CHAPTER

46

Crew Information System

CHAPTER 46
CREW INFORMATION SYSTEM

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

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46-EFFECTIVE PAGES

CHAPTER 46
CREW INFORMATION SYSTEM

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CHAPTER 46
CREW INFORMATION SYSTEM

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CHAPTER 46
CREW 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, 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) gives access to the ONS user interface. The tool is connected to a network data port through an Ethernet cable. The NFS operates as a web server, and hosts the ONS maintenance browser interface.

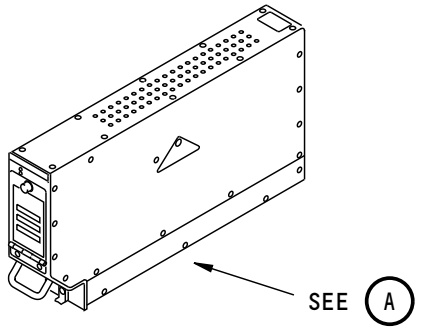
Acronyms and Abbreviations

- ACARS - Aircraft Communications and Reporting System
- ADIRU - Air Data Inertial Reference Unit
- 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
- CPU - Central Processing Unit
- CSR - Certificate Signing Request
- DEU - Display Electronic Unit
- DFDAU - Digital Flight Data Acquisition Unit
- DHCP - Dynamic Host Configuration Protocol
- DNS - Domain Name Server
- 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
- ML - Maintenance Laptop
- MMR - Multiple Mode Receiver
- MSD - Mass Storage Device
- NED - Network Extension Device
- NFS - Network File Server
- NTP - Network Time Protocol
- OAS - Operationally Approved Software
- OAS - Oracle™ Application Server
- OBEDS - Onboard Boeing Electronic Distribution (of) Software
- ODLF - Onboard Data Load Function
- ONS - Onboard Network System
- OPC - Operation Program Code
- OS - Operating System
- ROM - Read-Only Memory
- SAPS - Standard Airline Parameter Service

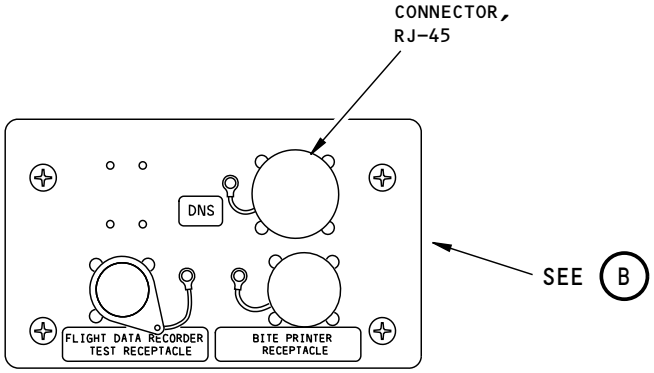
ONBOARD NETWORK SYSTEM INTRODUCTION

- 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
- WoW - Weight on Wheels

ONBOARD NETWORK SYSTEM INTRODUCTION



NETWORK FILE SERVER
(NFS)



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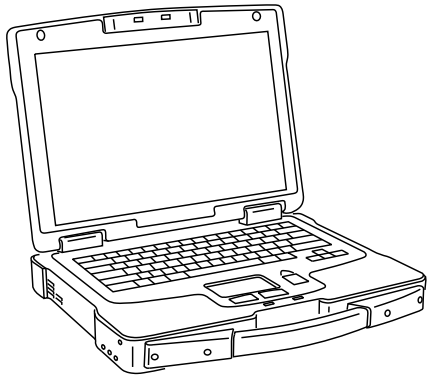

MAINTENANCE LAPTOP
(REMOTE)
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ONBOARD NETWORK SYSTEM INTRODUCTION

ONBOARD NETWORK SYSTEM DESCRIPTION

General

The Onboard Network System (ONS) is the central component of the Airplane Information System (AIS) domain on ONS-equipped aircraft. The system gives connectivity with onboard systems.

Network File Server

The primary Line Replaceable Unit (LRU) is theNetwork File Server (NFS). The NFS is installed on shelf E5-2 in the electrical bay.

During usual service, NFS operation is fully automatic. The user interface for NFS is through a:

- Portable Laptop Computer

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

Discrete

The NFS uses a discrete signal for awareness and control.

- Weight-On-Wheels (WOW).

Mass Storage Device

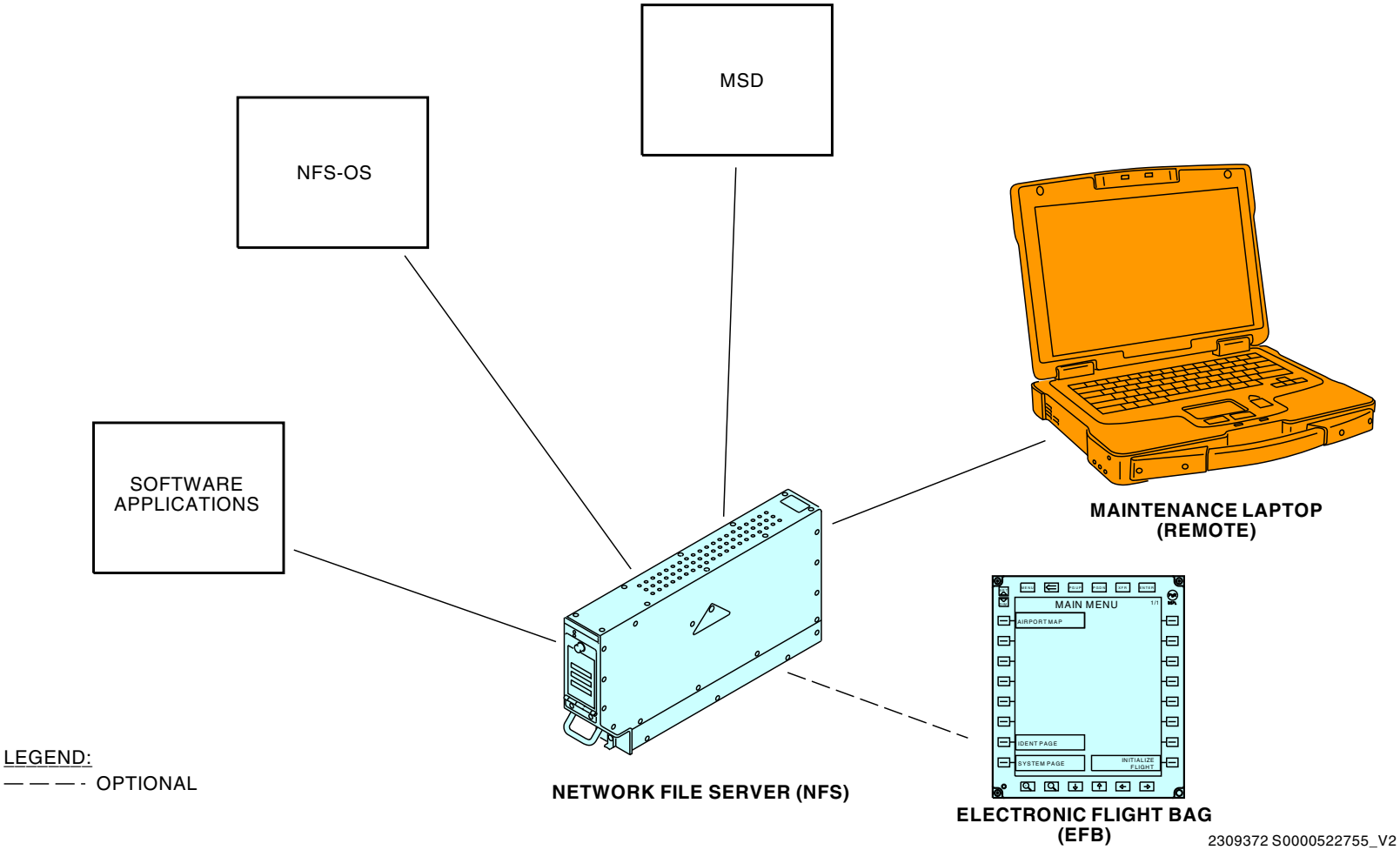
The Mass Storage Device (MSD) is a partition on the server available for file and data storage. For example, Loadable Software Airplane Part (LSAP) are saved (or, staged) to the MSD for future installation into the NFS, or other systems on the network.

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 Operational Approved Software (OAS) that supports the cabin crew, the maintenance crew, or other airline interests.

ONBOARD NETWORK SYSTEM DESCRIPTION



ONBOARD NETWORK SYSTEM DESCRIPTION

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ONBOARD NETWORK SYSTEM - NETWORK FILE SERVER

General

The primary hardware unit of theOnboard Network System (ONS) is the Network File Server (NFS). The NFS contains two isolated computer systems. They are as follows:

- Network File Server (NFS, single board computer)
- Network Extension Device (NED, single board computer).

There is one internal power supply that energizes the two computers.

NFS Server

The NFS server has an Intel™ processor with two isolated drives. The boot-drive is a 256MB (megabyte) flash memory drive. The operational drive is a 64GB (gigabyte) solid state drive (SSD).

NFS Server

The NFS has the following hardware:

- A Dual Intel™ Core i7 Processor
- 8GB RAM
- 500 MB primary boot-drive
- 2 x 256GB Solid State Drive (SSD).

Physical Description

These are the dimensions and weight of the NFS:

- Height 7.62 in. (19.35 cm)
- Width 2.27 in. (5.77 cm)
- Depth15.12 in. (38.40 cm)
- Weight 6.75 lb (3.06 kg) maximum.

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
- Discrete
- Ethernet.

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.

Single Board Computer Assembly

The 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 SDRAM supports a 133 MHz (Megahertz) bus cycle and Column Address Strobe (CAS) latency of 3 cycles.

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 eight discrete inputs and three program pin inputs, and has eight 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:

- Twelve 10BASE-T/100BASE-TX downlink channels
- Two gigabit Ethernet 1000BASE-SX fiber optic channels.

Mass Storage Device

The Mass Storage Device (MSD) is a software function of the ONS. The storage is on the 64 Gigabyte (GB) Solid State Drive (SSD). The MSD is 5 GB of that space.

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:

- Data storage unit
- Ethernet router between connected devices.

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 these procedures:

- On the ground - with a maintenance laptop.

The primary user interface is through a maintenance laptop. Use the maintenance laptop to do these operations:

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

Front Panel

These are the front panel indications on the NFS:

- Power - green Light Emitting Diode (LED)
- Fault - amber LED
- Disk - green LED
- NED - 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 NED indicator is on when the NED 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 NED Operational Program Software (OPS)

- While the NFS is dataloading, the 46 NED Operation Program Code (OPC).

The frequency the indicator goes on and off will go down to approximately one time during each second if the NED 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 NED has a fault.

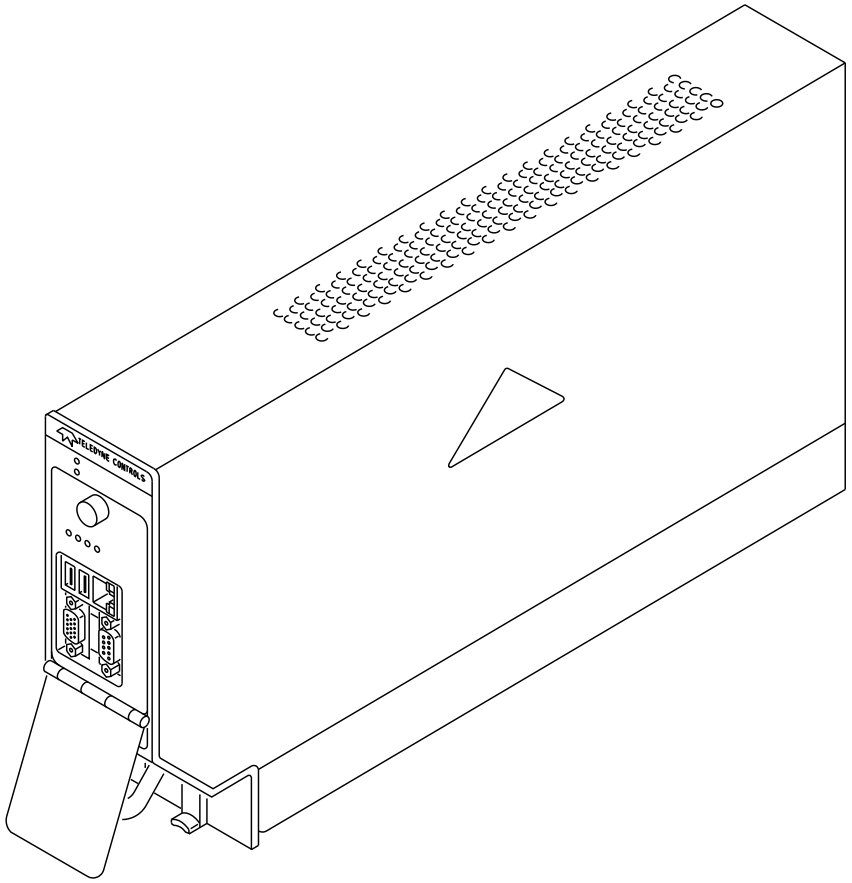
The LINK indicator is on when the Ethernet for the NFS subsystem is connected to the NED subsystem. It is typical for this to be solid green during normal operation. It is typical for this light to be off when the unit is running in the Boot OS, because the interface to the NED subsystem does not operate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

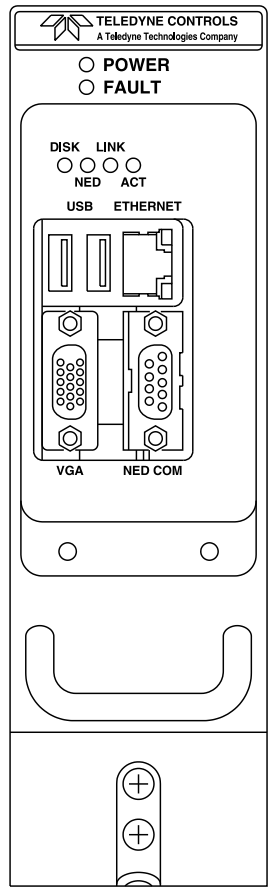
The ACT indicator is on when Ethernet data moves between the internal NED subsystem and the server subsystem. It is typical for this indicator to go on and off during normal operation. It is typical for this light to be off when the unit is running in the Boot OS, because the interface to the NED subsystem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

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.





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ONS - NETWORK FILE SERVER

ONBOARD NETWORK SYSTEM INTERFACES

General

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

- Aeronautical Radio Incorporated (ARINC) 429
- ARINC 717
- Analog discrete
- Ethernet 10/100 BASE-T.

Each type of connection can do one or more functions:

- Data acquisition
- 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 Line Replaceable Unit (LRU) communicate with the NFS using ARINC 429:

- ADIRU-L (Air Data Inertial Reference Unit)
- ATC-1 (Air Traffic Control Transponder)
- AVM (Airborne Vibration Monitor)
- Data Loader Control Panel
- DEU-1 (Display Electronic Unit)
- DEU-2
- FMC-1 (Flight Management Computer)
- FMC-2
- MMR-1 (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).

10/100 BASE-T Ethernet Connections

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

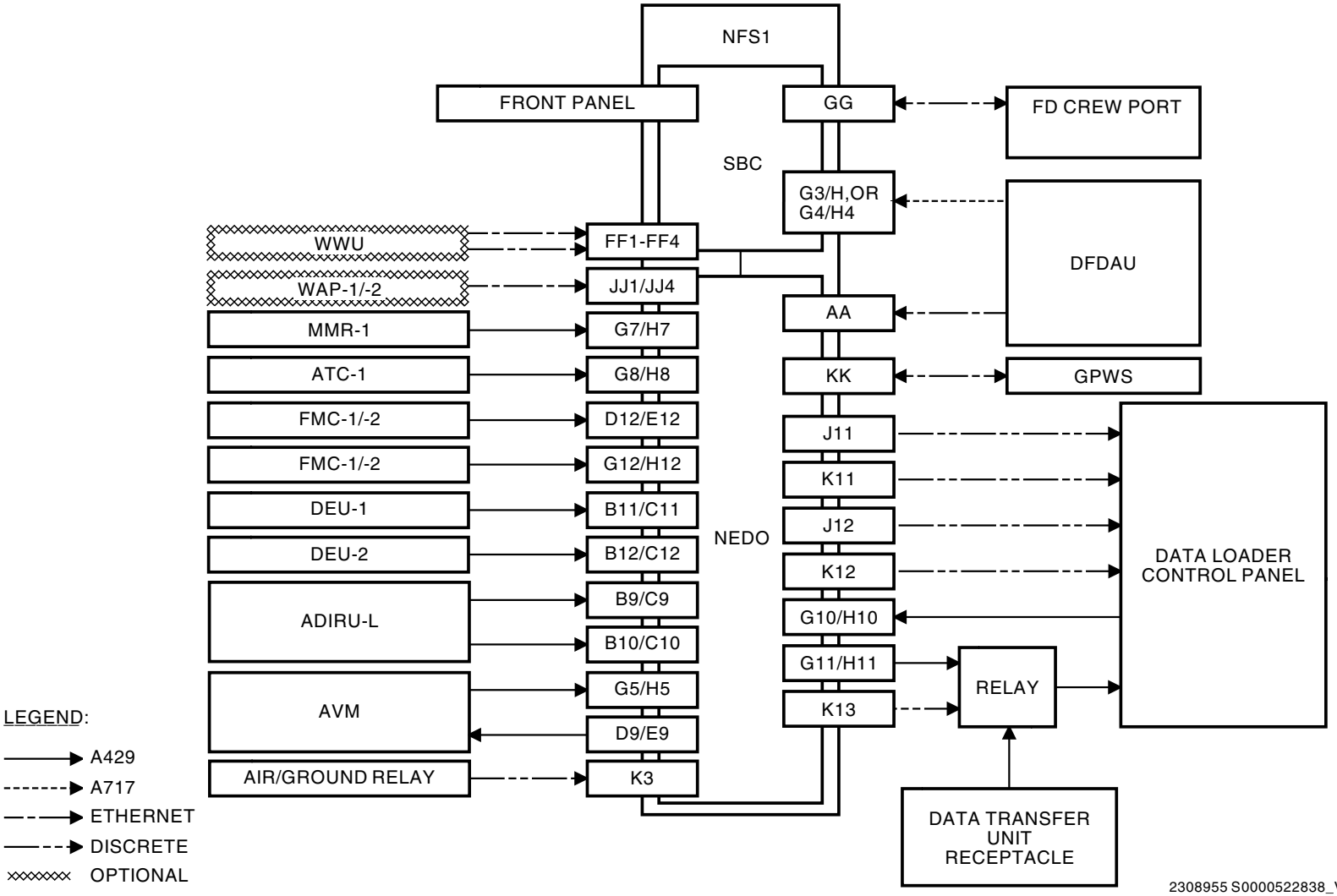
- DFDAU (digital flight data acquisition unit)
- GPWS (ground proximity warning system).
- Maintenance laptop, through the flight deck port.

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
- Data Loader Control Panel.

ONBOARD NETWORK SYSTEM INTERFACES



ONBOARD NETWORK SYSTEM INTERFACES

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, and a Network Extension Device (NED). When the system is serviceable, more applications and software parts can be installed.

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

The airline or operator can also specify software parts for installation. For more 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 LSAP(s). Four parts operate the server, and two parts operate the internal Network Extension Device (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 OPC	Server	Operational drive
46 NED OPS	Router	NED flash memory
46 NED OPC	Router	NED flash memory

Boot Software

The LSAP identified as NFS Boot Operating Software (OS) contains the basic boot-up instructions. During normal boot sequence, the NFS Boot OS is activated, and launches the Operational Operating System (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 started but does not hand-off to the Operational OS. The flash memory stays the primary drive.

For each of the two conditions, the user-interface can be access by these:

- Maintenance laptop.

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

NED Software

The NED Boot software is sufficient to boot-up the NED computer. The parts are recorded in internal memory on the NED card. These parts can not be erased, but they can be installed again, or replaced with new LSAP(s).

The NED Operational Program Software (OPS) runs the NED during normal operation. The OPS provides interconnection of the onboard Ethernet devices to the central network server as well as performs network filtering and classification.

Operational OS Software

During normal service, the NFS is controlled by a group of parts referred to as the Operational OS. 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 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.

SOFTWARE TYPE	LSAP NOMENCLATURE	COMPUTER	INSTALLED LOCATION
USER MODIFIABLE SOFTWARE	46 NFS (PART NAME-EXAMPLE) UMS	SERVER (FUTURE)	OPERATIONAL DRIVE
NED SOFTWARE	46 NED OPC	ROUTER	NED FLASH MEMORY
NED SOFTWARE	46 NED OPS	ROUTER	NED FLASH MEMORY
NFS 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)

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ONBOARD NETWORK SYSTEM USER INTERFACE

General

The Network File Server (NFS) is host to a web site called Onboard Network System (ONS). Access to the web site is by:

- A Maintenance Laptop computer and web browser application through a serviceable Ethernet connection to the ONS.

The browser application shows the ONS menu bar, with these three selections:

- Line Maintenance
- Extended Maintenance
- Other Functions.

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

Access - Data Ports

On the aircraft, connect the maintenance laptop to the ONS through an Ethernet cable in the RJ-45 data port.

The two ports give network access to NFS:

- In the airplane's electrical compartment, the NFS has one data port directly on the face of the Line Replaceable Unit (LRU).
- In the flight compartment, the data access port is installed in the flight compartment closet lining, aft of the captain's seat.

Maintenance Laptop

Access to the ONS website is through a specified laptop computer with a web browser application installed. Your airline or operator can specify more requirements.

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

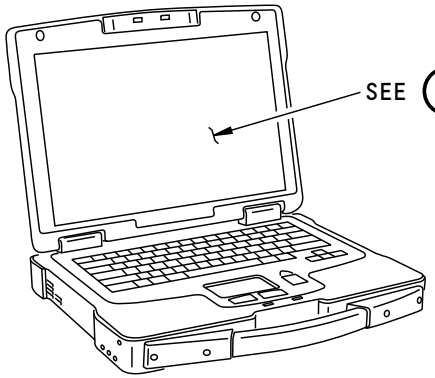
Maintenance Browser

Usually, 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 Mechanic ONS access is: http://ms.ons.pnet.

Exit the ONS web site and return to the PC desktop, click on the “X” in the top right corner.

