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Find the *Aitech Defense Systems P226* at our website: ***Click HERE***

P226

Rugged 6U VMEbus Power Supply Board



- *300 Watt Output*
- *85% Typical Efficiency*
- *16 - 36 Vdc Input Range, With Drop to 14 V for 45 s and 12 V for 3 s*
- *MIL-STD-704A and D Input Compliance (704A compliance for no damage)*
- *EMI/RFI Input Filter*
- *Input Transient Protection*
- *Input Reverse Polarity Protection*
- *Outputs: 5 V @ 46 A, 3.3V @ 15 A, +12 V @ 1.0 A, -12 V @ 1.0 A*
- *Output Over/Undervoltage and Short-Circuit Protections*
- *~ACFAIL, ~SYSRST and ~SYSFAIL VME Signals*
- *4 ms Holdup Time (50 ms with optional capacitor bank module)*
- *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, and Temperatures*

Aitech Defense Systems, Inc.
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Overview

Designed for harsh environment applications, the Aitech P226 is a versatile and reliable 6U VME power supply providing VME systems with an exceptionally wide input voltage range to assure excellent load and line regulation.

Input power can vary from 16 to 36 Vdc, with a drop to 14 Vdc for up to 45 seconds and 12 Vdc for 3 seconds. For EMI reduction, an input line filter is used to reduce the input reflected ripple.

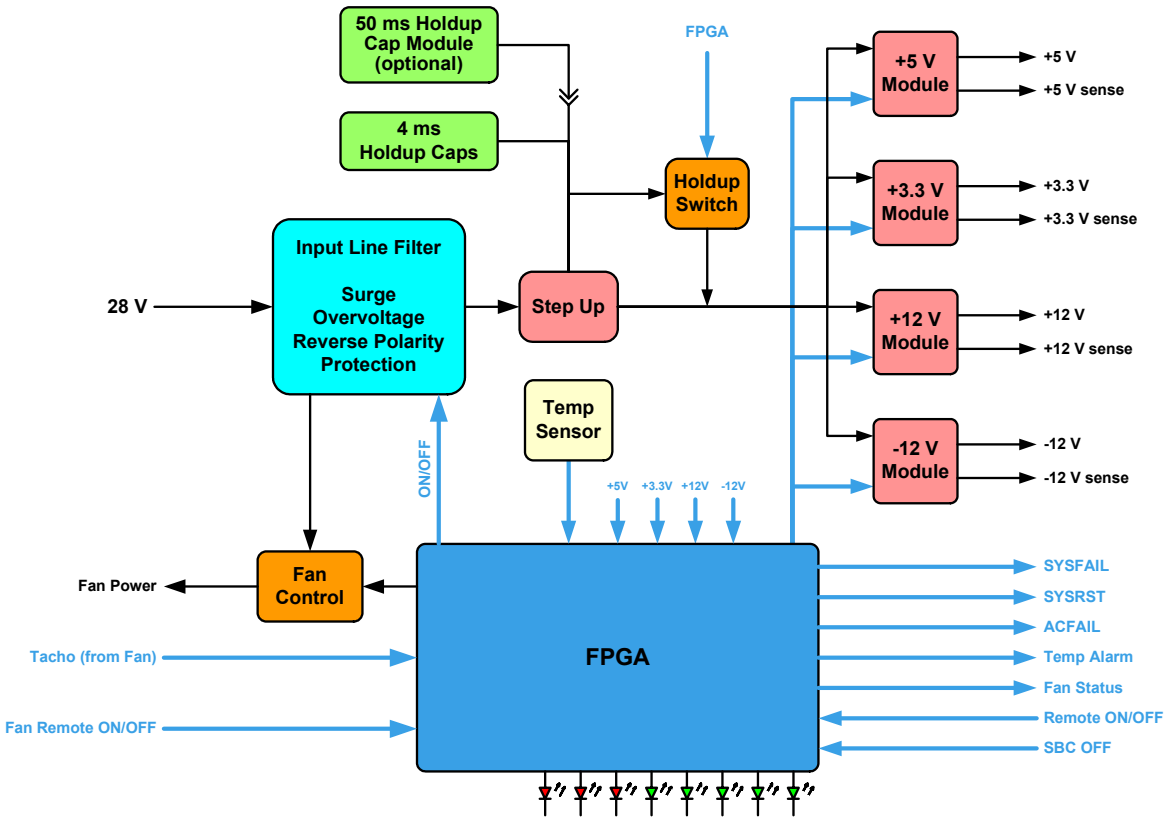
The power supply outputs four VME64x compliant voltages, each featuring a holdup time of 4 ms (50 ms holdup time with optional capacitor bank module). The four outputs are provided by four DC-to-DC converters, with a total power rating of up to 300 W, and minimum of 500 V isolation from input to output, thus eliminating any possibility of ground loops.

