PMC-16AICS32

32-CHANNEL 16-BIT TRANSDUCER INPUT PMC

With Scanning Input Current Source
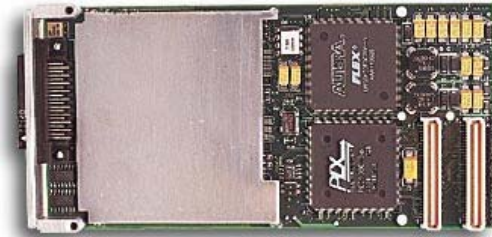
Features Include:

- 32 Differential or 64 Single-Ended 16-Bit Scanned Analog Voltage Input Channels
- 32-Channel Precision Scanning Excitation Current Source; 0.4ma to 10ma Options
- Input Ranges Selectable as ±10V, ±5V or ±2.5V
- Excitation Applied to any Channel Combination Under a Control Mask
- High Input Impedance for Channels Not Requiring Excitation
- Scan Rate Internally Adjustable from 0.06 to 3000 32-Channel Scans per Second
- External Hardware Sync Input/Output (Alternate Function for Channel 31)
- Data Buffered through a 64K-sample FIFO
- Continuous and Burst (One-Shot) Input Modes
- Scan Sizes from Two to 32 Channels-per-Scan; or Single-Channel sampling of any Channel
- On-Demand Internal Autocalibration
- DMA Engine Supports Block Mode Transfers
- Completely Software-Configurable; No Field Jumpers
- Single-width PMC Form Factor with EMI Shield and Panel Bezel

Applications Include:

- ✓ Resistance Transducers
- ✓ Voltage Inputs
- ✓ Temperature Measurement
- ✓ Data Acquisition Systems
- ✓ Process Monitoring
- ✓ Environmental Test Systems

Rev: 060804

Functional Description:

The PMC-16AICS32 board is a scanning 16-Bit analog digitizer that provides voltage measurement for up to 64 input channels, with precision current excitation available for 32 channels. A precision current source is switched synchronously with the input scanner to supply excitation for each channel as it is sampled. The excitation current can be programmed to occur in any combination of input channels, and those channels programmed not to receive the excitation can be used as basic analog voltage inputs. Input ranges are selectable as ±2.5V, ±5V or ±10V, and factory-configured excitation current is available from 0.4ma to 10ma. 16-bit sampled data is available to the PCI bus through a 64K-Sample FIFO buffer. All operational parameters are software configurable.

The analog inputs can be sampled in scans of 2, 4, 8, 16 or 32 differential channels, or 2, 4, 8, 16, 32 or 64 single-ended channels, or any individual channel can be selected for sampling. The scan rate can be controlled internally from 0.06 scans per second up to 50,000 scans per second for a 2-channel scan, or any single channel can be sampled at up to 100,000 samples per second. A Sync input/output signal can replace Channel 31 inputs to permit multiple boards to operate from a common scan-rate generator. An internal auto calibration utility uses hardware D/A converters to correct for offset and gain errors in the input signal path, and calibrates the inputs, but not the excitation source, to a precision internal calibration reference.
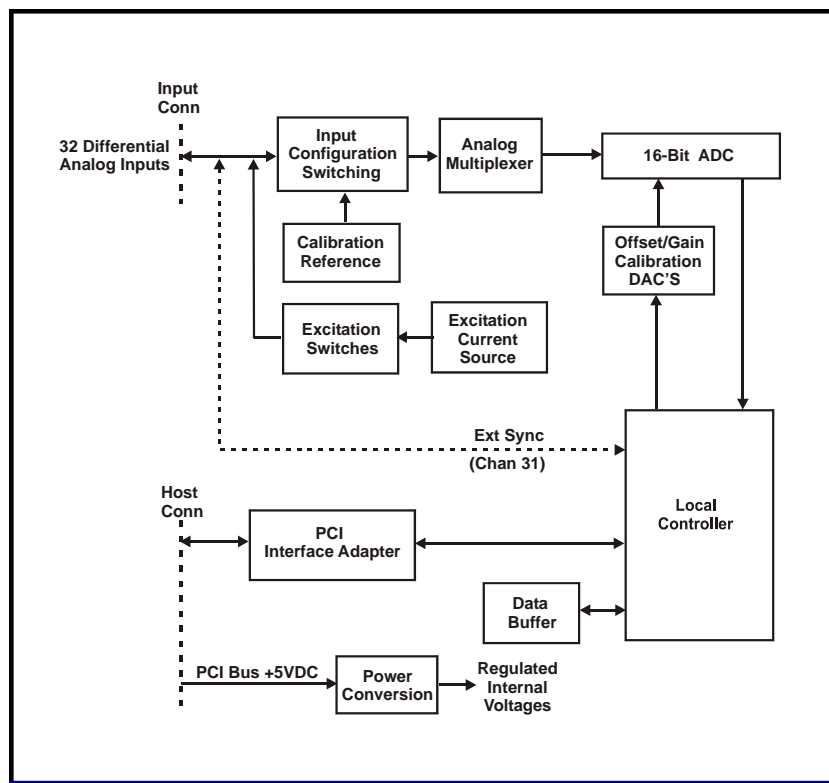

