Foxboro Evo™ Process Automation System

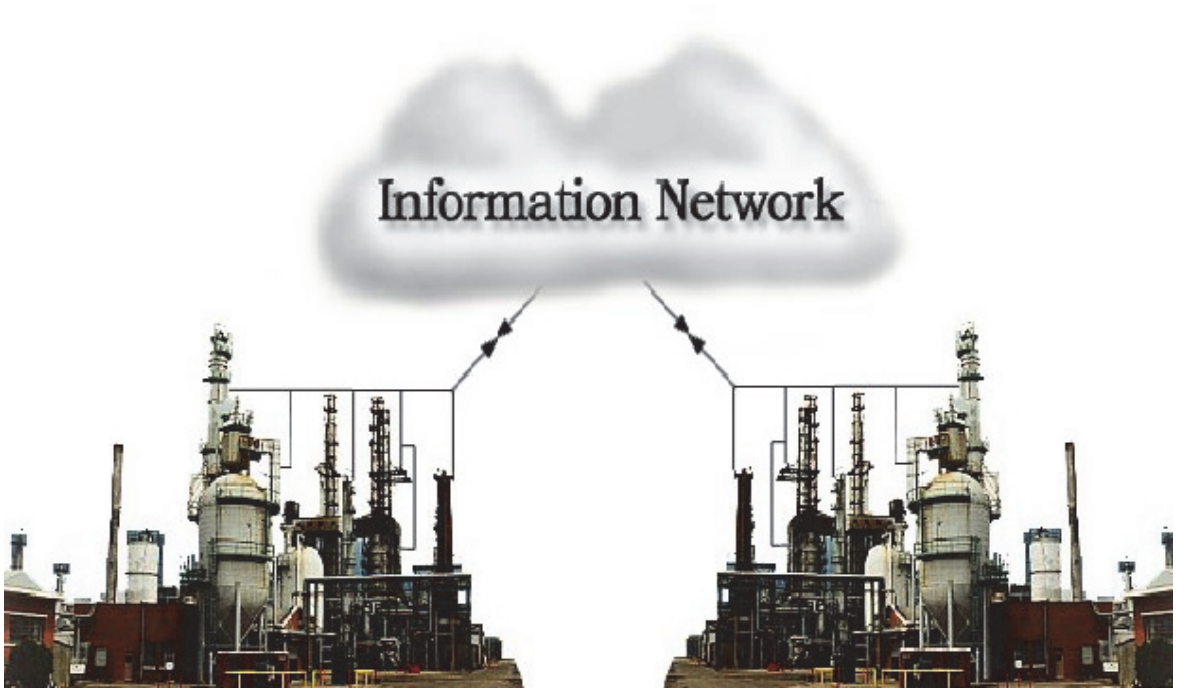
Product Specifications

Foxboro®

by Schneider Electric

PSS 31S-7INI

Information Network Interface (INI) for Windows® Software



The INI software interconnects independent systems such that interoperation is easy and transparent. The INI software enables data transfer and message forwarding.

OVERVIEW

The Information Network Interface (INI) software for Windows®, is an inexpensive, simple, and flexible product for the interconnection of independent systems over a customer-supplied network. The connection transfers Object Manager values and messages. This loose coupling allows the two systems to be maintained separately as part of the Foxboro Evo™ system overall approach to remote operations.

The INI package supplements the remote access provided by

- Remote Desktop sessions on stations and multiple user support of stations running a Microsoft® Windows Server 2008 and Windows Server 2003 operating system.

The INI software provides two services:

- Data Transfer: The transfer between a remote and local system and the representation of the remote data within the local Object Manager.
- Message Forwarding: The forwarding of messages from the remote system to the local system for alarm annunciation.

These two processes present remote data values and messages to stations on the local system as if the data and messages originated locally. The local representation of the remote objects may have exactly the same name as the remote objects. This means that application engineering can be preserved.

For example, remote displays can be transferred to the local system and used without changes.

The INI packages are best used to link:

- Geographically separated plants.
- Independent Foxboro Evo systems in the same plant that need to exchange data.
- Large systems that need to expand without degrading the performance of the installed control network (Carrierband LAN or the Foxboro Evo control network).
- Large systems that need to be split due to high loads with minimal impact on operation and with minimal additional engineering.