All outputs are individually protected against short-circuit and overvoltage. The power supply asserts all three VME 64x control signals - SYSRST, SYSFAIL and ACFAIL. All output voltages have sense lines to ensure voltage stability for high current loads.

The power supply includes a fan control circuit to control and monitor the operation of a 28 Vdc cooling fan. A temperature monitoring and control circuit controls fan operation, issues an alarm to indicate power supply over temperature, and shuts the power supply off if temperature reaches damaging levels. In addition, the P226 is equipped with sophisticated BIT logic that monitors inputs and outputs, temperature, and fan status, and provides the VME and BIT status signals.

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, indicating proper output voltages and power supply status.



P226 Power Supply Block Diagram

Functional Description

Input Voltage Operation and Protection

The P226 power supply operates over a continuous DC input voltage range of 16 to 36 V (18 V minimum required for turn-on).

The power supply will continue to operate normally during momentary input voltage drops down to 14 V for up to 45 seconds, or to 12 V for up to 3 seconds, after which automatic shutdown will occur.

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-704D and A (non-damage only for MIL-STD-704A input voltage surges).

Output Voltage Operation and Protection

One 1/2 brick and three 1/8 brick DC-to-DC converter modules provide four isolated outputs (+5Vdc, +3.3Vdc, +12Vdc, and -12Vdc respectively) with a total power rating of up to 300 W.

The DC-to-DC converters feature > 500 V input to output isolation, eliminating any possibility of ground loops. Moreover all the DC-to-DC converters are equipped with internal thermal shutdown, and each output channel has an independent current limitation implemented externally to the module by the P226 on-board logic.

Outputs are protected against short circuit, over-current, and over-voltage.

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

Hold-up Circuit

The P226 uses a holdup circuit that issues an ACFAIL signal, and enables the board to maintain all outputs within VME specification limits for 4 ms, or 50 ms with the optional capacitor bank module, after input voltage drops below 12 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 P226.

- Remote ON/OFF – Referenced to input GND
- SBC OFF – Referenced output GND. This signal puts the P226 into a latched OFF state. To turn it back ON, input 28 Vdc 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 P226 is designed to operate with a 28 Vdc cooling fan with integral tachometer (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:

- 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 reduces 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 the VME 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.

VME Power Monitor Circuit

The P226 performs as a VME 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 P226 reaches fully operational mode. During normal operation SYSFAIL# is asserted to indicate a power supply failure.

Mechanical and Thermal Construction

The P226 is a 6U VME board, equipped with wedgelocks to hold it in place, and extractors for easy removal. The optional 50 ms holdup time capacitor bank module comprises a second board that plugs into the P226 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 P226 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 P226 firmly against the cooling surface. In Aitech enclosures, the P226 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	16 - 36 V
Turn-on	18 V minimum
Voltage input drop	16~14 V for 45 sec 14~12 V for 3 sec
Overvoltage Protection	50 V
Reverse Polarity Protection	Up to 50 Vdc
General Characteristics and transient suppression	Per MIL-STD 704D and A, (non damage only for MIL-STD-704A input voltage surges >50 V)

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	46	15	1	1
Current Limit, Max Load (%)	110-120	110-125	110-130	110-130
Ripple/Noise (mV_{P-P})	<50	<50	<50	<50
Short Circuit Protection	✓	✓	✓	✓

Total Output Power, Maximum - 300 W

Fan Output Voltage

- Uses Filtered P226 Input Voltage
- 32 V Overvoltage Protection (shut off)
- 13 A Overcurrent Protection (shut off)

Efficiency

- 85% Typical

Thermal Shutdown

- 100 °C ± 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		Input
ACFAIL State	**3.3V**	**5V**	**28V**
Decreasing Voltage	2.9	4.5	11.7 ± 0.3
Increasing Voltage	3.18	4.85	17.7 ± 0.3

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	5V	3.3V	12V	-12V
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: -55 to +85 °C *
  Series-200: -40 to +71 °C
- Storage Temperature:
  -60 to + 100 °C

* @ 85% maximum rated power; full rated power at 75 °C.

