

- **64 Channels of TTL or 32 Channels of RS-422/485 Differential I/O**
- **All Channels Software Configurable to be TTL or Differential and Inputs or Outputs**
- **Optional: 8 Analog Output Channels, 12-bit D/A Converter**
- **4 Single-Ended Analog Voltage Output Channels with 0 to +10 V Output Range**
- **4 Single-Ended Analog Current Output Channels with 0 to 20 ma Range**
- **Optional: Four RS-23 /422/485 UART Serial Ports Capable of BAUD Rates up to 115.2 kbps**
- **Optional: Two Threshold Crossing Detector Inputs with Hysteresis**
- **Interrupt Capabilities Using PCI Interrupt Pins**
- **Programmable Interrupts from External TTL or Differential Inputs**
- **PCI Rev. 2.1 Compliant Supporting 32-bit @ 33MHz Operation**
- **Air-Cooled Version Compliant with IEEE 1386-2001 Specification**
- **Conduction-Cooled Version Compliant with ANSI/VITA20-2001**
- **Three Ruggedization Levels**
- **VxWorks® Drivers**
- **BIT (Built-in-Test) Coverage for complete Functional Testability**

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**Aitech Defense Systems, Inc.**

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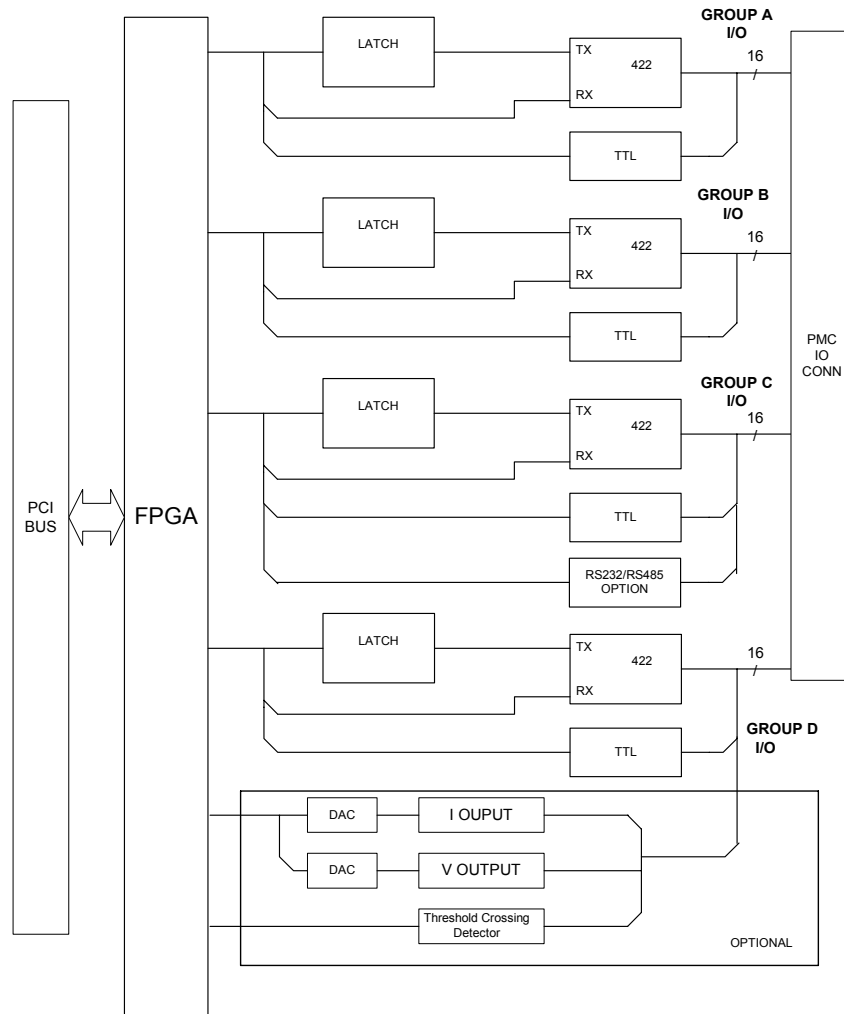
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### Parallel I/O PMC

The M451 Parallel Data card is a singlewide conduction-cooled PCI mezzanine card (PMC) with a 33 MHz 32-bit PCI interface. It provides up to 32 differential bi-directional I/O channels and up to 64 TTL I/O channels.

Additional factory configurable options include: up to four serial communication ports, analog current and voltage outputs and two threshold-crossing detectors. BIT stimulus and wrap-around monitoring is provided for each interface circuit.

The M451 is available in both commercial and military ruggedization levels.



