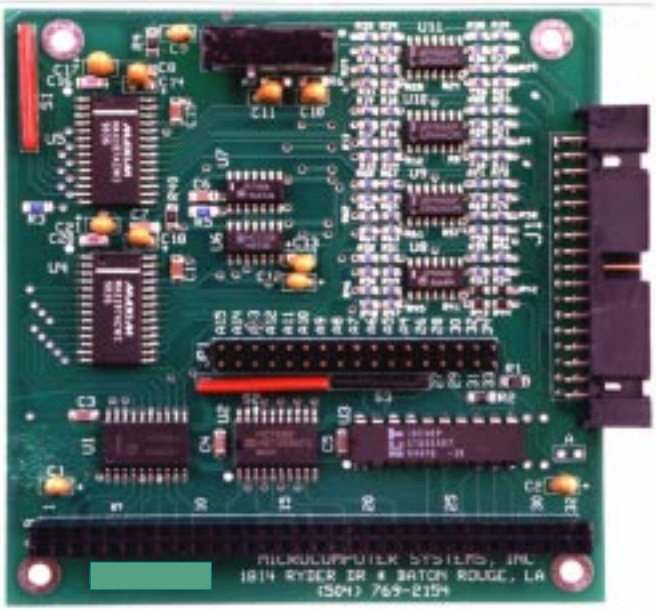
MSI PC/104
Embedded PC Series

MSI-P414 ANALOG INPUT CARD

FEATURES

- Up to 16 analog input channels, low cost, high performance.
- 12-bit resolution, ±1/2 LSB linearity.
- Software selectable input ranges of 0-5V, 0-10V, ±5V, ±10V, 0-20 mA (with MSI-P910) requiring no jumper selections.
- Input Impedance 1 MΩ (up to 1 GΩ available).
- Single +5V operation.
- 12 us total conversion time for a 83 ksps rate for each 8 channels (166 ksps for 16 channels).
- Two programmable power down modes .
- 8-bit stackthrough PC/104 with I/O mapped 16-bit addressing.
- Jumper selectable address and interrupt options.
- Operating temperature range -40° C to 85° C.
- Two-year warranty from date of shipment.

