P217

Rugged 3U VMEbus Power Supply Board

- *140 Watt Output with Greater Than 75% Efficiency*
- *18 - 36 Volt DC Input Range*
- *Input Transient and Reverse Polarity Protection*
- *EMI/RFI Input Filter*
- *Outputs: 5 V @ 18 A, +12 V @ 1.0 A, -12 V @ 1.0 A, 3.3V @ 11 A*
- *Output Over-Voltage and Short-Circuit Protection*
- *Optional: ~ACFAIL, ~SYSRST and ~SYSFAIL Output Signals with Holdup Time*
- *Input/Output and Chassis Isolation*
- *Thermal Shutdown*

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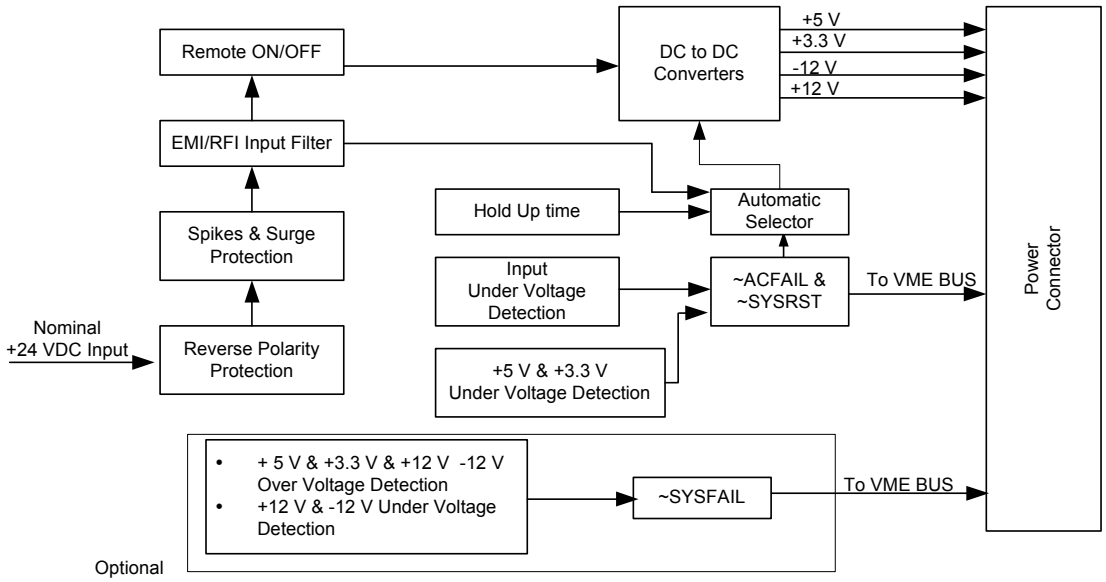
Overview

Two DC to DC converter modules are used to provide four isolated outputs with a power rating of up to 140W. To ensure top performance and noise reduction, Aitech used two converters made by the same manufacturer. The DC to DC converters feature a minimum of 500V isolation from input to output, eliminating any possibility of ground loops. Moreover the DC to DC converters are equipped with thermal shutdown capability. Each output channel has an independent current limitation. A line filter is used to reduce the reflected ripple in the inputs. The input power voltage can vary from 18 VDC to 36 VDC. Outputs are protected against short circuit and overvoltage.



P217 Power Supply Board Block Diagram

Functional Description

Output Voltages

DC/DC Converter 1 Outputs:
+5V at 18A maximum

DC/DC Converter 2 Outputs:

Voltage	Combined Operation	Independent Operation
+3.3V	11A	Max output power = 60W Min load on 3.3V must be 2A
+12V	1A	
-12V	1A	

Power Monitor Circuit

The 2P217 provides 3 power-fail signals (~ACFAIL, ~SYSFAIL and ~SYSRST) that indicate the valid output voltage level during power-up and power down. In case of a power drop below the minimum input voltage (18 VDC), the ~ACFAIL signal is asserted followed by ~SYSRST signal. This also triggers the holdup circuit. If the 5 V output drops below 4.85 V, or 3.3 V drops below 2.9 V the same mechanism asserted.
In case of +12 V, -12 V over voltage or under voltage, 3.3 V and 5 V over voltage, ~SYSFAIL signal is asserted to meet VME specifications.

Hold-up Circuit

The P217 uses a holdup circuit that enables the board to maintain all the output (within the VME specifications) for at least 4 ms after the input voltage drops below 18 VDC. This allows the system to take all necessary emergency actions before halting.

5 V Sensing

The 5V output is equipped with sense lines that are routed to the power connector. These sense lines are shorted to the output lines on the backplane.

5 V and 3.3 V Trimming

The 5 V output and 3.3 V output have a trimming capability to adjust the output voltages. The trimming resistors are assembled only if necessary during Acceptance Testing at Aitech facilities before shipment to customer.

Transient Protection

To protect the 2P217 input from transient voltages, a 45V/1.5KW per 1 ms transzorb is used.
All voltage outputs are protected using transzorbs against transient voltages.

Thermal Shutdown

The two DC-to-DC modules are equipped with a thermal shutdown mechanism.
In case temperature of the modules exceeds 105±5°C, the thermal shutdown mechanism will reduce the output voltages to nearly zero until the module temperature decreases below 100°C. It will then reoperate automatically.
If thermal shutdown persists, check that total input current below the maximum for your system configuration.

Power Supply Connector

The power supply connector is located at the bottom of the board.

