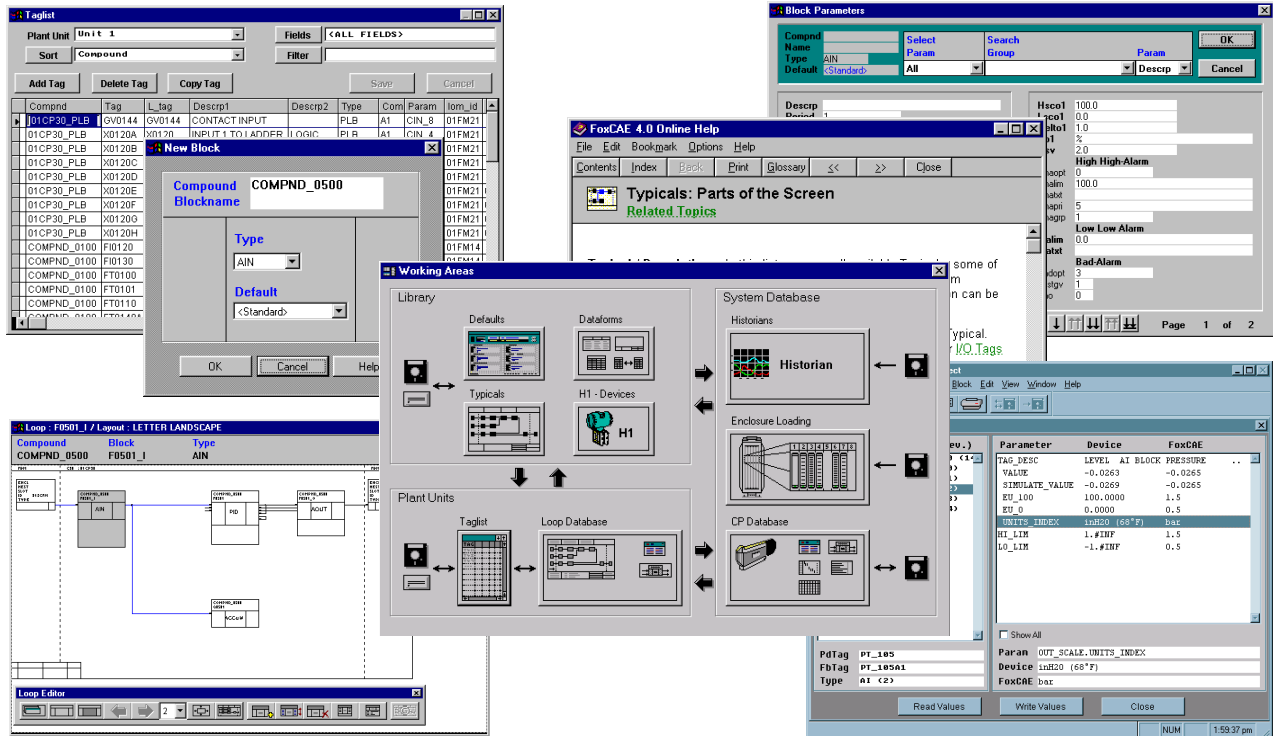


# I/A Series® Software FoxCAE™ Engineering Package for Windows® Based Workstations



**Intelligent Design Studio**

**On-line FOUNDATION™ fieldbus  
Device Configuration**

The FoxCAE™ software package provides powerful tools and routines for engineering the I/A Series® control station database, FOUNDATION fieldbus instruments, and I/A Series Historian application. With FoxCAE software, you can forward engineer your plant database, perform automatic loop documentation, and back-documentation. Intelligent Design Studio, which is part of the FoxCAE package, provides pre-engineered control loops that significantly reduce engineering costs.

## GENERAL DESCRIPTION

The FoxCAE package allows you to develop and document control loops from an instrument tag list using a library of control scheme components. From these control loops, you can generate I/A Series control blocks. You can then download the database to the target control stations. The FoxCAE package also enables you to upload control station databases from the I/A Series environment for maintenance and documentation. The Intelligent Design Studio portion allows you to select from a library of pre-engineered control loops.

For I/A Series systems interfacing with FOUNDATION fieldbus (H1) devices, the same FoxCAE database functions are used to perform H1 device configuration. The FoxCAE package allows you to use standard database constructs to forward-engineer a complete database for the H1 devices.

