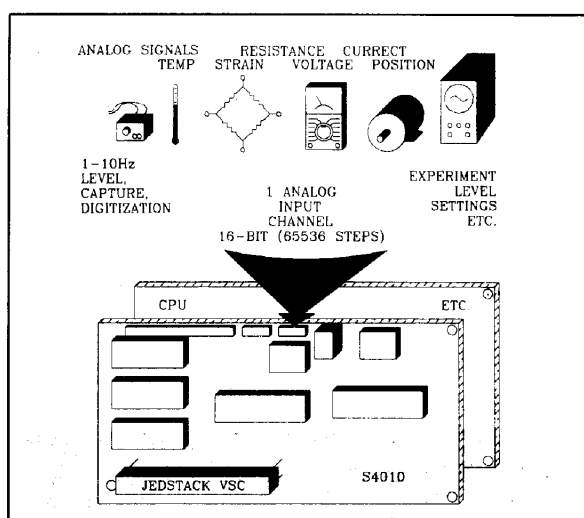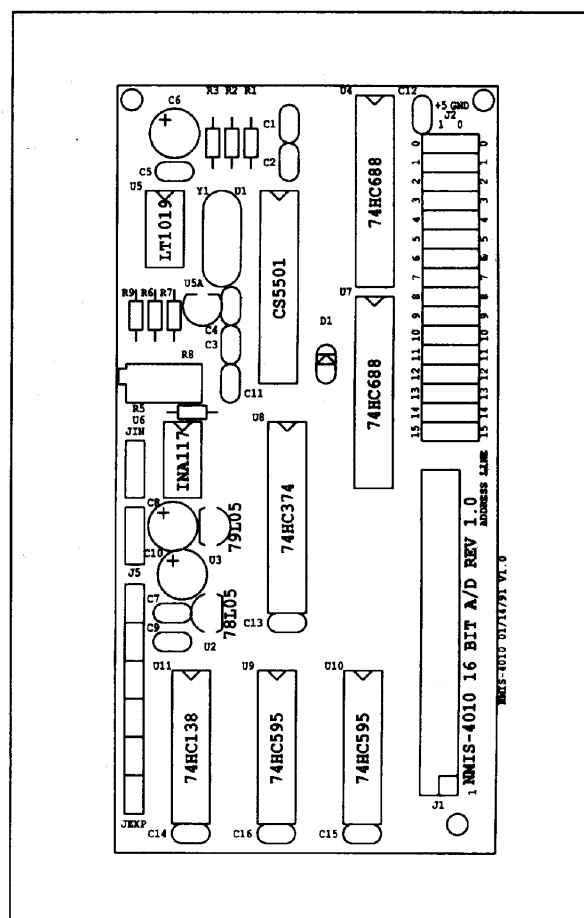# NMIS-4010 16-BIT ADC CARD

The NMIS-4010 Analog-to-Digital Converter Card, in 2x4"s™ format, provides a JEDSTACK™ computer system with a single, 16-bit channel of Analog-to-Digital input. It is ideal for measuring low-frequency signals (10 Hz) representing physical, chemical and biological processes. The Crystal CS5501 Analog-to-Digital Converter chip, or its equivalent, is used. The Burr-Brown INA117 is used as an input device. It can buffer small signals in the presence of common mode signals up to +/-200V. This gives the functionality of isolation amplifiers and isolated input-side power supplies without the high cost normally associated with them.

FEATURES

- True 16-bit A/D
  (Stable readings in all 16 bit positions!)

- +/- 2.5V differential input range

- 4000 Readings/Second

- 6-Pole, Low-Pass Gausian Filter
  10Hz corner frequency

- 400K ohms impedance differential inputs

- 200V operating common-mode input range

- 500V input protection (momentary)

- .003% linearity, 0 to 70° C,
  (optional configuration .0015%, -40 to +85° C)

- Software selectable Uniploar/Bipolar ranges

- System autocalibration capability

- Low power operation, and sleep mode

- Wide supply input range: +/-7V to +/-18V

A Vertical Stacking Connector in the lower right hand corner (top view) provides connections to the processor's address and data bus, control signals, 5V power and ground. Address decoding of the Analog-to-Digital Converter's space in memory is accomplished by two octal comparators and 16 two-position jumpers. Each jumper setting corresponds to the state of a particular address line. The NMIS-4010 occupies two addresses. Any 2-byte boundary in the 64K address space of the JEDSTACK™ bus can be selected by correct jumper placement.

Application

DESCRIPTION

The NMIS-4010 A/D card is designed to stack on the 2x4"s™ NMIS Series, the "100 Squared"™ NMIX and the "Generic Target Computer"™ NMIT Series (with the Vertical Stacking Connector added to the latter) of single board computers. The JEDSTACK™ provides the interface signals to the board including address lines, data lines, control lines and 5V power and ground. Discrete logic provides serial to parallel conversion to allow the processor to access and control the A/D. The fast HC logic allows 90nS access times.

The analog input is buffered by the INA117. The INA117 is a precision unity-gain differentail amplifier with very high common-mode input voltage range. It can accurately measure small differential voltages in the presence of common-mode signals up to +/-200 V. The INA117 inputs are protected from momentary common-mode or differential overloads up to +/-500 V.

In many applications where galvanic isolation is not essential, the INA117 allows the NMIS-4010 to be used, without isolation amplifiers. This also eliminates the need for costly input-side isolation power supplies and their associated noise and quiescent current. The INA117 features 0.001% linearity, and 200KHz bandwidth. Its output feeds the CS5501 input directly.

The CS5501 is a 16-bit A/D Converter which uses sigma delta conversion techniques. The analog input is continuously sampled by an analog modulator whose mean output duty cycle is proportional to the input signal. The modulator output is processed by an on-chip digital filter with a 6-pole Gaussian response, which updates the output data register with 16-bit binary words at a 4 kHz rate. The sampling rate, filter corner frequency and output rate are set by a master clock input, controlled by a 4 MHz crystal and the on-chip osicator.

The inherent linearity of the A/D Converter is excellent, and end-point accuracy is ensured by self-calibration of zero and full-scale, which may be initiate at any time. The self calibration scheme can also be extended to null system offset and gain errors in the input channel. A precision reference is provied to the CS5501 by a LT1019C-2.5. It has a stability of 20 ppm (typ.).

The NMIS-4010 takes its digital +5V from the processor bus (6 mA typ. in operation). An external analog +/-V of 7 to 18V (7mA typ.) must be provided. These feed the INA117 directly, and the CS5501 through on-board +/-5V regulators.

BIT	FUNCTION
0	CALIBRATE
1	BIPOLAR/UNIPOLAR
2	SC2 (SYSTEM CALIBRATION MODE)
3	SC1 (SYSTEM CALIBRATION MODE)
4	SLEEP
5	CHIP ENABLE
6	NOT USED
7	NOT USED

Control Register

ADDRESS	READ	WRITE
XXX0	DATA MSB	CONTROL REG.
XXX1	DATA LSB	NOT USED

Register Summary

NEW MICROS, INC.
1601 Chalk Hill Road
Dallas, Texas 75212
Tel: (214)-339-2204