CHAPTER

44

Cabin Systems

CHAPTER 44
CABIN SYSTEMS

Subject/Page	Date	COC
44-EFFECTIVE PAGES		
1 thru 2	Sep 15/2023	
44-CONTENTS		
1	Sep 15/2021	
2	BLANK	
44-21-00		
1	Sep 15/2021	
2	Sep 15/2021	
3	Sep 15/2021	
4	Sep 15/2021	
5	Sep 15/2021	
6	Sep 15/2021	
7	Sep 15/2021	
8	Sep 15/2021	
9	Sep 15/2021	
10	Sep 15/2021	
11	Sep 15/2021	
12	Sep 15/2021	
13	Sep 15/2021	
14	Sep 15/2021	
15	Sep 15/2021	
16	Sep 15/2021	
17	Sep 15/2021	
18	Sep 15/2021	
19	Sep 15/2021	
20	Sep 15/2021	

Subject/Page	Date	COC
44-21-00 (cont.)		
21	Sep 15/2021	
22	Sep 15/2021	
23	Sep 15/2021	
24	Sep 15/2021	
25	Sep 15/2021	
26	Sep 15/2021	
27	Sep 15/2021	
28	Sep 15/2021	
29	Sep 15/2021	
30	Sep 15/2021	
31	Sep 15/2021	
32	Sep 15/2021	
33	Sep 15/2021	
34	Sep 15/2021	
35	Sep 15/2021	
36	BLANK	
44-30-00		
1	Sep 15/2021	
2	Sep 15/2021	
3	Sep 15/2021	
4	May 15/2023	
5	Sep 15/2021	
6	Sep 15/2021	

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

44-EFFECTIVE PAGES

CHAPTER 44
CABIN SYSTEMS

Subject/Page	Date	COC
44-35-01		
1	Sep 15/2021	
2	Sep 15/2021	
3	Sep 15/2021	
4	Sep 15/2021	
5	Sep 15/2021	
6	Sep 15/2021	
7	Sep 15/2021	
8	Sep 15/2021	
9	Sep 15/2021	
10	Sep 15/2021	
11	Sep 15/2021	
12	Sep 15/2021	
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16	Sep 15/2021	
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19	Sep 15/2021	
20	Sep 15/2021	
21	Sep 15/2021	
22	Sep 15/2021	
23	Sep 15/2021	
24	Sep 15/2021	
25	Sep 15/2021	

Subject/Page	Date	COC
44-35-01 (cont.)		
26	Sep 15/2021	
27	Sep 15/2021	
28	Sep 15/2021	
29	Sep 15/2021	
30	BLANK	

A = Added, R = Revised, D = Deleted, O = Overflow, C = Customer Originated Change

44-EFFECTIVE PAGES

CHAPTER 44
CABIN SYSTEMS

44-CONTENTS

SERVER BASED ENTERTAINMENT SYSTEM - INTRODUCTION

General

A In-Flight Entertainment (IFE) system provides audio, video, and flight information to the passengers.

This is a server based IFE system with video distribution.

The configuration of the system consists of:

- Integrated Boarding Music
- Integrated Pre-Recorded Announcement Machine (PRAM) for Decompression and Fasten Seatbelt
- Integrated Passenger Flight Information System (PFIS)
- Crew Terminal
- Integrated Server

SIA 001-014

- Overhead Video Monitors.

SIA ALL

- Passenger Control Unit (PCU).
- Passenger Seat Power.
- Passenger Seat Audio.

SIA 015-999

- On-board Media Loader (OML).
- Seatback Video Display Unit (SVDU).

SIA ALL

- Seat Electronics Box.

SIA 015-999

- Seat Power Module.

Partial provisions are installed to support the installation of main in-flight entertainment and/or connectivity (IFEC) equipment, and interface wiring to the enhanced E6 rack.

SIA ALL

Abbreviations and Acronyms

- AMCU - Advanced Master Control Unit
- APU - Auxiliary Power Unit
- ATSU - Air Traffic Services Unit
- BIT - Built In Test
- CONFIG - Configuration
- CP - Crew Panel
- CT - Crew Terminal
- FMS - Flight Management System
- GUI - Graphical User Interface
- iBIT - Intrusive Built In Test
- IRU - Inertial Reference Unit
- IS - Integrated Server
- LED - Light Emitting Diode

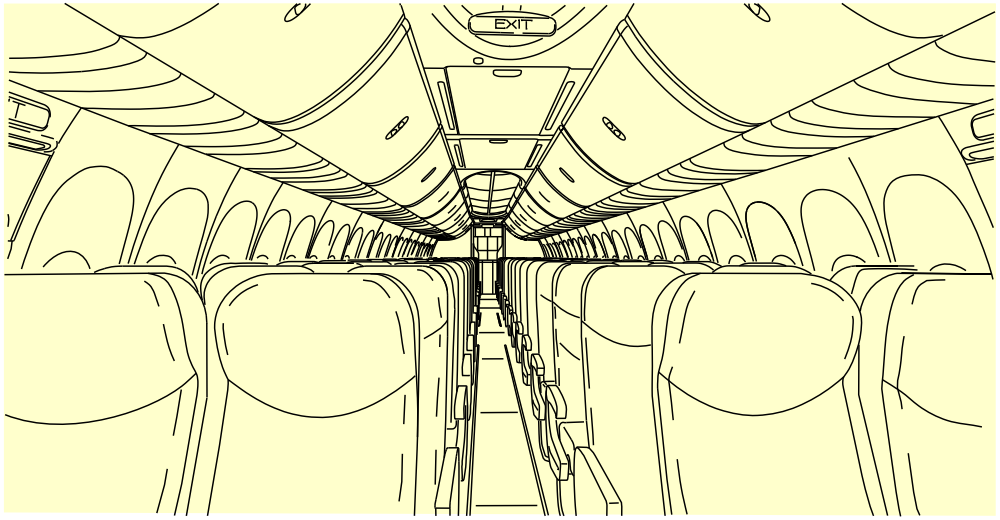
SIA 015-999

- OML - On-board Media Loader

SIA ALL

- PA - Passenger Announcement
- PAX - Passenger
- PCU - Passenger Control Unit
- PED - Portable Electronic Device
- PRAM - Pre-Recorded Audio Message
- PSS - Passenger Service System

- RAJ - Remote Audio Jack
- RJM - Remote Jack Module
- RJU - Remote Jack Unit
- SDU - Seat Display Unit
- UI - User Interface
- VA - Video Announcement



PASSENGER COMPARTMENT

2816469 S0000649255_V1

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION

General

The In-Flight Entertainment (IFE) system is installed at the following locations:

- Aft Cargo Compartment
- Passenger Compartment.

SIA 015-999

The partial provisions include the installation of circuit breakers, disconnect brackets, and discrete wiring interfaces to the E6 rack.

SIA ALL

The installation of the crew terminal, crew terminal harness, and ethernet data ports in the integrated shroud are located aft face of lavatory A. The crew terminal and data ports are labeled inoperative.

Passenger Compartment

The IFE equipment installed in the passenger compartment:

The Crew Terminal (CT) is installed on the aft face of the lavatory wall.

The Advanced Master Control Unit (AMCU) is installed in the overhead passenger compartment.

SIA 015-999

The on-board media loader is installed in the full height closet.

SIA 001-014

The Passenger Service Unit (PSU) Digital Overhead Monitor (DOM) is installed in the passenger compartment overhead area.

SIA ALL

The Seat Electronic Box (SEB) is installed in the passenger seat in the passenger compartment.

SIA 015-999

The Seat Power Module (SPM) is installed in the passenger seat in the passenger compartment.

SIA ALL

The Remote Jack Unit (RJU) installed in the passenger seat in the passenger compartment.

SIA 015-999

The seatback monitor is installed in a passenger seat in the passenger compartment.

SIA 001-014

The outlet unit is installed in a passenger seat in the passenger compartment.

SIA ALL

Aft Cargo Compartment

The Integrated Server (IS) is installed in the equipment rack.

Passenger Compartment

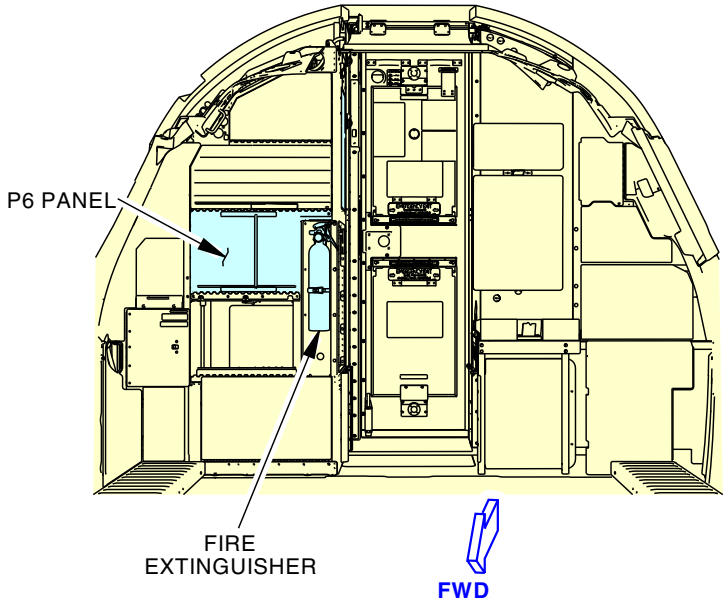
The IFE equipment installed in the passenger compartment:

- Display Unit and Docking Station
- Seat Power Unit.

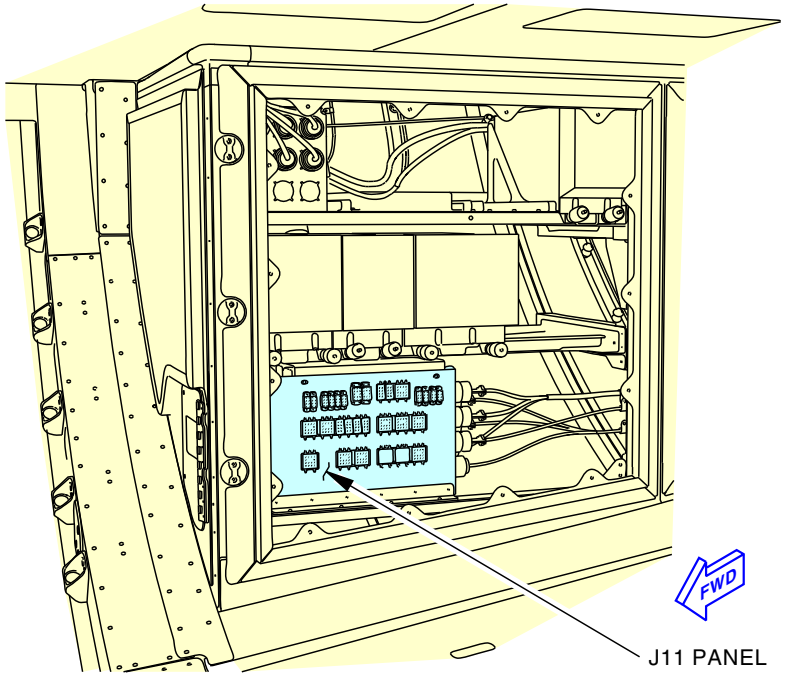
Aft Cargo Compartment

The System Control Unit is installed in the equipment rack.

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



FLIGHT COMPARTMENT
(AFT VIEW)

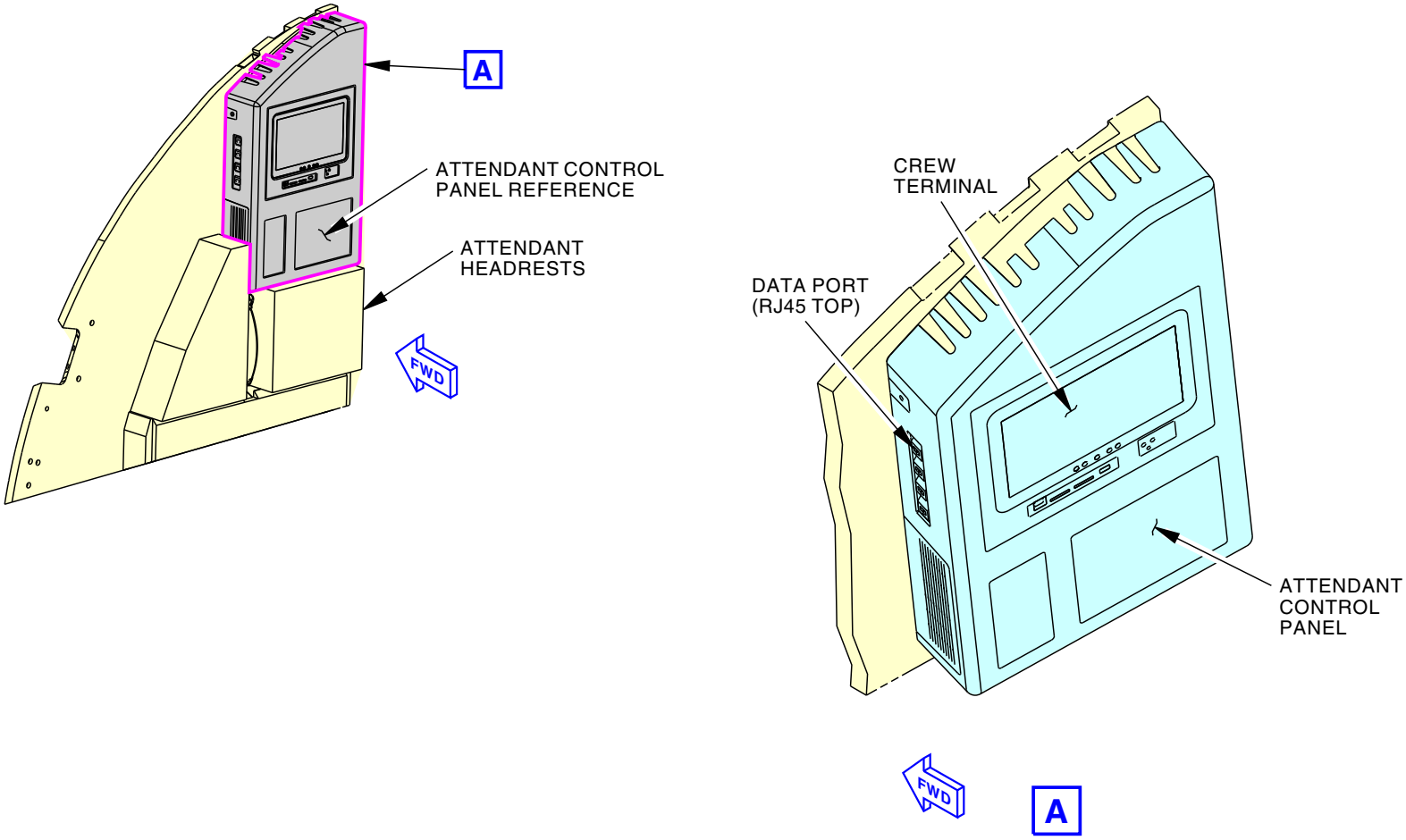


ENHANCED E6 EQUIPMENT RACK

2816593 S0000649254_V1

PARTIAL PROVISIONS - COMPONENT LOCATION

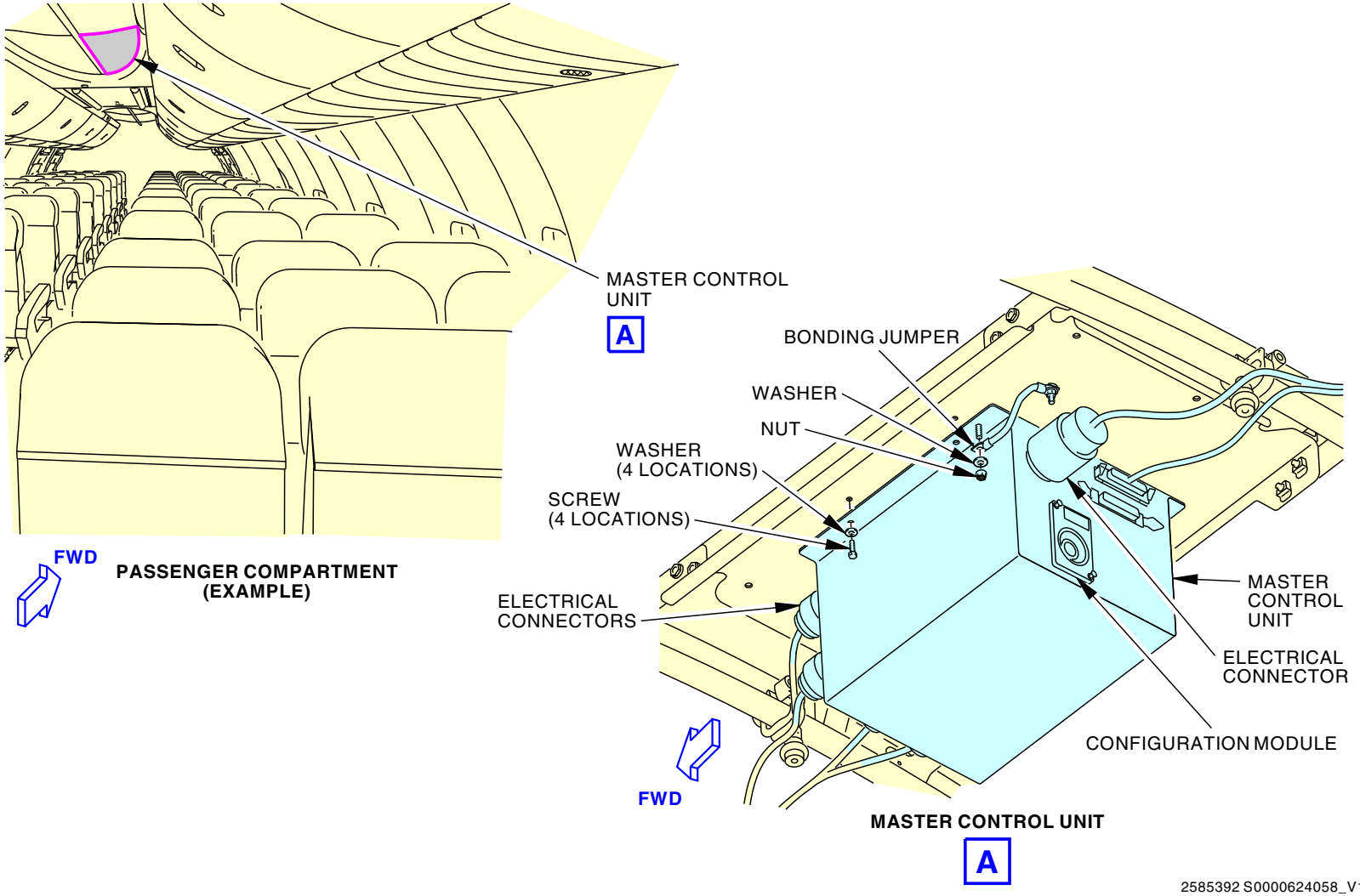
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



2568594 S0000615338_V1

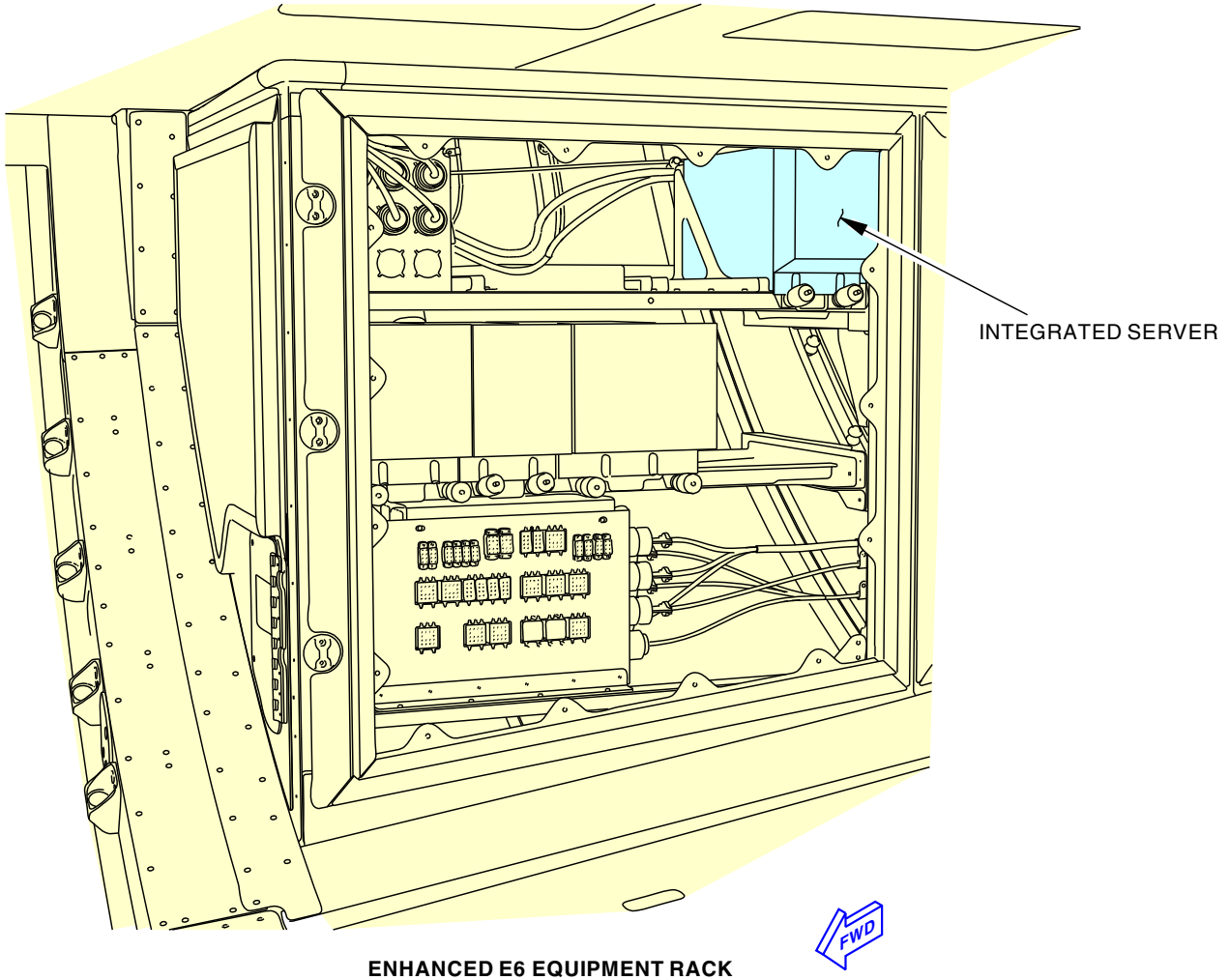
CREW TERMINAL - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



ADVANCED MASTER CONTROL UNIT - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION

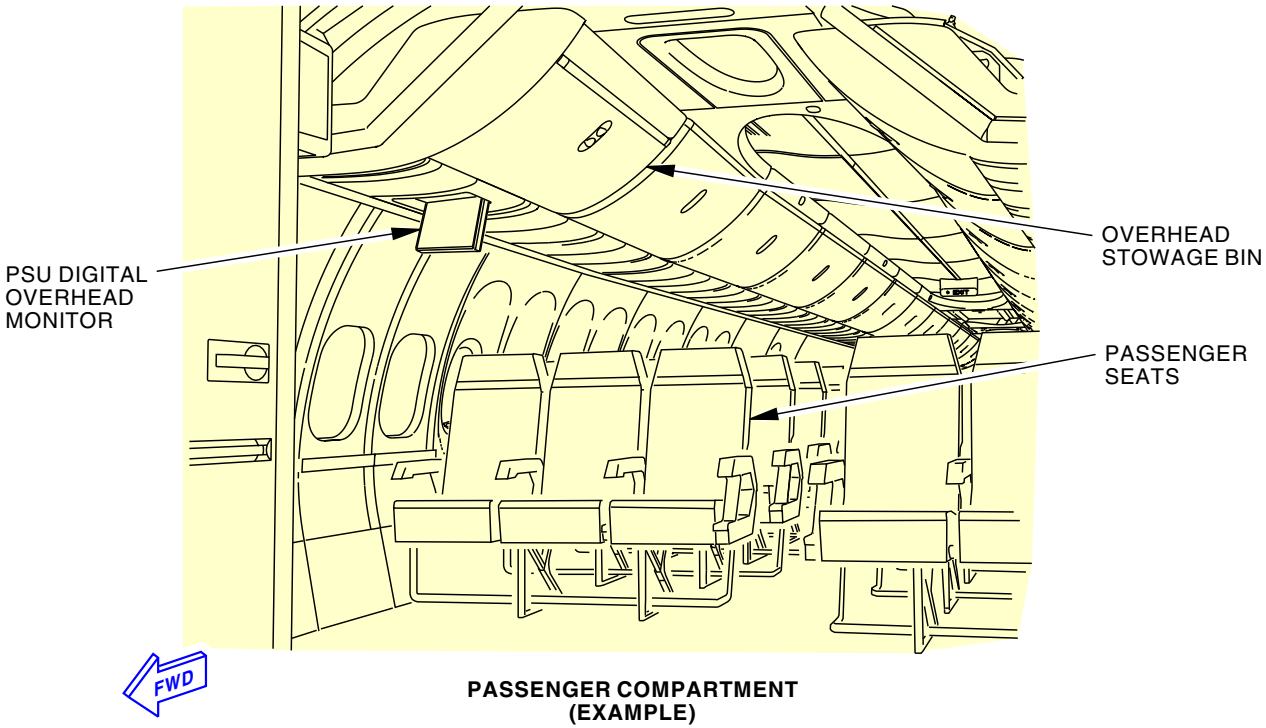


ENHANCED E6 EQUIPMENT RACK

2568596 S0000615340_V1

AFT CARGO COMPARTMENT - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION

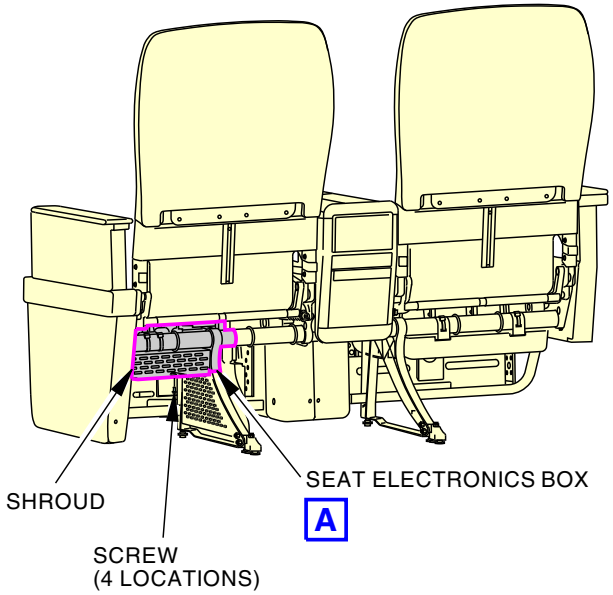


PASSENGER COMPARTMENT (EXAMPLE)

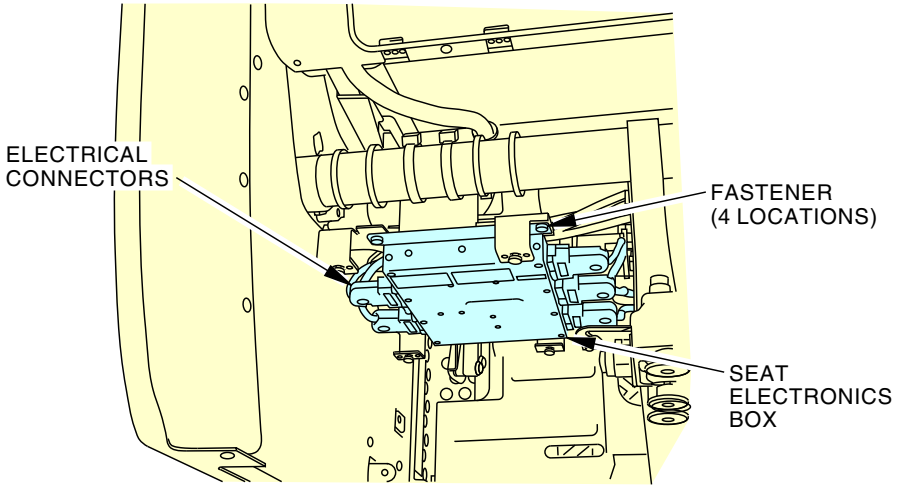
2568602 S0000615349_V1

PSU DIGITAL OVERHEAD MONITOR - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



PASSENGER SEATS (EXAMPLE)



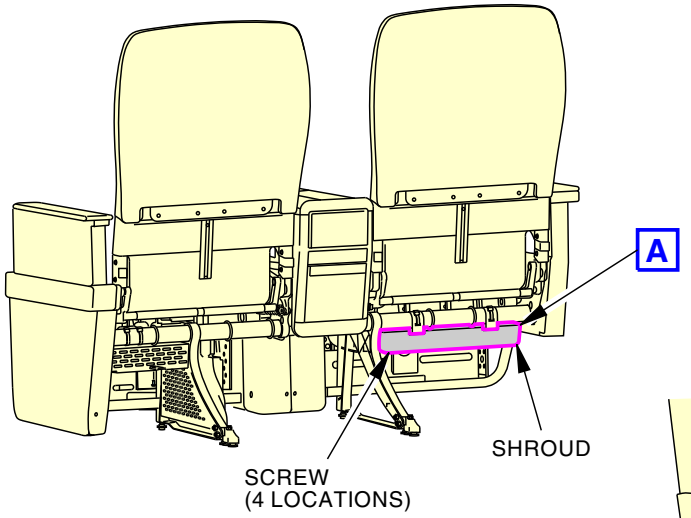
SEAT ELECTRONICS BOX

A

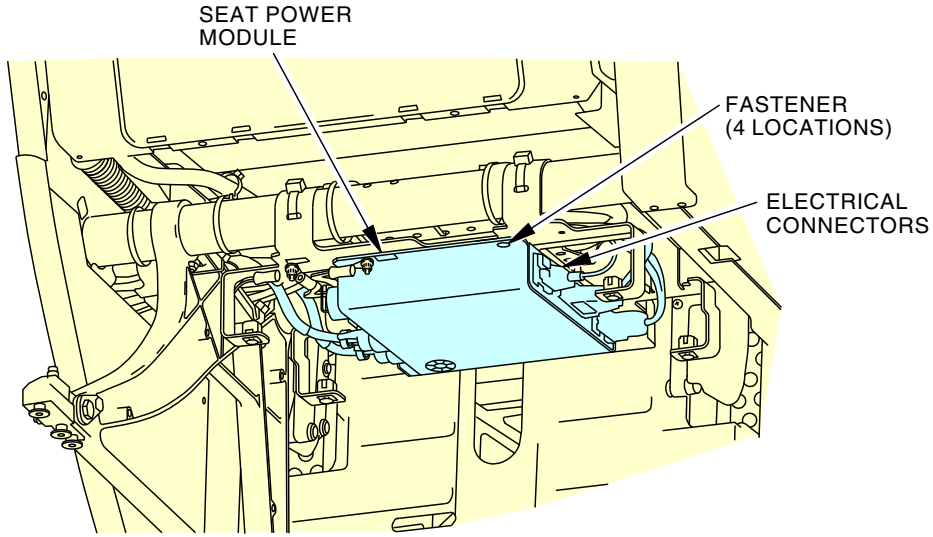
2795657 S0000637050_V1

SEAT ELECTRONICS BOX - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



PASSENGER SEATS (EXAMPLE)



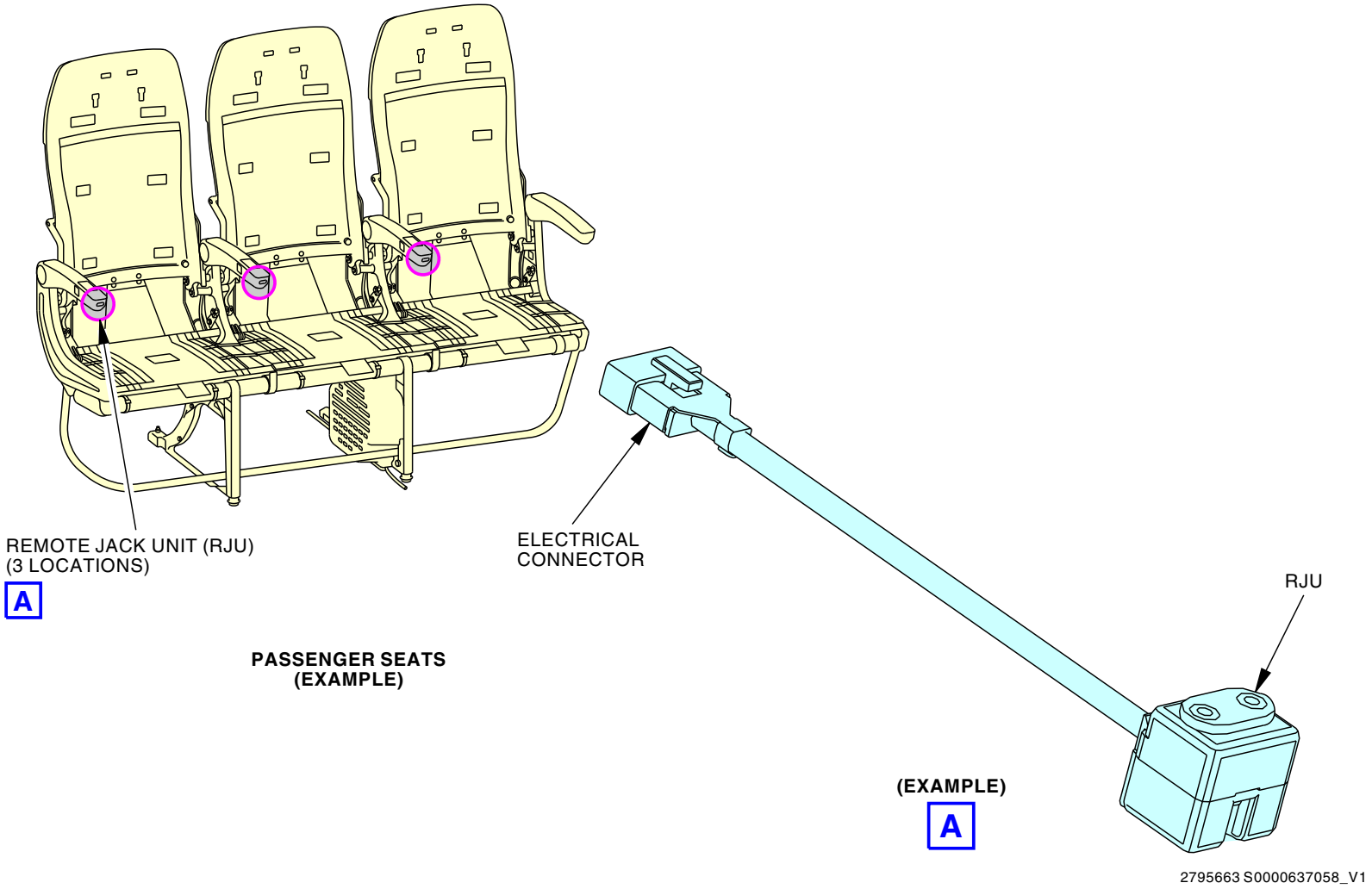
SEAT POWER MODULE

A

2795658 S0000637051_V1

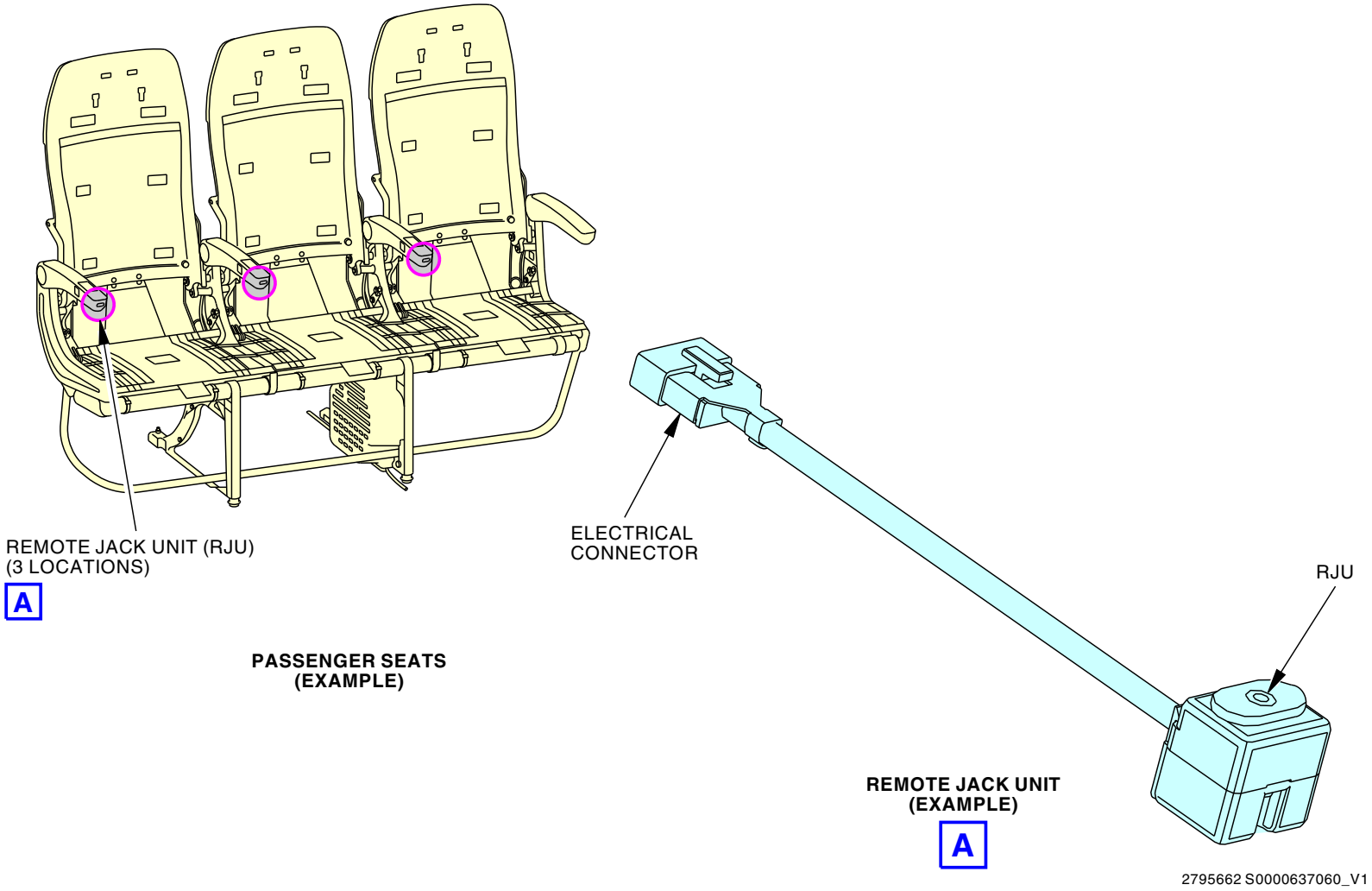
SEAT POWER MODULE - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



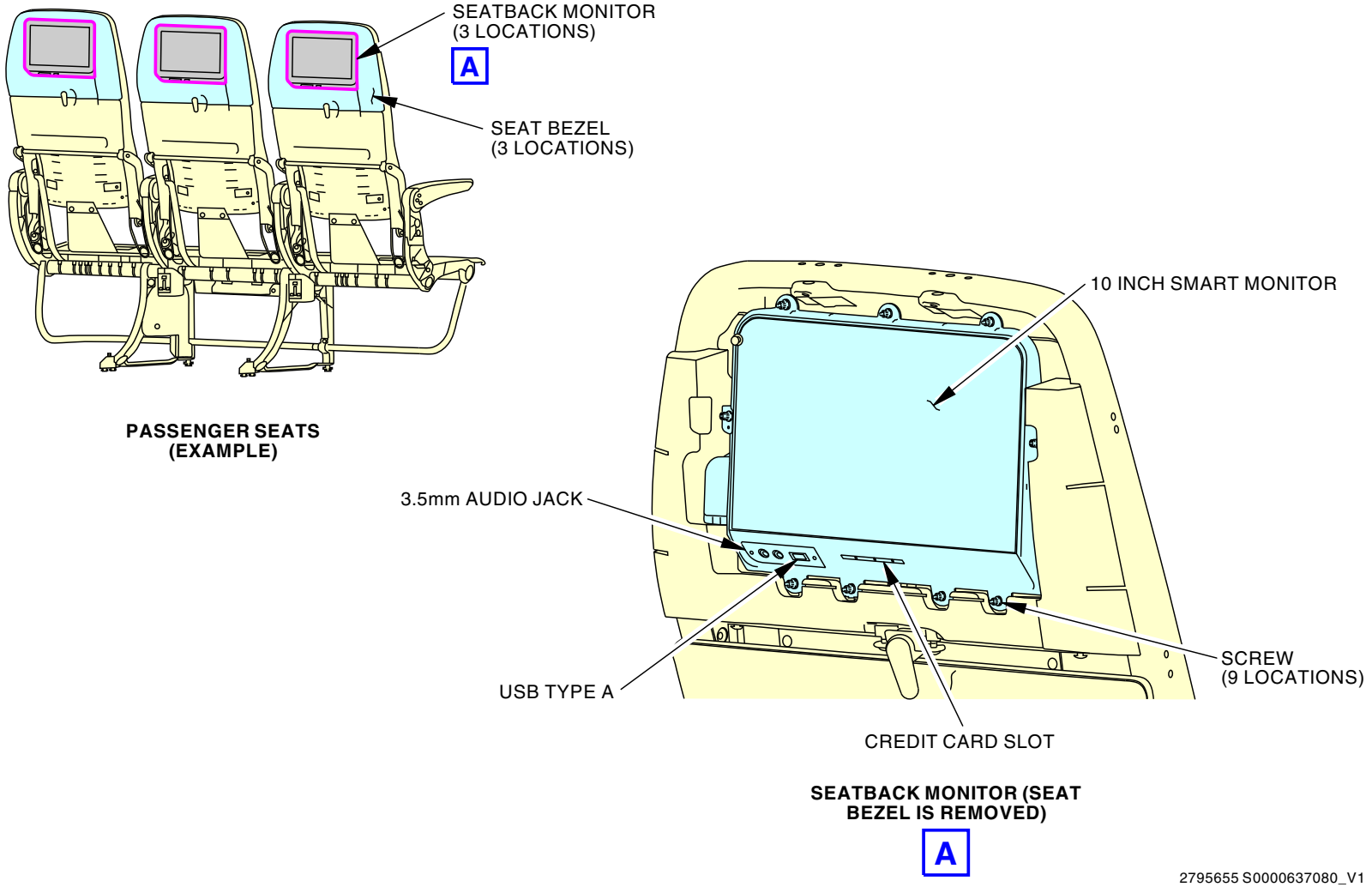
TWO JACK REMOTE JACK UNIT - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



SINGLE JACK REMOTE JACK UNIT - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



PASSENGER SEATS (EXAMPLE)

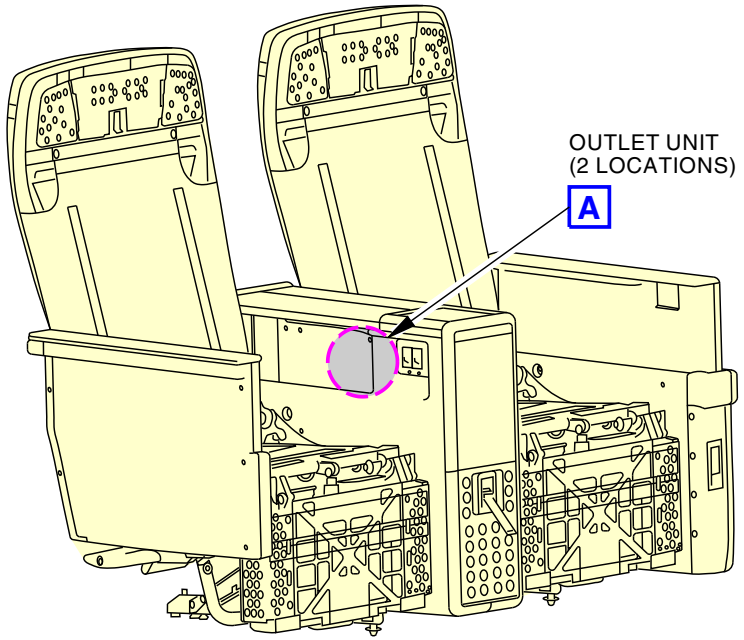
SEATBACK MONITOR (SEAT BEZEL IS REMOVED)

A

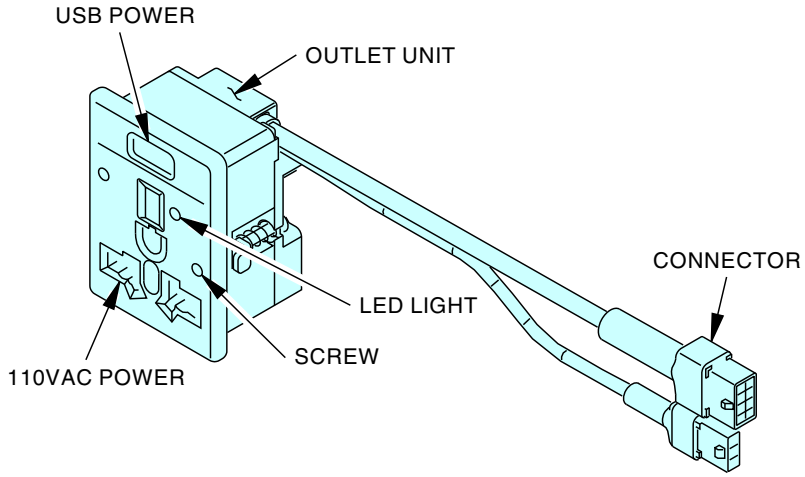
2795655 S0000637080_V1

10 INCH SEAT MOUNTED MONITOR - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT LOCATION



PASSENGER SEATS (EXAMPLE)



OUTLET UNIT (EXAMPLE)

A

2789129 S0000633885_V1

OUTLET UNIT - COMPONENT LOCATION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

General

The In-Flight Entertainment (IFE) equipment installed is used for entertainment purposes.

The IFE system consists of the following Line Replaceable Unit (LRU)'s:

- Crew Terminal (CT)
- Integrated Server (IS)

SIA 001-014

- Passenger Service Unit (PSU) Digital Overhead Monitor

SIA ALL

- Advanced Master Control Unit

SIA 001-014

- In-Seat Power Supply
- Outlet Unit

SIA ALL

- Remote Jack Unit
- Passenger Control Unit

SIA 001-014

- Remote Jack Module

SIA ALL

- Seat Electronics Box

SIA 015-999

- Solid State On-Board Media Loader
- Smart Monitor
- Seat Power Module.

Partial provisions install discrete wiring interfaces to aircraft systems, circuit breakers are collared and labeled inoperative, and brackets to accommodate wiring provisions.

Partial Provisions

Partial provisions installs the interface wiring for various aircraft systems.

The forward and aft disconnect bracket located in the overhead cabin area approximately STA 373 and STA 857 to accommodate wiring provisions.