## FEATURES AND BENEFITS

The FoxCAE engineering package is provided with a user license that can be used as a stand-alone or network version. The FoxCAE package provides the following features and benefits.

### Key Features

- Intelligent Design Studio allows you to select pre-engineered control loops from a library that match your process control needs.
- Construction of standardized definitions such as typical control loops (typicals), data sheets and default values.
- FOUNDATION fieldbus (H1) device configuration allows you to download pre-configured device databases to the H1 devices or to modify a single parameter in the device database.
- FoxCAE software has passed the FOUNDATION fieldbus Host Inter operability Support Test.
- Graphic loop editor with automatic drawing generation for ensuring consistent documentation layouts.
- Exchange of data with I/A Series systems; transfer of compound data to and from the control system.
- Enclosure and rack loading features.
- Copying of entire plant units.

### Benefits

- Interfaces with your plant design system (PDS) to import device tag lists and integration of externally generated tag list files in ASCII or .dbf-compatible formats.
- A complete plant database can be forward-engineered including H1 devices.
- Standard and custom block parameter default sets.
- Loop drawing from templates and block library.
- Automated propagation of block names and parameters.
- Control processor engineering including block ordering and phasing.
- Preservation of data for multiple uses of previously entered information.

- Graphic input windows for I/A Series control blocks that have structured parameter layouts for easy block configuration.
- Detailed descriptions of block functions and parameters that can be activated.
- Multi-user support and access levels.
- Reports for I/A Series database uploads that can be stored for future reference (change tracking).
- Automatic adaptation to I/A Series release upgrades while preserving all data.

The FoxCAE engineering package for Windows® based workstations is user-friendly and supports the three major tasks of project database processing.

- **Forward-Engineering:** Use tag lists, typicals and default values to easily and quickly build software loops, and configure data collection points for I/A Series Historian, FoxHistory and AIM\*Historian™ applications. These configurations can then be transferred to the I/A Series environment.
- **Loop Documentation:** Build typicals and loops, then print the graphical loop drawings on any Windows-compatible graphic printer.
- **As Built Documentation:** Take any compound from an I/A Series system and generate its loop documentation. The backdocumentation of control blocks loaded from the I/A Series system into the FoxCAE database use the graphic loop editor.

## FORWARD-ENGINEERING

The major benefit of forward-engineering with FoxCAE software is to automatically generate databases containing control blocks which can be loaded into the I/A Series system off-line via disk, or on-line via a network connection.

### Tag List

The first phase of forward-engineering, planning and data capture, starts with a device or instrument tag list (Figure 1), which contains all the block details such as device descriptors, functions, scaling, units, and channel loading of the Fieldbus Modules (FBMs). This information can easily be exchanged with other databases via an ASCII, csv, xls or .dbf-compatible file. Tags are assigned to plant units and can be filtered and sorted for detailed modification.

Compound	Tag	L_tag	Descrp1	Descrp2	Type	Com	Param	lom_id
01CP30_PLB	X0120A	X0120	INPUT 1 TO LADDER	LOGIC	PLB	A1	CIN_8	01FM21
01CP30_PLB	X0120B	X0120	INPUT 2 TO LADDER	LOGIC	PLB	A2	CIN_5	01FM21
01CP30_PLB	X0120C	X0120	INPUT 3 TO LADDER	LOGIC	PLB	A3	CIN_6	01FM21
01CP30_PLB	X0120D	X0120	INPUT 4 TO LADDER	LOGIC	PLB	A4	CIN_7	01FM21
01CP30_PLB	X0120E	X0120	OUTPUT 1 F. LADDER	LOGIC	PLB	A5	CO_9	01FM21
01CP30_PLB	X0120F	X0120	OUTPUT 2 F. LADDER	LOGIC	PLB	A6	CO_10	01FM21
01CP30_PLB	X0120G	X0120	OUTPUT 3 F. LADDER	LOGIC	PLB	A7	CO_11	01FM21
01CP30_PLB	X0120H	X0120	OUTPUT 3 F. LADDER	LOGIC	PLB	A8	CO_12	01FM21
COMPND_0100	FI0120	FI0120	FLOAT MEASUREMENT	AIN	A	PNT	01FM14	
COMPND_0100	FI0130	FI0130	FLOAT MEASUREMENT	AIN	B	PNT	01FM14	
COMPND_0100	FT0100	FT0100	FLOAT	AIN	A	PNT	01FM11	
COMPND_0100	FT0101	FT0101	FLOAT	AIN	A	PNT	01FM11	
COMPND_0100	FT0110	FT0110	FLOAT VALUE W.	COUNTER	MAIN	A1	PNT_1	01FM15

