Antenna Mounted HPAs for Satellite Communications

- 400 Watts C-Band
  400 Watts X-Band
  400 Watts Ku-Band
- No Shelter Required
- Short Waveguide Run
- Power Factor Corrected
- High Efficiency Dual-Stage TWTs

The XT-400 is a compact, self-contained, antenna mountable power amplifier designed for low cost installation and long life. The XT-400 design eliminates the need for an amplifier shelter as well as a long waveguide run between the amplifier and the antenna feed horn; for example, an antenna mounted 400 Watt Ku-Band amplifier with its shorter waveguide run will often deliver EIRP comparable to a 650 Watt rack mounted HPA. RF filters, cooling, and monitoring & control systems are all self-contained within the HPA. These features provide high reliability, low maintenance costs, and low replacement costs.

The XT-400 incorporates high efficiency, dual-stage collector TWTs. Some of the benefits of this type of TWT are: reduced prime power consumption, lower internal operating temperatures, and reliability enhancement. These benefits are obtained for both the linear and saturated modes of operation.

One of the features of the XT-400 is incorporation of power factor correction circuity that minimizes line current distortion and reduces the required volt-amps. The combination of power factor correction and high efficiency TWTs reduces input Volt-Amps by 45% when compared to equivalent amplifiers. A high frequency resonant conversion power supply is used that accepts a wide range of prime power (100 to 260 VAC). The automatic features of the power supply include quick recovery from prime power outages and multiple helix fault resets (three fault cycles).

The XT-400 may be configured for single-thread, redundant, phase-combined, or linearized operation.

A remote external controller is available to operate the HPA from a user selected location. Mounting brackets can be supplied to mount the HPA to most popular antennas.

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PERFORMANCE SPECIFICATIONS

Parameter	XT-400C, C-Band	XT-400X, X-Band	XT-400K, Ku-Band
FREQUENCY RANGE	5.850 to 6.425 GHz	7.90 to 8.40 GHz	13.75 to 14.5 GHz
Extended Frequency Coverage Available	(5.85 to 6.725 GHz)		(12.75 to 14.50 GHz)
OUTPUT POWER			
Traveling Wave Tube	400 Watts	400 Watts	400 Watts
Rated Power @ Amplifier Flange	350 Watts	350 Watts	350 Watts
GAIN			
Large Signal, minimum	47 dB	47 dB	47 dB
Small Signal, minimum	52 dB	52 dB	52 dB
Maximum SSG Variation Over:			
Any Narrow Band	1.0 dB per 40 MHz	1.0 dB per 40 MHz	1.0 dB per 80 MHz
Full Band	2.5 dB	3.0 dB	2.5 dB/500 MHz
Slope, maximum	± 0.04 dB/MHz	± 0.04 dB/MHz	± 0.04 dB/MHz
Stability, 24 Hr maximum	± 0.25 dB	± 0.25 dB	± 0.25 dB
Stability, Temperature	± 1.0 dB maximum over temperature range at any frequency		
INTERMODULATION			
with two equal signals	-18 dBc maximum with two equal carriers at 4 dB total output backoff		
HARMONIC OUTPUT, maximum	-60 dBc	-60 dBc	-60 dBc
AM/PM CONVERSION, maximum	2.5 °/dB at 6 dB below rated power		
NOISE POWER, maximum			
Transmit Band	- 70 dBw/4 KHz	- 70 dBw/4 KHz	- 70 dBw/4 KHz
Receive Band	-150 dBw/4 KHz	-70 dBw/4 KHz	-150 dBw/4 KHz
	3.7 to 4.2 GHz	7.25 to 7.75 GHz	10.95 to 12.75 GHz
GROUP DELAY, maximum			
Bandwidth	Any 40 MHz	Any 40 MHz	Any 80 MHz
Linear	0.01 nS/MHz	0.01 nS/MHz	0.01 nS/MHz
Parabolic	0.005 nS/MHz^2	0.005 nS/MHz^2	0.005 nS/MHz^2
Ripple	0.5 nS/Pk-Pk	0.5 nS/Pk-Pk	0.5 nS/Pk-Pk
RESIDUAL AM NOISE, maximum	-50 dBc to 10KHz -20 (1.5 + logf) dBc 10 to 500 KHz -85 dBc above 500 KHz		
PHASE NOISE, maximum	10 dB below IESS phase noise profile AC fundamental -50 dBc Sum of all spurs -47 dBc		
VSWR			
Input, maximum	1.3:1	1.3:1	1.3:1
Output, maximum	1.3:1	1.3:1	1.3:1

