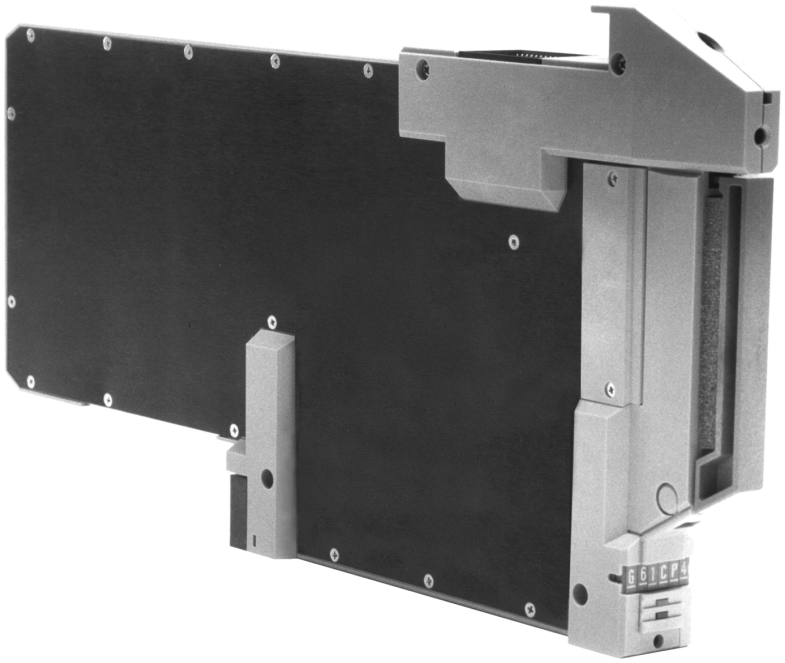
FOXBORO®

PSS 21H-7G4 B3

I/A Series® Hardware
Integrator 30, Style B for Modbus™ Devices



The I/A Series Integrator 30, Style B for Modbus devices is an optionally fault-tolerant station in the I/A Series system. It allows the integration of data from third-party Modbus-compatible devices into I/A Series databases so that the data may be accessed by standard I/A Series control blocks.

Devices with which the Integrator 30 can successfully communicate are those which support Modbus protocol. These devices must support the appropriate Modbus function codes from the list in Table 1, and operate in the Modicon™ Remote Terminal Unit (RTU) mode.

The Integrator 30 can communicate with any of AEG Schneider Automation's programmable controllers that have a Modbus port, such as the Modicon 484, 584, and 984 products.

It can also interface with Triconex™ Safety Systems and the Foxboro C50 Remote Terminal Unit (RTU).

Table 1. Modbus Protocol Function Codes

Function Code	Description
1	Read Coil Status
2	Read Input Status
3	Read Holding Registers
4	Read Input Registers
5	Force Single Coil
6	Preset Single Register
8	Loopback Diagnostic Test
15	Force Multiple Coils
16	Preset Multiple Registers
20	Read General Reference
21	Write General Reference

The Integrator 30 interfaces to the Modbus via direct connection to a Device or via Modbus modems using an RS-232-C compatible port. See Figure 1. Optionally, a hot spare port is available.

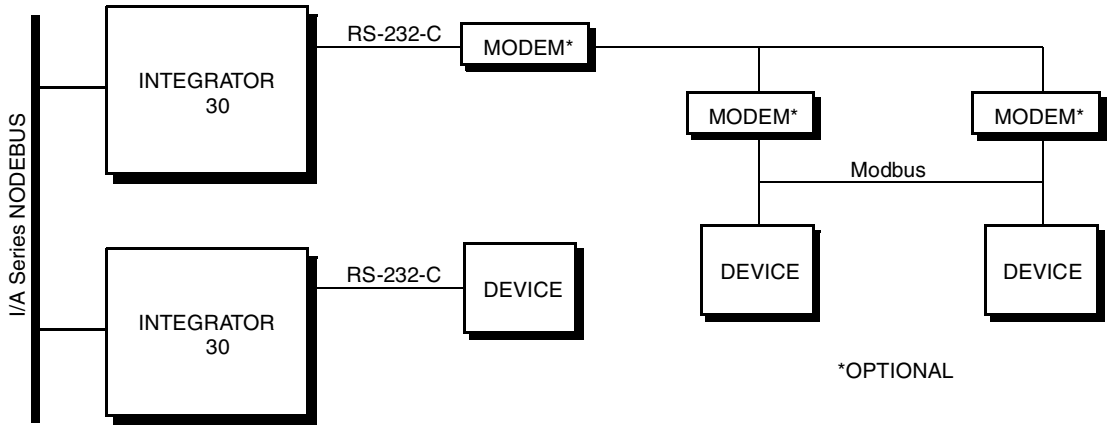


Figure 1. Typical Integrator 30 Configurations

Features of the Integrator 30 include:

