

CPA C-Band Solid State Indoor Power Amplifiers

Amplifiers



CPA-50



CPA-100/200

Application

The Comtech EF Data Model CPA Indoor C-Band Solid State Power Amplifier (SSPA) delivers 50, 100, or 200 Watts guaranteed, at the 1 dB compression point, to the transmit waveguide flange. It provides a cost effective and more reliable replacement for Traveling Wave Tube (TWT) amplifiers in C-Band terminals. Due to its small rack height, it is also ideal for the construction of small “flyaway” terminals, medium size (equivalent to Intelsat F) earth stations, and hub earth stations for small to medium size private networks, or point-to-point links.

Typical Users

- Larger Earth Stations
- SNG Providers

Common Applications

- Construction of small “flyaway” terminals, medium size earth stations & hub earth stations
- Small to medium sized private networks
- Point-to-point links

The Solid-State Advantage

The SSPA is constructed with highly reliable Gallium Arsenide Field Effect Transistors (GaAs FETs). With third order inter-modulation products from 4 to 6 dB better than TWT ratings, the CPA unit replaces TWTs with saturated power levels up to 400 Watts. The CPA also provides a Mean Time Between Failure (MTBF) that is 5 to 6 times greater than the typical TWT MTBFs.

Option Free

The CPA series of SSPAs come equipped with useful features that other manufacturers offer as options. Included in the base price are temperature compensation, sample ports, power monitor, rack slides, and full remote monitor and control capabilities.

Functional Description

The SSPA consists of a chassis, power supply, fan assembly, front panel assembly, Monitor/Control Processor (MCP), and an SSPA module. The amplifier was designed using a Comtech EF Data low-loss combining technique and an MCP-based temperature versus gain compensation.

Front Panel

The SSPA front panel contains a user-friendly Liquid Crystal Display (LCD) menu display and cursor control keys in order to display status or change parameters. The front panel also has LEDs for quick reference to binary status points and both input and output sample ports at -20 and -40 dBc for easy test point access.

Built-In Redundancy Controller

Each SSPA amplifier has the ability to function as a 1+1 or 1+2 redundancy controller in the backup mode. The optional redundancy configuration is implemented by attaching a ganged waveguide/coax transfer switch(es) to the input and output connectors of the amplifiers with a combination coaxial cable and waveguide kit. When the backup SSPA is commanded into the controller mode, it monitors the online SSPA(s) for faults. A faulted online unit may be disconnected and replaced without affecting the online power amplifier.

Remote Control

The remote control interface is selectable between EIA-232 and EIA-485, as well as full Ethernet including Telnet, SNMP and pre-loaded HTML GUI. All configuration control, status retrieval, and adjustments are available as simple ASCII commands through the serial interface or through the front panel menu. As a cost option, the remote control command structure can be customized in order to accommodate existing network control software.

Specifications

Output

Frequency	5.850 to 6.425 GHz (optional to 6.725 GHz)			
Power	<u>Model</u>	<u>50 W</u>	<u>100 W</u>	<u>200 W</u>
Output Power, P _{1dB}	dBm	+47	+50	+53
Output Power, P _{sat} , Typ	dBm	+48	+51	+54
Mute	-60 dB			
Impedance	50 Ω			
VSWR	1.25:1 maximum			
Connector	CPR-137G Waveguide			

Gain

Linear	
CPA-050	54.0 dB min., 57.0 dB typical
CPA-100/200	63.0 dB min., 67.0 dB typical
Adjust	20 dB in 0.25 dB steps
Full Band	
CPA-50/100/200	± 0.75 dB (± 1.00 dB extended band)
Per 40 MHz	± 0.25 dB
+0 to +50°C	± 0.50 dB @ center freq. ± 1.00 dB full band

Third Order Inter-Modulation

Intercept	
CPA-50	+56 dBm min., 58 typical
CPA-100	+59 dBm min., 61 typical
CPA-200	+62 dBm min., 63.5 typical
Products	
CPA-50/100/200	-32 dBc typical, -25 dBc max. @ 3 dB total backoff (two tones, Δf+ 1 MHz)

AM to PM Conversion

CPA-50/100/200	1.0° typ, 2.5 max. at rated output
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Group Delay (per 40 MHz)

Linear	± 0.03 ns/MHz
Parabolic	± 0.003 ns/MHz ²
Ripple	1.0 ns peak to peak

Spurious

Second Harmonic	-60 dBc max. @ 1 dB below rated output
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Phase Noise (dBc/Hz)

(with optional internal BUC and reference)	Typical dBc/Hz	Spec dBc/Hz
Offset = 100 Hz	-79	-72
1 KHz	-91	-84
10 KHz	-105	-97
100 KHz	-120	-107
1 MHz	-132	-115

Input

Impedance	50 Ω
Noise Figure	8 dB typical, 15 dB max. @ max. gain
VSWR	1.25:1 maximum
Connector	Type N

Front Panel

Display	20 x 2 LCD
Data Entry	Cursor control keypad
Output Sample	Type N, 50 Ω, -40 dBc
Input Sample	Type N, 50 Ω, -20 dBc

Remote Control

Com Port	EIA-485 or EIA-232, RJ-45 for Ethernet
Protocol	Protocol Comtech EF Data ASCII or Emulation Mode

Alarms

Summary Fault	Form C
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LED

Power On	Green
Fault	Red
Stored Fault	Red
TX On	Yellow
Online	Yellow
Remote	Yellow

Mechanical

Dimensions	height x width x depth
CPA-50	5.25" x 19" x 24" (13 x 48 x 60 cm)
CPA-100	8.75" x 19" x 24" (22 x 48 x 60 cm)
CPA-200	10.5" x 19" x 24" (27 x 48 x 60 cm)

Environmental

Temperature	
Operating	32 to 122°F (0 to 50°C)
Storage	-40 to 158°F (40 to 70°C) (derate 2°C/1000ft AMSL)
Humidity	10 to 95% Non-condensing operating 0 to 100% Non-condensing storage
Shock	Normal commercial shipping and handling

Power Requirements

CPA-50	90 to 135 or 180 to 270 VAC, 47 to 63 Hz, 500 W (Auto-select)
CPA-100	90 to 135 or 180 to 270 VAC, 47 to 63 Hz, 800 W (Auto-select)
CPA-200	180 to 270 VAC, 47 to 63 Hz, 1300 W (Auto-select)



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