



cherokeeTM
INTERNATIONAL

CAR1248FP

1200W
1U High Front-End
Power Supply

DETAIL SPECIFICATION

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1. GENERAL

Cherokee's latest addition to the CAR family is a low profile 1U 1200W front-end +48Vdc; ideal for datacom applications (enterprise networking, servers, storage equipment, etc) where space is a premium.

With an unprecedented power density of $\sim 19\text{W}/\text{in}^3$, the CAR1248 is designed for a maximum output power of 1200W (max 25A @ +48Vout, high line operation) in a 1U x 2U package. For scalable architectures, five units can be mounted together in a 1U high 19" shelf.

Features of the latest CAR1248 front-end include:

- Compact 1U Design
- Constant Power Characteristic
- High Power Density ($\sim 19\text{W}/\text{in}^3$)
- Visual LED Indicators (AC Good, DC Good ,Fault)
- Hot Plug-ability
- Redundant Parallel Operation
- Active Load Sharing (Single Wire)
- Remote On/Off
- Remote Sense (up to 0.50V compensation per leg)
- No Minimum Load Requirements
- Universal Input with PFC
- I2C Serial Bus
- Front to rear air-flow (reverse air flow capability – as an option)
- Five CAR1248 Modules per Rack (4.8KW N+1 Capability)

2. INPUT SPECIFICATIONS

Input Voltage

Range: 85*-264Vac (turn on > 90Vac)
Nominal: 230Vac or 90Vac (single phase)

* Unit derates below 90Vac (input) to 900W

Input Frequency

Range: 47-63Hz (ETSI 300132-1 recommendation)

Under-Voltage

The power supply switches off when mains voltage goes beyond the specified range. When active, the green LED is switched OFF on the front panel to generate a specific alarm. Turn off $\leq 80\text{Vac}$

Maximum Input Current

7.90A (full load, $V_{in} = 180\text{Vac}$)
12.75A (full load, $V_{in} = 100\text{Vac}$)

Power Factor

0.99 typical at nominal line & full load

Efficiency

90% typical, at nominal load and 230Vac (including Oring mosfets).
85% typical at 90Vac.

Input Fuse

Two fuses (line & neutral) – 20A & 250Vac
Type 3AB Axial

Relative Harmonics (of input current)

According to IEC 1000-3-2. Limits for harmonic current emissions for class A equipment

Inrush Current

Max 40A pk (Measured at 25°C for all line conditions typical duration 10ms)

Input Leakage Current

3mArms (250Vac & 60Hz)

Switching Frequency

200kHz Input (400kHz Output)

Hold-up Time

20ms at 1000W (typical) @ 90 Vac input
16.7ms at 1200W (typical) @ 180Vac input

3. OUTPUT SPECIFICATIONS

Output Voltage

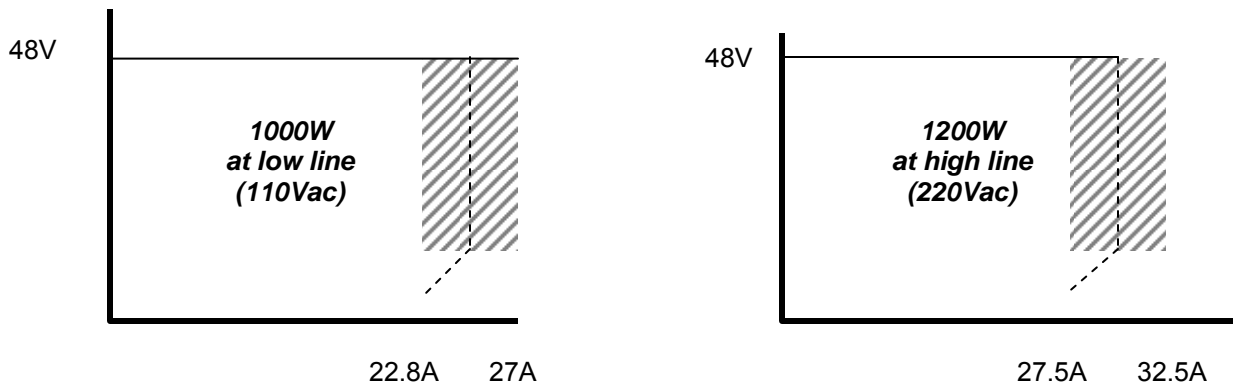
Nominal output: +48Vout
 Set tolerance: $\pm 0.5\%$
 Standby voltage: 5V (@ 0.5A) $\pm 5\%$

