User Manual for Communication Certification of the Information Management System (IMS-6010)

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Rockwell Collins

Information Management System IMS-6010

User Manual

This manual includes coverage of the following equipment:

Unit	Model	Collins Part Number
Information Management System	IMS-6010	822-3132-XXX

Notice

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1. GENERAL ADVISORIES FOR ALL UNITS.

WARNING

Service personnel are to obey standard safety precautions, such as wearing safety glasses, to prevent personal injury while installing or doing maintenance on this unit.

WARNING

Use care when using sealants, solvents and other chemical compounds. Do not expose to excessive heat or open flame. Use only with adequate ventilation. Avoid prolonged breathing of vapors and avoid prolonged contact with skin. Observe all cautions and warnings given by the manufacturer.

WARNING

Remove all power to the unit before disassembling it. Disassembling the unit with power connected is dangerous to life and may cause voltage transients that can damage the unit.

WARNING

This unit may have components that contain materials (such as beryllium oxide, acids, lithium, radioactive material, mercury, etc) that can be hazardous to your health. If the component enclosure is broken, handle the component in accordance with OSHA requirements 29CFR 1910.1000 or superseding documents to prevent personal contact with or inhalation of hazardous materials. Since it is virtually impossible to determine which components do or do not contain such hazardous materials, do not open or disassemble components for any reason.

WARNING

This unit exhibits a high degree of functional reliability. Nevertheless, users must know that it is not practical to monitor for all conceivable system failures and, however unlikely, it is possible that erroneous operation could occur without a fault indication. The pilot has the responsibility to find such an occurrence by means of crosschecks with redundant or correlated data available in the cockpit.

WARNING

Before handling any unit or unit component, ground the repair operator through a conductive wrist strap or other device that uses a 470 kΩ or 1 MΩ series resistor to prevent operator injury.

CAUTION

Turn off power before disconnecting any unit from wiring. Disconnecting the unit without turning power off may cause voltage transients that can damage the unit.

a. De-energize or remove all power, signal sources, and loads used with the unit.

b. Place the unit on a work surface that can conduct electricity (is grounded).

c. Ground the repair operator through a conductive wrist strap or other device using a 470 kΩ or 1 MΩ series resistor to prevent operator injury.

d. Ground any tools (and soldering equipment) that will contact the unit. Contact with the operator's hand is a sufficient ground for hand tools that are electrically isolated.

e. All ESDS replacement components are shipped in conductive foam or tubes and must be stored in their shipping containers until installed.

f. ESDS devices and assemblies that are removed from a unit must immediately be put on the conductive work surface or in conductive containers.

g. Place repaired or disconnected circuit cards in aluminum foil or in plastic bags that have a layer of, or are made with, conductive material.

h. Do not touch ESDS devices/assemblies or remove them from their containers until they are needed.

CHAPTER 1
General Information

1.1. INTRODUCTION.

This installation manual provides information for the installation of the Information Management System (IMS-6010) in the aircraft. The Information Management System (IMS) is a standalone Line Replaceable Unit (LRU) that can be utilized in multiple avionics applications.

1.1.1. Equipment Covered.

The IMS-6010 is covered in this manual. The IMS-6010 is illustrated as such:

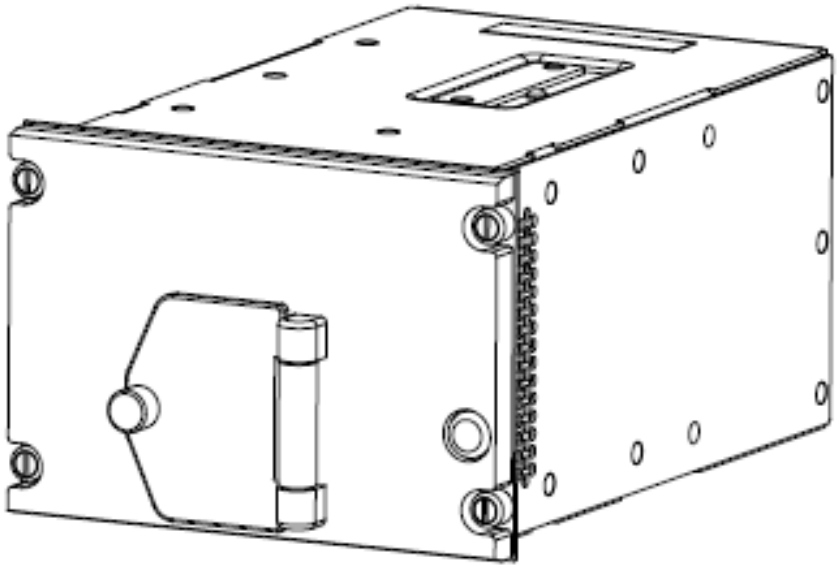

Figure 1-1. IMS-6010

1.1.2. Equipment Specifications.

Equipment specifications, physical characteristics, and power requirements for IMS-6010 are listed in Table 1-1.

Table 1-1. IMS-6010 Equipment Specifications.

CHARACTERISTIC	SPECIFICATION
Certification/Related Documents:	
Certification	
RTCA Documents	
Physical: Size:	
Height	104.78 mm (4.125 in) max.
Width	146.05 mm (5.750 in) max.
Length	248.54 mm (9.785 in) max. (USB and Ethernet access door in closed position)
Weight	1.79 kg (3.95 lb) nominal
Cooling Requirements	The IMS has both convectional cooling an internal fan which blows heated air out of the unit.
Electrical:	
Power Requirements	
Mounting Information	Refer to the Installation chapter for mounting information.
Mating Connector	Refer to the Installation chapter for mating connector information.

1.1.3. Environmental Qualifications.

Environmental qualifications for the IMS-6010 are listed in Table 1-2.

Table 1-2. IMS-6010 Environmental Qualifications Form.

