


## SPECIFICATION FOR PTCM1209 / PTCM1309 8.0 – 18.0 GHZ, 1.9 KW, 4% PULSED MODULAR INSTRUMENTATION AMPLIFIER

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### AMENDMENT RECORD

Issue Number	Date	Description
1	Sept 2016	Initial Issue
2	August 2017	Updated Prime Power spec. CN5514
3	January 2018	CN5613
4	March 2019	CN5977
5	August 2025	CN7392. Added PTCM1309 version

### Associated/Reference documents

Reference should also be made to the following documents:

Document Number	Issue Number	Description

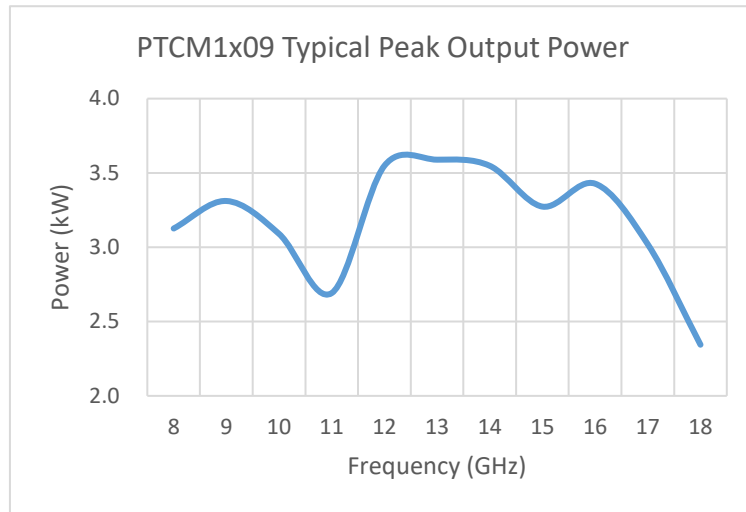
The PTCM1209 / PTCM1309 is a Pulsed Travelling Wave Tube (TWT) Amplifier with high efficiency, instantaneous bandwidth and high gain when compared with solid state amplifiers.

For high availability user applications including EMC / Radiated Immunity, Communications, EW, Radar, RF Component Testing and scientific applications.

Continuing with CPI TMDs heritage in ultra-reliable amplifiers, we have now improved the capability of our amplifiers through built in self-test, advanced fault diagnostics, modular, plug and play field replaceable PCBs and Ethernet remote control and monitoring. This product now offers unparalleled availability to the end user.



Example PTCM: Can be supplied with or without LCD screen



A standard but customisable 6U chassis and “soft” re-configurable control system enables many options to be easily and quickly configured.

- Rugged, ultra-reliable design
- Advanced Self-Diagnostics
- Ethernet interface - Graphical User Interface to run on any PC or laptop with a standard browser
- Remote Management and diagnostics
- RF forward sample ports available
- ISO9001 Accredited Quality Assurance

## RF Specifications

	Min	Typ	Max	Unit
Frequency	8.0		18	GHz
Peak Output Power	1.9	2.5		kW Pulse
RF Input Amplitude		0	5	dBm
Fwd Power Monitor		-50		dB
Load VSWR*		1.5:1	2:1	ratio
Reverse Power Protection		20%		Full Power
Spurious		-50	-40	dBc
Harmonics		-8	-2	dBc
Pulse Rise/ Fall Time		50	100	ns
Pulse Propagation Delay		200	300	ns
Beam ON Noise		-14	2	dBm/MHz
Pulse Width	PTCM1209	0.2	50	µs
	PTCM1309	0.2	100	µs
PRF		0	100	kHz
Duty Cycle		0	4.0	%

\* Note: The maximum Load VSWR is the trip level for damage protection when operated at full power. For full performance TMD recommends load VSWR of 1.5:1 or better. Operating at high power with poorly matched loads for sustained periods may cause damage to the TWT. If a good match is not possible TMD recommends the use of an external isolator. Contact TMD for a quotation.

