
Air Transport and Regional Technical Summary

MCS-4200/-7200 SATCOM System

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1. Overview

This technical description provides the specifications for an evolved version of the Honeywell/Thales MCS-4000/7000 SATCOM System that has been designated as the MCS-4200/7200 SATCOM system providing both ATC voice and data safety services for the cockpit as well as two channels of Swift Broadband for cabin connectivity.

The Honeywell/Thales MCS-4200/-7200 SATCOM system is fully capable of utilising the Inmarsat Aeronautical I4 satellite network's current capabilities, and can be easily upgraded/modified to accommodate the advent of new Inmarsat technology/ functionality. The physical platform for the SwiftBroadband (SBB) functionality is housed in a 4-MCU LRU, located in the space reserved for the (obsolete) RFU, and supports four Swift64 (i.e., M-ISDN and MPDS) channels. The system's LRU software is upgradeable to provide two channels of SwiftBroadband functionality for those systems originally delivered with Swift64 or without cabin broadband.

2. MCS-4200/7200 Technology Advantage

1. The MCS-4200/7200 is a mobile avionics communications system that supplies continuous worldwide voice and data communications services to and from the aircraft via satellite. The MCS-4200/7200 system utilises the antenna subsystem to transmit/receive L-band RF signals to/from satellites in geostationary orbit.
2. The MCS system augments and/or supersedes the present high frequency (HF) transceiver by supplying higher quality voice service, and by supplying data services at the higher bit rates required by datalink applications, such as automatic dependent surveillance (ADS-C), the international aircraft communications addressing and reporting system (ACARS), and CPDLC (Controller Pilot Data Link Communications) for FANS-1/A implementations and future CPDLC implementations.
3. The MCS-4200/7200 system provides seven baseband communication channels capable of supporting six simultaneous full-duplex circuit mode voice connections and one channel of packet- mode data. The MCS system will accommodate all four airborne categories of communications:
 - a. Air traffic control (ATC)
 - b. Aeronautical operational control (AOC)
 - c. Aeronautical administrative communications (AAC)
 - d. Aeronautical passenger communications (APC)
4. The four airborne communication categories are recognised by the International Civil Aviation Organization (ICAO) and the International Telecommunications Union (ITU), and are assigned priorities for communications purposes.

3. MCS-4200/7200 System Components

The MCS-4200/7200 system avionics will be comprised of the following components:

- Satellite Data Unit (SDU)
- High Speed Data Unit (HSU)
- High Power Amplifier (HPA).

These components are compatible with ARINC Characteristics 741 and 761.

Boeing 7-channel MCS-7200 Aero-H+ System (with RFUia)

Model	Description	Part Number
SD-720	SDU (7-channel, Boeing, S64)	7516118-27130
RF-700	RFUia	7516222-901
HP-720	HPA (60W)	7520000-20140

Airbus 7-channel MCS-7200 Aero-H+ System (with RFUia) - A380

Model	Description	Part Number
SD-720	SDU (7-channel, Airbus, SBB)	7516118-47145
RF-700	RFUia	7516222-901
HP-720	HPA (60W)	7520000-20140

Airbus 7-channel MCS-7200 Aero-H+ System (with RFUia) - LR

Model	Description	Part Number
SD-720	SDU (7-channel, Airbus, SBB, PIMBIT)	7516118-47151
RF-700	RFUia	7516222-901
HP-720	HPA (60W)	7520000-20140

Boeing 7-channel MCS-7200 Aero-H+ System (with S64 or SBB Mod B) - B777

Model	Description	Part Number
SD-720	SDU (7-channel, Boeing, SBB)	7516118-27135
HP-720	HPA (60W)	7520000-20140
HS-720	HSDU (SBB, Mod B)	7520061-34016
HDM	Hardware Data Module (SBB)	7520033-901

Airbus 7-channel MCS-7200 Aero-H+ System (with S64 or SBB Mod B) - A380

Model	Description	Part Number
SD-720	SDU (7-channel, Airbus, SBB)	7516118-47145
HP-720	HPA (60W)	7520000-20140
HS-720	HSDU (SBB, Mod B)	7520061-34016
HDM	Hardware Data Module (SBB)	7520033-901

Airbus 7-channel MCS-7200 Aero-H+ System (with S64 or SBB Mod B) - LR

Model	Description	Part Number
SD-720	SDU (7-channel, Airbus, SBB, PIMBIT)	7516118-47151
HP-720	HPA (60W)	7520000-20140
HS-720	HSDU (SBB, Mod B)	7520061-34016
HDM	Hardware Data Module (SBB)	7520033-901

