HMI Objects

To insert an HMI object, either press the insert key or right click anywhere in the white space to display the menu and select "Insert". A dialog box allows you to set a caption for the object you are about to insert. Next, select which type of object you want from the drop-down list.

Once an object is inserted on the HMI window, you can double click it (or press <Enter>) to bring up the "HMI Object Parameter Configuration" window. Clicking on the "Configure" button next to ***"Attributes"*** will bring up another window. Here you can configure:

HMI Object Caption	The title or caption for the object.
Width and Height	The object size in pixels. (The object size can also be set by the resize functions.)
Border Style	You may choose None, Black, 3-D raised and 3-D recessed. 3-D raised is ideal for buttons. The other choices are ideal for display only.
Alignment	You may choose Center, Left or Right to adjust the position of the caption.
Font Size	You may choose 8-22 point.
Font Color	You may choose Black, Blue, White, Green, Gray, Yellow, Orange or Red
Background color	To use the color wheel, drag the "color selector circle" to the desired position on the color wheel. Use the slider below the color wheel to darken or lighten your color. The "Color ID" displays your selected color as a six digit hex number in HTML color format. This number is useful for setting other objects and windows to the same color after a selection has been made the first time. Click to check "Limit colors" for optimum performance with 256 color or monochrome displays. Normally the three colors red, green and blue can each take on 1 of 256 different values thus giving 256 X 256 X 256 = 16,777,216 different colors. If "Limit colors" is enabled only 6 different values (00, 33, 66, 99, CC and FF) are allowed for red, green and blue. This gives 6 X 6 X 6 = 216 different colors (or shades of gray). Some important numbers are 000000 Black, 0000FF Dark blue, 00FF00 Green, 00FFFF Light blue, FF0000 Red, FF00FF Magenta, FFFF00 Yellow, FFFFFF White.

Set the "**Security Level (1-255)***"* of the object. When a user logs on, their password will determine their security level range. If an object falls within their range, it will be displayed. Otherwise, it will not be displayed.

The above two HMI object configuration parameters are configured the same for all HMI objects. Below is a description on how to configure specific parameters for the different HMI objects**.**

Frame

The Frame object has no other configuration parameters outside those described above. It is used only to offset or group other objects. Therefore, it's a good idea to give the frame the same security level as the object(s) it offsets. Otherwise, the frame may display, but contain no useful information. A frame can also be used to drag, delete or copy a group of other objects if "Magnetize" is enabled. The best border choices are "Black" or "3-D recessed".

Button

The Button object is used to navigate from one HMI window to another. The best border type is "3-D raised". In addition to the configuration options available to all objects (described above), Button has the following configuration parameters:

Window Control:	Informs the program about what to do with the window the button is located in, once the button is pressed. "Leave alone" means the window stays open and where it is. "Hide" means the window will be open (for fast reloading) but you won't see it, and "Close" means the window will be closed. If you choose to close the window, the next time the window is opened, all the information to display it will have to be reloaded from the ICON which can really slow things down, depending on your connection. However, if too many windows are left open, your computer may run out of resources to display them all. Therefore you might want to close seldom visited windows after each use.
Select Loop:	Enter the loop (1-4) in which the target window is located.
Select HMI:	Choose the HMI window you want the button to select.

Variable

This is the most commonly used object on your HMI. It allows you to display variable values in all sorts of configurations and optionally provide a way for users to change values.

Variable:	Enter the variable you wish to display. Right click in the blank for a list of the variables contained in the module. If a format (
Write security (0-255):	Allows you to set the security level required to change the variable at run time. 0 means it can never be changed. The level required to change the variable can be different than the level required to view it. That way some users can view the value but not change it.
Format:	Specify the format in which the variable will be displayed. "0-5 DP" displays as float with rounding to specified number of decimal places. "Float" picks best floating point display format. "Time" will format variable value as day:hour:minute:second (Use !System[1] for current time). "Decimal Integer" will convert float to unsigned integer and display in decimal format. "Hex Integer" will convert float to unsigned integer and display in hexadecimal format.