- High performance interface to Modbus devices
- Optional fault-tolerant configuration
- Utilization of standard I/A Series Communication Processor 30 hardware
- Support for the following standard I/A Series block types:

AIN	DEP	MON
ALMPRI	EXC	MOVLV
AOUT	GDEV	MTR
BLNALM	IND	PATALM
CALC	MAIN	REALM
CHARC	MCIN	TIM
CIN	MCOUT	VLV
COUT		

- A special block, MDSCAN, which is used to define the devices I/O point specifications for a compound. Only one MDSCAN block may reside in a compound to access points from any one device. The actual number of points accessed is dependent on the block's scan rate, the configuration of the compound, and the communication limit of the device. A maximum of 256 bytes can be read.
- Support for standard I/A Series alarm functions.
- Message Pass-Through (MPT) function which provides an interface for application programs to communicate with the Modbus Plus device via standard I/A Series interprocess communication (IPC) connected services. Any message that is understood by the target device can be sent using MPT. This includes reading and writing data, and downloading programs to the device or getting status information from the device. The peer processor provides CRC error checking at the link layer. All other error checking and handling must be done by the application program.

OPERATIONS

The Integrator 30 communicates with devices via RS-232-C serial data link communication in the Modbus RTU (Remote Terminal Unit) format. The Integrator 30 is able to access coil data (0XXXX), contact data (1XXXX), input registers (3XXXX), or output registers (4XXXX) of a device.

The Integrator 30 collects the required data from the devices, performs the necessary conversions, and then stores the converted data in its control database for incorporation into the I/A Series based plant management functions and operator displays. Data may also be written out to the individual devices from the I/A Series network.

System Management Support

The System Health displays for the Integrator 30 appear in a format similar to that of the control processor, so that the displays present the Integrator 30 as a control processor and the devices as Fieldbus Modules (FBMs). The system engineer/operator can use the System Health displays to disconnect a failed device or to restore communications to one that had failed.

Alarm Functions

The Integrator 30 fully supports I/A Series alarm functions. Standard I/A Series alarm processing is applied to data read from devices and alarms reported to the I/A Series operator via the alarm logging devices as configured in the compound/block database. All alarms are acknowledged from specific I/A Series displays. To allow for the dynamic suppression of selected alarms from the I/A Series workstation, the priorities and inhibit parameters of alarms are specified during block configuration.

PACKAGING AND ARCHITECTURE

The Modicon Integrator 30 is packaged as a single width Z-Module which, when installed in an I/A Series mounting structure, connects to the mounting structure bus and accesses the Nodebus. Modbus interface module connections are made via cable connectors secured to the top or bottom of the mounting structure that houses the Integrator module. The Integrator hardware architecture consists of the following elements:

- Multiple processors
- Dynamic RAM
- Nodebus interface
- Two interface I/O ports compatible with EIA RS-423/RS-232-C.

For enhanced reliability during maintenance operations, the Integrator 30 is equipped with a recessed reset button located at the front of the module. This feature permits switching module power off and on (manually) (for maintenance purposes) without removing the module from the enclosure.

Enhanced Reliability

The Integrator 30 offers optional fault tolerance for enhanced reliability. The fault-tolerant configuration consists of two modules operating in parallel with two separate connections to the Nodebus and to the device(s). See Figure 2.

The two processor modules, married together as a fault-tolerant pair, are designed to provide continued operation in the event of virtually any hardware failure occurring within one module of the pair. Both modules receive and process information simultaneously, and faults are detected by the modules themselves.

One of the significant methods of fault detection is comparison of communication messages at the module external interfaces. Upon detection of a fault, self-diagnostics are run on both modules to determine which module is defective. The non-defective module then assumes control without affecting normal system operations.

To further ensure reliable communication, the fault-tolerant processor performs error detection and address verification tests in its Nodebus interfaces.

DIAGNOSTICS

The Integrator uses three types of diagnostic tests to detect and/or isolate faults:

- Power-up self-checks
- Run-time and watchdog timer checks
- Off-line diagnostics.