Altitude (MIL-STD-810E)

- Operating: Up to 70,000 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 - 2k Hz, with total of 8 G_{RMS})
- Gun firing shock

Shock (MIL-STD-810E)

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

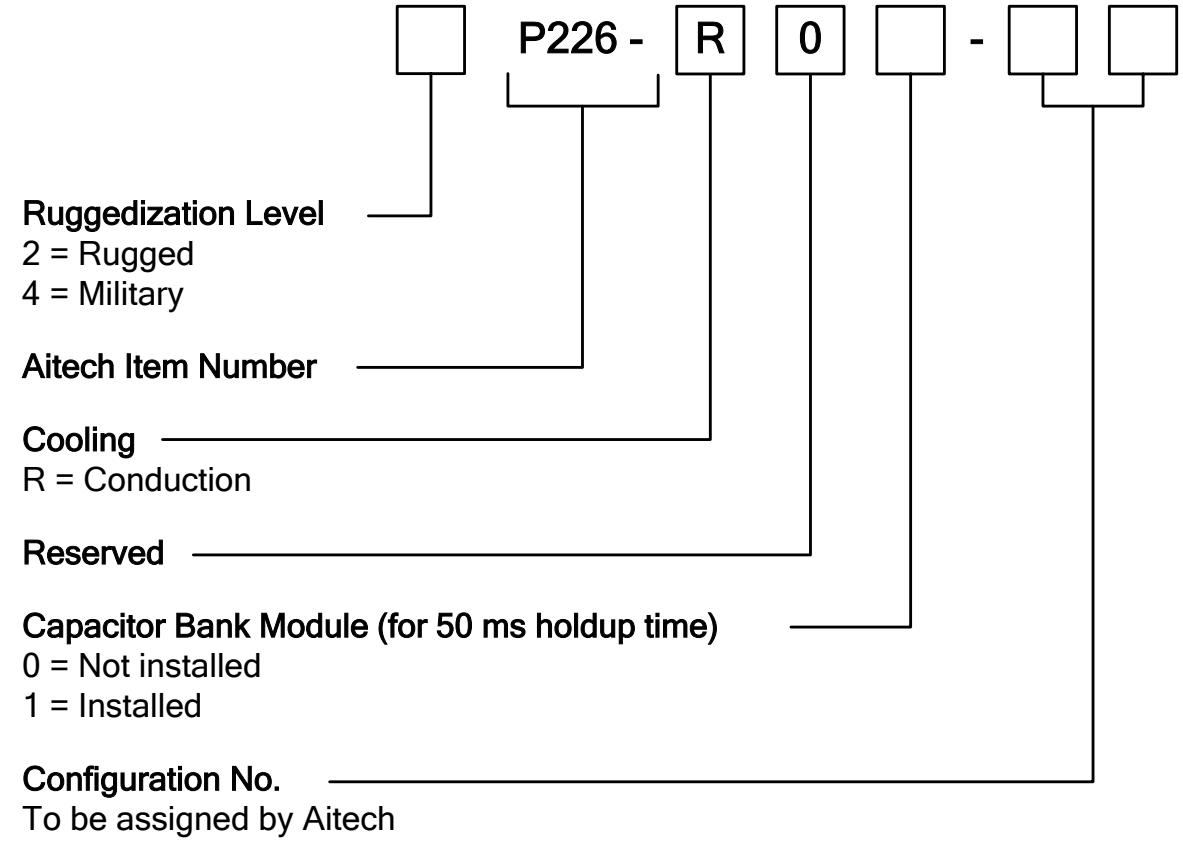
* With external input power line filter

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)

Ordering Information for the P226



Example: 2P226-R01-00

For more information about the P226 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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