CONDITIONS	DO-160G SECTION AND REV	EQUIPMENT QUALIFICATIONS CATEGORIES OF CONDUCTED TESTS
TEMPERATURE AND ALTITUDE:	4.0	A4
TEMPERATURE:	4.5	
GROUND SURVIVAL LOW TEMP	4.5.1	-55 °C (-67 °F)
OPERATING LOW TEMP	4.5.2	-15 °C (+5 °F)
GROUND SURVIVAL HIGH TEMP	4.5.3	+85 °C (+185 °F)
OPERATING HIGH TEMP	4.5.4	+55 °C (+131 °F)
IN FLIGHT LOSS OF COOLING	4.5.5	V. (30 Minute (+30 °C (+86 °F))
ALTITUDE	4.6.1	15, 000 ft

Table 1-2. IMS-6010 Environmental Qualifications Form. - Continued

CONDITIONS	DO-160G SECTION AND REV	EQUIPMENT QUALIFICATIONS CATEGORIES OF CONDUCTED TESTS
DECOMPRESSION	4.6.2	50,000 ft
OVERPRESSURE	4.6.3	170 kPa
TEMPERATURE VARIATION	5.0	B. (5 °C per minute)
HUMIDITY	6.0	A. (48 hours)
SHOCK:	7.0	B
OPERATIONAL	7.2	Tested at 6-g (11 ms duration)
CRASH SAFETY	7.3	Impulse 20-g, sustained 20-g
VIBRATION	8.0	(RBBI)(HR)(SM)
WATERPROOFNESS	9.0	E
FLUID SUSCEPTIBILITY	10.0	X
SAND AND DUST	11.0	X
FUNGUS RESISTANCE	12.0	X
SALT SPRAY	13.0	X
MAGNETIC EFFECT	14.0	X
POWER INPUT	15.0	Z
VOLTAGE SPIKE	16.0	B and Z.
AUDIO FREQUENCY SUSCEPTIBILITY	17.0	A
INDUCED SIGNAL SUSCEPTIBILITY	18.0	Z
RF SUSCEPTIBILITY	19.0	CC
EMISSION OF RF ENERGY	20.0	KR
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	21.0	M
LIGHTNING DIRECT EFFECTS	22.0	(A3)(J3)3
ICING	23.0	X
ELECTROSTATIC DISCHARGE SUSCEPTIBILITY	24.0	X
FLAMMABILITY	25.0	A
	26.0	X

1.2. PURPOSE OF EQUIPMENT.

Refer to Table 1-3 for a list of the units included in this manual.

1.3. EQUIPMENT OVERVIEW.

The IMS is Dzus-rail mounted LRU that provides a commercial data processing capability. The IMS is capable of transferring maintenance data between off-board commercial PC platforms and the aircraft cockpit. The IMS is used to run on-aircraft software packages that are hosted on the Windows 7 operating system.

1.3.1. Single Board Computer.

The SBC provides core X86 processing functionality in a small plug-in module.

1.3.2. Solid State Drive.

The Solid State Disk drive provides functionality equivalent to a PC spinning hard disk drive.

1.3.3. Wireless LAN Adapter.

The Wireless LAN Adapter provides an interface to 802.11 b/g wireless networks.

1.3.4. Power Supply CCA.

The Power Supply CCA is a plug-in card assembly that mates with the Interconnect card. The Power Supply converts the 28 VDC nominal power input to a regulated +5 VDC output for use by the other IMS modules. Included is a housekeeping supply and monitors for temperature, voltage and current. Storage capacitors are charged with sufficient energy to allow the IMS to continue to play through 200 ms power interrupt.

1.3.5. PC Base CCA.

The PC Base CCA is a plug-in card assembly that mates with the Interconnect card. The PC Base CCA is a Baseboard for hosting the Physical Layer I/O to support the ETX Computer Module. It provides Discrete I/O, one USB 2.0 port, one Ethernet Maintenance port, and a VGA Test port for use outside of the IMS cabinet. The PC Base CCA provides a PCI Bus, two IDE channels, an I2C/SMBus, and an ISA Bus for use within the IMS cabinet.

1.3.6. 802 Comm CCA.

The 802 Comm CCA is a plug-in card assembly that mates with the Interconnect card. The 802 Comm CCA also mates directly via stacking connectors with the PC Base card. The 802 Comm CCA provides seven total Ethernet Ports out of the IMS cabinet; two are dedicated for AFDX channels. The 802 Comm CCA provides 802.11b/g Wireless LAN functionality via a mini-PCI interface to a purchased Wireless Adapter mini-PCI card, which is hosted on the 802 Comm.

1.3.7. Interconnect CCA.

The Interconnect CCA attaches via screws into the rear of the IMS chassis structure. The Interconnect CCA provides interconnect between the CCAs and the external connectors. The Interconnect CCA provides lightning protection for the power input. The Interconnect CCA acts as a filter for signals and provides lightning protection for them.

1.3.8. Sim Board CCA.

The Sim Card CCA is a plug-in card assembly that mates directly with a stacking connector on the Comm CCA. The Sim Board CCA provides 4 SIM card slots for cellular function.

Table 1-3. IMS Major Components.

Assembly	Part Number	Description
Single Board Computer	270-3489-010	Purchased assembly.
Solid State Drive	270-3499-020	Purchased assembly.
Wireless LAN Adapter	270-3512-010	Purchased assembly.
PC Base CCA	828-3845-103	Manufactured circuit card assembly.
802 Comm CCA	828-3846-103	Manufactured circuit card assembly.
Power Supply CCA	828-3844-103	Manufactured circuit card assembly.
Interconnect CCA	828-3847-003	Manufactured circuit card assembly.
Sim Board CCA	828-4292-001	Manufactured circuit card assembly

1.4. RELATED PUBLICATIONS.

Refer to Table 1-4 for a list of publications related to IMS-6010.

Table 1-4. Related Publications.

PUBLICATION	COLLINS PART NUMBER
Rockwell Collins Installation Practices Manual	523-0775254
Rockwell Collins Bonding and Grounding Practices Manual	523-0776007

1.5. STORAGE.

The IMS-6010 should be stored in its original packing materials and shipping container. If the unit is to be stored for a long period of time, put the unit in an airtight plastic bag with sufficient desiccant to absorb moisture. At no time should the ambient temperature of the storage area fall below -55 °C (-67 °F) or rise above +85 °C (+185 °F). The relative humidity should never exceed 95 percent. If the unit is stored for an extended period of time, retest the unit prior to returning it to service to ensure that possible component degradation has not affected performance.

CHAPTER 2
Installation

2.1. GENERAL.

This chapter provides information for the installation of the Information Management System (IMS-6010). Procedures must be performed as described below to be sure of proper operation and performance.

NOTE

The information and instructions provided in this chapter are recommendations and do not necessarily correspond with any actual aircraft installation and wiring. This chapter cannot be used in place of a Supplemental Type Certificate (STC) or Type Certificate (TC).

2.2. UNPACKING AND INSPECTING EQUIPMENT.

Unpack the equipment carefully and make a careful visual inspection of the unit for possible shipping damage. All claims for damage should be filed with the transportation company involved. If claims for damage are to be filed, save the original shipping container and materials. If no damage can be detected, replace packing materials in the shipping container and save for future use (for example, storage or reshipment). Perform a visual inspection of the unit and inspect for the following concerns:

1. Look for any damage or corrosion.
2. Make sure all parts are intact and in working order.
3. Check connectors J1, J2, J3, J5, and J6 for any damage, corrosion and broken or bent pins.

2.3. PRE-INSTALLATION CHECK.

CAUTION

Remove all electrical power to the equipment and/or equipment mounts before installing or removing them.

