CHAPTER

46

Information System

CHAPTER 46
INFORMATION SYSTEM

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ONBOARD NETWORK SYSTEM INTRODUCTION

General

The Onboard Network System (ONS) is a computer based information system that supports flight, maintenance, and cabin operations.

The main hardware component of this system is the Network File Server (NFS). The server controls communications between connected airplane systems. With optional communications equipment installed, the NFS can support network connections between airplane systems and ground-based networks.

The NFS hosts the Mass Storage Device (MSD) function. The MSD gives software parts and data storage capacity.

The NFS can operate installed applications that support maintenance actions, and cabin operations.

An approved Maintenance Laptop (ML) or other Portable Maintenance Device (PMD) gives access to the ONS user interface. Also, the two inboard forward displays of the MAX Display System (MDS) in the flight compartment give access to the ONS user interface. The tool is connected to a network data port using an Ethernet cable and can also connect wirelessly if optional equipment is installed. The NFS operates as a web server, and hosts the ONS maintenance browser interface.

Acronyms and Abbreviations

- ADIRU - air data inertial reference unit
- AID - Aircraft Interface Device
- AIS - Airplane Information System
- APP - application
- ARINC - Aeronautical Radio Incorporated
- ATA - Airline Transport Association
- ATC - air traffic control
- AVM - airborne vibration monitor
- BEDS - Boeing electronic distribution (of) software
- CMU - Communications Management Unit
- CPU - central processing unit
- CSR - certificate signing request
- CWLU - crew wireless LAN unit
- DU - display unit
- DHCP - dynamic host configuration protocol
- DNS - domain name server
- DPC - display processing computer
- EGPWS - Enhanced ground proximity warning system
- EVSC - engine vibration signal conditioner
- FMC - flight management computer
- Gb - gigabyte
- GUI - graphic user interface
- ICAO - International Civil Aviation Organization
- ID - identification
- IP - internet protocol
- LAN - local area network
- LED - light emitting diode
- LRU - line replaceable unit
- LSAP - loadable software airplane part
- Mb - megabyte
- MDS - MAX display system
- MFD - multi-function display
- ML - maintenance laptop
- MMR - multiple mode receiver
- MSD - mass storage device
- NED - network extension device
- NFS - network file server

EFFECTIVITY

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- NSP - NED Subsystem Processor

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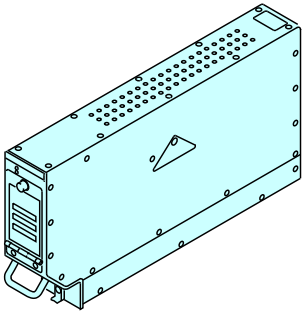
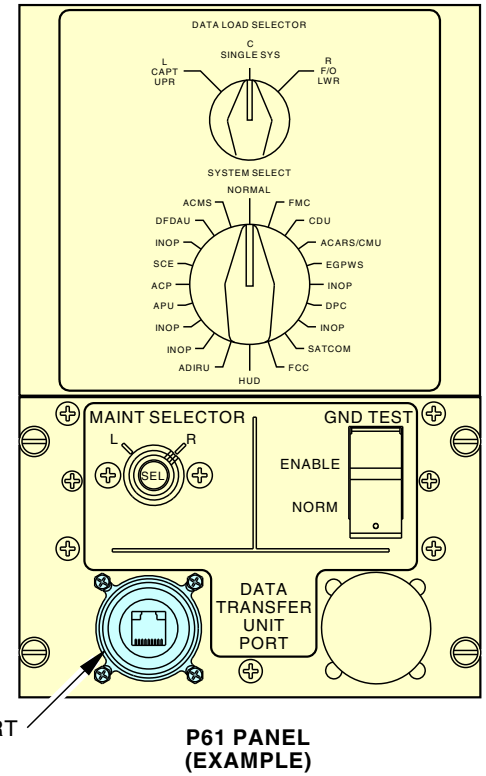
- NTP - network time protocol
- OAS - operationally approved software
- OAS - Oracle™ application server
- OBEDS - onboard Boeing electronic distribution (of) software
- ODLF - onboard data load function
- OMF - onboard maintenance function
- ONS - onboard network system
- OPC - operation program code
- OS - operating system
- PMD - portable maintenance device
- ROM - read-only memory
- SAPS - standard airline parameter service
- SBC - single board computer
- SDRAM - synchronous dynamic random access memory
- SPD - serial presence detect
- SSD - solid state drive
- TLS - transport layer security
- TWLU - terminal wireless LAN unit
- UDS - uplink-downlink service
- URL - uniform resource locator
- V ac - volts, alternating current
- V dc - volts, direct current
- VPN - virtual private network
- WAN - wide area network
- WAP - wireless access point
- WOW - weight on wheels.
- WWU - wireless WAN unit

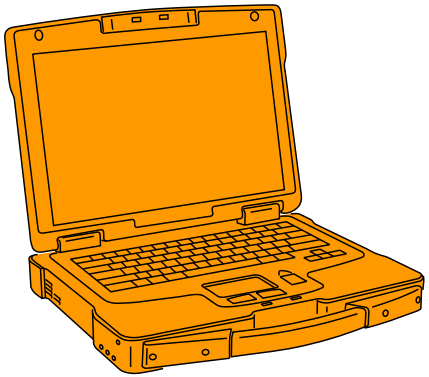
ONBOARD NETWORK SYSTEM INTRODUCTION



NETWORK FILE SERVER (NFS)



P61 PANEL (EXAMPLE)



MAINTENANCE LAPTOP

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ONBOARD NETWORK SYSTEM INTRODUCTION

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ONBOARD NETWORK SYSTEM GENERAL DESCRIPTION

General

The Onboard Network System (ONS) consists of a single Network File Server (NFS) Line Replaceable Unit (LRU) and multiple software parts that provide maintenance data, airline operational aircraft data processing, and communication services. The combination of hardware and software is referred to as the ONS. Aircraft data processing supports both line maintenance and maintenance operations engineering.

The ONS is an Ethernet avionics network system for transferring, storing and communicating data between LRUs on the aircraft as well as sending data off-board the aircraft.

The ONS is an avionics network system used for transferring, storing and communicating data between LRUs on the aircraft, as well as sending data off-board the aircraft.

ONS hosts the Onboard Maintenance Function (OMF)(s), Data Load functions, Engine Health Monitor functions, Data Monitor/Data Record functions, and Network functions. The mechanic performs these functions with the use of the ONS Web Application interface.

The ONS Web Application uses a browser to accomplish a number of system tests, configuration management, data load activities, Mass Storage Device (MSD) management, client file management, LRU monitoring, and Security maintenance activities.

Network File Server

The primary LRU is the NFS. The NFS is installed on shelf E4-2 in the electrical bay.

During usual service, NFS operation is fully automatic. The user interface for the NFS is a maintenance laptop or other Portable Maintenance Device (PMD). Also, the two inboard forward displays of the MAX Display System (MDS) give access.

Aircraft Ethernet Connectivity

The NFS is connected to the systems that follow, using Internet Protocol (IP) over Ethernet wiring:

- Enhanced Ground Proximity Warning System (EGPWS)
- Maintenance laptop
- CWLU (Crew Wireless LAN Unit)
- DFDAU (Digital Flight Data Acquisition Unit)
- DPC-1, DPC-2 (Display Processing Computer)
- EEC -1, EEC-2 (Electronic Engine Controller)
- EGPWS (Enhanced Ground Proximity Warning System)
- Flight Deck Crew Port (for Maintenance Laptop to ONS connection)
- MMR-1 (Multi-mode Receiver)
- WWU (Wireless WAN Unit)
- AID (Aircraft Interface Device)
- WWU (Wireless WAN Unit)
- CWLU (Crew Wireless LAN Unit)
- AID DG (Aircraft Interface Device Domain Guard)

Discrete

The NFS uses a discrete signal for awareness and control.

- Weight on wheels.

Mass Storage Device

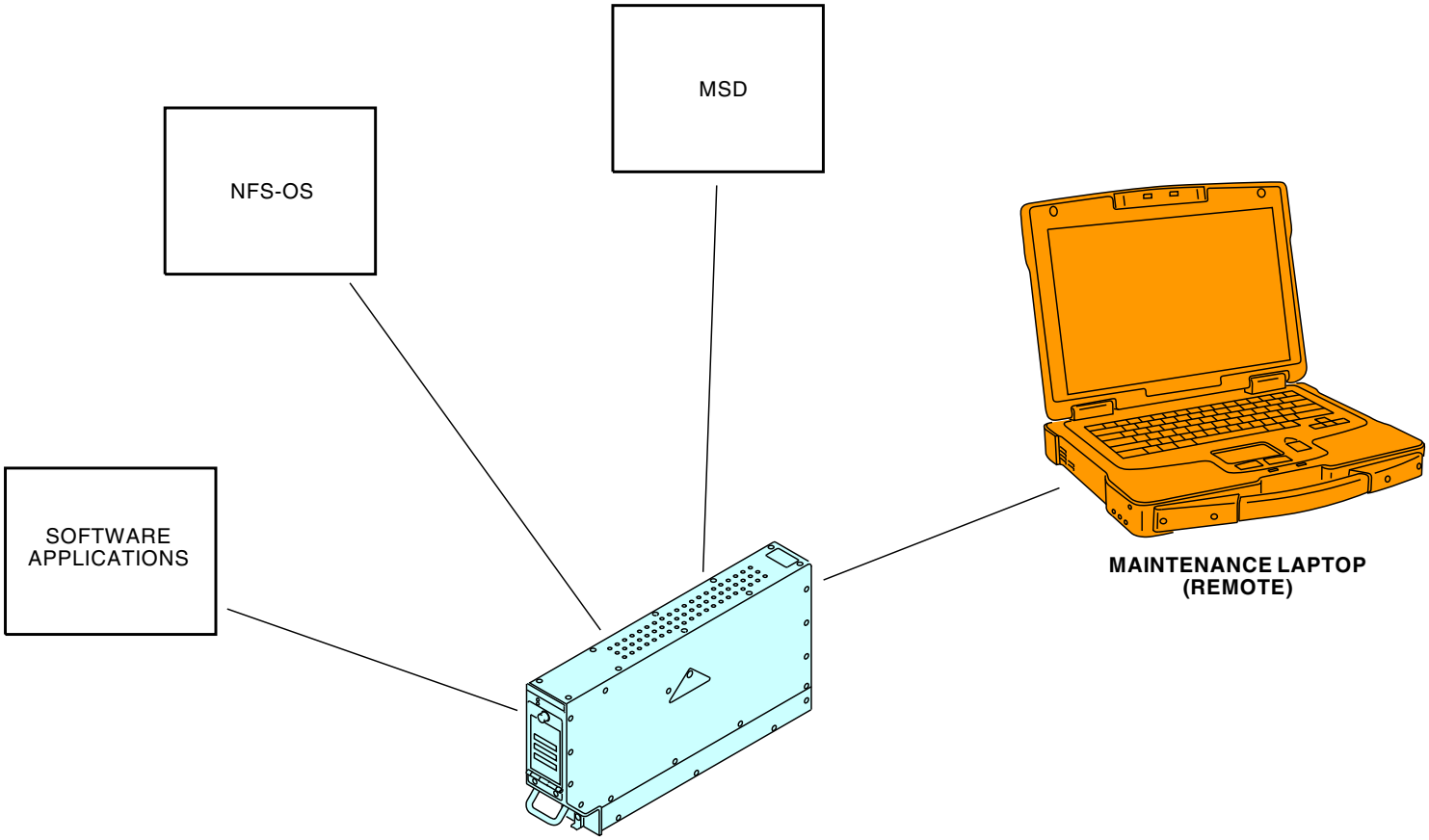
The MSD is a partition on the server available for file and data storage. For example, Loadable Software Airplane Part (LSAP) are saved (or, staged) to the MSD for future installation into the NFS, or other systems on the network.

Parts can be transferred manually or automatically to or from the MSD. A method of manual transfer can be with a maintenance laptop. An automatic transfer can use a laptop (application), or wireless connection.

Application Data Processing

The NFS can host operationally approved software that supports the cabin crew, the maintenance crew, or other airline interests.

ONBOARD NETWORK SYSTEM GENERAL DESCRIPTION



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ONBOARD NETWORK SYSTEM DESCRIPTION

ONBOARD NETWORK SYSTEM - NETWORK FILE SERVER

General

The primary hardware unit of the onboard network system is the network file server (NFS). The NFS contains two single board computers (SBCs). They are as follows:

- Server Subsystem Processor (SSP)
- Network Extension Device (NED) Subsystem Processor (NSP).

An internal power supply provides the necessary voltages that allows these SBCs to function.

NFS Server

The NFS allows for interconnection of other onboard Ethernet devices. It supplies data routing as well as certain network services.

The NFS supports the ONS functions that follow:

- Central server
- Routing and switching services
- ARINC 818 video output
- HDMI video interface
- SD removable storage
- Interface between existing ARINC 429, ARINC 717, and RS422 interfaces, USB 2.0 and USB 3.0 equipment, and/or aircraft discrete interfaces and the ONS.
- Push-button switch to reset the NFS Server Subsystem Processor and the NED Subsystem Processor

Physical Description

These are the dimensions and weight of the Network File Server (NFS):

- Height 7.62 in. (19.35 cm)
- Width 2.27 in. (5.77 cm)
- Depth15.12 in. (38.40 cm)
- Weight 8.0 lb (3.63 kg) maximum.

The NFS is a flange-mounted unit intended for installation in the aircraft avionics bay, or in close proximity to the equipment with which it is interfaced. One rear connector facilitates interconnection of the NFS with associated equipment. The NFS is comprised of a Server Subsystem Processor (SSP), a Network Extension Device (NED) Subsystem Processor (NSP), a Solid State Drive (SSD) (A5), an Input/Output CCA and a power supply, housed in a common enclosure.

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The NFS2-01 has an Intel™ processor with 8 gigabyte (GB) of Error Correcting Code (ECC) with Random Access Memory (RAM) and 2 - 256GB (240GB usable for each) Solid State Drives (SSD).

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The NFS2-03 has an Intel™ processor with 16 gigabyte (GB) of Error Correcting Code (ECC) with Random Access Memory (RAM) and 2 - 512GB (470GB usable for each) Solid State Drives (SSD).

SIA ALL

Functional Description

The NFS provides the following functions and capabilities:

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Server Subsystem Processor (SSP) (A2) – Provides the Computer on Module (COM) Express and ARINC 818 functions. The type 6 COM Express module includes an i7 Dual Core Intel Central Processing Unit (CPU) with 8 gigabyte (GB) of Error Correcting Code (ECC) with Random Access Memory (RAM) and 2 - 256GB (240GB usable for each) Solid State Drives (SSD) for the NFS2-01.

ONBOARD NETWORK SYSTEM - NETWORK FILE SERVER

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Server Subsystem Processor (SSP) (A2) – Provides the Computer on Module (COM) Express and ARINC 818 functions. The type 6 COM Express module includes an i7 Dual Core Intel Central Processing Unit (CPU) with 16 gigabyte (GB) of Error Correcting Code (ECC) with Random Access Memory (RAM) and 2 - 512GB (470GB usable for each) Solid State Drives (SSD) for the NFS2-03.

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NED Subsystem Processor (NSP) (A4) – Provides the NED function for a stand-alone NFS application. The NSP contains the following components: SOM CCA (A4A2), USB Flash (A4A3), and 2 GB SODIMM DDR-2 RAM (A4A4). The hardware includes a Cavium Networks CPU and necessary hardware to interface with ARINC 429, ARINC 717, and aircraft discretes. This CCA also includes a System on Module (SOM) to offload some of processing of the Cavium CPU. This CCA includes software developed by Teledyne controls.

Power Supply (A1) – The Power Supply converts input power and distributes for internal CCA use. The Power Supply is powered by 115 VAC, 400 aircraft input power, with maximum power consumption of 66 watts. The power supply generates +3.3VDC, +5.0VDC, +12VDC and -12VDC for operation of the single board computer (SBC). The power supply incorporates an on-board voltage monitor circuit to detect over-voltage conditions, temperature sensor to detect over-temperature conditions, and fault detection circuitry.

Solid State Drive (A5) - Used for data and program storage.

Input/Output CCA (IOC) (A3) - The IOC incorporates the connectors and filters necessary to accomplish interconnection of the NFS with associated aircraft equipment. The ARINC 600 Interface connector P1 on the back of the NFS facilitates interconnection of the unit with associated equipment.

NED Router

The NED router has a Cavium™ processor. Software parts for the NED are recorded in flash read-only memory (ROM). The NED receives and transmits three types of data:

- ARINC 429
- ARINC 717
- Aircraft Discretes

Power Supply Circuit Card Assembly

The NFS power supply gets 115V ac (volts alternating current), 400Hz (Hertz) aircraft power, with maximum power consumption of less than 50 watts. The power supply makes these voltages for operation of the Single Board Computer (SBC):

- Plus 3.3V dc (volts direct current)
- Plus 5V dc
- Plus 12V dc
- Minus 12V dc.

The power supply has these circuits:

- A voltage monitor circuit to find over voltage conditions
- A temperature sensor to find over temperature conditions
- Fault detection circuit.

NED Adapter Card Circuit Card Assembly

The Network Extension Device Adapter Card (NAC) communicates with an internal Network Extension Device (NED) SBC.

NED Subsystem Processor (NSP) Single Board Computer Assembly

The NSP SBC is a Central Processing Unit (CPU) card that has these functions:

- Onboard control logic from a network processor and a Field Programmable Gate Array (FPGA)
- Local power supply and voltage monitor
- Temperature monitor
- Memory - Synchronous Dynamic Random Access Memory (SDRAM), boot Read Only Memory (ROM), Compact Flash
- Ethernet controllers and a reset generator.

The SBC has these types of interface:

- Ethernet
- Aeronautical Radio Incorporated (ARINC) 429
- ARINC 717
- Serial
- Aircraft discrete.

For the control logic the network processor does these functions:

- Gives the interface between the control logic and onboard SDRAM
- Interface between the control logic and the onboard Ethernet Interface
- Gives the interface between the control logic and onboard boot ROM when the SBC starts operation
- Controls how the processor gets temperature data from the temperature monitor circuit
- Gives the clock and data interface for the SDRAM Serial Presence Detect (SPD) interface
- Gives the Medium Dependent Interface (MDI) clock
- Data path for the Ethernet interface
- Gives the control signals and data path for the onboard serial interface
- Monitors the signal outputs from the onboard power monitor and reset generator circuits, and starts the reset of the onboard circuits
- Operates with the FPGA to give an interface from the SBC discrete interface, ARINC 429 interface and onboard memory, and external discrete and ARINC 429 devices.

The SBC has these memory components:

- SDRAM
- Boot ROM
- Compact Flash.

The one Giga byte Small Outline Dual In-line Memory Module (SODIMM) SDRAM device gives Random Access Memory (RAM) for the network controller.

The boot ROM is a one 256 Megabit flash ROM device. The SBC uses the boot ROM during the start of operation to load operating software for the SBC.

The Compact Flash socket accepts a one Gigabyte Compact Flash card for mass data storage. The socket supports true Integrated Drive Electronics (IDE) mode using the integrated expansion bus of the network controller.

The discrete interface receives four discrete inputs and two program pin inputs, and has twelve discrete outputs. The discrete interface does the line conditioning and conversion of the front end lines to low voltage Complementary Metal Oxide Semiconductor (CMOS) levels.

The ARINC 429 is the interface between the SBC and external ARINC 429 devices. The ARINC 429 interface has four transmit channels and 12 receive channels. The ARINC 429 interface does the line conditioning and conversion of the ARINC 429 transmit and receive lines to low voltage CMOS levels for the FPGA.

These are the serial interfaces:

- RS-232 interface
- RS-485 auxiliary interface.

These are the Ethernet interfaces:

- Thirteen 10BASE-T/100BASE-TX downlink channels

- Two gigabit Ethernet 1000BASE-SX fiber optic channels.

Mass Storage Device

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The Mass Storage Device (MSD) is a software function of the Onboard Network System (ONS). The storage is on the 2 256 Gigabyte (GB) Solid State Drive (SSD).

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The MSD is a software function of the ONS. The storage is on the 2 512 GB SSD.

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Input Output Connector Circuit Card

The Input/Output Connector (IOC) gives the connectors and filters necessary to connect the NFS with the aircraft equipment. The Interface connector P1 on the back of the NFS connects the NFS with the aircraft equipment.

General

The NFS is an ARINC 763 integrated network server unit.

The NFS operates as a server and a computer.

When the NFS operates as a server, it does these operations:

- Ethernet router between connected devices
- Data storage unit.

When the NFS operates as a computer, it operates these types of software:

- Operating systems
- Operates specified Boeing software applications
- Operates third-party software applications.

The NFS is a part of the data network for the aircraft to ground. It uses interfaces to specified onboard Ethernet devices. With the applicable equipment, you can replace digital files between the NFS and a ground network with this equipment:

- On the ground - with a maintenance laptop.
- On the ground - with the two forward inboard displays.

The primary user interface is through a maintenance laptop. These are some of the operations possible with the maintenance laptop:

- Download reports (from ONS to the laptop)
- Install software
- Erase software
- Examine software
- Input monitoring.

The other user interface is the MAX Display System (MDS). These are some of the operations possible with the multi-function display:

- Ground Test
- Examine software
- Do a check of faults
- Install software.

Front Panel

These are the front panel indications on the NFS:

- Power - green Light Emitting Diode (LED)
- Fault - amber LED
- Disk - green LED
- NSP - green LED
- Link - green LED
- ACT - green LED
- RJ45 link - green LED

- RJ45 activity - green or amber LED.

The power indicator is on when the internal power supply of the NFS has power from the airplane. The power indicator is off when there is a power supply fault or no power to the NFS.

The fault indicator is on when the initialization operation of the Boot Operating Software (OS) is not correct or done. This light stays on during the normal initial Boot up, and goes off after two minutes. The light stays on, for more than 1 power cycle, if it is necessary for the NFS, to have the Boot OS installed, or there is a hardware fault. The LED does not come on when you do a software reboot from the maintenance screens.

The DISK indicator is on when the Server subsystem reads or writes to the Serial Advanced Technology Attachment (SATA) hard drive.

The NSP indicator is on when the NSP subsystem is on. These operation cause the NED indicator to go on and off quickly:

- When the Boot OS for the subsystem operates
- While the NFS is dataloading, the 46 NSP Operational Program Software (OPS)
- While the NFS is dataloading, the 46 NSP Operation Program Code (OPC).

The frequency the indicator goes on and off will go down to approximately one time during each second if the NSP system is operational. This occurs when the unit changes from boot/dataload mode to a normal operational condition. The indicator stays on if the subsystem for the NSP has a fault.

The LINK indicator is on when the Ethernet for the NFS subsystem is connected to the NSP subsystem. It is typical for this to be solid green during normal operation. It is typical for this light to be off when the unit is running in the Boot OS, because the interface to the NSP subsystem does not operate in the Boot OS. If the communication with the internal NSP has a fault, this light is off and there will be an applicable NFS Fault Message for the internal NSP.

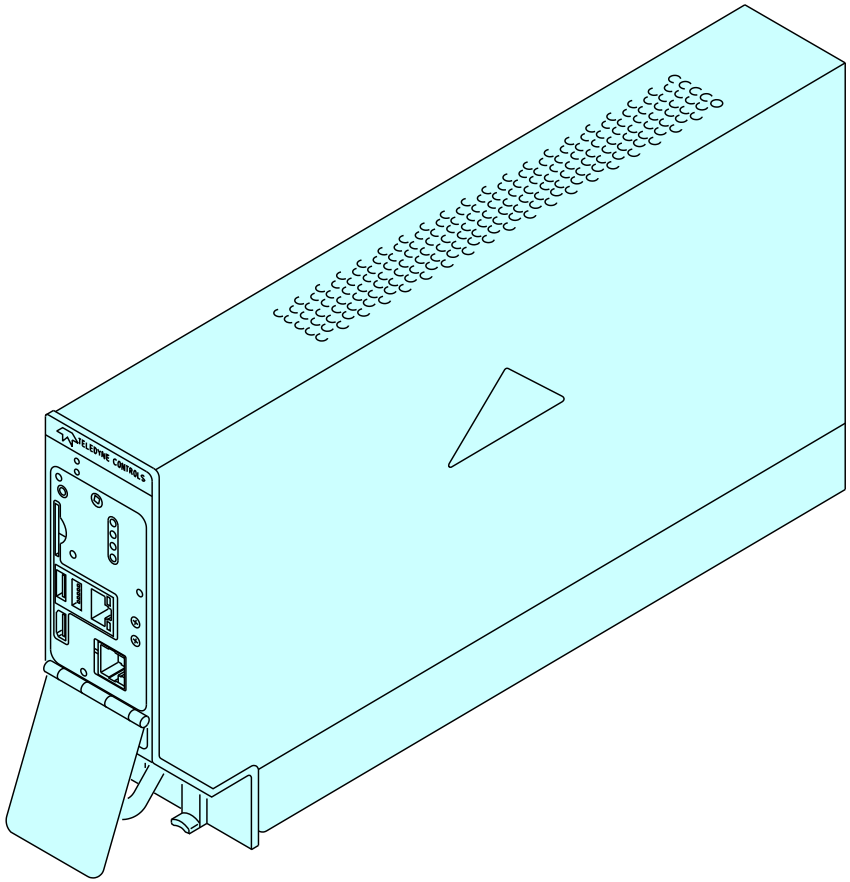
The ACT indicator is on when Ethernet data moves between the internal NSP subsystem and the server subsystem. It is typical for this indicator to go on and off during normal operation. It is typical for this light to be off when the unit is running in the Boot OS, because the interface to the NSP subsystem does not operate in the Boot OS. If the communication with the internal NSP has a fault, this light is off and there will be an applicable NFS Fault Message for the internal NSP.

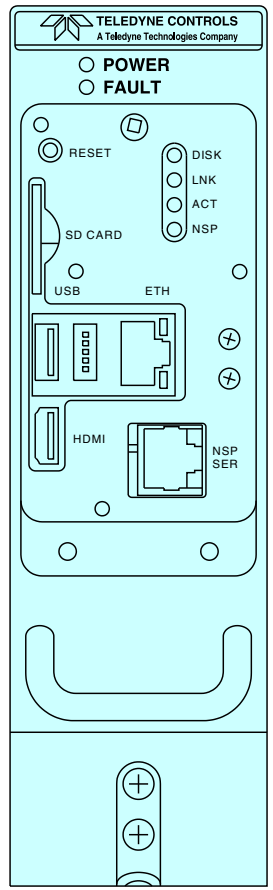
There are two LEDs for the RJ45 connection behind the front panel. These indications are equivalent to a standard link and an activity on a laptop connection. They will be off during these conditions:

- There is no cable connected
- The cable is defective
- The interface is disabled by an internal server or connected computer.

The activity light will go on and off when there is a data transfer on the interface. The activity light can be amber or green.

ONBOARD NETWORK SYSTEM - NETWORK FILE SERVER





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ONS - NETWORK FILE SERVER

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ONBOARD NETWORK SYSTEM INTERFACES

General

The Onboard Network System (ONS) Network File Server (NFS) uses six types of data connections:

- Digital Aeronautical Radio Incorporated (ARINC) 429
- Digital ARINC 717
- Analog and Digital Discretes
- Ethernet 10/100 BASE-T.
- Digital ARINC 818
- RS422

Each type of connection can do one or more functions:

- Data acquisition and data transmission
- Fault reporting of network communication problems
- Software installation.

ARINC 429 Connections

ARINC 429 refers to the avionics data bus, using a two-wire connection. These LRUs communicate with the NFS using ARINC 429:

- ADIRU-L (Air Data Inertial Reference Unit Left)
- ATC-1 (Air Traffic Control Transponder)
- CMU (Communications Management Unit)
- Data Load Control Panel
- DPC-1, DPC-2 (Display Processing Computer)
- FMCS Transfer Relay
- MMR-L, MMR-R (Multi-mode Receiver)

ARINC 717 Connection

ARINC 717 refers to the acquisition of flight data for recording. This LRU communicates with the NFS using ARINC 717:

- DFDAU (digital flight data acquisition unit)

Ethernet Connections

10/100 BASE-T Ethernet uses two pairs of wires (or 4 wires, total). These devices communicate with the NFS using Ethernet:

- CWLU (Crew Wireless LAN Unit)
- DFDAU (Digital Flight Data Acquisition Unit)
- DPC-1, DPC-2 (Display Processing Computer)
- EEC -1, EEC-2 (Electronic Engine Controller)
- EGPWS (Enhanced Ground Proximity Warning System)
- Flight Deck Crew Port (for Maintenance Laptop to ONS connection)
- MMR-L, MMR-R (Multi-mode Receiver)
- WWU (Wireless WAN Unit)
- AID (Aircraft Interface Device)
- WWU (Wireless WAN Unit)
- CWLU (Crew Wireless LAN Unit)
- AID DG (Aircraft Interface Device Domain Guard)
- SATCOM
- Boeing Flight Management System (BFMS)

Analog Discretes

Typically, an analog discrete is a circuit using one wire, and aircraft ground. These devices communicate with the NFS using discretes:

- Air/Ground relay
- CWLU (Crew Wireless LAN Unit)
- Data Load Control Panel
- WWU (Wireless WAN Unit)

ARINC 818 Connections

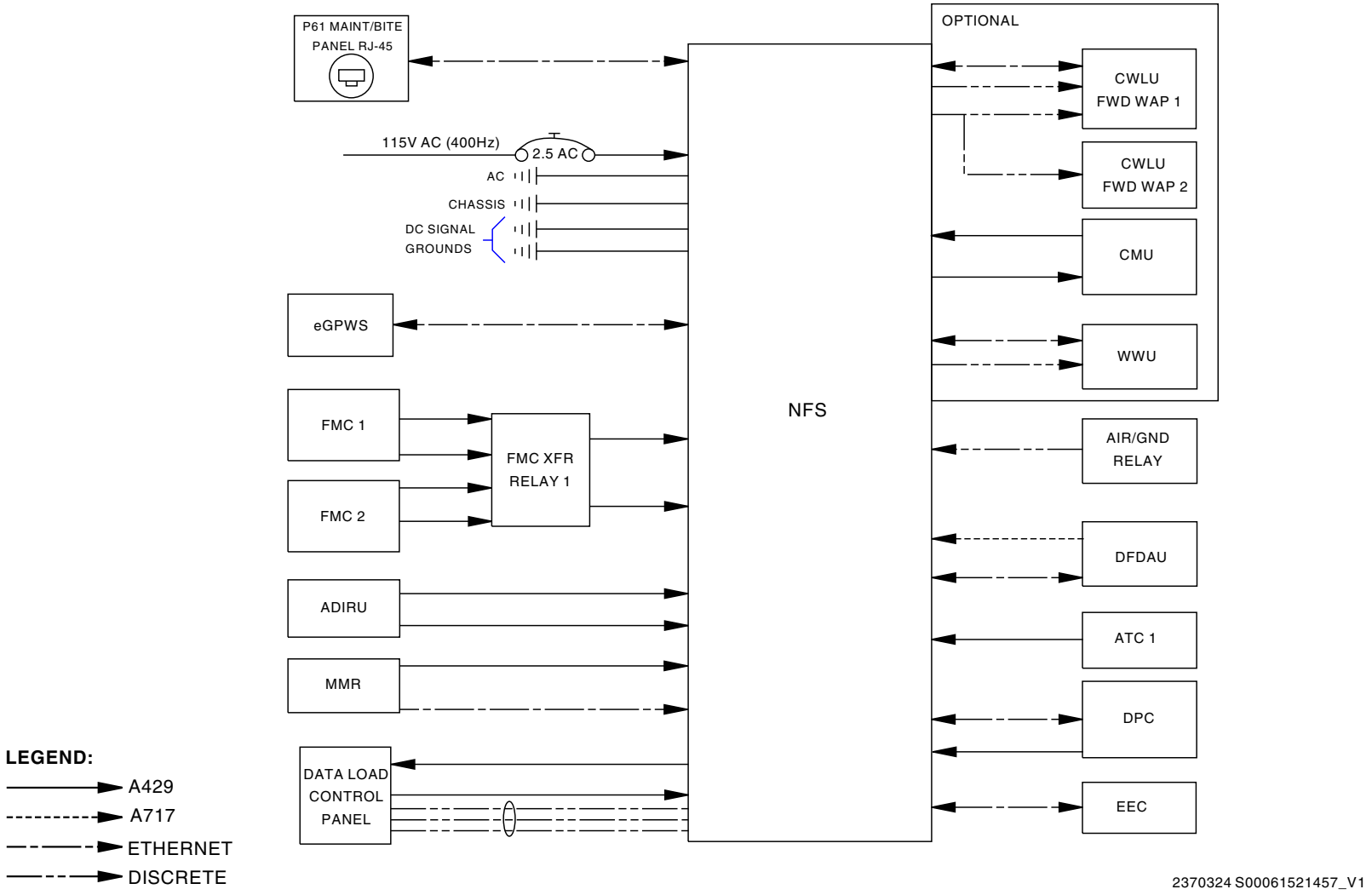
ARINC 818 refers to the fiber connection that allows for the transmission of video and data. These LRUs communicate with the NFS using ARINC 818:

- DPC-1, DPC-2 (Display Processing Computer)

Special Purpose

Other bus systems exist for special purpose applications. These include RS 422 for transmittal of ACMS reports and ARINC 717 for transmittal of parametric ACMS data from DFDAU to ONS.

ONBOARD NETWORK SYSTEM INTERFACES



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ONBOARD NETWORK SYSTEM INTERFACES

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ONBOARD NETWORK SYSTEM SOFTWARE

General

The Network File Server (NFS) uses software parts to operate the two internal single-board computers. These are the Server Subsystem Processor (SSP) and a Network Extension Device (NED) Subsystem Processor (NSP). When the system is serviceable, additional applications and software parts can be installed.

The NFS is delivered to the customer with a specific record of software parts. These parts are required as part of the aircraft certification.

The airline or operator can also specify software parts for installation. For additional information regarding this category of Loadable Software Airplane Part (LSAP), you can refer to FAA Advisory Circular 120-76.

Minimum Software Parts

Six software parts must be installed to boot and operate the NFS. These parts can not be erased, but they can be installed again, or replaced with new LSAPs. Four parts operate the server, and two parts operate the internal NED card. They are as follows:

NFS Software Parts

LSAP Nomenclature	Computer	Location
46 NFS BOOT OS	Server	Boot drive
46 NFS SERVER OS	Server	Operational drive
46 NFS NETMANAGER APP	Server	Operational drive
46 NFS MEF OPS	Server	Operational drive
46 NFS OPC	Server	Operational drive
46 NSP OPS	Router	NSP flash memory
46 NSP OPC	Router	NSP flash memory

Boot Software

The LSAP identified as NFS Boot OS contains the basic boot-up instructions. During the normal boot sequence, the NFS Boot OS is activated, and launches the Operational OS to complete the boot sequence. The NFS Boot OS part then stops running. During normal operation, the NFS operational disk is the primary drive.

To do maintenance on the operational drive, NFS Boot OS is activated but does not hand-off to the Operational OS. The flash memory remains the primary drive.

For each of the two conditions, the maintenance laptop is the user-interface.

NFS Boot OS can be replaced only after the NFS has booted completely in Operational OS.

NSP Software

The NSP Operational Program Software (OPS) runs the NSP during normal operation and is required for boot-up. This part is recorded in internal memory on the NSP - it cannot be erased, but it can be installed again or replaced with a new LSAP.

The NSP Operational Program Software (OPS) runs the NSP during normal operation.

Operational OS Software

During normal service, the NFS is controlled by a group of parts referred to as the operational OS (operating system). These parts are recorded in a partition on the solid state (operational) drive. Specifically, the parts are identified as:

- 46 NFS SERVER OS
- 46 NFS NETMANAGER APP
- 46 NFS MEF OPS
- 46 NFS OPC.

