFERENCE CALLS:



- STATION-TO-STATION CALLS:



CIS - TYPES OF CALLS

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**CIS - DIAL CODES****General**

The flight crew and flight attendants use two digit dial codes to make cabin interphone calls.

Station to Station Calls

Most station-to-station codes relate the location of the handset to the code.

To call the handset, push the first dial code key then the second for the station.

Conference Calls

Conference calls include a set number of stations. The configuration database identifies the stations.

To make a conference call, push the first dial code key then the second. The call can come from any handset.

Passenger Address Codes

The passenger address codes are for passenger address announcements.

Pilot Calls

The pilot call codes are for calls from the cabin to the flight deck.

The ground crew code is only for the flight crew to call the ground crew.

Land Line Calls

The external power and gate link panel has two telephone jacks. If you connect a local telephone network to a jack, you can access the network by dialing *9. With the system connected to a telephone network, you use the handset like a telephone.

Configuration Database

The configuration database identifies all types of calls and their dial codes. The configuration database also enables or disables the landline calls.

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DOORS - LEFT

DOOR 1 LEFT - 11
DOOR 2 LEFT - 12
DOOR 3 LEFT - 13
DOOR 4 LEFT - 14

DOORS - RIGHT

DOOR 1 RIGHT - 21
DOOR 2 RIGHT - 22
DOOR 3 RIGHT - 23
DOOR 4 RIGHT - 24

CONFERENCE CALLS

CONFERENCE CALL 1 - 71
CONFERENCE CALL 2 - 72
CONFERENCE CALL 3 - 73
CONFERENCE CALL 4 - 74
CONFERENCE CALL 5 - 75
ATTENDANT ALL CALL - 54
ALL CALL - 55

PASSENGER ADDRESS CODES

PA AREA 1 - 41
PA AREA 2 - 42
PA AREA 3 - 43
PA AREA 4 - 44
PA AREA 5 - 45
PA AREA 6 - 46
PA ALL AREA - 40
PA PRIORITY ALL AREA - 47

PILOT CALLS

FLIGHT DECK - 31
PILOT ALERT - **
CABIN READY - 6*

OTHER CALLS

GROUND CREW - *1

LANDLINE CALLS

LANDLINE - *9

TYPICAL

CIS - DIAL CODES

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CIS - HANDSET TONES

General

The CIS makes tones to tell you the condition of a call. The CIS makes five types of tones:

- Dial tone
- Ring-back
- Busy signal (normal)
- Busy signal (fast)
- Success tone.

Dial Tone

When any station goes off hook, it gets a dial tone. The dial tone continues until you push a dial code key or for 30 seconds.

The dial tone is a mix of two frequencies (350 hertz and 440 hertz).

Ring-Back Tone

The ring-back tone tells you the other station has not answered. It starts after you push the second dial code key.

The ring-back tone is a mix of two frequencies (440 hertz and 480 hertz). It is on for two seconds and off for four. It repeats while the other station is on-hook. It stops when the other station goes off-hook.

Busy Signal Tone

The busy signal tone tells you the other station is off-hook. It starts after you push the second dial code key. It continues until you hang up or push the reset key.

The busy signal tone is a mix of two frequencies (480 hertz and 620 hertz). It is on for 0.5 seconds and off for 0.5 seconds. It repeats while you have the handset off-hook.

If you are on the line with another station and you dial an off-hook number, the busy signal tone only lasts for five seconds.

Fast Busy Signal Tone

The fast busy signal tone tells you the dial code is not a correct code. It also tells you when your call is canceled by a higher priority call. If you use an incorrect dial code, the fast busy signal tone starts after you push the second dial code key. If a higher priority call cancels yours, the fast busy signal tone starts when you are disconnected.

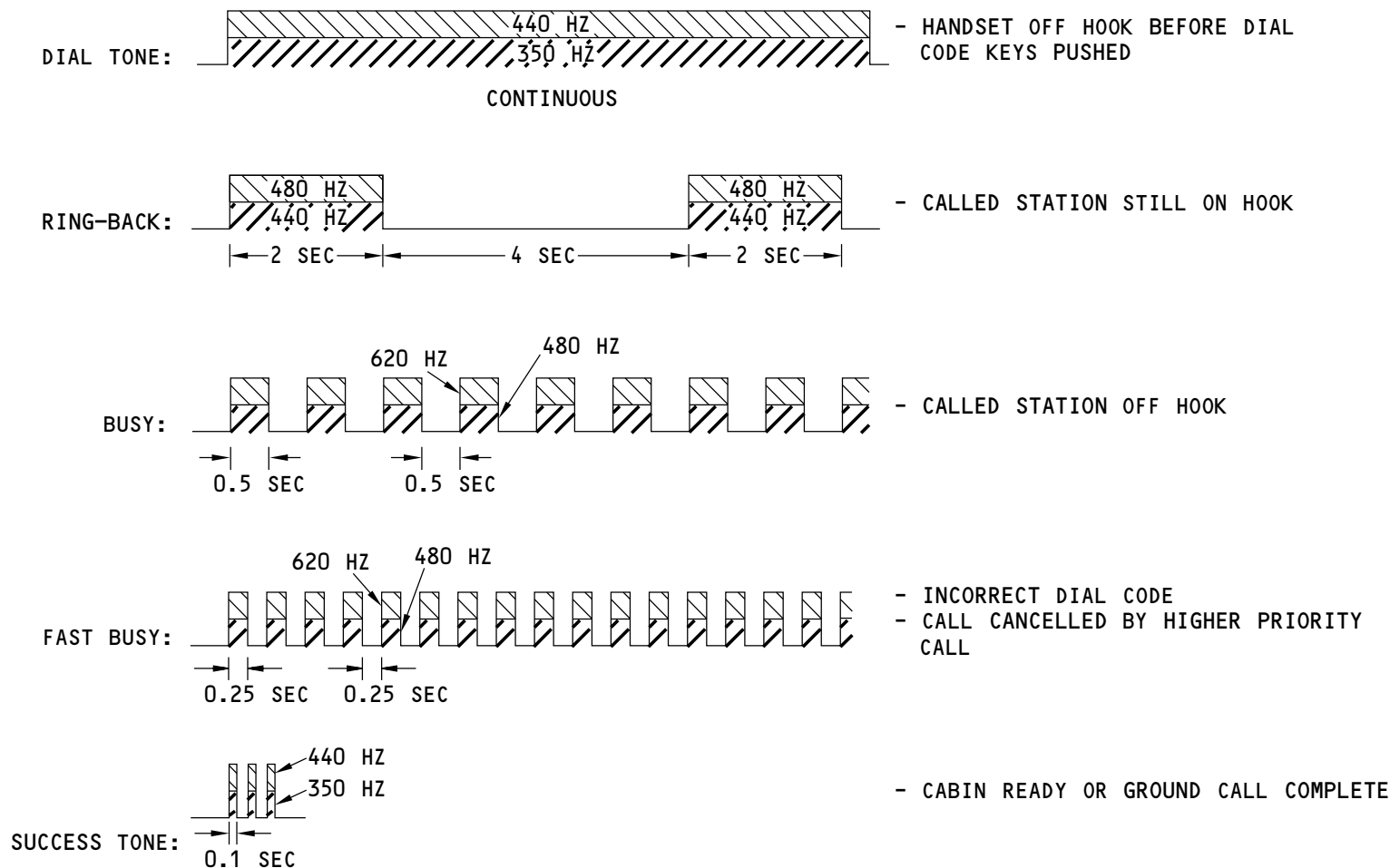
The fast busy signal tone is a mix of two frequencies (480 hertz and 620 hertz). It is on for 0.25 seconds and off for 0.25 seconds. It repeats while you have the handset off-hook.

If you are on the line with another station and you dial an incorrect number, the busy signal only lasts for five seconds.

Success Tone

The success tone tells you that you have completed an indication only type of call. Two CIS calls supply indications only. They are cabin ready and ground crew call. The cabin ready call shows a message on the center control display unit. The ground crew call sounds the ground crew call horn. The success tone is for the cabin ready call and ground crew call. It tells you that the CIS sent the message or made the horn sound.

The success tone lasts 0.6 seconds. It has three pulses of two frequencies. The two frequencies are 350 hertz and 440 hertz. It is on for 0.1 seconds, then off for 0.1 seconds. It repeats two more times.



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CIS - HANDSET TONES

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CIS - PILOT ALERT

General

Flight attendants use a pilot alert call to tell the flight crew about an emergency. This is the highest priority call. A pilot alert replaces all other types of calls to the flight deck.

Operation

To make a pilot alert call, push ** on any cabin attendant handset (CAH).

The flight crew gets these indications:

- A chime sound
- An EICAS alert message - CABIN ALERT
- A center control display unit (CDU) message - PILOT ALERT
- The CAB - CALL light shows on all audio control panels (ACPs).

When the flight crew answers the call, most indications go away. The CDU message stays until the call ends.

If the flight crew is on a different type of call, the other station gets a fast busy signal. The flight crew gets the pilot alert indications and connects directly to the pilot alert.

If the flight crew is on a different pilot alert, they get the pilot alert indications again and the third station connects to the call.

If the flight crew uses the cabin interphone system for a passenger address announcement, they get the pilot alert indications but they do not connect to the pilot alert. The station that makes the pilot alert gets a normal busy signal.

End Call

If the flight crew answers the call on the flight interphone system, they can end a call by one of these two ways:

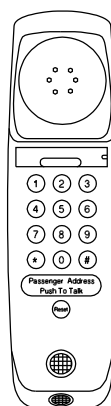
- Push any other ACP transmit switch
- Push the line select key (LSK) next to <END CALL on the center CDU.

If the flight crew uses the flight deck handset (FDH), they can end the call by one of these three ways:

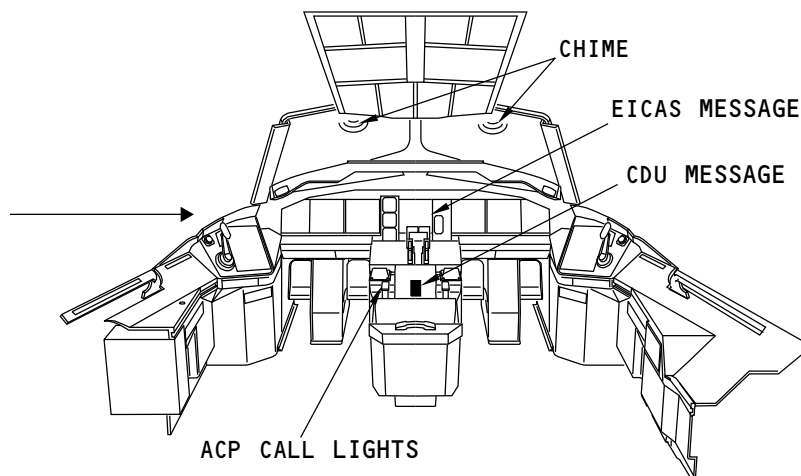
- Return the FDH to the cradle
- Push RESET on the FDH
- Push the LSK next to <END CALL on the center CDU.

PILOT ALERT CALL

- ALERTS THE FLIGHT CREW
- DIAL CODE - **
- FROM ANY CAH
- REPLACES ANY OTHER TYPE OF CALL
- CONNECTS TO ANY EXISTING PILOT ALERT CALL



CAH



CIS - PILOT ALERT

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CIS - CONFERENCE CALLS

General

A conference call connects a group of stations in one CIS call. The configuration database identifies the stations in a conference call. Each conference call has one dial code for all stations. The configuration database also identifies the dial code for each conference call.

The configuration database can identify as many as ten conference calls. There are two basic conference calls:

- All call
- Attendant all call.

All Call

An all call includes all stations. Each attendant station gets a chime and a call light. These are the flight deck indications:

- A chime sound
- An EICAS alert message - CABIN CALL
- A center control display unit (CDU) message - ALL CALL
- The CAB - CALL light on the audio control panels (ACPs).

As each handset goes off hook, it connects to the conference call.

Station-to-station calls that do not include the flight deck get a one second fast busy signal. When they end the call, they connect to the all call. If they do not end the call in six seconds, they automatically connect to the all call.

Attendant All Call

An attendant all call is the same as the all call, but does not include the flight deck.

Other Conference Calls

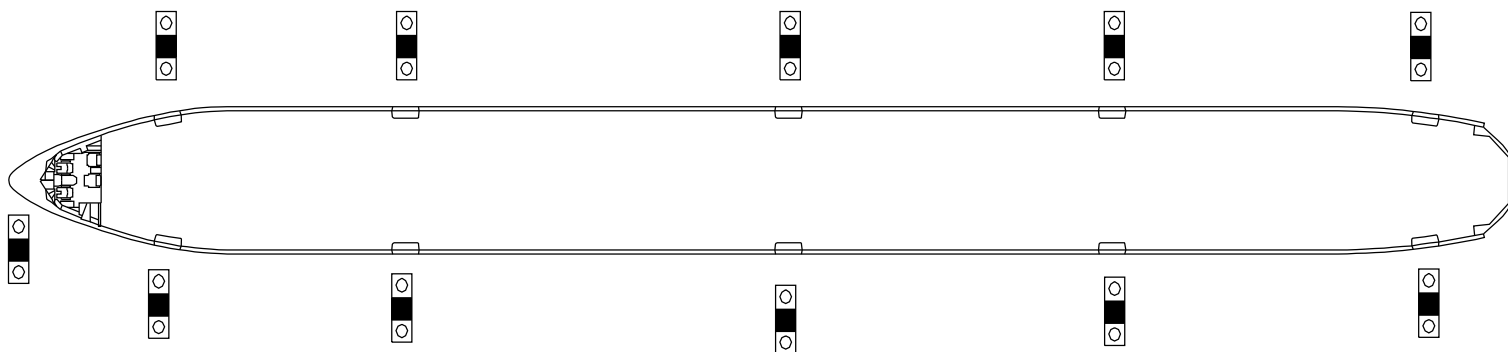
The CIS can have as many as eight other conference calls. The configuration database identifies the stations included, the call indications, and the dial codes.

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ALL CALL

- ALERTS ALL STATIONS
- DIAL CODE - 55
- FROM ANY STATION
- STATIONS CONNECT AS THEY GO OFF HOOK
- EXISTING CALLS GET SHORT FAST BUSY SIGNAL

ATTENDANT ALL CALL

- SAME AS ALL CALL BUT DOES NOT INCLUDE THE FLIGHT DECK
- DIAL CODE - 54

OTHER CONFERENCE CALLS

- ANY GROUP IDENTIFIED BY CONFIGURATION DATABASE

CIS - CONFERENCE CALLS

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**CIS - STATION-TO-STATION CALLS****General**

A station-to-station call is a normal two way call. Any station can make a call to any other station. Each station has a two digit dial code.

Operation

Most dial codes have a relation to the location of the CAH. The dial code of the CAH at door 1 left is 11. The CAH at door 2 left is 12. The CAH at door 1 right is 21 and so on.

To call another station, push the applicable dial code keys. The attendant station gets a call light and a high-low chime. A call to the flight deck gets these indications:

- A chime sound
- An EICAS alert message - CABIN CALL
- A center control display unit (CDU) message that shows the location of the station that made the call
- The CAB - CALL light on all three audio control panels (ACPs).

If the station that receives the call is on another call, you get a normal busy signal.

If the code is not a correct number, you get a fast busy signal.

When you make a two way connection, you can add a third. To add the third, dial another station number.

When you make a three way connection, you can add a fourth. To add a fourth, dial another station number. No more than four connections can be on a station-to-station call.

End Call

To end a call, either push RESET or return the CAH to the cradle. If more than two stations are on a line, the call ends when only one CAH is off-hook.

Remote Answer

You can use any CAH to answer a call to a different station. To do this, select the dial code of the station that receives the call.

Call Transfer

You can answer a call and send it to a different station. After you answer the call, select the dial code of the station you want to send it to. You can stay on the line or return the handset to the cradle.

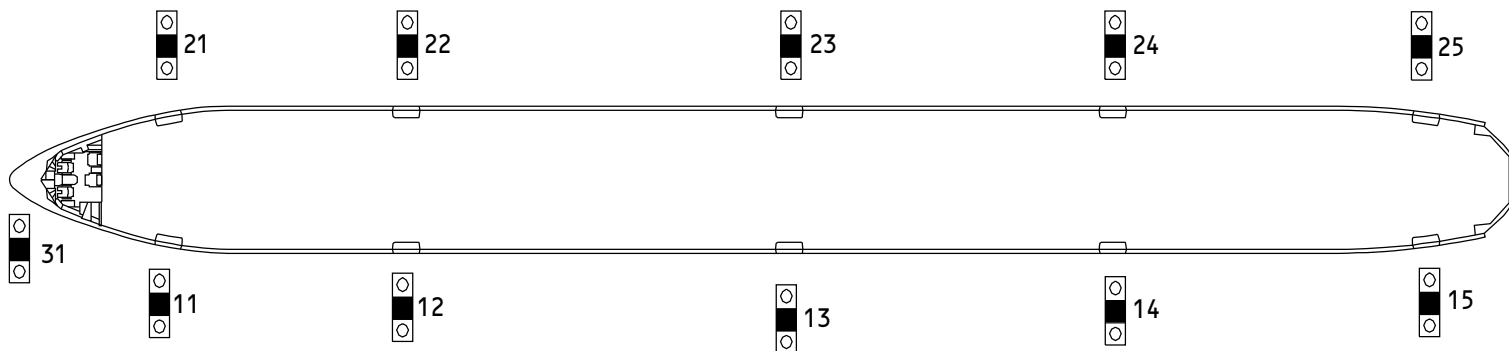
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STATION-TO-STATION CALLS

- ANY STATION CAN CALL ANY OTHER STATION
- TWO DIGIT DIAL CODE RELATED TO LOCATION
- ALERTS CALLED STATION
- AS MANY AS FOUR STATIONS CAN CONNECT TO ONE LINE
- REMOTE ANSWER - CAN ANSWER FROM DIFFERENT STATION (SELECT CALLED STATION DIAL CODE)
- CALL TRANSFER - CAN SEND CALL TO DIFFERENT STATION (SELECT OTHER STATION DIAL CODE)

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CIS - STATION-TO-STATION CALLS

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**CIS - FLIGHT DECK CONTROLS****General**

The flight crew can use either the flight deck handset (FDH) or flight interphone system to connect to the CIS. The FDH is the same as the cabin attendant handsets.

To use the flight interphone system, select CAB on an audio control panel (ACP). Use the center control display unit (CDU) to select dial codes and receive CIS messages.

Audio Control Panel

The cabin interphone transmitter select switch connects the crew member to the CIS.

When a call comes to the flight deck, the ACP CALL light comes on. To answer the call, push the cabin interphone transmitter select switch. This also causes the CALL light to go off. The cabin interphone receiver volume control sets the volume.

To make a call, push the cabin interphone transmitter select switch. Then use the center CDU to select a dial code.

Push the cabin interphone transmitter select switch two times in one second to make a call to door 1 left.

Center Control Display Unit

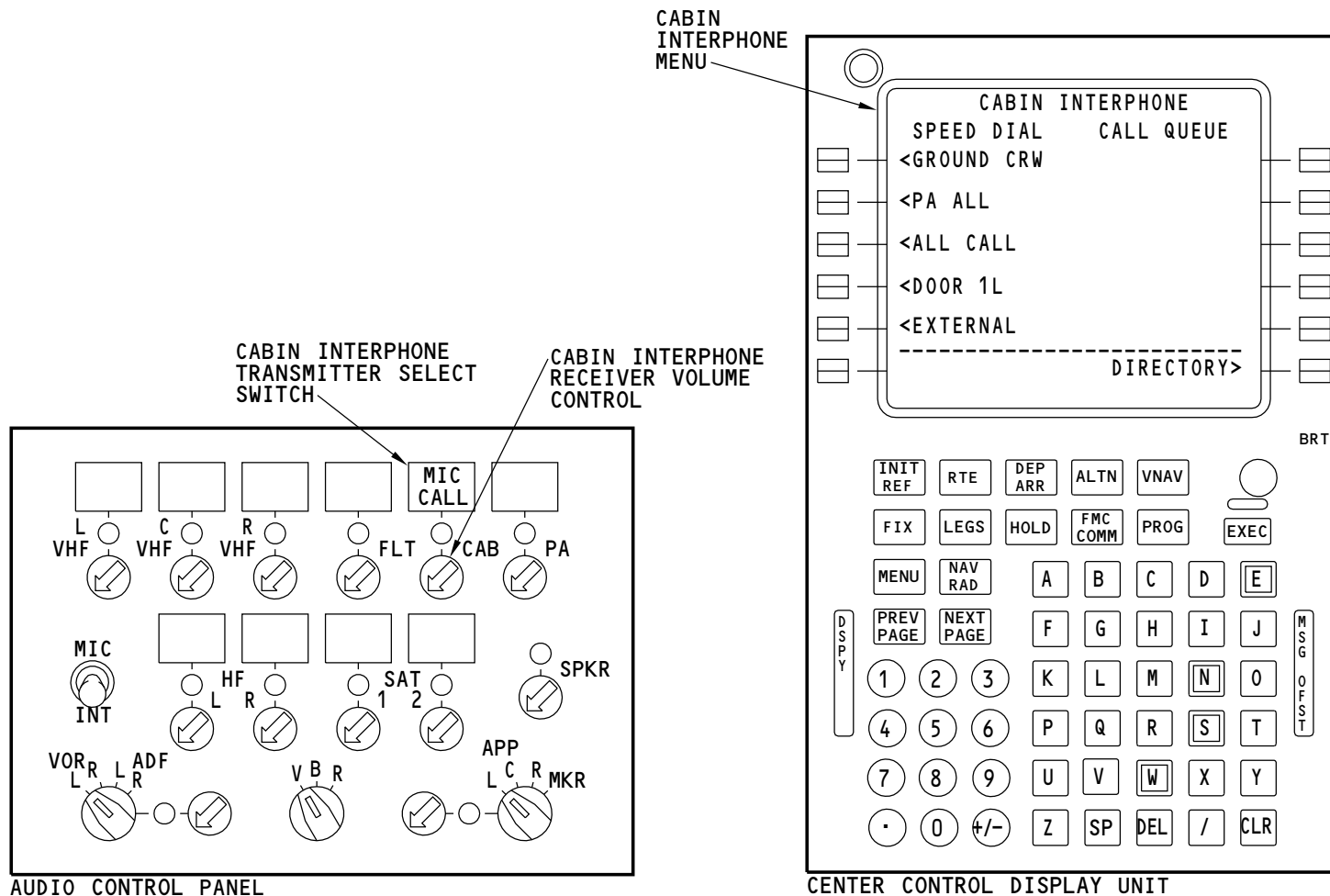
Flight crew uses the center CDU to select dial codes. It also shows directories and incoming call data.

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CIS - FLIGHT DECK CONTROLS

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**CIS - CDU OPERATION - CABIN INTERPHONE MENU****General**

The flight crew can use the center control display unit (CDU) to operate the CIS. The center CDU also shows CIS call data.

To show the cabin interphone menu, push the line select key (LSK) next to <CAB INT on the CDU menu.

The configuration database identifies all the selections on the cabin interphone CDU pages.

Cabin Interphone Menu

The cabin interphone menu has different selections. LSKs 1 left through 5 left are for speed dial selections. LSKs 1 right through 5 right are for stored messages. Use LSK 6 left to make a call. LSK 6 right selects the directory.

Speed Dial

The flight crew uses the speed dial selections to make a call. To make a call, push the LSK next to the call selection.

Send

The flight crew can make a call to any station from the cabin interphone menu. To call a station, push the station code numbers on CDU keys. The dial code and station shows in the scratch pad. <SEND shows next to LSK 6 left. Push LSK 6 left to make the call.

Call Queue

The call queue shows calls that came to the flight deck while the line was busy. The CDU shows the station that made the call. When the current call is over, the flight crew can call the station back. They push the LSK next to the stored message to make the call.

If more than one call goes to the flight deck while the line is busy, the CDU shows them in the call queue. The first message shows at LSK 1 right. The second message shows at LSK 2 right, and so on.

PA/Video In Use

The cabin interphone pages on the CDU show passenger address and video system activity. When the passenger address system is in use, PA IN USE shows above the scratch pad. When the video system is on, VIDEO IN USE shows above the scratch pad. When both the passenger address system and the video system are on, PA IN USE shows.

Directory

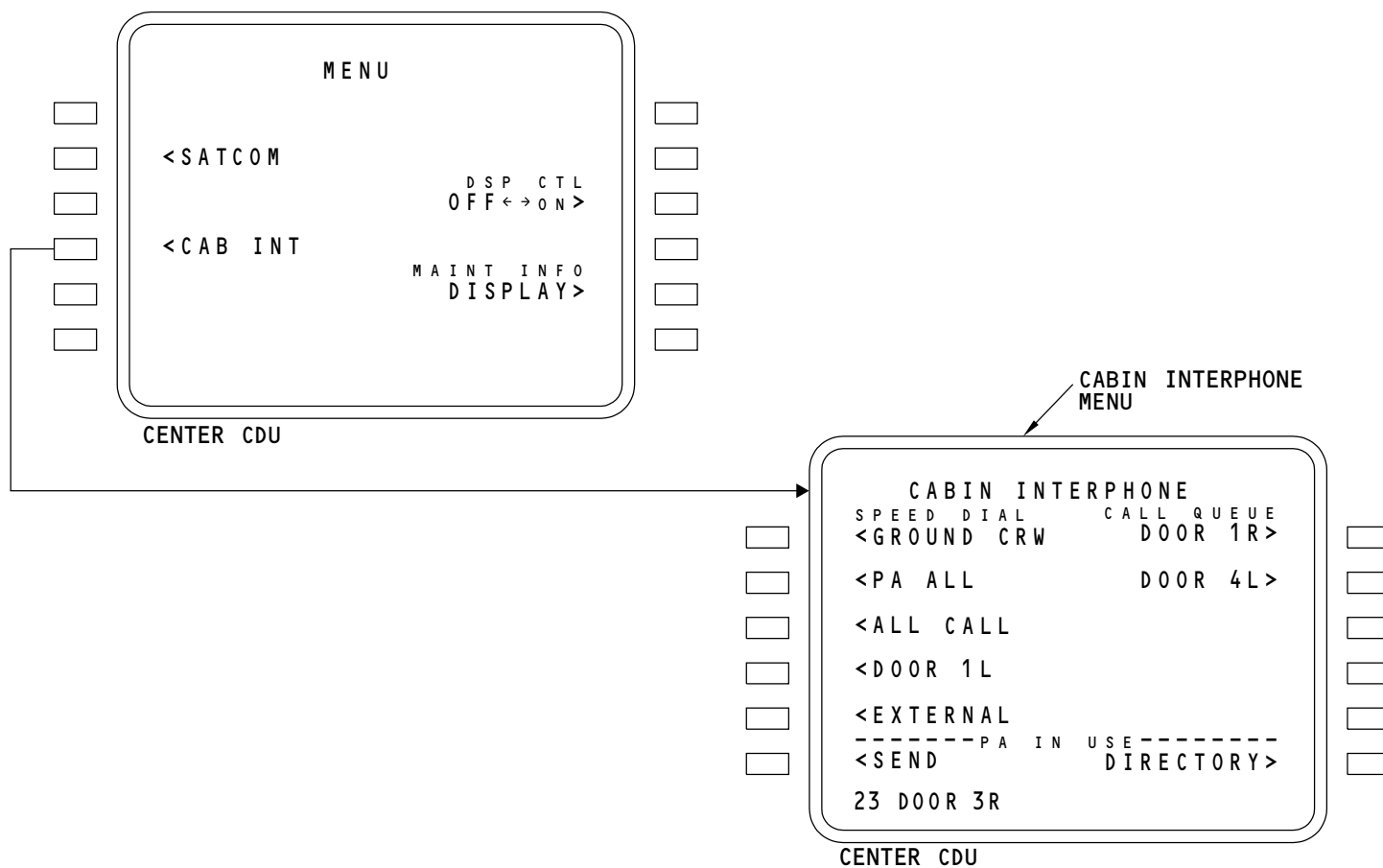
The directory pages give selections to call other stations. Push LSK 6 right to show the directory.

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CIS - CDU OPERATION - CABIN INTERPHONE MENU

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CIS - CDU OPERATION - MAIN DIRECTORY

General

The flight crew uses the directory pages to make CIS calls. The main directory gives access to sub-directories.

Main Directory

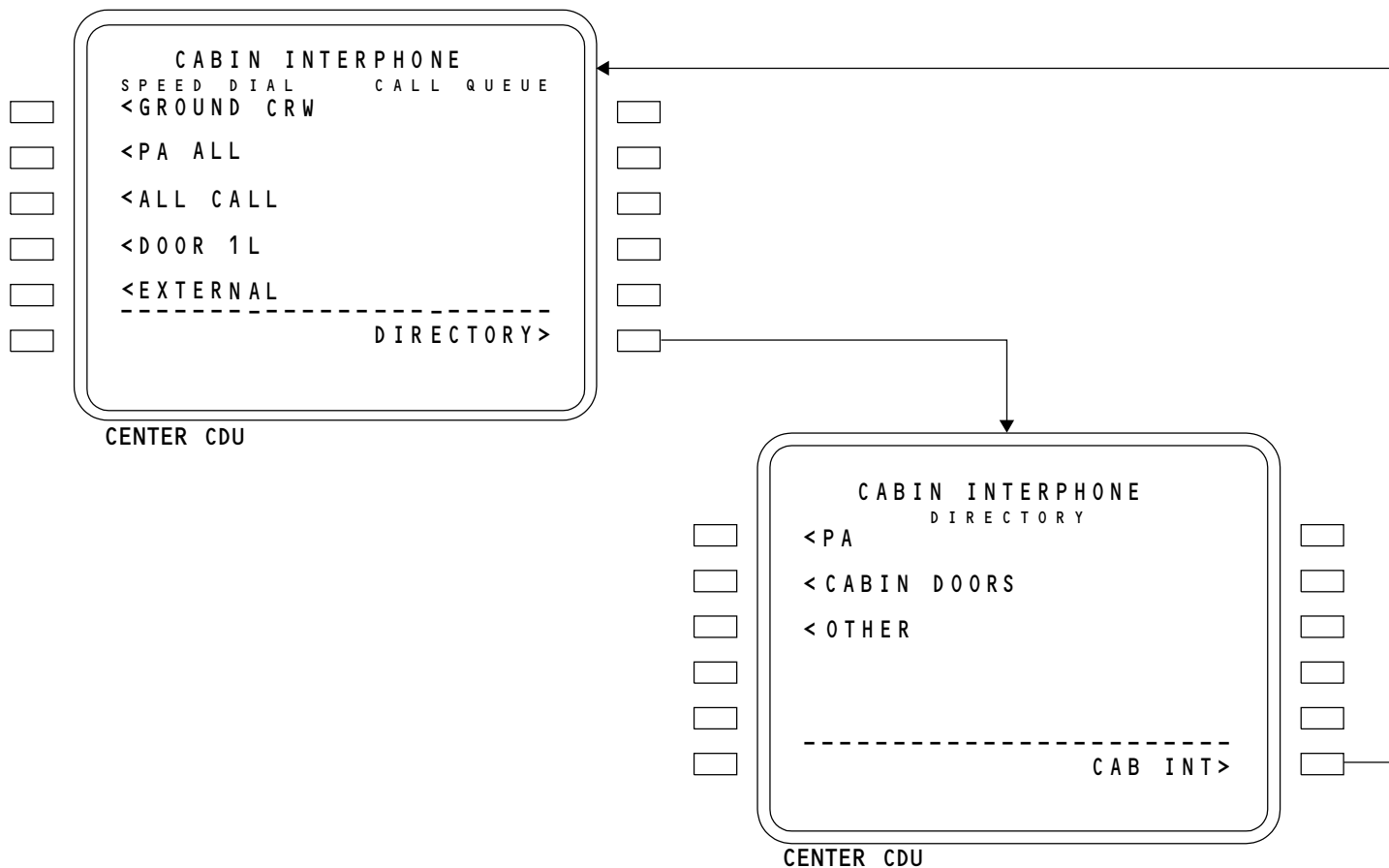
To show the main directory, push line select key (LSK) 6 right on the cabin interphone menu. To show a sub-directory, push the LSK next to the applicable directory title.

To return to the cabin interphone menu, push LSK 6 right.

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CIS - CDU OPERATION - MAIN DIRECTORY

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CIS - CDU OPERATION - DOORS SUB-DIRECTORY

General

The flight crew uses the doors sub-directory to make station-to-station calls to handsets at the cabin doors.

Directory Access

To show the cabin doors sub-directory, push line select key (LSK) 2 left.

The other directories operate in the same way.

Push LSK 6 right to return to the cabin interphone menu.

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CIS - CDU OPERATION - DOORS SUB-DIRECTORY

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**CIS - CONFIGURATION DATABASE PROGRAMMED ITEMS****General**

The CSS configuration database supplies details of CSS operation. For the CIS, the database gives configuration data for:

- Cabin attendant handsets (CAHs)
- Dial codes
- Conference calls
- Chimes
- Call lights
- CDU selections.

Cabin Attendant Handsets

The configuration database identifies the number of CAHs. It also supplies the location of each handset.

Dial Codes

The configuration database identifies the dial code for each station. It also identifies the dial code for conference calls and special function calls.

Conference Calls

The configuration database identifies the stations included in each conference call. A conference call has two or more stations on the same call. The call uses one dial code that can come from any station. The CIS can have as many as ten conference calls.

Chime Types and Count

The configuration database identifies the chime type and number of chimes for each type of call. When a station receives a call, it normally gets a single high-low chime. Special calls, such as an all call, may use different chimes. The station can get more than one chime. It can also get low-high chimes, instead of high-low chimes.

Call Lights

The configuration database identifies the flashing or non-flashing condition of call lights for each type of call. When a station receives a call, it normally gets a non-flashing call light. Special calls, such as an all call, may use a flashing call light.

CDU Selections

The configuration database identifies the selections available on the center control display unit (CDU). It identifies the calls that have a speed dial on the cabin interphone menu. It also supplies the selections on the directory page and sub-directory pages.

Priority Line Connection

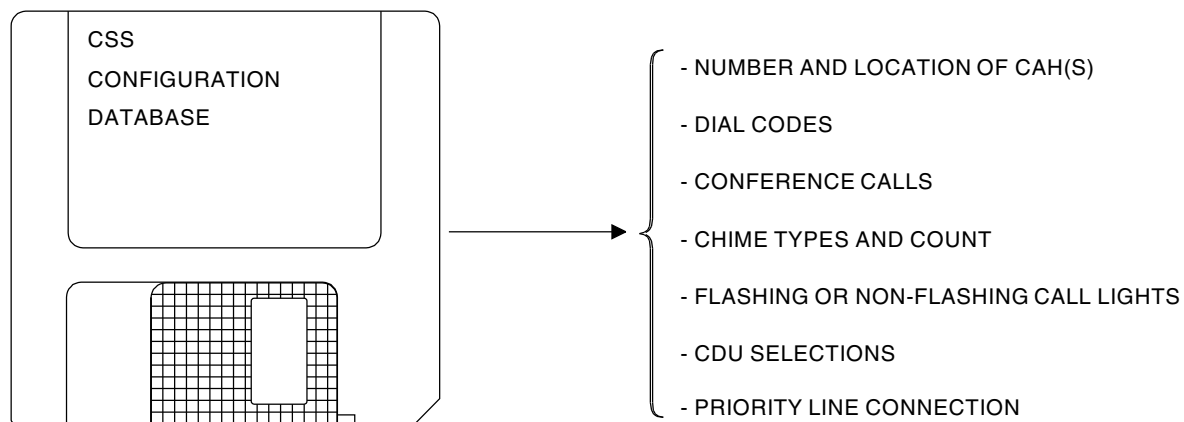
When the flight crew pushes the CAB button twice on their audio control panel, they make a call to the priority station. The configuration database identifies where the call goes.

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CIS - CONFIGURATION DATABASE PROGRAMMED ITEMS

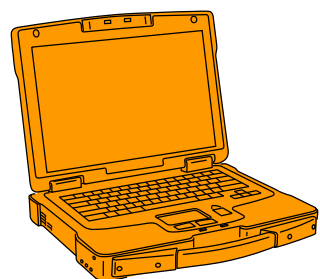
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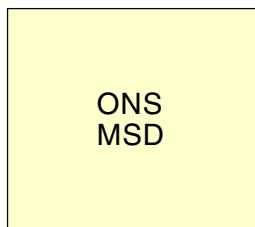
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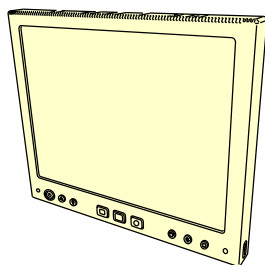
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MAINTENANCE LAPTOP
(REMOTE)



ONS
MSD



MAT

CSS
CONFIGURATION
DATABASE

- NUMBER AND LOCATION OF CAH(S)
- DIAL CODES
- CONFERENCE CALLS
- CHIME TYPES AND COUNT
- FLASHING OR NON-FLASHING CALL LIGHTS
- CDU SELECTIONS
- PRIORITY LINE CONNECTION

CIS - CONFIGURATION DATABASE PROGRAMMED ITEMS

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CIS - CABIN TESTS

General

Use the cabin system control panel (CSCP) to do the cabin test for the cabin interphone system (CIS).

See the cabin services system (CSS) section for more information about tests (SECTION 23-39).

Quick Test

Use quick test to quickly find major faults. This test checks these CIS components:

- Passenger address/cabin interphone (PA/CI) controller
- Zone management units (ZMUs).

This test collects continuous monitor data for as long as 20 seconds. The CSCP shows the failures.

To start a quick test, touch START QUICK TEST.

All Test

Use all test for a more complete test. All test starts a complete BITE of the system. The screen shows all the failures the BITE finds.

To start an all test, touch START ALL TEST.

Engineering Tests

Use engineering tests for more detailed tests.

Touch ENGINEERING TESTS to show the engineering tests menu.

Lamps Test

The lamps test does not test the CIS.

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CABIN TESTS	CABIN CONFIGURATION	CABIN FAULTS REVIEW	CABIN REPORT
START QUICK TEST ENGINEERING TESTS ... START ALL TEST LAMPS TEST MAIN MENU			

CABIN SYSTEM CONTROL PANEL

CIS - CABIN TESTS

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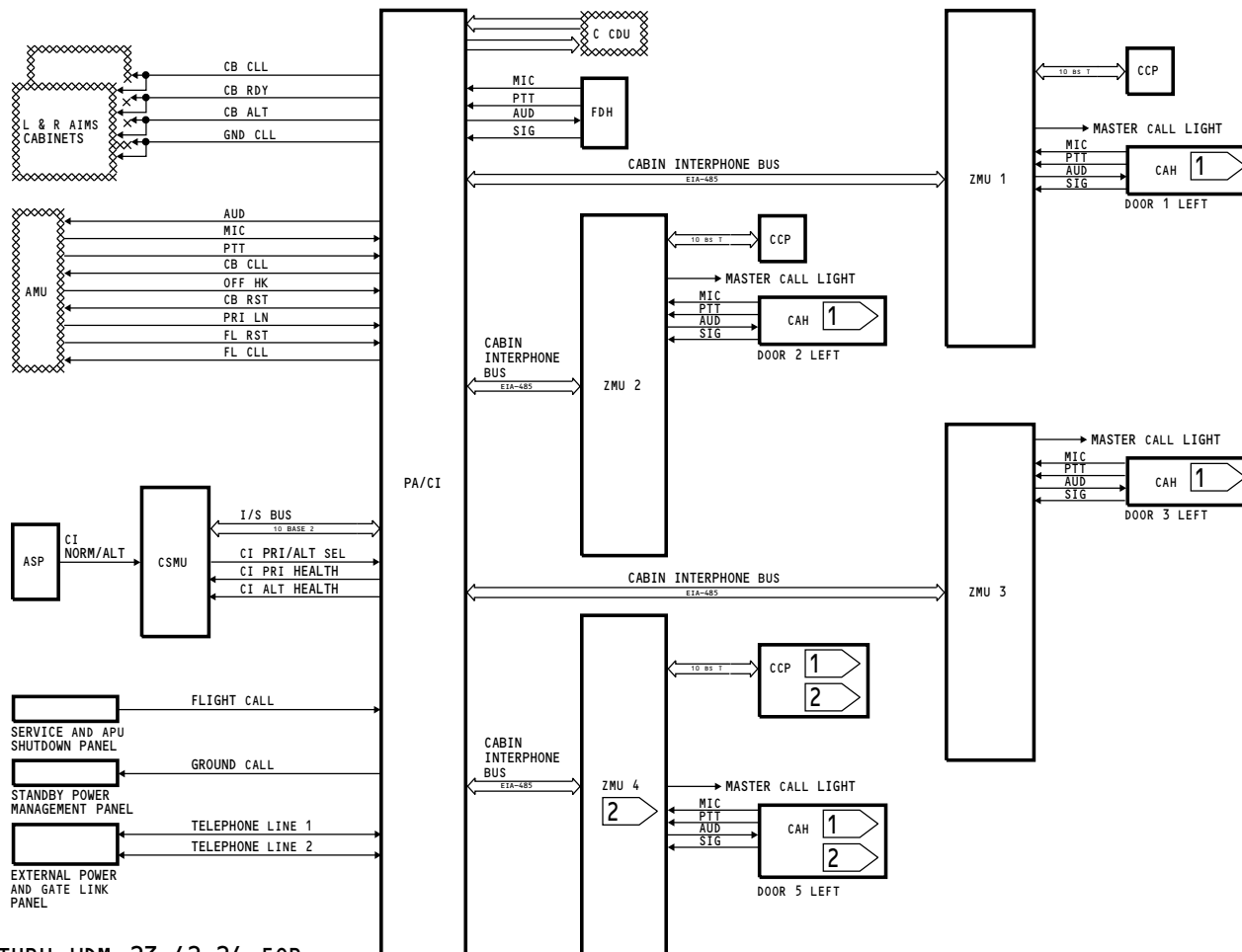


CIS - INTERFACE DIAGRAM

Interface Diagram

This interface diagram is for reference purposes.





1 SEE WDM 23-42-21 THRU WDM 23-42-24 FOR QUANTITY AND LOCATION OF HANDSETS

2 IF INSTALLED

CABIN INTERPHONE SYSTEM - INTERFACE DIAGRAM

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GROUND CREW CALL SYSTEM - INTRODUCTION

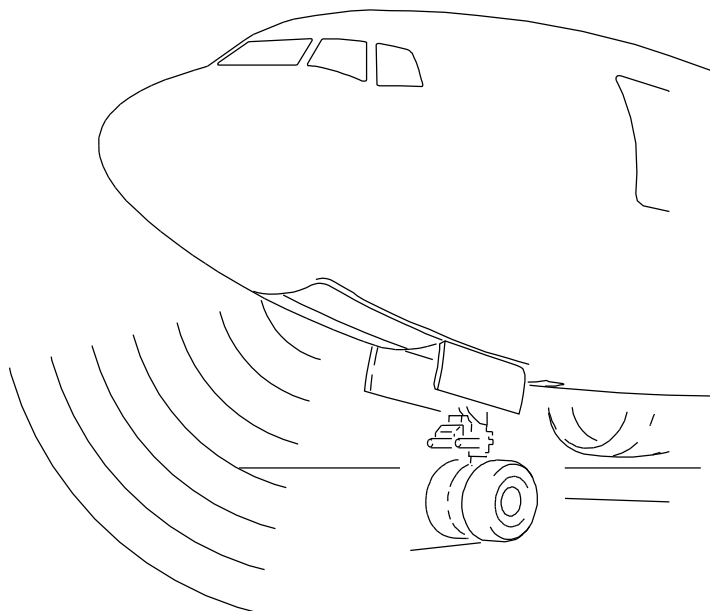
Purpose

The ground crew call system has these three functions:

- It tells flight deck personnel that there is a call from the ground
- It tells ground personnel that there is a call from the flight deck
- It tells ground personnel that the air data inertial reference unit (ADIRU) is on battery power or that there is an equipment cooling failure.

Abbreviations and Acronyms

- ACP - audio control panel
- ADIRS - air data inertial reference system
- ADIRU - air data inertial reference unit
- AIMS - airplane information management system
- AMU - audio management unit
- CDU - control display unit
- ECS - environmental control system
- EICAS - engine indication and crew alerting system
- ELMS - electrical load management system
- flt - flight
- gnd - ground
- LSK - line select key
- PA/CI - passenger address/cabin interphone



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GROUND CREW CALL SYSTEM - INTRODUCTION

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**GROUND CREW CALL SYSTEM - GENERAL DESCRIPTION****General**

The flight crew and the ground crew use the ground crew call system to tell each other to answer a call on the flight interphone system. The system supplies aural and visual signals in the flight deck and in the nose wheel well area.

Flight Deck Call

To call the flight deck, the ground crew pushes the flight deck call switch. This causes these flight deck indications:

- A light comes on the audio control panel (ACP)
- A chime comes on in the flight deck
- A message shows on EICAS.

Ground Crew Call

To call the ground crew, the flight crew selects GND CREW on the center CDU cabin interphone menu or uses the flight deck handset. This causes the ground crew call horn to come on.

Power or Equipment Cooling Failures

The ground crew call horn also comes on when the airplane is on the ground and one of these occurs:

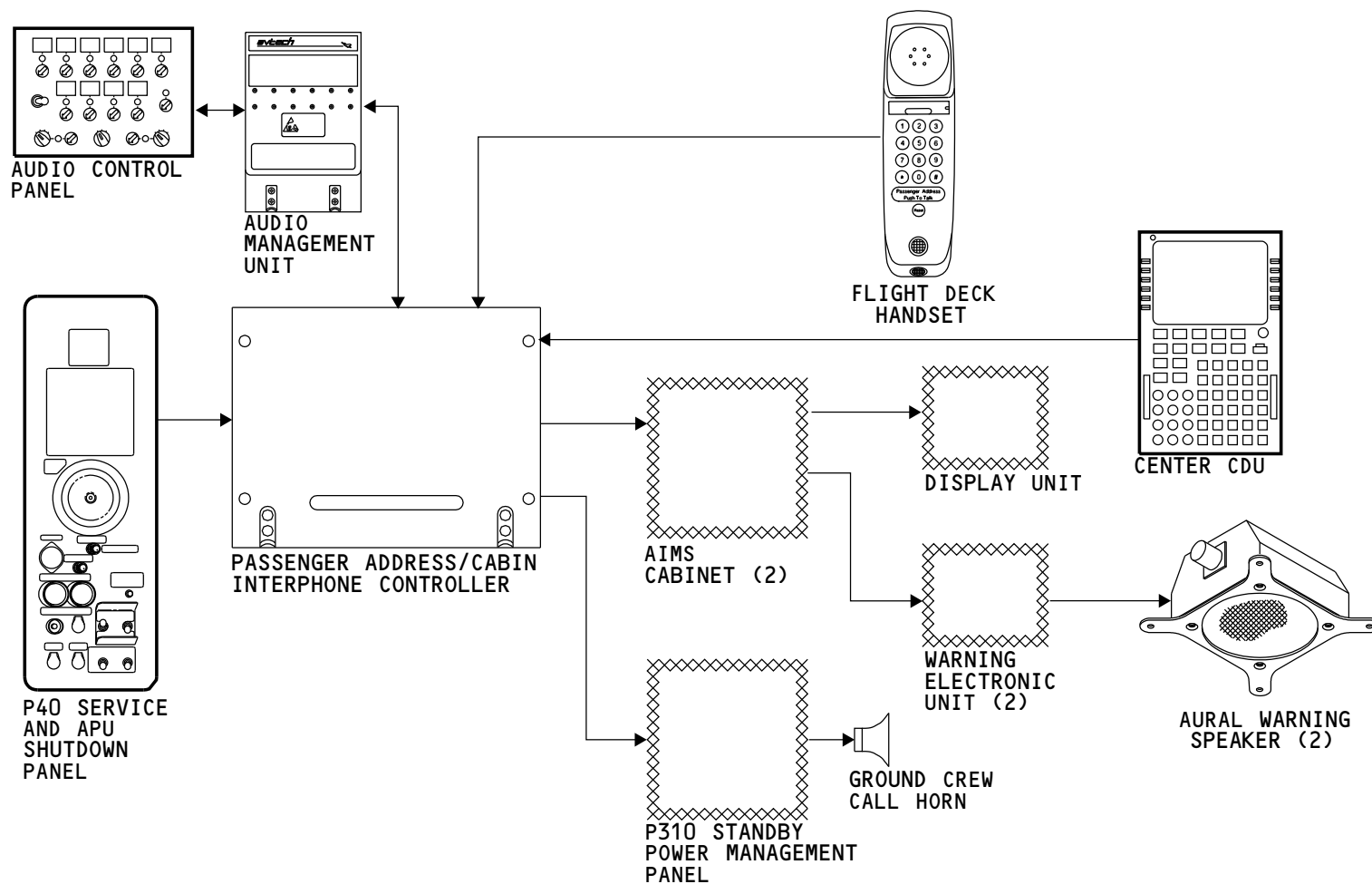
- There is an equipment cooling failure
- The air data inertial reference unit (ADIRU) is on and there is no AC power on the airplane.

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GROUND CREW CALL SYSTEM - GENERAL DESCRIPTION

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GROUND CREW CALL SYSTEM - NOSE WHEEL WELL COMPONENT LOCATIONS

Ground Crew Call System Component Locations

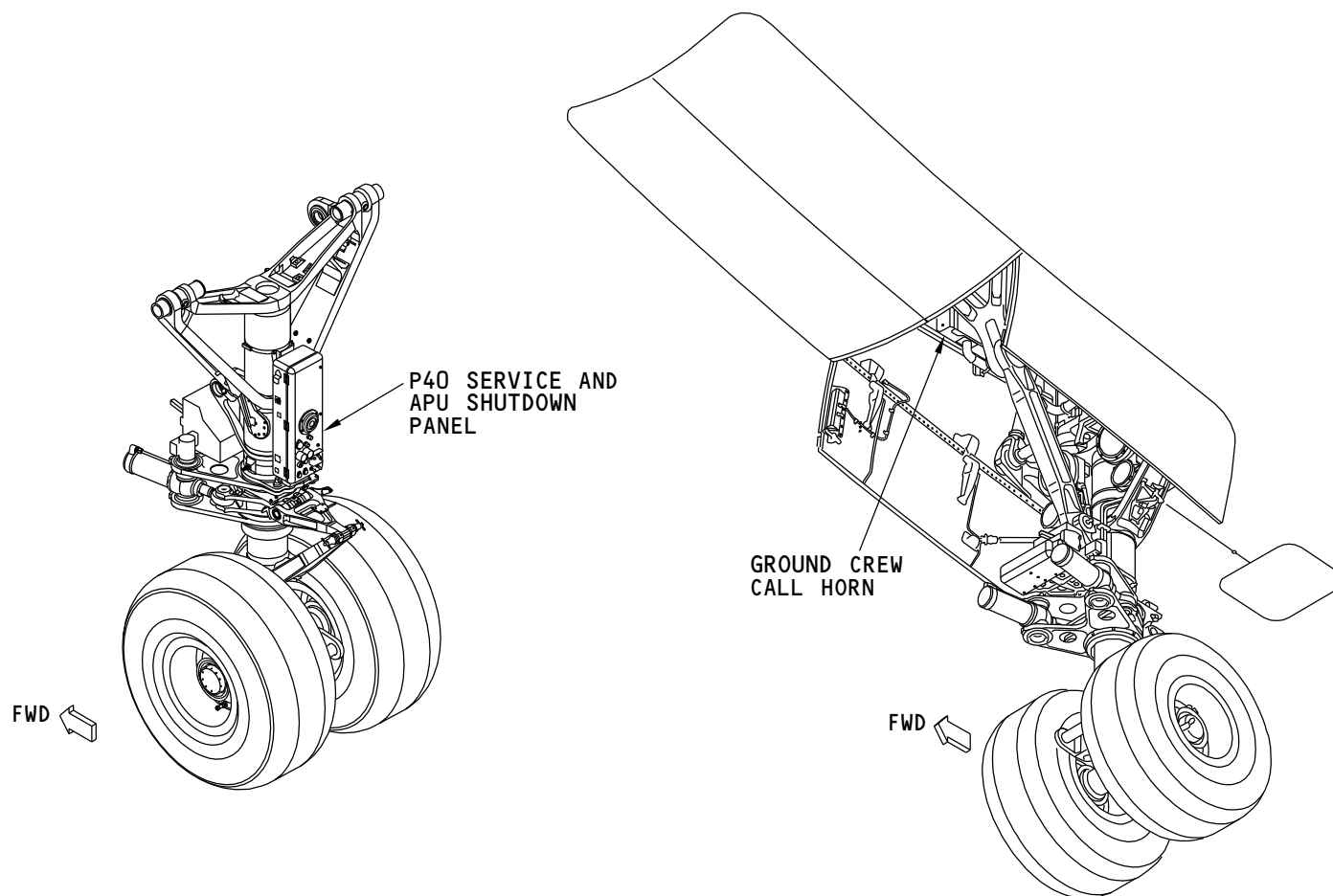
The ground crew call horn and the service and APU shutdown panel are in the nose wheel well area.

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GROUND CREW CALL SYSTEM - NOSE WHEEL WELL COMPONENT LOCATIONS

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GROUND CREW CALL SYSTEM - INTERFACES

General

The ground crew call system uses the passenger address/cabin interphone (PA/CI) controller to send signals between the flight crew and the ground crew.

PA/CI Controller

The standby power management panel has two circuit breakers that connect power to the PA/CI controller. One supplies power to the normal cabin interphone controller. The other supplies power to the secondary cabin interphone controller.

The nose gear electrical service panel sends a flight deck call discrete to the PA/CI controller.

The PA/CI controller sends a flight call discrete to the audio management unit (AMU) and gets a flight call reset signal from the AMU.

The center control display unit (CDU) or flight deck handset (FDH) sends dial code information to the PA/CI controller.

The PA/CI controller sends a flight deck call discrete to the AIMS cabinets to make a chime come on and show a message on EICAS.

Standby Power Management Panel

The PA/CI controller sends a discrete to the standby power management panel. The standby power management panel also gets signals from the environmental control system (ECS) and from the air data inertial reference system (ADIRS).

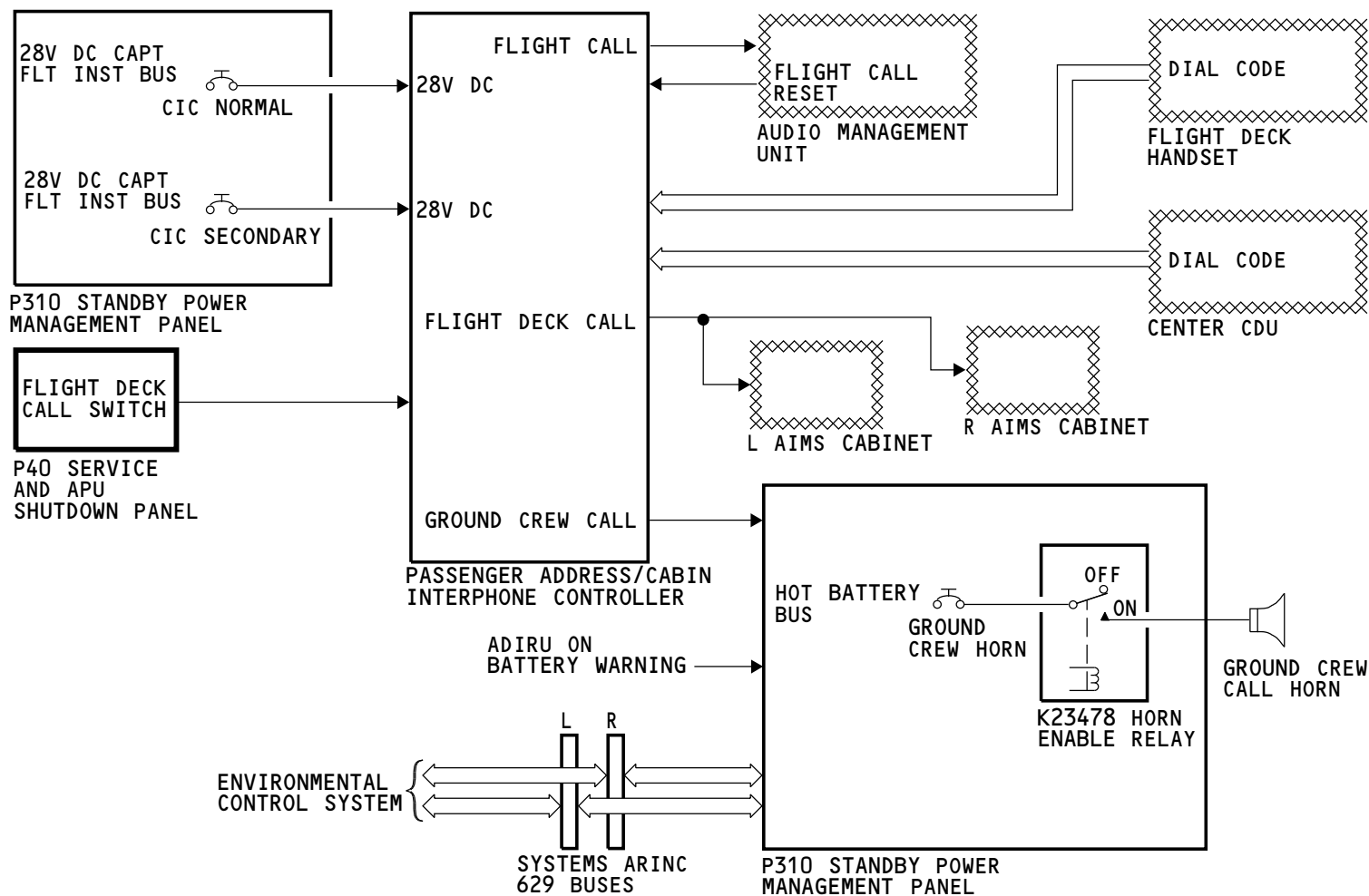
These signals cause the ground crew call horn to come on.

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GROUND CREW CALL SYSTEM - INTERFACES

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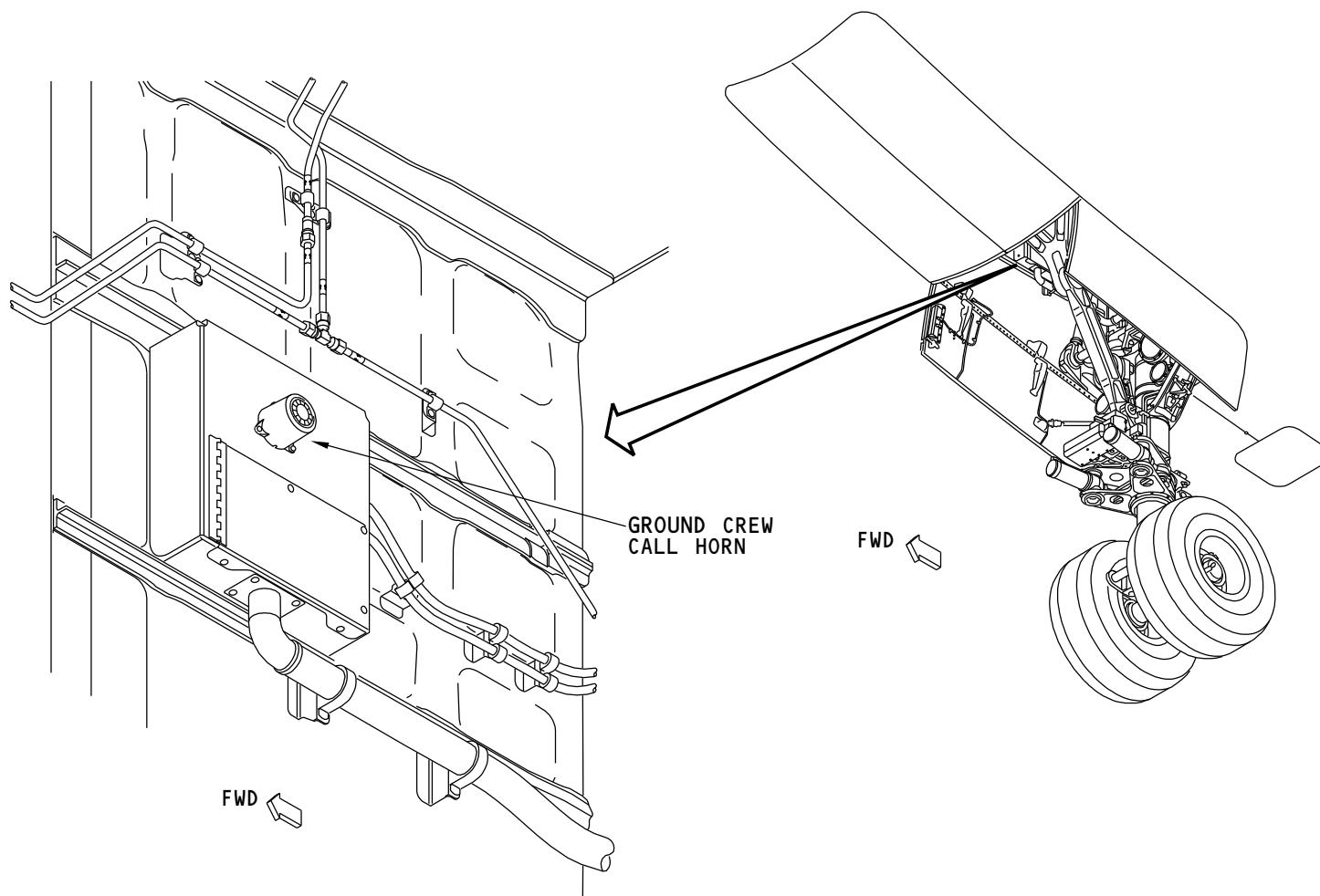


GROUND CREW CALL SYSTEM - GROUND CREW CALL HORN

Purpose

The ground crew call horn comes on for 3 seconds when there is a call from the flight deck. The horn comes on continuously when the air data inertial reference unit (ADIRU) is on battery power, or there is an equipment cooling failure.