Output Current (nominal)

20.8A @ +48Vnom for low line operation (90Vac)
 25.0A @ +48Vnom for high line operation (230Vac)
 Minimum Load: 0A

Current Limit

The unit is self-protected via constant current limit characteristic between the range of 110% - 130% of Iout nominal.



Short Circuit – hiccup mode protection, self resetting upon clearance of the fault condition.

Output Power

1000W at low line* operation (90Vac)
1200W at high line operation (230Vac)

* Unit derates below 90Vac (input) to 900W.

Line/Load/Temperature Regulation

$\leq \pm 2\%$ of V_{nom} for any combination of line, load & temperature.

Over-voltage Protection

60Vdc max Latched

Reset condition by recycling the AC input or applying Remote ON/OFF

Dynamic Response

$dl_{out}/dt \leq 1A/\mu s$

Deviation $\leq 5\%$ V_{out} (for a 50% step load)*

Recovery time 300 μs

* for system load conditions $> 10\%$ l_{out} max.

Turn on/off Delay Time

Mains on delay time $\leq 2s$

Remote on delay time $\leq 40ms$

Remote off delay time $\leq 40ms$

Turn-on Rise Time

$\leq 50ms$

Ripple and Noise

Complies with ETS300 132-2

32 dBrc (measured without external battery) – TBD

Narrow band noise/Wideband noise (25 Hz - 20 kHz)

$\pm 1\%$ (pk-pk) @ 20MHz with 0.1 μF ceramic and 10 μF electrolytic caps at the output

Bias Supply

5V @ 0.5A.

Referenced to the -ve Return.

Ideal source for housekeeping & monitoring circuitry.

4. SIGNALS AND CONTROLS

For specific signal protocol please contact factory.

All analog signals are referenced to the -Vout Return or Chassis Ground.

Output Voltage Programming (Vprog)

Analog input signal - voltage determining the rectifier output voltage.

$V_{out} = 43.2V + 3.3 \times (V_{prog} - 0.364)V$ where $0.364V < V_{prog} < 3.27V$

The output voltage goes from 43.2Vdc to 52.8Vdc

Output Current Monitoring

Analog output signal.

Voltage proportional to the power supply output current (0.2V/A) \pm 250mV.

Load Share/Paralleling

Analog signal. Single wire connection.

Ishare bus voltage at full load

Unit will load share within $\pm 10\%$ of full load on V1 (48V output).

Remote ON/OFF

TTL compatible. Open collector (High) for normal operation.

Sink current: 1mA. Max collector voltage: 12Vdc

Logic 1 (TTL High) or open enables unit (ON); Logic 0 (TTL Low) or short shuts unit down (OFF).

Cycling this signal resets the over-voltage protection memory.

AC OK

TTL compatible. Open collector (High) for normal operation.

Sink current: 20mA. Max collector voltage: 12Vdc

AC OK indicates that AC is applied within the specified input range for the rectifier.

DC OK

TTL compatible. Open collector (High) for normal operation.

Sink current: 20mA. Max collector voltage: 12Vdc

Over Temperature Warning

TTL compatible. Open collector (High) for normal operation.

Sink current: 20mA. Max collector voltage: 12Vdc

In the event of an over temperature condition, the unit protects itself by providing a low warning signal for 10 seconds (typical) and then shutting off. Auto restart after the condition is cleared.

