



INTRODUCTION

The Comtech EFData CST-5000 is a low- to medium-power, C-band, satellite earth station, and electronics terminal configured in two assemblies:

- The feed assembly consists of a transmit reject filter (TRF) and low noise amplifier (LNA).
- The outdoor enclosure assembly consists of a solid state power amplifier, up/down converters, monitor and control (M&C) microprocessor, and power supply.

The CST-5000 meets all requirements for operation on private and regional domestic C-band satellite networks.

APPLICATIONS

When used in conjunction with Comtech EFData modems, the CST-5000 is ideal for single digital carriers up to 2.04 Mbit/s, or multiple carrier operation over a 36 or 72 MHz bandwidth. Because the CST-5000 has a 70 or 140 MHz IFL, it can also be used for other analog and digital applications. Small- to medium-size earth stations are easily constructed and commissioned with a CST-5000.

When used with a high gain antenna, this terminal can also be used as the radio frequency (RF) electronics of a central hub in point-to-multipoint applications, and serve as the terminal for the end points of the network. The Comtech EFData line of low-cost very small aperture terminal (VSAT) modems may also be used in the construction of such networks.

MONITOR AND CONTROL (M&C)

An onboard microprocessor monitors and controls all operational parameters and systems status of the CST-5000. This powerful M&C system enables the user to locally or remotely control functions such as output power, and transmit/receive channel frequencies. The system also reports terminal configuration status, as well as fault status of all terminal components.

The CST-5000 can be initially configured by an optional keyboard/LED controller within the enclosure, or by connection of a common ASCII RS-232/485 terminal connected to the serial port. A simple command set allows total configuration control and retrieval of status information. If the indoor unit is a more sophisticated station M&C computer, the serial port can be set to RS-485 for bus operation.

LNA ASSEMBLY

The LNA assembly consists of a wave guide transmit reject filter and an LNA. The TRF provides receive system protection from transmit energy fed back through the antenna feed system. The LNA standard noise temperature is 65°K, with options down to 35°K, depending upon Gain over Temperature (G/T) requirements.

OUTDOOR ENCLOSURE

The outdoor unit is a weatherproof enclosure housing the up/down converters, solid state power amplifier (SSPA), monitor/control processor, and power supply. Power levels range from +8 dBm (for driving an external SSPA or traveling wave tube [TWT]) to 40W, depending upon EIRP requirements. SSPAs are temperature compensated for maximum stability.

Up and down converters utilize dual conversion with individual synthesizers for independent transmit and receive transponder selection. The microprocessor provides critical online loop monitoring, dynamic control functions, configuration control, fault/status monitoring, and a serial computer/terminal interface.

INSTALLATION

The CST-5000 is small and light weight, and can be easily mounted to the hat ring of a fiberglass antenna, the mount of an aluminum antenna, or within the hub of a large antenna. Alternately, the enclosure can be mounted on a stand-alone pipe support. Connection to indoor modems and station monitor/control equipment is made using two low-cost 70 MHz coaxial cables and a twisted pair for ASCII control of the terminal. The final connection to the enclosure is prime power at either 110/220 VAC or -48 VDC.



