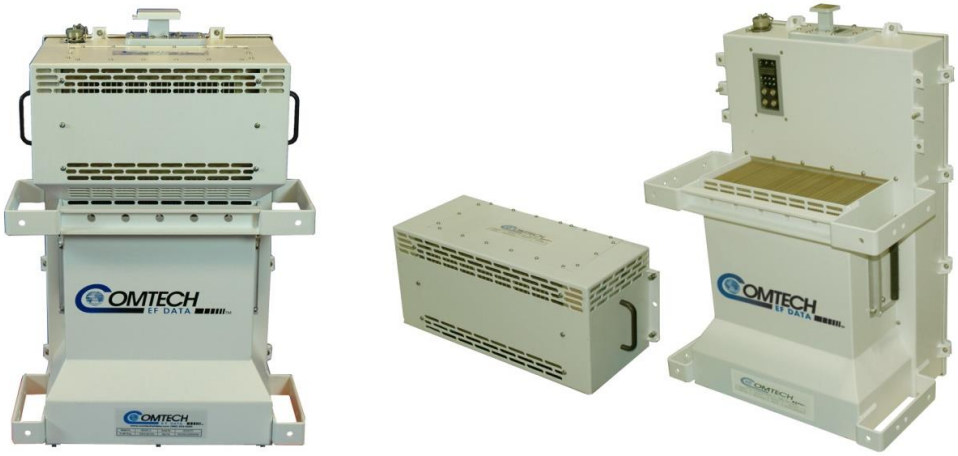
High-Power Outdoor C-, X- and Ku-Band Power Amplifiers

Amplifiers



Overview

Comtech EF Data's (CEFD) series of High-Power Outdoor (HPOD) C-, X-, and Ku-Band Solid-State Power Amplifiers (SSPAs) provide a cost-effective option to TWT amplifiers in satellite communications terminals. The HPOD delivers its rated power, guaranteed at the 1 dB compression point to the transmit waveguide flange.

Field Replaceable Power Supply

Recognizing that the MTBF limiting factor for almost all electronic equipment is the power supply, the HPOD provides for easy field replacement. Simply disconnect the AC mains, release the captive fasteners, and remove the supply from the SSPA module.

The Solid-State Advantage

Each HPOD is constructed with highly reliable GaAs FETs. High linearity SSPA technology enables achieving intermodulation specifications using lower power amplifiers. The HPOD SSPA also provides an MTBF that is 4 to 5 times greater than legacy TWT MTBFs.

Functional Description

An HPOD consists of an SSPA module with the Monitor/Control Processor (MCP), a field replaceable power supply, and a field replaceable fan assembly. The amplifier features a Comtech EF Data low-loss combining technique and MCP-based temperature versus gain compensation.

Redundant Systems

The HPOD amplifiers were designed from the start to provide cost-effective 1:1 or 1:2 systems. Redundant system control is built into the unit, eliminating an external controller with its associated cabling. This provides a cost benefit to our customers both at initial purchase and at installation.

Higher Power Through Phase Combining

Comtech EF Data's phase-combined systems allow the outputs of two amplifiers to be summed together. A "normal" 1:1 system using 300 W amplifiers provides 300 W of output power (the offline unit's capabilities are unusable). The same amplifiers in a 1+1 phase-combined system will provide 600 W of output power in normal operation, and a "soft failure" state of 300 W. If no degradation on failure can be accommodated, a third amplifier can be added to form a 1:2 phase-combined system.

Optional "Smart BUC" Functionality

Our unique approach to L-Band/RF frequency conversions eliminates DC and 10 MHz from the input coax. This greatly simplifies redundant and multi-carrier operation. It offers full 13.75 to 14.5 GHz Ku-Band coverage and supports industry standard FSK modem/BUC communications. The optional BUC can lock to an external or internal reference oscillator.

Feature Packed

The HPOD SSPAs come equipped with useful features that other manufacturers offer as options. Included in each unit's base price are temperature compensation, sample ports, power monitor, field-replaceable power factor corrected supply, and full remote monitor and control capabilities.

Specifications

Output

	C-Band	X-Band	Ku-Band
Frequency	5.850 to 6.425 GHz 5.850 to 6.725 GHz (Optional)	7.9 to 8.4 GHz	14.0 to 14.5 GHz 13.75 to 14.5 GHz (Optional)
Available Power			
Outputs P1dB (Psat), W (See Note)	200 (250) 250 (300) 350 (400) 400 (500) 500(600)	200 (250) 250 (300)	80 (100) 100 (125) 175 (200) 200 (250)
Phase Combined Systems P1dB (Psat), W (See Note)	500 (600) 700 (800) 800 (1000) 1000(1200)	400 (500) 500 (600)	160 (200) 200 (250) 350 (400) 400 (500)
Connector	CPR-137G Waveguide	CPR-112G Waveguide	WR75G Waveguide
Mute	-60 dBc		
Impedance	50 Ω		
VSWR	1.25:1 maximum		

Gain

Linear

C-, X-, and Ku Band	70 dB min., 75 dB typical
Adjust	20 dB in 0, 25 dB steps
Full Band	± 1.0 dB
Per 40 MHz	± 0.25 dB
-40 to +55°C	± 1.0 dB

Linearity

Third Order Intermodulation Products	-30 dBc typical, -25 dBc max. @ 3 dB total back-off from rated P1d B (two tones, Δf = 1 MHz)
Plinear (typ.)	-30 dBc spectral regrowth @ 1.8 dB OPBO from rated P1dB

AM To PM Conversion

2° typical, 3.5° maximum at rated output

Group Delay (Per 40 MHz)

Linear	± 0.01 ns/MHz
Parabolic	± 0.003 ns/MHz^2
Ripple	± 1.0 ns peak to peak

Spurious

Second Harmonic (C- and X-Band)	-60 dB dBc max. @ 1 dB below rated output
Non-Harmonic Related	-65 dB dBc max.

Note: P1db over all temp/frequencies, Psat typ., Derate power by 1dB over 6.425 to 6.725 and 13.75 to 14.0 GHz and .2 dB for 500 W unit, @ + 55C, standard band edge

Input

Impedance	50.Ω
Noise Figure	8 dB typical, 10 dB maximum @ maximum gain (15 dB for HPOD Ku-Band)
VSWR	1.25:1 maximum
Connector	Type N

Sample Ports

Output Sample	Type N, 50 Ω, -40 dBc nominal
Input Sample	Type N, 50 Ω, -20 dBc nominal

Remote Control

Com Port	RS-485 or RS-232, Ethernet optional

Alarms

Summary Fault	Form C

Environmental, Power and Physical

Operating Temp.	-40° to +55°C (-40° to 131°F)
Non-Operating Temp.	-50° to +75°C (-58° to 167°F)
Operating Humidity	0 to 100% condensing
Ingress Protection	Designed for IP-66 (Dust tight, strong water jets)
Altitude	10,000 feet above sea level (derated 2°C/ 1000 ft AMSL)
C- and X-Band	180 to 264 VAC, 47 to 63 Hz
Ku-Band	180 to 264 VAC, 47 to 63 Hz
Dimensions (height x width x depth)	11.49" x 17.88" x 26.77" (29.18 x 45.41 x 67.99 cm)
Weight	75 lbs (34 kg) nominal

Available Options

Optional BUC (Specifications may vary)

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