Airplane systems discrete wiring interfaces to E6 rack:

- Air/Ground (Weight on Wheels)
- Parking Brake Position
- Door Lock/Unlock
- Engines On/Off
- No Smoking
- Fasten Seat Belts
- Decompression.

Interface wiring for Video-On Indicator.

ARINC 429 interface wiring to Flight Management Computer (FMC) and Air Data Inertial Reference Unit (ADIRU).

Interface wiring for the E3 disconnect for Aircraft Communications Addressing And Reporting System (ACARS)/Communications Management Unit (CMU).

Interface wiring for Passenger Address (PA) system.

Interface wiring to the Attendant Control Panel (ACP).

Interface wiring from the circuit breakers to E6 rack overhead disconnect for IFE Control Panel.

SIA ALL

Crew Terminal

The CT is designed to provide aircraft crew access to configuration and maintenance control. The CT has a capability to provide the capability of storing data and cabin zone control.

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

The CT has the following functions:

- Control of cabin lighting
- Control of cabin zone to video source mapping
- Control of boarding music
- Control of Pre-Recorded Announcement Machine (PRAM)
- Control of PA cabin zone configuration
- Control of Data Loading
- Initiate BITE requests to all peripherals and store resulting BITE data for fault location and unit type
- Preview video and audio programs.

Integrated Server

The IS is designed to provide an interface between cabin equipment and the aircraft avionics equipment, provide Audio Video On Demand (AVOD) streaming, PA audio, and network connections to other units in the system.

The IS has the following functions:

- Provides Ethernet interfaces to the aircraft equipment
- Provides ARINC 429 interfaces to the aircraft subsystems
- Supports PA audio zones and overriding entertainment audio during PA announcements
- Provides PRAM and Boarding Music audio
- Routes passenger service data to the aircraft system
- Supports wireless streaming
- Web portal
- Broadband access
- Inbound and outbound data network capability.

SIA 001-014

Passenger Service Unit (PSU) Digital Overhead Monitor (DOM)

The Digital Overhead Monitor (DOM) panel consists of a frame mounting structure which houses a retractable 12-in. LCD Monitor. It is used for installation onto existing overhead rails using connect clips and hinges.

The DOM has the following features:

- Deploys into the view position within 10 seconds
- Retracts into the stowed position within 10 seconds
- Manual reset switch
- Obstruction retraction
- Impact retraction
- Power failure retraction
- Maintenance latch block.

SIA ALL

Advanced Master Control Unit

The Master Control Unit (MCU) distributes power to the passenger seats.

SIA 001-014

In-Seat Power Supply

The In-Seat Power Supply (ISPS) supplies 110VAC power.

Outlet Unit

A Personal Electronic Device (PED) connects to the outlet unit.

SIA ALL

Remote Jack Unit

The Remote Jack Unit (RJU) is an extension of the Passenger Control Unit (PCU) for audio connection, such as a headset.

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

Passenger Control Unit

The Passenger Control Unit (PCU) provides the interface to control audio entertainment for the passenger.

The PCU refers to the following:

- Passenger Control Unit
- Passenger Seat Handset and Cradle.

SIA 001-014

Remote Jack Module

The Remote Jack Module (RJM) provides USB power to charge a PED.

SIA ALL

Seat Electronics Box

The Seat Electronics Box (SEB) provides audio and power to the passenger seat.

SIA 015-999

On-Board Media Loader

The On-board Media Loader (OML) loads content media to the IFE system.

Video Display Unit

The video display unit provides the video presentation to the passenger through a in-seat color display.

The video display unit Graphical User Interface (GUI) can also be used to interact with the IFE system at the passenger seat.

Seat Power Module

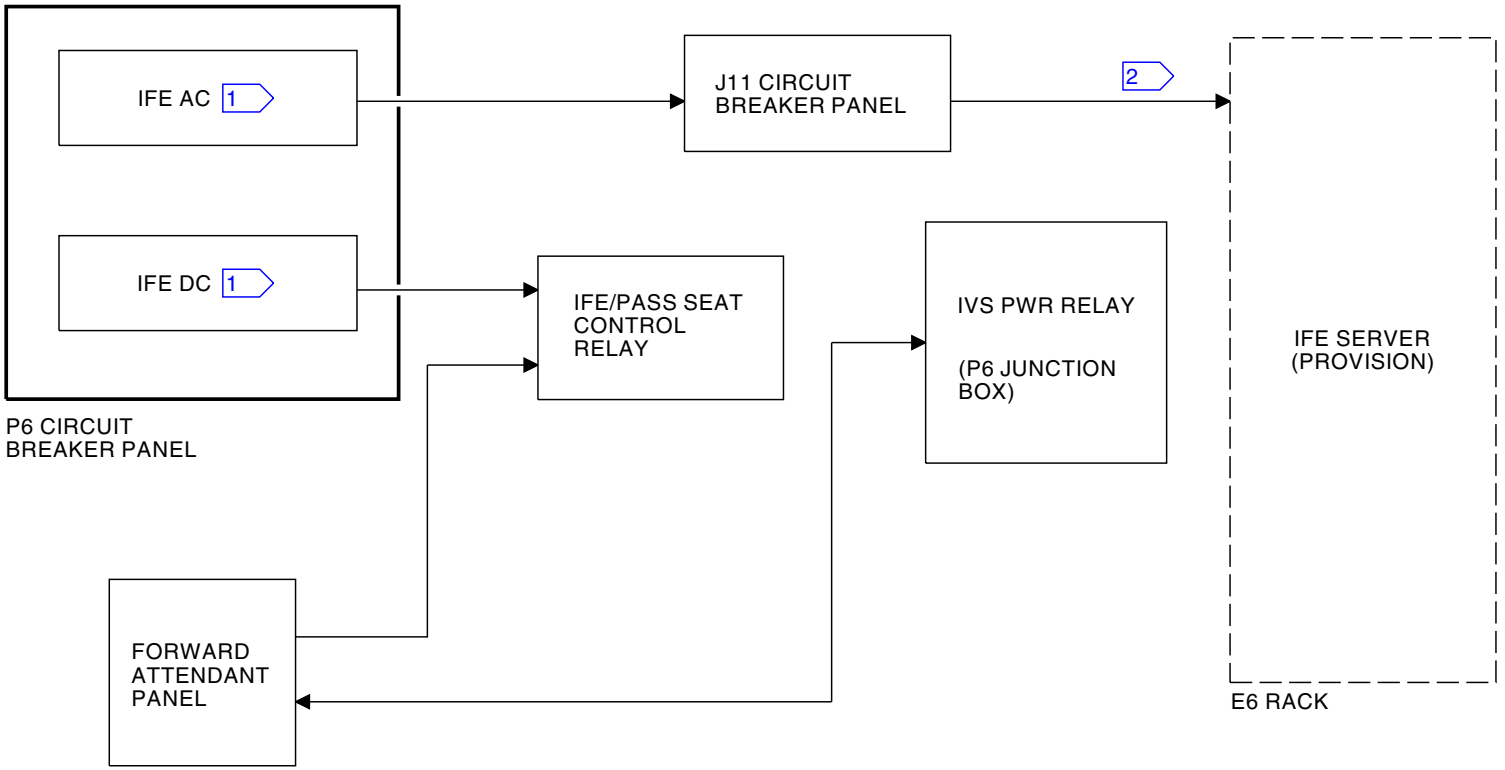
The Seat Power Module (SPM) supplies power to the outlet units to power and operate a laptop computer or PED and recharge its battery. The SPM also has the capability of providing DC power to the Seat Electronics Box (SEB) and IFE in-seat peripheral equipment. There is a SPM installed at every seat group and each SPM can provide PC power for up to 3 outlet units. The SPM is also equipped with a Built-In Test (BIT) functionality.

The SPM has these features:

- Connects to 115VAC, 360-800Hz single phase airplane input power.
- Provides 110VAC, 60Hz, single phase power for PED.
- Provides 28VDC to an IFE SEB and peripheral equipment.

SIA ALL

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

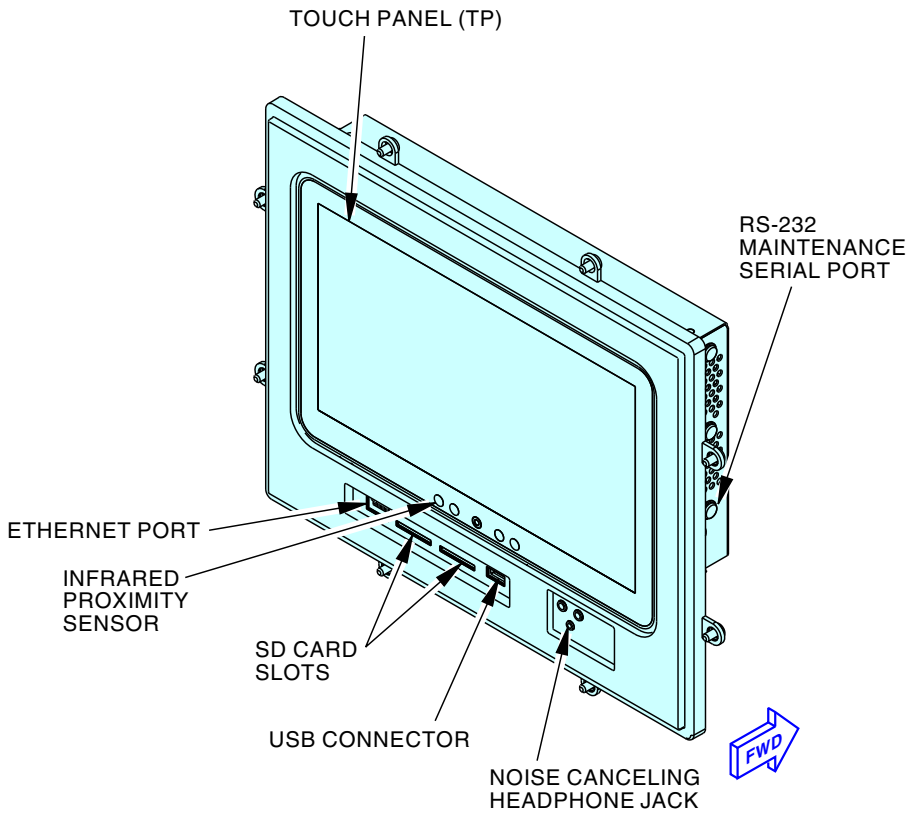


1 NOP
2 CAP AND STOW CONNECTOR

2816598 S0000649253_V1

PARTIAL PROVISIONS - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

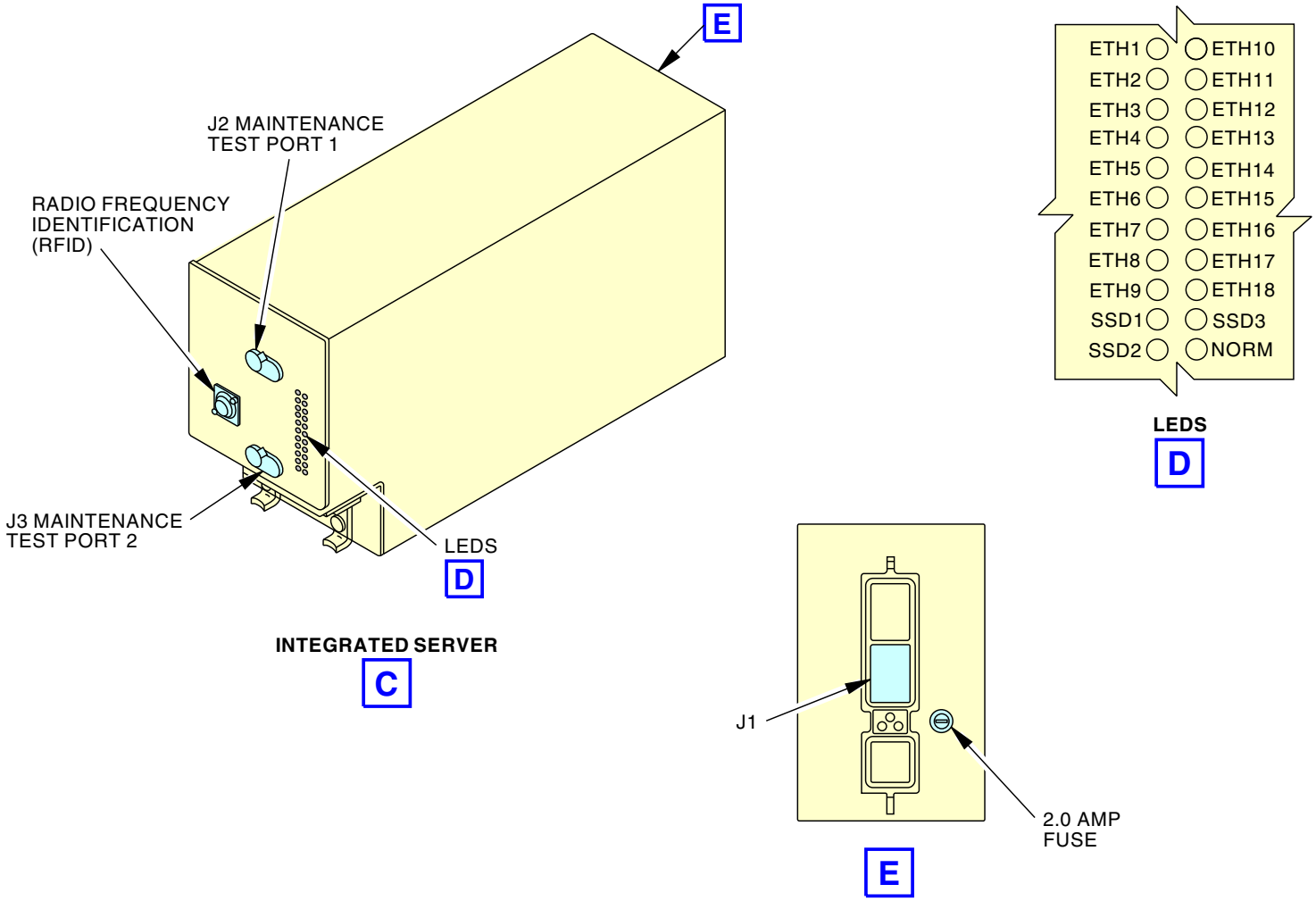


CREW TERMINAL

2557252 S0000609035_V1

CREW TERMINAL - GENERAL DESCRIPTION

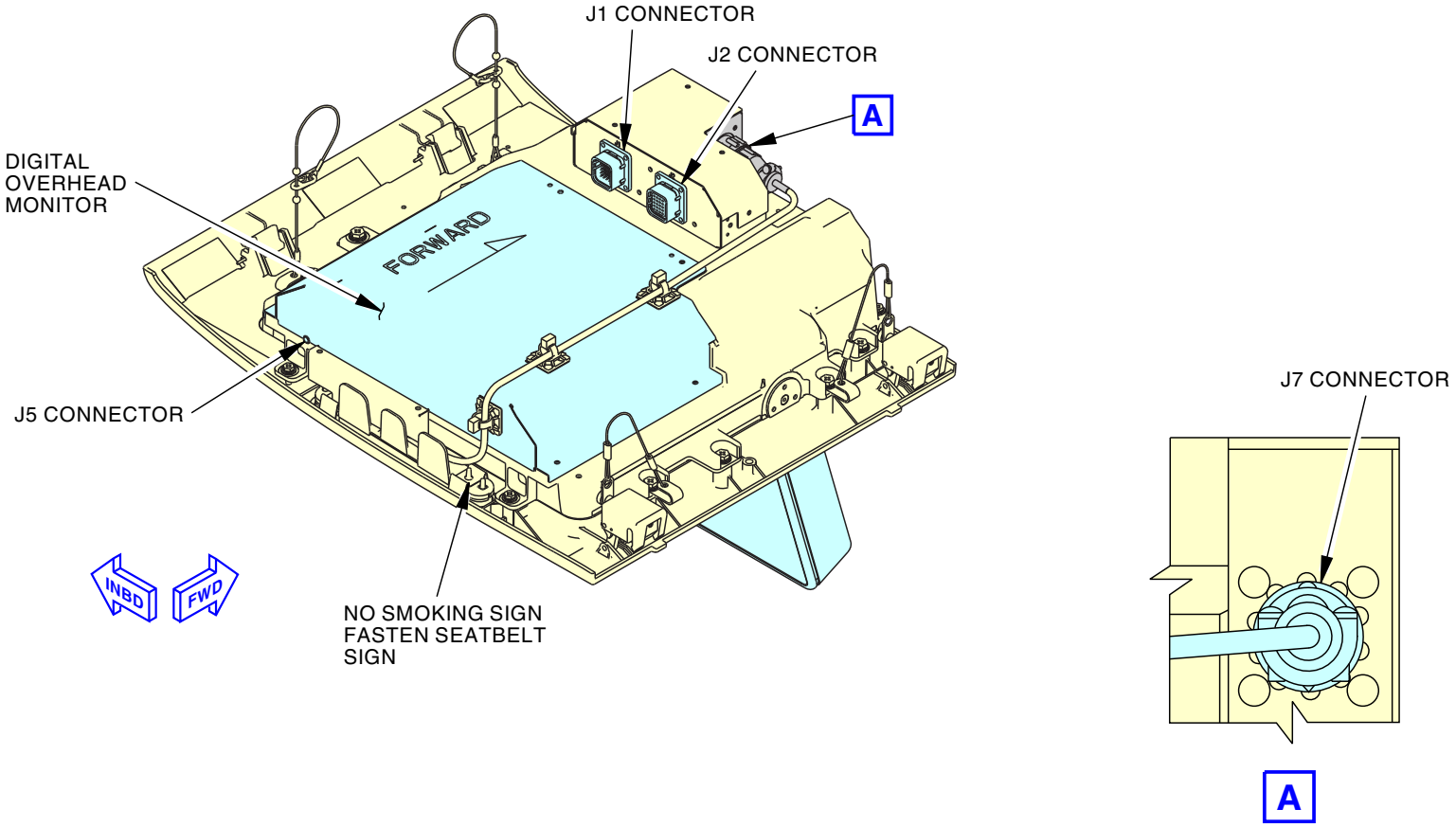
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



2568604 S0000615350_V1

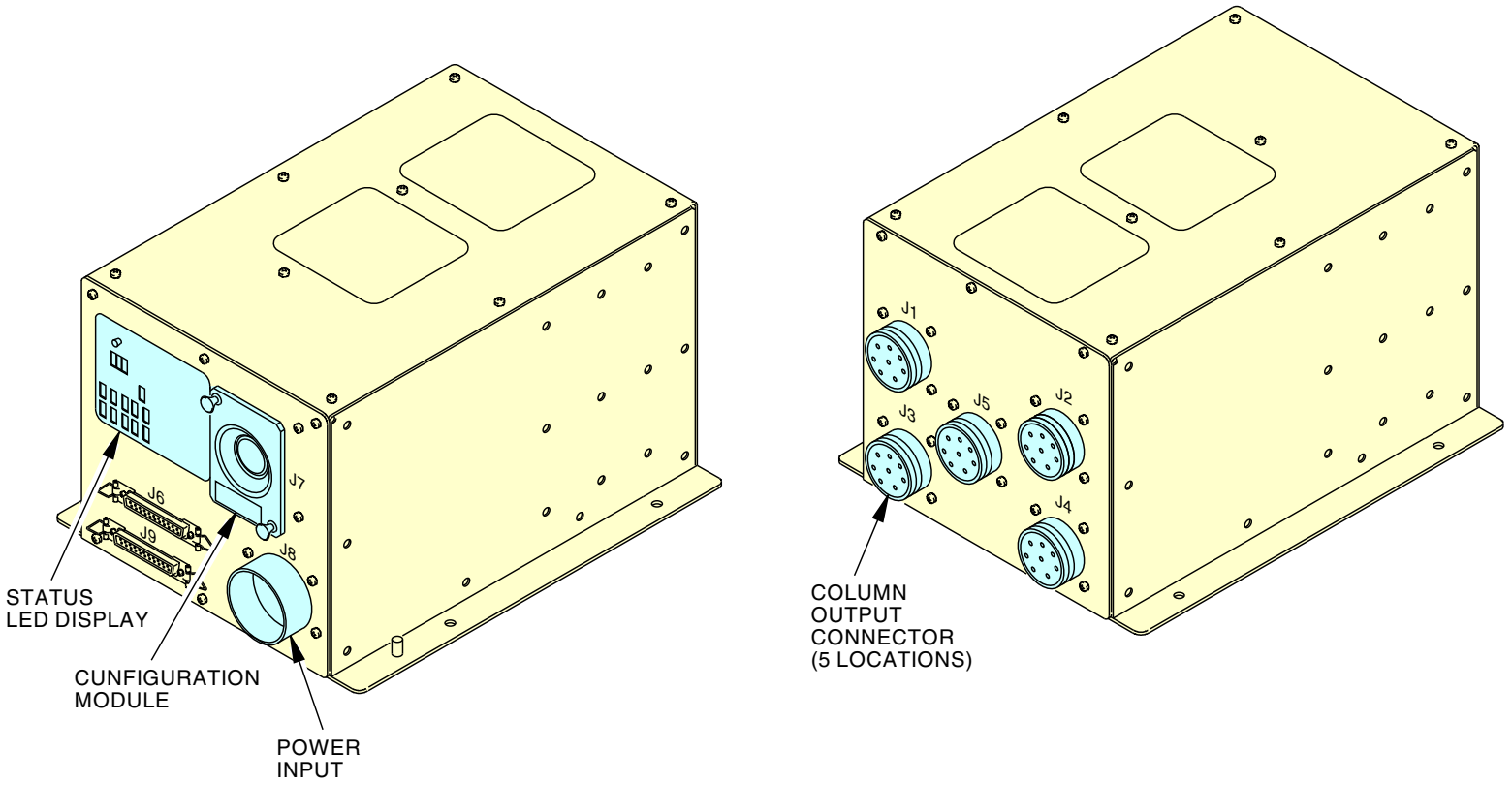
INTEGRATED SERVER - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