Figure 1. Tag List

### Default Values

The FoxCAE package reduces the repetitive manual data entry involved in block configuration by providing multiple default configurations for each block type. These default sets not only automate block configuration, but also promote plant-wide engineering standards and practices while serving the unique requirements of each control project. When the default values are modified during program development, or later during maintenance, The FoxCAE package automatically updates the affected block parameters in the project database.

Editing default values is done in special parameter windows, which display the parameters of the control blocks in logical groups and subwindows (Figure 2). For each parameter, descriptive text appears in the status line and detailed Help screens are included.

Block Parameters window showing default values for an AIN block. The window is divided into sections for Real-Input and Real-Output parameters. The Real-Input section includes parameters like Meas, Hsc1, and Lsc1. The Real-Output section includes parameters like Delt1, E11, Meropt, Mscale, Iomopt, Pnt\_no, Sco, Atc, Hsc1, Lsc1, Delt1, Eo1, Holim, Lolim, Dsv, and Mckopt.

Figure 2. AIN (Analog Input) Flow Default Values

### Typical Loops and Devices

A typical (typical loop) is an assembly of several software blocks resulting in a complete control loop or complex control structure. During the next phase of

forward-engineering, typical loops are designed with the graphic loop editor by adding I/A Series software blocks and specifying the connections between the block parameters. Since the layout of the typical is defined in a graphic mode on the screen, it is not necessary to work with abstract lists or tables. You can see the data flow between I/A Series control blocks. See Figure 3.

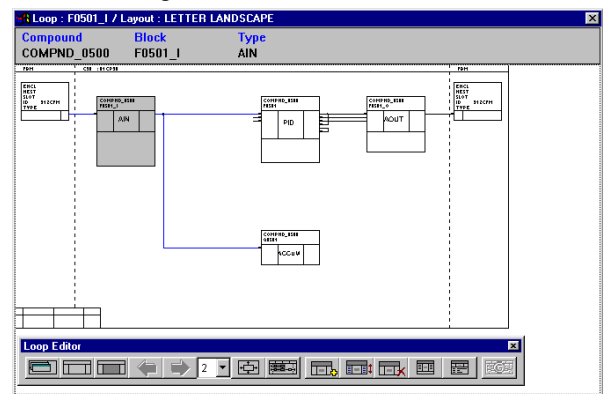


Figure 3. Typical Loop

### Intelligent Design Studio

Intelligent Design Studio is intended as an example of how to use this engineering tool to expressively and efficiently execute an I/A Series project from a control design perspective and can also be used as a starter kit for projects by reusing the provided:

- Loop Templates
- Default block configurations
- Propagation Rules.

By applying Intelligent Design Studio, FoxCAE Edition the user can generate the entire control project database by simply completing the I/O Tag List table with project specific details such as:

- I/O Tag Name
- Compound to which the Tag is to be applied
- Template to which the Tag is to be applied
- I/O point in the Template the Tag is assigned
- Type of signal [AIN; AOUT; CIN; COUT; ...]
- Any descriptors associated with the signal
- Engineering units
- Scaling information
- Signal conditioning index [T/C, RTD, ...]
- Period between scans [sampled data interval]
- Physical connection point of the I/O point
  - FBM Name [IOM\_ID]
  - Point on the FBM.

### Control Loops

Routines to build individual control loops combine information stored in the tag list with general definitions from typical and default values.

### Plant Units

Loops and tags can be grouped into *plant units* making it possible to work with large databases in one project.

You can replicate the control database for an entire plant unit using global replacement for names of loops, tags, and compounds.

### Block Order

The forward-engineering process is concluded by the assignment of the new compounds to control stations. For each compound, you can check the sequence in which the blocks will be executed in the I/A Series system. A special Block order tab displays the signal flow between blocks (Figure 4). FoxCAE software can automatically optimize this sequence according to the signal flow.

