

Exhibit E

Product Description

1. Product Description

1.1. Overview

The High Speed data Transceiver (HST), type numbers HST-2110 and HST-2120 are additional units designed to work with the existing SRT-2100 Satellite Data Unit (SDU). A complete SATCOM system consists of the following components:

Type Number	Name	Manufacturer	FCC ID
SRT-2100 (3 channel version)	Satellite Data Unit	Rockwell Collins	AJK8222023
High Gain Antenna System	n/a	various	n/a

Table 1 – List of Equipment

The units listed above have previously received FCC Type Certification as necessary. The SRT-2100 requires software modifications to support the addition of the HST-2110 or HST-2120. The modifications do not result in changes that affect previously submitted test data for this unit.

The changes necessary to add an HST-2110 or HST-2120 to the existing SRT-2100 System are highlighted in the outlined area of the figure below:

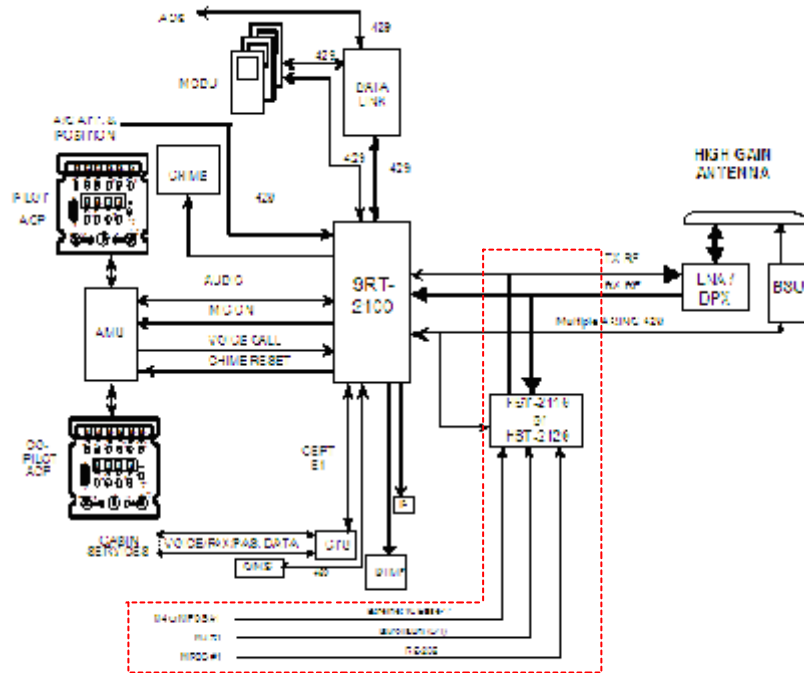


Figure 1 - SRT-2100 System with HST

The HST-2110 or HST-2120 will add the INMARSAT Swift 64 service to the existing INMARSAT aeronautical services already supported by the SRT-2100 system.

By incorporating the Swift 64 service from INMARSAT, the HST High-Speed Transceiver will provide 64 kilobits per second connectivity using the existing SAT-2100 antenna and high-power amplifier. The HST supplies interfaces to Ethernet, ISDN and RS-232 which will provide real time passenger e-mail and Internet access as well as the provisioning for other future high speed data applications such as real time cabin surveillance to the ground, file server, Swift Broadband and integrated information systems cockpit applications.

1.2. HST-2110 and HST-2120 Equipment Specifications

CHARACTERISTIC	SPECIFICATION
Digital interface	
Crosstalk Bus	High-speed ARINC 429 input and output
Ethernet User Interface	10 Base T input and output
ISDN User Interface	64 kbps ISDN Euro input and output
RS-232 User MPDS Interface	115.2 kbps RS -232 input and output
RS-232 Data Loader Port	115.2 kbps RS -232 input and output
Input characteristics	
Frequency range	1530.0 to 1559.0 MHz
Impedance	50 Ω nominal
VSWR	2.0:1 max
Signal input level	-100 dBm to -60 dBm
Output characteristics	
Frequency range	1626.5 to 1660.5 MHz
Impedance	50 Ω nominal
Load VSWR	2.0:1 operational, infinite, survival
Output power	-6.5 dBm to 22 dBm in 0.5 dB increments

