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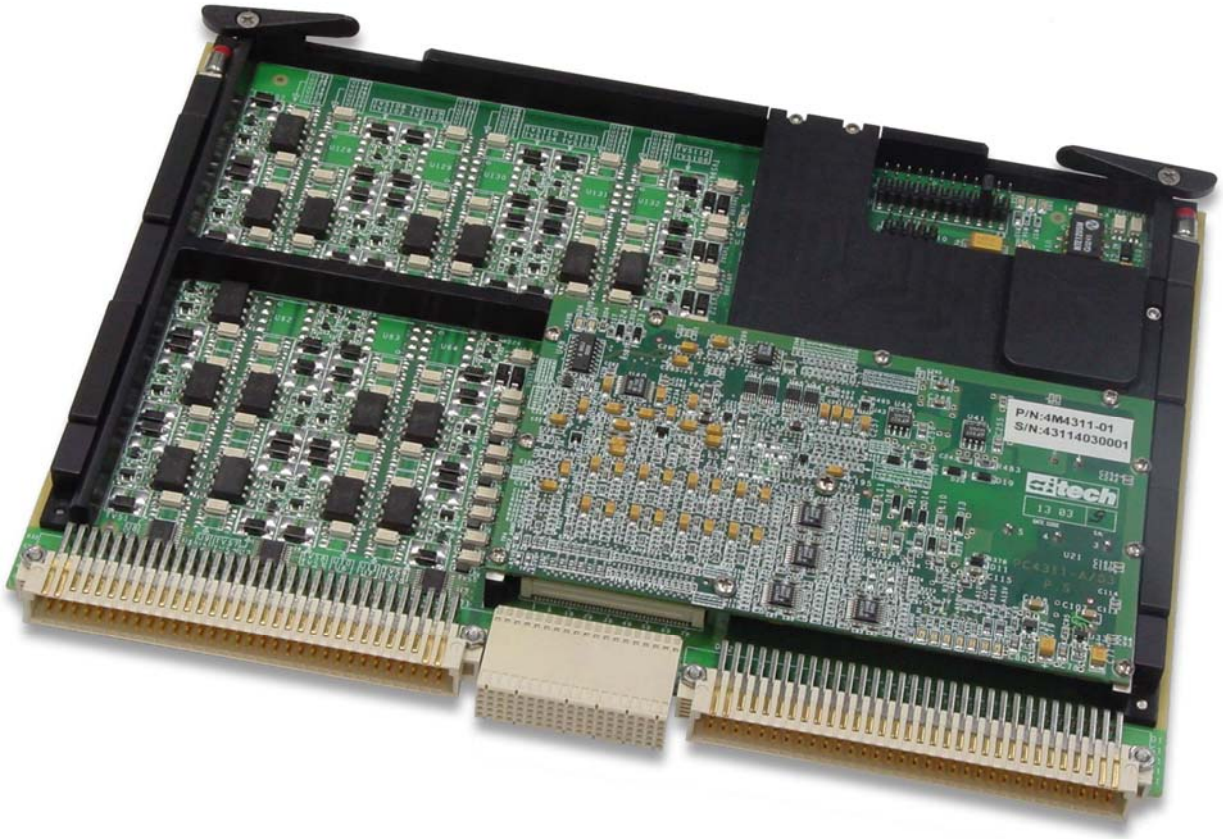
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Find the *Aitech Defense Systems C431* at our website: ***Click HERE***