Figure 1. PMC-16AICS32; Functional Organization

This product is functionally compatible with the IEEE PCI local bus specification Revision 2.3, and supports the "plug-n-play" initialization concept. System connections are made at the front panel through a high-density 68-pin connector. Power requirements consist of +5 VDC, in compliance with the PCI specification, and operation over the specified temperature range is achieved with conventional convection cooling.

ELECTRICAL SPECIFICATIONS

At +25 ^{O}C, with specified operating conditions

❑ Input Characteristics:

Configuration:	32 differential or 64 single-ended analog voltage input channels, 32 of which support current excitation for resistance transducers.
Voltage Ranges:	Software configurable as ±10 Volts, ±5 Volts or ±2.5 Volts.
Input Impedance:	20 Megohms input to return, typical at 100 Hz scan rate. Typically 10 Megohms at 1000 Hz scan rate.
Common Mode Rejection:	60 dB typical, DC-60 Hz (Differential inputs)
Common Mode Range:	Same as selected voltage range, with zero normal mode signal (Diff inputs)
Crosstalk Rejection:	85dB channel-to-channel, typical, DC-1.0 kHz, 0-1000 scans per second
Overvoltage Protection:	±25 Volts with power applied *; ±40 Volts with power removed.

 * Channel 31 HI/LO pins are limited to -0.5 to +7.0 Volts when software-configured as alternate TTL Sync-I/O function.

❑ Transfer Characteristics:

Resolution:	16 Bits (0.0015 percent of FSR)
Maximum Sample Rate:	100K samples per second
Maximum Scan Rate:	100K scans per second, divided by number of channels in scan
Channels per scan:	2, 4, 8, 16, 32 differential channels, or 2, 4, 8, 16, 32, 64 single-ended channels, or any single differential or single-ended channel.

DC Accuracy:
(Maximum composite
error after autocalibration)

Range	Midscale Accuracy	±Fullscale Accuracy
±10V	± 3mv	± 4mv
±5V	± 2mv	± 3mv
±2.5V	± 1mv	± 2mv

Integral Nonlinearity:	±0.007 percent of FSR, typical

❑ Excitation Current Source:

Current:	1.000 milliamp source. Optional 0.400, 2, 3, 5 or 10 milliamps.
Accuracy:	±0.04 percent maximum
Compliance:	±10 Volts to 3ma; ±8V to 10ma
Impedance:	50 Megohms minimum to 3ma; 20 Megohms to 10ma
Application:	All HI inputs in differential mode; all even-numbered single-ended inputs.

❑ Analog Input Operating Modes and Controls

Input Data Buffer:	64K-sample FIFO	
Analog Input Modes:	Continuous Scan:	Selected analog inputs are scanned continuously at a rate determined by the internal rate generator.
	Single Scan:	Each scan is initiated either by a software command or by a hardware TTL input.
	Single Channel:	Any single selected channel is sampled continuously
	Selftest:	Autocalibration and Selftest modes

Rate Generator:	Programmable from 0.06 - 100,000 conversions per second. External triggering is available through Channel 31 pins.
Input Data Format:	Selectable as offset binary or as two's complement

PCI INTERFACE

❑ **Compatibility:**   Conforms to PCI Specification 2.3; D32; 33MHz; 3.3V,5V signaling.
Supports "plug-n-play" initialization.
Single multifunction interrupt.
Supports block mode DMA transfers as bus master.

MECHANICAL AND ENVIRONMENTAL SPECIFICATIONS

❑ **Power Requirements**

+5VDC ±0.2 VDC at 0.70 Amp, maximum, 0.50 Amp typical

Power Dissipation:	Typical:	2.1 Watts, Side 1;	0.4 Watt, Side 2.
	Maximum:	3.0 Watts, Side 1;	0.5 Watt, Side 2.

❑ **Physical Characteristics**

Height:	13.5 mm (0.53 in)
Depth:	149.0 mm (5.87 in)
Width:	74.0 mm (2.91 in)
Shield:	Side-1 protected by an EMI shield.

