

SYSTEM INTEGRATION

Integrating a complete system

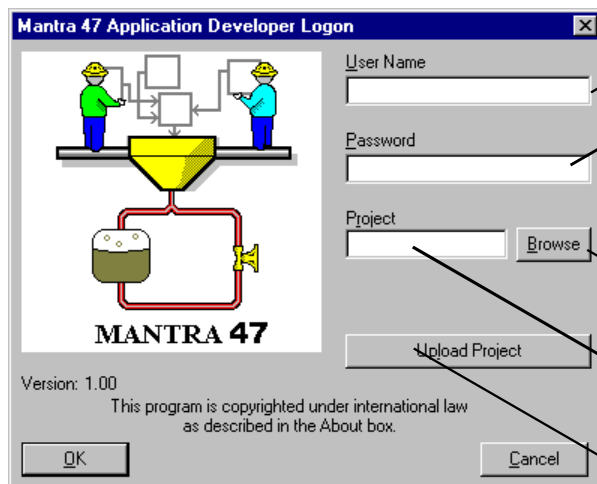
The MANTRA 47 advanced control system is the result of careful integration of several functional modules, all seamlessly tied to one another to make it the most user-friendly system in its class available on the market today.

Every I/O module is referred by a device name, and the addressing is determined by the module's location and not determined by any board level dip-switch. Every network device is referred to by a device name, and no physical location references are needed.

The engineering configuration software initiates a system integration process by defining projects for each controller, defining I/O devices within each controller, defining network devices for each controller, and defining communication links.

The individual control schemes in a project, referred to as block diagrams, mimic the P&I or control schematics. A collection of block diagrams, or a project, runs on an individual controller unit with seamless integration between multiple controller devices on the network.

The SCADA software on the GUI Workstation directly connects to the controller units and displays graphics, trends, and recipes as programmed, or distributes data to other display nodes on the network. Thus, the entire system is integrated, and there is no need for any custom programming to build the system together.



to log on to MANTRA 47:
type the user name and password your installer specified

to select or enter project:
click on: Browse and select project from list
OR
type project name
OR
click on: Upload Project
↓
OK

Function modules

Understanding the functional modules inside a MANTRA 47 system is key to designing an optimally engineered system.

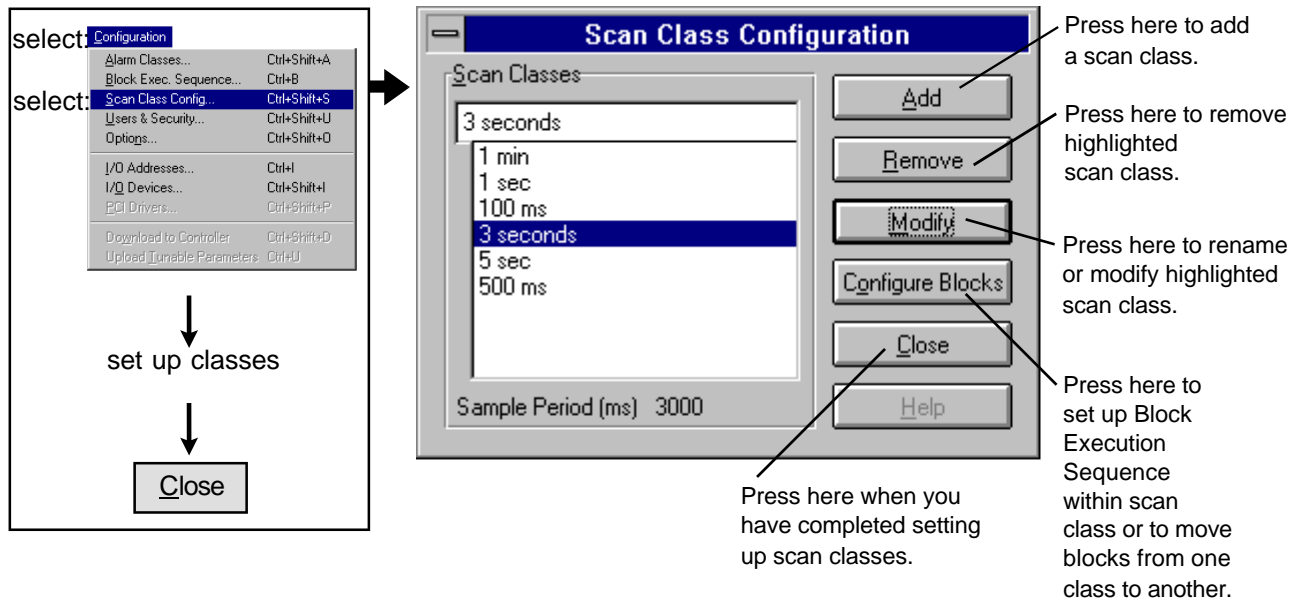
The I/O device module is responsible for getting the real I/O signals from the field to the control system CPU executing the function block algorithms. Each I/O module on the system bus is a device, and once configured, is available for use on I/O function blocks.