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GROUND CREW CALL SYSTEM - GROUND CREW CALL HORN

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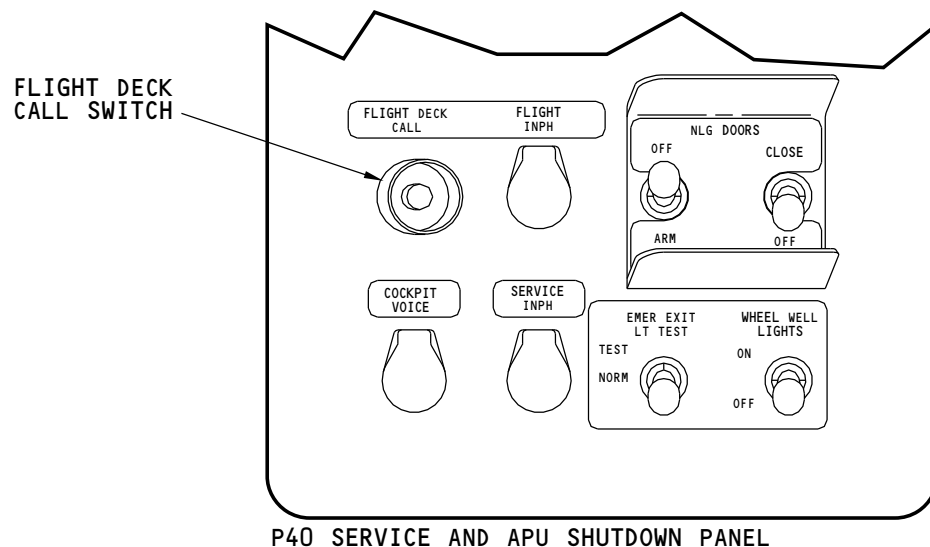
**GROUND CREW CALL SYSTEM - FLIGHT DECK CALL SWITCH****Purpose**

You use the flight deck call switch on the service and APU shutdown panel to tell the flight crew to select the flight interphone system to speak with the ground crew.

Operation

Push the momentary FLIGHT DECK CALL switch to cause these three indications in the flight deck:

- A single high-low chime comes on through the aural warning speakers
- The FLT call lights on the audio control panels (ACP) come on
- The message GROUND CALL shows on EICAS.



GROUND CREW CALL SYSTEM - FLIGHT DECK CALL SWITCH

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GROUND CREW CALL SYSTEM - AUDIO CONTROL PANEL

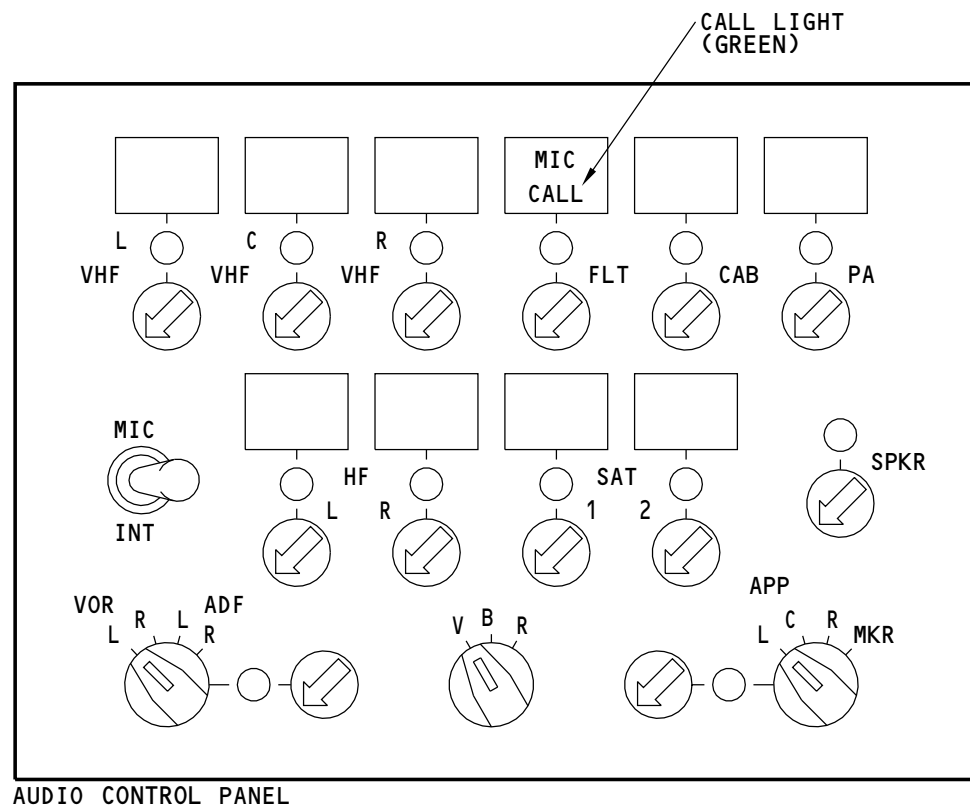
Purpose

The audio control panel (ACP) supplies call annunciations.

The audio control panel FLT call light shows CALL when you push the flight deck call switch on the service and APU shutdown panel.

When the flight crew selects the FLT transmit switch the CALL light goes off.

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GROUND CREW CALL SYSTEM - AUDIO CONTROL PANEL

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**GROUND CREW CALL SYSTEM - CENTER CDU****Purpose**

The flight crew uses the center control display unit (CDU) or enters the applicable dial code on the flight deck handset to start a ground crew call.

Cabin Interphone Menu

The flight crew uses the cabin interphone menu to call the ground crew. To show the cabin interphone menu, push the line select key (LSK) next to <CAB INT on the CDU menu.

Push the LSK next to the <GND CREW selection or enter the applicable dial code on the CDU keypad, and push LSK 6L to call the ground crew.



GROUND CREW CALL SYSTEM - CENTER CDU

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**GROUND CREW CALL SYSTEM - FUNCTIONAL DESCRIPTION****General**

The passenger address/cabin interphone (PA/CI) controller gets flight deck and ground crew call signals. It sends signals to cause different indications in the flight deck and at the nose wheel well.

Flight Deck Call Operation

When you push the flight deck call switch, a ground goes to the PA/CI controller. This causes the microprocessor to send messages to the:

- Audio management unit (AMU)
- AIMS cabinets.

The AMU causes the CALL light on the flight interphone transmit switch on each audio control panel (ACP) to come on.

The AIMS cabinets send signals for a high-low chime through the aural warning speakers and a message on EICAS.

Horn Operation

When you select GND CREW on the center CDU cabin interphone menu or enter the applicable dial code on the flight deck handset, the microprocessor sends a signal to the P310 standby power management panel. The electrical load management system (ELMS) signal interface unit-2 (SIU-2) on the standby power management panel energizes the horn enable relay when the airplane is on the ground. The SIU also monitors the status of horn enable relay K23478.

When there is an equipment cooling failure, the horn enable relay also energizes.

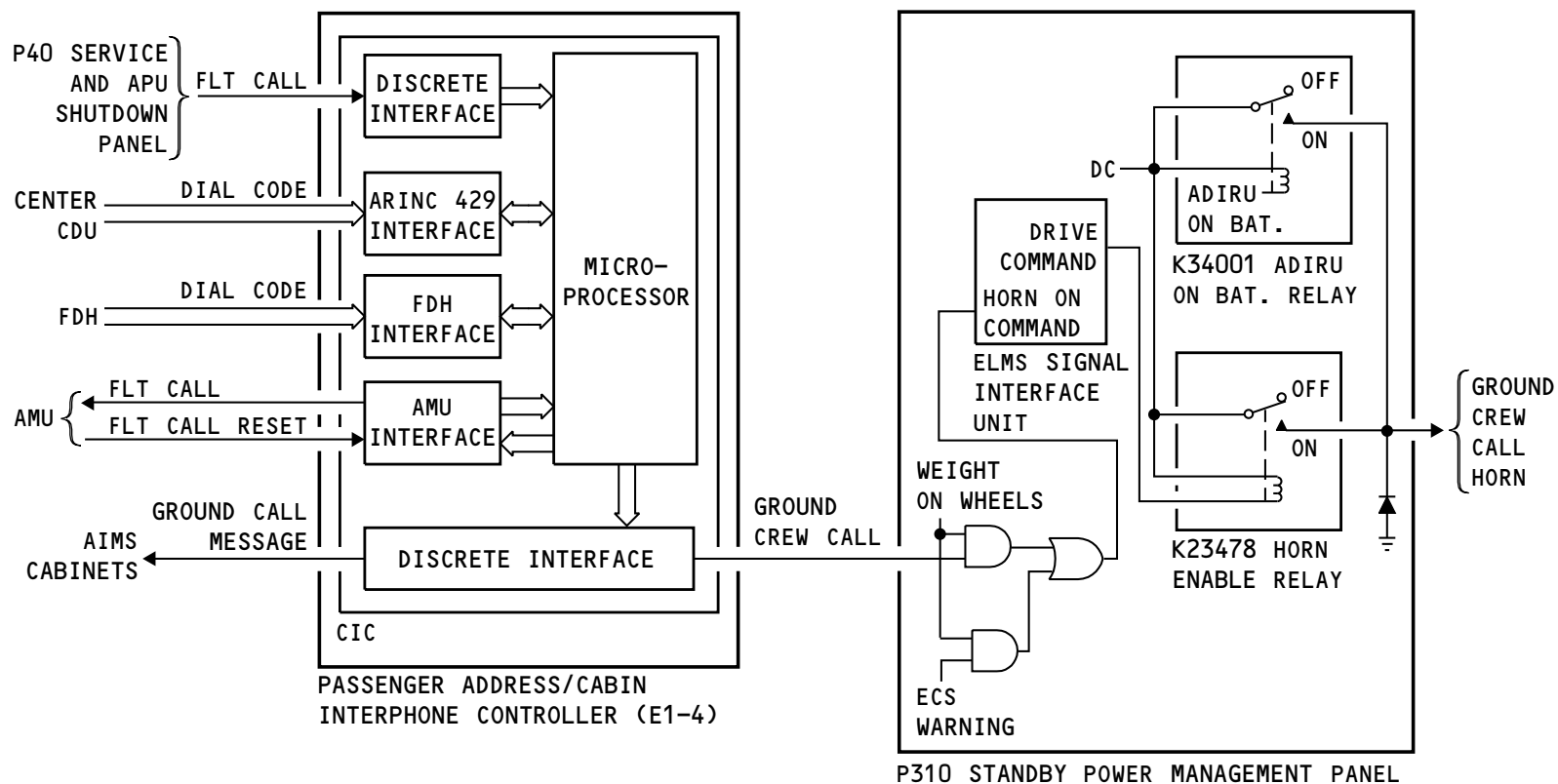
When the ADIRU is on without AC power, the ADIRU on-battery relay energizes and causes the horn to come on. This signal does not go through the horn enable relay.

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GROUND CREW CALL SYSTEM - FUNCTIONAL DESCRIPTION

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FLIGHT INTERPHONE SYSTEM - INTRODUCTION

Purpose

The flight crew uses the flight interphone system to speak with each other and the ground crew.

Flight and maintenance crews use the flight interphone system to get access to the communication systems and to monitor the navigation receivers.

The flight interphone system is part of the digital control audio system (DCAS).

Abbreviations and Acronyms

- ACP - audio control panel
- ADF - automatic direction finder
- AIMS - airplane information management system
- AMU - audio management unit
- app - approach
- CAB - cabin
- CAPT - captain
- COMM - communication
- DCAS - digital control audio system
- DME - distance measuring equipment
- F/O - first officer
- F/OBS - first observer
- GSHLD - glareshield
- HF - high frequency
- ILS - instrument landing system
- INT - interphone
- MD&T - master dim and test
- MEC - main equipment center
- MIC - microphone
- MB - marker beacon

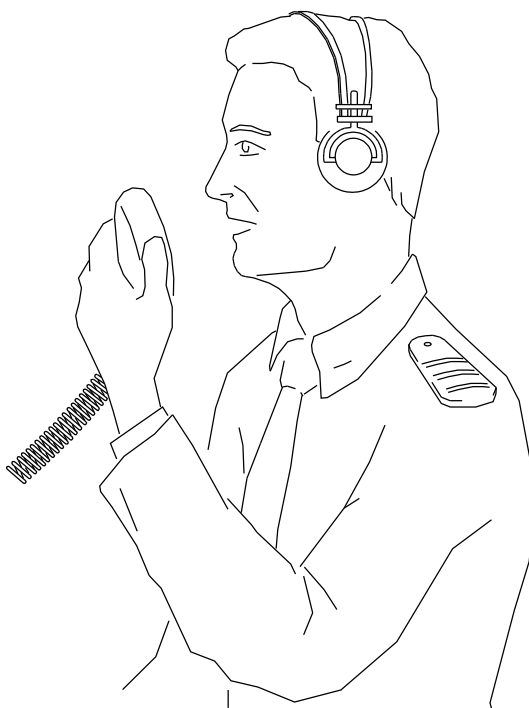
- nav - navigation
- OBS - observer
- PA - passenger address
- PA/CI - passenger address/cabin interphone
- PTT - push-to-talk
- R/T - receive/transmit
- RTP - radio tuning panel
- S/OBS - second observer
- SATCOM - satellite communications
- SELCAL - selective calling
- VHF - very high frequency
- VOR - VHF omnidirectional range

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FLIGHT INTERPHONE SYSTEM - INTRODUCTION

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FLIGHT INTERPHONE SYSTEM - GENERAL DESCRIPTION

General

The audio management unit (AMU) controls the routing of audio signals to and from the flight crew.

Flight Crew Interfaces

This system description shows the captain's system. Interfaces and components for other flight crew stations are almost the same.

The flight crew uses microphone (mic) switches on these components to send audio to the AMU:

- Glareshield
- Control column
- Hand microphone
- Audio control panel (ACP).

A microphone on these components lets the flight crew speak on the flight interphone system:

- Hand mic
- Oxygen mask
- Headset (through the boom mic/headphone panel).

The flight crew uses ACPs for these functions:

- Audio signal selection and monitoring
- Connect to other communication systems.

The AMU sends audio signals to the headsets and to the flight interphone speakers.

The observer audio selector controls a backup mode when the captain's or first officer's audio system has a failure.

Ground Crew Interfaces

The ground crew uses jacks in the main equipment center (MEC) and on the service and APU shutdown panel to connect to the flight interphone system.

Other Component and System Interfaces

The AMU connects to these other components for the related function:

- Service interphone jacks - to send and get audio from the service interphone system
- Service interphone switch - connects the service interphone system with the flight interphone system
- Communications transceivers - the AMU sends push-to-talk (PTT) and microphone audio to the transceivers and gets audio back from them
- Navigation radios - the AMU gets voice and Morse code identification tones.

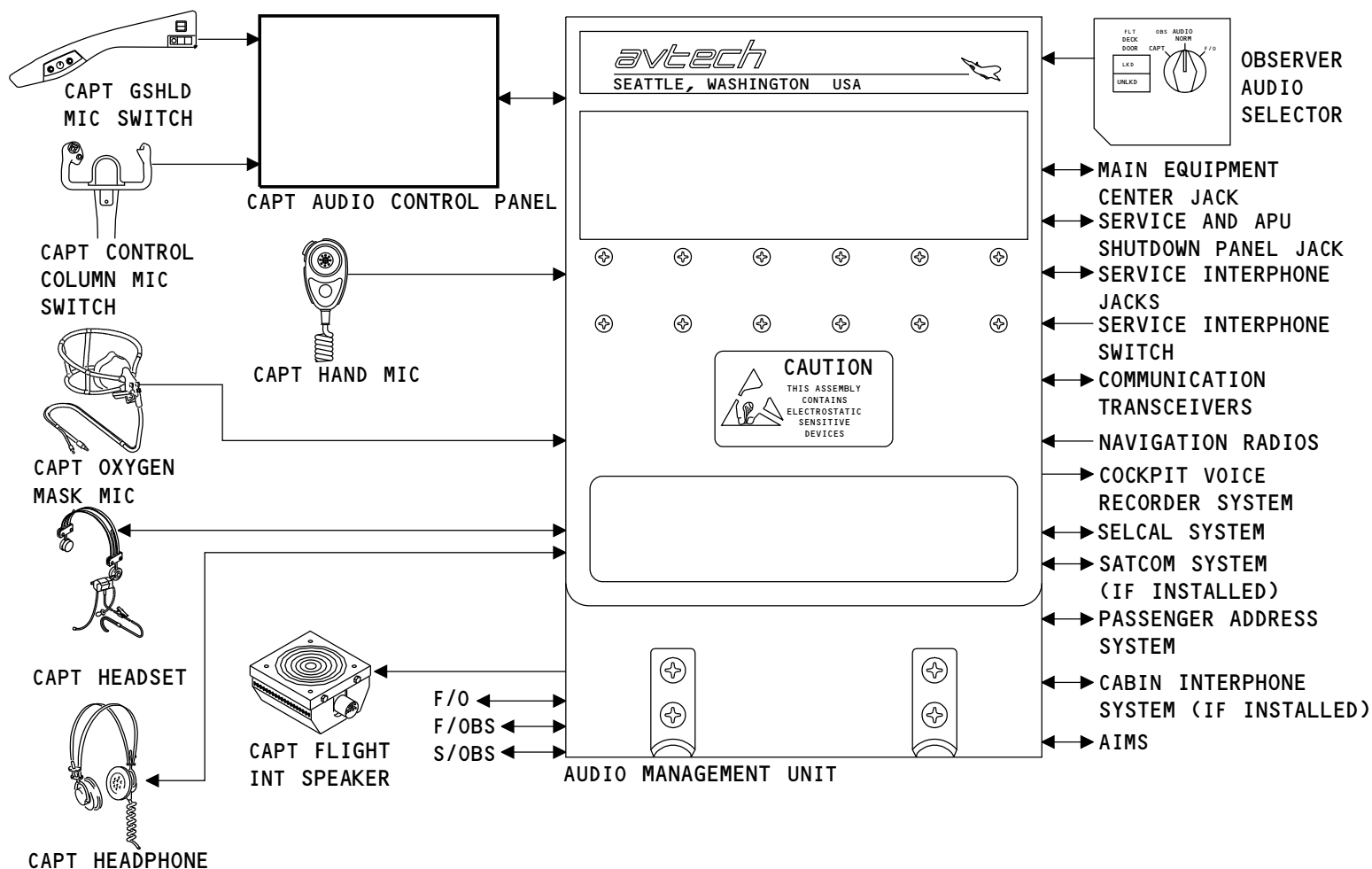
The flight interphone system also has an interface with these other systems:

- Cockpit voice recorder system - to record the flight crew microphone and receive audio
- SELCAL system - the AMU gets discretes to control call lights on the ACP and sends resets to the SELCAL decoder
- SATCOM system - permits the flight crew to speak with ground stations
- Passenger address system - this connection lets the flight crew make announcements to passengers
- Cabin interphone system - lets the flight crew speak with attendants
- AIMS - the AMU sends BITE data to AIMS and receives DME pairing data from AIMS over an ARINC 629 systems bus.

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FLIGHT INTERPHONE SYSTEM - GENERAL DESCRIPTION

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**FLIGHT INTERPHONE SYSTEM - FLIGHT DECK COMPONENT LOCATIONS****Flight Deck Component Locations**

These are the captain's flight interphone system components:

- Boom mic/headphone panel
- Control column mic switch
- Flight interphone speaker
- Hand mic jack
- Glareshield mic switch
- Audio control panel (ACP) on the P8 aft aisle stand panel.

The other flight crew stations have the same components except that the first and second observers do not have a glareshield mic switch or a control column mic switch.

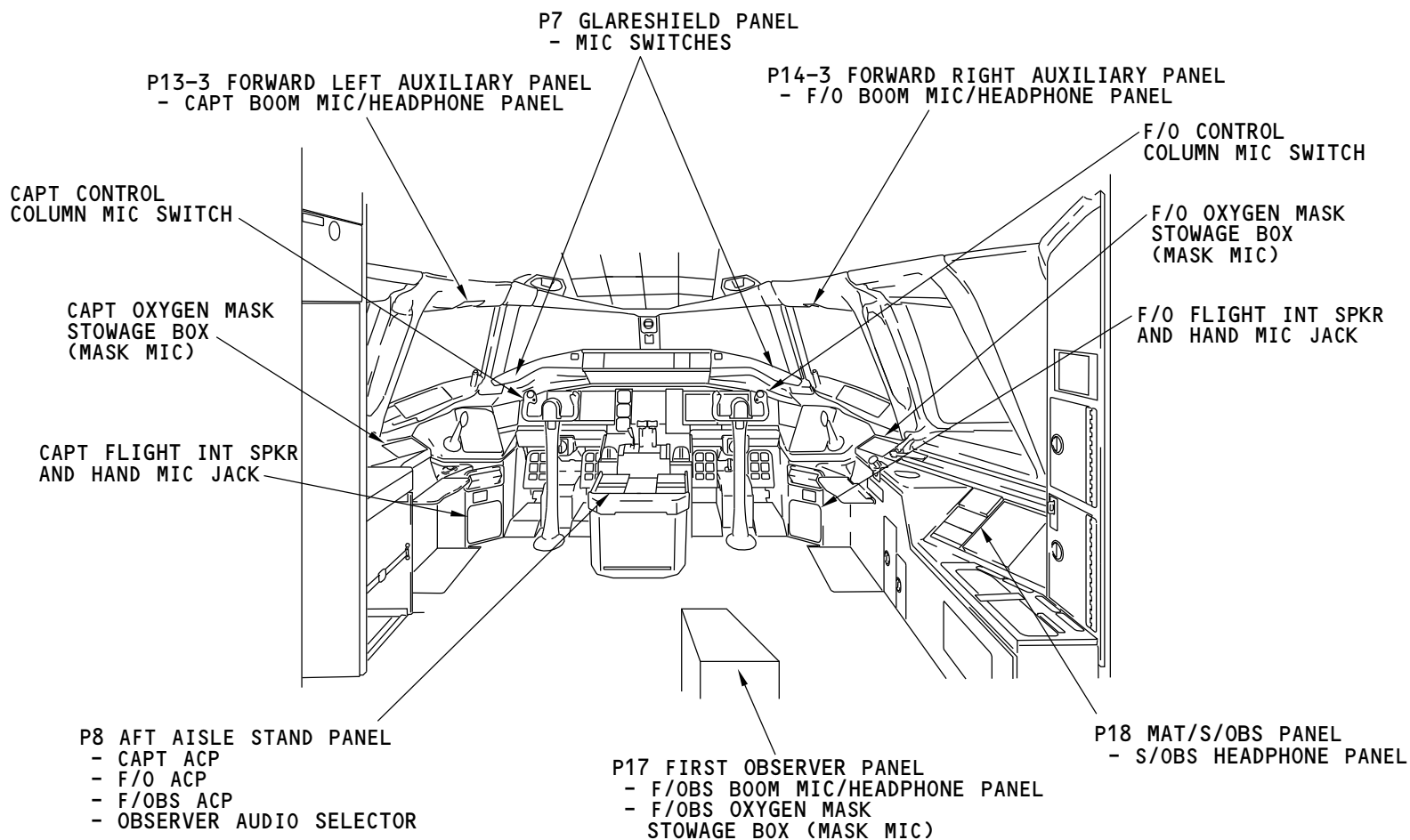
The second observer does not have an audio control panel or a hand mic jack.

The observer audio selector is on the P8 aft aisle stand panel.

Other Systems Component Locations

The captain, first officer and first observer each have an oxygen mask with a microphone in a stowage box adjacent to the station.

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FLIGHT INTERPHONE SYSTEM - FLIGHT DECK COMPONENT LOCATIONS

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**FLIGHT INTERPHONE SYSTEM - COMPONENT LOCATIONS****Flight Interphone Component Locations**

There are flight interphone system components on the nose gear and in the main equipment center.

Nose Gear

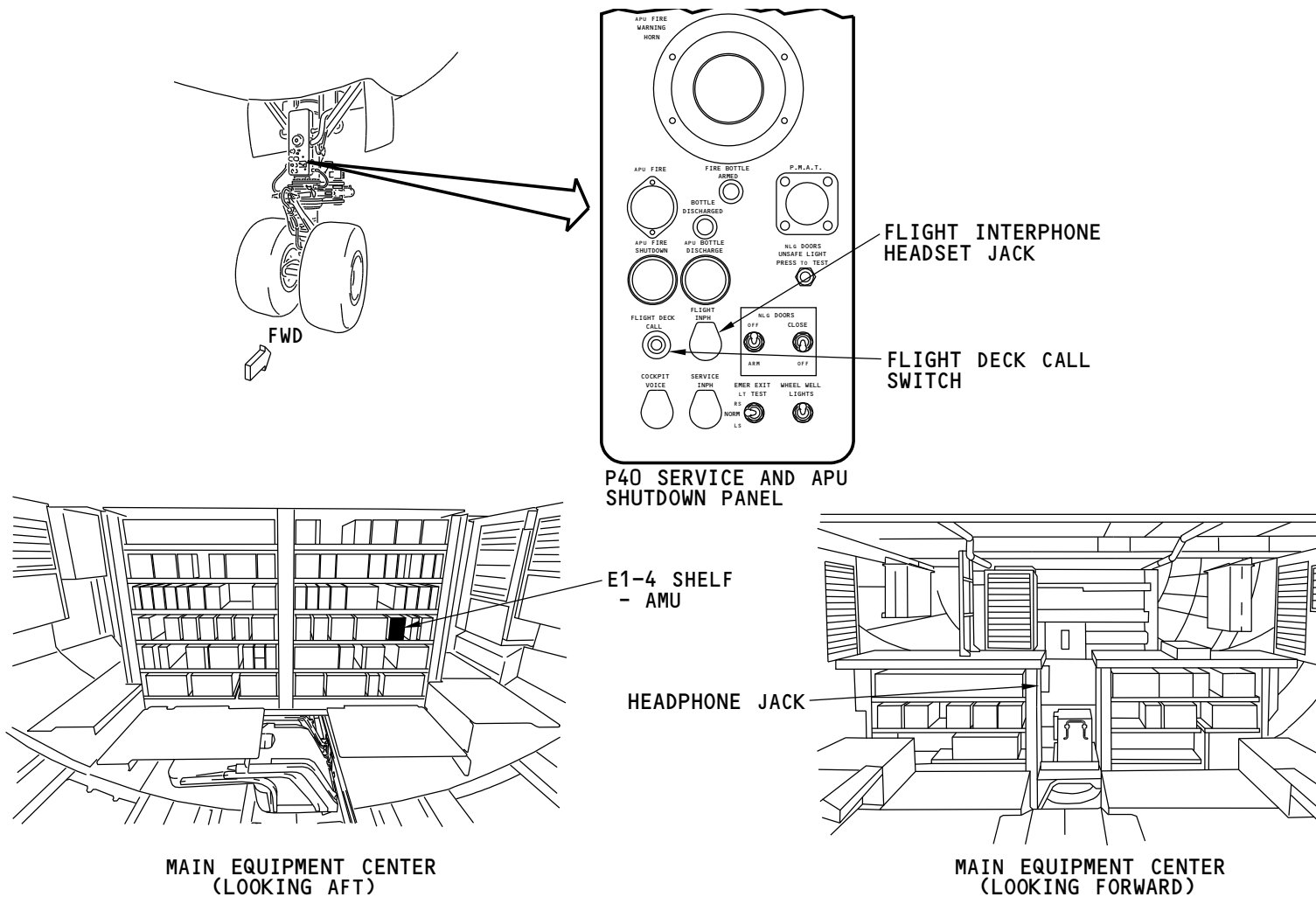
These flight interphone system components are on the service and APU shutdown panel:

- Flight interphone headset jack
- Flight deck call switch.

Main Equipment Center

These flight interphone system components are in the main equipment center (MEC):

- Audio management unit (AMU)
- Flight interphone headphone jack.



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FLIGHT INTERPHONE SYSTEM - COMPONENT LOCATIONS

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FLIGHT INTERPHONE SYSTEM - POWER INTERFACE

General

Power for the flight interphone system comes through circuit breakers in the overhead circuit breaker panel.

The audio management unit (AMU) has a connector board and three station cards, one for each of the flight crew stations. Each station card has a power supply for its circuits.

INTERPHONE-CAPT Circuit Breaker

The INTERPHONE-CAPT circuit breaker connects 28v dc to these components:

- Captain's flight interphone speaker
- Captain's card
- Captain's audio control panel (ACP) through the AMU.

Use the tow switch to supply power to the captain's station of the flight interphone during airplane towing. When the tow switch is on, the DC TOWING RELAY connects 28v dc to the components through the TOW INTERPHONE-CAPT circuit breaker.

INTERPHONE-F/O Circuit Breaker

The INTERPHONE-F/O circuit breaker connects 28v dc to these components:

- First officer's flight interphone speaker
- First officer's card
- First officer's ACP through the AMU.

A different source of power for these components is through the INTERPHONE-F/O STBY PWR circuit breaker.

INTERPHONE-OBS Circuit Breaker

The INTERPHONE-OBS circuit breaker connects 28v dc to these components:

- First observer's card

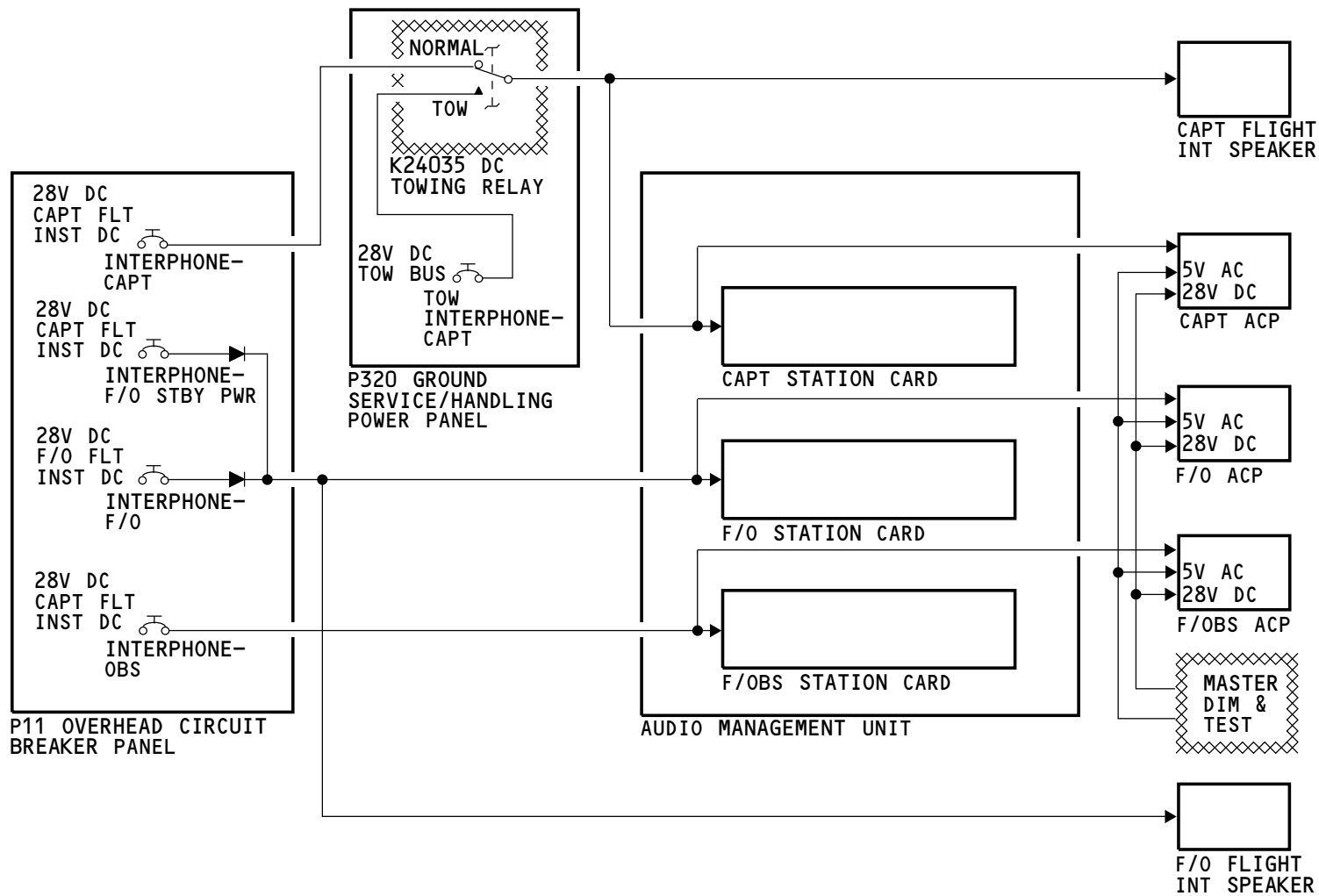
- First observer's ACP through the AMU.

Master Dim and Test

Each ACP gets 5v ac and 28v dc from the master dim and test (MD&T) system. The ACP uses 5v ac for the panel lights and 28v dc for:

- Call lights
- Mic lights
- Receive LEDs.

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FLIGHT INTERPHONE SYSTEM - POWER INTERFACE

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FLIGHT INTERPHONE SYSTEM - FLIGHT DECK INTERFACES

General

The flight interphone system has these four flight deck stations:

- Captain
- First officer
- First observer
- Second observer.

The captain's, first officer's and first observer's stations connect to a related circuit card in the audio management unit (AMU) for these functions:

- Receive inputs from the stations
- Supply audio signal routing
- Give selection indications to the audio control panels (ACPs).

Captain and First Officer Stations

The captain's and first officer's stations have these control signal and audio interfaces:

- Glareshield microphone (mic) switches
- Control wheel mic switches
- ACP
- Hand microphone
- Oxygen mask microphone and door switch (mask mic on/off)
- Headset
- Headphone
- Flight interphone speaker.

The glareshield and control wheel microphone switches connect to the station's ACP. The ACP sends a microphone or interphone (INT) PTT signal to the AMU. You use a mic/interphone switch on the ACP to send the related PTT signal to the AMU.

The hand microphone sends a PTT signal and audio through a jack panel to the AMU.

A door switch in the oxygen mask stowage box sends a mic on/off signal to the AMU. A microphone in the mask sends audio.

The AMU gets audio from a boom microphone on a headset.

The AMU sends audio to the headset, headphones, and flight interphone speaker.

First and Second Observer Stations

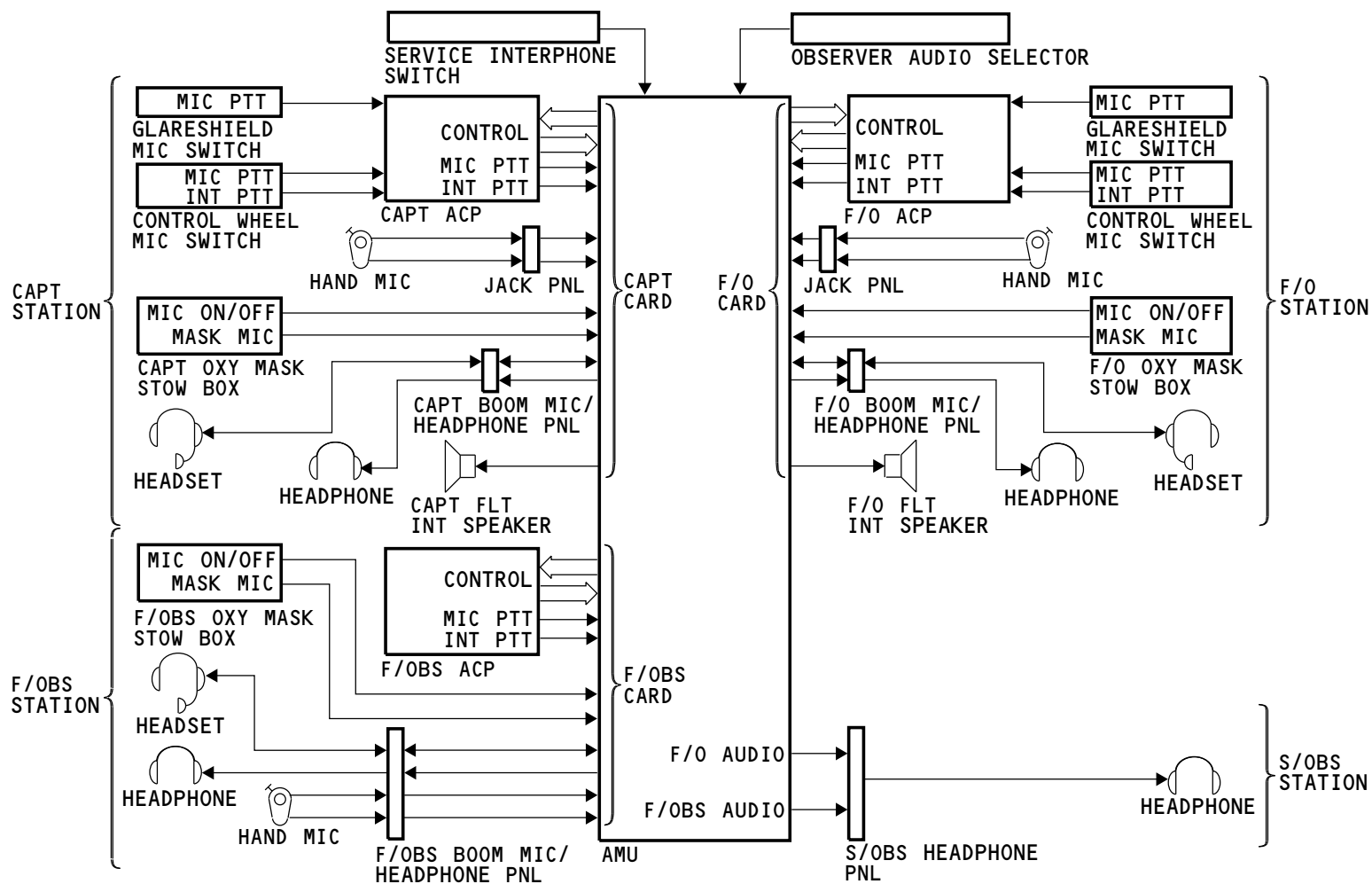
The first observer station has the same controls and interfaces as the captain and first officer except that it does not have these components:

- Flight interphone speaker
- Control wheel mic switches
- Glareshield mic switches.

The second observer station has a jack panel that allows the second observer to monitor the first officer or the first observer audio.

Other Flight Deck Interfaces

The service interphone switch and observer audio selector connect to the AMU to control audio modes and selections.



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FLIGHT INTERPHONE SYSTEM - FLIGHT DECK INTERFACES

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FLIGHT INTERPHONE SYSTEM - COMMUNICATION SYSTEM INTERFACES

General

The audio management unit (AMU) controls the routing of audio in the flight interphone system.

The AMU gets control and PTT signals from the audio control panels (ACPs). The AMU sends data to the ACPs to control lights.

Satellite Data Unit

The AMU gets call light and audio signals from the satellite data unit (SDU). The AMU turns on an associated call light on the ACPs. The flight crew makes selections on the ACP to reset the SATCOM call chime, turn on a microphone signal, and send audio to the SDU.

Communication Transceivers

The communication transceivers send audio outputs to the AMU. The transceivers get microphone audio and PTT discretes from the AMU.

The HF antenna couplers use the PTT signal to tune to a frequency.

SELCAL Decoder

The SELCAL decoder sends call set discretes to the AMU. The AMU uses them to control ACP call lights. The AMU sends call reset discretes to the SELCAL decoder to cancel the call discrete and turn off the call lights.

Passenger Address/Cabin Interphone (PA/CI) Controller

The AMU sends audio and PTT signals to the PA/CI controller. It receives audio from the PA/CI controller.

When the AMU receives a cabin call from the PA/CI controller, the ACP CALL lights come on. When the flight crew selects CAB on the ACP, the AMU sends a cabin call answer signal to the PA/CI controller. The PA/CI controller sends the cabin reset signal to the AMU. This causes the ACP CALL lights to go off.

The flight crew selects PA on the ACP to talk to passengers. The AMU sends a PTT signal and audio to the PA/CI controller. The PA/CI controller sends a sidetone audio back to the AMU.

When the ground crew calls the flight deck from the nose gear electrical service panel, the PA/CI controller sends a flight deck call signal to the AMU. This causes the ACP CALL lights to come on. When the flight crew selects FLT on any ACP, the AMU sends a flight reset signal to the PA/CI controller.

Cockpit Voice Recorder

The AMU sends audio from the captain, first officer, and first observer to the cockpit voice recorder.

Flight Interphone Jacks

The ground crew use the flight interphone jacks at the service and APU shutdown panel and in the main equipment center to talk to the flight crew.

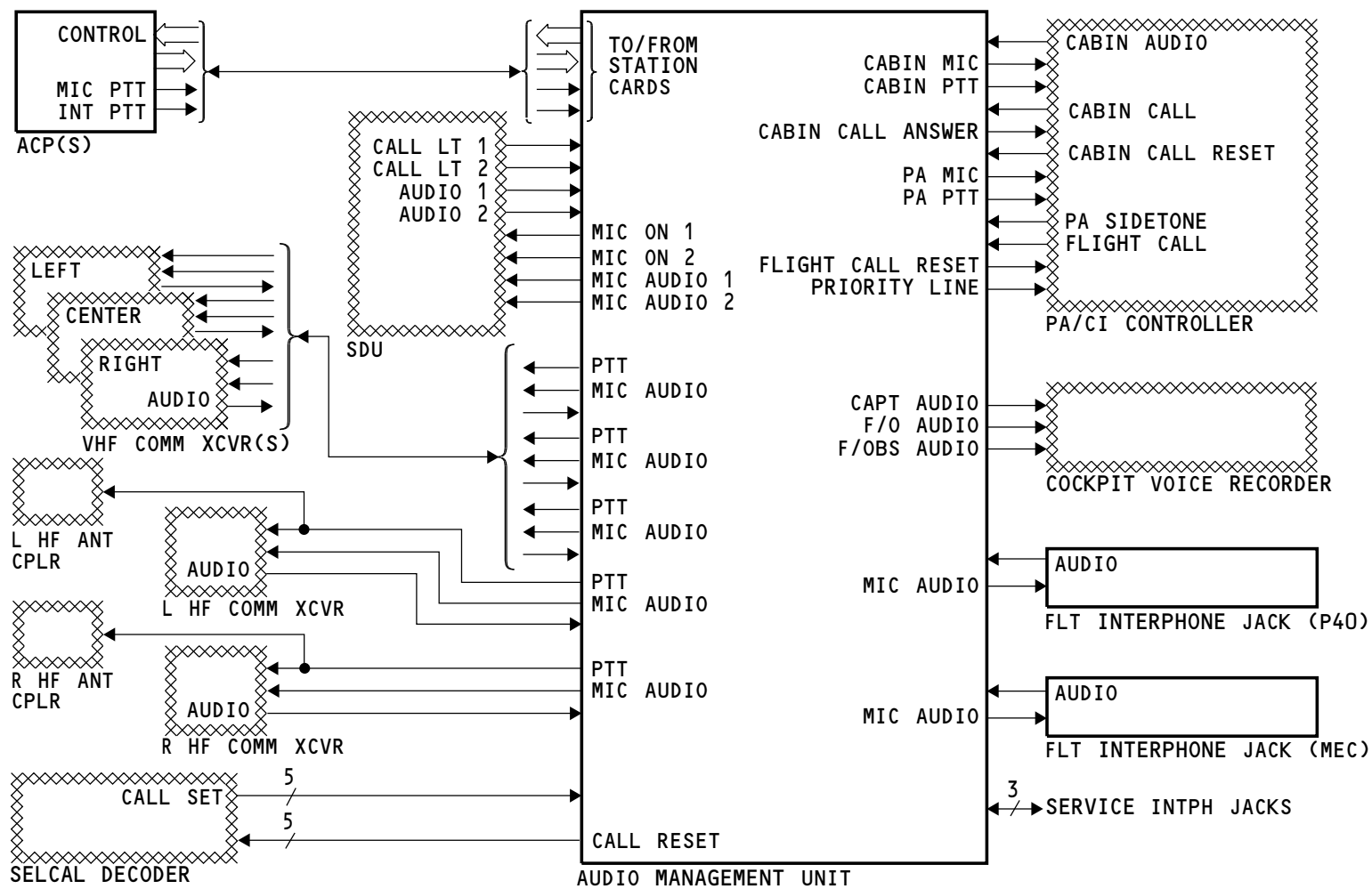
Service Interphone Jacks

The AMU has three outputs that connect to many service interphone jacks on the airplane.

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FLIGHT INTERPHONE SYSTEM - COMMUNICATION SYSTEM INTERFACES

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FLIGHT INTERPHONE SYSTEM - NAVIGATION AND AIMS INTERFACES

Navigation Interfaces

These four navigation radio systems send audio signals to the audio management unit (AMU):

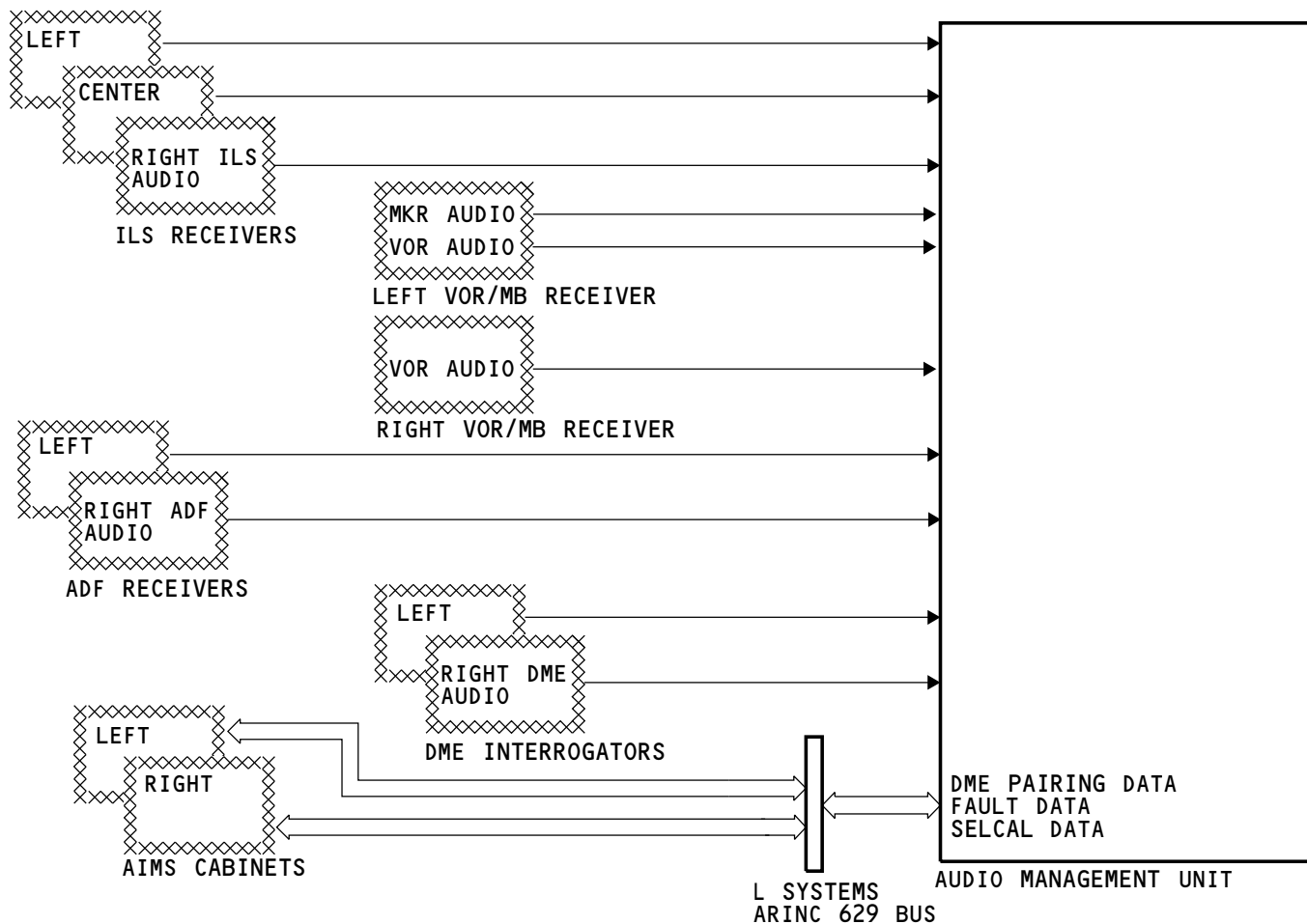
- Instrument landing system (ILS) receivers
- VHF omnidirectional range (VOR)/marker beacon receivers
- Automatic direction finder (ADF) receivers
- Distance measuring equipment (DME) interrogators.

AIMS Interface

The AIMS cabinets send DME pairing data to the AMU. This data tells the AMU to place DME audio on the VOR or ILS audio channel.

The AMU sends failure data to the AIMS cabinets.

The AMU also sends SELCAL set/reset data to the AIMS cabinets. The AIMS cabinets use this data to alert the flight crew.



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FLIGHT INTERPHONE SYSTEM - NAVIGATION AND AIMS INTERFACES

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FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL

Purpose

The flight crew uses the audio control panels (ACPs) to control audio for the communication and navigation radio systems. Each ACP controls one station.

Controls

These are the controls on the ACP:

- Transmitter select switches
- Receiver volume controls
- Speaker volume control
- Approach receiver selector
- NAV filter selector
- VOR/ADF receiver selector
- Mic/interphone switch.

Lights

These are the three kinds of lights on the ACP:

- Call lights
- Mic lights
- Receiver lights.

Transmit Operation

To connect a microphone (boom, oxygen mask, or handheld) to a communication radio or system, push the related transmitter select switch. You can select only one system at a time. When you push a transmitter select switch, this is what happens:

- The MIC light on the upper half of the switch comes on
- The receive audio of the selected system comes on at the volume set by the receiver volume control.

A call goes to an attendant station when you push the cabin interphone (CAB) transmitter select switch twice in one second. The cabin management system (CMS) identifies the attendant station.

When the ACP first gets power, all transmitter select switches are off.

Receive Operation

The lower half of a transmitter select switch is a CALL light. This light comes on when the related system calls the flight crew.

The call light goes off when you push the transmitter select switch. If the MIC light for that transmitter select switch is on, push any mic switch to reset the call light. The flight interphone call light also goes out when you select the INT position of the mic/int switch on the ACP or on the control column.

The call lights for the SATCOM system do not go off when you push the transmitter select switch. You make selections on a control display unit (CDU) to turn off the SATCOM call lights.

The SELCAL inputs to the audio management unit (AMU) control the HF and VHF call lights. The passenger address/cabin interphone controller input controls the CAB call light. The flight deck call switch on the P40 service and APU shutdown panel controls the FLT call light.

To listen to communication or navigation system audio, push the receiver volume control (push-on, push-off) and turn it to adjust the volume. You can monitor any combination of systems at any time. The receiver light comes on to show that the related receiver control is on.

Mic/Interphone Switch

This switch is a three-position switch that is spring loaded to center. In the MIC position, a PTT signal causes the selected system to transmit. The flight crew member talks on the oxygen mask microphone or the boom microphone.

In the INT position, a PTT signal to the AMU connects the flight crew together through the flight interphone system. It is not necessary to select any transmit switch to use the flight interphone. The flight crew member talks on either the oxygen mask microphone or the boom microphone.

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FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL**Speaker Volume Control**

This control is functional only on the audio control panels in the captain and first officer positions. The speaker volume control turns on or off the flight deck speaker at the related station and adjusts its volume.

VOR/ADF Selector

Use the VOR/ADF selector to select a VOR or ADF receiver.

Filter Selector

The filter selector tells the AMU how to process VOR, ADF, and ILS audio. In the V (voice) position, the AMU passes only voice frequencies through the filter and filters out the 1020 Hz range frequency.

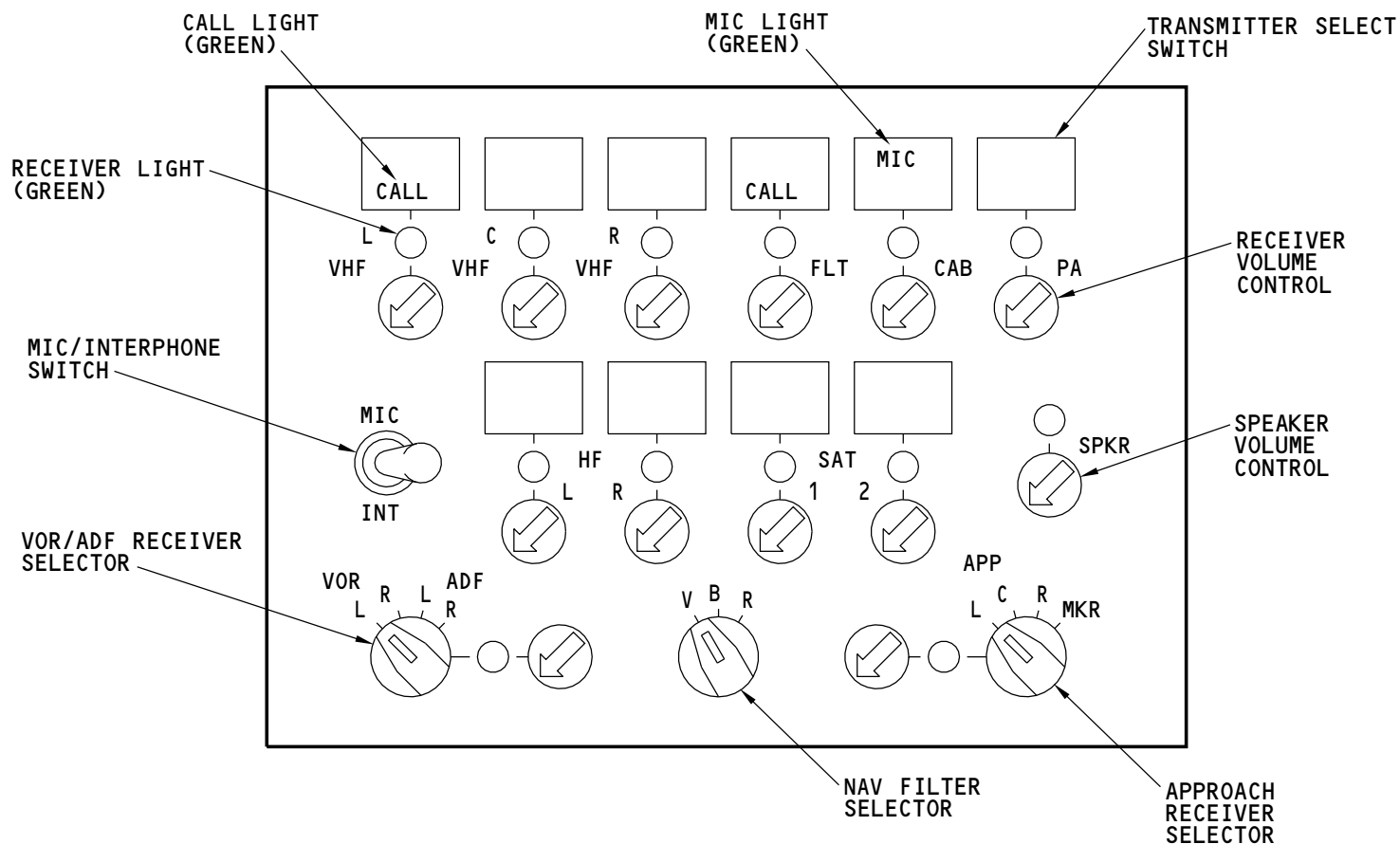
In the B (both) position, the AMU permits voice and range (coded station identification) frequencies through the filter to the audio output.

In the R (range) position, the AMU passes only the range frequency through the filter and filters out the voice frequencies.

Approach Receiver Selector

The approach receiver selector controls selection of these navigation radios:

- Left instrument landing system (ILS) receiver
- Center ILS receiver
- Right ILS receiver
- Marker beacon receiver.



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FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL

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**FLIGHT INTERPHONE SYSTEM - AUDIO MANAGEMENT UNIT****Purpose**

The audio management unit (AMU) controls audio signal routing in the flight interphone system.

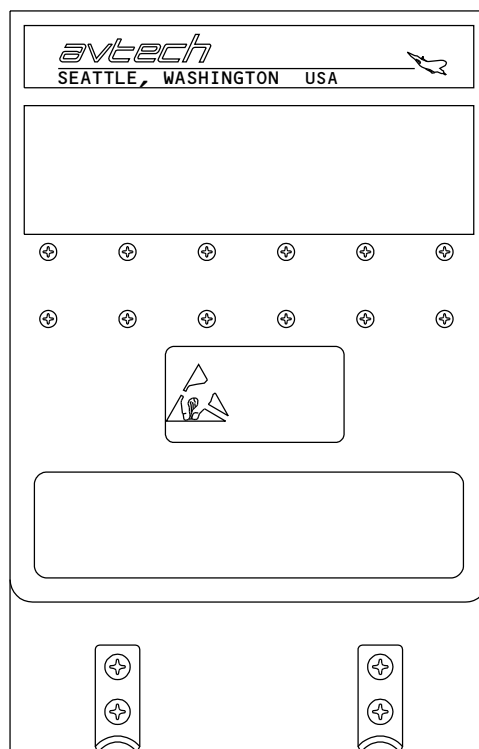
Physical Description

The AMU is a 4 MCU LRU and weighs approximately 12 pounds.

Functions

The AMU monitors inputs from the audio control panels (ACPs) to supply connections for these signals:

- Communication transceivers audio
- Navigation transceivers audio
- Passenger address audio
- Cabin interphone audio
- Flight interphone audio
- SATCOM audio
- SELCAL call alerts and resets.



FLIGHT INTERPHONE SYSTEM - AUDIO MANAGEMENT UNIT

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**FLIGHT INTERPHONE SYSTEM - OBSERVER AUDIO SELECTOR****Purpose**

The observer audio selector controls the inputs and outputs of the first observer's station card in the audio management unit (AMU).

The switch lets the captain or first officer use the first observer's audio control panel (ACP) if their AMU audio station card or ACP has a failure.

Selector Positions

When you select CAPT, the captain's inputs and outputs connect to the first observer's station card.

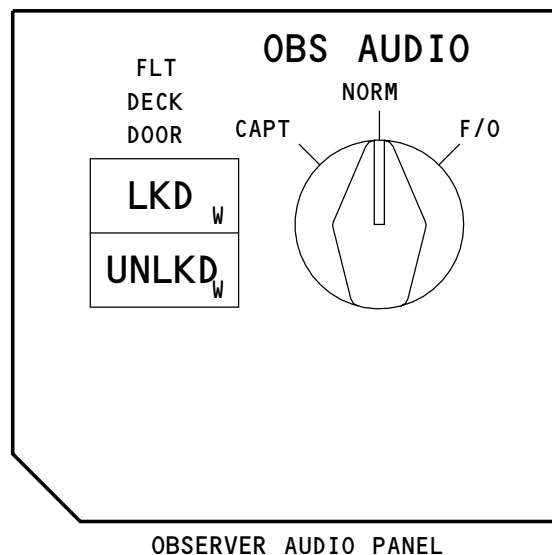
When you select NORM, the first observer's inputs and outputs connect to the first observer's station card.

When you select F/O, the first officer's inputs and outputs connect to the first observer's station card.

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FLIGHT INTERPHONE SYSTEM - OBSERVER AUDIO SELECTOR

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FLIGHT INTERPHONE SYSTEM - JACK PANELS

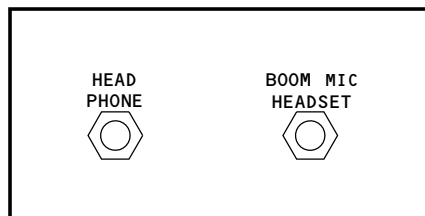
General

Handsets and headphones connect to jack panels at these three crew stations:

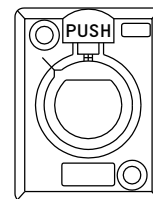
- Captain
- First officer
- First observer.

The second observer can monitor audio from the first officer or the first observer.