The control network remains the best solution for those nodes that work closely to control a single process or process area, or require sophisticated redundancy.

DATA TRANSFER

The INI package includes software to transfer data between local and remote systems over a customer supplied network. The data transfer mechanism uses the networked FoxAPI™ software (netFoxAPI)/Networked AIM*API and Application Objects. Networked AIM*API is the Foxboro Evo system standard for the transfer of process data over a customer supplied network.

Application Objects (AOs) are Object Manager objects that reside in the memory of the INI's station like a Shared Variable. Unlike Shared Variables, AOs use the three part Compound:Block:Parameter (C:B:P) naming structure of control station based objects.

The INI data transfer software bridges the gap between netFoxAPI/Networked AIM*API and the Application Objects by mapping remote data values to local AOs and vice versa.

The INI software implements bi-directional, change-driven data transfer that fully supports connected and one-shot data access on the local system to remote data. Its support for one-shot, "set" access to remote data provides read-back of the remote values to ensure that changes made at the remote system are reflected locally. This functionality makes alarm acknowledgements and setpoint ramping efficient and reliable.

When used in a symmetric configuration, the INI package offers the most efficient means of exchanging data between Foxboro Evo systems without using the control network.

MESSAGE FORWARDING

All INI part numbers include software to forward messages from the remote system to the local system for annunciation.

Software loaded on the remote system receives messages sent to it by standard message sources. Received messages are forwarded from the remote component to the local component over the customer supplied network. A configuration file in the local system specifies the target alarm annunciation devices on the local system.

The supported message sources are:

- Any third party or Foxboro supplied program that uses connectionless IPC messages.
- System Monitor.
- Operator Action Journal.
- Control stations.

Supported control station messages include Process Alarms, Sequence Block messages, and Sequence of Event messages.

The INI Message Forwarding software is specified as a message destination by using standard mechanisms, e.g., Compound Alarm Group Device lists.

Targeted alarm annunciation devices include:

- Workstations to trigger horns and annunciator keyboards
- Printers
- Alarm historians

Process Alarms can be acknowledged from the Local Alarm Manager or the Remote Alarm Manager depending on how the INI package is applied.

System Alarms can be acknowledged using a remote instance of the System Manager or System Manger Display Handler (SMDH) assuming the network latency and bandwidth allow it.

ADVANTAGES OF THE INI

The advantages of the INI include:

- System shutdowns are not required for implementation.
  - If two Nodes that were configured independently need to be interconnected using the control network, at least one of the nodes will need a complete reboot and both nodes will need updates to their system configurations. The INI may require a reboot of its host station. Broadcast and multicast traffic in each Node is reduced compared to a system linked using the control network.
  - As systems are joined, the broadcast/multicast traffic increases. This can have a dramatic impact on control network and station performance on large systems.
- Each Node can run at a different revision of the Foxboro Evo Control Core Services or I/A Series software.
  - Nodes linked on a control network must be upgraded at the same time with certain minor exceptions. This makes scheduling maintenance more difficult.
- There are no name conflicts between the local and remote systems.
  - Interconnected Nodes must be designed such that all stations and Compounds have unique names. However, it is common for different plants and units to reuse the same names. The INI allows the local name to differ from the remote if that is required.
- Overall system reliability can be enhanced.
  - The INI allows each plant area to maintain an independent CSA database.
- Control Database Access Security is enhanced since the systems are kept separate.
  - By design the Foxboro Evo system allows configuration of any station from any station. While this feature is generally a benefit, it becomes a problem if one needs to maintain configuration control while still exchanging data. This situation is found in plants that assign maintenance people to process units and to plants that must by law ensure that no unauthorized changes are made.
- The INI operates over arbitrary distances since it can run over any TCP/IP network.
  - The CBLAN is constrained by the characteristics of the IEEE 802.4 standard to a plant spanning 20 km (12.4 mi). While this limit is acceptable in many instances, offshore facilities and plants with a large amount of acreage are significantly constrained by this limitation.

