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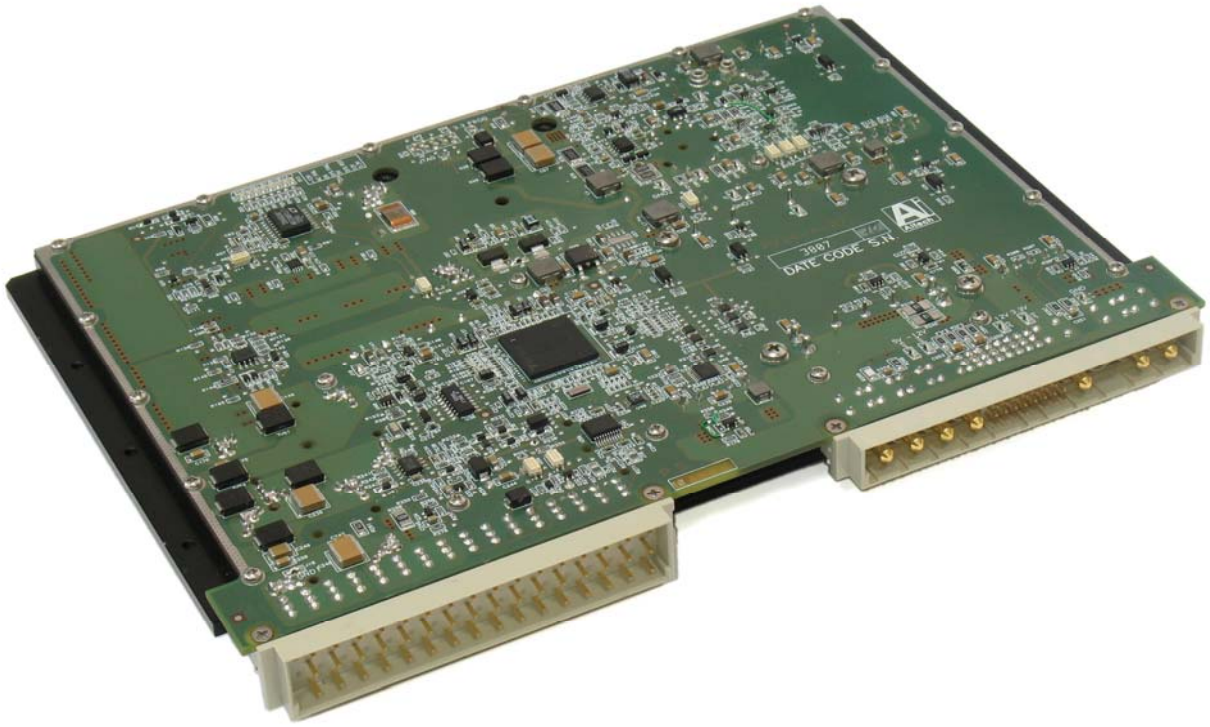
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Find the *Aitech Defense Systems P228* at our website: ***Click HERE***

P228

Rugged 6U Power Supply Board



- 6U Form Factor
- 500 Watts Outputs Power
  - 5 V @ 60 A
  - 3.3V @ 25 A
  - +12 V @ 5.0 A
  - -12 V @ 5.0 A
- 85% Efficiency
- 18 - 32 Vdc Input Range
- MIL-STD-704A/D/E/F and 1275
- EMI/RFI Filter for MIL-STD-461
- Input Transient Protection
- Input Reverse Polarity Protection
- Suitable for VME, CompactPCI, and VPX Systems
- Output Over/Undervoltage and Short-Circuit Protections
- ~ACFAIL, ~SYSRST and ~SYSFAIL Control Signals
- Holdup Time
- Input/Output and Chassis Isolation
- Thermal Shutdown
- External ON/OFF Control, DC Fan Output Drive and Control
- Internal BIT Status and Alarms for Voltages, Currents & Temperatures

Aitech Defense Systems, Inc.
A member of the Aitech Rugged Group, Inc.
19756 Prairie Street, Chatsworth, CA 91311
Tel: (888) Aitech-8 (248-3248) Fax: (818) 718-9787 e-mail: sales@rugged.com web: www.rugged.com

Overview

Designed for harsh environment applications, the Aitech P228 is a versatile and reliable 6U power supply providing rugged systems with an exceptionally wide input voltage range (18 - 32 Vdc) to ensure excellent load and line regulation. For EMI reduction, an input line filter is used to reduce the input reflected ripple.