Prior to installation of unit in the aircraft, make sure the system or equipment that will interface with the IMS-6010 is operating properly and all applicable tests have been performed. Refer to the latest revision of the Component Maintenance Manual (CMM) or Illustrated Parts List (IPL) to perform testing of the unit. In the absence of the CMM/IPL, the Acceptance Test Procedure for the panel variant will be used to perform testing of the unit.

2.3.1. Cabling Precautions.

Observe the following precautions during the preparation of the interconnect wiring cables:

- Bond and shield all parts of the aircraft electrical system such as generators and ignition systems.
- Keep connecting cables away from heavy current carrying circuits, pulse transmitting equipment, and interference sources.
- Make all external connections to the system equipment through the designated connector J1, Figure 2-2 and connector J2, and Figure 2-3 and connector J3. The required hardware and connector are supplied if specified.
- Suitable wire should be used in accordance with applicable specifications.
- Leave slack in cable to allow free movement of equipment, keeping wires from breaking.

2.4. PLANNING.

Proper and careful planning prior to installation is essential for reliable performance and easy maintenance. The list that follows is a sample of the points to be considered in planning an installation:

1. Installation location. Allow for adequate airflow for cooling, good bonding to aircraft ground, ease of cable routing, room for single/dual/triple mounting in a location that provides structural rigidity.
2. Installation configuration.
3. Compatibility with other equipment and loading considerations.

2.4.1. Installation Configurations.

The complete configuration is dependent of the desired connections to ancillary equipment. Figure 2-1 shows a typical configuration:

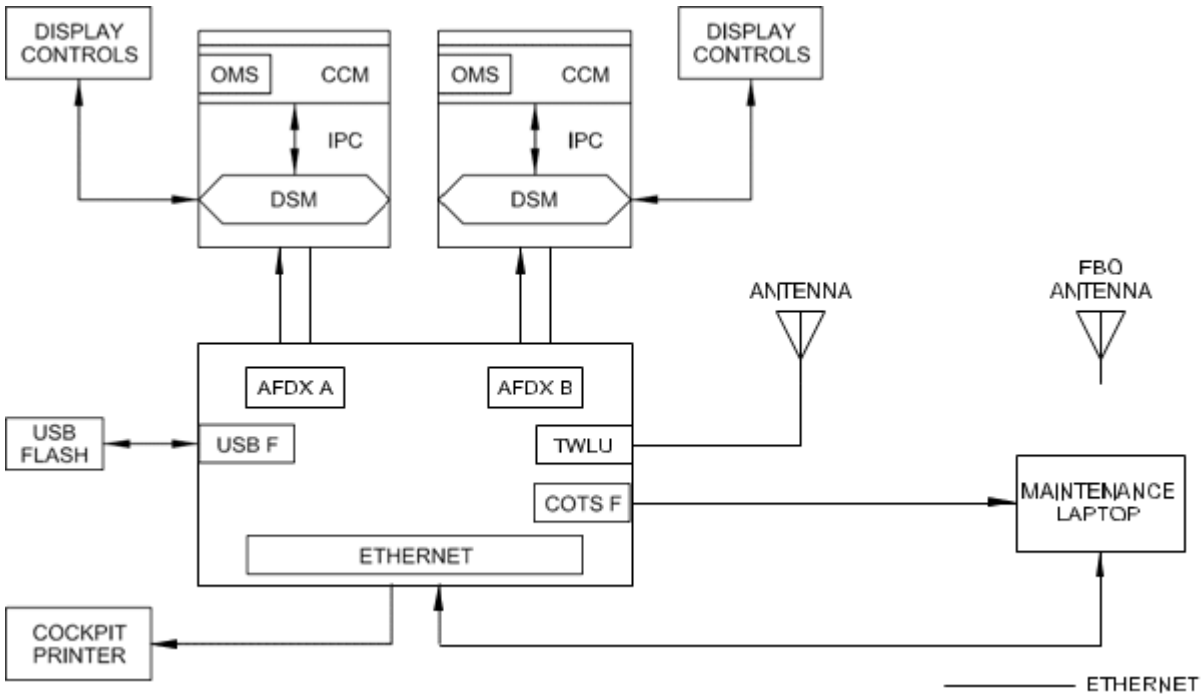

Figure 2.1. IMS-6010 Configuration

2.4.2. Strapping Options.

There are no strapping requirements for the IMS-6010.

2.4.3. Input Power.

All power required by the IMS-6010 is provided by the aircraft in which the system is installed. The IMS-6010 requires an input of +28 V dc at 55 watts (max) of power for normal operation.

2.4.4. Cooling Considerations.

For IMS-6010 environmental qualification refer to Chapter 1, General Information.

2.4.4.1. Units tightly packed on the equipment rack heat each other through radiation, convection, and sometimes by direct conduction. If space permits, separate the units from each other to significantly improve reliability.

2.4.4.2. Even a single unit operates at a much higher temperature in still air than in moving air. Fans, or some other means of moving the air around electronic equipment, are usually a worthwhile investment. If a form of ram air cooling is installed, make certain that rainwater cannot enter and be sprayed on the equipment.

2.5. CABLING INSTRUCTIONS.

WARNING

Make sure that the aircraft battery master switch is turned off before installing any of the interconnect cabling. Failure to do so could cause electrical arcing that might result in damage to the equipment or serious injury to maintenance personnel.

Interconnect cables should be prepared in accordance with the interconnect diagrams which are part of approved supplemental type certificate data packages.

2.5.1. Parts Required.

Table 2-1 lists the mating connectors, strain reliefs and contacts required to install the IMS-6010.

Table 2-1. IMS-6010 Mating Connector Hardware.

REF DES	LRU CONNECTOR	MATING CONNECTOR	BACKSHELL/STRAIN RELIEF	DESCRIPTION
	CPN MIL VENDOR PN	CPN MIL VENDOR PN	CPN MIL VENDOR PN	
J1	D38999/20FG35AN D38999/20FG35AN	D38999/26FG35SN D38999/26FG35SN	GLENAIR 400HS001M2107L3 or equivalent	79 PIN SERIES FOR ETHERNET
J2	D38999/20FG35AA D38999/20FG35AA	D38999/26FG35SA D38999/26FG35SA	859-6619-160 or equivalent	79 PIN SERIES FOR SIGNAL AND POWER
J3	357-7347-010 M39012/28-0018	M39012/26-0011 M39012/26-0011		TNC WLAN 1, MATE IS PLUG FOR RG-400
J4				
J5	268-0013-110 RJ-45 JACK	RJ-45 PLUG		FRONT PANEL RJ-45
J6	360-0417-010 USB TYPE A	USB PLUG		FRONT PANEL USB

2.5.2. Connector Information.

2.5.2.1. During preparation of the interconnect cables, observe the precautions that follow:

- Read all notes on the drawings and interconnect diagrams prior to fabricating interconnect wiring cables.
- Bond and shield all parts of the aircraft electrical system, for example, generator and ignition systems.
- Keep the interconnect cables away from circuits carrying heavy current, pulse transmitting equipment, and other sources of interference.
- Make all external connections of the equipment through the designated connectors listed on the outline and mounting diagrams.