User Modifiable Software (UMS) Parts

User modifiable software (UMS) parts add functions to the server that support airline operations or business purposes. Typically, UMS parts can contain account information, airport data for off-airplane communication, or other configuration data.

ONBOARD NETWORK SYSTEM SOFTWARE

SOFTWARE TYPE	LSAP NOMENCLATURE	COMPUTER	INSTALLED LOCATION
USER MODIFIABLE SOFTWARE	46 NFS (PART NAME-EXAMPLE) UMS	SERVER (FUTURE)	OPERATIONAL DRIVE
NSP SOFTWARE	46 NSP OPC	ROUTER	NSP FLASH MEMORY
NSP SOFTWARE	46 NSP OPS	ROUTER	NSP FLASH MEMORY
NSF BOOT SOFTWARE	46 NFS BOOT OS	SERVER	BOOT DRIVE
OPERATIONAL OS	46 NFS NETMANAGER APP	SERVER	OPERATIONAL DRIVE
OPERATIONAL OS	46 NFS OPC	SERVER	OPERATIONAL DRIVE
OPERATIONAL OS	46 NFS SERVER OS	SERVER	OPERATIONAL DRIVE

ONBOARD NETWORK SYSTEM SOFTWARE PARTS (EXAMPLE)

2370325 S00061521459_V2

ONS SOFTWARE

ONBOARD NETWORK SYSTEM USER INTERFACE

General

The Network File Server (NFS) is host to a website called Onboard Network System (ONS). You get access to the website with the two inboard, forward displays of the MAX Display System (MDS). Access to the website is also with a Portable Maintenance Device (PMD). This is typically a maintenance laptop computer and web browser application. The web browser application shows the ONS menu bar, with these three selections:

- LINE MAINTENANCE
- EXTENDED MAINTENANCE
- OTHER FUNCTIONS.

NOTE: The available applications and functions that show are different for the Maintenance Laptop and the MDS. The Maintenance Laptop has more functions. Selection of optional equipment also determines the available applications that show.

This menu bar is the starting point for ONS operation and maintenance.

ONS Access - Data Ports

To get access, connect the PMD to ONS with an Ethernet cable connected to an RJ-45 data port. There are two data access ports on the aircraft.

In the airplane's electrical compartment, the NFS has one data port directly on the face of the LRU.

In the flight compartment, the data access port is installed on the P61 Panel at the right bulkhead as you enter the flight compartment.

The two ports each give network access to NFS.

When optional equipment is installed, the Maintenance Laptop also has wireless access available.

ONS Access - Wireless

The CWLU (optional) lets the user wirelessly connect a PMD to interface with the ONS.

ONS Access - MAX Display System (MDS)

The 737 MDS provides read-only fault reporting information to ONS to support the Onboard Maintenance Function (OMF). The MDS enables a user interface to ONS through the Onboard Maintenance pages. Control of maintenance pages on the MDS is accomplished using cursor controllers located in the flight deck on the Multi-Functional Panel Control or the alternate cursor controller on the P61 panel. By default, access to Maintenance Pages on forward displays is disabled in flight. On the ground, the operator can choose to enable in-flight (above 10,000 feet altitude) access to MAINT pages on the MDS.

Portable Maintenance Device

Access to the ONS website is by using a specified laptop computer, with a web browser application installed. Your airline or operator can specify additional requirements. The PMD is Ground Support Equipment (GSE) that is used to connect to the NFS to support maintenance and airplane operations from the ONS, such as data loading, Mass Storage Device (MSD) functions, report downloads, and maintenance message correlations to status messages. The PMD is configured with appropriate software to allow for a browser interface to NFS functionality.

NOTE: The Boeing Company recommends Mozilla Firefox as the web browser application for ONS access and operation.

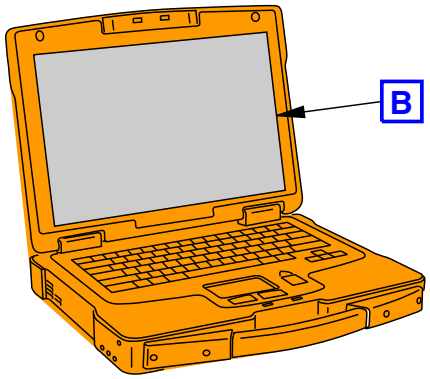
Maintenance Browser

Typically, the desktop of the laptop shows an icon that will automatically launch the web browser and connect to the ONS web site. Or, you can manually type the URL into web browser's address bar.

NOTE: The URL for ONS access is: http://ms.ons.pnet.

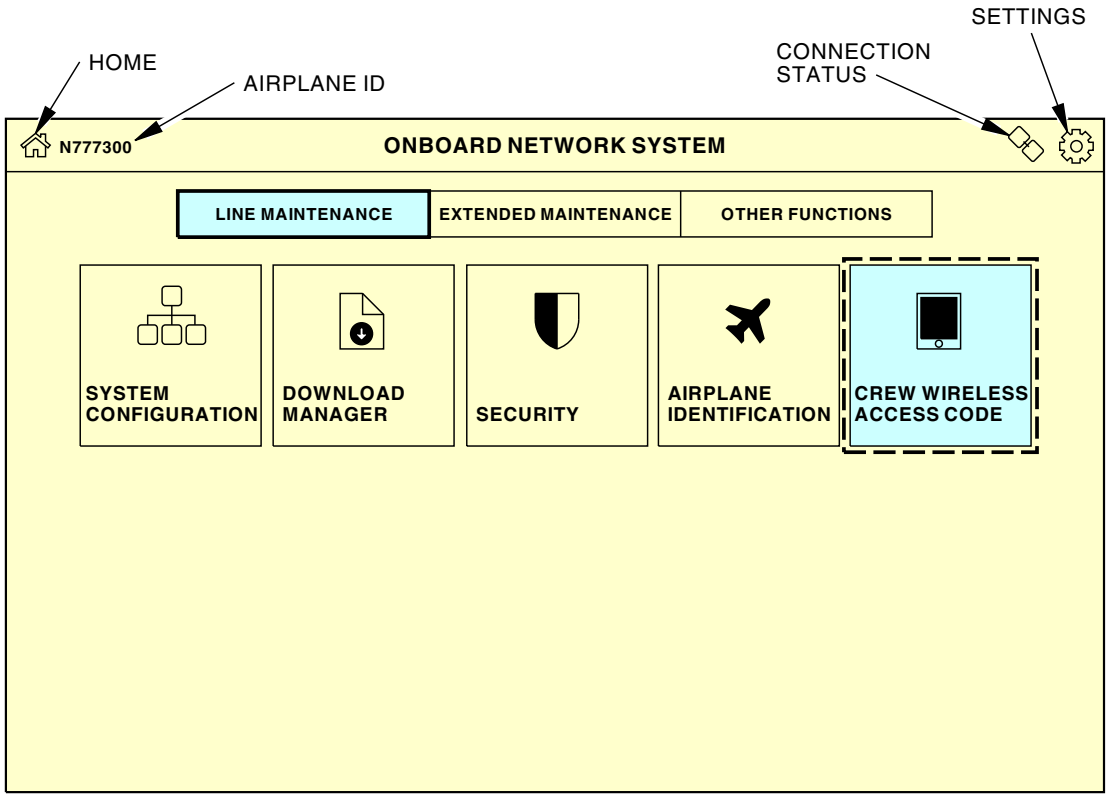
To exit the Onboard Network System web site, and return to the PC desktop, click once on the X in the upper right-hand corner.

ONBOARD NETWORK SYSTEM USER INTERFACE



MAINTENANCE LAPTOP

A



USER INTERFACE (EXAMPLE)

B

LEGEND:

– – – – OPTIONAL - WIRELESS CONNECTION REQUIRED (AVAILABLE ONLY WITH ADDITIONAL HARDWARE CONFIGURATION)

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ONBOARD NETWORK SYSTEM USER INTERFACE

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ONBOARD NETWORK SYSTEM - MAINTENANCE BROWSER

General

The Onboard Network System (ONS) Web Application is hosted by an Internet Web Server located on the Network File Server (NFS). The Web Server provides the ONS screens to the maintenance laptop connected via a maintenance port and (when configured) is capable of providing the screens to other devices connected wirelessly.

The ONS Web Application is designed and optimized to operate on the Mozilla Firefox Internet browser

The ONS Maintenance screens were designed with the Portable Maintenance Device (PMD) user in mind. The ONS Maintenance screens have settings of a pixel resolution of 1024 x 768 at 96 pixels per inch. This design allows the Maintenance Laptop user to run and view multiple applications simultaneously.

When the ONS Web application opens, the default Line Maintenance menu home screen shows. A description of the page follows.

ONS Home Page

The system navigation bar is near the top of the page, and has these selections:

- Line Maintenance
- Extended Maintenance
- Other Functions.

All ONS functions are organized into one of these groups.

Color indicates the function state of the user interface controls. The screen color of a function such as a Task Workflow button indicates its state.

- White: indicates that the state is enabled.
- Blue: shows the state is disabled or not available.
- Green: shows the operation is pressed or selected.

NOTE: Note: Elements of the Maintenance screens that appear in a shade of blue are disabled. They will appear with white text when actions enabled by appropriate screen selections and input. When a feature is selected, it appears in green.

In the top left corner of the page is the HOME icon. When you select the HOME icon, it returns to the ONS Home screen with the Line Maintenance default selected.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: For OS9.1, the icon at the top left corner of the screen is a drop down menu. This menu contains the HOME button. Line Maintenance, Extended Maintenance, and Other Functions are also listed, and these selections can be expanded to show all menu options within each selection.

SIA ALL

Adjacent to the HOME icon in the top left corner is the airplane identification. This shows a factory line number or operator tail ID.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: For OS9.1, the icon at the top left corner is a drop down menu.

SIA ALL

In the top right corner is the Settings Option icon. When you select the Settings Option icon, a popup list shows with these options (depending on your airplane configuration): Mechanic, Switch to Flight, Switch to Cabin, Exit ONS.

Adjacent to the Settings Option icon in the top right corner is the Connection icon. This chain link icon is connected and is white in color to show a serviceable ONS Ethernet or Wi-Fi connection. The chain link icon shows broken and is amber in color when the connection state is not serviceable, for example when the NFS is rebooting.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, there are also shortcut icons located at the top of the screen above the system navigation bar. These icons are tied to specific ONS maintenance pages. All icons are interactive, and can be selected to navigate to their appropriate page. These shortcut icons give a general status for the page they represent. Icons that indicate their page's functionality is unserviceable will list "Unavailable" in amber. Icons that indicate their page's functionality is serviceable will list a status in green. This status will either list "Available" or a specific active service applicable to their page.

SIA ALL

Line Maintenance Functions

Line Maintenance consists of maintenance functions that support daily airplane maintenance.

Extended Maintenance Functions

Extended Maintenance consists of maintenance functions that support more detailed analysis of airplane maintenance information, as well as other functions that are performed less frequently than those defined under Line Maintenance.

Other Functions

Other functions are limited to member systems special functions. Special Functions contain all member systems Special Functions available at the time the menu is selected, organized by ATA. Some examples of special functions include: setting certain parameters for a member system and erasing memory from a Line Replaceable Unit (LRU). Special Functions follow the same menu approach as Ground Tests.

Applications

Application Buttons show on each of the three ONS Home screens. They provide access to individual ONS applications.

Individual application screens are displayed between the Page Header and the Page Footer (if applicable). The Page Header will display the individual application name when an Application is selected.

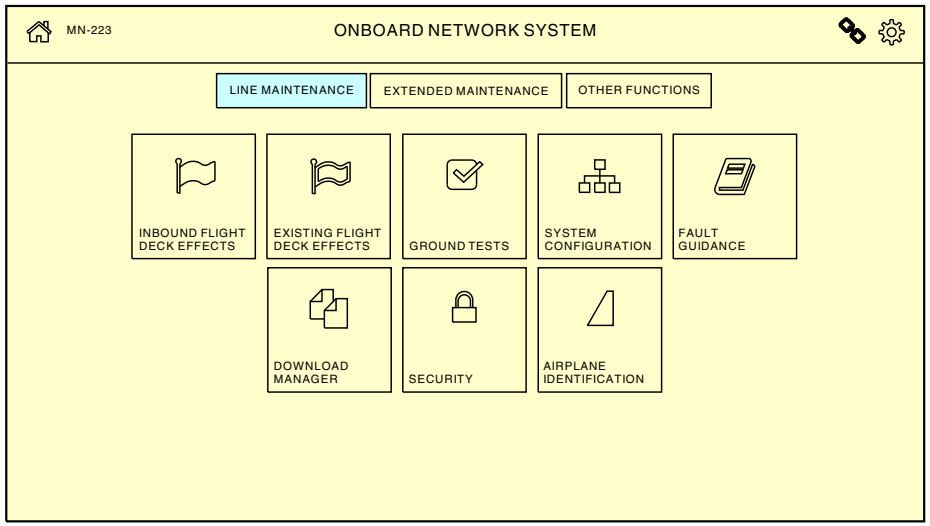
The Application Header is just below the Page Header and may have Segmented Controls, Task Workflow Buttons, or could be blank.

Application Segmented Controls: In the Application Header below the Page Header on some application screens providing access to application specific operations. Segmented controls do not have dependencies on the other controls.

Task Workflow Buttons: In the Application Header below the Page Header on some application screens, these provide a series of items or operations that must be performed in sequence. As each process is performed the next process screen is enabled and becomes available. In the following screen shot the first process is enabled and the others remained disabled until the User has selected appropriate options or entered appropriate data to enable the next button in the Task Workflow.

Screen Page Footer: Shows at the bottom of all ONS screens and provides content and optional operations dependent on the context.

ONBOARD NETWORK SYSTEM - MAINTENANCE BROWSER



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ONBOARD NETWORK SYSTEM - MAINTENANCE BROWSER

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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE

General

The default home page for the Onboard Network System (ONS) maintenance browser is the Line Maintenance page. Line Maintenance consists of maintenance functions that support daily airplane maintenance.

Line Maintenance Application Selections

There are applications that are the same for the MAX Display System (MDS) and for the Portable Maintenance Device (PMD). There are also Line Maintenance selections that are specific to the MDS or the PMD.

These are the Line Maintenance selections that show on the MDS:

- Inbound Flight Deck Effects
- Existing Flight Deck Effects
- Ground Tests
- System Configuration
- Fault Guidance
- Crew Wireless Access Code

These are the Line Maintenance selections that show on the PMD:

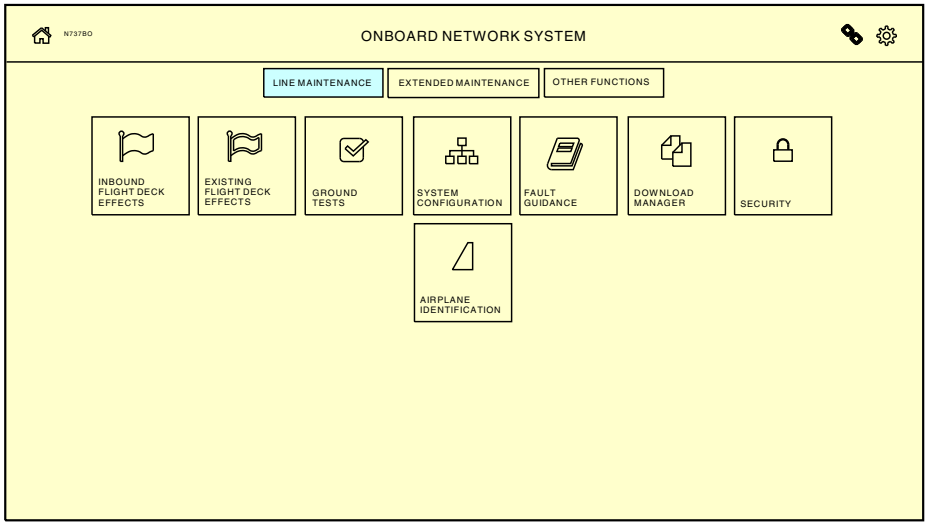
- Inbound Flight Deck Effects
- Existing Flight Deck Effects
- Ground Tests
- System Configuration
- Fault Guidance
- Download Manager
- Security
- Airplane Identification

Application Descriptions

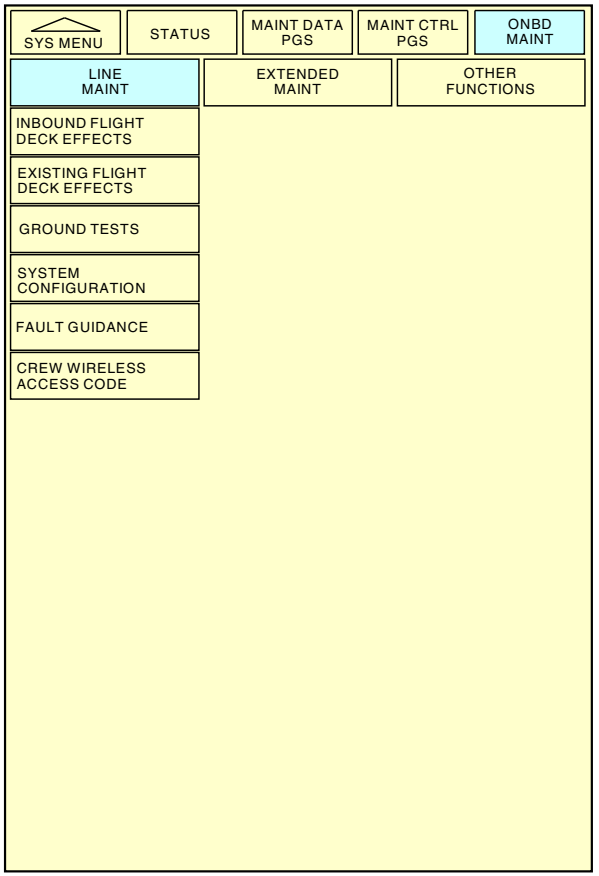
- Inbound Flight Deck Effects: This application available on the MDS and on the PMD, contains “in-flight” faults for the inbound leg (i.e., “leg 0”), grouped by FDE and sorted by time with the most recent FDE appearing first.
- Existing Flight Deck Effects: This application available on the MDS and the PMD contains faults that are currently active, grouped by FDE and sorted by time with the most recent FDE appearing first.
- Ground Tests: This application shows on the MDS and on the PMD and contains all Member Systems ground tests available at the time the menu is selected, organized by ATA.
- System Configuration: This application shows on the MDS and on the PMD and it contains all Member Systems configuration data available at the time the menu is selected. Configuration data includes the equipment part number, serial number, loaded software part numbers, and options data. Organized by ATA.
- Fault Guidance: This application is on the MDS and on the PMD and contains general information about troubleshooting at the ATA level.
- Crew Wireless Access Code: Is only available on the MDS. It provides temporary access codes that allow the Mechanic to connect the PMD wirelessly to the airplane's ONS System when the optional Crew Wireless LAN Unit (CWLU) is installed.
- Download Manager: Is only available on the PMD. The Download Manager application provides a single point for selecting and transferring files off the aircraft. The Download Manager provides the ability to view and manage a list of file types, view a list of stored files, view detailed file attributes, download and delete files, and view file store summary information.
- Security: Is only available on the PMD. The Security screens allow the user to select clients (interfacing systems to the ONS) to view and generate new credentials. The user can also view and generate the NFS credentials as well as the airplane credentials.

- Airplane Identification: Is only available on the PMD. The Airplane Identification screens allow the user to manually enter airplane identification data including Airline Identification (ID), Aircraft Type, and Aircraft Number (Tail ID).

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE



PORTABLE MAINTENANCE DEVICE (PMD)



INBOARD FORWARD DISPLAY

NOTE:

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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE PAGE

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - INBOUND FLIGHT DECK EFFECTS

General

Inbound flight deck effect (FDE) show the FDEs recorded during the present leg. Use this function when you want to see in-flight faults for the inbound leg grouped by FDE and sorted by time with the most recent FDE first.

To get access to this application, use the MAX Display System (MDS) inboard forward displays (MFDs). Or, use the Maintenance Laptop (ML) or other type of approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > INBOUND FLIGHT DECK EFFECTS.

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Inbound Flight Deck Effects.

Summary

The information that you see on the Inbound Flight Deck Effects page includes:

- Airplane ID, flight number, departure a destination airports, and leg start time.
- A summary and status of all FDE's, date and time of recorded faults, fault descriptions, fault types, fault codes and maintenance message numbers, if applicable.
- A summary and status of all correlated FDE's with date and time, fault description, type, fault code and maintenance message.
- Recommended maintenance action and possible causes
- If applicable, all correlated FDE's

Flight Deck Effect

The FDE will show the visual indications that show when the fault occurred. This effect is usually an annunciation light that shows a problem with a system.

Status

The fault status shows the fault as active, status, or not active.

Fault Code

The fault code is an 8 digit number used to identify the fault in the Fault Reporting Manual (FRM) or in the Interactive Fault Isolation Manual (IFIM).

Maintenance Message

Every fault message has a unique number to identify that specific fault. This is the maintenance message number that is used to identify and troubleshoot the fault. The display also has an option to make a selection from the FDE summary of a single maintenance message to see these details:

- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.

Other Selections

From the summary page further information can be found using the buttons on the bottom of the screen.

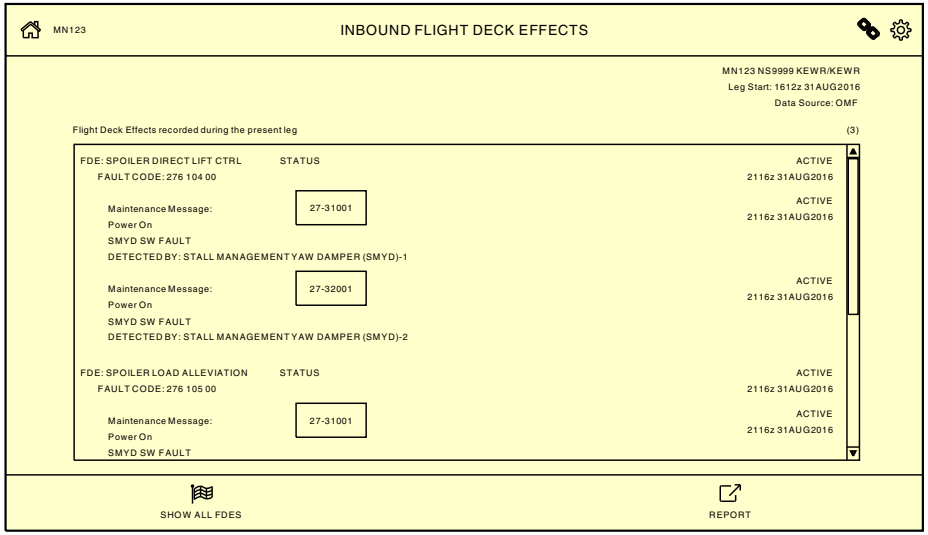
The maintenance message data page (MAINT MSG DATA) is accessed by highlighting the specific fault shown on the summary page and pressing the button next to the Maintenance Message.

The SHOW ALL FDES button toggles between the display of all flight deck effects and showing only active FDEs.

A report of the summary page can be created and stored in memory by using the REPORT button. Reports can then be downloaded using the PMD.

When you select the FLIGHT LEGS option, there is a SHOW LEG tab and a SHOW DATA tab. A flight leg graph shows when you select the SHOW LEG tab. A flight leg data table shows when you select the SHOW DATA tab.

NOTE: The FLIGHT LEGS icon, SHOW LEG tab, and SHOW DATA tab do not show on the MDS multifunction display (MFD)(s). These options show only on the Maintenance Laptop or other type of PMD.



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - EXISTING FLIGHT DECK EFFECTS

General

Existing Flight Deck Effect (FDE) contains faults that are currently active, grouped by FDE and sorted by time with the most recent FDE appearing first. Newly active faults will be added to the display dynamically, but faults that become inactive will remain on the display with their status updated to “NOT ACTIVE” until the page is refreshed. The user can show correlated FDEs (FDEs that are correlated to one or more maintenance messages), or show all FDEs regardless of whether they are correlated or not.

To get access to this application, use the MAX Display System (MDS) two forward dispays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > EXISTING FLIGHT DECK EFFECTS.

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Existing Flight Deck Effects.

Summary

The information that you see on the Existing Flight Deck Effects page includes:

- Airplane ID, flight number, and departure and destination airports for the inbound leg.
- A summary of all active FDE's with fault code, maintenance message number and maintenance message text.
- Options to show correlated FDEs and uncorrelated FDEs.

There is also an option to make a selection from the FDE summary of a single maintenance message to see the details that follow:

- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.
- Recommended maintenance actions to include possible causes.
- Fault history

Flight Deck Effect

The FDE will show the visual indications that show when the fault occurred. This effect is usually an annunciation light that shows a problem with a system.

Status

The fault status shows the fault as active, status, or not active.

Fault Code

The fault code is a 8 digit number used to identify the fault in the Fault Reporting Manual (FRM) or in the Interactive Fault Isolation Manual (IFIM).

Maintenance Message

Every fault message has a unique number to identify that specific fault. This is the maintenance message number that is used to identify and troubleshoot the fault. The display also has an option to make a selection from the FDE summary of a single maintenance message to see these details:

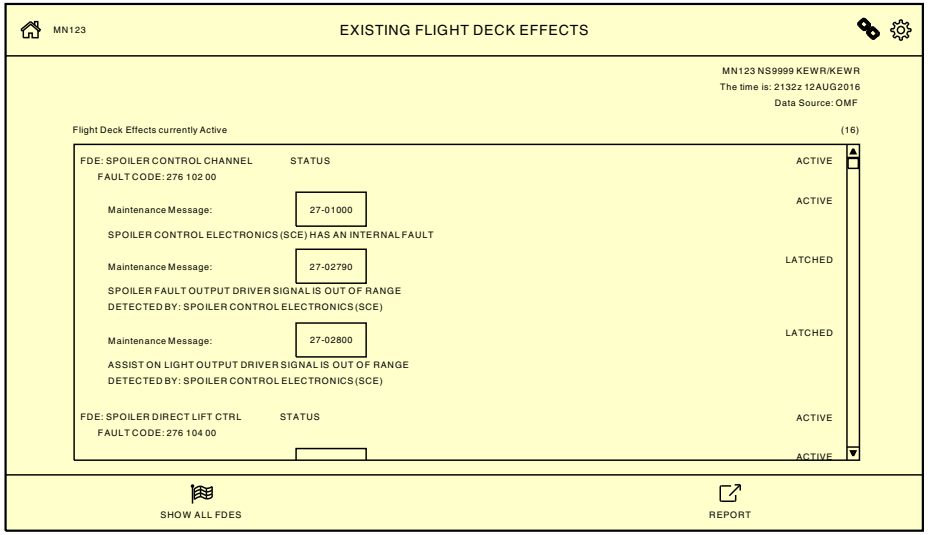
- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.

Correlated Maintenance Messages

The Onboard Maintenance Function (OMF) knows which maintenance message is related to each status message. The OMF shows the status message and the related maintenance message together.

When the status message and the maintenance message show together on the OMF, the maintenance message is "correlated" to the status message.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - EXISTING FLIGHT DECK EFFECTS



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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - EXISTING FLIGHT DECK EFFECTS

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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - GROUND TESTS

General

The Ground Test page allows for selection of tests. The Ground Test function allows the user to request that a supporting member system LRU run a ground test. Ground tests can only be executed when the interfacing system determines that it is safe to perform the test.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs), an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > GROUND TESTS

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Ground Tests.

The four parts for each ground test performed are:

- Selection of the ATA and the required test
- The Precondition page
- Test
- The Post condition page

Ground Tests contain all Member Systems ground tests available at the time the menu is selected, organized by ATA.

There are three types of ground tests:

- System Test
- Operational Test
- LRU Replacement Test

NOTE: For line maintenance, the operational test is to be performed. The system test is to be performed during major maintenance.

All three test types are not available for all ATA systems. The types of ground tests that are available to you automatically show after you make the ATA system selection.

NOTE: It is necessary to first make a selection of the ATA system. Then, after the different test types become enabled, it is necessary to select the applicable test type. The selection of the test type then populates the Select SystemTest window with all the applicable System, Operational, or LRU replacement tests for that ATA system.

Interactive or Non-Interactive

Ground tests are interactive or non-interactive. It is possible that the ground test you select is an Interactive Test. Interactive Tests have instructions and steps that you do while the test is in operation. The steps and instructions may include opening or closing circuit breakers, a change to existing switch settings, activating or deactivating interfacing systems or other actions. Non-interactive tests do not require actions after the test starts. If the ground test you select is interactive, it is important to follow all instructions that show when the test is in operation.

The table that follows shows all ATA ground tests, test types, test names, and shows if the test is interactive.

GROUND TESTS

ATA	TEST TYPE	TEST NAME	INTERACTIVE TEST?
21 - Air Cond	Sys Test	Air Conditioning IBIT - Left	NO
21 - Air Cond	Sys Test	Air Conditioning IBIT - Right	NO
21 - Air Cond	Sys Test	Air Conditioning IBIT with Flow Sensor Test - Left	NO
21 - Air Cond	Sys Test	Air Conditioning IBIT with Flow Sensor Test - Right	NO
27 - Flt Cont - Stall Mngmnt Yaw Damper Sys	Sys Test	SMYD 1 - Self Test	YES

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - GROUND TESTS

(Continued)

ATA	TEST TYPE	TEST NAME	INTERACTIVE TEST?
27 - Flt Cont - Stall Mngmnt Yaw Damper Sys	Sys Test	SMYD 1 - Servo Test	YES
27 - Flt Controls - Stall Mngmnt Yaw Damper Sys	Sys Test	SMYD 2 - Self Test	YES
27 - Flt Cont - Stall Mngmnt Yaw Damper Sys	Sys Test	SMYD 2 - Servo Test	YES
27 - Spoiler Cont	Oper Test	Control Wheel	YES
27 - Spoiler Cont	Oper Test	SCE Test	YES
27 - Spoiler Cont	Oper Test	Speedbrake Lever	YES
27 - Spoiler Cont	Sys Test	Flight Spoilers	YES
27 - Spoiler Cont	Sys Test	Ground Spoilers	YES
31 - Indicating Sys	Sys Test	DPC-1 CMU Chime Test	YES
31 - Indicating Sys	Sys Test	DPC-1 MAINT Light Test	YES
31 - Indicating Sys	Sys Test	DPC-2 CMU Chime Test	YES
31 - Indicating Sys	Sys Test	DPC-2 MAINT Light Test	YES
31 - Indicating Sys	LRU Rplcmnt Test	DPC-1 NVM Erase Function	NO
31 - Indicating Sys	LRU Rplcmnt Test	DPC-1 Replacement Test	NO
31 - Indicating Sys	LRU Rplcmnt Test	DPC-2 NVM Erase Function	NO
31 - Indicating Sys	LRU Rplcmnt Test	DPC-2 Replacement Test	NO

ATA	TEST TYPE	TEST NAME	INTERACTIVE TEST?
SIA 015-999; SIA 001-014 POST SB 737-46-1029			
32 - AACU	Sys Test	Antiskid/Autobrake System Test	YES
SIA ALL			
32 - PSEU	Oper Test	PSEU - LGTV Test	NO
32 - PSEU	Oper Test	PSEU - Self Test	NO
32 - PSEU	LRU Rplcmnt Test	PSEU - Replacement Test	YES
36 - Pneu	Oper Test	Protection Gate - Left	YES
36 - Pneu	Oper Test	Protection Gate - Right	YES
36 - Pneu	Sys Test	Pneumatic Engine ON - Left	YES
36 - Pneu	Sys Test	Pneumatic Engine ON - Right	YES
36 - Pneu	LRU Rplcmnt Test	Electrical LRU - Left	YES
36 - Pneu	LRU Rplcmnt Test	Electrical LRU - Right	YES
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF - Left FAMV	YES
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF- Right FAMV	YES
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF - Left HPSOV	YES
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF - Right HPSOV	YES
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF - Left PRSOV	YES

EFFECTIVITY

SIA ALL

(Continued)

ATA	TEST TYPE	TEST NAME	INTERACTIVE TEST?
36 - Pneu	LRU Rplcmnt Test	Pneumatic Engine OFF-Right PRSOV	YES
71-80 Left Eng	Oper Test	Actuator Test	YES
71-80 Left Eng	Oper Test	Thrust Reverser Interlock Test	YES
71-80 Left Eng	Sys Test	Electronic Engine Controller Blower Test	YES
71-80 Left Eng	Sys Test	Electronic Engine Controller Test	NO
71-80 Left Eng	Sys Test	Engine Idle Test	YES
71-80 Left Eng	Sys Test	Harness Test	YES
71-80 Left Eng	Sys Test	Ignition Channel A Test	YES
71-80 Left Eng	Sys Test	Ignition Channel B Test	YES
71-80 Left Eng	Sys Test	Wet Motor Test	YES
71-80 Right Eng	Oper Test	Actuator Test	YES
71-80 Right Eng	Oper Test	Thrust Reverser Interlock Test	YES
71-80 Right Eng	Sys Test	Electronic Engine Controller Blower Test	YES
71-80 Right Eng	Sys Test	Electronic Engine Controller Test	NO
71-80 Right Eng	Sys Test	Engine Idle Test	YES
71-80 Right Eng	Sys Test	Harness Test	YES
71-80 Right Eng	Sys Test	Ignition Channel A Test	YES
71-80 Right Eng	Sys Test	Ignition Channel B Test	YES
71-80 Right Eng	Sys Test	Wet Motor Test	YES

Selection

The selection page for Ground Tests has three selection areas:

- Select the ATA System
- Select the Test Type
- Select the Test

The ATA selection area shows all the ATA numbers that are available for ground test selection. When a selected ATA does not have a specific ground test type available, that selection for test type will be colored cyan. The Select System Test box will have no selections shown.

If a test type is available for the selected ATA, the active test type will have white lettering. You then select the applicable test type, for example an LRU replacement test. After the test type is selected, the available tests will appear in the Select System Test window area. Select the test required. After test selections have been made, select continue to go to the precondition page.

NOTE: Menu options in cyan colored selections are not available.

Following selection of the CONTINUE button, the Precondition dialog box will show.

Pre-Condition Page

The precondition page gives a description of the test and any prerequisites that are required. Verify the information that shows and do all of the preconditions required for the test. If the preconditions are more than one page of text, all pages must be reviewed before the CONTINUE button can be selected. Then, after you complete all steps on the pre-condition page, select the continue button to go to the test page.

Test Screen

The Test Screen gives the mechanic control and current status of the test. The test screens show: Test initiation, Test In Progress, and either Test Pass or Test Fail. Before a test is done, the Onboard Maintenance Function (OMF) determines if the system being tested is currently inhibiting the test, or if another test is currently running that will interfere with the selected test. If any of these conditions exist, an Inhibit screen show. If none of these conditions exists, then the test is ready to run. The test will start executing when the operator selects the START TEST button. While the test is running, the LRU may display an Interactive dialog box with specific operator instructions (if the test includes interactive test screens). The user must read the information, perform one or more actions, and then select the Continue command. When a test is in progress, the test may be stopped by either the operator or the LRU in-test. This only applies to those tests that can be stopped during execution. The operator can stop the test by selecting the STOP TEST button if available. The LRU in test will stop the test if an inhibit condition is detected during test execution. This will be indicated on the System Test screen. When a test is complete, the System Test screen will display a Calculating Test Results screen. Once complete, the Ground Test will indicate PASSED or FAILED. If the test failed, a list of maintenance messages will show.

Test Initiation

After selection of the test, the initiation screen will show. This screen shows what test is being initiated, if the test in ready or inhibited, and the start of test selection.

Test in Progress

This shows after test has started for the duration of the test.

NOTE: Some tests are interactive. A separate window will open with instructions on the actions to be performed.