Power-up self-checks are initiated when power is applied to the Integrator. These checks perform sequential tests on various Integrator functional elements. Red and green indicators at the front of the Integrator module reflect the successful (or unsuccessful) completion of the various phases of the startup sequence.

The run-time and watchdog timer checks provide continuous monitoring of Integrator functions during normal system operations. The operator is informed of a malfunction by a printed or displayed system message.

Off-line diagnostics are run for the purpose of performing comprehensive tests and checks on various system station components.

By using the off-line diagnostics, the operator is able to isolate and/or confirm a suspected fault in the Integrator.

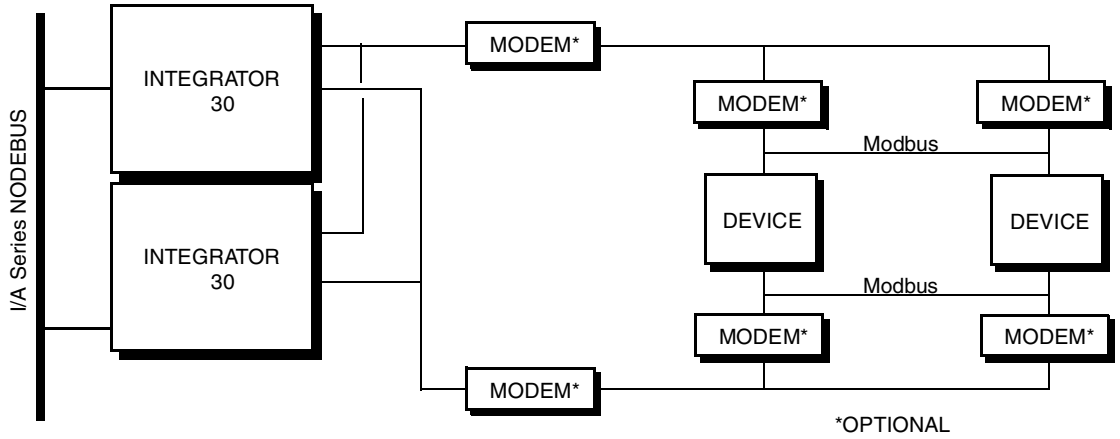


Figure 2. Integrator 30 Fault-Tolerant Redundant Cabling Configuration

FUNCTIONAL SPECIFICATIONS

Processor Type
Refer to PSS 21H-7G9 B3

Memory
Refer to PSS 21H-7G9 B3

Number of Configurable MDSCAN Blocks
Up to 64 MDSCAN blocks with up to 256 bytes of data (2048 coil/contact values for 128 registers) per block

Basic Processing Cycle (BPC)
0.5, 1, 2, 4, 8, 16, 32, 64, 256, 512, or 1024 seconds selectable at system configuration time.

I/O Communications
TYPE
Two RS-232-C (asynchronous) ports.
TRANSMISSION RATE
Asynchronous I/O port at up to 19.2 K baud.
PROTOCOL CAPABILITY
Asynchronous 5 to 8 bit characters; odd, even, or no parity, 1 or 2 stop bits.
I/O CAPACITY
Up to 64 devices, maximum (number of actual devices is device performance dependent).

Database Sizing
To calculate the size of the database in the Integrator, use *Control Processor Sizing Spreadsheet* for standard I/A Series control blocks. Use only the Integrator's specific control blocks listed in the paragraph "I/A Series Control Blocks" on page 8 to calculate the database size.
INTEGRATOR 30
Use the CP30 guidelines for standard I/A Series control blocks and add the MDSCAN and ECB block equivalent, as listed below, to obtain the total database size. Recommended maximum database size is 300 block equivalents.

Block Type	Block Equivalent
MDSCAN	1.31 (=2)
ECB16	1.39 (=2)

Other factors affecting Integrators' compound/block performance are the number of WPs and AWs accessing Integrator's compound/block data and the number and type of peer-to-peer connections.

C50 Remote Terminal Unit (RTU) I/O Points
Up to 500 input/output points.

Block Loading
Multiple compounds may be configured to run in a single phase, but the I/O load should be kept under 75% as shown by the Station block display. The number of block equivalents executing per second should not exceed 300. If either limit is exceeded, BPC overruns may occur.

ENVIRONMENTAL SPECIFICATIONS

Refer to PSS 21H-7G9 B3.

PHYSICAL SPECIFICATIONS

Refer to PSS 21H-7G9 B3.

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