- The INI's bandwidth can range from low to extremely high, depending on the customer supplied network and the application needs.
    - Customer supplied networks often exceed 100 Mbps though the INI does not have a minimum bandwidth requirement.
- The INI optimizes the use of communication resources.
    - Resource optimization is important in the Foxboro Evo system since the CP not only controls the plant, but supplies all of the data used by each data consumer, e.g., the Historian, FoxView, and application programs. The INI can optimize communication resources if it is hosted by a station that is also running applications that use AIM*API/FoxAPI™.
- The INI's configuration requirements are much less than those of Device Integrator based solutions which are the only other approach for distance greater than 20 Km (12.4 mi).
    - The INI does require more effort than the CBLAN, but it includes tools to facilitate the process.
    - Moreover, the INI allows the application engineering to be reused. For example, remote displays can be used without change on the local system. This is a big savings compared to using Device Integrators

INI VERSIONS

The INI software is available in two versions:

- INI70 Asymmetric with Message Services
- INI70 Symmetric with Message Services

All INI versions offer:

- High-speed, high-volume data transfer from the remote system to the local system
- Support for high-speed, but low-volume, changes in the remote system to support remote operation.

The INI:Asymmetric versions require no software on the remote system for data transfer and is the preferred solution for data acquisition and remote control.

However, if high-speed, high-volume data transfer from the local system to the remote system is required, the INI:Symmetric versions should be used.

In this case, the INI package must be loaded on an station in each system.

TYPICAL CUSTOMER SUPPLIED NETWORK

The INI software requires a TCP/IP network. Typically, this is a dedicated, point-to-point link. Common implementations include point-to-point cabling over wire or fiber optic cables and dedicated high-speed data line. The INI software can also operate over more complex networks.

SECURITY

The INI package supports the use of standard network security hardware and software and leverages the security features of netFoxAPI/Networked AIM*API. This API allows the station owning the data to control access to that data. For example, netFoxAPI/Networked AIM*API can be used to allow the INI software to read from the server, but not write to it.

INI VERSION USAGE

Figure 1 shows a common application of the INI:Asymmetric. The INI software runs on the Supervisory System and transfers large amounts of data and messages from the Independent Nodes A-C. The dotted line from the Supervisory System indicates that the supervisory system is sending small amounts of data back; for example, setpoint changes and alarm acknowledgements.

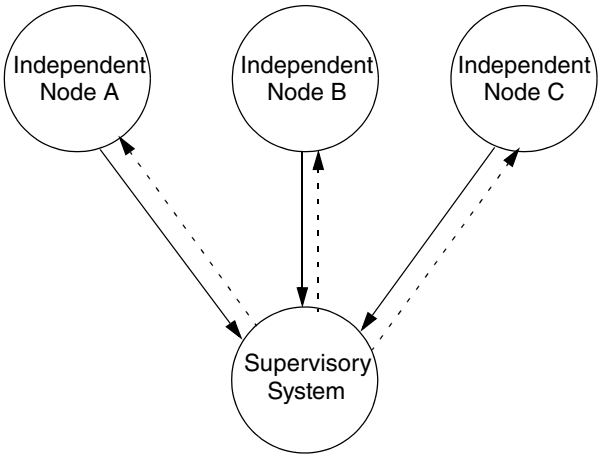


Figure 1. INI Asymmetric Application

In Figure 2, the INI:Symmetric provides high-volume, bi-directional, data and message transfer.

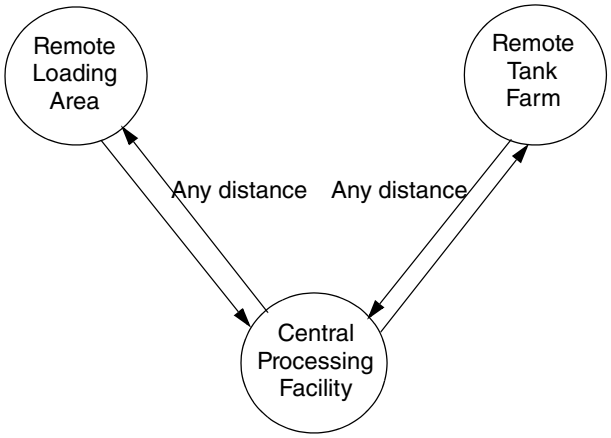


Figure 2. INI Symmetric Application

In this application, the INI software ensures that the Remote Loading and Storage Area applications in the Central Refinery have all of the data that they need to operate while providing the remote sites with data to visualize the central operation.