Test Complete (Pass or Fail)

Test status shows after the test is complete. If the test passes, the options are to do the test again or return the airplane to normal condition.

If the test fails, the screen shows:

- Failed LRU
- Fault code
- Reason for failure

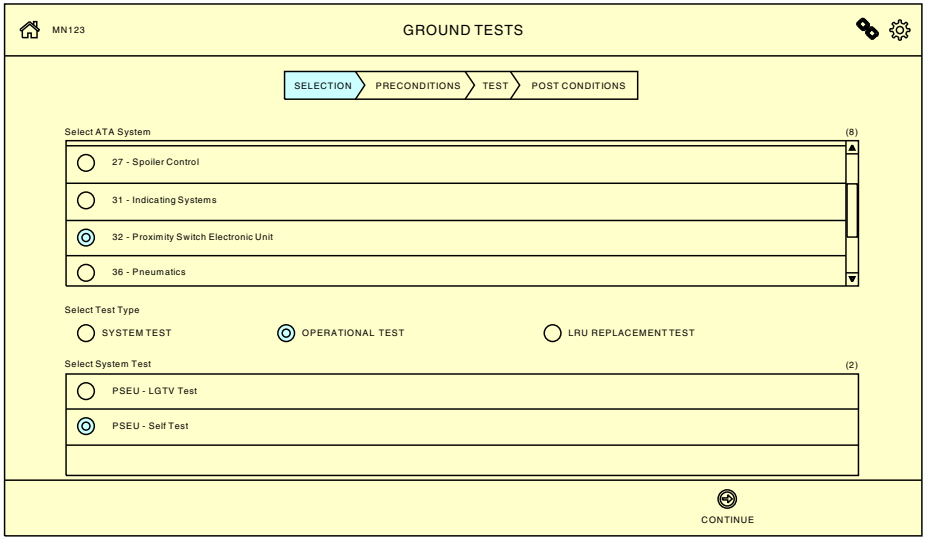
For a test failure, the options are:

- New Test
- Maintenance Message Data
- Post Conditions
- Report

Post Conditions

The final page for ground tests is post conditions. The post conditions page show the necessary steps to return the airplane to service.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - GROUND TESTS

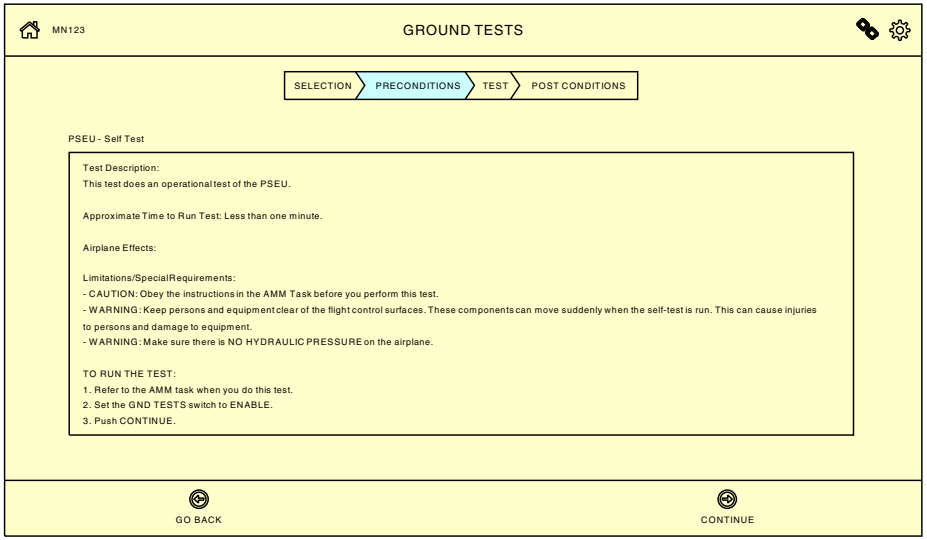


NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551092 S0000598013_V1

ONBOARD NETWORK SYSTEM GROUND TESTS



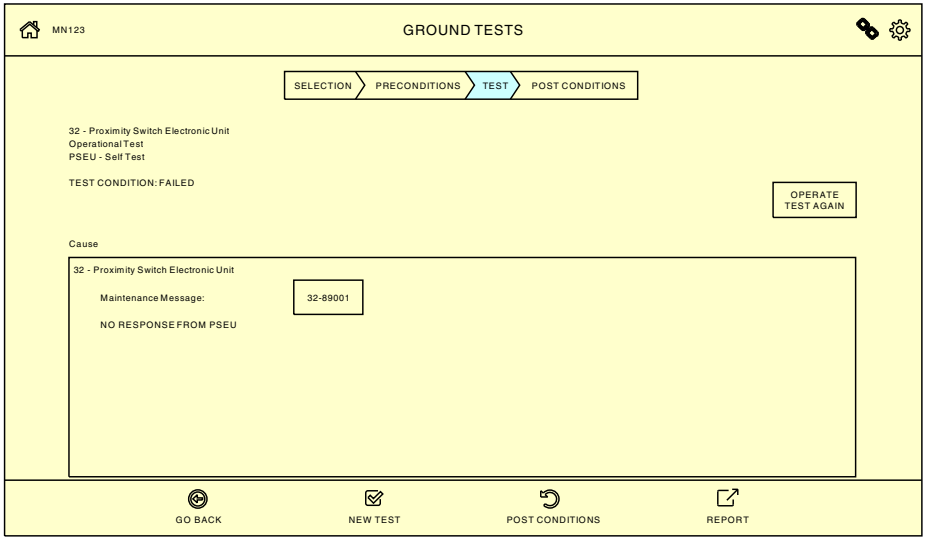
NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551098 S0000599373_V1

ONBOARD NETWORK SYSTEM GROUND TESTS

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - GROUND TESTS



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551225 S0000599374_V1

ONBOARD NETWORK SYSTEM GROUND TESTS

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SYSTEM CONFIGURATION

General

The System Configuration screen contains all member systems configuration data available at the time the menu is selected. This includes the Onboard Network System (ONS) Network File Server (NFS) and all Line Replaceable Unit (LRU)(s) that interface with ONS. There is a function to download a record of the installed parts.

To get access to this application, Portable Maintenance Device (PMD) and on the MAX Display System (MDS) two inboard, forward displays, known as the multifunction display (MFD)s.

Using the ONS maintenance browser on the PMD, access to the page is by the selection: LINE MAINTENANCE > SYSTEM CONFIGURATION.

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > SYSTEM CONFIGURATION

The page first shows a list of sorted ATAs. It is possible to select one ATA, or the ALL SYSTEMS icon lets you choose all systems. After you select an ATA (or ALL SYSTEMS) and then select the CONTINUE icon, a list of LRUs show. Each LRU that shows represents a folder or container of software parts. This is the data that shows for an LRU.

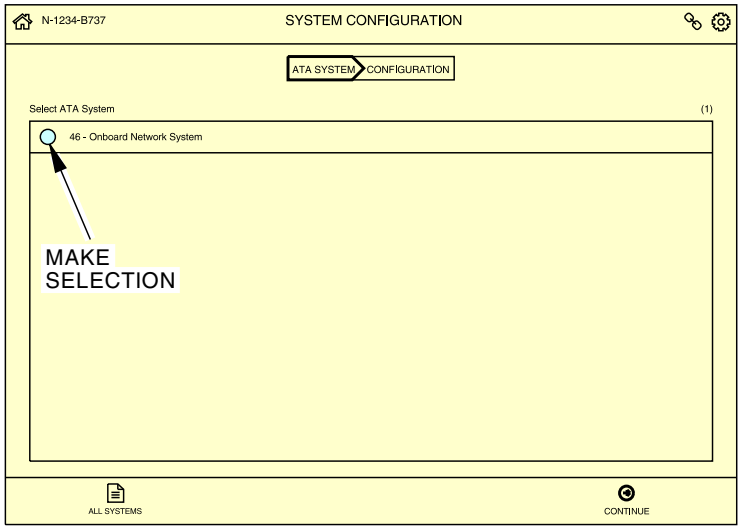
- LRU (hardware) name
- Hardware part number
- Hardware serial number
- Software location description
- Software part number
- Software nomenclature

After the hardware and software information shows, the SYSTEM CONFIGURATION page gives access that lets you download the results. You do this by selecting the REPORT icon.

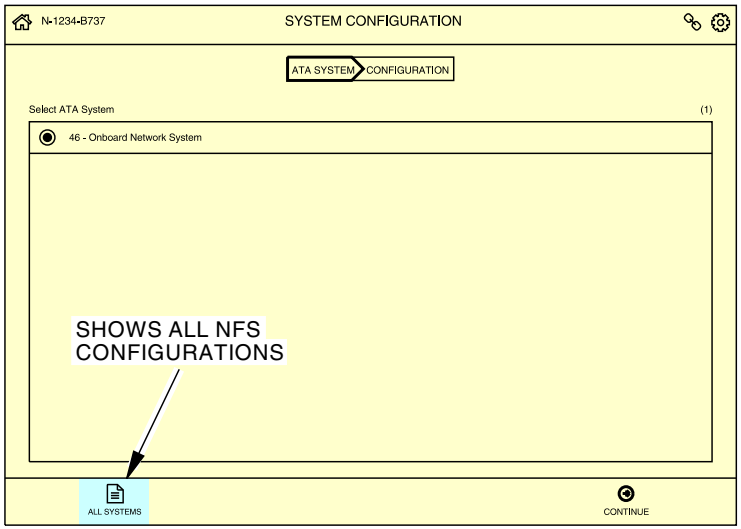
NOTE: A report can only be downloaded to a maintenance device via the PMD.

To exit SYSTEM CONFIGURATION, and return to the main menu, click once on the Home icon, located within the menu icon at the upper left corner of the page. Or, select the GO BACK icon to return to the ATA SYSTEM selection page.

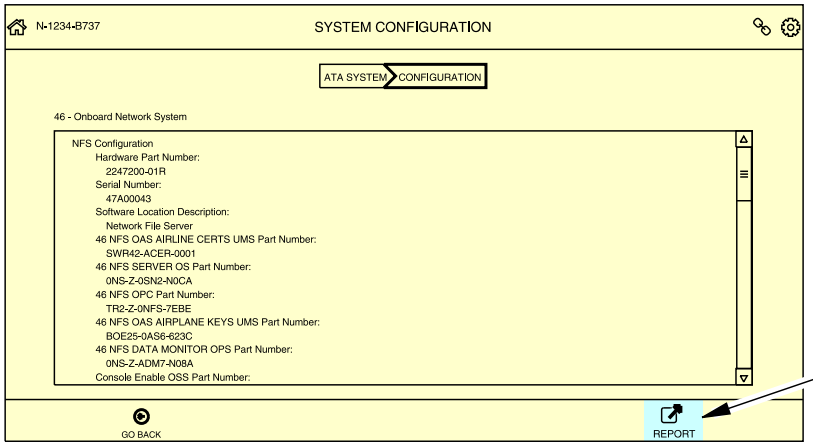
ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SYSTEM CONFIGURATION



SYSTEM CONFIGURATION ATA PROCESS FLOW



SYSTEM CONFIGURATION ATA SELECTED



SYSTEM CONFIGURATION

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

2370328 S00061521465_V1

ONS SYSTEM CONFIGURATION

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - FAULT GUIDANCE

General

The Fault Guidance application gives general information about faults at the ATA level.

To get access to this application, Onboard Network System (ONS) with the MAX Display System (MDS) multifunction display (MFD). The Maintenance Laptop (ML) or other type of approved Portable Maintenance Device (PMD) also gives access to the Fault Guidance function.

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > FAULT GUIDANCE

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Fault Guidance.

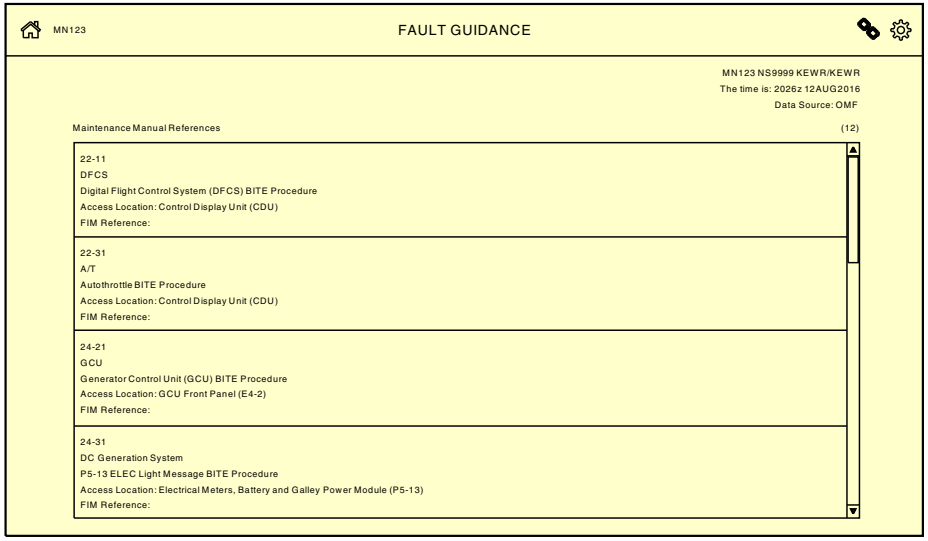
Fault Guidance Data

For each fault that shows, Fault Guidance gives the information that follows:

- Aircraft Maintenance Manual (AMM) references
- ATA Chapter-Section
- ATA System Name
- Guidance on where to look for fault indications, such as Line Replaceable Unit (LRU) front panel LEDs
- FIM ATA Chapter-Section references to the System LRU Built-In-Test Equipment (BITE) test.

Use the Line Maintenance menu function Fault Guidance when you need a quick reference to start BITE or you need troubleshooting procedures for a specific ATA section and subject.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - FAULT GUIDANCE



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551093 S0000598099_V1

ONBOARD NETWORK SYSTEM FAULT GUIDANCE

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - CREW WIRELESS ACCESS CODE

General

The Crew Wireless Access Code application provides a temporary access code that is then used with a Portable Maintenance Device (PMD) to make a wireless connection to the airplane's Onboard Network System (ONS).

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs).

Make these selections from the ONS Main Menu on the MDS: LINE MAINT > CREW WIRELESS ACCESS CODE.

Once a new access code is obtained, the user will have a limited amount of time to use it to connect to ONS before the code expires. The access code is only valid for fifteen (15) minutes. If the crew wireless access code does not show and the word “Expired” shows, then make the “NEW ACCESS CODE” selection.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, the access code is only valid for five (5) minutes.

SIA ALL

This random number is generated by the system to ensure security of the ONS connections. The maintenance or flight crew must enter the code and log into the wireless system before the time expires. If the time expires, a new random code must be generated.

The items required for wireless access are:

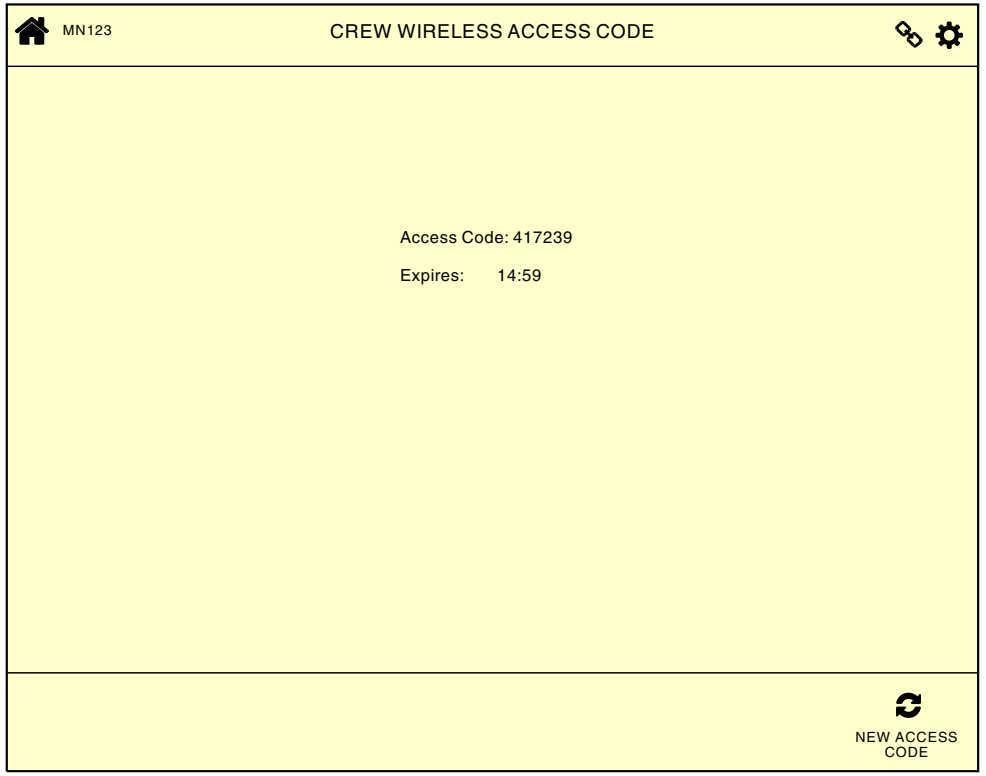
- Crew Wireless LAN Unit (CWLU)
- Security certificates install on wireless device
- Access code generated

Logging into the system using the access code is time sensitive. However, the time restriction is removed once the operator is logged into the system.

NOTE: The access code is not required for direct connection using the maintenance/bite panel or network file server front panel Ethernet connection.

NOTE: This function requires CWLU option installed in the airplane.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - CREW WIRELESS ACCESS CODE



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2552816 S0000598104_V2

ONBOARD NETWORK SYSTEM CREW WIRELESS ACCESS CODE

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - DOWNLOAD MANAGER

General

The Download Manager provides a means for the user to download log files, and any others that have been made accessible, from the Onboard Network System (ONS). The Download Manager controls the download of on-board files, logs and reports from the Network File Server (NFS) storage to the PMD.

To get access to this application, use an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Download Manager.

These are download type examples:

- Security logs
- Performance logs FSS MEF
- Engine reports
- ACARS reports
- LRU reports
- User defined reports

Operations include transfer of data, details about selected file size, and deletion of files.

The Download Manager screens allow the user to select data files (such as QAR or Engine Data) to transfer from the ONS to the PMD, or to delete the files from the ONS. Files can be filtered by application and file type.

The Download Manager function is available only on the Portable Maintenance Device (PMD). You cannot get access to the Download Manager on the MAX Display System (MDS).

SIA 015-999; SIA 001-014 POST SB 737-46-1029

The Download Manager screens allow the user to select data files (such as QAR or Engine Data) to transfer from the ONS to the PMD, or to delete the files from the ONS. Files can be filtered by application and file type.

SIA ALL

Network File Server

The Network File Server (NFS) has three types of log files:

- Performance
- Security
- Syslog.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, syslog is called system.

SIA ALL

To get access to these pages from the ONS main menu, make the selections: Extended Maintenance > Download Manager. Select LOG under “Select Application” and then the log type under “Select Type.” Performance, Security, and Syslog can be selected in any combination before selecting CONTINUE.

Logs Page

To examine all of the log names on the page, use the vertical scroll bar.

When the table of data exceeds 100 records, then four page selection buttons show. Use the page navigation buttons, and the vertical scroll bar, to examine all files in the log. The buttons are as follows:

- FIRST - shows the initial page of log files.
- PREV - shows the previous page of log files.
- NEXT - shows the following page of log files.
- LAST - shows the last page of log files.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, the four page selection buttons will show after the table of data exceeds 1000 files.

SIA ALL

When one or more log files is highlighted, use the DELETE function to erase the file(s) from the ONS.

To select all logs that have not already been transferred off the NFS, use the UNTRANSFERRED button. Once a log has been transferred, a checkmark will appear under the TRANSFERRED column.

To view the details of your selection(s), select DETAILS. This will show the number of files selected and their total size.

The GET CURRENT button is a manual feature that will generate the latest performance log, security log, and system log for download.

Performance Logs

Performance log files contain a record of specified operations that can help troubleshoot data-load problems.

Performance log files can be downloaded or erased. There is no system restriction.

Security Logs

Security log files contain a record of specified operations that can help identify security violations.

All log files can be downloaded. However, certification rules require that log files be kept onboard for a specified minimum time. Therefore, logs that do not meet that minimum cannot be erased.

Syslogs Logs

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, syslog is called system

SIA ALL

Syslog files contain a record of specified operations that can help troubleshoot software problems.

Syslog files can be downloaded or erased. There is no system restriction.

Airplane Data Recording Application (ONS Quick Access Recorder)

The Airplane Data recorder (ADR) application records real-time airplane data. The Airplane Date Recorder (ADR) interfaces with the Digital Flight Data Acquisition Unit (DFDAU) through an Aeronautical Radio Incorporated (ARINC) 717 bus connection to the Network File Server (NFS). The Airplane Date Recorder (ADR) can store one (1) Gigabyte (GB) of airplane parameters from the ARINC 717 data bus per flight leg. The ARINC stores a total of nine (9) flight legs of recorded data before overwriting earlier recorded data. The DFDAU Airplane Condition And Monitoring System (ACMS) can also write its ACMS reports to the ADR-2 in an Onboard Network System (ONS) Quick Access Recorder (QAR) report via its connection with the NFS.

The ONS Maintenance Application allows a line maintenance technician to manually select and download an ONS QAR report to a connected portable maintenance device. The ONS as configured by the Message Exchange Function (MEF) User Modifiable Software (UMS) and Exterior Communications (EXCOMM) User Modifiable Software (UMS) can automatically download ONS QAR reports to an E-Enabling Ground System (E-EGS) Loadable Software Airplane Part (LSAP) Librarian suite.

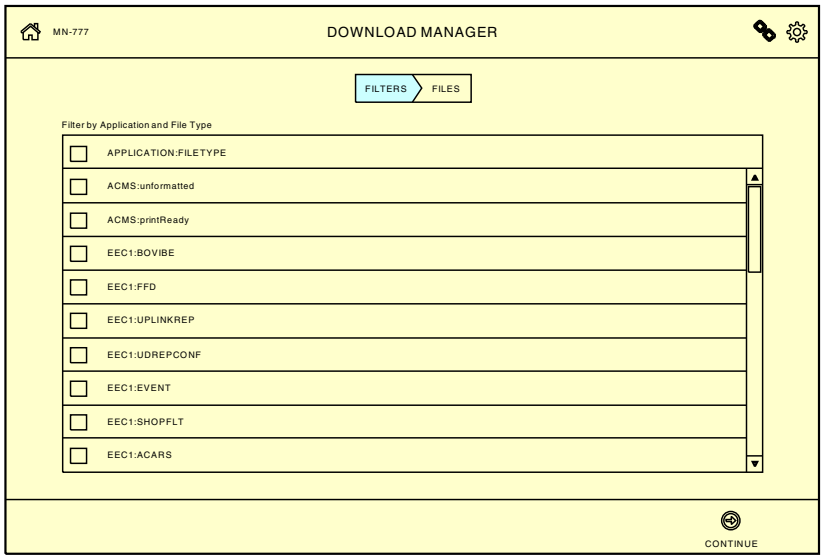
To access the QAR Data Utility on a PMD: LINE MAINTENANCE > Download Manager.

QAR Data Utility

Airlines that choose the Airplane Data Recorder (ADR) application (ONS QAR) option may manually or automatically downlink the QAR files back to the airline office network. The QAR Data Utility is provided only to airline customers who select the ONS QAR option.

The Airplane Data Recorder (ADR) writes ARINC 717 airplane parameter data and ACMS text reports into a file with the extension ".adr". The Boeing QAR Data Conversion Utility processes QAR.adr file content into two output files. One file with the file extension ".raw" is the ARINC 717 airplane parameter data encoded and recorded in digital data "frames." An airline must provide additional software to convert the raw data frames content into airplane parameters in engineering data units. The other file with the extension ".acms" contains alphanumeric text reports from the DFDAU ACMS. The QAR Data Utility can copy a QAR.adr to a designated archiving location before it converts the file's content.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - DOWNLOAD MANAGER



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551095 S0000598105_V1

ONBOARD NETWORK SYSTEM DOWNLOAD MANAGER

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY

General

The page named Security is a sub-menu within the selection Line Maintenance. The Security page can be used to generate or view credentials for the following functions:

- Security Airplane Credentials
- Security Server Credentials
- Security Client Credentials.

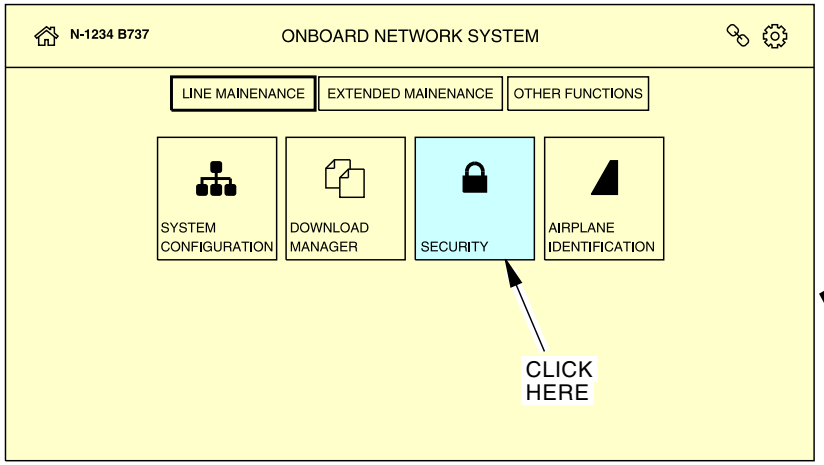
The Security menu is only available from the Portable Maintenance Device (PMD). You cannot access to the Security function on the MAX Display System (MDS).

To get access to the Security menu, from the main menu bar, make the selections: Line Maintenance > Security. To exit the security menu, and show the Line Maintenance menu, click on the home icon in the upper left-hand corner.

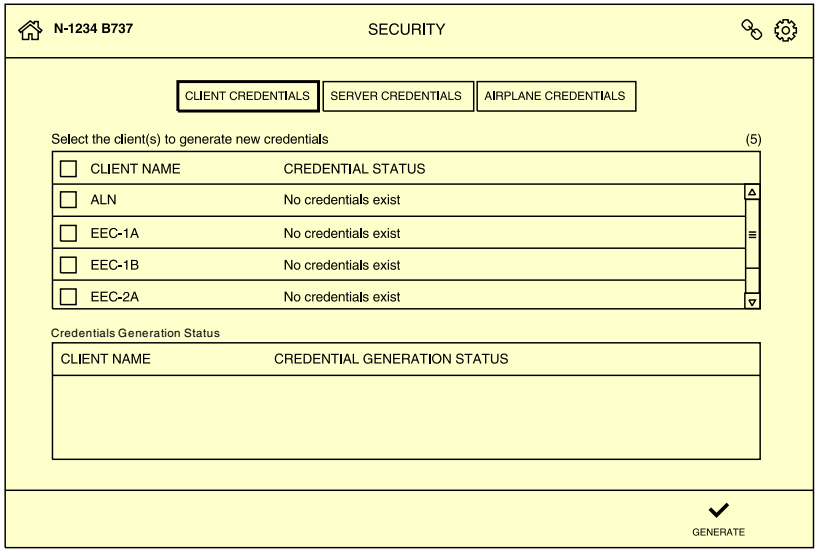
The Security tabs can be used for verification of security certificates. The Generate (credentials) button found under each tab is disabled until a selection is mad within that tab. After selection of the correct sub menu, the GENERATE button on the page footer is clicked. A confirmation pop-up will be displayed with a CANCEL or CONTINUE option. Each tab (Client, server, airplane) has its own generate credentials confirmation pop-up. The Security tabs can also be used to verify credentials have been previously generated. Credentials that are already present will have the date and time they were generated.

NOTE: NOTE: The Credentials screens (Clients, Servers and Airplane) are only available on the ground. If the function is selected and the system is in air, the screens will not display and a error pop-up is displayed.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY



LINE MAINTENANCE HOME SCREEN (WITH AIRPLANE ID)



SECURITY APPLICATION SCREEN

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

2370339 S00061521482_V1

ONS SECURITY PAGE

General

The airplane credential is a necessary digital data file for encrypted network communication. The airplane credential refers to airplane identification for use by the Onboard Network System (ONS). In contrast, client credentials refer to the connected client devices. And the server credential identifies the unique Network File Server (NFS) Line Replaceable Unit (LRU). The airplane, server and client credential files all must agree for serviceable ONS communications.

The Airplane Credentials page lets you see the condition of the security credentials of an airplane, and generate a new set of credentials.

To show the airplane credentials page, use the ONS menu bar, and make the selections: Line Maintenance > Security > Airplane Credentials.

Airplane Credentials

These are the conditions of the airplane credentials that show on the airplane credentials screen:

- A successful credential request was generated on (Date, Time) but no certificates exist on the aircraft
- A valid certificate exists
- A valid certificate exists and another credential request was made on (Date, Time)
- No valid certificate exists nor has a credential request been made
- A credential request could not be processed due to unavailability of required aircraft parameters from the Standard Airplane Parameter Service (SAPS) service.

The GENERATE CREDENTIALS button will operate only if SAPS parameters are available. The SAPS parameters are necessary to make a self-signed certificate and key pair. The SAPS gives the ONS clients access to airplane parameters. These are the airplane parameters that the SAPS give to the ONS clients for the Certificate Signing Request (CSR):

- Date
- Time
- Tail identification (ID).
- Airline ID
- Aircraft Type

If you click the GENERATE CREDENTIALS button and a CSR is in the system, then the overwrite confirmation pop-up shows.

The overwrite confirmation pop-up has CONTINUE button and a CANCEL button. Click on the CONTINUE button to continue the overwrite operation. Click the CANCEL button to go back to the airplane credentials screen.

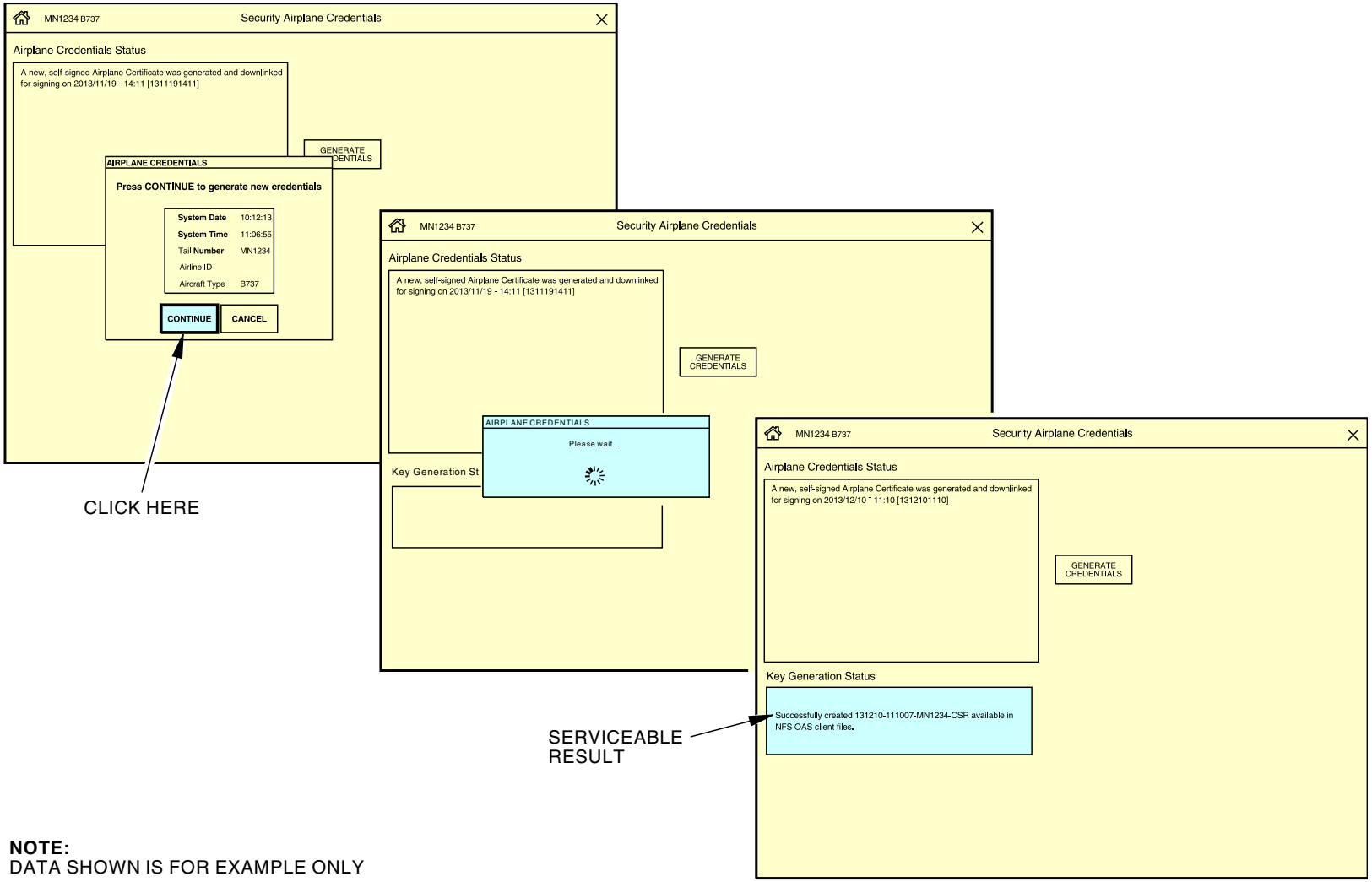
If you click the CONTINUE button on the overwrite confirmation pop-up, then the generate credentials confirmation pop-up shows. This is the data on the generate credentials confirmation:

- System date - from SAPS
- System time - from SAPS
- Tail number - from SAPS
- Airline ID - from SAPS
- Aircraft Type - from SAPS
- CONTINUE button
- CANCEL button.

Click on the CONTINUE button to continue the overwrite operation. Click the CANCEL button to go back to the airplane credentials screen.

If you click the CONTINUE button on the generate credentials pop-up, the progress indicator pop-up shows. The progress indicator pop-up shows until the overwrite function completes. The result screen shows when the overwrite function completes.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY - SECURITY AIRPLANE CREDENTIALS



NOTE:
DATA SHOWN IS FOR EXAMPLE ONLY

2370341 S00061521485_V1

ONS AIRPLANE CREDENTIALS

General

A server credential is a necessary digital data file for encrypted network communication. The server credential refers to the Network File Server (NFS). In contrast, the client files refer to the connected client devices. The server and client files must agree for serviceable Onboard Network System (ONS) communications.

The server credentials page has a function to generate all-new server and client credentials in one action.

Server Credentials Page

To show the server credentials page, begin from the ONS menu bar, and make the selections: Line Maintenance > Security > Server Credentials. The weight-on-wheels discrete must be in the ground condition.

The Security Server Credentials page shows the presence of the server credential and its date and time stamp.

Generate Credentials Function

The Generate Credentials button is adjacent to the credentials status. This function makes the server credential, and all client credentials unserviceable, and makes all new ones.

NOTE: When you generate a new server credential, ONS installs all-new client credentials at the same time. The server and client credentials must agree.

Click on the GENERATE CREDENTIALS button on the server credentials display to start the generate credentials operation. The pop-up for confirmation shows when the operation starts. The pop-up for confirmation has a CONTINUE button and a CANCEL button. Click on the CONTINUE button to continue the generate credentials operation. Click on the CANCEL button to cancel the generate credentials operation.

When the generate credentials operation starts to operate the pop-up for progress shows this data:

- Header – Generating new sever credentials
- A time counter of the generate credentials operation
- Generating credentials in process.

A server credential generation will cause the NSP to reboot, so the NFS will be unusable for 10 minutes after initiating the generation.

Access Denied Problems

Access to the server credential page is blocked when another application is in service and has control.