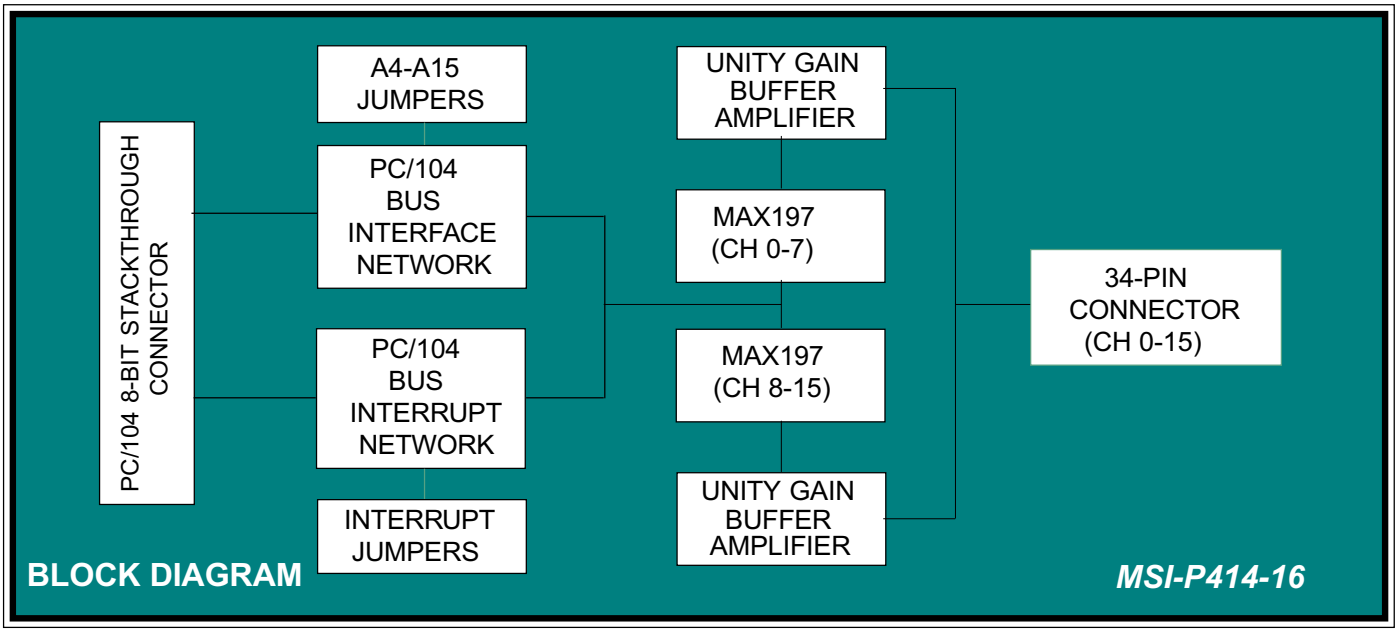


DESCRIPTION

The MSI-P414 is a low cost, high performance 12-bit analog input card designed for use with all PC/104 embedded systems. Two models provide input capacities of 8 or 16 channels which operate from a single +5V supply. Software programmable input ranges are 0-5V, 0-10V, ±5V and ±10V with a linearity of 1/2 LSB. In addition, a fault condition on any channel will not effect the conversion result on the selected channel.

A/D Converters - The card employs up to two MAX197 eight-channel A/D converters that incorporate a precision 2.5V reference source with buffer amp, an internal 1.56 MHz clock, and successive approximation and internal input track/hold circuitry to convert the analog signal

(over)



of each channel into a 12-bit digital signal. Low span and offset errors result in no adjustments being required for these functions. Typical total conversion times of 12 us gives a sample rate of 83 ksps for each group of eight channels yielding rates up to 166 ksps for 16 input channels.

Card Addressing - The card is I/O mapped using 16-bit addressing to select the input channels and device status. Option jumpers are provided for specifying the card **base** address (A4 - A15). The address of the control word/ input data (C/I) and status for each channel is

Channels	C/I Address	Status Address
0-7	base + 0 (lo) base + 1 (hi)	base + 8 (bit 0)
8-15	base + 2 (lo) base + 3 (hi)	base + 8 (bit 1)
16-23	base + 4 (lo) base + 5 (hi)	base + 8 (bit 2)
24-31	base + 6 (lo) base + 7 (hi)	base + 8 (bit 3)

Interrupts - Interrupt processing is provided for IRQ4 thru IRQ7 and IRQ9 using options jumpers.

Programming - Performing conversions is very simple. A control byte is written to the desired channel group lo byte specifying the channel within the group (bits 0-2), input range (bit 3), polarity (bit 4), mode (bit 5), and the clock and power down selection (bits 6-7). The status bit of the channel group indicates when the conversion is complete. The data is then read, D0-D7 at the lo address of the channel group and D8-D11 at the hi address of the channel group, bits 0-3. The read operation can be performed under software polling or by using interrupt processing.

SPECIFICATIONS

PC/104 8-bit, stackthrough

Analog Inputs

Channels	8 to 16 in groups of 8
Converter	MAXIM MAX197
Input Ranges	0-5V, 0-10V, ±5V, ±10V 0-20 mA with MSI-P910
Resolution	12 bits
Conversion Rate	82 ksps per 8 channels
Non-linearity	±1/2 LSB
Offset Error	< 0.5% Span
Gain Error	< 0.5% Span
Signal-to-Noise	70 dB min
Input Resistance	1 MΩ (with SIPs S4 & S5) 1GΩ (SIPs S4 & S5 removed)

Internal Reference

Ref Out Voltage	4.096 V ±1.5% max.
Temp. Coeff.	40 ppm/°C

Connectors

MSI-P414-8	One (1) 3M 30316-5002 or eq. (16-pin)
MSI-P414-16	One (1) 3M 30334-5002 or eq. (34-pin)

Interrupts

Channels	One, sharing with tri-state buffer for IRQ4-7, 9

Option Jumpers .025" square posts, 0.1" grid

Electrical & Environmental

+5V @ 70 mA typical
-40° to 85°C

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