2568605 S0000615352_V1

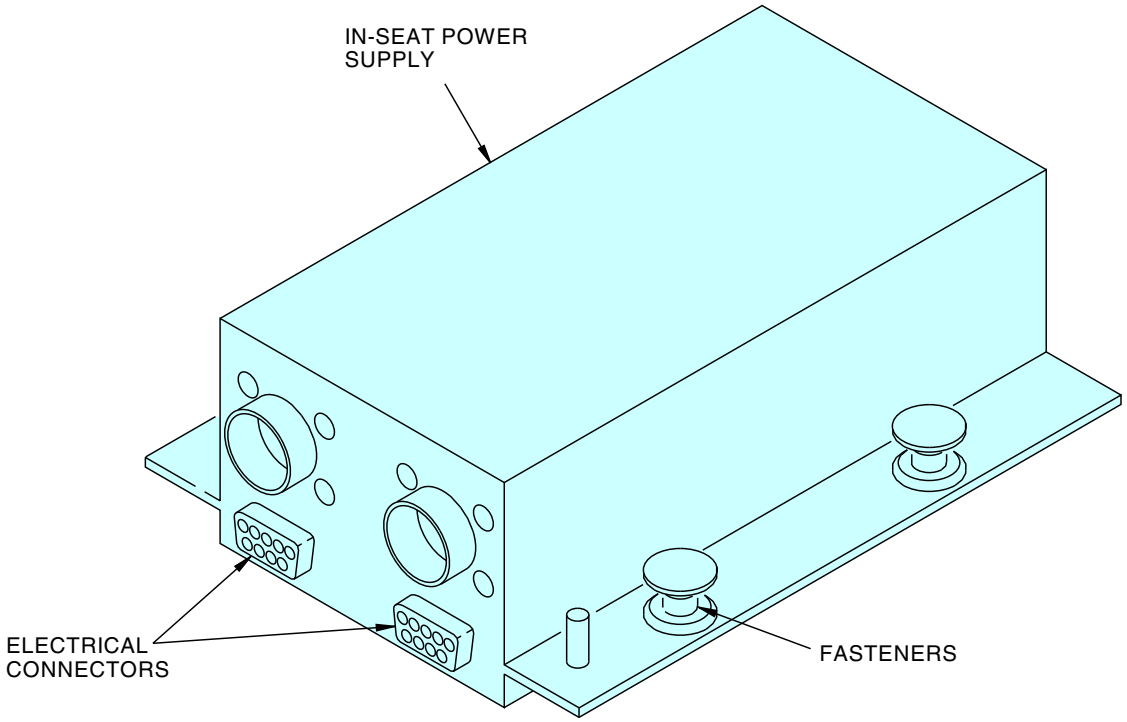
PSU DIGITAL OVERHEAD MONITOR - GENERAL DESCRIPTION



MASTER CONTROL UNIT

2547017 S0000605803_V1

ADVANCED MASTER CONTROL UNIT - GENERAL DESCRIPTION

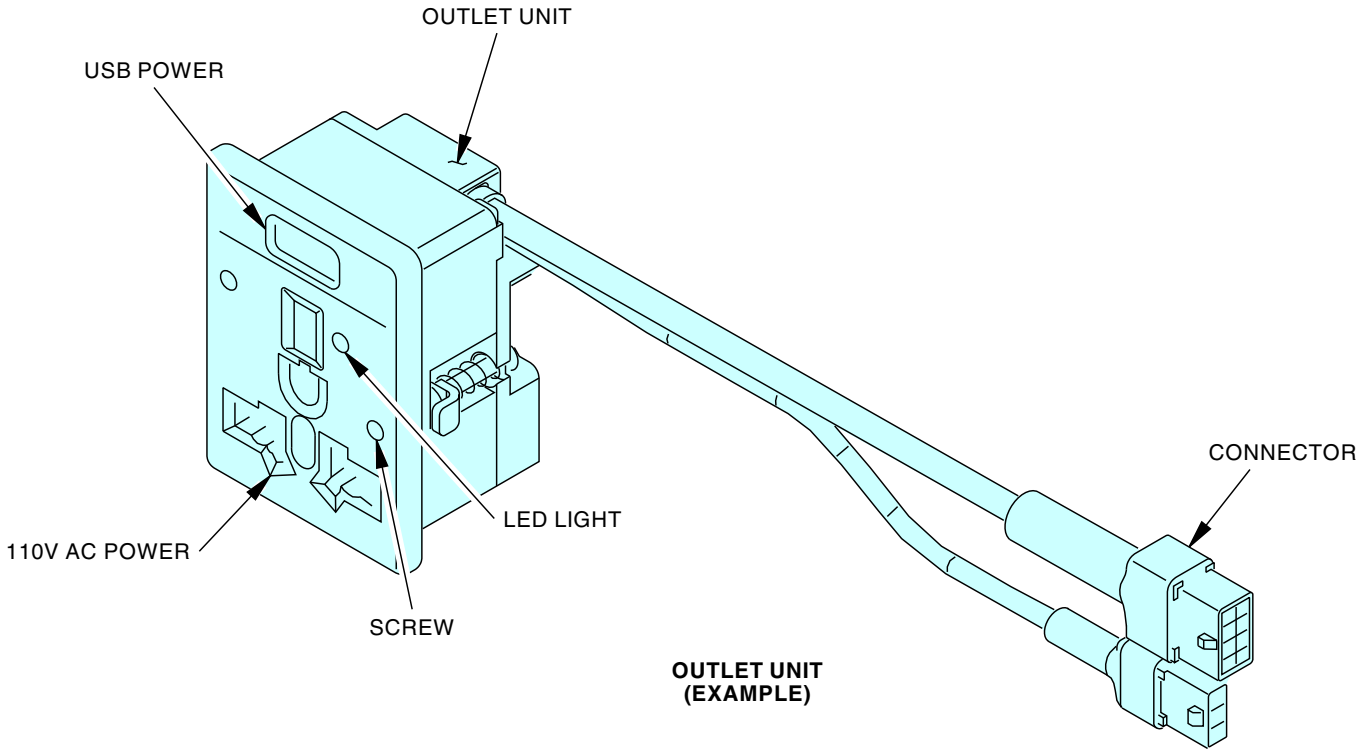


**IN-SEAT POWER SUPPLY
(EXAMPLE)**

2547058 S0000605806_V1

IN-SEAT POWER SUPPLY - GENERAL DESCRIPTION

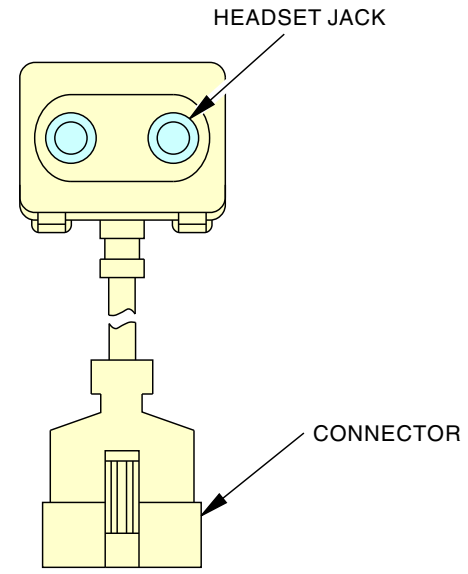
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



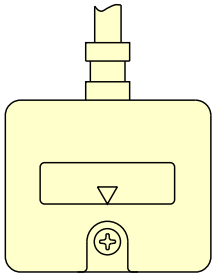
OUTLET UNIT (EXAMPLE)

2547056 S0000605859_V2

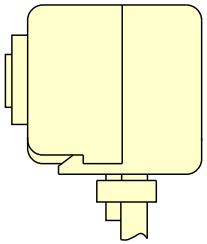
OUTLET UNIT - GENERAL DESCRIPTION



REMOTE JACK UNIT
(FRONT VIEW)
(EXAMPLE)



REMOTE JACK UNIT
(REAR VIEW)
(EXAMPLE)

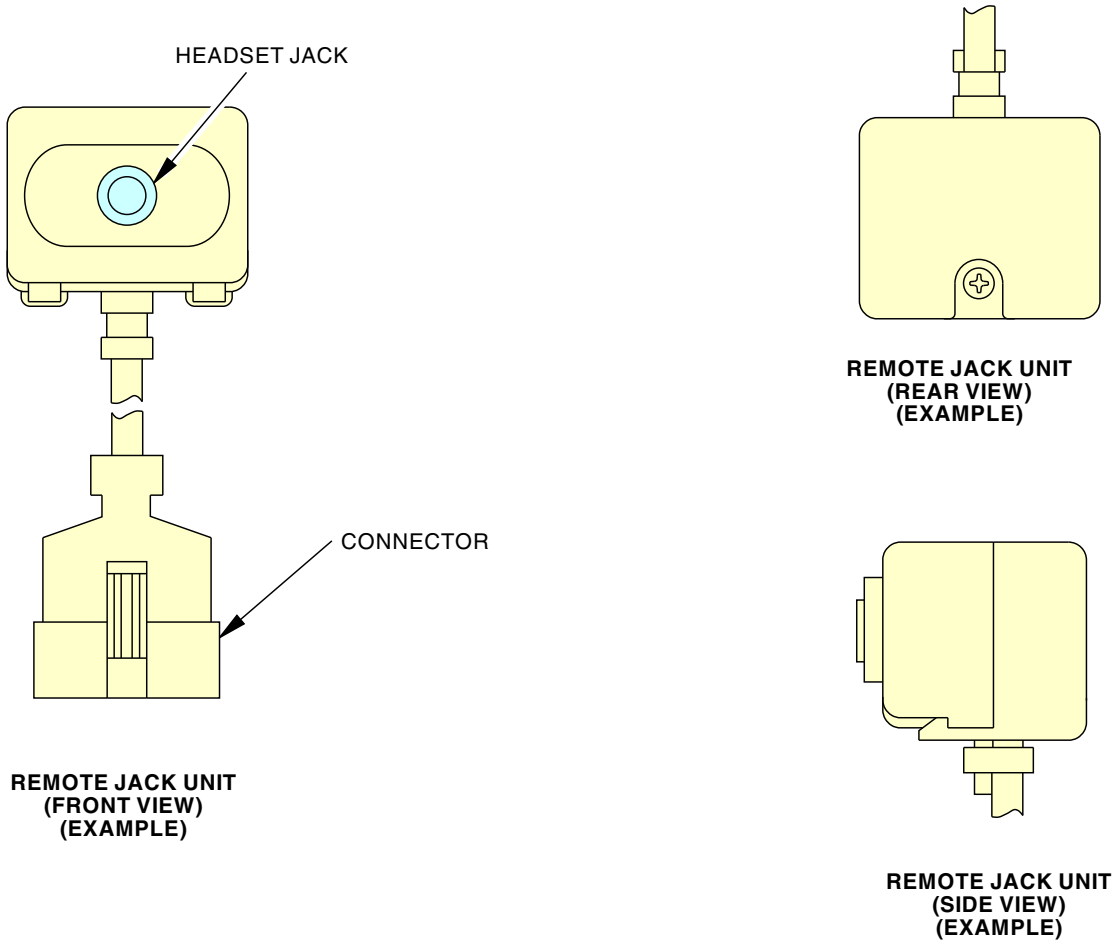


REMOTE JACK UNIT
(SIDE VIEW)
(EXAMPLE)

2585394 S0000624020_V1

TWO JACK REMOTE JACK UNIT - GENERAL DESCRIPTION

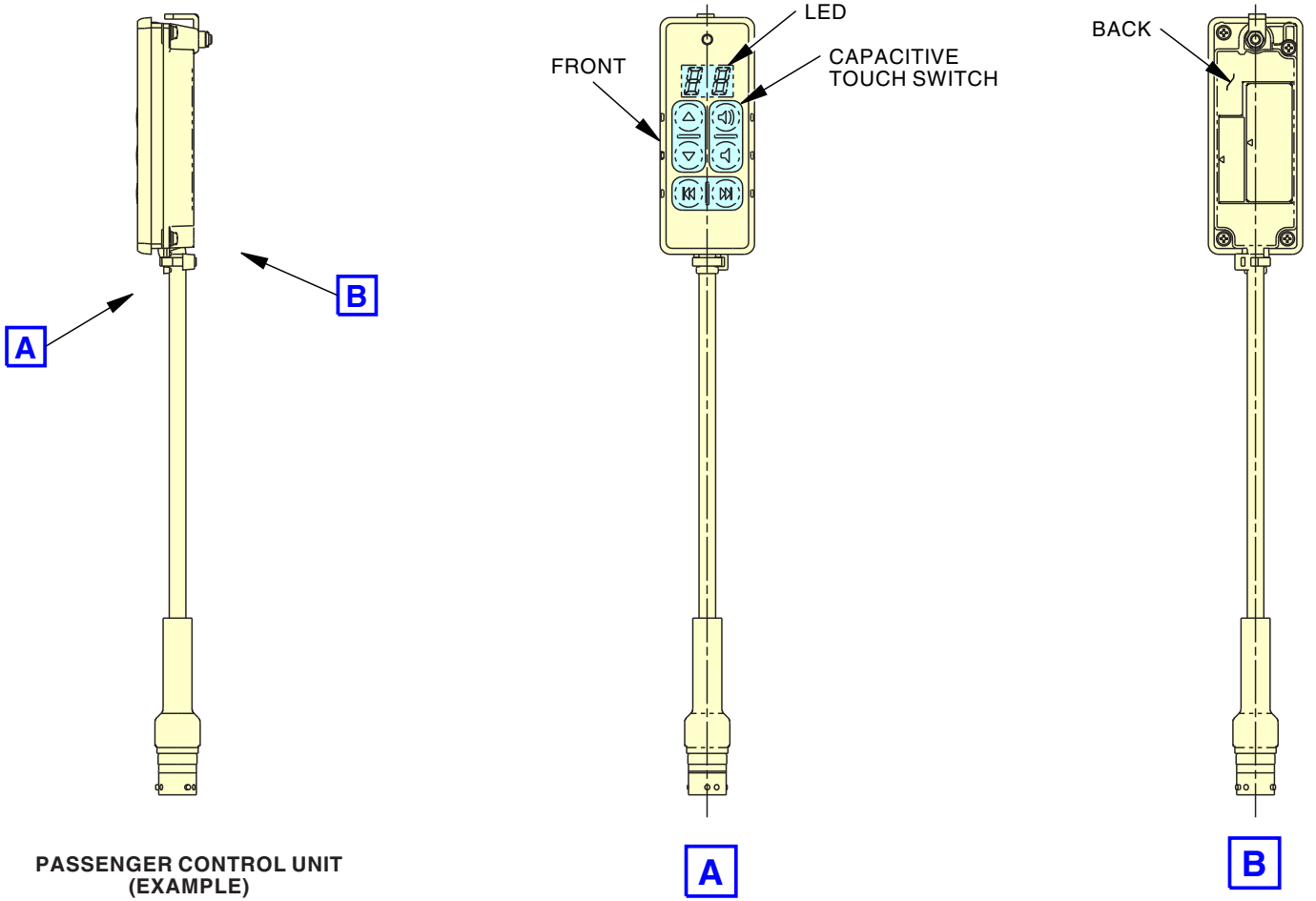
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



2585395 S0000624022_V1

SINGLE JACK REMOTE JACK UNIT - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

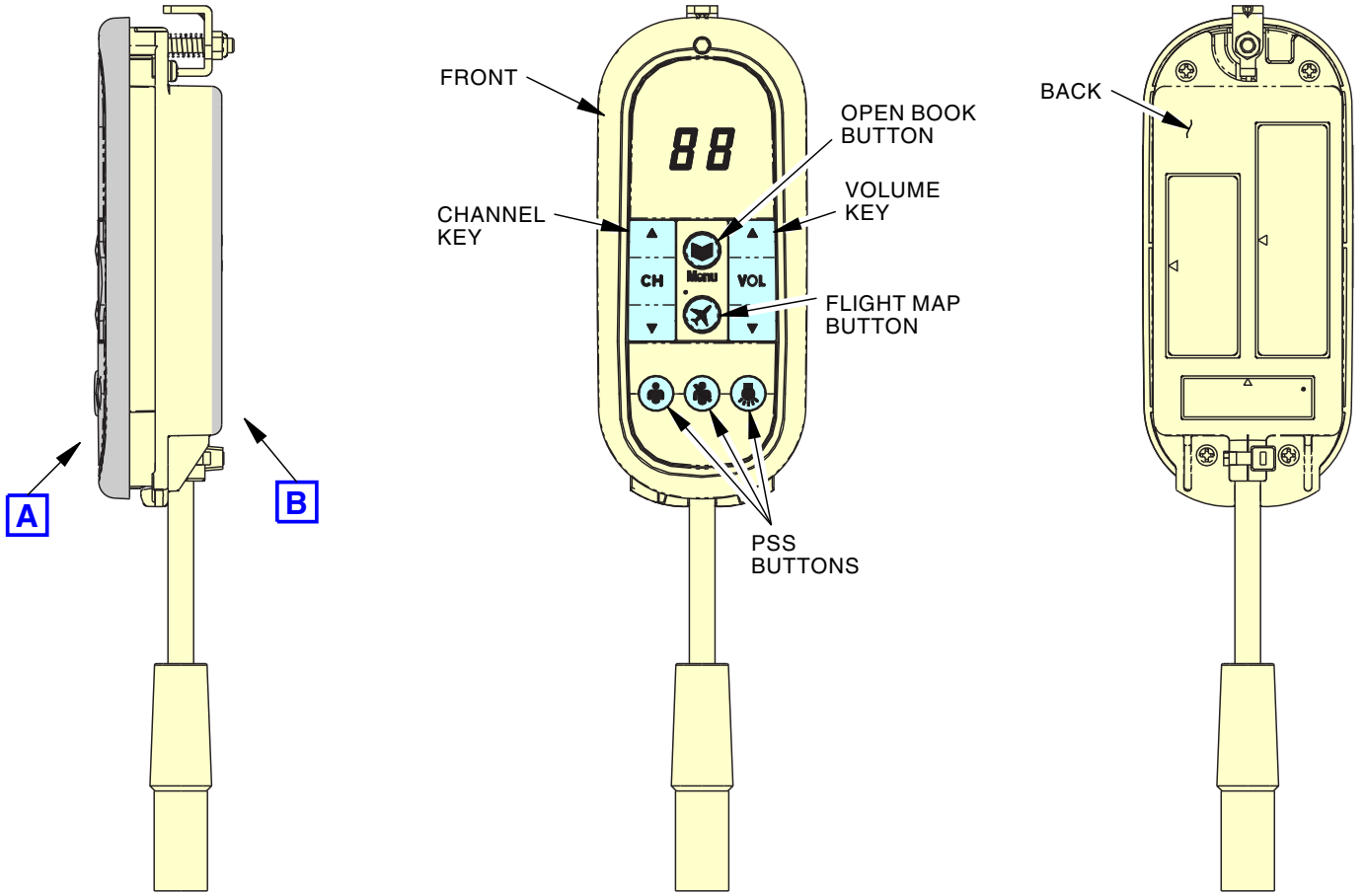


PASSENGER CONTROL UNIT
(EXAMPLE)

2585393 S0000624040_V1

PASSENGER CONTROL UNIT - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

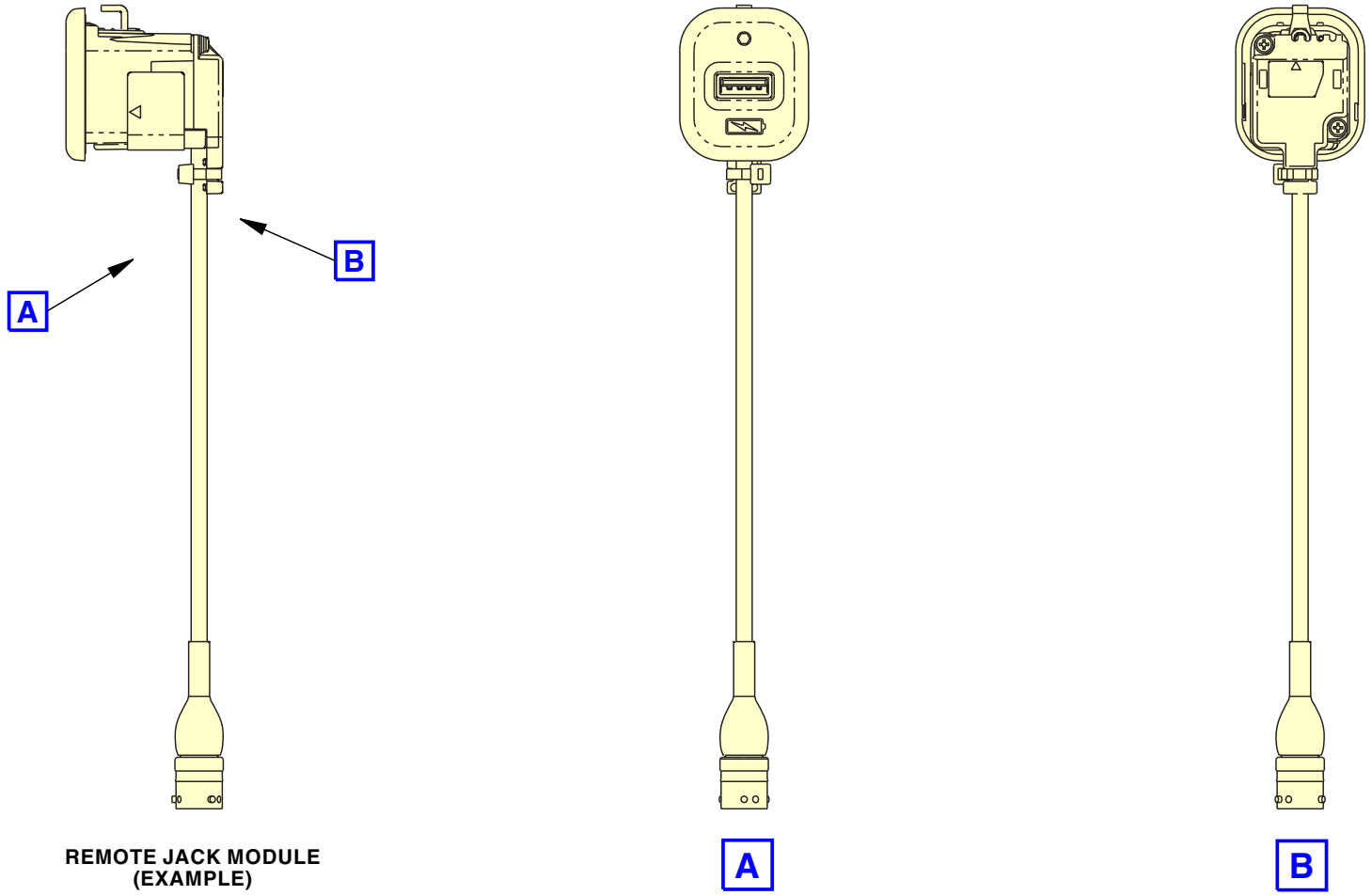


PASSENGER CONTROL UNIT

2979889 S0000758124_V1

PASSENGER CONTROL UNIT - GENERAL DESCRIPTION

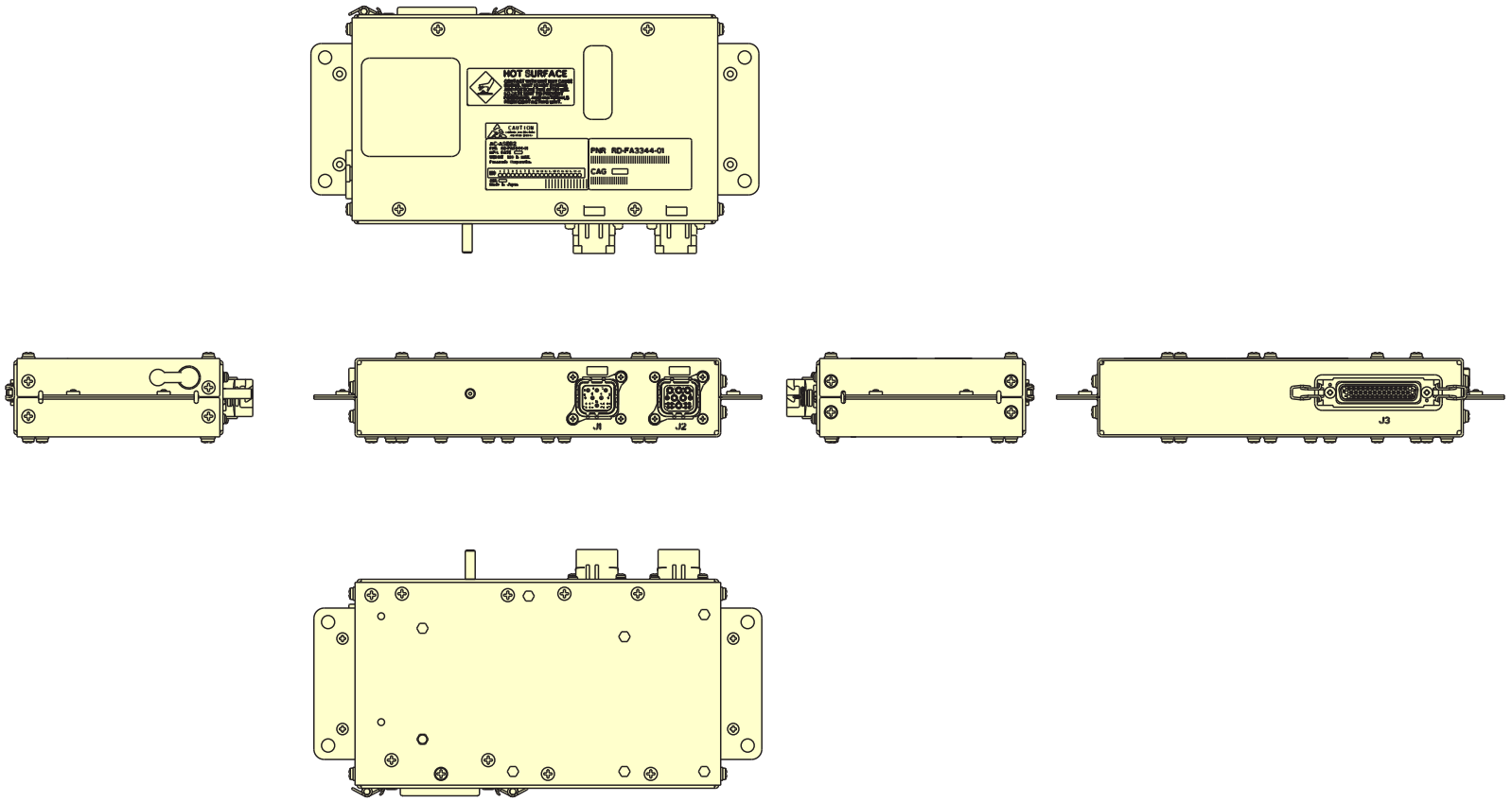
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