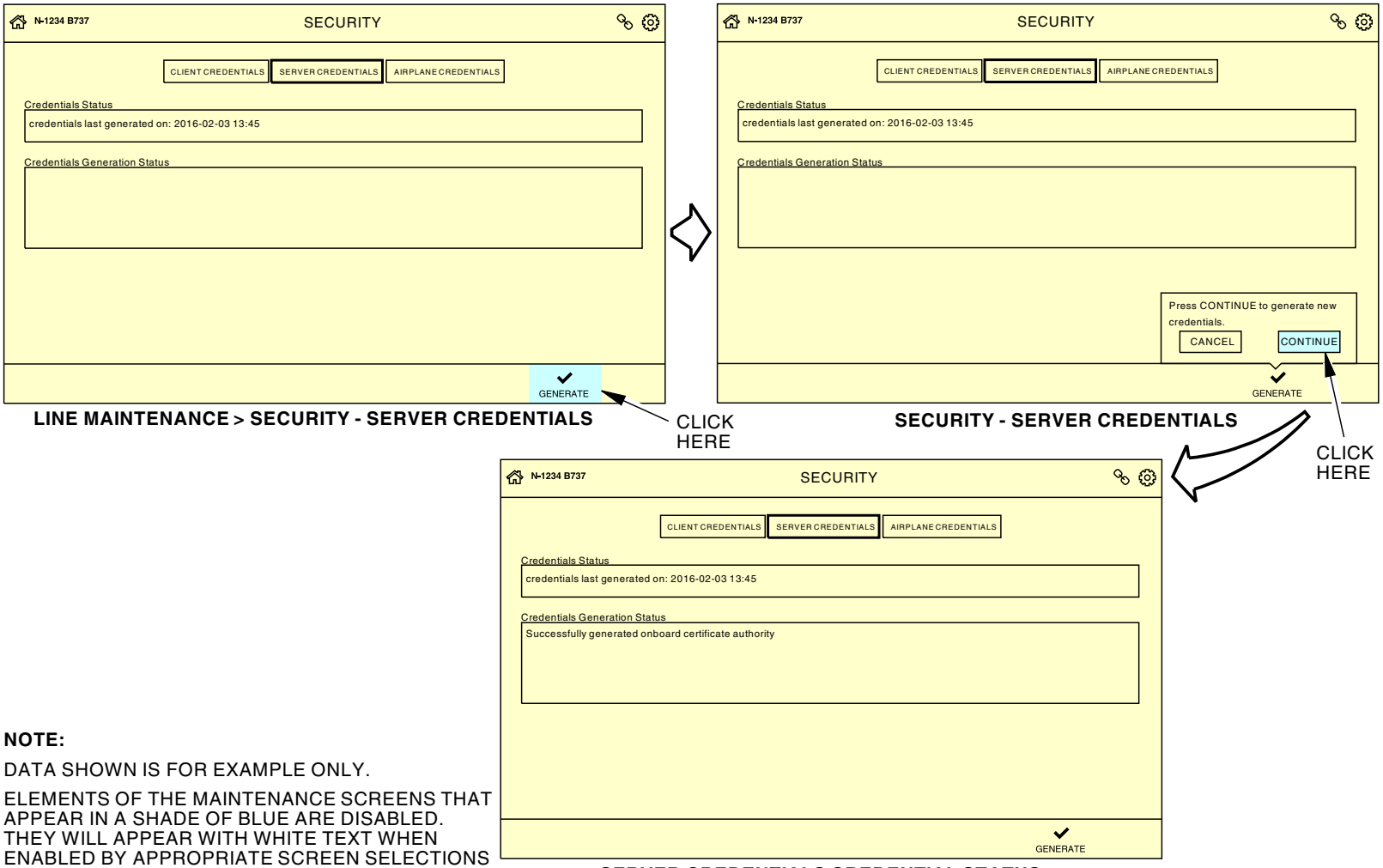
Each of these operations that follow can prevent access to the server credential page.

- Dataload
- Uninstall NFS Parts
- Reboot To Boot OS
- Client Credentials
- Server Credentials.

The access denied pop-up for server credentials shows when an operation, that does not agree with the server credentials function, is in operation. The access denied pop-up for server credentials has a OK button. Click on the OK button to return to the server credentials screen.

To resolve the problem and get access, the in-service operation must be stopped or closed.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY - SECURITY SERVER CREDENTIALS



NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

ELEMENTS OF THE MAINTENANCE SCREENS THAT APPEAR IN A SHADE OF BLUE ARE DISABLED. THEY WILL APPEAR WITH WHITE TEXT WHEN ENABLED BY APPROPRIATE SCREEN SELECTIONS AND INPUT. WHEN A FEATURE IS SELECTED, IT APPEARS GREEN.

2370342 S00061521487_V1

ONS SECURITY SERVER CREDENTIALS PAGE

General

A client credential is a necessary digital data file for Onboard Network System (ONS) network security. The client credential refers to the network-connected Line Replaceable Unit (LRU). In contrast, the server credential refers to the Network File Server (NFS). The server and client credentials must agree for serviceable ONS communications.

Typically, the client credential is generated after LRU installation, or to resolve an ONS fault log message.

The client credential is serviceable when the NFS fault log shows no messages or faults for the specified LRU.

Client Credentials Page

To show the Client Credentials page, use the ONS maintenance browser to make the selections: Line Maintenance > Security > Client Credentials.

The page shows a table with columns for client name, and credential status.

Adjacent to the data, are three function buttons:

- SELECT ALL
- UNSELECT ALL
- GENERATE CREDENTIALS.

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NOTE: In OS9.1, the buttons are:

1. CLIENT NAME – acts as a select all button
2. GENERATE – generates credentials for selected clients

SIA ALL

Generate Credentials Function

To operate the GENERATE CREDENTIALS function, one or more target clients must be selected (or, highlighted). Click once on the GENERATE CREDENTIALS button, and follow the instructions in the pop-up windows.

When complete, the Security Client Credentials page shows the credential with a new date and time stamp.

To make sure the new credential is serviceable, examine the NFS fault log for messages. The credential is serviceable when no NFS fault log messages show.

Access Denied Problems

Access to the client credential page is blocked when another operation, or application, is in service and has control.

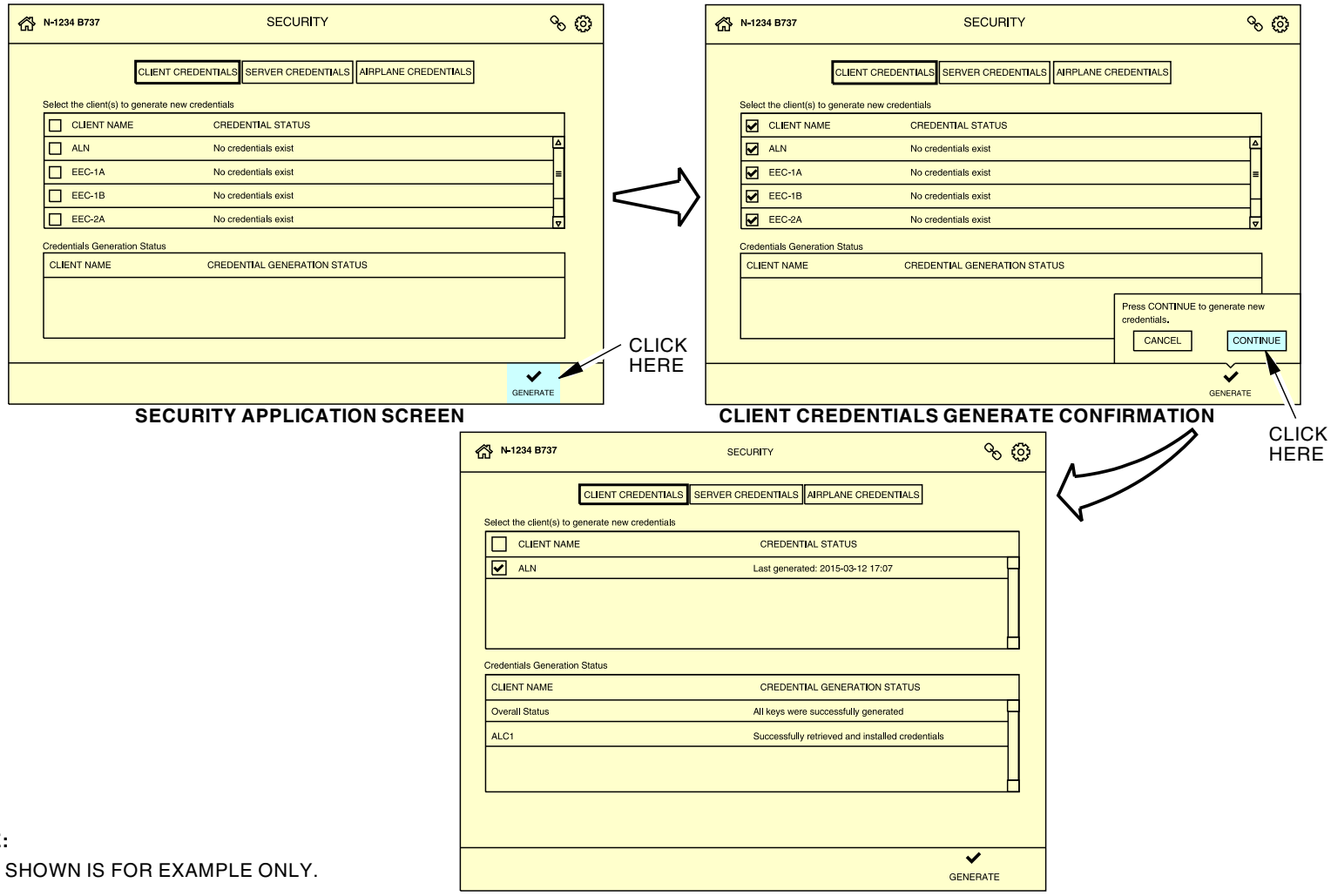
Each of these operations that follow can prevent access to the client credential page.

- Dataload
- Uninstall NFS Parts
- Reboot To Boot OS
- Client Credentials
- Server Credentials.

The access denied pop-up for client credentials shows when an operation, that does not agree with the client credentials function, is in operation. The access denied pop-up for client credentials has a OK button. Click on the OK button to return to the client credentials screen.

To resolve the problem and get access, the in-service operation must be stopped or closed.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY - SECURITY CLIENT CREDENTIALS



SECURITY APPLICATION SCREEN

CLIENT CREDENTIALS GENERATE CONFIRMATION

CLIENT CREDENTIALS COMPLETED

NOTE:
DATA SHOWN IS FOR EXAMPLE ONLY.

2370344 S00061521490_V1

ONS CLIENT CREDENTIALS PAGE

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - AIRPLANE IDENTIFICATION

General

The Airplane Identification (ID) function tells the Onboard Network System (ONS) specific information about the airline and the airplane. This information is necessary to ONS for network communications, security, and to identify reports and files.

NOTE: The data shown on ONS Airplane Identification must agree with the airplane data plate, and airworthiness certificate.

This function is found only on the Portable Maintenance Device (PMD). You cannot get access to Airplane Identification on the MAX Display System (MDS).

Make these selections from the ONS Main Menu on the PMD: Line Maintenance > Airplane ID.

Typically, you examine the airplane identification data every time you install a Network File Server (NFS).

Airplane Identification Page

The airplane identification page shows three data fields.

- airline ID
- Aircraft type
- Airplane ID

The Airline ID is the designation for the IATA Airline ID. The airline ID is a two-letter code. Use uppercase alpha-characters only, and not numeric.

The aircraft type is the major-minor model of the airplane. The data field uses a predefined drop-down menu. The available selections will show as four uppercase alphanumeric characters (for example; B739).

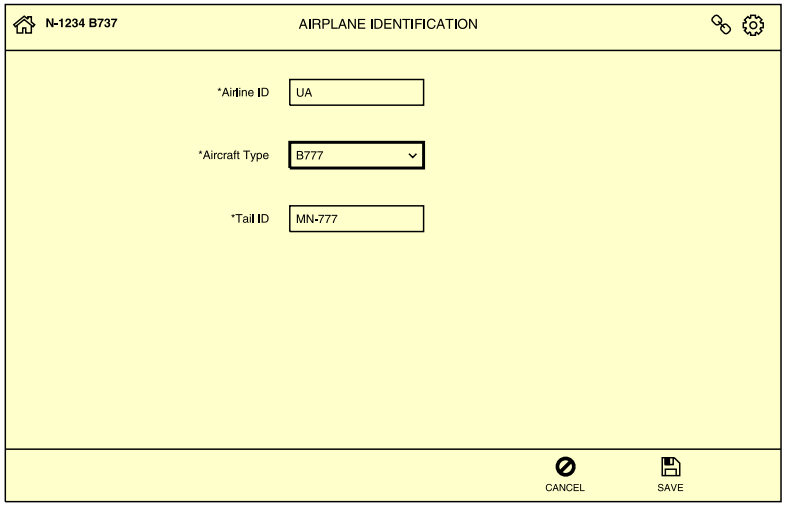
On the PMD, use the laptop keyboard to enter characters into the Airplane, and Airline ID fields. To make the Aircraft Type selection, use the laptop's cursor and selection bar. Select the SAVE icon to update all changes or select the CANCEL icon to exit the page.

AIRCRAFT	DROPDOWN LIST AIRCRAFT TYPE
BOEING 737-600	B736 (737-600)
BOEING 737-700	B737 (737-700)
BOEING 737-800	B738 (737-800)
BOEING 737-900	B739 (737-900)
BOEING 737-7 (MAX)	B737 (737 MAX 7)
BOEING 737-8 (MAX)	B738 (737 MAX 8)
BOEING 737-9 (MAX)	B739 (737 MAX 9)
BOEING 737-10 (MAX)	B739 (737 MAX 10)
BOEING 737-200 (MAX)	B739 (737 MAX 200)

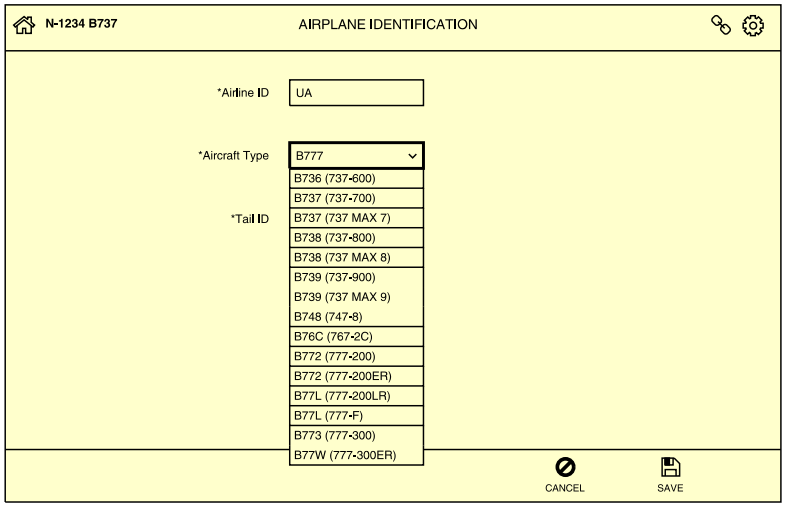
The airplane ID (tail ID) is the airplane registration number. Use between four and seven uppercase alphanumeric characters. The dash character can also be used.

Use the laptop keyboard to enter characters into the Airplane, and Airline ID fields. To make the Aircraft Type selection, use the laptop's cursor and selection bar. Select the SAVE icon to update all changes or select the CANCEL icon to exit the page.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - AIRPLANE IDENTIFICATION



AIRPLANE IDENTIFICATION SCREEN



AIRPLANE IDENTIFICATION WITH DROPDOWN FOR AIRCRAFT TYPE

2370346 S00061521493_V1

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

ONS AIRPLANE IDENTIFICATION PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE

General

On the Onboard Network System (ONS) main menu bar, the second selection is Extended Maintenance.

ONS Extended Maintenance consists of maintenance functions that support more detailed analysis of airplane maintenance information, as well as other functions that are performed less frequently than those defined under Line Maintenance.

There are applications that are the same for the MAX Display System (MDS) or the Portable Maintenance Device (PMD) There are also Extended Maintenance selections that are specific to the MDS or the PMD.

These are the Extended Maintenance selections that show on the MDS:

- Present Leg Faults
- Existing Faults
- Fault History
- Maintenance Enable/Disable
- LRU Reports
- Backup and Restore

These are the Extended Maintenance selections that show on the PMD:

- Present Leg Faults
- Existing Faults
- Fault History
- Data Load
- Maintenance Enable/Disable
- Network File Server
- Mass Storage Device
- Input Monitoring
- LRU Reports
- Off-Board Links
- Crew Wireless (optional)
- Printer Condition (optional)
- Backup and Restore

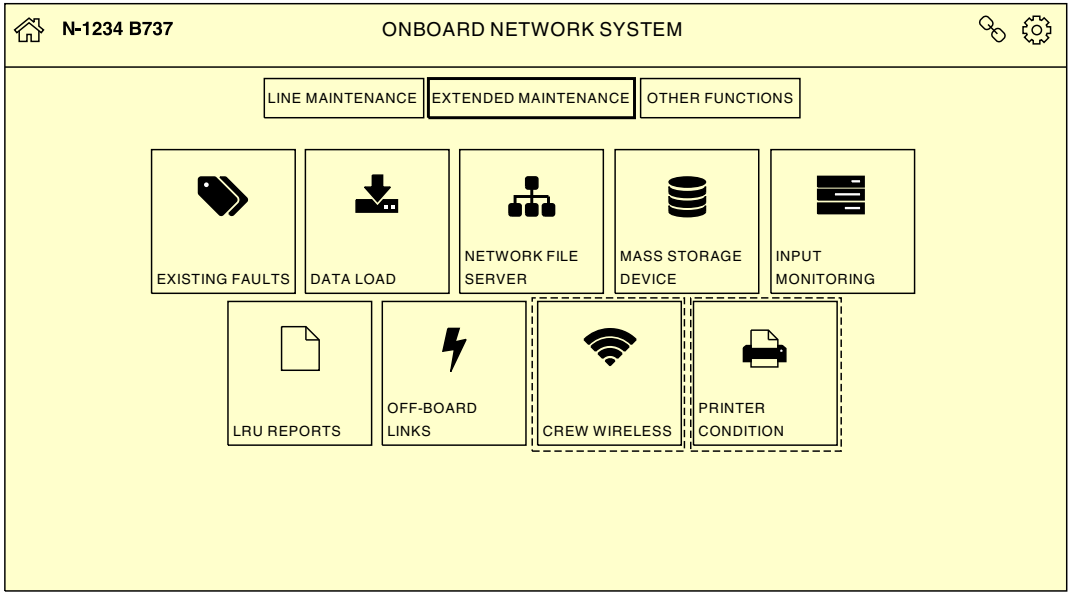
SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, Backup and Restore is located within Network File Server.

SIA ALL

To see the Extended Maintenance menu, use the Extended Maintenance selection in the navigation bar.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE



ONS EXTENDED MAINTENANCE MENU

LEGEND:

[------] OPTIONAL

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

ELEMENTS OF THE MAINTENANCE SCREENS THAT APPEAR IN A SHADE OF BLUE ARE DISABLED. THEY WILL APPEAR WITH WHITE TEXT WHEN ENABLED BY APPROPRIATE SCREEN SELECTIONS AND INPUT. WHEN A FEATURE IS SELECTED, IT APPEARS GREEN.

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ONS EXTENDED MAINTENANCE MENU

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - PRESENT LEG FAULTS

General

The Present Leg Fault page is a sub-menu within the selection Extended Maintenance. This page contains faults for the current leg, grouped by flight deck effect (FDE) and sorted by time with the most recent FDE appearing first. Any faults from the present leg which do not correlate to an FDE are grouped together at the end of the correlate list as non-correlated faults. The user can optionally display faults grouped by ATA and sorted by ATA chapter number.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

To get access to the Present Leg Faults page make the following selections from the Onboard Network System (ONS) Main Menu on the PMD: Extended Maintenance > Present Leg Faults.

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > PRESENT LEG FAULTS.

Summary

The information that you see on the Inbound Present Leg Faults page includes:

- Airplane ID, flight number, departure a destination airports, and leg start time.
- A summary and status of all Present Leg Faults for the current leg grouped by flight deck effect (FDE). The faults are sorted by time with the newest FDEs showing first.
- These summaries include the date and time of recorded faults, fault descriptions, fault types, fault codes and maintenance message numbers.
- A summary and status of all correlated FDE's with date and time, fault description, type, fault code and maintenance message.
- Recommended maintenance action and possible causes.
- If applicable, all correlated FDE's.

Status

The fault status shows the fault as active, status, or not active.

Fault Code

The fault code is an 8 digit number used to identify the fault in the Fault Reporting Manual (FRM) or in the Interactive Fault Isolation Manual (IFIM).

Maintenance Message

Every fault message has a unique number to identify that specific fault. This is the maintenance message number that is used to identify and troubleshoot the fault. The display also has an option to make a selection of a single maintenance message to see these details:

- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.

Other Selections

From the summary page further information can be found using the buttons on the bottom of the screen.

The maintenance message data page (MAINT MSG DATA) is accessed by highlighting the specific fault shown on the summary page and pressing the button next to the Maintenance Message.

The SORT BY FDE button displays all active faults and their correlated FDEs on the page.

The SELECT NEW ATA button pulls up a screen of ATA listings that contain active faults. One ATA, multiple ATAs, or all ATAs can be selected and then only faults for these ATAs are listed.

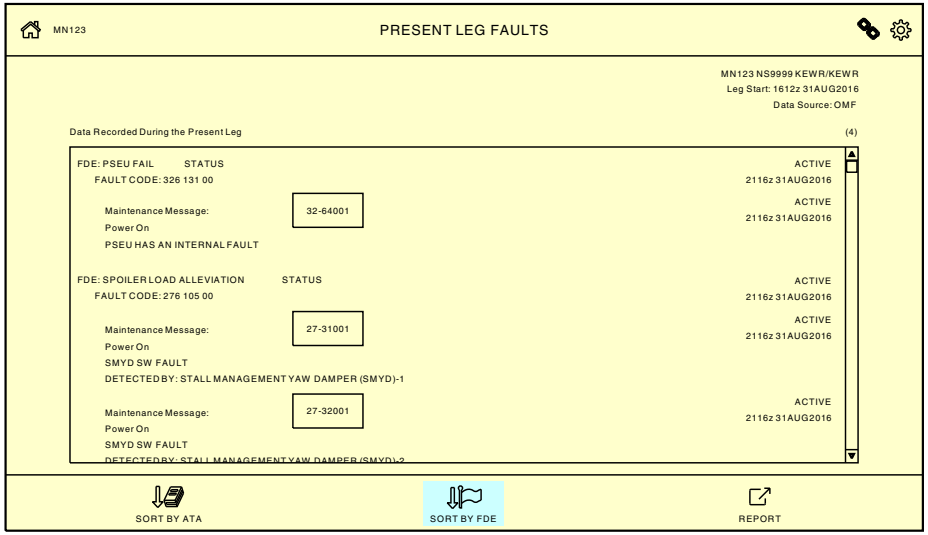
A report of the summary page can be created and stored in memory by using the REPORT button. Reports can only be downloaded using the PMD.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - PRESENT LEG FAULTS

When you select a single FDE or maintenance message, there is a FAULT HISTORY tab and a FLIGHT LEGS tab.

NOTE: The FLIGHT LEGS tab does not show on the MDS multifunction display (MFD)(s). This option shows only on the Maintenance Laptop or other type of PMD.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - PRESENT LEG FAULTS



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551245 S0000605968_V1

ONS PRESENT LEG FAULTS

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - EXISTING FAULTS

General

The Existing Faults page contains either active maintenance messages for a selected ATA, or active Flight Deck Effect (FDE)(s) and their correlated active maintenance messages. The Existing Faults page has the ability to select existing faults by those ATAs that contain existing faults. Selecting the specific ATA chapter and then selecting the CONTINUE button will produce the list of existing faults for that system.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > EXISTING FAULTS

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Existing Faults.

Summary

The information that you see on the Inbound Present Leg Faults page includes:

- Airplane ID, flight number, departure a destination airports, and leg start time.
- A summary and status of all Present Leg Faults for the current leg grouped by flight deck effect (FDE). The faults are sorted by time with the newest FDEs showing first.
- These summaries include the date and time of recorded faults, fault descriptions, fault types, fault codes and maintenance message numbers.
- A summary and status of all correlated FDE's with date and time, fault description, type, fault code and maintenance message.
- Recommended maintenance action and possible causes.
- If applicable, all correlated FDE's.

Status

The fault status shows the fault as active, status, or not active.

Fault Code

The fault code is an 8 digit number used to identify the fault in the Fault Reporting Manual (FRM) or in the Interactive Fault Isolation Manual (IFIM).

Maintenance Message

Every fault message has a unique number to identify that specific fault. This is the maintenance message number that is used to identify and troubleshoot the fault. The display also has an option to make a selection of a single maintenance message to see these details:

- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.

Other Selections

From the summary page further information can be found using the buttons on the bottom of the screen.

The maintenance message data page (MAINT MSG DATA) is accessed by highlighting the specific fault shown on the summary page and pressing the button next to the Maintenance Message.

The SORT BY FDE button displays all active faults and their correlated FDEs on the page.

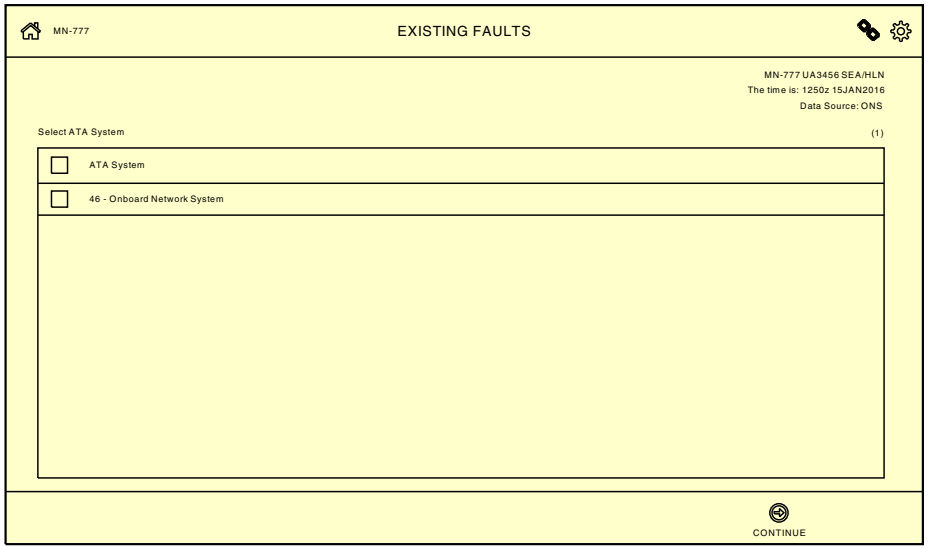
The SELECT NEW ATA button pulls up a screen of ATA listings that contain active faults. One ATA, multiple ATAs, or all ATAs can be selected and then only faults for these ATAs are listed.

A report of the summary page can be created and stored in memory by using the REPORT button. Reports can only be downloaded using the PMD.

When you select a single FDE or maintenance message, there is a FAULT HISTORY tab and a FLIGHT LEGS tab.

NOTE: The FLIGHT LEGS tab does not show on the MDS multifunction display (MFD)(s). This option shows only on the Maintenance Laptop or other type of PMD.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - EXISTING FAULTS



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

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ONS EXISTING FAULTS PAGE

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - FAULT HISTORY

General

The Fault History page contains historical maintenance messages and flight deck effect (FDE)s stored over multiple legs. Fault History can show either maintenance messages and FDEs by ATA or by flight leg.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > FAULT HISTORY.

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Fault History.

Summary

The information that you see on the Inbound Present Leg Faults page includes:

- Airplane ID, flight number, departure a destination airports, and leg start time.
- Summaries of faults recorded for each flight leg, flight phase, and fault type first.
- These summaries include the date and time of recorded faults, fault descriptions, fault types, fault codes and maintenance message numbers.
- A summary and status of all correlated FDE's with date and time, fault description, type, fault code and maintenance message.
- Recommended maintenance action and possible causes.
- If applicable, all correlated FDE's.

Status

The fault status shows the fault as active, status, or not active.

Fault Code

The fault code is an 8 digit number used to identify the fault in the Fault Reporting Manual (FRM) or in the Interactive Fault Isolation Manual (IFIM).

Maintenance Message

Every fault message has a unique number to identify that specific fault. This is the maintenance message number that is used to identify and troubleshoot the fault. The display also has an option to make a selection of a single maintenance message to see these details:

- Date, time and flight phase when message occurred.
- Number of occurrences.
- Previous occurrences to include fault history.

Other Selections

From the summary page further information can be found using the buttons on the bottom of the screen.

The SELECT FDE BY LEG button pulls up a screen of leg listings, starting with Leg 0, that contained active faults. One leg, multiple legs, or all legs can be selected and then only faults for these legs are listed.

The SELECT NEW ATA button pulls up a screen of ATA listings that contain active faults. One ATA, multiple ATAs, or all ATAs can be selected and then only faults for these ATAs are listed.

The IMPORT/EXPORT button can be used to export all fault history to the download manager or a maintenance device. This button can also be used to import a fault history file from a maintenance device. This file will populate the fault history page with its contents.

NOTE: Importing a fault history file will overwrite the current fault history information.

NOTE: Importing and exporting cannot be done via the MDS.

The DELETE ALL button deletes all fault history data. This action cannot be undone.

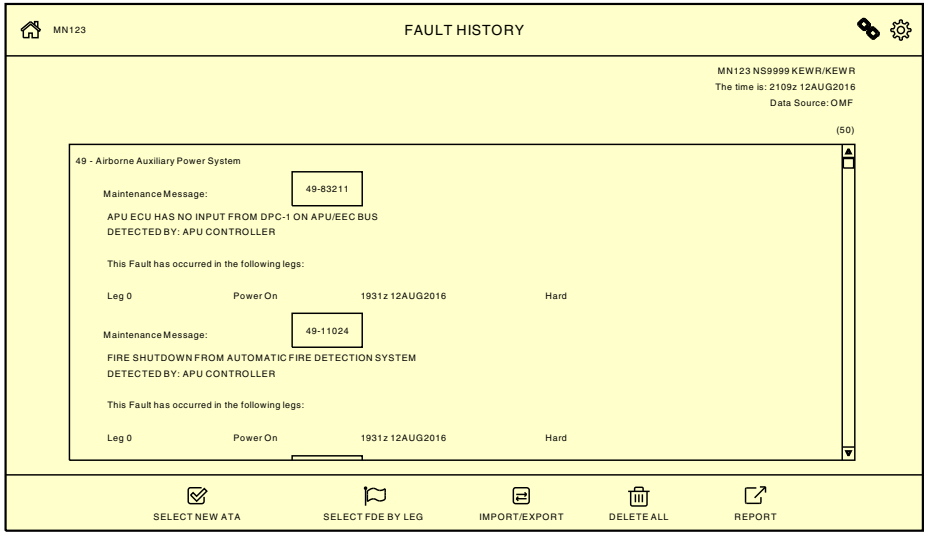
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - FAULT HISTORY

A report of the summary page can be created and stored in memory by using the REPORT button. Reports can only be downloaded using the PMD.

The maintenance message data page (MAINT MSG DATA) is accessed by highlighting the specific fault shown on the summary page and pressing the button next to the Maintenance Message. When you select a single maintenance message, there is a FAULT HISTORY tab and a FLIGHT LEGS tab.

NOTE: The FAULT HISTORY tab and FLIGHT LEGS tab do not show on the MDS multifunction display (MFD)(s). These options show only on the Maintenance Laptop or other type of PMD.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - FAULT HISTORY



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2370350 S00061521501_V1

EXTENDED MAINTENANCE - FAULT HISTORY

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - DATA LOAD

General

The Data Load page allows software data loading onto onboard, loadable Line Replaceable Unit (LRU)(s). The Loadable Software Airplane Part (LSAP) must first be staged on the Onboard Network System (ONS) Mass Storage Device (MSD) using a Portable Maintenance Device (PMD). Once the part is staged in ONS, the user selects the system to be loaded, selects the software part to be loaded, reviews any preconditions, and loads the part.

The FAULT HISTORY tab and FLIGHT LEGS tab do not show on the MDS multifunction display (MFD)(s). These options show only on the Maintenance Laptop or other type of PMD.

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > DATA LOAD

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Data Load

Dataload Process

The dataload function lets you select a target LRU for software installation, and make the target LSAP selection. When the LRU and LSAP are selected, the function completes the software installation. The target LSAP must be present on the MSD.

Certain LRUs, such as the Network File Server (NFS) and Wireless WAN Unit (WWU), allow for installation of multiple parts at the same time. Other LRUs, such as the EECs and DPCs, only allow for installation of one part at a time.

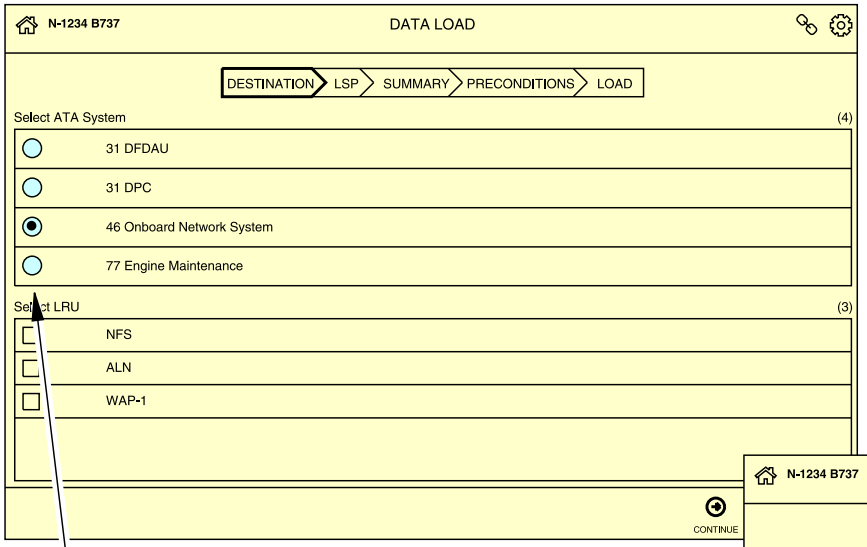
When the installation is complete, the page then shows the DATA LOAD RESULT page. This page shows the part number and load status (or condition) of the installed LSAP. A serviceable installation will show the LOAD STATUS: SUCCESS.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

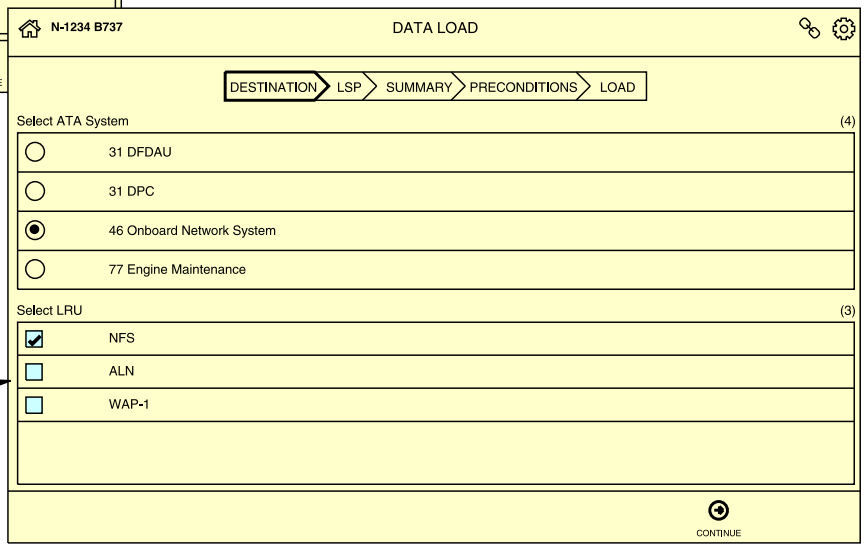
NOTE: The only exception to this SUCCESS status occurs when installing an OS9.1 Boot OS onto a serviceable OS7.1 NFS. At this time, a “Not Installed” message will show, despite the dataload being successful.