ONBOARD NETWORK SYSTEM USER INTERFACE



MAINTENANCE LAPTOP

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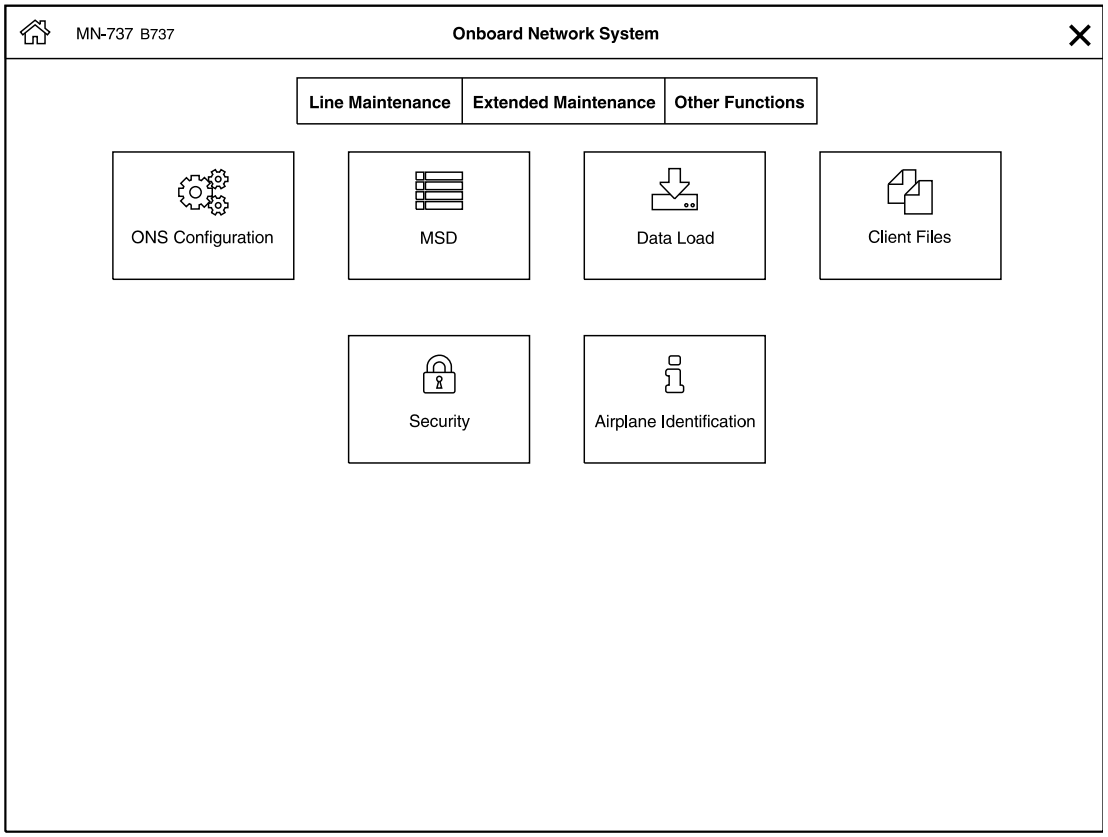

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ONS USER INTERFACE

General

The default home page for the Onboard Network System (ONS) maintenance browser is the Line Maintenance page. This is a web page you access using a standard web browser.

Navigation Bar

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

- Extended Maintenance
- Line Maintenance
- Other Functions.

All ONS functions are organized into one of these groups.

NOTE: The system description pages that follow are organized by the navigation bar and icon name. The > symbol refers to the path that shows a specific screen. For example, Extended Maintenance > Client Files shows the necessary selections to show the Client Files page.

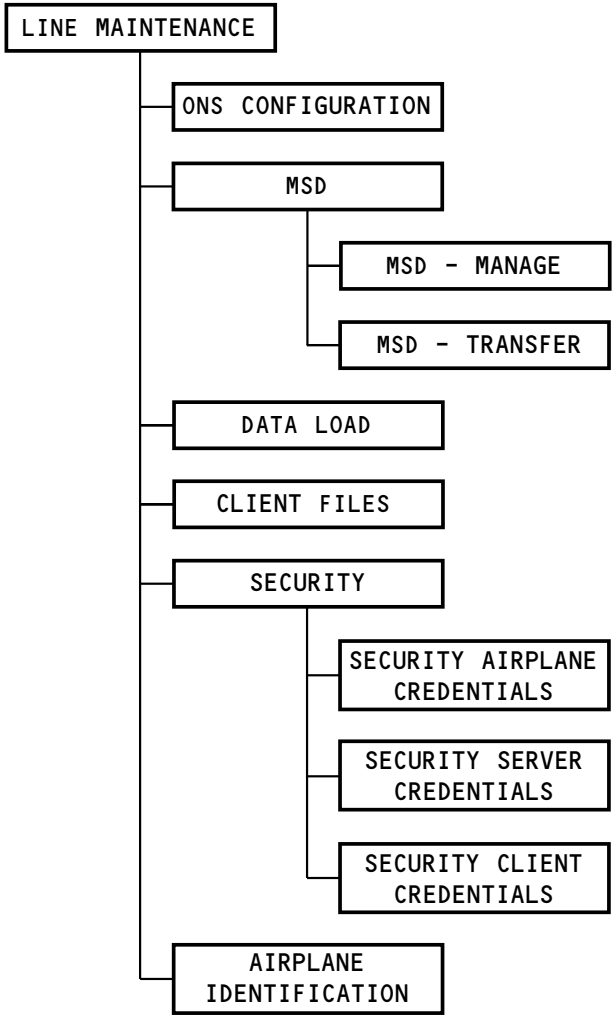
Line Maintenance Selections

The Line Maintenance selection shows these icons:

- Airplane Identification
- Client Files
- Data Load
- MSD (Mass Storage Device)
- ONS Configuration
- Security.

To return to the Line Maintenance page from other pages in the system, use the Line Maintenance function in the navigation bar.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE



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ONBOARD NETWORK SYSTEM - LINE MAINTENANCE PAGE

General

The ONS CONFIGURATION page gives a record of connected Line Replaceable Unit (LRU)(s), and the software parts installed in network file server that support the specified LRU. There are functions to print or download a record of the installed parts, and a function that removes these parts from the Network File Server (NFS).

Using the Onboard Network System (ONS) maintenance browser, access to the page is by the selection: LINE MAINTENANCE > ONS CONFIGURATION.

The page shows a table of LRU(s). Each LRU shown represents a folder, or container of software parts. These are the data columns:

- LRU NAME
- SOFTWARE PART NUMBER
- NOMENCLATURE.

The ONS configuration page gives access to these functions:

- UNINSTALL NFS PARTS
- PRINT REPORT
- DOWNLOAD REPORT.

To exit ONS CONFIGURATION, and return to the main menu, click once on the Home icon, at the upper left corner of the page.

Details of Selected Hardware

ONS CONFIGURATION shows a data box below the words: Details of Selected Hardware. When a single LRU is highlighted, the data box shows the hardware part number, and hardware serial number.

UNINSTALL NFS PARTS

To remove or erase an Loadable Software Airplane Part (LSAP) from the NFS, use the UNINSTALL NFS PARTS function.

This process requires that you first select the target LRU container, and then make the selection UNINSTALL NFS PARTS. The result then shows the parts within the container that can be removed.

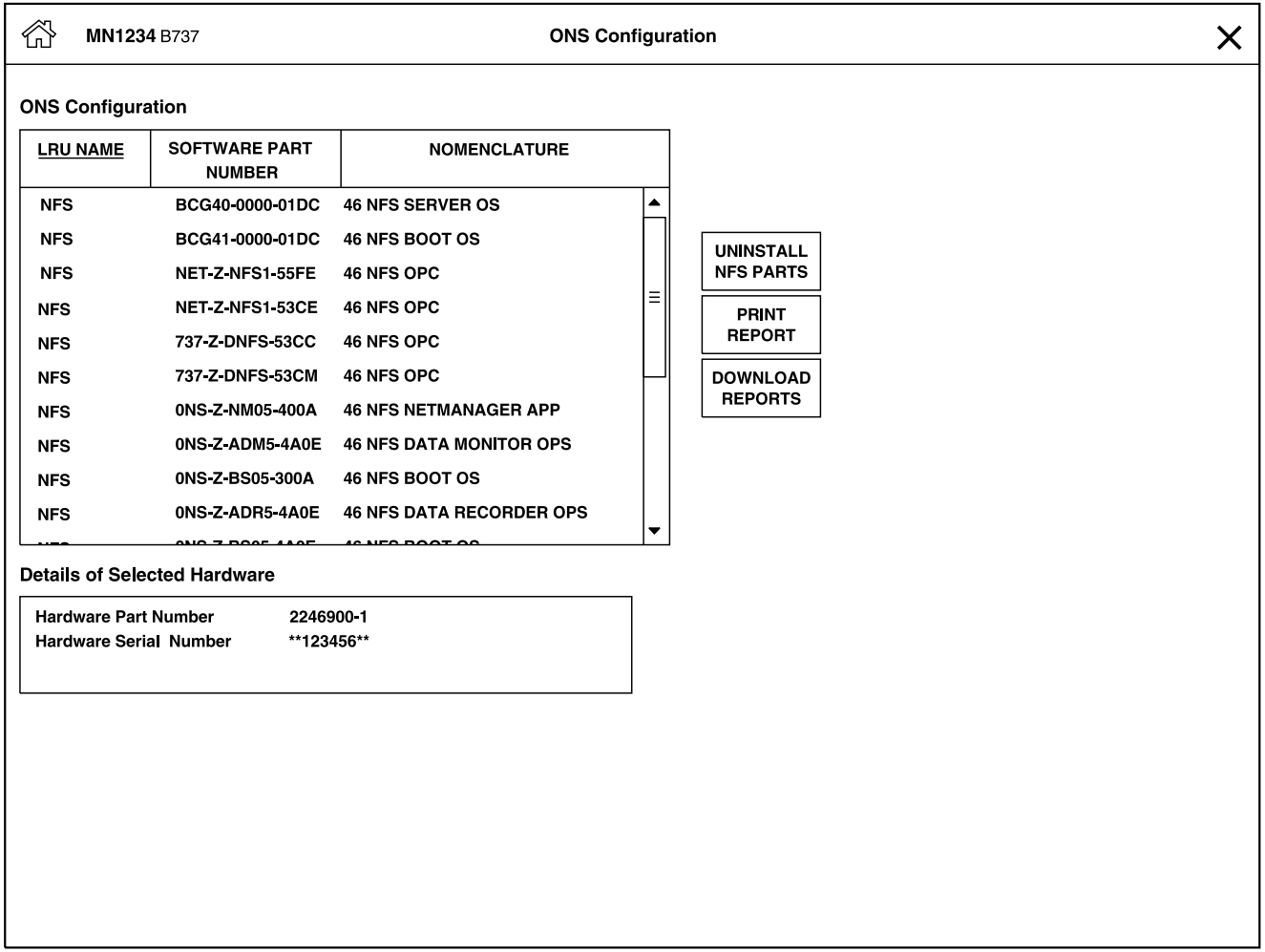
The container shows the words: Select LSAP(s) to erase from ONS. After highlighting one or more parts, the ERASE button cause the parts to be removed.

DOWNLOAD REPORT

The download report function makes a digital record of the hardware and software configuration of the NFS. The report includes the configuration of each network-connected system.

When selected, the ONS browser lets you save the file to the maintenance laptop, or to an external storage device.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - ONS CONFIGURATION



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2311904 S0000524947_V1

ONS CONFIGURATION PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - MASS STORAGE DEVICE

General

Select the MANAGE MSD display button to control the software parts that are on the Mass Storage Device (MSD). The MANAGE MSD function shows a list of software parts and their attributes.

The page starts with the ATA CHAPTER column in a sequence from lowest to highest. Click on the underlined column title to change the sequence of the list. You can use the three columns to change the sequence.

These are the columns that shows on the MANAGE MSD screen:

- Air Transport Association (ATA) CHAPTER
- Software part number
- Nomenclature.

For an Aeronautical Radio Incorporated (ARINC) 615 formatted part this data shows:

- Media Set part number
- Loadable Software Airplane Part (LSAP) part numbers - indented below the Media Set part number.

NOTE: These are only available when the parts have been packaged using the Boeing Ground Tools.

The ATA CHAPTER column is the ATA chapter for the Line Replaceable Unit (LRU) for the applicable software part. If more than one LRU is applicable, the list uses the ATA of the first LRU.

The SOFTWARE PART NUMBER column is the part number of the software on the MSD or the media set part. The data comes from the part header if the format contains the data. For ARINC 615 parts, the part number comes from the packaging data. The packaging data comes from the Boeing Ground Tools. If the packaging data is not available, the part number shows as the top directory name in the archive file uploaded.

The NOMENCLATURE column is the description of the part of the software on the MSD or media set part. The data comes from the part header if the format is ARINC 665-3. For all other formats, the part description comes from the packaging data from the Boeing Ground Tools. If the packaging data is not available, the ATA and the system type of the first LRU applicable with the software sets the part description.

The MSD SUMMARY section shows this data:

- The quantity of free space of the space applicable to the MSD function
- Total used storage.

When you make a selection of one or more parts, the SELECTED LSAP SUMMARY section shows. The summary data is for the selection of the LSAP or LSAPs. The summary shows the number of files and the total quantity in bytes.

The MANAGE MSD screen has the Onboard Network System (ONS) Maintenance Web Graphical User Interface (GUI) user an options for these functions:

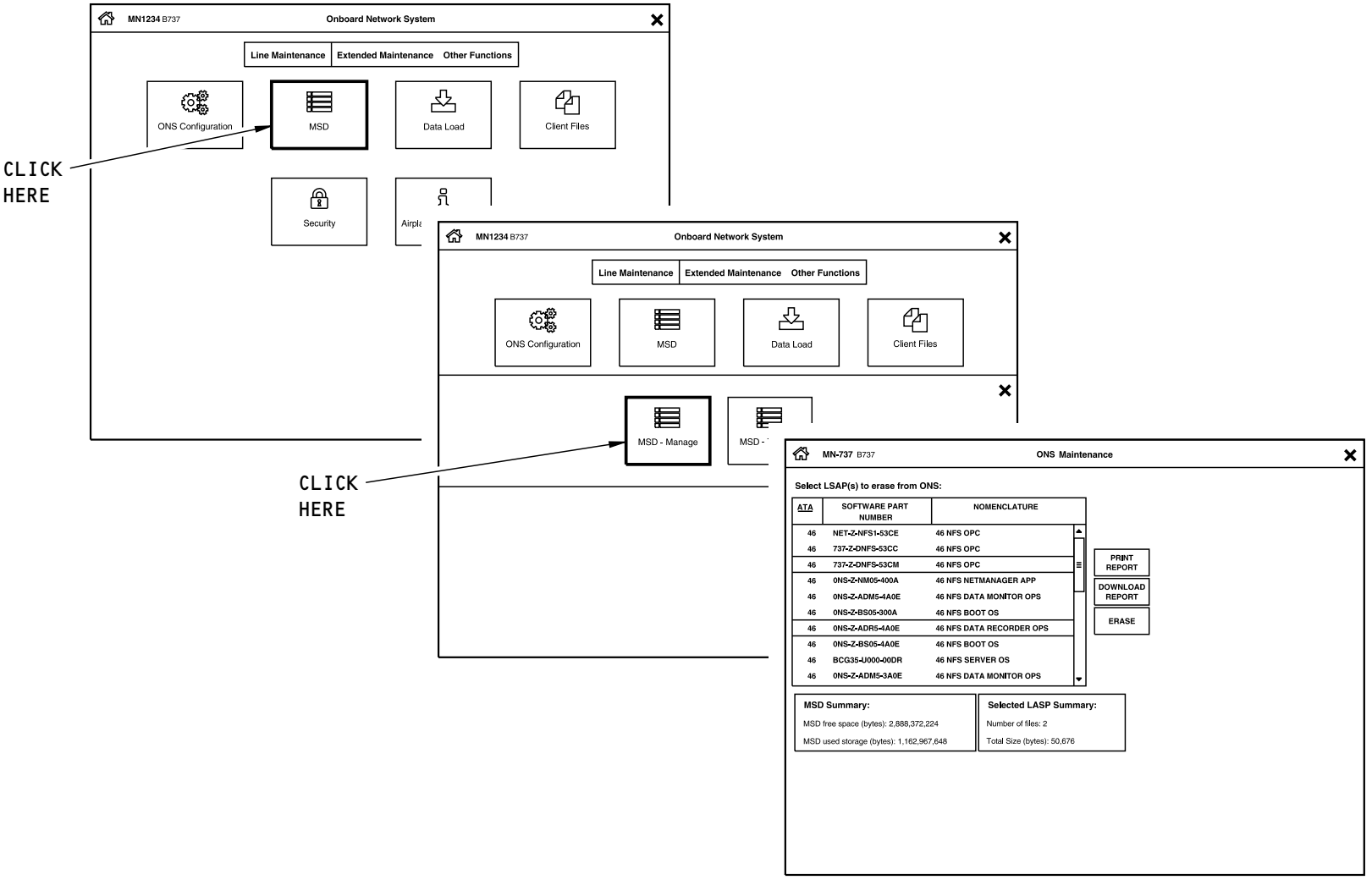
- PRINT REPORT
- DOWNLOAD REPORT
- ERASE.

Use the PRINT REPORT button to send a report of the MSD configuration data to a printer.

Use the DOWNLOAD button to send a report of the system configuration data to the laptop or to media that is connected to the laptop.

Use the ERASE button to remove the LSAP from the MSD.

ONBOARD NETWORK SYSTEM - APPLICATION - MASS STORAGE DEVICE



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2311949 S0000525154_V1

ONS MASS STORAGE DEVICE PAGE

General

The mass storage device (MSD) manage page shows a table of loadable software airplane parts (LSAP). These parts shown are not in service. They are available for future installation into the applicable LRU.

The MSD - Manage page has functions to print, or download a configuration report. There is also a function to erase one or more LSAP from the MSD.

To show MSD - MANAGE from the ONS menu bar, make the selections: Line Maintenance > MSD > MSD - Manage.

MSD - Manage

These are the columns that show on the MANAGE MSD page:

- ATA - refers to ATA (or, Air Transport Association) chapter number
- SOFTWARE PART NUMBER
- NOMENCLATURE.

The ATA column refers the chapter number assigned by the Air Transport Association, for that Line Replaceable Unit (LRU), for the specified software part. If two or more LRUs share the part, the ATA of the first LRU is specified.

The SOFTWARE PART NUMBER column refers to the software, or media set part number. The data shown comes from the software part header, when provided.

The NOMENCLATURE column refers to the software part's description. When the part format is Aeronautical Radio Incorporated (ARINC) 665-3, then the part header gives the nomenclature data. For all other formats, the part description comes from the packaging data from the Boeing Ground Tools. If the packaging data is not available, the Air Transport Association (ATA) and the system type of the first LRU applicable with the software sets the part description.

The MSD SUMMARY section shows the amounts of available, and storage used.

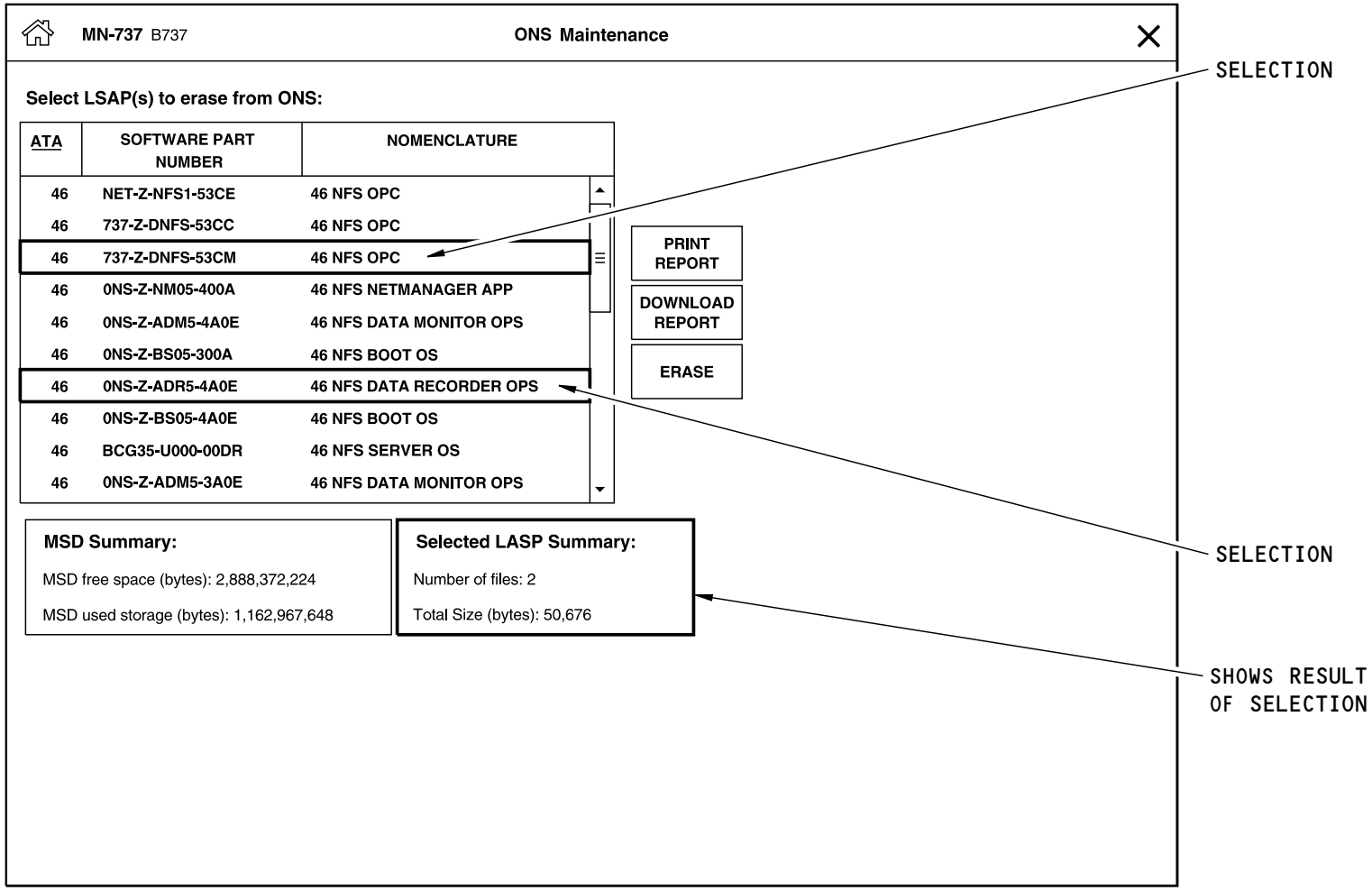
When one or more parts is selected, the SELECTED LSAP SUMMARY section shows the quantity of LSAPs selected, and the amount of storage they occupy.

The DOWNLOAD function makes a record of the MSD configuration.

The ERASE function removes the highlighted software part from the MSD.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - MSD - MANAGE

LINE MAINTENANCE > MSD > MSD MANAGE



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2312287 S0000525174_V1

MSD - MANAGE PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - MSD - TRANSFER

General

The Mass Storage Device (MSD) transfer page is the function that moves digital files from the maintenance laptop to the MSD.

To get access to the page, use the Onboard Network System (ONS) maintenance browser menu bar, and make the selections: Line Maintenance > MSD > MSD - Transfer.

To exit the MSD functions, and return to the ONS main menu, click on the home icon, in the upper left-hand corner.

MSD - Transfer

The page shows with no initial information.

The upper section of page shows:

- The words: Select a file with parts to transfer:
- An empty box - that will show the directory path. You can manually type the path into this box, or use the Browse button.
- The Browse button - lets you navigate to the target file, and make your selection.
- The Transfer button - executes the transfer function.

The lower portion of the page shows the Transfer Results table. The data shows as follows:

- File name
- Part number
- Status.