C431

A/D, D/A, and Digital I/O VME Board



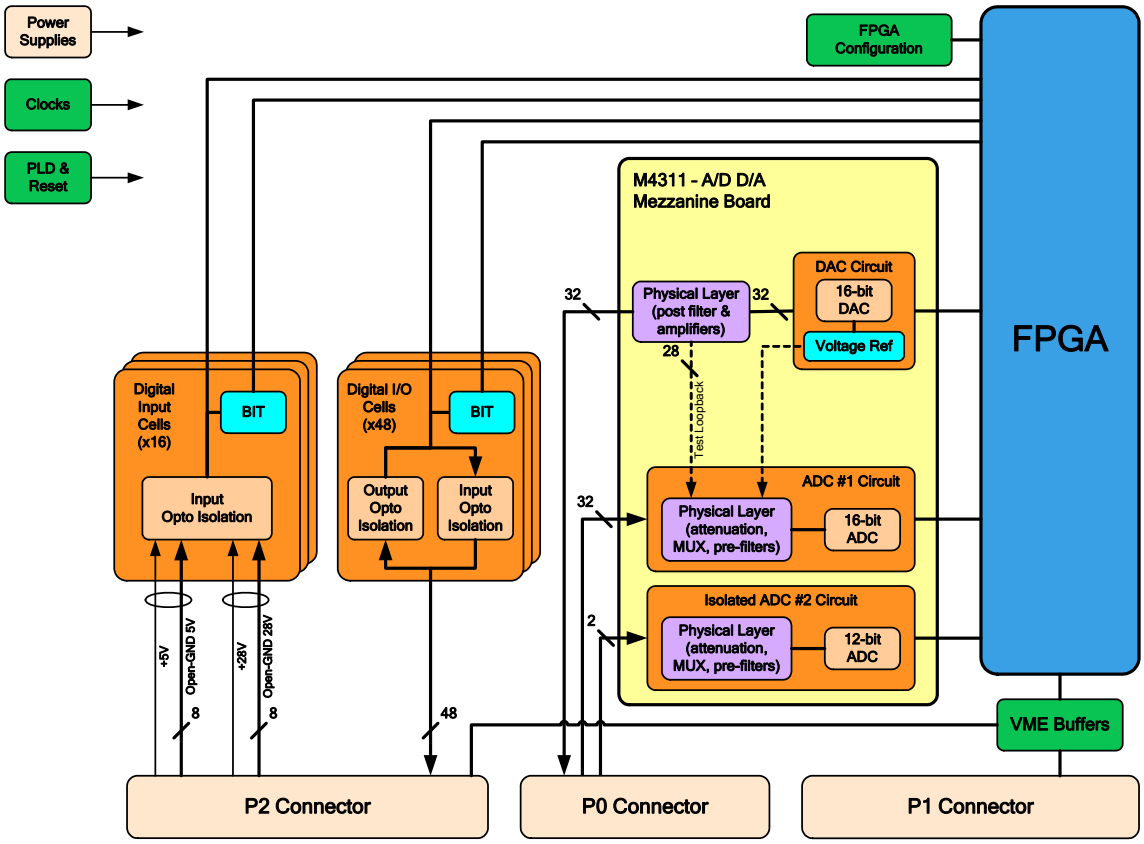
- 16 Differential/32 Single-Ended 16-bit A/D Input Channels
- 2 Differential, 12-bit, Isolated A/D Input Channels
- Thirty-Two 16-bit D/A Channels
- 48 Opto-Isolated Digital I/O Cells
  - Each Digital I/O Cell is Factory Configurable as Input or Output
  - Output Sink up to 1 A
  - Factory Configurable Input Threshold Levels
- 16 Opto-Isolated Digital Input Channels Designed for Switch Activation
- VME Slave Interface Implemented in a High Performance FPGA
- All Digital & Analog I/O Signals are Available at the VME P2 & P0 Connectors
- Low Power Consumption < 8 W
- VxWorks, Linux, and INTEGRITY Drivers (Optional)
- BIT (Optional)
- On-Board A/D - D/A Loopbacks and High Precision Reference Voltage Sources for High Reliability Operation
- On-Board Temperature Sensor
- Conduction and Air Cooled Versions
- Vibration and Shock Resistant

Aitech Defense Systems, Inc.
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Overview

The innovative Aitech C431 is a VMEbus slave card that provides extensive I/O resources including analog-to-digital, digital-to-analog, and opto-isolated digital I/O capabilities for harsh environment applications.

Two ADC devices, a 16-bit and a 12-bit ADC, provide high precision analog-to-digital conversion. The 16-bit device input channels are software configurable, either to 32 single-ended input channels or 16 differential channels or a combination of both. The 12-bit ADC controls two completely isolated differential channels.



C431 Block Diagram

One 16-bit DAC device provides 32 high reliability output levels.