SUMMARY OF REMOTE OPERATION CAPABILITIES

Table 1 shows features and capabilities found in the control network and describes how the remote operations solution compares to those features as provided by the control network.

Table 1. Remote Operation Support

Features	Remote Operations featuring Remote Display Access and Information Network Interface
Redundancy	The INI software does not direct, product based redundancy; however, application specific approaches to redundancy are available.
Real-Time Information	
Peer-to-Peer Data Transfer	INI software can connect the points automatically based on its configuration.
Graphic and other Application Support	INI software represents remote data locally and these tags are available to all local applications. The INI software representation enables local applications to address these tags using all normal OM mechanisms: Read Lists, Write Lists, One-Shot Gets, and One-Shot Sets. The station supports Remote Desktop.
Message Forwarding	The INI software does not adjust the time stamps in the forwarded messages.
Process Alarms	INI Message Forwarding software. The local Application Object and remote block must have the same name.
System Monitor Messages	INI Message Forwarding software. Record the messages in a remote historian and retrieve them locally. Record the message in an AIM*Historian™ database using a remote data collector for the messages.
Operator Action Journal Messages	INI Software Record the messages in a remote historian and retrieve them locally. Record the message in an AIM*Historian database using a remote data collector for the messages.
Process Operation	
Process Graphics	Local process graphics access the local Application Object that is representing the remote data. This approach allows the same display to be used at both locations and it has normal display update speeds. However, redundancy is limited and there is some delay as the data travels through the INI software. The station supports Remote Desktop.
Current Alarm Display/Alarm Manager	INI Message Forwarding to local Alarm Manager The INI software fully supports local annunciation of remote alarms. It provides message forwarding which allows local Alarm Managers and Printers to display remote alarms. It can represent the remote block's UNACK parameter that allows local Alarm Managers to acknowledge remote alarms. The INI software does not adjust the time stamp on forwarded messages. The station Remote Desktop.

Table 1. Remote Operation Support (Continued)

Features	Remote Operations featuring Remote Display Access and Information Network Interface
Annunciator Keyboard Support	INI Software
Local Horns	INI Software
Programmatic Access	
FoxAPI/AIM*API	NetFoxAPI/Networked AIM*API NetFoxAPI/Networked AIM*API has clients for stations. With some minor rework, existing applications can be ported from Local FoxAPI/AIM*API to netFoxAPI/Networked AIM*API client.
Native APIs	* OM API: NetFoxAPI/Networked AIM*API replaces the native OM API. * Historian API: NetFoxAPI/Networked AIM*API replaces native OM and Historian APIs.
File Transfer	Microsoft networking can be used to transfer files.
Historical Data	
Collection Group Data	AIM*Historian software supports remote collectors with local data access. In addition, data can be collected and stored remotely and accessed locally using several Information Suite tools.
Reduction Group Data	See above
Archive Group Data Message Data	See above INI software can forward messages to local system for storage. * FoxAMI's software is not available for Windows stations. * AIM*Historian software can collect messages remotely and Information Suite tools can access the message data. * The Alarm Manager software allows viewing of alarms in a remote historian.
Configuration	
Displays	FoxDraw software can be run locally on a PC and the files may be stored remotely on the target station if the network is set up properly.
Control Blocks	* The FoxCAE and IACC software can be used over a properly set up TCP/IP network * The ICC is available remotely.
System	System Configuration can be done on a local PC, but installation requires physical access to the remote stations.
Others	Most configurators are available remotely.
System Management	SMDH interface is available remotely.

REQUIREMENTS

Customer Supplied Network

- Any for which a Network Interface Card is available.
- TCP/IP suite based.