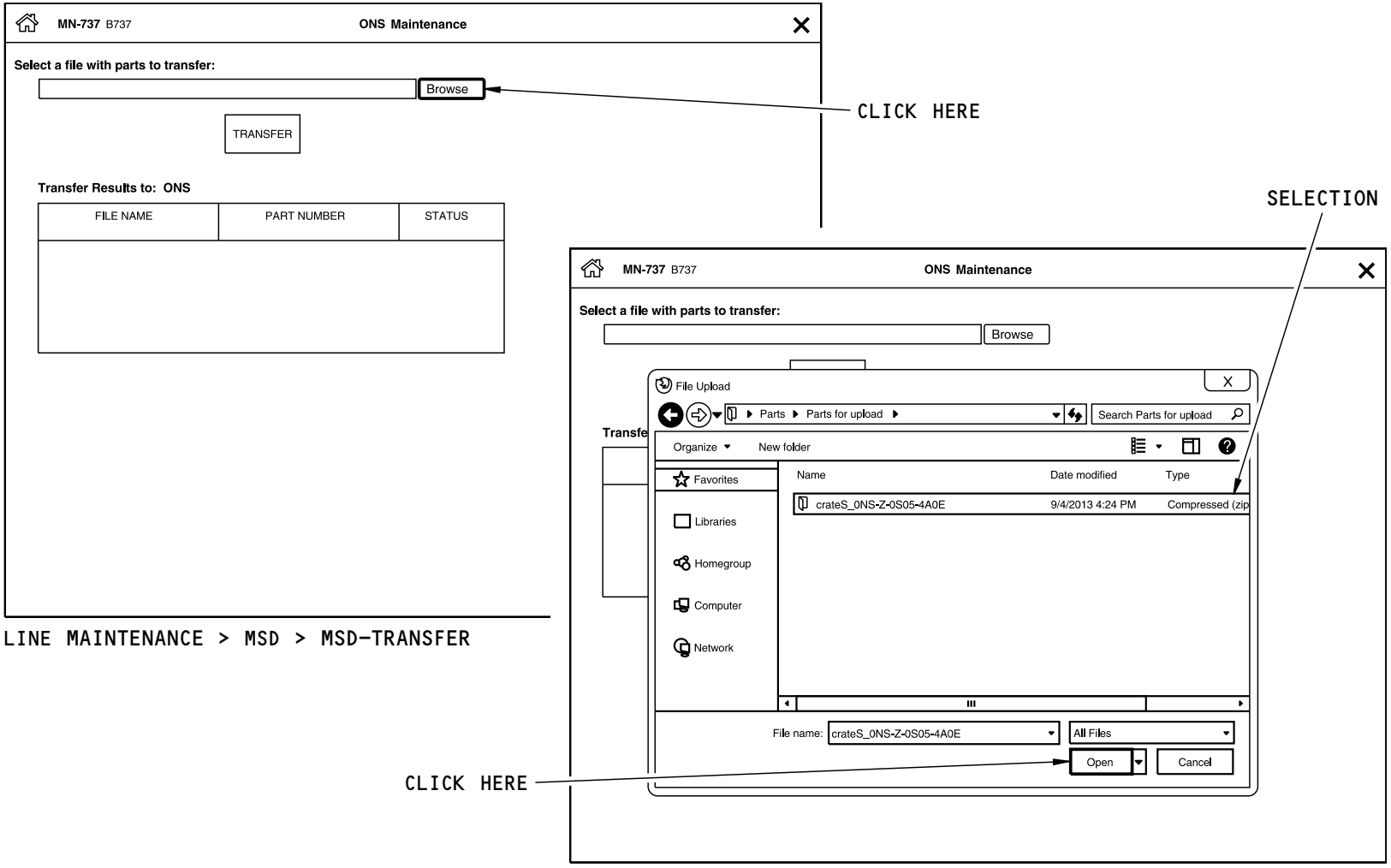
NOTE: The transfer function accepts only files that meet strict engineering conditions.

Transfer Process

The process to add a file to the MSD is as follows.

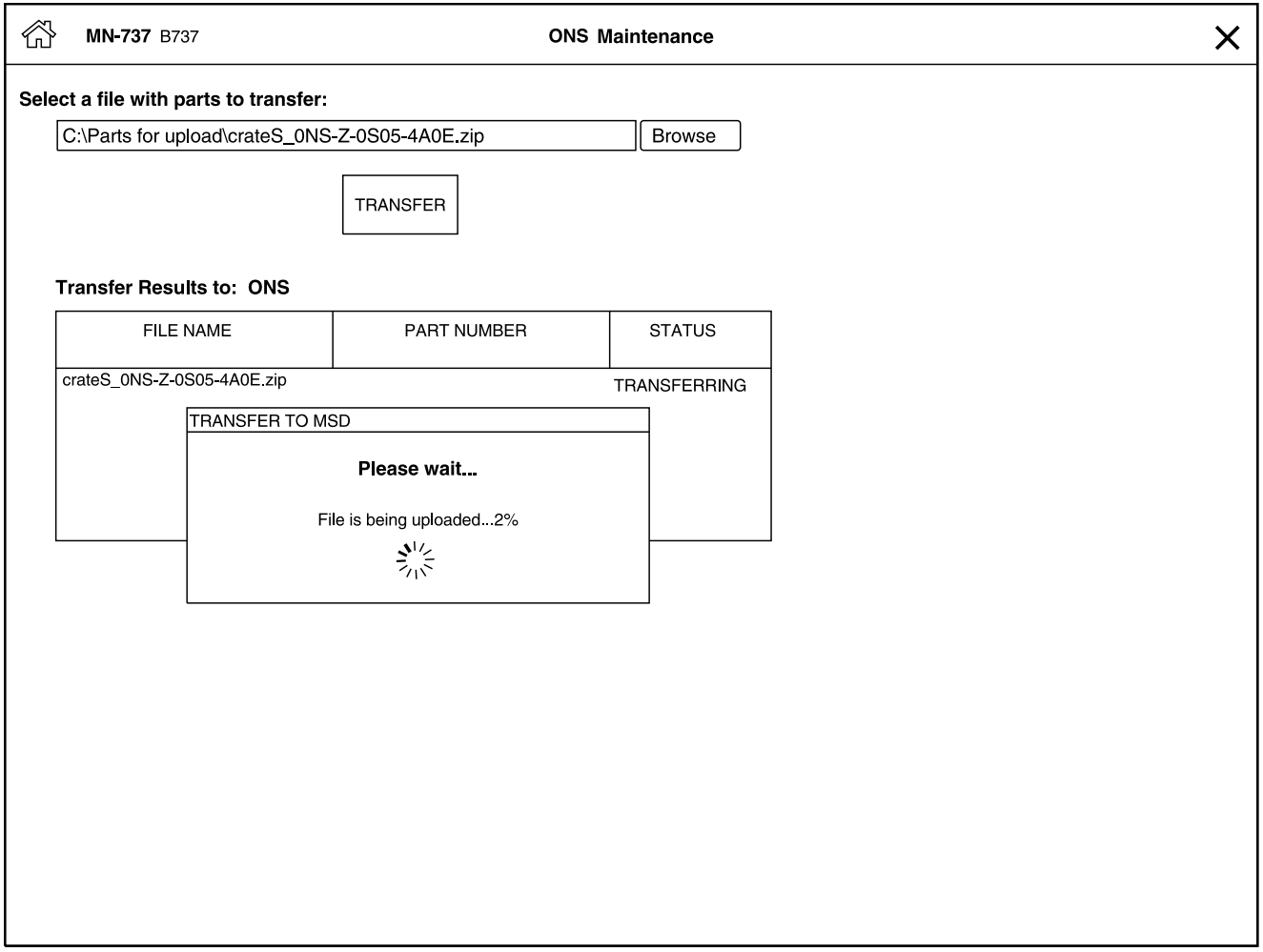
- Connect the Portable Maintenance Device (PMD) to the ONS.
- Show the MSD - Transfer page.
- Use the Browse function to find and select the source file.
- Make sure the transfer page accepts the part for transfer.
- Make the transfer Loadable Software Airplane Part (LSAP) selection.
- Make sure the part shows the transfer status: SUCCESS.

ONBOARD NETWORK SYSTEM - APPLICATION - MSD - TRANSFER



MSD - TRANSFER PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - MSD - TRANSFER

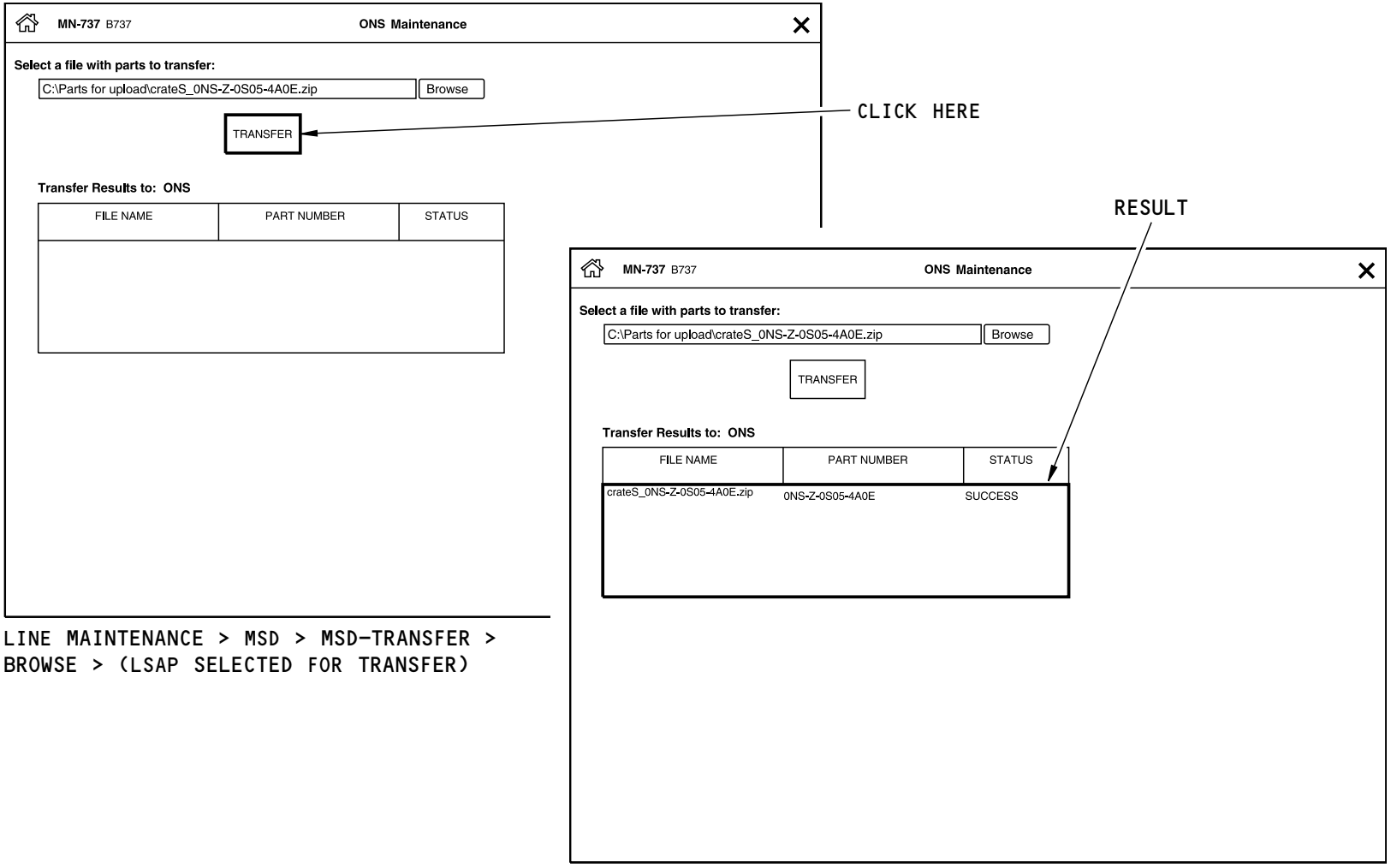


LINE MAINTENANCE > MSD > MSD-TRANSFER > BROWSE > (FILE SELECTION) > OPEN

2312257 S0000525735_V1

MSD - TRANSFER PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - MSD - TRANSFER



LINE MAINTENANCE > MSD > MSD-TRANSFER > BROWSE > (LSAP SELECTED FOR TRANSFER)

LINE MAINTENANCE > MSD > MSD-TRANSFER > TRANSFER > SUCCESS STATUS

2312265 S0000525736_V1

MSD - TRANSFER PAGE

General

Dataload refers to the software installation process into connected Onboard Network System (ONS) devices.

NOTE: The system cannot perform a data load when the Weight-On-Wheels (WOW) status shows that the system is in the air, if the airplane is on the ground but moving, or if an optional Data load enable discrete is not selected.

Using the maintenance browser, the selection LINE MAINTENANCE > DATALOAD shows a function that installs software parts automatically into a specified Line Replaceable Unit (LRU). The NFS always shows as an available installation target. More LRU-systems can show when installed.

Dataload Process

The dataload function lets you select a target LRU for software installation, and make the target Loadable Software Airplane Part (LSAP) selection. When the LRU and LSAP are selected, the function completes the software installation. The target LSAP must be present on the mass storage device (MSD).

When you install to the NFS only, you can install one part, or multiple parts at the same time. When you install into an LRU other than NFS, you can install only one selection 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.

Data Load Complete

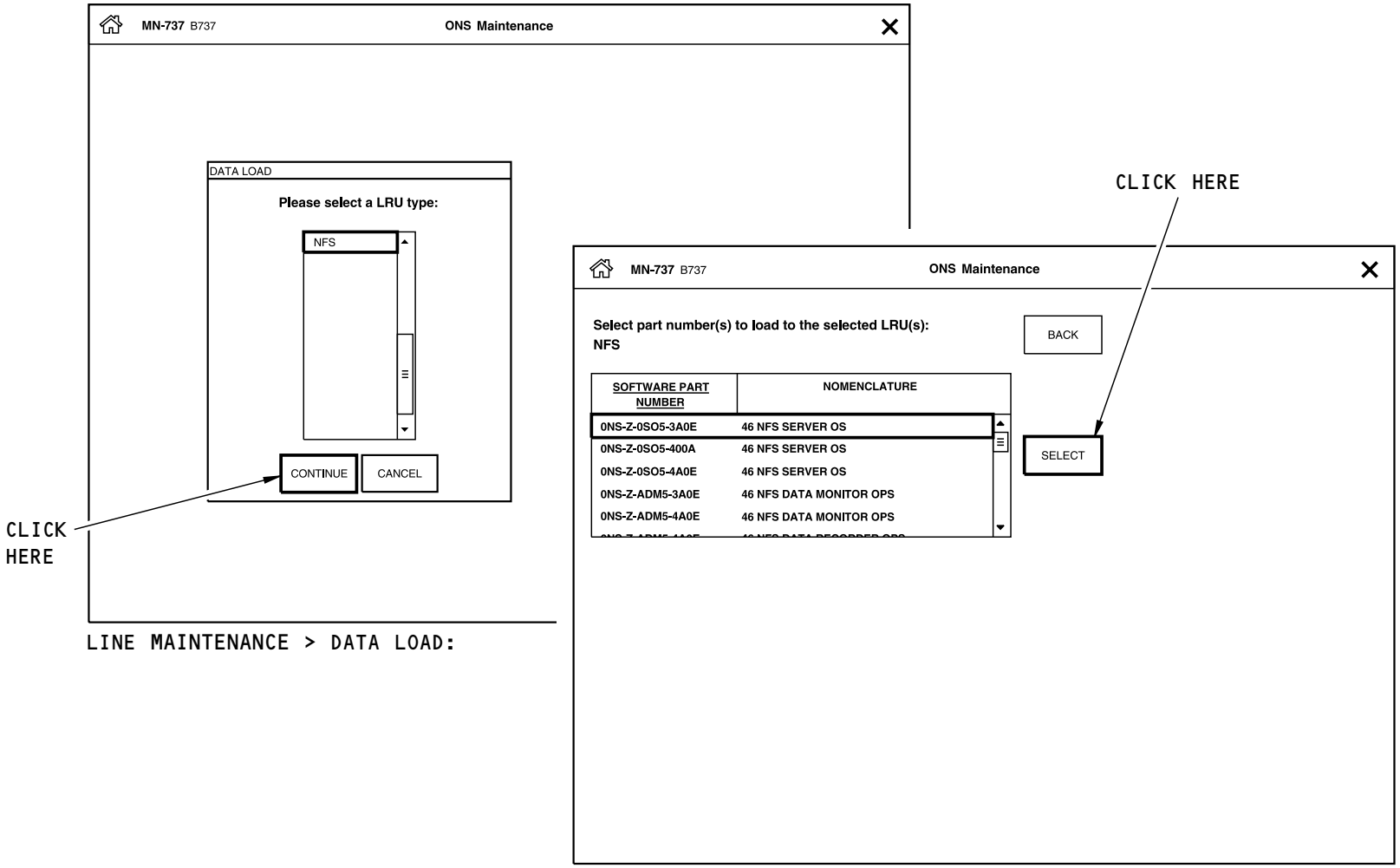
Completed the load process, the LOAD process screen shows the load status for each item.

The possible values for load status include these:

- Success - The part was successfully loaded for all the selected LRU(s).
- Failed - The part was valid but failed to successfully load due to transfer error, script error, or other procedural problem.
- Undefined - No result from the backend regarding the load status.
- Invalid Part - The part failed its verification check. No parts are loaded if part fails validation.
- Not Loaded - If one part in a multiple part load fails, the status Not Loaded is displayed for the remaining parts.

Once the part is installed, ONS automatically reboots. This will take a few minutes.

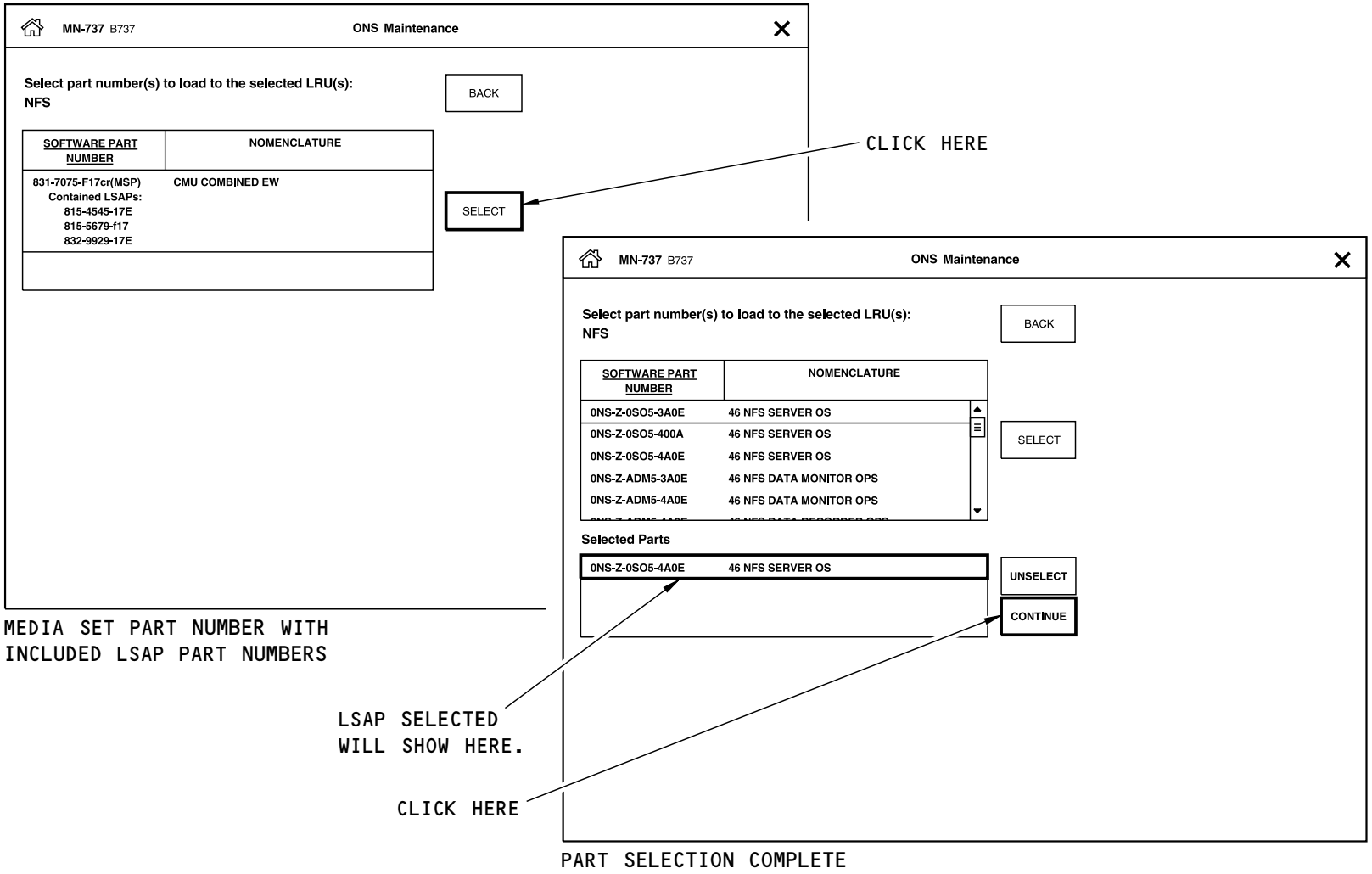
ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - DATA LOAD



2312125 S0000525745_V1

ONS DATA LOAD PAGE

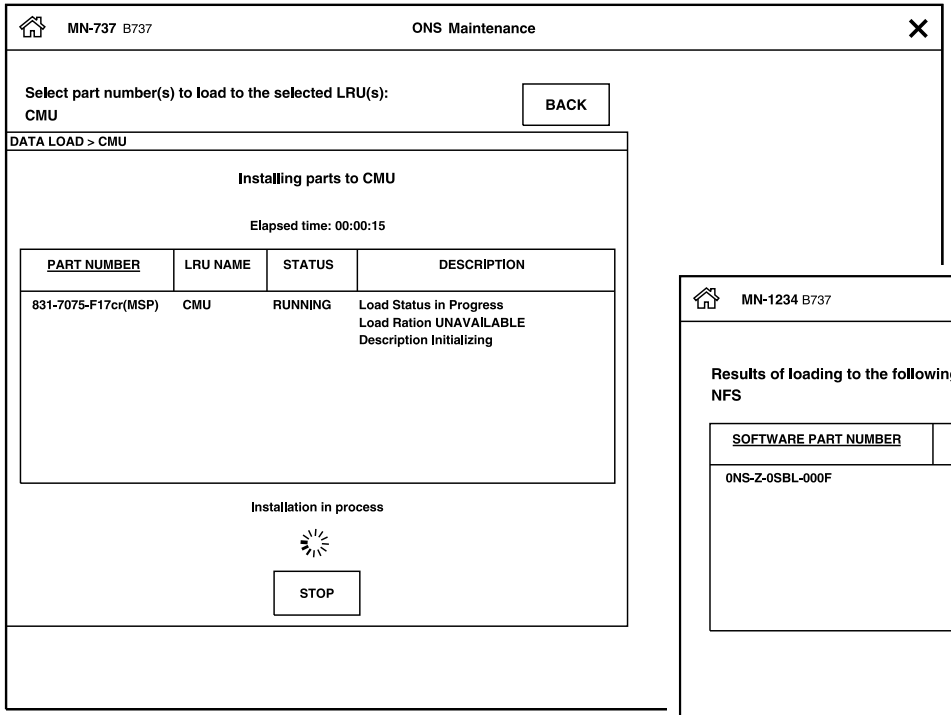
ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - DATA LOAD



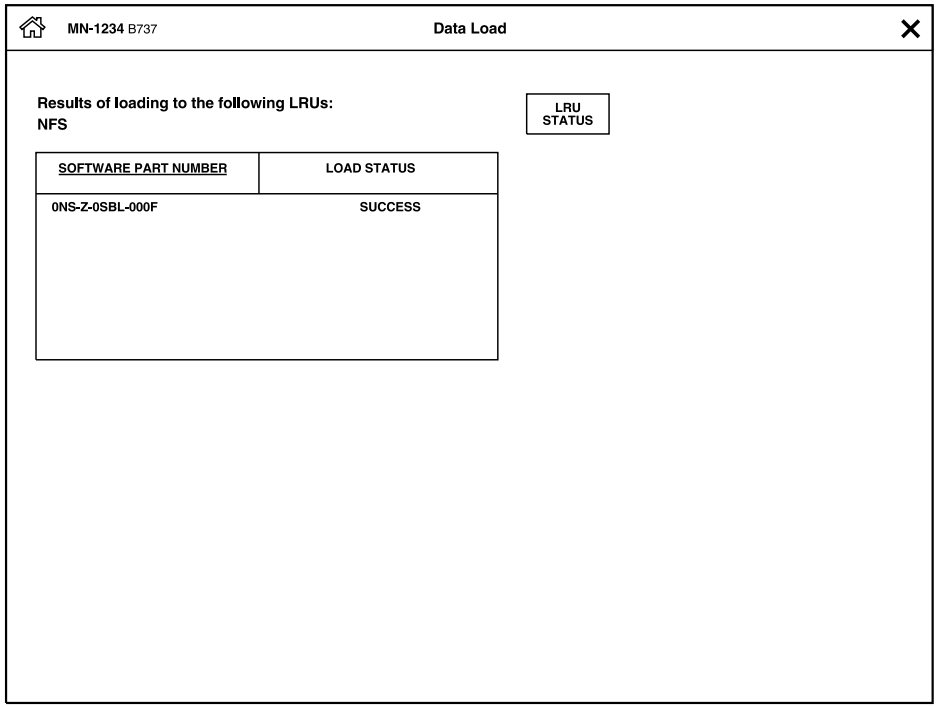
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2312164 S0000525806_V1

ONS DATA LOAD PAGE



DATA LOAD PROGRESS INDICATOR POP-UP



DATA LOAD DETAILED RESULTS VIEW (SUCCESS)

2312166 S0000525821_V1

ONS DATA LOAD PAGE

General

A client file refers to digital file made by a network client, and stored on the network file server (NFS). Typically, client files are saved in the file store for the specified client.

