400 Watt C, X, and Ku-Band Tri-Band Rack Mount High Power Amplifier

FEATURES

- *Rack mount Tri-Band for fixed and transportable applications*
- *Compact 3RU chassis*
- *Extended frequency bands available*
- *Menu driven front panel display & control*
- *Optional integrated linearizer*

The **XTRD-400T1** is a highly efficient rack-mountable traveling wave tube (TWT) amplifier designed for fixed and mobile uplink applications. The unit includes RF gain control, a solid state pre-amplifier, RF filters, cooling, and monitoring & control (M&C) systems. Rack space is conserved because the amplifier occupies only 3 rack units (5 ¼ inches) of a standard 19 inch rack cabinet. Nominal weight is 50 pounds.

The unit features a menu driven front panel display, RS-232/422/485 serial port interfaces for complete computer control. RF, traveling wave tube, and default parameters are easily monitored on the four line front panel display. Gain control is provided via the front panel or through the serial interface.

The **XTRD-400T1** amplifier incorporates high efficiency dual-stage collector TWTs. Reliability is enhanced because both prime power consumption and internal operating temperatures are reduced for both the linear and saturated modes of operation. Power factor correction circuitry is also included which minimizes line current distortion and reduces the required Volt-Amps input. The automatic features of the high frequency resonant conversion power supply include quick recovery from prime power supply outages and multiple helix fault resets (three fault cycles). Depending upon user requirements, this high power amplifier can be configured for either single thread or redundant system operation.

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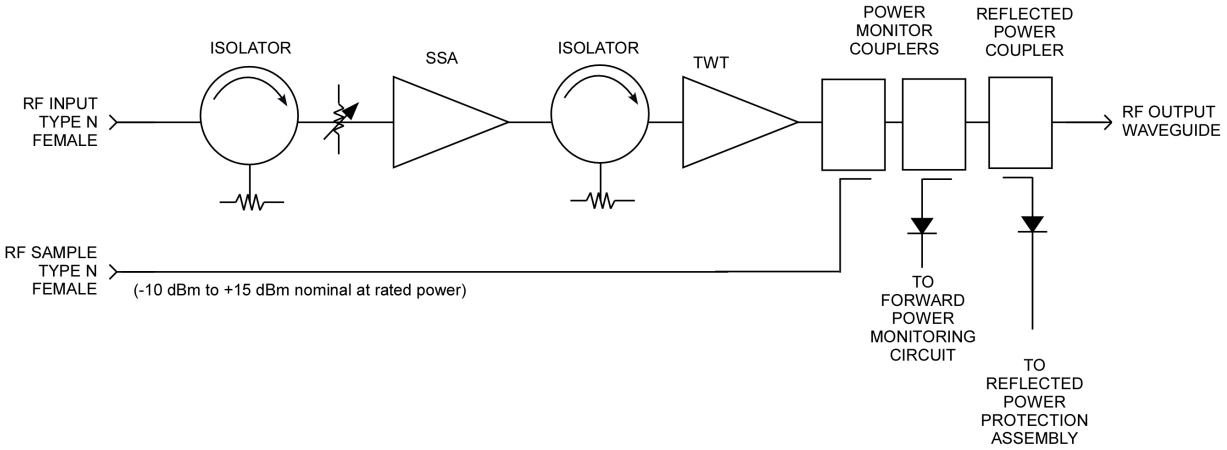
PERFORMANCE SPECIFICATION