**M451 Block Diagram**



## Features

### Architecture

The Parallel Data PMC Card is a 32-bit PCI target that controls a variety of I/O functions via registers in its assigned PCI memory space. The board does not use PCI I/O space. The PCI bus interface and control functions are implemented in an Actel FPGA device.

Hardware resources are divided into four functional groups, as follows:

- Group A – 16 TTL I/O channels or four RS-422/485 differential channels.
- Group B – 16 TTL I/O channels or four RS-422/485 differential channels.
- Group C – 16 TTL I/O channels or eight RS-422/485 differential or optionally four RS-232 channels.
- Group D –
  - 16 TTL I/O channels or eight RS422/485 differential channels.

OR

- Optional: four Analog Voltage-Out channels and four Analog Current-Out channels and two Threshold Crossing Detector Inputs.

Each Group is allocated 16 pins on the PMC P4 connector. The different resources in each Group must share pins and therefore they cannot be used simultaneously. Features identified as optional are configured in hardware. Contact the factory for specific configurations.

### TTL and RS-485 I/O Channels

Each group of four pins can be software configured for discrete TTL or RS-422/485 I/O. Each TTL channel can be set as input, output, or both. Each RS-422/485 differential channel can be set as input, output, or both. All outputs can be read back as inputs for the Built-In test.

### Serial Ports

The board can be configured with up to four Serial UART interfaces with either RS-232 or RS-422/4485 interfaces. These interfaces support asynchronous data rates at up to 115.2 kbps.

### Interrupt Controller

The Parallel Data PMC Card has a software programmable interrupt controller that can be configured to provide PCI interrupts based on the serial I/O channels or on a high or low transition on any of the TTL or Differential I/O channels.

### Analog Voltage Outputs

A 12-bit D/A converter yields up to four Analog Voltage outputs operating between 0 to +10 volts and an output drive of 20 mA with load compensation.

### Analog Current Outputs

A 12-bit D/A converter yields up to four Analog Current outputs operating between 0 to 20 mA and an output drive ranging between 0 to 20 mA with load compensation.

### Threshold Detect Inputs

There are two threshold crossing detection inputs with hysteresis. These input thresholds can be factory set to range between 0.5 and 4.5 volts. The two inputs are phase detected and the frequency is measured.

### Test and Diagnostics Features

- Full Functional testability using internal BIT stimulus, read-back of all digital outputs, and analog output threshold detection.
- BIT software provided for loading on the host processor platform

### Software Drivers

The M451 PMC is delivered with a complete set of VxWorks® drivers and BIT. These can be integrated into the carrier (host) VxWorks® platform.



### **Mechanical Features**

The M451 PMC is available in two mechanical formats:

- Air-cooled per IEEE 1386-2001 for installation on top commercial and rugged air-cooled carrier boards.
- Conduction cooled per ANSI/VITA20-2001 for installation on top IEEE 1101.2 conduction-cooled carrier boards.

High power components are cooled by an aluminum heatsink.

All M451 I/O signals are routed to the PMC P4 I/O connector.

### **Dimensions**

- Air-cooled: per IEEE 1386-2001
- Conduction cooled: per ANSI/VITA 20-2001

### **Power Requirements**

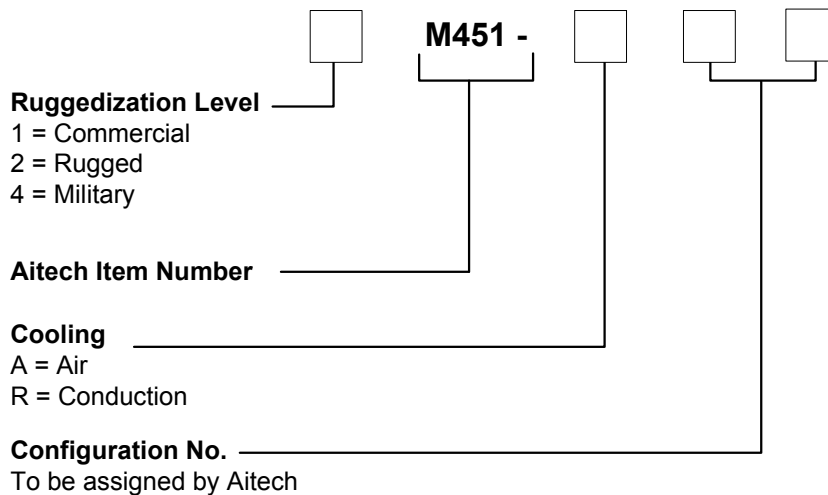
Total power consumption (maximum): 5W

+5V	(± 5%)	0.2A
+12V	(± 10%)	0.16A
-12V	(± 10%)	0.16A

### **Environmental Features**

Please, refer to the Aitech ruggedization datasheet.

### **Ordering Information for the M451**



Example: 4M451-A-02



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