



**C.M. TECHNOLOGY**

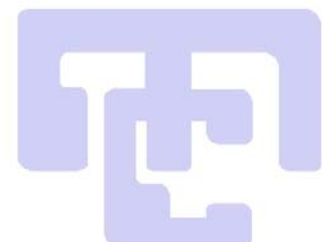
Designed and Manufactured in Australia

## FULL DATA SHEET

[www.cmtechnology.com.au](http://www.cmtechnology.com.au)

Tel: + 61 2 9764 6550

### PSTR110, PSTR74, PSTR48, PSTR 24



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General View showing anodized custom extrusions, poly carbonates front panels, extruded handles and the provision to rack mount. The large heatsink fins allow cool running and therefore a high MTBF of >60000 hours.



Strong internal construction allows in excess of 100 hours NATA tested resonance vibration tests. (Freight Rail Corporation specification.)

Note the laser cut stainless steel safety cage. This cage allows free air circulation around the control electronics to keep temperatures low and raise the MTBF.



The daylight visible annunciator LEDs shine through the label, giving a simple field diagnosis for a failed supply. The heavy one piece extruded handle and rack mounting notches are shown.



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### TYPE 24, 48, 74 & TYPE 110 TELECOMMUNICATION POWER SUPPLIES FOR RAILWAY APPLICATIONS.

#### 1.0: General Information:

The C.M.T. types 24, 48, 74 & 110 Telecommunication Power Supplies are DC to DC Converters designed to provide an isolated, regulated, overvoltage and transient protected 13.8 Volt source for radio and other ancillary equipment that is to be powered from the train DC supply.

These supplies feature a 22 amp high current 13.8 Volt output with an excellent 1% overall voltage regulation and high energy conversion efficiency. The supplies also feature 1000 volts input to output isolation and internationally acceptable levels (AS3548) of conducted RFI. The units are standard 19" rack mounting (3 R.U.), convection cooled and designed for high electrical and mechanical reliability (MTBF >60,000 hours) with an operating temperature range of -10 to +60 Celsius. The supplies are widely used within the Australian railway system.

#### 1.1: Type Definition:

The power supply type required depends upon the nominal DC input voltage:

- |            |                 |
|------------|-----------------|
| • Type 24  | Nominal 24 V DC |
| • Type 48  | Nominal 48 V DC |
| • Type 74  | Nominal 74 V DC |
| • Type 110 | Nominal 110V DC |

The only difference in the products is in the main high frequency ferrite power transformer, the lexan front label and some MOSFETS. All other parts are in common to the range, thus minimizing spare part requirements.

#### 1.2: Equipment Dimensions and Mounting:

The power supplies are designed for standard 19 inch rack mounting. The internal case is approx. 110 mm deep and is of stainless steel construction, laser cut. The extruded aluminum front is fitted with two carry handles and is anodized black. The various warning LEDS shine through a back screen printed lexan front panel label that carries the Type Number and the Litton CIR series power connectors. The unit is secured with only 4 front panel screws. **Note: Free air circulation is required around the internal case, as up to 70 watts has to be dissipated by the unit at maximum load.** An air flow of > 1Metre/sec should be supplied. An external circuit breaker should be fitted on the input circuit, as no internal fuses are used. The front panel forms part of the heatsink.

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### 1.3 Australian Content:

The power supplies are designed and manufactured in Australia from Australian sourced materials where that is possible. The Australian content is >80% and the units qualify for the Australian made symbol.

## 2.0 Equipment Electrical Specification:

### 2.1: Input Voltage:

- |            |          |           |
|------------|----------|-----------|
| • Type 24  | Min 15 V | Max 32V   |
| • Type 24  | Min 40 V | Max 60 V  |
| • Type 74  | Min 55 V | Max 100 V |
| • Type 110 | Min 70 V | Max 150 V |

### 2.2: Transient Protection:

The supplies are not susceptible to voltage spikes applied to the input terminals with the following characteristics:

- Peak Voltage                      5000 Volts
- Rise Time                      < 0.1 microseconds
- Fall time to 2000V 160 microseconds , RC type time constant
- Energy in Spike                      <100 joules

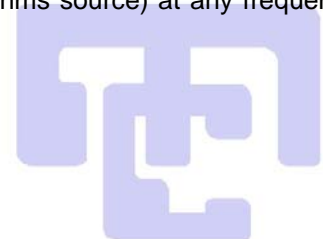
### 2.3: Input-Output Voltage Isolation:

Both input and output terminals float with respect to the metal case, which is grounded.

- Isolation input to case      > 1000 V rms AC 50 Hertz for 1 minute
- Isolation output to case      > 1000 V rms AC 50 Hertz for 1 minute
- Isolation input to output      > 1000 V rms AC 50 Hertz for 1 minute

### 2.4: Input Noise Immunity:

Power Supply Operation is not affected by the application of 200 mV rms (50 ohms source) at any frequency from DC to 50 M Hz. A multi-pole input EMC/EMI filter is used.





## 2.5: Reverse Polarity Protection:

The supplies are input diode isolated. They are not affected by indefinite reverse power within the input voltage limits 0 to 150 V DC. (0 to 55V DC PSTR 24) Normal operation is restored immediately upon the correct application of power. Under reverse power, no output voltage is present. The reverse polarity is indicated by a RED daylight visible high brightness LED labeled "POLARITY". Correct polarity DC is shown by a GREEN high brightness "xxx V DC" LED, both adjacent to the input DC CR socket.