❑ **Environmental Specifications**

Ambient Temperature Range:	Operating: 0 to +65 degrees Celsius inlet air
	Storage: -40 to +85 degrees Celsius
Relative Humidity:	Operating: 0 to 80%, non-condensing
	Storage: 0 to 95%, non-condensing
Altitude:	Operation to 10,000 ft.
Cooling:	Conventional convection cooling; 150 LFPM

ORDERING INFORMATION

Specify the basic product model number followed by an option suffix "-A", as indicated below. For example, model number PMC-16AICS32-2.0 describes a board with an excitation current of 2.000 milliamps.

Optional Parameter	Value	Specify Option As:
Excitation Current	0.400 ma	A = 0.4
	1.000 ma	A = 1.0 or blank
	2.000 ma	A = 2.0
	3.000 ma	A = 3.0
	5.000 ma	A = 5.0
	10.000 ma	A = 10.0

SYSTEM I/O CONNECTIONS

Table 1. System Connector Pin Functions

ROW-A				ROW-B		
	SIGNAL				SIGNAL	
PIN	S.E. MODE	DIFF MODE		PIN	S.E. MODE	DIFF MODE
1	INP00 *	INP00 HI *		1	INP32 *	INP16 HI *
2	INP01	INP00 LO		2	INP33	INP16 LO
3	INP02 *	INP01 HI *		3	INP34 *	INP17 HI *
4	INP03	INP01 LO		4	INP35	INP17 LO
5	INP04 *	INP02 HI *		5	INP36 *	INP18 HI *
6	INP05	INP02 LO		6	INP37	INP18 LO
7	INP06 *	INP03 HI *		7	INP38 *	INP19 HI *
8	INP07	INP03 LO		8	INP39	INP19 LO
9	INP08 *	INP04 HI *		9	INP40 *	INP20 HI *
10	INP09	INP04 LO		10	INP41	INP20 LO
11	INP10 *	INP05 HI *		11	INP42 *	INP21 HI *
12	INP11	INP05 LO		12	INP43	INP21 LO
13	INP12 *	INP06 HI *		13	INP44 *	INP22 HI *
14	INP13	INP06 LO		14	INP45	INP22 LO
15	INP14 *	INP07 HI *		15	INP46 *	INP23 HI *
16	INP15	INP07 LO		16	INP47	INP23 LO
17	AGND	AGND		17	AGND	AGND
18	AGND	AGND		18	AGND	AGND
19	INP16 *	INP08 HI *		19	INP48 *	INP24 HI *
20	INP17	INP08 LO		20	INP49	INP24 LO
21	INP18 *	INP09 HI *		21	INP50 *	INP25 HI *
22	INP19	INP09 LO		22	INP51	INP25 LO
23	INP20 *	INP10 HI *		23	INP52 *	INP26 HI *
24	INP21	INP10 LO		24	INP53	INP26 LO
25	INP22 *	INP11 HI *		25	INP54 *	INP27 HI *
26	INP23	INP11 LO		26	INP55	INP27 LO
27	INP24 *	INP12 HI *		27	INP56 *	INP28 HI *
28	INP25	INP12 LO		28	INP57	INP28 LO
29	INP26 *	INP13 HI *		29	INP58 *	INP29 HI *
30	INP27	INP13 LO		30	INP59	INP29 LO
31	INP28 *	INP14 HI *		31	INP60 *	INP30 HI *
32	INP29	INP14 LO		32	INP61	INP30 LO
33	INP30 *	INP15 HI *		33	INP62/ * SYNC HI **	INP31 HI/ * SYNC HI **
34	INP31	INP15 LO		34	INP63/ SYNC LO**	INP31 LO/ SYNC LO**

  * Selectable as an excitation pin.
 ** Software-selected.
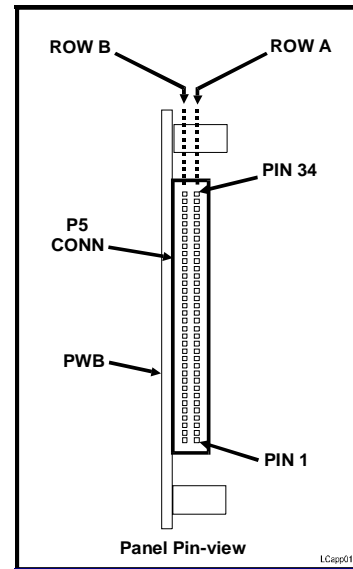
Figure 2. System Input Connector

System Mating Connector:

   68-pin 0.050" Subminiature connector:
   with metal shield:
   AMP #749621-7 or equivalent.

   Board connector (Ref): Amp # 787170-7.