REMOTE JACK MODULE
(EXAMPLE)

2585397 S0000624046_V1

REMOTE JACK MODULE - GENERAL DESCRIPTION



SEAT ELECTRONICS BOX
(EXAMPLE)

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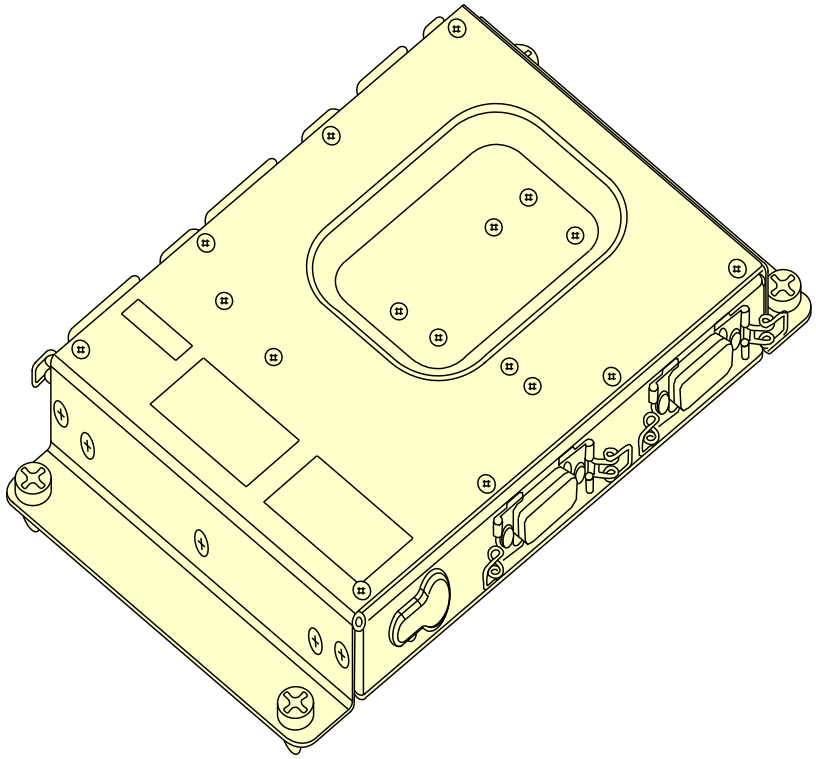
SEAT ELECTRONICS BOX (AC-SEB2) - GENERAL DESCRIPTION

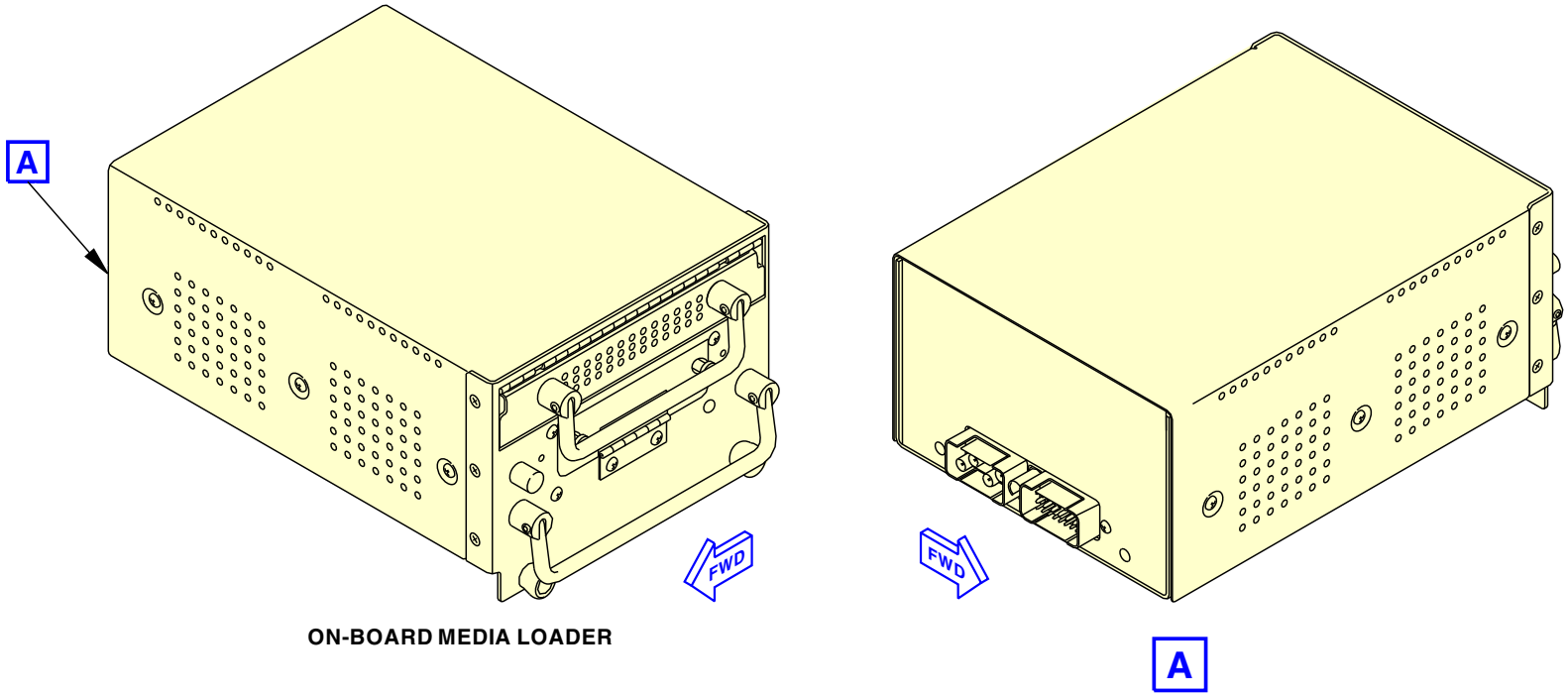


SEAT ELECTRONIC BOX (DC-SEB)

2795660 S0000636961_V1

SEAT ELECTRONICS BOX (DC-SEB) - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION

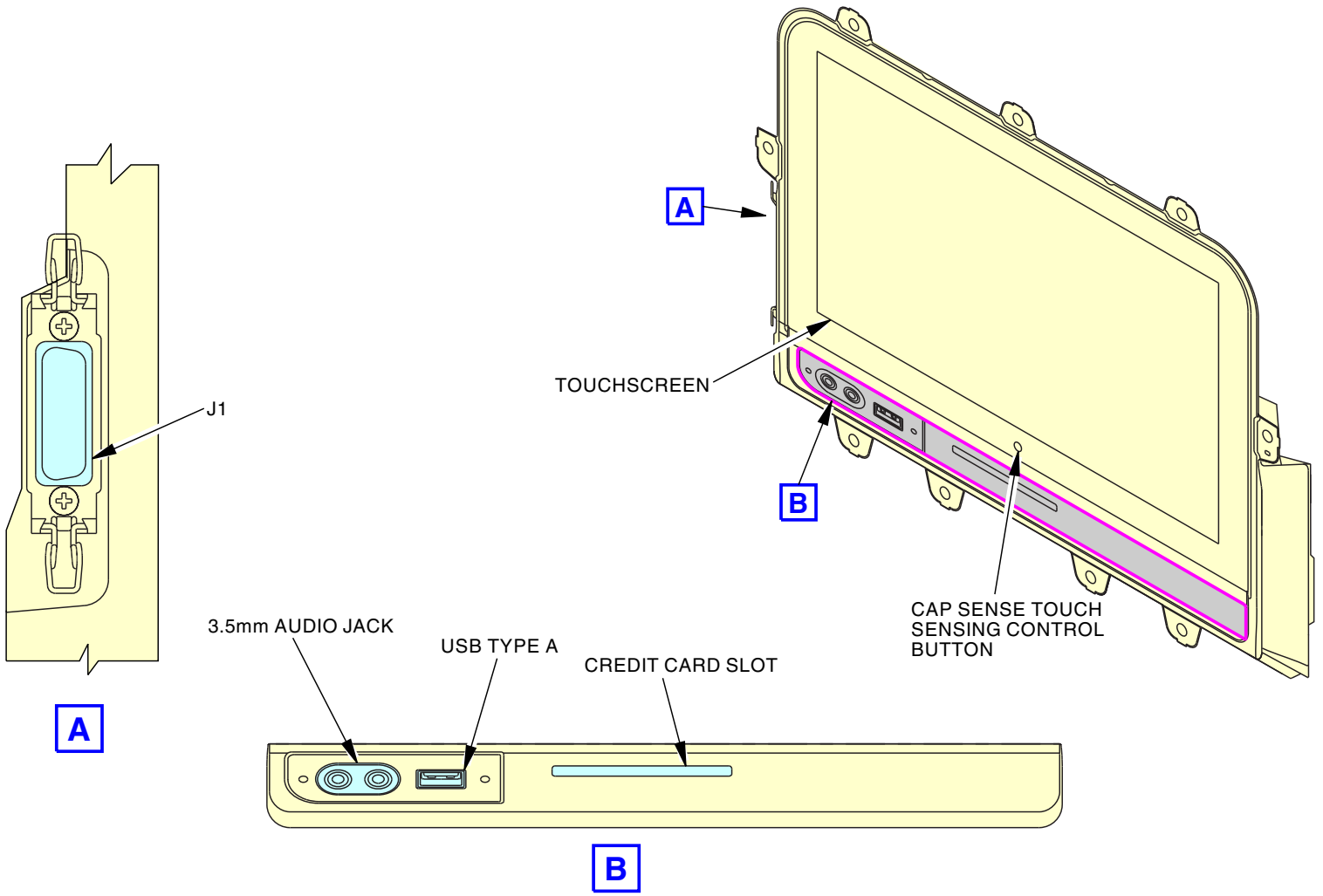


ON-BOARD MEDIA LOADER

2557259 S0000609498_V1

SOLID STATE DRIVE ON-BOARD MEDIA LOADER - GENERAL DESCRIPTION

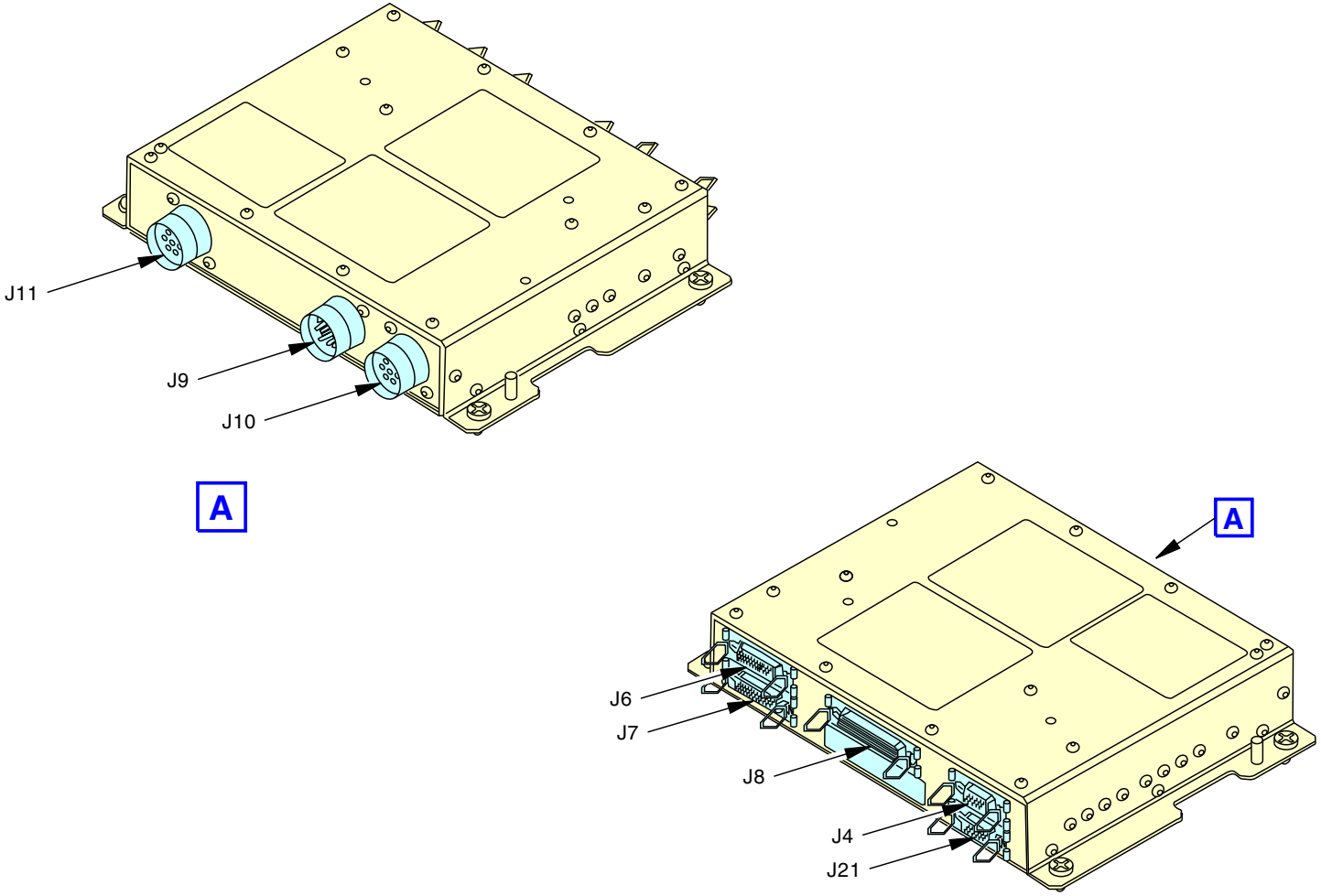
SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



2795653 S0000636965_V1

10 INCH SMART MONITOR - GENERAL DESCRIPTION

SERVER BASED ENTERTAINMENT SYSTEM - COMPONENT DESCRIPTION



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SEAT POWER MODULE (SPM) - GENERAL DESCRIPTION

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EXTERNAL COMMUNICATION SYSTEM - INTRODUCTION

General

The external communication system provides reliable communication with the aircraft while on the ground. Through the use of the GSM Cell Data Modem (CDM), also referred to as Cell Modem (CM), data can be transferred with a wireless connection from the In-Flight Entertainment (IFE) system on the aircraft to a terminal receiving station.

Abbreviations and Acronyms

- ACP - Attendant Control Panel
- CDM - Cell Data Modem
- CT - Crew Terminal
- CM - Cell Modem

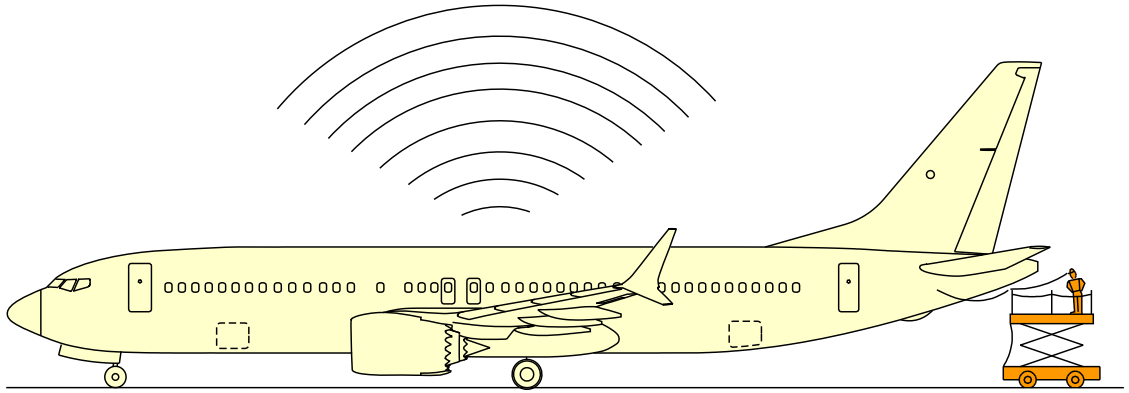
SIA 015-999

- FS - File Server

SIA ALL

- GSM - Global System for Mobile Communication
- IFE - In-Flight Entertainment
- IS - Integrated Server

EXTERNAL COMMUNICATION SYSTEM - INTRODUCTION



2545266 S0000604628_V1

EXTERNAL COMMUNICATION SYSTEM - INTRODUCTION

EXTERNAL COMMUNICATION SYSTEM - COMPONENT DESCRIPTION

General

The following components are part of the external communication system:

SIA 001-014

- GSM Cell Modem

SIA 015-999

- 4G Enhanced Cell Modem
- Cellular Antenna Assembly
- WiFi Antenna Assembly

SIA ALL

The following components are part of the In-Flight Entertainment system but work in conjunction with the external communication system components:

- Crew Terminal
- Data Port

SIA 015-999

- File Server

SIA ALL

- Integrated Server

SIA 001-014

Cell Modem

The Global System for Mobile communications (GSM) Cellular Data Modem (CDM) is a component of the IFE system that provides a private Internet Protocol (IP) networking connection with the Panasonic Network Operations Center (NOC) using GSM Wireless packet Data Services. The CDM has an integrated antenna that can automatically and securely transmit and receive data (i.e. BITE, software configuration files, OneMedia, crew manuals) from the aircraft while it is on the ground.

The CDM communicates with the IFE system through an RJ-45 connection and the existing Ethernet data bus with the Aircraft Interface. Any data received from the CM, media files for example, can then be distributed to on board passengers. The crew panel is used to preform operational and functional test of the CM.

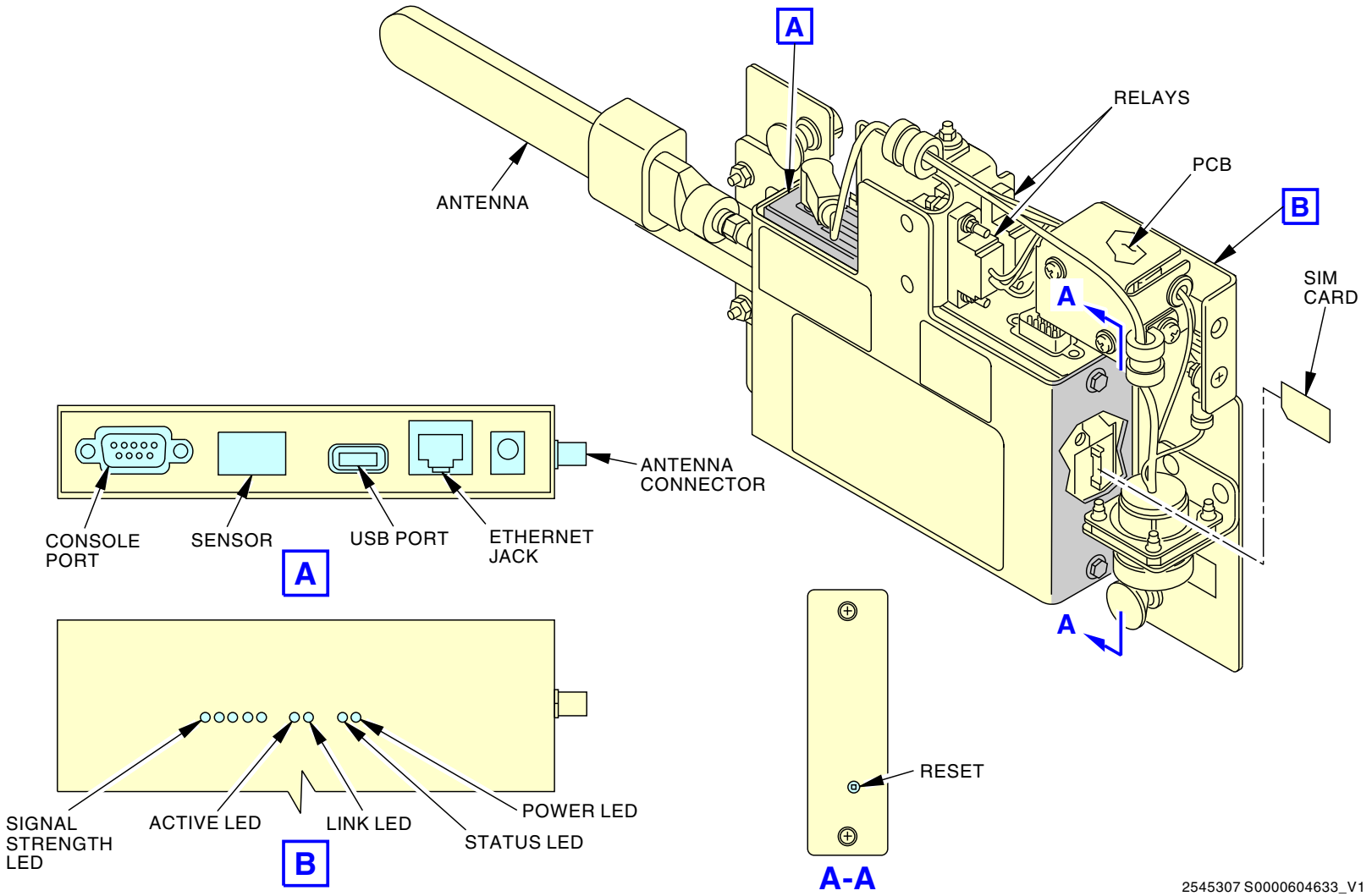
SIA 015-999

Enhanced Cell Modem

The Enhanced Cell Modem (ECM) is designed to provide the cellular and wireless data bridge from the aircraft to the ground network server for gatelink application. The ECM communicates with other head-end equipment through the copper gigabit Ethernet and serves as a cellular-to-wired network switch, routing the media content, application software, and service data. It is a component of the In-Flight Entertainment (IFE) system.

