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RC 4000 PERIPHERAL DEVICES

AIC 402, ANALOG INPUT CONTROLLER

PRELIMINARY SPECIFICATIONS

KEY: General Manual.

ABSTRACT: This report describes the logical structure of the AIC 402, ANALOG INPUT CONTROLLER when used as ANALOG INPUT UNIT in connection with the RC 4000 Computer.

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1. MAIN CHARACTERISTICS

The AIC 402 Analog Input Controller is connected to the low-speed data channel by means of a buffer register.
It selects the requested analog input channel within maximum 1024 channels by means of an analog multiplexer, and converts the analog data to digital form by means of a 12-bit A/D-converter. Additionally, it selects the requested analog input range, within maximum 4 fixed ranges, simultaneously with the channel selection. The ranges are expressed in voltage and can be from 10 millivolts to 10 volts bipolar, according to customer requirements.
AIC 402 will always be under remote control.

2. COMMANDS

For the AIC 402 device the control command and the sense command are available. The value of the modifier-field, bit 18:21 in the effective address of the i/o-instruction, is irrelevant as it has no influence on the operation of the device.

2.1. Control Command.

A control command initiates an analog input operation during which the device is not ready. During the execution of the control command the contents of the working register is transferred to the device buffer register and the value is interpreted as follows:

Bit (0:11): Irrelevant.
Bit (12,13): Analog range field where
Bit (12,13) = 00 selects range No. 0 (lowest range)
Bit (12,13) = 01 selects range No. 1
Bit (12,13) = 10 selects range No. 2
Bit (12,13) = 11 selects range No. 3 (highest range)
Bit (14:23): Analog input channel address (integers 0-1023).

The range and channel selection takes place immediately after the transfer of control information, and maximum 45 milliseconds later the analog input operation is finished. At this time the device changes from busy to ready.

2.2. Sense Command, Status, Interrupt.

When an analog input operation is not in progress, a status and data word may be transferred from the buffer register to a working register by means of a sense command.

The contents of the buffer register has the following meaning:

Bit (0): Not used (= 0).

Bit (1): Parity error.

Bit (2:11): Not used (= 0).

Bit (12:23): Converted analog value (A/D value).

Converted analog value is given as a signed integer where the numerical value 2048 corresponds to a full scale analog input signal.

Parity error = 1 if an overload condition has been present during the preceding analog input operation.

When an overload condition occurs, it may not be possible to achieve valid A/D values within the following 50 milliseconds. Due to this a 50-millisecond timer in the device is started as soon as an overload is detected. This time interval is terminated by an interrupt signal, indicating that the device is available for valid analog input operations.

Further when the device changes from busy to ready condition an interrupt signal is generated at the same interrupt input as used for the overload timer.