	"Selection set" maps a counting integer (0, 1, 2 …) to a text string with attributes using a selection set (see below). "Date" will format variable value as MM/DD/YYYY (Use !System[0] for current date). "Date/Time" displays the current date and time as MM/DD/YYYY HH:MM:SS. You do not need to select a variable for this format selection since this is a built in variable. For "Date" and "Date/Time" the date format can be changed from the default US display of MM/DD/YYYY to other formats. in "System parameter Config" under "Password/system" on the "Program View" tab you may pick alternate displays of YYYY/MM/DD or DD/MM/YYYY.
Selection Set:	Only configure this parameter if you chose "Selection set" for "Format:" above. You may choose an already defined selection by selecting an entry from the "Select Existing Set" drop down list. You may choose to define a new selection set by clicking the "Add Set" button, edit the contents of an already existing set with the "Edit Set" button or clear a set with the "Clear Set" button. There is no way to delete a set. Instead, use the Clear Set button to set a definition no longer needed to null. Later, if you need a new set, use the Edit Set button to define new entries for the set named null. When editing a selection set, first enter a unique name in the "Enter Selection Set Name" field so you can identify this selection set definition in the "Select Existing Set" drop down list for future use. You may enter new entries in the "Add selection" field and click the "Add" button to add to the end of your selection set list. Or you may highlight an already existing selection set entry and use the "Replace" button to replace a selection. Or you may highlight an already existing selection set entry and use the "Delete" button to delete the entry. You may have a maximum of 50 different selection set entries with a total length of 4000 characters for all entries plus some internal overhead. This overhead is an additional 9 characters per selection set for attributes plus selection set title plus 2 characters. This still leaves over 50 characters for up to 50 selection set descriptions. You may highlight an already existing selection set entry and click the "Set Properties" button to bring up a display configuration screen. This is similar to the Attributes configuration screen described at the beginning of this Help document and allows you to set the text justification, font size and color and object background color for the display of this selection set entry. Notice you can set each entry differently, thus allowing different selections to show up in different colors and font configurations for alarm and status displays. At HMI run time the first text item in the selection set will display when the variable value is zero, the second entry displays with a value of one, the third

	entry displays with a value of two and so on. Selection sets simply convert counting integer values used by the program into colored text strings, easier for the user to understand when the HMI runs.
Override:	If "Yes" is selected, then an additional "End Override" button is added to the variable value entry field at HMI run time. Any values entered by the user "overrides" normal values generated in the program. If the "End override" button is pressed the value 3.4028235E38 is written to the variable which causes the program to revert to using program generated values. This operation is not automatic but is implemented with an expression program step using the override functions. Insert an expression like the following into your expression statement: normal_var 'orider' override_var Configure your HMI variable to point to "override_var". Now if the user enters an override value, this value is selected from the "override_var" variable instead of the value in "normal_var" because the value in "override_var is less than 3.4028235E38. When the user clicks the "End override" button the value 3.4028235E38 is written to "override_var". This value cases the 'orider' function to select the value from variable "normal_var" instead of "override_var".
Min Val:	Sets the minimum value accepted and the lower end of the range for the display for a slider, bar, knob or meter.
Max Val:	Sets the maximum value accepted and the upper end of the range for the display for a slider, bar, knob or meter.
Type:	Sets the type of variable display as Box, LED (Simulated Light Emitting Diode), Switch, Slider, Bar, Knob, Meter,Button, Radio Button or Check box. You will need to resize the object so it looks appropriate after you finish these parameter configurations. Note: Selection sets can optionally be used with the Box and Knob otherwise they are continuous. It must be used with the LED , Button, Radio Button or Check Box. Box: Up to 50 selection set entries Knob: Up to 7 selection set entries (number of selection set entries determines number of positions (2-7). No titles or attributes are used! LED: 2 selection set entries for color only (no text used) Button: 2 selection set entries Radio Button: As many as will fit on your HMI screen. Check Box: 2 entries one for no select and one for select

Style:	Sets the style of the selected type. This includes picking a color and style selection. Not all Types have selectable styles.