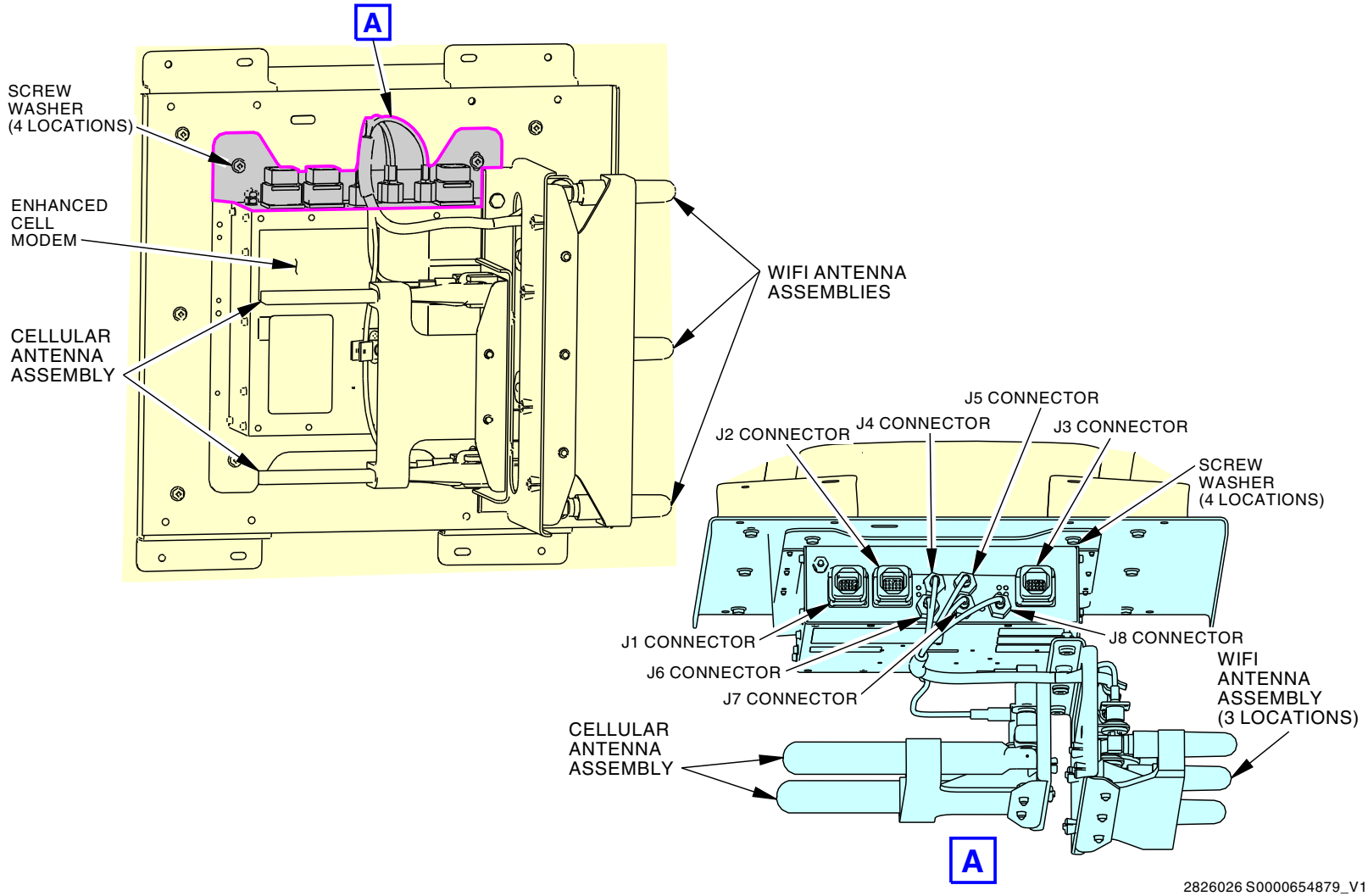
SIA ALL

EXTERNAL COMMUNICATION SYSTEM - COMPONENT DESCRIPTION



CELL MODEM - COMPONENT DESCRIPTION

EXTERNAL COMMUNICATION SYSTEM - COMPONENT DESCRIPTION



ENHANCED CELL MODEM - COMPONENT DESCRIPTION

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GLOBAL COMMUNICATION SUITE - INTRODUCTION

General

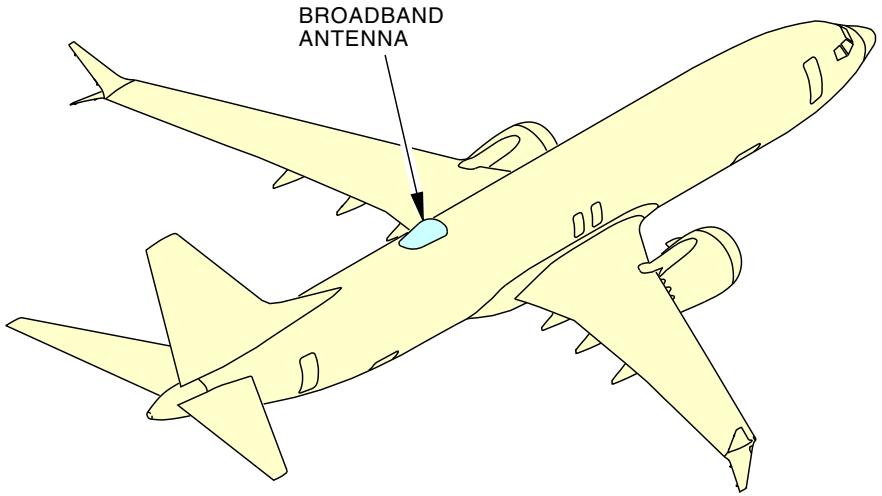
Global Communications Suite is comprised of the following:

The eXConnect (also called eXW) provides two-way broadband connectivity to an aircraft. It supports a wide range of passenger and crew applications, including these applications are Pre-Recorded Announcement and boarding Music, Internet access, voice, data, and the ability to monitor and transmit airline operational data in real time.

Abbreviations and Acronyms

- BITE - Built-In-Test Equipment
- CT - Crew Terminal
- DSSS - Direct Sequence Spread Spectrum
- AI - Aircraft Interface
- FS - File Server
- GHz - Gigahertz
- GPRS - General Packet Radio Service
- IEEE - Institute of Electrical and Electronics Engineers, Inc.
- IFES - In-Flight Entertainment System
- MPEG - Moving Picture Experts Group
- OML - On board Media Loader
- PA - Passenger Address
- PED - Portable Electronic Device
- PRAM - Pre Recorded Announcement and Boarding Music
- SMS - Short Message Service
- SNR - Signal-to-Noise Ratio
- SSD - Solid State Drive
- TNC - Threaded Neill–Concelman
- USB - Universal Serial Bus
- WAP - Wireless Access Point
- WLAN - Wireless Local Area Network.

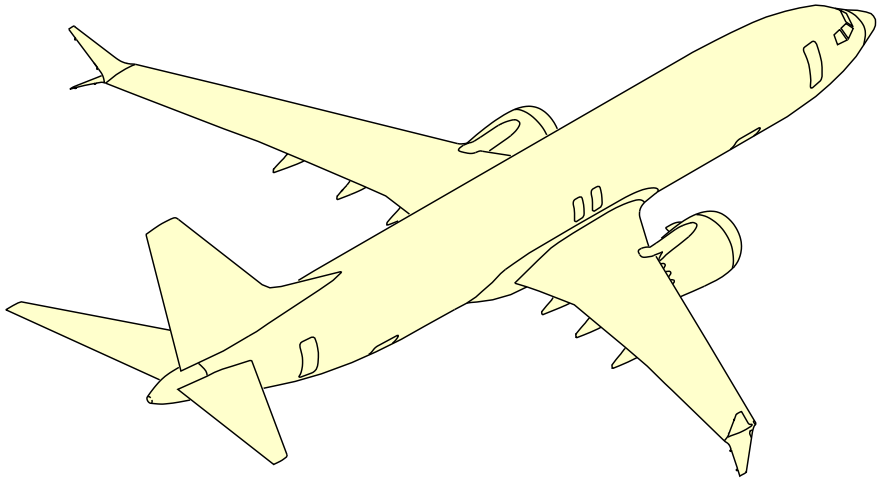
GLOBAL COMMUNICATION SUITE - INTRODUCTION



BROADBAND COMMUNICATION SYSTEM - INTRODUCTION

2531200 S0000599333_V1

GLOBAL COMMUNICATION SUITE - INTRODUCTION



BROADBAND COMMUNICATION SYSTEM - INTRODUCTION

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GLOBAL COMMUNICATION SUITE - INTRODUCTION

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GLOBAL COMMUNICATION SUITE - GENERAL DESCRIPTION

Media and Data Communication

- Media Streaming

  The eXW In-Flight Entertainment (IFE) supports the delivery of media content and services to passenger devices over an IEEE 802.11 wireless network at 2.4 GHz and 5 GHz frequencies in the cabin.

  The eXW IFE supports streaming MPEG4 format H.264 encoded video at a bit rate of 600 kbps. The bit rate increases to approximately 850 kbps when audio and overhead files are added.

- Pause Function

  Upon receipt of a Passenger Address (PA), or Video Passenger Address (VPA), all applicable media passenger media pauses. A pop-up message is shown on the passenger devices, and all media player controls are unavailable.

- Load Balancing

  eXConnect supports streaming media at a bit rate of 1 Mbps. The audio and video media is streamed from a Cabin Wireless Access Point (CWAP) to a Personal Electronic Device (PED).

  eXConnect dynamically assigns PEDs to CWAP radios based upon the number of PED connections per CWAP radio and Signal to Noise Ratio (SNR).

- Media Content and Software Loading

  eXConnect media content and software are loaded at the Ethernet port. A light media content or software load can be done from the USB port.

- BITE/Maintenance Function

  The CMI allows the operator to command built-in test equipment, to check software configuration and do various maintenance activities.

- Security Function

  eXConnect includes a public network. The PEDs do not have access to the Aircraft system network.

Wireless Communication

eXConnect allows supported passenger devices to connect to the system and supports wireless protocol of IEEE 802.11 for the devices' wireless connection.

Portal Access Methods

eXConnect supports six CWAP allocation using six 5 GHz channels and three to four 2.4 GHz channels.

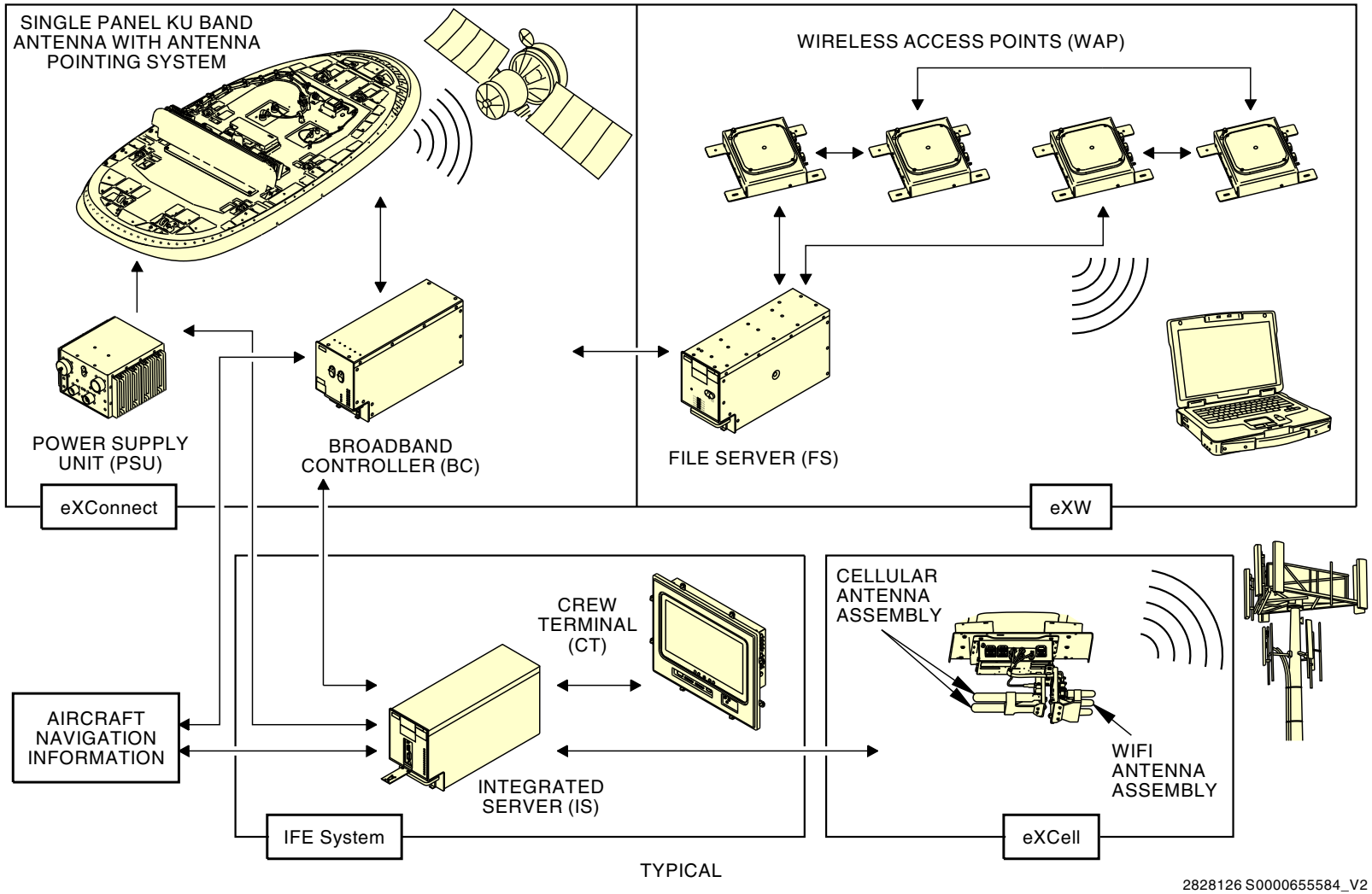
The eXConnect Portal and public network can be accessed wirelessly via the CWAP.

Control

The Crew Terminal is the primary control interface between the Global Communication Suite and cabin or maintenance crews. Global Communication Suite configuration and commands are done at the Crew Terminal.

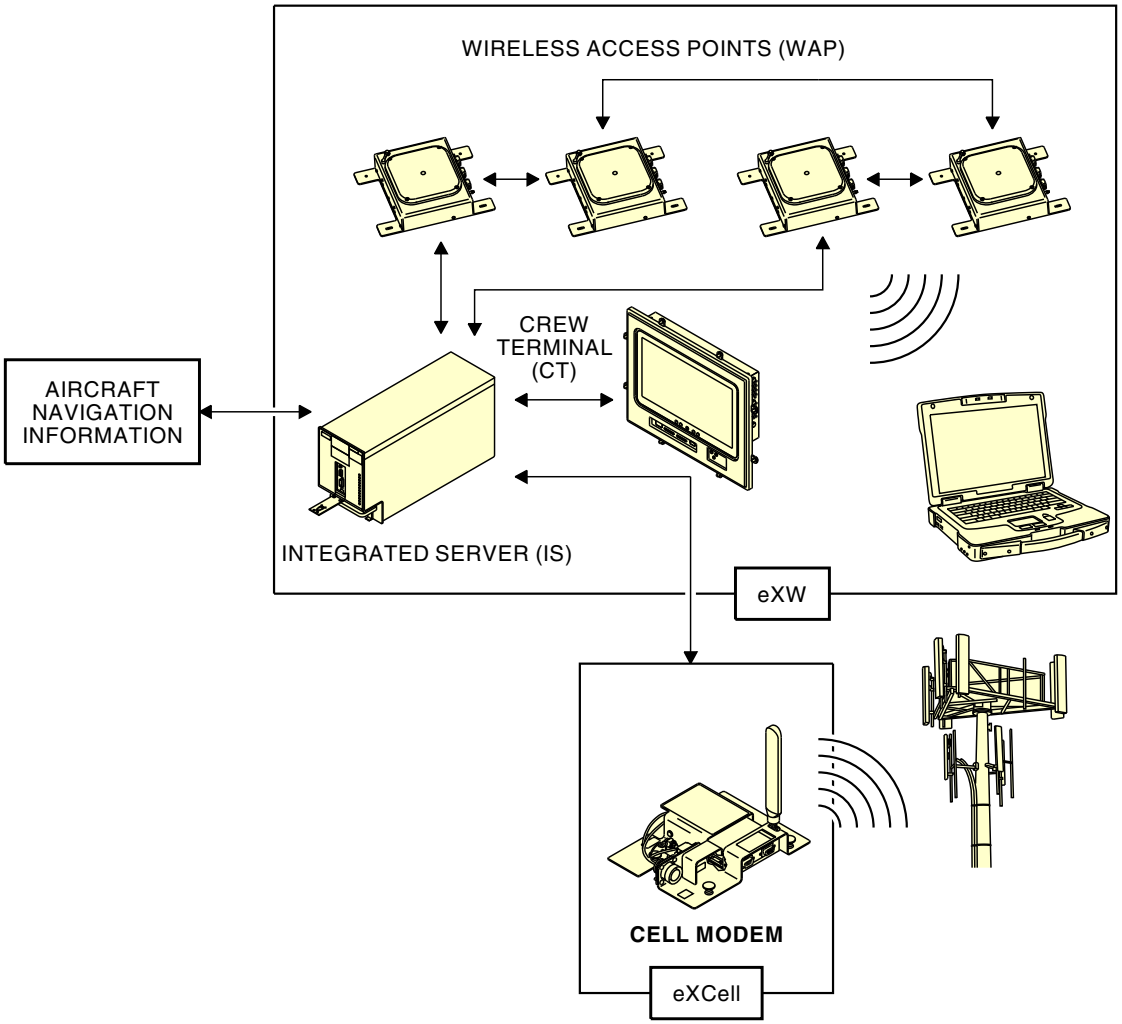
The Broadband Antenna power supply unit is controlled through the BROADBAND COM switch in the Flight Deck P5.

GLOBAL COMMUNICATION SUITE - GENERAL DESCRIPTION



GLOBAL COMMUNICATION SUITE - GENERAL DESCRIPTION

GLOBAL COMMUNICATION SUITE - GENERAL DESCRIPTION



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GLOBAL COMMUNICATION SUITE - GENERAL DESCRIPTION

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GLOBAL COMMUNICATION SUITE - COMPONENT DESCRIPTION

General

The following components are part of the Global Communication Suite:

SIA 015-999

- Broadband Control Panel

SIA ALL

- Crew Terminal
- Cabin Wireless Access Point

SIA 015-999

- File Server

SIA ALL

- Integrated Server

SIA 015-999

- Solid State Drive On-Board Media Loader
- Broadband Controller
- Antenna Pointing System
- Single Panel Antenna
- Broadband Antenna Power Supply Unit.

SIA ALL

Wireless Access Point

The Cabin Wireless Access Point (CWAP), Dual Radio which will communicate with In-Flight Entertainment (IFE) head-end Line Replaceable Unit (LRU) via two 100/1000 BaseT Ethernet ports and provide wireless access to portable electronic devices.

The unit works as an CWAP which will provide wireless access to portable electronic devices:

- Communicate with IFE head-end LRU via two 100/1000 BaseT Ethernet ports
- Each CWAP can communicate with clients via wireless access.

SIA 015-999

File Server

The File Server (FS) is an audio server, video server, and a data file server.

The FS has these features:

- Gigabit Ethernet Controller Interface Ports
- 1.20 TB minimum of media and data storage
- RS-232 maintenance port
- +5 V unit address discrete inputs
- Spare discrete inputs
- Media decryption (software).

Broadband Control Panel

The broadband control panel location is on the P5 overhead panel. The switch supplies power to a satellite antenna which provides internet connectivity to a Personal Electronic Device (PED).

SIA ALL

Integrated Server

The Integrated Server (IS) is designed to provide an interface between cabin equipment and the aircraft avionics equipment, provide Audio Video On Demand (AVOD) streaming, Passenger Address (PA) audio, and network connections to other units in the system.

The IS has the following functions:

- Provides Ethernet interfaces to the aircraft equipment
- Provides ARINC 429 interfaces to the aircraft subsystems
- Supports PA audio zones and overriding entertainment audio during PA announcements

- Provides Pre-Recorded Announcement Machine (PRAM) and Boarding Music audio
- Routes passenger service data to the aircraft system
- Supports wireless streaming
- Web portal
- Broadband access
- Inbound and outbound data network capability.

SIA 015-999

Solid State Drive On-Board Media Loader

The Solid State Drive On-Board Media Loader (SSD-OML) is used to load content to the server.

The SSD-OML will interface with the server.

SIA ALL

Crew Terminal

The Crew Terminal (CT) is a component of the Panasonic Avionics Corporation IFE System.

The CT has these interfaces:

- Gigabit Ethernet Ports
- 100 BaseT Ethernet Port
- USB Ports
- Stereo Audio Output
- Noise Cancelling Headphone Jack
- USB Connection
- SDXC Card Reader
- RS-232 Maintenance Port
- 11.1 inch Display Panel
- Touchscreen Interface
- Sensing Control Button
- IR Proximity Sensor.

SIA 015-999

Broadband Controller

The Broadband Controller (BC) is a component of the Panasonic Avionics Corporation IFE System.

The BC has these interfaces:

- Four 1000BaseT Ethernet ports
- Twelve 100BaseT Ethernet ports to CP, IFE, PicoCell, RFMU, ACU, TWLU and 6 WAP
- Four ARINC-429 RX ports
- Two ARINC-429 TX ports
- One RS-422 interface to ACU
- One External antenna relay interface (Connexion Antenna)
- One RF input from antenna for downstream signal
- One RF output to antenna for upstream signal
- One Buffer (of the RF input) TV RF Output to another BC
- Two address discrete inputs
- One modem TX disable discrete input
- Eight spare discrete inputs
- Four discrete outputs
- One smart card reader
- Two RS-232 maintenance ports.

Power Supply Unit

The Power Supply Unit (PSU) is used as a component of the Panasonic Avionics Corporation IFE System.

The PSU converts 115 volts AC aircraft power to regulated 30 volts DC power to be used by the Broadband Antenna. The PSU also provides an Ethernet interface that allows access to and transfer of BITE information from the PSU.

SIA 015-999 (Continued)

Single Panel Antenna

The Single Panel Antenna (SPA) is a component of the IFE system.

The SPA system consists of one transmit/receive antenna panel, all associated electronics, an Elevation over Azimuth positioner system, drive motors, encoders, drive electronics and cables to interface with the aircraft internal systems. The antenna system is intended for use as a non-navigational, 2-way, broadband communication system to be installed under a radome on the top external fuselage of an aircraft.

The SPA uses bi-directional array elements (Tx and Rx) with electromechanical steering on azimuth and elevation and electrical steering in polarization. The SPA operates in the Ku-band with a receive range of 10.70 to 12.75 GHz and a transmit range of 14.0 to 14.5 GHz.

The component has these interfaces:

- One RF output from antenna for Forward Channel signal (L-Band, 950-1450 and 1650-2150 MHz)
- One RF input to antenna for Return Channel signal (L-Band, 950-1450 MHz) with 10 MHz Reference
- Two Connectors for Power and Data (ARINC 429 and Ethernet)
- One Connector for the APS interface.

Antenna Pointing System

The Antenna Pointing System (APS) is a component of the IFE system.

The APS is a navigational module that can connect up to three GPS antennas. The APS provides the exact location in space, the altitude (Pitch, Yaw, Roll), and the rate of the parameters measured for SPA satellite aiming purposes. It includes sensors (magnetometers, rate gyros, accelerometers) that send navigation data to the SPA by serial interface lines. The SPA takes the navigation data and translates it to actual looking angle towards the communication satellite in order to maintain communication.