SIA ALL

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - DATA LOAD



EXTENDED MAINTENANCE > DATA LOAD



NOTE:

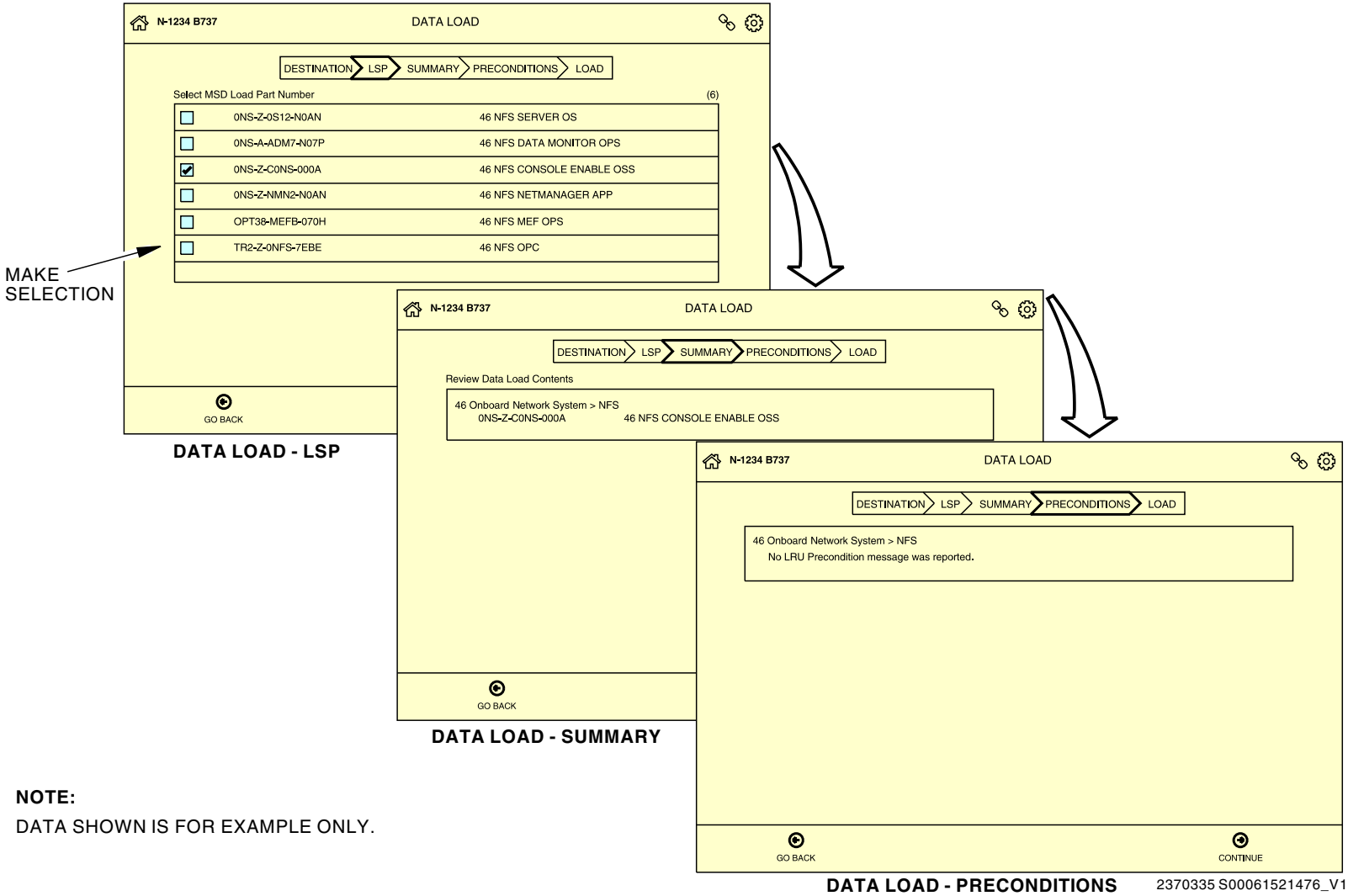
DATA SHOWN IS FOR EXAMPLE ONLY.

DATA LOAD - DESTINATION

2370334 S00061521475_V1

ONS DATA LOAD PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - DATA LOAD

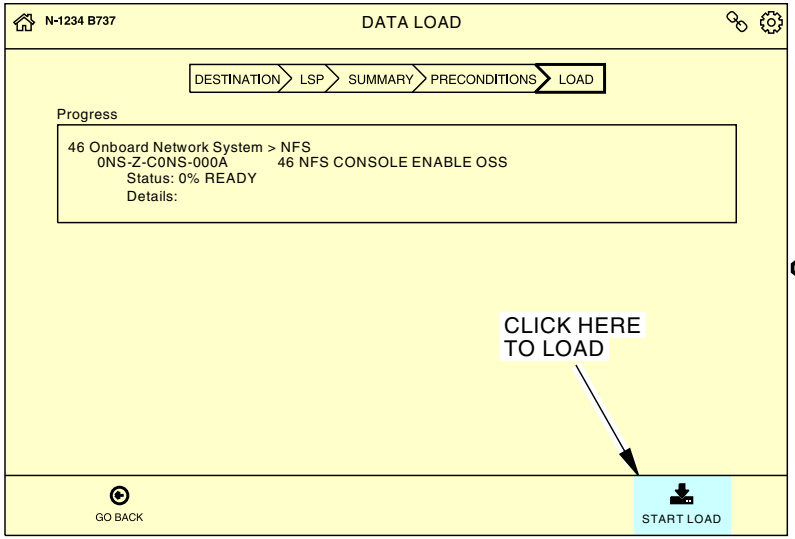


NOTE:

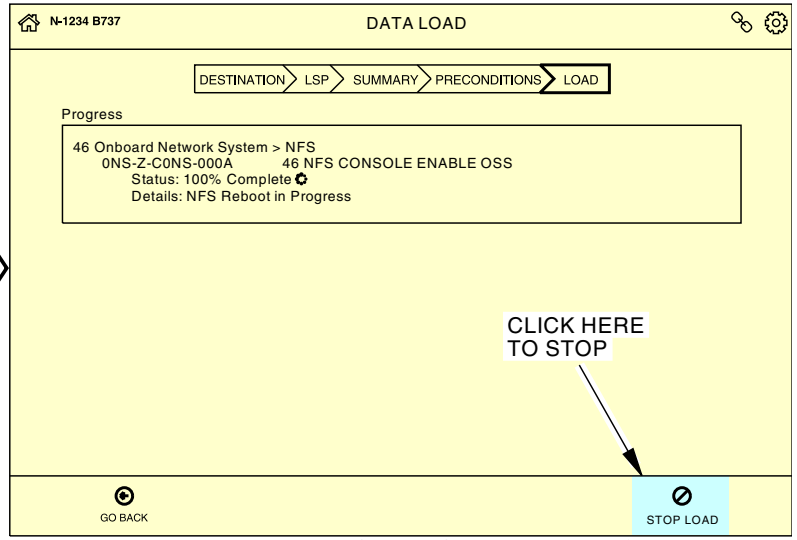
DATA SHOWN IS FOR EXAMPLE ONLY.

ONS DATA LOAD PAGE

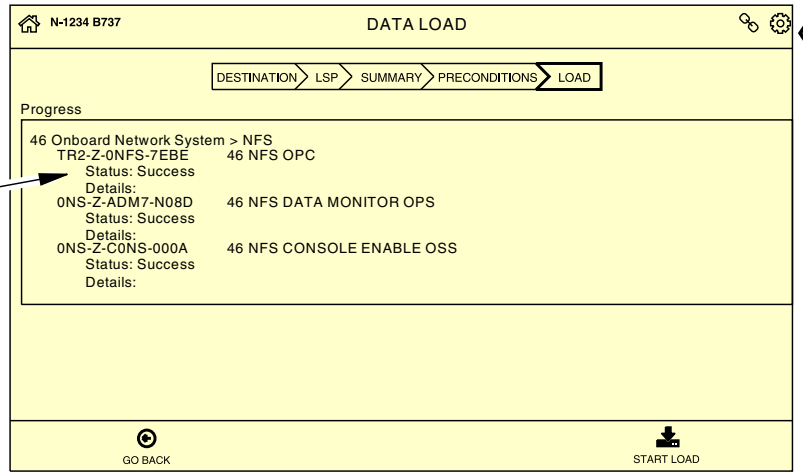
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - DATA LOAD



DATA LOAD - LOAD



DATA LOAD - LOAD



DATA LOAD - LOAD STATUS

NOTE:
DATA SHOWN IS FOR EXAMPLE ONLY.

2370336 S00061521477_V1

ONS DATA LOAD PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - MAINTENANCE ENABLE/DISABLE

General

The Maintenance Enable/Disable function allows users to enable/disable flight leg transitions and to manually select the maintenance supplementary flight phase to suppress faults during extended maintenance operations. Maintenance Enable/Disable disables a flight leg transition with subsequent retention of faults by the Onboard Maintenance Function (OMF) before planned ground engine runs for testing or maintenance. This function may be used in-service or during flight test to disable a flight leg transition and retention of faults by the OMF when ground engine runs are planned.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > MAINTENANCE ENABLE/DISABLE

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Maintenance Enable/Disable.

Summary

To stop the OMF from rolling a flight leg every time an engine starts, there is a “flight leg enable” function. If the leg is enabled, starting an engine will roll a leg and disable future leg rolls. During normal operation, the flight leg will be re-enabled automatically when the airplane hits 80 kts; setting the airplane up for the next leg after it hits the ground again. The flight leg enable/disable menu will allow the operator to override that enable setting

When you enable the Maintenance Phase, the OMF stops storing faults in fault history while the phase is active. For example, enabling the maintenance phase allows the mechanic to work an air crew reported fault but not create additional faults on the ground when opening circuit breakers and disconnecting connectors while troubleshooting the original fault. If the Maintenance Phase is left enabled accidentally, the OMF will end the maintenance phase and revert back to normal phases at takeoff.

Functions

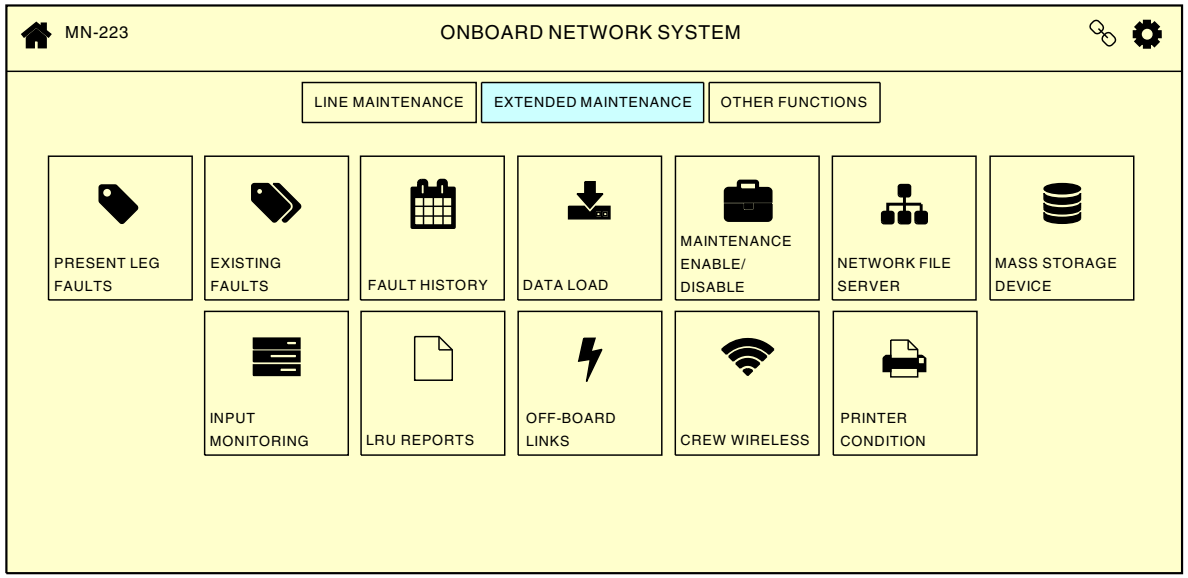
The two functions that can be controlled from the maintenance enable/disable page are:

- Flight leg transition (Leg Enable or Leg Disable)
- Maintenance phase (Phase Enable or Phase Disable)

The flight leg transition will normally occur during engine start. When disabled, the flight leg will not be enabled until take-off or LEG ENABLE is selected.

The maintenance phase is enabled for fault reports unless it is manually disabled or at take-off. If manually disabled, maintenance phase will remain disabled until manually enabled.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - MAINTENANCE ENABLE/DISABLE



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EXTENDED MAINTENANCE - MAINTENANCE ENABLE/DISABLE

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - NETWORK FILE SERVER

General

The Network File Server (NFS) screens allow the user to view the software parts loaded on the NFS, as well as delete selected software parts. The user can also command:

- Reboot the NFS
- Reset the NFS data
- Re-image the NFS
- Uninstall LSAPs

SIA 015-999; SIA 001-014 POST SB 737-46-1029

- Backup & Restore

SIA ALL

To access the Network File Server screens, make the following selections from the Onboard Network System (ONS) Main Menu: Extended Maintenance > NETWORK FILE SERVER

The Network File Server screens are only available when using the Portable Maintenance Device (PMD).

NOTE: The Network File Server screens are not available when using the MAX Display System multi-function displays.

Network File Server (NFS) Reboot

SIA 001-014 PRE SB 737-46-1029

A reboot of the NFS is equivalent to cycling power to the NFS. It is necessary to wait approximately five (5) minutes for the NFS to reboot.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

A reboot of the NFS is equivalent to cycling power to the NFS. It is necessary to wait approximately ten (10) minutes for the NFS to reboot.

SIA ALL

To do this task, the aircraft must be on the ground with its weight compressing the landing gear.

Do this task when you get access to the ONS Maintenance browser main menu with the Maintenance Laptop (ML) or other type of approved PMD.

NOTE: This function is not available when using the MAX Display System (MDS) multifunction display (MFD)(s).

To get access to the NFS Reboot function, make the following selections from the ONS Main Menu: Extended Maintenance > Network File Server > Reboot.

Network File Server (NFS) Reset Data

The NFS Reset Data function clears accumulated data from the NFS. The Reset Data operation restores applications to their default state and cannot be undone.

When the Reset Data function is performed, the NFS is set to the initial software configuration. This removes application data and system logs. However loaded software, Mass Storage Device (MSD) data, security credentials, and security logs are not affected.

To perform this task, the aircraft must be on the ground with its weight compressing the landing gear.

To access the NFS Reset Data function, make the following selections from the ONS Main Menu: Extended Maintenance > Network File Server > Reset Data.

Network File Server (NFS) Re-Image

The NFS Reimage function clears all load-able software and data from the NFS. The entire disk is restored to its initial state, including erasing all the current data on the hard disk. Only the Boot OS is left loaded on the box. It is then necessary to install the minimum operating system software parts to regain functionality.

NOTE: Do not stage software parts on the MSD before performing the reimage. It is important to know that the reimage operation also deletes all files on the MSD. If necessary, make a record of the software parts on the MSD before the NFS reimage.

NOTE: Do this task only when instructed by your engineering department.

TThe reimage operation sets the NFS to operate from the BOOT OS, and then the software on the operational drive can be replaced. The initial data loader function is used to import the specified crated parts one at a time, and then the parts are installed as a group.

To do this task, the aircraft must be on the group with its weight compressing the landing gear.

To access the NFS Reimage function, make the following selections from the ONS Main Menu: Extended Maintenance > Network File Server > Reimage.

Uninstall LSAPs

The NFS Uninstall LSAPs function uninstalls selected loadable airplane parts (LSAPs) from the NFS. This function does not remove the LSAPs from the NFS Mass Storage Device (MSD). Core LSAPs, such as the Boot OS and the Server OS, cannot be uninstalled from the NFS using this function.

After a part(s) is selected, the DELETE button in the footer of the screen will enable. DELETE can then be selected, at which point a prompt will appear to verify the uninstall. After selecting CONTINUE, the uninstall will begin. The NFS will reboot at this time. It is necessary to wait approximately ten (10) minutes for the NFS to reboot.

To do this task, the aircraft must be on the ground with its weight compressing the landing gear.

Backup & Restore

The Backup and Restore Service (BARS) enables backup and restoration (both automatic and manual) of the Network File Server (NFS) Mass Storage Device (MSD), Onboard Network System (ONS) Loadable Software Airplane Part (LSAP), ONS Logs, and Onboard Maintenance Function (OMF) data to a Secure Digital (SD) media card. The SD media card is installed in the SD Card slot located under the front cover of the NFS.

An ONS configured with OS7.1 or OS9.1 will perform an automated backup of the NFS to the SD media card whenever the NFS senses that the airplane transitioned from ground to air.

In the event of an NFS LRU failure, the SD media card, containing the backup image from the failed NFS, can be removed from the failed NFS and installed in the replacement NFS. The Boot OS installed on the replacement NFS must match the Boot OS on the SD card. When the replacement NFS, having only a boot OS installed, is powered-up, an automatic restore of the replacement NFS will be performed using the back-up image from the SD media card.

The ONS BARS user interface provides the ability to perform manual backup and restore operations, initializes an SD media card, and view the current status of the SD media card.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

SIA 001-014 PRE SB 737-46-1029

In OS7.1, make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Backup & Restore.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

In OS9.1, make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Network File Server > Backup & Restore

SIA ALL

Make these selections from the ONS Main Menu on the MDS: EXTENDED MAINT > BACKUP AND RESTORE

BARS functions require that the NFS is receiving the Airplane ID parameter from the MDS. When the Airplane ID parameter is not available to the NFS, BARS will display a “MISSING AIRPLANE IDENTIFICATION” message window.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

In OS9.1, it is possible to manually set a missing Airplane ID via the Airplane ID function under Line Maintenance.

NOTE: : “MISSING AIRPLANE IDENTIFICATION” message window will appear after NFS power on or reboot until BARS has received the Airplane ID from the MDS. If an SD media card is not installed in the NFS, the “Missing Airplane Identification” will appear after NFS power on or reboot.

SIA ALL

BARS functions also require that the Airplane ID of an initialized SD media card match the Airplane ID that the NFS is receiving from the MDS or, in OS9.1, the Airplane ID page. When the Airplane ID contained on the SD media card does not match the Airplane ID the NFS is receiving, BARS will display an “AIRPLANE IDENTIFICATION MISMATCH” message window.

NOTE: When either the Missing Airplane ID or Airplane ID Mismatch faults are set, the SD Card Fail fault bit will be set

When there is no SD media card installed in an NFS, NFS Card Status will be “Not Installed”.

SD Media Card Initialization

There are two ways that a SD media card is initialized:

- Automatic SD Media Card Initialization - BARS will automatically initialize an SD media card once the NFS is booted-up and the NFS detects a SD media card is present.
- Manual SD Media Card Initialization - SD media card can be manually initialized using either the MDS OMF or the PMD with the ONS Maintenance Browser.

SIA 001-014 PRE SB 737-46-1029

The SD media card in initialization requires the MDS being powered-up for the NFS to receive the Airplane ID parameter.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

The SD media card in initialization requires the MDS being powered-up for the NFS for the Airplane ID to be set via the Airplane ID page.

SIA ALL

SD Media Card Status

The SD media card status can be checked using the BARS page. Media card details will include:

- Total Storage Space
- Available Active Backup Storage Space
- Available Recoverable Backup Space

BARS Backup Function

There are three ways that the NFS data image are backed-up:

- Encrypted Backup - When an airplane is configured with Wireless WAN Unit (WWU) and /or Crew Wireless LAN Unit (CWLU), the NFS will have 46 NFS OAS AIRLINE CRL UMS and 46 NFS OAS AIRPLANE KEYS UMS software installed. BARS requires that the 46 NFS OAS AIRPLANE KEYS UMS and 46 NFS OAS AIRLINE CRL UMS software are backed-up encrypted. If the ONS is not configured to support encrypted backup, the 46 NFS OAS AIRPLANE KEYS UMS and 46 NFS OAS AIRLINE CRL UMS will not be backed up by BARS.
- Automatic Backup - The ONS is configured to automatically perform a backup of the NFS whenever the airplane transitions from Ground to Air. Once the SD Media card is installed and initialized and if applicable, encrypted backup is enabled, BARS will perform the automated backups to the NFS.
- Manual Backup - a manual backup can be initiated and saved to the installed SD media card.

- Stage 1 is applicable to all NFS configurations and restores all of the data and the ONS software parts that do not require an encryption passphrase key to enable restoration. The Stage 1 restoration is automatically initiated once the NFS with an SD media card that has a BARS backup image is powered up.
- Stage 2 is only applicable to NFS configurations that include 46 NFS OAS AIRLINE CRL UMS and 46 NFS OAS AIRPLANE KEYS UMS software parts. These parts require an encryption passphrase key to enable restoration. Stage 2 can only be accomplished using a PMD.

BARS Restore Function

BARS supports performance of both automatic and manual restore of an NFS. NFS restoration is performed in two stages:

SIA 015-999; SIA 001-014 POST SB 737-46-1029

Software Signature Checking

The software signature checking feature activates enhanced software tampering protection when performing software distribution using a PMD.

The operator must enable a secure distribution of software to the ONS. A certification authority is created with the purchase of keys and/or certificates from a third-party certificate authority. A Configuration Item Signer Crater Tool (CSCT) is provided to sign and create all software using the two operator unique private key(s).

The operator must create an NFS OAS AIRLINE CERTS UMS software part. This software part must be loaded to the ONS where the software signature checking feature is enabled.

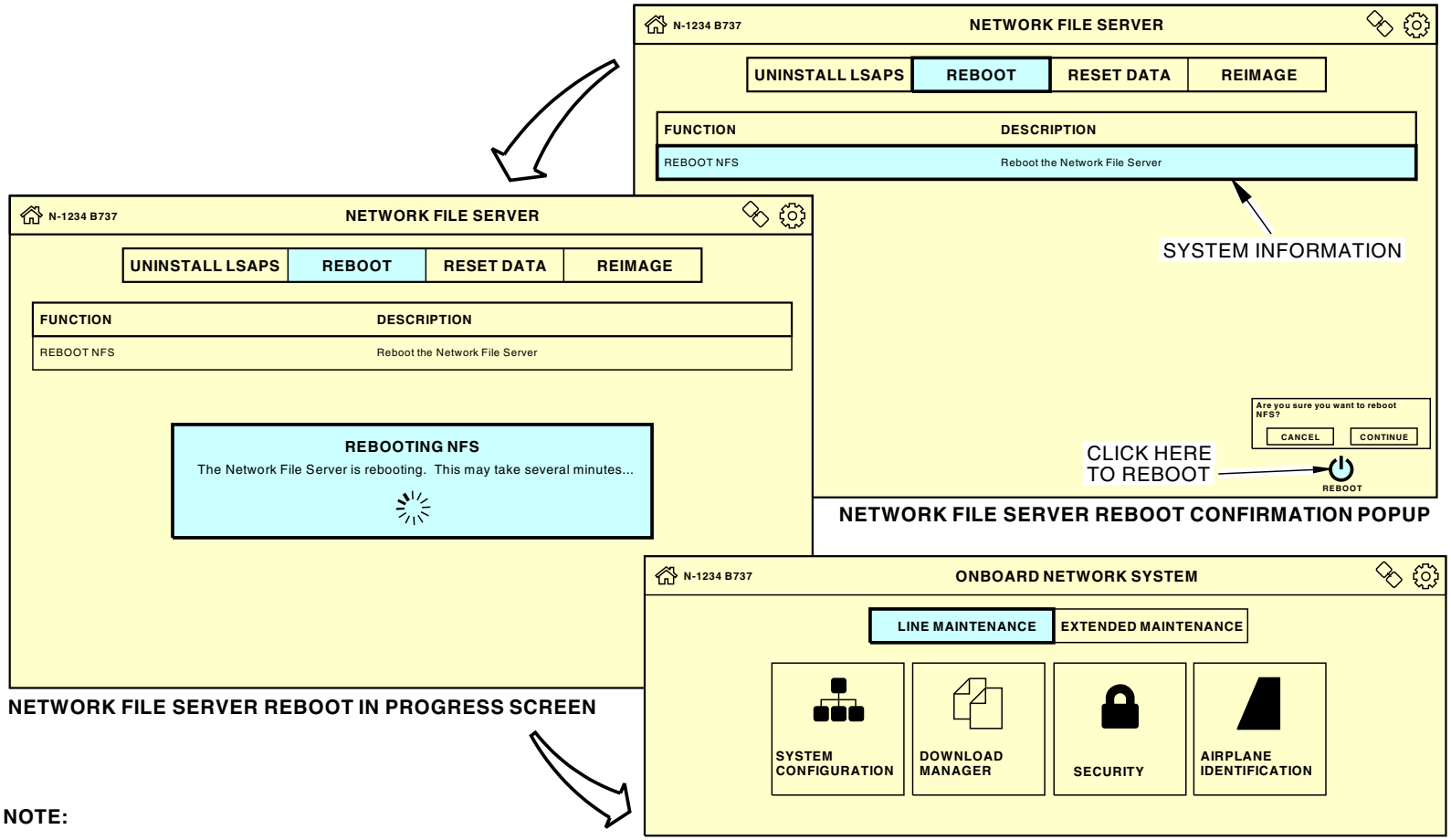
Check the interchangeability drawing to identify the NFS OPC which has part signature validation enabled.

Load the enabled NFS OPC signature validated part to the NFS.

SIA ALL

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - NETWORK FILE SERVER

EXTENDED MAINTENANCE>ONS MAINTENANCE>REBOOT



NETWORK FILE SERVER REBOOT CONFIRMATION POPUP

NETWORK FILE SERVER REBOOT IN PROGRESS SCREEN

NETWORK FILE SERVER - AFTER REBOOT RETURN TO HOME SCREEN

NOTE:

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ELEMENTS OF THE MAINTENANCE SCREENS THAT APPEAR IN A SHADE OF BLUE ARE DISABLED. THEY WILL APPEAR WITH WHITE TEXT WHEN ENABLED BY APPROPRIATE SCREEN SELECTIONS AND INPUT. WHEN A FEATURE IS SELECTED, IT APPEARS IN GREEN.

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ONS MAINTENANCE - NETWORK FILE SERVER REBOOT

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - MASS STORAGE DEVICE

General

The Mass Storage Device (MSD) screen gives control and management of software parts stored on the internal and external MSD(s).

To get access to this application,use an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Mass Storage Device.

Summary

The primary page has a selection of a MSD option in the top table of the MSD application screen. At the center of the page is the “Select the Load Part Number” table. The footer options found at the bottom of the MSD has the STORAGE, DETAILS, REPORT, DELETE, and ADD icons.

NOTE: In the Onboard Network System (ONS) web application, elements of the Maintenance screens that show in a shade of blue are disabled. When enabled, through screen selections, it will show in white text. When a selection is set, it shows in green.

Parts Selection

Select a MSD option in the “Select the MSD” at the top of the table. This starts a “Retrieving Parts” window that retrieves parts of the selected MSD. The parts show on the MSD “Select the Load Part Number” table which has these columns:

- ATA - shows the Air Transport Association (ATA) chapter where the Line Replaceable Unit (LRU) is located. ATA does not apply to the external MSD(s). The Loadable Software Airplane Part (LSAP) list is arranged by ATA.
- PART NUMBER - The part number of the software part.
- NOMENCLATURE - Describes the related software part.

NOTE: For ARINC 615 parts, the Media Set part number is shown and the included LSAP part numbers are in parenthesis listed after the Media Set part number.

Check the check box in Table Header adjacent to “ATA” test selects all parts (or unselects all parts). The “up/down” ▲▼ arrows adjacent to column table headers sorts the column. Selecting a part in the “Select the Load Part Number” table makes all the footer options available.

Footer Options

Select any of the footer options shows more data of the part set in the “Select the Load Part Number” table. These are the footer option icons located at the bottom of the screen:

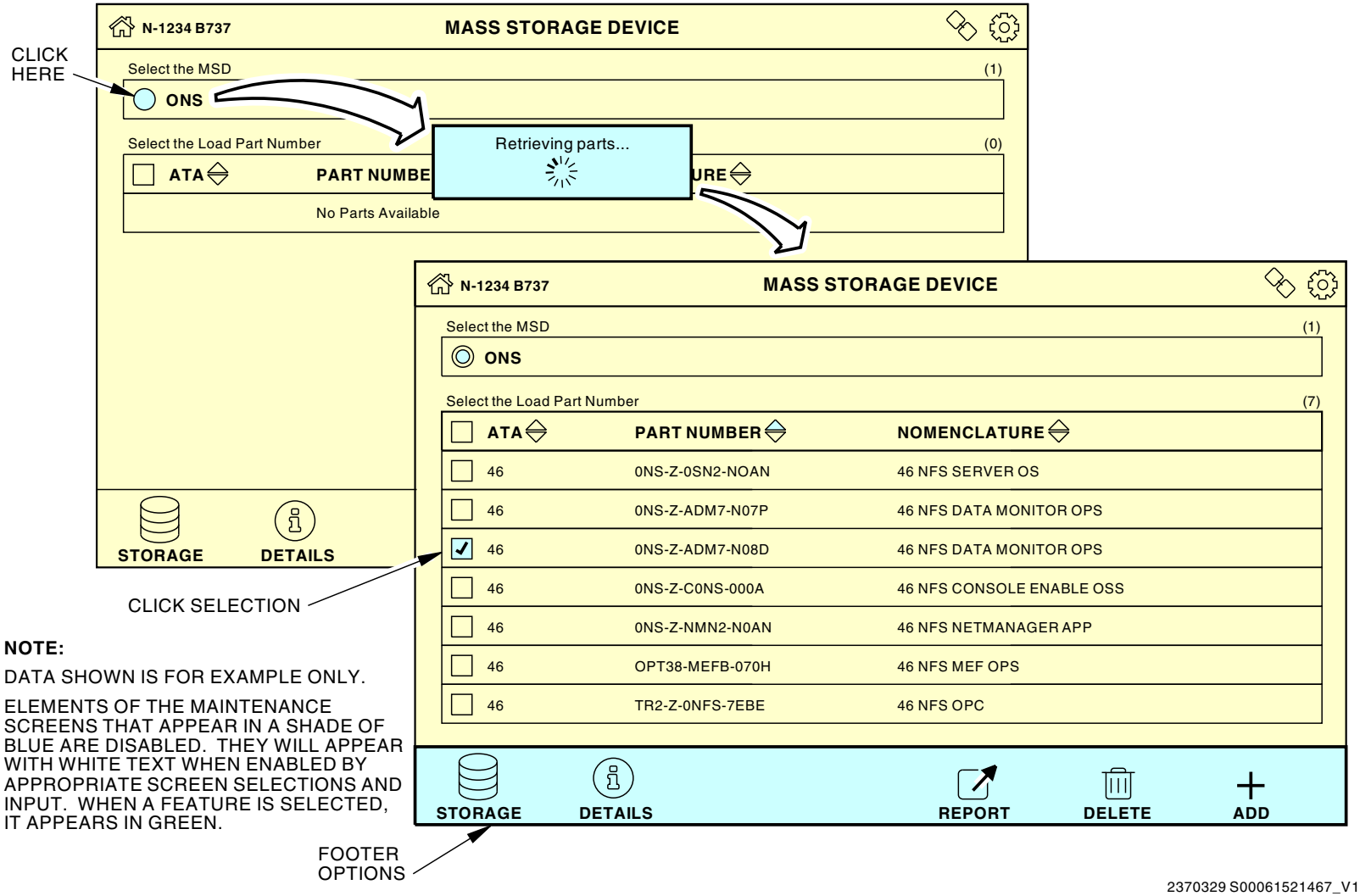
- STORAGE - Displays the total storage summary information for the selected MSD. The amount of MSD free space and used storage are displayed in KB, MB, or GB as appropriate.
- DETAILS - Displays the “File Summary” which gives the total number of LSAPs and an estimated size of the selected parts. The selected parts “Estimated Size” is shown in bytes.
- REPORT - Sends a MSD report of the selected part(s) to the selected MSD. The REPORT window has a “Select Destination” for the MSD report to be sent to. At the bottom of the REPORT window there is a CLOSE button to dismiss, STOP button to halt a transfer in progress, or SEND button to start sending the report.
- DELETE - Removes the part(s).
- ADD - Adds part(s) to the MSD from the PMD.

NOTE: A report can only be saved via the PMD.

NOTE: Parts can only be added via the PMD.

NOTE: Transferring parts to the MSD with this interface does not install them to the NFS. It simply places them on the NFS hard drive so they are available for install. Similarly, if a part is installed, deleting it from the MSD will not uninstall it. At the successful completion of the parts transfer process from the PMD to the MSD, it is necessary to do a normal part install using the ONS Data Load application.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - MASS STORAGE DEVICE



NOTE:

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ONS MASS STORAGE DEVICE PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - INPUT MONITORING

General

The input monitoring function gives the condition of Onboard Network System (ONS) communications between the Network File Server (NFS) and the connected system or device.

To get access to this application, use an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the PMD: Extended Maintenance > Input Monitoring.

Summary

A pop-up window will show with the available network devices. Of the possible selections, avionics parameters and NFS always will show. If an additional system or device shows, the pages will look and operate the same as the NFS descriptions that follow.

Input Monitoring > Avionics Parameters

The INPUT MONITORING selection, followed by the Avionics Parameters selection shows selected avionics data. The data shown (or, parameters) shows:

- Aircraft Tail I)
- Aircraft Type
- Airline ID
- International Civil Aviation Organization (ICAO)
- Time
- Date
- Origin
- Destination
- Weight on Wheels.

These parameters can be helpful for ONS troubleshooting.

Input Monitoring > NFS

The INPUT MONITORING selection, followed by the NFS selection, shows a page with five buttons as follows:

- ETHERNET
- 429 RECEIVE
- 429 TRANSMIT
- INPUT DISCRETES
- OUTPUT DISCRETES.
- 717 RECEIVE

SIA 001-014 PRE SB 737-46-1029

NOTE: In OS7.1, the 717 RECEIVE tab has been replaced with QAR RECEIVE.

SIA ALL

These functions are the data bus and discrete interfaces of the NFS. Each button shows the condition and settings for that interface.

Input Monitoring > NFS > Ethernet

The Ethernet page shows each Ethernet port of the rear connector on NFS. The configuration as described in the End Connection column will match the system wiring diagram, and the present status of the interface is provide with the following definitions:

- UP - the interface is serviceable.
- DOWN - the interface is unserviceable.
- ADMIN DOWN - the interface is set to OFF in the configuration software part.
- UNAVAILABLE - unserviceable, in that the protocol to read the condition was unsuccessful.

NOTE: The UNAVAILABLE condition can suggest that the client and server credentials do not agree.

Input Monitoring > NFS > 429 Receive

The 429 RECEIVE page shows a record with each NFS 429 receive bus, the interface connection name, and the interface condition (or status).

The data below END CONNECTION is the interface name. The interface name shown, and the same interface name on the wiring diagram shall agree.

The data below STATUS gives the condition of the interface at the time the page was selected. The condition can be as follows:

- High - the interface is serviceable, with a high-speed connection.
- Low - the interface is serviceable, with a low-speed connection.
- Failed - the interface is unserviceable (specifically, the input signal label does not agree with the Operational Program Configuration (OPC) specified label).
- Disabled - the interface is unserviceable (specifically, turned off in the configuration part).
- Unavailable - the protocol to read the condition was unsuccessful.