- For balanced connections, use twisted-pair shielded wiring for minimum pickup of electrostatic and magnetic fields. Avoid long runs of wire and keep input and output circuits separated as much as possible.
- All interconnect wires and cables should be marked in accordance with the Aircraft Electronics Association (AEA) WireMarking Standard.
- Avoid excessive cable lengths, but allow sufficient slack for movement due to vibration.
- After installation of the cables in the aircraft, and before installation of the equipment, check to make sure that aircraft power is applied only to the pins specified on the interconnect diagrams and that all other wires and shields are properly terminated.

2.5.3. Cable Shields and Cable Shield Grounds.

All wiring and component selections must follow the specification FAA AC43.13-1B and the accepted procedures of the industry.

1. Connect the unit primary DC power-return circuit and chassis ground (if used) to the different ground points in the aircraft. Do not connect these two circuits together at their ground points. Make each wire as short as possible, do not make more than 1 meter (39.37 inches). All power (high) wiring must be a minimum of AWG 22 with the power (ground) wiring AWG 20 unless differently noted.
2. Connect to ground the two ends of the cable that have an external shield unless shown differently.
3. Connect all the cable shields to ground at one ground-point for each, unless shown differently. If the connector backshell is of a metal conductor material and a low impedance bond is made, connect the cable shield to the connector backshell and keep the shields internal to the connector backshell.
4. Connect the cable shield to related pins in the connector when a low-impedance bond is not made to the connector backshell. Alternate scheme gives less shielding and the performance is substantially decreased at the radar and higher frequencies.

Table 2-2. Mating Cable Guidelines For IMS-6010

Signal type	Cable type	Max cable length	Shield config	Gnd/Rtn
Ethernet	Tensolite NF24Q100 or equivalent	73 m	Integral shield, ties to backshell	N/A
USB	Tensolite NF24Q100 or equivalent	5 m		Dedicated power return
Discrete	22 gauge or equivalent			Referenced to common signal ground
Audio input	Twisted, shielded pair, 24 gauge or equivalent			
RF	RG400 coaxial or equivalent	20 ft		
+28VDC & 28VDC_RTN	22 gauge or equivalent		N/A	Dedicated power return

2.6. CABLE ASSEMBLY - CONNECTOR J1 PINS.

NOTE

Different cable assemblies may not be required depending on aircraft configuration.

For additional information during the cable assembly and the system overview for the unit interface being used refer to Figure 2-2, Figure 2-4, and Table 2-3 for Connector J1.

Table 2-3. J1 Connector Pin Functions.

PIN	FUNCTION	CONNECTION	TYPE
1	AFDX CHANNEL A ETHERNET PORT TRANSMIT HIGH		Output
2	AFDX CHANNEL A ETHERNET PORT TRANSMIT LOW		Output
3	RESERVED		
4	AFDX CHANNEL A ETHERNET PORT RECEIVE HIGH		Input
5	AFDX CHANNEL A ETHERNET PORT RECEIVE LOW		Input
6	RESERVED	No connection	
7	USB PORT 1 DATA HIGH		Input/Output
8	USB PORT 1 DATA LOW		Input/Output
9	RESERVED		
10	USB PORT 1 +5 VDC POWER (500 ma max)	Power	Output
11	USB PORT 1 POWER RETURN		
12	RESERVED	No connection	
13	AFDX CHANNEL B ETHERNET PORT TRANSMIT HIGH		Output
14	AFDX CHANNELl B ETHERNET PORT TRANSMIT Low		Output
15	RESERVED	No connection	
16	AFDX CHANNEL B ETHERNET PORT RECEIVE HIGH		Input
17	AFDX CHANNEL B ETHERNET PORT RECEIVE LOW		Input
18	RESERVED	No connection	
19	ETHERNET PORT 1 TRANSMIT HIGH		Output
20	ETHERNET PORT 1 TRANSMIT LOW		Output
21	RESERVED	No connection	
22	ETHERNET PORT 1 RECEIVE HIGH		Input
23	ETHERNET PORT 1 RECEIVE LOW		Input
24	RESERVED	No connection	
25	ETHERNET PORT 2 RECEIVE HIGH		Input
26	RESERVED	No connection	
27	ETHERNET PORT 2 TRANSMIT HIGH		Output
28	RESERVED	No connection	
29	RESERVED	No connection	

Table 2-3. J1 Connector Pin Functions. - Continued

PIN	FUNCTION	CONNECTION	TYPE
30	RESERVED	No connection	
31	RESERVED	No connection	
32	RESERVED	No connection	
33	RESERVED	No connection	
34	RESERVED	No connection	
35	RESERVED	No connection	
36	RESERVED	No connection	
37	RESERVED	No connection	
38	RESERVED	No connection	
39	RESERVED	No connection	
40	RESERVED	No connection	
41	RESERVED	No connection	
42	RESERVED	No connection	
43	RESERVED	No connection	
44	RESERVED	No connection	
45	RESERVED	No connection	
46	RESERVED	No connection	
47	RESERVED	No connection	
48	ETHERNET PORT 2 RECEIVE LOW		Input
49	RESERVED	No connection	
50	ETHERNET PORT 2 TRANSMIT LOW		Output
51	RESERVED	No connection	
52	ETHERNET PORT 3 TRANSMIT HIGH		Output
53	ETHERNET PORT 3 TRANSMIT LOW		Output
54	RESERVED	No connection	
55	ETHERNET PORT 3 RECEIVE HIGH		Input
56	ETHERNET PORT 3 RECEIVE LOW		Input
57	RESERVED	No connection	
58	ETHERNET PORT 4 TRANSMIT HIGH		Output
59	ETHERNET PORT 4 TRANSMIT LOW		Output
60	RESERVED	No connection	
61	ETHERNET PORT 4 RECEIVE HIGH		Input
62	ETHERNET PORT 4 RECEIVE LOW		Input
63	RESERVED	No connection	

Table 2-3. J1 Connector Pin Functions. - Continued

PIN	FUNCTION	CONNECTION	TYPE
64	ETHERNET PORT 5 TRANSMIT HIGH		Output
65	RESERVED	No connection	
66	RESERVED	No connection	
67	RESERVED	No connection	
68	RESERVED	No connection	
69	RESERVED	No connection	
70	RESERVED	No connection	
71	RESERVED	No connection	
72	RESERVED	No connection	
73	RESERVED	No connection	
74	RESERVED	No connection	
75	ETHERNET PORT 5 TRANSMIT LOW		Output
76	RESERVED	No connection	
77	ETHERNET PORT 5 RECEIVE HIGH		Input
78	ETHERNET PORT 5 RECEIVE LOW		Input
79	RESERVED	No connection	

2.7. CABLE ASSEMBLY - CONNECTOR J2 PINS.

NOTE

Different cable assemblies may not be required depending on aircraft configuration.