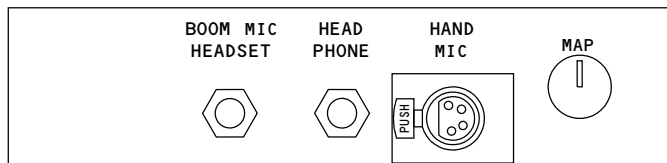
The captain and first officer hand microphone jacks are near the related flight interphone speaker. The first observer jack panel has a hand microphone jack.



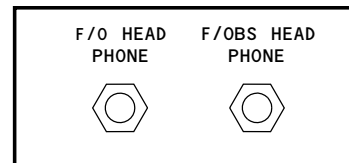
BOOM MIC/HEADPHONE PANEL -
CAPTAIN AND FIRST OFFICER



HAND MICROPHONE
JACK - CAPTAIN
AND FIRST OFFICER



BOOM MIC/HEADPHONE/MAP LIGHT PANEL -
FIRST OBSERVER



HEADPHONE PANEL -
SECOND OBSERVER

FLIGHT INTERPHONE SYSTEM - JACK PANELS

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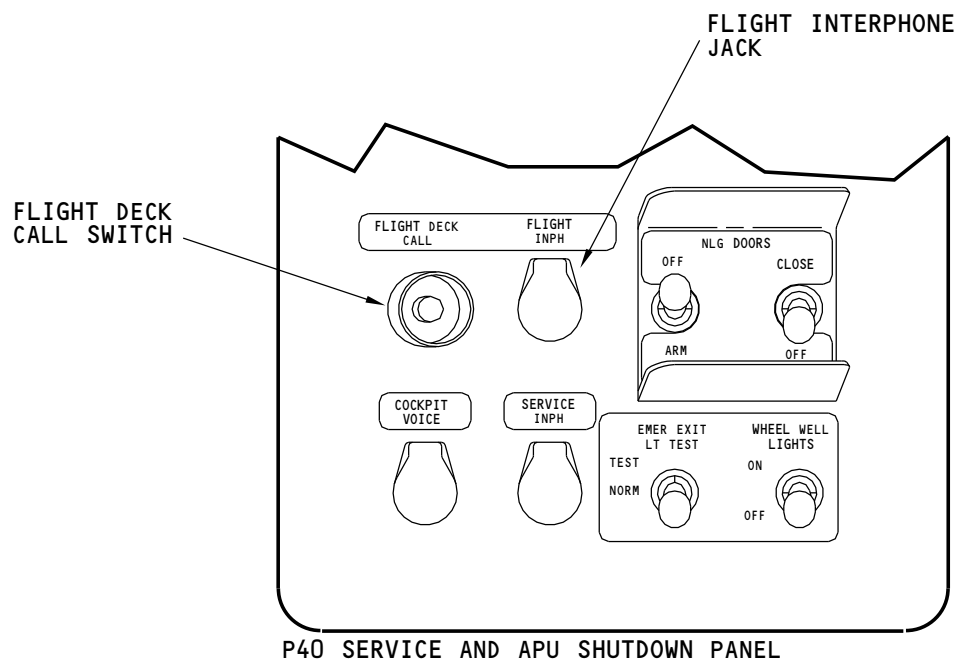
FLIGHT INTERPHONE SYSTEM - FLIGHT INTERPHONE JACK

Purpose

The ground crew talks to the flight crew on the flight interphone system. A ground crew headset connects to the flight interphone jack on the service and APU shutdown panel.

When you push the flight deck call switch, the flight interphone CALL lights on all audio control panels (ACPs) come on.

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FLIGHT INTERPHONE SYSTEM - FLIGHT INTERPHONE JACK

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FLIGHT INTERPHONE SYSTEM - MICROPHONES AND HEADSETS

Purpose

The flight interphone system uses headsets and microphones for audio interfaces with the audio management unit (AMU).

Headset

A headset has these three parts:

- A boom microphone
- Headphones
- An amplifier.

You need to use a microphone (mic) switch on one of the control columns, glareshield, or the audio control panels (ACPs) to send audio to the AMU. The amplifier sends audio at the correct level for the AMU. You use the headphones to hear the audio from the AMU.

Hand microphone

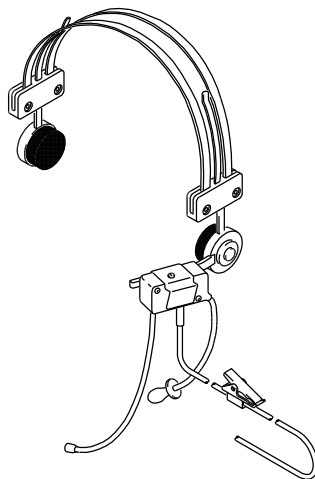
A mic switch on the hand microphone sends audio to the AMU. A preamplifier in the microphone sends the audio signals at the correct level for the AMU.

Oxygen mask

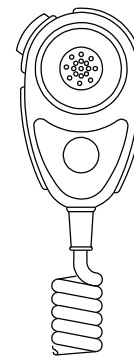
A carbon microphone in the oxygen mask permits communication during emergencies. Oxygen mask microphones do not have preamplifiers. You key the microphone with the mic switches on the control columns, glareshield, or the ACPs.

Headphones

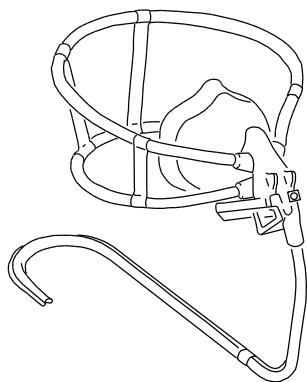
Use the headphones to listen to audio from the AMU.



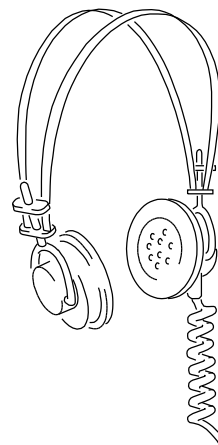
HEADSET



HAND MICROPHONE



OXYGEN MASK



HEADPHONE

FLIGHT INTERPHONE SYSTEM - MICROPHONES AND HEADSETS

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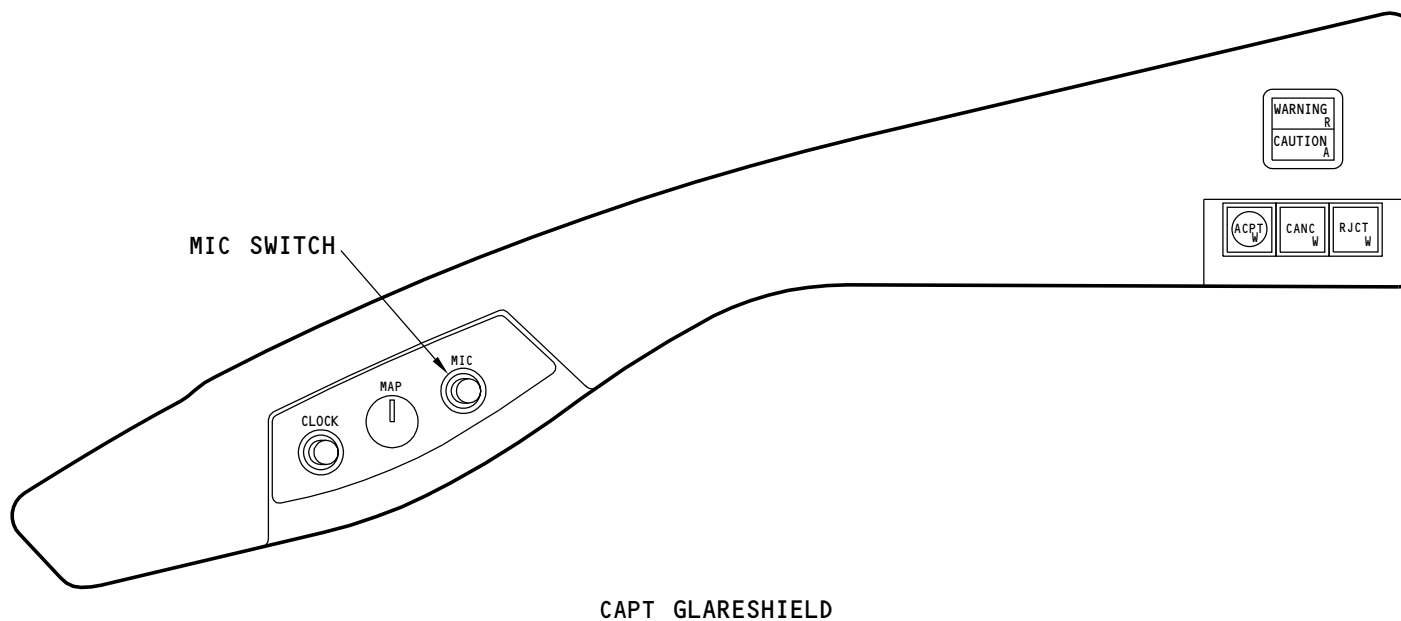


FLIGHT INTERPHONE SYSTEM - GLARESHIELD MIC SWITCH

General

The glareshield microphone (mic) switch gives PTT inputs to the audio management unit (AMU) for the headset or oxygen mask microphones.

When you push the mic switch, microphone audio and the PTT signal go to the selected communication system.



CAPT GLARESHIELD

FLIGHT INTERPHONE SYSTEM - GLARESHIELD MIC SWITCH

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FLIGHT INTERPHONE SYSTEM - CONTROL WHEEL MIC SWITCH

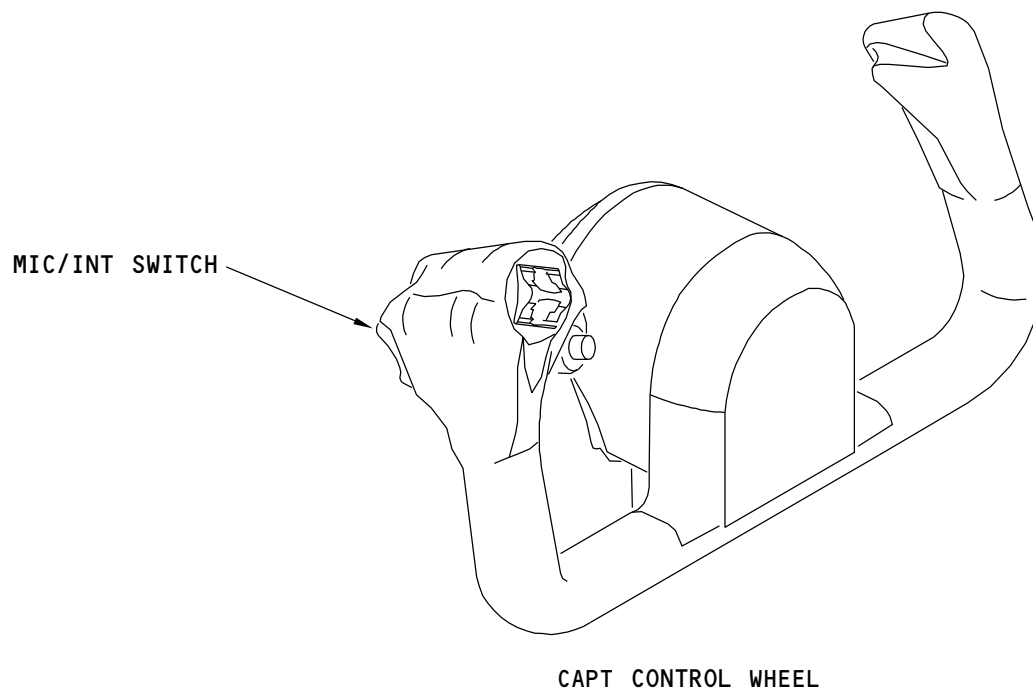
Purpose

The control wheel microphone (mic) switch gives PTT inputs to the audio management unit (AMU) for the headset or oxygen mask microphones.

Locations and Functions

The switch is a three-position switch and is on the outboard horn of each control wheel. In the MIC position, the microphone audio goes to the selected communication system. In the INT position, the microphone audio goes directly to the flight interphone system without selecting the FLT transmit switch on the audio control panel.

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FLIGHT INTERPHONE SYSTEM - CONTROL WHEEL MIC SWITCH

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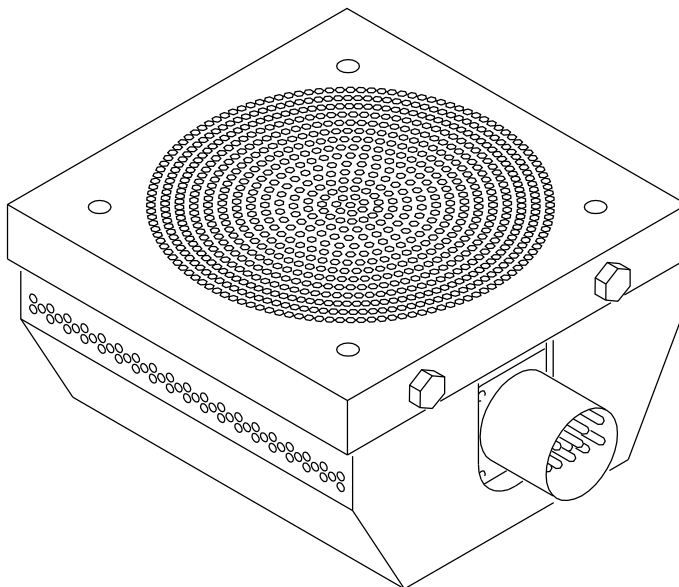


FLIGHT INTERPHONE SYSTEM - FLIGHT INTERPHONE SPEAKER

Function

The captain's and first officer's flight interphone speakers receive audio from the audio management unit (AMU). You use the speaker volume control on the audio control panel (ACP) to select and adjust the volume of the related speaker.

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FLIGHT INTERPHONE SYSTEM - FLIGHT INTERPHONE SPEAKER

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FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL FUNCTIONAL DESCRIPTION

General

You use the audio control panel (ACP) to select audio for the headsets and for the flight interphone speakers. You also use it to select a communication system.

ACP Components

The ACP has these items:

- Front panel lights and switches
- Light drivers
- Multiplexer
- Analog-to-digital (A/D) converter
- Microprocessor and memory
- ARINC 429 interface.

Front Panel Components

The ACP has these front panel components:

- Transmitter select switches with mic and call lights
- Receiver volume controls and lights
- Selectors.

The mic and call lights get 28v dc from the master dim and test (MD&T) circuits. A light turns on when it gets a ground from the light drivers.

When you push the transmitter select switch, it sends a ground to the multiplexer.

You push in the receiver volume control to hear audio for the related system. The receiver volume control switch sends a ground to the multiplexer. The light emitting diode (LED) turns on when it gets a ground from the light drivers.

A potentiometer in the receiver volume control adjusts voltage to the multiplexer. This controls the audio volume.

Each selector position sends a ground to the multiplexer when you select it.

The mic/interphone switch gets a ground from the audio management unit (AMU). When you select MIC, it sends a microphone PTT signal to the AMU. When you select INT, the ACP sends an interphone PTT signal.

The captain's and first officer's ACPs get inputs from the glareshield and control wheel microphone switches. These inputs connect to the mic and int PTT outputs to the AMU.

Light Drivers

The light drivers get data from the microprocessor to turn on and off the mic, call and receiver lights.

Multiplexer

The multiplexer gets ground signals from these front panel components and sends them to the A/D converter:

- Transmitter select switches
- Receiver volume controls
- Selector switches.

The receiver volume controls also send voltages to the multiplexer for audio volume control.

A/D Converter

The A/D converter gets analog signals from the multiplexer. It changes these signals to digital and sends them to the microprocessor.

Microprocessor and Memory

The microprocessor uses a program in memory to control the functions of the ACP.

It gets switch position data from the A/D converter and sends it to the ARINC 429 interface. It uses data from the ARINC 429 interface to control front panel lights.

The microprocessor also sends BITE status and failure data to the AMU through the ARINC 429 interface.

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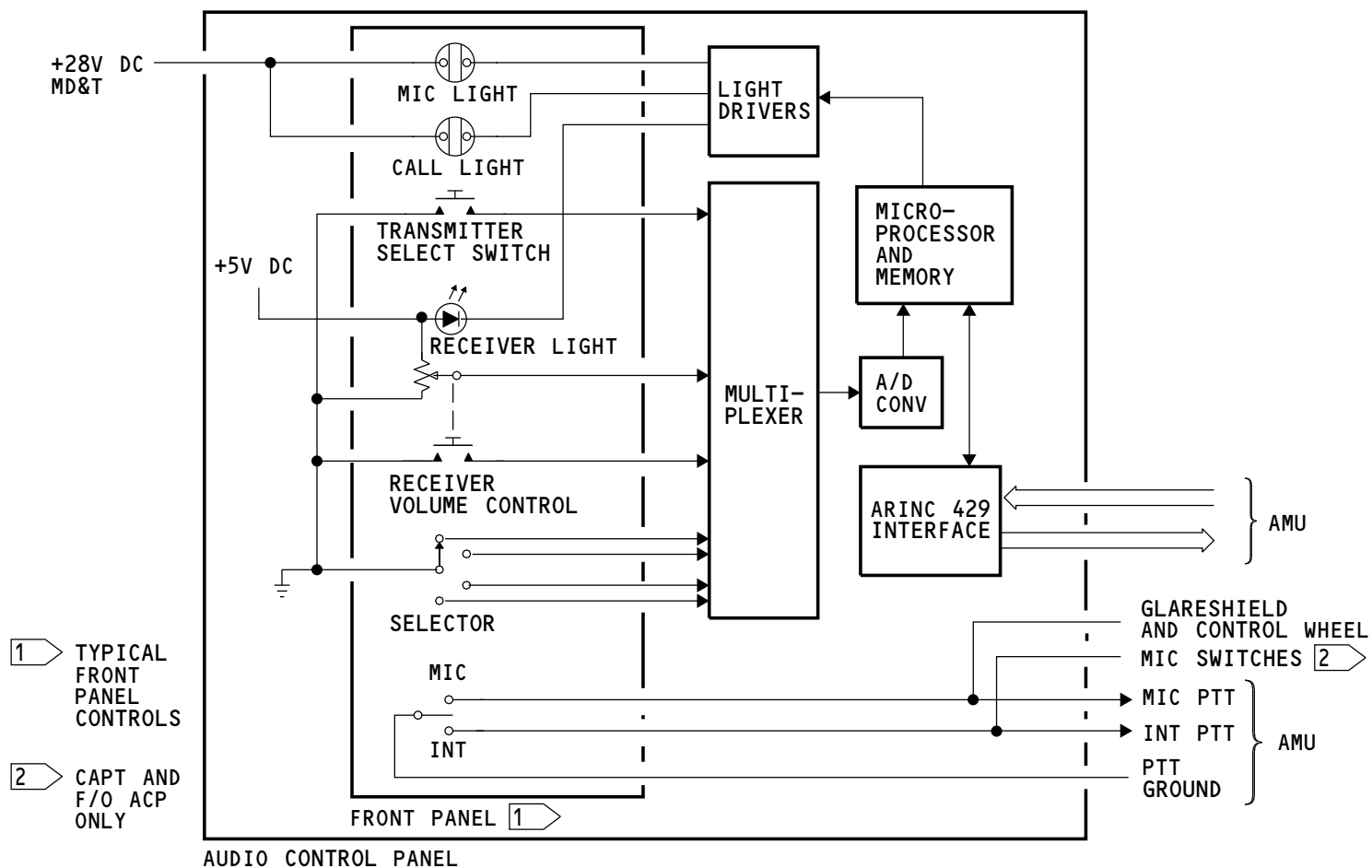
FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL FUNCTIONAL DESCRIPTION

ARINC 429 Interface

The ARINC 429 interface gets digital data from the microprocessor and changes it to ARINC 429 for the AMU.

It also changes the ARINC 429 data from the AMU to digital for the microprocessor.

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FLIGHT INTERPHONE SYSTEM - AUDIO CONTROL PANEL FUNCTIONAL DESCRIPTION

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FLIGHT INTERPHONE SYSTEM - PTT FUNCTION

General

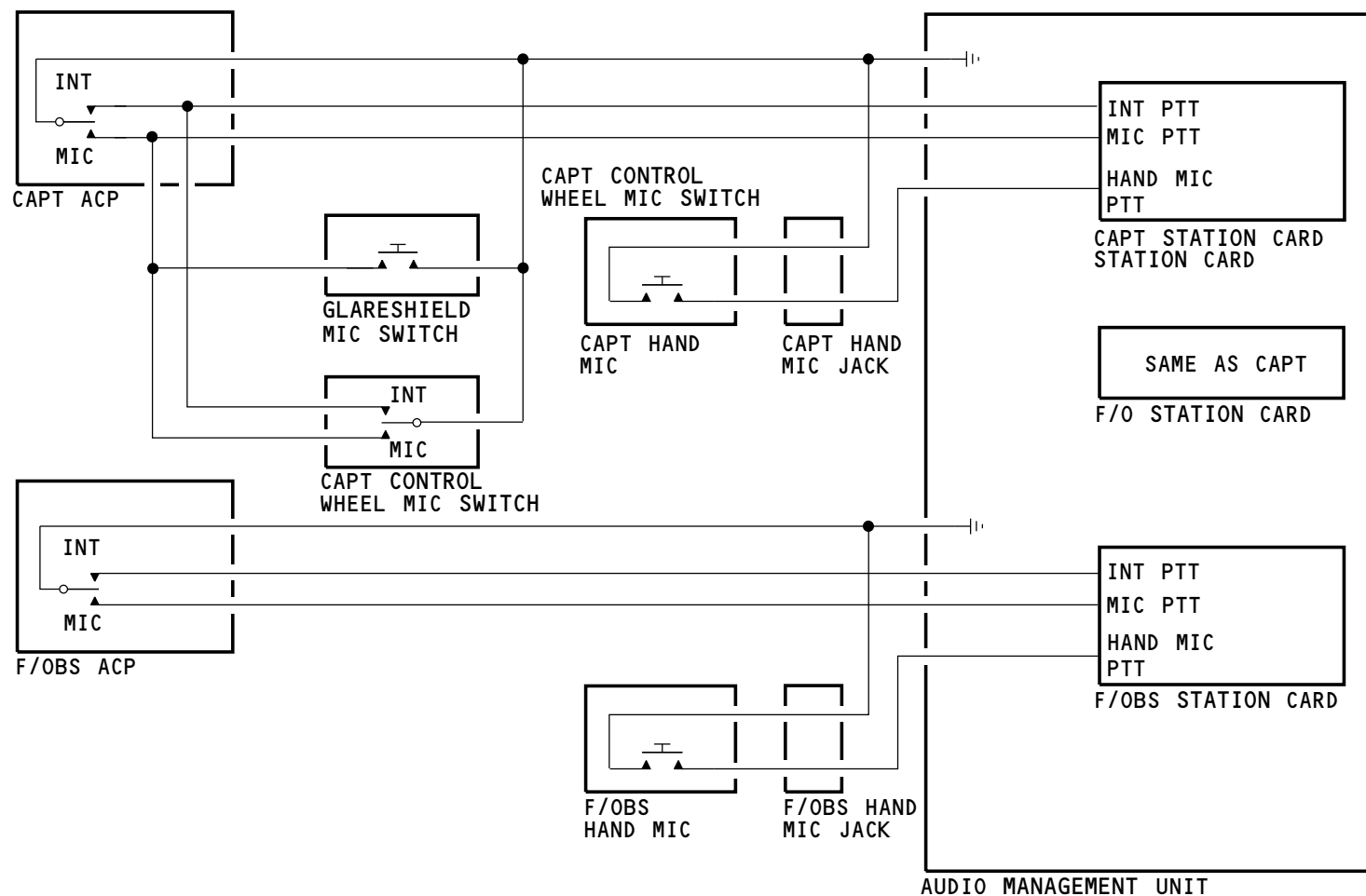
The captain and first officer use a microphone (mic) switch on any one of these components to send a push-to-talk (PTT) signal to the audio management unit (AMU):

- Audio control panel (ACP)
- Glareshield
- The control wheel
- The hand microphone PTT switch.

Set the mic/interphone switch to INT to access the flight interphone system directly.

The first observer sends a PTT only from the hand microphone and ACP.

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FLIGHT INTERPHONE SYSTEM - PTT FUNCTION

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FLIGHT INTERPHONE SYSTEM - AUDIO MANAGEMENT UNIT FUNCTIONAL DESCRIPTION

General

The audio management unit (AMU) controls all audio to and from the flight crew stations.

The station cards use inputs from the flight crew to control audio routing.

AMU Inputs

Each station card in the AMU receives audio from these sources:

- Flight deck microphones
- Communication transceivers
- Navigation receivers
- Satellite data unit (SDU)
- Passenger address/cabin interphone (PA/CI) controller.

The station cards also get control signal inputs from these:

- Audio control panels (ACPs)
- Microphone switches
- PA/CI controller.

A multiplexer in the AMU gets call signals from the SDU for SATCOM system calls. When the SELCAL decoder gets a call, it sends a discrete to the multiplexer. The AMU microprocessor controls the multiplexer to get one input at a time through the analog-to-digital (A/D) converter. The microprocessor sends the multiplexer data to the station cards to control call lights on the ACPs.

AMU Outputs

Each station card sends audio to the headphones and flight interphone speakers for the related station. The headphone audio for the captain, first officer, and first observer go to related channel inputs to the cockpit voice recorder (CVR).

The AMU mutes the audio to the flight interphone speakers when the captain or first officer transmit.

Each station card sends audio through microphone audio isolation circuits to these components:

- HF and VHF communication transceivers
- SDU
- PA/CI controller.

The station cards also send push-to-talk (PTT) signals through PTT isolation circuits to the communication transceivers and the PA/CI controller.

The microprocessor in the AMU sends signals to the demultiplexer. The demultiplexer uses the data to send control signals and resets to these components:

- PA/CI controller - flight call reset, priority line discrete, and cabin call answer
- SDU - microphone on signals
- SELCAL decoder - call reset signals.

ARINC 629 Interface

The ARINC 629 interface circuit connects to the left systems ARINC 629 data bus. The AMU uses data from this bus to control signal pairing of distance measuring equipment (DME) interrogators with instrument landing system (ILS) or VHF omnidirectional range (VOR) audio. The AMU sends BITE and failure data to the central maintenance computing system (CMCS) on this bus.

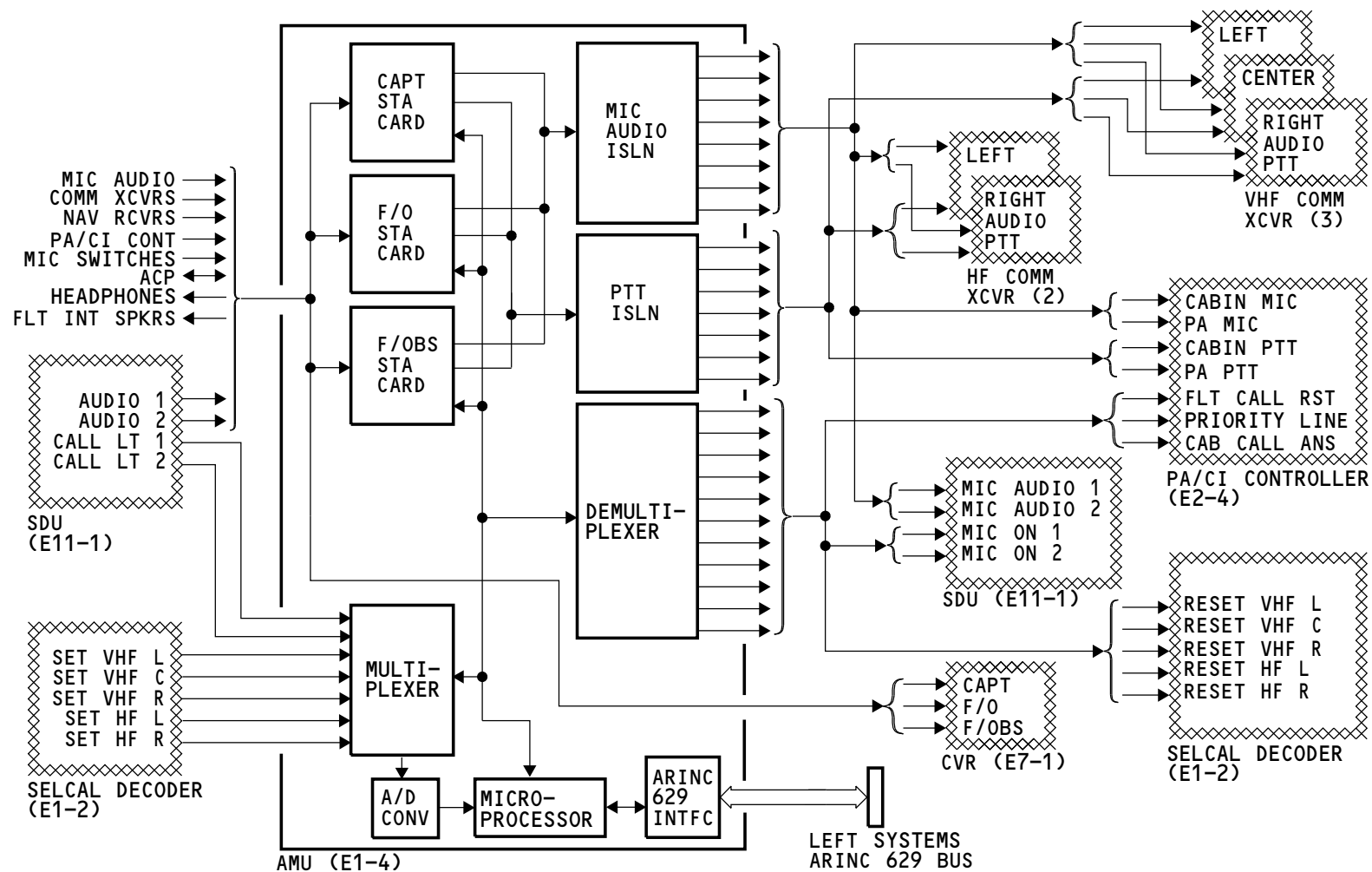
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FLIGHT INTERPHONE SYSTEM - AUDIO MANAGEMENT UNIT FUNCTIONAL DESCRIPTION

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FLIGHT INTERPHONE SYSTEM - AMU STATION CARD FUNCTIONAL DESCRIPTION

General

The AMU has a station card for each flight crew station. The station card gets inputs from related station components to control audio routing.

The example shows captain's station card. The other station cards operate in the same way.

Control Signals

The flight crew uses the controls on an ACP to select the operating modes of the AMU. ARINC 429 data from the ACP goes to the microprocessor in the AMU. The data tells the microprocessor which inputs and outputs to select.

The discrete multiplexer gets control signals from these sources:

- Hand mic - push-to-talk (PTT) signal
- Oxygen mask mic - on/off signal from the oxygen mask stowage box
- ACP - mic and interphone PTT
- Passenger address/cabin interphone (PA/CI) controller - cabin call, cabin call reset, and flight call.

The discrete multiplexer uses an input from the microprocessor to select one input at a time and send it to an analog-to-digital (A/D) converter. The A/D converter changes the analog inputs to digital signals and sends them to the microprocessor.

Flight Crew Audio

The flight crew uses one of their microphones to send audio to the AMU. The boom mic, hand mic, and oxygen mask mic send audio to the mic select circuits.

The microprocessor selects the audio input in the mic select circuits. The audio goes to the mic audio router and to the communication/navigation (comm/nav) audio multiplexer.

The microprocessor tells the mic audio router to send the audio through isolation circuits to one of these components:

- Left VHF communication transceiver
- Center VHF communication transceiver
- Right VHF communication transceiver
- Left HF communication transceiver
- Right HF communication transceiver
- Satellite data unit (SDU)
- PA/CI controller.

The microprocessor uses PTT select circuits to send a related PTT signal for the audio. The SDU does not use a PTT.

Navigation/Approach Inputs

The AMU gets audio tones from the navigation and approach systems.

The microprocessor controls the distance measuring equipment (DME) paring circuits. These circuits pair DME audio with VHF omnidirectional range (VOR) or instrument landing system (ILS) audio. The audio pairs go to the navigation/approach audio multiplexer.

The navigation/approach audio multiplexer gets audio from the center ILS and left and right automatic direction finder (ADF) receivers. Marker beacon (MB) audio from the left VOR/MB receiver also goes to the multiplexer. The microprocessor uses data from the ACP to select the multiplexer inputs.

Comm/Nav Inputs

The communication/navigation audio multiplexer gets the output from the navigation/approach audio multiplexer. It also gets voice audio from these sources:

- The mic select output
- VHF and HF communication transceivers
- PA/CI controller
- SDU

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**FLIGHT INTERPHONE SYSTEM - AMU STATION CARD FUNCTIONAL DESCRIPTION**

- Service interphone system.

The microprocessor controls the comm/nav audio multiplexer to select one or more inputs and send them to the digital signal processor (DSP) core.

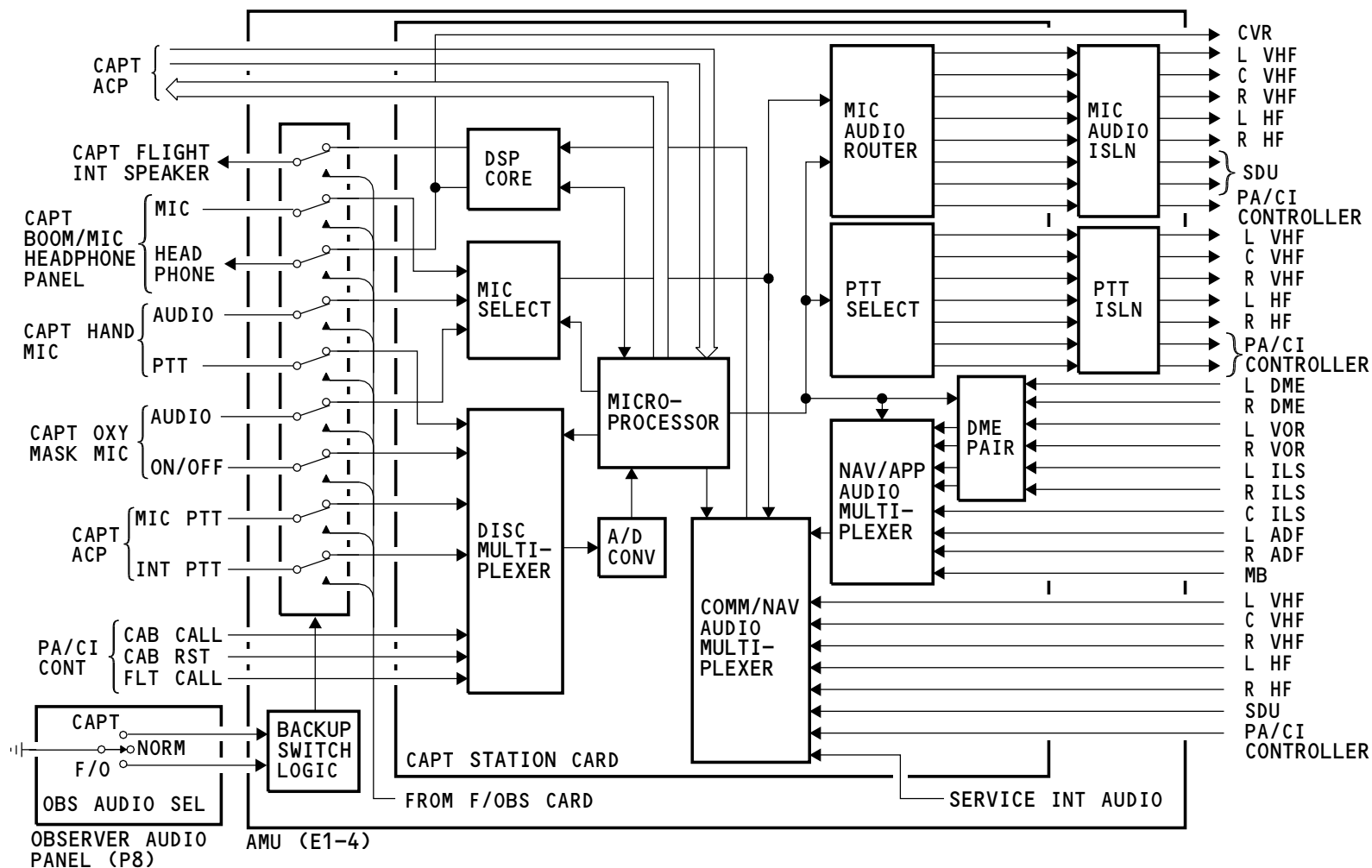
The DSP core gets control signals from the microprocessor. These control signals tell the DSP where to send the audio. The DSP sends audio to the flight interphone speaker, headphone jack, and cockpit voice recorder (CVR).

Backup Switch Logic

The backup switch logic gets signals from the observer selector switch. When you choose CAPT on the observer selector switch, the control signals that normally go to the captain station card now go to the first observer station card. The audio to the captain station comes from the first observer station card.

The switch logic is the same for the first officer card and station when you select F/O on the observer audio selector.

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FLIGHT INTERPHONE SYSTEM - AMU STATION CARD FUNCTIONAL DESCRIPTION

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**FLIGHT INTERPHONE SYSTEM - OBSERVER AUDIO SYSTEM SWITCHING****General**

The observer audio selector controls connections to the first observer's station card in the audio management unit (AMU). The AMU has many switches that connect the first observer to a flight crew station. The observer audio selector has these three positions:

- CAPT
- NORM
- F/O.

CAPT Position

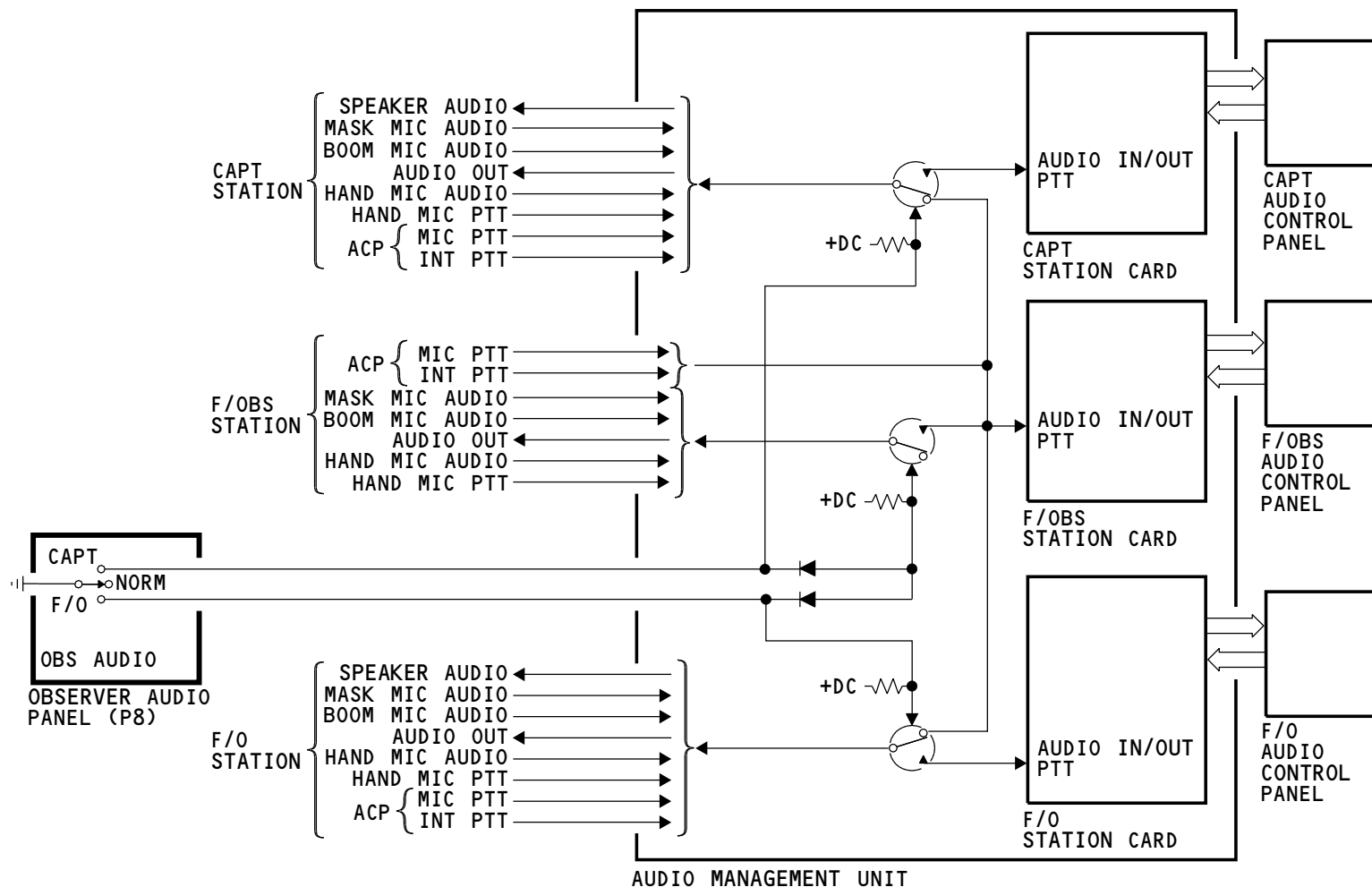
When you select the CAPT position, the switch connects a ground to the AMU. The AMU disconnects the first observer and connects the captain's audio and PTT interfaces to the first observer's card. This includes the microphone and interphone PTTs from the captain's ACP. The captain makes all other selections with the first observer's audio control panel (ACP).

NORM Position

When you select NORM, the first observer's AMU inputs and outputs connect to the first observer's card.

F/O Position

When the observer audio selector is in the F/O position, it sends a ground to the AMU. The AMU disconnects the first observer and connects the first officer's audio and PTT interfaces to the first observer's card. This includes the microphone and interphone PTTs from the first officer's ACP. The first officer makes all other selections with the first observer's ACP.



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FLIGHT INTERPHONE SYSTEM - OBSERVER AUDIO SYSTEM SWITCHING

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FLIGHT INTERPHONE SYSTEM - TEST

General

Use the digital control audio system test to test the flight interphone system.

Digital Control Audio System Test

This test verifies the operation of the digital control audio system. The digital control audio system includes the flight interphone system.

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GROUND TESTS

SELECT ATA SYSTEM (55)

- 23 VHF COMMUNICATION SYSTEM
- 23 SATELLITE COMMUNICATIONS (SATCOM) SYSTEM
- 23 DIGITAL CONTROL AUDIO SYSTEM
- 24 MAIN AC ELECTRICAL POWER GENERATION SYSTEM
- 24 BACKUP (VSCF) ELECTRIC POWER SYSTEM (BEPS)
- 24 ELMS P210 POWER MANAGEMENT PANEL
- 24 ELMS P110 POWER MANAGEMENT PANEL

SELECT TEST TYPE

- ☒ SYSTEM TEST
- ☐ OPERATIONAL TEST
- ☐ DU REPLACEMENT TEST

SELECT SYSTEM TEST

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST

DIGITAL CONTROL AUDIO SYSTEM

CMCS GROUND TEST SELECTION DIALOG BOX

FLIGHT INTERPHONE SYSTEM - TEST

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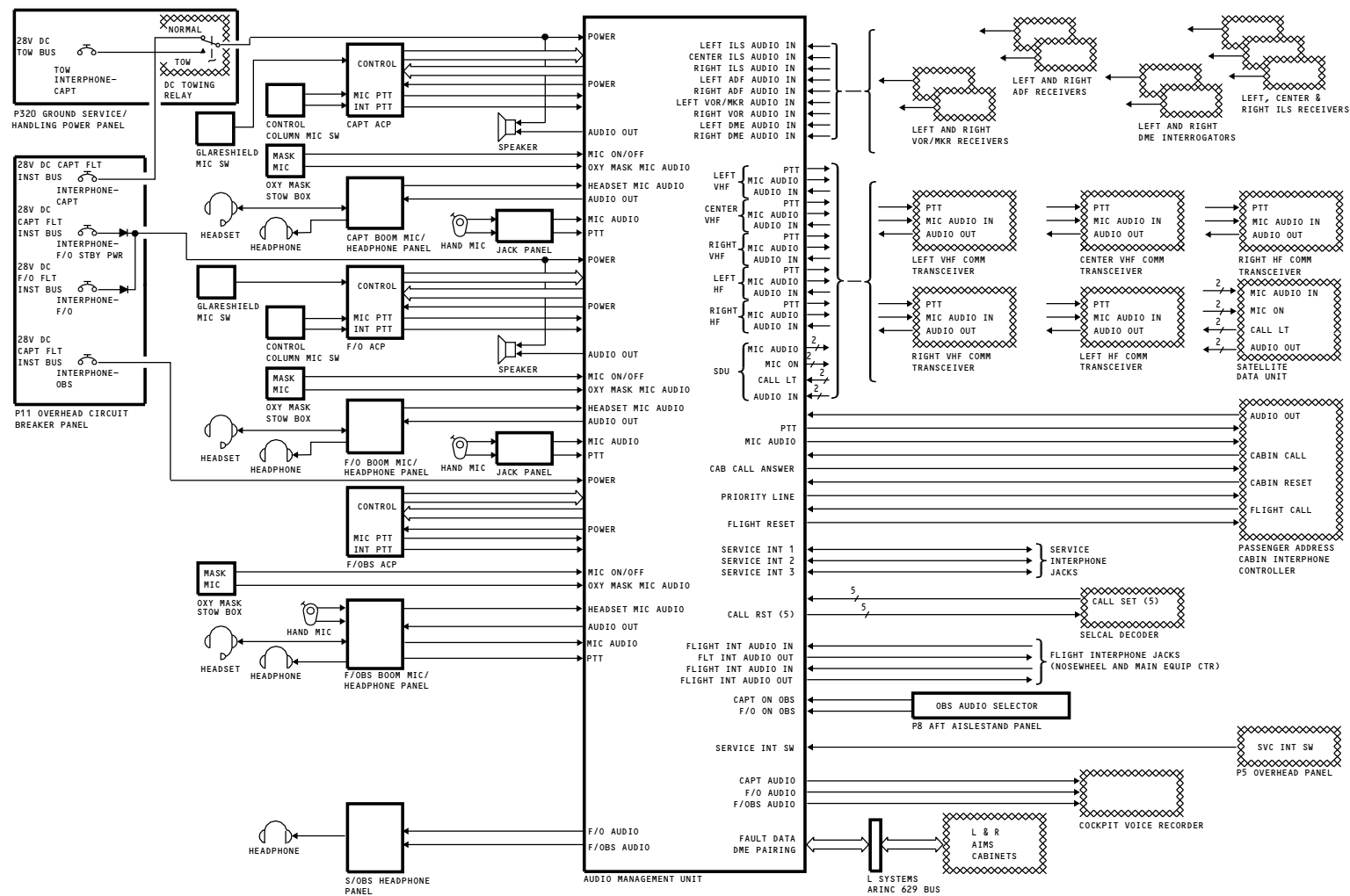


FLIGHT INTERPHONE SYSTEM - INTERFACES

Interfaces

This interface is for reference purposes.

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FLIGHT INTERPHONE SYSTEM - INTERFACES

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STATIC DISCHARGERS

Purpose

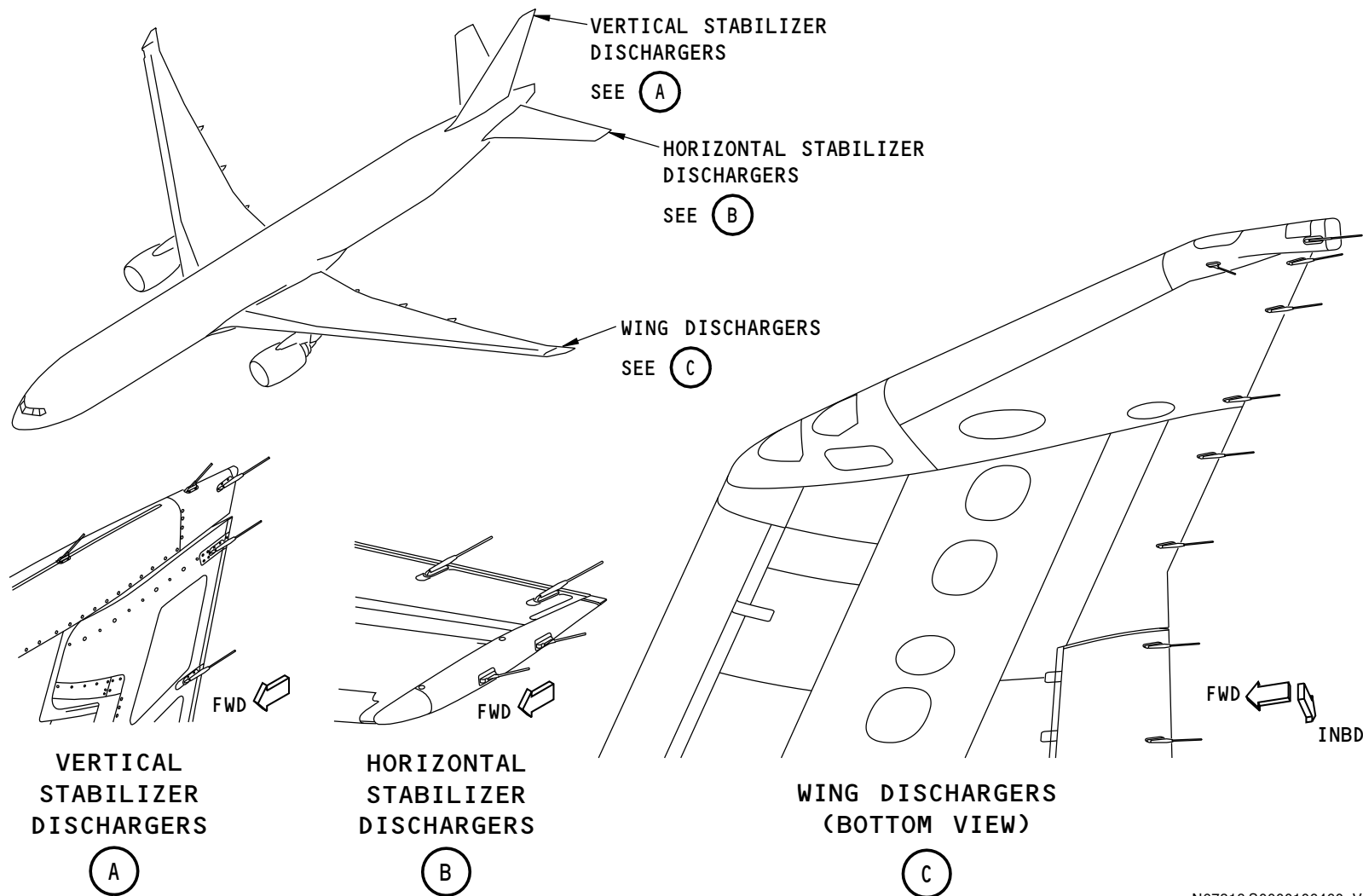
The airplane has static dischargers to reduce the amount of static electricity from the airplane surfaces. This makes sure there is little or no interference with the radio receiver antennas.

Characteristics

Each discharger has a carbon fiber tip at the end of a slender rod. The rod is a resistive (conducting) material connected to a metal base. The base has an electrical connection with the airplane surface.

There are trailing edge and tip dischargers. Tip dischargers are slightly smaller than trailing edge dischargers.

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	D633W101-ARO



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STATIC DISCHARGERS

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VOICE RECORDER SYSTEM - INTRODUCTION

General

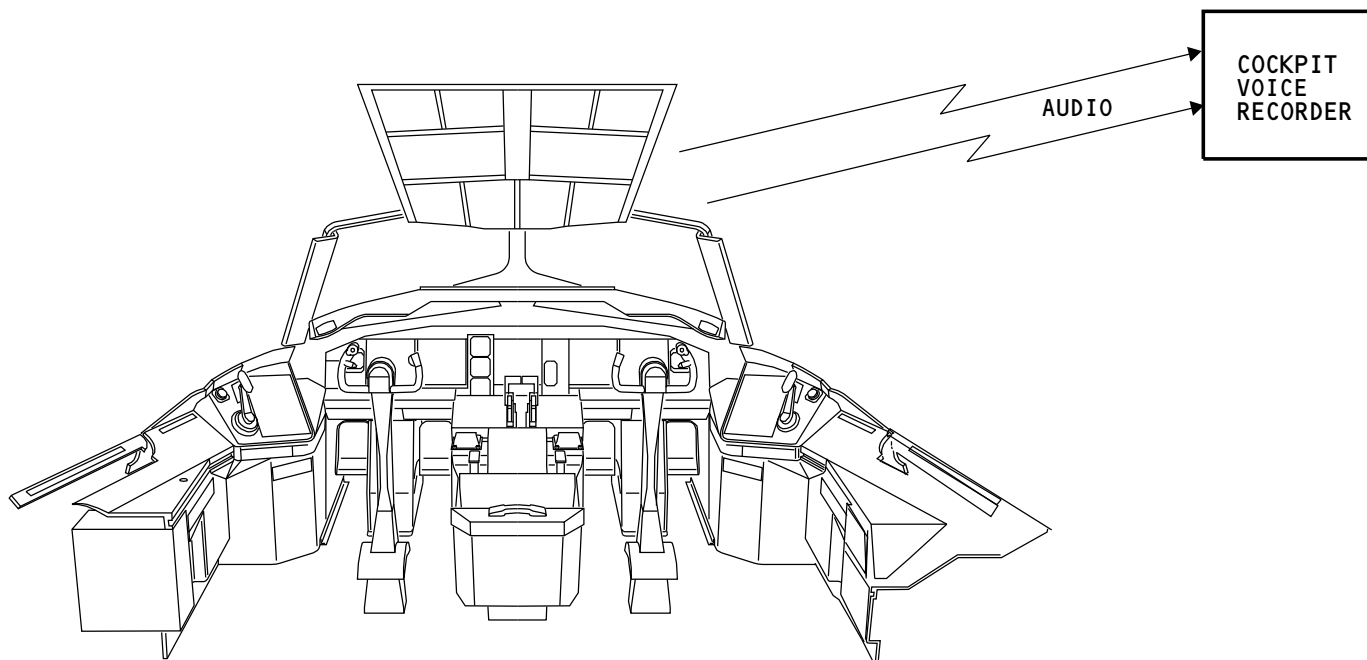
When activated manually or automatically, the voice recorder system continuously records these flight deck sounds:

- Flight crew communications
- Conversations
- Aural warnings.

The system keeps the last 120 minutes of audio. You use the recorded audio for post-incident inspection.

Abbreviations and Acronyms

- A/D - analog to digital
- ACP - audio control panel
- AMU - audio management unit
- APU - auxiliary power unit
- Capt - captain
- CKT - circuit
- CVR - cockpit voice recorder
- D/A - digital to analog
- F/O - first officer
- F/OBS - first observer
- ULB - underwater locator beacon
- UTC - universal time coordinate



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VOICE RECORDER SYSTEM - INTRODUCTION

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VOICE RECORDER SYSTEM - GENERAL DESCRIPTION

General

The cockpit voice recorder (CVR) receives audio from the audio management unit (AMU) and CVR microphone. The cockpit voice recorder panel connects the cockpit voice recorder microphone and the CVR.

The CVR also receives data from the left AIMS.

Components

The voice recorder system has these components:

- Cockpit voice recorder unit
- Cockpit voice recorder panel.
- Cockpit voice recorder microphone
- Voice recorder switch

Functional Description

The voice recorder system records inputs from these sources:

- Cockpit voice recorder microphone
- AMU.
- Left AIMS

The cockpit voice recorder microphone collects flight compartment sounds, such as voices and aural warnings. The audio goes through the cockpit voice recorder panel to the CVR.

The AMU sends these three channels of audio to the CVR:

- Captain
- First officer (F/O)
- First observer (F/OBS).

You monitor recorded audio with phone jacks at these locations:

- Cockpit voice recorder panel
- P56 Main wheel well electrical service panel.

The CVR records the datalink messages that received from the Data Communication Management Function (DCMF) of the left AIMS cabinet.

An erase switch on the cockpit voice recorder panel erases the recorded audio when the airplane is on the ground and the parking brake is set.

A test switch on the cockpit voice recorder panel starts a test of the voice recorder system. The result of the test is indicated by the LED/Meter Indicator on the cockpit voice recorder panel.

A voice recorder switch controls power to the voice recorder. The switch allows manual or automatic operation of the voice recorder.

An underwater locator beacon (ULB) is mounted on the front of the CVR. The ULB is a battery-powered device and an underwater location aid. The ULB transmits an acoustic signal into the surrounding water upon activation by its water-sensitive switch.

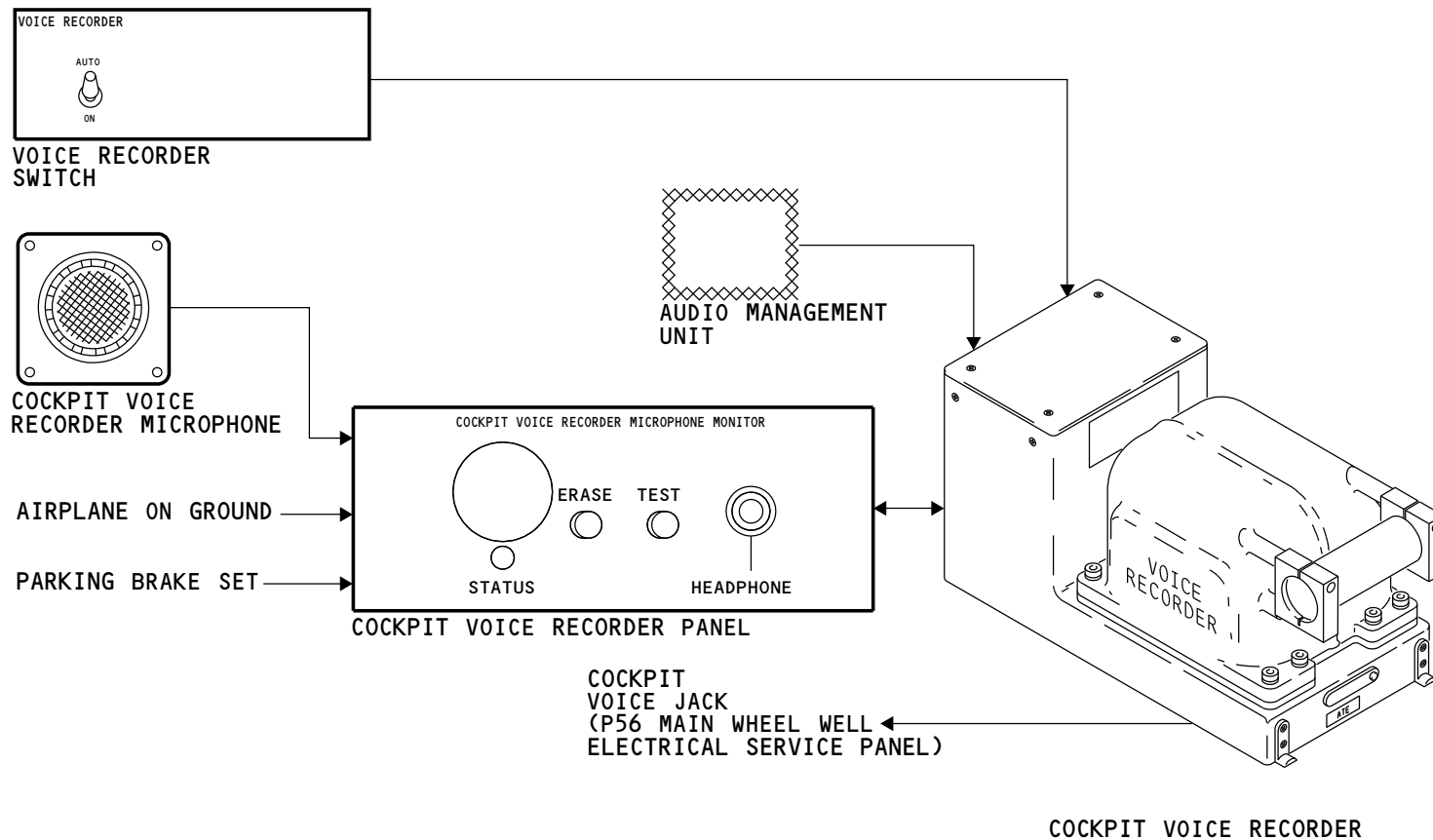
The CVR gets the universal coordinated time constant (UTC) from the left AIMS cabinet.

