

# CPI 1.25 kW SuperLinear® TWT Amplifier for Satellite Communications

## The TL12UI

1250 W peak (540 W linear) TWT Compact High Power Amplifier features high efficiency, small size and integral computer interface.

### Compact

Provides 1250 watts of peak power (540 watts linear) in a compact nine rack-unit package, digital ready, for wideband, single- and multi-carrier satellite service in the 13.75 to 14.50 GHz frequency band (12.75 to 14.50 GHz optional). Designed to linear output up to 540 watts at the flange for multi-carrier uplinks. Ideal for transportable and fixed earth station applications where space and prime power are at a premium. 30% smaller than traditional HPAs.

### Efficient and Reliable

Employs an ultra-high efficiency dual-depressed collector helix traveling wave tube backed by many years of field-proven experience in airborne and military applications. The collector's high efficiency results in super-cool operation.

### Simple to Operate

User-friendly microprocessor-controlled logic with integrated computer interface, digital metering, pin diode attenuation, optional integrated linearizer for improved intermodulation performance, and BUC option for use with L-band modems.

## Ku-Band



### Global Applications

Meets International Safety Standard EN-60215 and EMC Standard 2004/108/EC to satisfy worldwide requirements.

### Easy to Maintain

Modular design and built-in fault diagnostic capability with convenient and clearly visible indicators for easy maintainability in the field.

### Worldwide Support

Backed by over two decades of satellite communications experience, and CPI's worldwide 24-hour customer support network that includes sixteen regional factory service centers.

**satcom**  **division**

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

**tel:** +1 (650) 846-3803  
**fax:** +1 (650) 424-1744

**e-mail:** [satcommarketing@cpil.com](mailto:satcommarketing@cpil.com)  
[www.cpii.com/satcom](http://www.cpii.com/satcom)

## OPTIONS & COMPANION PRODUCTS:

- *Integral Linearizer*
- *Remote Control Panel*
- *Redundant and Power Combined Subsystems*
- *External Receive Band Reject Filter*
- *Extended Frequency (12.75 to 14.50 GHz)*
- *Integral L-Band Block Upconverter (BUC) - specifications for the BUC option are not included on this data sheet. Please consult TD-169 for details.*
- *Ethernet Interface*

## SPECIFICATIONS, TL12UI

### Electrical

Frequency	13.75 to 14.50 GHz (12.75 to 14.50 GHz optional)
<b>Output Power</b>	
TWT Peak Power	1250 W (60.97 dBm)
Flange Peak Power*	1075 W (60.32 dBm)
CW Flange Power (min.)	540 W (57.33 dBm)
CW Flange Power (max.)	680 W (58.33 dBm)
<i>*Note: This amplifier does not provide 1075 W of power at the flange. The Flange Peak Power specification is provided so that the user can more easily calculate the desired backoff level from peak. See "CW Flange Power" above for CW output power specifications.</i>	
Bandwidth	750 MHz
Gain	70 dB min.
Output Power Adjustability	0 to -30 dB of output with 0.1 dB typical resolution
Gain Stability	±0.25 dB/24 hr max. (at constant drive and temp.)
Small Signal Gain Slope	±0.02 dB/MHz max.
Small Signal Gain Variation	1.0 dB pk-pk max. over any 80 MHz; 1.5 dB pk-pk max. over any 80MHz with linearizer option; 3.0 dB pk-pk max. across 750 MHz (4.0 dB pk-pk across 1750 MHz); 4.0 dB pk-pk max. across 750 MHz with linearizer option (6.0 dB pk-pk across 1750 MHz)
Input/Output VSWR	1.3:1 max.
Load VSWR	1.5:1 max. for full spec compliance; any value without damage; 2.0:1 continuous operation
<b>Phase Noise</b> <sup>1</sup>	
IESS-308/309	
phase noise continuous	10 dB below mask
AC fundamentals related	-50 dBc
Sum of spurs	-47 dBc
<b>Noise Density</b>	<-130 dBW/4 kHz, below 12.7 GHz (below 11.7 GHz w/ 12.75 GHz config) <-65 dBW/4 kHz, passband to 18.0 GHz (<-60 dBW/4 kHz with linearizer) <-105 dBW/4 KHz, 18.0 to 26.0 GHz <-125 dBW/4 kHz, 26.0 to 40.0 GHz
<b>AM/PM Conversion</b>	2.0°/dB max. for single carrier at 8 dB OBO (at 3 dB OBO with optional linearizer)
<b>Intermodulation</b> (with two equal carriers)	-26 dBc max. with linearizer at 540 W output power (-26 dBc without linearizer at 215 W output power)

### Electrical (continued)

<b>Group Delay</b> (in any 80 MHz band)	0.01 ns/MHz linear 0.001 ns/MHz <sup>2</sup> parabolic 0.5 ns pk-pk ripple max.
<b>Primary Power</b> <sup>2</sup>	All ratings are ±10%, 47-63 Hz, 5-wire, 3-phase with neutral and ground 200 to 240 VAC (without neutral) 380 to 415 VAC
<b>Power Factor</b>	0.95 min.
<b>Power Consumption</b>	2.6 kVA max. at 540 W output power (2.3 kVA typ.)

### Environmental

<b>Ambient Temperature</b>	-10° to +50°C operating -20° to +70°C non-operating
<b>Relative Humidity</b>	95% non-condensing
<b>Altitude</b>	Up to 10,000 ft (3000 m) with standard adiabatic derating of 2°/1000 ft.; 50,000 feet non-operating
<b>Shock and Vibration</b>	Designed for normal transportation environment per Section 514.4 MIL-STD-810E. Designed to withstand 20g at 11 ms (1/2 sine pulse) in non-operating condition
<b>Heat Dissipation</b>	2000 W max.

### Mechanical

<b>Cooling(TWT)</b>	Forced air with integral blower. Maximum external pressure loss allowable: 0.25 inch water gauge.
<b>RF Input Connection</b>	Type N female
<b>RF Output Connection</b>	WR-75G waveguide flange, grooved, threaded UNF 2B 6-32
<b>RF Power Monitors</b>	Type N female
<b>Computer Interface</b>	RS-422/485 or RS232 serial (Ethernet optional)
<b>Dimensions (W x H x D)</b>	19 x 15.75 x 24 in. (483 x 400 x 610 mm)
<b>Weight</b>	155 lbs. (70.5 kg) max.

<sup>1</sup>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.

<sup>2</sup>AC current harmonic content: less than 20%, primarily fifth and seventh harmonics. Harmonics must be considered when choosing UPS sources.



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.



**satcom** division