The power supply outputs four common voltages for VME, VPX and CompactPCI systems, with a total combined output capacity of 500 watts. Holdup time at full rated output is 2 ms (25 ms with optional capacitor bank module).

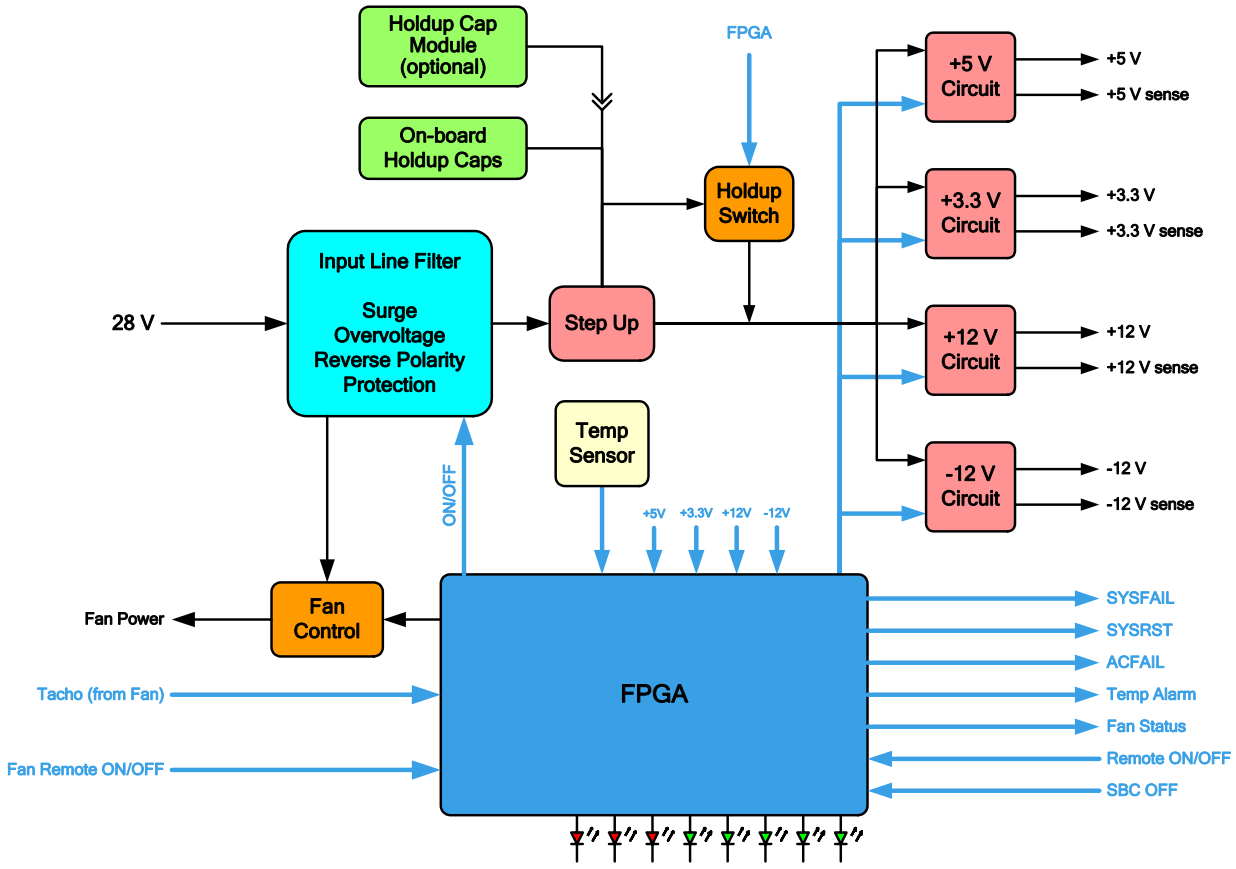
All output voltages have sense lines to ensure voltage stability for high current loads. Furthermore, all outputs are individually protected against short-circuit and overvoltage.