1. Satellite Data Unit (SDU)



Figure 1 - Satellite Data Unit

Table 1 SD-720 SDU Leading Particulars

Characteristic	Specification
Dimensions (maximum)	
• Height	7.624 in. (193.65 mm)
• Width	7.51 in. (190.75 mm)
• Length	15.26 in. (337.60 mm)
Weight (maximum)	25 lbs (11.4 kg)
Power Requirements	
• AC Voltage at SDU Terminals	100 to 122 V ac, 360 to 800 Hz (normal operation) 92 V ac, 320 Hz minimum; 134 V ac, 800 Hz maximum > 96 V ac, 320 to 800 Hz (startup)
AC Current Requirements¹	
• Nominal at 115 V ac (Current/Power Factor)	1.3 amps/0.70 @ 400 Hz
• Maximum at 92 V ac (Current/Power Factor)	2.0 amps/0.82 @ 800 Hz
Circuit Breaker Ratings	
• 115 V ac Circuit Breaker	3 amp TYPE A
User Replaceable Parts	None
Operating Temperature	-55 C (-67 F) to +70 C (158 F)
Operating Altitude	to 55,000 ft (16.8 kilometers)
Cooling Requirements ²	
• Minimum	0.15 ± 0.05 in. (3.81 ± 1.27 mm) of water at a flow rate of 72.8 ± 2.0 lbs (33.0 ± 0.9 kg) per hour
• Maximum	0.25 ± 0.05 in. (6.35 ± 1.27 mm) of water at a flow rate of 96.2 ± 2.0 lbs (43.6 ± 0.9 kg) per hour
Power Dissipation	
• Nominal	105 W (OCXO at Nominal Current Draw)
• Maximum	150 W (OCXO at Maximum Current Draw)
Mating Connectors	
• J1	Radiall Part No. NSXN2P201X0004
• J2	Honeywell Part No. 4004295-160, ITT Part No. KJ6F18A53P
Mounting	ARINC 600 6-MCU Tray Assembly

NOTES:

¹ All power factors (PF) are leading.

² Mounting trays with integral cooling fans that meet the cooling requirements are available from suitable vendors (e.g., ECS, EMTEQ) for retrofit applications.

2. High Speed Data Unit (HSU)

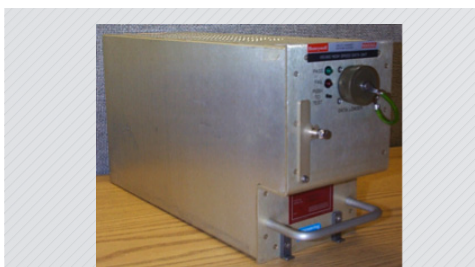


Figure 2 - High Speed Data Unit

Table 2 HS-720 HSU Leading Particulars

Characteristic	Specification
Dimensions (maximum)	
• Height	7.624 in. (193.65 mm)
• Width	5.04 in. (128.02 mm)
• Length	15.07 in. (382.78 mm)
Weight (maximum)	15 lbs (7.3 kg)
Power Requirements	
• AC Voltage at HSU Terminals	100 to 122 V ac, 360 to 800 Hz (normal operation) 92 V ac, 320 Hz minimum; 134 V ac, 800 Hz maximum > 96 V ac, 320 to 800 Hz (startup)
AC Current Requirements¹	
• Nominal at 115 V ac (Current/Power Factor)	1.2 amps/0.70 @ 400 Hz
• Maximum at 92 V ac (Current/Power Factor)	1.8 amps/0.79 @ 800 Hz
Circuit Breaker Ratings	
• 115 V ac Circuit Breaker	3 amp TYPE A
User Replaceable Parts	None
Operating Temperature	-55 C (-67 F) to +70 C (158 F)
Operating Altitude	to 55,000 ft (16.8 kilometers)
Cooling Requirements ²	
• Minimum	0.15 ± 0.05 in. (3.81 ± 1.27 mm) of water at a flow rate of 48.5 ± 2.0 lbs (22.0 ± 0.9 kg) per hour
• Maximum	0.25 ± 0.05 in. (6.35 ± 1.27 mm) of water at a flow rate of 63.1 ± 2.0 lbs (28.7 ± 0.9 kg) per hour
Power Dissipation	
• Nominal	98 W (OCXO at Nominal Current Draw)
• Maximum	150 W (OCXO at Maximum Current Draw)
Mating Connectors	
• J1	Radial Part No. NSXN2P221X0003
• J2	Honeywell Part No. 4004295-160, ITT Part No. KJ6F18A53P
Mounting	ARINC 600 4-MCU Tray Assembly

NOTES:

¹ All power factors (PF) are leading.