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VOICE RECORDER SYSTEM - GENERAL DESCRIPTION

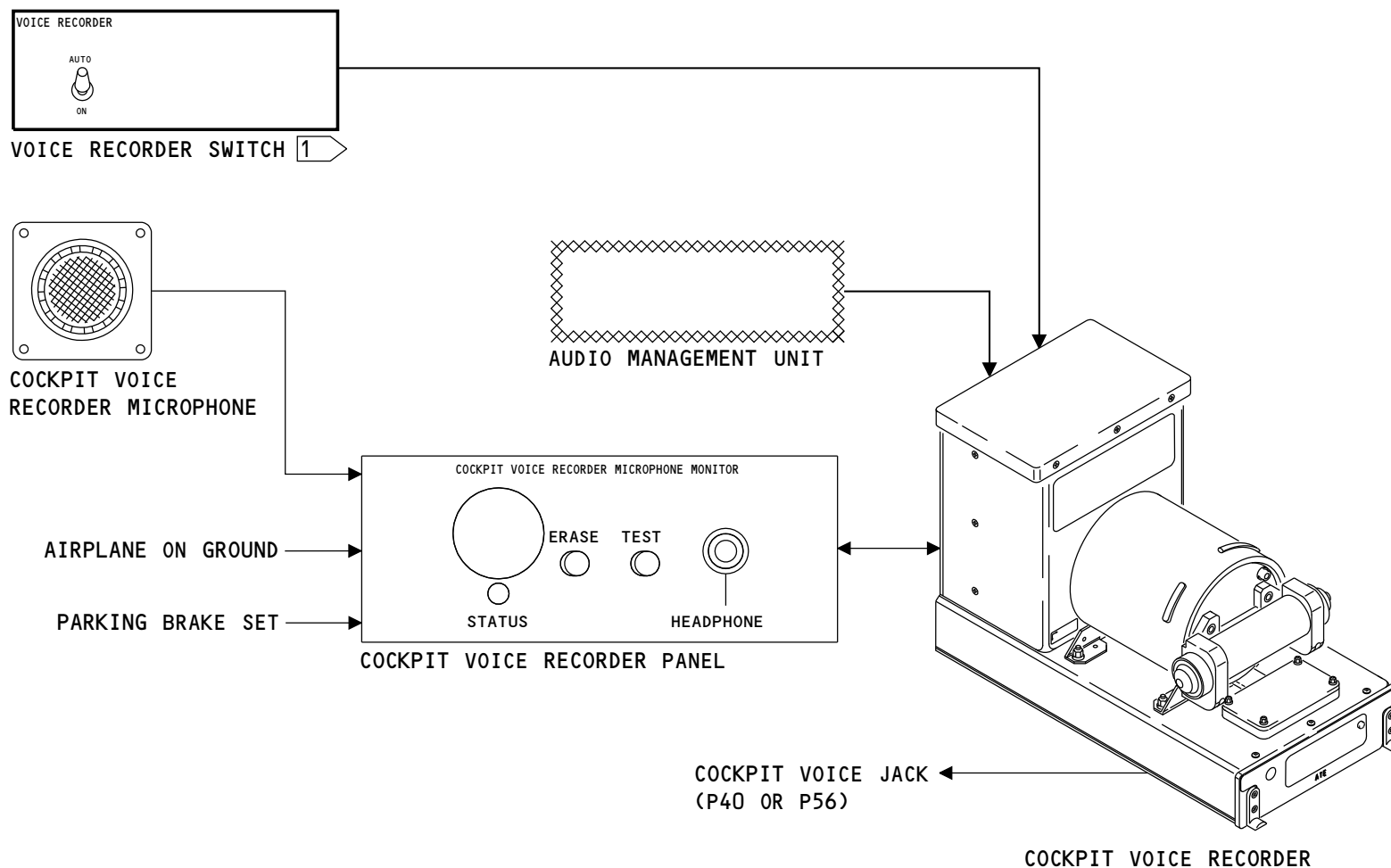
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VOICE RECORDER SYSTEM - GENERAL DESCRIPTION

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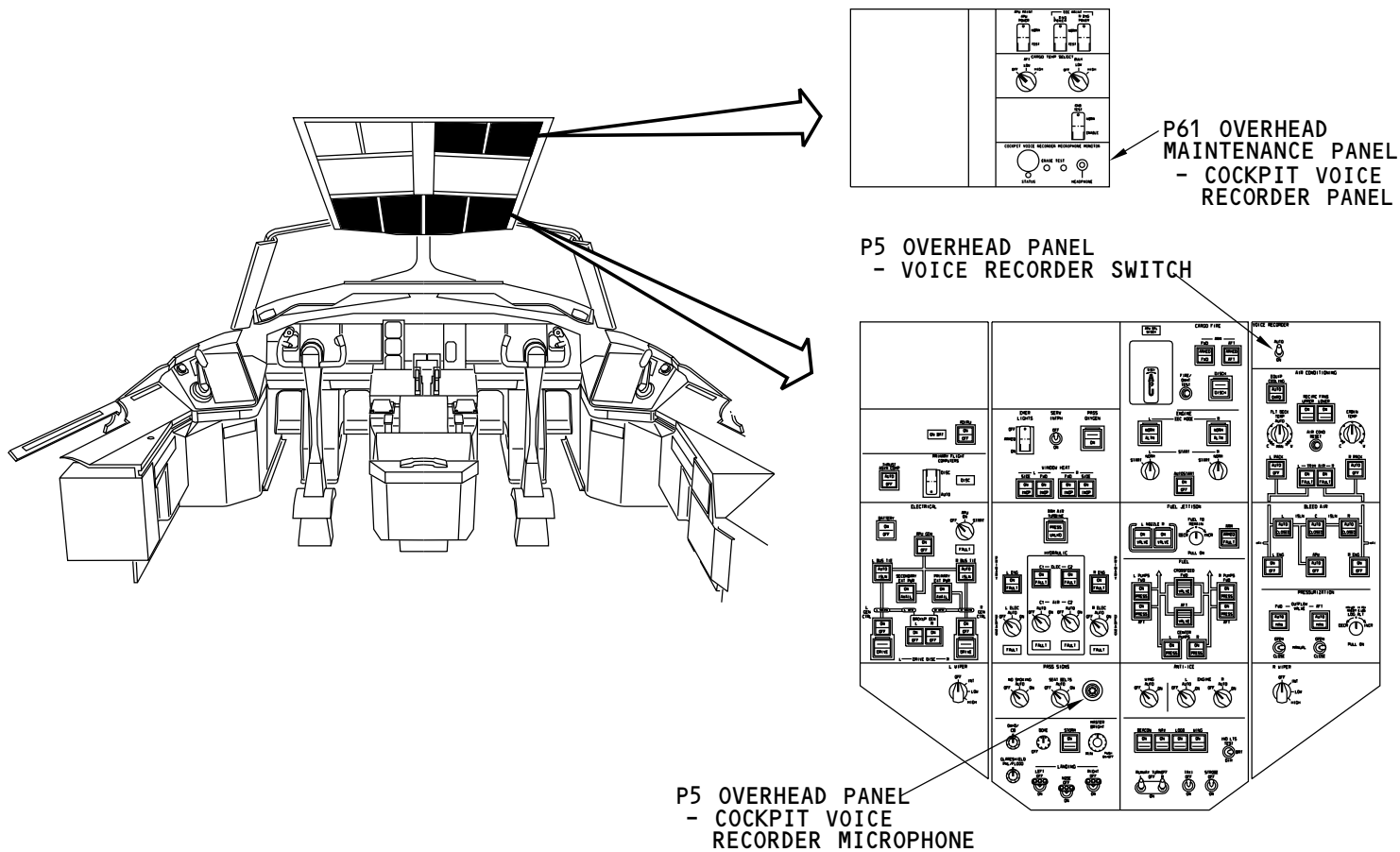


VOICE RECORDER SYSTEM - COMPONENT LOCATIONS 1

General

The cockpit voice recorder panel, cockpit voice recorder microphone, and voice recorder switch are in the flight deck.

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VOICE RECORDER SYSTEM - COMPONENT LOCATIONS 1

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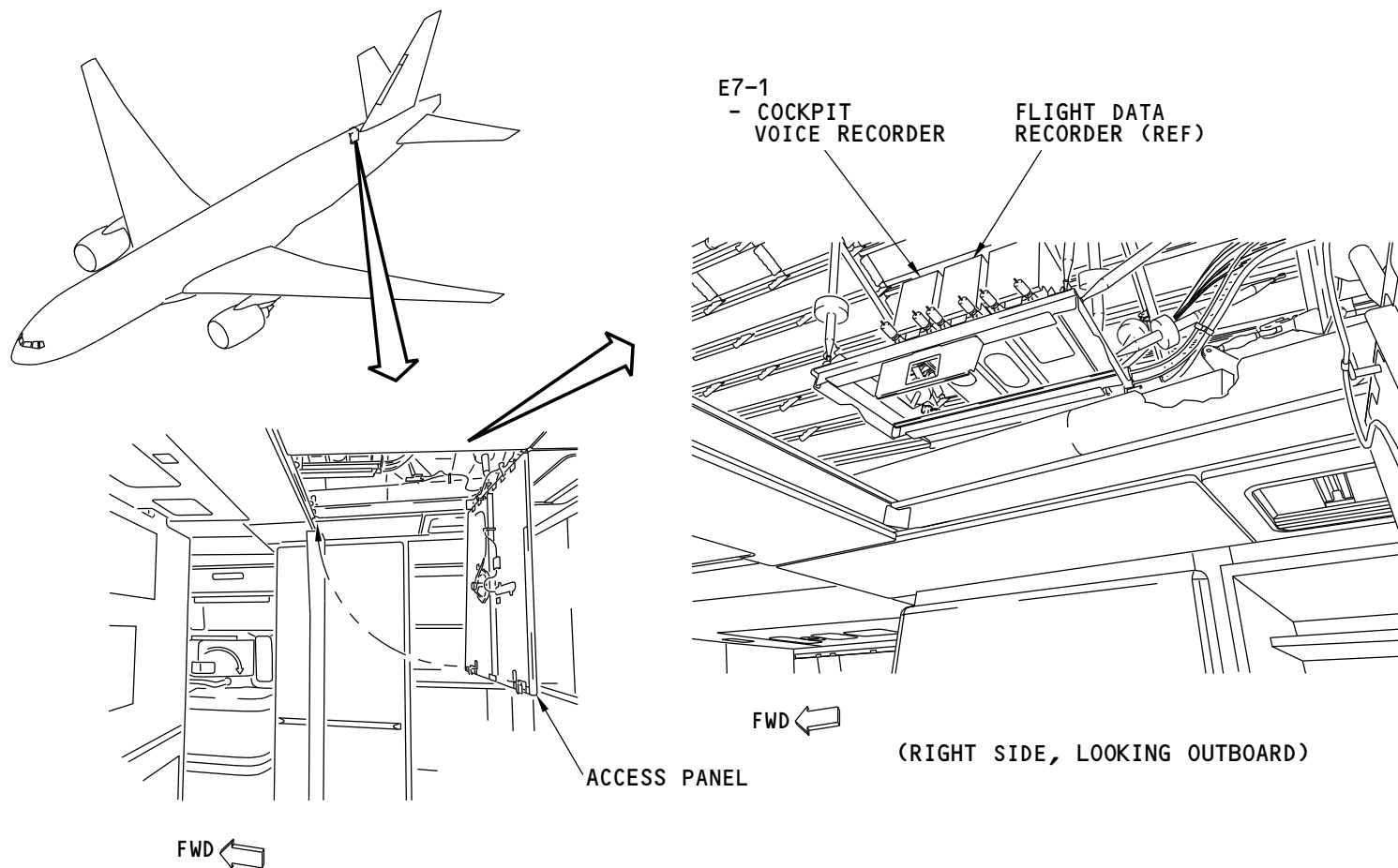


VOICE RECORDER SYSTEM - COMPONENT LOCATIONS 2

General

The cockpit voice recorder is in the Electronic Equipment Rack, E7-1 in the aft cabin above the ceiling.

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VOICE RECORDER SYSTEM - COMPONENT LOCATIONS 2

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VOICE RECORDER SYSTEM - POWER INTERFACE

Power

ARO ALL; AIRPLANES WITH CVR AUTO/ON SWITCH

The CVR Auto/On switch system controls the 115v ac power from the VOX RCDR circuit breaker to the voice recorder. In normal operation, the CVR Auto/On switch is spring-loaded to the AUTO position. In automatic operation, the voice recorder gets the 115v ac power when one or both engines set to run. In manual operation, the voice recorder gets 115v ac power when the CVR Auto/On switch is set to the ON position, the switch will latch in the ON position until the switch is set to the AUTO position or one of the engines starts to cause the switch spring-loaded back to the AUTO position. The CVR SW circuit breaker sends 28v dc to the relays and switch.

ARO ALL

In the event of 115v ac normal power loss to the CVR, the CVR gets the battery backup power (28v dc) from the Main or APU battery.

ARO ALL; AIRPLANES WITH CVR AUTO/ON SWITCH

Relays

When both engines are off, the K76104 gen cont/ign left engine relay connects a ground to the coil of relay K2. With 28v dc from the CVR SW circuit breaker, relay K2 energizes and sends a ground to the coil of the voice recorder switch.

The 28v dc from the CVR SW circuit breaker goes through the lower contact of the voice recorder switch. This latches the switch in the ON position and sends 115v ac to the CVR.

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When you start an engine, the gen cont/ign engine relay for that engine connects a ground to the engine state relay (K23333). This immediately energizes the second half of K23333 and sends 115v ac from the VOX RCDR circuit breaker to the CVR. The run position of the gen cont/ign engine relay of the started engine removes the ground from the relay K2. It also de-energizes the relay in the voice recorder switch and opens the contacts in the voice recorder switch. The switch springs back to the AUTO position.

When you shut down the last engine, the ground is removed from the first half of K23333 and it de-energizes. The second half of K23333 de-energizes and removes 115v ac from the voice recorder.

When the airplane is in the air mode. The voice recorder gets 115v ac power from the VOX RCDR circuit breaker through the air/ground relay (K32314).

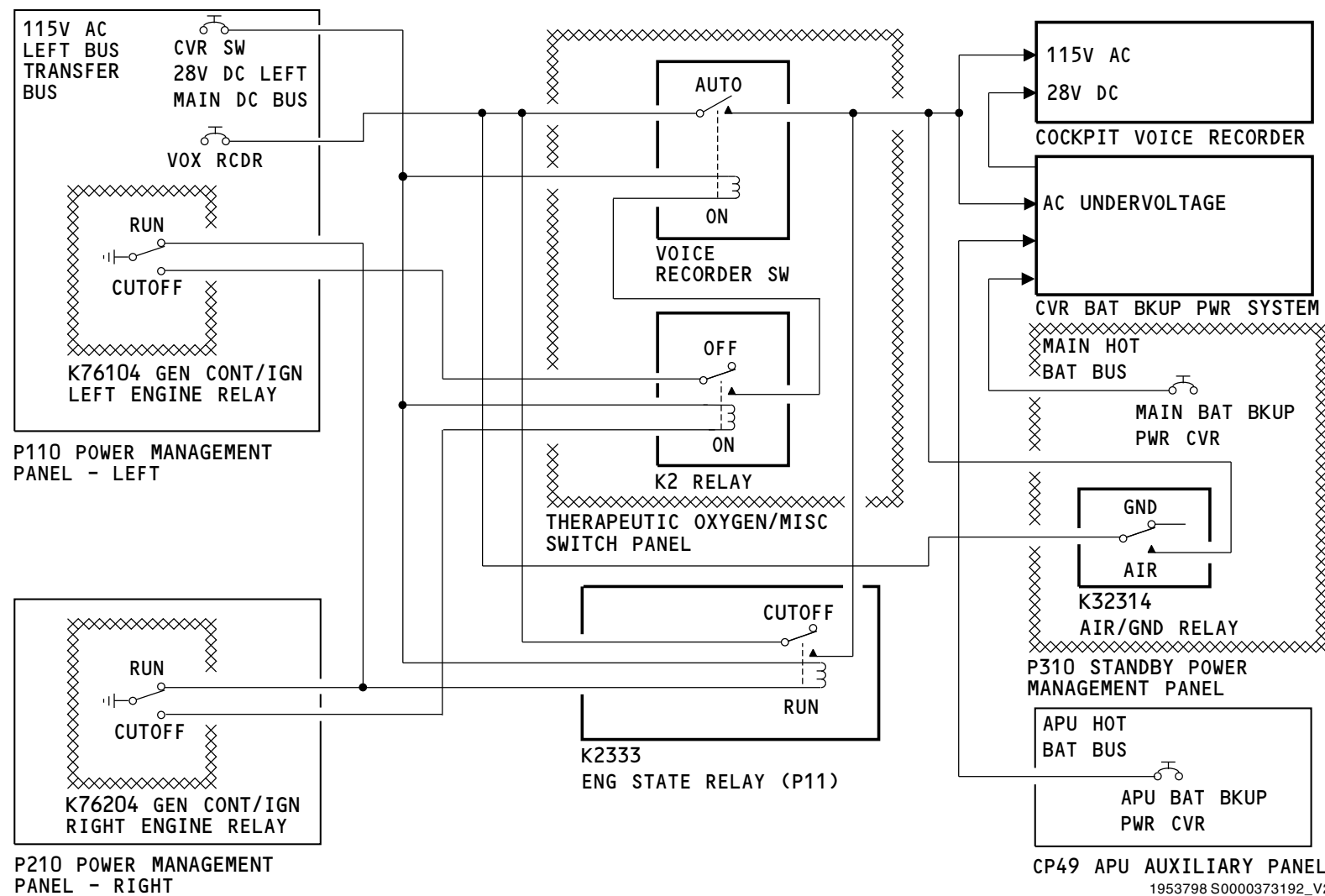
Battery Backup Power

When the 115v ac normal power loss to the CVR. The ac undervoltage sensor relay (K23335) senses it and de-energizes when the ac voltage decreases to approximately 104v ac. This lets the Main and APU batteries (28v dc) power connects to the CVR through the interval timer relay (K23334).

When ac undervoltage sensor relay (K23335) de-energized, it connects the Main and APU batteries (28v dc) power to energize the interval timer relay (K23334).

When the interval timer relay (K23334) energized, it connects the Main and APU batteries (28v dc) power to the CVR for 10 +/- 1 minutes. After approximately 10 minutes, the interval timer relay de-energized and battery backup power is removed from the CVR..

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VOICE RECORDER SYSTEM - POWER INTERFACE

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**VOICE RECORDER SYSTEM - INTERFACE****Power**

The cockpit voice recorder (CVR) gets 115v ac from the VOX RCDR circuit breaker. The CVR supplies 18v dc to the audio amplifier in the cockpit voice recorder panel.

In the event of 115v ac normal power loss to the CVR, the CVR gets the battery backup power (28v dc) from the Main or APU battery.

Relays

The K32001 parking brake relay gets 30v dc from the CVR. When the parking brake is on, the relay closes. The relay sends 30v dc to the K32216 ground mode relay.

The K32216 ground mode relay gets 30v dc from the closed K32001 parking brake relay. When the airplane is on the ground, K32216 closes. The relay sends 30v dc to the cockpit voice recorder panel. This 30v dc goes to the erase switch.

Cockpit Voice Recorder Microphone

The cockpit voice recorder microphone sends area audio to the cockpit voice recorder panel.

Cockpit Voice Recorder Panel

The cockpit voice recorder panel sends these signals:

- Area audio to the channel 4 input of the CVR
- Test discrete to the CVR
- Erase discrete to the CVR.

Audio Management Unit

The audio management unit (AMU) sends these signals:

- First observer (F/OBS) audio to the channel 1 input of CVR
- First officer (F/O) audio to the channel 2 input of the CVR
- Captain (CAPT) audio to the channel 3 input of CVR.

Cockpit Voice Recorder

The CVR sends these signals:

- 30v dc to the parking brake relay
- Test results to the cockpit voice recorder panel
- Audio to the cockpit voice jack on the P56 main wheel well electrical service panel.
- Audio to the cockpit voice recorder panel.

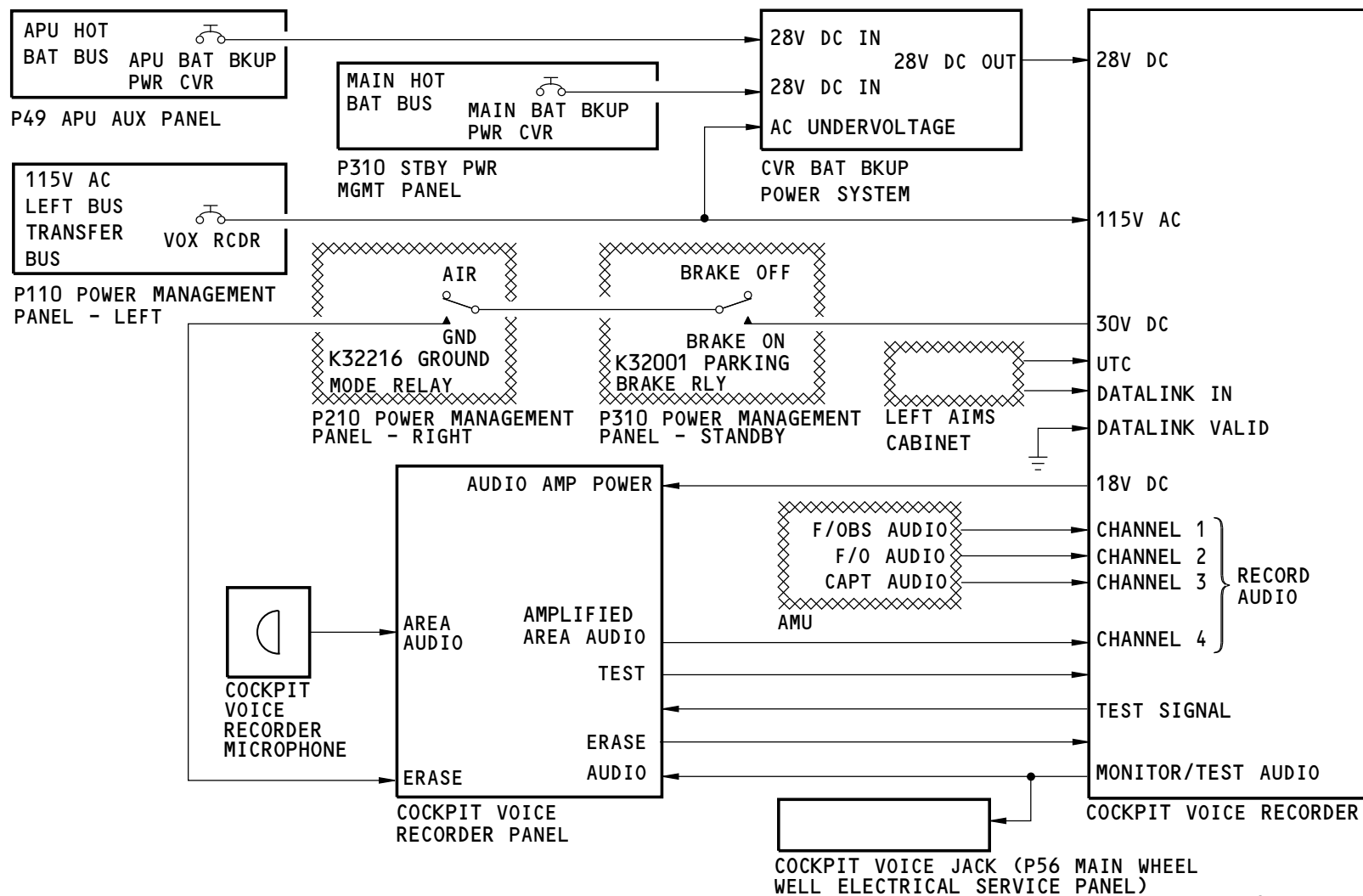
The CVR gets the datalink messages signals from the left AIMS cabinet.

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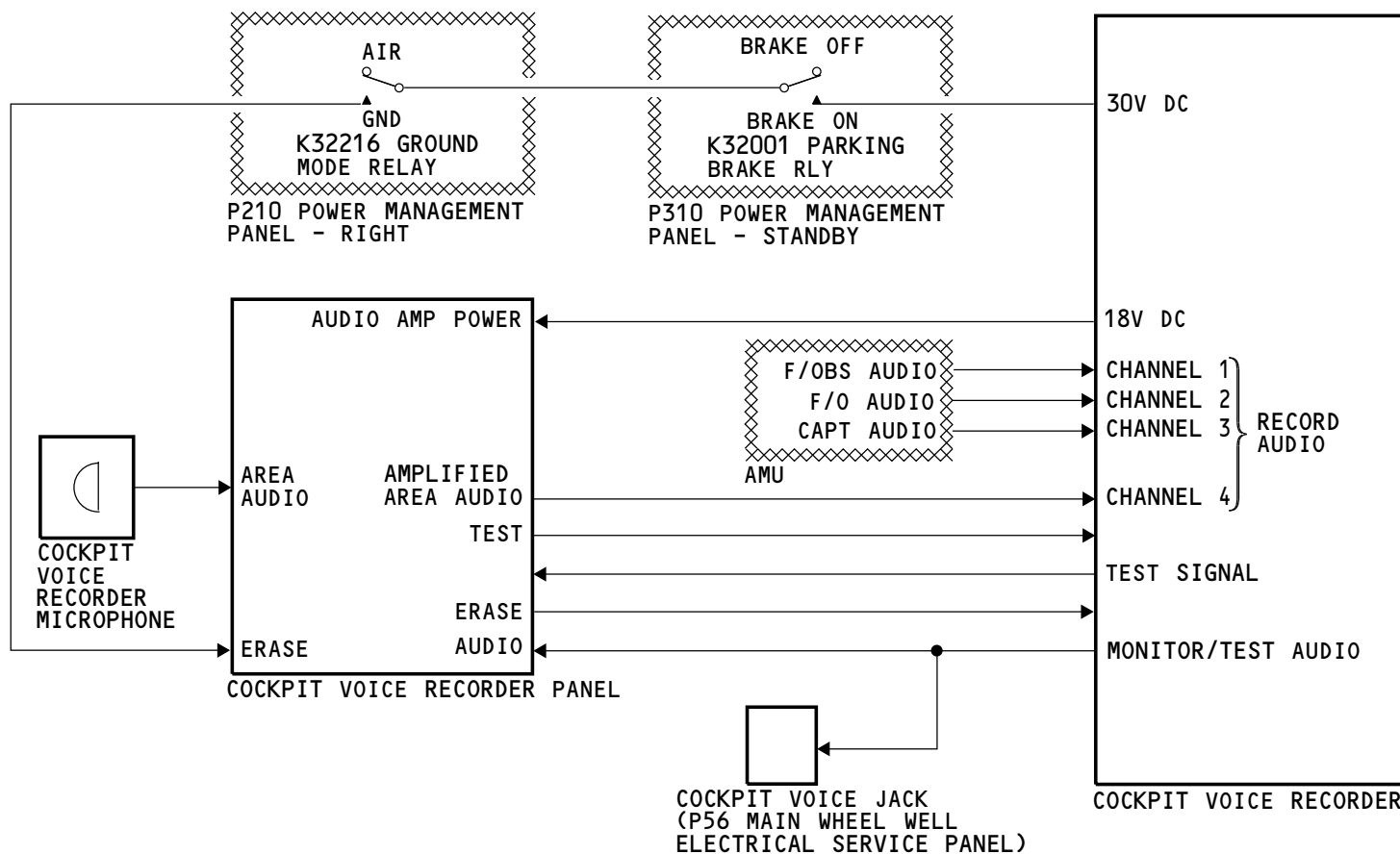
VOICE RECORDER SYSTEM - INTERFACE

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VOICE RECORDER SYSTEM - INTERFACE

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**VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER****Purpose**

When activated manually or automatically, the cockpit voice recorder (CVR) continuously records these flight deck sounds:

- Flight crew communications
- Conversations
- Aural warnings.

The recorder keeps the last 120 minutes of audio.

The CVR also records the datalink messages from the left AIMS cabinet.

Physical Description

The CVR uses a solid-state memory as the record medium. The memory is in a separate crash survivable case. The case is watertight, shock resistant, and heat resistant.

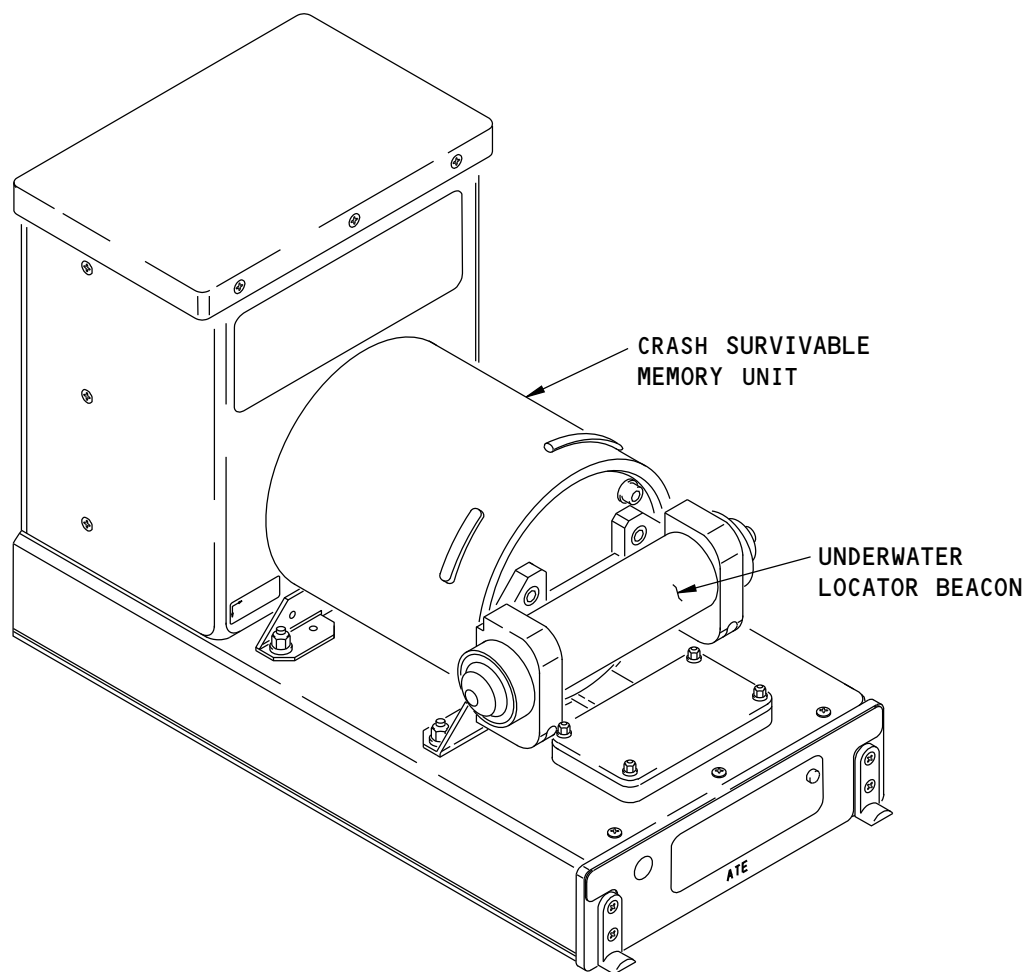
The CVR has these physical characteristics:

- Height - 6.1 in. (15.5 cm)
- Width - 4.91 in. (12.47 cm)
- Depth - 12.5 in. (31.8 cm)
- Weight - 10 lb (5 kg)

The CVR is bright orange with reflective stripes.

An LED indicator on the front panel shows the condition of continuous BITE. If the indicator is on, there is a failure.

An underwater locator beacon (ULB) is on the CVR front panel. The ULB helps locate the CVR in water.



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VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER

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**VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER PANEL****Purpose**

Use the cockpit voice recorder panel for these purposes:

- Monitor the recorded audio
- Erase the recorded audio
- Test the voice recorder system.

Controls and Indications

The cockpit voice recorder panel has these controls and indicators:

- STATUS indicator
- TEST switch
- ERASE switch
- 600 Ohm headset jack.

The ERASE switch starts the erase operation. This erases the recorded audio if the airplane is on the ground with the parking brake set.

The headset jack permits you to monitor the mixed audio of the four channels during record operation.

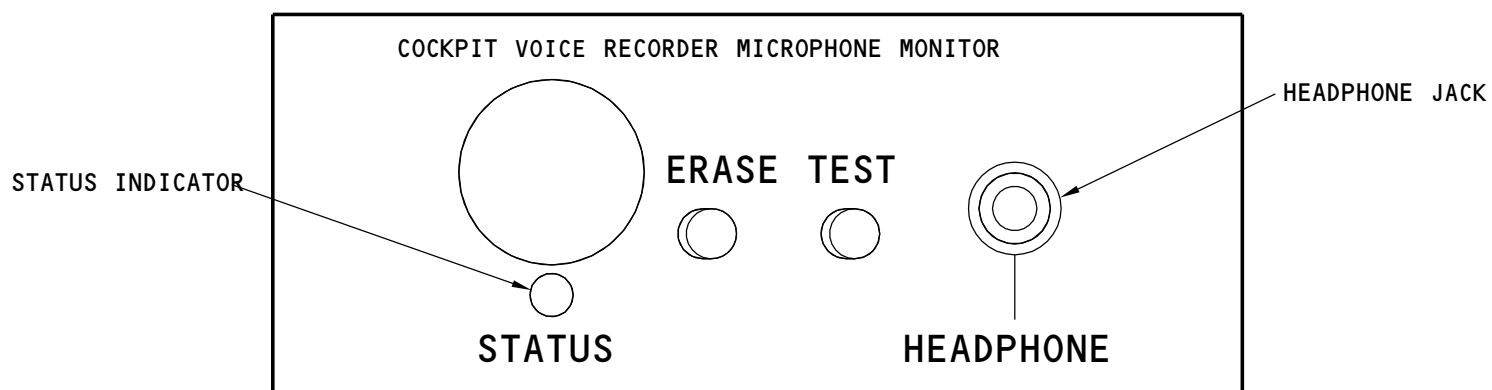
Test

The operation test of the voice recorder system does a check of the audio circuits of the cockpit voice recorder (CVR).

To do the test, connect a headset to the headset jack on the cockpit voice recorder panel. Set the AUTO/ON switch to the ON position. Push the TEST switch for a minimum of one second. These are the results of a good test:

- The STATUS indicator flashes once
- You hear a 800 Hz tone on the headset.

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VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER PANEL

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VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER MICROPHONE

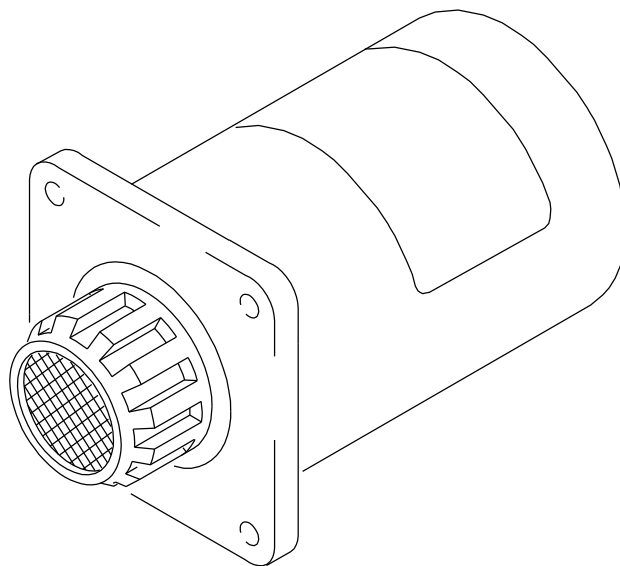
Purpose

The cockpit voice recorder microphone collects flight deck area audio for input to the CVR.

Physical Description

The condenser-type microphone has a frequency range of 150 Hz - 5 kHz.

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VOICE RECORDER SYSTEM - COCKPIT VOICE RECORDER MICROPHONE

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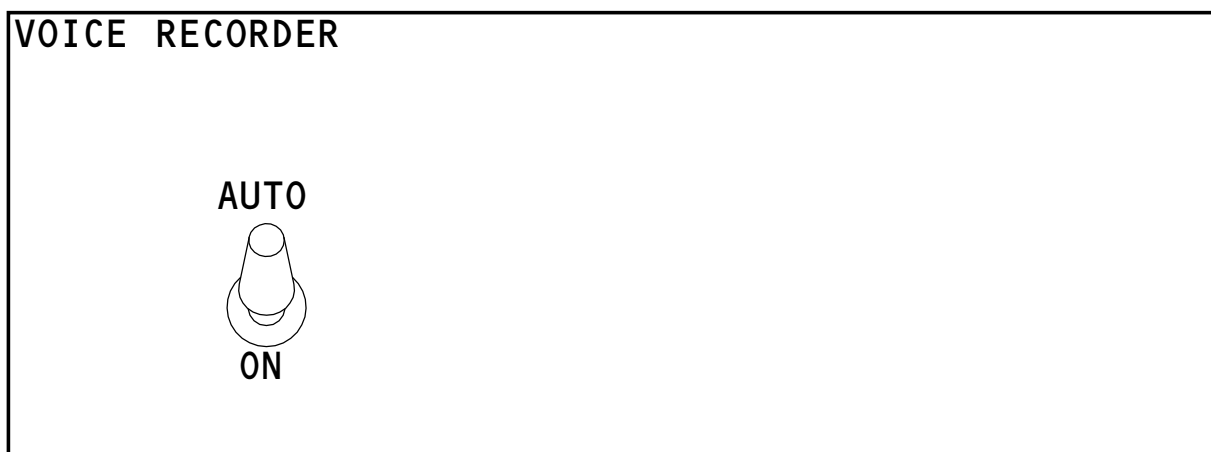
**VOICE RECORDER SYSTEM - VOICE RECORDER SWITCH****Purpose**

The voice recorder switch controls power to the voice recorder for manual or automatic operation.

Auto/on function

The switch is spring-loaded to the AUTO position. In this position, power goes to the voice recorder when at least one engine is on.

With both engines off, set the switch to ON to apply power to the voice recorder. The switch latches in the ON position. Set the switch to AUTO to remove power from the voice recorder. The switch automatically returns to AUTO when you start an engine.



THERAPEUTIC OXYGEN/MISC
SWITCH PANEL

VOICE RECORDER SYSTEM - VOICE RECORDER SWITCH

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VOICE RECORDER SYSTEM - UNDERWATER LOCATOR BEACON

Purpose

The voice recorder underwater locator beacon (ULB) makes the cockpit voice recorder easier to find if it is in water.

Physical Description

The underwater locator beacon is an ultrasonic beacon in a self-contained unit.

The ULB has these properties:

- Length - 4.0 inches
- Diameter - 1.3 inches
- Weight - less than 7 ounces.

Operation

Operation is automatic if the ULB is in water.

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The ULB operates to a maximum depth of 20,000 feet. It has a detection range of two miles. When in water, it has an operation life of at least 30 days.

ARO 015-999

The ULB operates to a maximum depth of 20,000 feet. It has a detection range of two miles. When in water, it has an operation life of at least 90 days.

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The ULB sends out an acoustic pulse tone of 37.5 kHz.

Training Information Point

Replace the underwater locator beacon on or before the date shown on the replacement label.

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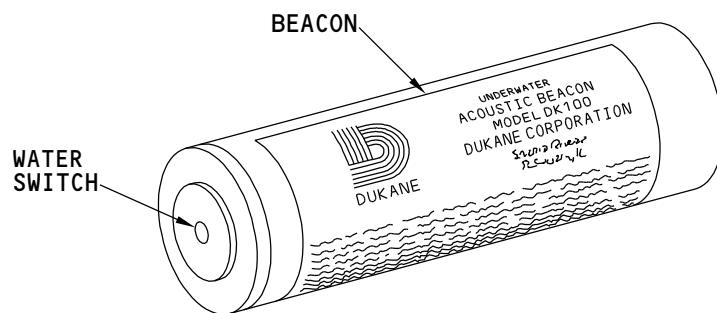
NOTE: The DK120/90 ULB uses a lithium battery. If not activated, it has a life of six years. It is important to keep the water switch contacts clean. The battery is not a line replaceable unit.

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VOICE RECORDER SYSTEM - UNDERWATER LOCATOR BEACON

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VOICE RECORDER SYSTEM - FUNCTIONAL DESCRIPTION

General

The voice recorder system receives flight deck sounds and flight crew communications. It keeps this audio in a solid state memory. The voice recorder system has these modes of operation:

- Normal operation
- Erase
- Test.

Normal Operation

With power on the airplane and the cockpit voice recorder (CVR) circuit breaker closed, the CVR operates when you switch the cockpit voice recorder auto/on switch on or start one of the engines.

Four audio channels go to the CVR. Channel 1, 2, and 3 audio is from the audio management unit (AMU). Each channel carries audio from one crew member's flight interphone audio. The audio on each channel is the sum of these signals:

- Hot mic audio (microphone audio when there is no PTT)
- Received audio as selected on the crew member's audio control panel (ACP)
- Sidetone audio to the crew member.

Channel 4 audio is from the cockpit voice recorder microphone. The cockpit voice recorder microphone sends flight deck area audio to the CVR. The CVR panel gets 18v dc for the preamplifier from the CVR. The preamplifier in the panel increases the strength of the channel 4 audio and sends it to the CVR.

30v dc bias signal is a record enable signal from the airplane interface through an external jumper back to the airplane interface.

All audio goes to the airplane interface in the CVR. The airplane interface sends the audio to the controller card.

The controller card has an analog-to-digital (A/D) converter and data compressor circuit for each audio channel.

The A/D converter changes the audio from analog to digital. The data compressor decreases the number of bits needed to store the data.

The controller card sends the digital compressed audio to the crash survivable memory unit. The crash survivable memory unit keeps the data in solid state memory.

Each channel of audio also goes to a digital-to-analog (D/A) converter and decompression circuit.

The decompression circuit changes the compressed digital audio back to normal digital audio. The D/A converter changes the digital audio to analog. The four channels of audio go to a mixer circuit. The mixer combines the audio and sends it to the cockpit voice recorder panel headset jack.

The monitor audio also goes to an audio jack on the P56 main wheel well electrical service panel.

The CVR gets universal coordinated time (UTC) data from the left AIMs cabinet. UTC data is sent to both the CVR and the flight data recorder (FDR). CVR and FDR events are synchronized using UTC data.

The CVR gets datalink messages from the left AIMs cabinet. The datalink messages are stored in the crash survivable memory unit on the CVR.

Test

Push the test switch on the cockpit voice recorder panel to start a self test. A test discrete goes to the CVR.

The CVR does a self test. If the test is good, you get these indications:

- The cockpit voice recorder panel STATUS LED comes on
- There is an 800 Hz tone at the headset jack.

Erase

When the airplane is on the ground with the parking brake on, you push and hold the ERASE switch on the cockpit voice recorder panel to erase the CVR.

The airplane interface in the CVR sends 30v dc to K32001 parking brake relay. When the parking brake is on, the relay closes.

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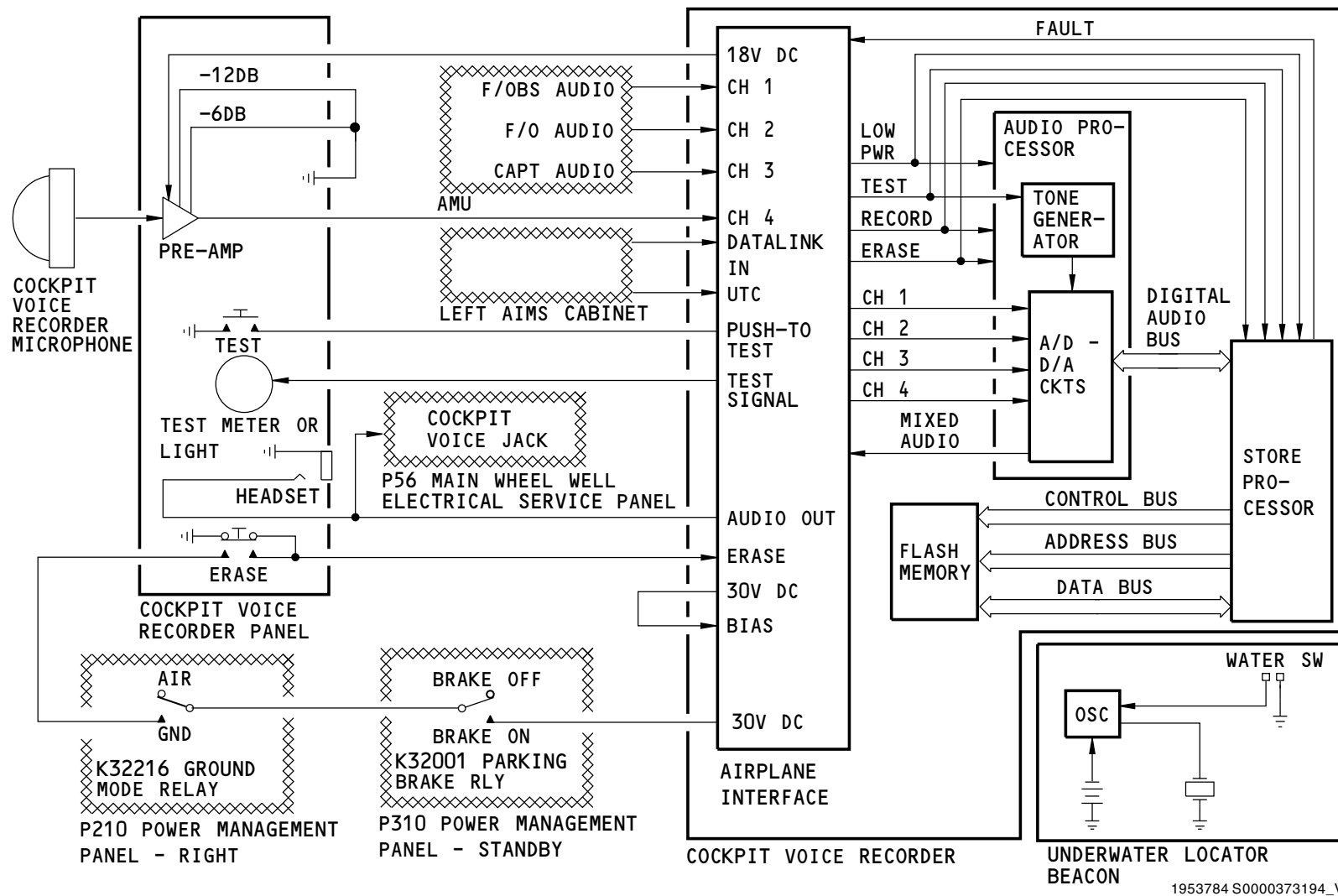
VOICE RECORDER SYSTEM - FUNCTIONAL DESCRIPTION

The 30v dc goes through the K32001 relay to K32216 ground mode relay. When the airplane is on the ground, the relay closes. The 30v dc goes through the K32216 relay to the ERASE switch in the cockpit voice recorder panel.

When you push the ERASE switch, the 30v dc goes to the airplane interface in the CVR. The airplane interface sends this erase discrete to the controller card. The controller card sends a digital signal to the crash survivable memory unit. The crash survivable memory unit disables the data download capability for the previously recorded audio.

Underwater Locator Beacon Functions

The underwater locator beacon (ULB) sends a sound signal when in water. It uses a battery for power. The battery sends power to the oscillator when the ULB is in water. The oscillator operates at 37.5 kHz. The transducer changes electrical signal to a sound signal and transmits the signal once per second.



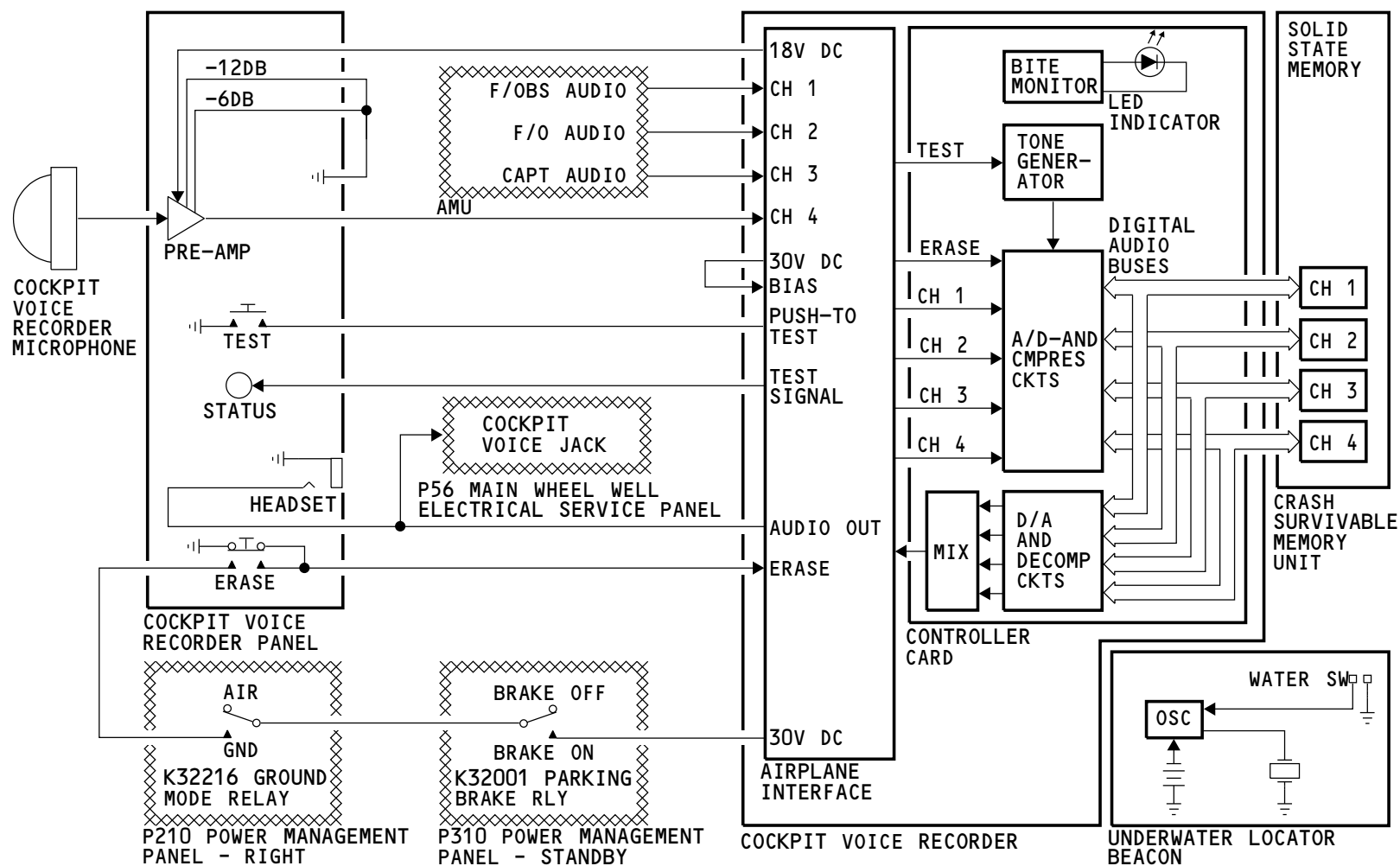
VOICE RECORDER SYSTEM - FUNCTIONAL DESCRIPTION

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VOICE RECORDER SYSTEM - FUNCTIONAL DESCRIPTION

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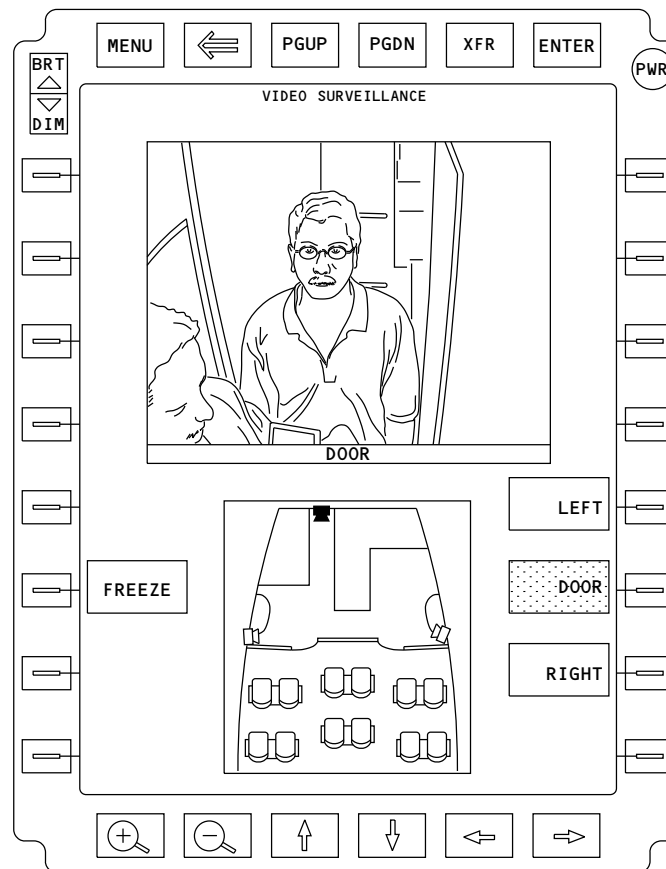
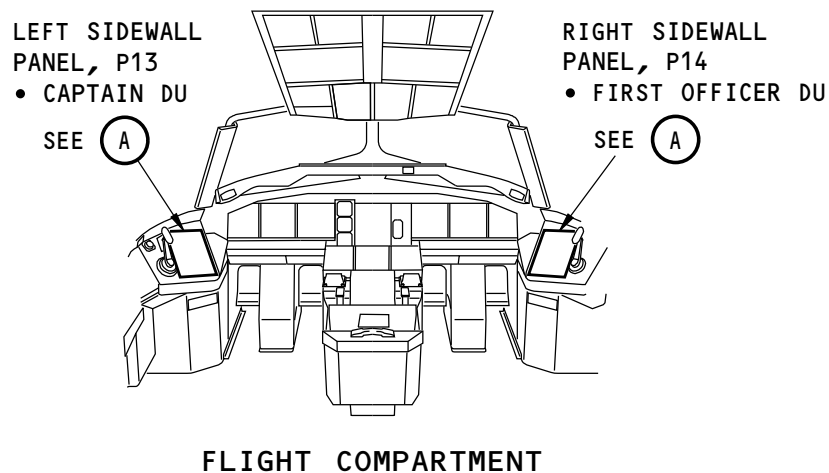
FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - INTRODUCTION

General

The Flight Deck Entry Video Surveillance System (FDEVSS) is a video system that provides the flight crew surveillance capability of the flight deck doorway and the forward galley areas.

Abbreviations and Acronyms

- CCU - Camera Control Unit
- EFB - Electronic Flight Bag
- FDEVSS - Flight Deck Entry Video Surveillance System
- IR - Infrared
- NTSC - National Television System Committee (FCC)
- PID - Pilot Information Display
- VSU - Video Server Unit.



NOTE: THE DATA SHOWN ON
THE DISPLAY IS ONLY
AN EXAMPLE.

DISPLAY UNIT (DU)

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - INTRODUCTION

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - GENERAL DESCRIPTION

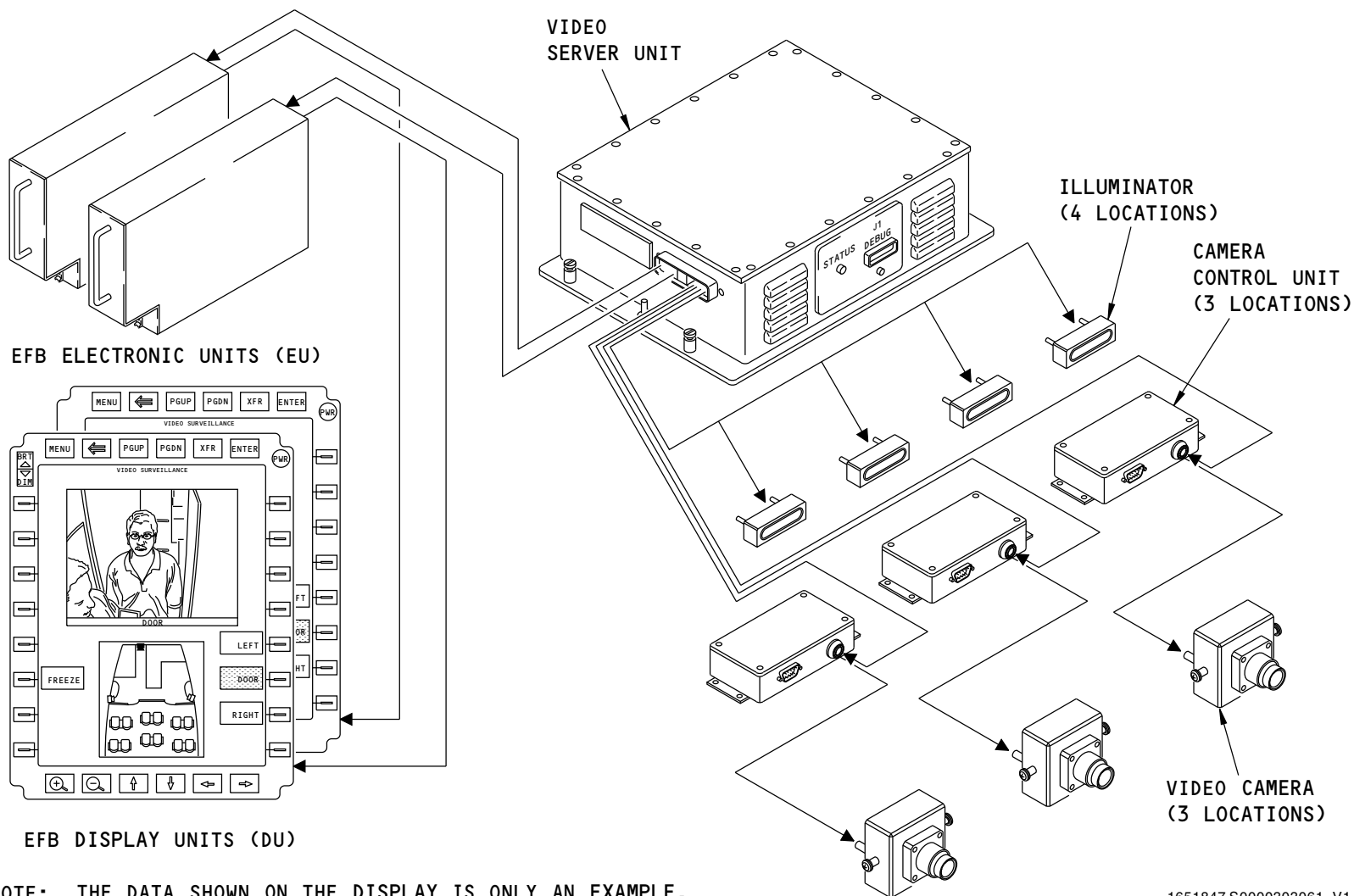
General

The Flight Deck Entry Video Surveillance System (FDEVSS) is a video system that provides video surveillance of the cockpit door and surrounding area. This lets the flight crew, before they allow entry, to see the person who wants access to the flight compartment.

Components

The FDEVSS consists of the following components:

- Three black and white cameras with integrated near-infrared (IR) illumination.
- Camera Interface Unit (CIU)
- Electronic Flight Bag (EFB) Display Unit (DU)
- Software application that provides the command, control and display of live video images. The software resides in the host EFB hardware.



FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - GENERAL DESCRIPTION

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - COMPONENT LOCATIONS

General

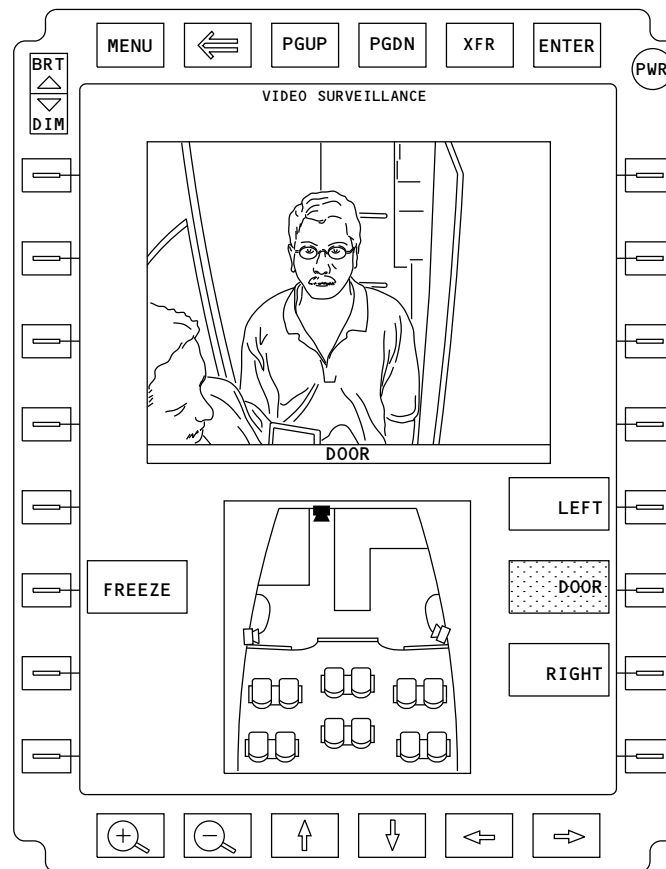
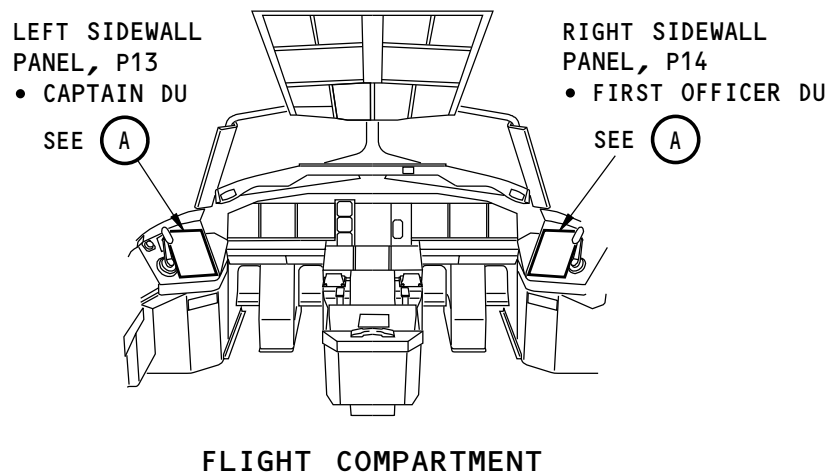
Three infrared (IR) cameras are installed in the ceiling of the forward galley and the flight compartment door area.