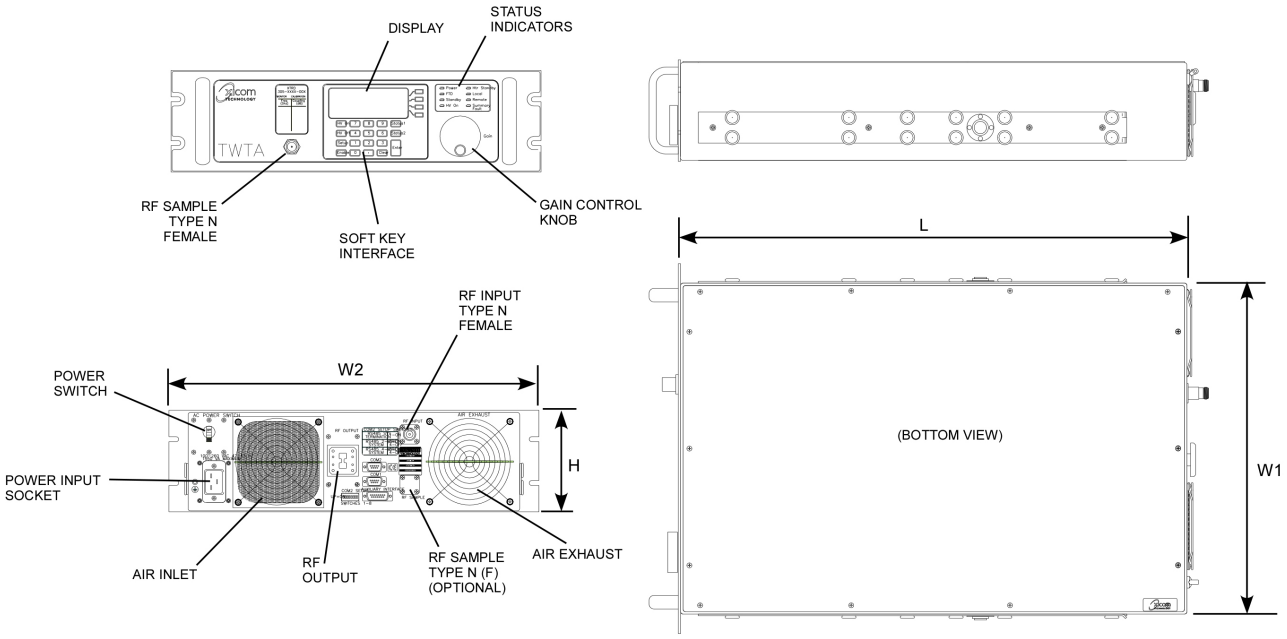
Parameters	C-Band	X-Band	Ku-Band
FREQUENCY RANGE	5.850 to 6.425 GHz*	7.90 to 8.40 Ghz	14.0 to 14.5 GHz*
OUTPUT POWER			
Traveling Wave Tube	325 W	400 W	325 W
Rated Power @ Amplifier Flange	290	356 W	290 W
GAIN			
Large Signal (minimum)	60 dB	62 dB	62 dB
Small Signal (minimum)	63 dB	65 dB	65 dB
Attenuator Range (continuous)		20 dB	
Maximum SSG Variation Over			
Any Narrow Band	1.5 dB per 40 MHz	1.3 dB per 40 MHz	1.3 dB per 80 MHz
Full Band		± 2.5 dB	
Slope (maximum)		± 0.04 dB/MHz	
Stability, 24 hr. (maximum)		± 0.25 dB	
Stability, Temperature (maximum)		± 1.0 dB over temperature range at any frequency	
INTERMODULATION (maximum) with two equal carriers		-17 dBc @ 4 dB total output power backoff from rated power	
HARMONIC OUTPUT (maximum)	0 dBc @ 49 dBm	-10 dBc	-12 dBc
AM/PM CONVERSION (maximum)		2.5 deg/dB at 6 dB below rated power	
NOISE POWER (maximum)			
Transmit Band		-70 dBW/4 kHz	
Receive Band	-70 dBW/4 kHz 3.7 to 4.2 GHz	-70 dBW/4 kHz 7.25 to 7.75 GHz	-70 dBW/4 kHz 10.95 to 12.75 GHz
GROUP DELAY (maximum)			
Bandwidth	Any 40 MHz	Any 40 MHz	Any 80 MHz
Linear		0.01 nS/MHz	
Parabolic		0.005 nS/MHz^2	
Ripple		0.5 nS/Pk-Pk	
RESIDUAL AM NOISE (maximum)		-50 dBc to 10 kHz -20 (1.5 + logf) dBc 10 to 500 kHz -85 dBc above 500 kHz	
PHASE NOISE (maximum)		12 dB below IESS phase noise profile AC fundamental -50 dBc Sum of all spurs -45 dBc	
VSWR			
Input (maximum)		1.3:1	
Output (maximum)		2.2:1	

* Extended frequency coverage available.

BLOCK DIAGRAM



OUTLINE DRAWING



DIMENSIONS		
	INCHES	CENTIMETERS
L	26.00	66.04
W1	17.00	43.18
W2	19.00	48.26
H	5.219	13.26
Nominal Weight: 50 lbs (22.68 kg)		

PRIME POWER

180 to 264 VAC
47 to 63 Hz, Single Phase
1900 VA (maximum)
0.95 Minimum Prime Power Factor

CE

ENVIRONMENT

NONOPERATING TEMPERATURE RANGE	-50°C to +70°C
OPERATING TEMPERATURE RANGE	-10°C to +50°C (2°C/1000 Feet Derating)
HUMIDITY	Up to 95% Noncondensing
ALTITUDE	10,000 Feet MSL (maximum)
SHOCK AND VIBRATION	Normal Transportation
COOLING	Forced Air

INTERFACE

	Type	Function	
CONTROLS	LOCAL	Local/Remote	AC Power On/OFF
	LOCAL AND REMOTE	Gain	High Voltage ON/OFF
		Min/Max Power Alarm/Fault	Audio Alarm ON/OFF
		Reflected Power Alarm/Fault	Units (Watts, dBm, dBW)
		Fault Reset	Lamp Test
		Heater Standby ON/OFF	
STATUS	FRONT PANEL LEDs	Standby	Power
		Local	Remote
		Summary Fault	High Voltage ON/OFF
		Heater Time Out (FTD)	Heater Standby
	FRONT PANEL DIGITAL DISPLAY	Power Out	Beam Hours
		Reflected Power	Helix Current
		TWT Temperature	Helix Voltage
		Heater Hours	Faults: High VSWR High Voltage Helix Current TWT Temperature
	DRY FORM-C RELAY CONTACTS (2)	Summary Fault	
COMPUTER SERIAL PORT	HARDWARE INTERFACE	Two Ports: RS-232 & RS-422/RS-485	
	XICOM COMMAND SET	ASCII Commands	
	RF SAMPLE PORT COUPLING	-37 dB Nominal	

OPTIONS

- Extended Frequency Coverage
- 1:1, 1:2, 1:N Redundancy
- Variable Phase Power Combining
- Integrated Linearizer

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