## 2.6: Output Voltage:

### 2.61:Nominal:

The nominal output voltage is 13.8 V DC at 16 amps. Other voltages on request. Output voltage present is shown by a GREEN high brightness LED, "12 V", adjacent to the output DC CIR sockets.

### 2.62: Regulation:

When measured at the back of the output connector (i.e.. not including drops in the output plug itself), the regulation is:

- Over load 0-16 amps (input nominal) < +/- 1%
- Over Input Range (Load 16 amps) < +/- 1%
- Over Temperature (Input Nominal, Load 16 amps) < +/- 1%

## 2.7: Output Current:

The rated output is **16 amps rms, maximum continuous at 60 Celsius**. The supply has a constant current type of limiting behavior, and allows parallel connection & redundant operation. The **current limit** is 22 amps. The supply is limited by its passive (no fans) heat sink. The supply can be short circuited. The "rms" figure allows duty cycle ratings e.g.:

- 22 Amps for 1minute, 12 Amps for 4 minutes cyclic duty at 60°C
- At 50 C, the available current is 20 amps in a free air flow of > 1m/sec

## 2.8: Output Voltage Ripple & Transients:

The output voltage ripple and transients are less than 100mV for any load.

## 2.9: Output Noise:

The output noise under all load conditions is <100 mV peak , DC to 100 MHz.





### 2.10: Over Voltage Protection:

The output is disconnected if it should exceed an internal preset for 1mS.



Over Volts disconnect 14.9 VDC +/- 3% (Hysteresis 0.6 Volt DC)

No fuses are used. The output cannot reverse under any condition.

### 2.11: Current Limiting:

The supplies do not require a load for proper operation. The outputs are current limited electronically. No fuses are used. Disconnection and Re-connection of the load during operation will not damage the supplies.

### 2.12: Parallel Operation:

The supplies are designed for parallel operation, either for load sharing or redundant operation techniques.

### 2.13: Efficiency:

The efficiency at 16 amps (75% load) is >80% (83% typical PSTR 24 &74 84% PSTR 110)

### 2.14: Cooling:

The unit is convection cooled. Provision for free air circulation around the inner case (~110 mm deep ) should be made, as up to 70 watts can be dissipated at maximum load. 1 metre/sec of air flow should be provided.

The supply should not be used in a confined space that is not fully ventilated.

### 2.15: MTBF:

The unit is manufactured using only well specified and qualified components. In particular, the electrolytics are IEC 384-4, long life grade, climatic category IEC 68 (-40 +85) with a life in excess of 60,000 hours at a 60 Celsius ambient and full ripple current. Infant mortality is eliminated with a full load burn in at final test (8Hrs) before dispatch. The MTBF is **predicted** at > 60, 000 hours in normal service.

### 2.16: Temperature Rating:

The power supplies are specified for operation from -10 to +60°C.





### 2.17: Options:

Series Type "PSTRxxF" has the options:

- Input Ripple filter for high ripple (>5%) DC sources.
- Power good (13.8+/- %5) floating contact set

## 3.0: Equipment Mechanical Specification:

### 3.1: General:

The power supplies are designed and manufactured with the rigors of railway application in mind. The major components like electrolytics have multiple terminations into the printed circuit board, which itself is made of 70 micron (twice normal), through hole plated, tinned fibre glass. Critical joints are bolted for extra strength and other components supported with Loctite 480 adhesive. The PCB is also conformal coated to stabilize the minor components and for dust protection. All components mount to the PCB. There are no looms other than short jumper wires from the PCB and soldered to the CIR in-out connectors. The wires used are silicone insulated high temperature grade. The power supplies consist of a 19 inch standard rack mount, extruded aluminium front panel assembly anodized black. To this is bolted a removable inner safety case that is made from laser cut stainless steel. All parts mount to a single PCB screwed at many places to the front panel. A back screen printed lexan label covers the annunciator LEDs, effectively sealing the front panel. The supply is mounted to the rack with 4 front panel screws. All electrolytics are mechanically clamped to the frame independent of the PCB mounts.

### 3.2: Mechanical Stability:

To provide an independent assessment of the product, the mechanical stability of the unit was tested by the Philips NATA laboratory for the Freight Rail Corporation project. The tests comprised a vibration test at the resonance frequency to the test specifications for Railway based electronic equipment and dust penetration tests to IP50.

### 3.3: Maintainability and Warranty:

The supplies are manufactured from discrete components soldered to a double sided through hole plated PCB. Complete parts lists (with suppliers), circuit diagrams, overlays, descriptions of operation and calibration details are included in the purchase price.

Within warranty (12 months) return to factory freight paid applies. The unit will be returned freight paid. Outside warranty, the units can be returned freight paid to the factory for maintenance for a fixed fee + freight ( if the unit is in good mechanical condition)



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### 3.4: Revision Notes:

Rev. 1.0 December 1992	Initial Release
Rev. 1.1 March 1993	Increase Efficiency to >80% due to 3F3 ferrites being available.
Rev 1.2 June 1993	Modified mechanical design. Type 24 added. Maintainability spec added
Rev 1.3 February 1994	Add Operation & Calibration Description to full specification.
Rev 1.4 March 1994	Tidy up. PSTR24 18 now 21V note qualifying this.
Rev 1.5 February 1995	Include new graphics
Rev 2.0 July 1996	Improved PSTR24 at 15 V. Add duty cycle or "rms" to current limit
Rev 2.1 Sept 2001	Improved graphics
Rev 2.2 July 2003	Include Telstra (1996) 48 V variant in main spec.



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