Table 2 – Equipment Specifications

1.3. HST Hardware Overview

The HST product line consists of the following LRUs:

- The HST-2110, Collins Part Number 822-2231-020. This unit is designed to operate primary power of 115 VAC, 400Hz. It is similar to the previously Type Certified HST-900 except that it contains a new channel card (with a single RF module) replacing the current channel card. The new channel card refreshes technology and allows for future growth for future Inmarsat services such as SwiftBroadband.
- The HST-2110, Collins Part Number 822-2231-010. This unit is designed to operate with 28V DC primary power. It is similar to the previously Type Certified HST-900 except that it contains a new channel card (with a single RF module) replacing the current channel card, and the 28V DC power supply. The new channel card refreshes technology and allows for future growth for future Inmarsat services such as SwiftBroadband.
- The HST-2120, Collins Part Number 822-2233-010. This unit is designed to operate primary power of 115 VAC, 400Hz. It is similar to the previously Type Certified HST-900 except that it contains a new channel card, with two RF modules, replacing the current

channel card. This unit supports two simultaneous channels of Swift64. The new channel card refreshes technology and allows for future growth for future Inmarsat services such as SwiftBroadband.

Figure 2 shows the major functional blocks of the HST-2110 (single channel), Figure 3 shows the major functional blocks of the HST-2120 (dual channel).

