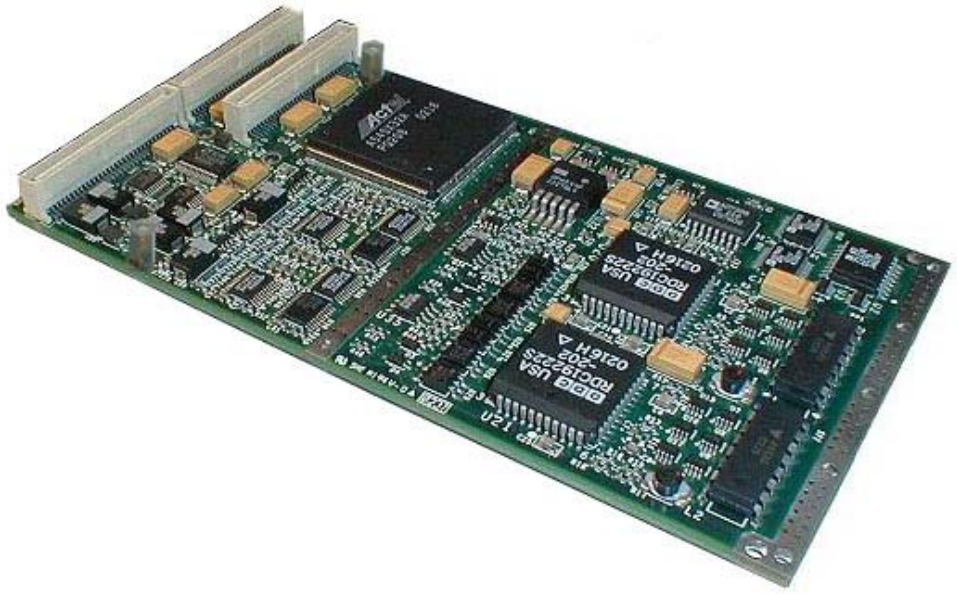
M410
Servo I/O PMC



- *2-Synchro/Resolver to Digital Converters*
  - *Selectable Resolution at 10, 12, 14 or 16 bit*
  - *Interface for Either 3-wire Synchro or 4-wire Resolver*
  - *11.8Vrms Input Voltage*
  - *Input Frequencies of 400Hz to 3kHz*
  - *AC Voltage Source/Frequency Reference Software Configurable for Frequencies of 400Hz or 1200Hz*
- *A/D Converter*
  - *16-bit A/D Conversions at 100 kSPS*
  - *8 Single-Ended or 4 Differential Software Selectable Analog Inputs*
  - *± 10V Analog Input Range*
  - *2 AC Input Interfaces*
- *D/A Converter*
  - *12-bit resolution*
  - *4 Analog Outputs: 2 Voltage Mode, 2 Configurable as ± 10 Analog Voltage Mode or 0 to 20 mA Current Mode*
- *Multiple Discrete Interfaces*
  - *16 TTL or 8 Differential I/O*
  - *4 General Purpose, TTL I-/O*
  - *4 Low-side Solenoid Drivers*
  - *2 High-side Drivers*
- *PCI 2.1 Interface Compliant, 32 bit @ 33 MHz PCI Bus Interface*
- *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) Available for complete Functional Testability*