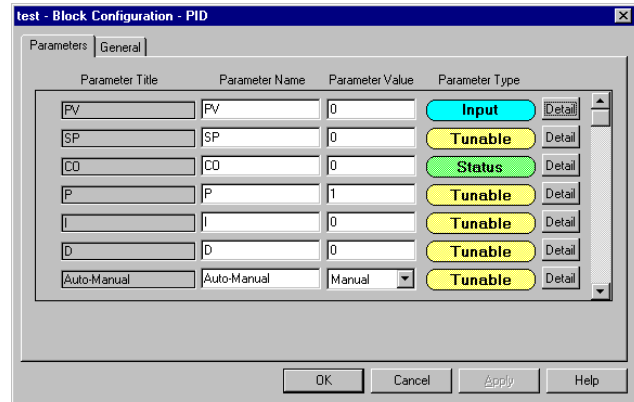
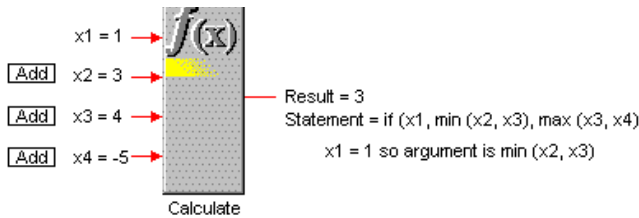
Thus, while building a program, in order to connect to a physical I/O signal, one needs to refer to a particular device and channel number, and not refer to a card's physical location or attributes.

The control is done at the function block level on the controller module. Each block has its own scan class and executes deterministically in a block execution sequence. Most control blocks can generate alarms at the block level and report back to the supervisory or graphics software.

Similarly, most input/output device blocks can report data failures at the block level and initiate logic driven action without the interference of supervisory control systems software.

Even security is handled at the block level and restricts a user to accessing selected parameters only within a block.





Function Block OBJECTS – a new paradigm

The MANTRA 47 function block programming tool is a generation ahead of CAD-based drawing tools traditionally employed on older control systems.

Using state-of-the-art object oriented design techniques, the function block control library represents a collection of objects, which can be manipulated to change dimensions and parameter types, and can be configured using user-defined block name and parameter name tags.

Thus, a sum block is a sum object which can represent a 2-element weighted sum or increase in size to represent an n-element weighted sum, by using a button function labelled "Add Inputs."

Other special functions allow a user to configure parameters as tunable, input, or output status depending on the nature of the application for which the block is being used.

Integrated HMI software

The MANTRA 47 HMI software uses a very popular GUI development environment which is customized to communicate with the MANTRA 47 control system.

Using database export tools, the MANTRA 47 supervisory HMI software database is set up and ready to communicate with the control system very quickly. The HMI software uses modern tools like graphic builder, trending, supervisory system alarms, scheduled reports, and advanced options like Batch management, Recipe management, and Batch trending.

Using dual Ethernet architecture, the MANTRA 47 HMI workstations can share view and engineering development nodes on its independent data management network, thus reducing the traffic on the control Ethernet network linking different MANTRA 47 controllers.

3rd party connectivity

The MANTRA 47 Data Server allows Windows DDE clients to communicate with the MANTRA 47 control database residing on the Engineering Development workstation.

Data from the MANTRA 47 control system can be easily exchanged with Windows applications like Microsoft Excel and other programs which support DDE communication protocols.

The MANTRA 47 HMI software supports ODBC and SQL, thus providing capability for inserting and retrieving data from databases in both on-line and off-line mode. The MANTRA 47 HMI can exchange data with all databases that are ODBC-compliant.