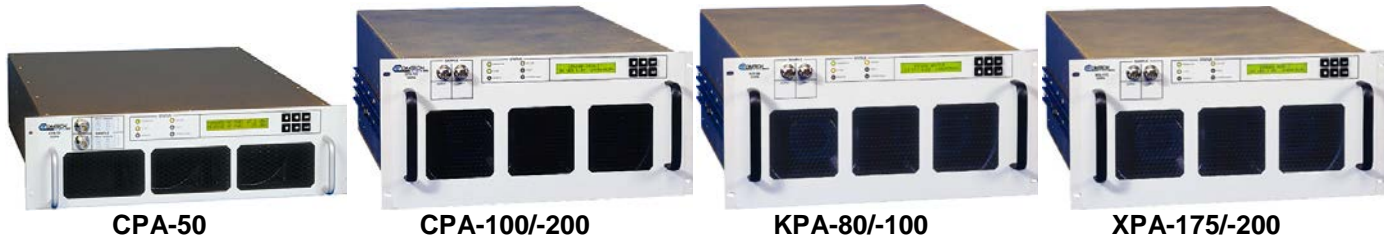


# CPA, KPA & XPA Solid-State Indoor Power Amplifiers

Amplifiers



## Overview

Our indoor series of Solid-State Power Amplifiers (SSPAs) includes the CPA for C-Band, the KPA for Ku-Band and the XPA for X-Band. Each model has a rack-mountable chassis, power supply, fan assembly, front panel assembly, Monitor/Control Processor (MCP), and an SSPA module. The amplifiers were designed using our low-loss combining technique and an MCP-based temperature versus gain compensation.

The front panel of the units features a user-friendly Liquid Crystal Display (LCD) menu display and cursor control keys to display status and enable parameter configuration. The front panel also has LEDs for quick reference to binary status points and both input and output sample ports for easy test point access.

The units each deliver the rated power, guaranteed, at the 1 dB compression point, to the transmit waveguide flange. The amplifiers are cost-effective and provide a reliable replacement for alternate technologies. As a result of the small form factors, the CPA, KPA and XPA are ideal for the construction of small "flyaway" terminals, medium sized (equivalent to Intelsat F class) earth stations, and hub earth stations for small to medium size private networks or point-to-point links.

The SSPAs are constructed with highly reliable Gallium Arsenide Field Effect Transistors (GaAs FETs). Solid-State provides significant advantage over alternate technologies, including:

- More superior third order inter-modulation products – from 4-6 dB better
- Saturated power levels up to twice that of the CPA's, KPA's or XPA's rated output
- Greater Mean Time Between Failure (MTBF) – 4-6X better

The CPA, KPA and XPA are also equipped with useful features that other manufacturers offer as chargeable options. Included in the base price of our units are:

- Temperature compensation
- Sample ports
- Power monitor
- Rack slides
- Full remote monitor and control capabilities

## Built-In Redundancy Controller

Each 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

CPA	5.850 to 6.425 GHz (optional to 6.725 GHz)
KPA	14.0 to 14.5 GHz
XPA	7.9 to 8.4 GHz

#### Power

CPA-50	47 dBm min. @ 1 dB compression 48 dBm min. @ P <sub>sat</sub> Typical
CPA-100	50 dBm min. @ 1 dB compression 51 dBm min. @ P <sub>sat</sub> Typical
CPA-200	53 dBm min. @ 1 dB compression 54 dBm min. @ P <sub>sat</sub> Typical
KPA-80	48.5 dBm min. @ 1 dB compression 49.5 dBm min. @ P <sub>sat</sub> Typical
KPA-100	49.5 dBm min. @ 1 dB compression 50.5 dBm min. @ P <sub>sat</sub> Typical
XPA-175	52.2 dBm min. @ 1 dB compression 53.2 dBm min. @ P <sub>sat</sub> Typical
XPA-200	53 dBm min. @ 1 dB compression 54 dBm min. @ P <sub>sat</sub> Typical