All ADC and DAC devices are advanced high-speed devices enabling high sampling rates.

Digital I/O provides high current opto-isolated channels specifically designed for switch activation and high current switching applications. Each of these opto-isolated channels may be individually configured to operate as input or output.

The card integrates a sophisticated design totally separating the analog and digital domains allowing it to achieve high quality analog to digital and digital to analog conversions.

The VMEbus interface implemented in the C431 is incorporated in an FPGA logic device providing a simple and reliable interface. The VME interface provides slave functionality only and supports A32/D08/D16/D32 access modes.

The C431 is a low power card delivering high I/O capabilities with minimal power consumption.

The C431 is optionally delivered with a complete set of drivers and optional Built-In Tests (BIT) for all of its on board resources. The drivers integrated into the VME host card environment provide full control and access to all of the C431 modules.

The on-board temperature sensor enables fixing of analog and digital conversion errors.

Functional Description

Analog I/O Interface

The C431 VME I/O board includes Analog to Digital (A/D) and Digital to Analog (D/A) channels as described below.

Standard A/D Input Channels (ADC1)

- Up to 32 Single Ended or up to 16 Differential Analog Input Channels (combinations of the two are available)
- 16-bit ADC device resolution (12-bit actual input voltage resolution)
- Input Channels are Software selected by MUX devices
- Software configuration of Differential/Single Ended inputs
- Input voltage range: +/-10 V (other input voltage ranges can be implemented upon request)
- Up to +/- 70 V over voltage/fault protection
- Includes two modes of operation:
  - **"Single mode" –** convert on command one selected channel.
  - **"Single Scan mode"** – convert all channels sequentially on demand.
- Support for VME interrupt or polling mode operation
- Analog data sampling rate: 7 kHz per channel
- Offset and Gain Calibration support using a built-in voltage and ground references
- Passive analog low pass filtering on ADC input (filter parameters can be customized upon request)
- BIT support for the A/D path using internal loopback connections from DAC outputs to ADC1 inputs.

Isolated A/D Input Channels (ADC2)

- 2 Differential analog Input channels
- 12-bit A/D device resolution
- Isolated supply and digital interfaces
- 0 to +10 V analog inputs voltage range (other input voltage ranges can be implemented upon request)
- Sampling Rate: Up to 9.6 kHz
- Up to +70 V overvoltage/fault protection
- BIT, Offset and Gain Calibration support using the built-in voltage and ground references

D/A Output Channels

- Up to 32 Analog output channels
- 16-bit D/A device resolution
- 0 to +10 V analog output voltage range (other output voltage ranges can be implemented upon request)
- Maximum conversion time per channel (from VME to analog output): 35 µsec
- Buffer amplifier outputs delivers up to 2.5 mA at full-scale voltage on all outputs simultaneously

Voltage Reference Output

High precision 2.5 V voltage reference buffered output routed to P0 I/O connector

Digital I/O Interface

The C431 VME I/O board provides digital isolated input and output channels

I/O Channels

48 optically Isolated I/O channels can be factory configured as inputs or outputs.

When Configured as Outputs:

- Each channel provides two lines (+ & -) at two operation state modes:
  - Output logic "0" - Lines are open
  - Output logic "1" - Lines are shorted
- Max output voltage range: 0 to +40 Vdc or AC peak
- Max output current sink: 1 A per output channel
- Each output channel includes an on board feedback status circuit used for testing during real-time operation
- Each channel has a 400 W transient overvoltage protection
- During power-up and initialization, all outputs are set to logic "0" (lines open)

When Configured as Inputs:

- Threshold voltage can be factory configured for each input channel
- Internal power supply is used for testing the input channels during non operation
- Each channel has a 400 W transient overvoltage protection
- The board reads logic "0" at any unconnected (open) input channel
- Max current draw for each channel is up to 5 mA

Input Channels

16 optically isolated input channels

- The input terminal needs to be connected to a switch, which closes circuit to the common supply GND
- Threshold voltage can be factory configured for each input channel
- Max current draw for each channel is up to 5 mA
- The board reads logic “0” at any unconnected (open) input channel
- 8 channels have a 200 W transient overvoltage protection and 8 channels have a 400 W transient overvoltage protection

VMEbus Interface

The C431 VME Bridge is implemented in an FPGA logic device. The VME Bridge provides slave VME capabilities and supports A32/D08/D16/D32 data transfers from/to any standard VME host board

The C431 supports VMEbus interrupts generation on any of the seven VME interrupt levels.