PRIME POWER

100-260 VAC
47 to 63 Hz, single phase
1550 VA Maximum
0.95 Minimum Power Factor

CE COMPLIANT

OPTIONS

Detected RF
Remote External Controller
Preamplifiers
Gain Control
Serial or Discrete Interface
Extended Frequency Coverage
1:1, 1:2, 1:N Redundancy
Variable Phased Combined
Integrated Linearizers

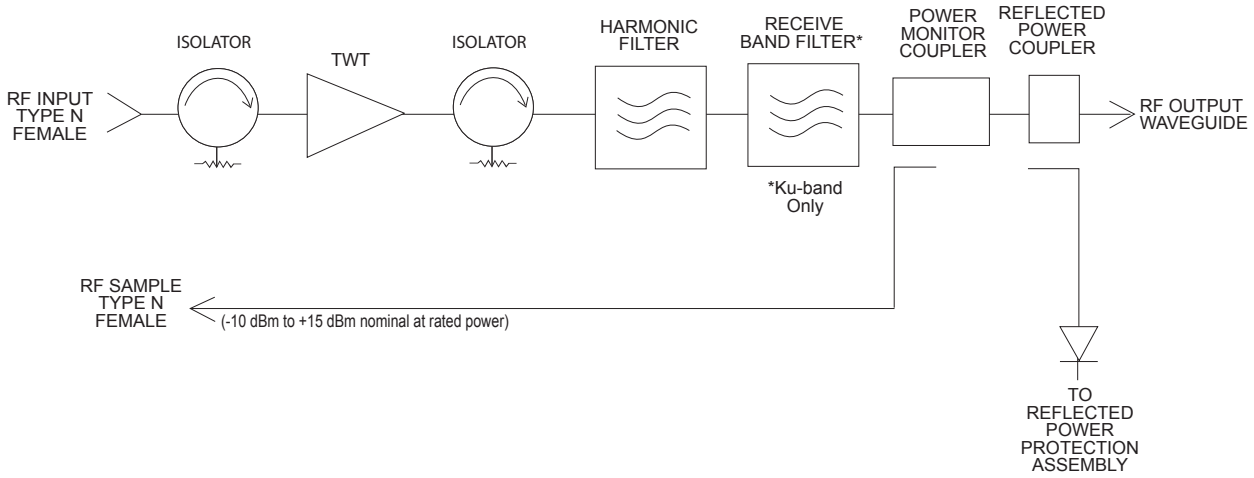
ENVIRONMENT

NON-OPERATING TEMPERATURE RANGE	-50° C to +70° C
OPERATING TEMPERATURE RANGE	-40° C to +50° C
HUMIDITY	Up to 100% Condensing
ALTITUDE	10,000 feet MSL maximum
SHOCK AND VIBRATION	Normal Transportation
COOLING	Forced Air