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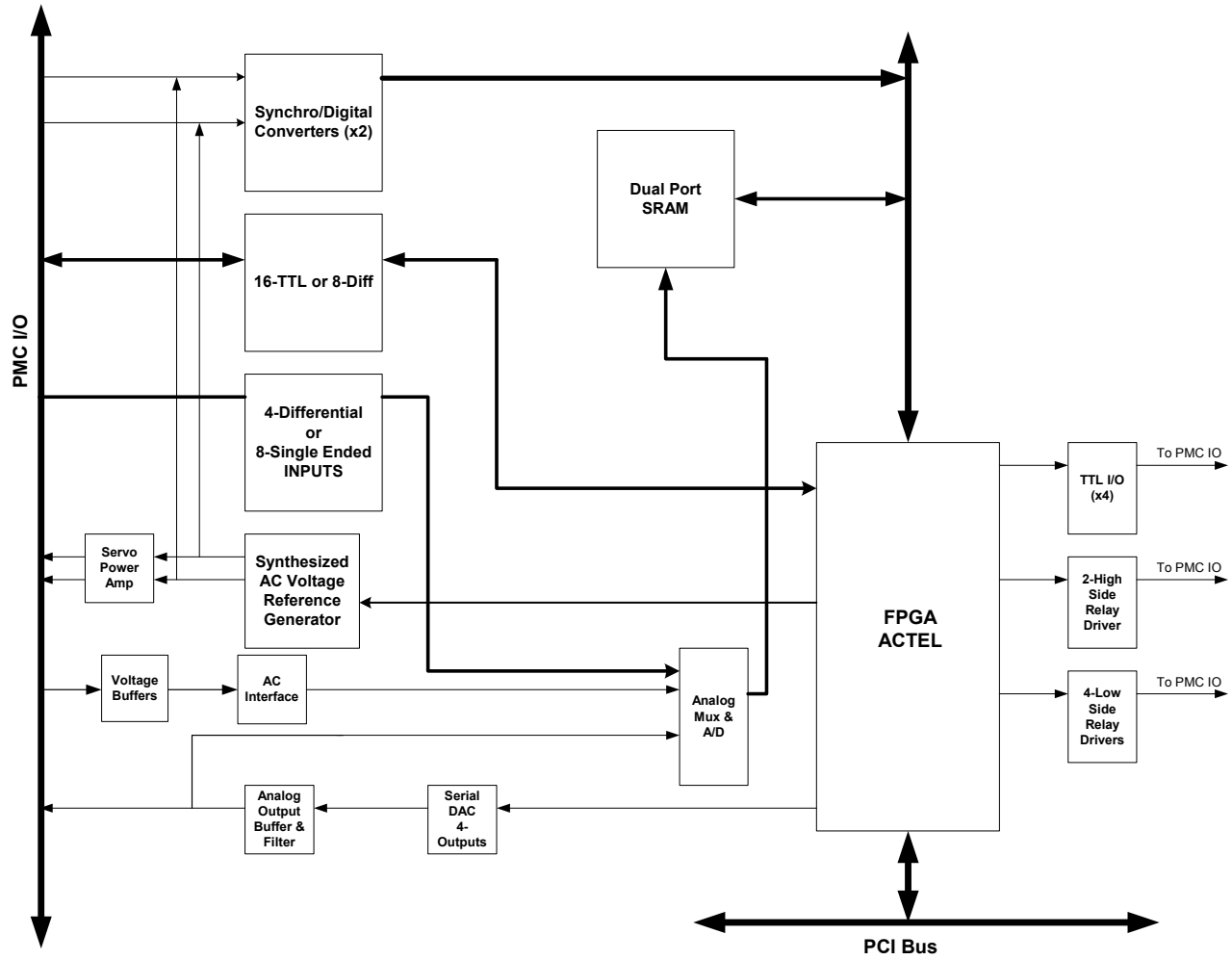
Servo I/O PMC

The M410 Servo I/O PMC board is designed to provide three-wire Synchro-to-Digital (or four wire Resolver-to-Digital) conversion at 14-bit resolution (minimum) on a cost effective and small industrial PMC form factor. An on-board, synthesized AC-voltage source and frequency generator provide built-in-test (BIT) capability for the Synchro-to-Digital (S/D) converters.

To complement the S/D converters, general-purpose digital and analog I/O are also designed to provide a PMC solution that is suitable for a configurable servo-control-loop application.

All I/O can be sampled and stored in on-board, memory-mapped SRAM for further inspection and processing by the host processor. All I/O is BIT capable.

Implemented in an Actel FPGA, the M410 supports a high performance PCI interface that is fully compliant with PCI specification, revision 2.1.



M410 Block Diagram

Features

Architecture

The M410 architecture provides various interfaces to support control systems applications. It has 2 Synchro or Resolver inputs with 2 multiplying DACs for BIT stimulate, 8single-ended or 4 differential analog inputs, 4 analog outputs, 16 TTL or 8 differential digital I/Os, 2 –High-side and 4 –Low-side drivers, 4 TTL I/Os, 2 AC voltage presence input monitors, 2 buffered analog input, and a 400 or 1200 Hz frequency generator.

Synchro/Resolver Inputs

Each Synchro/Resolver interface employs Data Devices Corporation's RDC-19222 chip. The RDC-19222 converts the phase/amplitude from a Synchro or Resolver to a digital angle and velocity. The resolution of the RDC is factory set to 10,12,14, or 16 bits. The input interface is direct connection and supports either 3-wire or 4-wire with voltage scaling resistor settable at factory. Two multiplying DACs are used to simulate Sine and Cosine input to RDC-19222 during BIT.