For additional information during the cable assembly and the system overview for the unit interface being used refer to Figure 2-2, Figure 2-3, and Table 2-4 for Connector J2.

DC resistance needs to be 2.5 milli-Ohms maximum between the rear connector shell and the mounting surface(s) where applicable in Figure 2-5 and Figure 2-6. Refer to 523-0775254 Installation Practices Manual and 523-0776007 Bonding and Grounding Practices.

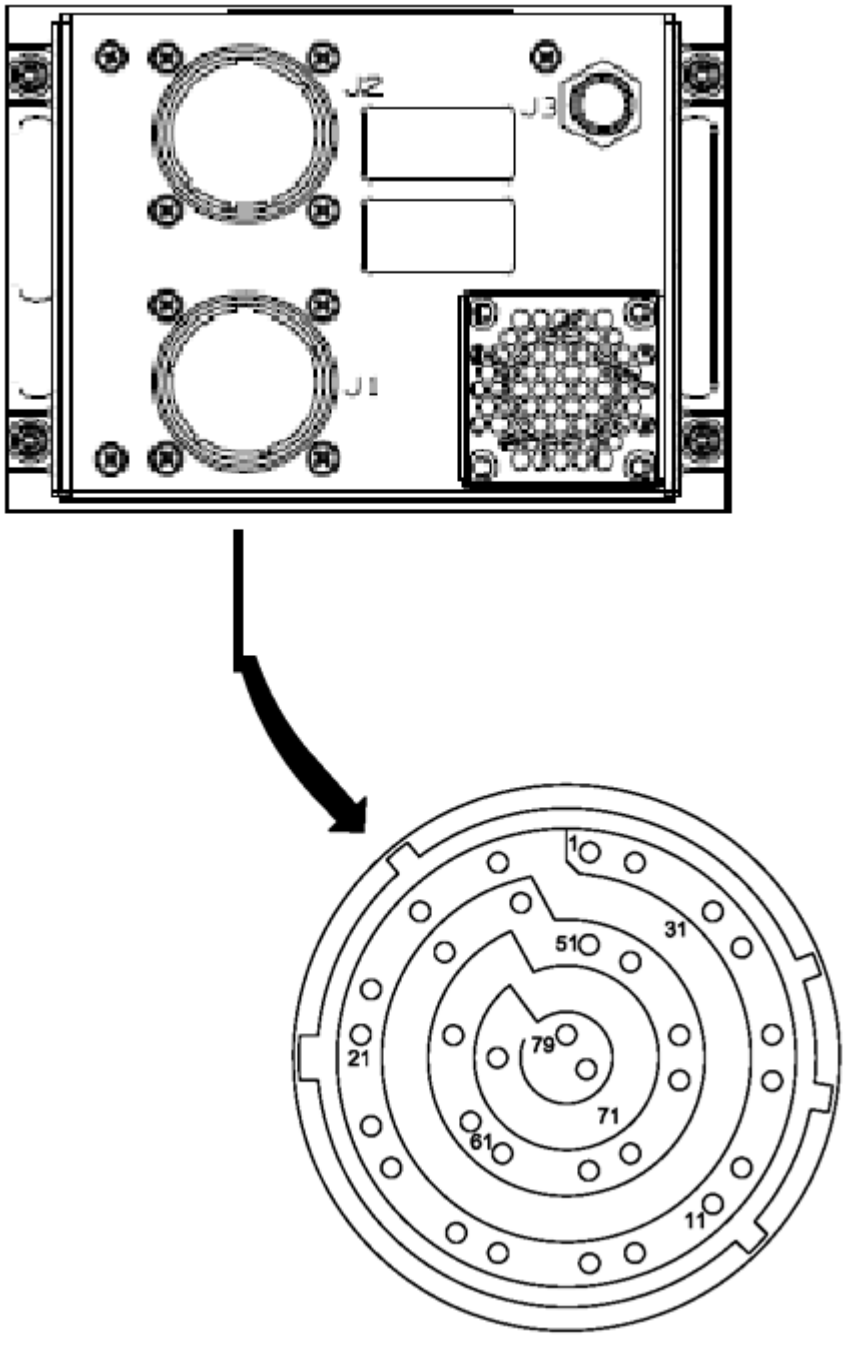

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Figure 2-2. Jl Pin Arrangement

