MSI STD BUS
Embedded Series
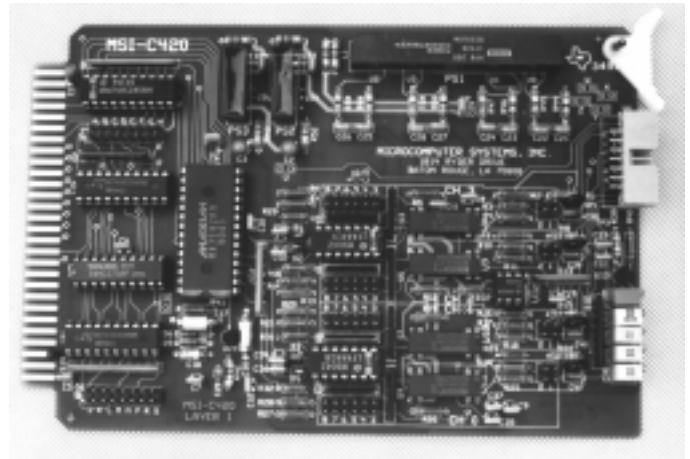
MSI-C420P ISOLATED ANALOG INPUT CARD

APPLICATIONS

♦ Isolation of analog inputs for signal processing in harsh industrial environments.

♦ Elimination of troublesome ground loops associated with analog signal inputs.

♦ Protection of monitoring equipment from electrical surges and large common-mode voltages.

♦ Excitation of transducer transmitters for thermocouple, RTD, and strain gauge inputs.

♦ RTU, SCADA, and data monitoring for all STD BUS systems.

DESCRIPTION

The MSI-C420P isolated analog input card is designed for acquiring analog data in harsh electrical environments with all STD BUS systems. The unit is particularly useful in RTU, SCADA, and monitoring and control applications. Commonly encountered ground loop currents and voltages and large common-mode voltages associated with industrial monitoring applications are eliminated by onboard circuitry. The unit is implemented on a 4-layer card using low-power CMOS components for operating in a temperature range from -25° C to 85° C.

The card provides four isolated input channels by utilizing individual onboard dc-to-dc converters for powering isolation amplifiers of each channel. These power converters also are designed to source 20 mA at a minimum of 12 VDC for exciting transducer transmitters such as thermocouple, RTD, and strain gauge sensors for temperature, pressure, level, flow, weight, etc. measurements. Seven commonly used input voltage and current ranges are individually jumper selectable with a span and zero potentiometer adjustments. A 4-channel successive approximation analog converter provides data to the computer.

Card addresses are switch selectable in the hexadecimal ranges of 0 to FF for 8-bit I/O mapped addresses (the original STD BUS

FEATURES

♦ Four isolated 12-bit differential analog input channels.

♦ Conversion accuracy of ±1 LSB.

♦ Selectable input ranges of 0-20 mA, 4-20 mA, 0-1V, 0-5V, 0-10V, ±5V and ±10V.

♦ Active 20 mA inputs for powering transducer transmitters.

♦ Conversion rate of 6,000 samples per second.

♦ Isolation voltage of 750V from input-to-input and input-to-STD BUS.

♦ Maximum overvoltage of 100V with surge protection on all inputs.

♦ Isolation-mode rejection (IMR) of 140 dB @ 60 Hz.

♦ Operating temperature range -25°C to 85°C.

♦ Simple software sequences for data input.

♦ Low power CMOS design using a standard size STD BUS 4-layer printed circuit board.

♦ 100% testing and 48-hour burn-in.

♦ One-year warranty from date of shipment.

configuration) or 0 to FFFF for 16-bit I/O mapped addresses. Analog inputs are provided via a Phoenix MSTB 2,5/9-GF pluggable terminal block which simplifies installation and maintenance procedures. Complete hardware documentation with schematics are supplied with the *MSI-C420P User's Manual.*

SOFTWARE

The software drivers required for processing input data are simple sequences producing a start conversion command, a status check command, and a read data command. These sequences can be implemented under interrupt control if desired. The start conversion command is a write to the channel LO register. When a ready status of 0 is present in bit 7 of the channel HI register, data is read from the channel HI register (bits 11 thru 8, most significant bits) and the channel LO register (bits 7 thru 0). The register addresses are

Channel	LO Reg Addr	HI Reg Addr
0	base	base+1
1	base+2	base+3
2	base+4	base+5
3	base+6	base+7

where base is the card address selected by the card address option jumpers. A sample BASIC program for data input at hexadecimal card address 300 is

```
100  BASE=&H300           'set Base
110  FOR 1=0 TO 3         'select chan I
120  OUT BASE+2*1,0       'start convert
130  A=INP(BASE+2*1+1)    'input status
140  IF A>&H7F THEN GOTO 130  'READY?
150  IDATA(l)=(A AND &HF)*256+INP(BASE+2*l)
160  NEXT I
```

Sample programs for assembly language and 'C' compilers are given in the *MSI-C420P User's Manual.*

SPECIFICATIONS

Analog Inputs

Channels	4 Differential Input
Converter Type	12-Bit Successive Approximation
Accuracy	±1 LSB
Conversion Rate	6000 cps maximum
Isolation Voltage	750V Input-to-Input
	750V Input-to-STD Bus
Maximum Overvoltage	100V
Isolation-mode Rejection (IMR)	140 dB @ 60 Hz
Coding	Binary
Input Ranges	0-20 mA, 4-20 mA, 0-1V, 0-5V, 0-10V, ±5V, and ±10V
Surge Suppressor	Varistor/capacitor with series resistor.

Power Consumption

+5V @ 600 mA maximum
      @ 475 mA typical
Add 75 mA for each input channel selected to source 20 mA for exciting an input transducer.

Environmental

Operating Temperature -25° C to 85° C.

Physical Parameters

Size	6.5" x 4.5"
Input Connector	Phoenix MSTB 2,5/9-GF