Differential or Single-Ended Analog Inputs

The M410 analog inputs consist of 8 –single-ended inputs with unity gain that can be converted to 4 differential analog inputs. The analog signal is digitized by the Linear Technology's LTC1605 16-bit 100 kSPS A/D converter. The selection of differential or single-ended mode is commanded through software. The analog input voltage range is ± 10 Volts. All analog inputs have low pass anti-aliasing filters.

Analog Outputs

The M410 provides 4 analog outputs using Analog Devices' AD7398 Quad 12-bit DAC. Two of these outputs are voltage mode and are factory configurable for 0 to +10 Volts or –10 to +10 Volts outputs. The other two outputs are factory configurable for use as either current mode with 0 to 20 milliAmps outputs or voltage mode with either 0 to +10 Volts or –10 to +10 Volts outputs. All analog outputs have low pass filters to smooth out the conversion steps.

Digital I/Os

For digital/discrete interfaces, the M410 provides multiple discretes software configurable between 16-bit TTL I/Os or 8-bit differential (RS-485 or RS-422 compatible) I/Os, 4-bit TTL-only I/Os, 2-bit for High-side drivers, and 4-bit for Low-side drivers.

The TTL or differential I/Os can be software configured as either input or output ports. Each bit of the 4-bit TTL only I/Os can be software configured as either input or output. The High-side drivers support 28V input with 150 mΩ ON resistance per driver. The Low-side drivers share common return with 500 mΩ ON resistance per driver. The Low-side's return can be factory set to board digital Ground or external return.

PCI Bus Interface

The M410 incorporates a high performance PCI to Local Bus Bridge supporting 32-bit operation at 33 MHz and fully compliant with the PCI Rev. 2.1 specification.

Software

Test and Diagnostics Features

- Full Functional testability using internal BIT stimulus, redundant input paths, and analog output loopbacks.
- BIT software provided for loading on the host processor platform

Software Drivers

The M410 PMC is delivered with a complete set of VxWorks® drivers and BIT. These should be integrated into the carrier (host) VxWorks® platform.

Mechanical Features

The M410 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.

Dimensions

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

Power Requirements

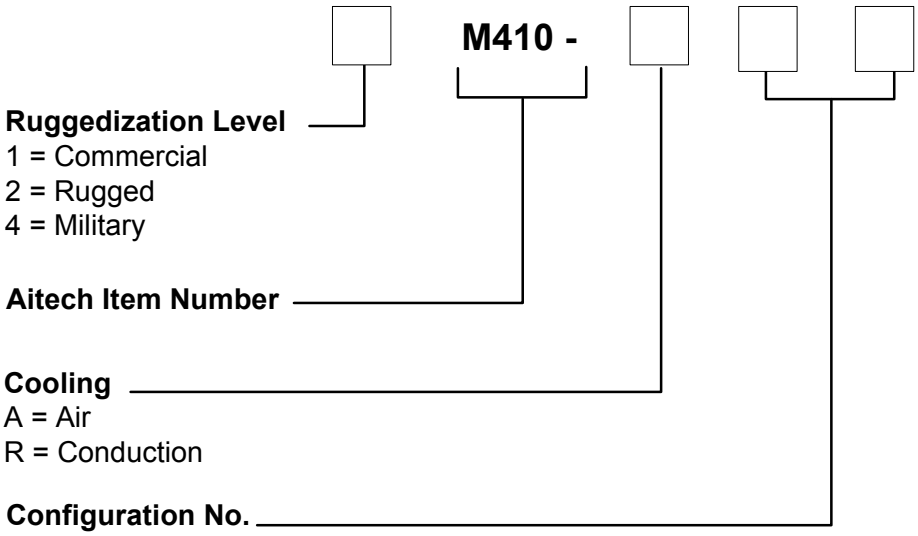
Total power consumption (maximum): 5W

+5V	(± 5%)	0.55A
+12V	(± 10%)	0.073A
-12V	(± 10%)	0.073A

Environmental Features

Please, refer to the Aitech ruggedization datasheet

Ordering Information for the M410



Example: 4M410-A02

For more information about the M410 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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