You use the client files page to get access to these files. These are examples of client files:

- Certificate signing request - a digital file created using server credential page.
- LRU Report - a digital file created using the LRU Reports page.
- ONS client file - one or more digital files created by a client LRU on the network.

A certificate signing request (CSR) is a file saved to the client files store. An LRU Report can be saved to the client files store. When specified by a maintenance action, you will download files like these to the maintenance laptop using the Client Files page.

Currently, no 737-NG network clients are configured to save files to the file store.

In contrast to client files, for example, a loadable software airplane part (LSAP) is not stored in the client files store. LSAP are found in the mass storage device (MSD).

From the menu bar, you get access to the Client Files page by making the selections: Line Maintenance > Client Files. To exit Client Files, and show the Line Maintenance menu, click on the home icon, in the upper left-hand corner.

Client Files Page

The client files screen shows a list of client stores available in the File Store. The client files screen has this data:

- CLIENT NAME
- TOTAL NUMBER OF FILES
- USED SPACE (BYTES)
- FREE SPACE (BYTES)
- TOTAL SPACE (BYTES).

Below the words File Store Summary is the result of all files in all stores combined. The summary has this data:

- Total number of files in the file store
- Total used space in bytes
- Total free space in bytes
- Total file store space in bytes.

When you make a selection of client name, the CONTINUE button becomes serviceable. Click the CONTINUE button to show the client files store screen.

The screen for the client files store shows this data for the files in the client file store:

- FILE NAME
- FILE SIZE (BYTES)
- DATETIME OF CREATION.

On the bottom of the screen for the client files store is a summary of the client file store. The summary has this data:

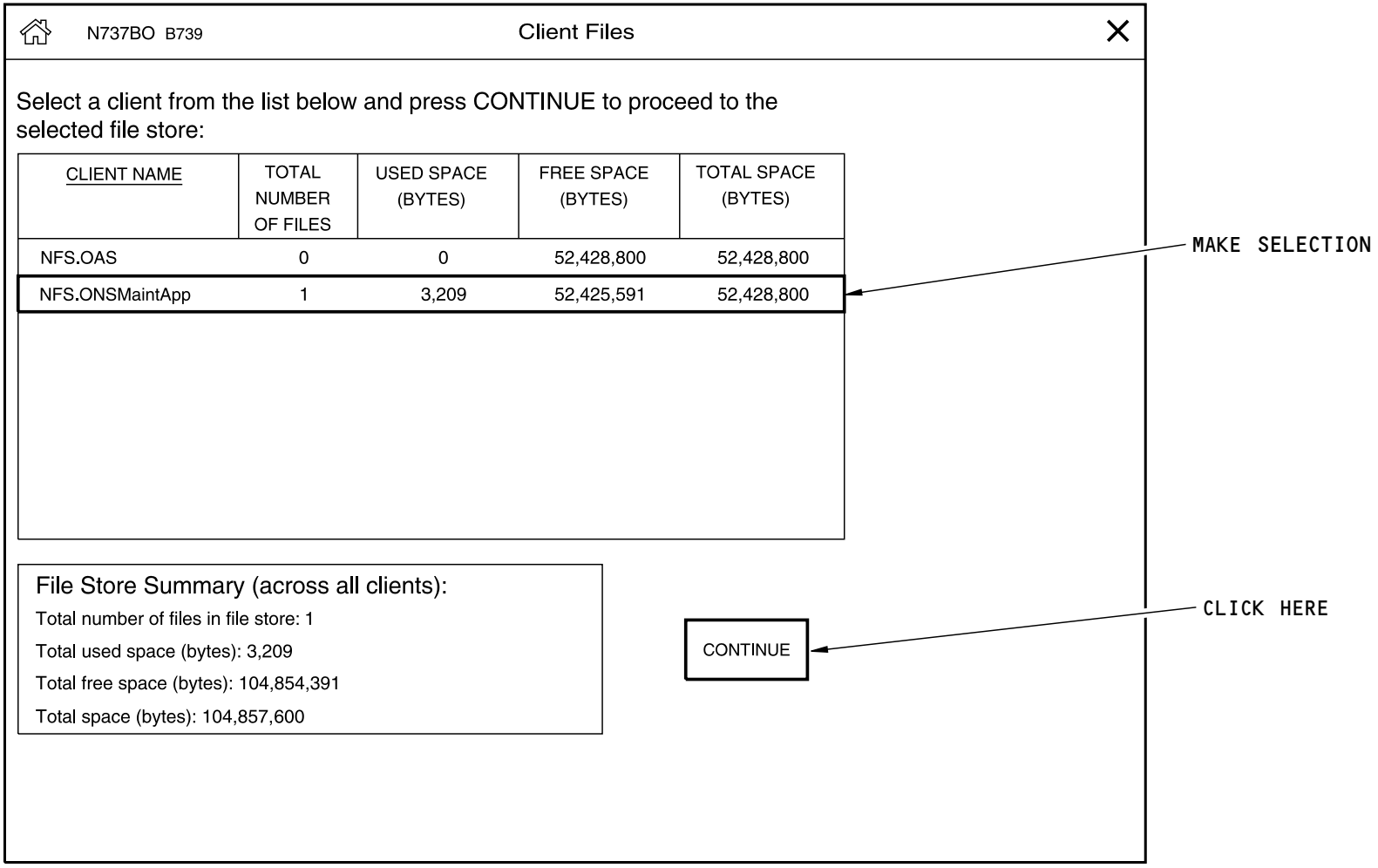
- Total number of files in the client file store
- Total used space in bytes
- Total free space in bytes
- Total client file store space in bytes.

These are the three functions you can do from the screen for the client files store:

- List
- Copy
- Delete.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - CLIENT FILES

LINE MAINTENANCE > CLIENT FILES:



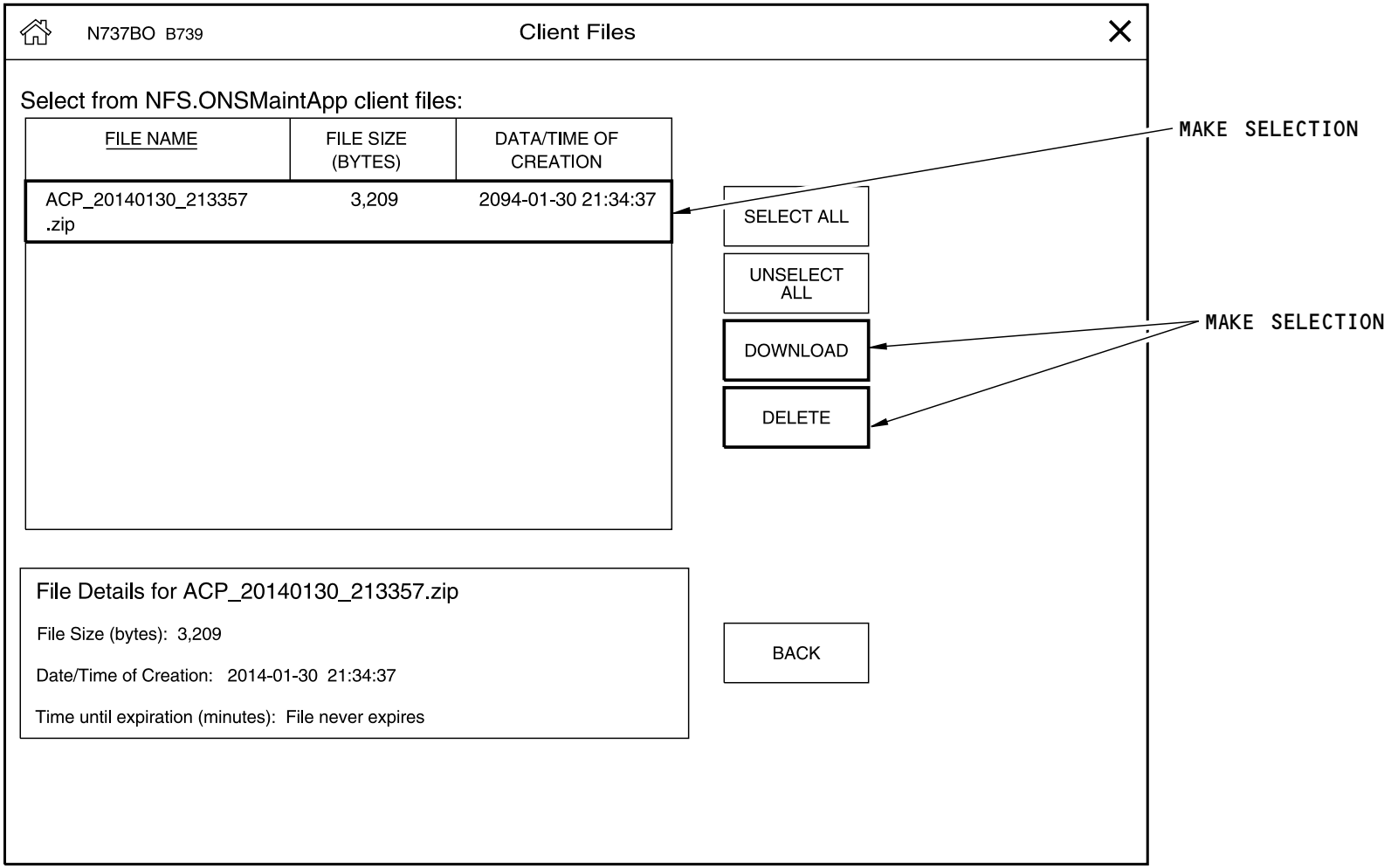
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2322237 S0000525748_V1

ONS CLIENT FILES PAGE

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - CLIENT FILES

LINE MAINTENANCE > CLIENT FILES > CLIENT FILE STORE



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2322251 S0000526883_V1

ONS CLIENT FILES STORE PAGE

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General

The page named SECURITY is a sub-menu within the selection Line Maintenance. These are the functions shown on the Security menu.

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

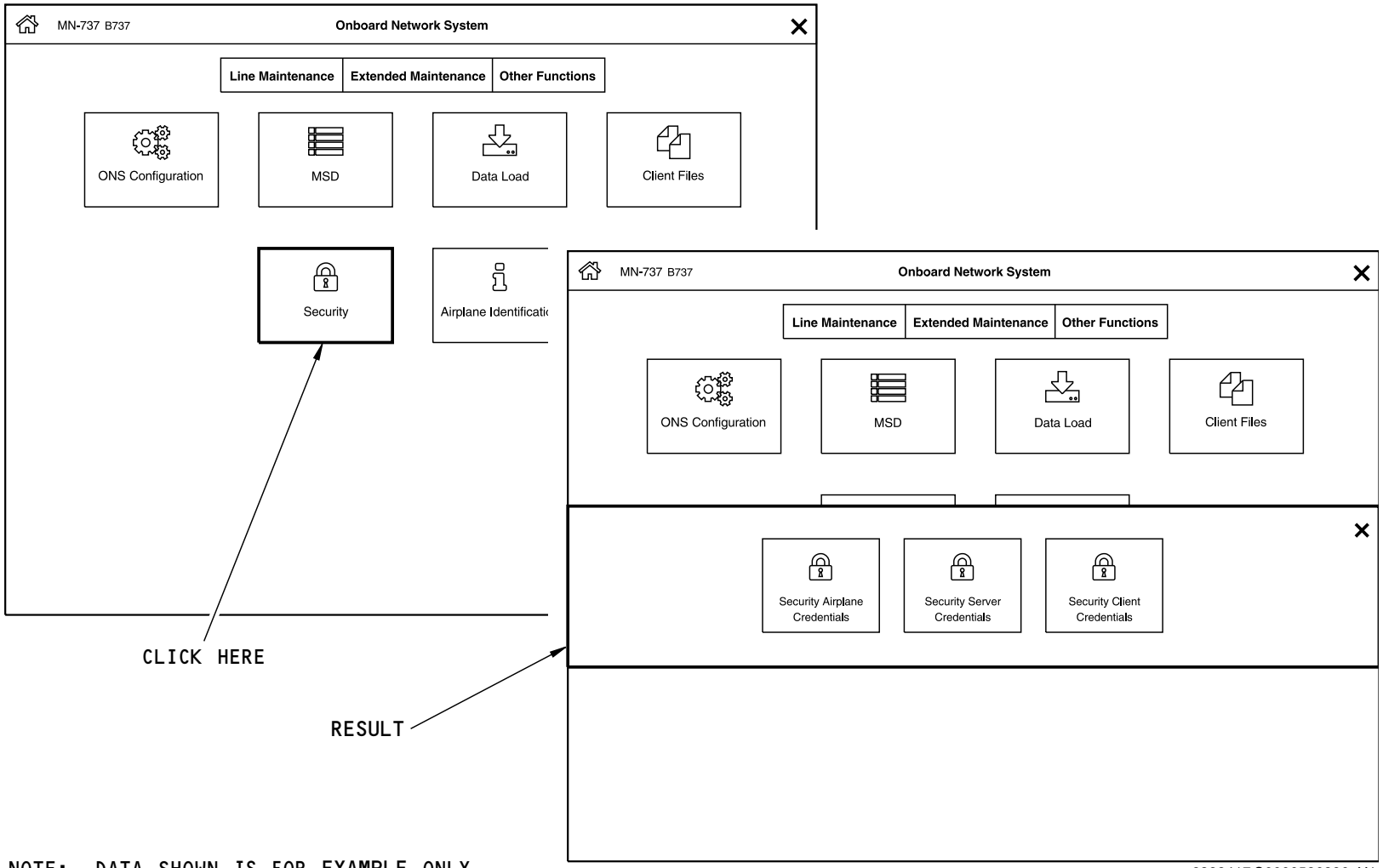
To get access to the Security menu, from the main menu bar, make the selections: Line Maintenance > Security.

To exit the security menu, and show the Line Maintenance menu, click on the home icon in the upper right-hand corner.

NOTE: The Credentials screens (Clients, Servers and Airplane) are only available when the system is in the Weight-On-Wheels (WOW) state. If the CLIENT CREDENTIALS function is selected and the system is not in the WOW state, the screens will not display and an Inappropriate System State pop-up is displayed.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - SECURITY

LINE MAINTENANCE > SECURITY



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

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 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 > 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).

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.

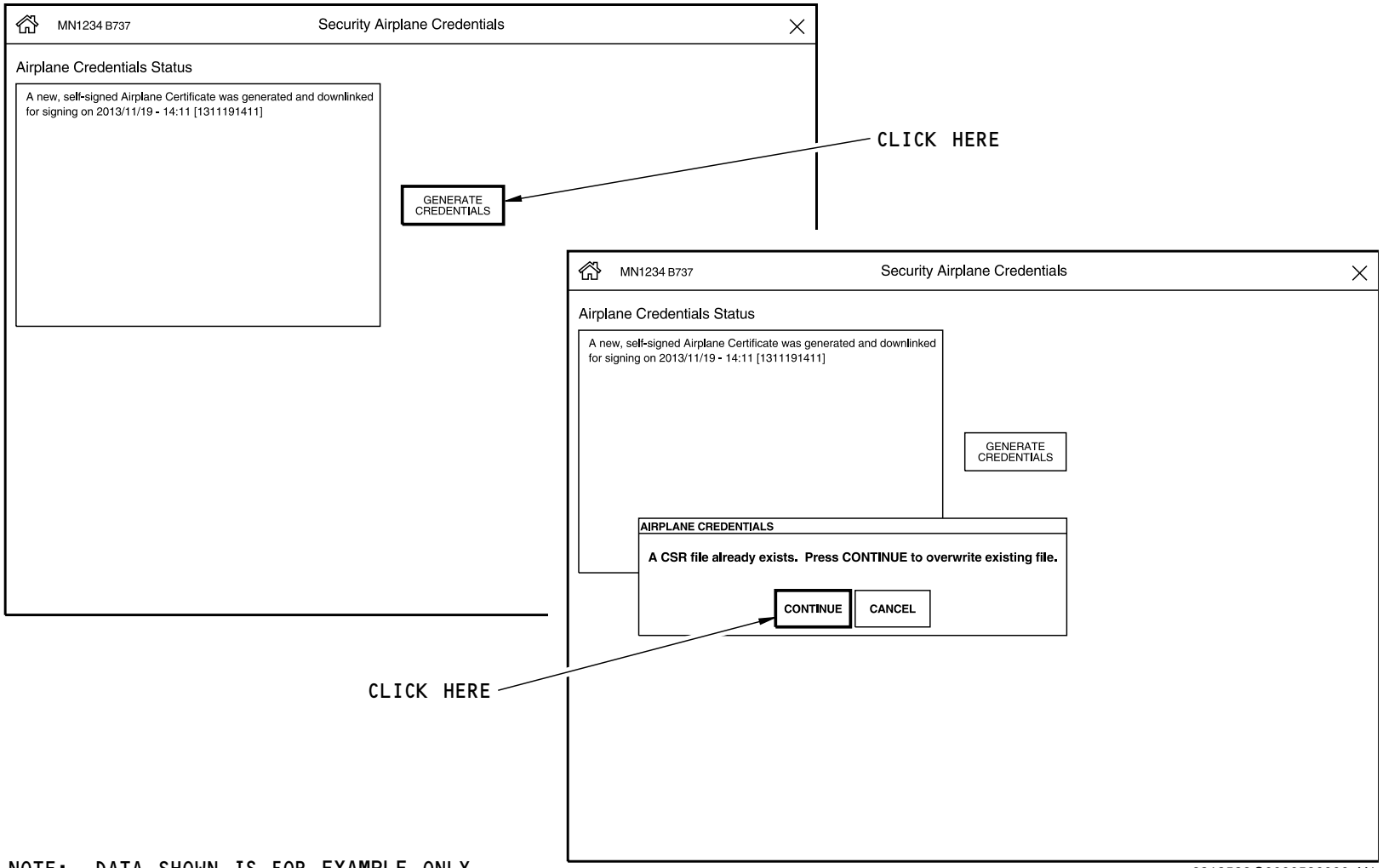
If you click the CONTINUE button on the overwrite confirmation pop-up, then the generate credentials confirmation pop-up shows. This is the data on the generate credentials confirmation:

- System date - from SAPS
- System time - from SAPS
- Tail number - from SAPS
- 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.

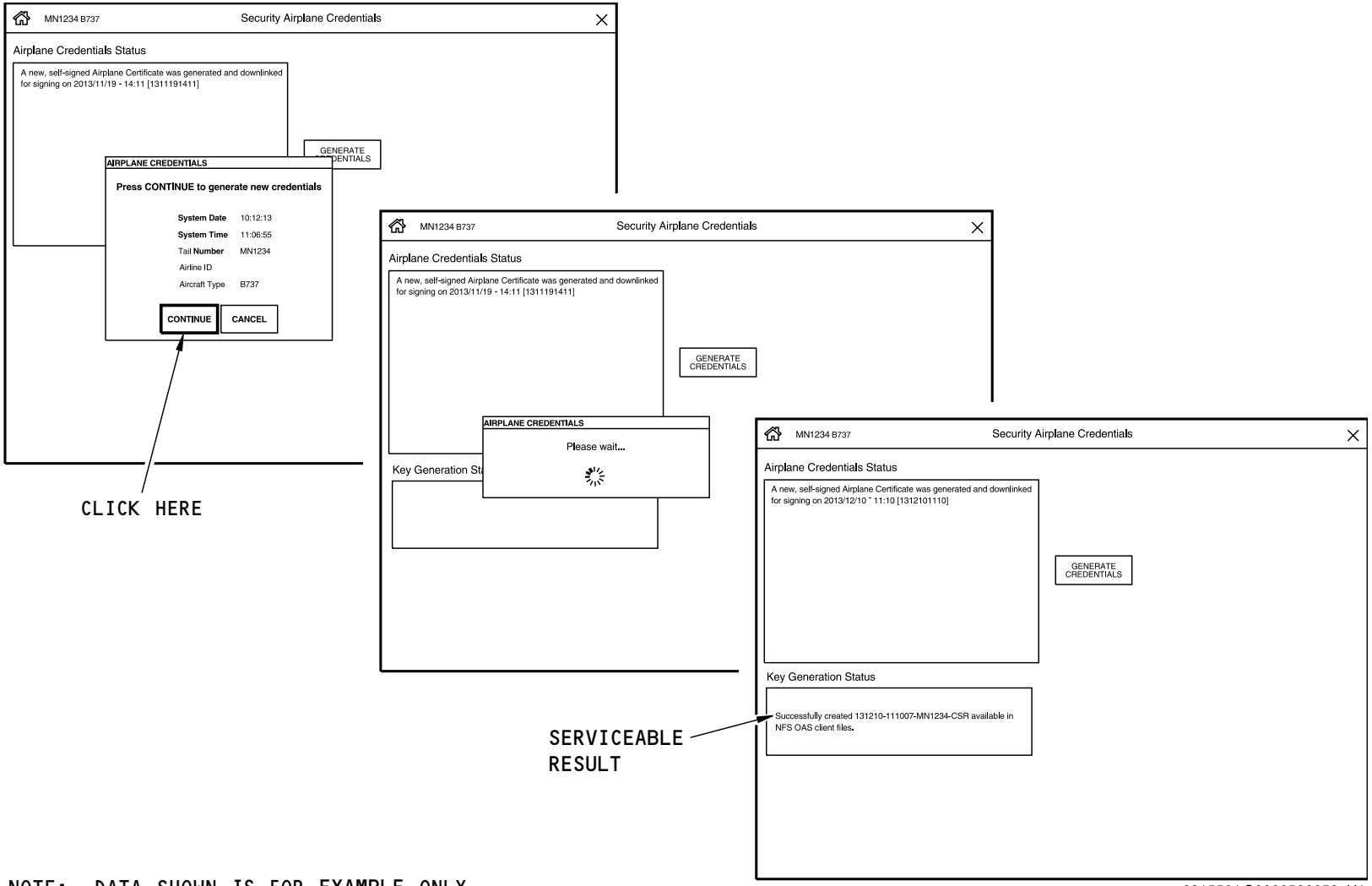
If you click the CONTINUE button on the generate credentials pop-up, the progress indicator pop-up shows. The progress indicator pop-up shows until the overwrite function completes. The result screen shows when the overwrite function completes.