The P228 features 500 V isolation from input to output, thus eliminating any possibility of ground loops.

The power supply includes a fan control circuit to control and monitor the operation of a cooling fan. The circuit includes voltage regulation to maintain constant fan power, regardless of supply voltage and load, to ensure maximum fan RPM. A temperature monitoring and control circuit controls fan operation, issuing an alarm to indicate power supply overtemperature, and shutting the power supply off if temperature reaches damaging levels. In addition, the P228 is equipped with sophisticated BIT logic that monitors inputs and outputs, temperature, and fan status, and provides BIT and status signals (SYSRST, SYSFAIL and ACFAIL).

Three discrete inputs enable the power supply and the fan to be turned on and off remotely.

Eight indicator LEDs provide a convenient visual indication of power supply status.



P228 Power Supply Block Diagram

Functional Description

Input Voltage Operation and Protection

The P228 power supply operates over a continuous DC input voltage range of 18 - 32 V.

Input power protection circuitry protects the power supply from reverse input voltage up to 50 Vdc, and inrush current greater than 35 A.

The power supply provides full specification operation with input power compliant to MIL-STD-704A/D/E/F and 1275 (non damage with minimum voltage of 18 V).

Output Voltage Operation and Protection

Four independent power supply circuits provide four isolated outputs (+5 Vdc/60 A, +3.3 Vdc/25 A, +12 Vdc/5 A, and -12 Vdc/5 A respectively) with a total combined output power capacity of 500 W before derating (see derating graph below).

The power supply circuits feature > 500 V input to output isolation, eliminating any possibility of ground loops. Moreover, each output channel has an independent current limitation implemented by the P228 on-board logic.

Outputs are protected against short circuit, overcurrent, and overvoltage.

All output voltages are equipped with sense lines that are routed to the power connector.

Hold-up Circuit

The P228 uses a holdup circuit that issues an ACFAIL signal, and enables the board to maintain all outputs within specification limits for 2 ms, or 25 ms with the optional capacitor bank module, after input voltage drops below 18 Vdc. This allows the system to take all necessary emergency actions before shutting down.

External Control Signals

Two discrete inputs enable external control of the P228.

- Remote ON/OFF – Referenced to input GND
- SBC OFF – Referenced output GND. This signal puts the P228 into a latched OFF state. To turn it back ON, input voltage must be removed and reapplied or the Remote ON/OFF signal (above) must be used to turn power off and on again.

Fan Control and Monitoring

The P228 is designed to operate a cooling fan with integral tachometer (for example EG&G Rotron Propimax3 or similar), by feeding the filtered power supply input voltage to the fan.

A fan control unit in the power supply provides the following functions:

- Regulated constant 30 V fan power to ensure high RPM. The fan supply is independent of P228 input voltage.
- Monitoring of fan voltage and current
- Monitoring of fan tachometer - Activates an external fan status signal if fan speed is out of specification limits.
- Overvoltage protection - Protects fan by turning it off if voltage exceeds 32 V
- Overcurrent protection - Protects fan by turning it off if current exceeds 13 A
- High temperature control - Protects power supply and system from overheating by turning fan on if power supply temperature exceeds 50 °C
- Low temperature control - Protects fan from damage by turning it off if power supply temperature is less than 0 °C
- Remote control - Enables fan to be turned on and off via a discrete input. This control is overridden by the high and low temperature control described above.

Temperature Detector

A temperature detector circuit monitors power supply operating temperature using an integral temperature sensor. The temperature detector circuit is connected to the fan control circuit enabling control of the fan as described above.

In the event of the power supply overheating, the temperature detector circuit triggers a discrete output alarm signal at the power supply connector when a temperature of 90 °C is detected. If the temperature reaches 100 °C, the temperature detector circuit shuts the power supply down. When temperature returns to a safe operating level, the power supply automatically turns back on.

Status LEDs

The power supply is equipped with an internal BIT mechanism that monitors the outputs at all times.

Four green LEDs indicate that the four output voltages are within specification limits, and three red LEDs indicate when the SYSRESET, SYSFAIL, and ACFAIL signals are asserted. An additional green LED indicates power supply normal operation by blinking.

Power Monitor Circuit

The P228 performs as a power monitor with respect to the SYSRST#, SYSFAIL#, and ACFAIL#.

