

I/A Series[®] Remote Terminal Unit (RTU) C50 Analog/Digital Input Module



The C50 Analog/Digital Input Module provides powerful data collection and input monitoring facilities through 32 individually configured digital inputs and 4 x 12 bit analog input sources.

FEATURES

- Removable plug-connected termination board allows the logic card to be removed without disconnecting the field wiring
- Scaling resistors that use screw type terminals and are on the field side of isolation links
- Digital inputs are software configurable as Status, Momentary Change Detect (MCD), 12/24 bit Accumulator, Sequence of Events (SOE), or a combination of these

- Optical isolation on all digital inputs
- Zero and full scale voltage checks on Analog/ Digital Converter (ADC) with offset compensation
- Common voltage inputs (+V_E or -V_E) are selectable in groups of eight digital inputs
- Incorporates digital input bounce elimination circuitry with a chatter filter
- Each input link has a disconnect link with test points



Module Description

The digital input subsystem processes all contact type inputs to the C50 RTU as shown in Figure 1. The module optically isolates, filters, and protects against surge transients; it also interfaces the contact information to the onboard microprocessor.

All digital input circuits employ contact bounce elimination circuitry, which rejects noisy contact transitions until the input signal has been stable for a period of 2 msec.

The analog input subsystem performs the data sampling and processing for all analog input points. The module provides protection against surge transients and noise, delivering a multiplexed sample to the Analog/Digital Converter (ADC).

Digital Inputs

The digital inputs are grouped into four groups of eight, with a common terminal for each group. Each group accepts common positive or common negative. Digital inputs are scanned once every millisecond and may be time tagged for Sequence of Events (SOE) processing if required. Each of the digital inputs may be individually configured as Accumulators, Momentary Change Detection (MCD) inputs, Status inputs, or a combination of these. Digital input types may be intermixed within a module.

Analog Inputs

The analog input subsystem consists of a multiplexer, amplifier and an Analog/Digital Converter (ADC). The circuitry provides a multiplexed sample to the ADC, which converts the signal to a 12-bit word. These results are then stored in shared memory for access by the Master Processor Module via the Electrobus interface.

Automatic zero drift correction is provided by the onboard microprocessor. Zero and full scale voltage references are available as internal database points, enabling access by the Master Station.



Figure 1. C50 Analog/Digital Input Module Functional Block Diagram

Fault Diagnosis

All cables are terminated on the front panel of the unit providing quick access for diagnosis and repair. Test points are provided on each side of the isolation links and a **RUN/FAIL** LED, as shown in Figure 2, is provided on the front panel of each module to simplify troubleshooting. The operating conditions of the module is reported to the Master Processor for remote/local diagnosis via system database alarm points.

ORDERING INFORMATION		
Field Interrogation Power Supply (FIPS)	Part Number	Description
24 V	0303363	24 V Digital Input Logic Board
24 V	0303313	24/48 V dc Termination Board
48 V	0303362	48 V Digital Input Logic Board
48 V	0303313	24/48 V dc Termination Board
129 V	0303361	129 V Digital Input Logic Board
129 V	0303379	129 V dc Termination Board
	1050020	Firmware

θ θ RUN/FAIL 1D1 0. 1d2 1D3 1D4 1D5 1D6 1D7 1D8 1COM 2D1 2d2 2D3 2D4 2D5 2D6 2D7 2D8 2COM 3D1 3d2 3D3 3D4 3D5 3D6 3D7 3D8 3COM 4D1 4d2 4D3 4D4 4D5 4D6 4D7 4D8 4COM A1+ A7-A2· A2· 0. A3+ A3 A4+ •••• A4-SHIELD θ

NOTE

Firmware must be separately ordered and installed.

Figure 2. Front Panel

PHYSICAL SPECIFICATION

Overall Unit

PHYSICAL SIZE

Logic/termination combination 233 mm x 160 mm Termination board 263 mm x 71 mm

ENVIRONMENTAL SPECIFICATIONS

Ambient Temperature

0°C to 60°C (optional -20°C to 60°C)

Humidity 10% to 95% RH (non-condensing)

FUNCTIONAL SPECIFICATIONS

Power Requirements

Processor Type

Bus Interface

Electrobus

Z80 interfaces to Electrobus via shared RAM

+5 V @ 420 mA +15 V @ 10 mA -15 V @ 15 mA

FUNCTIONAL SPECIFICATIONS (CONT.)

Analog Inputs

MULTIPLEXER Solid State NUMBER OF CHANNELS 4x analog field inputs 2x internal check analog inputs 32x digital input INPUT CIRCUITS 32/module in four groups of eight inputs ADC TYPE Dual Slope RESOLUTION 12 bits + sign CONVERSION SPEED 80 msec/channel MAXIMUM DATA AGE 600 msec **INPUT SIGNAL RANGE** ±1 V or 0 to 2 V dc FULL SCALE RANGE ±2000 counts (overrange ±2047 counts) or +4000 counts (overrange +4095 counts) COMMON MODE ERROR 0.01% per V to a maximum of ±6 V **TEMPERATURE ERROR** 0.0016% per °C (0°C to 60°C) MAXIMUM ERROR ±0.25% over full common mode and temperature range DIFFERENTIAL MODE VOLTAGE ±50 V dc or peak ac without damage DIFFERENTIAL MODE REJECTION 50 dB minimum @ 50 Hz COMMON MODE REJECTION 80 dB @ 6 V peak, dc to 50 Hz, @ 1 Kohm impedance unbalance **REFERENCE VOLTAGES** Zero volts and full scale positive (+1 V)

The Foxboro Company

33 Commercial Street Foxboro, Massachusetts 02035-2099 United States of America <u>http://www.foxboro.com</u> Inside U.S.: 1-508-543-8750 or 1-888-FOXBORO (1-888-369-2676) Outside U.S.: Contact your local Foxboro Representative.

MAXIMUM COMMON MODE VOLTAGE

Operating within Specification ±6 V dc or peak ac

Without Damage ±50 V dc or peak ac

TRANSIENT PROTECTION Meets IEEE Std 472-1974; ANSI C37.90.1-1974; IEC 255-4 Class 3

Digital Inputs

INPUT TYPES

Status

- Momentary Change Detection (MCD)
- Sequence of Events (SOE)
- Accumulator (12- or 24-bit)

NOTE

Maximum input frequency 200 Hz. Each input can be configured for any input type.

BOUNCE ELIMINATOR CIRCUIT

Eliminates any input bounce < 2 msec; further filtering in firmware ensures only valid pulses of definable widths are processed

CIRCUIT TYPES

Common return per group of eight to be used as common positive or common negative

INPUT VOLTAGE

24 V, 48 V, or 129 V dc input modules available; field interrogation supply is externally sourced INPUT CURRENT

5 mA

ISOLATION TYPE

Optocoupler

INSULATION

2 kV rms for 1 minute input to ground, with surge suppression devices isolated from ground for test TRANSIENT PROTECTION

Meets IEEE Std 472-1974; ANSI C37.90a-1974; IEC 255-4 Class 3; IEC 255-22-4; IEC 801-4 Chatter filter per point to eliminate oscillating alarms

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