LINE MAINTENANCE > SECURITY > SECURITY AIRPLANE CREDENTIALS



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

ONS AIRPLANE CREDENTIALS



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

ONS AIRPLANE CREDENTIALS

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General

A server credential is a necessary digital data file for encrypted network communication. The server credential refers to network file server. 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 > Security Server Credentials.

The Weight-On-Wheels (WOW) discrete must be in the ground condition.

The Security Server Credentials page shows the presence of the server credential, and it's 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.

Access Denied Problems

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

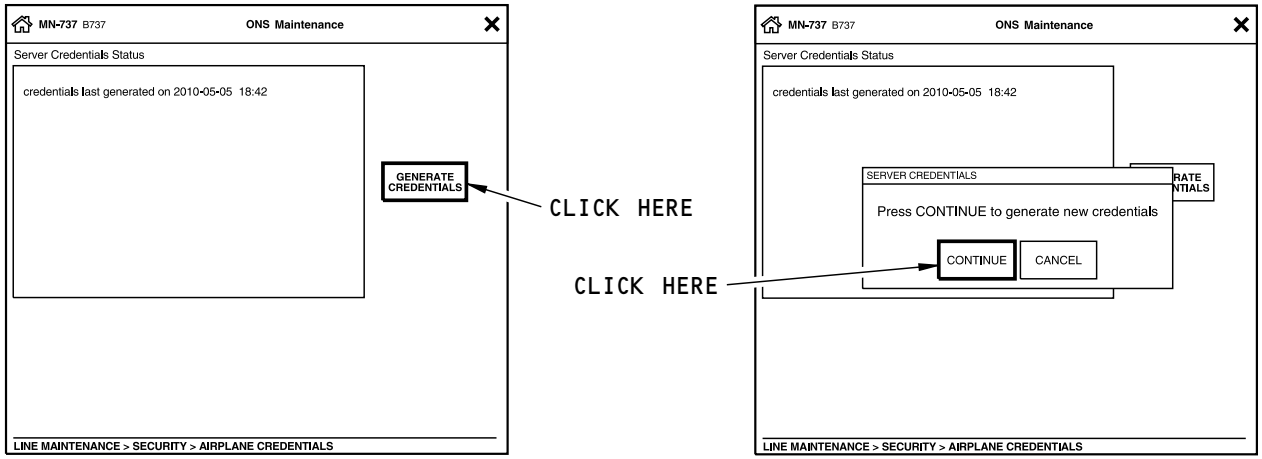
Each of these operations that follow can prevent access to the server credential page.

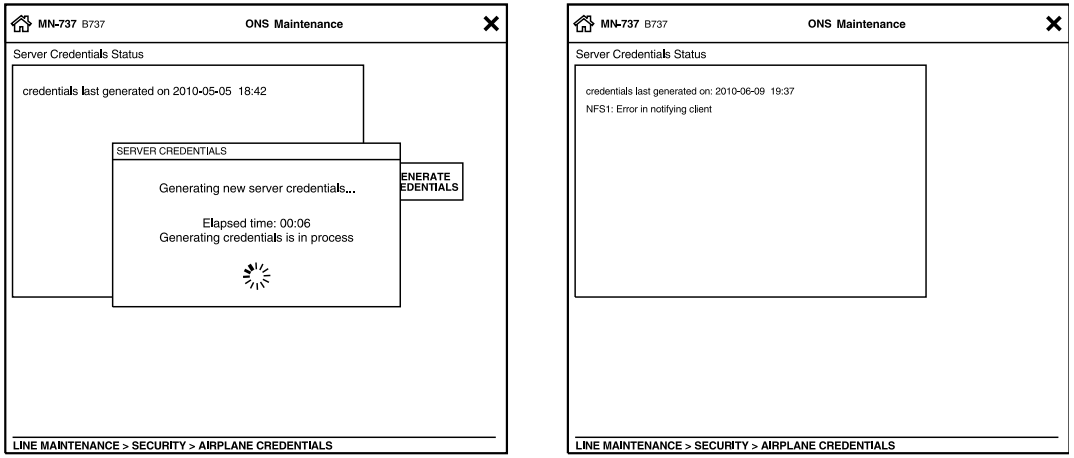
- Dataload
- Uninstall NFS Parts
- Reboot To Boot OS
- Client Credentials
- Server Credentials

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

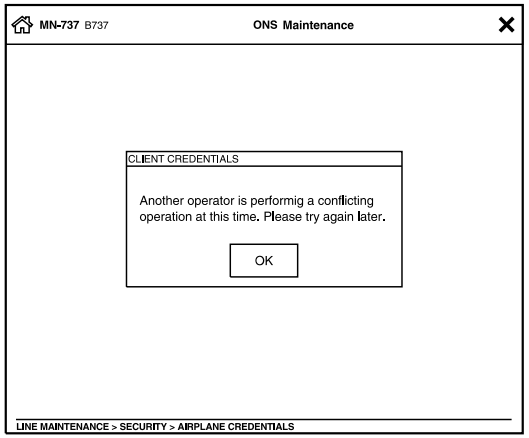




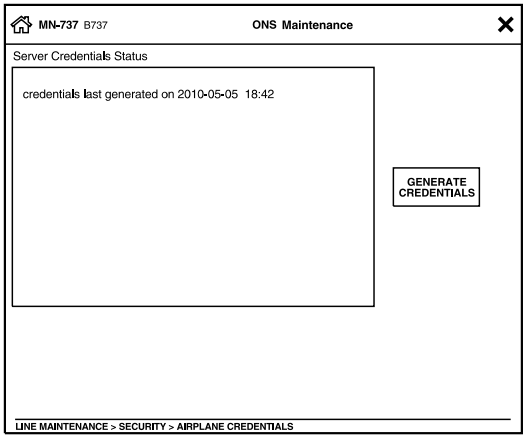
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2313931 S0000526043_V1

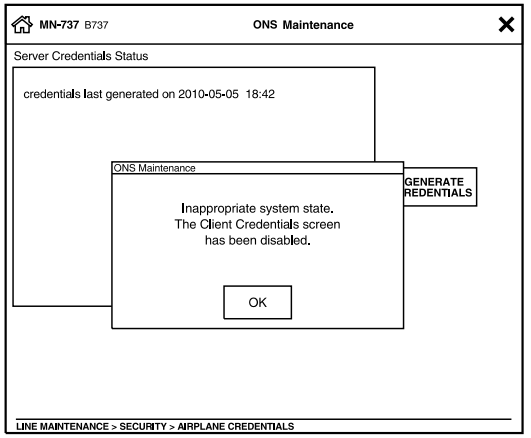
ONS SECURITY SERVER CREDENTIALS PAGE



SERVER CREDENTIALS - ACCESS DENIED



SERVER CREDENTIALS



SERVER CREDENTIALS NOT AVAILABLE POP-UP

NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2313993 S0000526091_V1

ONS SECURITY SERVER CREDENTIAL PROBLEMS

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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 theNetwork File Server (NFS). The server and client credentials must agree for serviceable ONS communications.

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

The client credential is serviceable when the ONS 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 > 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.

Client Credentials Page

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

The page shows the Select the client(s) to generate new credentials table with columns:

- Select/Unselect check box
- CLIENT NAME
- CREDENTIAL STATUS

The Credentials Generation Status table with columns:

- CLIENT NAME
- CREDENTIAL GENERATION STATUS

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

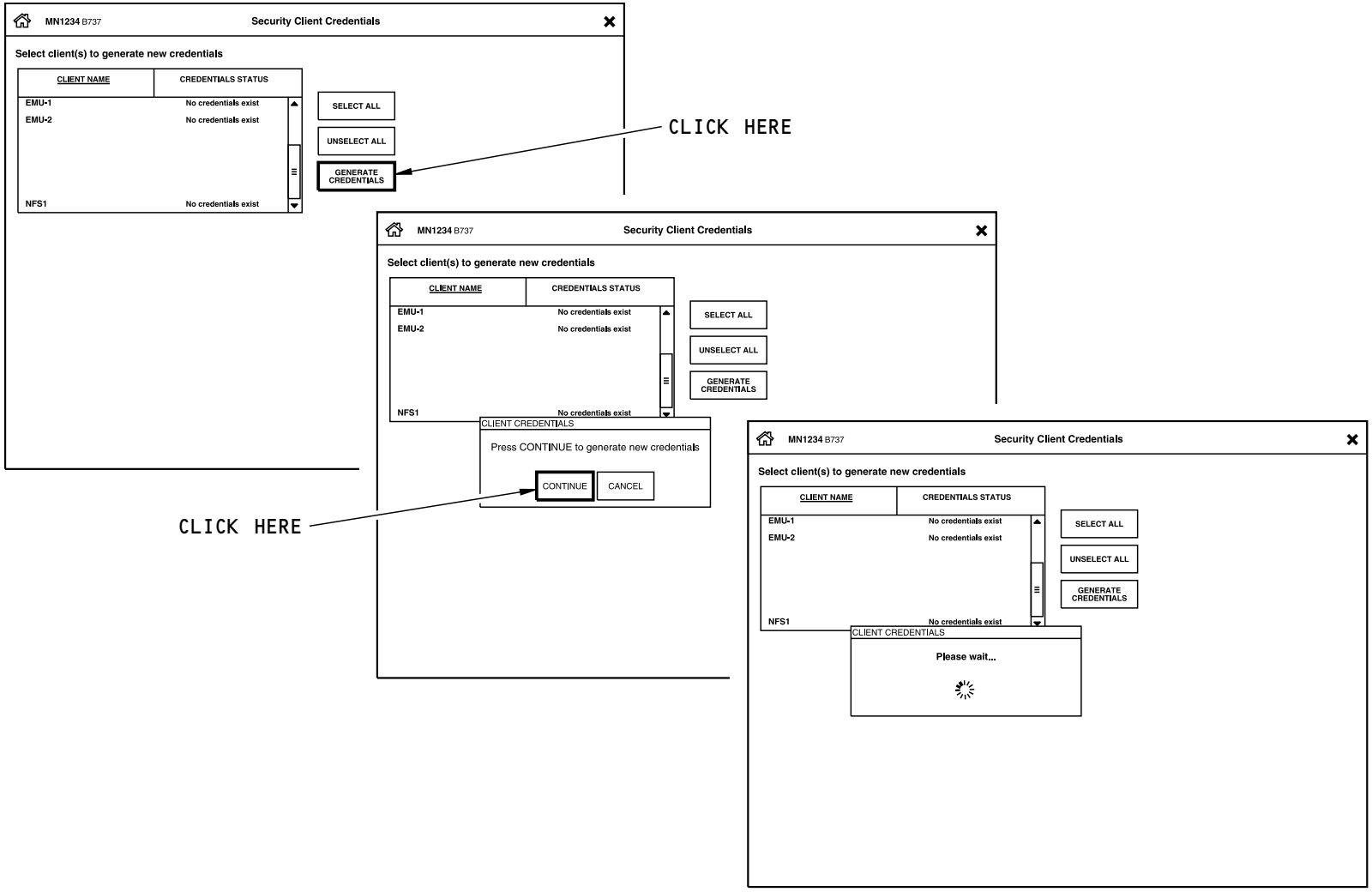
Access to the client credential page is blocked when one operation or application is in process and has control.

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.

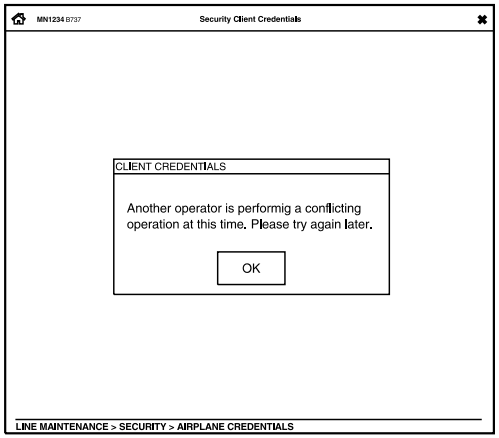
To resolve the problem and get access, the in-service operation must be stopped or closed.



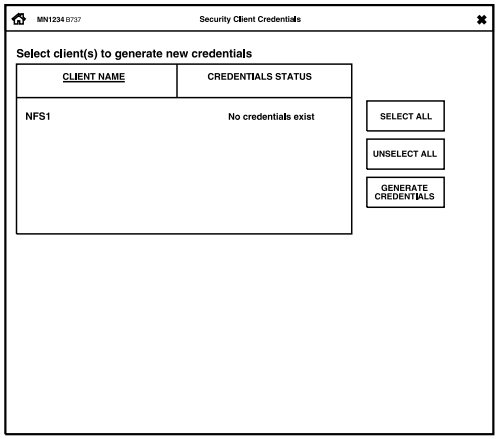
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2313690 S0000526096_V1

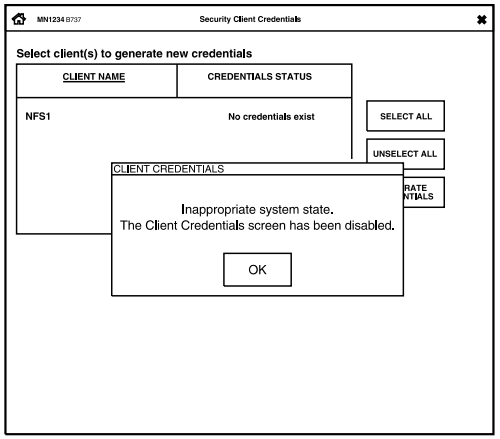
ONS CLIENT CREDENTIALS PAGE



CLIENT CREDENTIALS
NOT AVAILABLE POP-UP



CLIENT CREDENTIALS



CLIENT CREDENTIALS -
ACCESS DENIED

NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2313733 S0000526093_V1

ONS SECURITY CLIENT CREDENTIAL PROBLEMS

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General

The airplane identification (ID) page is the data entry page. The page tells Onboard Network System (ONS) specific information about the airline and airplane. ONS uses this information for network communications and security.

You get access to the page from the main menu bar by making the selections: Line Maintenance > Airplane Identification.

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

Usually, you will examine the airplane identification data each time you install a Network File Server (NFS).

Airplane Identification page.

The airplane identification page shows three data fields.

- Airplane ID or Tail ID
- Aircraft type
- Airline ID

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

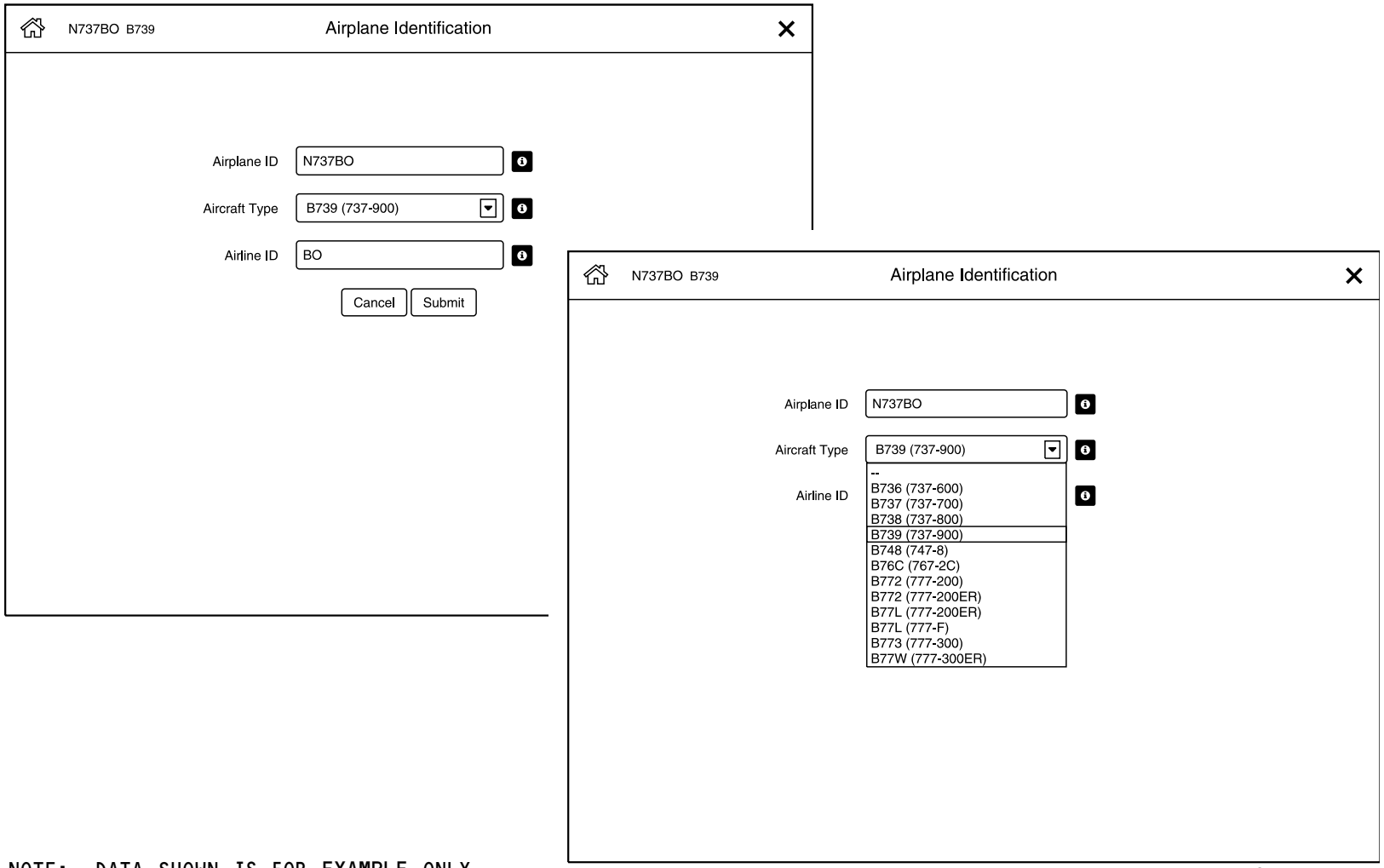
The aircraft type is the major-minor model of the airplane. The data field uses a predefined drop-down menu. The available selections will show as four uppercase alphanumeric characters (for example; B739).

The airline ID is a two-letter code. Use uppercase alpha-characters only, and not numeric.

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.

ONBOARD NETWORK SYSTEM - LINE MAINTENANCE - AIRPLANE IDENTIFICATION

LINE MAINTENANCE > AIRPLANE IDENTIFICATION:



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2322440 S0000526618_V1

ONS AIRPLANE IDENTIFICATION PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE

General

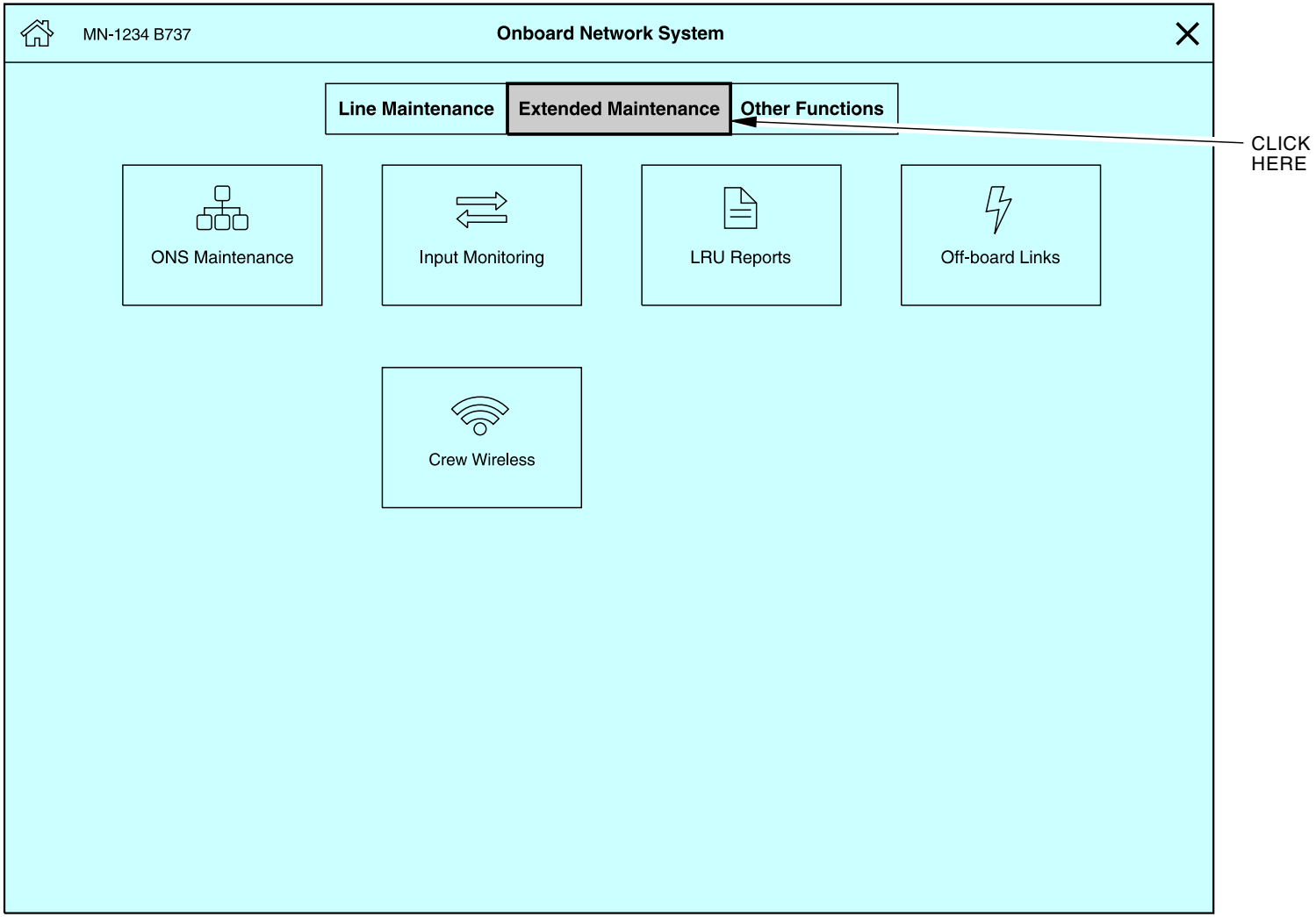
On the ONS main menu bar, the second selection is Extended Maintenance.