NOTE: The UNAVAILABLE condition can suggest that the client and server credentials do not agree.

Input Monitoring > NFS > 429 Transmit

The 429 TRANSMIT page shows a record with each NFS 429 transmit bus, the interface connection name, and the interface condition (or, status).

The data below END CONNECTION is the interface name. The interface name shown, and the same interface on the wiring diagram shall agree.

The data below STATUS gives the condition of the interface at the time the page was selected. The condition can be as follows:

- High - the interface is serviceable, with a high-speed connection.
- Low - the interface is serviceable, with a low-speed connection.
- Failed - the interface is unserviceable (specifically, an internal fault prevents the data transmission).
- Disabled - the interface is unserviceable (specifically, turned off in the configuration part).
- Unavailable - the protocol to read the condition was unsuccessful.

NOTE: The UNAVAILABLE condition can suggest that the client and server credentials do not agree.

Input Monitoring > NFS > Input Discretes

The INPUT DISCRETES page shows a record with each NFS input discrete, the interface connection name, and the interface condition (or, status).

The data below END CONNECTION is the interface name. The interface name shown, and the same interface on the wiring diagram shall agree.

The data below STATUS gives the condition of the interface at the time the page was selected. The condition can be as follows:

- Open - the interface has no path to aircraft ground.
- Ground - the interface senses a path to aircraft ground.
- Unavailable - the protocol to read the condition was unsuccessful.

NOTE: The UNAVAILABLE condition can suggest that the client and server credentials do not agree.

Input Monitoring > NFS > Output Discretes

The OUTPUT DISCRETES page shows a record with each NFS output discrete, the interface connection name, and the interface condition (or, status).

The data below END CONNECTION is the interface name. The interface name shown, and the same interface on the wiring diagram shall agree.

The data below STATUS gives the condition of the interface at the time the page was selected. The condition can be as follows:

- Open - the interface has no path to aircraft ground.
- Ground - the interface senses a path to aircraft ground.

- Unavailable - the protocol to read the condition was unsuccessful.

Input Monitoring > NFS > 717 Receive/QAR Receive

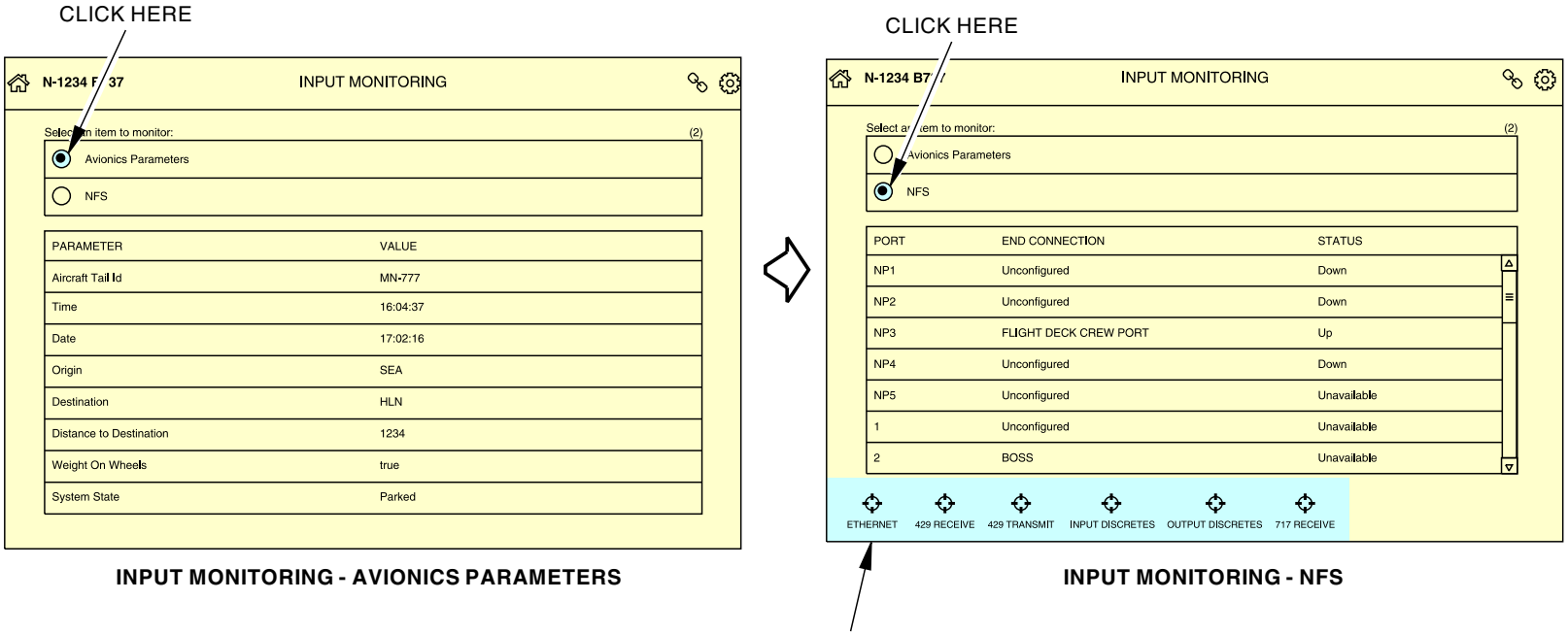
The 717/QAR page shows a record with each DFDAU bus, the interface connection name, and the interface status.

The data below END CONNECTION is the interface name. The interface name shown and the same interface name on the wiring diagram shall agree.

The data below STATUS gives the condition of the interface at the time the page was selected. The condition can be as follows:

- ACTIVE – the interface is serviceable
- INACTIVE – the interface is unserviceable

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - INPUT MONITORING



INPUT MONITORING - AVIONICS PARAMETERS

INPUT MONITORING - NFS

NOTE:

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2370357 S00061521512_V1

ONS INPUT MONITORING PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS

General

A Line Replaceable Unit (LRU) report is a digital data file used for use by maintenance or engineering. This report can be a Built-In-Test (BIT) result, or other data specified by the airline, or equipment manufacturer. The LRU Reports page gives the functions to do these steps:

- Choose a specific Onboard Network System (ONS) client
- Set the network client to make one or more new reports
- Download the reports to the laptop or external memory.

The LRU Reports screen is an application that is only available using the Portable Maintenance Device (PMD). It is not accessible when using the multifunction display (MFD) of the MAX Display System (MDS).

From the ONS main menu, you get access to LRU Reports by making the selections: Extended Maintenance > LRU Reports. To exit the function, click once on the home icon in the upper left-hand corner.

LRU Reports

When selected, the LRU Reports page shows a pop-up window with the words: SELECT LRU TYPE. These LRUs can make a report:

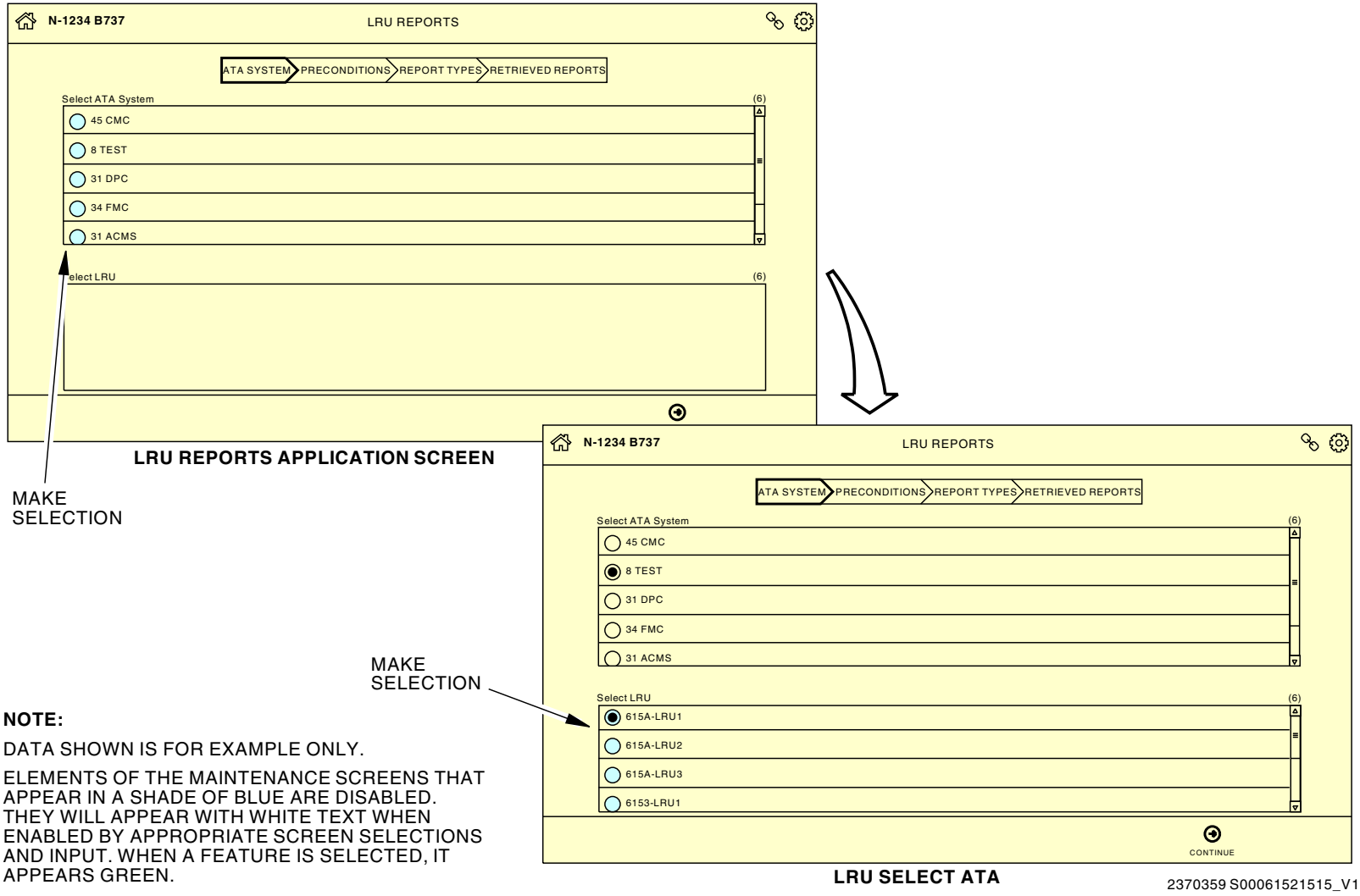
- Audio Control Panel (ACP)
- Flight Control Computer (FCC)
- Flight Management Computer (FMC)
- Control Display Unit (CDU)
- Display Processing Computer (DPC)
- Spoiler Control Electronics (SCE)

An additional pop-up can show, to select the left or right-hand, or, LRU-1 or LRU-2 or LRU - 3.

The Preconditions page then shows. Verify all conditions are met before selecting Continue. The main LRU Reports page then shows. Find the target report, and check the boxes next to the reports to select them. When a report is selected, a checkmark shows in the box next to it.

When the report selection is set, make the Continue selection. When the report is ready, save the file to the maintenance laptop, external memory, or to the Download Manager.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS



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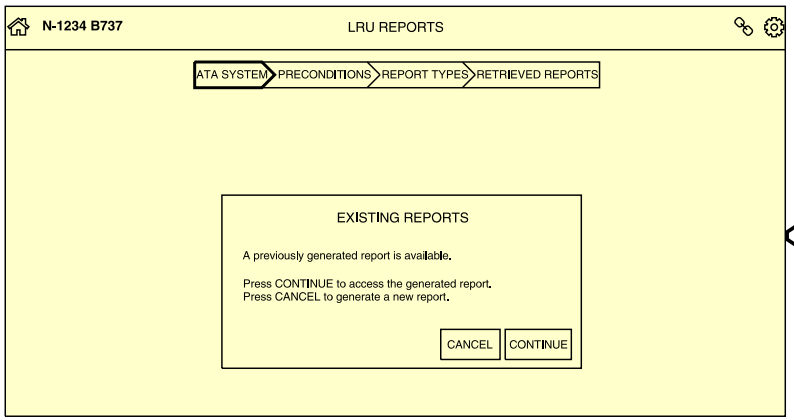
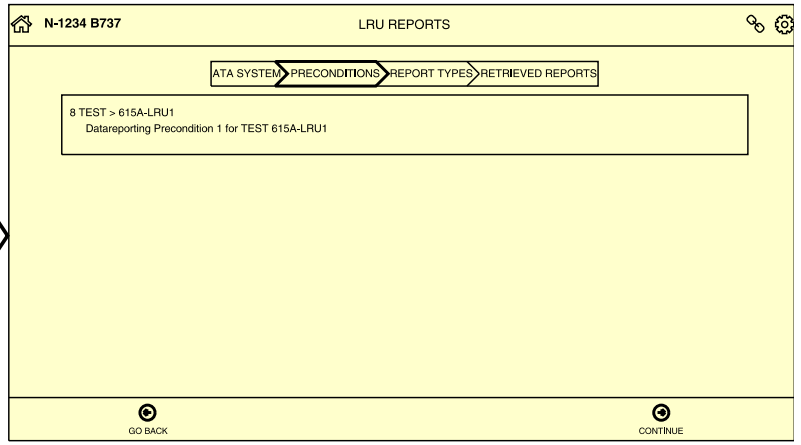
ONS LRU REPORTS PAGE

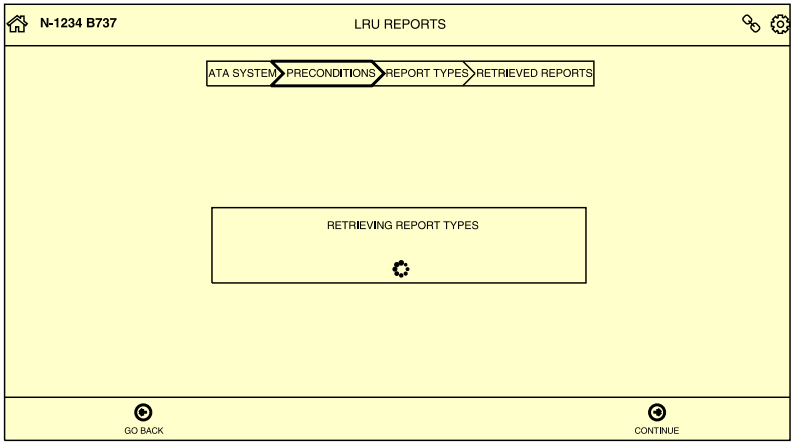
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS



LRU REPORTS EXISTING REPORTS



LRU REPORTS PRECONDITIONS



LRU REPORTS RETRIEVE TYPES

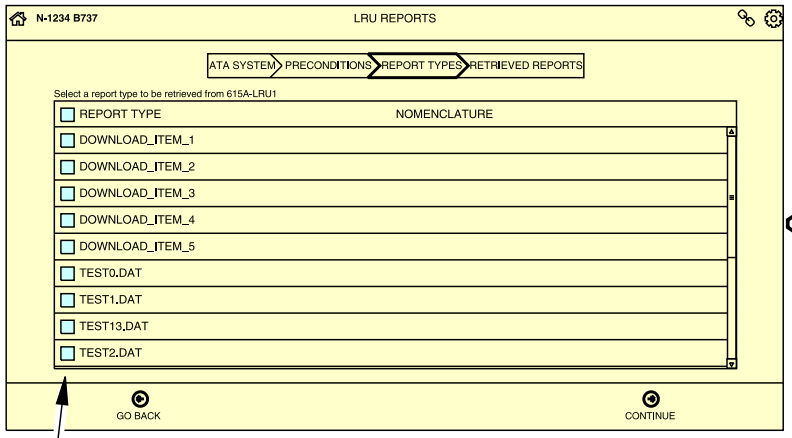
NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

2370360 S00061521516_V1

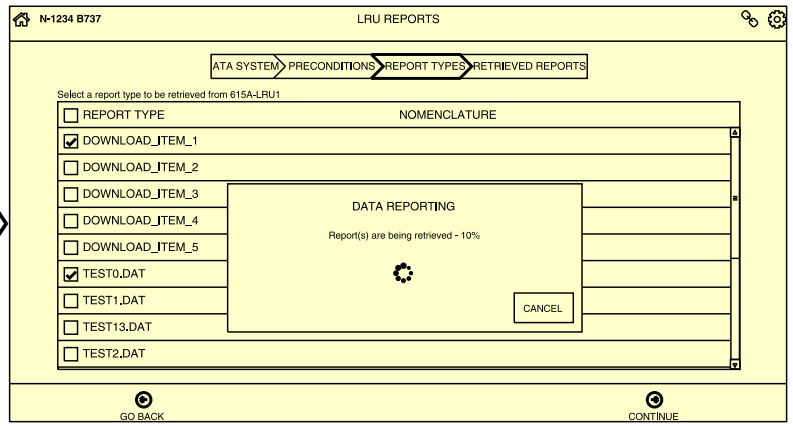
ONS LRU REPORTS PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS

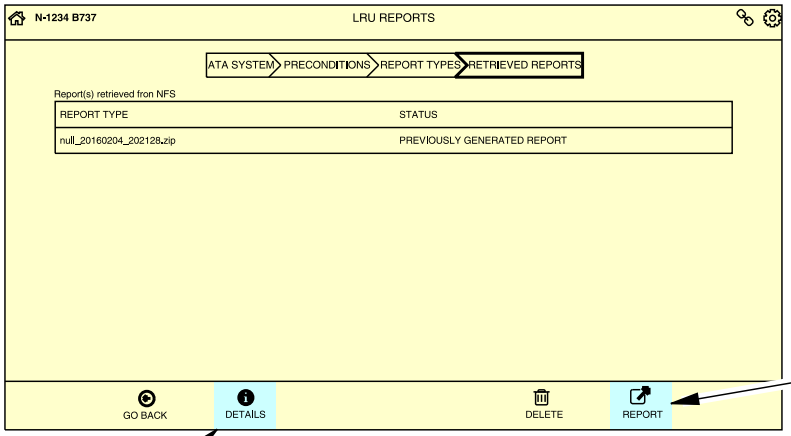


LRU REPORT TYPES SELECTED

MAKE SELECTION



LRU REPORT DATA REPORTING



SAVES REPORTS

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY

PROVIDES A REPORT SUMMARY

LRU REPORTS - RETRIEVED REPORTS

2545673 S0000604293_V1

ONS LRU REPORTS PAGE

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - OFF-BOARD LINKS

General

The name OFF-BOARD LINKS refers to data communication between the Onboard Network System (ONS) and a ground-based data network.

The Off-Board Links screens allow the user to view the status of off-board links to the ONS, such as the Wireless WAN Unit (WWU). The status indicates whether the interface is active. This function also gives the user the ability to do a test of the link.

To get access to this application, use an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the PMD: EXTENDED MAINTENANCE > Offboard Communications.

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, this function is called OFF-BOARD LINKS

SIA ALL

NOTE: This function requires a connectivity option, such as WWU, to be installed in the airplane.

This function also gives the user the ability to do a test of the link.

There are four (4) tabs in the off-board links function:

- Link Status
- Wi-Fi
- Cellular
- SATCOM

It is necessary to get access to the .Onboard Maintenance Function (OMF) to perform this task.

The Off-Board Links function is only available when the OMF is accessed with the Maintenance Laptop or other type of approved Portable Maintenance Device (PMD). This function is not available using the multifunction display (MFD) on the MAX Display System (MDS).

To access the Off-Board Links function, make these selections from the ONS Main Menu: Extended Maintenance > Off-Board Links.

NOTE: The Off-Board Links button is serviceable when one or more optional communication interfaces, such as WWU, is installed and enabled.

Summary

SIA 001-014 PRE SB 737-46-1029

In OS7.1, there are three (3) tabs in the off-board links function:

- LINK STATUS
- WI-FI
- CELLULAR

SIA 015-999; SIA 001-014 POST SB 737-46-1029

In OS9.1, there are (6) tabs in the offboard communication function:

- LINKS
- WI-FI
- CELLULAR
- SATCOM
- ACARS
- MESSAGING

SIA ALL

NOTE: These tabs are configuration specific and may not all show.

OS7.1 and OS9.1: Link Status/LINKS Page

LINK STATUS is the default page for OFF-BOARD LINKS and is always present. LINKS is the default page for Offboard Communication and is always present.

A table of data shows each available link with status information. The columns of the table are as follows:

- TYPE - Gives the name of the specified LRU.
- LINK - Gives the type and configuration of the specified link.
- STATUS - Gives the current condition of the communication link.
- DEFAULT - When a check-mark (√) shows, the ONS selects that specified link as the primary connection method.
- TEST - Gives a check-mark (√) to indicate that the link was successfully tested. Gives an X to indicate that the link was not successfully tested.
- LOCATION - Gives the data that is specific to the link or operator-specified override when triggered by the current aircraft location.

Below the table, the Link Status page shows two (2) functional buttons on the Page Footer:

- TEST DEFAULT LINK - This function begins the link verification test for the default link.
- SET DEFAULT LINK - This function lets you manually set the default link.

Test Default Link Function

The test default link button initiates a link verification test using the currently-specified default link.

When selected, a confirmation pop-up shows with the selections CONTINUE or CANCEL. To initiate the check, click on CONTINUE. To escape the test and return to the Link Status page, click CANCEL.

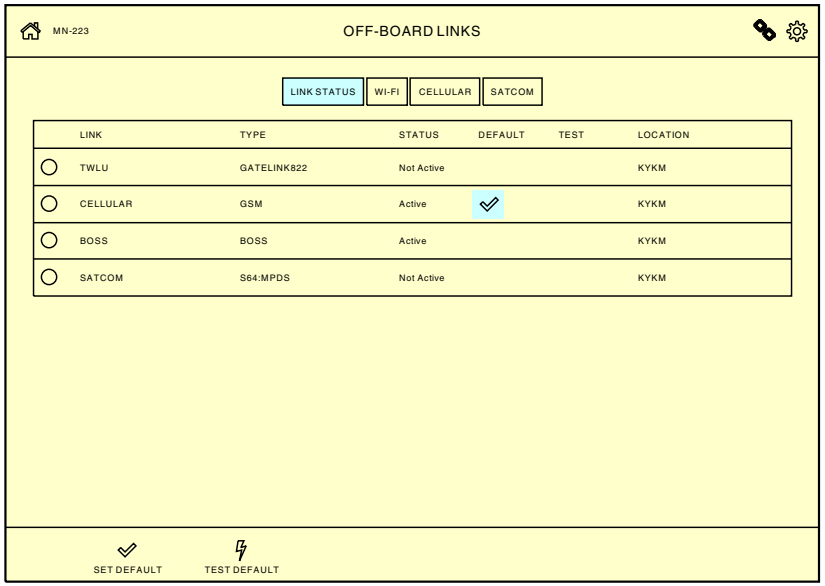
When the test is complete, the TEST column in the link status table shows with one of these results:

- Check-mark (√)- Serviceable
- X - Unserviceable

Set Default Link Function

The Set Default Link button lets you manually set the default link from a list of active links. Select the link from the radio-button next to the link type on the link status table. Then select the SET DEFAULT button. A confirmation pop-up shows with the selections CONTINUE or CANCEL. To set the default link, click on CONTINUE. To escape and return to the Link Status page, click CANCEL.

When a link has been manually set to default, the Link Status page will display a check-mark (√) in the DEFAULT column.



NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2551257 S0000605970_V1

ONS - OFF-BOARD LINKS

General

The WI-FI page manages the status and control information for configured wireless connections. The WI-FI application screen provides access to additional actions and information via the active buttons on the page footer.

This will present a page with several buttons along the bottom of the screen which is defaulted to the CONDITION screen. The available buttons are as follows:

- CONDITION
- TEST LINK
- DIAGNOSTICS
- DISCRETES
- SCAN

Select button to access additional functionality and/or display a screen with additional information. The screens displayed have viewable and/or selectable parameter data options that are determined by the Operational Program Configuration (OPC) and User Modifiable Software (UMS) files.

Examples show in this section are for the Aircraft Wireless Local Area Network (AirLAN) Wi-Fi. If the Wi-Fi Line Replaceable Unit (LRU) is a different LRU, such as the Miltope Terminal Wireless LAN Unit (TWLU) Wi-Fi, then there may be some slight variations in the screen details.

CONDITION

The CONDITION screen provides the overall summary status of the Wi-Fi LRU. This screen displays table with six parameters and their condition. The parameters are as follows:

- Link State
- Active Profile
- Associated SSID
- WWU RF Status
- WWU WOW Status
- Controller State

The CONDITION screen updates automatically at least every five (5) seconds.

TEST LINK

The TEST LINK function tests the Wi-Fi ground connection.

To test the Wi-Fi link to the ground, click the TEST LINK button in the page footer of the Wi-FI initial screen. The system initiates a W-Fi link test by attempting to communicate to the ground services. The Wi-FI Testing Link pop-up is displayed.

Once the link test completes, the Testing Link pop-up will close.

The TEST LINK selection does a check of the link condition. If the TEST LINK button gives the result SUCCESS, then the Wi-Fi link condition is serviceable.

If the test result has failed due to a disconnected link then the Testing Link pop-up will show “Service Disabled”. Click the OK button to return to the CONDITION screen.

DIAGNOSTICS

The DIAGNOSTICS selection shows a page with several internal Wi-Fi parameters and their values. The data can help troubleshoot Wi-Fi and Gatelink problems. The displayed parameters include:

- Active Profile
- Link State
- Associated SSID
- Security Mode
- Country Code
- • WWU MAC ID
- AP MAC ID
- Assigned IP Address
- Assigned Netmask
- Assigned Gateway

- DNS Address(es)
- Link Speed RX/TX (MvpsB)
- RF Protocol
- RF Channel
- RF Signal Strength (dBm)
- Radio ID
- RF SNR (dB)
- Bytes Received/Sent
- Connect Time (sec)

Use the right scrollbar on the DIAGNOSTICS screen if not all parameters are visible.

The DIAGNOSTICS screen automatically refreshes every five (5) seconds.

DISCRETES

The DISCRETES screen provides an interface to control the discrete status and profile of the Wi-Fi. The screen automatically refreshes every five (5) seconds and consists of two tables: DISCRETE & PROFILE CONTROL, and PARAMETER DETAILS.

The DISCRETE & PROFILE CONTROL table displays”

- • WiFi RF Status - manual ON/OFF
- Power Discrete Status - manual ON/OFF (not applicable for AirLAN Wi-Fi)
- WWU Weight-On-Wheels (WOW) Status
- Aircraft Location - “>” icon to select location
- Active Profile - “>” icon to select profile

To turn the RF ON/OFF, click the ON/OFF button for the Radio Frequency (RF) Discrete Status control to turn the RF ON/OFF.

NOTE: The ON/OFF button changes based on the RF Discrete Status. If the RF Status is set to OFF, the button displays ON and turns the RF ON when clicked. If the RF Status is ON, the button displays OFF and turns OFF the RF when clicked.

To turn the Power Discrete ON/OFF (not applicable for AirLAN Wi-Fi), click the ON/OFF button for the Power Discrete Status control to turn the Wi-Fi power on or off. The button operates as a toggle to switch states.

NOTE: The manual ON/OFF button changes based on the Wi-Fi Power Discrete Status. If the Wi-Fi Power Status is set to OFF, the button displays ON and will turn the Wi-Fi power on when clicked. If the Wi-Fi Power Status is set to ON, the button displays OFF, and will turn the Wi-Fi Power off when clicked.

To specify an Aircraft Location, click the Aircraft Location arrow icon (>) in the Profile Control table to specify an Aircraft Location. The Aircraft Location selection screen appears. Select an airport from the Airport Location table.

NOTE: Only airport locations that have Wi-Fi profiles defined are displayed in the selection screen.

Then click the Back to Wi-Fi Discretes button to set the value and return to the Wi-Fi Discretes screen.

To specify an Active Profile, click the Active Profile arrow icon (>) on the DISCRETE & PROFILE CONTROL table to specify an active profile. In the Select Active Profile table, select a profile. Then click the Back to Wi-Fi Discretes button to set the value and return to the previous screen.

WI-FI PARAMETER DETAILS is a table of the Wi-Fi Discrete Control screen that dynamically displays the Wi-Fi connection, airport, and other information. Displayed information includes connection state, Airport ID, Airport, Service Set Identifier (SSID), and Link Completion level.

Wi-Fi Clear Profile

When the system is configured to provide Wi-Fi communications via the AirLAN LRU, the CLEAR PROFILE button is preset on the Wi-Fi DISCRETES screen below the DISCRETE & PROFILE CONTROL table.

Click on the CLEAR PROFILE button, which is enabled once a profile is loaded, to clear the current profile. The display will then show no details in the PARAMETER DETAILS table and the message “No profiles loaded”.

NOTE: Clearing the profiles effectively disables the AirLAN Wi-Fi established connection.

SCAN

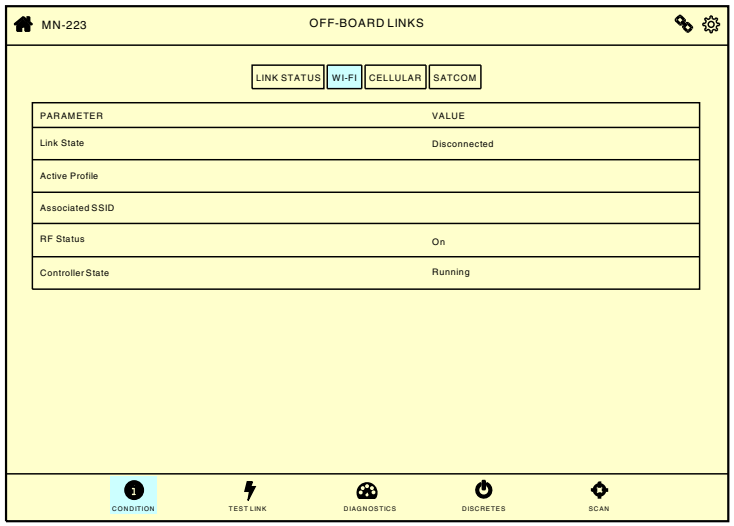
Use the Wi-Fi SCAN screen to display the Wi-Fi LRU wireless neighborhood scan data. The SCAN screen is accessed from the SCAN button on the Wi-Fi screen page footer.

A list of all available devices in the neighborhood is displayed along with the following device properties: MAC ADDRESS, SSID, MODE, CHANNEL, SIGNAL, NOISE, SNR, and INFO. In the list of devices, the * symbol appears before the SSID of a device connected to the Wi-Fi. The Wireless Scan screen automatically refreshes every five (5) seconds.

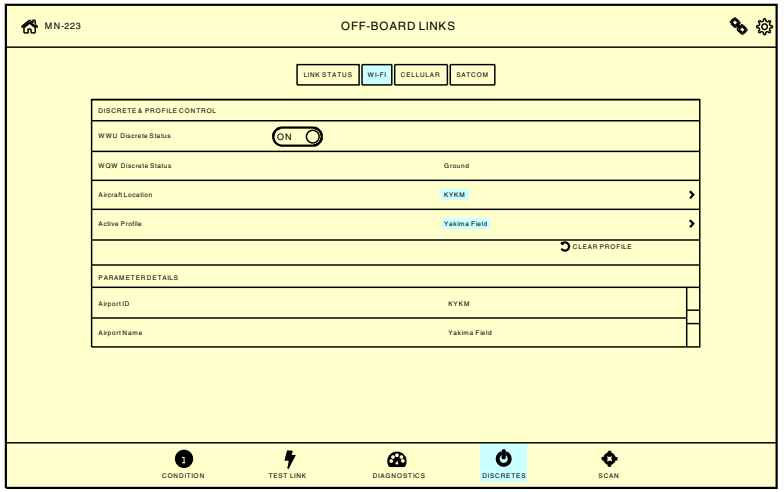
The SCAN selection shows a page which displays all active Wi-Fi networks. A confirmation pop-up shows up with the selections CONTINUE or CANCEL. To start the scan, click on CONTINUE. To escape and show the Off-Board Links page, select CANCEL.

When the Wi-Fi power or the RF is turned off, the Wireless Scan screen displays the message “Turn on WiFi RF to enable the scan”.

When the Wi-Fi does not support the wireless scan function, the Wireless Scan screen with report that “Wi-Fi Scan Unavailable”.



WIFI INITIAL SCREEN



WIFI DISCRETE TABLE

NOTE:

THE DATA SHOWN ON THE DISPLAY IS ONLY AN EXAMPLE.

2552863 S0000606376_V3

WI-FI INITIAL SCREEN AND DISCRETES SCREEN TABLES

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - OFF-BOARD LINKS - CELLULAR

General

The CELLULAR pages manage the status and control information for configured cellular connections.

The selection will present a page with several buttons along the bottom of the screen which is defaulted to the CONDITION screen.

- CONDITION
- TEST LINK
- DIAGNOSTICS
- DISCRETES
- SCAN

CONDITION

The CONDITION selection shows six conditions and their value

- Link State
- Active Profile
- Associated Network Specification
- WWU RF Status
- WWU WOW Status
- Controller State

TEST LINK

The TEST LINK function makes the Wireless WAN Unit (WWU) do a check of the cellular link, using the active profile shown in the box. If the result shows SUCCESS, then the WWU communication link is serviceable.

DIAGNOSTICS

The DIAGNOSTICS selection displays several parameters and their value. The data shown can be used to evaluate the cellular link condition. The parameters shown are as follows:

- Active profile
- Link state
- Associated Network Specification
- WWU RF Status
- SIM Slot
- Phone Number
- User Name
- SIM IMSI
- SIM Serial Number
- Assigned IP Address
- Assigned Netmask
- Assigned gateway
- DNS Address(es)
- System Mode
- Cellular band (Mhz)
- Network Gen
- Signal Strength (dBm)
- Signal Quality (bars)
- Link Speed RX/TX (Mbps)
- Bytes Received/Sent
- Connect Time (seconds)

DISCRETES

The DISCRETES selection provides status information and gives three (3) control functions.

Cellular RF Status is a control that sets the cellular RF output to ON or OFF. The adjacent button changes the setting.

Aircraft Location displays the current location used in the profile and lets the operator choose an alternate value for troubleshooting by clicking the arrow (>) on the right. The available locations are specified in the 46 NFS EXCOMM UMS part.

Active Profile displays the current profile in use by the controller and lets the operator choose an alternate value for troubleshooting by clicking the arrow (>) on the right. The available profiles are specified in the 46 NFS EXCOMM UMS part.

NOTE: Overridden states will only remain until the next automatic transition that disagrees with the overridden state.

SCAN

The SCAN selection shows a page which displays all active cellular networks available to the WWU. To start the scan, click on CONTINUE. To escape and return to the Off-Board Links page, select CANCEL.