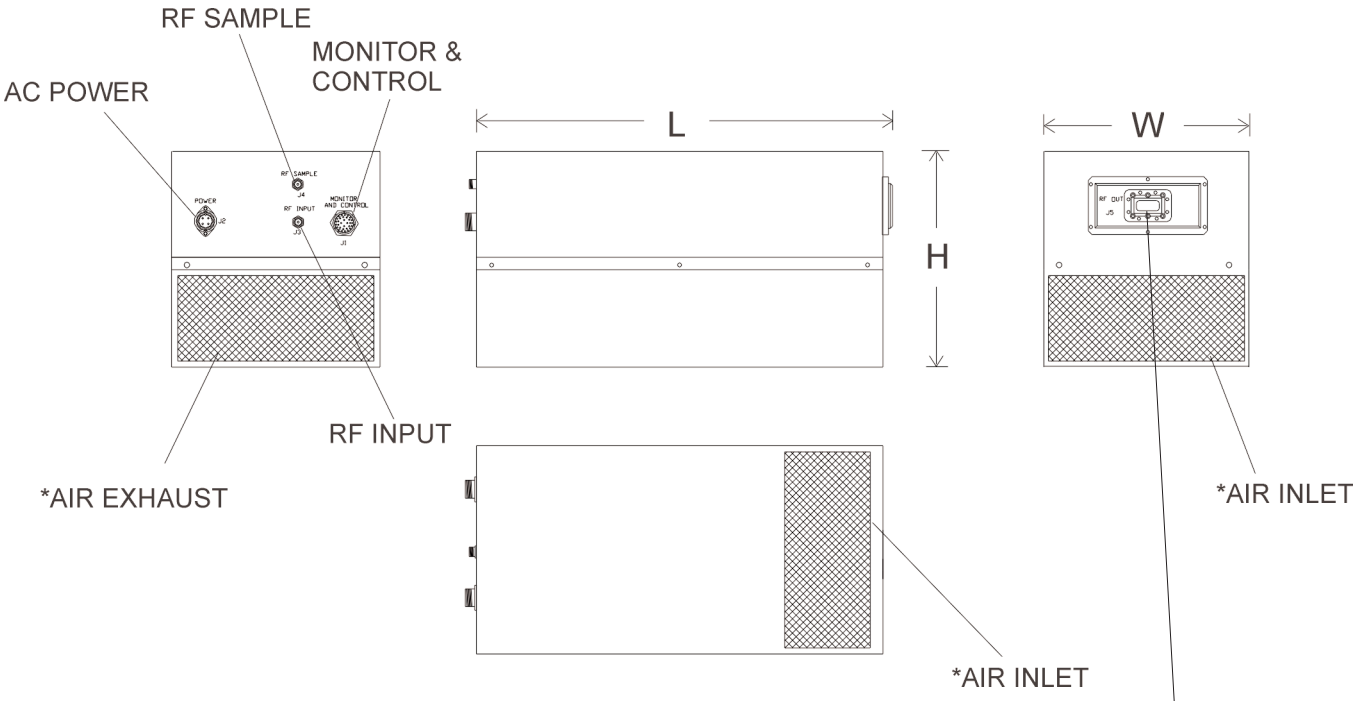
INTERFACE

TYPE	FUNCTION	
CONTROLS	Power ON	HV ON
	Fault Reset	Heater Standby
	Note: Heater Standby reduces the TWT heater voltage for situations where the high voltage is off for extended periods.	
MONITORS-DIGITAL	High Voltage On	Helix Current Latched Fault
	Heater Time Out (FTD)	Summary Fault
	Standby	High Voltage Fault
	Helix Current/Arc Fault	Fan Fault
MONITORS-ANALOG	+15 VDC (100 mA max)	Helix Current (2 mA/V)
	+24 VDC (100 mA max)	Cathode Voltage (1000:1 V/V)
	TWT Temperature	RF Output Power (optional)

Block Diagram



Outline Drawing



Note:
Mounting Brackets Not Shown
* Requires Air Flow Clearance

DIMENSIONS (MAX)	
L	20.50 inches
H	10.60 inches
W	10.25 inches

WEIGHT (TYPICAL)
55 lbs

WAVEGUIDE FLANGE

C-Band	CPR 137G
X-Band	CPR 137 G
Ku-Band	WR-75

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