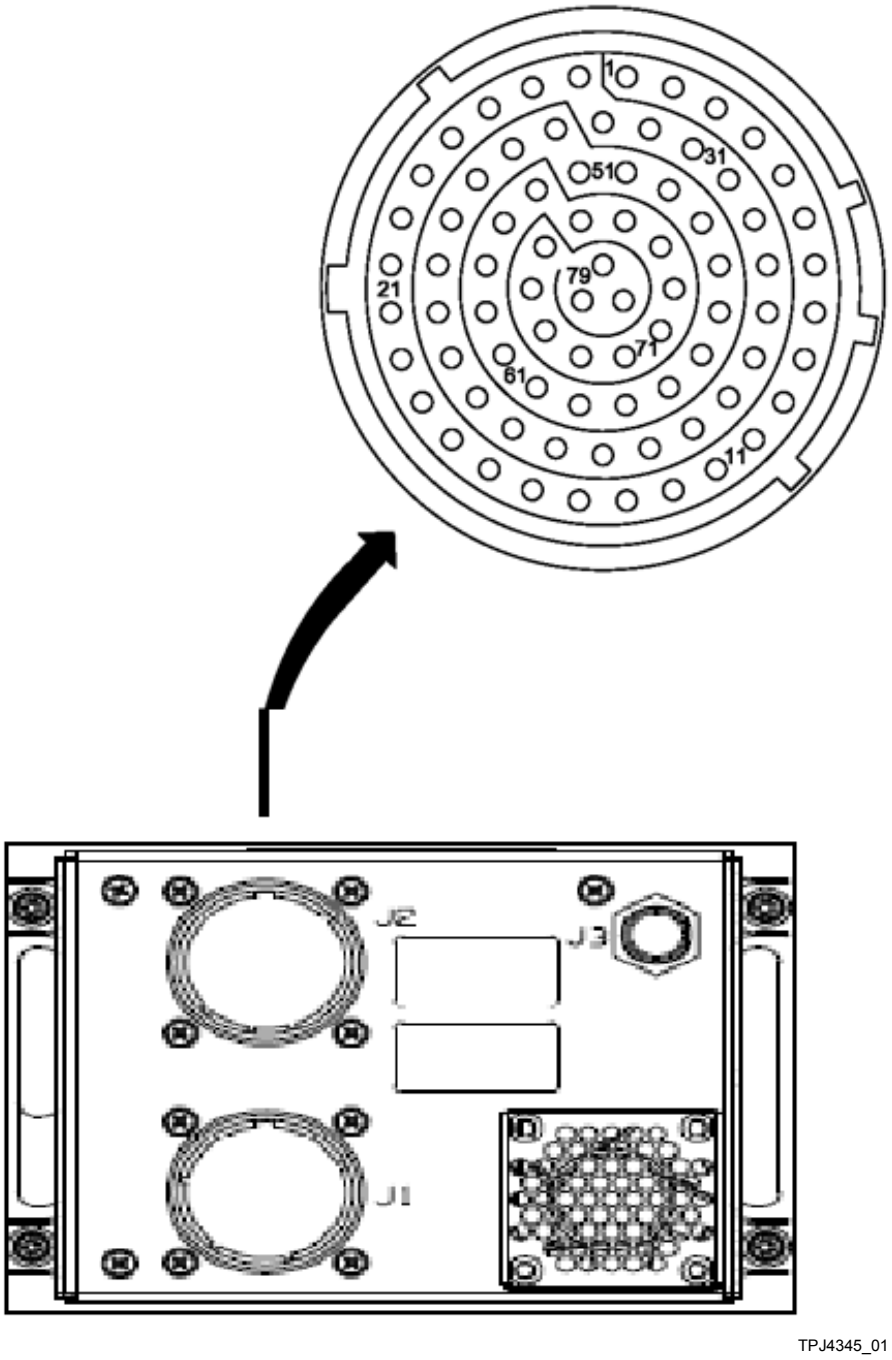

Figure 2-3. J2 Pin Arrangement

Table 2-4. J2 Connector Pin Functions.

PIN	FUNCTION	CONNECTION	TYPE
1	AUDIO IN LEFT HIGH	Reserved/No connection	Input
2	GROUND	Ground	
3	AUDIO OUT LEFT	Reserved/No connection	Output
4	GROUND	Ground	
5	VGA VIDEO RED		Output
6	VGA VIDEO GREEN		Output
7	VGA VIDEO BLUE		Output
8	VGA GROUND		
9	VGA HORIZONTAL SYNC		Output
10	VGA SYNC GROUND		Output
11	VGA VERTICAL SYNC		Output
12	VGA SERIAL Clock		Output
13	CHASSIS GROUND		
14	CHASSIS GROUND		
15	CHASSIS GROUND		
16	CHASSIS GROUND		
17	SPARE	No connect	
18	+28 VDC PRIMARY POWER INPUT	POWER	Input
19	+28 VDC PRIMARY POWER INPUT	POWER	Input
20	28 VDC POWER Return	Ground	
21	28 VDC POWER Return	Ground	
22	SPARE	No connection	
23	ARINC 429 PORT 2 RECEIVE HIGH	Not implemented/Reserved	Input
24	SERIAL RS-422 PORT 1 TRANSMIT HIGH	Not implemented/Reserved	Output
25	SERIAL RS-422 PORT 1 TRANSMIT LOW	Not implemented/Reserved	Output
26	SPARE	No connection	
27	GROUND	Ground	
28	AUDIO IN Left Low	Reserved/No connection	Input
29	AUDIO IN RIGHT HIGH	Reserved/No connection	Input
30	SPARE	No connection	
31	AUDIO OUT RIGHT	Reserved/No connection	Output
32	VGA RED GROUND		Output
33	VGA GREEN GROUND		Output

Table 2-4. J2 Connector Pin Functions. - Continued

PIN	FUNCTION	CONNECTION	TYPE
34	VGA BLUE GROUND	No connection	Output
35	VGA RESERVED		Output
36	VGA +5 VDC		Output
37	SPARE		
38	VGA SERIAL DATA		Output
39	DISCRETE IN 1, GENERAL PURPOSE (user defined)		Input
40	DISCRETE IN 2, GENERAL PURPOSE (user defined)		Input
41	DISCRETE IN 3, GENERAL PURPOSE (user defined)		Input
42	DISCRETE IN, WEIGHT ON WHEELS, ACTIVE LOW (dedicated)		Input
43	DISCRETE OUT 1, GENERAL PURPOSE (user defined)		Output
44	DISCRETE OUT 2, GENERAL PURPOSE (user defined)		Output
45	DISCRETE OUT 3, GENERAL PURPOSE (user defined)		Output
46	DISCRETE OUT 4, GENERAL PURPOSE (user defined)		Output
47	ARINC 429 PORT 2 RECEIVE LOW	Not implemented/Reserved	Input
48	SERIAL RS-422 PORT 1 RECEIVE HIGH	Not implemented/Reserved	Input
49	SERIAL RS-422 PORT 1 RECEIVE LOW	Not implemented/Reserved	Input
50	AUDIO IN RIGHT LOW	Not implemented/Reserved	Input
51	SERIAL RS-422 PORT 2 RECEIVE HIGH	Not implemented/Reserved	Input
52	SERIAL RS-422 PORT 2 RECEIVE LOW	Not implemented/Reserved	Input
53	SPARE	No connection	
54	TEST DISCRETE IN 1, FACTORY RESET LOW		Input
55	TEST DISCRETE IN 2, FACTORY RESET LOW		Input
56	SERIAL RS-232 PORT 1 RECEIVE	Not implemented/Reserved	Input
57	GROUND	Ground	

Table 2-4. J2 Connector Pin Functions. - Continued

PIN	FUNCTION	CONNECTION	TYPE
58	SERIAL RS-232 PORT 1 TRANSMIT	Not implemented/Reserved	Output
59	GROUND	Ground	
60	GROUND	Ground	
61	ARINC 429 PORT 1 TRANSMIT HIGH	Not implemented/Reserved	Output
62	ARINC 429 PORT 1 TRANSMIT LOW	Not implemented/Reserved	Output
63	ARINC 429 PORT 1 RECEIVE HIGH	Not implemented/Reserved	Input
64	ARINC 429 PORT 1 RECEIVE LOW	Not implemented/Reserved	Input
65	SERIAL RS-422 PORT 2 TRANSMIT HIGH	Not implemented/Reserved	Output
66	SERIAL RS-422 PORT 2 TRANSMIT LOW	Not implemented/Reserved	Output
67	SERIAL RS-422 PORT 4 TRANSMIT LOW	Not implemented/Reserved	Output
68	SPARE	No connection	
69	TEST DISCRETE IN 3, WATCHDOG DISABLE LOW		Input
70	TEST DISCRETE IN 4		Input
71	GROUND	Ground	
72	SERIAL RS-422 PORT 3 TRANSMIT HIGH	Not implemented/Reserved	Output
73	SERIAL RS-422 PORT 3 TRANSMIT LOW	Not implemented/Reserved	Output
74	SERIAL RS-422 PORT 3 RECEIVE HIGH	Not implemented/Reserved	Input
75	SERIAL RS-422 PORT 3 RECEIVE LOW	Not implemented/Reserved	Input
76	SERIAL RS-422 PORT 4 TRANSMIT HIGH	Not implemented/Reserved	Output
77	SERIAL RS-422 PORT 4 RECEIVE HIGH	Not implemented/Reserved	Input
78	SERIAL RS-422 PORT 4 RECEIVE LOW	Not implemented/Reserved	Input
79	GROUND	Ground	

2.8. CABLE ASSEMBLY - CONNECTOR J3 PINS.

NOTE

Antenna coax cable should be no more than 4.7 dB, which equates to approximately 20 feet of RG 400 cable.