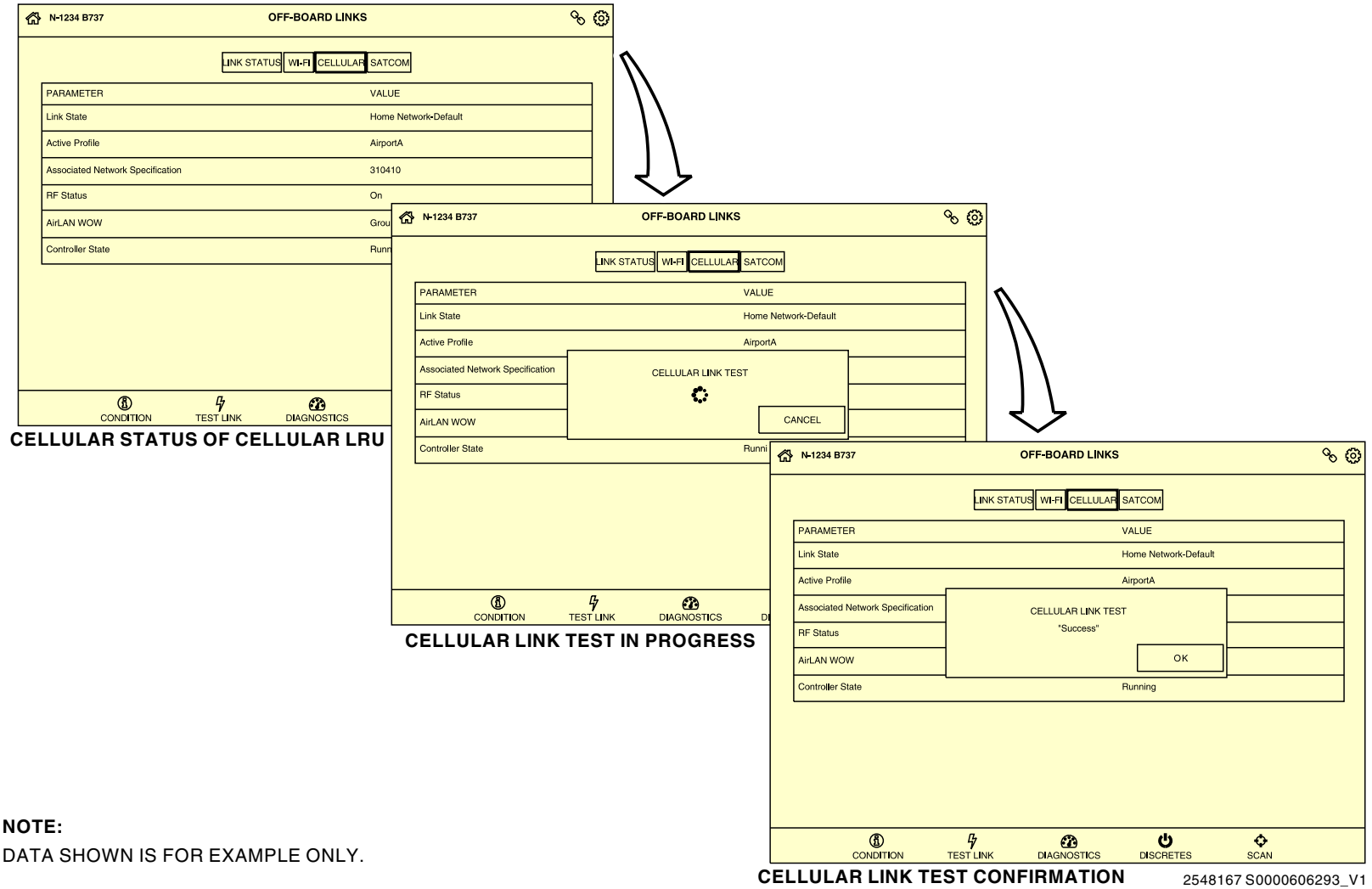
SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, the page name is Offboard Communication

SIA 001-014

NOTE: Initiating a cellular scan will cause an active cellular connection to disconnect.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - OFF-BOARD LINKS - CELLULAR



CELLULAR STATUS OF CELLULAR LRU

CELLULAR LINK TEST IN PROGRESS

CELLULAR LINK TEST CONFIRMATION

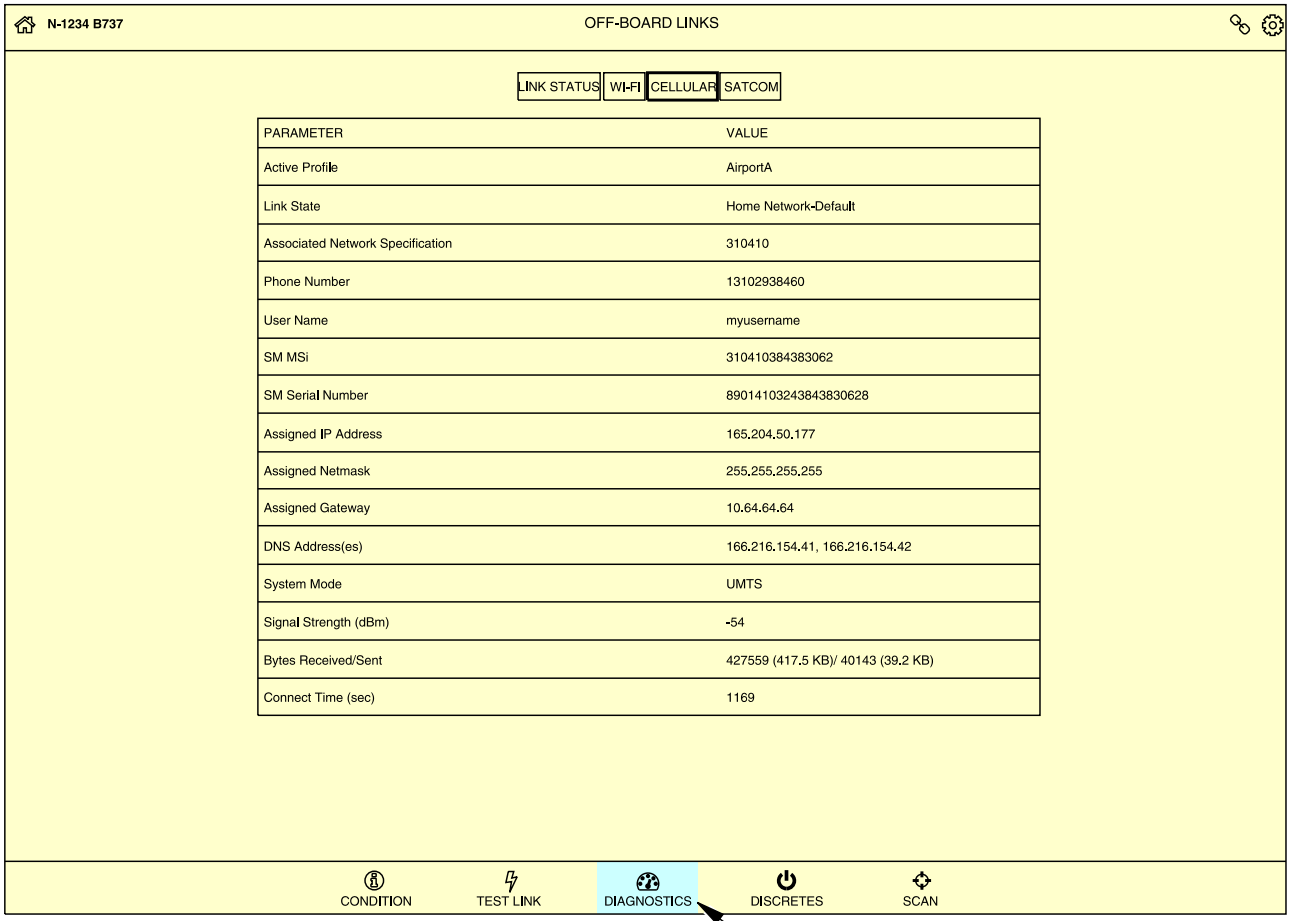
2548167 S0000606293_V1

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

ONS OFF-BOARD LINKS - CELLULAR - TEST LINK

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - OFF-BOARD LINKS - CELLULAR



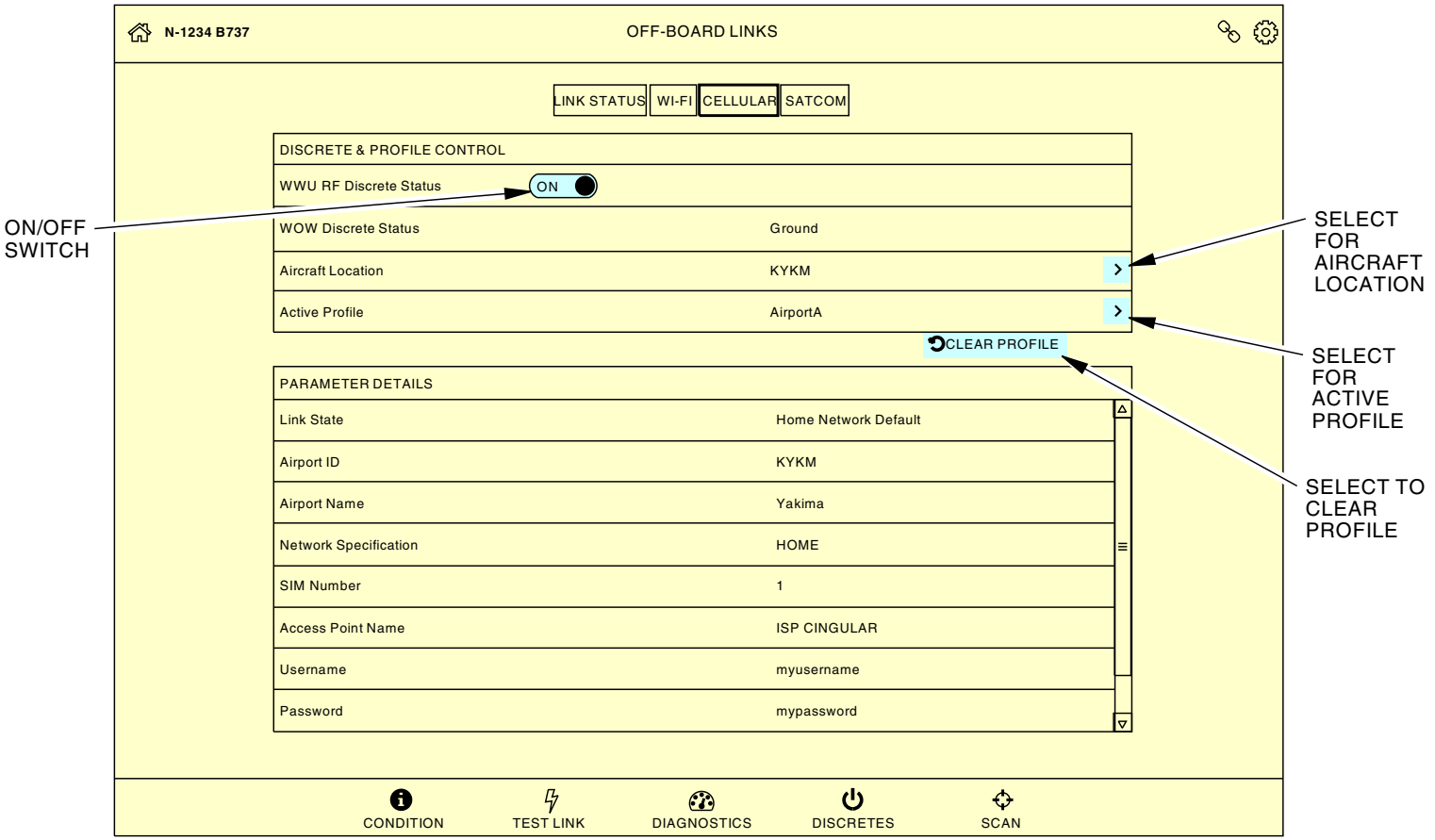
PARAMETER	VALUE
Active Profile	AirportA
Link State	Home Network-Default
Associated Network Specification	310410
Phone Number	13102938460
User Name	myusername
SM MSi	310410384383062
SM Serial Number	89014103243843830628
Assigned IP Address	165.204.50.177
Assigned Netmask	255.255.255.255
Assigned Gateway	10.64.64.64
DNS Address(es)	166.216.154.41, 166.216.154.42
System Mode	UMTS
Signal Strength (dBm)	-54
Bytes Received/Sent	427559 (417.5 KB)/ 40143 (39.2 KB)
Connect Time (sec)	1169

NOTE:

ELEMENTS OF THE MAINTENANCE SCREENS THAT APPEAR IN A SHADE OF BLUE ARE DISABLED. THEY WILL APPEAR WITH WHITE TEXT WHEN ENABLED BY APPROPRIATE SCREEN SELECTIONS AND INPUT. WHEN A FEATURE IS SELECTED, IT APPEARS GREEN.

2548168 S0000606295_V1

ONS OFF-BOARD LINKS - CELLULAR - DIAGNOSTICS



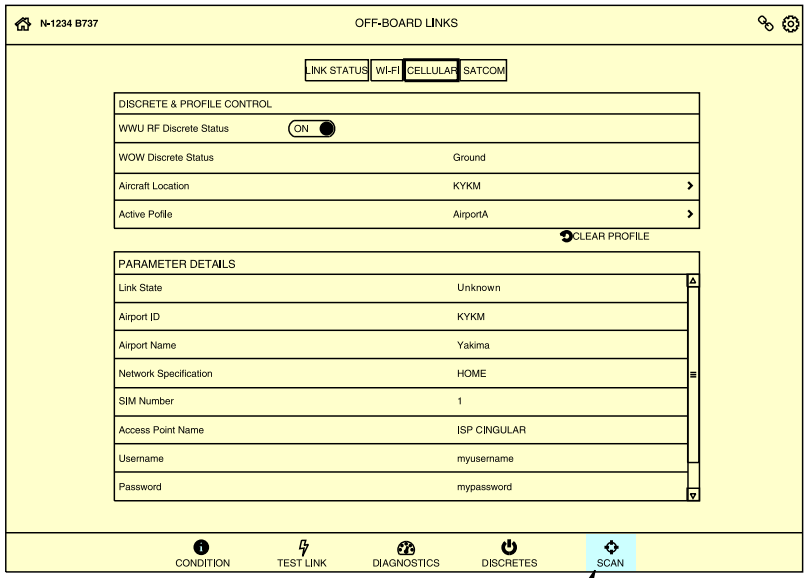
NOTE:
DATA SHOWN IS FOR EXAMPLE ONLY.

CELLULAR SELECT LOCATION AND PROFILE CONTROLS

2548169 S0000606296_V1

ONS OFF-BOARD LINKS - CELLULAR - DISCRETES

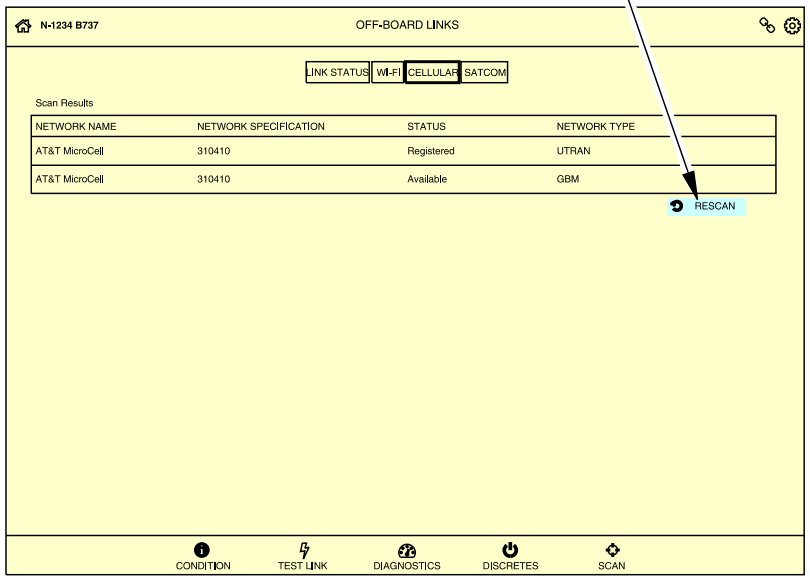
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - OFF-BOARD LINKS - CELLULAR



CELLULAR - SCAN

CLICK HERE FOR CELLULAR SCAN

CLICK HERE TO RESCAN



CELLULAR SCAN RESULTS

2548173 S0000606297_V1

NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

ONS OFF-BOARD LINKS - CELLULAR - SCAN

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - CREW WIRELESS

General

The Crew Wireless screens allow the user to configure crew wireless components, including Wireless Access Point (WAP)s and radios.

NOTE: This function requires the Crew Wireless LAN Unit (CWLU) option to be installed on the airplane.

To get access to this application, use an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the PMD: EXTENDED MAINTENANCE > Crew Wireless.

Summary

There are four (4) tabs in the off-board links function:

- WAP
- RADIOS
- SERVICES
- CLIENTS

WAP

The WAP page is the default page for Crew Wireless and is always present. This page shows a summary of all WAPs configured in the OPC. This summary includes the WAP name, its power status, its RF status, its general status, its services, and the number of its clients. In order for a WAP to be serviceable, its power must be ON, its RF Status must be ON, and its status must be Running.

Two buttons are located on the footer of the screen:

- TURN OFF POWER – Allows a user to turn off power for all listed WAPs
- RESET – Allows a user to restore all values on the page to their default status defined in the OPC

SIA 015-999; SIA 001-014 POST SB 737-46-1029

NOTE: In OS9.1, only the RESET button is available.

SIA ALL

Radios

The Radios page lists the radios currently available and broadcasting. Each radio displays a set of values:

- RADIO NAME
- PROTOCOL
- FREQUENCY
- CHANNEL
- TX POWER
- RF STATUS
- BSSID

The only interactive button on this page is the RF status, which can be turned on or off for each radio.

Services

The Services page lists the different network names that the WAPs are broadcasting. The three available services are:

- Cabin Crew
- Flight Crew
- Maintenance

NOTE: Not all services may display depending on the OPC configuration.

Each service lists their SSID, their State, and the number of clients they are connected to. Only the state button is interactive, and can be used to turn on or off specific services.

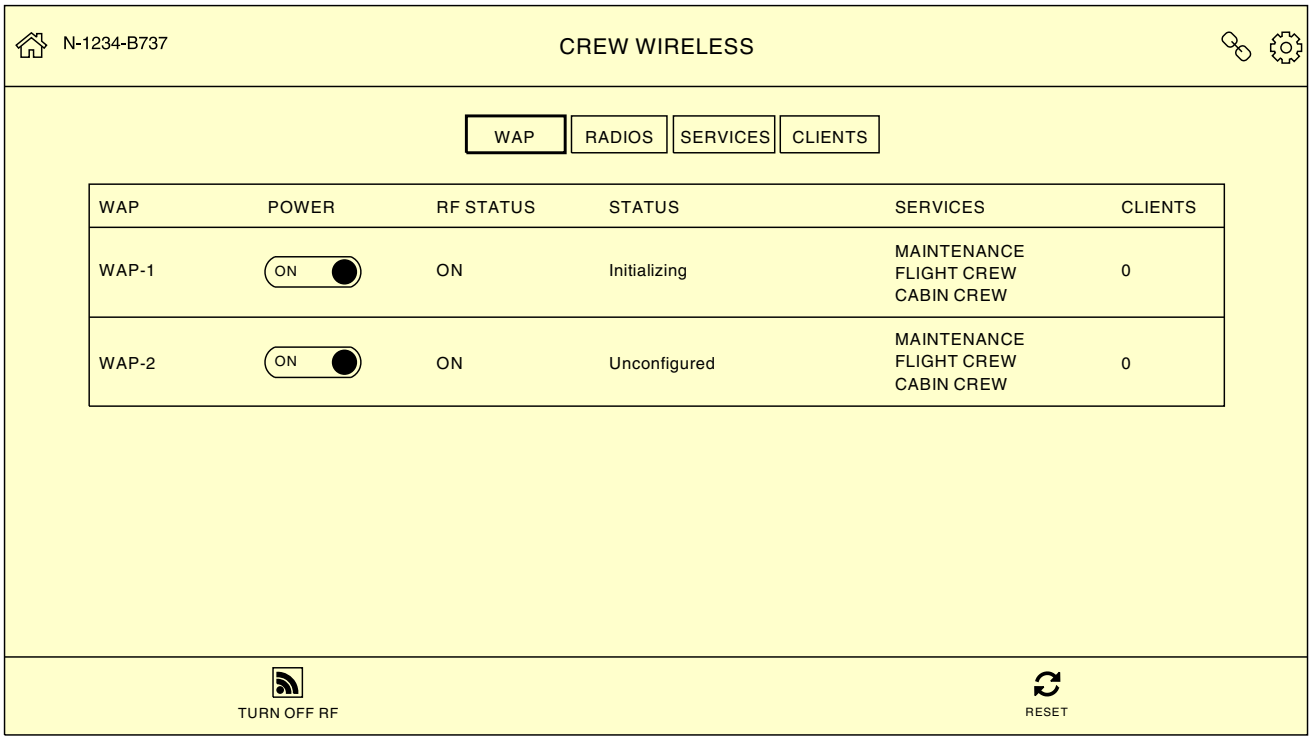
At the footer of the page, the RESET button can be used to restore all values on the page to their default status defined in the OPC.

Clients

The Clients page lists all clients that are currently connected to a service. Clients will show on this page as soon as they are connected to a service, regardless of whether a CWAC has been entered. Only clients with the appropriate certifications can connect to the services broadcast by the WAP(s).

Each client lists its MAC Address, its IP Address, the Service it is connected to, the WAP it is connected to, and it's Signal Strength. No interactive buttons are present on this page.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - CREW WIRELESS



CREW WIRELESS INITIAL SCREEN - WAP

NOTE:

ELEMENTS OF THE MAINTENANCE SCREENS THAT APPEAR IN A SHADE OF BLUE ARE DISABLED. THEY WILL APPEAR WITH WHITE TEXT WHEN ENABLED BY APPROPRIATE SCREEN SELECTIONS AND INPUT. WHEN A FEATURE IS SELECTED, IT APPEARS GREEN.

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ONBOARD NETWORK SYSTEM CREW WIRELESS

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - BACKUP AND RESTORE

General

The Backup and Restore Service (BARS) enables backup and restoration (both automatic and manual) of the Network File Server (NFS) Mass Storage Device (MSD), Onboard Network System (ONS) Loadable Software Airplane Part (LSAP), ONS Logs, and Onboard Maintenance Function (OMF) data to an Secure Digital (SD) media card. The SD media card is installed in the SD Card slot located under the front cover of the NFS.

An ONS configured with OS7.1 will perform an automated backup of the NFS to the SD media card whenever the NFS senses that the airplane transitioned from ground to air.

In the event of an NFS LRU failure, the SD media card, containing the backup image from the failed NFS, can be removed from the failed NFS and installed in the replacement NFS. When the replacement NFS, having only an OS7.1 boot OS installed, is powered-up, an automatic restore of the replacement NFS will be performed using the back-up image from the SD media card.

The ONS BARS user interface provides the ability to perform manual backup and restore operations, initializes an SD media card, and view the current status of the SD media card. BARS is accessible from both the MAX Display System (MDS) OMF and also via an approved Portable Maintenance Device (PMD) connected to the RJ45 Ethernet port located on the P61-4 MAINT/BITE panel.

BARS functions require that the NFS is receiving the Airplane ID parameter from the MDS. When the Airplane ID parameter is not available to the NFS, BARS will display a “MISSING AIRPLANE IDENTIFICATION” message window.

NOTE: “MISSING AIRPLANE IDENTIFICATION” message window will appear after NFS power on or reboot until BARS has received the Airplane ID from the MDS. If an SD media card is not installed in the NFS, the “Missing Airplane Identification” will appear after NFS power on or reboot.

BARS functions also require that the Airplane ID of an initialized SD media card match the Airplane ID that the NFS is receiving from the MDS. When the Airplane ID contained on the SD media card does not match the Airplane ID on the NFS is receiving from the MDS, BARS will display an “AIRPLANE IDENTIFICATION MISMATCH” message window.

NOTE: When either the Missing Airplane ID or Airplane ID Mismatch faults are set, the SD Card Fail fault bit will be set

When there is no SD media card installed in an NFS, NFS Card Status will be “Not Installed”.

SD Media Card Initialization

There are two ways that a SD media card is initialized:

- Automatic SD Media Card Initialization - BARS will automatically initialize an SD media card once the NFS is booted-up and the NFS detects a SD media card is present.
- Manual SD Media Card Initialization - SD media card can be manually initialized using either the MDS OMF or the PMD with the ONS Maintenance Browser.

The SD media card in initialization requires the MDS being powered-up for the NFS to receive the Airplane ID parameter.

SD Media Card Status

The SD media card status can be checked using either the MDS or a PMD. Media card details will include:

- Total Storage Space
- Available Active Backup Storage Space
- Available Recoverable Backup Space

BARS Backup Function

There are three ways that the NFS data image are backed-up:

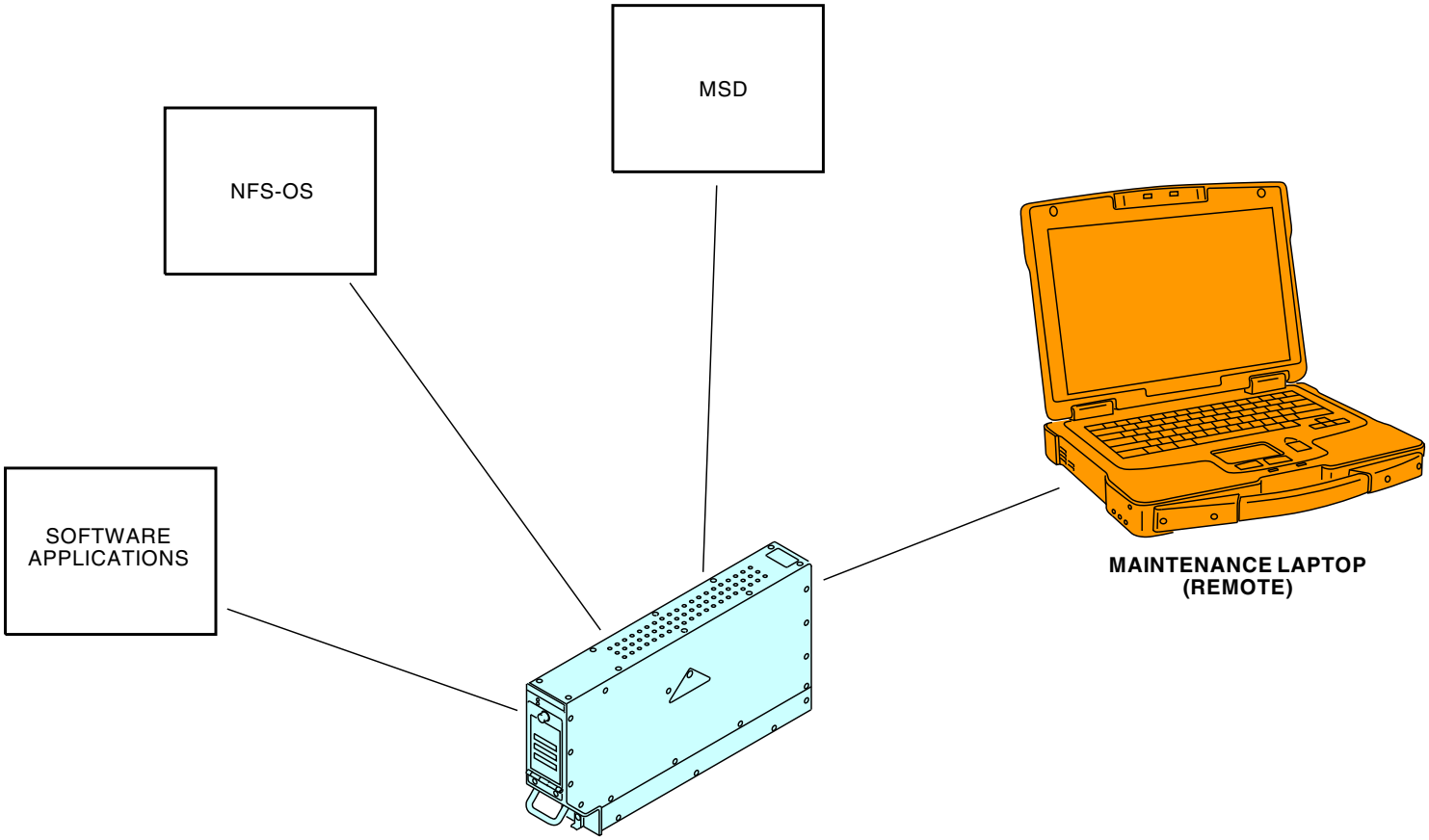
- Encrypted Backup - When an airplane is configured with Wireless WAN Unit (WWU) and /or Crew Wireless LAN Unit (CWLU), the NFS will have 46 NFS OAS AIRLINE CRL UMS and 46 NFS OAS AIRPLANE KEYS UMS software installed. BARS requires that the 46 NFS OAS AIRPLANE KEYS UMS and 46 NFS OAS AIRLINE CRL UMS software are backed-up encrypted. If the ONS is not configured to support encrypted backup, the 46 NFS OAS AIRPLANE KEYS UMS and 46 NFS OAS AIRLINE CRL UMS will not be backed up by BARS.
- Automatic Backup - The ONS is configured to automatically perform a backup of the NFS whenever the airplane transitions from Ground to Air. Once the SD Media card is installed and initialized and if applicable, encrypted backup is enabled, BARS will perform the automated backups to the NFS.
- Manual Backup - Using the MDS OMF or a PMD, manual backup can be initiated and saved to the installed SD media card.

BARS Restore Function

BARS supports performance of both automatic and manual restore of an NFS. NFS restoration is performed in two stages:

- Stage 1 is applicable to all NFS configurations and restores all of the data and the ONS software parts that do not require an encryption pass phrase key to enable restoration. The Stage 1 restoration is automatically initiated once the NFS with an SD media card that has a BARS backup image is powered up.
- Stage 2 is only applicable to NFS configurations that include 46 NFS OAS AIRLINE CRL UMS and 46 NFS OAS AIRPLANE KEYS UMS software parts. These parts require an encryption pass phrase key to enable restoration. Stage 2 can only be accomp0lished using a PMD.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - BACKUP AND RESTORE



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ONBOARD NETWORK SYSTEM BACKUP AND RESTORE

Airplane Data Recording Application (ONS Quick Access Recorder)

The Airplane Data recorder (ADR) application records real-time airplane data. The Airplane Date Recorder (ADR) interfaces with the Digital Flight Data Acquisition Unit (DFDAU) through an Aeronautical Radio Incorporated (ARINC) 717 bus connection to the Network File Server (NFS). The Airplane Date Recorder (ADR) can store one (1) Gigabyte (GB) of airplane parameters from the ARINC 717 data bus per flight leg. The ARINC stores a total of nine (9) flight legs of recorded data before overwriting earlier recorded data. The DFDAU Airplane Condition And Monitoring System (ACMS) can also write its ACMS reports to the ADR-2 in an Onboard Network System (ONS) Quick Access Recorder (QAR) report via its connection with the NFS.

The ONS Maintenance Application allows a line maintenance technician to manually select and download an ONS QAR report to a connected portable maintenance device. The ONS as configured by the Message Exchange Function (MEF) User Modifiable Software (UMS) and Exterior Communications (EXCOMM) User Modifiable Software (UMS) can automatically download ONS QAR reports to an E-Enabling Ground System (E-EGS) Loadable Software Airplane Part (LSAP) Librarian suite.

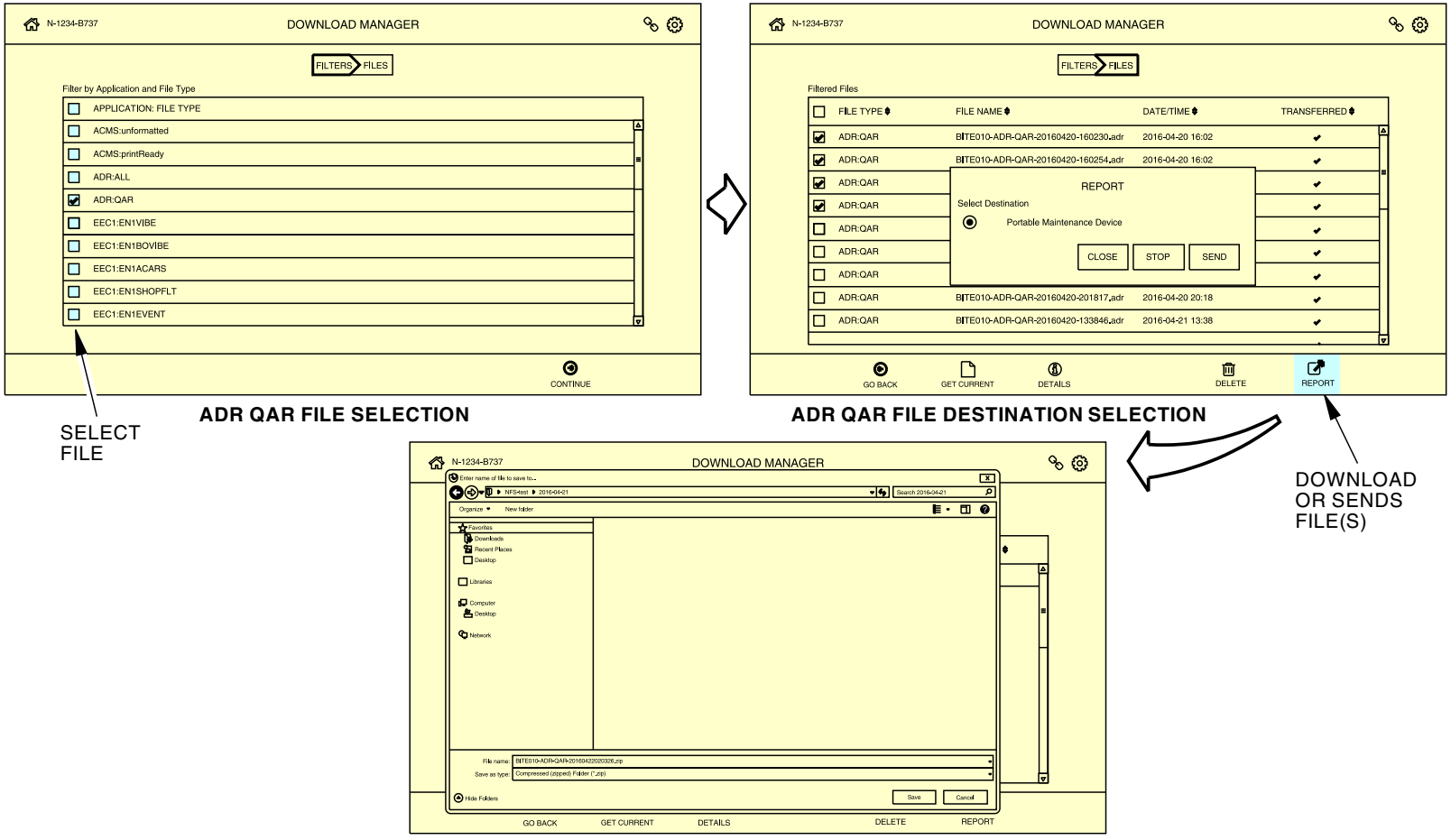
To access the QAR Data Utility: Line Maintenance > Download Manager.

QAR Data Utility

Airlines that choose the Airplane Data Recorder (ADR) application (ONS QAR) option may manually or automatically downlink the QAR files back to the airline office network. The QAR Data Utility is provided only to airline customers who select the ONS QAR option.

The Airplane Data Recorder (ADR) writes ARINC 717 airplane parameter data and ACMS text reports into a file with the extension “.adr”. The Boeing QAR Data Conversion Utility processes QAR.adr file content into two output files. One file with the file extension “.raw” is the ARINC 717 airplane parameter data encoded and recorded in digital data “frames.” An airline must provide additional software to convert the raw data frames content into airplane parameters in engineering data units. The other file with the extension “.acms” contains alphanumeric text reports from the DFDAU ACMS. The QAR Data Utility can copy a QAR.adr to a designated archiving location before it converts the file’s content.

ONBOARD NETWORK SYSTEM - APPLICATION - QAR



NOTE:

DATA SHOWN IS FOR EXAMPLE ONLY.

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LINE MAINTENANCE HOME SCREEN

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS

General

On the Onboard Network System (ONS) main menu bar, the third selection is named Other Functions.

There are applications that are the same for the MAX Display System (MDS), the Portable Maintenance Device (PMD). There are also Line Maintenance selections that are specific to the MDS or the PMD.