ACFAIL# is asserted in the event of an input power loss or failure of the +5 V or +3.3 V output. This also triggers the holdup circuit.

SYSRST# is asserted for 200 ms at any power-on event.

SYSFAIL# is asserted during any power-on event until the P228 reaches fully operational mode. During normal operation SYSFAIL# is asserted to indicate a power supply failure.

Mechanical and Thermal Construction

The P228 is a 6U board, equipped with wedgelocks to hold it in place, and extractors for easy removal. The optional 25 ms holdup time capacitor bank module comprises a second board that plugs into the P228 mainboard and is held in place with screws. The capacitor bank module has an integral aluminum frame for strength and to provide EMI/RFI shielding.

Cooling of the P228 is by heat transfer through the surface of its heatsink directly to a cooled surface. Two mounting holes enable the use of screws to seat the P228 firmly against the cooling surface. In Aitech enclosures, the P228 is mounted with the entire surface of its heatsink in thermal contact with an enclosure wall that is fan cooled on the exterior of the enclosure.

EMI/RFI Design

The power supply is equipped with an on board EMI/RFI line filter on the input power lines, to meet the requirements of MIL-STD-461.

All high power and noisy components are cooled and shielded by a monolithic heatsink, and the heatsink of the optional capacitor bank module provides additional shielding.

Power Supply Connector

The power supply utilizes two power connectors located at the bottom of the board.

Specifications

Input

Normal Steady State Operation	18 - 32 Vdc
Overvoltage Protection	50 Vdc
Reverse Polarity Protection	Up to 50 Vdc
General Characteristics and transient suppression	Per MIL-STD 704A/D/E/F and 1275 (non damage with minimum voltage of 18 Vdc)

Outputs

Output Specification	OUT1	OUT2	OUT3	OUT4
Voltage (Vdc) Min	+4.875	+3.2	+11.64	-11.64
Voltage (Vdc) Max	+5.25	+3.45	+12.6	-12.6
Current (A), Max	60	25	5	5
Current Limit, Max Load (%)	110-120	110-125	110-130	110-130
Ripple/Noise (mVP-P)	<50	<50	<50	<50
Short Circuit Protection	✓	✓	✓	✓

Fan Output Voltage

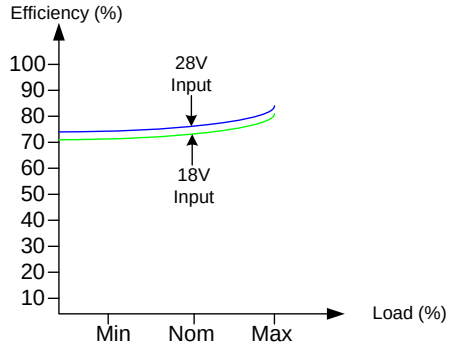
- Uses Filtered P228 Input Voltage
- 30 V constant to the fan
- 32 V Overvoltage Protection (shutoff)
- 13 A Overcurrent Protection (shutoff)

Backplane support

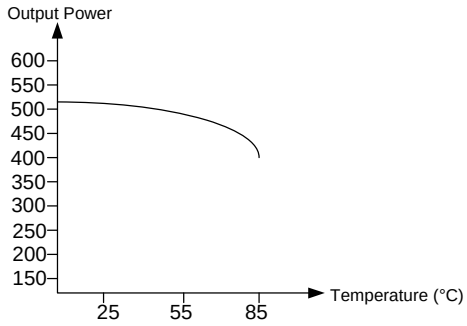
The power supply can be used with Aitech B027 in order to fit a standard enclosure.

For more information about the B027, please contact the Aitech sales department.