Table 2-5. J3 Connector Pin Functions

PIN	FUNCTION	CONNECTION	TYPE
Center	2.4 GHz RF for WLAN		Input/Output
Shield	GROUND	Ground	GND

2.9. CABLE ASSEMBLY - CONNECTOR J4 PIN (FUTURE GROWTH).

NOTE

J4 is not installed in the baseline design.

The purpose of dual RF connections is to support spatial diversity reception. The J4 connector shall provide a Radio Frequency interface for the 2.4 GHz wireless LAN function.

2.10. CABLE ASSEMBLY - CONNECTOR J5 PINS.

The J5 connector provides a USB interface. Table 2-5 provides the connector signal definition. The J5 connector is Samtec USB-AM-S-F-B-SM1, CPN 360-0417-050, (USB Type A).

Table 2-6. J5 Connector Pin Functions.

PIN	FUNCTION	CONNECTION	TYPE
1	USB PORT 2 +5VDC POWER, 500 MA CAPABLE	POWER	Output
2	USB PORT 2 DATA LOW		Input/Output
3	USB PORT 2 DATA HIGH		Input/Output
4	USB PORT 2 GROUND	GROUND	GND

2.11. CABLE ASSEMBLY - CONNECTOR J6 PINS.

The J6 connector provides an Ethernet LAN interface. Table 2-6 provides the connector signal definition. The J6 connector is CPN 358-0042-010 (RJ45 jack).

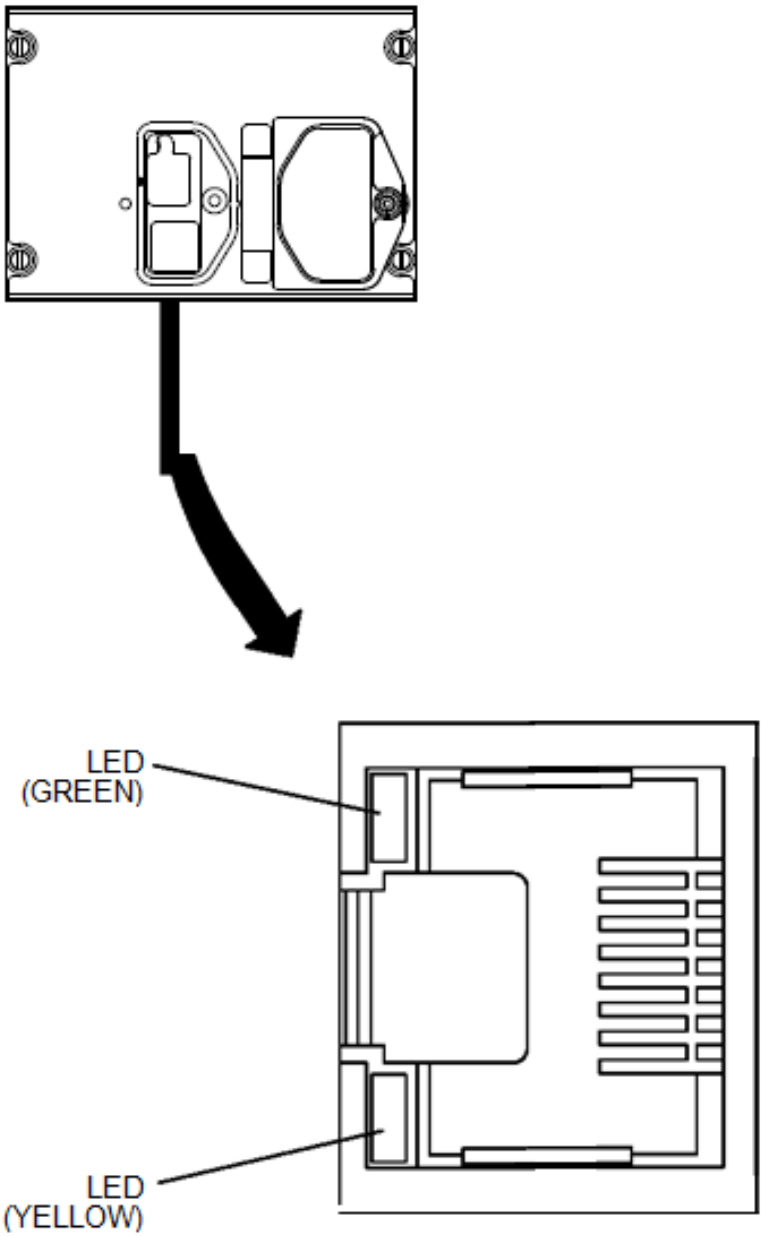

Figure 2-4. RJ45 J6 Front Ethernet Indicator Lights

Table 2-7. J6 Connector Pin Functions.

PIN	FUNCTION	CONNECTION	TYPE
1	Ethernet port 6 Receive High		Input
2	Ethernet port 6 Receive Low		Input
3	Ethernet port 6 Transmit High		Output
4		No connection	
5		No connection	
6	Ethernet port 6 Transmit Low		Output
7		No connection	
8		No connection	

2.12. INSTALLATION PROCEDURES.

This section contains procedures for installing the IMS-6010 in the aircraft. Procedures must be performed as described below to ensure proper operation and performance.

2.12.1. IMS-6010 Installation and Removal.

WARNING

Make sure that the aircraft battery master switch is turned off before installing any equipment, mounts, or interconnect cables. Failure to do so could cause electrical arcing that might result in damage to the equipment or serious injury to maintenance personnel.

Select the desired location for the unit.

2.12.1.1. To install the IMS-6010, perform the steps that follow:

1. Remove electrical power from the aircraft.
2. Make the appropriate cutout (if required).
3. Pull the mating connector assemblies J1, J2, and J3 through the cutout hole.
4. Remove connector covers from mating connectors.
5. Connect P1 to J1 on IMS-6010.
6. Connect P2 to J2 on IMS-6010.
7. Connect P3 to J3 on IMS-6010.
8. Make sure the locking devices are secure to the connectors J1, J2, and J3.
9. Install the unit in the cutout until flush.
10. Tighten the four Dzus fasteners to secure IMS-6010 in place.

