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Find the *Aitech Defense Systems E110* at our website: ***Click HERE***

# E110

## Fin Cooled ATR Compact Short VME Enclosure




- ***Rugged Chassis for Mobile Military Applications***
- ***Designed for Harsh Mechanical, Climatic, Chemical and Electrical Stresses***
- ***Environmentally Sealed***
- ***Compact and Lightweight with 6 Standard VME64x Slots***
- ***Internally Conduction-Cooled; External Convection and Radiation by Fins***
- ***Fully Sealed Faraday Cage and Complete EMI/RFI Filtering***
- ***Customized Front Panel Connectors with optional I/O transition board***
- ***P221 Multi-Output Removable VME 6U Power Supply***

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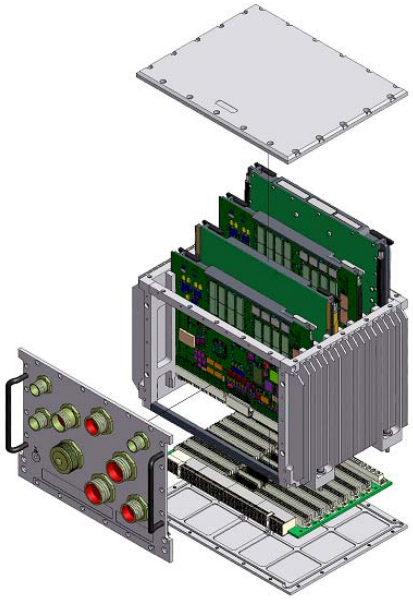
## *Overview*

Aitech's E110 Convection/Radiation cooled VME computer enclosure is built to be rugged and reliable as well as lightweight and compact. EMI/RFI protected and environmentally sealed, the E110 is capable of withstanding extreme environmental conditions of altitude, temperature, humidity, shock, vibration, EMI and chemical exposure. This makes it ideal for use in all military environments.

### *Sturdy Mechanical Design*

The E110 is constructed of durable CNC machined 6061-T6 aluminum. Fasteners are stainless steel and often-used threads have self-locking stainless steel helicoils to withstand severe vibration and shock. All connectors are located on the front panel of the enclosure for easy access. Side and back walls are externally finned for natural convection and radiation cooling without sacrificing ruggedness. Designed with 2 built-in handles, the E110 is also equipped with hooks and mounting holes to facilitate installation in standard 1/2-ATR short mounting trays. Optional mounting side flanges are available for hard mounting to a shelf.

The mechanical structure concept of the E110 is shown below:



### *Board Capacity*

The E110 accommodates 6 standard VME boards with 0.8 inch pitch, including:

- IEEE 1101.2 conduction-cooled VME cards
- Commercial VME boards without front panels

### *VME Backplane*

The backplane is VME64x compliant with 160-pin, 5-row J1/J2 connectors and 95-pin PO connectors in all slots.

Any of the pins in rows A and C, and user defined pins in rows Z and D of the J2 connectors, as well as the 95 I/O pins from each of the P0 connectors (up to a maximum of 695), can be routed to front panel I/O connectors.

### *Front Panel*

The front panel features a flexible configuration of connectors that conform to military standards, one for input power and all others for I/O. It may also be equipped with any of the following options: LED indicator to track system operation, On/Off switch and external grounding screw.

### *I/O harness*

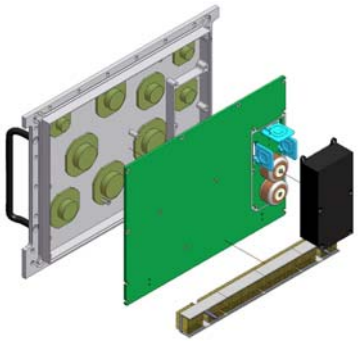
The front panel connectors are routed to the backplane via customized I/O harness.

This approach is recommended for small quantities and prototyping, for large quantities and for complete I/O lines filtering and protection the use of an optional I/O transition board is recommended.