Efficiency Graph



Derating Graph



Thermal Shutdown

- 100 ± 5 °C

Isolation Resistance

- >10 MΩ at 100 V input to chassis
- >10 MΩ at 100 V output to chassis
- >10 MΩ at 500 V input to output

ACFAIL and SYSRST

Input/Output Under Voltage Sensing

	Output [V]		Input [V]
ACFAIL State	**3.3 V**	**5 V**	**28 V**
Decreasing Voltage	2.9	4.5	17.6
Increasing Voltage	3.18	4.85	17.9

SYSFAIL

Output Undervoltage Sensing

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

Output Overvoltage Sensing and Indication

SYSFAIL State	5 Vdc	3.3 Vdc	12 Vdc	-12 Vdc
Decreasing Voltage	5.35	3.46	12.65	-12.65
Increasing Voltage	5.9	3.75	13.7	-13.7

Environmental

Temperature (MIL-STD-810E)

- Maximum Operating Temperatures: (at heatsink surface)
  Series-400: -40 to +85 °C
- Series-200: -40 to +71 °C
- Storage Temperature:
  -60 to + 100 °C

Altitude (MIL-STD-810E)

- Operating: Up to 50,000 ft.

Humidity (MIL-STD-810E)

- 5 - 95% relative humidity

Vibration (MIL-STD-810E)

- On the move full functionality
- Random (maximum 0.1 g^2/Hz at 20 - 2 kHz, with total of 8 g_{rms})
- Gunfire vibration

Shock (MIL-STD-810E)

- Single shocks, operating - 40 g peak, half-sine, 11 ms, in 3 axes.
- Bench handling

EMC Protection (MIL-STD-461D, Part IV) *

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

* With external input power line filter

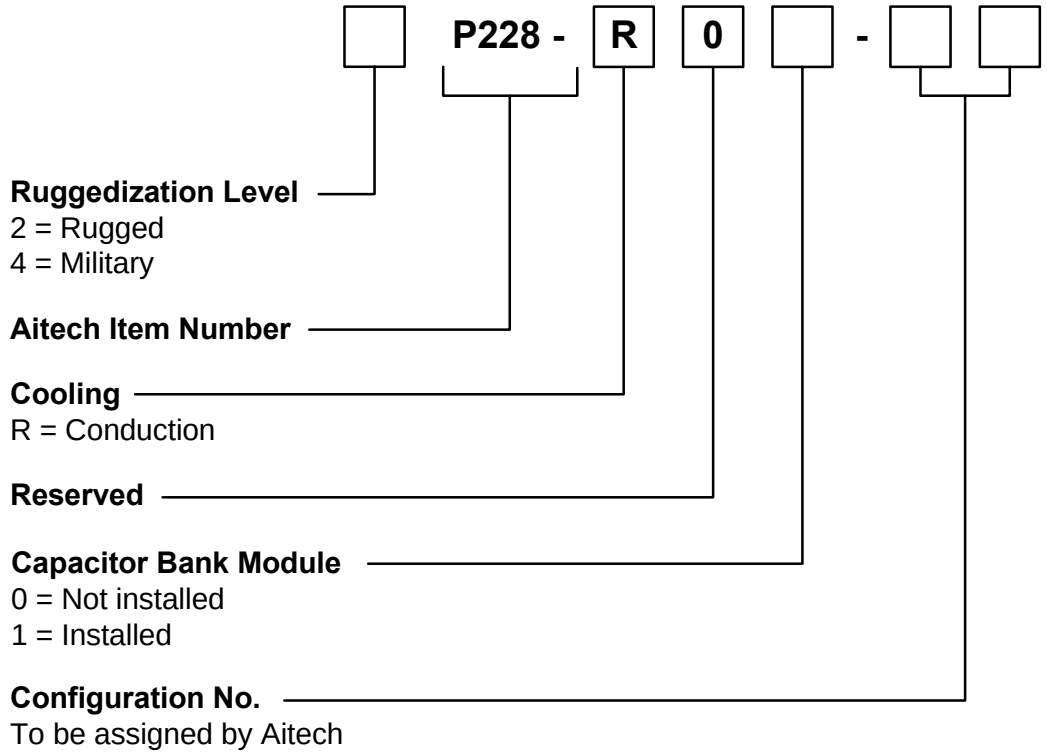
Mechanical Specifications

Dimensions and Weight

Height:	233.35 mm
Depth:	160 mm excluding VME connectors protrusion
Width:	23.2 mm (without optional capacitor bank module) 39.3 mm (with optional capacitor bank module)
Weight:	1415 g (without optional capacitor bank module) 1890 g (with optional capacitor bank module)

P228
Rugged 6U Power Supply Board

Ordering Information for the P228



Example: 2P228-R01-00

For more information about the P228 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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19756 Prairie Street, Chatsworth, CA 91311
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