ONS Extended Maintenance shows a menu with these selections:

- ONS Maintenance
- Input Monitoring
- LRU Reports

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

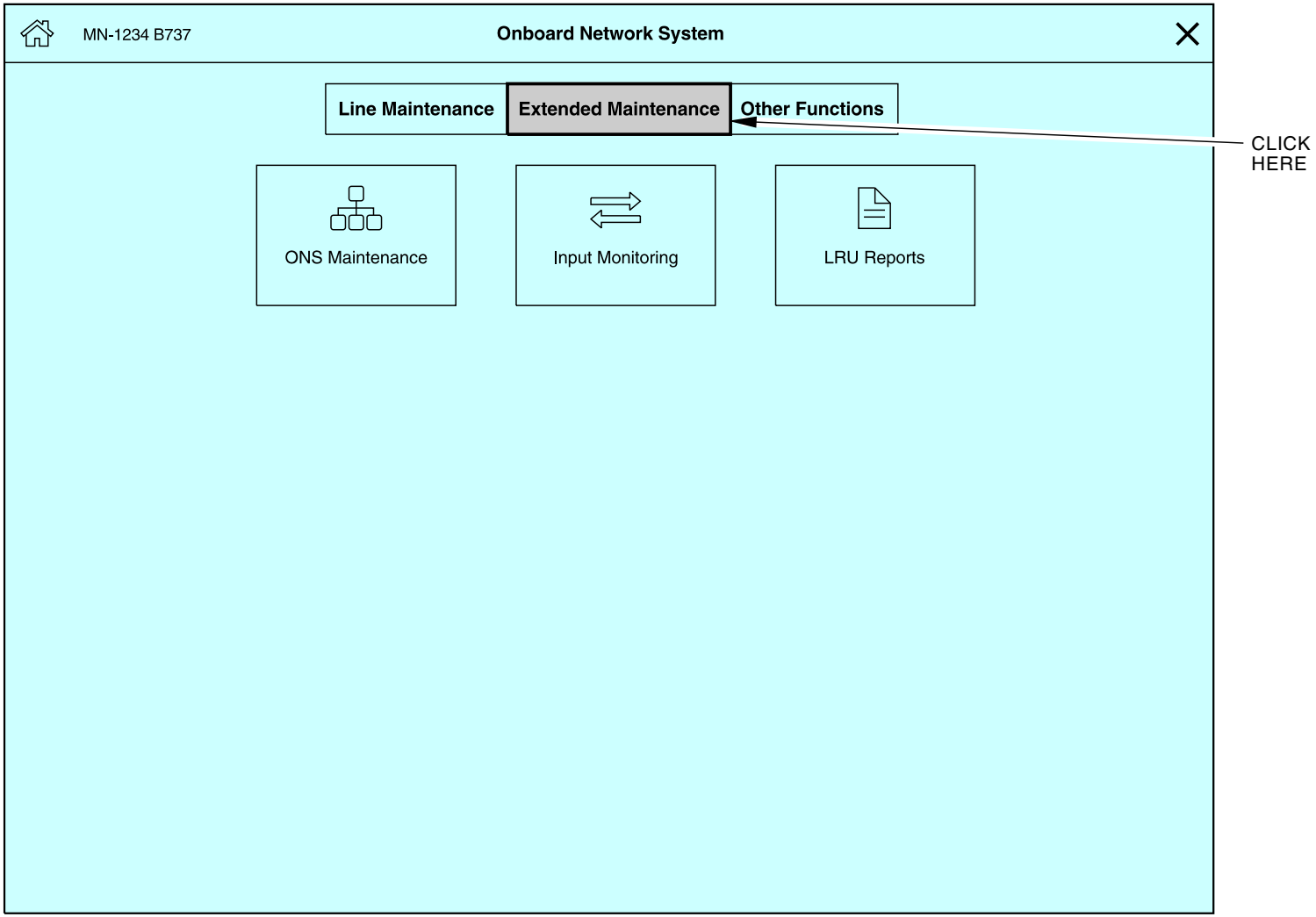
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE



2323622 S0000526239_V2

ONS EXTENDED MAINTENANCE MENU

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE



ONS EXTENDED MAINTENANCE MENU

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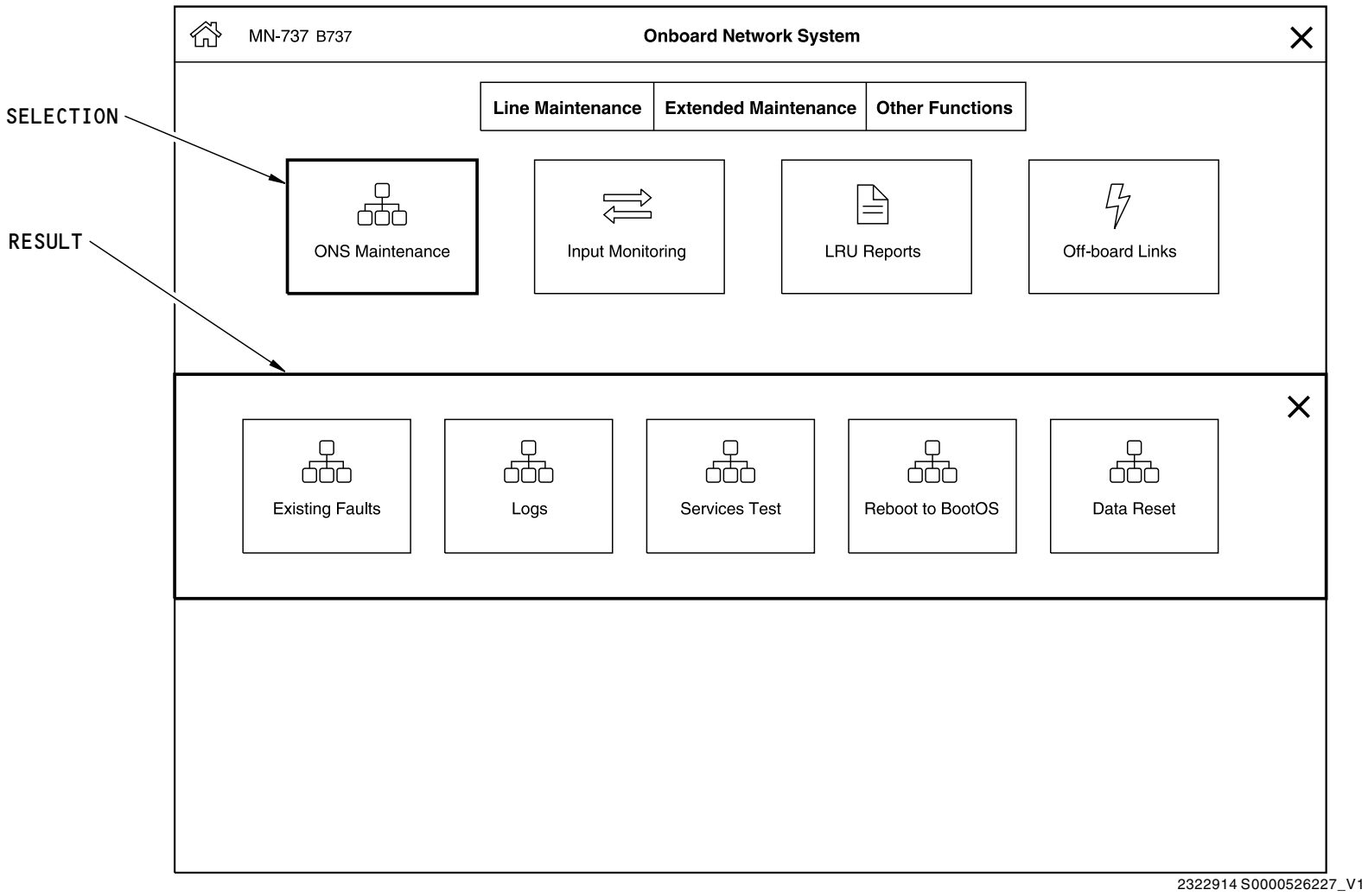
General

The page named ONS Maintenance is a sub-menu within the selection Extended Maintenance. These are the functions shown on the ONS Maintenance menu:

- Existing Faults
- Logs
- Services Test
- Reboot to BootOS
- Data Reset.

To get access to the ONS Maintenance menu, from the main menu bar make the selections: Extended Maintenance > ONS Maintenance.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - ONS MAINTENANCE



ONS MAINTENANCE PAGE

General

The existing faults page gives a record of Network File Server (NFS)-to-Line Replaceable Unit (LRU) communication problems.

To get access to this page from the Onboard Network System (ONS) menu bar, make your selections: Extended Maintenance > ONS Maintenance > Existing Faults.

General

The Existing Faults application on the Extended Maintenance Home screen provides a list of active faults as well as detailed fault information organized by subsystem destination.

To get access to this page from the home screen, make your selections: Extended Maintenance > Existing Faults.

The Existing Faults screen is displayed with, a listing of the Air Transport Association (ATA) Systems available for selection.

Select an ATA SYSTEM. Select all ATA Systems by selecting the ATA System checkbox (√) or select the individual system checkbox (√). The CONTINUE button is then enabled.

Fault Results

The Existing Faults page shows the words Fault Results, and a table with two columns:

- LRU NAME
- MESSAGE.

When the NFS senses a communication problem with the LRU, the LRU name shows, with the quantity of messages. If a network-connected LRU has no messages, it does not show in the table. To refresh the fault results data, the user can select a different page, and then return to the NFS MESSAGES page or can select refresh on the browser.

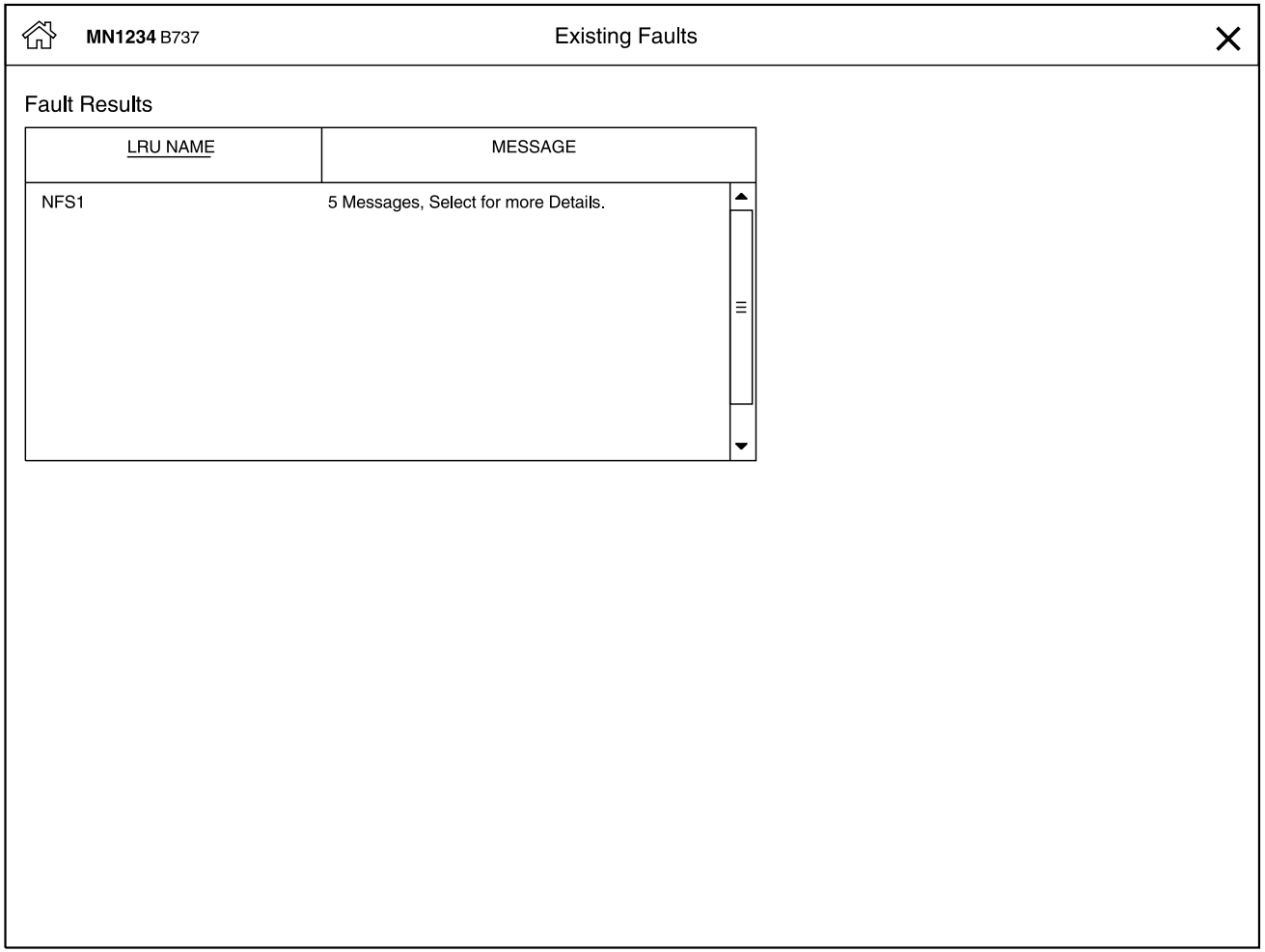
When no LRU shows, with no messages, then the ONS is serviceable.

Fault Details

When the LRU row is selected, the message shows in box below the words Fault Details. Use the scroll bar to examine all of the messages.

When a fault does show, refer to the same fault code number in the Fault Isolation Manual (FIM).

EXTENDED MAINTENANCE > ONS MAINTENANCE > EXISTING FAULTS:



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2314629 S0000526322_V1

ONS EXISTING FAULTS PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - ONS MAINTENANCE - LOGS

General

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

- Performance
- Security
- Syslog.

There is a separate page for each log type. Each of the three log pages has the same functions, and operates the same way.

To get access to these pages from the Onboard Network System (ONS) main menu, make the selections: Extended Maintenance > ONS Maintenance > Logs.

To exit the Logs page, and return to the main menu, click once on the Home icon in the upper left-hand corner. To exit the maintenance browser, and show the laptop's desktop, click once on the “X” in the upper right-hand corner.

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.

When one or more log files is highlighted, use the DOWNLOAD function to copy the file to an internal drive, or removable media.

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

Performance Logs

The selection Extended Maintenance > ONS Maintenance > Performance shows a record of performance log files, and functions to download or erase them.

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

Security Logs

The selection Extended Maintenance > ONS Maintenance > Security shows a record of network security log files, and functions to download or erase them.

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 can not be erased.

Syslogs Logs

The selection Extended Maintenance > ONS Maintenance > Syslogs shows a record of system log files, and functions to download or erase them.

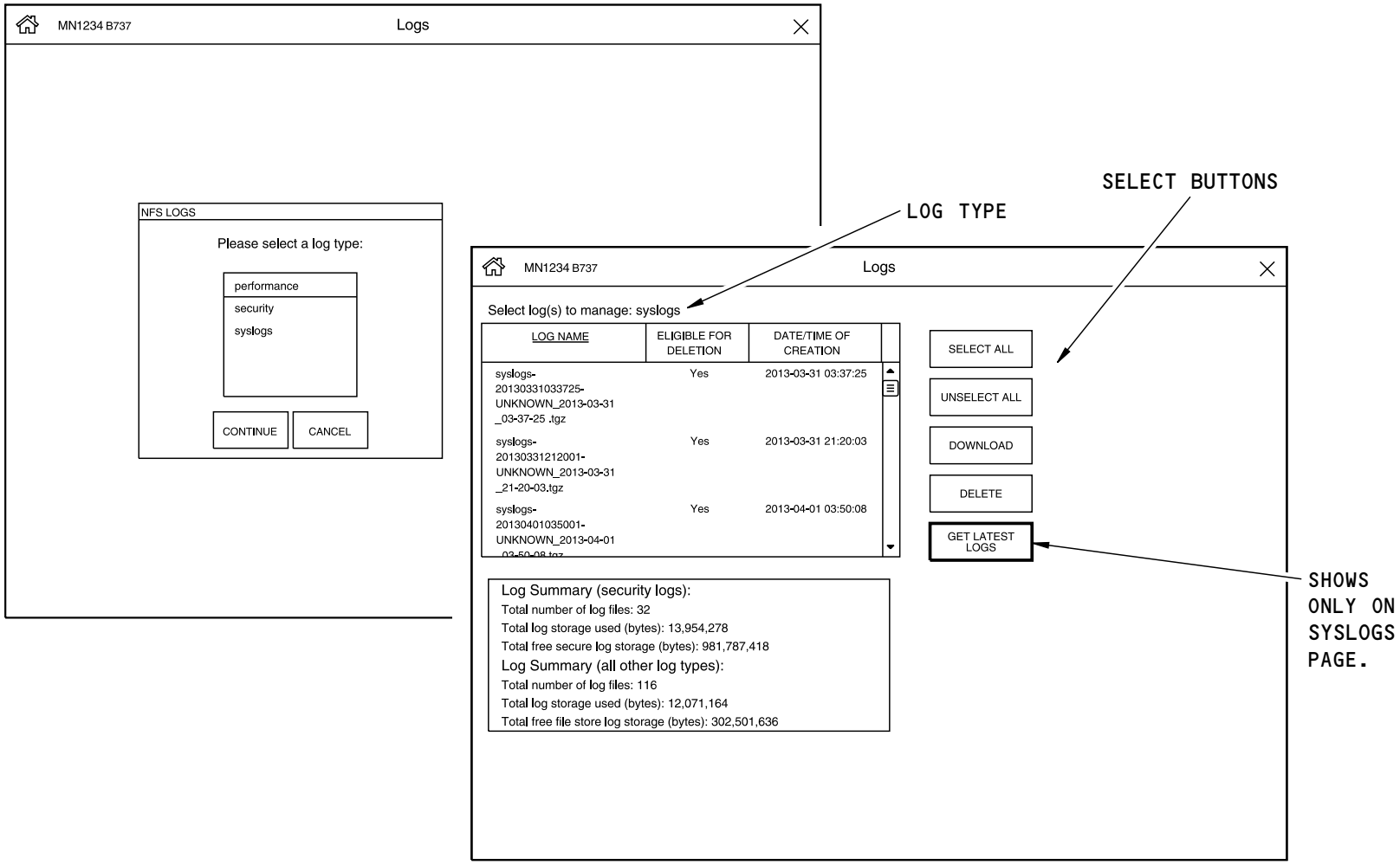
Syslog files contain a record of specified operations that can help troubleshoot software problems.

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

The function GET LATEST LOGS is an automated feature to isolate the newest syslog files for download.

ONBOARD NETWORK SYSTEM - APPLICATION - ONS MAINTENANCE - LOGS

EXTENDED MAINTENANCE > ONS MAINTENANCE > LOGS:



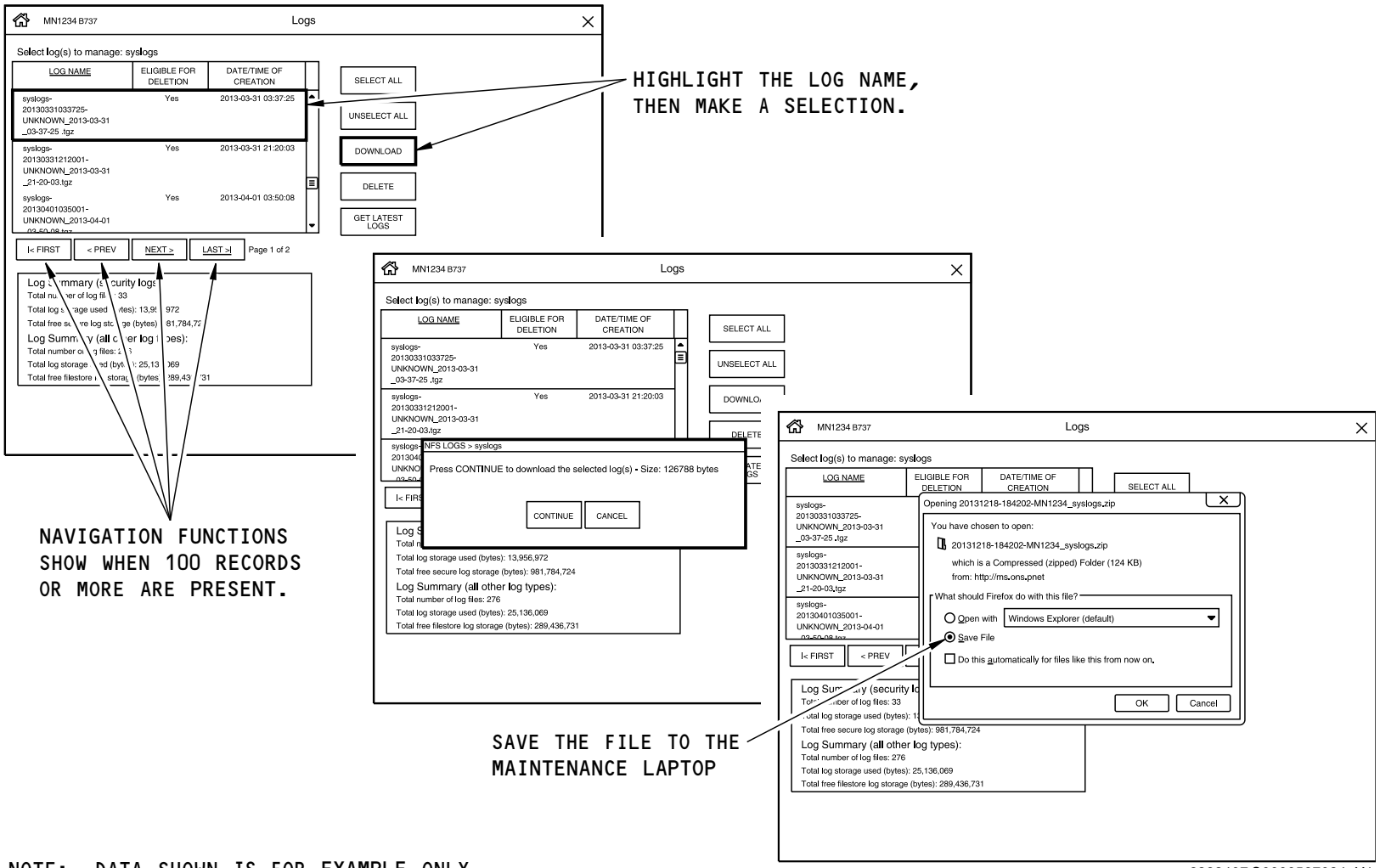
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2323302 S0000526229_V1

ONS MAINTENANCE - LOGS PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - ONS MAINTENANCE - LOGS

LOGS > SYSLOGS > DOWNLOAD:



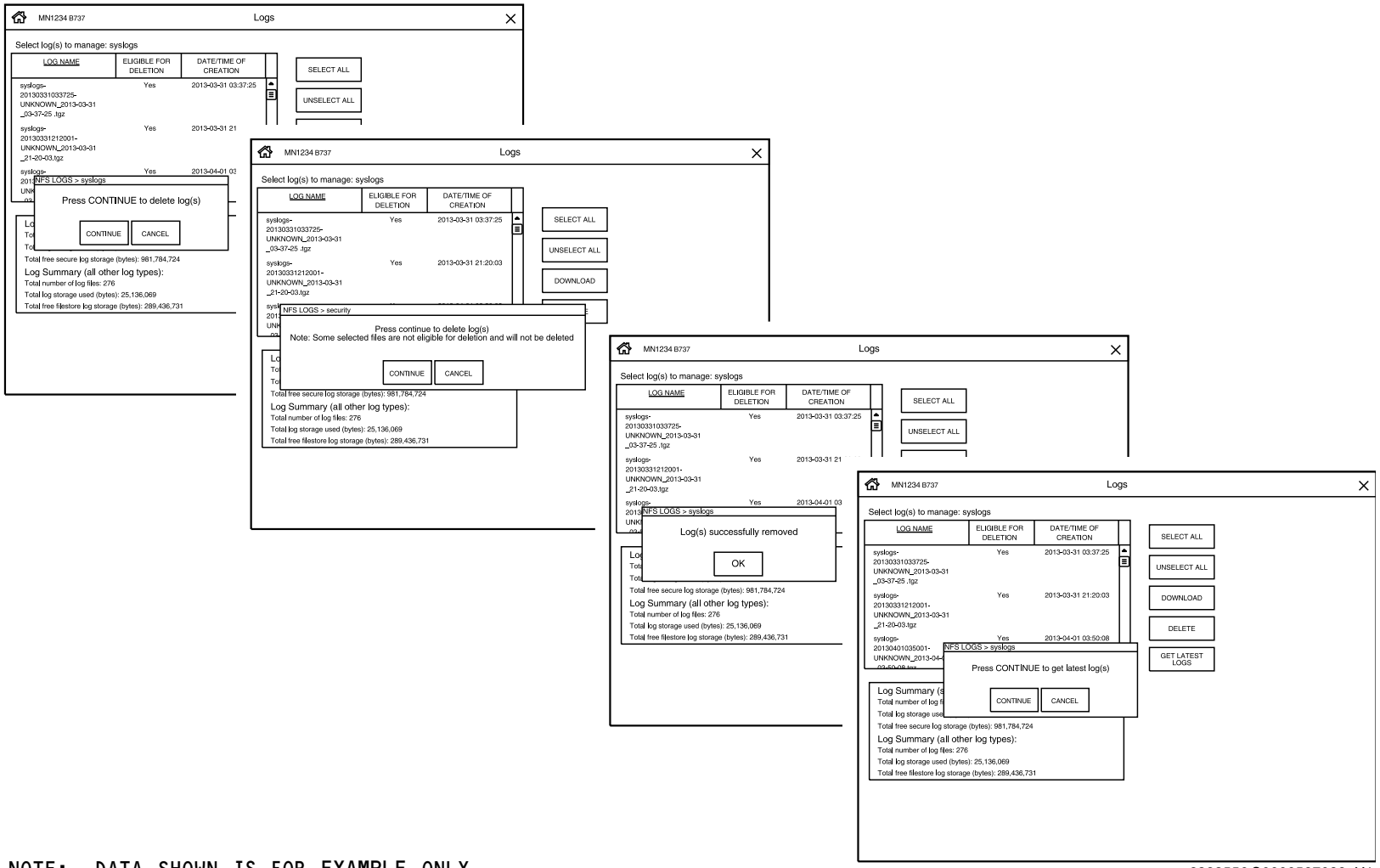
NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2323407 S0000527084_V1

ONS MAINTENANCE - LOGS PAGE

ONBOARD NETWORK SYSTEM - APPLICATION - ONS MAINTENANCE - LOGS

LOGS > SYSLOGS > DELETE:



2323556 S0000527089_V1

NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

ONS MAINTENANCE - LOGS PAGE

General

The ONS Services Test is a function that examines each installed network service, and reports the condition.

To show the page from the ONS menu bar, make the selections: Extended Maintenance > ONS Maintenance > Services Test.

Services Test

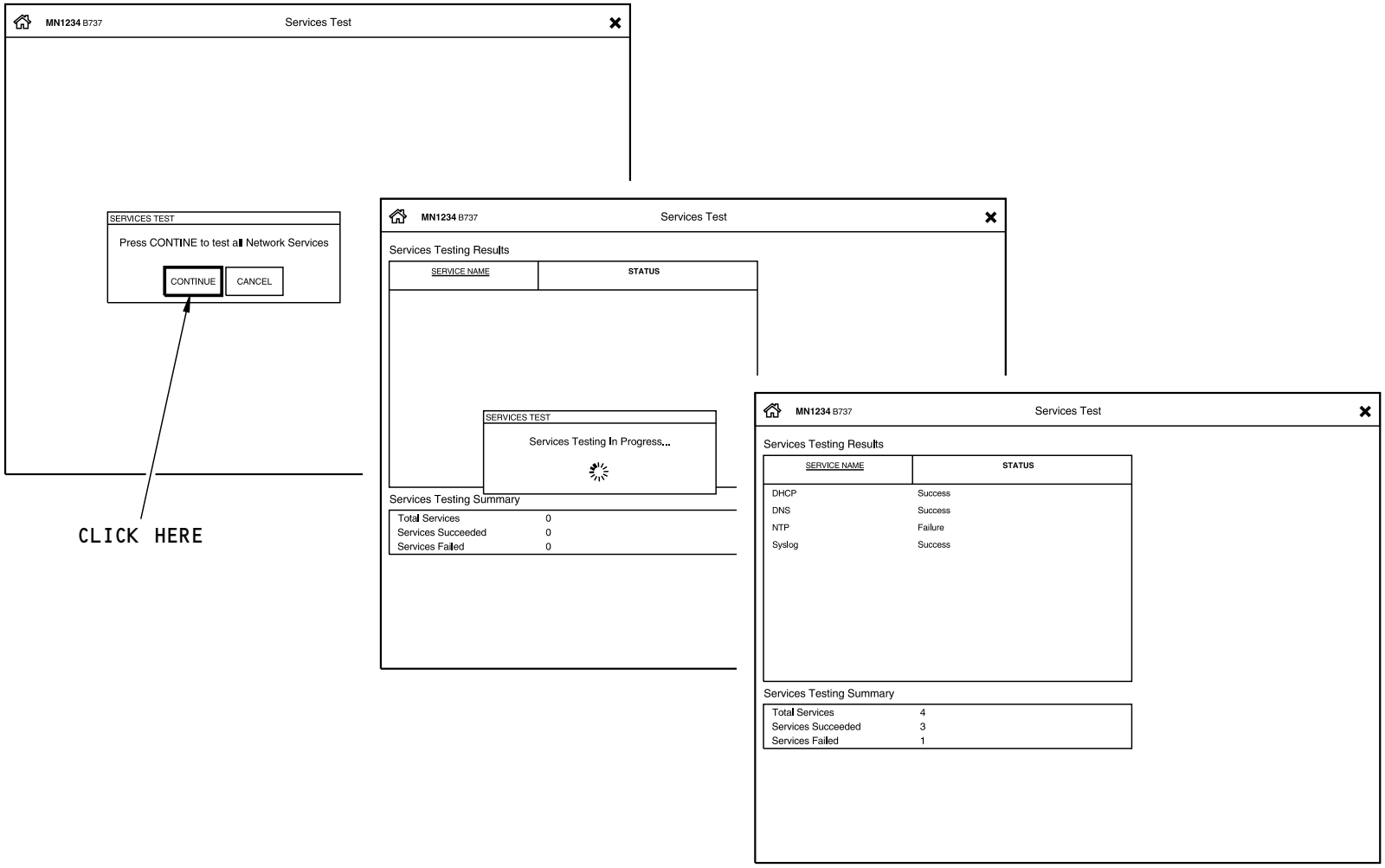
The Services Test page shows the results in a table with the headings SERVICE NAME, and STATUS. Typically, these are the names of the services installed:

- DHCP (dynamic host configuration protocol)
- DNS (domain name server)
- NTP (network time protocol)
- Syslog (system log).

Operation of the test is automatic. The results of the test shows below the word STATUS. A serviceable result shows the word Success. If the word Failure shows, then a maintenance action can be necessary.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - ONS MAINTENANCE - SERVICES TEST

EXTENDED MAINTENANCE > ONS MAINTENANCE > SERVICES TEST:



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2315203 S0000526230_V1

ONS MAINTENANCE - SERVICES TEST PAGE

General

Boot Operating System (OS) is a minimum, temporary operating system for use during Network File Server (NFS) OS maintenance. Boot OS is stored in NFS firmware.

The Reboot to Boot OS function sets the NFS to transfer control from NFS OS to Boot OS. When Boot OS is in service, then maintenance can be done to NFS OS software parts. Boot OS is not serviceable during flight.

From the main menu bar, you can get access to Reboot to Boot OS using these selections: Extended Maintenance > Onboard Network System (ONS) Maintenance > Reboot to Boot OS.

Reboot to Boot OS

The Reboot to Boot OS page has two buttons: REBOOT, and BACK.

To complete the Boot OS process, make your selections REBOOT, followed by CONTINUE on the confirmation pop-up window.

To exit, and show the ONS maintenance menu, you can click once on the BACK button, or click once on the home icon, in the upper left-hand corner.

Reboot to Boot OS Problems

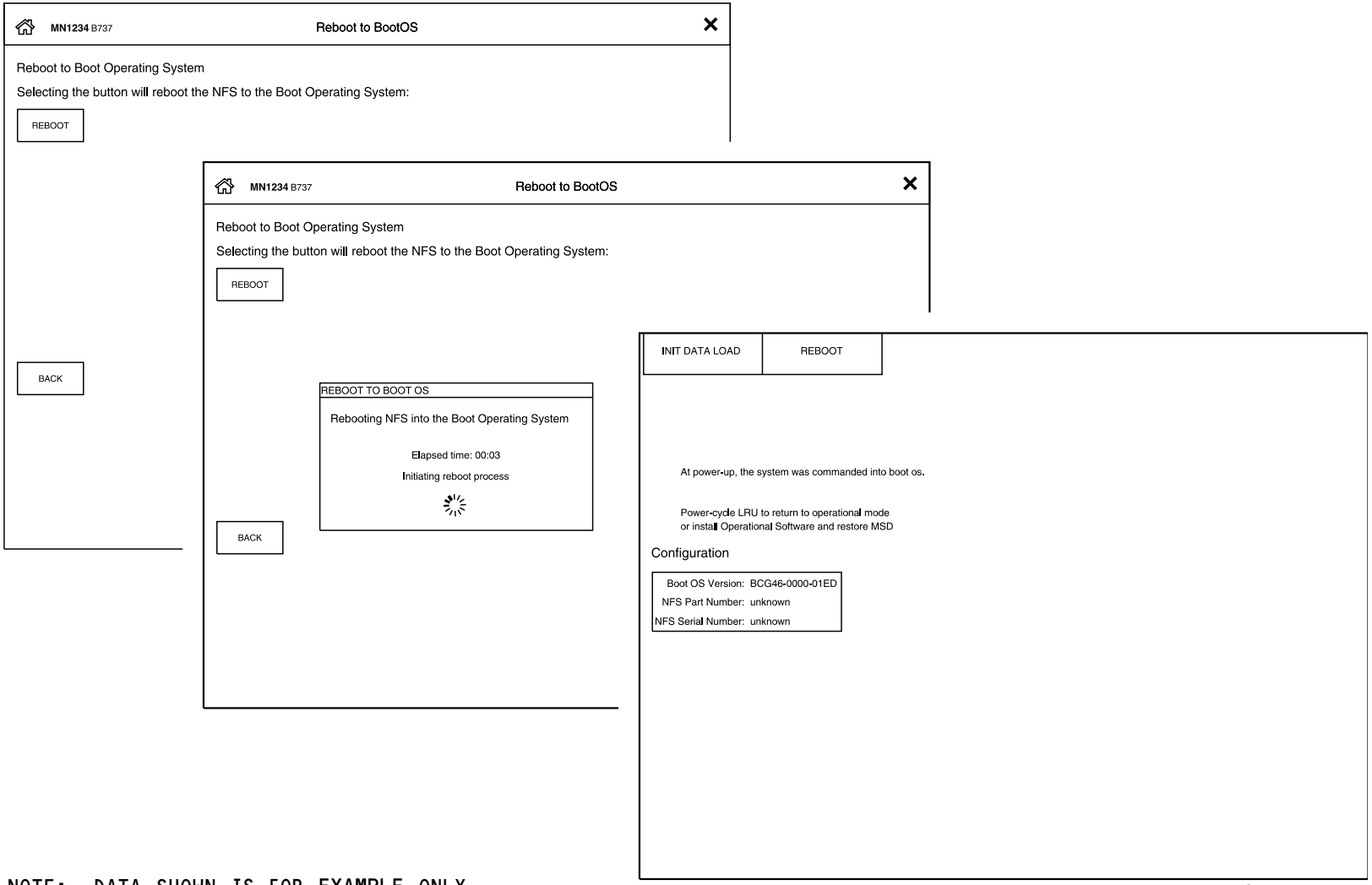
The Reboot to Boot OS function can be unserviceable when another function is already in service. A pop-up window will show the words ACCESS DENIED. These are operations that do not agree with the Reboot to Boot OS sequence:

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

The access denied window shows when an operation, that does not agree, is in operation. On the pop-up window, click on the OK button to show again the Reboot to Boot OS page. These steps can make the Reboot to Boot OS function serviceable again:

- Go to another screen, but not one shown on the list.
- Close or terminate the ONS browser.
- Begin a new session with the ONS Maintenance website.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - ONS MAINTENANCE - REBOOT TO BOOT OS



NOTE: DATA SHOWN IS FOR EXAMPLE ONLY

2314085 S0000526232_V1

ONS MAINTENANCE - REBOOT TO BOOT OS PAGE

General

The data reset function can restore a specified Onboard Network System (ONS) application to its default condition. All data used by the application is erased permanently.

From the ONS menu bar, you get access by making the selections: Extended Maintenance > ONSMaintenance > Data Reset.

To exit the function, and show the ONS Maintenance menu, click once on the “X” in the upper right-hand corner.

Data Reset

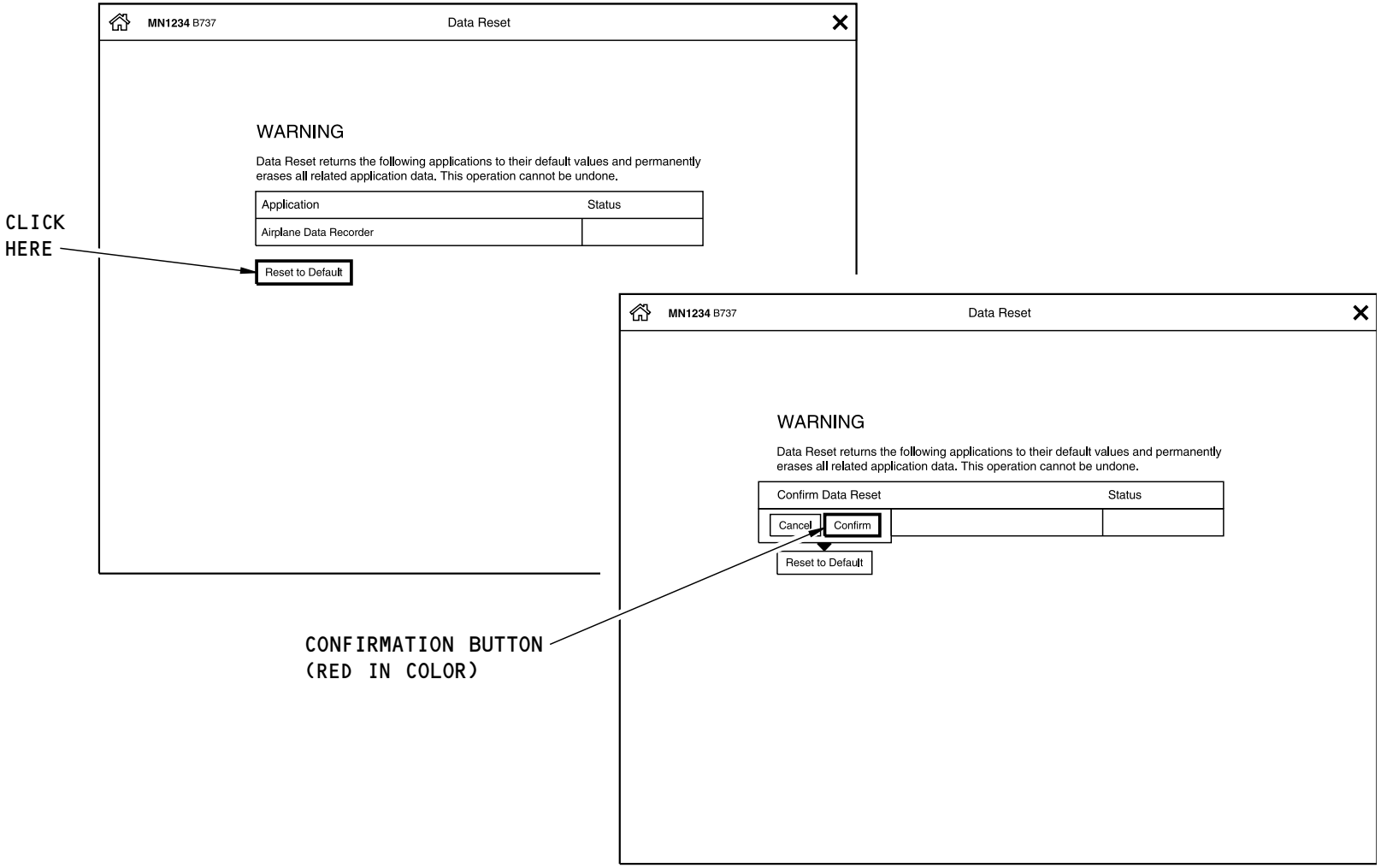
The data reset page shows a table with the columns Application, and Status. An application name that shows can be set to its originally installed condition, with no prior records or data. This operation does not install the application. It only erases data files that support the application.

To begin the data reset process, make the selection: Reset to Default. Follow the on-screen confirmation steps. When complete, the result shows below the word Status. A serviceable result shows the word Success.

In the upper right-hand corner, click on the “X” to show again the main menu.

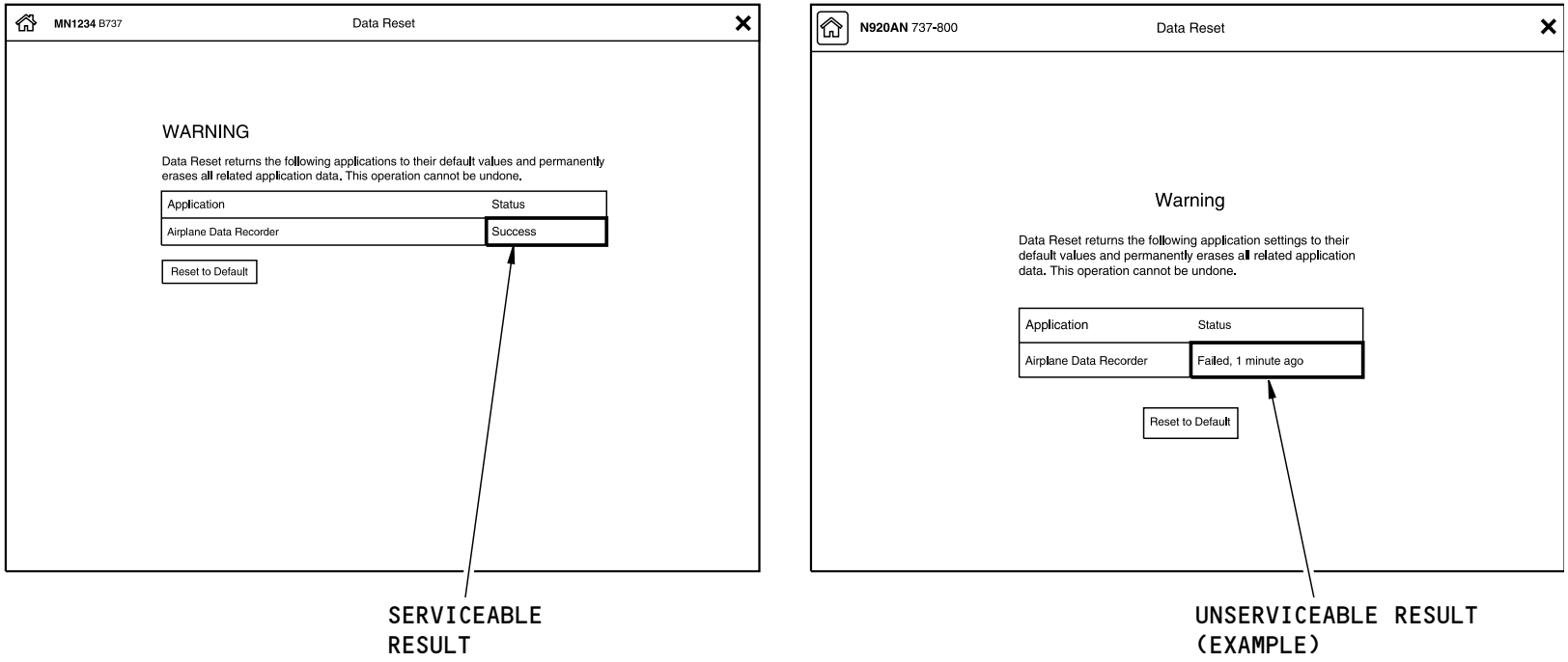
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - ONS MAINTENANCE - DATA RESET

EXTENDED MAINTENANCE > ONS MAINTENANCE > DATA RESET:



2323665 S0000526246_V1

ONS MAINTENANCE - DATA RESET PAGE



2323778 S0000527169_V1

ONS MAINTENANCE - DATA RESET

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ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - INPUT MONITORING

General

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

To get access from the main menu bar, make your selections: Extended Maintenance > Input Monitoring.

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.

To exit this menu and show the main menu, click on the home icon in the upper left-hand corner. To exit the ONS maintenance session and show the laptop's desktop, click on the “X” in the upper right-hand corner.

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 identification (ID)
- Aircraft Type
- Airline ID
- International Civil Aviation Organization (ICAO)
- Time
- Date
- Origin
- Destination
- Weight-On-Wheels (WOW).

These parameters can be helpful for ONS troubleshooting.

Input Monitoring > NFS

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

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

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.