## Mechanical

Parameter	Value
Width	19" Front panel
Height	6U Front panel height
Depth	800mm, excluding handles (provision for external EMC shield at rear)
Weight	47kg
Cooling	Integral forced air cooling – air entry front and exit rear

## RF and Interface connections

Parameter	Value
RF Input Connector	Type: N Female, 50 Ohm
RF Sample Port	Type: N Female, 50 Ohm, nominally -50dB wrt. RF output
RF Output Connector	Type: WRD750
RF Modulation Input	Type: BNC Female, 5V TTL
Ethernet Input	RJ45

## Electrical Specifications

	Single Phase	Three Phase
Input Voltage	240 V -20%/+10%	208 V <sub>LL</sub> ± 10%*
Frequency	50/60 Hz	50/60 Hz
Operating Current	Typ: 6.5 A, Max: 8 A	Typ: 2.5 A, Max: 3.5 A
Power Consumption	Typ: 1.5 kW, Max 2.5 kW	Typ: 1.5 kW, Max 2.5 kW
Connector	IEC C20	L2120-FI

\* V<sub>LL</sub> is defined as the voltage across two electrical phases

## Environmental

Parameter	Value
Vibration	Military Standard 810G- Transport
Operating Temperature	0°C to +40°C
Non-Operating Temperature Limit	-10°C to +50°C
Humidity	80% maximum, non-condensing

## Protection

The amplifier has advanced TWT and power supply protection:

- Heater, Grid and Cathode voltage continual monitoring
- VSWR Protection – unit will trip if reverse power exceeds 25% of max rated power
- TWT Current and Voltage Protection
- TWT Arc Protection
- TWT and PSU Over Temperature
- Standby and Operate Accumulated Hours
- Input Modulation Limit Check on Pulse Width, Pulse Repetition Frequency and Duty Cycle


## Remote Interface and/or Integral LCD Screen

The web page based interface shows every parameter on a single page with no need for sub menus. All values are updated in real time.

## Enhanced availability through Fault Diagnostics

- Detailed trip reasons are displayed on the web page
- CPI TMD can connect to the unit over the internet (with the customers permission) to diagnose and support any fault in more detail
- All power supplies are field replaceable items that slot in from the rear panel – new ones can be fitted in a matter of minutes
- The amplifier will log operational hours and any tripped states with a date stamp throughout its life. This greatly aids diagnostics, for instance, TMD can assess (when allowed) whether a TWT is near end of life and arrange a replacement TWT so the amplifier is available when you need it.

CPI TMD Technologies Tools



Power

Standby

Operate

Time to heater warmup  
WARM

Trip Code 0x00000000 0x00000000 0x00000000 0x00000000

Information No Trip

Alternate

BASE UNIT

Parameter	Value	Units
R.F. Power Rev	low	dBm
Pulse Width	52.0	us
P.R.F.	0.8	kHz
Duty Cycle	4.0	%
T.W.T. Temp	47	Celsius
Power Supply Temp	35	Celsius
Heater Voltage	6.32	Volts
Grid OFF Voltage	401	Negative Volts
Grid ON Voltage	156	Volts
Cathode Voltage	14.1	Negative kV
Fan Speed	2578	R.P.M.
Standby Accumulated	5	Hours
Operate Accumulated	138	Hours

Example: Integrated Web Sever Page

## Available Options

Option	Part Number Addition
5" LCD Screen	S
Rear RF Output	R
Rear RF Input	RI
RF Inhibit BNC	IN
IEEE GPIB / RS-232 / RS-422 / RS-485 / Serial USB *	GP / R2 / R4 / R5 / US
Ethernet Web Interface Fiber-Optic **	FO
Rack Slides (100% extension)	RS
3-Phase 208 V <sub>LL</sub>	3P
Extended Pulse Width ***	PTCM1323
Reflected Power Monitoring Port	RP
Harmonic Filter	HF
Adjustable Gain	AG
Foldback (Graceful Degradation)	FB
Waveguide Output ****	W
External Accessories *****	E

\*The serial interfaces are available as well, if requested.

\*\*The unit comes with a RJ45 Ethernet port as standard or alternative optional Fibre Optic.

\*\*\* Up to 100us on selected models only

\*\*\*\* Only available on certain models

\*\*\*\*\* Only available on certain models where the standard output is coaxial (Contact the factory for more information)

\*\*\*\*\*The External Accessories can include Harmonic Filters or RF Adapters, which need to be requested and specified in the Configuration Summary

For Example: PTCM1000-SINRS has a screen, RF inhibit and rack slides