Fault Signal

TTL compatible. Open collector (High) for normal operation.

Sink current: 20mA. Max collector voltage: 12Vdc

This alarm is an opto-isolated open collector signal referenced to -Vout Return. The signal indicates that a failure has been detected in the unit due to an over-temperature or over-voltage shutdown condition.

Signal Return

The signal return is the reference for all the signals and is internally connected to the output return.

PS Missing/Return

The signal is connected to the output return to notify the system whether the power supply is present or unplugged.

Module Enable (Short Pin)

Power supply will turn on when pin engages. It is required to tie the Mating Connector pin to the Output Return.

Hot Swap

Unit is equipped with internal Or-ring mosfets in the + Vout leg and designed for hot swap operation.

LEDs

AC OK (Green), DC OK (Green), Fault (Red)

Write Protect

This signal is used for factory EEPROM programming only. When left open, the EEPROM will be write protected. Pulling the signal low (to signal return) will remove the write protection.

Interrupt

The interrupt signal will be issued when signals on the I2C bus have changed state.

5. I2C Serial Communication (Option)

The I2C interface incorporated within the CAR1248 rectifier includes facilities to monitor various operating parameters within the unit and transmits these on demand over an industry standard I2C Serial bus. I2C operation will over-ride analog signal operation when this option is selected.

Electrical Interface

Address lines (A0, A1 &A2)

These external address lines allow up to 5 CAR1248FP modules to be addressed on a single I2C bus.

Serial Clock

This line is clocked by the processor that controls the I2C serial bus. It should be tied to a +5V supply via a pull up resistor.

Serial Data

This line is a bi-directional data line. It should be tied to a +5V supply via a pull up resistor.

Digital Functions/Features

Serial Number/Part Number – module information read-back (EEPROM)

AC Good

DC Good

Fault

Thermal warning

Remote ON/OFF

6. SAFETY ASPECTS

Applicable Standards

IEC 950 (per EN 60950)

CSA C22.2-950

UL 1950

CE Mark (LVD)

Input Fuse

20A

Isolation

Insulation test voltage:

Input – ground: 1500Vac

Output – ground: 500Vdc

Input – Output: 3000Vac

EMC SPECIFICATIONS

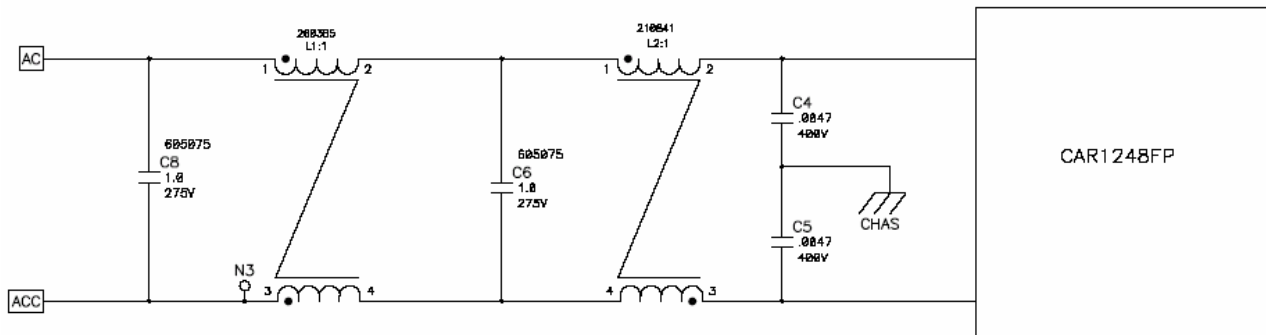
Immunity

Port	Phenomena	Test	Criteria	Ref Standard
Enclosure	Conducted RF fields Immunity	130dB μ V 0.15MHz - 80MHz (80% AM)	A	EN 61000-4-6
	Radiated RF fields Immunity	10V/m 80MHz - 1000MHz (80% AM)	A	EN 61000-4-3
		ESD	8KV air 4KV contact	B
AC input	Fast transients Common mode	(5/50ns) 2KV	B	EN 61000-4-4
	Voltage dips	-30%, 10ms	A	EN 61000-4-11
	Voltage interr.	-60%, 100ms -100%, 5000ms > 95% 5 s	B	
	Surge common mode differential mode	(1.2 / 50 μ s) 4KV 2KV	A	EN 61000-4-5