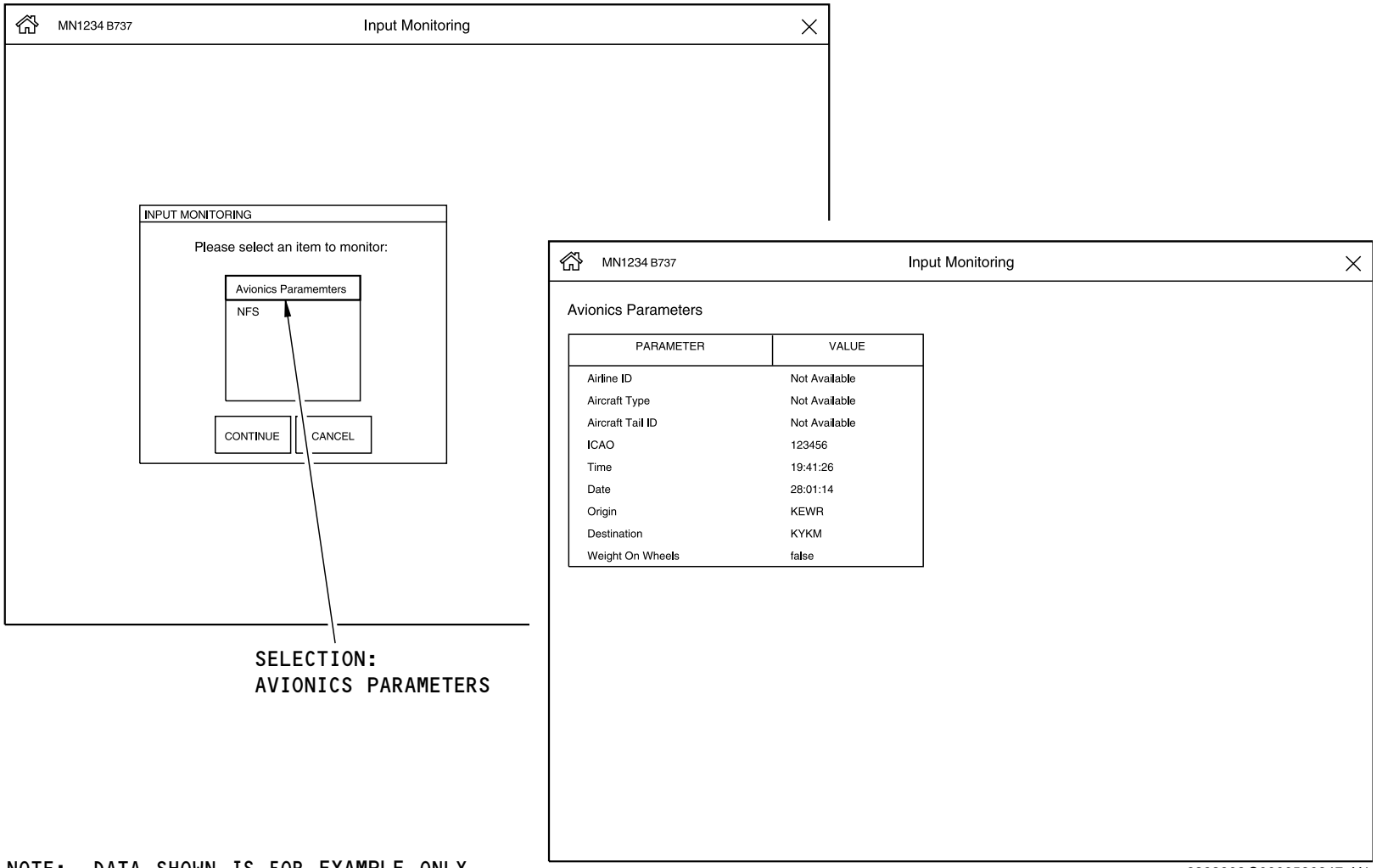
The data below STATUS gives the condition of the interface at the time the page was selected.

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.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - INPUT MONITORING

EXTENDED MAINTENANCE > INPUT MONITORING



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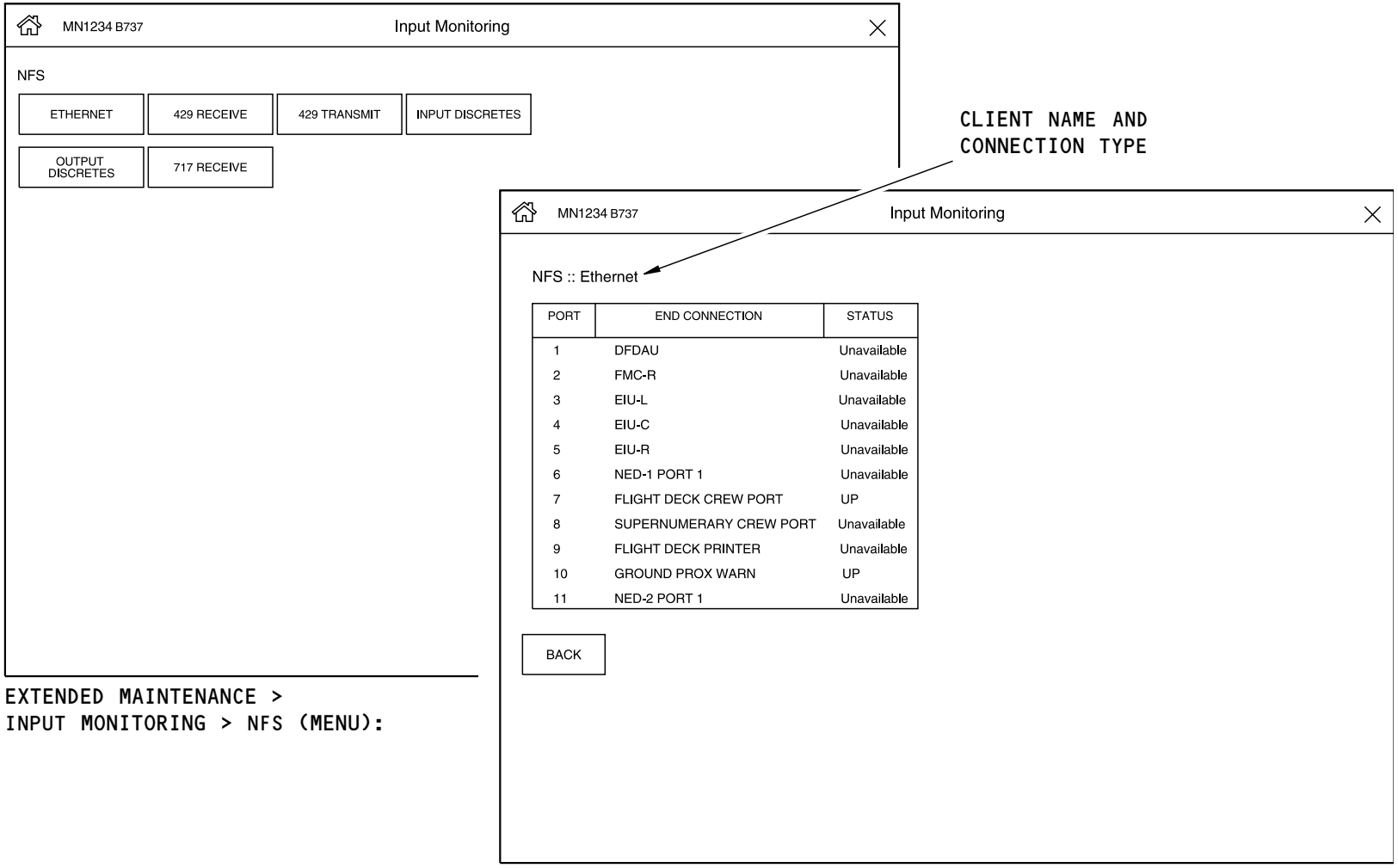
ONS INPUT MONITORING PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - INPUT MONITORING



EXTENDED MAINTENANCE >
INPUT MONITORING > NFS (MENU):

EXTENDED MAINTENANCE > INPUT MONITORING > NFS > ETHERNET:

2323913 S0000527271_V1

ONS INPUT MONITORING PAGE

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General

An 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.

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 LRU(s) can make a report:

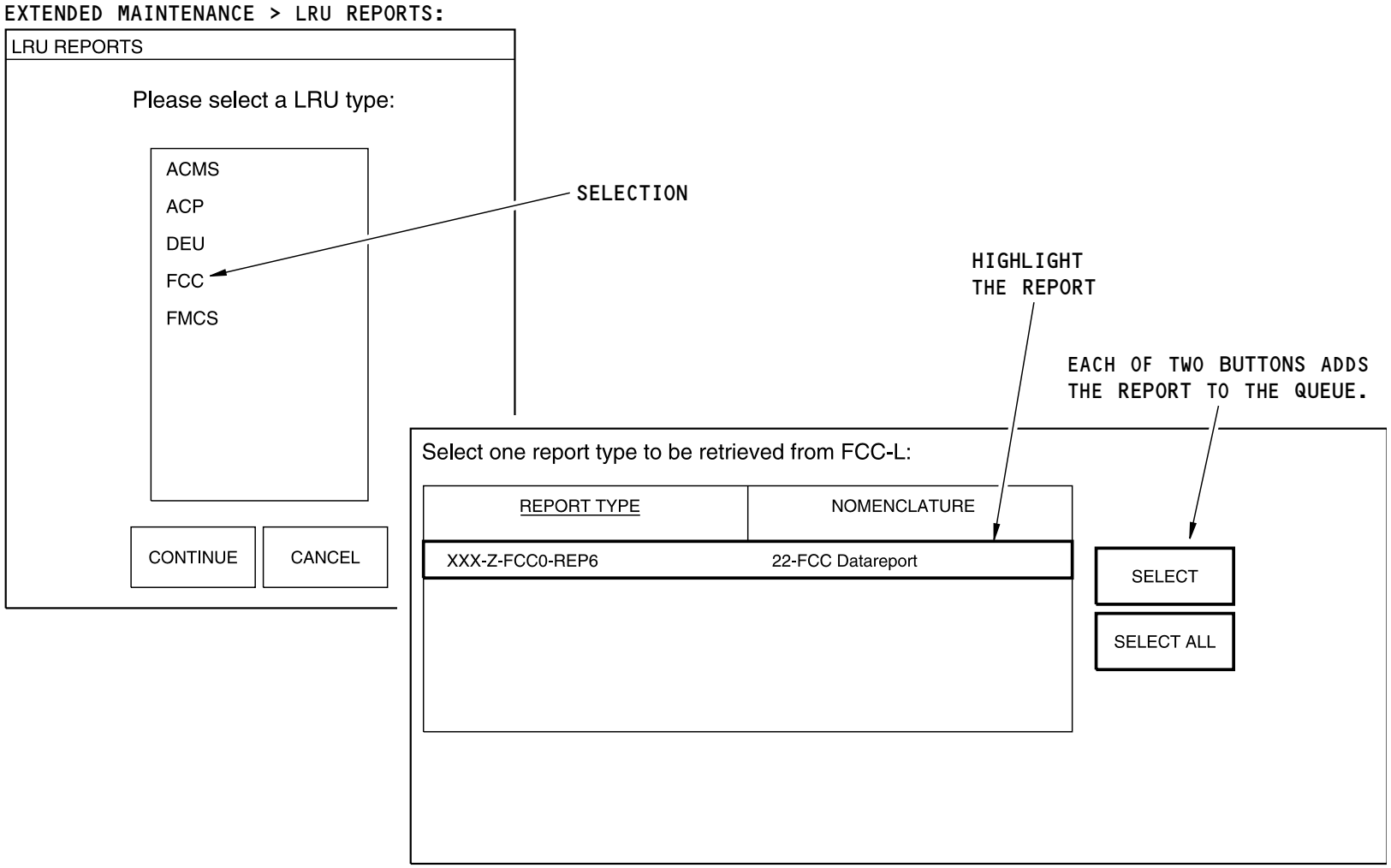
- Audio Control Panel (ACP)
- Display Electronic Unit (DEU)
- Flight Control Computer (FCC)
- Flight Management Computer (FMC)(s)

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

The main LRU Reports page then shows. Find the target report, and use to buttons to add to your reports to the selected group. When a report is selected, it shows in second data box, below the first.

When the report selection is set, make the Continue selection. Follow the on-screen confirmation step. When the report is ready, save the file to the maintenance laptop, or external memory.

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS



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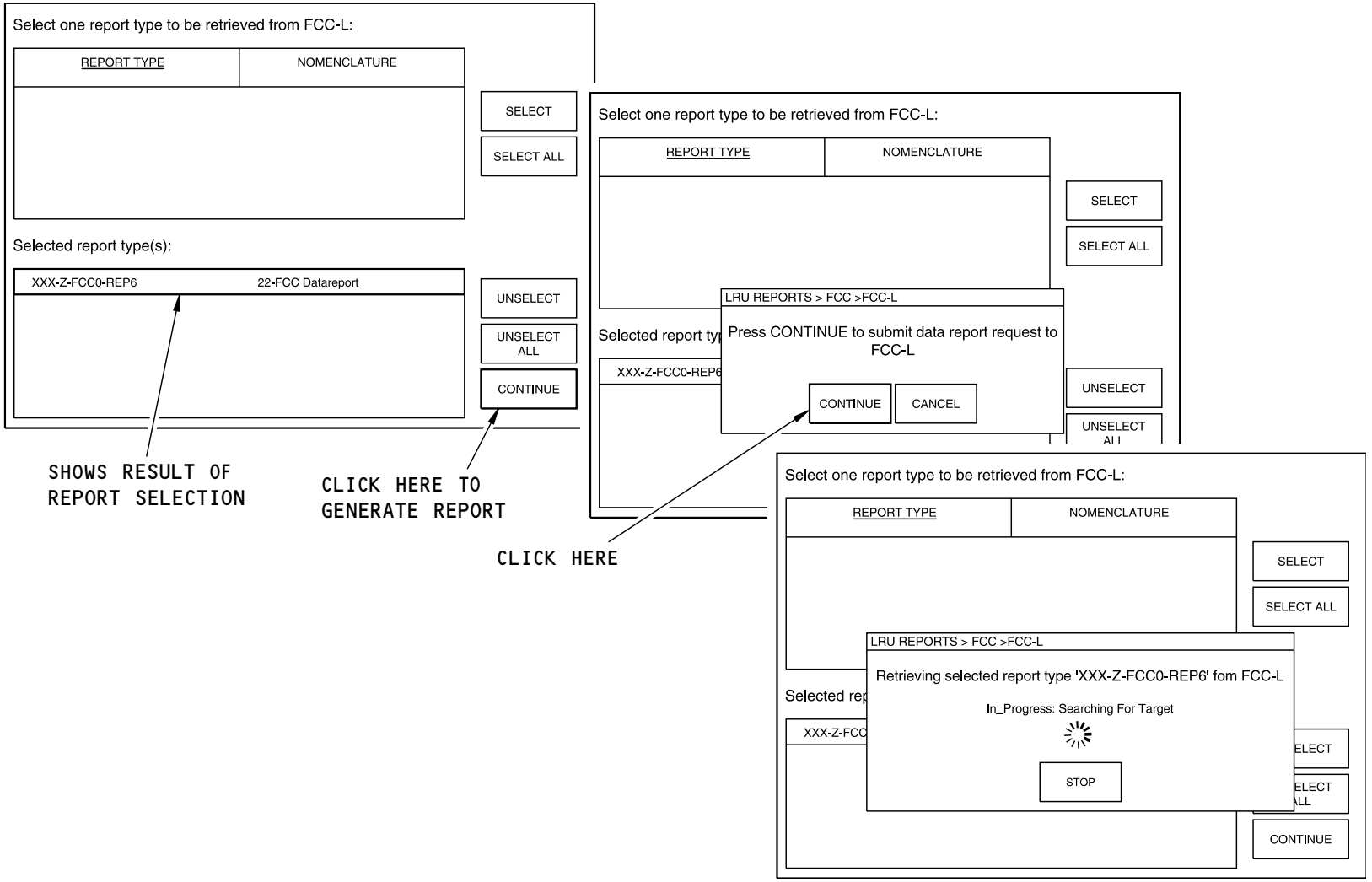
ONS LRU REPORTS PAGE

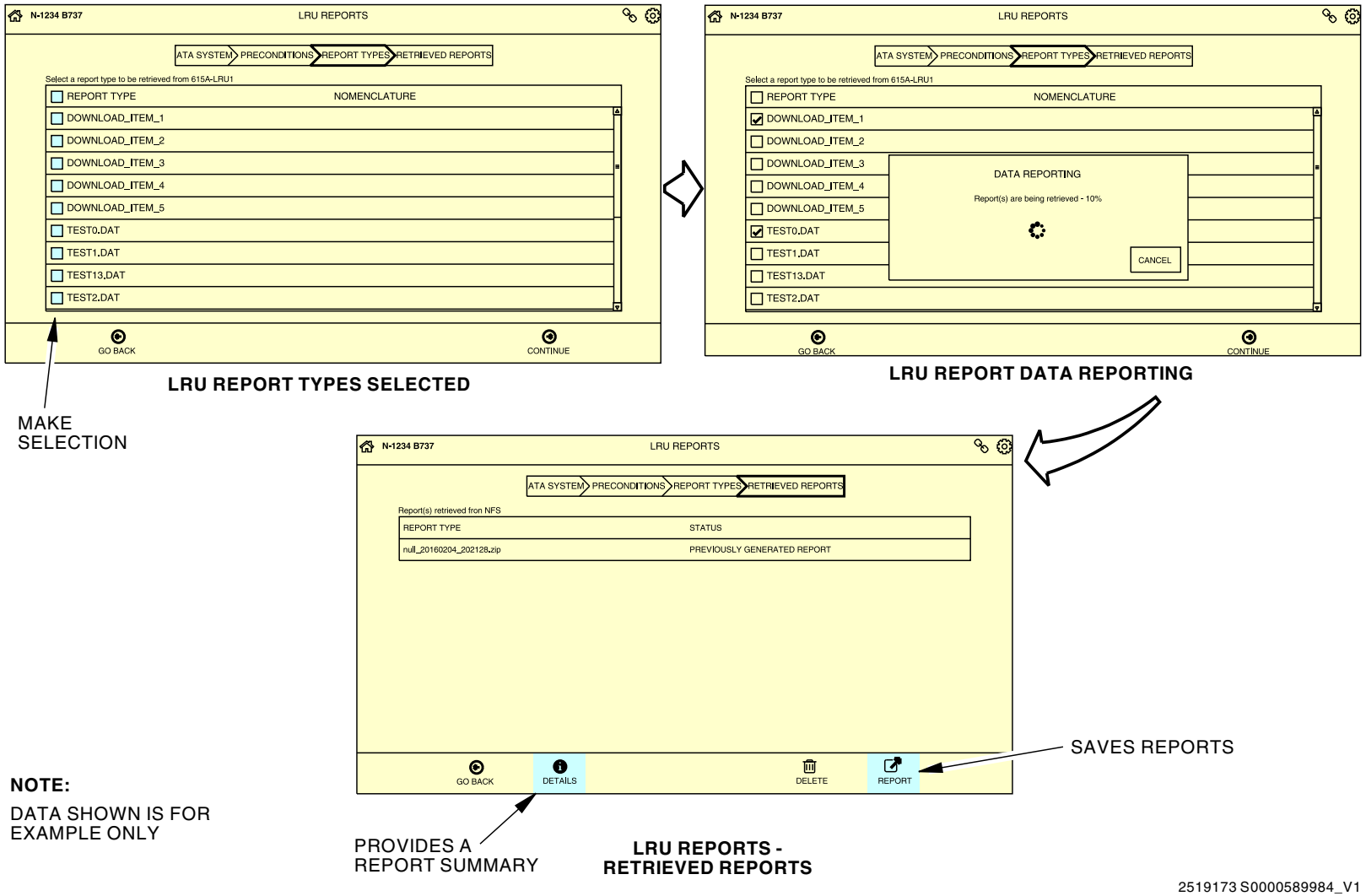
ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS



2323855 S0000527570_V1

ONS LRU REPORTS PAGE

ONBOARD NETWORK SYSTEM - EXTENDED MAINTENANCE - LRU REPORTS



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LRU REPORTS TYPES SELECTED, DATA REPORTING, AND RETRIEVED REPORTS

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS

General

On the ONS main menu bar, the third selection is named Other Functions.

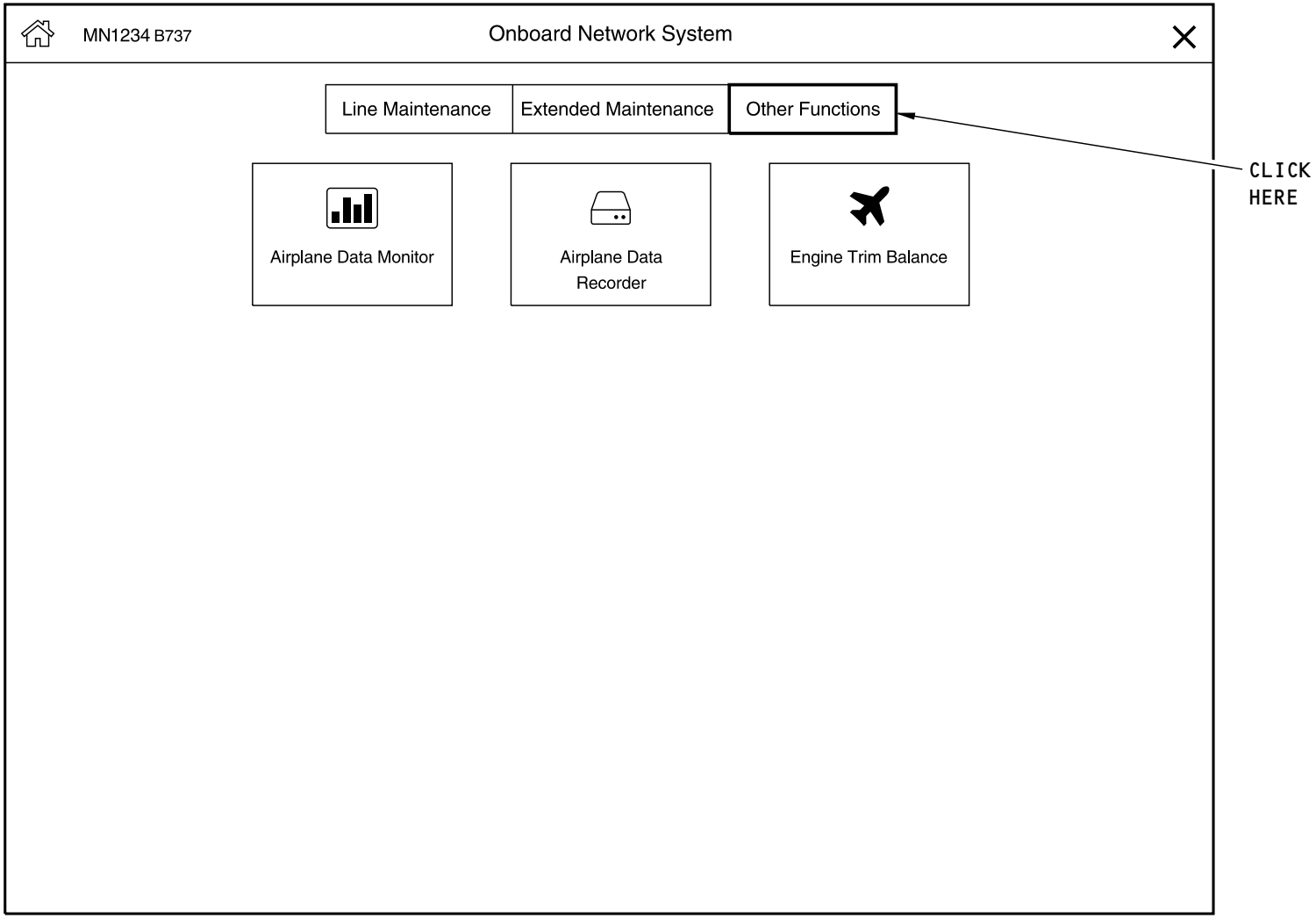
ONS Other Functions shows a menu. The menu shows applications specified by your airline or operator. For example, these selections can show:

- Airplane Data Monitor
- Airplane Data Recorder
- Engine Trim Balance.

NOTE: These three applications are shown for example only.

To see the Other Functions menu, use the Other Functions selection in the navigation bar.

ONBOARD NETWORK SYSTEM - OTHER FUNCTIONS



ONS - OTHER FUNCTIONS MENU