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TRANSMIT CHARACTERISTICS

Output Freq. (no inversion)	5.845 to 6.425 GHz
Input Frequency	70 MHz \pm 18 MHz (optional 140 MHz)
Output Power at 1 dB compression	+8 dBm or 5W (+37 dBm) or 10W (+40 dBm) or 20W (+43 dBm) or 40W (+46 dBm)
Third Order Intercept	+18 dBm (for +8 dBm) or +46 dBm (for 5W) or +49 dBm (for 10W) or +52 dBm (for 20W) or +55 dBm (for 40W)
Nominal Small Signal Gain	26 dB (for +8 dBm) or 68 dB (for 5W) or 71 dB (for 10W) or 74 dB (for 20W) or 77 dB (for 40W) \pm 11 dB min.
Gain Adjust Range (from nominal)	
Gain Variation:	
Over 36 MHz	\pm 1 dB max.
Over 36 MHz, temp., and aging	\pm 2 dB max.
Noise Figure:	
Max. Attenuation	23 dB max.
Min. Attenuation	15 dB max.
Group Delay	25 ns/36 MHz
Synthesizer Step Size	2.5 MHz (optional 125 kHz)
Synthesizer Phase Noise	-60 dBc/Hz at 100 Hz -70 dBc/Hz at 1 kHz -75 dBc/Hz at 10 kHz -80 dBc/Hz at 100 kHz
Frequency Stability:	
At Shipment	\pm 1 x 10 ⁻⁸
Daily at 23°C	\pm 1 x 10 ⁻⁸
Annual at 23°C	\pm 1 x 10 ⁻⁷
Over Temperature	\pm 1 x 10 ⁻⁸ (-40 to +55°C)
After 30 min. warm-up	\pm 1 x 10 ⁻⁸
Electrical Adjustment	0.5 x 10 ⁻⁷
Isolation on Fault Shutdown	-60 dBc
Spurious:	
< 250 kHz Carrier Offset	-35 dBc max.
> 250 kHz Carrier Offset	-50 dBc max.
HPA Harmonics	-50 dBc max.
RF Output VSWR	1.5:1 at 50Ω
RF Output Connector	Type N Female
IF Input VSWR	1.5:1 at 50Ω
IF Input Connector	Type TNC Female



RECEIVE CHARACTERISTICS

Input Freq. (no inversion)	3.620 to 4.200 GHz
Output Frequency	70 MHz \pm 18 dB (optional 140 MHz)
Output Power at 1 dB compression	+15 dBm
Third Order Intercept	+25 dBm
Gain Adjust Range (with LNA)	87 to 99 dB
Gain Variation (with LNA):	
Over 36 MHz	\pm 1.5 dB max.
Over 36 MHz, temp., and aging	\pm 4 dB max.
Noise Temp. (with LNA)	LNA Specification
Group Delay	25 ns/36 MHz
Synthesizer Step Size	2.5 MHz (optional 125 kHz)
Synthesizer Phase Noise	-60 dBc/Hz at 100 Hz -70 dBc/Hz at 1 kHz -75 dBc/Hz at 10 kHz -80 dBc/Hz at 100 kHz
Frequency Stability:	
At shipment	\pm 1 x 10 ⁻⁸
Daily at 23°C	\pm 1 x 10 ⁻⁸
Annual at 23°C	\pm 1 x 10 ⁻⁷
Over Temperature	\pm 1 x 10 ⁻⁸ (-40 to +55°C)
After 30 min. warm-up	\pm 1 x 10 ⁻⁸
Electrical Adjustment	0.5 x 10 ⁻⁷
Spurious Non-Signal Related	-60 dBm max.
Image Rejection (all conversions)	> 35 dB
Linearity	Intermods < -35 dBc for two tones at -89 dBm at 95 dB gain
RF Input VSWR	1.25:1 at 50Ω (with LNA)
RF Input Connector	Type N female
IF Output VSWR	1.5:1 at 50Ω
IF Output Connector	Type TNC female
COMMON	
Prime Power	95 to 230 VAC, 47 to 63 Hz, or 48 VDC
Power Consumption:	
+8 dBm Output	90W
5W Output	140W
10W Output	210W
20W Output	340W
40W Output	600W
Size	23" H x 10.5" W x 9" D
Weight	40 lbs.
Sealing	Weatherproof
Ground Attach	#10 AWG ground lug
Environmental:	
Temperature	-40 to +55°C operational -50 to +80°C survival
Humidity	0 to 100% RH
Altitude	0 to 15,000 ft. operational 0 to 50,000 ft. survival

OPTIONS

- 140 MHz
- 125 kHz Step Size
- KP-10 Hand-Held Keypad

NOTES:

- For LNA and M&C specifications, refer to the CST-5000 C-Band Satellite Terminal Installation and Operation manual.
- For information on the high-power version of the CST-5000, refer to the HPCST-5000 High-Power C-Band Satellite Terminal product data sheet.