Emission (size dependent – per Engineering)

Port	Frequency-range	Limits	Reference Standard
AC input (conducted)	0.15 – 30MHz	B*	EN 55022 FCC Docket 20780 Part 15, Subpart J Class B.
	0 – 2KHz	-	EN 61000-3-2
Enclosure (radiated)	30 - 230MHz	B*	EN 55022
	230 - 1000MHz		

* Will meet Class B at rack level or with a specified external EMI filter.



7. MECHANICAL SPECIFICATIONS

Dimensions

Height: 1.65" - (fits in 1U rack in vertical installation). 1.61" without bezel.

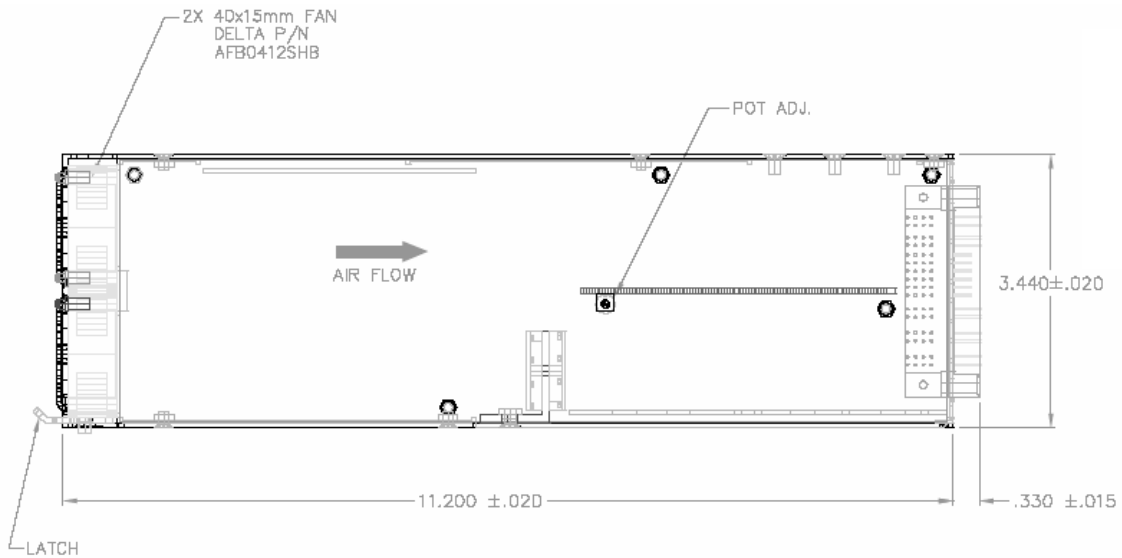
Width: 3.44" - (fits in 2U rack in horizontal installation)

