The XTRT-400 is a highly efficient rack mountable traveling wave tube amplifier (TWTA) designed for fixed and mobile uplink applications. The unit includes RF gain control, a solid state pre-amplifier, RF filters, cooling, and monitoring and control (M&C) systems. Rack space is conserved because the amplifier occupies only 3 rack units (5¼ inches) of a standard 19-inch rack cabinet. Nominal weight is 56 pounds.

The XTRT-400 is a 400W amplifier with a touch screen front panel for easy customer interface. The display shows HPA status, parameter trend analysis and event logs, and remote diagnostics can be easily performed via the Ethernet interface. Also, because the display can show and control waveguide switches or a combiner, the need for separate external controllers is eliminated for common architectures.

The XTRT-400 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 outages and multiple helix fault resets (three fault cycles.) Depending upon user requirements these amplifiers can be configured for either single thread or redundant system operation.
### PERFORMANCE SPECIFICATION

#### Parameters | XTRT-400X
---|---
**FREQUENCY RANGE**
(extended frequency coverage available) | 7.90 to 8.40 GHz

**OUTPUT POWER**
- Travelling Wave Tube | 400 W
- Rated Power @ Amplifier Flange (minimum) | 350 W

**GAIN**
- Large Signal (minimum) | 70 dB
- Small Signal (minimum) | 75 dB
- Attenuator Range (continuous) | 25 dB
- Maximum SSG Variation Over:
  - Any Narrow Band | 1.0 dB per 40 MHz
  - Full Band | 3.0 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 | -18 dBc @ 4 dB total output power backoff from rated power

**HARMONIC OUTPUT (maximum)** | -60 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
  | 7.25 to 7.75 GHz

**GROUP DELAY (maximum)**
- Bandwidth | Any 40 MHz
- Linear | 0.01 nS/MHz
- Parabolic | 0.005 nS/MHz²
- Ripple | 0.5 nS/Pk-Pk

**RESIDUAL AM NOISE (maximum)** | -50 dBc to 10 kHz
-20 (1.5 + logf) dBc 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 -47 dBc

**VSWR**
- Input (maximum) | 1.3:1
- Output (maximum) | 1.3:1
**BLOCK DIAGRAM**

RF INPUT
TYPE N
FEMALE

ISOLATOR

SSA

ISOLATOR

TWT

ISOLATOR

HARMONIC
FILTER

POWER
MONITOR
COUPLERS

REFLECTED
POWER
COUPLER

RF OUTPUT
WAVEGUIDE

RF SAMPLE
TYPE N
FEMALE

(-10 dBm to +15 dBm nominal at rated power)

**OUTLINE DRAWING**

<table>
<thead>
<tr>
<th>DIMENSIONS (max)</th>
<th>INCHES</th>
<th>CENTIMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>17.00</td>
<td>43.18</td>
</tr>
<tr>
<td>W2</td>
<td>19.00</td>
<td>48.26</td>
</tr>
<tr>
<td>L</td>
<td>23.0</td>
<td>58.42</td>
</tr>
<tr>
<td>H</td>
<td>5.22</td>
<td>13.25</td>
</tr>
<tr>
<td>WEIGHT (Typical)</td>
<td>50 lb.</td>
<td>22.68 kg.</td>
</tr>
</tbody>
</table>

RF OUTPUT (Waveguide Flange)
X-Band-CPR-137G or WR-112
### Prime Power
- **100 to 260 VAC**
- **47 to 63 Hz, Single Phase**
- **1400 VA (typical)**
- **0.95 Minimum Prime Power Factor**

### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controls</strong></td>
<td></td>
</tr>
<tr>
<td>Local/Remote</td>
<td>AC Power On/Off</td>
</tr>
<tr>
<td>Gain</td>
<td>High Voltage On/Off</td>
</tr>
<tr>
<td>Min/Max Power Alarm/Fault</td>
<td>Audio Alarm On/Off</td>
</tr>
<tr>
<td>Reflected Power Alarm/Fault</td>
<td>Units (Watts, dBm, dBW)</td>
</tr>
<tr>
<td>Fault Reset</td>
<td>Lamp Test</td>
</tr>
<tr>
<td>Heater Standby On/Off</td>
<td></td>
</tr>
<tr>
<td><strong>Front Panel LEDs</strong></td>
<td></td>
</tr>
<tr>
<td>Standby</td>
<td>Power</td>
</tr>
<tr>
<td>Local</td>
<td>Remote</td>
</tr>
<tr>
<td>Summary Fault</td>
<td>High Voltage On/Off</td>
</tr>
<tr>
<td>Heater Time Out (FTD)</td>
<td>Heater Standby</td>
</tr>
<tr>
<td><strong>Front Panel Digital Display</strong></td>
<td>Power Out</td>
</tr>
<tr>
<td></td>
<td>Reflected Power</td>
</tr>
<tr>
<td></td>
<td>TWT Temperature</td>
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<tr>
<td></td>
<td>Heater Hours</td>
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<tr>
<td></td>
<td>Beam Hours</td>
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<tr>
<td></td>
<td>Helix Current</td>
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<tr>
<td></td>
<td>Helix Voltage</td>
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<tr>
<td></td>
<td>Faults:</td>
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<td>High VSWR</td>
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<td>High Voltage</td>
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<tr>
<td></td>
<td>Helix Current</td>
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<tr>
<td></td>
<td>TWT Temperature</td>
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<tr>
<td><strong>Dry Form-C Relay Contacts (2)</strong></td>
<td>Summary Fault</td>
</tr>
<tr>
<td><strong>Computer Serial Port</strong></td>
<td></td>
</tr>
<tr>
<td>Hardware Interface</td>
<td>Two Ports: RS-232 &amp; RS-422/RS-485</td>
</tr>
<tr>
<td>Xicom Command Set</td>
<td>ASCII Commands</td>
</tr>
</tbody>
</table>

### Options
- **1:1, 1:2, 1:N Redundancy**
- **Variable Phase Combined**
- **Integrated Linearizer**
- **Block Upconverter**