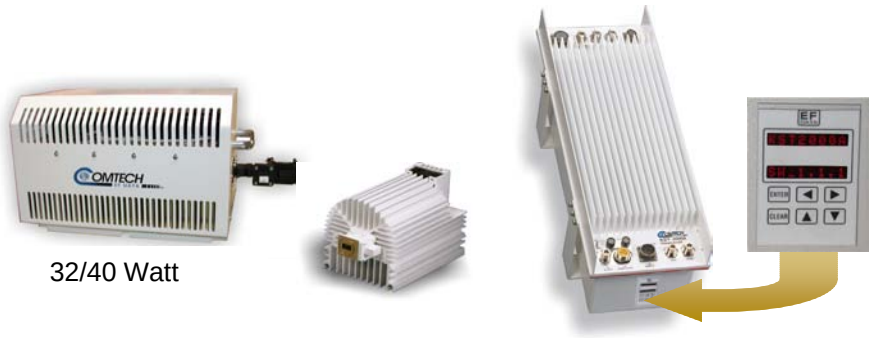
KST-2000A/B Ku-Band Satellite Transceiver



32/40 Watt

INTRODUCTION

The Comtech EF Data (CEFD) KST-2000A/B Ku-Band satellite earth station transceiver is a full-featured, high-performance transceiver available in several application-specific configurations. Performance highlights include the following:

- 13.75 to 14.5 GHz Tx (available ≤ 40 watt)
- 14.0 to 14.5 GHz Tx optional (available ≤ 80 watt)
- 10.95 to 12.75 GHz Rx with wide band LNA (KST-2000A)
- 10.95 to 11.70 GHz, 11.70 to 12.20 GHz or 12.25 to 12.75 GHz Rx (KST-2000B)
- 70 or 140 MHz IF input/output
- Transmit only option available

A KST-2000A/B consists of three distinct functional areas:

Converter

The converter portion of the system controls external SSPAs. The converter unit is a convection cooled, up/down converter with an internal power supply and microprocessor-based Monitor and Control (M&C).

Receive Options

The KST-2000A model includes a Low Noise Amplifier (LNA), while the KST-2000B offers a choice of Low Noise Block converters (LNB). Both the LNA and LNB are feed-mounted with or without a Transmit Reject Filter (TRF).

Power Amplifier

Power amplifiers are available in a selection of output capabilities. Automatic Gain Control (AGC) provides power output stability for 40 Watts or less.

APPLICATIONS

The KST-2000A, with its wide band receiver, is ideally suited for the following mobile/transportable applications:

- Satellite News Gathering (SNG)
- Very Small Aperture Terminals (VSATs)
- Flyaway Terminals

The lower-cost KST-2000B offers a choice of LNBs for its receive band, making it ideal for fixed station uses:

- Rural Telephony
- Network Hub Stations
- Network Remote Sites

FEATURES

- Feedhorn-mounted SSPA (2, 4, or 8 Watts)
- Light weight units (intended for spar mount)
- Modular construction for ease of upgrades
- FSK control from selected CEFD modems
- Built-in Display and Keypad option (available)
- External LED indicators for Power, Tx RF, and Fault
- Power-factor-corrected power supplies
- L-Band receive monitor output
- High-stability internal frequency reference or an external reference
- Built in redundancy controller

STANDARDS AND CERTIFICATIONS

The KST-2000A/B meets the following industry standards:

- IESS 308 and IESS 309 (Phase Noise)
- FCC Radiated Emissions Requirements

The system is also CE Mark certified for the following:

- EN55022 (Conducted and Radiated Emissions)
- EN50082-1 (Immunity)
- EN60950 (Safety)
- EN61000-3-2 (Harmonic Current Emissions)

INSTALLATION

The KST-2000A/B can be mounted behind the reflector of small antennas, on the feed boom of offset feed antennas, or within the hub of larger antennas. Two coaxial cables connect the converter unit to the separate SSPA and the LNA or LNB assembly.

Additionally, the SSPA connects to the converter unit with a separate M&C cable. For SSPAs of 8W or less, the M&C cable supplies power directly from the converter unit. For applications above 8W, the SSPA contains a separate power supply.

Connection to indoor equipment, such as modems, is accommodated via two low-cost 70 or 140 MHz coaxial cables. A twisted pair may be used for M&C functions.

Transceivers

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KST-2000A/B Ku-Band Satellite Transceiver

CONVERTER TRANSMIT CHARACTERISTICS

Output Frequency	13.75 to 14.5 GHz, in 1.0 MHz steps
Input Frequency	50 to 90 MHz (100 to 180 MHz optional)
Input Power Level	-25 to -45 dBm operational
Gain	42 dB nom. at mid-range attenuator setting
Gain Variation with Frequency	
±20 MHz	2 dB peak to peak
Entire Band	3 dB peak to peak
Gain Stability at any Single Frequency	4 dB peak to peak
User Attenuator Range	0 to 20 dB, in 1 dB steps
Power Output at 1dB Compression	+15 dBm minimum
Transmit Phase Noise	Exceeds requirements of IESS 308/309