These are the Other Function selections that show on the MDS:

- Special Functions
- Engine Trim Balance

These are the Other Function selections that show on the PMD:

- Shop Faults
- Airplane Data Monitoring
- Special Functions
- Engine Trim Balance.
- EEC Data Download

NOTE: These applications are optional, and shown for example only.

Shop Faults

The Shop Faults screens provide a means for maintenance personnel to display and report shop fault data stored in member systems. The shop fault data can be used directly by maintenance personnel or sent upon request to either Boeing or a Line Replaceable Unit (LRU) supplier that is performing troubleshooting.

The shop fault data is a combination of standard LRU maintenance information and failure information detected by a member system Built-In-Test Equipment (BITE). This data is stored in the member system's local Non Volatile Memory (NVM) for use during shop maintenance. This function provides access and outputs to shop fault data when you use the Portable Maintenance Device (PMD).

The Shop Faults screens allow access to shop fault data, including:

- Request and display shop fault data from member systems.
- Download a report of shop fault data to a PMD.

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: OTHER FUNCTIONS > SHOP FAULTS.

Make these selections from the ONS Main Menu on the PMD: OTHER FUNCTIONS > Shop Faults.

Airplane Data Monitor

The Airplane Data Monitoring screens allow the user to view the value of airplane data parameters via the ONS. Each parameter includes the value, validity, units, timestamp, comments, and identifier. The types of data supported are:

- ARINC 717
- ARINC 429
- Analog Discrete
- Analog

The displayed data is also available to be downloaded to the Portable Maintenance Device (PMD).

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: OTHER FUNCTIONS > AIRPLANE DATA MONITOR.

Make these selections from the ONS Main Menu on the PMD: OTHER FUNCTIONS > Airplane Data Monitors.

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS

Engine Health Management

The Engine Health Management page can be used to reconfigure weights, interact with flight history, conduct ground runs, choose data criteria, and balance coefficients.

The default page that shows under Engine Health Management is the ENGINE tab, which displays two selectable options for Engine Position: 1 and Engine Position: 2. After selecting an Engine and then selecting Continue, the ENGINE WEIGHTS tab will show. If the ENGINE WEIGHTS tab is selected, a drop down menu appears that shows:

- ENGINE WEIGHTS
- TRIM BALANCE
- GROUND RUN
- DATA CRITERIA
- BALANCE COEFFICIENTS

To get access to this application, use the MAX Display System (MDS) two forward displays (MFDs) or an approved Portable Maintenance Device (PMD).

Make these selections from the ONS Main Menu on the MDS: OTHER FUNCTIONS > ENGINE HEALTH MANAGEMENT

Make these selections from the ONS Main Menu on the PMD: OTHER FUNCTIONS > Engine Health Management.

Engine Weights

This tab lists all FAN Weight Bolts and LPT Weight Clips that are current installed. Weights can be added, deleted, and edited on this tab. At the top of the page, the Engine Model and Engine Serial Number are listed.

Trim Balance

This tab lists the flight history. The flight history includes ground runs and in-air flights. Specific legs can be selected an interacted with. Some examples of available interactions are:

- SOLUTION
- N1 FRONT
- N1 REAR
- N2
- COEFFICIENTS
- WEIGHTS
- PEAK DATA
- REPORT

At the top of the page, the Engine Model and Engine Serial Number are listed.

Ground Run

A ground run can be conducted using this tab. The RECORD button in the footer of the page begins the ground run recording. As the speed target bins are filled, a box will show around the numbers listed in the “Ground Run Speed Targets” section of the page. Once enough speed target bins are filled, the STOP button in the footer can be used to stop the recording. Selecting SAVE will save the ground run in the fault history under Trim Balance.

At the top of the page, the Engine Model and Engine Serial Number are listed.

Data Criteria

The Data Criteria tab allows for the selection of the Data Stability Recording Criteria. The available options are:

- NONE
- LOW
- MEDIUM
- HIGH

The default Data Criteria is MEDIUM.

At the top of the page, the Engine Model and Engine Serial Number are listed.

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS

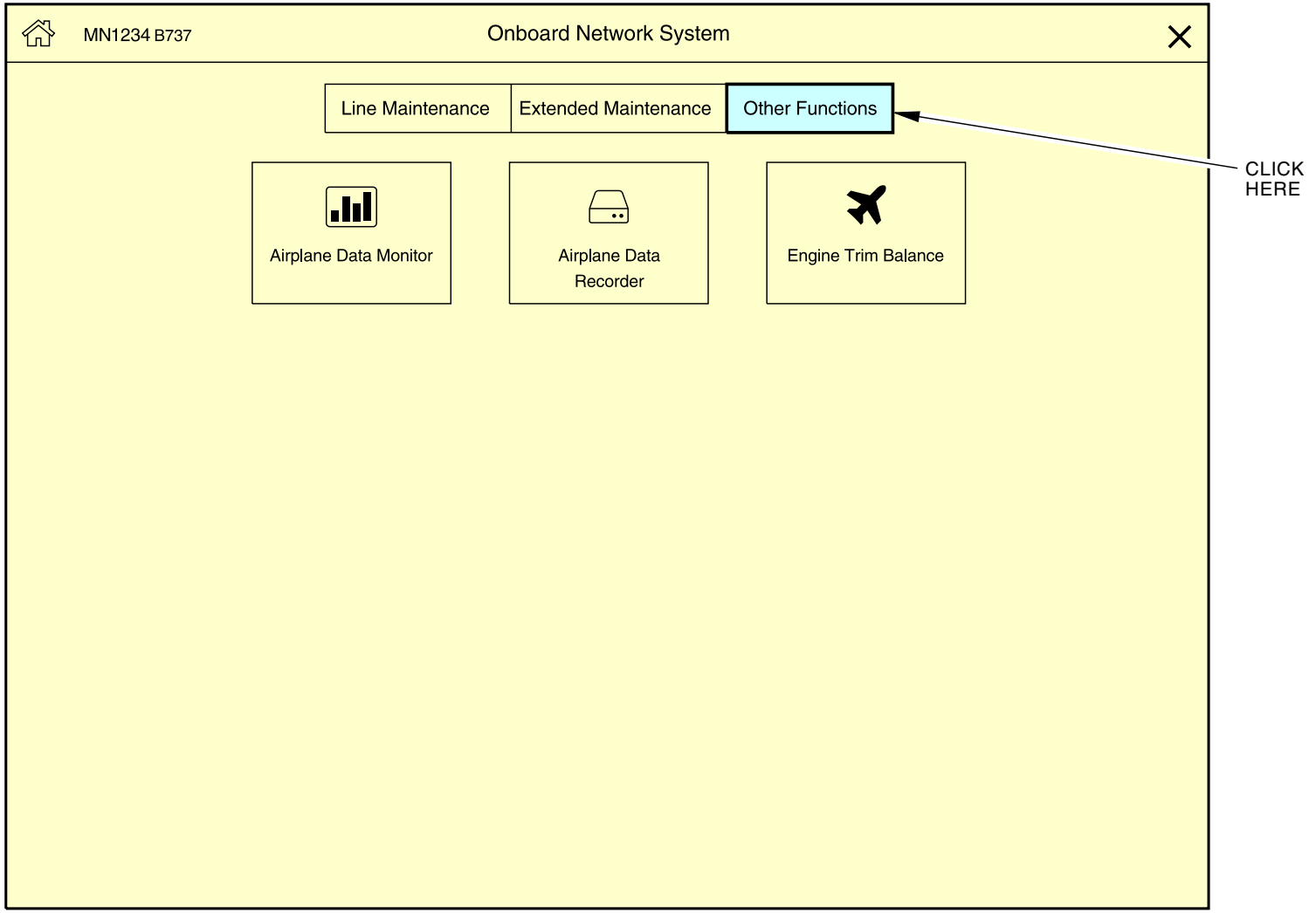
Balance Coefficients

The Balance Coefficients tab allows a user to generate specific coefficients. Once two ground runs or two flight legs are selected, the CALCULATE button in the page footer will enable. This button can be used to generate and accept new specific coefficients. This page allows for two views:

- N1 Vibration Front Sensor Flight History
- N1 Vibration Rear Sensor Flight History

At the top of the page, the Engine Model and Engine Serial Number are listed.

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS



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ONS - OTHER FUNCTIONS MENU

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WIRELESS WAN UNIT - DESCRIPTION

General

The Wireless WAN Unit (WWU) is a low-power data transceiver that connects the Onboard Network System (ONS) to off-airplane wireless ground networks.

The WWU contains two separate cellular radios. The cellular configuration is set by the subscriber identification module, or SIM card.

The aircraft must be on the ground, with the weight-on-wheels discrete grounded to make a network connection.

NOTE: The manufacturer of this LRU can use the nomenclature Aircraft Wireless LAN Unit (AWLU), or formerly, AirLAN®. Typically, the nomenclature WWU, AWLU, and AirLAN® refer to the same unit when the part numbers agree.

The WWU communicates with the Network File Server (NFS) using Ethernet. The WWU sends and recieves Radio Frequency (RF) data from the external wi-fi antenna, and the two connector-mounted cellular antennas.

To perform a condition check, change WWU settings, or install software, you will use the ONS maintenance browser. The ONS maintenance browser is an on-board web site hosted by the NFS.

Physical Description

The WWU has a metal enclosure with the following characteristics:

- Length - 11.45 in. (29.08 cm)
- Width - 6.46 in. (16.41 cm)
- Height - 1.82 in. (4.62 cm)
- Weight - 4 lb (2 kg)

The WWU has five interface connectors.

- J1 (insert A) connects electrical power and discretes.
- J1 (insert B) connects to the ARINC 429 data bus and RS232 maintenance port.
- J2 is the 10/100BASE-T Ethernet interface, and connects to the NFS.
- J3 and J4 are TNC RF coaxial antenna connections for cellular service.
- J5 is a TNCC RF connector for IEEE 802.11 specification wi-fi service and is not used.

The WWU requires 115 V ac (volts alternating current), 400 Hz (Hertz) electrical power.

The WWU uses passive cooling. It does not required forced air cooling.

The case has three radio power indicator LED lamps, one LED for each internal radio card. The LEDs are identified as WF, C1 and C2. The LED shows green in color when the radio card is energized.

Operational Software

The WWU operating system can be installed or replaced using the ONS. Typically, the new software parts are saved to the Mass Storage Device (MSD) for future installation to the WWU.

The software version and it's operating condition can be checked using the ONS maintenance browser.

Operation

The WWU is set to the enabled or disabled condition using the ONS maintenance browser.

NOTE: When the WWU is set to RF disabled, the unit is still energized. To remove electrical power, the correct circuit breaker must be opened.

When the Weight-On-Wheels (WOW) discrete is true (grounded), the NFS automatically sets a second output discrete that enables RF wireless communications.

When in service, the NFS senses possible network signals from the WWU and initializes a handshake sequence to create a network connection. When an authorized connection is serviceable, the transfer of data is automatic.

WIRELESS WAN UNIT - DESCRIPTION

Communication Security

For cellular service, the two cellular radio cards in the WWU require one SIM card each. The SIM card can limit service to a specific service carrier, or specific regions. A serviceable SIM card is necessary to make a cellular network connection.

If the WWU has SIM1 or SIM2 not installed, the SIM cover label with show the words ICCID: NOT INSTALLED. This condition make the specified cellular radio card unserviceable.

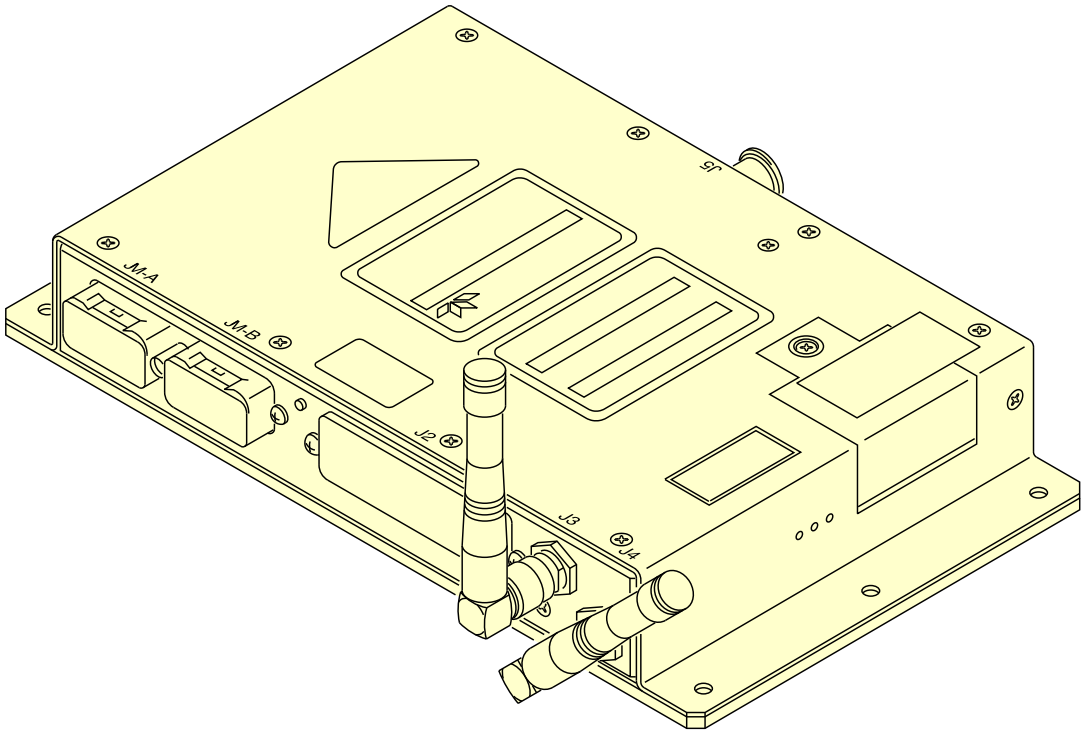
For aircraft-to-ground network security the NFS requires a serviceable, digitally signed, airplane credential. This credential is a software part. The ONS maintenance browser is used to generate a key. The key is then signed by the network administrator and returned. The serviceable part is then installed.

NOTE: To make WWU communications serviceable, you must do a check of, or generate new airplane credentials.

A serviceable airplane credential (.AMI file) is necessary only for the conditions that follow:

- To let the OBEDS function of the NFS communicate automatically with the BEDS ground support tools.
- To let the WWU communicate using wi-fi with the ground access point.
- To let a maintenance laptop connect to the NFS through specific data ports, where port-based security is specified.

WIRELESS WAN UNIT - DESCRIPTION



WIRELESS WAN UNIT (WWU)

2548061 S0000606111_V1

WIRELESS WAN UNIT - DESCRIPTION

CREW WIRELESS LAN UNIT - DESCRIPTION

SIA 001-005

General

The Crew Wireless LAN Unit (CWLU) is a low powered receiver transmitter for use as a Local Area Network (LAN). The CWLU gives a safe wireless connection in the airplane between the Onboard Network System (ONS) and the flight crew, cabin crew or maintenance personnel.

The CWLU operates at 115V AC, 400Hz, and contains two wireless LAN channels. Only one channel can operate at any given time. The LAN channels operate in the 2.4 GHz or 5.6 GHz band.

Connectivity

The CWLU gives safe wireless connectivity in these areas:

- Cabin
- Flight deck
- Cargo area
- Area directly outside of the airplane

Physical Description

These are the physical properties of the CWLU:

- Width - 6.97 in. (17.7 cm)
- Height - 2.4 in. (6.1 cm)
- Length - 11.5 in. (29.2 cm)
- Weight - 3.5 lb (1.6 kg) maximum

Antenna Assembly

The CWLU has four RF antennas that are compatible with IEEE 802.11a/b/g/n. The antennas connect to the CWLU with Threaded Neill-Concelman (TNC) connectors. The TNC connectors' input impedance is 50 ohms each.

SIA 006-999

General

The CWLU is a low powered receiver transmitter for use as a LAN. The CWLU gives a safe wireless connection in the airplane between the ONS and the flight crew, cabin crew or maintenance personnel.

The CWLU operates at 115 AC, 400Hz, and contains two wireless LAN channels. The two channels can be operated at the same time. The LAN channels operate in the 2.4 GHz or 5 GHz band.

Connectivity

The CWLU gives safe wireless connectivity in these areas:

- Cabin
- Flight deck
- Cargo area
- Area near the outside the airplane

Physical Description

These are the physical properties of the CWLU:

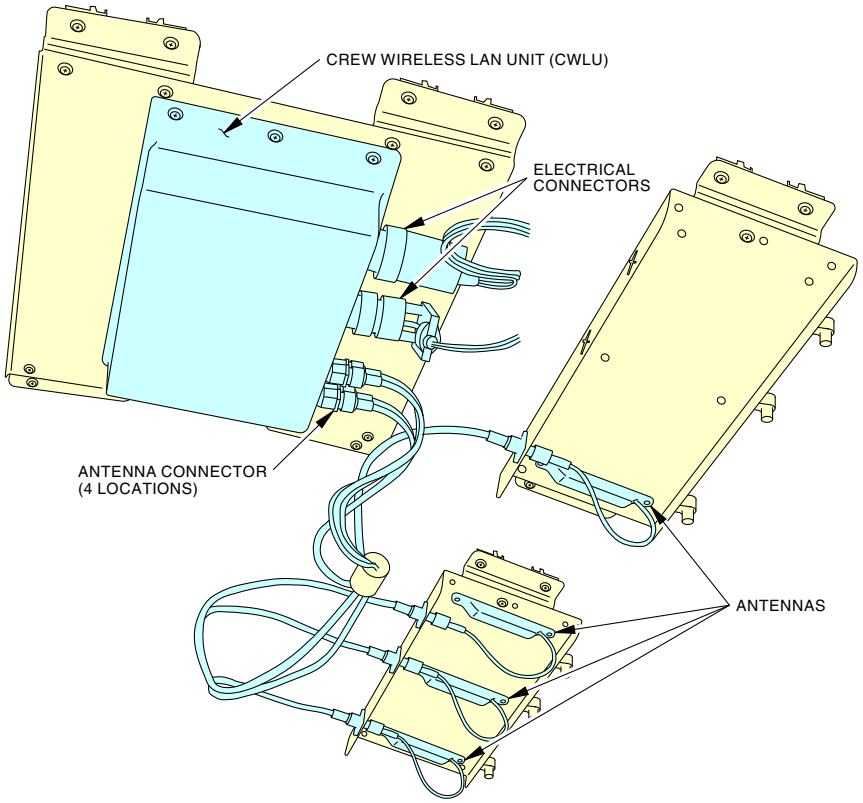
- Width - 7.35 in. (18.7 cm)
- Height - 2.89 in. (7.3 cm)
- Length - 11.5 in. (29.2 cm)
- Weight - 4.4 lb (2.0 kg) maximum

Antenna Assembly

The second generation CWLU has an antenna array assembly attached on top of the CWLU that is compatible with IEEE 802.11a/b/g/n/ac.

SIA ALL

CREW WIRELESS LAN UNIT - DESCRIPTION

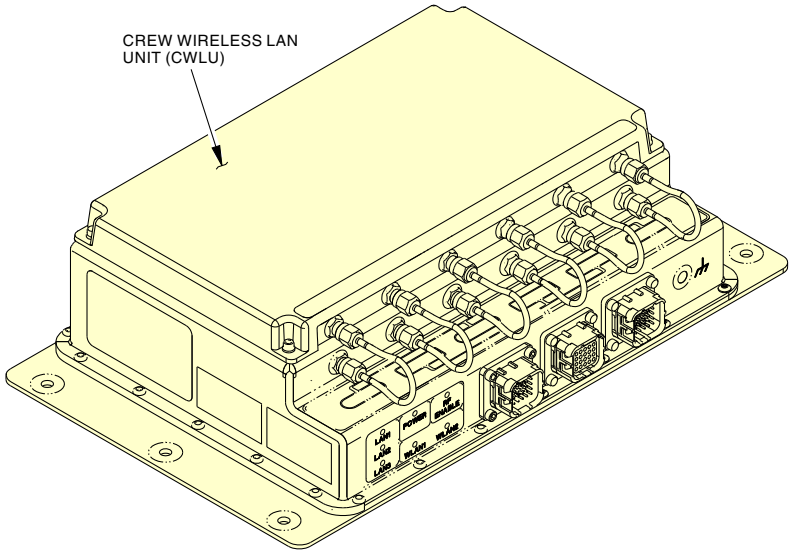


CREW WIRELESS LAN UNIT (CWLU) (EXAMPLE)

2814482 S0000648771_V1

CREW WIRELESS LAN UNIT - DESCRIPTION

CREW WIRELESS LAN UNIT - DESCRIPTION



**CREW WIRELESS LAN UNIT (CWLU)
(EXAMPLE)**

2814329 S0000648773_V1

CREW WIRELESS LAN UNIT - DESCRIPTION

AIRCRAFT INTERFACE DEVICE - DESCRIPTION

General

The Aircraft Interface Device (AID) is a multi-functional data transceiver that connects the Onboard Network System (ONS) to off-airplane wireless ground networks. The AID operates as an ARINC 822 Terminal Wireless LAN Unit (TWLU) and also provides cellular (LTE) connection.

The aircraft must be on the ground, with the Weight-On-Wheels (WOW) discrete grounded to make a network connection.

When the AID operates in IEEE 802.11n/ac modes, the typical supported range from the ground access point is up to 512 ft (156 m). Using the cellular network connection, the useful distance is much greater.

The AID communicates with the Network File Server (NFS) using Ethernet. The AID sends and receives Radio Frequency (RF) data from the external Multi-Input Multi-Output (MIMO) antenna for both Wireless and Cellular connections.

To do a condition check, change AID settings, or install software, you will use the ONS maintenance browser. The ONS maintenance browser is an onboard web site hosted by the NFS.

Physical Description

The AID unit has a metal enclosure with the following characteristics:

- Length - 11.45 in. (29.08 cm)
- Width - 7.98 in. (20.27 cm)
- Height - 3.75 in. (9.53 cm)
- Weight - 9 lb (4 kg).

The AID unit has twelve interface connectors:

- J1 (insert A) connects to electrical power and discretes.
- J1 (insert B) connects to the ARINC 429 data bus and RS232 maintenance port.
- J2 contains four Gigabit Ethernet interfaces and four 10/100 BASE-T Ethernet interfaces to connect to the NFS and other network equipment.
- J3 and J4 are TNC RF coaxial antenna connections for cellular service.
- J5 and J6 are TNC RF connectors for off-board Wi-Fi service and connect to the external antennas of the aircraft.
- J7 and J8 are TNC RF connectors for on-board crew Wi-Fi service and connect to the internal antennas located in the crown of the aircraft.
- J9 and J10 are two mini SIM card slots.
- J12 is an RJ-45 connector that supports Gigabit Ethernet interface for maintenance and alternate means to dataload.

The AID requires 115 Alternating Current Volts (VAC) and 400Hz (Hertz) electrical power.

The AID uses passive cooling. It does not require forced air cooling.

The AID front panel contains two LED indicators. One for POWER and one for STATUS.

The indicators of the POWER LED are as follows:

- Off = No Power.
- Solid Green = Operational (power applied and fully booted).
- Solid Red = Data loading or booting.
- Off = No Power.

The indicators of the STATUS LED is as follows:

- Solid Green = No fault (default).
- Blinking Red = Soft fault (AID monitor detected a fault that may be caused by incorrect, invalid or missing loadable software part. Expected maintenance action is to dataload and confirm correct SW configuration).
- Solid Red = Hard fault (AID monitor detected a fault that indicates a failure in a required internal component. Expected maintenance action is to remove/replace the AID LRU).

AIRCRAFT INTERFACE DEVICE - DESCRIPTION

Operational Software

The AID operating system can be installed or replaced by using the ONS. Typically, the new software parts are saved to the Mass Storage Device (MSD) for future installation into the AID.

Operation

The AID is set to the enabled or disabled condition using the ONS maintenance browser.

NOTE: When the AID is set to RF disabled, the unit remains energized. To remove electrical power, you must open the correct circuit breaker.

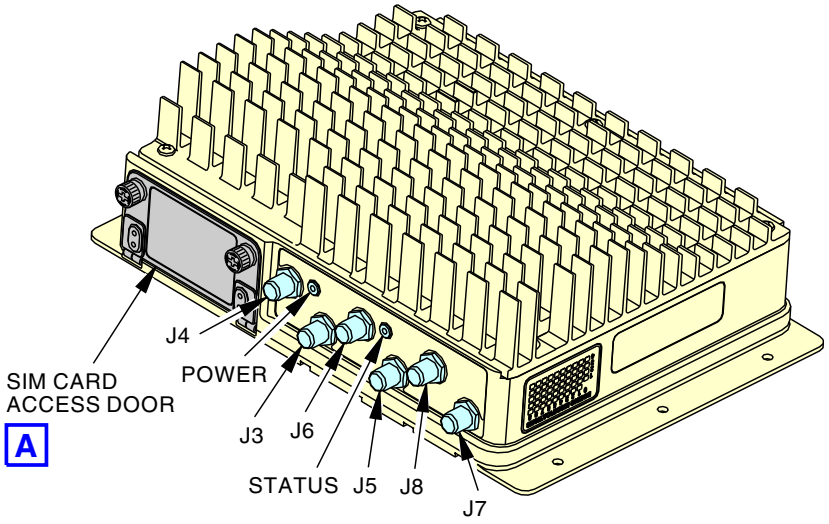
When the WOW discrete is true (grounded), the AID enables the off-board RF communications (cellular or off-board Wi-Fi).

Upon being enabled, the AID searches for possible network signals, and initializes a handshake sequence to create a network connection. When an authorized connection is serviceable, the transfer of data is automatic.

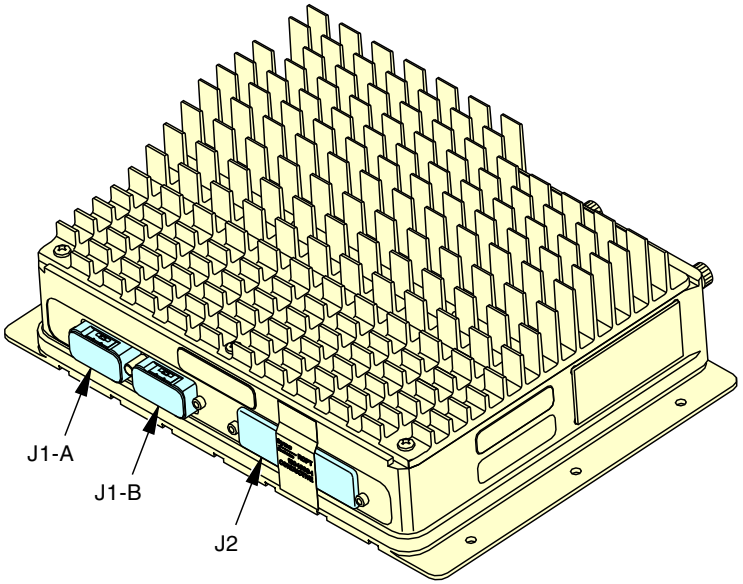
Communication Security

For cellular service, the AID contains slots for up to two SIM cards. While a cellular scan can be performed without a SIM card, a serviceable SIM card is necessary to make a cellular network connection. The dual SIM card feature allows the AID to support up to two separate cellular service providers (for example one at departure and one at destination). The SIM cards can limit service to a specific service carrier, or specific regions. A serviceable SIM card is necessary to make a cellular network connection.

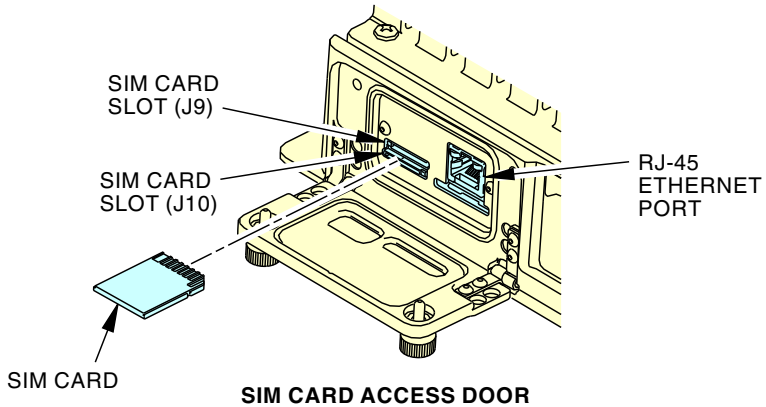
AIRCRAFT INTERFACE DEVICE - DESCRIPTION



AIRCRAFT INTERFACE DEVICE (AID) SIDE VIEW



AIRCRAFT INTERFACE DEVICE (AID) SIDE VIEW

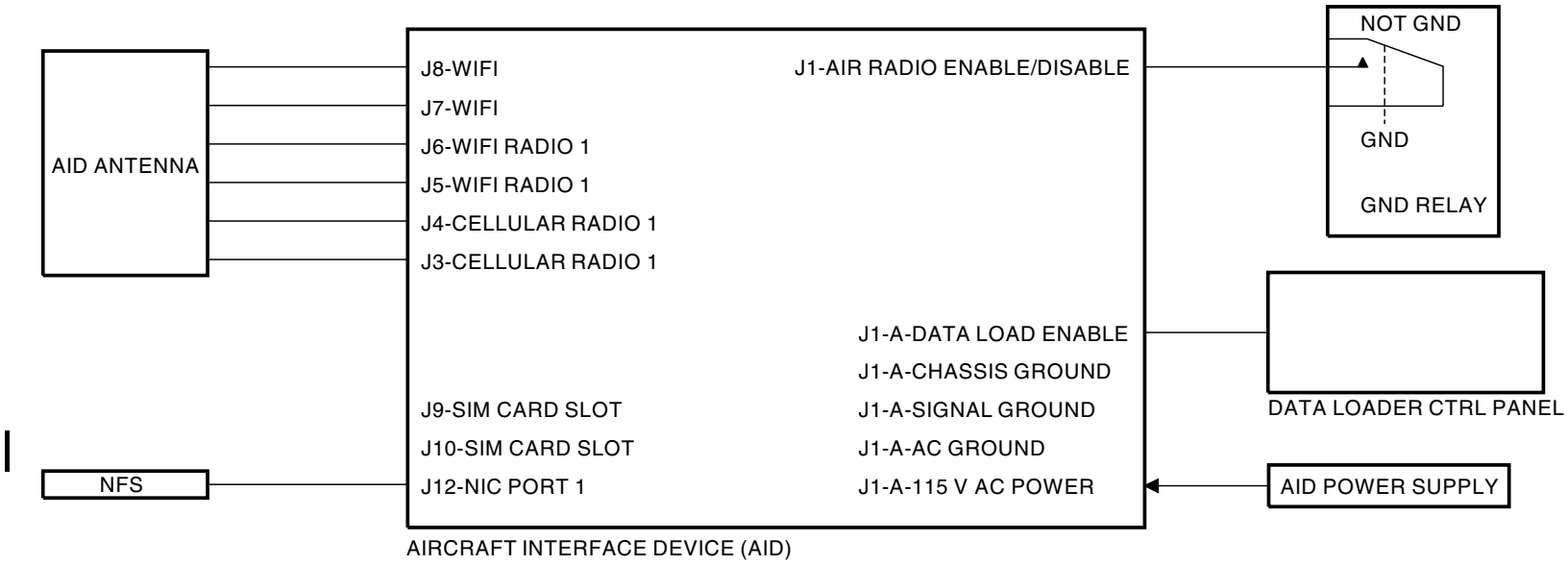


SIM CARD ACCESS DOOR

2935088 S0000711094_V2

AIRCRAFT INTERFACE DEVICE - DESCRIPTION

AIRCRAFT INTERFACE DEVICE - DESCRIPTION



2936453 S0000712025_V2

AIRCRAFT INTERFACE DEVICE - DESCRIPTION

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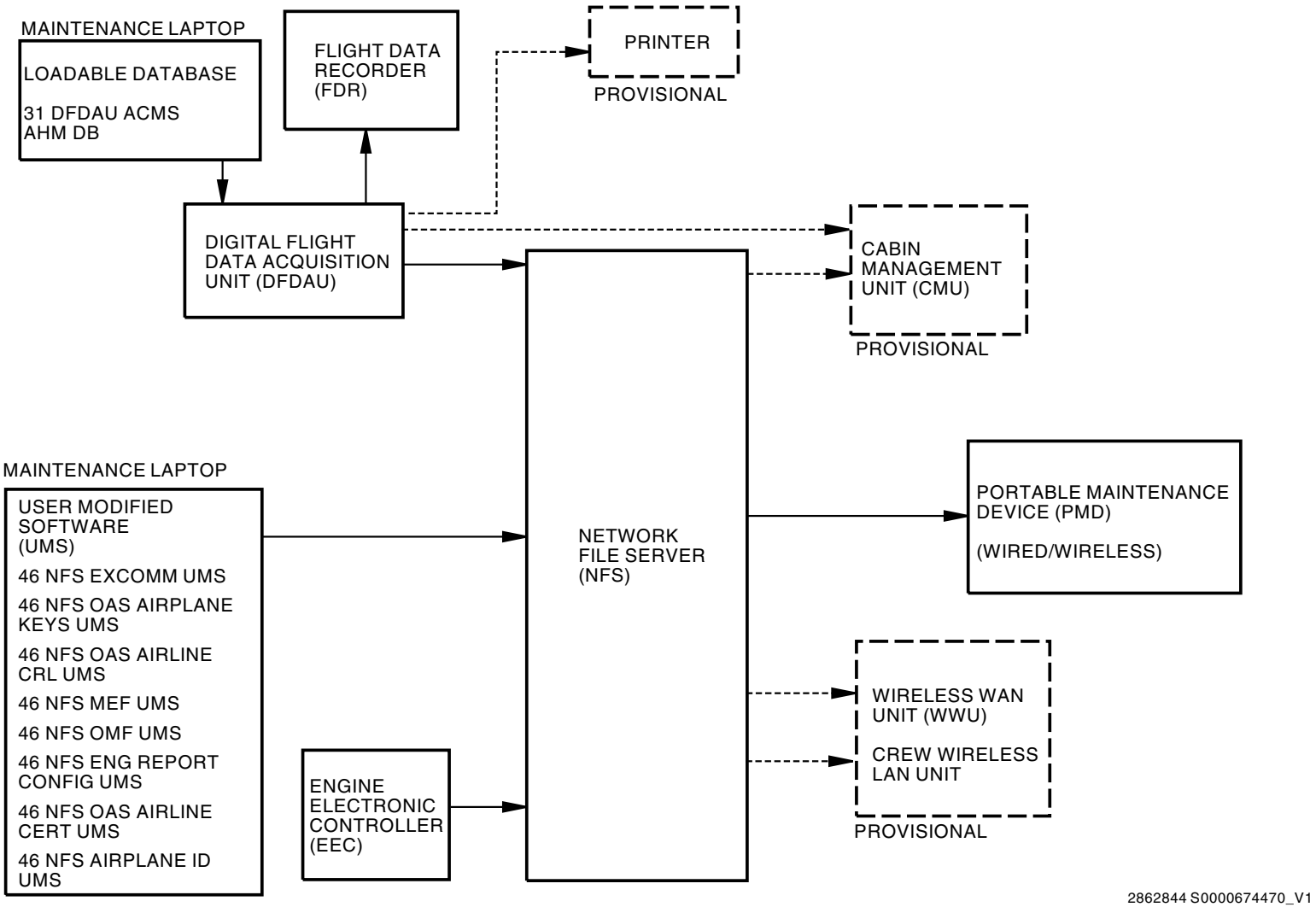
ONBOARD NETWORK SYSTEM - DATA CONNECTIVITY

General

This page is for reference purposes.

ONBOARD NETWORK SYSTEM - DATA CONNECTIVITY



2862844 S0000674470_V1

ONBOARD NETWORK SYSTEM - DATA CONNECTIVITY