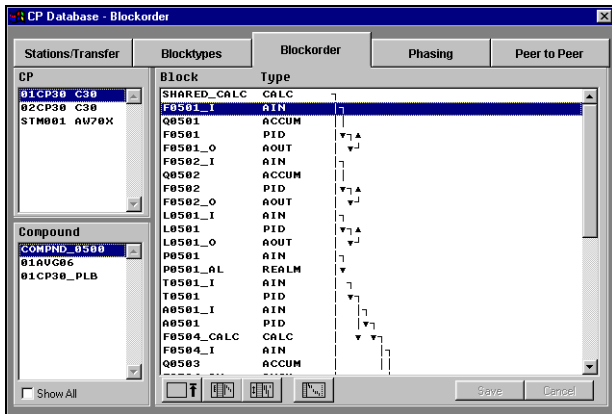


Figure 4. Blockorder and Signal Flow

### Control Station Loading

Before you save the compounds for the I/A Series control station, you can check phase loading for each control station. The Phasing tab of the control station database window displays a graphic bar diagram that shows each phase and the percentage loaded (Figure 5). This check of the phase loading is especially useful in avoiding control station overload.

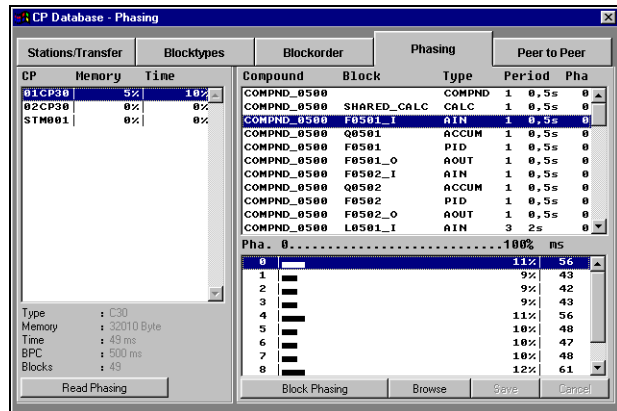


Figure 5. Control Station Phasing Bar Diagram

### I/A Series Historian and AIM\*Historian Configuration

The FoxCAE package supports configuration of historian applications including I/A Series Historian, FoxHistory, and AIM\*Historian. Data collection point assignments are made either by default block type or on a point-by-point basis. The configured database is saved on disk for transfer to an I/A Series system. (Figure 6).

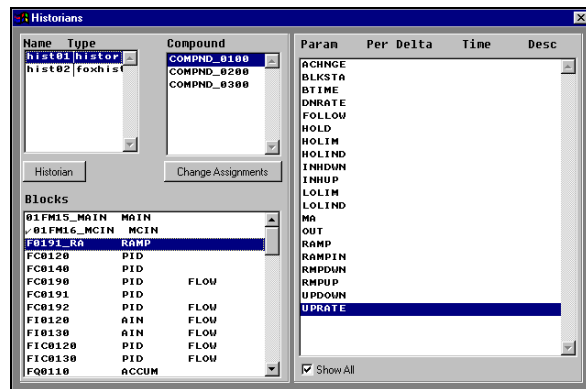


Figure 6. Historian Configuration

### H1 Device Configuration

For H1 device configuration operations, the FoxCAE package provides the ability to view and verify the device information prior to uploading or downloading the device database (Figure 7).

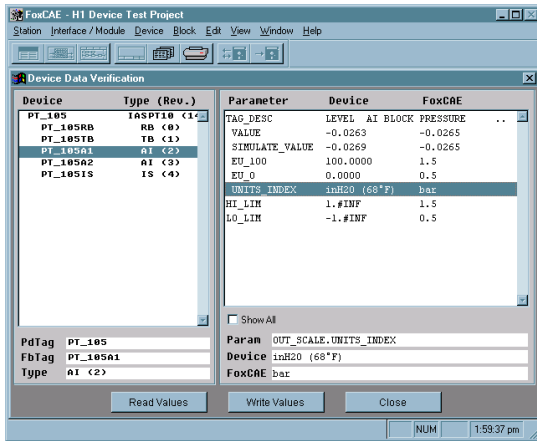


Figure 7. H1 Device Data Verification

### Enclosure and Rack Loading

The enclosure and rack loading area has been enhanced to allow you to edit enclosure, rack and module types, as well as drawing sheets for the drawing headers. See Figure 8.