The captain's Electronic Flight Bag (EFB) Display Unit (DU) is located on the left side wall, P13 panel. The first officer's EFB DU is located on the right side wall, P14 panel.

There are three cameras installed in the ceiling panels. Each camera connects to one camera control unit, which is above the ceiling panel.

There is one illuminator adjacent to camera 1, and camera 3. There are two illuminators adjacent to camera 2.

The video server unit is above the ceiling panel.



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THE DISPLAY IS ONLY
AN EXAMPLE.

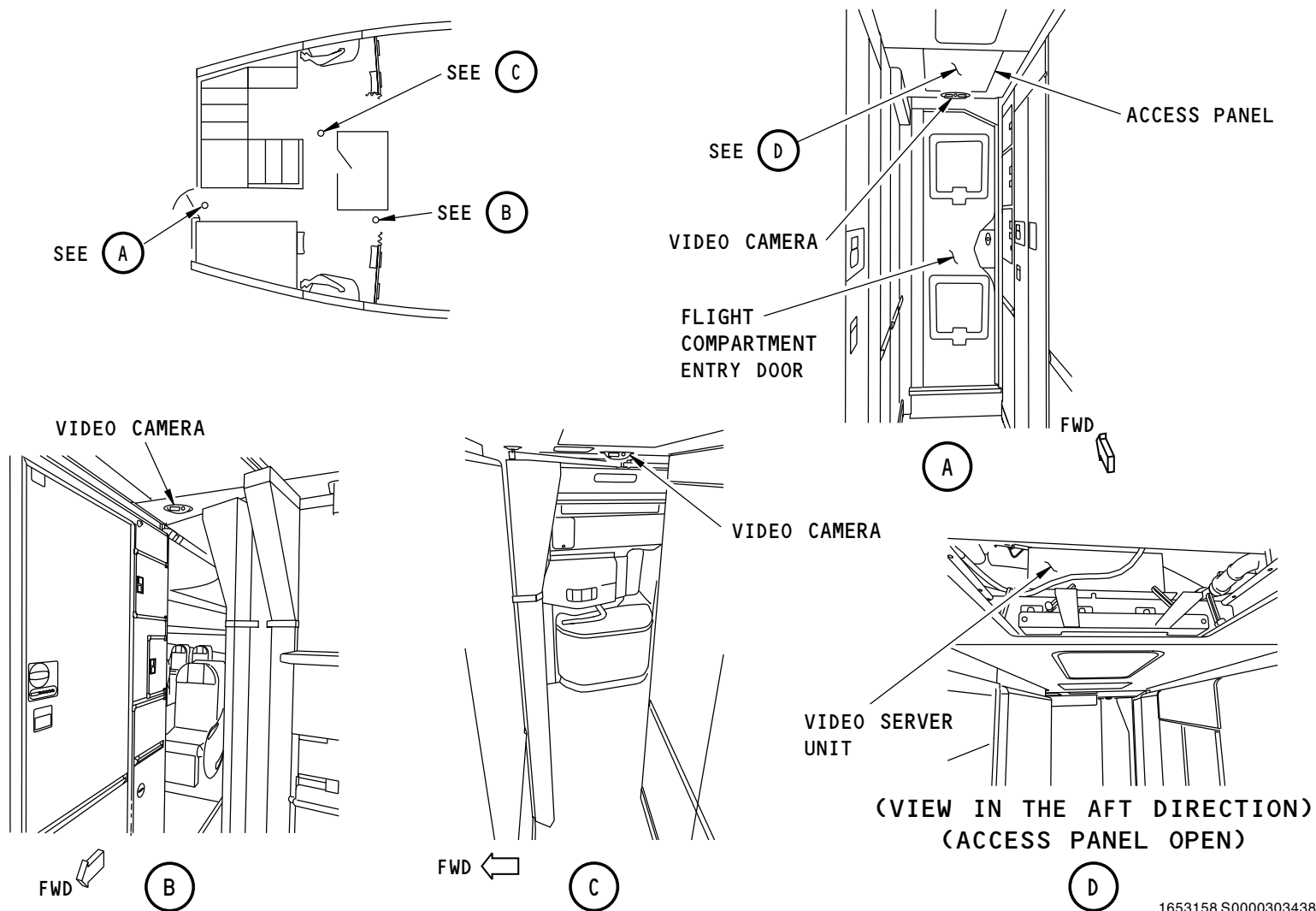
DISPLAY UNIT (DU)

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - COMPONENT LOCATIONS

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE - COMPONENT LOCATIONS

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**FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - INTERFACE****Infrared Camera and Camera Control Unit**

The system has three infrared monochrome cameras, and three camera control units (CCU).

Each CCU receives 24V dc (volts direct current) from the video server unit (VSU). Each CCU then supplies 9V dc to one camera.

Each camera supplies a video signal to the applicable CCU, and then to the VSU.

Illuminators

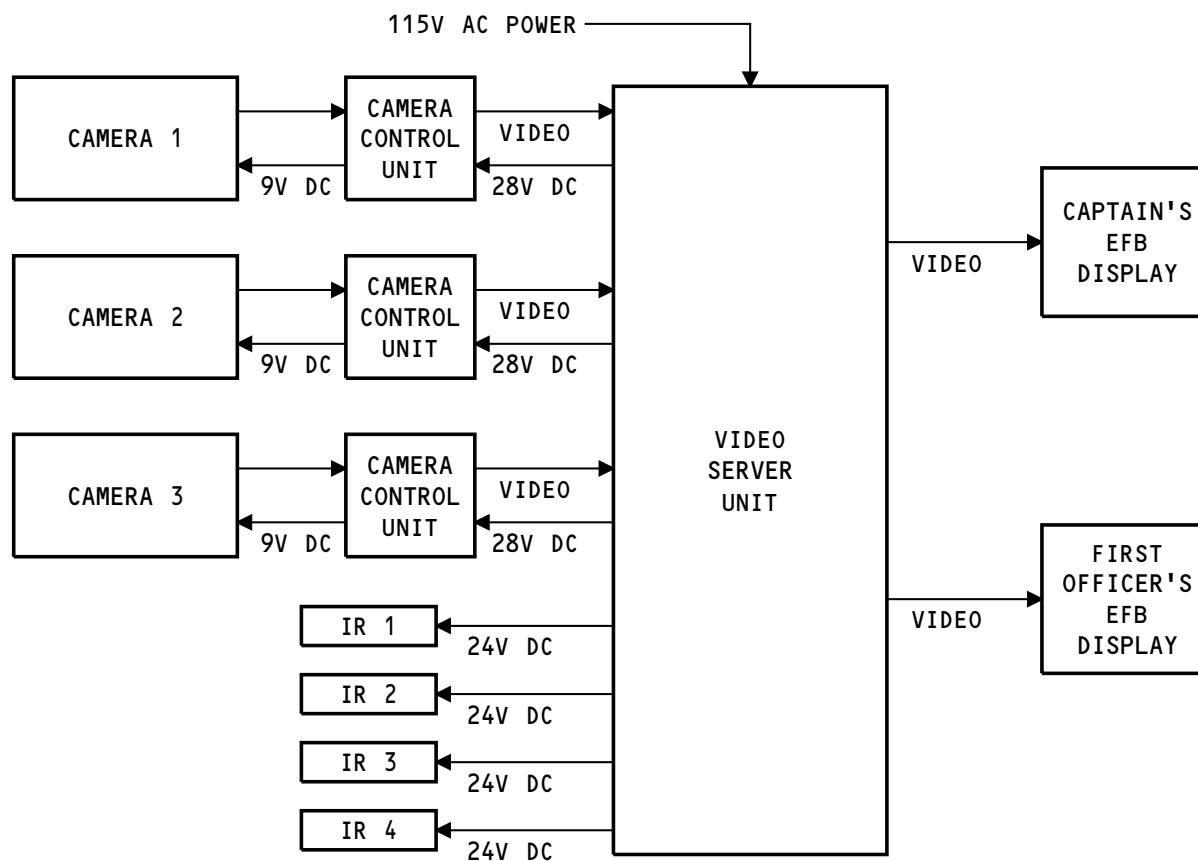
There are four infrared illuminators. Two illuminators are adjacent to the flight deck door entry camera. There is one illuminator adjacent to each side-view camera.

The VSU supplies 24V dc to each illuminator.

Electronic Flight Bag

The Electronic Flight Bag (EFB) receives data from the VSU, and shows the video images of the flight deck entry, and forward galley areas, on the captain's, or first officer's Display Unit (DU).

The VSU sends digital video data over 10/100 BASE-T ethernet to EU-L and EU-R. There is a separate, isolated ethernet link to each Electronics Unit (EU).



1663168 S0000303246_V1

FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - INTERFACES

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EFFECTIVITY
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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - INFRARED CAMERA

General

Each infrared camera is a sealed component that senses the strength and position of IR light reflected by an object, and converts that to an analog signal. The cameras produce a monochrome (black and white) image in NTSC format. The camera is line-replaceable, and can not be modified, or repaired in the field.

The camera has physical characteristics as follows:

- Width - 1.2 in. (29.5 mm)
- Height - 1.2 in. (29.5 mm)
- Depth - 1 in. (26 mm), approximately
- Weight - 2 oz (52 g), approximately, including wires.

The camera has one lead with a single 10-pin connector. Power to the camera is supplied by the camera control unit (CCU). The camera and CCU are matched for impedance and voltage, and are set by the specified part numbers.

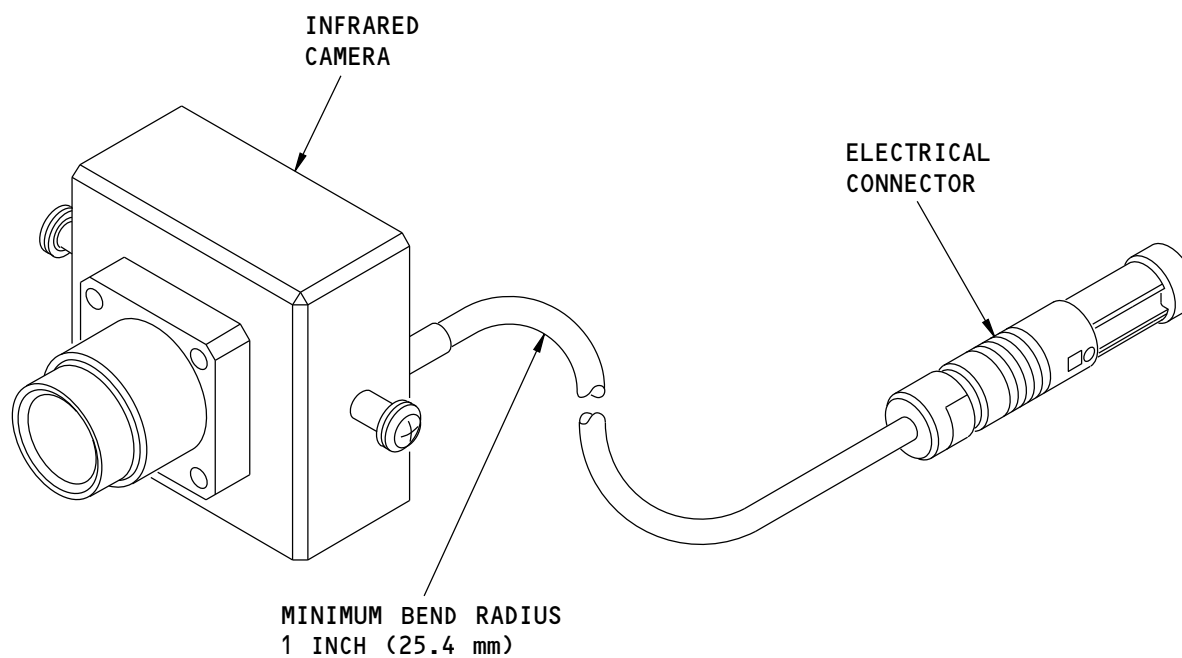


THE REPLACEMENT COMPONENTS MUST HAVE THE SAME PART NUMBERS AS THE COMPONENTS WHICH WERE REMOVED. INCORRECT COMPONENTS CAN CAUSE DAMAGE TO THE SYSTEM.

The features that follow are set by the camera manufacturer's part number.

- Lens aperture (size)
- Camera resolution (lines)
- Input voltage
- Impedance
- Lead length and material.

An external illuminator, installed adjacent to each camera, supplies infrared light.



1345022 S0000239730_V1

INFRARED CAMERA

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EFFECTIVITY
ARO 001-017

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FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - FUNCTIONAL DESCRIPTION

Functional Description

Three video cameras are mounted in the ceiling panel of the forward galley and entry door area. The cameras change images into analog video signals, that are sent through an adjacent camera control unit, and then to the video server unit (VSU). Each camera supplies a continuous signal to the VSU.

There is one camera control unit (CCU) adjacent to each camera. The CCU supplies reduced voltage to the camera, and supplies balanced video signal to the VSU.

The VSU receives all three camera signals, but transmits only the selected signal to the left, and right Electronic Flight Bag (EFB) Electronics Unit (EU). The VSU converts each analog signal to digital data, and compresses the data for transmission through Ethernet. The data is received by EU-L and EU-R of the EFB, and is shown on the captain's, or first officer's EFB Display Unit (DU).

A software application within EFB controls the camera selection and display. From the MAIN MENU on the captain's or first officer's DU, push the VIDEO Line Select Key (LSK) to show all three (3) camera images. One image will show as the main view, in the high-resolution large window. The second and third images also show, except in two small, low-resolution windows.

The software application VIDEO controls the camera selection and display. The application is installed in EFB EU-L and EU-R. The display shows the selected video in the main window. Below the window is a cabin diagram that shows the camera locations, and one touchscreen button to select each of the cameras (left, door, or right).

Access to the video application is on the EFB MAIN MENU, on the captain's or first officer's DU.

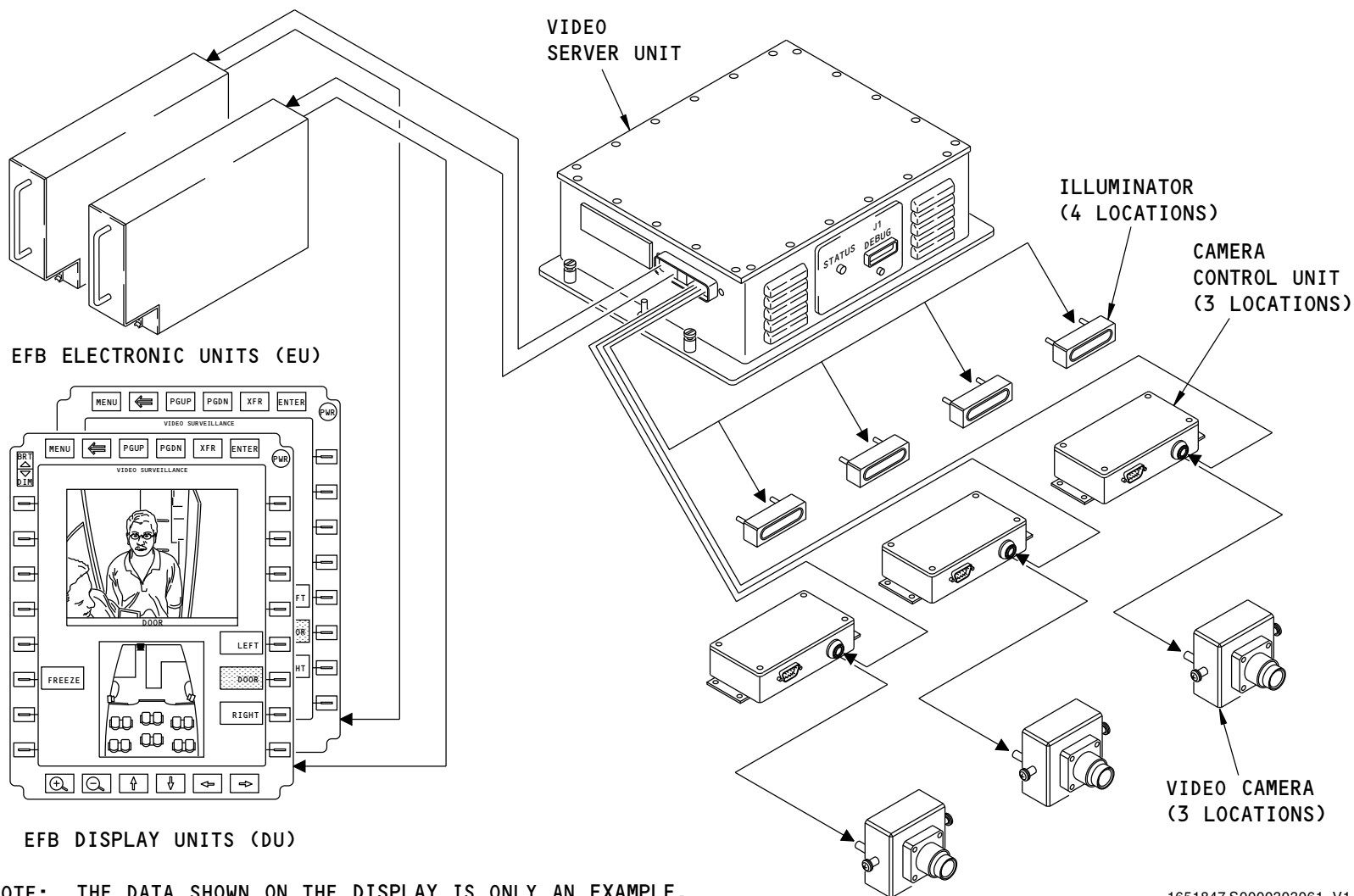
When the application is active, the DU shows the selected video image, a diagram that shows the active camera, and four touchscreen buttons. The buttons are identified as follows:

- Left - shows the signal from the left camera, that looks toward door 1R.
- Door - shows the signal from the door camera, that looks aft.
- Right - shows the signal from the right camera, that looks toward door 1L.

- Freeze - causes the DU to show one frame from the continuous video signal.

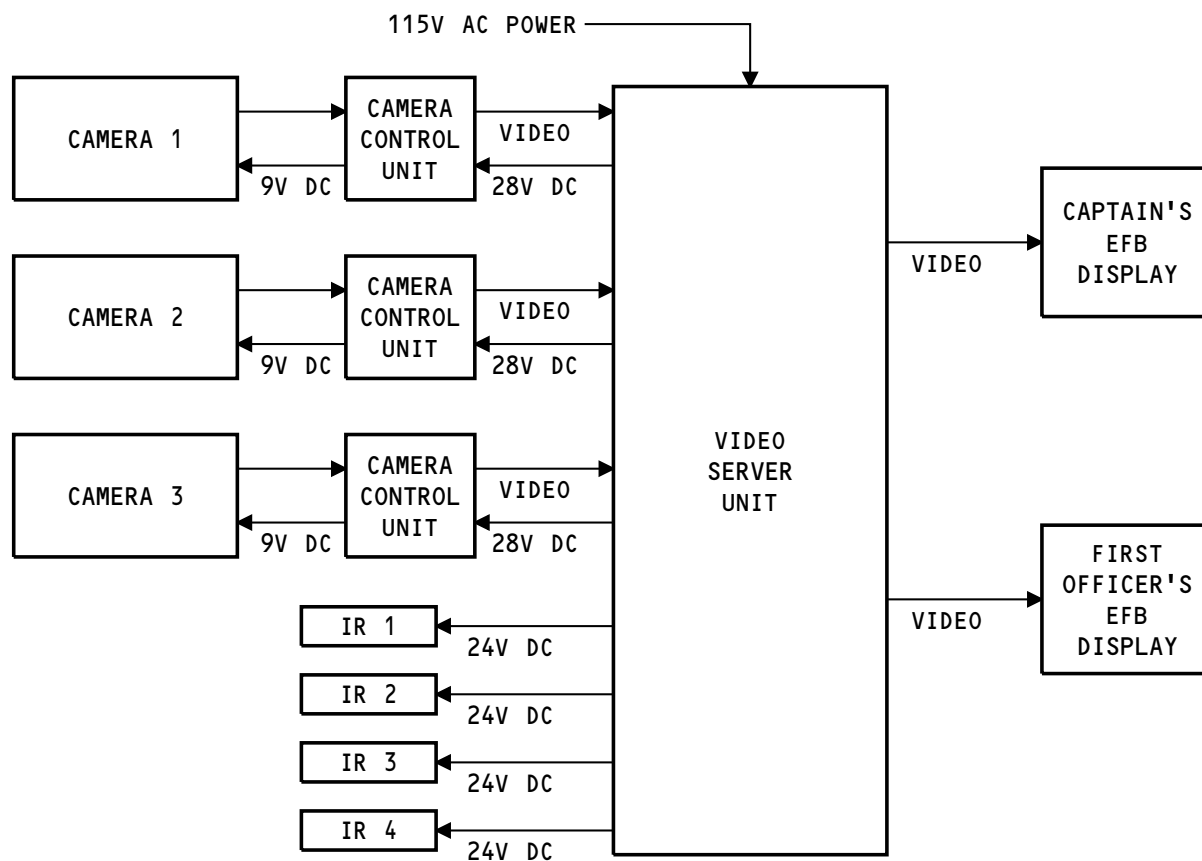
The left (<=), and right arrow (=>) bezel keys can also do camera selection.

NOTE: The FDEVSS can show only the image from a single camera at one time.



FLIGHT DECK ENTRY VIDEO SURVEILLANCE SYSTEM - FUNCTIONAL DESCRIPTION

1651847 S0000303061_V1



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FLIGHT DECK ENTRY VIDEO SURVEILLANCE - FUNCTIONAL DESCRIPTION

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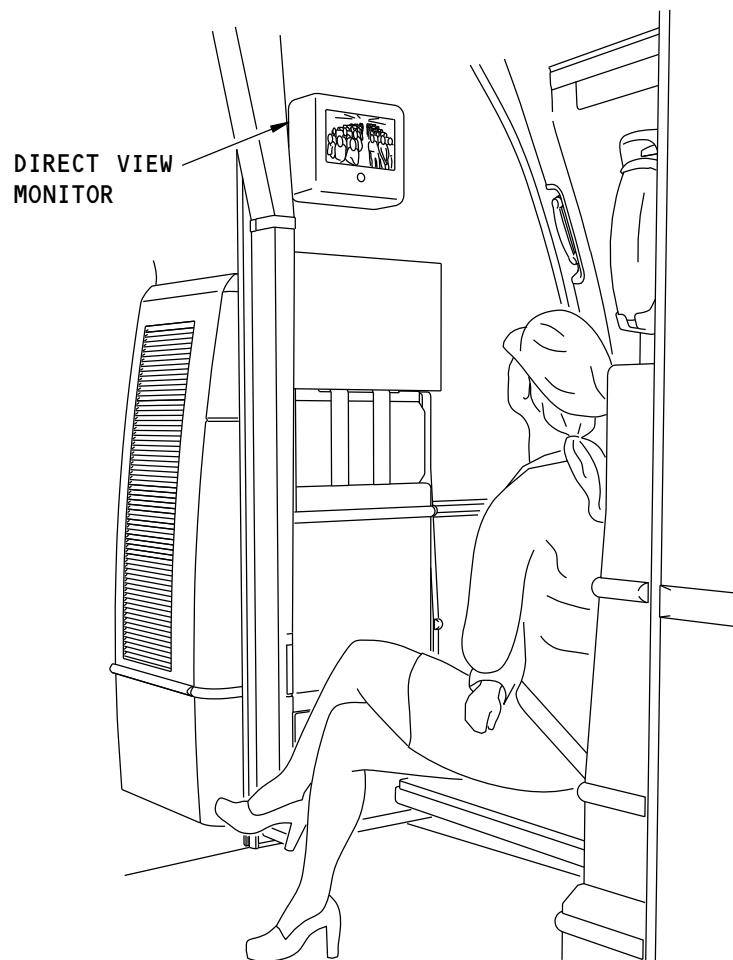
**DIRECT VIEW CABIN CAMERA SYSTEM - INTRODUCTION****General**

The Direct View Camera System is a stand-alone video system that allows flight attendants to view the passengers in the first class cabin.

The system is activated during the taxi, take-off and landing flight phases. The system would be turned off for other flight phases.

Abbreviations and Acronyms

- CCU - camera control unit
- IR - infra-red
- MSU - monitor/switch unit



PASSENGER COMPARTMENT
ENTRYWAY

DIRECT VIEW CAMERA SYSTEM - INTRODUCTION

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DIRECT VIEW CABIN CAMERA SYSTEM - GENERAL DESCRIPTION**General**

The Direct View Cabin Camera System (DVCCS) is a video system that provides video surveillance of the first class cabin. This lets the cabin attendant at the door 1L attendant station see activity in the first class cabin, and the areas near doors 1L and 1R.

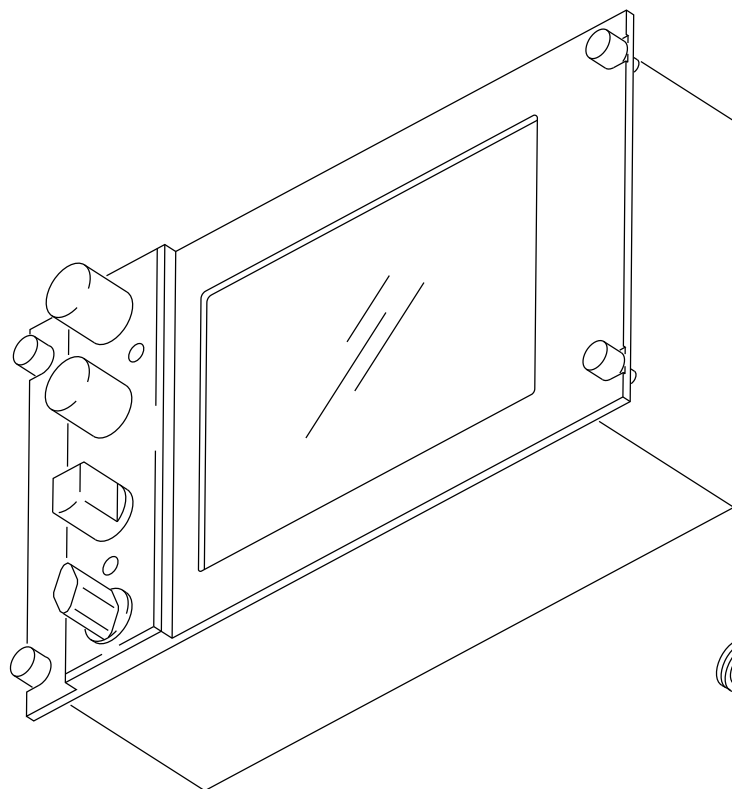
The system is normally used during the taxi, takeoff and landing phases of airplane operation, when passengers should be sitting in their seats.

The system is turned off during those phases of aircraft operation where the passengers have access to the facilities within the cabin.

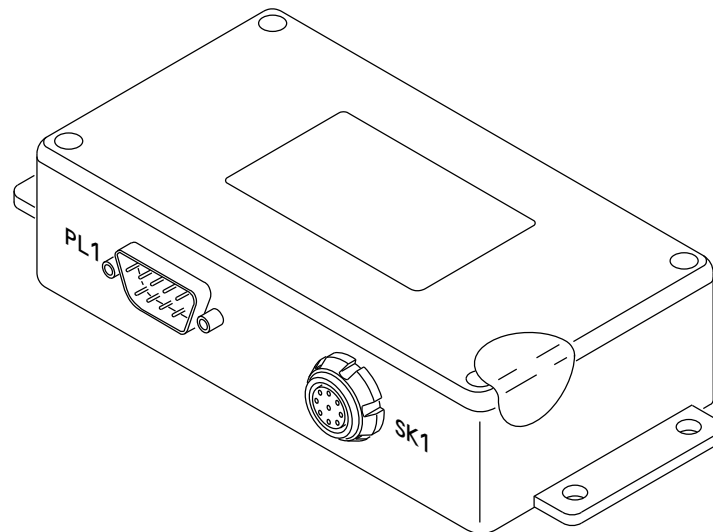
Components

The DVCCS consists of the following components:

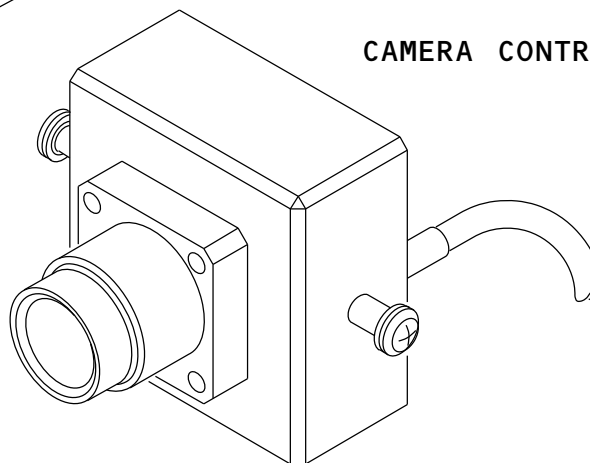
- A monochrome video camera, installed in the aft first class ceiling header, in a position to see movement in the first class cabin.
- A camera control unit, installed adjacent to the video camera.
- A combination Liquid Crystal Display (LCD) monitor and switch unit, installed on the forward side of the closet located just aft of entry door 1L.



DIRECT VIEW MONITOR



CAMERA CONTROL UNIT



CAMERA

DIRECT VIEW CABIN CAMERA SYSTEM - GENERAL DESCRIPTION

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DIRECT VIEW CABIN CAMERA SYSTEM - COMPONENT LOCATIONS

General

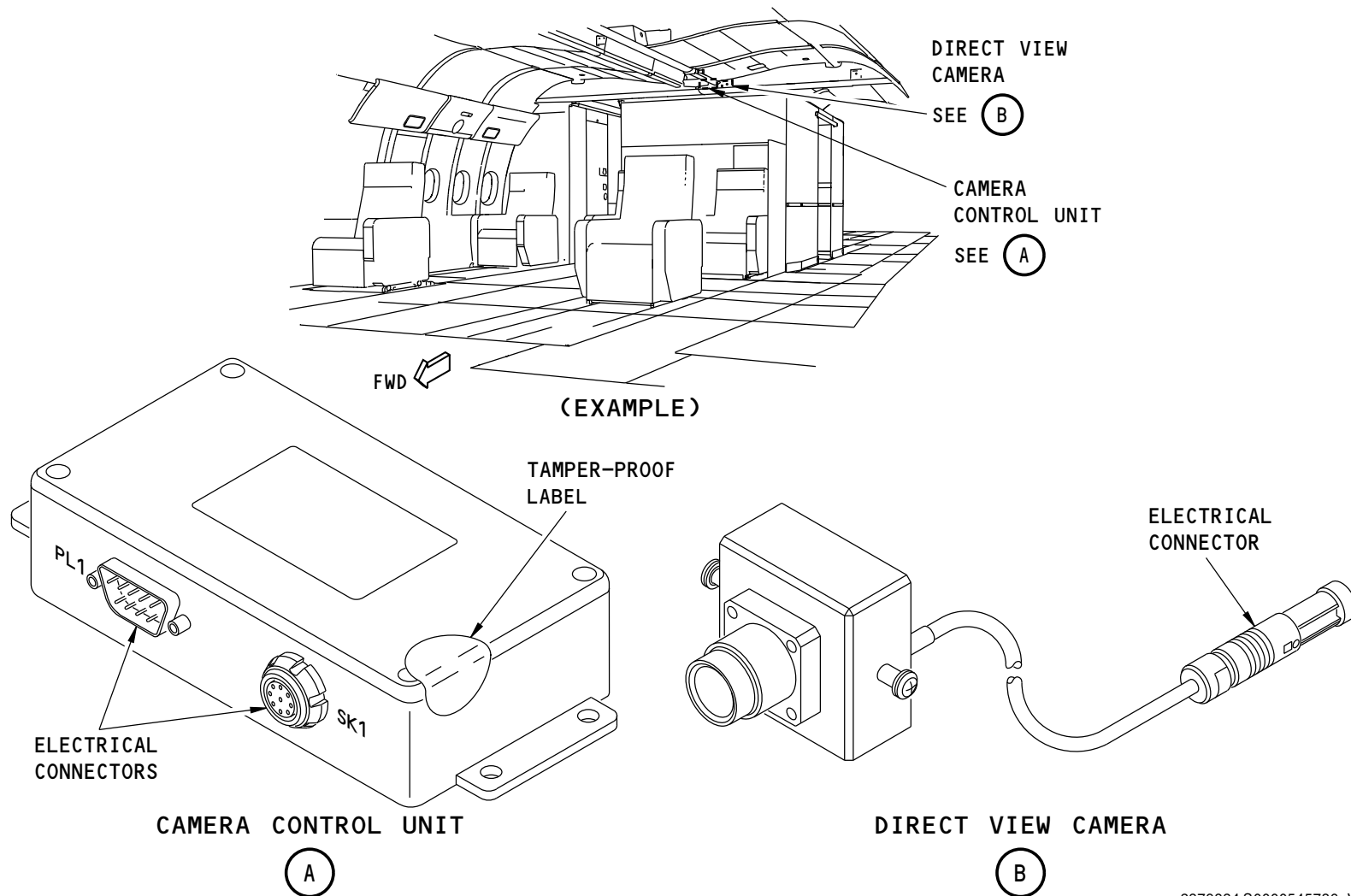
The Direct View Cabin Camera System (DVCCS) has components in the passenger cabin area.

Passenger Cabin

The monitor/switch unit (MSU) is installed on a bracket on the forward side of the closet aft of entry door 1L. It is covered by a shroud.

A video camera is installed on a header in the aft ceiling of the first class cabin.

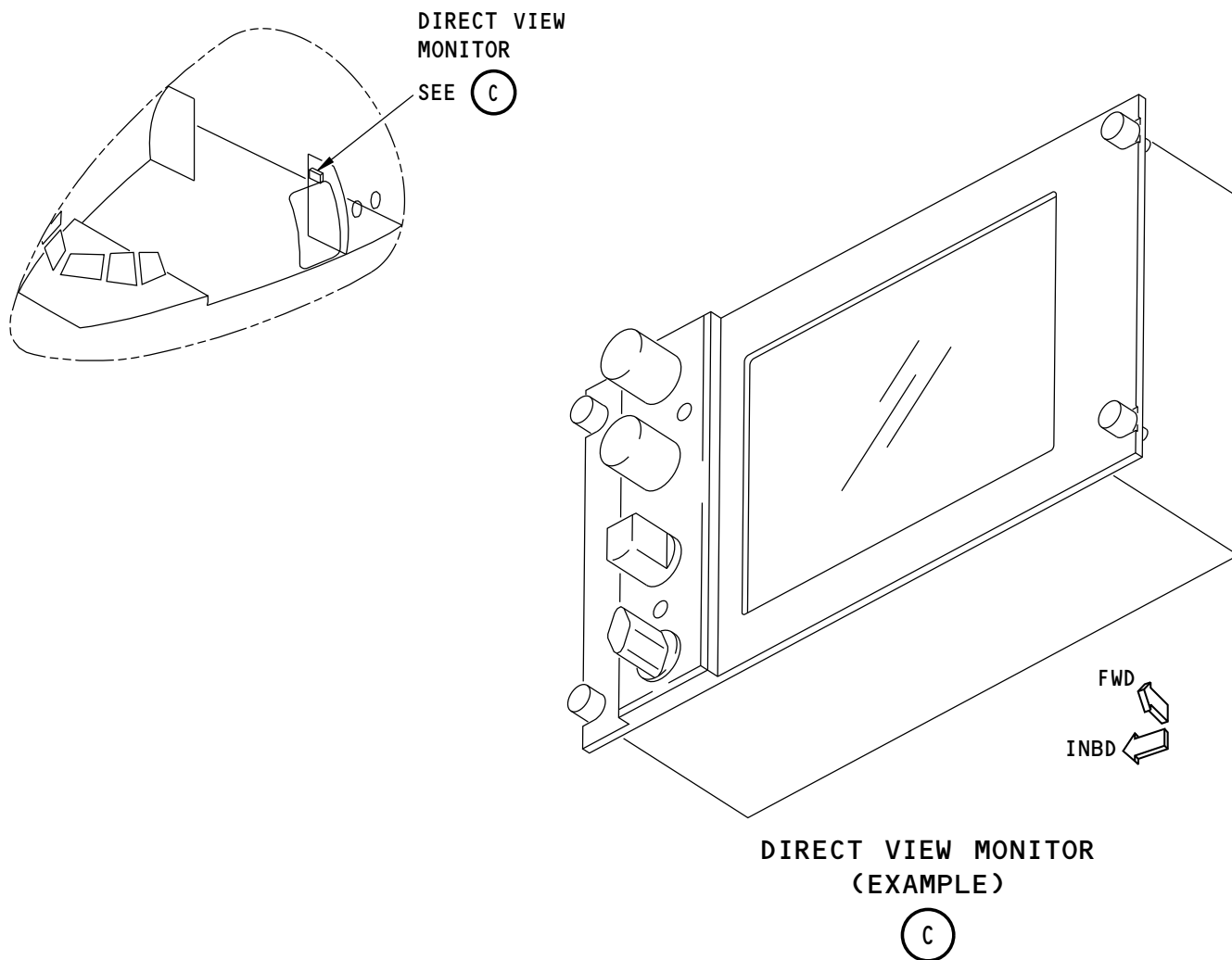
There is also one camera control unit (CCU) installed adjacent to the video camera.



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DIRECT VIEW CAMERA SYSTEM - COMPONENT LOCATIONS

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DIRECT VIEW CAMERA SYSTEM - COMPONENT LOCATIONS

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DIRECT VIEW CABIN CAMERA SYSTEM - FUNCTIONAL DESCRIPTION

General

The Direct View Cabin Camera system is designed to augment aircraft security by providing a secured unobstructed view of the first class cabin for flight attendants during flight or ground operations.

The Direct View Cabin Camera system uses one camera linked to a LCD Monitor/Switch Unit mounted at the door 1L attendant station. The camera is positioned in the aft first class cabin header, looking forward.

The Direct View Cabin Camera system consists of one camera, one camera control unit, and a LCD monitor.

Primary power for the system is 28 volts dc supplied from the 28V DC Main Bus through a 5A circuit breaker labeled DIRECT VIEW CAMERA. There are two OFF/ON switches that control the electrical power to the direct view camera system. These two switches are installed on the LCD Monitor/Switch Unit and the monitor shroud.

System Components

Camera

- The monochrome CCD video camera is designed for use in pressurized, heated areas in the aircraft. The camera's small size allows for covert or overt mounting. The lens is changeable and allows for various fields of view as required for each position and area to be covered. All components of the camera are contained in an Aluminum Alloy housing.
- Power is supplied to the camera from the Camera Control Unit which converts the 28V DC aircraft power to 9V DC. Maximum current draw of the camera is 1.1 watts at 9V DC.

Camera Control Unit

- The Camera Control Unit is used to interface the aircraft 28V DC power and video signal to and from the camera. The unit is contained in an Aluminum Alloy die-cast box having two electrical connectors for interface. Internal protection is provided by a resettable 1 amp fuse. The control unit is capable of converting un-balanced video to a balanced video output, if required.

- The Camera Control Unit must be mounted within four meters of the system camera.

Monitor/Switch Unit

- System control is through the Monitor/Switch Unit. This unit controls the CCTV system power (On/Off), camera input select, monitor brightness, and contrast. The unit, mounted by four dzus fasteners, is located on the forward side of the closet aft of door 1L.
- The monitor is used to display images from the camera. The monitor uses a 50 ohm balanced video input from the Camera Control Unit.
- OFF/ON: Controls the electrical power to the direct view camera system. This switch usually controlled by the maintenance personnel on the ground. In the usual condition, this switch is in the ON position.
- AVNCS/COCKPIT/GLY: A eight-position switch labeled for the possible locations of eight cameras. The eight cameras were used on the original installation on MD-11 airplanes. Only one camera source is used in this installation. This is the camera 1 position, the most counter-clockwise position of the switch.
- BRT: Adjusts the brightness of the LCD Monitor.
- CONTRAST: Adjusts the contrast of the LCD Monitor.
- There is also a push-button OFF/ON switch on the monitor shroud for the flight attendant to turn the direct view camera system off or on. This switch also refers to as a Cut-Off switch for the direct view camera system.

System Operation

28V DC power is available to the system when the system circuit breaker is engaged.

The system is not powered until the power switch on the monitor/switch unit is set to the ON position and the push-button switch on the monitor shroud is "on".

When set to the ON position, electrical power is routed to the LCD Monitor and the Camera Control Unit (CCU).

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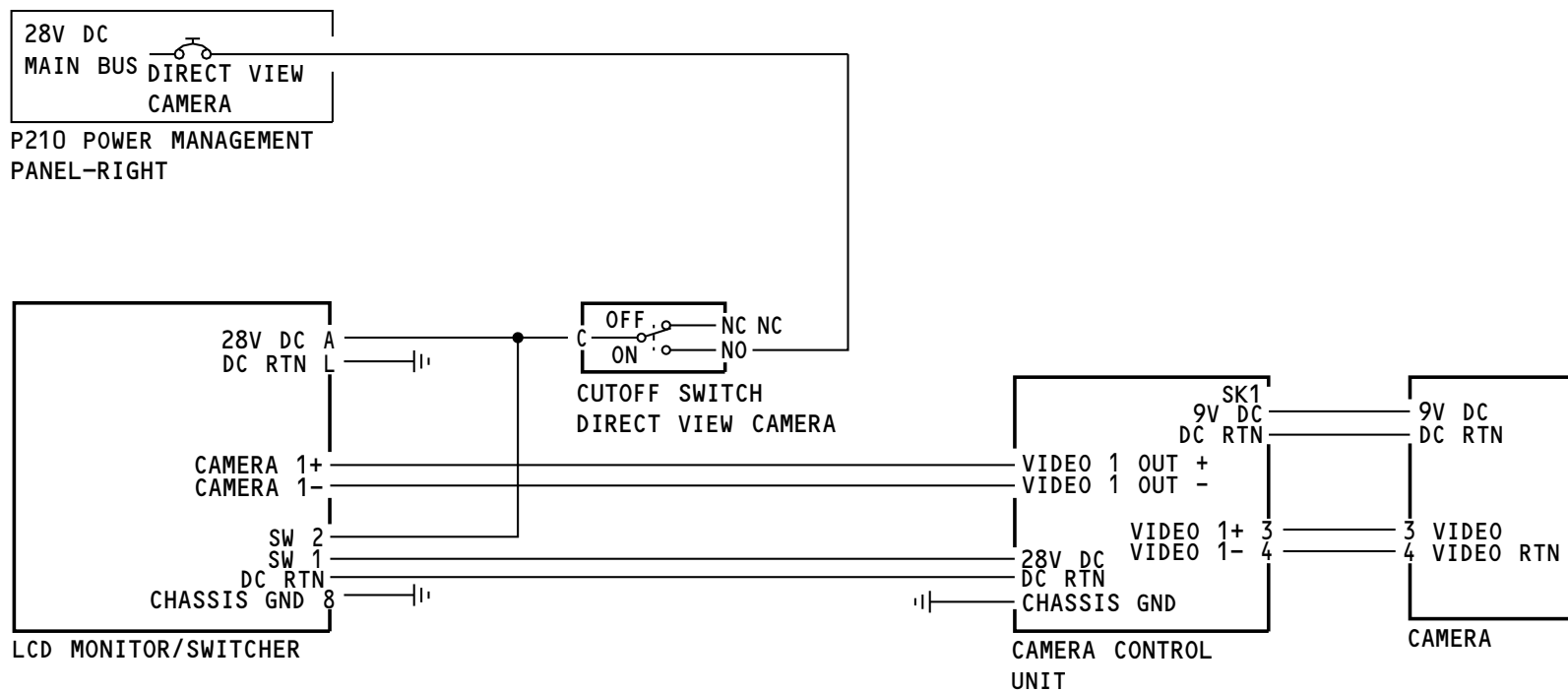


DIRECT VIEW CABIN CAMERA SYSTEM - FUNCTIONAL DESCRIPTION

The LCD Monitor will come on and display the selected video source in a few moments.

The CCU supplies electrical power to the camera.

The CCU will begin to feed video back to the Monitor/Switch Unit.



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DIRECT VIEW CABIN CAMERA SYSTEM - FUNCTIONAL DESCRIPTION

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CAMERA CONTROL UNIT

General

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The camera control unit (CCU) is an analog interface unit between the video server and the infrared camera. One CCU is installed adjacent to each camera. The CCU supplies power to the camera. The CCU receives the camera video signal, and transmits it to the video server.

ARO 018-999

The camera control unit (CCU) is an analog interface unit between the monitor/switch unit and the infrared camera. The CCU is installed adjacent to the camera. The CCU supplies power to the camera. The CCU receives the camera video signal, and transmits it to the monitor/switch unit.

ARO ALL

The CCU is line-replaceable, and can not be serviced in the field.

Physical Description

Each CCU has properties as follows:

- Length - 5.5 in. (139.7 mm)
- Width - 2.5 in. (64 mm)
- Height - 1.6 in. (41.6 mm)
- Weight -7.8 oz (220 g) maximum.

The housing is aluminum, with an attachment flange on each side. There is a tamper-proof label on the cover.

There are two electrical connectors as follows:

- Round 10 pin, SK1, connects to the camera.
- Trapezoid 9 pin, PL1, connects to the video switch.

The CCU is cooled by convection. No forced-air cooling is required.

Functional Description

ARO 001-017

The CCU has these functions for Fight Deck Entry Video Surveillance System:

- Receives 24V dc (volts direct current) from the video server unit.
- Supplies 9V dc to the camera.
- Changes unbalanced analog video from the camera, to balanced analog video for the video server unit.
- Changes the camera output impedance from 75 ohms, to the value required for the video server unit.

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The CCU has these functions for Direct View Cabin Camera System:

- Receives 28V dc from the monitor/switch unit.
- Supplies 9V dc to the camera.
- Changes unbalanced analog video from the camera, to balanced analog video for the monitor/switch unit.
- Changes the camera output impedance from 75 ohms, to the value required for the monitor/switch unit.

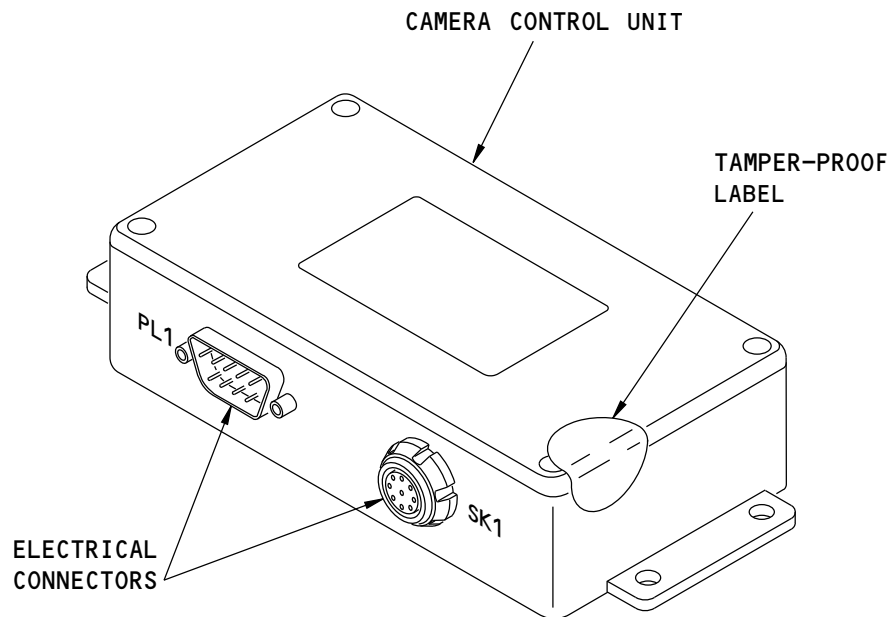
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CAMERA CONTROL UNIT

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DIRECT VIEW CAMERA

General

The direct view camera is a sealed component that senses the strength and position of IR light reflected by an object, and converts that to an analog signal. The cameras produce a monochrome (black and white) image in NTSC format. The camera is line-replaceable, and can not be modified, or repaired in the field.

The camera has physical characteristics as follows:

- Width - 1.2 in. (29.5 mm)
- Height - 1.2 in. (29.5 mm)
- Depth - 1 in. (26 mm), approximately
- Weight - 2 oz (52 g), approximately, including wires.

The camera has one lead with a single 10-pin connector. Power to the camera is supplied by the camera control unit (CCU). The camera and CCU are matched for impedance and voltage, and are set by the specified part numbers.

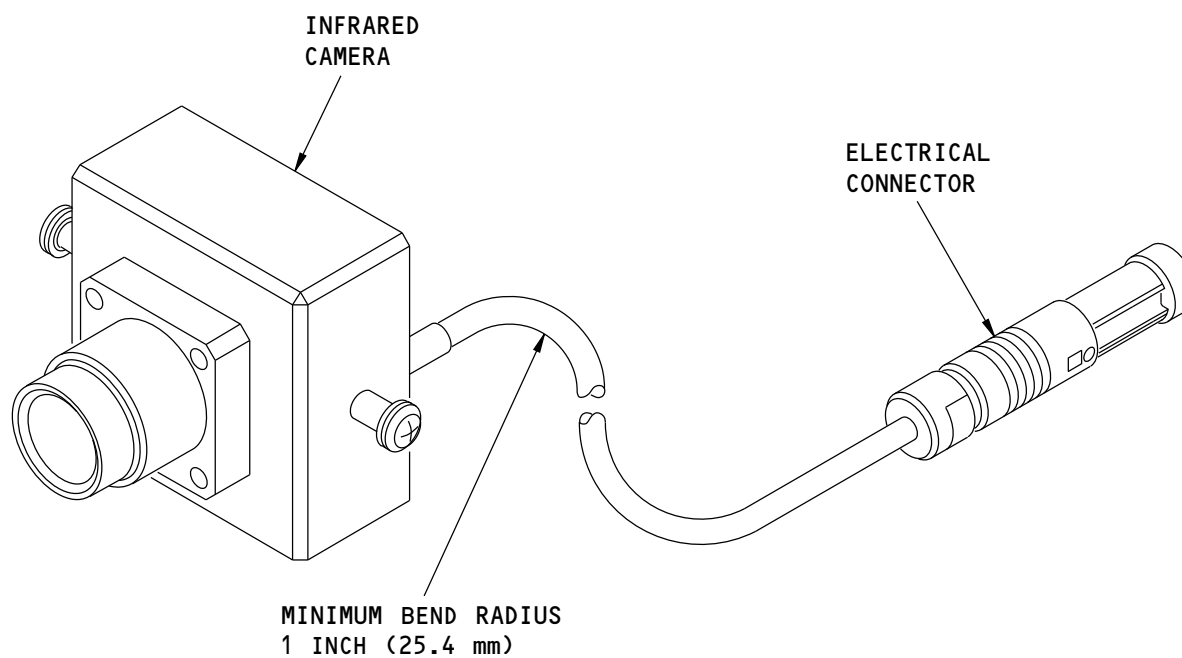


CAUTION

THE REPLACEMENT COMPONENTS MUST HAVE THE SAME PART NUMBERS AS THE COMPONENTS WHICH WERE REMOVED. INCORRECT COMPONENTS CAN CAUSE DAMAGE TO THE SYSTEM.

The features that follow are set by the camera manufacturer's part number.

- Lens aperture (size)
- Camera resolution (lines)
- Input voltage
- Impedance
- Lead length and material.



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INFRARED CAMERA

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VIDEO SERVER UNIT

General

The video server unit (VSU) is a digital video server that can receive and record data to an internal hard disk drive. The VSU can transmit live, or recorded video over Ethernet to a monitor system, for example the Electronic Flight Bag (EFB).

The VSU configuration is set by internal hardware and software. The configuration is identified by the part number, and can not be changed or serviced in the field.

Physical Description

The VSU has these physical characteristics:

- Height - 15 in. (376 mm)
- Width - 11 in. (279 mm)
- Depth - 4 in. (109 mm)
- Weight -13 lb (6 kg) maximum.

The front of the unit has four Light Emitting Diode (LED) lights, which can show red or green in color. The LEDs show the conditions as follows:

- POWER (LED 1)
- HDD (software application, and disk drive activity, LED 2)
- ENET (Ethernet bus activity, LED 3)
- BITE (camera condition, LED 4).

The enclosure has four Input Output (I/O) connectors, J1, J2, J3, and J4.

- J1 - has three Quadax pins for ethernet, and one 40 pin connector for analog video signals
- J2 - one 80 pin connector
- J3 - on front panel, used for depot maintenance only.
- J4 - RJ45 connector on front panel, used for depot maintenance only.

Functional Description

The VSU receives 115V ac (volts alternating current), 400Hz (Hertz) power from the surveillance camera circuit breaker. The VSU supplies 24V dc (volts direct current) power to each camera control unit (CCU), and infrared illuminator. The VSU has internal fuses on the input and output power circuits. The unit also has thermal protection that can prevent operation of the internal hard drive when the temperature is less than 32°F (0°C), or more than 131°F (55°C).

The VSU can receive data from a maximum of 16 sources in composite-video format. The VSU receives a continuous video signal from each camera control unit (CCU). The CCU is pre-set to the correct impedance, video balance, and duplex specifications to agree with the VSU.

NOTE: Do not substitute a camera control unit or video server unit with a non-approved part number. The output format of the CCU video signal must agree with the input requirement of the VSU.

The VSU can transmit up to 16 channels of video over Ethernet. The output is in NTSC, or PAL specification (resolution), as set by the internal software. However, the EFB accepts only three channels, in NTSC format.

The VSU uses internal hardware to multiplex, digitize and compress the video signal. The data file contains a sequence of image frames, and is recorded to the internal hard disk drive. The data is recorded with a header that can include time and date, machine identity, camera title, and event title.

The VSU is cooled by convection from cabin air. No forced air cooling is necessary.

Operation and Control

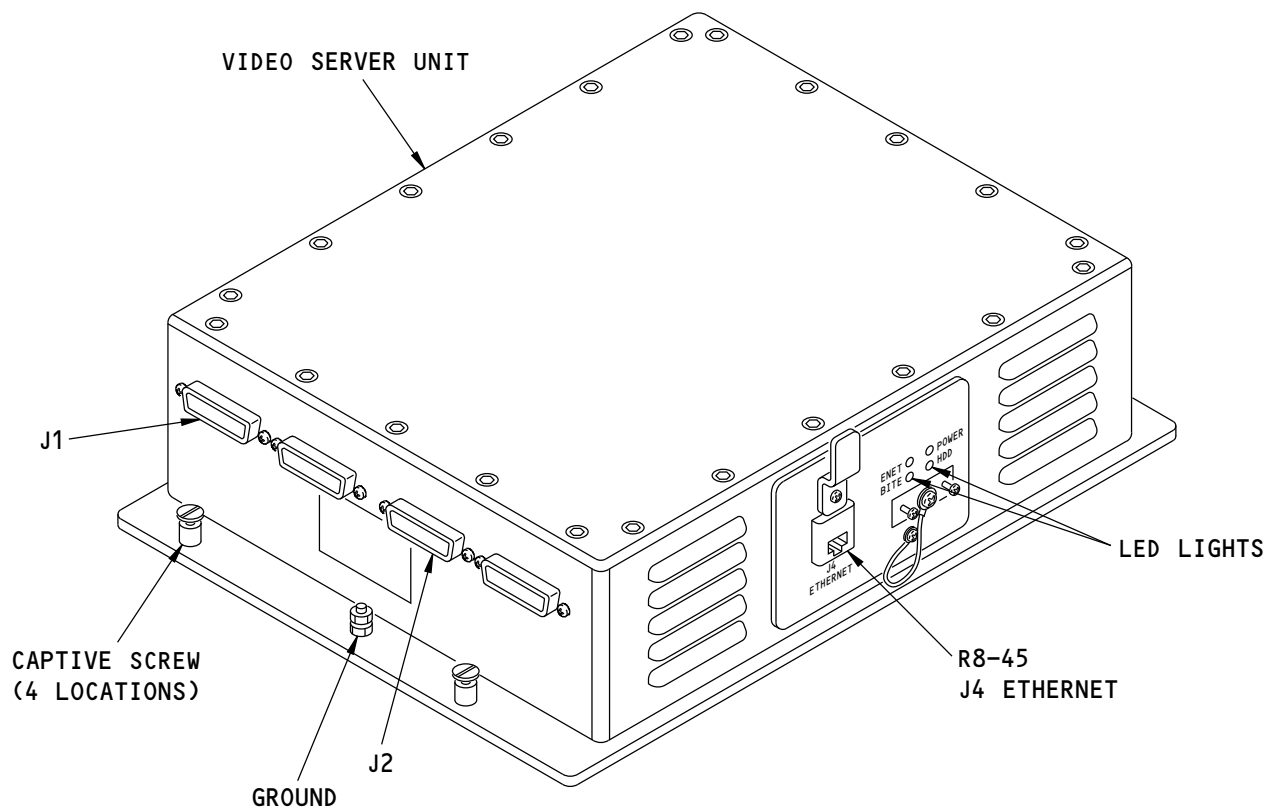
Operation of the video server is automatic when the unit is energized. Control of the unit is set by the VIDEO software application on the captain's, or first officer's EFB Display Unit (DU).

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VIDEO SERVER UNIT

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ILLUMINATOR

General

The illuminator is a component that makes infrared (IR) light. It emits a wide beam of near-infrared light that is invisible to the eye, but is sensed by the flight deck entry cameras. There are four illuminators: one adjacent to each camera, plus one additional unit adjacent to the flight compartment door camera.

The illuminator is a sealed assembly, and can not be repaired.

Physical Description

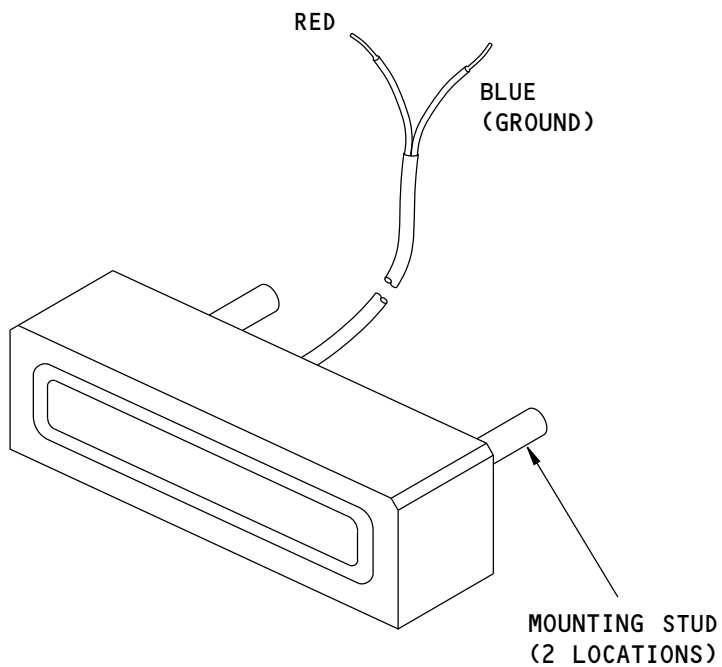
Each illuminator has properties as follows:

- Height - 0.6 in. (14.3 mm)
- Width - 1.7 in. (44.3 mm)
- Depth - 0.9 in. (23.8 mm)
- Weight - 0.5 oz (14.2 g) maximum, excluding the wires.

The housing is plastic, with two threaded attachment posts on the rear face. The assembly includes two wire leads (red receives power, blue goes to ground).

Functional Description

The illuminator operates continuously using 24V dc (volts direct current) from the video server unit (VSU), M44232. The unit emits light at the frequency of approximately 880nm (nanometers). The projected beam is approximately 150 degrees wide.