Mute -60 dB

Impedance 50 Ω

VSWR 1.25:1 maximum

#### Connector

CPA	CPR-137G Waveguide
KPA	WR75G Waveguide
XPA	CPR-112G waveguide

### Gain

#### Linear

CPA-50	54 dB min., 57 dB typical
CPA-100	63 dB min., 67 dB typical
CPA-200	63 dB min., 67 dB typical
KPA-80	61 dB min., 64 dB typical
KPA-100	65 dB min., 70 dB typical
XPA-175	62 dB min., 65 dB typical
XPA-200	62 dB min., 67 dB typical

Adjust 20 dB in 0.25 dB steps

Full Band ± 0.75 dB (± 1.00 dB extended band)

Per 40 MHz ± 0.25 dB

+0 to +50°C ± 0.50 dB @ center frequency

± 1.00 dB full band

### Third Order Inter-Modulation

#### Intercept

CPA-50	56 dBm min., 58 dBm typical
CPA-100	59 dBm min., 61 dBm typical
CPA-200	62 dBm min., 63.5 dBm typical
KPA-80	58.5 dBm min., 59.5 dBm typical
KPA-100	59 dBm min., 61 dBm typical
XPA-175	60.5 dBm min., 62 dBm typical
XPA-200	60.5 dBm min., 62 dBm typical

#### Products

CPA-50/100/200	-32 dBc typical, -25 dBc max. @ 3 dB total backoff (two tones, Δf+ 1 MHz)
KPA-80/100	-30 dBc typ, -25 dBc max. @ 3 dB total backoff (two tones, Δf+ 1MHz)
XPA-175/200	-30 dBc typical, -25 dBc max. @ 3 dB total backoff (two tone, Δ f+1MHz)

### AM to PM Conversion

CPA	1.0° typical, 2.5 maximum at rated output
KPA	2.0° typical, 3.0 maximum at rated output
XPA	2.0° typical, 3.0 maximum at rated output

### Group Delay (per 40 MHz)

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

### Spurious

Carrier Related	-65 dBc
Line Related	-50 dBc

### Input

Impedance	50 Ω
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### Noise Figure

CPA	8 dB typical, 15 dB max. @ max. gain
KPA	10 dB typical, 15 dB max. @ max. gain
XPA	10 dB typical, 15 dB max. @ max. gain

VSWR 1.25:1 maximum

### Connector

CPA	Type N
KPA	SMA female
XPA	Type N

Level -10 dBm typical

### Phase Noise (dBc/Hz) (with optional internal BUC & reference)

Offset	Typical dBc/Hz	Spec dBc/Hz
100 Hz	CPA: -79	CPA: -72
	KPA: -76	KPA: -69
	XPA: -78	XPA: -72
1 KHz	CPA: -91	CPA: -84
	KPA: -85	KPA: -82
	XPA: -87	XPA: -84
10 KHz	CPA: -105	CPA: -97
	KPA: -98	KPA: -90
	XPA: -104	XPA: -97
100 KHz	CPA: -120	CPA: -107
	KPA: -114	KPA: -102
	XPA: -114	XPA: -107
1 MHz	CPA: -132	CPA: -115
	KPA: -132	KPA: -115
	XPA: -132	XPA: -115

### 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	Comtech ASCII or Emulation Mode

### Alarms

Summary Fault	Form C Contacts
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### LEDs

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

## Physical & Environmental

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)
KPA-80	9" x 19" x 24" (22 x 48 x 60 cm)
KPA-100	9" x 19" x 24" (22 x 48 x 60 cm)
XPA-175	11" x 19" x 24" (27 x 48 x 61 cm)
XPA-200	12" x 19" x 24" (31 x 48 x 61 cm)

### Temperature

Operating	0 to 50°C (32 to 122°F) (Derate 2° C/1000ft AMSL)
Storage	-40 to 70°C (-40 to 158°F)

### Humidity

Operating	10 to 95% Non-condensing
Storage	0 to 100% Non-condensing storage

**Shock** | Normal commercial shipping and handling

## Power Requirements

Model	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)
KPA-80	180 to 270 VAC 47 to 63 Hz 1100 W (auto-select)
KPA-100	180 to 270 VAC 47 to 63 Hz 1100 W (auto-select)
XPA-175	180 to 270 VAC 47 to 63 Hz 1800 W
XPA-200	100 to 140 (special order) or 180 to 270 VAC 47 to 63 Hz 2600 VA 1800 W



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