Instruction

The Instruction object allows the user to change one or more configuration parameters for the selected instruction at HMI run time. In addition to the configuration options available to all objects (described above), you may click the "Instructions" button. Now two configuration fields appear:

Selected Instruction:	Select the desired instruction from the drop-down list labeled "Selected Instruction".
Selected Override Template:	Next, select or create the desired instruction override template. All instructions of the same type have the same list of templates. You may choose an already defined template by selecting an entry from the "Selected Override Template" drop down list. You may choose to define a new template set by clicking the "Add" button, edit the contents of an already existing template with the "Edit" button or clear a template with the "Clear" button. There is no way to delete a template. Instead, use the Clear button to set a template no longer needed to null. Later, if you need a new template, use the Edit button to define new entries for the set named null. When editing a template, first enter a unique name in the "Override Template Name" field so you can identify this template definition in the "Selected Override Template" drop down list for future use. After you press the Add or Edit button the "Override Strings" configuration window is displayed. This window displays all the configuration fields for the selected instruction. The left column displays the default instruction configuration headings. You enter the new override heading in the right column. When you fill in the right field, you are telling the program to allow the user to change that parameter at HMI run time. The string you type into the field is what will be displayed. You may change the string or leave it the same as the default (or change to a foreign language). The run-time user will not be able to see or change any fields left blank.

The Instruction object can be used to allow a user at HMI run time to change selected parameters. Examples include changing setpoints and timing sequences defined in the Constant instruction, setting Conversion Coefficients in the Convert instruction, changing alarm limits in the Limit instruction or changing the correction type in the Correct instruction.

Resource

The Resource object can be used to display a picture within the HMI, link to a help file which is displayed in a separate browser window, run a separate executable program on the browser's computer or run the historical file reporting function. In addition to the configuration options available to all objects (described above), Resource has the following configuration parameters:

URL:	Select the location of the file to be displayed or program to be executed. If "Picture" is selected the JPG or GIF file must be located on the ICON and you simply enter the name of the file. For "Help" HTML pages, give the complete location of the file. These files may be located anywhere, including a server on the Internet. If "Program" is selected, enter the name of the program including the path. For Windows users the default subdirectory is the "Windows" subdirectory. For UNIX users the default subdirectory is your home directory.

Type:	Select the type of file to be accessed (Picture, Help or Program) or select Historical file. If "Picture" is selected, the file will be displayed within the size of the Resource object on the HMI screen. Pictures may be JPG or GIF files. If "Help" is selected, the HTML help file entered in the URL/Name will be displayed in a separate browser window.
	
	If "Program" is selected, the program entered in the "URL/Name" field will be executed on the browser's computer. Note, the program can only be run if you have the Java 1.2 plug-in loaded and your policy file allows access to your machine. On a "Windows" machine you need an entry in the file ".java.policy" under your "Windows" subdirectory like the following:
	
	grant codeBase "http://192.168.1.100:82/*" {
	
	permission java.io.FilePermission "<<ALL FILES>>", "read, write, delete,execute";
	
	};
	
	You must change 192.168.1.100:82 to the actual IP address and port number for the ICON you are accessing.
	
	If "Historical file" is selected, the object will bring up the historical reporting package allowing the user at run time to retrieve data from any periodic or event files, display in tabular or graphical form, print in tabular form to the printer or send to a local disk file for import into a spreadsheet. For this case the URL field is not used.

Graph_var

This object can graph from 1-5 variable values in real-time in strip chart format. You may select the sample rate from as fast as once per second to as slow as once per hour. The chart is only updated while the HMI screen is selected and it starts over every time the HMI is first accessed. To avoid these limitations you may use the next object "Graph_bin". The only draw back is that you must configure a period file for the sample rate you desire and then save the values to this file which requires a little extra programming effort.