ILLUMINATOR

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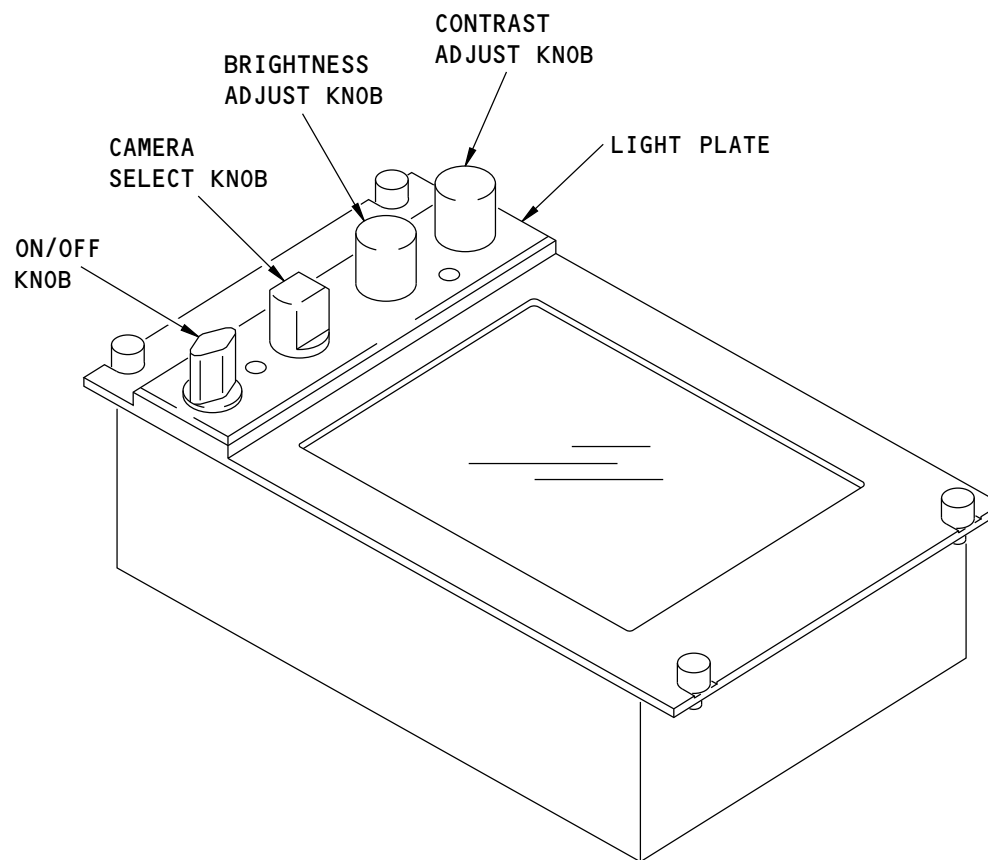
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DIRECT VIEW MONITOR

General

- The direct view LCD monitor receives video input from the direct view camera(s) and displays these images. The monitor can accept video from up to 8 cameras. A seated flight attendant uses the monitor to view the passenger cabin during taxi, takeoff and landing.
- The monitor is installed at the Door 1L attendant station, aft of the door.
- The monitor has control knobs for contrast and brightness.
- The monitor has ON/OFF switch which controls the power to the monitor.
- The monitor has Camera Selector switch which can have up to 8 camera positions available.
- The monitor has a 6.4 inch screen and display resolution of 960 x 234 dots.
- The monitor operates from 28V dc power supplied by the airplane.



DIRECT VIEW MONITOR

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**PC POWER SYSTEM (FLIGHT COMPARTMENT) - INTRODUCTION****General**

The PC Power System provides 110 VAC/60Hz electrical power for use by the crew. The interface to the PC Power System is through outlets installed in the flight compartment. The user connects a laptop computer or other personal electronic device (PED) to the outlets.

Abbreviations and Acronyms

- A/C - Alternating Current
- ACOU - Alternating Current Outlet Unit
- AUX - Auxiliary
- BITE - Built-In Test Equipment
- C/B - Circuit Breaker
- D/C - Direct Current
- ePT - e-Plane Portable Terminal
- ISPS - In-Seat Power Supply
- IUL - In-Use Light
- LED - Light Emitting Diode
- LRU - Line Replaceable Unit
- OU - Outlet Unit
- PC - Personal Computer
- PED - Personal Electronic Device
- SAC - Seat Actuator Controller
- SVDU - Seat Video Display Unit



PC POWER SYSTEM - INTRODUCTION

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**PC POWER SYSTEM (FLIGHT COMPARTMENT) - COMPONENT LOCATION****General Description**

The PC Power System receives 115 VAC/400 Hz aircraft power and changes it to 110 VAC/60 Hz power for the users.

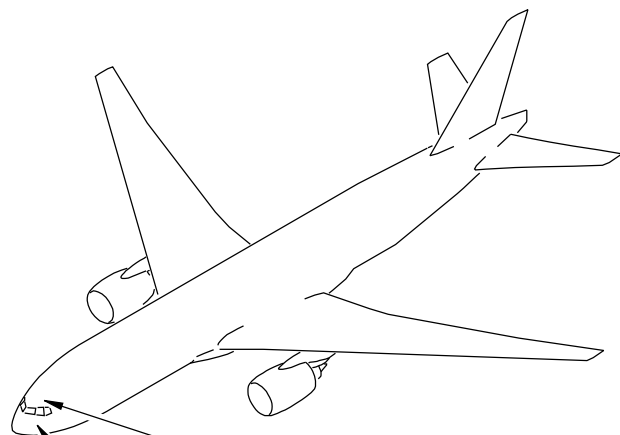
The Flight Compartment PC Power System has these components:

- In-Seat Power Supply (ISPS)
- Outlet Unit (OU)
- Applicable cables and harness connections.

Component Location

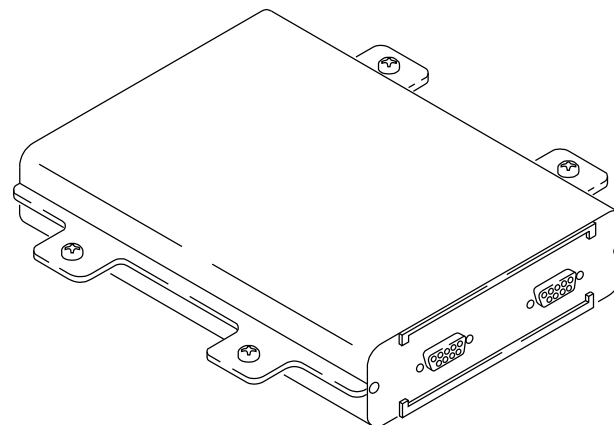
- The ISPS is located in the flight compartment in the first officer's side console or second observer's console.
- There are two outlet units located above the interphone speakers in the captain and first officer's forward consoles (P13 and P14).

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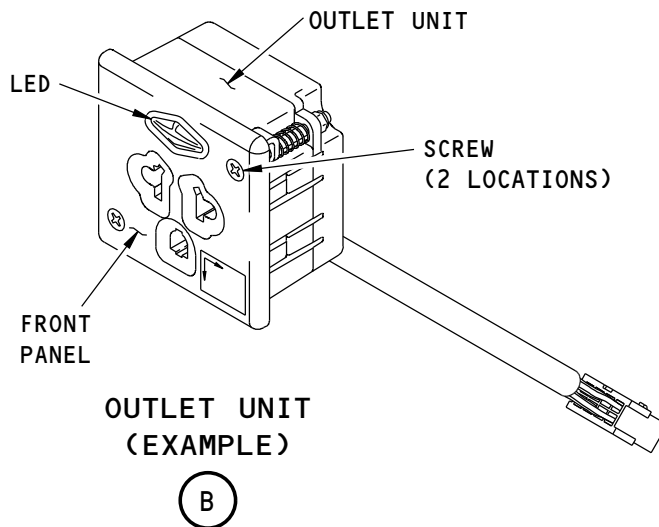


OUTLET UNIT
SEE (B)

IN-SEAT POWER SUPPLY
SEE (A)



IN-SEAT POWER SUPPLY
(EXAMPLE)
(A)



OUTLET UNIT
(EXAMPLE)
(B)

PC POWER SYSTEM (FLIGHT COMPARTMENT) - COMPONENT LOCATION

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**PC POWER SYSTEM (FLIGHT COMPARTMENT) - ISPS - GENERAL DESCRIPTION****General**

The ISPS provides power to operate a laptop computer or PED and recharge its battery.

The ISPS is supplied with power from the airplane. The ISPS converts the input power and supplies it to the outlet unit (OU).

The In-Seat Power Supply (ISPS) is installed at the following location(s):

- First officer's side console.

Physical Description

The ISPS is a rectangular box with connectors on two sides of the box. The ISPS can provide power for up to three OU's.

Functional Description

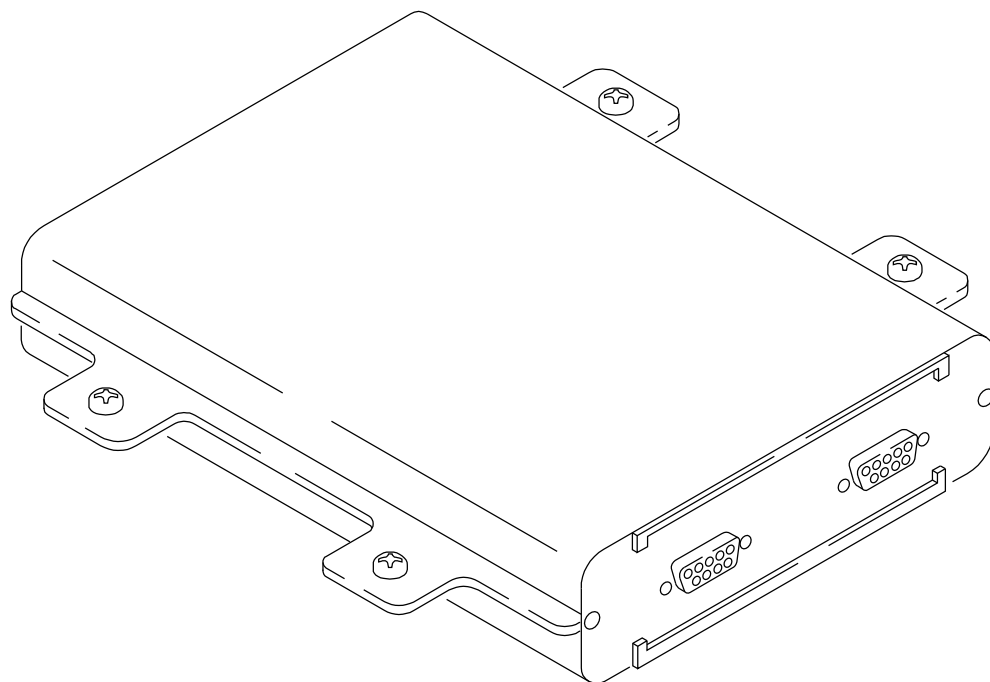
The ISPS converts the input power of 115VAC/400 Hz to output power of 110VAC/60Hz for the outlet unit.

The ISPS monitors the output load and provides overcurrent, overvoltage, undervoltage, Ground Fault Interruption monitoring and automatic shutoff.

The ISPS provides Built-In-Test (BIT) functionality.

The ISPS indicates faults and BIT by using the outlet unit (OU) LED.

The ISPS provides Electro-Magnetic Interference (EMI) filtering.



**IN-SEAT POWER SUPPLY
(EXAMPLE)**

PC POWER SYSTEM - ISPS - GENERAL DESCRIPTION

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**PC POWER SYSTEM (FLIGHT COMPARTMENT) - OUTLET UNIT - GENERAL DESCRIPTION****General**

The Outlet Unit (OU) supplies a power socket to operate a laptop computer or a personal electronic device (PED) and recharge its battery.

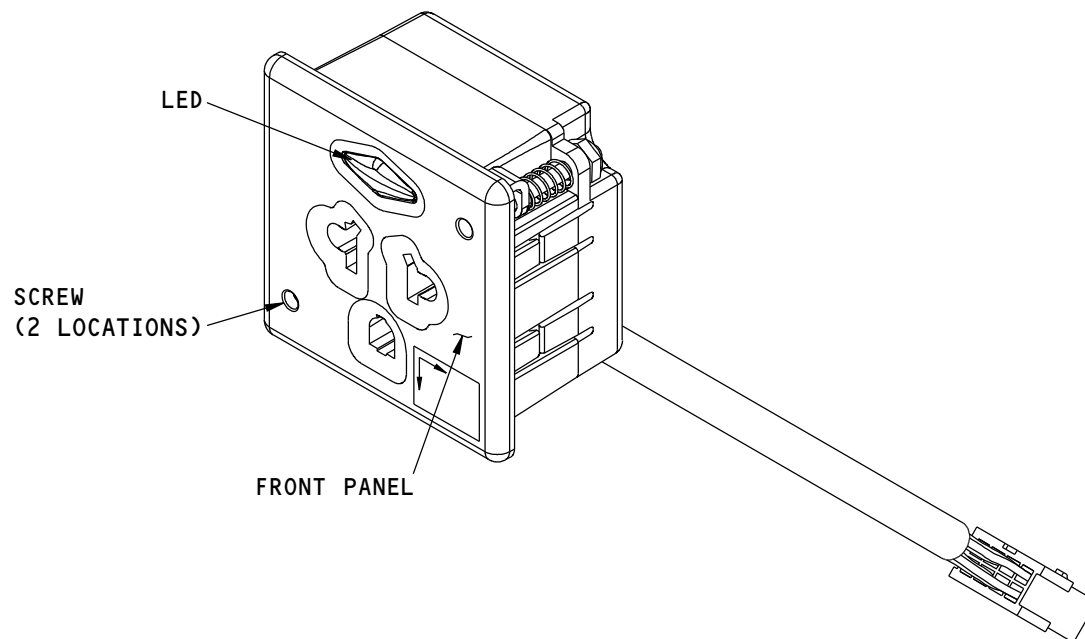
The outlet unit is used in conventional 110V AC systems.

The outlet unit connects to the In-Seat Power Supply (ISPS) output.

LED Indicator

- Shows a red light when there is a fault with the ISPS.
- Shows a green light when power is available and/or in use at the OU.
- Is extinguished when power is not available.

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**OUTLET UNIT
(EXAMPLE)**

OUTLET UNITS - GENERAL DESCRIPTION

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ARINC 629 - INTRODUCTION

General

An ARINC 629 data bus is an electronic data movement system that connects many line replaceable units (LRUs) in a single communication loop. Data from any ARINC 629 LRU is available to all other LRUs on the same ARINC 629 bus.

Communication on an ARINC 629 data bus is bidirectional; data to and from the LRUs moves on the same bus.

The ARINC 629 bus permits greater volume and speed of data movement than other data buses now in use.

There are seven (7) ARINC 629 data buses in the 777 airplane. There are three (3) ARINC 629 Flight Control busses and there are four (4) Systems ARINC 629 busses.

- RXN - receive input line 2
- SG - sync gap (ARINC 629)
- SIM - serial interface module (ARINC 629)
- TG - terminal gap (ARINC 629)
- TI - transmit interval (ARINC 629)
- TXN - transmit output line 2
- TXO - transmit output line 1
- XPP - transmit personality PROM

Abbreviations and Acronym

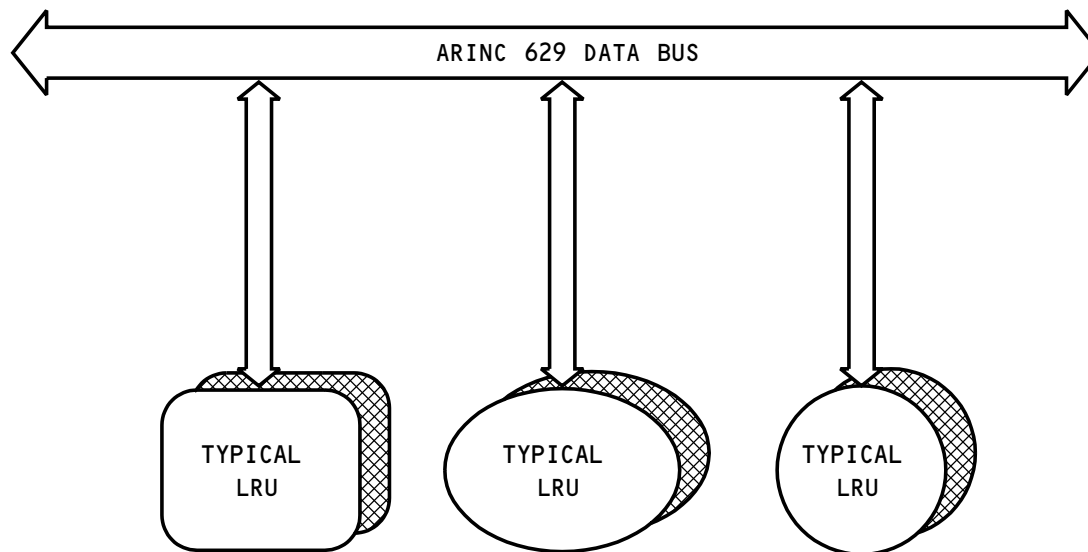
- AIMS - airplane information management systems
- ARINC - Aeronautical Radio, Inc.
- BPCU - bus power control unit
- CDU - control display unit
- CSMA - carrier-sense multiple access
- I/O - input/output
- IC - integrated circuit
- LRM - line replaceable module
- LRU - line replaceable unit
- mA - milliampere
- MPP - multiple personality PROM
- PPSSP - pre-pre-sync sync pulse
- PROM - programmable read only memory
- PSSP - pre-sync sync pulse
- ROM - read only memory
- RPP - receive personality PROM
- RXI - receive input line 1

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ARINC 629 - INTRODUCTION

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ARINC 629 - GENERAL DESCRIPTION

General

An ARINC 629 data bus is a twisted pair of wires with termination resistors at each end. As many as 120 LRUs can use one ARINC 629 data bus. In 777 airplanes the maximum number of current-mode couplers per bus is 46.

Components

The ARINC 629 data bus system has these parts:

- Data bus cable
- Current-mode couplers
- Stub cables.

The ARINC 629 system also includes these components in the LRUs:

- Serial interface modules
- Terminal controllers.

Characteristics

The ARINC 629 data bus system has these characteristics:

- The LRUs send data one at a time in sequence
- The LRUs receive data at the same time
- Communication on ARINC 629 is bi-directional; LRUs may transmit and receive data on the same bus
- One LRU may connect to more than one data bus through separate couplers on each bus
- All data on the bus is available to all the LRUs on that bus.

ARINC 629 Data Bus Configuration

These are the ARINC 629 data buses:

- Three flight control buses
- Four system buses

The flight control buses connect LRUs that have flight control functions.

The system buses connect LRUs that have airplane system functions. These buses work independently from the flight control buses. The systems buses move data between these five areas:

- Avionics
- Propulsion
- Electrical
- Electro-mechanical
- Environmental control.

Functional Description

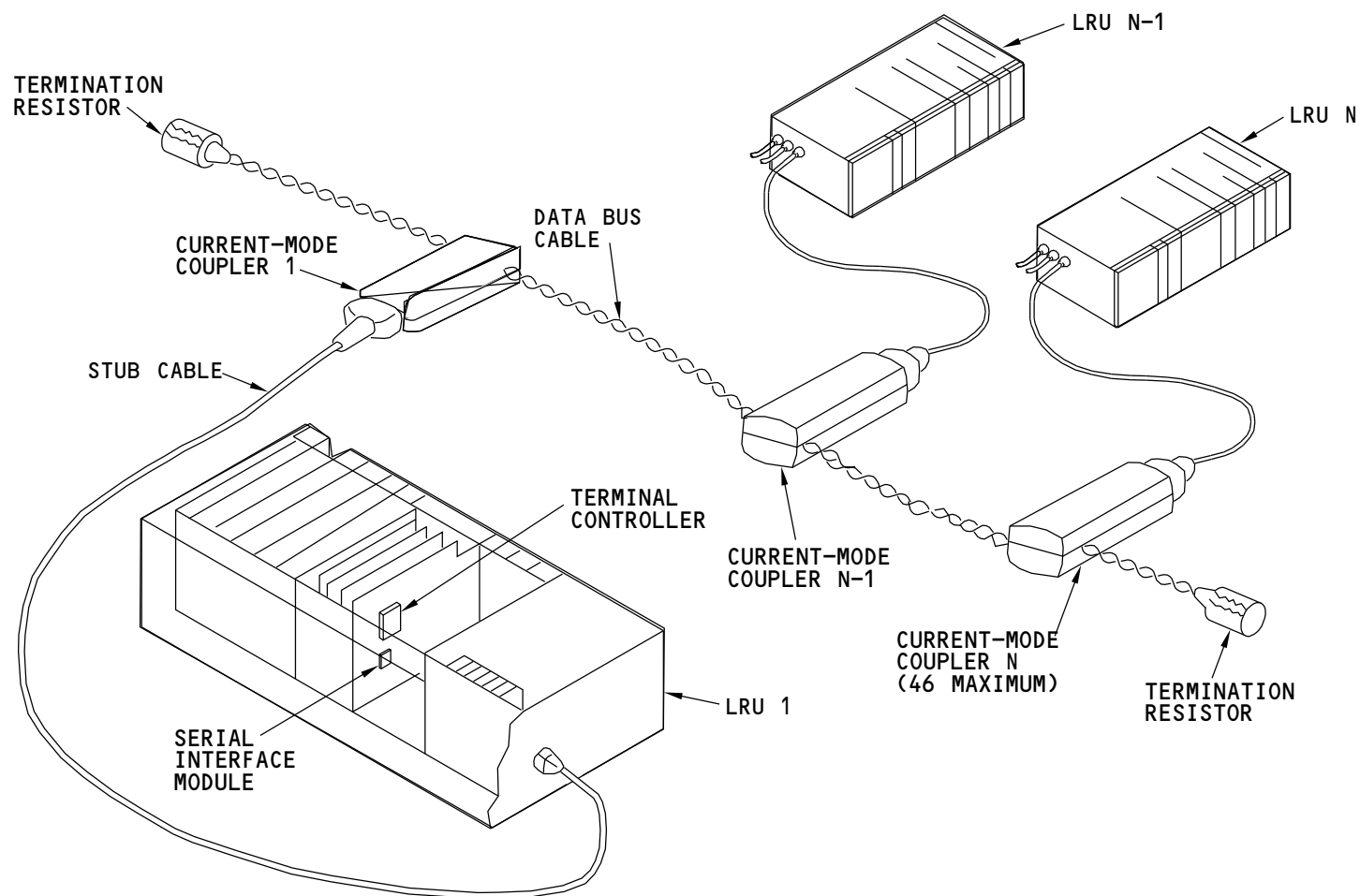
Each LRU uses one or more current mode couplers to connect to data buses.

A current mode coupler and its terminal (terminal controller and serial interface module) move data to and from the bus. Only one terminal on a bus transmits at a time. Each terminal listens to the bus and waits for a stop in data movement on the bus from other LRUs before it transmits.

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ARINC 629 - GENERAL DESCRIPTION

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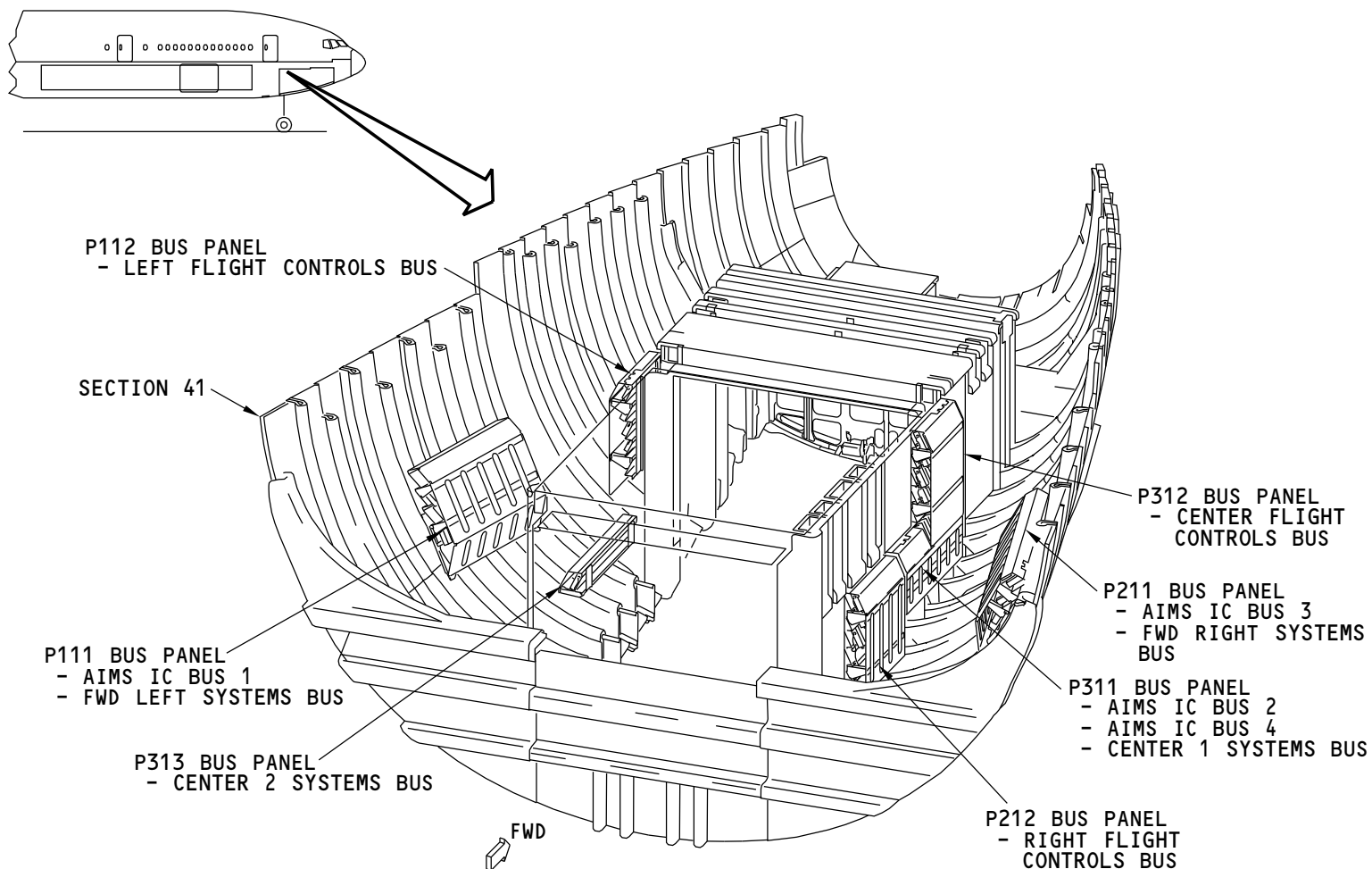
**ARINC 629 - FORWARD COMPONENT LOCATIONS****General**

There are seven bus panels in the forward section on the left and right sides of the nose wheel well. Each panel contains the current-mode couplers and ARINC 629 buses.

Bus Panels

These are the seven bus panels in the forward section:

- P112 - Left flight controls ARINC 629 bus
- P212 - Right flight controls ARINC 629 bus
- P312 - Center flight controls ARINC 629 bus
- P313 - Center 2 systems ARINC 629 bus.
- AIRPLANES WITH AIMS 2 HARDWARE;
AIMS intercabinet (IC) buses are connected with four Ethernet cables.



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ARINC 629 - FORWARD COMPONENT LOCATIONS

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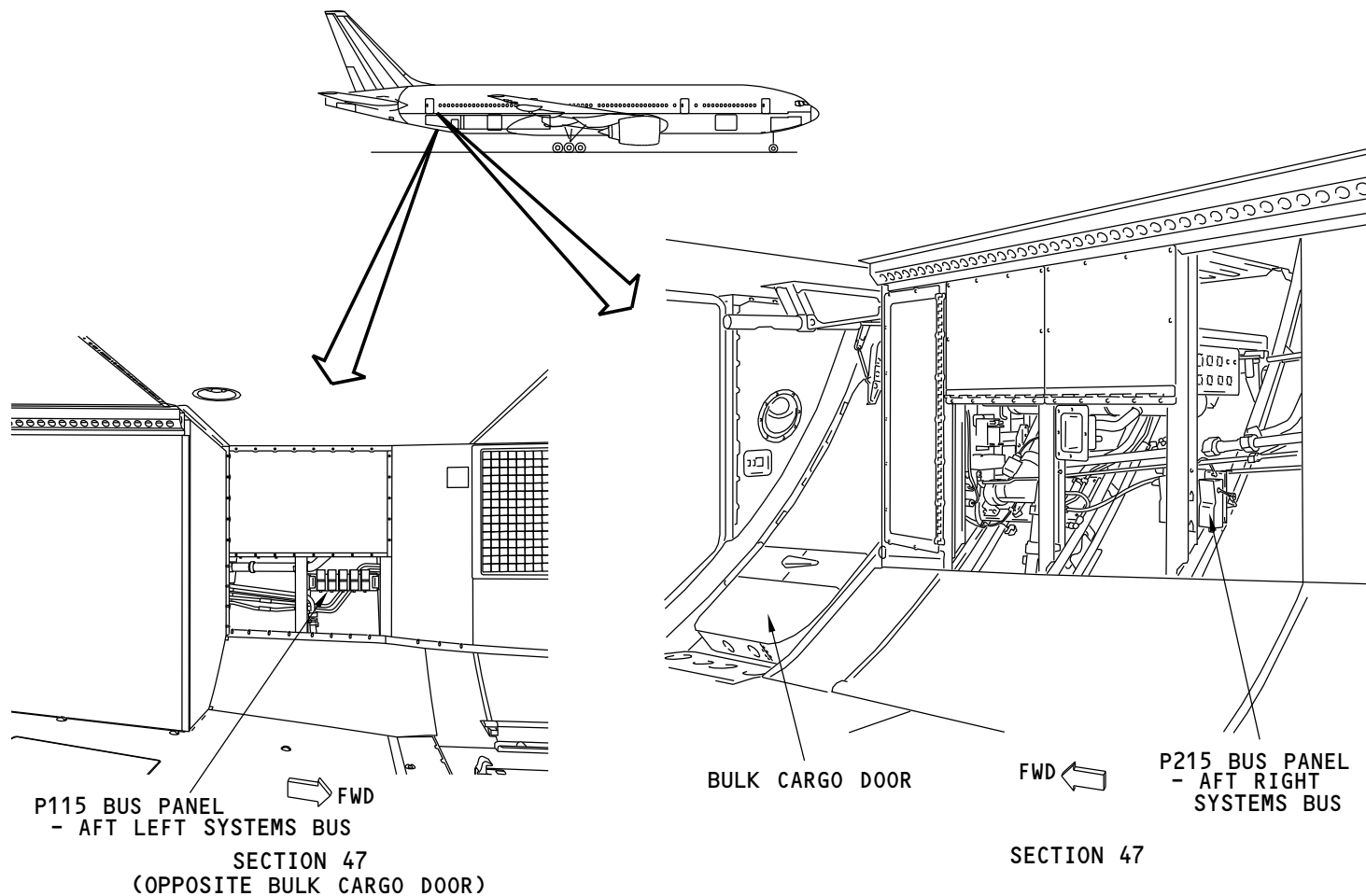
**ARINC 629 - AFT COMPONENT LOCATIONS****General**

There are two bus panels in the aft section of the airplane. Each panel contains current-mode couplers and ARINC 629 buses.

Bus Panels

These are the bus panels in the aft section:

- P115 has the aft section of the left systems bus
- P215 has the aft section of the right systems bus.



ARINC 629 - AFT COMPONENT LOCATIONS

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**ARINC 629 - SYSTEMS BUS PRODUCTION BREAKS****General**

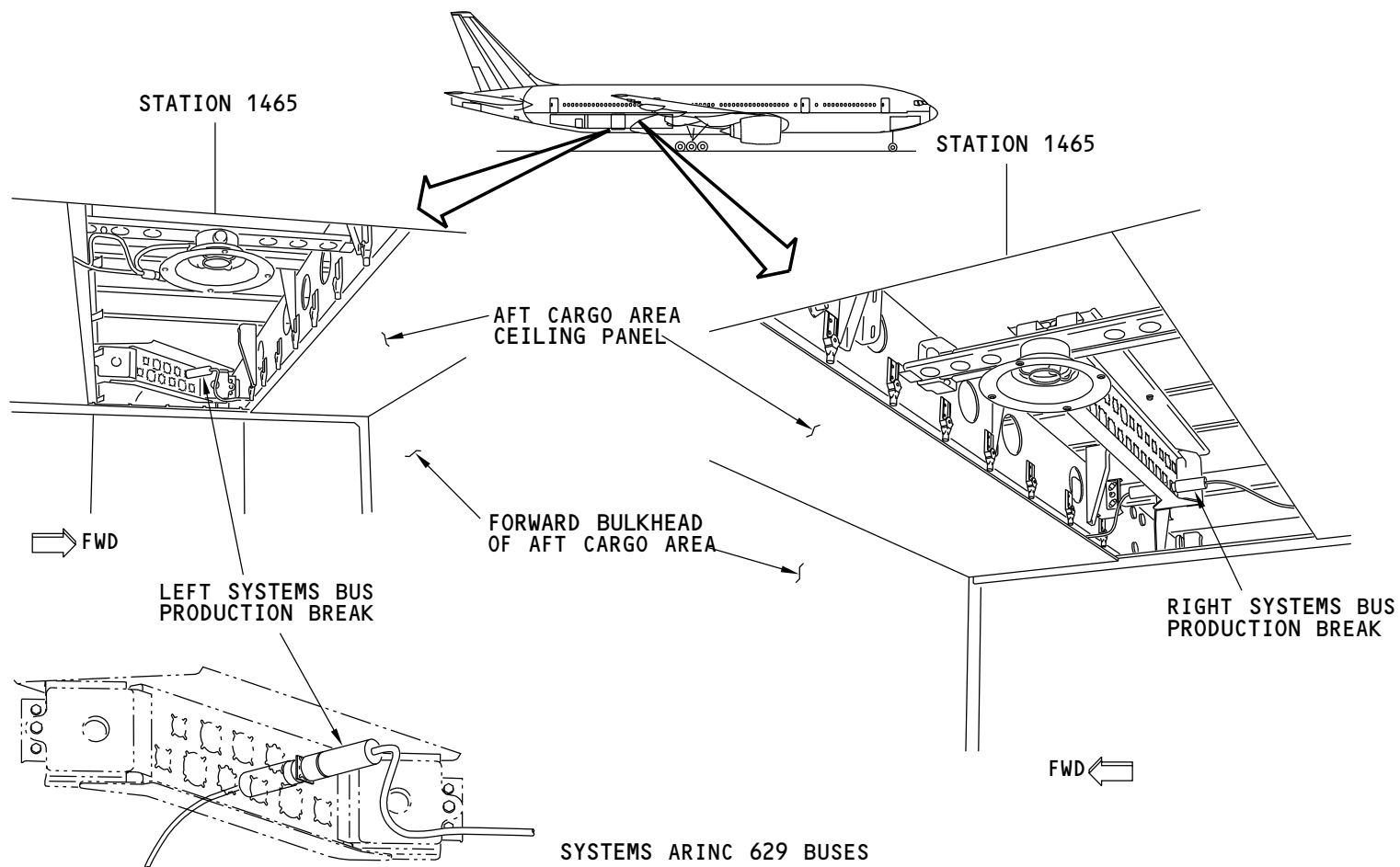
There is a production break in the left systems ARINC 629 bus and in the right systems ARINC 629 bus. The break divides the bus in two parts to help in removal and installation.

Production Breaks

The production breaks are above ceiling panels in the aft cargo compartment near the forward bulkhead.

The right systems bus production break is on the right side of the compartment. The left systems bus production break is on the left.

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ARINC 629 - SYSTEMS BUS PRODUCTION BREAKS

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ARINC 629 - SYSTEMS BUS INTERFACES

General

These are the four systems ARINC 629 buses:

- Left systems bus
- Center 1 systems bus
- Center 2 systems bus
- Right systems bus.

Left Systems ARINC 629 Bus

These LRUs transmit and receive on the left systems bus:

- Bus power control unit (BPCU)
- Generator control unit (GCU)
- Backup (BU) converter
- Left system card file (LSCF)
- Right system card file (RSCF)
- Electrical load management system (ELMS)
- Proximity switch electronics unit (PSEU)
- Fuel quantity indicating system (FQIS)
- Auxiliary power unit (APU)
- Airborne vibration monitor (AVM)
- Flap slat electronics unit (FSEU)
- Air supply control and cabin pressure controllers (ASCPC)
- Cabin temperature controllers (CTC)
- Overhead panel ARINC 629 system (OPAS)
- Audio management unit (AMU)
- Main wheel steering control unit (MWSCU)
- Brake temperature monitor unit (BTMU)
- Brake system control unit (BSCU)
- Warning electronic system - left (WES-L)
- Autopilot flight director computer (AFDC)

- Engine data interface unit (EDIU)
- Passenger address/cabin interphone (PA/CI) controller
- Control display unit (CDU)
- Airplane information management system (AIMS).

One LRU also has a receive-only connection to the left systems bus:

- Warning electronic system - left (WES-L CH 2).

Center1 Systems ARINC 629 Bus

These LRUs transmit and receive on the center1 systems bus:

- Flap slat electronics unit (FSEU)
- Warning electronic system (WES)
- Autopilot flight director computer (AFDC)
- Engine data interface unit (EDIU)
- Airplane information management system (AIMS).

These LRUs also have a receive-only connection to the center1 systems bus:

- Flap slat electronics unit - 1 (FSEU-1)
- Flap slat electronics unit - 2 (FSEU-2)
- Warning electronic system - right channel 1 (WES-R CH 1).

Center 2 Systems ARINC 629 Bus

These LRUs transmit and receive on the center 2 systems bus:

- Engine data interface unit (EDIU)
- Airplane information management system (AIMS).

Right Systems ARINC 629 Bus

These LRUs transmit and receive on the right systems bus:

- Bus power control unit (BPCU)

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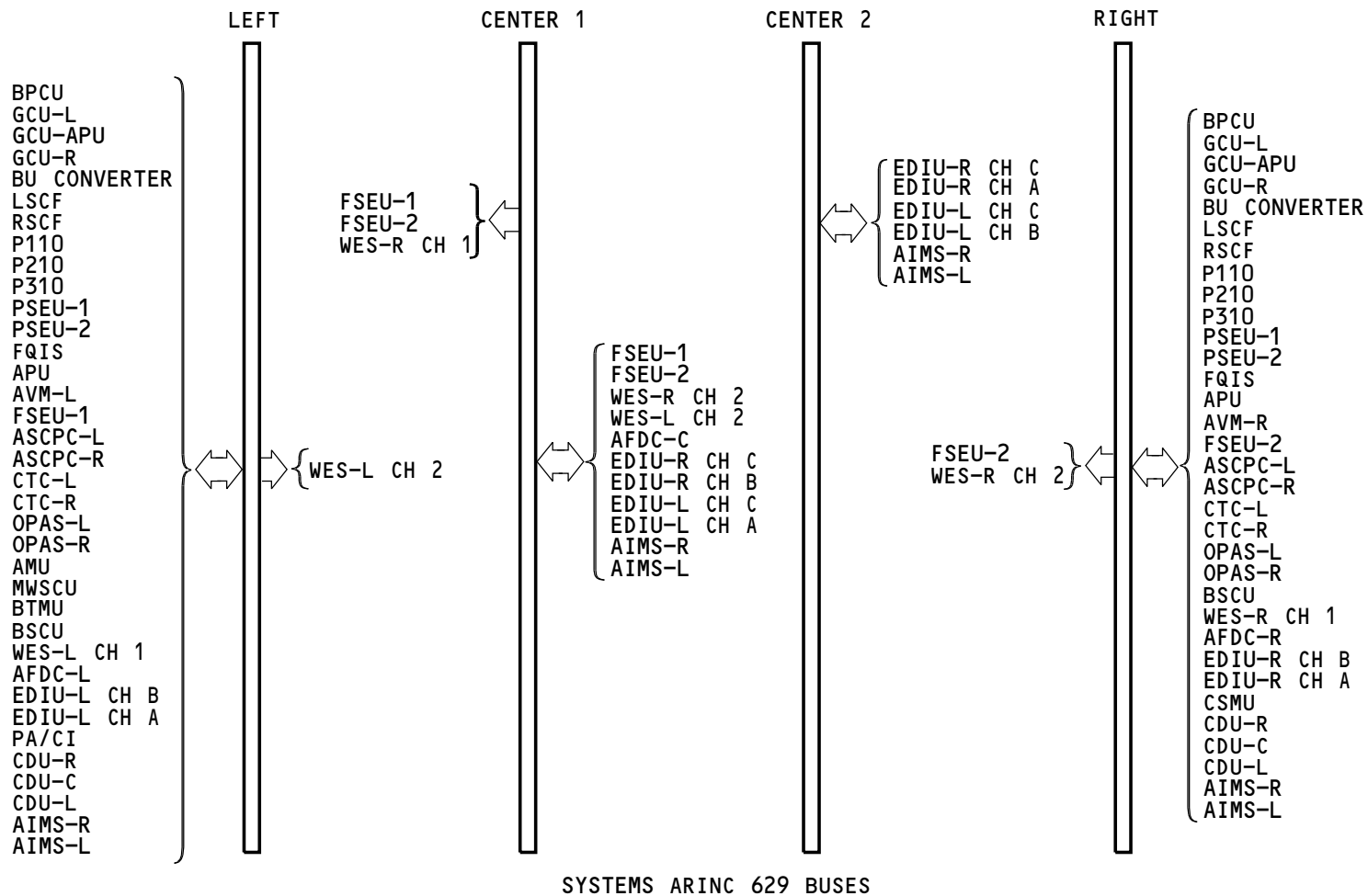
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ARINC 629 - SYSTEMS BUS INTERFACES

- Generator control unit (GCU)
- Backup (BU) converter
- Left system card file (LSCF)
- Right system card file (RSCF)
- Electrical load management system (ELMS)
- Proximity switch electronics unit (PSEU)
- Fuel quantity indicating system (FQIS)
- Auxiliary power unit (APU)
- Airborne vibration monitor (AVM)
- Flap slat electronics unit (FSEU)
- Air supply control and cabin pressure controllers (ASCPC)
- Cabin temperature controllers (CTC)
- Overhead panel ARINC 629 system (OPAS)
- Brake system control unit (BSCU)
- Warning electronic system (WES)
- Autopilot flight director computer (AFDC)
- Engine data interface unit (EDIU)
- Cabin system management unit (CSMU)
- Control display unit (CDU)
- Airplane information management system (AIMS).

These LRUs also have a receive-only connection to the right systems bus:

- Flap slat electronics unit - 2 (FSEU-2)
- Warning electronic system - RIGHT (WES-R CH 2).



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ARINC 629 - SYSTEMS BUS INTERFACES

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ARINC 629 - FLIGHT CONTROLS BUS INTERFACES

General

These are the three flight controls ARINC 629 buses:

- Left flight controls bus
- Center flight controls bus
- Right flight controls bus.

Left Flight Controls ARINC 629 Bus

These LRUs transmit and receive on the left flight controls bus:

- Air data inertial reference unit (ADIRU)
- Airplane information management system (AIMS)
- Air data module total pressure (ADM TP)
- Air data module static pressure (ADM SP)
- Autopilot flight director computer (AFDC)
- Power supply assembly (PSA)
- Primary flight computer (PFC)
- Actuator control electronics (ACE).

These LRUs also have a receive-only connection to the left flight controls bus:

- Secondary attitude air data reference unit (SAARU)
- Control display unit (CDU)
- Autopilot flight director computer (AFDC)
- Primary flight computer (PFC)
- Actuator control electronics (ACE).

Center Flight Controls ARINC 629 Bus

These LRUs transmit and receive on the center flight controls bus:

- Secondary attitude air data reference unit (SAARU)
- Air data module total pressure (ADM TP)

- Air data module static pressure (ADM SP)
- Autopilot flight director computer (AFDC)
- Power supply assembly (PSA)
- Primary flight computer (PFC)
- Actuator control electronics (ACE)
- Airplane information management system (AIMS).

These LRUs also have a receive-only connection to the center flight controls bus:

- Air data inertial reference unit (ADIRU)
- Autopilot flight director computer (AFDC)
- Primary flight computer (PFC)
- Actuator control electronics (ACE).

Right Flight Controls ARINC 629 Bus

These LRUs transmit and receive on the right flight controls bus:

- Air data inertial reference unit (ADIRU)
- Air data module total pressure (ADM TP)
- Air data module static pressure (ADM SP)
- Autopilot flight director computer (AFDC)
- Power supply assembly (PSA)
- Primary flight computer (PFC)
- Actuator control electronics (ACE).

These LRUs also have a receive-only connection to the right flight controls bus:

- Secondary attitude air data reference unit (SAARU)
- Airplane information management system (AIMS)
- Control display unit (CDU)
- Autopilot flight director computer (AFDC)
- Primary flight computer (PFC)

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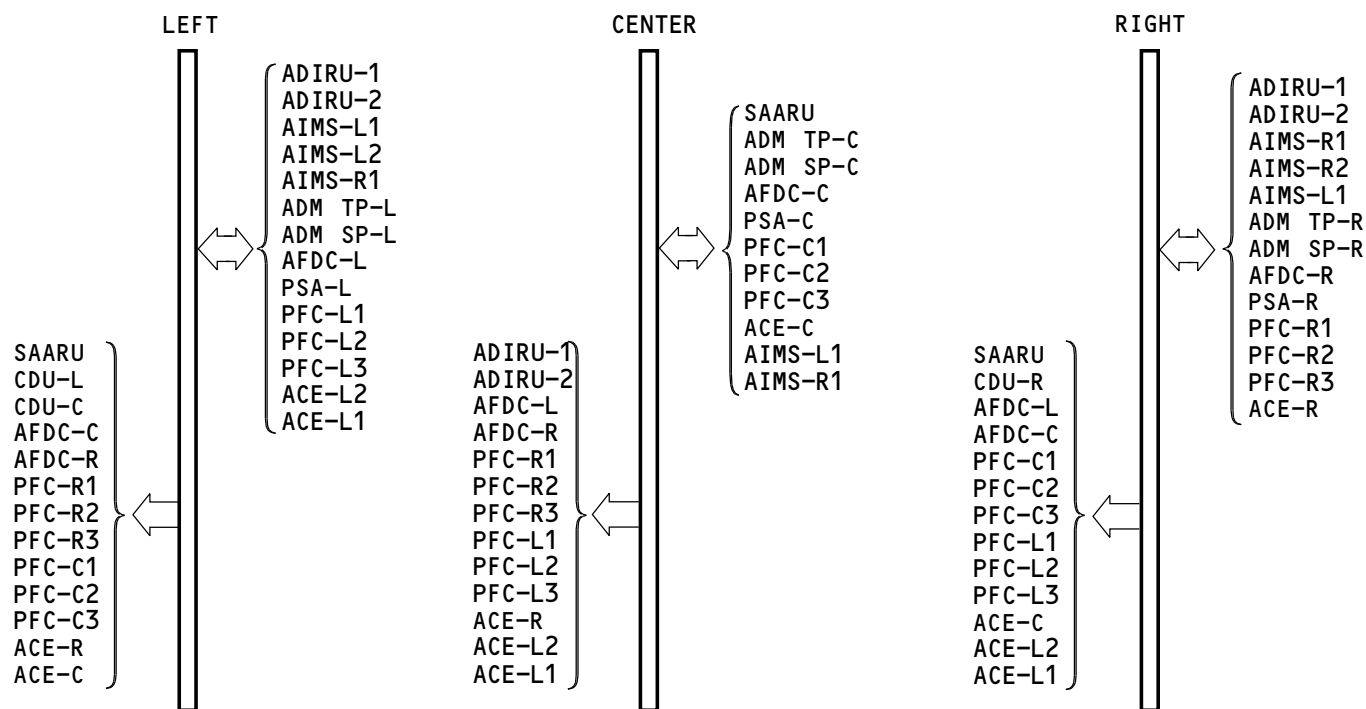
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ARINC 629 - FLIGHT CONTROLS BUS INTERFACES

- Actuator control electronics (ACE).

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ARINC 629 - FLIGHT CONTROLS BUS INTERFACES

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ETHERNET AIMS INTERCABINET BUS INTERFACES

General

The left and right AIMS cabinets transmit and receive data on all four of the AIMS intercabinet (IC) Ethernet buses.

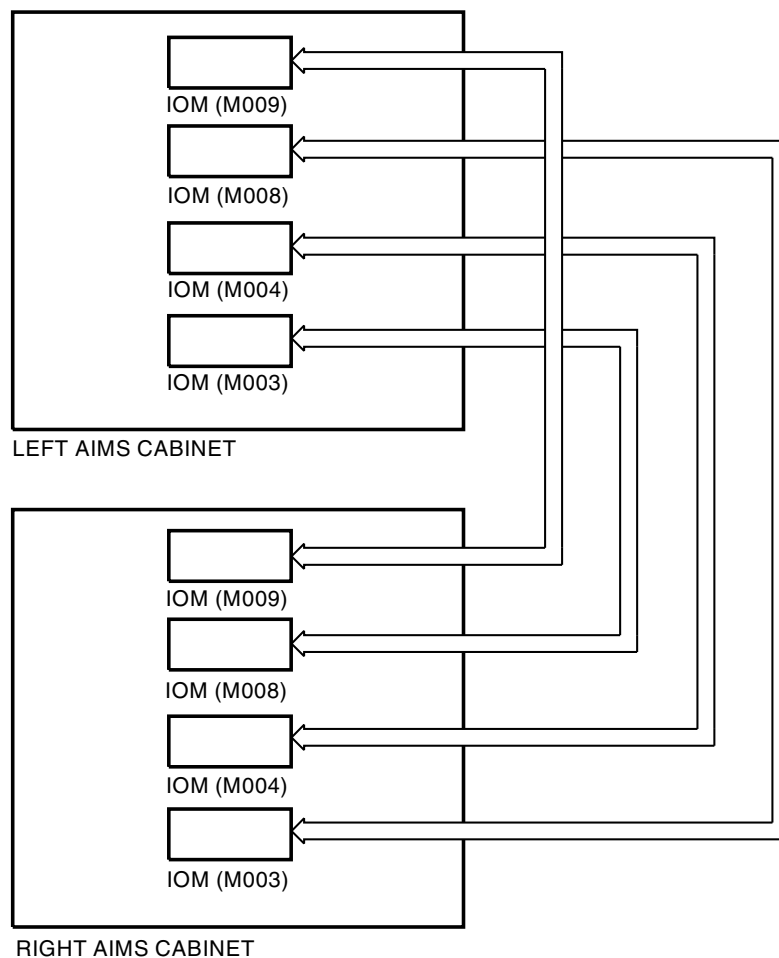
There are four AIMS intercabinet buses:

- Airplane information management system (AIMS) intercabinet bus 1
- AIMS intercabinet bus 2
- AIMS intercabinet bus 3
- AIMS intercabinet bus 4.

For more information about AIMS, see Airplane Information Management System (AIMS), 31-41-00.

AIMS Cabinets

Data that goes between the two AIMS cabinets include intra-function active-nonactive data and inter-function communication data.



AIMS INTERCABINET (IC) ETHERNET BUSES

W49981 S0000123398_V3

AIMS - INTERCABINET ETHERNET BUSES INTERFACES

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ARINC 629 - CURRENT-MODE COUPLER**Purpose**

The current-mode coupler connects the bus cable to the stub cable.

Physical Description

These are the physical characteristics of the current-mode coupler:

- It is a single piece construction
- It has a flip-open cover with protective wire guides that allow for fast data bus cable removal and installation
- It has a receptacle for the stub cable connector
- It is installed with only two screws
- It has a waterproof housing

There are different suppliers for current-mode couplers. They all function in the same way. They are interchangeable.

E-Core Assembly

An E-core assembly is a part of the coupler. An I-Core is part of the coupler cover. Together the E-core and I-Core are electromagnetic components that couple the signals in the data bus cable in and out of the coupler. The wire guides are grooves that give a controlled routing and protection for the wires of the data bus cable.

Location

All the current-mode couplers are on the bus panels.

Training Information Point

Couplers are interchangeable units. Covers and bases from different suppliers are not interchangeable.

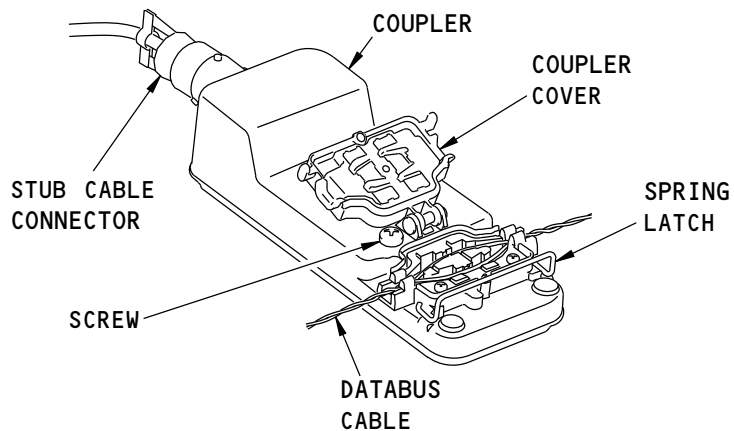
Remove power from the LRU before you replace the coupler for that LRU.

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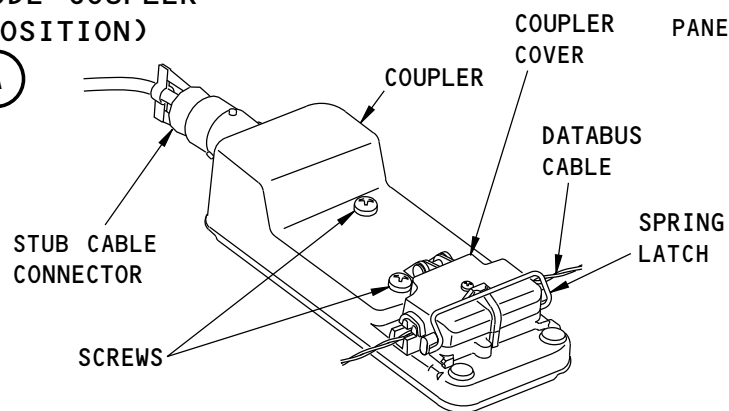
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**CURRENT-MODE COUPLER
(OPEN POSITION)**

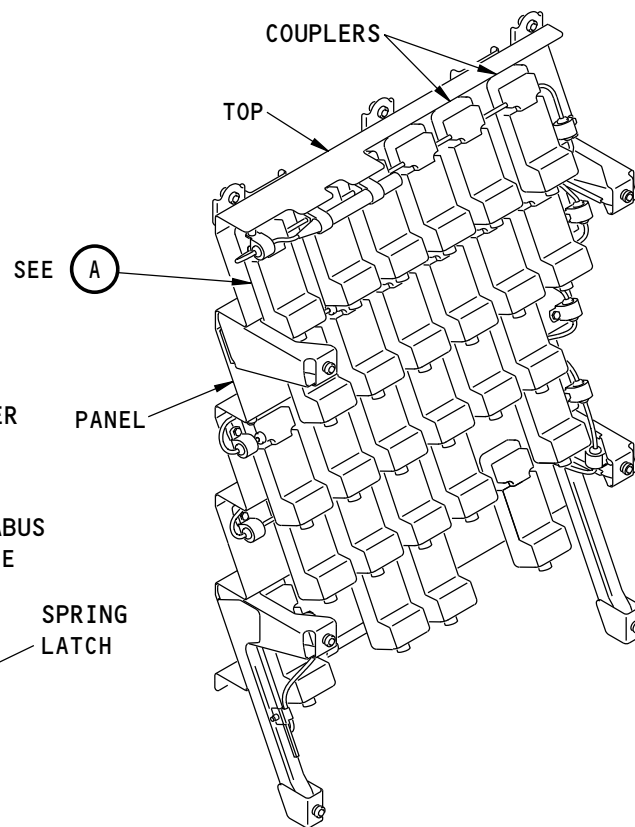
(A)



**CURRENT-MODE COUPLER
(CLOSED POSITION)**

(A)

ARINC 629 - CURRENT MODE COUPLER



**BUS PANEL (COVER REMOVED)
(EXAMPLE)**

J54689 S0000172070_V1

ARINC 629 - BUS CABLE AND BUS PANEL**Purpose**

The bus cable moves data between LRUs. A current-mode coupler and a stub cable attach each LRU terminal to the data bus cable.

Physical Description

A bus cable is a pair of twisted wires with a termination resistor at each end. Each resistor has a value of about 130 ohms.

The left and right systems bus cables have production break connectors in the middle for easy replacement. The parts of the system bus cable that are external to the coupler panels have shielding outside.

A bus cable in the 777 may be as long as 180 feet. It connects as many as 46 current-mode couplers.

The cable has a center conductor covered by a layer of foam. A Teflon skin covers the foam.

Location

All the bus cables except the left and right systems bus cables are fully inside the bus panels. The left system bus connects the forward bus panel (P111) to the aft bus panel (P115) with a production break in between. The right systems bus connects the forward bus panel (P211) to the aft bus panel (P215) with a production break in between.

Training Information Point

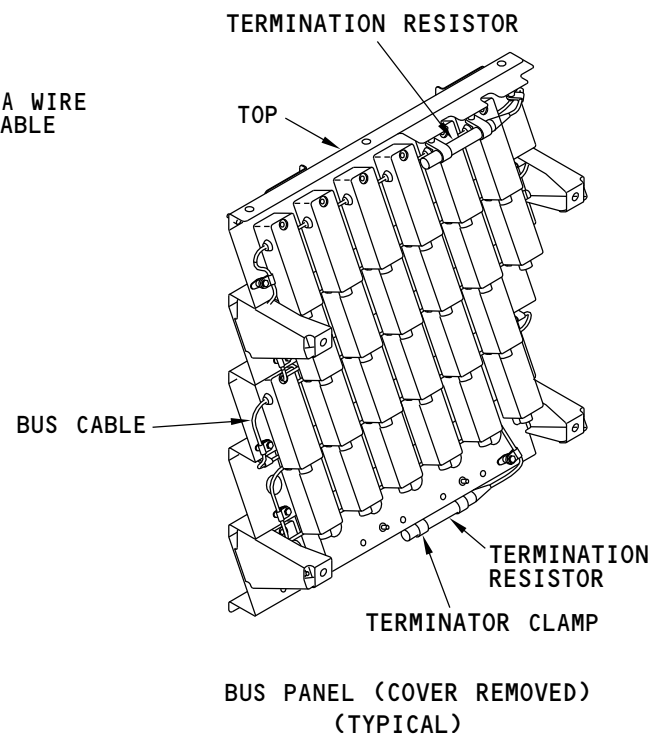
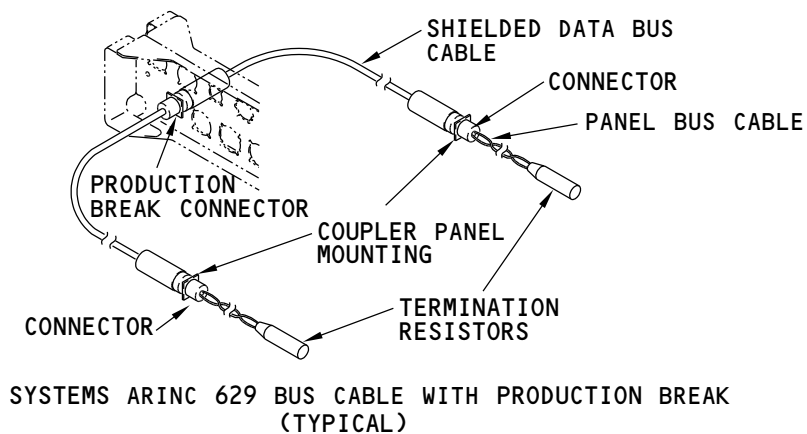
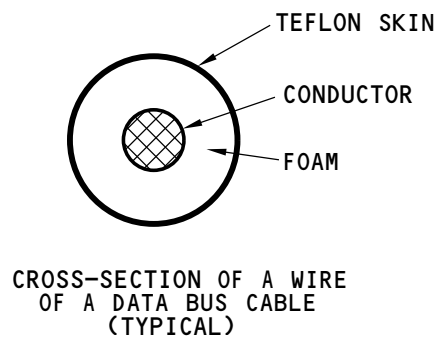
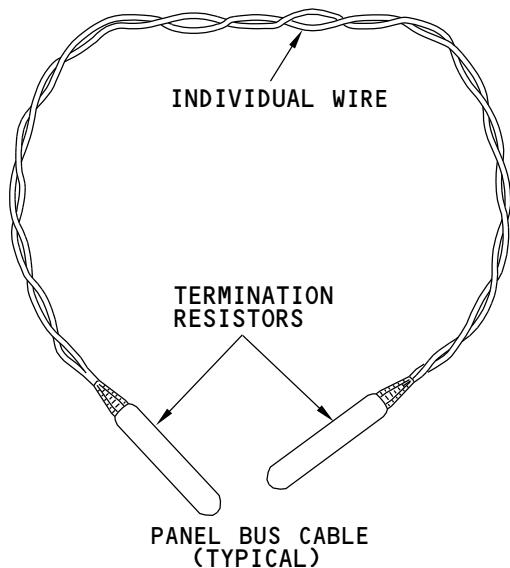
Be careful when you install the bus cable on a panel. Do not cut or cause damage to the Teflon skin of the bus cable. Damage to the Teflon skin can cause corrosion on the conductor or failure of the system.