2.12.1.2. To remove the IMS-6010, perform the steps that follow:

1. Remove electrical power from the aircraft.
2. Loosen the four Dzus fasteners that secure the IMS-6010 in place.
3. Remove the unit from the cutout until clear of mounting surface.
4. Loosen locking device on connector J1.
5. Loosen locking device on connector J2.
6. Loosen locking device on connector J3.
7. Disconnect P3 from J3 on IMS-6010.
8. Disconnect P2 from J2 on IMS-6010.
9. Disconnect P1 from J1 on IMS-6010.
10. If immediately installing a replacement IMS-6010, go to IMS-6010 Installation. If not immediately installing a replacement IMS-6010, go to step 9.
11. Install dust cover on connector J1 to prevent damage to pins.
12. Install dust cover on connector J2 to prevent damage to pins.
13. Install dust cover on connector J3 to prevent damage to pins.
14. Secure J1, J2, and J3 connectors with tie wraps to cables to prevent damage to connectors and other intelligence.

2.13. TESTING.

Refer to the Maintenance chapter for test procedures for the IMS-6010.

CHAPTER 3
Operation

3.1. OPERATION PROCEDURES.

The IMS-6010 provides the capability for the technician to acquire maintenance data for each LRU for troubleshooting purposes. The DDS software, which is a component of the software load on the IMS-6010, provides the ability to retrieve System Event log files to determine the function of the operating system and the associated DDS applications on the device.

3.1.1. Operating Procedures.

For instruction on how to operate the IMS-6010, go to the M145 Avionics System Operators Guide (CPN 523-0808930).

CHAPTER 4
Theory of Operation

4.1. INTRODUCTION TO THEORY OF OPERATION.

This chapter presents the Theory of Operation for the IMS-6010. The Theory of Operation is presented in an overview of the entire system and as functional theory for the system unit.

4.2. INFORMATION MANAGEMENT SYSTEM.

The IMS-6010 contains the software and hardware to monitor and control the user and equipment interfaces while being the platform from which applications operate. The IMS transfers maintenance data between off-board commercial PC platforms and the aircraft cockpit. The IMS runs on-aircraft software packages that are hosted on the Windows XP operating system.

4.3. FUNCTIONAL DESCRIPTION.

The IMS utilizes three purchased commercial-off-the-shelf (COTS) modules for its core functionality; a Single Board Computer (SBC), a Solid State Drive (SSD), and a Wireless LAN Adapter (WLA). Three plug-in circuit card assemblies (CCAs) provide further functions: the Power Supply CCA, the PC Base CCA and the 802 Comm CCA. The Interconnect CCA acts as backplane for the LRU.

4.4. SYSTEM INTERFACE.

The IMS provides a link to the avionics system via two non-redundant AFDX Ethernet channels. Other Ethernet interfaces allow for maintenance connection points around the aircraft, and interface to printer.

The following input/output signals are located on the rear connectors J1 and J2 of the unit. All output control signals are capable of sinking 100 mA (Maximum), unless otherwise noted.

Front panel connectors on the IMS allow for an operator to insert a commercial USB memory stick into the unit, or to connect a laptop computer via RJ45 jack. Remote Ethernet connection points may be implemented in the aircraft, which will allow dataload or maintenance access. The WLA and external antenna provide 802.11 wireless LAN function for maintenance access.

4.4.1. General Information for Connector J1 Signals.

The pins in connector J1 (X) are spare and are reserved in function. They are not connected in the IMS-6010.

Table 4-1. Main Input Power Source.

INPUT SPECIFICATION	VALUE
Nominal Input Voltage	28.0 V dc
Maximum Continuous Input Voltage	30.3 V dc
Minimum Continuous Input Voltage	22.0 V dc
Maximum Surge Voltage - 100 ms	
Maximum Surge Voltage - 1 sec	47.5 V dc
Power Consumption (Max)	55 Watts

CHAPTER 5
Maintenance

5.1. INTRODUCTION TO MAINTENANCE.

This chapter provides the procedures for the post-installation check of the Information Management System (IMS-6010) in the aircraft.

5.2. TESTING PROCEDURES.

Procedures provided herein are oriented for the IMS-6010. Interfacing equipment will need to be verified for their correct operation using test procedures from the related manufacturers.

5.2.1. Initial Power ON.

On each power-up of the unit, the boot loader initializes the hardware, performs a power-on self test sequence, and the kernel startup followed by the application software.

5.2.2. Power-on Self Test.

After the initialization of the hardware, the power-on self test is performed by the boot loader. Selective test of the RAM space and an OS image CRC check is performed. Successful test continues by the boot loader to the kernel startup.

5.2.3. Kernel Startup.

During the kernel startup, the USB status LED located on the front panel is YELLOW, indicating the successful completion followed by the application startup.

5.2.4. Application Startup.

During the application startup, the USB status LED located on the front panel is GREEN, indicating the successful completion followed by the USB port readiness.

5.2.5. Additional Functional Checks.

After the installation of the IMS-6010 in the aircraft, make sure the equipment that interfaces with the unit is energized. Refer to the last revision of the IMS CMM to do the Return-To-Service (RTS) test if there is a problem with the unit. Use the latest revision of the Acceptance Test Procedure to do the test if there is no CMM to use.

5.3. SELF TEST.

The IMS supports self-test functions. These are implemented through IMS software programs. The IMS hardware shall provide features that facilitate the self test functions:

- Power on self test functions of Single Board Computer (SBC).
- Self diagnostic functions of Single State Device (SSD).
- Self diagnostic functions of WLA.
- Regulated power voltage monitoring for over & under voltage.
- Temperature monitoring for over and under operating temperature.
- Non-volatile memory in SSD to store fault data.

GLOSSARY

Term	Definition
AEA	Aircraft Electronics Association
AFDX	Avionics Full Duplex Switched Ethernet
AFIS	Airborne Flight Information System
ARINC	Aeronautical Radio, Incorporated
CCA	Circuit Card Assembly
CDU	Control Display Unit
CPN	Collins Part Number
DBU	Data Base Unit
DMU	Data Management Unit
ETX	Embedded Technology eXtended
FADEC	Full Authority Digital Engine Control
FMC	Flight Management Computer
FMS	Flight Management System
FSU	File Server Unit
IFIS	Integrated Flight Information System
LAN	Local Area Network
LED	Light Emitting Diode
LRU	Line Replaceable Unit
MCDU	Multifunction Control Display Unit
MDC	Maintenance Diagnostic Computer
MFD	Multifunction Display
MTBF	Mean Time Between Failure
N/A	Not Applicable
RTS	Return To Service
STC	Supplemental Type Certificate
TC	Type Certificate
USB	Universal Serial Bus
WLA	Wireless LAN Adapter