WinSystems®

PC/104 MODULE

PCM-AIO
Low Cost
12-Bit Analog I/O

FEATURES

- Low cost, 12-bit A/D and D/A
- Up to 8 input channels:
  - Each channel configurable for Unipolar (0 to +5V) or Bipolar (-2.5 to +2.5V)
  - Built-in Sample-and-Hold
  - 10uS conversion speed
  - Available with A/D only for lowest cost board
- Two independent analog voltage output channels
  - Output voltage ranges are 0 to +5V and ±5V
- I/O mapped on the PC/104 Bus
- Small size: 3.6" x 3.8"
- Very low power
- Extended temperature range: 0ºC to +65ºC

The PCM-AIO is a multipurpose 12-bit analog input and analog output module. It can serve as a data acquisition and control board for use with PC/104 compatible embedded systems. The analog input is software configurable with either single-ended or differential inputs. Any channel can be configured as unipolar or bipolar for maximum flexibility.

The PCM-AIO module can be ordered without the D/A circuitry to yield the lowest cost A/D function.

The PCM-AIO module also provides two, independent 12-bit analog voltage output channels. Each channel can be configured for one of 2 ranges. Both channels are double buffered and operate in simultaneous update mode.

FUNCTIONAL CAPABILITY

PC/104 Interface - The PCM-AIO is I/O port mapped and requires 12 contiguous addresses.

Analog to Digital Converter - The PCM-AIO uses the Maxim MAX180, 12-bit data acquisition chip. It combines an 8 channel input multiplexer, high bandwidth Track-and-Hold (T/H), low-drift zener reference, and flexible microprocessor interface with a high conversion speed, successive approximation analog to digital converter. The device samples and digitizes in ten microseconds.

The MAX180 can be software configured for unipolar or bipolar operation and single-ended or differential inputs on a per channel basis. Output coding is natural binary for unipolar operation with 1 LSB = 1.22mV (5V/4096). Coding is twos complement for bipolar.

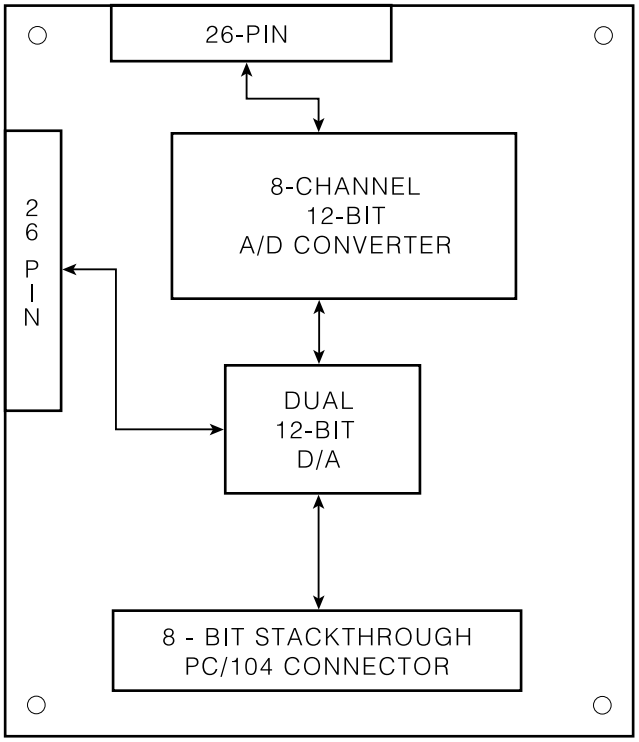
Potentiometers are on the card to permit both gain and offset adjustment.

Starting a Conversion - The conversion is begun by writing a word to the control register to select the channel and specify if it is single-ended/differential and unipolar/bipolar. Output data is latched and the PCM-AIO sets a Busy flag signaling conversion complete. An interrupt request is also generated after each completed conversion. A jumper selects IRQ2 through IRQ7 on the PC/104 bus.

Input Configuration - Each A/D channel is input from a single 26-pin connector. WinSystems offers the CBL-120-3 which is a 3 foot, #28 AWG, ribbon cable designed to provide access to signals from the 26-pin, 0.100" grid connector on the PCM-AIO.

Also available is the CBL-130-4, a 4 foot, ribbon cable, that will connect the PCM-AIO to the Analog-ADP. The Analog-ADP is a non-isolated signal conditioner and termination panel of analog signals for use with WinSystems' A/D converters.

Digital to Analog Converter - The PCM-AIO contains an Analog Devices' AD7537. Two independent 12-bit DACs are on one monolithic chip and configured to provide either unipolar or bipolar outputs. The output range is 0 to +5 or ±5 volts.



PCM-AIO BLOCK DIAGRAM

A two-byte I/O write is required to update the 12-bit D/A. The digital data input section is double buffered to allow simultaneous update of both DAC's. These registers latch the 12-bit digital word and keeps the D/A converter's output constant until it is updated with a new value in one step.

Output Configuration - The D/A output channels are wired to a 26-pin connector. Alternating ground lines, paired with each output channel's signal lines improves noise immunity and reduces cross talk.

SPECIFICATIONS

Electrical
A/D Section
Number of Channels: Up to 8
A/D Resolution: 12-bits
Input range: 0 to +5 volts; single-ended
-2.5 to +2.5 volts; differential
Coding: Natural binary (unipolar)
Two's complement (bipolar)
Nonlinearity: ±1 LSB
Gain error: Adjustable to zero
Conversion speed: 10 microseconds

D/A Section
Number of Channels: 2
D/A Resolution: 12-bits
Coding: Straight binary (unipolar)
Offset binary (bipolar)
Output Voltage Range: 0 to +5V; ±5V @5 mA
Nonlinearity: ±1 LSB
Relative Accuracy: ±1 LSB
Output Settling Time: 5 uS

Power Requirements:
+5 VDC ±5% at 30 mA (typ.)
-12VDC ±10% at 25 mA (typ.)

Mechanical
Dimensions: 3.6" x 3.8" (90mm x 96mm)

Connectors
A/D Input: 26-pin dual on 0.100" grid
D/A Output: 26-pin dual on 0.100" grid

Environmental
Operational Temperature: 0ºC to +65ºC

ORDERING INFORMATION

PCM-AIO	12-bit, A/D and D/A PC/104 module
PCM-AIO-80	12-bit A/D PC/104 module (no D/A)
CBL-120-3	3 ft., 26 conductor ribbon cable with one unterminated end
CBL-130-4	4 ft., 26 conductor, ribbon cable to the Analog-ADP card
Analog-ADP	Analog termination panel

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