### *Optional Front Panel I/O transition board*

An optional I/O transition board can be supplied per customer requierments suitable for the signal integrity of the specific I/O signals and per any EMI/RFI requierments, including high-energy spikes and lightning protections. Consults Aitech for customization of the A/M option.

The I/O transition board mechanical concept is shown below:



In order to allow the use optional I/O transition board the backplane should be also customized to include all the I/O signals with full signal integrity and controlled impedance and rout them to connect with the I/O transition board.

The design of the customized backplane and the I/O transition board is done using the same I/O signals characteristics, ensuring full matching of controlled impedances and signal integrity.

### *Thermally Efficient*

The E110 does not require external forced air or base plate cooling. The E110 is cooled by the convection of surrounding air, and radiation. Heat from the cards is conducted to the aluminum-finned sidewalls and dissipated to the ambient.

The back radiator dissipates heat from the power supply in the same manner.

Note:

There must be some free space around the enclosure to allow free convection of the air.

### *Electro-Magnetic Compatibility*

Aitech's E110 minimizes emission and susceptibility interference with these features:

- Metal-to-metal clamping with conductive surfaces and fasteners
- Conductive O-ring seals
- Shielded power supply board
- Input line filter on the inner surface of the front panel for reduced EMI/RFI noise to/from power cable, additional line filter module on the power supply board.
- Isolated chassis; input; and digital grounds, with optional connections between them.
- External chassis grounding screw.

### *Environmental Sealing*

The E110 is sealed against humidity, raindrops and splash. Enclosure mating surfaces are sealed with hollow silicone rubber O-ring seals. Connectors and other accessories are protected in the same manner.

### *Corrosion Resistant Finish*

External surfaces of the E110 are hard anodizing coated for excellent corrosion resistance. As an option, epoxy paint in standard military colors is available with nonstandard colors upon request.

Internal surfaces are chemical conversion coated for corrosion resistance and electrical conductivity. All finishes and components are fungus resistant.

All internal boards are conformally coated.

### *High Performance Power Supply*

The P221 removable power supply provides continuous high current, high efficiency operation, under the most adverse conditions. The user, to avoid enclosure maintenance downtime, can easily replace it, similar to other VME cards.

Major features of the P221 include:

- DC-DC converters, designed to operate even with irregular or noisy power sources
- 175 Watt Output with Greater Than 75% Efficiency
- Very wide input voltage range 16 - 36 Volt DC Input Range with Drop to 14 V for 45 Sec.
- MIL-STD-704A and D Input Compliance
- EMI/RFI Input Filter and Input Transient Protection
- Outputs: 5 V @ 30 A, ±12 V @ 1.0 A each, 3.3V @ 12 A
- Output Over/Undervoltage and Short-Circuit Protections
- Equipped with all VME64x control signals: ~ACFAIL, ~SYSRST and ~SYSFAIL
- High Holdup Time: 50 ms
- Input/Output and Chassis Isolation
- Thermal Shutdown and Reverse Polarity Protection
- External ON/OFF Control.
- DC Fan Output Drive and Control
- Internal BIT Status and Alarms for Voltages, Currents, and Temperatures

The full description of the P221 is given in its brochure. Following are its specifications.

## Power Supply Specifications

### Input

| | |
|---|---|
| Voltage Range (DC Continuous) | 16 V to 36 V |
| Voltage input drop | 14 V to 45 Sec |
| Non Damage DC input voltage | Max 50 V |
| Nominal Input Voltage | 24 V |
| Reverse Polarity | Protected 0 to 50 Vdc |
| General Characteristics and transient suppression | Per MIL-STD 704 D and A, (with the exception of meeting the input voltage surges for MIL-STD-704A for non damage only) |

### Outputs

| Voltage | Combined Operation | Independent Operation |
|---|---|---|
| +5.0V | 30A | Max combined output power 5 and 3.3 Volts outputs = 150W |
| +3.3V | 12A | |
| +12V | 1A | |
| -12V | 1A | |