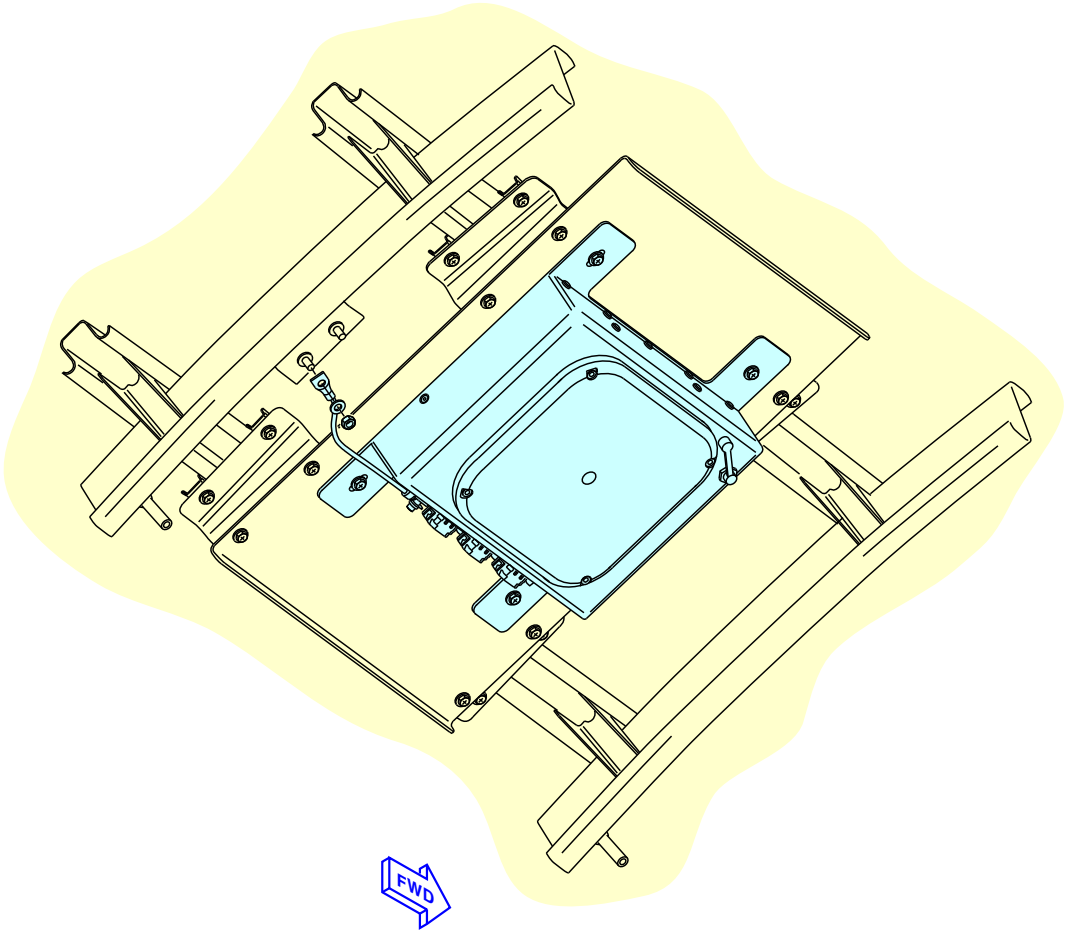
There are 2 modes that the SPA uses with the APS:

- ARINC 429 mode: the APS helps improve the navigation data rate of the SPA
- APS mode: the APS uses only the APS navigation data.

The APS has these Printed Circuit Boards (PCBs):

- APS Main Board
- APS Adapter Board.

SIA ALL



CABIN WIRELESS ACCESS POINT

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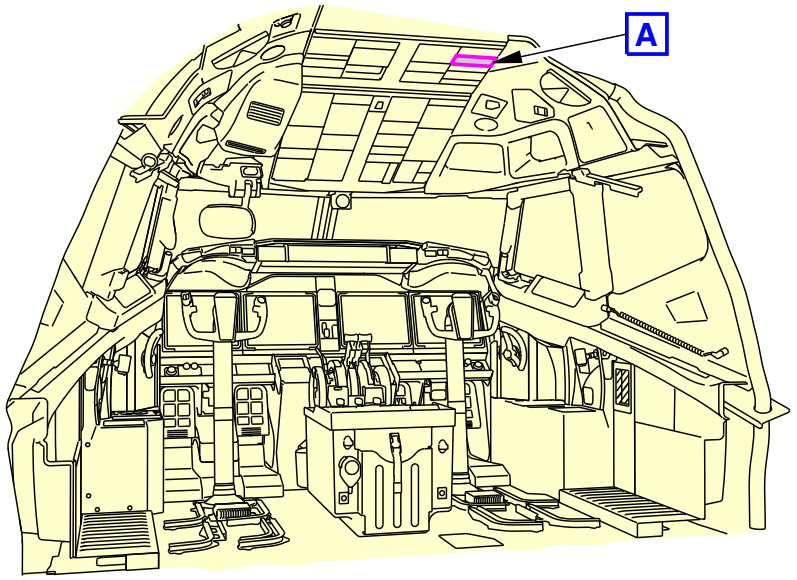
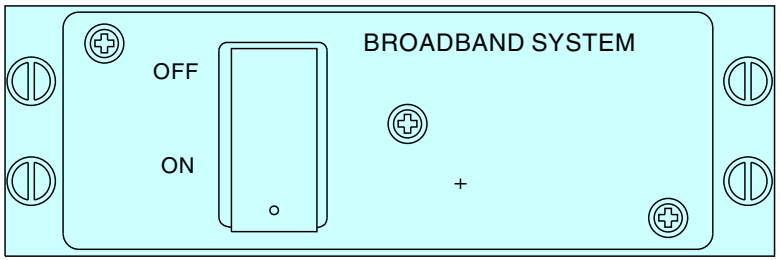
WIRELESS ACCESS POINT





TWO POSITION BROADBAND CONTROL PANEL

A

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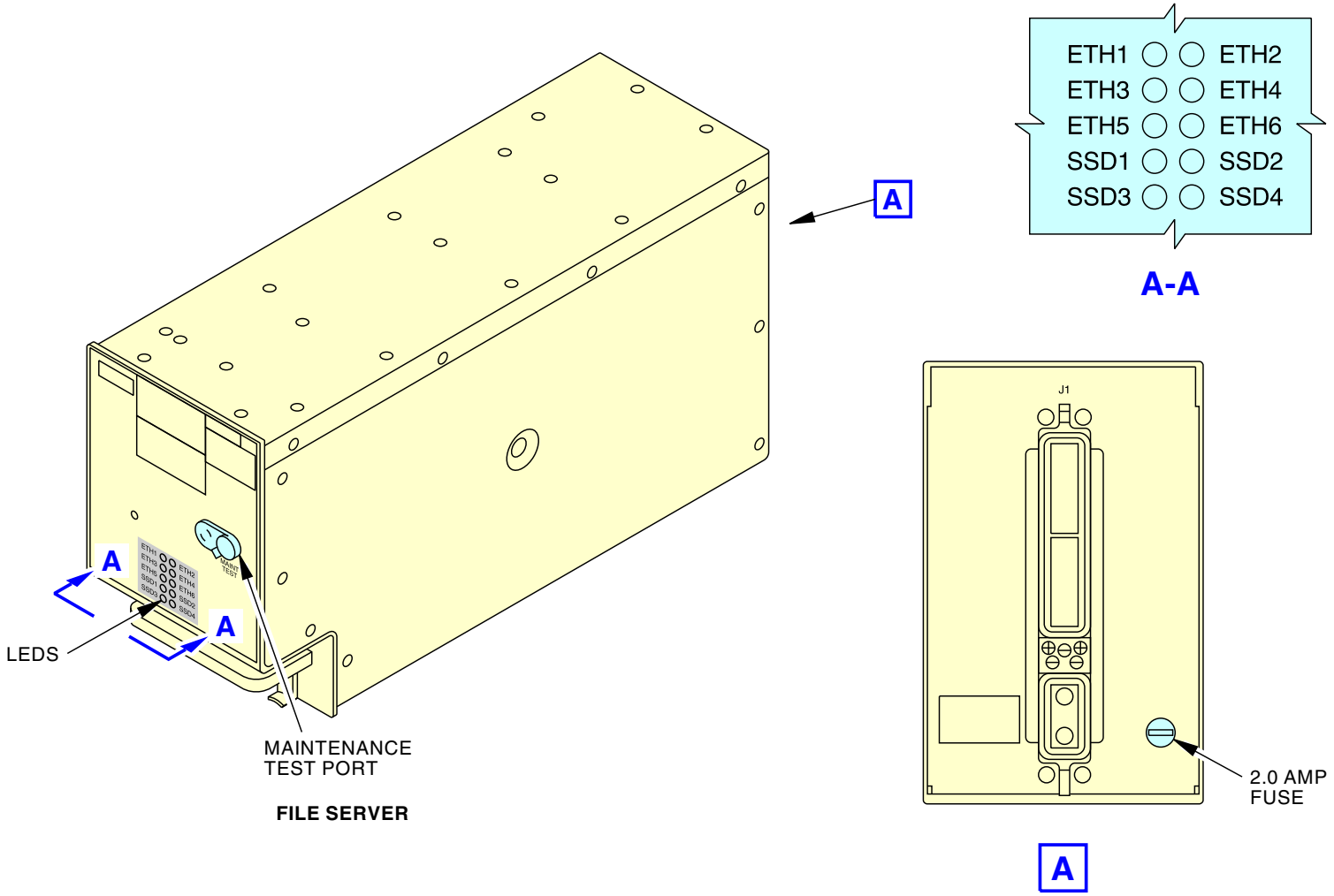
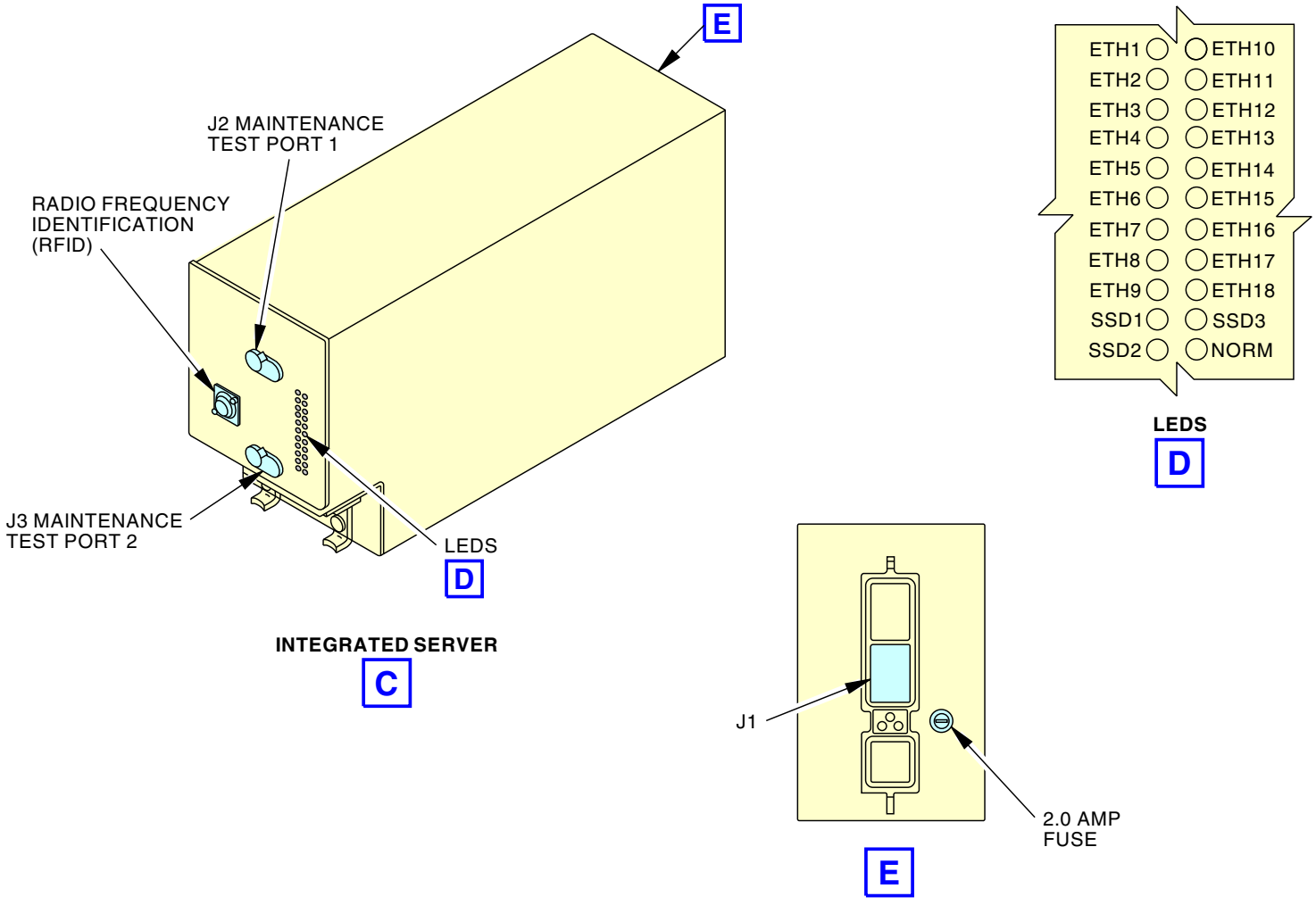
BROADBAND CONTROL PANEL



FILE SERVER

GLOBAL COMMUNICATION SUITE - COMPONENT DESCRIPTION



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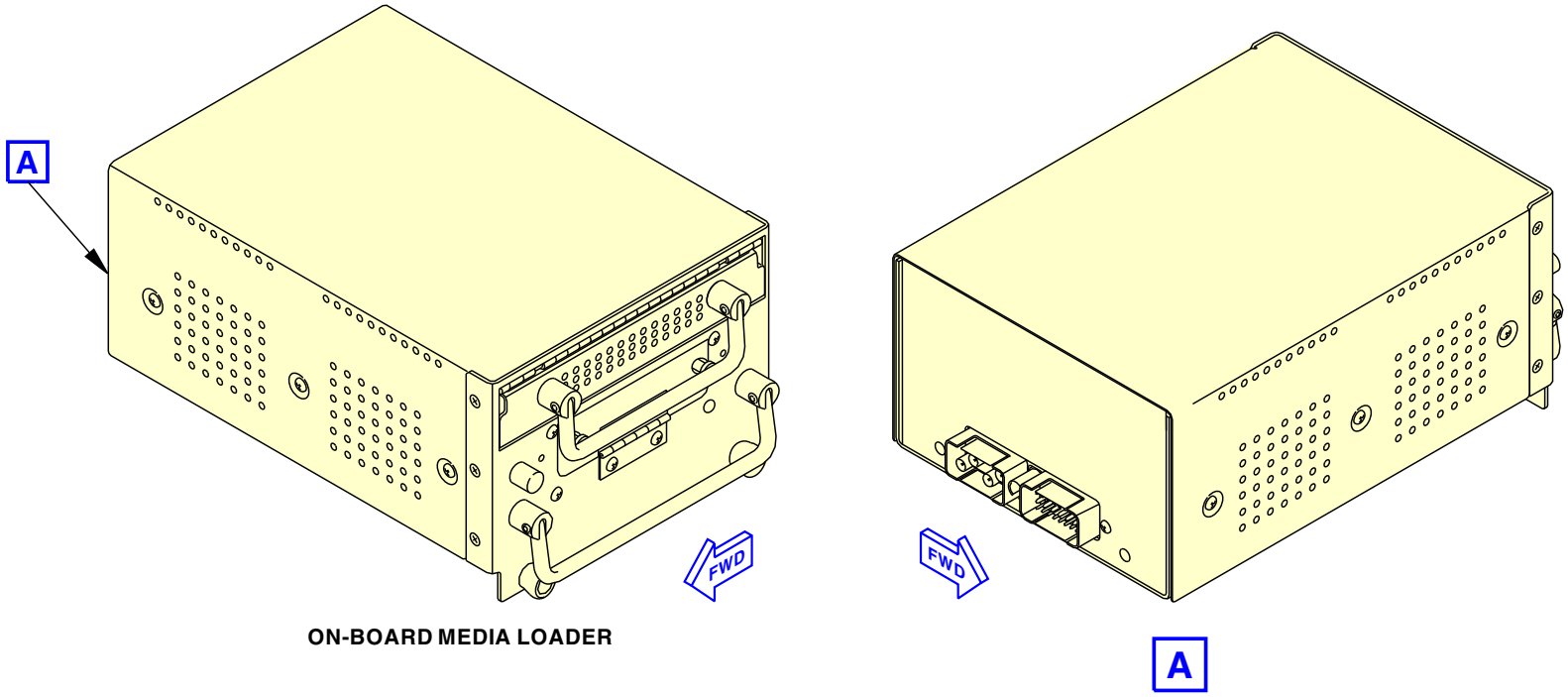
INTEGRATED SERVER



ON-BOARD MEDIA LOADER

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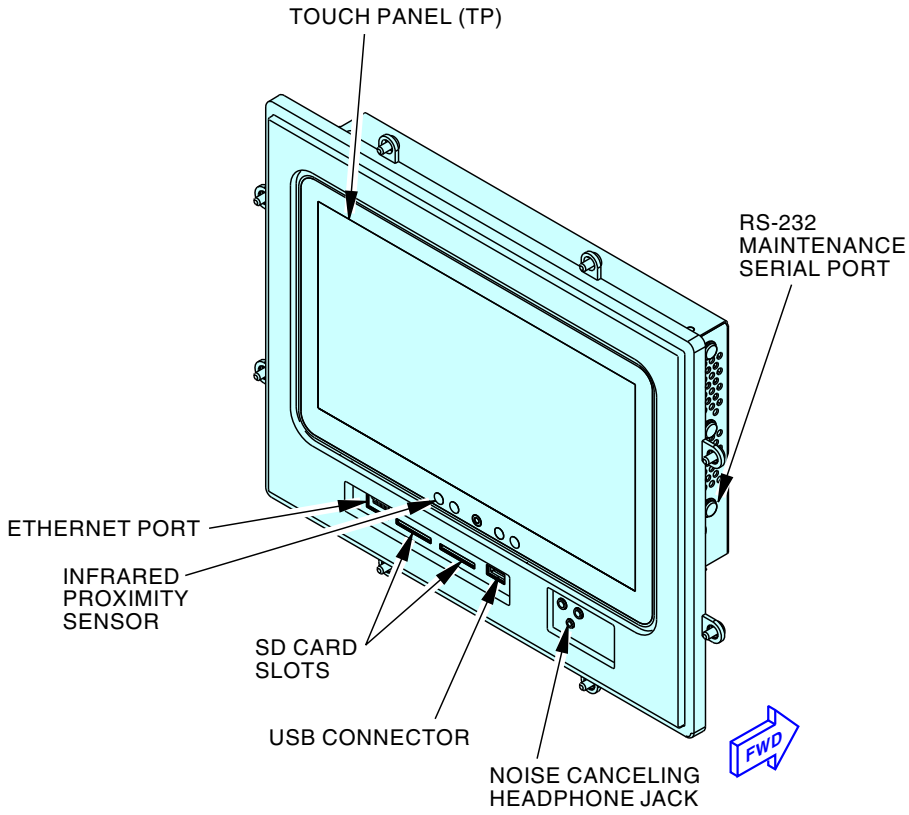
SOLID STATE DRIVE ON-BOARD MEDIA LOADER



CREW TERMINAL

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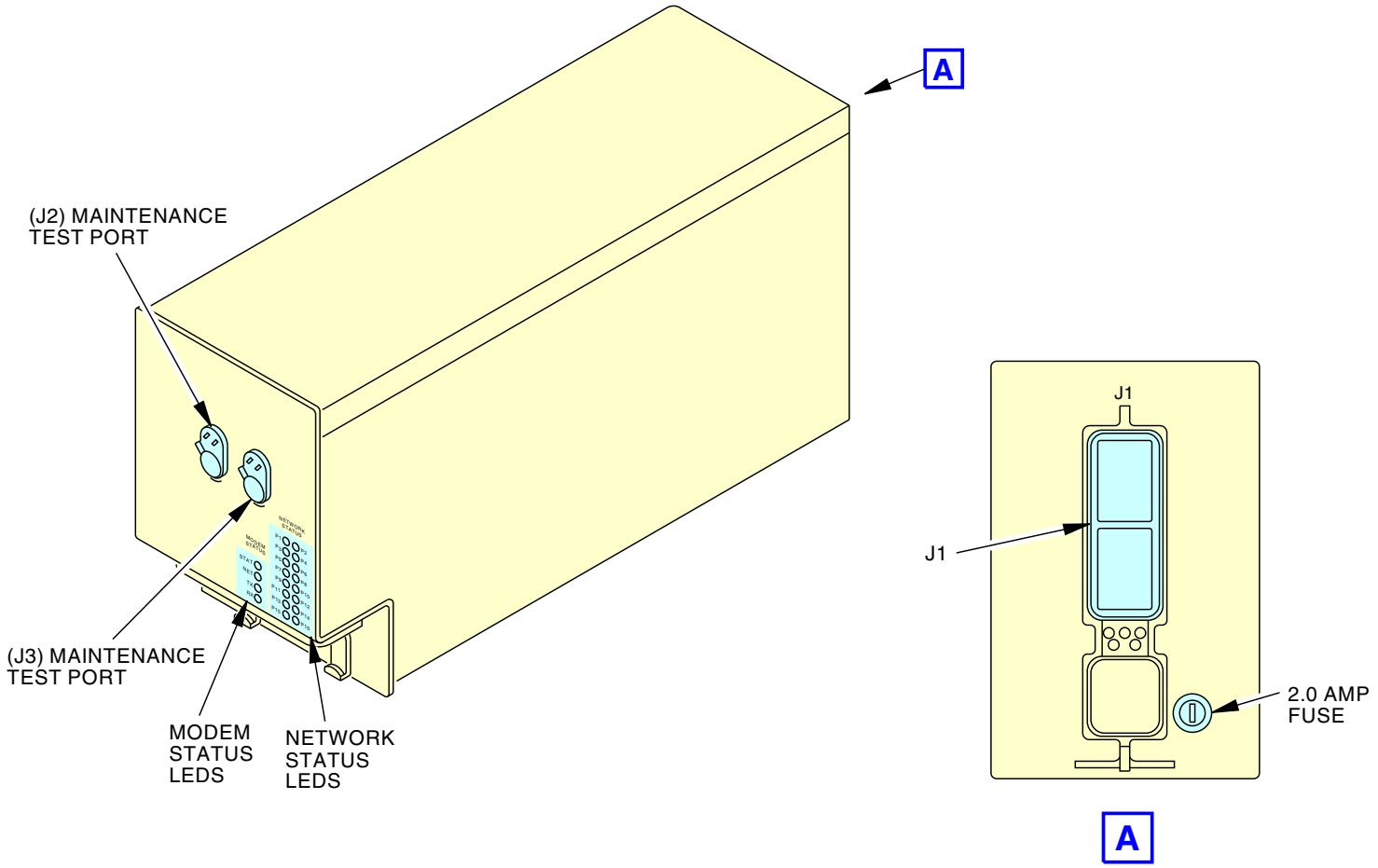
CREW TERMINAL