Platforms

- Stations with an additional Network Interface Cards (NIC).
- FoxAPI is required for I/A Series software v8.2-v8.7.
- AIM*API is required for Foxboro Evo Control Services v9.0-v9.1 and I/A Series software v8.8.
- I/A Series software v8.2-v8.4.x Standard.
- I/A Series software v8.5-v8.8 Standard or Security Enhanced with default domain group policies.
- Foxboro Evo Control Core Services software v9.0 and higher Standard or Security Enhanced with default domain group policies.

NOTE

When using security enhanced software, please be aware that changing the default domain group policies or improperly using McAfee® ePolicy Orchestrator (ePO) firewall can adversely affect the proper operation of the INI. Modifying Active Directory Group Policies is considered an advanced action and should only be undertaken by qualified personnel. Use of any firewall, including the authorized McAfee ePO firewall could also adversely affect the functionality of the INI applications if not configured properly.

RAM

- Minimum: 20 MB of RAM per instance
- Larger databases require more RAM

ORDERING INFORMATION

The INI70 product is available in a number of configurations that vary with the customer's needs. Expected delivery time is four to six weeks.

PART NUMBERS

- Q0301ZS - INI70 Asymmetric Software for Two Systems (Figure 3)
- Q0301ZT - INI70 Asymmetric Software for Five Systems (Figure 4)
- Q0301ZU - INI70 Symmetric Software for Two Systems (Figure 5)
- Q0301ZV - INI70 Symmetric Software for Five Systems (Figure 6)
- Q0302AC - Upgrade to INI70 Asymmetric Software for Two Systems (Figure 3)
- Q0302AG - Upgrade to INI70 Asymmetric Software for Five Systems (Figure 4)
- Q0302BN - Upgrade to INI70 Symmetric Software for Two Systems (Figure 5)
- Q0303AQ - Upgrade to INI70 Symmetric Software for Five Systems (Figure 6)

TYPICAL INI70 CONFIGURATIONS

INI70 Asymmetric Software for Two Systems

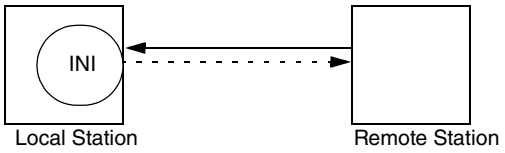


Figure 3. Q0301ZS and Q0302AC

INI70 Asymmetric Software for Five Systems

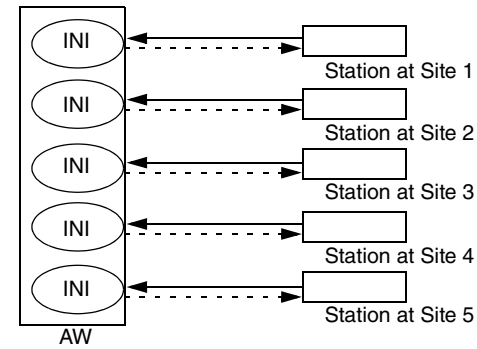


Figure 4. Q0301ZT and Q0302AG

INI70 Symmetric Software for Two Systems

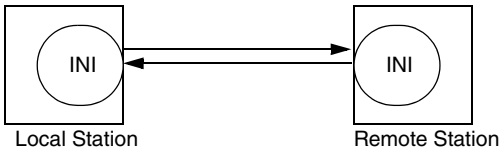


Figure 5. Q0301ZU and Q0302BN

INI70 Symmetric Software for Five Systems

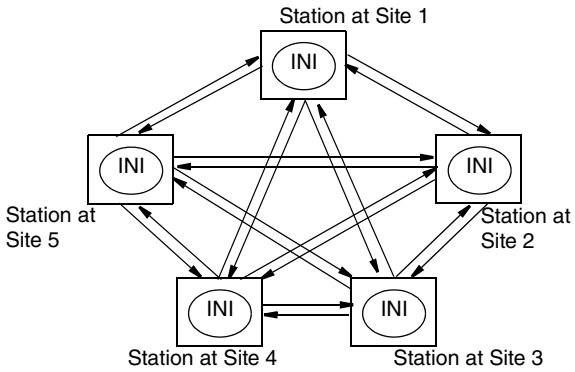


Figure 6. Q0301ZS and Q0303AQ

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