C-Band Gen IV Klystron High Power Amplifier for Satellite Communications

C-Band

The Gen IV High Power Amplifier

C-Band Gen IV—provides up to 3.35 kW of power in a dual drawer package

Unmatched Efficiency
Uses less power and produces less heat than any other K-HPA. When the Power Saver (included as standard) is switched on, power savings are even greater. Can be operated with full beam voltage at any RF output power.

Unmatched Size
Greater efficiency and exceptional thermal margins have enabled CPI to design the smallest KPA on the market—without the threat of overheating or a shorter klystron life.

Greater Reliability
Low temperatures are the key to longer lifetimes for klystrons and electronic parts. The CPI high efficiency klystron makes these lower temperatures possible.

Useful Displays
Large, high quality, graphical display has a wide viewing angle and a sharp appearance. All important functions are clearly displayed, and an event log is included.

Easy Maintenance, Easy Handling
All areas of the amplifier are easily accessible and there are no large harnesses to get in the way. Separate RF and Power Supply drawers slide out from a standard rack.

Acoustically Quiet
The quietest K-HPA in the industry.

Worldwide Support
Backed by over two decades of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes nine regional factory Service Centers.

satcom division

811 Hansen Way
P.O. Box 51625, Palo Alto, CA 94303

tel: (650) 846-3803
fax: (650) 424-1744

e-mail: marketing@satcom.cpii.com
www.cpii.com/satcom

C-Band
Gen IV Klystron High Power Amplifier

C-Band

SPECIFICATIONS, C-Band Gen IV

Electrical

Frequency Ranges	5.85 - 6.425 GHz; others available as options
Klystron Power Output	3.35 kW min. (65.2 dBm)
Amplifier Output[1] at flange with harmonic filter	2.88 kW min. (64.6 dBm)
Bandwidth	45 MHz; 80 MHz available as an option.
Power Adjustability	0 to -20 dB of output with ±0.1 dB typical resolution
Gain at Rated Power	77 dB min.
Gain Stability vs. Time	±0.25 dB/24 hr. max. at constant drive and temperature
Gain Stability vs. Temp.	1 dB max. from 20° to 40°C; ±2.5 dB max from 0° to 50°C (at constant drive)
Gain Slope (at rated power)	0.04 dB/MHz max. over Fo±13 MHz (Fo±18 MHz with 80 MHz option)
Gain Variation (at rated power)	0.4 dB pk-pk ± Fo 13 MHz (Fo ±18 MHz with 80 MHz option)
Input VSWR	1.25:1 max.
Output VSWR	1.3:1 max.
Load VSWR	2.0:1 max. for full spec. compliance; any value for operation without damage
Residual AM[2]	-50 dBc maximum, 20 to 400 Hz -60 dBc maximum, 400 Hz to 2 kHz -80 dBc maximum, 2 kHz to 500 kHz
AM/PM Conversion (at rated power)	4°/dB maximum
Harmonic Output with filter: without filter:	 -80 dBc -35 dBc
Noise and Spurious (at rated gain)	-135 dBW/4 kHz, 3.7 to 4.2 GHz -70 dBW/4 kHz, in passband -110 dBW/MHz, 4.2 to 40 GHz (excluding passband)
Phase Noise[2]	Exceeds requirements of IESS-308/309 by -10 dB at -10 dB backoff.
Intermodulation	-29 dBc with two equal carriers at total output 7 dB below rated single-carrier output
Group Delay	In any 36 MHz band (72 MHz for 80 MHz klystron): 0.25 ns/MHz linear max. 0.05 ns/MHz^2 parabolic max. 2.0 ns pk-pk ripple max.
Primary Power[3]	All ratings are ± 10%, 47-63 Hz 3-phase with neutral and ground: 208 VAC 380 to 415 VAC 480 VAC

[1] Harmonic filter can be removed as an option. Add 0.25 dB to amplifier output for units ordered without harmonic filter.

[2] Prime power AC line unbalance not to exceed 3%. Excess imbalance may cause an increase in residual RF noise (AM, FM and PM). Phase noise increase is typically 2.5 dB / % imbalance.

Electrical (continued)

Power Consumption[4]	9.5 kW max. Typical values for the following RF output backoffs with respect to rated (power saver off): 8.9 kW @ 0 dB (rated) 6.6 kW @ -4 dB 5.6 kW @ -7 dB 5.2 kW @ -10 dB 4.8 kW @ -13 dB
Power Factor	0.95 minimum
Inrush Current, peak	180% of normal line current peak max. (first half cycle only)

Mechanical

RF Input Connection	Type N female
RF Output Connection	CPR137F flange
RF Power Monitors	Type N female
Dimension (W x H x D without fans and handles)	
RF Drawer	19 x 17.5 x 28 in. (483 x 445 x 711 mm)
PS Drawer	19 x 8.75 x 24 in. (483 x 223 x 610 mm)
Weight	
RF Drawer	160 lbs w/klystron (72.6 kg)
PS Drawer	100 lbs (45.4 kg)
Cooling	Forced air with integral blower and fans; separate klystron collector cooling path
Air Flow Rate, Klystron	175 cfm min., at sea level
External Ducts Backpressure	0.5 inch water gauge total, maximum
Klystron Heat Loss[5]	5300 W max.
Heat Loss in Room (cabinet less Klystron)	2000 W max.
Acoustic Noise	63 dBA nominal, measured 3 ft. from front of equipment

Environmental

Ambient Temperature	-10° to +50° operating; -40° to +80° non-operating
Relative Humidity	95%, non-condensing
Altitude	
operating:	10,000 ft. (3000 m) with standard adiabatic temp derating of 2°C/1000 ft. or 6.5°C/km
non-operating:	40,000 ft. (12,000 m)
Shock and Vibration	As normally encountered in satellite earth stations and shipping

[3] AC current harmonic content: less than 20%, primarily fifth and seventh harmonics. Harmonics must be considered when choosing UPS sources.

[4] Lower power consumption can be achieved if power saver (included as standard) is employed when operating below rated output power.

[5] For 3.35kW klystron.

OPTIONS:

- *Motorized Channel Selector: (<1 second)*
- *Remote Control Panel*
- *Protection Switching*
- *80 MHz Bandwidth*
- *Linearizer*
- *L-Band Block Upconverter (BUC) (Contact factory for typical performance specifications with integrated BUC)*

CE ISO 9001 CCЭ

KEEPING YOU ON THE AIR
not up in the air

CPI wireless solutions
satcom division

Please check CPI's web site to ensure most current data sheet.

For more detailed information, please refer to the corresponding CPI Technical Description.

Note: *Specifications may change without notice as a result of additional data or product refinement.*

Please contact CPI before using this information for system design.

MKT 79, ISSUE 6 2/03 PDF