Geographical Addressing

The C431 VME Base address can be set in one of three methods:

- Using the on board jumpers
- Using VME64x geographical address signals

Factory programming is available upon request.

General Purpose TTL Input

A TTL level input for optional triggering of A/D or D/A devices.

Mechanical Features

The C431 is available in two mechanical formats:

- Air-cooled per ANSI/VITA 1-1994
- Conduction cooled per IEEE 1101.2

Both mechanical formats are single-slot 6U modules.

Custom metal frame provides excellent rigidity and shock resistance. In addition custom metal frame provides an array of stiffeners to support rugged PMC boards.

Dimensions

- Air-cooled: per ANSI/VITA 1-1994
- Conduction cooled: per IEEE 1101.2

Weight

- Air-cooled: < 410 g (0.9 lbs)
- Conduction cooled: < 550 g (1.21 lbs)

Thermal Management

Careful mechanical design including custom heatsink modules combined with a metal frame allow for optimal heat dissipation.

Power Requirements

The C431 may be configured to receive all its power from the VME backplane’s +5.0 V supply only. It also has the capability to utilize the +3.3 V power supply from the backplane as defined in the VME64x specification.

Total power consumption of the C431 depends on its configuration and assembly options.

Fully featured and configured to take all its supply from the +5.0 V power supply, its power consumption is 7.85 W (typ.) and 13.6 W (max.) as follows:

+3.3 V	(± 5%)	0 A (typ)	0 A (max)
+5.0 V	(± 5%)	1.45 A (typ)	2 A (max)
+12 V	(± 10%)	0.05 A (typ)	0.3 A (max)
–12 V	(± 10%)	0 A (typ)	0 A (max)

Software Support

The C431 slave VME board can optionally be supplied with drivers for the VxWorks, Linux, and INTEGRITY operating systems, which are loaded and run on the VME host board (master). These drivers allow operation and control of the C431 from the host board via the VMEbus.

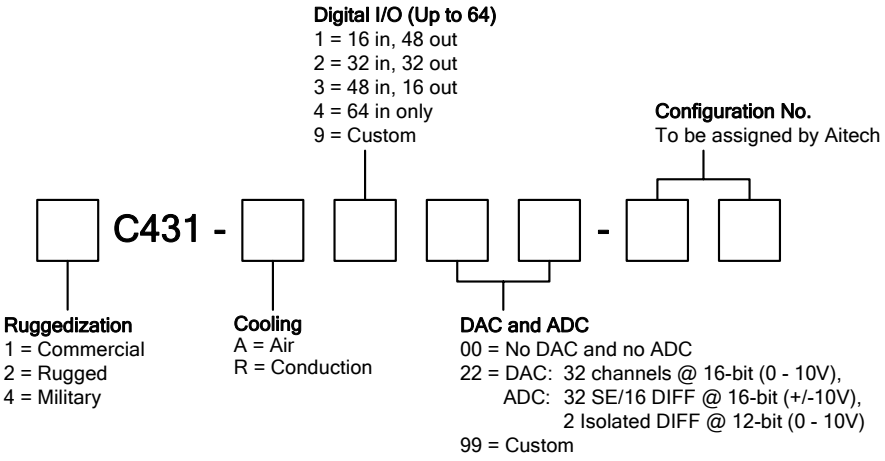
The C431 drivers also optionally include a set of BIT functions, which are used to test the A/D, D/A, and digital I/O functions.

Drivers for other popular real-time operating systems can be supplied upon request

Environmental Features

Refer to the Aitech Ruggedization datasheet.

Ordering Information



Example: 4C431-R322-00

Note: Configuration options have been simplified relative to previous releases of this datasheet. Orders using legacy part numbers will be honored, but are not recommended for new designs.

For alternative configurations or more information about the C431 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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