CONVERTER RECEIVE CHARACTERISTICS

Input Frequency	
KST-2000A	10.95 to 12.75 GHz
KST-2000B	950 to 1700 MHz
	(All tunable in 1.0 MHz steps)
Output Frequency	50 to 90 MHz (100 to 180 MHz optional)
Gain	45 dB minimum @ 0 dB attenuator setting
User Attenuator Range	0 to 20 dB, in 1 dB steps
Gain Variation with Frequency	At a fixed temperature
Any 40 MHz Band	2.0 dB peak to peak
Entire Operating Band	3.0 dB peak to peak
Power Output @ 1 dB Compression	+16 dBm minimum
Power Output Stability over Temp.	4.0 dB peak to peak at a fixed frequency
Phase Noise	Exceeds requirements of IESS 308/309
Spurious Signals	
Signal Related	-50 dBc at -5 dBm output
	-35 dBc at <250 kHz from carrier
Non Signal Related	-87 dBm max. referred to converter input
Third Order Products	-33 dBc for two carriers each at +6 dBm
Auxiliary Output Monitor	
Frequency	950 to 1700 MHz
Gain	20 dB relative to the carrier input
Connector	Type N female, 50Ω
KST-2000A LNA	
Noise Temperature Option	110 or 85°K
Gain Option	50 or 60 Db
KST-2000B LNB	
Frequency Option	10.95 to 11.70 GHz
	11.70 to 12.20 GHz
	12.25 to 12.75 GHz
Noise Figure	1.0 dB max

GENERAL CONVERTER CHARACTERISTICS

Prime Power	85 to 264 VAC, 47 to 63 Hz, <200W
	48 VDC Optional
Frequency Stability	1.5 x 10^{-9}/24 hrs
	1 x 10^{-8}/Rated Temp
Serial Data Interface,	EIA-232
User-Selectable	EIA-485, half duplex
	EIA-422, half duplex
Serial Data Baud Rate (user-selectable)	300, 600, 1200, 2400, 9600, 19200
Discrete Alarm Outputs: Uplink Summary Alarm, Downlink Summary Alarm, System Summary Alarm	Form "C" relay contacts
LED External Indicators	Prime Power On/Tx RF On Summary fault
IF Input/Output Connectors	Type N female, 50Ω
Tx Output/Rx Input Connectors	Type N female, 50Ω
Size	21.75 H x 8.25 W x 8.0 D inches
	(55.2 H x 21 W x 20.3 D cm)
Weight	35 lbs (16 kg) KST-2000A
	30 lbs (14 kg) KST-2000B
Environmental (Convection Cooled)	
Temperature	-40 to +55°C operational
	-50 to +75°C storage
Humidity	0 to 100% RH

GENERAL SSPA CHARACTERISTICS For ≤ 40W

Frequency Range	13.75 to 14.5 GHz	14.0 to 14.5 GHz
Power Output	+33 dBm for 2W unit	+33 dBm for 2W unit
(at 1 dB Compression, at 25ºC)	+36 dBm for 4W unit	+36 dBm for 4W unit
	+39 dBm for 8W unit	+39 dBm for 8W unit
	+42 dBm for 16W unit	+42 dBm for 16W unit
	+44 dBm for 25W unit	+44 dBm for 25W unit
	+45 dBm for 32W unit	+45 dBm for 32W unit
	+46 dBm for 40W unit	+46 dBm for 40W unit
Third Order Intercept Point	+41 dBm for 2W unit	+41 dBm for 2W unit
(9 dB OPBO single carrier,	+44 dBm for 4W unit	+44 dBm for 4W unit
6 dB OPBO total)	+47 dBm for 8W unit	+47 dBm for 8W unit
	+50 dBm for 16W unit	+50 dBm for 16W unit
	+52 dBm for 25W unit	+52 dBm for 25W unit
	+53 dBm for 32W unit	+53 dBm for 32W unit
	+54 dBm for 40W unit	+54 dBm for 40W unit
Gain (Nominal)	+27 dB for 2W unit	+27 dB for 2W unit
	+30 dB for 4W unit	+30 dB for 4W unit
	+33 dB for 8W unit	+33 dB for 8W unit
	+36 dB for 16W unit	+36 dB for 16W unit
	+38 dB for 25W unit	+38 dB for 25W unit
	+39 dB for 32W unit	+39 dB for 32W unit
	+40 dB for 40W unit	+40 dB for 40W unit

Gain Variation Over Frequency	2.0 dB peak to peak at 25°C
Input Connector	Type N female, 50Ω
Output Connector	WR-75 waveguide flange
Input Power	+9.75 VDC from converter for 2, 4, and 8W units
	85 to 264 VAC, 47 to 63 Hz or
	48 VDC up to 40W SSPA Optional
	16, 25, 32W, 40W units
	16W 180W
	25W 360W
	32W 380W
	40W 390W

SSPA CHARACTERISTICS FOR ≥ 80W

Note: 80W SSPA operates only with 220V AC source.

Frequency Range	14.0 to 14.5 GHz
Minimum Power Output (P_{1dB})	+48 dBm for 80W
Third Order Intermodulation	-20 dBc max for 80W
At 3 dB backoff from P_{1dB}	
Gain (Nominal)	40 dB for 80W
Gain Variation over Temperature	± 1.5 dB for 80W @ 25°C
Gain Variation over 500 MHz	2.0 dB p-p
Input Power 220 VAC	1200W for 80W

SYSTEM TRANSMIT CHARACTERISTICS WITH COMTECH EF DATA SSPA For ≤40W

Gain Stability over Temp, AGC on,	3.0 dB peak to peak maximum
Fixed Frequency	2.0 dB peak to peak typical
Gain Variation with Frequency	
± 20 MHz	2.0 dB peak to peak
Entire Band	3.0 dB peak to peak
Spurious Signals (13.75 to 14.5 GHz)	
Signal Related	-50 dBc at 6 dB below P1 dB
< 250 kHz	-35 dBc at 6 dB below P1 dB

System Gain Calculations with CEFD SSPA

System Gain = Transceiver + SSPA Gain