Total Output Power, Maximum - 175 W

- Low output ripple
- Outputs isolated from inputs
- Isolation to chassis
- Short-circuit protection and overvoltage protection

| Output Specifications | MAIN | 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 |
| Overvoltage Protection (V) | 6-6.45 | 3.8-4.2 | +13.8-14.9 | -13.8-14.9 |
| Current (A), Max | 30 | 12 | 1 | 1 |
| Current Limit, Max Load (%) | 110-160 | 120-165 | 110-230 | 110-230 |
| Ripple/Noise (P-P, mV) | <50 | <50 | <50 | <50 |

### Efficiency

- >75%

### Thermal Shutdown

- Above 100 °C ± 5 °C

### Isolation Resistance

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

### 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 Under Voltage Sensing

| | Output | | Input |
|---|---|---|---|
| **ACFAIL State** | **3.3V** | **5V** | **24V** |
| **Decreasing Voltage** | 2.9 | 4.5 | 13.7 ± 0.3 |
| *Increasing Voltage* | 3.18 | 4.85 | 17.7 ± 0.3 |

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

### 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 |

### Holdup Circuit

Enables all outputs for at least 50 ms after input drops under 14 Vdc, at load conditions of 125 Watts.

## Enclosure Environmental Spec

- **Operating Temp.**
  Ser 200 level Enclosure: -40 °C to +71 °C*
  Ser 400 level Enclosure: -55 °C to +71 °C*
- **Non-operating Temp.**
  Ser 200 level Enclosure: -50 °C to +85 °C
  Ser 400 level Enclosure: -62 °C to +100 °C
- **Low Pressure**

| | |
|---|---|
| Operating*: | Up to 40,000 ft |
| Storage: | Up to 60,000 ft |

  * Maximum operating temperature is a function of total power dissipation and altitude. The 71°C temperature is for power dissipation of 85 W with card edge of 85 °C @ sea level, or 85 W at 55 °C with card edge of 85 °C @ 40,000 ft.

- **Humidity**
  5%-95% relative humidity with condensation
- **Vibration**

| | |
|---|---|
| Sine** | Cycling of 5 g (max) at 5 to 500 Hz |
| Random** | 10 g RMS at 20 to 2000 Hz |
| Transportation | Loose cargo vibration |

- **Shock**** - Single half-sine shocks:
  40 g peak
  3 axes
  11 ms duration

  ** Hard mounted

- **Transit Drop***** 1 ft. drop on concrete

  *** Packed in cargo box

- **Bench Handling**
  4-in unpackaged drop at a 45° angle to simulate conditions during servicing
- **Salt Fog** 5% salt spray
- **Fine Dust** Wind and fine dust particles
- **EMI/RFI**
  Designed to meet the emanation and susceptibility limits of MIL-STD-461, as per MIL-STD-462 requirements, CE101/102, CS101/102,114, & RE101/102 RS101/103.

## General Specifications

- **Dimensions**
  Standard Full -ATR short mounting footprint, except for shorter length:
  10.12 x 8.1 in (W x D)

  Maximum external dimensions with fins and handle:
  11.42 x 9.6 x 7.62 in (W x D x H)
- **Weight**
  Less than 18 lbs, without boards and I/O transition board.

  Less than 19.8 lbs, without boards.
- **Power Dissipation Capability**
  More than 85 W at 71°C, or 135 W at 55°C ambient air temperature at sea level, with maximum 85 °C at card edge, or 85 W at 55 °C with maximum card edge of 85 °C, @ altitude of 40,000 ft.

## Development System Compatibility

To provide for a smooth transition between development and deployment, Aitech offers an equivalent, low-cost commercial integrated system with standard VME boards and an AC-operated, fan-cooled enclosure.

## Accessories

Aitech offers a wide range of custom mounting options and cable sets.

For more information about Aitech's rugged and military VME enclosures or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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