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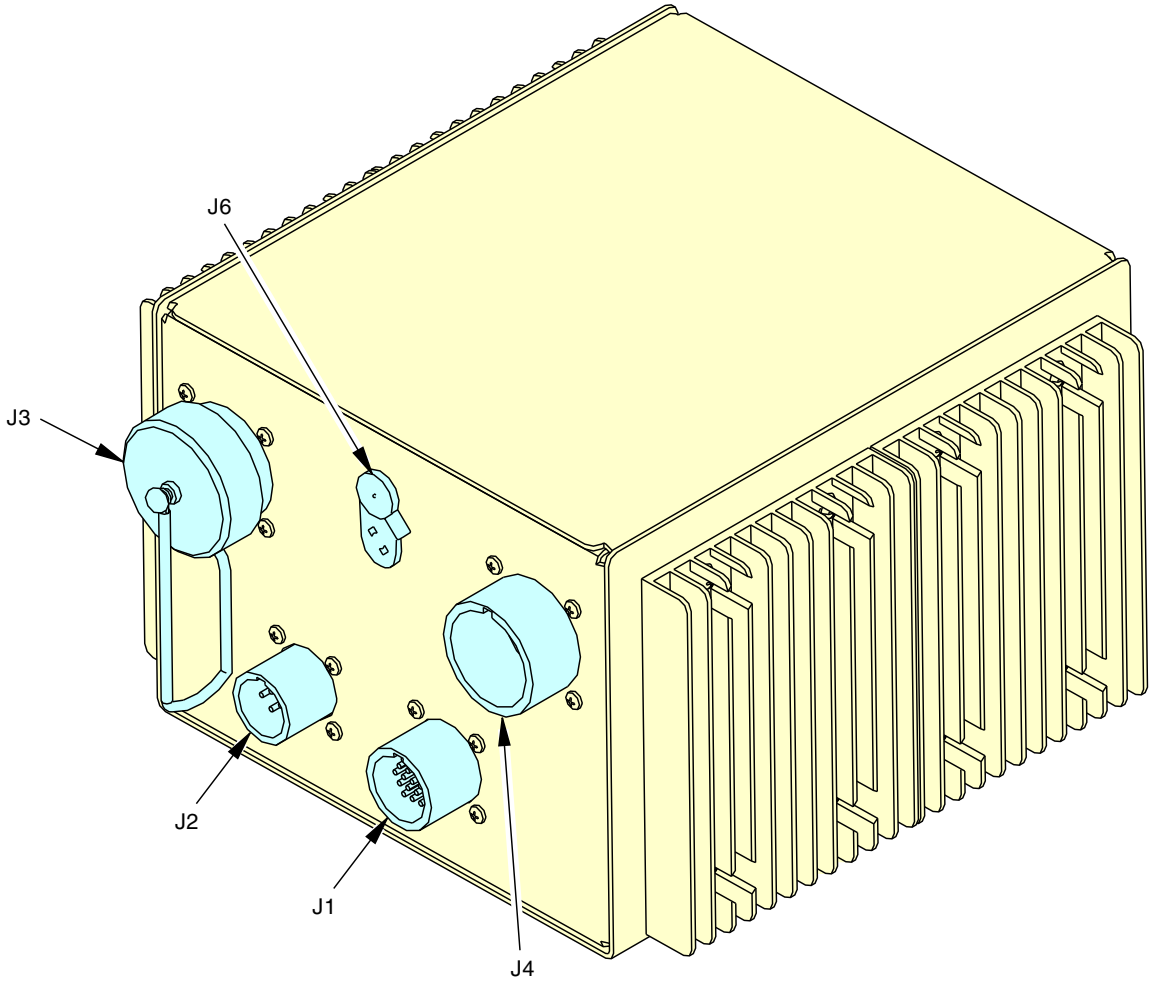
BROADBAND CONTROLLER



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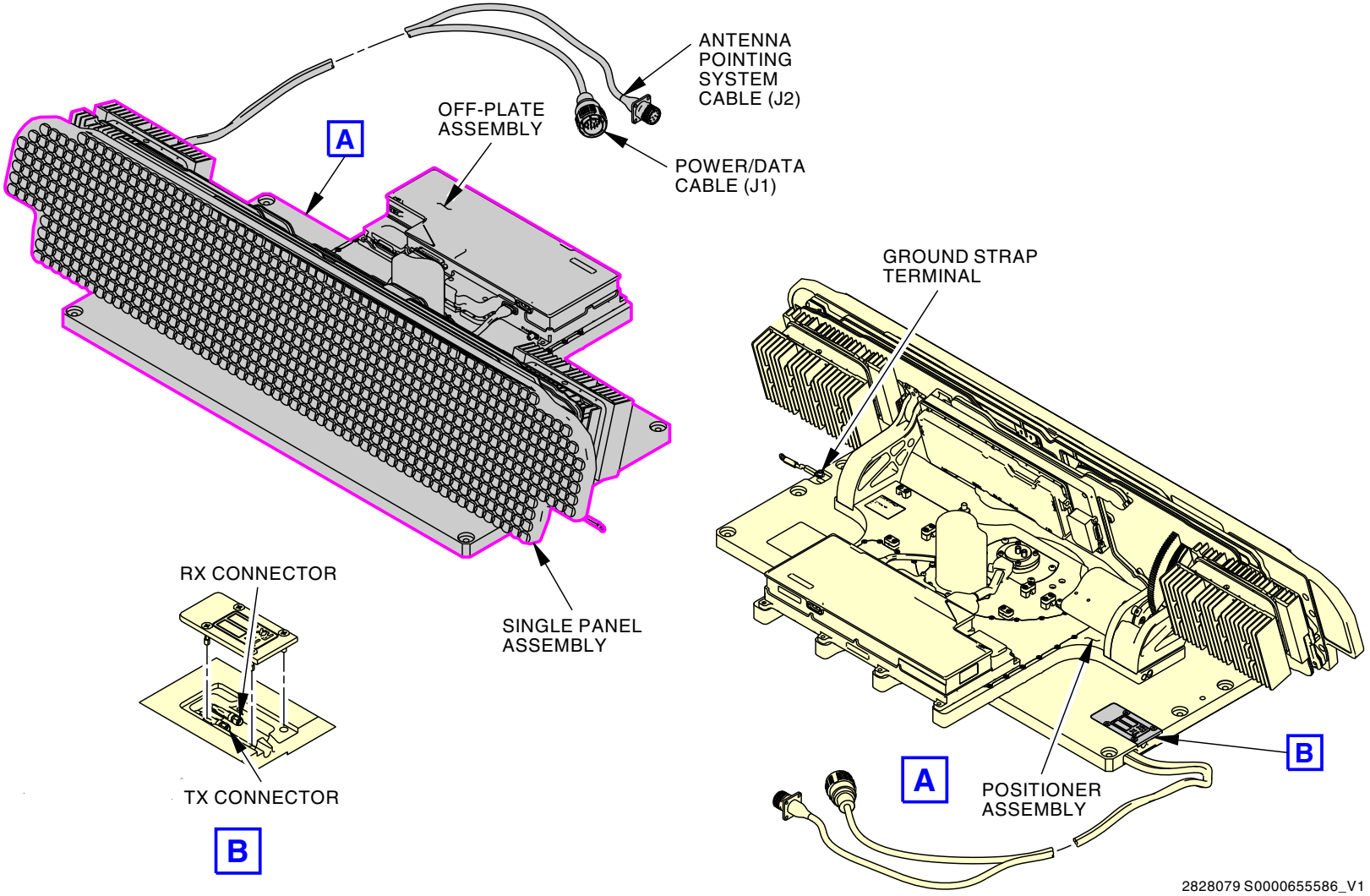
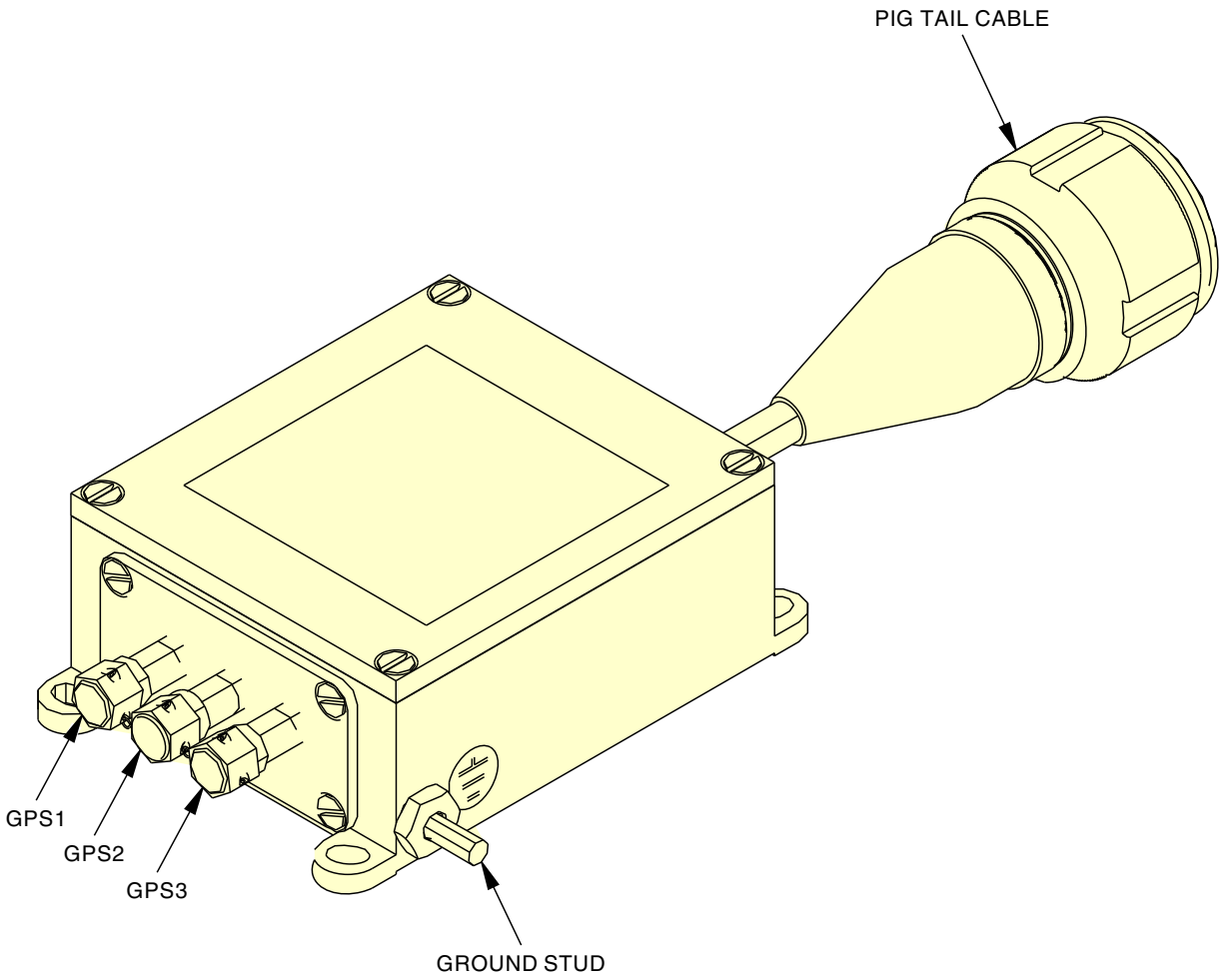
BROADBAND ANTENNA POWER SUPPLY UNIT

GLOBAL COMMUNICATION SUITE - COMPONENT DESCRIPTION



SINGLE PANEL ANTENNA



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ANTENNA POINTING SYSTEM

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CREW TERMINAL - FUNCTIONAL DESCRIPTION

Functional Description

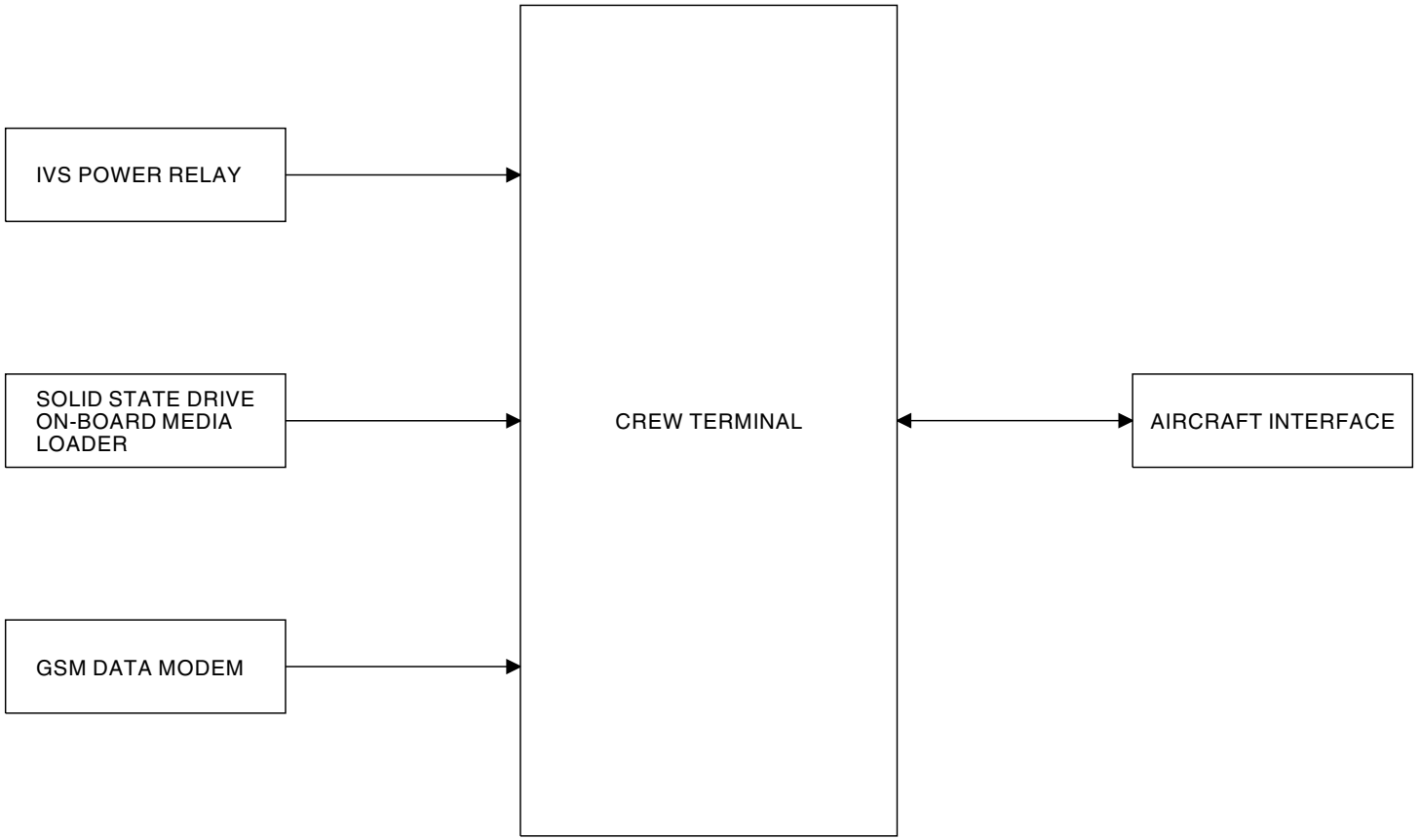
The Crew Terminal (CT) provides crew access to the global communication suite and the In-Flight Entertainment (IFE) System.

The CT is designed to provide aircraft crew access to configuration and maintenance control. The CT has a capability of multiple CT installations in an aircraft and provides the capability of storing data and cabin zone control. The CT provides the following functions, all of which are controlled through Crew Terminal application screens. The CT is a component of the Panasonic Avionics Corporation IFE System.

The Crew Terminal has these functions:

- Control of cabin lighting
- Control of cabin zone to video source mapping
- Control of boarding music
- Control of PRAM
- Control of passenger address cabin zone configuration
- Control of Data Loading
- Initiate BITE requests to all peripherals
- Store BITE data for fault location and unit type
- Preview audio and video programs

CREW TERMINAL - FUNCTIONAL DESCRIPTION



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CREW TERMINAL - FUNCTIONAL DESCRIPTION

BROADBAND CONTROLLER - FUNCTIONAL DESCRIPTION

Functional Description

.The Broadband Controller (BC) receives L-band signal, demodulates it and delivers broadband access and connectivity to the passenger laptops. The L-band signals from the BC are up converted to Ku-band and transmitted to the designated satellite. The BC is designed to operate between 950 to 2150 MHz. However the Panasonic Ku-band antenna input to the BC receiver port only operates from 950 to 1450 MHz. While the iDirect modem design can operate with L-band inputs above 1450 MHz, it never does so with the current Ku-band antenna configuration. Panasonic's L-band and Ku-band frequencies of operation are identical to CbB, which never operates at Lband frequencies above 1450 MHz.

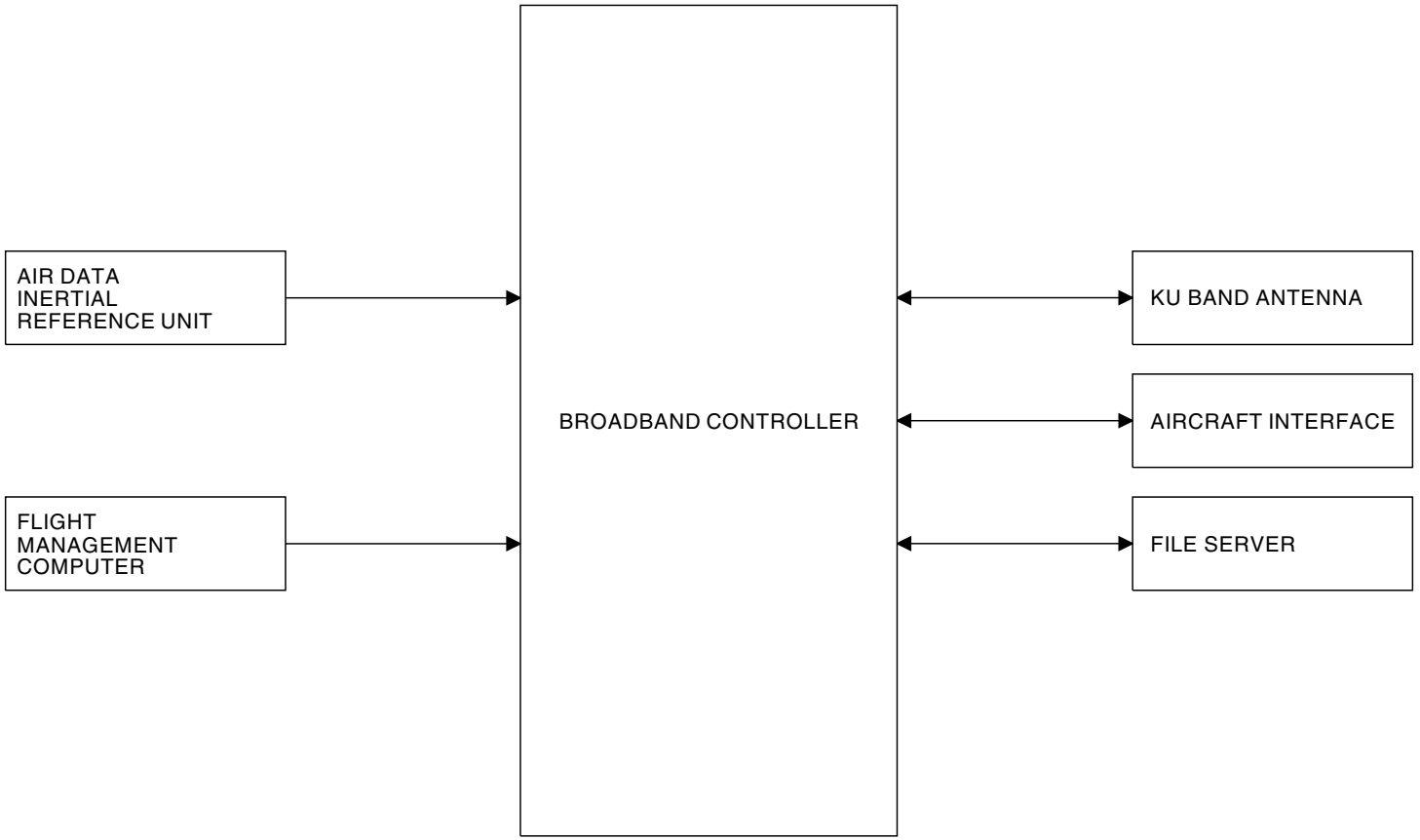
The TVRO RF characteristics are identical to the receive input to the modem. TVRO is the output of an RF splitter of the receive input. It is also limited to 950 to 1450 MHz because it is the same signal that comes from the Ku-band antenna.

The BC is a component of the Panasonic Avionics Corporation In-Flight Entertainment (IFE) System.

The BC has these functions:

- Broadband access
- Inbound and outbound data network capability
- ARINC-429 interfaces to aircraft subsystems
- Ethernet connections to WAP, IFE, CT, and ACU
- Aircraft keyline interfaces

BROADBAND CONTROLLER - FUNCTIONAL DESCRIPTION



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BROADBAND CONTROLLER - FUNCTIONAL DESCRIPTION

FILE SERVER - FUNCTIONAL DESCRIPTION

Functional Description

.The File Server (FS) is an audio server, video server, and data file server.

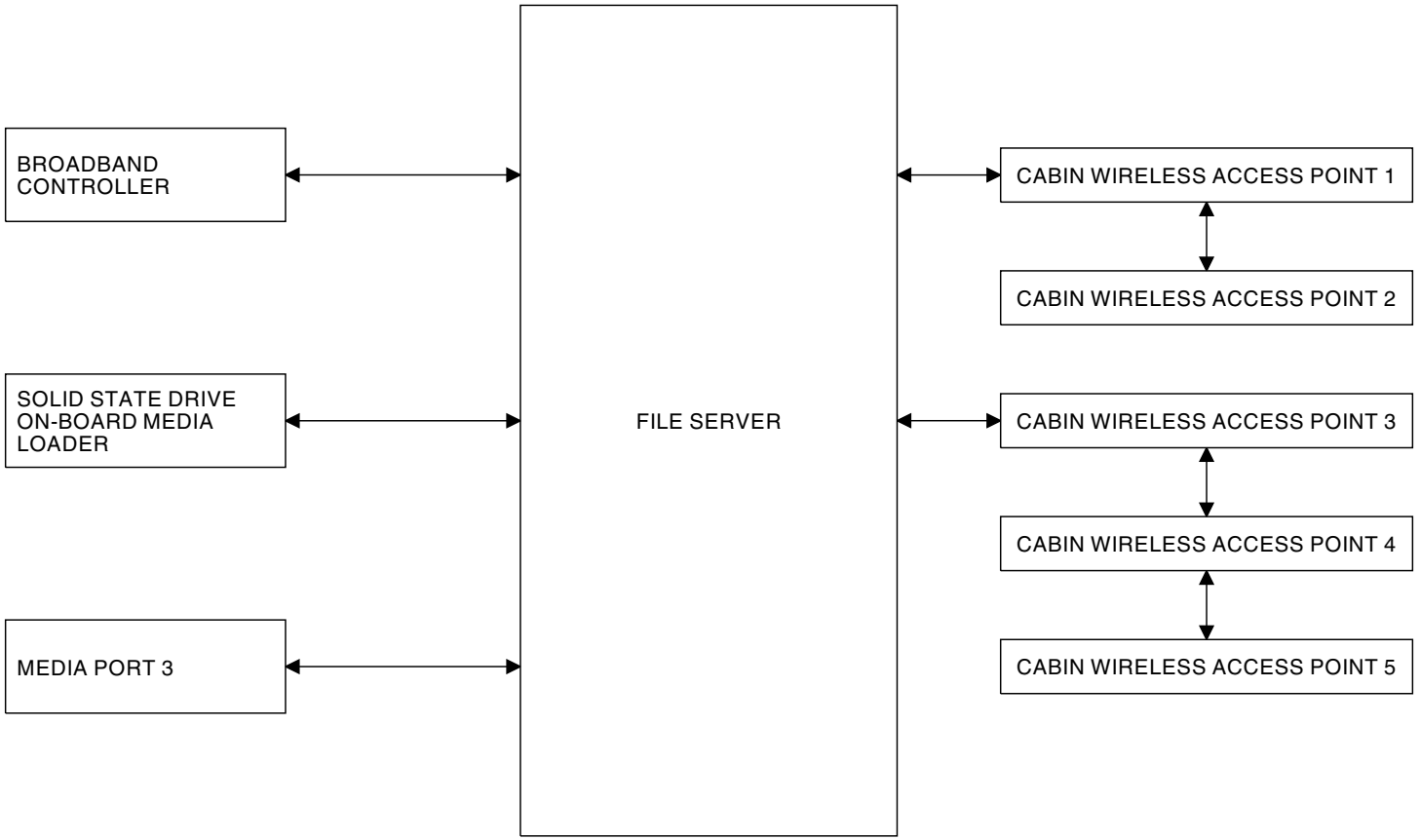
The FS has these functions:

- Stores all passenger revenue data collected during a flight
- Decrypts 3DES hardware from stored MPEG files

The FS has these applications programs:

- Airlines Passenger Information Database
- Interactive Passenger Service Menus
- Electronic Catalog Sales to Passengers
- Cabin Supplies Inventory Management
- Cabin Communications Management
- Unit Downloadable Software

FILE SERVER - FUNCTIONAL DESCRIPTION



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FILE SERVER - FUNCTIONAL DESCRIPTION