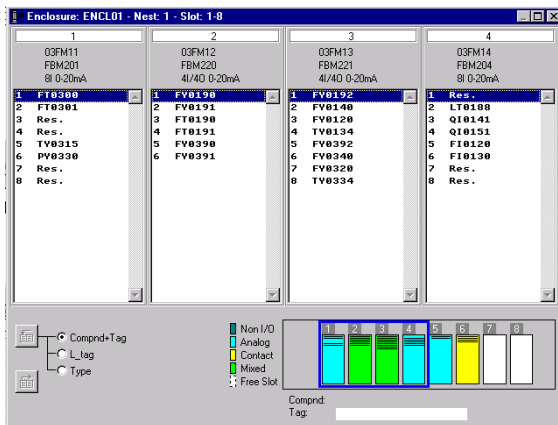


Figure 8. Enclosure Loading

### LOOP DOCUMENTATION

A graphic loop editor is used for the creation of typicals and individual loops. The positioning of the standard software blocks, block connections and references is done automatically. This results in consistent documentation that is structured by function (Figure 9).

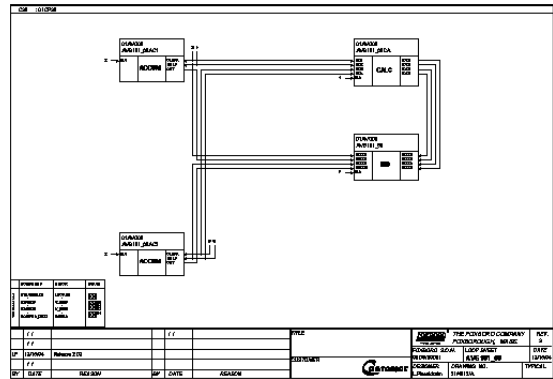


Figure 9. FoxCAE Loop Drawing

### AS BUILT DOCUMENTATION

You can take any compound from an I/A Series system and generate its loop documentation. The as-built-documentation of control blocks loaded from the I/A Series system into the FoxCAE database also uses the graphic loop editor. Since as-built-documentation only works with the blocks and connections it finds, it is not necessary to prepare typical loops or layouts. You can start as-built-documentation regardless of existing loops or typicals (Figure 10).

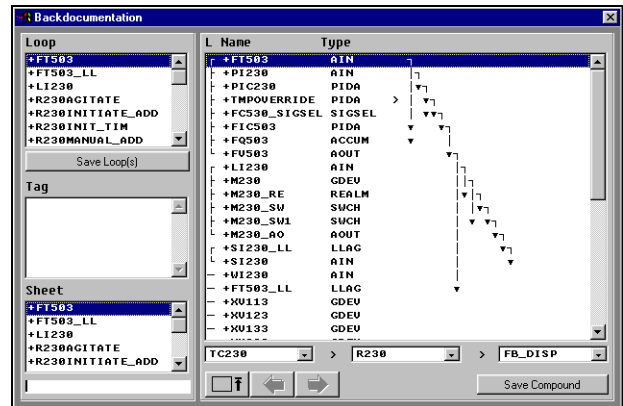


Figure 10. Backdocumentation Window

### HARDWARE AND SOFTWARE REQUIREMENTS

For smooth and reasonably fast operation of the program, the following hardware and software configuration is required:

**Computer**

Intel® Pentium® II (or higher) processor

**Memory**

64 MB

**Hard Disk**

At least 100 MB free

**Platforms**

Microsoft® Windows NT® 4.0 Workstation or Server

Microsoft Windows XP® Professional

**H1 Device Interface (Direct Connect Mode)**

Interfacing with FOUNDATION fieldbus (H1) devices requires the use of one of the following:

- A standard desktop personal computer running Windows NT or Windows XP and containing a National Instruments® AT-FBUS or AT-FBUS/2 NI-FBUS® interface card, and associated Communications Manager (CM) software.
- A standard notebook personal computer running Windows NT or Windows XP and containing a National Instruments PCMCIA or PCMCIA/2 NI-FBUS interface card, and associated Communications Manager (CM) software.

**Printer**

Laser printer (PostScript® emulation recommended)



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