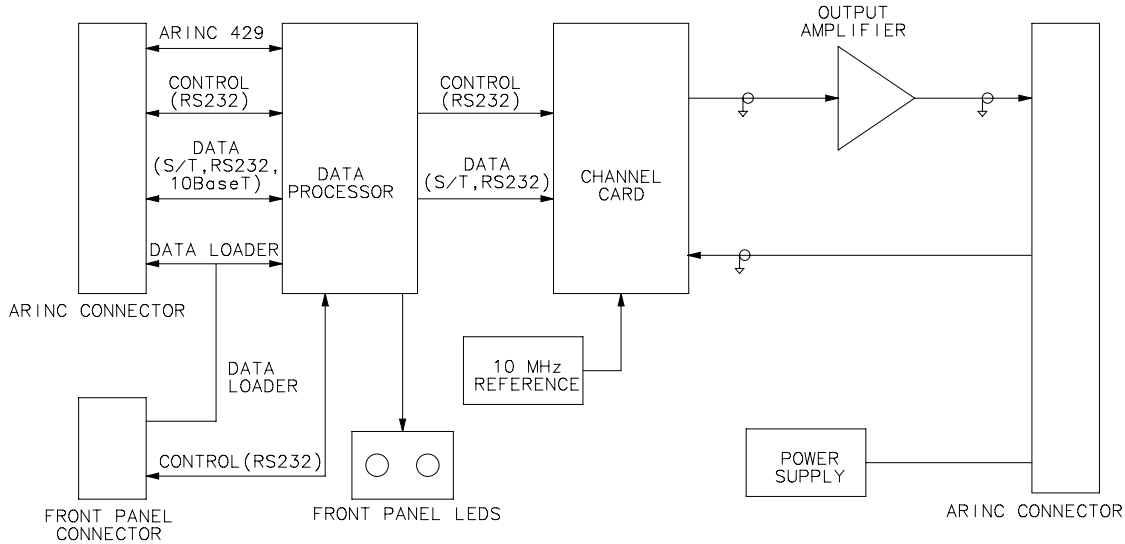


Figure 2 HST-2110 Block Diagram

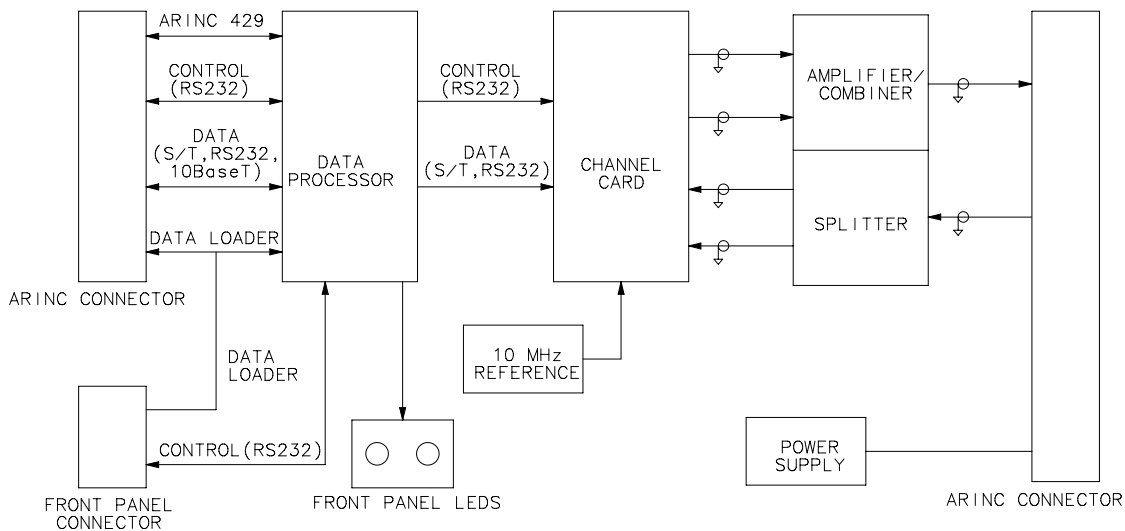


Figure 3 HST-2120 Block Diagram

1.4. Mechanical

Both the HST-2110 and HST-2120 are housed in a 2-MCU-size unit with mounting requirements according to the ARINC 600 specification. The HST chassis is designed for either forced air or convection cooling. The front panel contains a data loader connector used to upload data to the HST and a set of LEDs to indicate unit status. It also contains a “self-test” button and corresponding LED indicators for active operator maintenance. A backplane assembly interfaces the ARINC 600 connector with the power supply, channel card, data processor card, and output amplifier. The HST also

contains an ovenized high stability crystal oscillator to provide a stable 10 MHz reference to the channel card.

1.5. Channel Card

The Channel Card contains the entire physical layer to L band and the protocols of an Inmarsat Swift64 terminal. In addition to the Inmarsat MISDN and MPDS protocol functionality, the Channel Card interfaces with the Data Processor for command and control functions. The Interfaces between the Channel Card and the Data Processor fall into the broad categories of Operational, BITE, Maintenance, and Test and Approval. Data interfaces to the Channel Card are ISDN BRI S/T for circuit switched data and RS-232 for packet data (MPDS). Analog voice services are not supported. The Channel Card is designed to be software upgradeable for Inmarsat SwiftBroadband operation when the service becomes available.

1.6. Data Processor

The purpose of the Data Processor is twofold:

1.6.1. Control

The Data Processor shall mediate between the Channel Card and the SDU, performing protocol conversion as required ensuring proper control of the HST. It shall also provide configuration and testing capabilities.

1.6.2. User Data

The Data Processor shall provide data conversion between the ISDN and RS232 on the Channel Card and other interfaces as required (i.e., 10BaseT Ethernet). This may include providing OSI Layer 2 and Layer 3 services.

1.7. Power Supply

The Power Supply provides regulated power to the Channel Card, 10 MHz Reference, Output Amplifier and Data Processor.

1.8. 10 MHz Reference

The 10 MHz Reference provides a high stability 10 MHz reference signal to the Channel Card.

1.9. Output Amplifier

The Output Amplifier increases the power of the RF signal from the Channel Card to the required level.

1.10. Backplane

The Backplane is a passive module that provides interconnection between all other modules of the HST and to the outside world.