There is a special wire separator tool (WST8139) for bus cable installation on the coupler. The use of unapproved tools can cause damage to the bus.

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ARINC 629 - BUS CABLE AND BUS PANEL

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**ARINC 629 - STUB CABLE****Purpose**

The stub cables are for bi-directional data movement between the LRU and the current-mode coupler. The stub cables also supply power from the LRUs to the current-mode couplers.

Physical Description

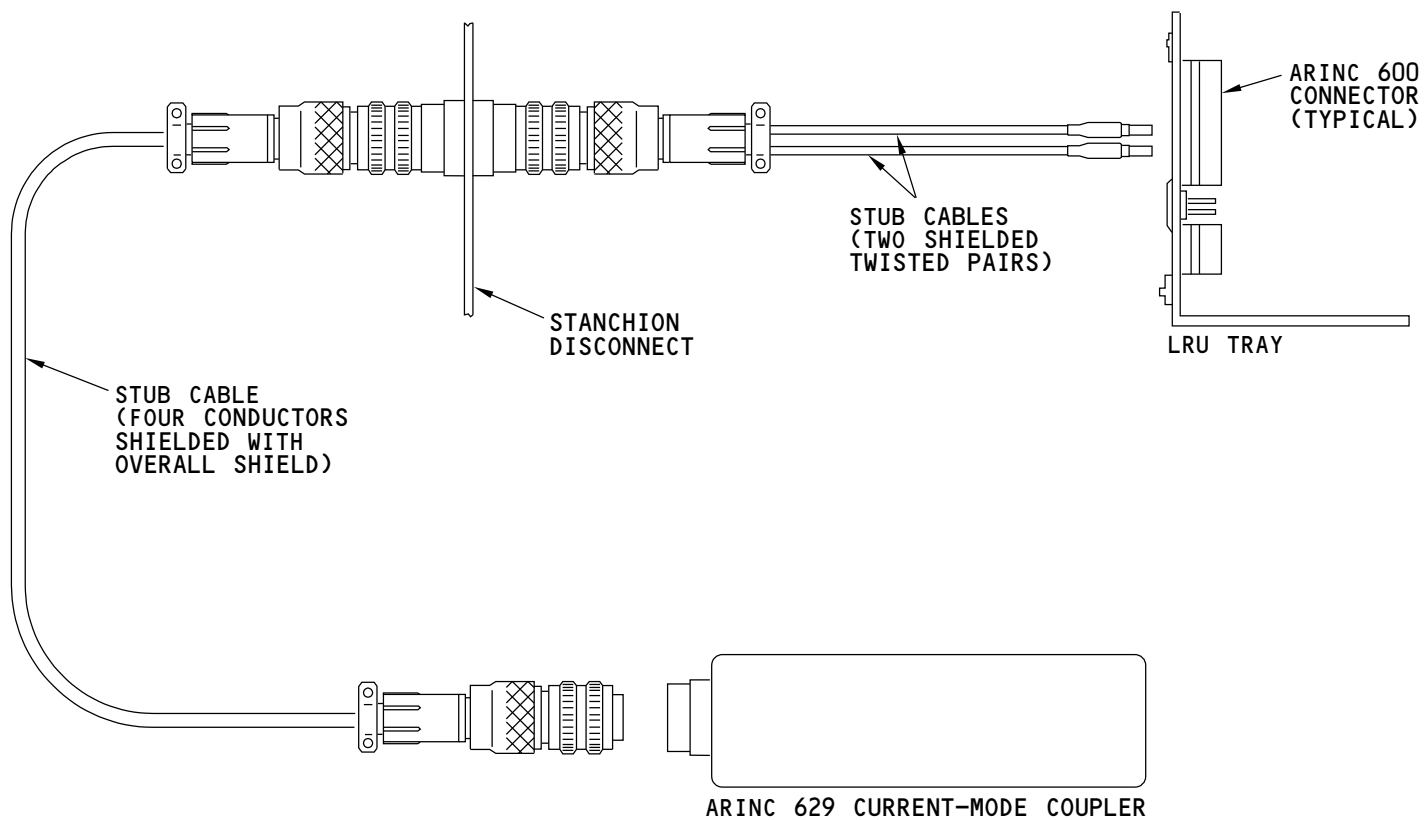
A stub cable has four wires; two to transmit and the other two to receive.

Stub cables can be as long as 57 feet for transmit/receive couplers and 75 feet for receive-only couplers.

Location

The stub cables are in the airplane wiring bundles.

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ARINC 629 - STUB CABLE

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ARINC 629 - CURRENT-MODE COUPLER FUNCTIONAL DESCRIPTION

General

A current-mode coupler, together with a serial interface module (SIM) supplies the interface between the ARINC 629 data bus cable and an ARINC 629 terminal in the LRU. The current-mode coupler is a dual channel device in both transmit and receive operations. It has two transmit drivers and two receivers. The SIM makes the transmit and receive channel selection.

Normal Transmit Mode Operation

The current mode coupler transmit drivers put signals on the data bus. The current mode coupler receives the voltage signals from the SIM over the transmit stub of the stub cable. The current mode coupler puts the signals onto the data bus. Thus it changes voltage signals from the SIM to the current signals on the bus.

Normal Receive Mode Operation

The current mode coupler receives current mode signals from the bus. It changes them to voltage signals which go to the SIM over the receive stub of the stub cable.

Transmit Inhibit Mode Operation

The SIM monitors the quality of the transmit signal from the LRU. If the signal is unsatisfactory, the SIM stops transmit operation. The LRU continues to receive data during the transmit inhibit mode of operation.

Power

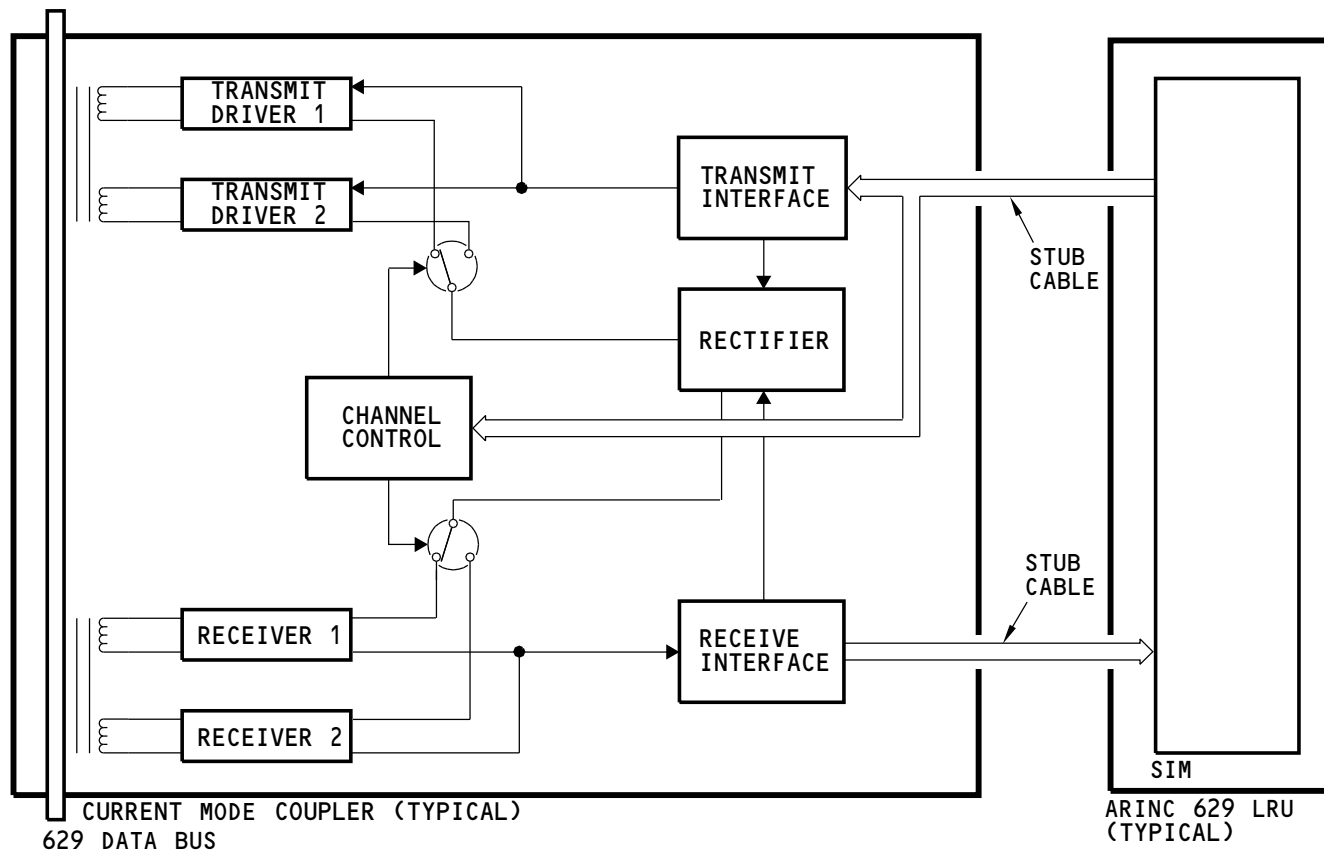
The coupler rectifier receives power from the SIM through the transmit and receive interfaces.

Control

The SIM converts bi-phase logic transitions from the terminal controller into an analog signal. These conversions are called doublets.

The SIM selects the active transmit driver and receiver for transmit and receive operations. The channel control logic selects the switch position in the coupler for the correct transmit driver and receiver. The transmit driver and receiver selection is based on the SIM (and coupler) manufacturer's default channel selection.

To function correctly, the SIM and coupler must be on the same channel. If the SIM powers up on a different channel than the coupler, it will be transmitting doublets of opposite polarity from what the coupler was expecting. This polarity difference causes the coupler to switch to the other channel that expects that polarity. If the SIM and coupler powered up on the same channel, then no channel switching is necessary. The act of switching channels can corrupt the word being transmitted at the time of the switchover. However, the systems ignore that error as the SIM is designed to expect errors immediately after it commands a channel change in the coupler. The SIM excuses the first wordstring from internal integrity checking. However, it does signal the presence of errors to the terminal controller. At the next transmit interval, the SIM does not reverse doublet polarity, the coupler stays on the same channel and, assuming no faults, the system will then function correctly.



ARINC 629 - CURRENT-MODE COUPLER FUNCTIONAL DESCRIPTION

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ARINC 629 - LRU FUNCTIONAL DESCRIPTION

General

An ARINC 629 LRU contains a serial interface module (SIM) and a terminal controller. These move data between the LRU and the current-mode coupler. Each LRU has a personality that identifies its purpose and operation. The personality data is in two parts:

- Transmit personality PROM (XPP)
- Receive personality PROM (RPP).

The terminal controller uses the personality prompts to control the flow of data between the LRU and the data bus.

SIM Functions

The SIM together with the current-mode coupler supplies the interface between the ARINC 629 data bus cable and the terminal controller in an LRU.

In transmit mode, the SIM changes transmit signals from the terminal controller into analog voltage signals. It moves these to the current-mode coupler over the transmit stub of the stub cable.

In receive mode, the SIM receives the voltage signals from the current-mode coupler after the current-mode coupler changes the current-mode signals to voltage signals. The SIM changes the received voltage signals into transition signals and moves them to the terminal controller.

The SIM monitors the quality of its own transmit signal and tells the terminal controller about any problem.

It does a check of the signal put on the data bus by the current-mode coupler. The SIM tells the terminal controller if the signal is not satisfactory.

The SIM also monitors the quality of signals received from other LRUs.

Terminal Controller Functions

The ARINC 629 terminal controller moves data to and from the LRU subsystem memory through the subsystem interface. The LRU transmit personality PROM (XPP) and receive personality PROM (RPP) control the flow of data.

The terminal controller gets its protocol access values from the XPP or the RPP.

Bus Protocol

The ARINC 629 uses a procedure to control access to the data bus. This procedure is the bus protocol.

Each LRU has a time period in which it may transmit.

After an LRU transmits, the control function measures the time and makes sure that it does not transmit again until all the other LRUs on the bus have an option to transmit.

Transmitter Operation

In an ARINC 629 LRU, the terminal controller controls the schedule of messages on the data bus based on personality data stored in the transmit personality PROM (XPP).

The transmitter uses the XPP to put these details in each message on the data bus:

- Labels in the message
- Number of words in each word string in the message.

The transmitter gets transmit data from the subsystem memory. The protocol logic of the terminal controller monitors the operations and permits the transmitter to transmit. The transmitter sends one complete message each time it transmits.

ARINC 629 - LRU FUNCTIONAL DESCRIPTION

Receiver Operation

In an LRU, the SIM receiver circuit gets the messages from the data bus through the coupler. It uses the received data based on personality data in the receive personality PROM (RPP).

The receive circuit monitors all signals on the data bus.

When it finds a message label on the bus, it knows if the message is good or is not based on the message structure. If it is good, the receiver uses the message.

Fault Monitor and Control Function

The fault monitor in the ARINC 629 system prevents faults that cause the bus to fail or that degrade the data on the bus. An ARINC 629 LRU monitors all signals on the bus including its own.

ARINC 629 messages contain data words. All received words must pass a receive data test which examines the word structure.

The SIM monitors the received word strings to make sure they are correct.

When a terminal transmits a message on the bus, the terminal receiver reads the message and the monitor circuit makes sure it is correct.

When in the monitor mode, the receiver uses the RPP based on the transmitted label in the same way as in the receive mode.

The receiver goes into the monitor mode when any of the following occurs:

- The transmitter gives a signal to the coupler when it starts to transmit
- The receiver finds a label that the terminal has authority to transmit.

The transmitter stops operation if there are repeated transmit signal errors. You must reset power to the LRU to continue transmit operation.

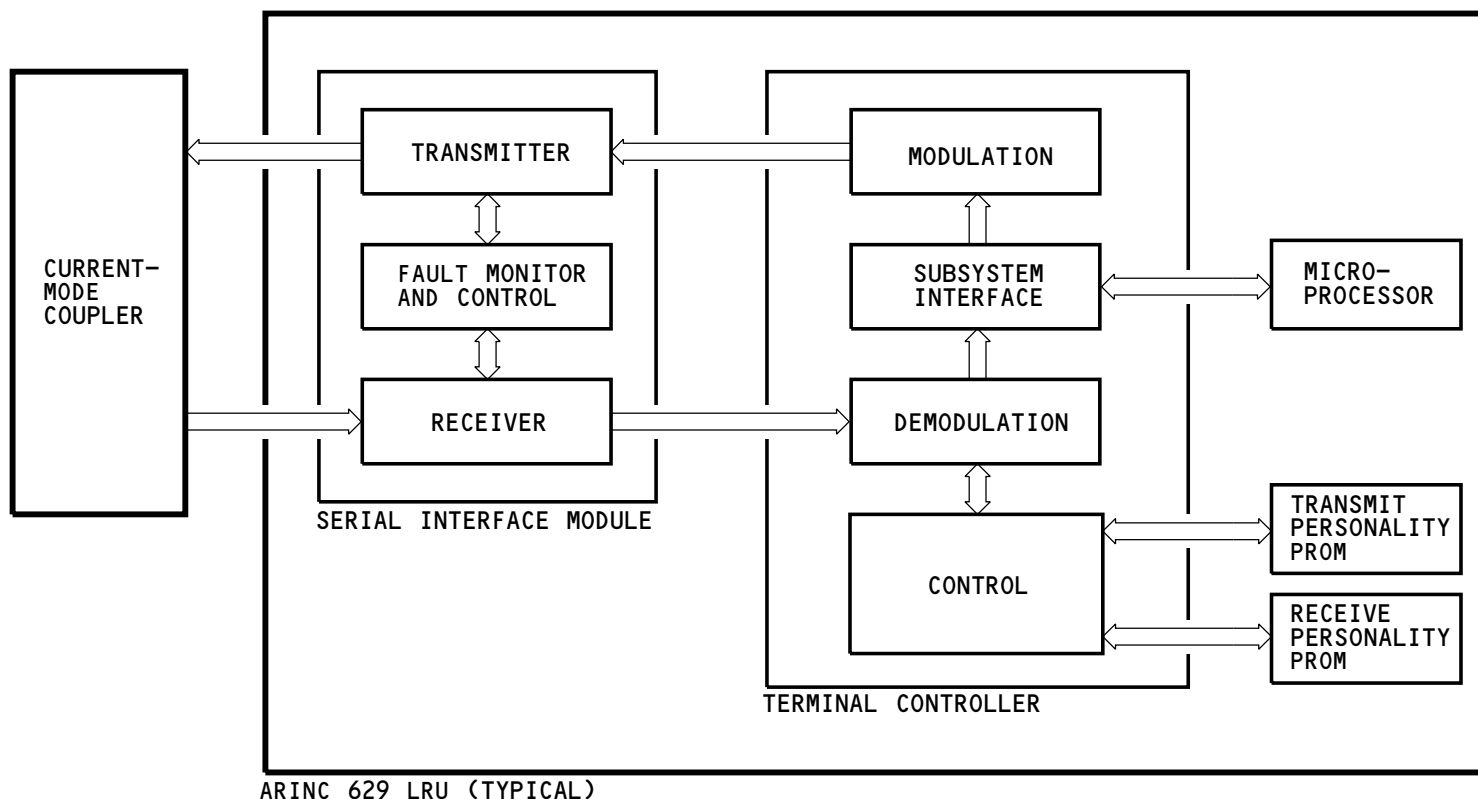
If the monitor function does not operate, the transmitter will stop. This occurs if the LRU transmits but the monitor does not receive data.

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ARINC 629 LRU (TYPICAL)

ARINC 629 - LRU FUNCTIONAL DESCRIPTION

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ARINC 629 - MESSAGE STRUCTURE FUNCTIONAL DESCRIPTION

General

Data in the ARINC 629 system moves through the data bus cable and other components as messages. Between each message is a terminal gap. A message is a group of word-strings. Each word string has a label word followed by data words. Each message has a special structure. The structure allows the LRUs to select and read the message.

- A 3-bit time lo hi sync pulse.

Message Structure

A message has up to 31 word strings. There is a 4-bit time gap between each word string.

A word string begins with a label word. A word string has up to 256 data words. There is no gap between words in a word-string.

The minimum length message has 1 label and no data words. The maximum length message has 31 labels with 256 data words following each label, and 30 time gaps of 4 bits each.

Label Word Structure

A label word is a 20-bit word. It has:

- A 12-bit label field
- A 4-bit label extension field
- A single parity bit
- A 3-bit time hi lo sync pulse.

A pulse of one half-bit time, called the pre-sync sync pulse (PSSP), comes before the first label word of a message. An approximately one half-bit time pre-pre-sync sync pulse (PPSSP) comes before the PSSP.

The PPSSP and the PSSP occur prior to the 3-bit time hi lo sync pulse

Data Word Structure

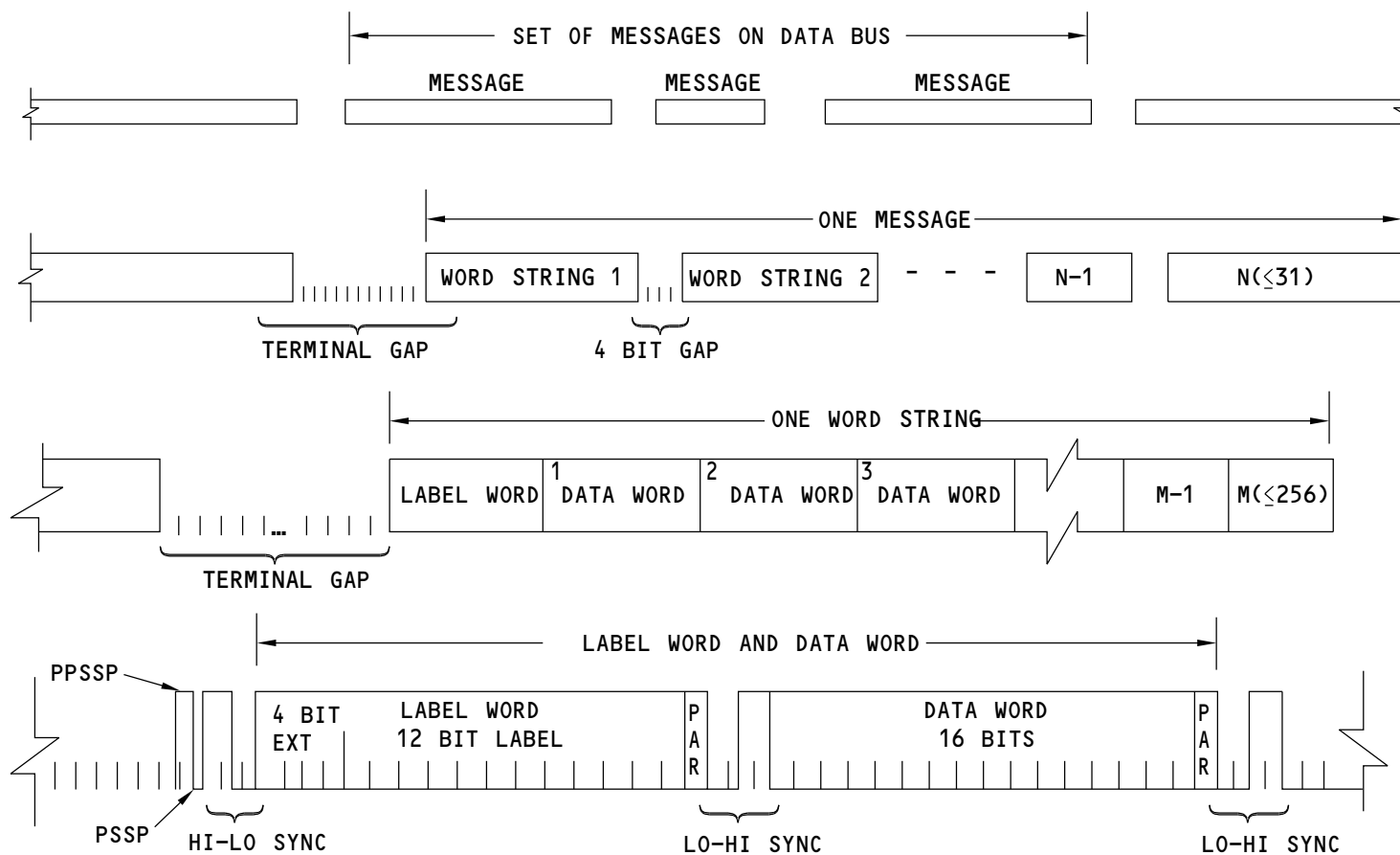
A data word is also a 20-bit word. It has:

- A 16 bit data field
- A single parity bit

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ARINC 629 - MESSAGE STRUCTURE FUNCTIONAL DESCRIPTION

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ARINC 629 - TIMING FUNCTIONAL DESCRIPTION

General

Because of the quantity of data that may be on the bus, ARINC 629 uses a time procedure to prevent accidental signal mixture. ARINC 629 uses three timers:

- Transmit interval (TI) timer
- Synchronization gap (SG) timer
- Terminal gap (TG) timer.

The timers are part of the LRU personality. Each LRU uses all three timers to isolate data messages.

Transmit Interval (TI)

All LRUs on a bus have the same TI. The TI for any LRU begins the moment the terminal starts to transmit. After the terminal transmits a message, it must wait the length of time equal to TI before it transmits again.

The TI would never be only a message transmission without the SG and TG. A message would never completely fill the Transmit Interval (TI). By definition, the TI should be longer than the time necessary for all messages to appear on the bus. Also, it is not necessary for all data to be transmitted in every Transmit Interval (TI). Allowances are made for wordstrings of different lengths to alternate with each other in successive transmit intervals. While the system is designed to be able to handle very long messages, the 777 does not use long messages. Messages are short enough so that every LRU gets their turn to transmit each TI.

Synchronization Gap (SG)

After the TI, the SG is the longest timer. The SG begins when there is no signal on the bus. The SG is the same for all LRUs. It has a value larger than the value of the longest terminal gap used on a given bus.

If a signal comes on the bus before the SG completes, the SG stops. When the SG completes, it stays reset until the LRU transmits again.

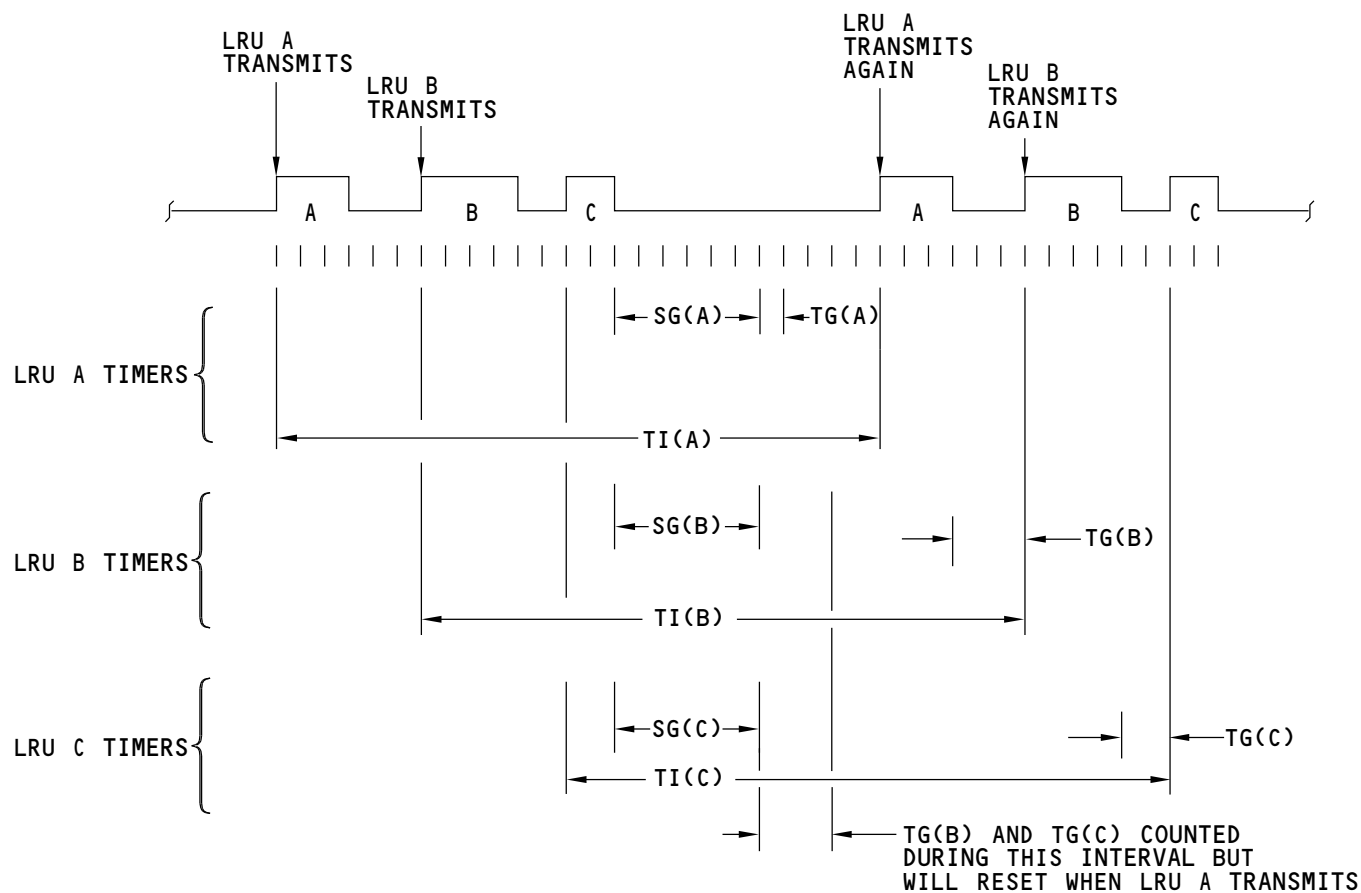
Terminal Gap (TG)

Each LRU on the bus has a special TG. The TG begins after the SG is complete and no signal is on the bus.

The TG and SG cannot overlap in time. They must occur in sequence.

If there is a signal on the bus before the TG completes, the TG stops. It starts again when there is no signal on the bus. If the Terminal Gap (TG) time stops due to a signal on the bus, and then starts again when there no longer is a signal on the bus, the TG will reset and start again. The Terminal Gap (TG) timer is reset by the presence of a carrier. The TG should only begin after the Synch Gap (SG) has elapsed and only if no carrier is present. Unlike the SG, once it has elapsed, the TG is reset. Note that the SG will only reset when its terminal begins transmitting.

A Terminal Gap (TG), unlike the TI and SG, are unique to each terminal. The TG is simply a quiet period that has existed on the bus since the SG occurred. All bus quiet time is used to elapse the SG and TG timers. TI's are designed to allow all users the opportunity to transmit as often as possible. As each TG is unique, the specific transmitter (terminal) waits, detects a bus quiet period equal to its allocated TG and the terminal then transmits its message.



ARINC 629 - TIMING FUNCTIONAL DESCRIPTION

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ARINC 629 - PERIODIC MODE TIMING FUNCTIONAL DESCRIPTION

General

The ARINC 629 uses these three timers:

- Transmit interval (TI)
- Synchronization gap (SG)
- Terminal gap (TG).

The three timers operate in these two ways:

- Periodic mode
- Aperiodic mode.

The periodic mode makes sure that an LRU transmits at a regular time sequence, in their power-up order.

If an LRU message length increases because of a non-normal condition, the system changes to aperiodic operation. In aperiodic operation, the LRU transmits in a different time sequence. In the aperiodic mode, the LRUs transmit in order of shortest TG to longest TG.

Periodic Mode

The periodic mode is the normal mode of operation.

In the periodic mode, an LRU transmits one time every TI.

The examples show the timing diagram for three LRUs in the periodic mode.

At event 1, all three timers (TI, SG & TG) for LRU 1 are complete and LRU 1 starts to transmit a message (M). LRUs 2 and 3 stop their TGs when LRU 1 starts to transmit.

At event 2, LRU 1 no longer transmits, and LRU 2 and 3 start their TG timers.

At event 3, the TG timer for LRU 3 is complete, however TI still continues. LRU 3 does not transmit. The TG timer for LRU 2 continues.

At event 4, the TG timer for LRU 2 is complete. All three timers for LRU 2 (TI, SG and TG) are complete and the LRU starts to transmit a message, while LRU 3 waits for its TI to complete. LRU 3 stops its TG when LRU 2 starts to transmit.

At event 5, LRU 2 stops transmission and LRU 2 starts its TG timer.

At event 6, the TG timer for LRU 3 completes. For LRU 3, all three timers (TI, SG and TG) are complete and it starts to transmit a message.

At event 7, LRU 3 no longer transmits, and all three LRUs start their SG timers.

At event 8, all three SG timers are complete and the TG timers start.

At event 9, the TG for LRU 1 completes, TI continues, so it does not transmit.

At event 10, TG for LRU 3 is complete, the TI continues, so the LRU does not transmit.

At event 11, the TG for LRU 2 completes, the TI continues, so the LRU does not transmit.

Back at event 1 when all three timers (TI, SG and TG) for LRU 1 are complete and it starts to transmit a message. LRU 2 and 3 stop their TGs when LRU 1 starts to transmit.

Aperiodic Mode

Aperiodic data is a direct result of a discrete event. It is data that is asynchronous and updated at a non-uniform rate. For example, aperiodic data can be a position report in landing gear systems.

Aperiodic data transfers data on events important to airplane operation. This data is in two classes:

- Data to control tasks such as landing gear sensors and flight deck switches
- Data for status information.

Aperiodic data also transmits large blocks of data for these functions:

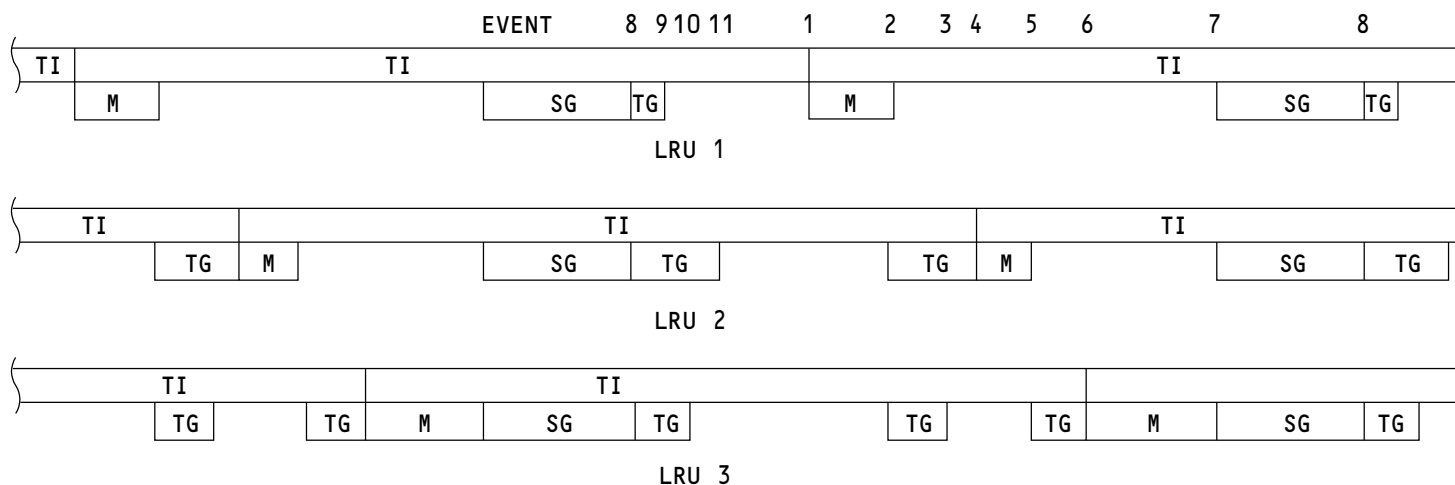
- Data base loads
- Operational software
- BITE information.

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NOTE: NOT TO SCALE

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ARINC 629 - PERIODIC MODE TIMING FUNCTIONAL DESCRIPTION

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**ARINC 629 - TEST****Tests**

You use the maintenance access terminal (MAT) to do the ARINC 629 coupler replacement test.

This test does not do a check of the AIMS intercabinet buses.

The central maintenance computing function (CMCF) does not have a specified ARINC 629 system test to check the entire system.

ARINC 629 Coupler Replacement Test

For this operational test, you do a check of the configuration of a system that connects to each of the buses. The data you see on the MAT tells you if the bus is operational.

Training Information Point

Use the ARINC 629 system test procedure if you can not do the operational test. This test does not use the MAT. You use an ARINC 629 data bus analyzer.

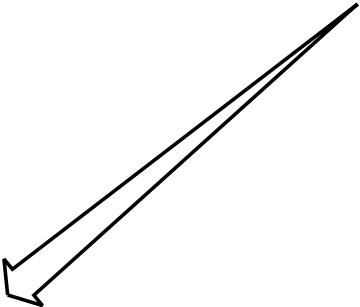
Use the standard wiring practices manual when you replace ARINC 629 stub or system cables.

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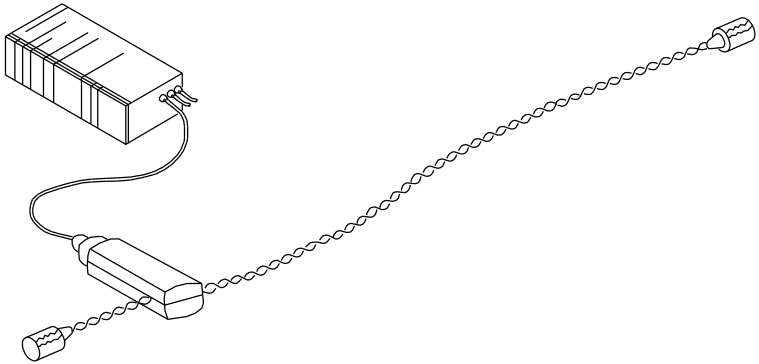
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LINE MAINTENANCE	EXTENDED MAINTENANCE	OTHER FUNCTIONS	HELP	REPORT
INBOUND FLIGHT DECK EFFECTS	ONBOARD MAINTENANCE			
EXISTING FLIGHT DECK EFFECTS				
GROUND TESTS				
SYSTEM CONFIGURATION				
EXIT MAINTENANCE				
LEFT CENTRAL MAINTENANCE COMPUTING FUNCTION (CMCF)				



- COUPLER LRU REPLACEMENT
TEST



ARINC 629 - TEST

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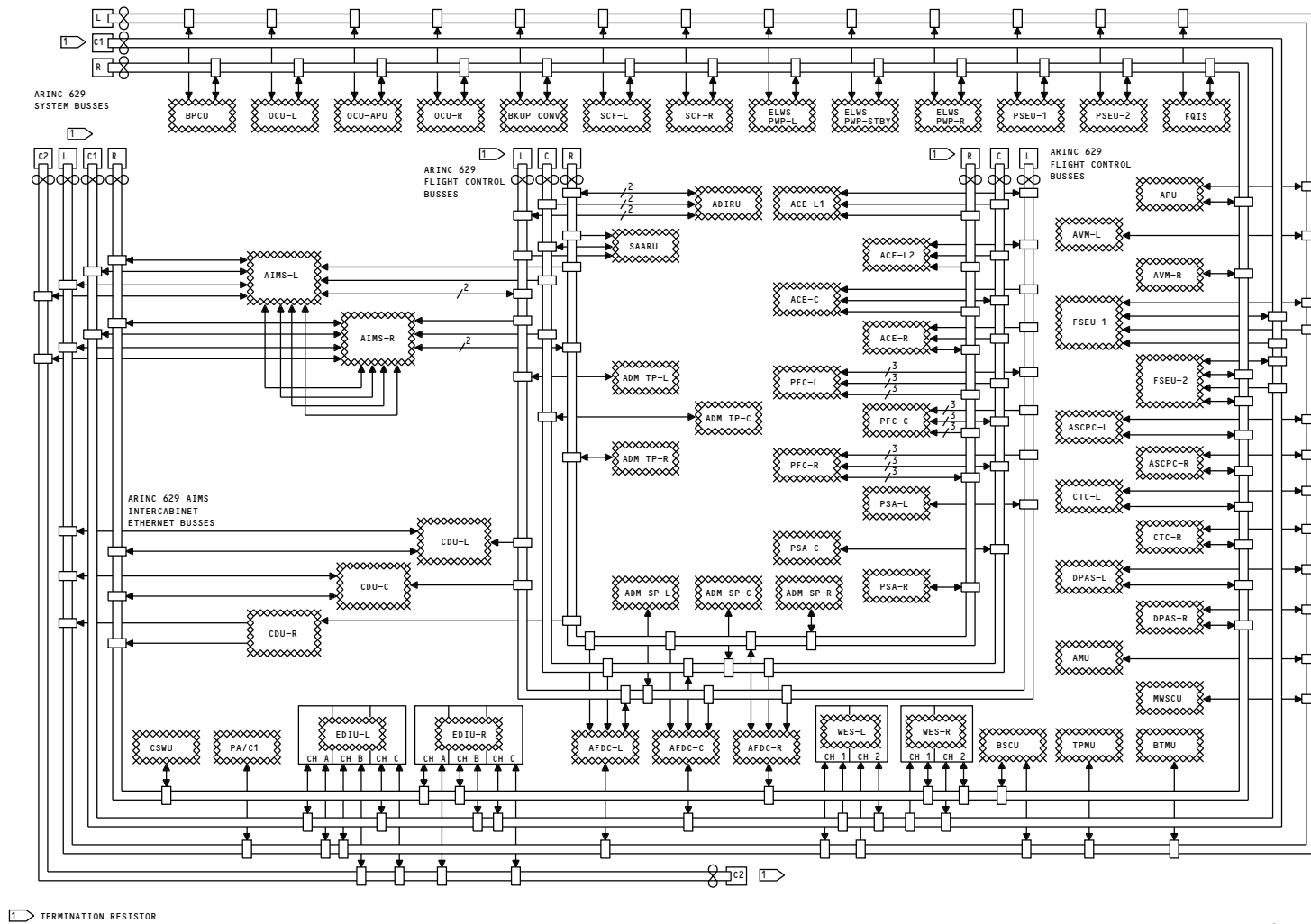


ARINC 629 - OVERALL INTERFACE DIAGRAM

Interface

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ARINC 629 - INTERFACE DIAGRAM

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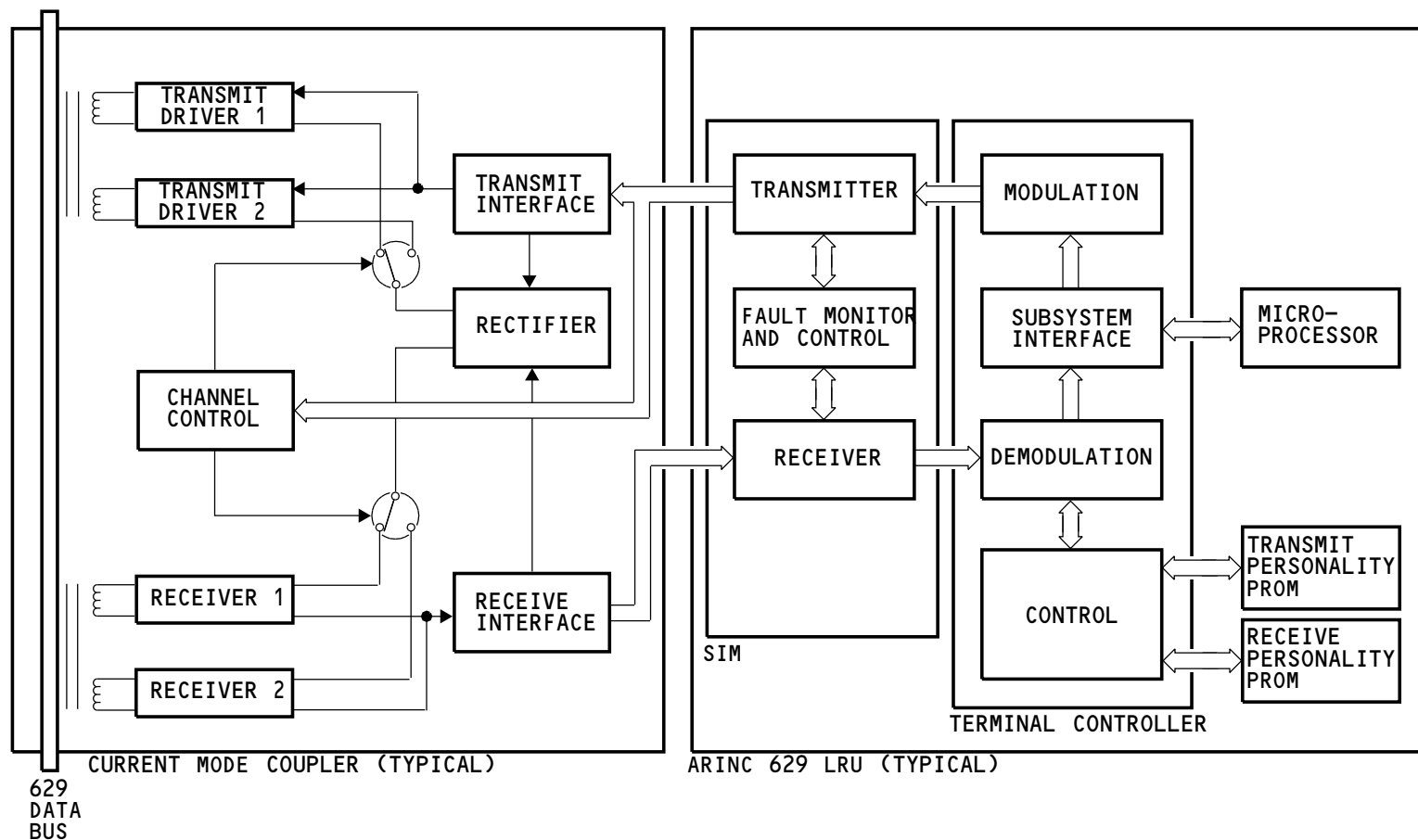


ARINC 629 - OVERALL FUNCTIONAL DESCRIPTION DIAGRAM

Functional Description

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ARINC 629 - OVERALL FUNCTIONAL DESCRIPTION DIAGRAM

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**OVERHEAD PANEL ARINC 629 SYSTEM - INTRODUCTION****General**

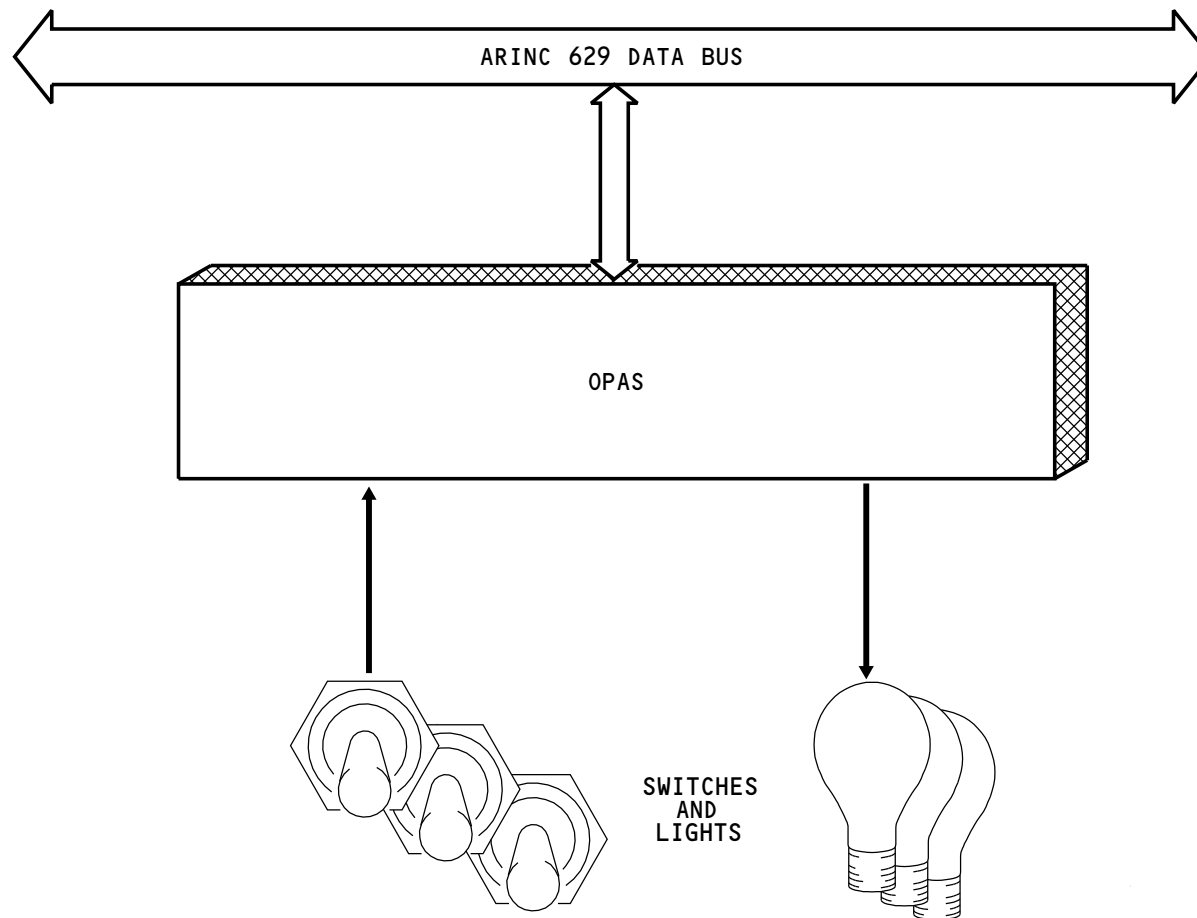
The overhead panel ARINC 629 system (OPAS) sends flight deck switch position data to the ARINC 629 systems buses. It also gets data from the ARINC 629 systems buses to turn on and off some flight deck panel lights.

The OPAS helps decrease the weight of the airplane. It uses less wires than direct connections between these units:

- Switches
- Lights
- Line replaceable units (LRUs)
- Line replaceable modules (LRMs).

Abbreviations and Acronyms

- ARINC - Aeronautical Radio, Inc.
- CMCS - central maintenance computer system
- EICAS - engine indication and crew alerting system
- LED - light emitting diode
- LRM - line replaceable module
- LRU - line replaceable unit
- MAT - maintenance access terminal
- MD&T - master dim and test
- OPAS - overhead panel ARINC 629 system
- OPBC - overhead panel bus controller
- OPCF - overhead panel card file
- OPIC - overhead panel interface card
- PDCU - panel data concentrator unit



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OVERHEAD PANEL ARINC 629 SYSTEM - INTRODUCTION

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OPAS - GENERAL DESCRIPTION

General

The OPAS moves flight deck switch and light data through the overhead panel card files (OPCFs) and panel data concentrator units (PDCUs).

The overhead panel bus controllers (OPBCs) are the interface units for the ARINC 629 buses.

Components

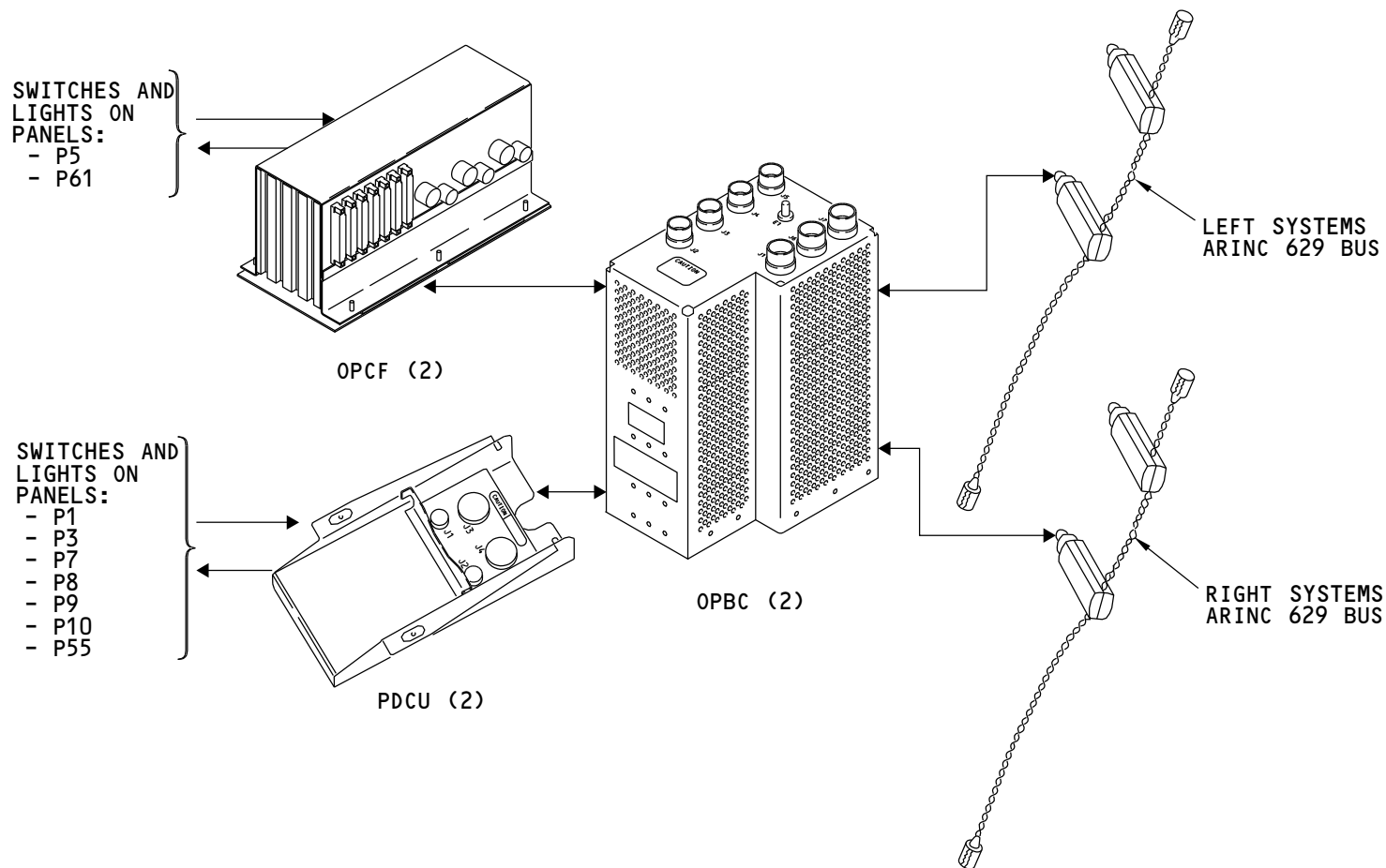
The OPAS has these six components:

- Left and right OPCFs
- Left and right PDCUs
- Left and right OPBCs.

Operation

These are the functions of OPAS:

- It sends flight deck switch position data to the systems ARINC 629 buses
- It gets data from the systems ARINC 629 buses to turn some flight deck panel lights on and off
- It reports system faults to the central maintenance computer system (CMCS)
- It reports OPAS failures to the flight crew by an EICAS status message.



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OPAS - GENERAL DESCRIPTION

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**OPAS - COMPONENT LOCATIONS****General**

These are the OPAS components in the flight deck:

- Left and right overhead panel card files (OPCFs)
- Left and right panel data concentrator units (PDCUs)
- Left and right overhead panel bus controllers (OPBCs).

Each OPCF has right and left overhead panel interface cards (OPICs).

Overhead Panel Card Files

The OPCFs are in the P61 overhead maintenance panel. The left OPCF is in the left side of the panel. The right OPCF is in the right side of the panel.

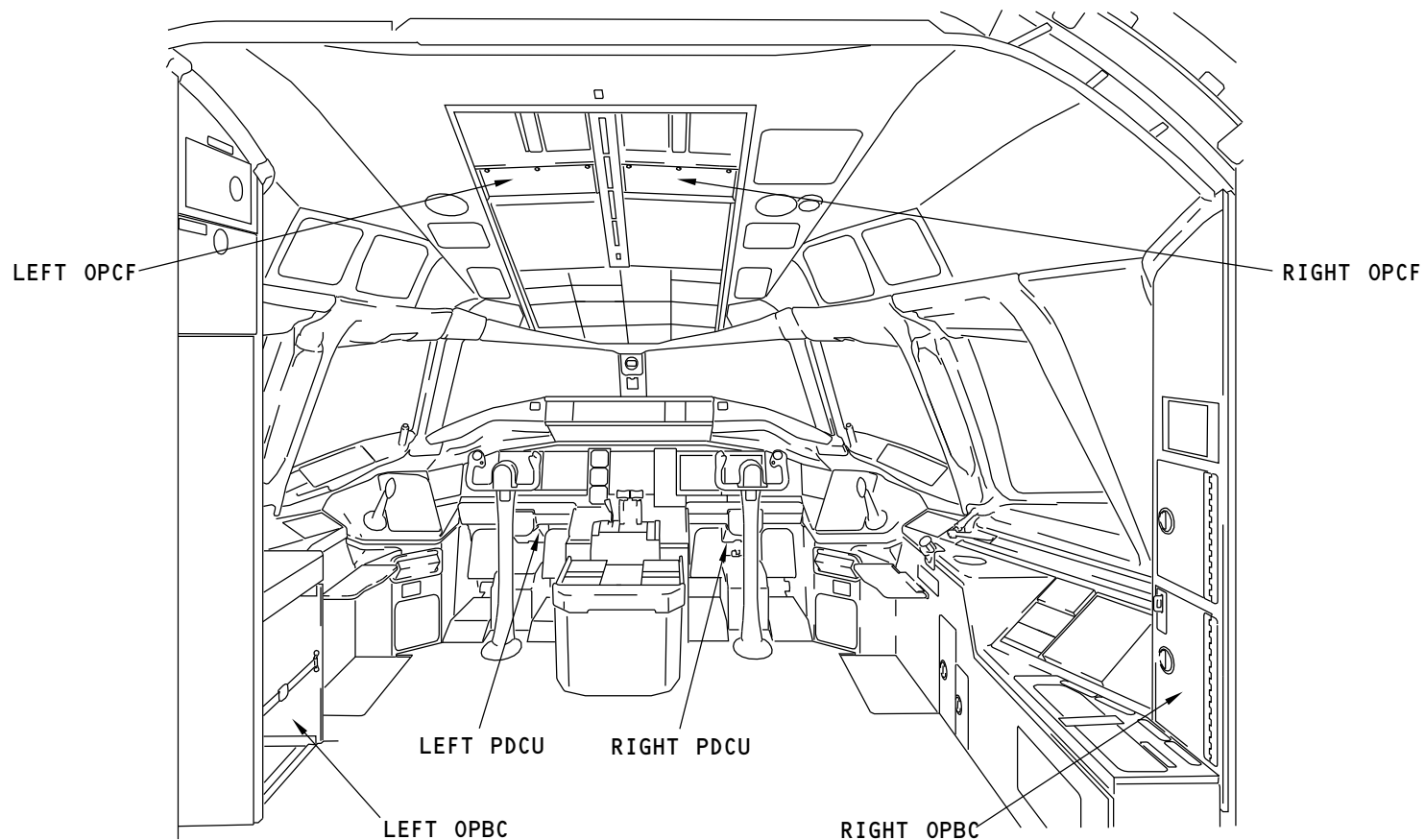
Panel Data Concentrator Units

The PDCUs are near the floor in the forward part of the flight deck. The left PDCU is on the left side, forward of the captain's seat. The right PDCU is on the right side, forward the first officer's seat.

Overhead Panel Bus Controllers

The left OPBC is in the back of the storage area adjacent to the captain's seat. The right OPBC is in the storage area adjacent to the maintenance access terminal (MAT).

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OPAS - COMPONENT LOCATIONS

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**OPAS - OVERHEAD PANEL CARD FILES INTERFACES****General**

There are two overhead panel card files (OPCFs). Each OPCF has two interchangeable overhead panel interface cards (OPICs); A1 and A2.

The OPICs send data to the right and left overhead panel bus controllers (OPBCs) on RS 485 buses. Each RS 485 bus has a twisted shielded pair of wires. Data is moved at 10 mega-bits per second on the RS 485 bus. The OPBCs connect to the left and right systems ARINC 629 buses.

Power Interfaces

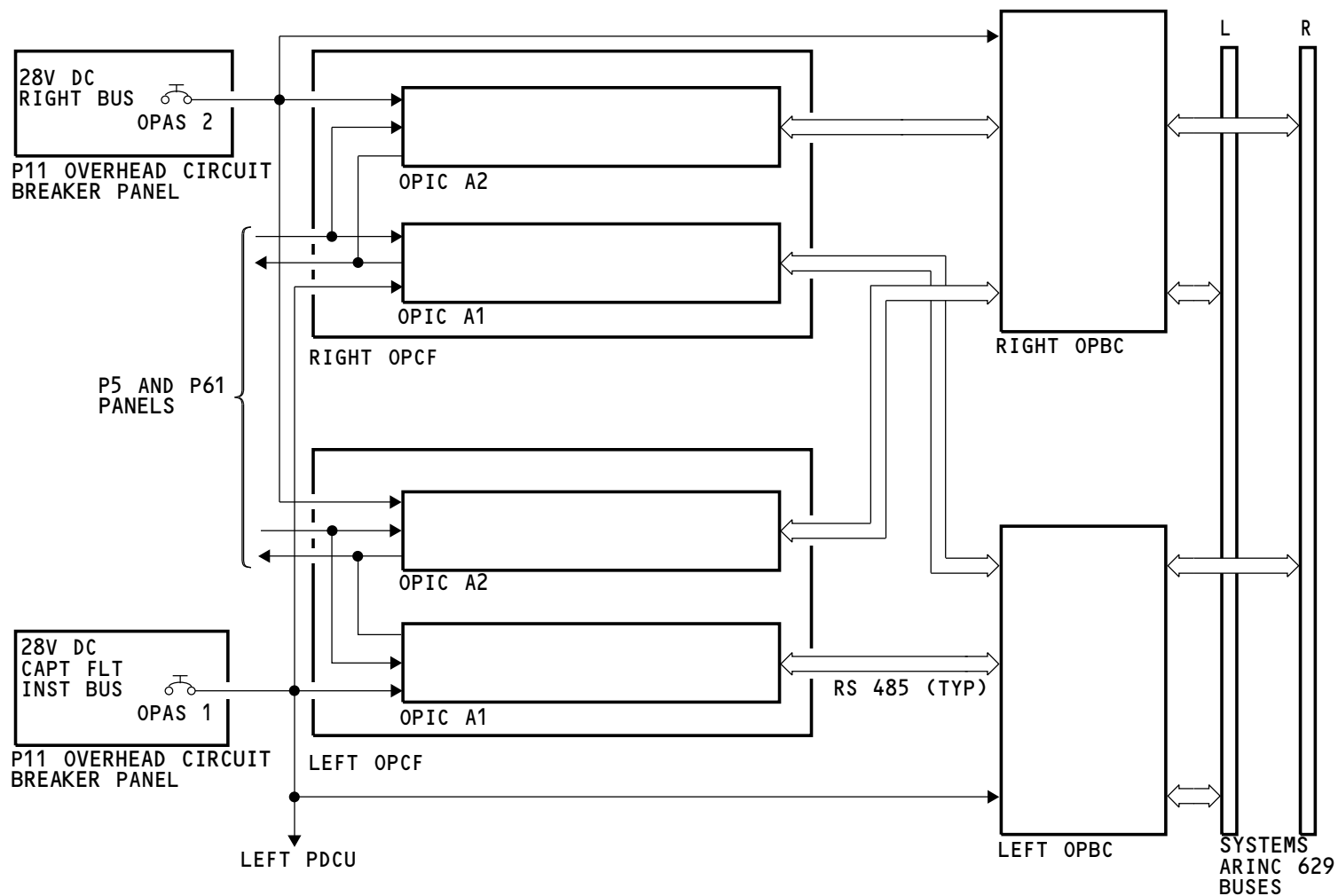
The OPAS 2 circuit breaker connects 28v dc to the OPIC A2 in each OPCF and to the right OPBC.

