1 Chapter 1. INTRODUCTION

This chapter describes the purpose and function, description, and system specifications of the SDC-600 C-band up converter (Figure 1-1), referred to in this document as "the up converter."

Figure 1-1. SDC-600 C-Band Up Converter

1.1 Purpose and Function

The up converter translates the system modem IF signals to the C-band signals necessary to interface with satellite communication systems. Monitor and Control (M&C) is supplied by the up converter, and made available through an RS-232-C/485 remote port. Refer to Figure 1-2 for a block diagram of a satellite communications system using the up converter.

Figure 1-2. Satellite Communication System Block Diagram

1.2 Description

The up converter is a complete unit that converts modem IF signals to C-band for use in a
C-band satellite communications system. The up converter is a 19" rack-mountable
enclosure made of fixed, modular construction (Figure 1-3).

Figure 1-3. Converter Modular Construction Inside View

The only removable board within the up converter is the M&C board (Figure 4-1).

The up converter contains:

- C-band block converter module
- M&C card
- M&C I/O
- Control interface card
- Front panel board
- First mixer module
- Second mixer module

All controls and indicators for operation of the up converter are located on the front panel.
The chassis contains the power supply. A fan is located on the rear panel.

A block diagram of the up converter is shown in Figure 1-4.

Figure 1-4. SDC-600 Block Diagram

The up converter consists of the following assemblies:

Assembly	Drawing #
SDC-600 Top Assembly	AS/2038D
Chassis Assembly	AS/1619D

Power Supply:
  AC Power Supply
  DC Power Supply (optional)
	
	PS/AC110W04P01
	PS/DC180W3P15V

ASS'Y, Front Panel Control Board	AS/1686D-1
ASS'Y, Rear Panel	AS/1687D-1
ASS'Y, Module Assembly UHF Mixer	AS/1972D (70 MHz) AS/2016D (140 MHz)

ASS'Y, Module Assembly L-Band Mixer	AS/1973D
ASS'Y, Monitor and Control	AS/0356C
ASS'Y, Control Interface Board	AS/1609C-1
ASS'Y, M&C I/O	AS/1655C
ASS'Y, C-Band Mixer	PP/99D1439
ASS'Y, 10 MHz Oscillator	AS/3321

1.3 System Specification

Table 1-1 lists the operating specifications of the up converter.

Table 1-1. SDC-600 Operation Specifications

System Specifications	
Diagnostic Features	Fault Monitoring
Prime Power	100 to 240 VAC, 50 to 60 Hz, 75W max 48 VDC, $\pm$ 10% optional

Physical:
   Size
   Weight
	
	3.5" x 22" x 19", rack mountable
	20 lbs

Environmental:
   Temperature
   Humidity
   Altitude
	
	0 to 50°C
	5 to 95% noncondensing
	10,000 feet MSL

Auxiliary Connections:
   Summary Fault
   Auxiliary Monitor Interface
   Auxiliary Control Interface
	
	9-pin D
	50-pin D
	37-pin D

Input Characteristics:
   Frequency Range
   Input Level
   Impedance
   Return Loss
   Connector
	
	50 to 90 MHz, or 100 to 180 MHz
	-5 dBm max
	75Ω
	20 dB typical, 17 dB min
	BNC Female

Output Characteristics:
   Frequency Range
   Frequency Sense
   Frequency Steps
   Max. Conversion Gain
   Gain Control
   Gain Flatness
   Gain Stability
   Frequency Stability
	
	5845 to 6425 MHz
	Positive (no inversion)
	125 kHz
	15 dB, $\pm$ 0.5 dB
	0 to -15 dB, in 0.5 dB steps
	$\pm$ 0.25 dB over 10 MHz
	$\pm$ 0.25 dB per day at constant temperature
	1×10^{-8}, 0 to 50°C, 1×10^{-9} per day
	1×10^{-8} per day, < 30 days operation
	after 30 days operation, 1.5×10^{-7} per year

Table 1-1. SDC-600 Operation Specifications (Continued)

System Specifications (Continued)		
Phase Noise (SSB):	<u>Typical</u>	<u>Max.</u>
100 Hz	-64 dBc	60 dBc
1 kHz	-74 dBc	70 dBc
10 kHz	-82 dBc	80 dBc
100 kHz	-95 dBc	90 dBc
Rated Output	0 dBm	
Output Power	+10 dBm at 1 dB compression point	
Output Impedance	50Ω	
Output Return Loss	20 dB Typical, 17 dB min	
Output Connector	Type N Female	
Output Level Stability	$\pm$ 0.5 dB/25°C	
Output Spurious:	-35 dBc $\leq$ 250 kHz offset Fc	
Signal Related	-60 dBc In-band	
LO Leakage	-80 dBm max In-band	
Output Disable	Fault	
External Reference	5 MHz	
External Ref. Level Range	+5 dBm, $\pm$ 3 dB	
External Ref. Signal Type	Sinusoidal/Square	
M&C:		
Monitor	Opto-isolated Inputs	
	Module Faults	
	Summary Faults	
Control	Frequency	
	Reference Frequency	
	Gain	
	RF ON/OFF	
	Auxiliary FORM-C	
Access	Front Panel Keyboard	
	Remote Control	
Front Panel:		
Display	LCD	
Data Entry	Keyboard	
Summary Alarm	LED	

Table 1-1. SDC-600 Operation Specifications (Continued)

Remote Control Specifications	
Serial Interface	RS-232-C or RS-485
Baud Rate	110 to 9600 bit/s
Mode	Asynchronous
Commands	ASCII characters
Connector	9-pin D
Signals Controlled/Monitored	Transmit Frequency Transmit Gain RF Out ON/OFF Backup Mode Manual/Auto Backup Converter 1-9 Latching Relay Set/Reset External Faults A External Faults B Analog Channel #1 Analog Channel #2 Analog Channel #3 Analog Channel #4 L-band Temperature C-band Temperature Frequency Assignment Backup Configuration External Fault Mask A External Fault Mask B Remote Information Time Date Power Supply Voltages Fault Status Stored Fault Status
Configuration Retention	Will maintain current configuration for over one year without minimum power
Addressing	Programmable to 1 of 255 possibilities; address 0 reserved for global address
Local control of all remote functions included via push-button entry	

A typical up converter output spectrum is shown in Figure 1-5.

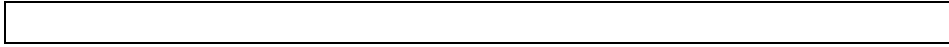A typical phase noise diagram is shown in Figure 1-6.
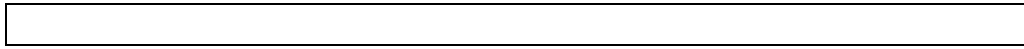
Figure 1-5. Up Converter Output Spectrum (Typical)

Figure 1-6. Phase Noise (Typical)

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