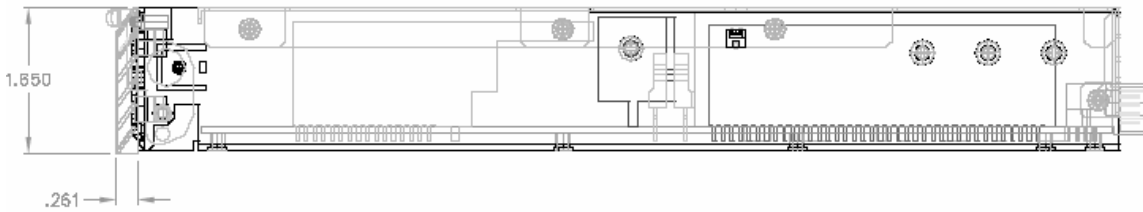
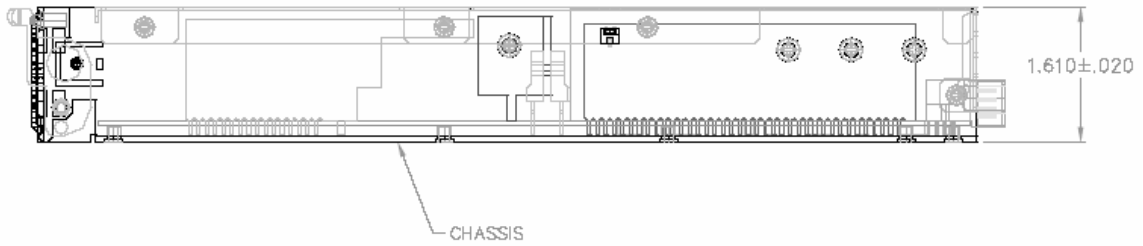
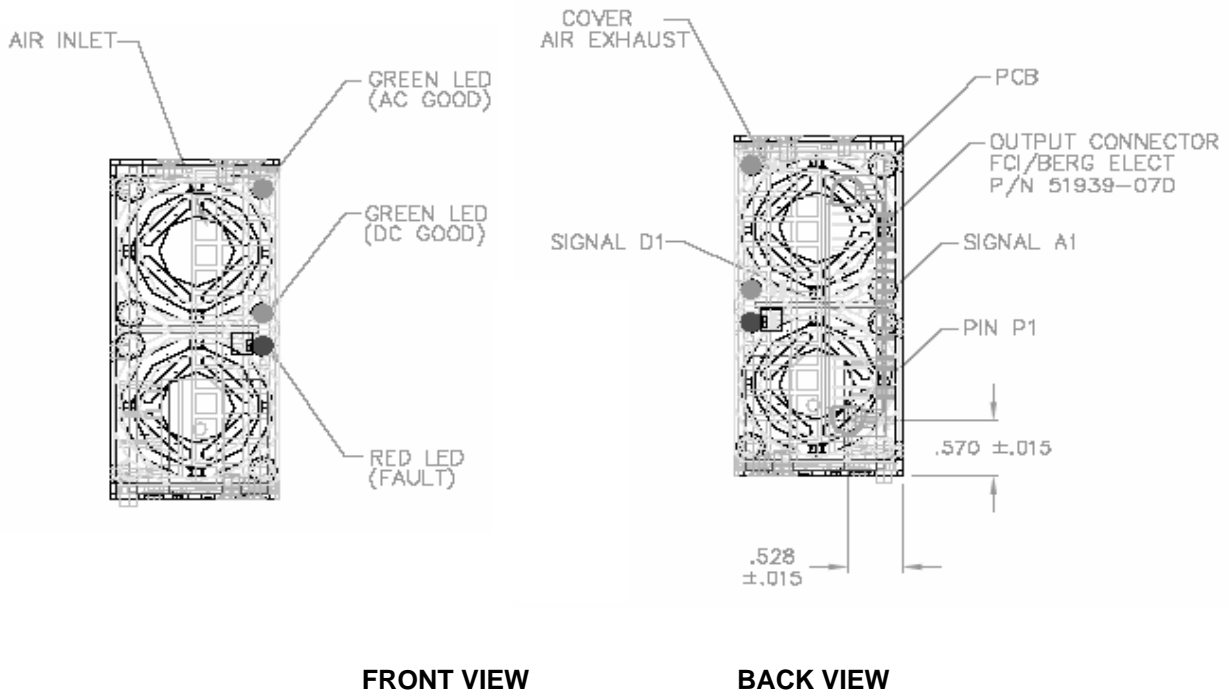
Depth: 11.2"

Mounting

Hot plugging allowed. The PS is automatically locked when introduced into the rack. To remove, a small handle enables that user to unlock the unit and easily extract the unit.