The OPAS 1 circuit breaker connects 28v dc to the OPIC A1 in each OPCF and to the left OPBC.

Right and Left OPCFs

Many switches and lights on the P5 and P61 panels connect to the OPICs in the right and left OPCFs. The OPIC A2s in both card files connect to the right OPBC. Both OPIC A1s connect to the left OPBC.

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OPAS - OVERHEAD PANEL CARD FILES INTERFACES

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OPAS - PANEL DATA CONCENTRATOR UNITS INTERFACES**General**

Switches and lights in the flight deck connect to right and left panel data concentrator units (PDCUs).

The PDCUs connect to the right and left overhead panel bus controllers (OPBCs). The OPBCs connect to the left and right systems ARINC 629 buses.

Power Interfaces

The OPAS 3 circuit breaker connects 28v dc to the right PDCU.

The OPAS 1 circuit breaker connects 28v dc to the left PDCU.

Right and Left PDCUs

Many switches and lights on these flight deck panels connect to the PDCUs:

- P1 left forward panel
- P3 right forward panel
- P7 glareshield panel
- P8 aft aisle stand panel
- P9 forward aisle stand panel
- P10 control stand
- P55 glareshield center panel.

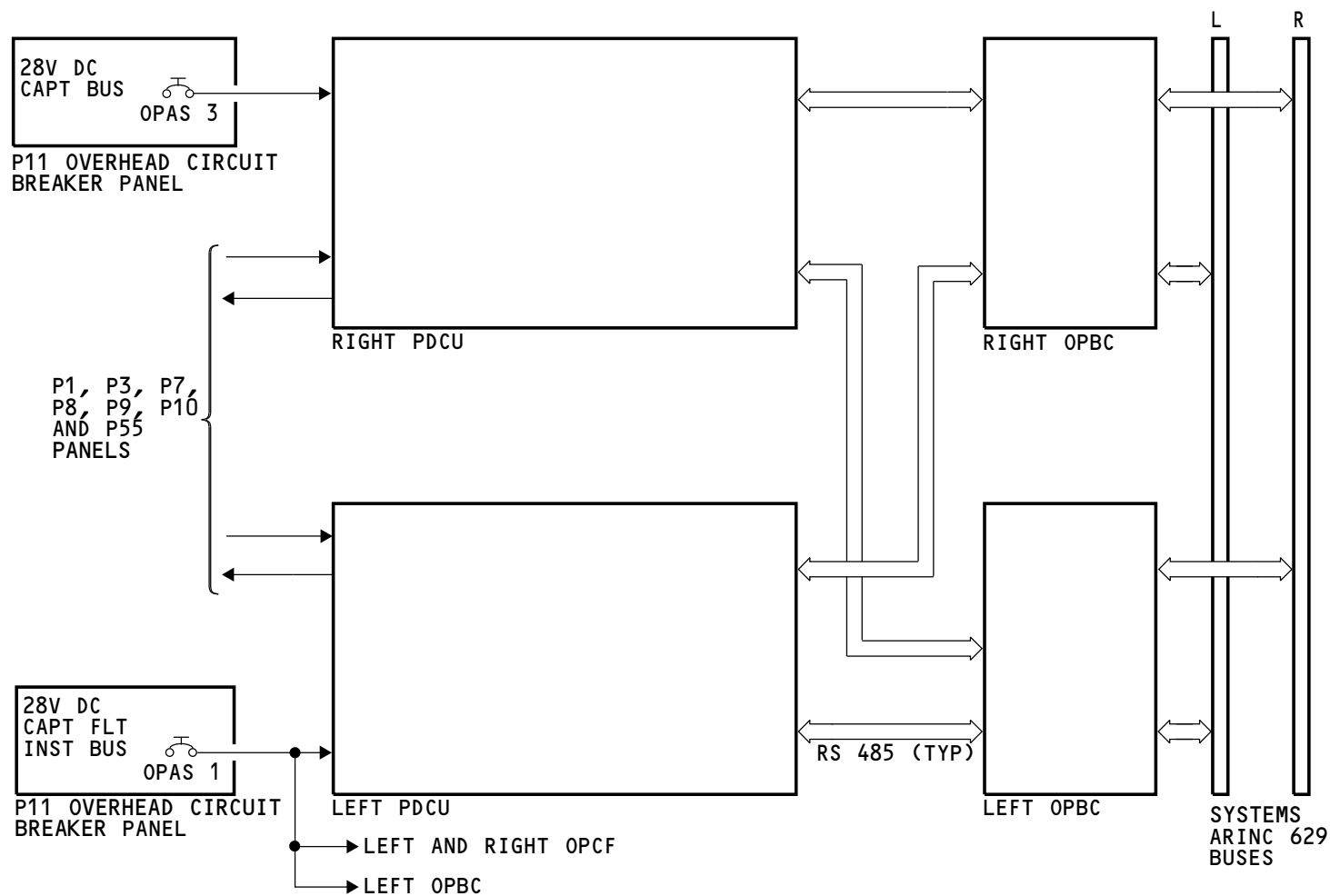
The right and left PDCUs connect to both right and left OPBCs.

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OPAS - PANEL DATA CONCENTRATOR UNITS INTERFACES

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**OPAS - OVERHEAD PANEL CARD FILES****Purpose**

The overhead panel card files (OPCFs) send switch position data from the P5 and P61 panels to the overhead panel bus controllers (OPBCs). They also get data from the OPBCs to control some lights in the P5 and P61 panels.

Physical Description

Each OPCF has these parts:

- A chassis
- A connector board
- A backplane board
- Two overhead panel interface cards (OPICs).

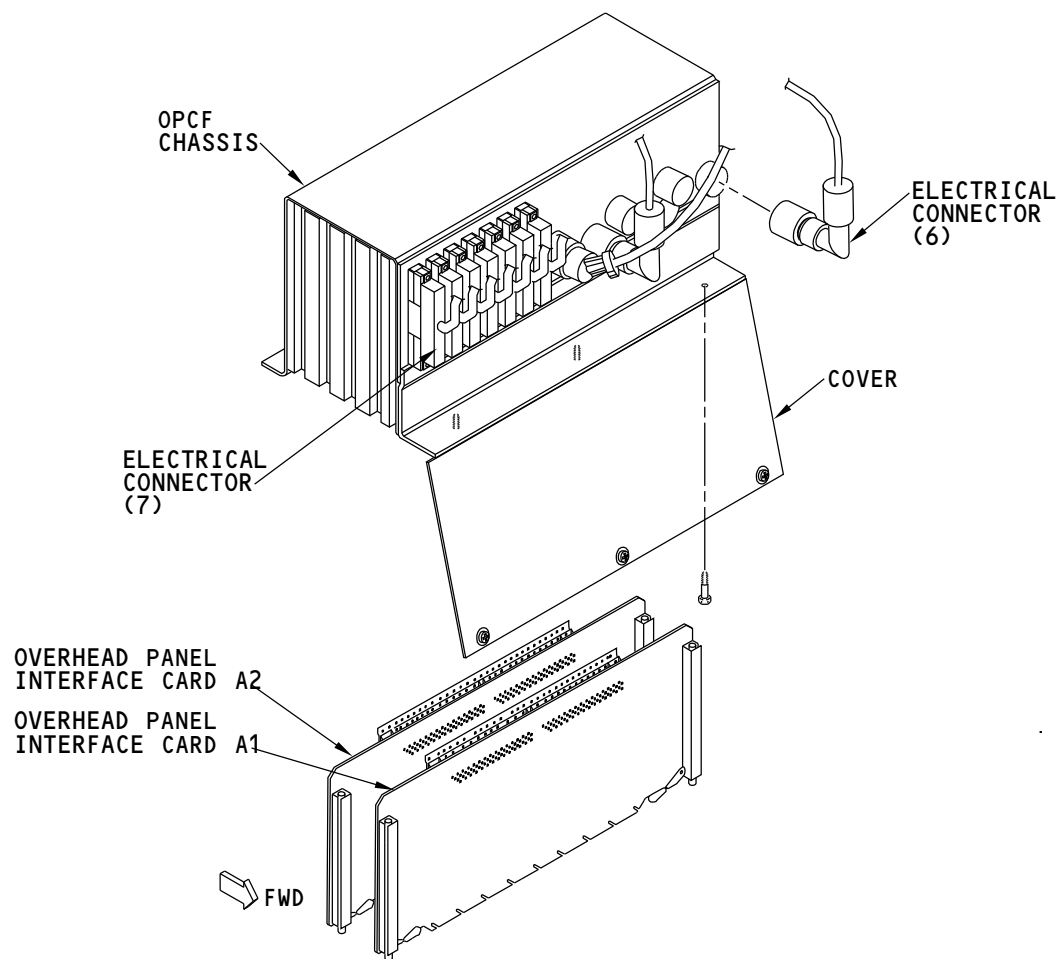
An OPCF with both OPICs weighs 9 pounds. Its dimensions are:

- Length - 13 inches
- Width - 6 inches
- Height - 4.5 inches.

Training Information Point

The OPCFs are interchangeable. The OPICs in each OPCF are also interchangeable.

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OPAS - OVERHEAD PANEL CARD FILES

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OPAS - OVERHEAD PANEL CARD FILES FUNCTIONAL DESCRIPTION

General

Each overhead panel card file (OPCF) has two overhead panel interface cards (OPICs); A1 and A2. The positions of many switches in the P5 and P61 panels go to the OPICs. The OPICs send the switch position data to the overhead panel bus controllers (OPBCs) on a serial bus.

The OPICs also get data from the OPBCs to turn on and off indicator lights on the P5 and P61 panels.

OPCF Description

Each OPCF has two OPICs. An OPCF contains connections to the OPICs for these signals:

- Switch inputs
- Light outputs
- Serial data inputs and outputs
- Channel identifications.

OPIC Description

Each OPIC has these circuits:

- A multiplexer for as many as 160 inputs
- A demultiplexer for as many as 36 light outputs
- A microprocessor
- A fault monitor
- One serial port communication bus
- A channel identification interface for program pins.

OPIC Operation

The multiplexer receives inputs from the panel switches. It selects a signal from one switch at a time and sends it to the microprocessor.

The microprocessor sends the switch position data to the serial port. The microprocessor also receives data from the serial port to control lights. It sends this data to the demultiplexer.

The demultiplexer controls the output to the lights.

The fault monitor circuit identifies OPAS faults to the microprocessor. The microprocessor sends the fault data to the OPBC. The OPBC then sends this data to the central maintenance computer system (CMCS).

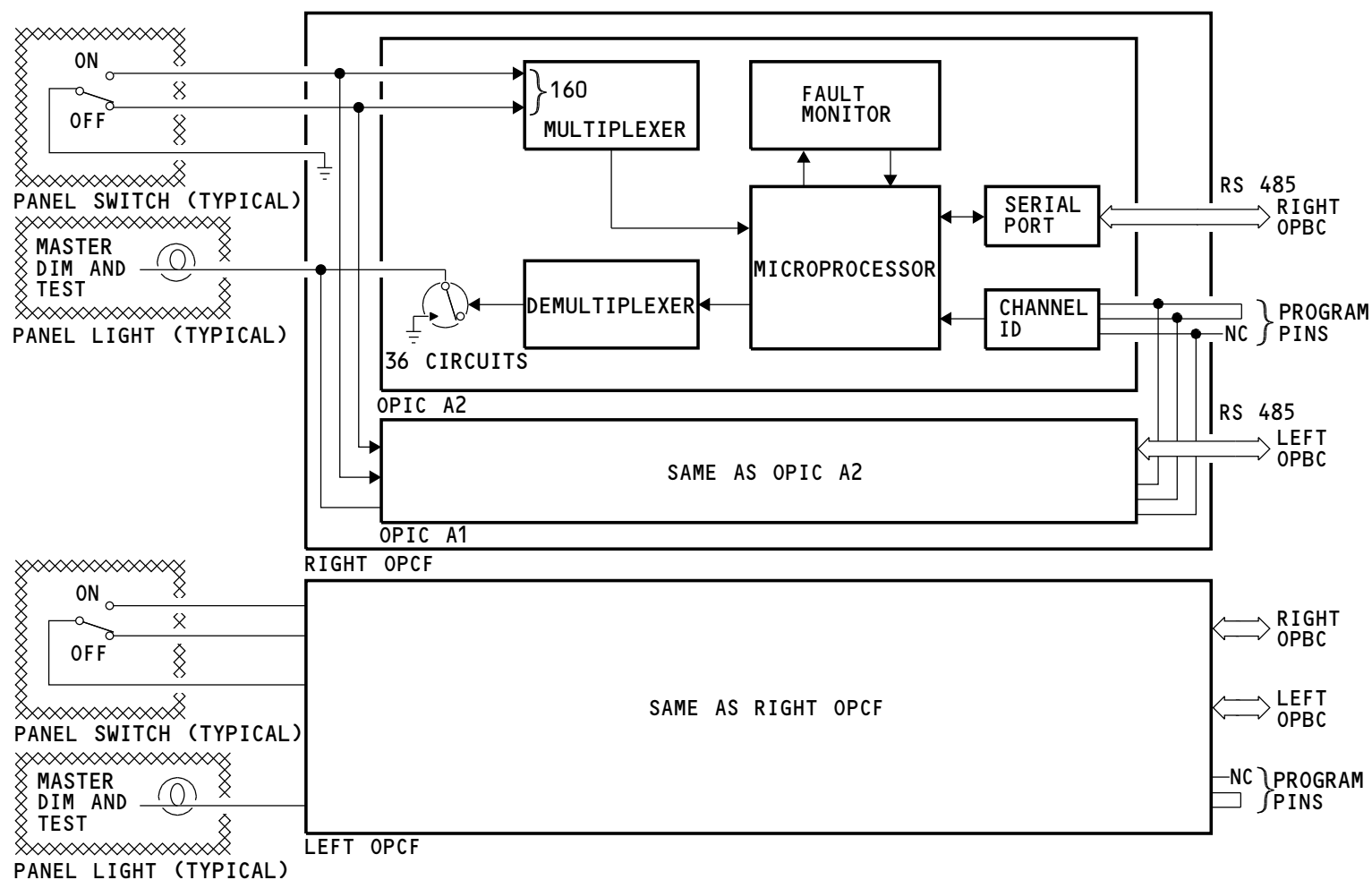
The serial port permits the OPIC to send and get switch and light data from the OPBC.

The program pins connect to the channel identification circuit to tell the OPIC its location and functions.

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OPAS - OVERHEAD PANEL CARD FILES FUNCTIONAL DESCRIPTION

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**OPAS - PANEL DATA CONCENTRATOR UNIT****Purpose**

The panel data concentrator units (PDCUs) send switch position data from some flight deck panels to the overhead panel bus controllers (OPBCs). They also get data from the OPBCs to turn on and off some panel lights.

Physical Description

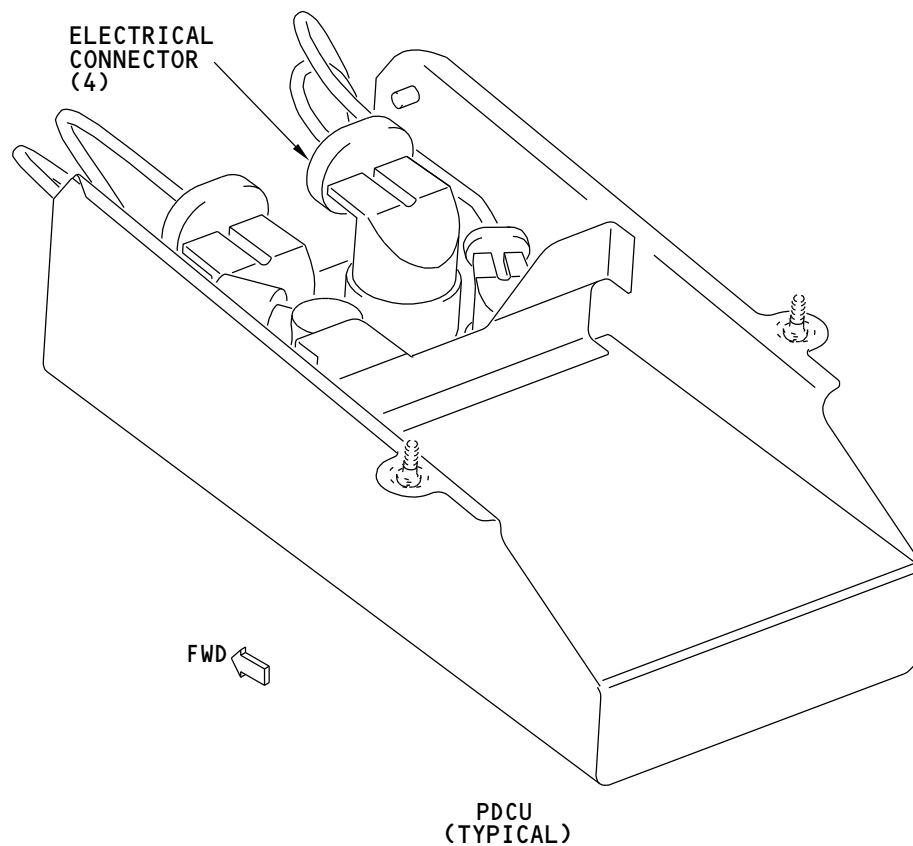
A PDCU weighs 3.5 pounds. Its dimensions are:

- Length - 14 inches
- Width - 8 inches
- Height - 3.5 inches.

Training Information Point

The PDCUs are interchangeable.

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OPAS - PANEL DATA CONCENTRATOR UNIT

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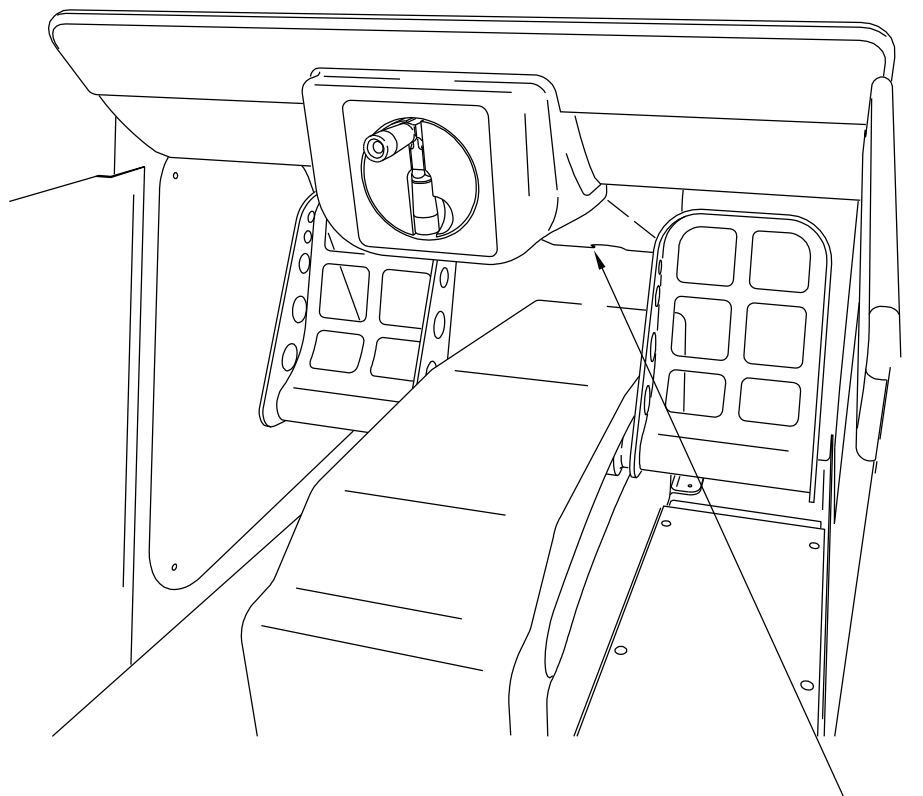
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OPAS - PANEL DATA CONCENTRATOR UNIT INSTALLATION

General

The left panel data concentrator unit (PDCU) is in the flight deck, near the floor between the captain's rudder pedals. The right PDCU is in the same location between the first officer's rudder pedals.



CAPTAIN'S RUDDER PEDAL AREA

LEFT PDCU

OPAS - PANEL DATA CONCENTRATOR UNIT INSTALLATION

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**OPAS - PANEL DATA CONCENTRATOR UNITS FUNCTIONAL DESCRIPTION****General**

The panel data concentrator units (PDCUs) send serial switch position data to the overhead panel bus controllers (OPBCs). The PDCUs also get data from the OPBCs to turn on and off some panel lights.

The serial ports permit the PDCUs to send and get switch and light data from the OBPCs.

PDCUs Functions

Each PDCU has these circuits:

- A multiplexer for 80 inputs
- A demultiplexer for 18 light outputs
- Two serial ports.

PDCUs Operation

Each PDCU gets inputs from switches on these panels:

- P1 left forward panel
- P3 right forward panel
- P7 glareshield panel
- P8 aft aisle stand panel
- P9 forward aisle stand panel
- P10 control stand
- P55 glareshield center panel.

The multiplexer receives inputs from the panel switches. It selects a signal from one switch at a time and sends it to the microprocessor.

The microprocessor sends the condition of the switch to the serial ports. The microprocessor receives data from the serial ports to control lights. It also sends data to the demultiplexer.

The demultiplexer controls the output to the lights.

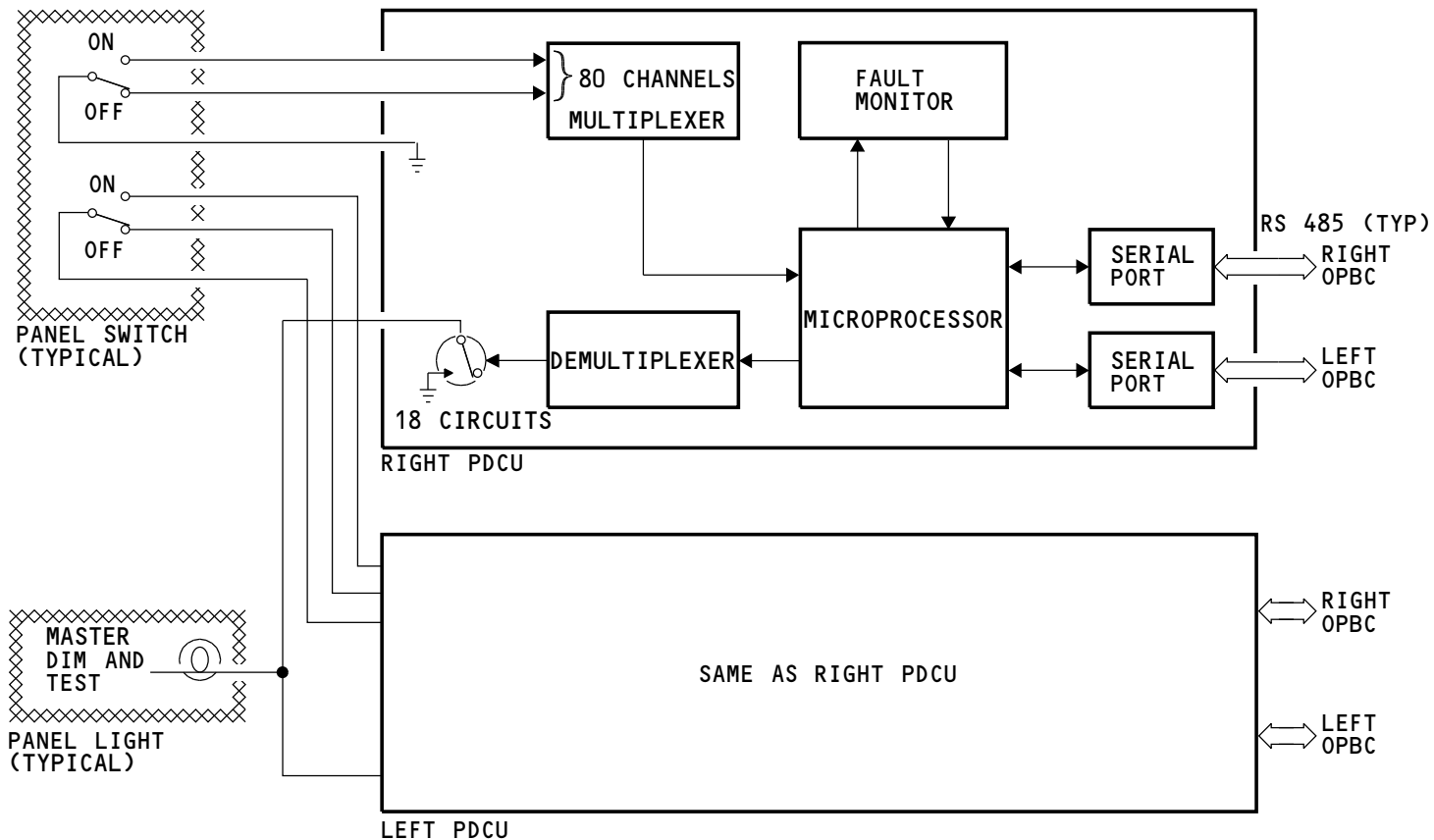
The fault monitor circuit identifies OPAS faults to the microprocessor. The microprocessor sends the fault data to the central maintenance computer system (CMCS).

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OPAS - PANEL DATA CONCENTRATOR UNITS FUNCTIONAL DESCRIPTION

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**OPAS - OVERHEAD PANEL BUS CONTROLLERS****Purpose**

Two overhead panel bus controllers (OPBCs) are the OPAS interface with the ARINC 629 system buses.

Physical Description

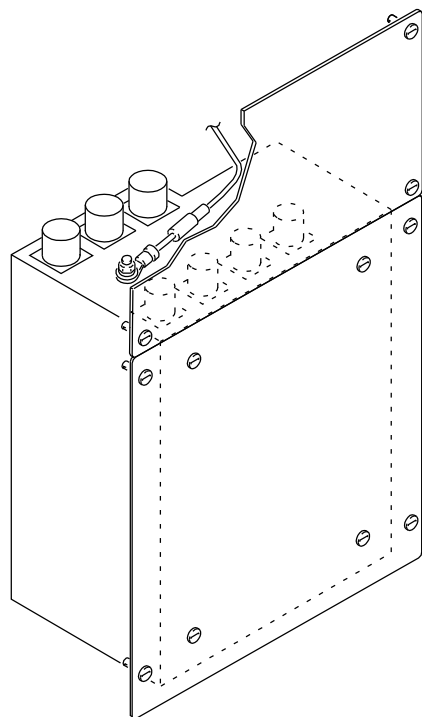
An OPBC weighs 6.6 pounds. The dimensions are:

- Length - 10 inches
- Width - 7.6 inches
- Height - 4.9 inches.

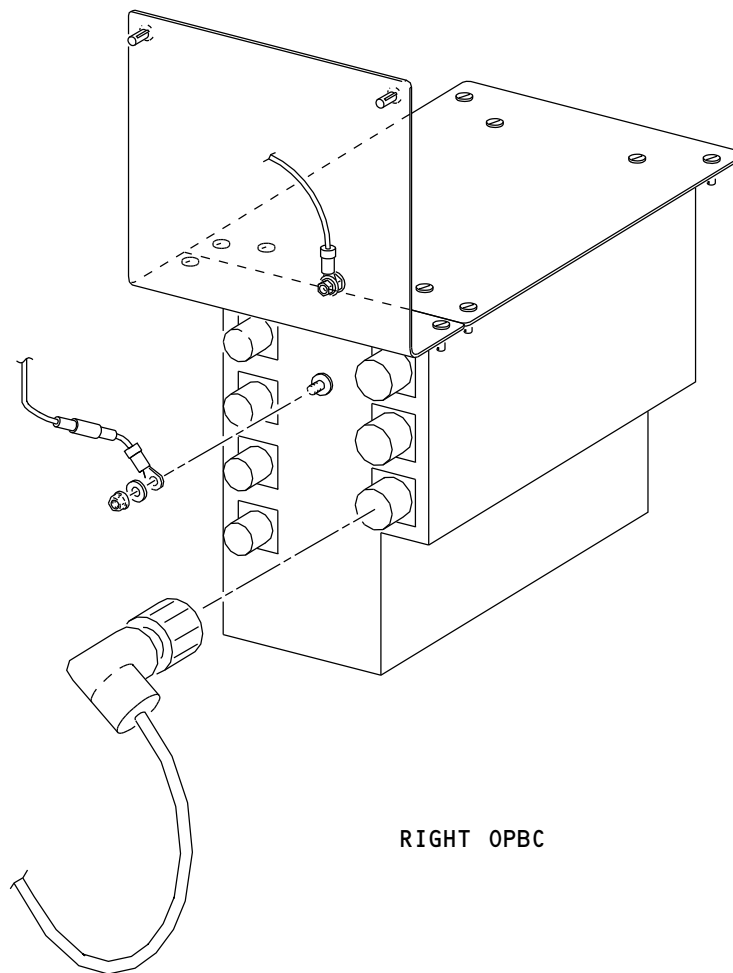
Training Information Point

The left and right OPBCs are interchangeable.

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LEFT OPBC



RIGHT OPBC

OPAS - OVERHEAD PANEL BUS CONTROLLERS

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OPAS - OVERHEAD PANEL BUS CONTROLLER INSTALLATION

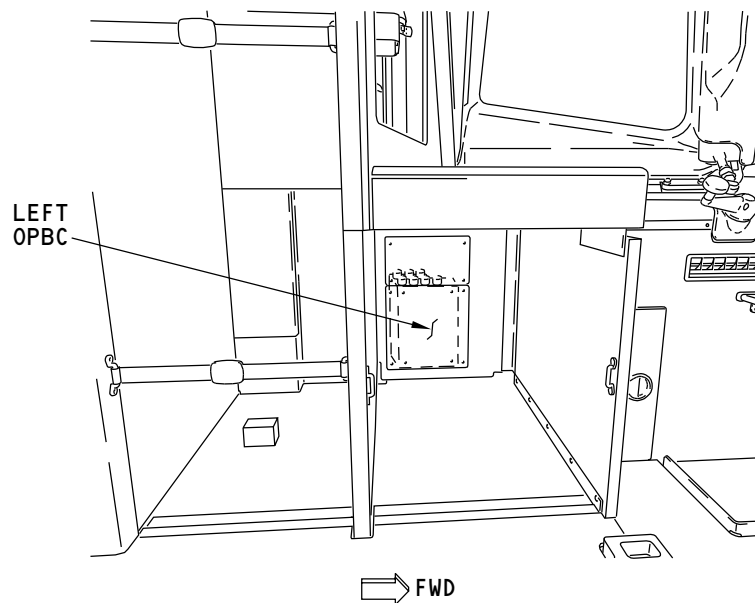
Left OPBC

The left overhead panel bus controller (OPBC) is behind a panel at the back of the captain's storage cabinet.

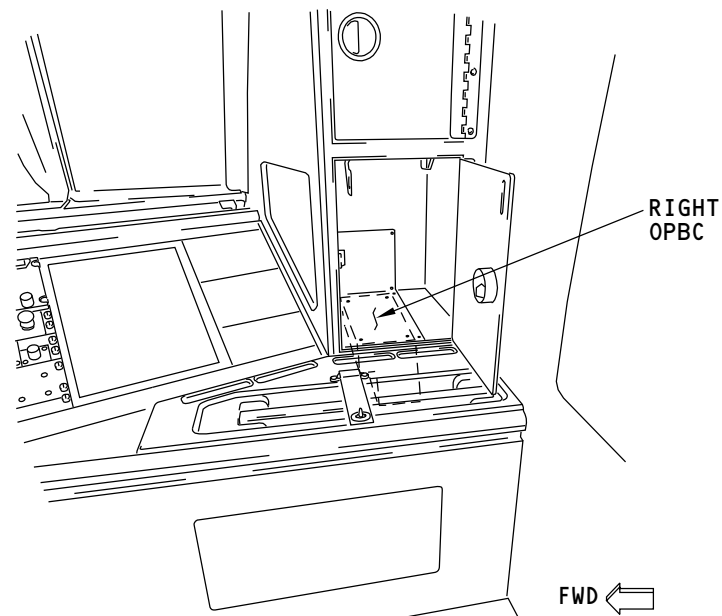
Right OPBC

The right OPBC is under a panel in the storage cabinet adjacent to the MAT.

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FLIGHT DECK
(LEFT SIDE, LOOKING OUTBOARD)



FLIGHT DECK
(RIGHT SIDE, LOOKING OUTBOARD)

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OPAS - OVERHEAD PANEL BUS CONTROLLER INSTALLATION

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**OPAS - OVERHEAD PANEL BUS CONTROLLER FUNCTIONAL DESCRIPTION****General**

There are two overhead panel bus controllers (OPBCs), one on each side of the flight deck. Each OPBC has these components:

- Four serial interface controllers
- Microprocessor
- Fault monitor
- Two ARINC 629 terminal controllers
- A channel identification interface for program pins.

Overhead Panel Bus Controller Functions

Each OPBC has these functions:

- It transmits flight deck switch position data to the ARINC 629 system buses
- It receives data for flight deck lights and LEDs from the ARINC 629 system buses
- It does a fault check of data.

Serial Interface Controllers

The microprocessor uses the serial interface controllers to send and get data through the overhead panel interface cards (OPICs) and panel data concentrator units (PDCUs).

Fault Monitor

The fault monitor circuit identifies OPAS faults to the microprocessor. The microprocessor sends the fault data to the central maintenance computer system (CMCS).

Microprocessor

The microprocessor sends data to and receives data from the ARINC 629 system buses, PDCUs, and OPICs.

It isolates and controls data inputs and outputs to prevent signal mixture.

ARINC 629 Terminal Controllers

The ARINC 629 terminal controllers are the interfaces between the OPBCs and the ARINC 629 system buses.

The ARINC 629 terminal controllers monitor the data they transmit. If they find faults in the data, they stop operation.

Channel Identification

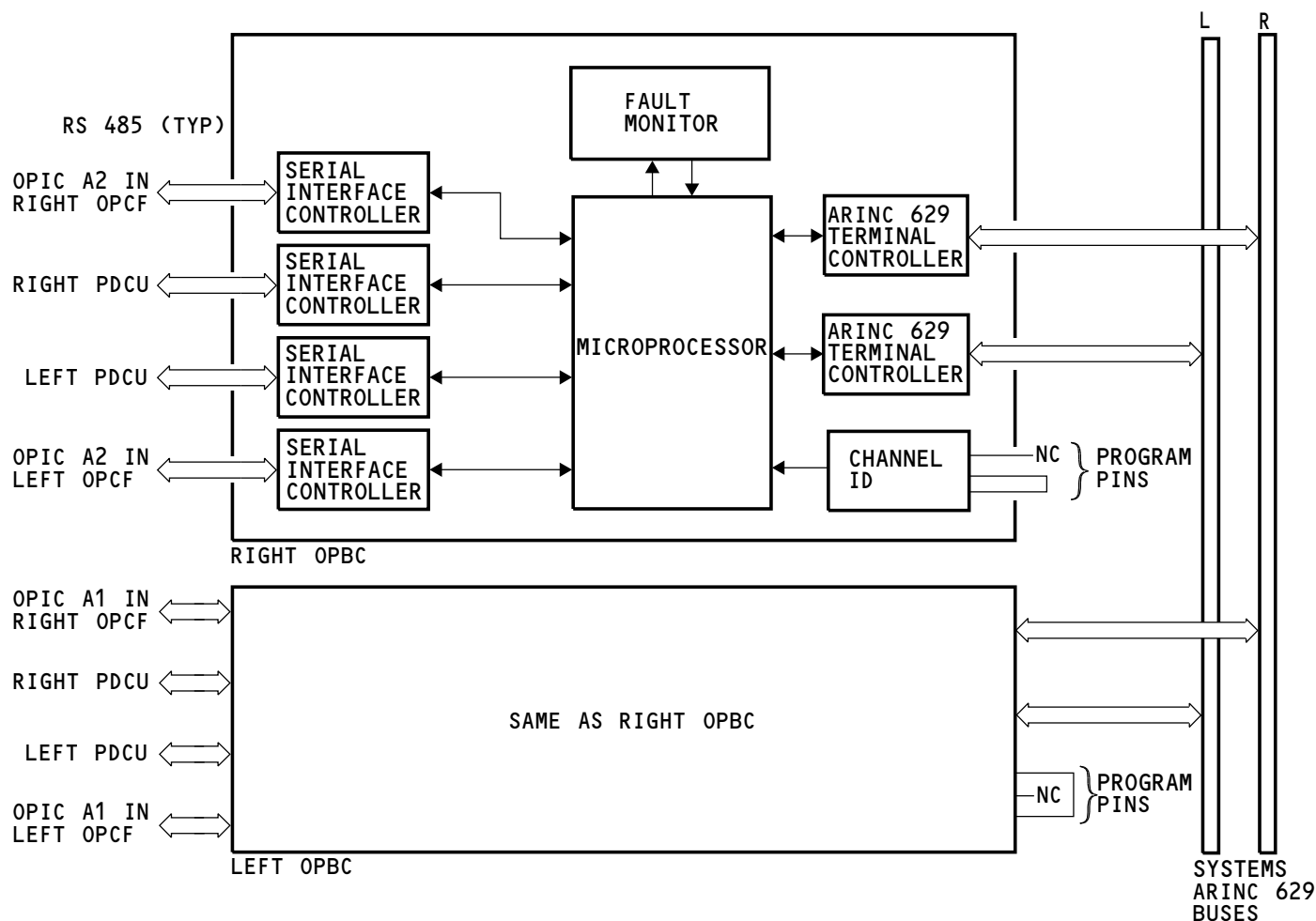
The program pins connect to the channel identification circuit to tell the OPBC its location and functions.

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OPAS - OVERHEAD PANEL BUS CONTROLLER FUNCTIONAL DESCRIPTION

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**OPAS - TEST****General**

These are the system tests for the OPAS:

- Left overhead panel ARINC 629 system
- Right overhead panel ARINC 629 system

OPAS System Test

Each system test makes sure the operation of that channel is fully functional.

Do both system tests to completely make sure the operation of the OPAS is correct.

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GROUND TESTS

SELECT ATA SYSTEM

23 VHF COMMUNICATION SYSTEM

23 SATELLITE COMMUNICATIONS (SATCOM) SYSTEM

23 DIGITAL CONTROL AUDIO SYSTEM

23 OVERHEAD PANEL ARINC 629 SYSTEM

24 ELMS P210 POWER MANAGEMENT PANEL

24 ELMS P110 POWER MANAGEMENT PANEL

SELECT SYSTEM TEST

LEFT OVERHEAD PANEL ARINC 629 SYSTEM

RIGHT OVERHEAD PANEL ARINC 629 SYSTEM

CONTINUE

HELP

GO BACK

SELECT SYSTEM TEST

LEFT OVERHEAD PANEL ARINC 629 SYSTEM

RIGHT OVERHEAD PANEL ARINC 629 SYSTEM

CMCS GROUND TEST SELECTION DIALOG BOX

OPAS - TEST

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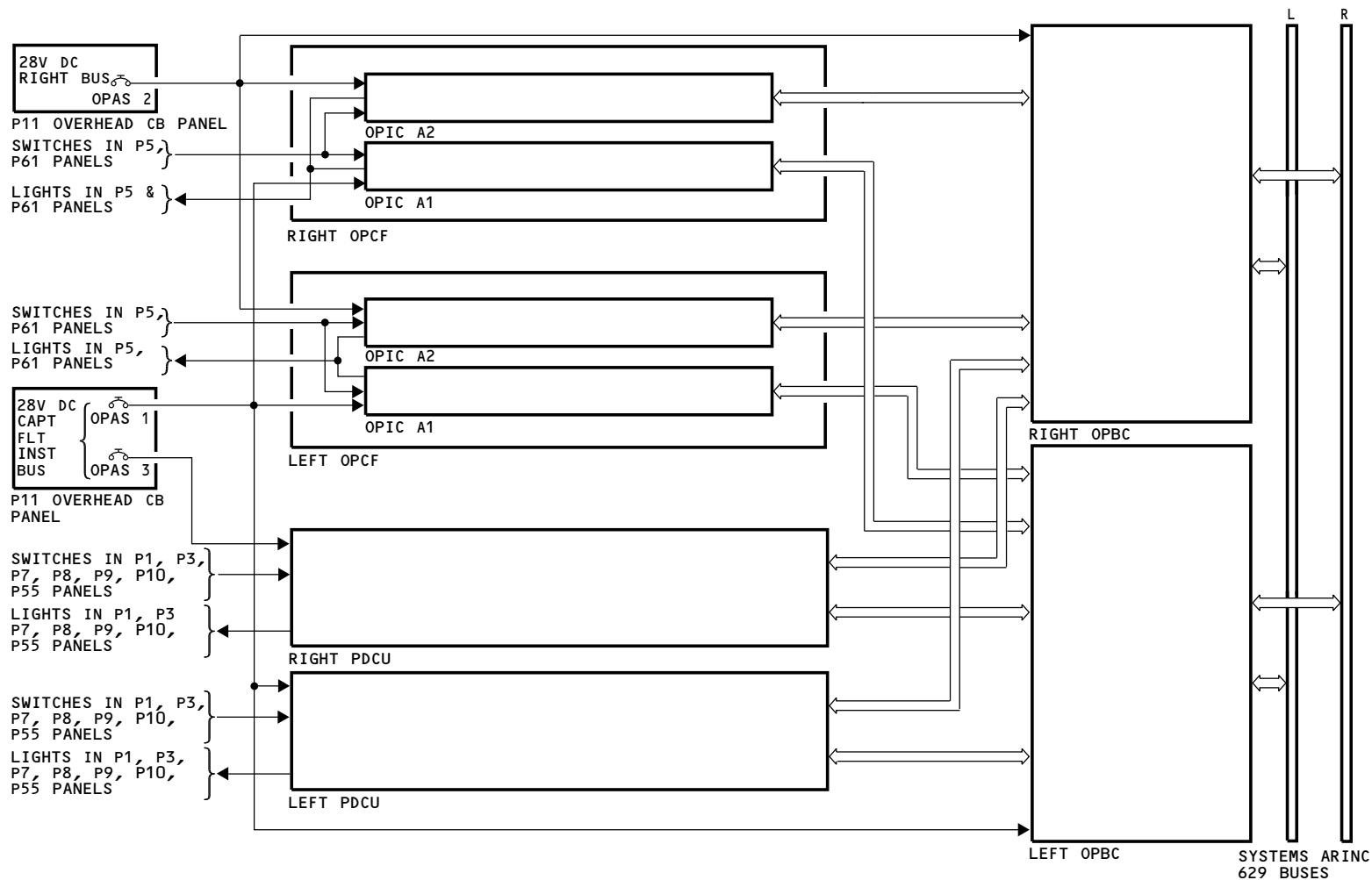


OPAS - OVERALL INTERFACES

Interfaces

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OPAS - OVERALL INTERFACES

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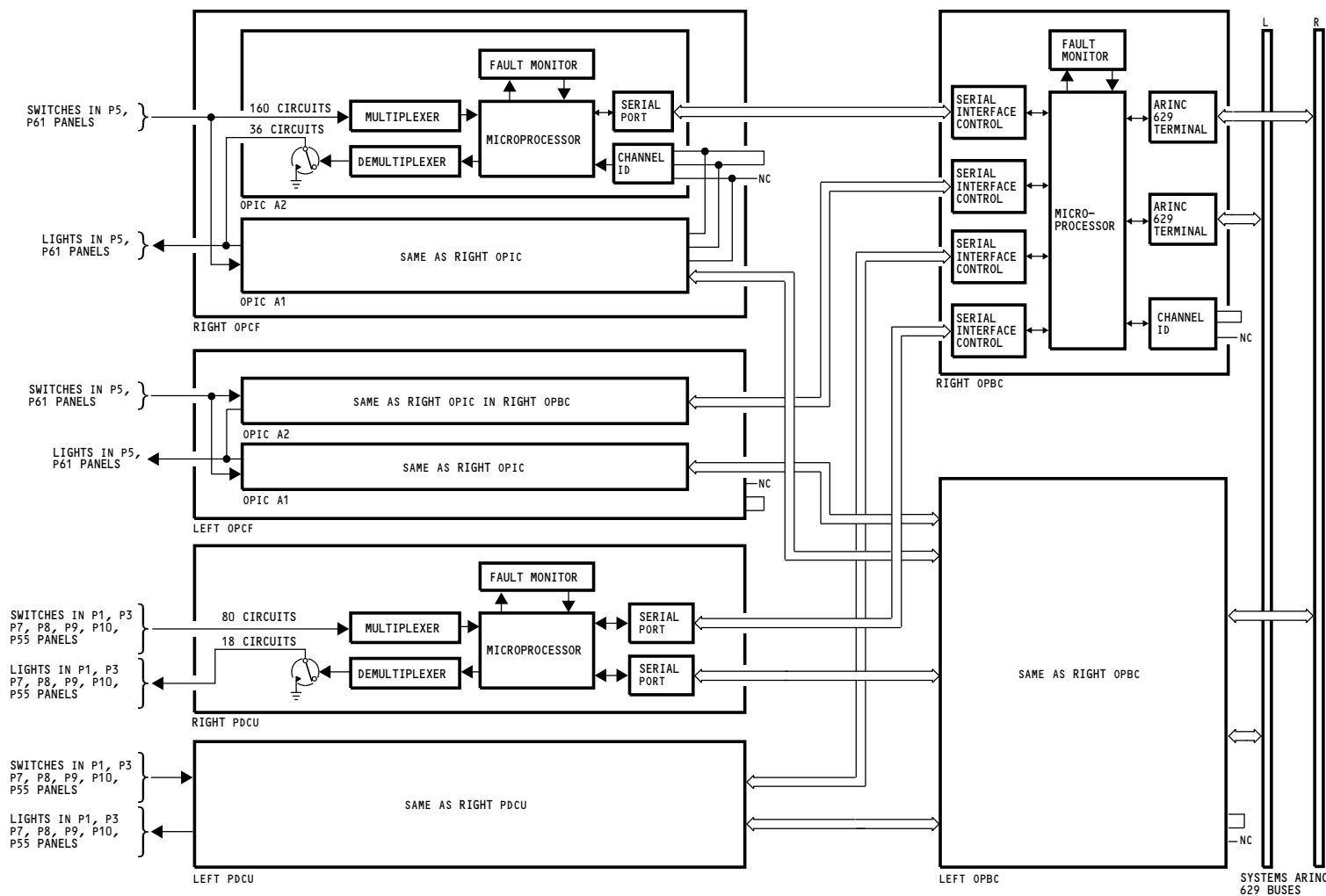


OPAS - OVERALL FUNCTIONAL DESCRIPTION

Functional Description

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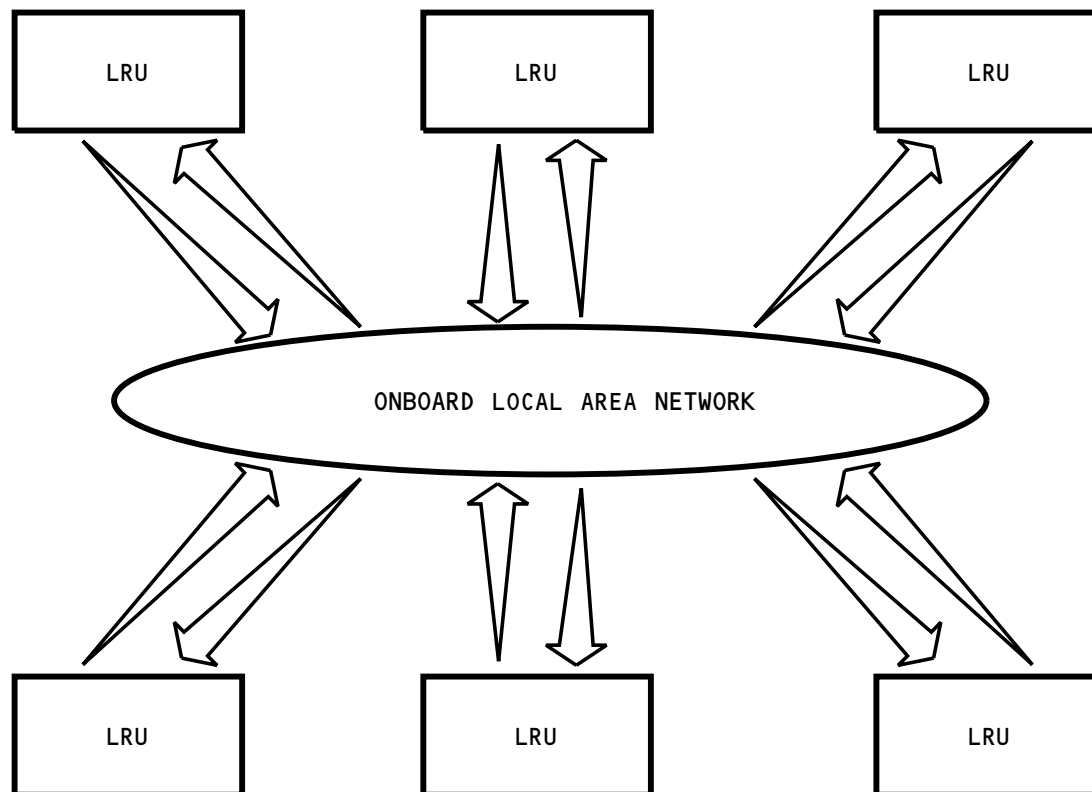
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**PLANENET LOCAL AREA NETWORK - INTRODUCTION****Purpose**

The PlaneNet local area network (LAN) is a point to point 10BaseT Ethernet network that provides the interface for, and supports communication between, LRUs in the PlaneNet LAN.. The PlaneNet LAN is used to transmit and receive block data between units connected to it. It also gives the ability to load software into the LRUs connected to it.

Abbreviations and Acronyms

- ACMF - airplane condition monitoring function
- AIMS - airplane information management system
- CMCF - central maintenance computing function
- DCMF - data communication management function
- FMCF - flight management computing function
- IP - internet protocol
- LAN - local area network
- LRU - line replaceable unit
- MAT - maintenance access terminal
- OLAN - onboard local area network
- PMAT - portable maintenance access terminal
- TCP - transmission control protocol
- UDP - user datagram protocol



ONBOARD LOCAL AREA NETWORK - INTRODUCTION

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PLANENET LOCAL AREA NETWORK - GENERAL DESCRIPTION

General

The PlaneNet local area network (LAN) is characterized as a point to point 10BaseT Ethernet network which provides connectivity between the various LRUs in PlaneNet. The 10BaseT Ethernet interface supports communication between AIMS and other LRUs on the PlaneNet. The PlaneNet LAN is used to transmit and receive block data between units connected to it. PlaneNet member systems use standard TCP/UDP/IP Ethernet protocols for data transfer and for software data loading applications.

PlaneNet provides a high-speed communications path to PlaneNet member systems primarily for transferring maintenance data for display. Additionally, the interface allows onboard software data loading or down loading of maintenance data.

The data communication management function (DCMF) in the AIMS communications slim line replacable module (SLRM) CPM/COMM has the communication protocols that permit the AIMS functions to communicate with the PlaneNet LAN. The central maintenance computing function (CMCF) and airplane condition monitoring function (ACMF) send their data to the DCMF to be formatted with the correct data format. The DCMF then transmits this data on the PlaneNet LAN.

Planenet Components

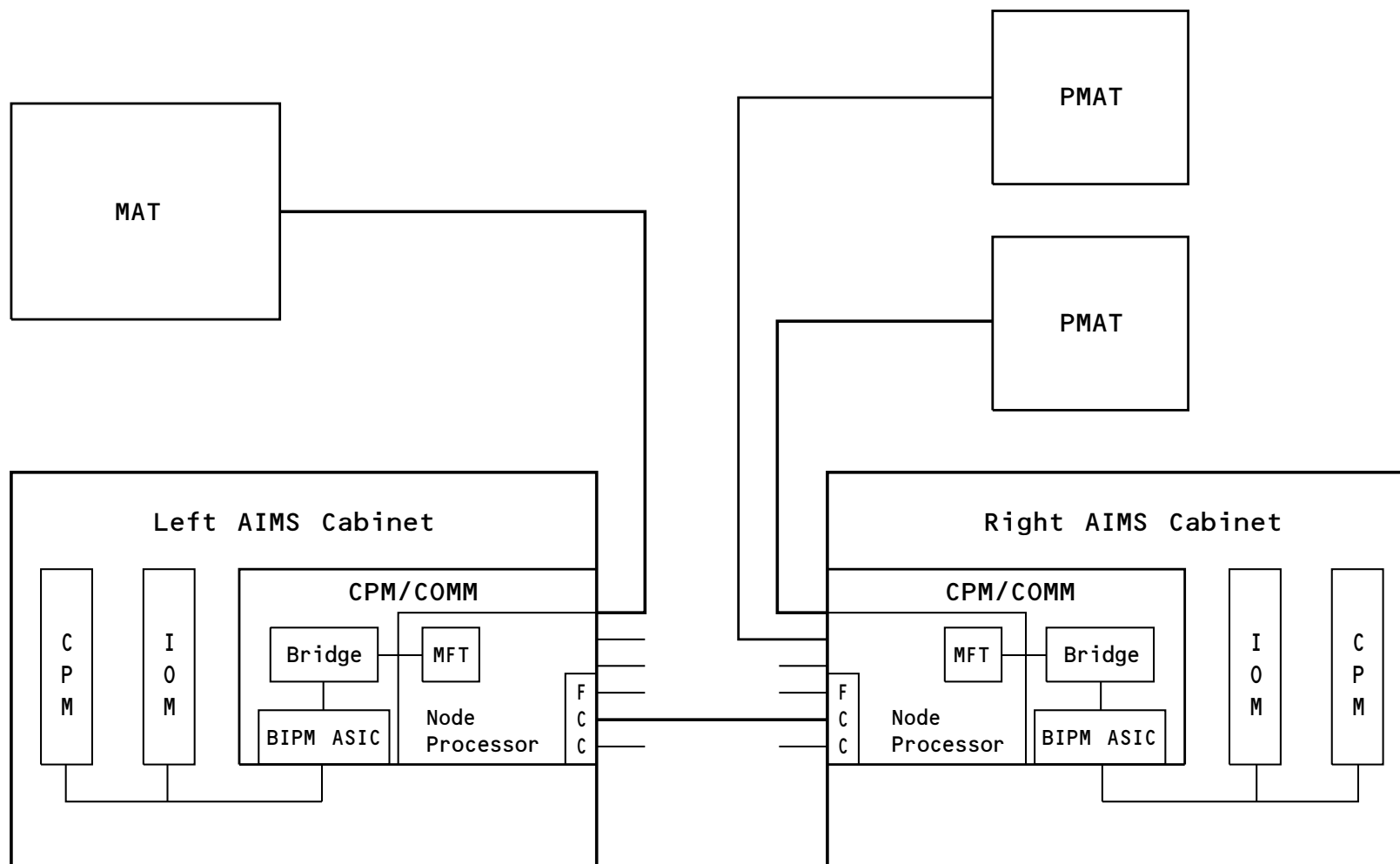
PlaneNet consists of 2 AIMS cabinets, one Maintenance Access terminal (MAT), located in the flight deck and two Portable Maintenance Access Terminal (PMAT) ports, one located in the flight deck and one in the EEbay. AIMS interfaces to the PlaneNet LAN through the CPM/COMM module.

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PLANENET LOCAL AREA NETWORK - GENERAL DESCRIPTION

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PLANENET LOCAL AREA NETWORK - INTERFACES

General

The internal communications interface over 10BASE-T Ethernet Local Area Network (LAN) is provided by the Node Processor (NP) in the CPM/COMM module in the AIMS cabinet. It uses the DCMF to facilitate communications between AIMS functions and PlaneNet member systems. The DCMF PlaneNet Interface Function provides the communication protocols that allow AIMS functions to communicate with member systems on PlaneNet. PlaneNet systems include the MAT and the PMATs that are accessible via the Node Processor and Ethernet LAN. During normal operations and in all phases of flight, the PlaneNet Interface supports the reliable transfer of data between AIMS applications and PlaneNet member systems. Specifically, the DCMF PlaneNet Interface facilitates flight crew access to LRU/LRM fault data (in AIMS CMCF) or system statistical data (in AIMS ACMF) via the flight deck MAT or optional flight deck Side Displays (if installed).

The initialization and normal operation of the PlaneNet Avionics Local Area Network (AVLAN), and thus the DCMF PlaneNet Interface, is transparent to the flight crew. During normal operations, the DCMF PlaneNet Interfaces in both AIMS (left and right) cabinets are "alive" and respond to data on the PlaneNet (i.e. copy data), but only one DCMF is considered "active" and therefore forwards data on to AIMS applications. Having both DCMF PlaneNet Interfaces alive also allows any applicable AIMS function in either AIMS cabinet to utilize either the (left or right) DCMF PlaneNet Interface for communication with PlaneNet member systems. This approach has the benefit of minimizing DCMF redundancy management tasks for PlaneNet communications. For more information on AIMS, see 31-41-00.

One of the primary purposes of the DCMF PlaneNet Interface is to facilitate communication of maintenance data between the MAT/PMATs and AIMS CMCF or ACMF. The Maintenance Terminal Function (MTF) is the high level application responsible for forwarding pertinent LRU/LRM fault data (both fault report and shop fault data gathered by CMCF) or statistical data (gathered by ACMF) to the MAT/PMATs for display to maintenance crews and/or for archival storage. The PlaneNet Interface provides the reliable communication path for the transfer of MTF commands and responses. The PlaneNet Interface also supports maintenance-initiated LRU/LRM ground tests and display of subsequent test results via MTF on the MAT or a PMAT. Additionally, the PlaneNet interface supports data transfer for on-ground data loading between a MAT or PMAT station and airplane loadable LRU/LRMs via the AIMS Data Load Gateway Function (DLGF). The data loading of DCMF is based on ARINC 615a data loading via NP over an Ethernet interface. During ground or airborne phases of flight, the PlaneNet Interface also supports the transfer of PlaneNet member system BITE information to AIMS CMCF and the forwarding of pertinent aircraft information (aircraft identification, flight leg, flight phase, etc.) from CMCF to PlaneNet member systems.

Physically, the Node Processors (in left and right AIMS cabinets) are interconnected as point-to-point scheme to each other and to the member systems of PlaneNet (MAT) via Ethernet V2 and 10Base-T as Link Layer using TCP/IP protocol. The communication connection between PlaneNet member systems and Node Processor is established utilizing socket. Socket is a method of communication between a client program and a server program in a network. PlaneNet systems use "stream socket" to achieve highly reliable connection-oriented communication to member systems. There are nine portals from DCMF interface in Node Processor into MBM (one portal for each TCP/IP connection) to communicate with CMCF, ACMF, and OMS. DCMF interfaces within Node processor will be composed of ten UNIX processes. Nine processes are to maintain each TCP/IP connection and one process is for CMC server to listen for incoming CMC connections from MAT and PMAT. The DCMF interface performs the role of connection management. For more information on DCMF, see 23-27-00.

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PLANENET LOCAL AREA NETWORK - INTERFACES

MAT

The MAT connects to the left AIMS cabinet. The MAT receives aircraft maintenance data from the CMCF and ACMF through DCMF via the PlaneNet Interface. This data can be downlinked, printed, and/or downloaded to a storage medium on the MAT by the maintenance crew through the MAT. The MAT also provides maintenance the interface for initiating tests on airplane LRU/LRMs for trouble shooting purposes. The MAT is also the primary Data Loader device that maintenance uses for loading airplane LRU/LRM operational software. For more information on the MAT and the PMAT, see 45-10-00.

PMAT

The PMAT(s) connect to the right AIMS cabinet. The PMATs receive aircraft maintenance data from the CMCF and ACMF through DCMF via Node Processor with PlaneNet using 10 Base-T Ethernet medium. This data can be downlinked and printed by maintenance through the PMATs. The PMATs also provide maintenance with secondary interfaces for initiating tests on airplane LRU/LRMs for trouble shooting purposes and for loading airplane LRU/LRM operational software.

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