² Mounting trays with integral cooling fans that meet the cooling requirements are available from suitable vendors (e.g., ECS, EMTEQ) for retrofit applications.

3. High-Power Amplifier (60 Watt)



Table 3 HP-720 60W HPA Leading Particulars

Characteristic	Specification
Dimensions (maximum):	
• Height	7.813 in. (198.45 mm)
• Width	10.22 in. (259.59 mm)
• Length	15.20 in. (386.08 mm)
Weight (maximum)	32.0 lb (14.5 kg)
Power Requirements	
• AC Voltage at HPA Terminals	100 to 122 V ac, 360 to 800 Hz (normal operation) 92 V ac, 320 Hz minimum; 134 V ac, 800 Hz maximum > 96 V ac, 320 to 800 Hz (start-up)
AC Current Requirements¹	
• Nominal at 115 V ac (Current/Power Factor)	4.1 amps/0.89 @ 400 Hz
• Maximum at 92 V ac (Current/Power Factor)	5.8 amps/0.91 @ 800 Hz
RF Power Output	
• Rated operating power	60 W (multiple carriers)
• Maximum power	80 W (short duration, single carrier) Circuit Breaker Ratings:
• 115 V ac Circuit Breaker	7.5 amp TYPE A User Replaceable Parts None
Operating Temperature	-55 C (-67F) to +70C (158F)
Operating Altitude	to 55,000 ft (16.8 kilometres) Cooling Requirements 2:
• Minimum	0.15 ± 0.05 in. (3.81 ± 1.27 mm) of water at a flow rate of 121.3 ± 2.0 lb (55.0 ± 0.9 kg) per hour
• Maximum	0.25 ± 0.05 in. (6.35 ± 1.27 mm) of water at a flow rate of 176.4 ± 2.0 lb (80.0 ± 0.9 kg) per hour
Power Dissipation	
• Nominal	354 W for VSWR = 1.0
• Maximum	404 W for VSWR = 1.0
Mating Connectors	
• J1	Radiall Part No. NSXN2P221X0008
• J2	Honeywell Part No. 4004295-160, ITT Part No. KJ6F18A53P
• J3	BNC Plug
Mounting	ARINC 600 8-MCU Tray Assembly

NOTES:

¹ All PF are leading.

² Mounting trays with integral cooling fans that meet the cooling requirements can be obtained from suitable vendors (e.g., ECS, EMTEQ).

4. Radio Frequency Unit Interface Adapter (RFUIA)



Figure 4 - Radio Frequency Unit Interface Adapter

Table 4 RFUIA Leading Particulars

Characteristic	Specification
Dimensions (maximum)	
• Length	12.76 in. (324.1 mm)
• Width	4.90 in. (124.5 mm)
• Height	7.64 in. (194.1 mm)
Weight (maximum)	4 lbs (1.82 kg)
Power requirements	None
Cooling	Convection, no forced air required

5. Summary

The MCS-4200/7200 SATCOM system is a powerful and versatile airborne communications system. It will provide the airline's cockpit crew, cabin crew and passengers with access to multi-channel satellite based telephony and packet-data functionality based on the proven ARINC 741/761 specifications. In addition, it will furnish the cabin with Inmarsat SwiftBroadband (and fall back to Swift64) connectivity at data rates of SwiftBroadband services that approach 432 kbps per channel (2 channels). In addition, Honeywell is working with Inmarsat to implement the High Data Rate Bearer updates planned to occur later in 2013 that will allow for an increase in SwiftBroadband data rates (streaming IP service) of up to 800 Kbps.

This upgrade will be performed via a software only upgrade to the MCS-4200/7200 (no hardware changes will be required).

Abbreviations

ACAR	Aircraft Communications Addressing and Reporting System
ADL	Airborne Data Loader
ARINC	Aeronautical Radio, Inc.
ATA	Air Transport Association
ATC	Air Traffic Control
ATS	Air Traffic Services
CRC	Cyclic Redundancy Check
FMC	Flight Management Computer
HGA	High Gain Antenna
HPA	High Power Amplifier
HPR	High Power Relay
HSD	High Speed Data
HSDU	High Speed Data Unit
INMARSAT	International Maritime Satellite Organization
INS	Inertial Navigation System
MCDU	Multifunction Control Display Unit
MTBF	Mean-Time-Between-Failure
PDL	Portable Data Loader
RFU	Radio Frequency Unit
RFUIA	Radio Frequency Unit Interface Adapter
RTCA	Radio Technical Commission for Aeronautics
SDU	Satellite Data Unit
SRU	Shop Replaceable Unit

For more information on Honeywell's
MCS-4200/-7200 SATCOM System
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