Outline Drawing (Preliminary)



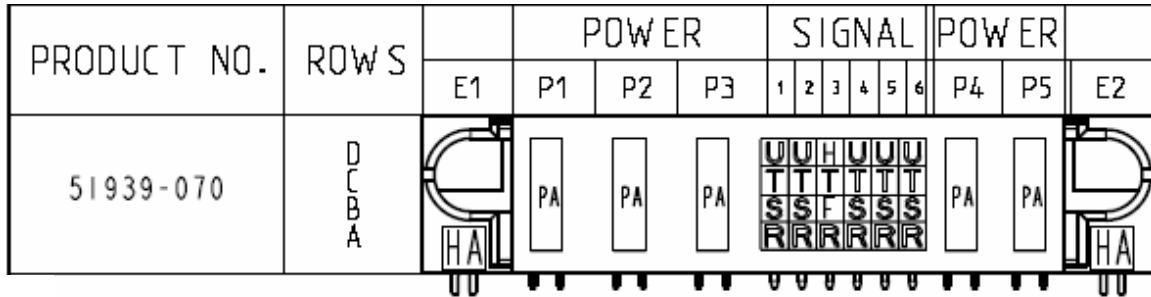


WITH FRONT BEZEL

CONNECTIONS

FCI Berg P/N: 51939-070

Mating connector – FCI Berg P/N: 51915-050



A1	Vstb [5V]	C1	I Share	P1	Line
A2	Vstb [5V] Return	C2	N/C	P2	Neutral
A3	Signal Return	C3	Temperature OK	P3	Chassis
A4	Write Protect	C4	I2C Address (A0)	P4	+Vout
A5	Remote Sense (+)	C5	I2C Address (A1)	P5	Output Return
A6	Remote Sense (-)	C6	I2C Address (A2)		
B1	Fault	D1	V Prog		
B2	I Monitor	D2	OVP Test Point		
B3	Module Enable	D3	Remote ON/OFF		
B4	PS Missing/Return	D4	DC OK		
B5	Serial Data Line	D5	AC OK		
B6	Serial Clock Line	D6	Interrupt		

8. ENVIRONMENTAL SPECIFICATIONS

Temperature

Operating ambient: -10°C to +70°C (full power up to 50°C)

Active derating between: 50°C and +70°C (2.5% °C/Watt)

Storage: -40°C to +85°C

Cooling:

Horizontal airflow front to back with built in fan

Humidity

Operating relative humidity: 30 to 95 % non-condensing

Storage: 10 to 95 % non condensing



Altitude – Pressure Drop

Operating (up to 2250m): 700 – 1100mbar
Non-operating: 300 – 1100mbar

Vibration/Shock

Shock & Vibration: Designed to meet NEBS GR-63-CORE Level 3
Frequency Range: 20 – 2000Hz
Time duration: Minimum of 30 minutes
Acceleration: 6Grms

Telcordia GR-63-CORE, GR-487-CORE (NEBS shock and vibration,
Seismic Zone 4)

MTBF

100,000 hrs at full load and 50°C per Bellcore RPP
200,000 hrs at full load and 50°C – demonstrated

9. PART NUMBER SELECTION

PRODUCT	DESCRIPTION	PART NUMBER
1200W Front-End	+48Vout Front-End	CAR1248FP-1A
1200W Front-End	+48Vout Front-End - I2C Option*	CAR1248FPC-1A
1200W Front-End	+48Vout Front-End with Face Plate (standard model)	CAR1248FPB-1A
1200W Front-End	+48Vout Front-End with Face Plate & I2C Feature*	CAR1248FPBC-1A
6000W Rack	Rack for CAR1248FP – Holds 5 Units	ACE125RUW-1A

* I2C feature includes voltage adjust/control.

CAR 12 48 XX X X