Specifications

Input

Voltage Range (DC) Continuous	**18 V to 36 V**
Nominal Input Voltage	**24 V**
Reverse Polarity	**Protected 0 to 40 VDC**
General Characteristics and transient suppression	**Per MIL-STD 704 D and per MIL-STD 1275AT (Except for single fault conditions, Cranking conditions, Ignition conditions)**

Outputs

2 DC/DC converters with a total of 4 output voltages as follows:

DC/DC Converter 1 Output:
+5V at 18A maximum

DC/DC Converter 2 Outputs:

Voltage	Combined Operation	Independent Operation
+3.3V	11A	Max output power = 60W Min load on 3.3V must be 2A
+12V	1A	
-12V	1A	

- Low output ripple
- Outputs isolated from inputs and from each other using separate grounds
- Isolation to chassis
- Short-circuit protection

Output Specifications	MAIN	OUT2	OUT3	OUT4
Voltage (VDC)	+4.875	+3.195	+11.64	-11.64
	+5.25	+3.45	+12.8	-12.8
Voltage Tolerances (V)	±0.05	±0.05	±0.45	±0.45
Overvoltage Protection (V)	6	4	+14	-14
Current (A), Max	18	11	1	1
Current Limit, Max Load (%)	>120			
Tolerance (%)	±10			
Static Line/Load Regulation (%) max	0.5	0.5	0.5	0.5
Trans. Response (µS) (Dynamic Regulation)	75	50	50	50
Ripple/Noise (P-P, mV)	<50	<50	<100	<100

Total Output Power, Max. - 140 W

Efficiency

>75%

Thermal Shutdown

Over 105°C ± 5°C

Isolation Resistance

>1 MΩ at 250 V input to output or chassis.
Separate Lines for +5V, +3.3V and ±12V GNDs

5 V Output Voltage Sensing

Sense lines routed to the power connector for remote sensing.

EMI/RFI Input filter

The power supply is equipped with an EMI/RFI input Filter.

ACFAIL and SYSRST

Input/Output Undervoltage Sensing

	Output		Input
ACFAIL State	**3.3V**	**5V**	**24V**
Decreasing Voltage	2.9	4.5	17.4 ± 0.4V
Increasing Voltage	3.18	4.85	18 ± 0.4V

- ACFAIL low to SYSRST low: >2 msec
- ACFAIL high to SYSRST high: >200 msec

SYSFAIL

Output Undervoltage Sensing

SYSFAIL State	+12V	-12V
Decreasing Voltage	11	-11
Increasing Voltage	11.64	-11.64

Output Overvoltage Sensing

SYSFAIL State	5V	3.3V	12V	-12V
Decreasing Voltage	5.35	3.46	12.65	-12.65
Increasing Voltage	6	3.96	14	-14

Holdup Circuit

Enables all outputs for at least 4 ms after input drops under 18 VDC.

Environmental Features

Temperature Range (per MIL-STD-810E)

- Operating Temperature:
  -55°C to + 85°C
- Storage Temperature:
  -60°C to + 100°C

Altitude (per MIL-STD-810E)

- Operating: Up to 70,000 ft.

Humidity (per MIL-STD-810E)

5 - 95% relative humidity

Sand and Dust (per MIL-STD-810E)

Exposure for 30 minutes at velocities of 20 MPH

Vibration

- On the move full functionality (MIL-STD-810E)
- Random (maximum 0.1 g2 /Hz at 20 - 2k Hz)

Shock (per MIL-STD-810E)

Single shock - 40g peak half sine during 11 ms in 3 axes.Packaged Drop (per MIL-STD-810E)
Three 3 ft. drops on each face

EMC Protection

Per MIL-STD-461D, Part IV with line filter:

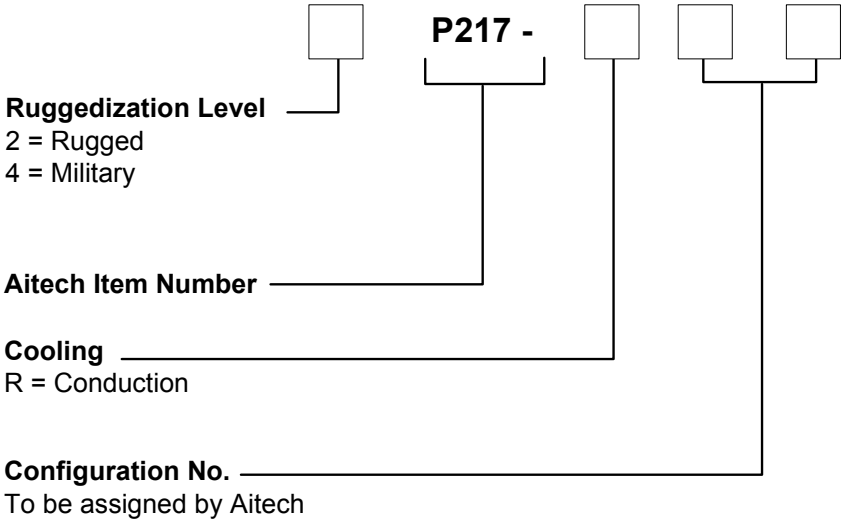
- CS101 (20 Hz - 50 kHz)
- CE102 (10 KHz - 10 MHz)
- CS114 (10 KHz - 400 MHz)
- RE102 (10 KHz - 10 GHz)

Mechanical Specifications

Dimensions and Weight

Height:	169 mm (6.65 in) (including connector)
Depth:	25.4 mm (1.00 in)
Width:	100 mm (3.93 in)
Weight:	330 grams (0.75 lbs)

Ordering Information for the P217



Example: 2P217-R00

For more information about the P217 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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