Format:	Select the number of decimal place positions to display 0-5 or "Digital 1" or "Digital 2". If Digital 1 or 2 is selected then a value of 0 will represent a logic 0 and a non-zero value will represent a logic 1. For Digital 1 the first trace will toggle between 0 and 10% of full scale, the second between 20 and 30%, the third between 40 and 50%, the fourth between 60 and 70% and the fifth between 80 and 90%. Digital 2 works like digital 1 except that a logic 0 is at the bottom of the graph for all 5 traces. Digital 1 and Digital 2 allow easy creation of digital strip charts with up to five digital traces per graph.
Min val:	If "Constant" is selected for **Max/Min Type** set the minimum Y value for the graph as a constant. Otherwise enter a variable name to use to dynamically be able to change the graph min value at run time.
Max val:	If "Constant" is selected for **Max/Min Type** set the maximum Y value for the graph. Otherwise enter a variable name to use to dynamically be able to change the graph max value at run time.
Interval:	Use the drop down list to select the graph length and sample interval. The entry 5M/1S indicates the overall strip chart is 5 minutes long and the sample rate is every 1 second.
Variable 1:	Enter the first display variable.
Var 2:	Enter the second display variable. Set to "Null" if you don't want to graph this variable.
Var 3:- Var 5:	Repeat as before for variables 3 to 5.
Caption 1:	Enter your descriptive caption for variable 1. You must enter at least one character.
Cap 2:- Cap 5:	Enter additional captions only if you have defined display variables. Otherwise delete all characters in the string.
Max/Min Type	You may select "Constant" or "Variable". (See Max and Min above.) Select the desired entry and click update before entering the Min val and Max val.

Graph_bin

This object can graph from 1-5 historical bin items in real-time in strip chart format from the periodic file. You may select the sample rate from as fast as once per second to as slow as once per hour (depending on the recording interval for your periodic file). The chart is updated from the historical file so it will "catch up" if the HMI screen is not always active. It also creates the chart from the periodic file when the HMI screen is first accessed.

Time file:	Select the time file from which to graph bins. (The decimal point format positions are read from the periodic file and can be configured from 0-5 or "Digital". If Digital is selected then a value of 0 will represent a logic 0 and a non-zero value will represent a logic 1. Furthermore, the first trace will toggle between 0 and 10% of full scale, the second between 20 and 30%, the third

	between 40 and 50%, the fourth between 60 and 70% and the fifth between 80 and 90%. This allows easy creation of digital strip charts with up to five digital traces per graph.)
Min val:	If "Constant" is selected for **Max/Min Type** set the minimum Y value for the graph as a constant. Otherwise enter a variable name to use to dynamically be able to change the graph min value at run time.
Max val:	If "Constant" is selected for **Max/Min Type** set the maximum Y value for the graph. Otherwise enter a variable name to use to dynamically be able to change the graph max value at run time.
Interval:	Use the drop down list to select the graph length and sample interval. The entry 5M/1S indicates the overall strip chart is 5 minutes long and the sample rate is every 1 second. You must match the recording interval of your file or select a longer period.
Bin 1:	Enter the bin number of the first bin to graph.
Bin 2:- Bin 5:	Enter additional bin numbers if desired. Set a bin value to 0 to disable. (The captions are read from the periodic file.)
Max/Min Type	You may select "Constant" or "Variable". (See Max and Min above.) Select the desired entry and click update before entering the Min val and Max val.

HMI Objects

To insert an HMI object, either press the insert key or right click anywhere in the white space to display the menu and select "Insert". A dialog box allows you to set a caption for the object you are about to insert. Next, select which type of object you want from the drop-down list.

Once an object is inserted on the HMI window, you can double click it (or press <Enter>) to bring up the "HMI Object Parameter Configuration" window. Clicking on the "Configure" button next to ***"Attributes"*** will bring up another window. Here you can configure:

HMI Object Caption	The title or caption for the object.
Width and Height	The object size in pixels. (The object size can also be set by the resize functions.)
Border Style	You may choose None, Black, 3-D raised and 3-D recessed. 3-D raised is ideal for buttons. The other choices are ideal for display only.
Alignment	You may choose Center, Left or Right to adjust the position of the caption.
Font Size	You may choose 8-22 point.
Font Color	You may choose Black, Blue, White, Green, Gray, Yellow, Orange or Red
Background color	To use the color wheel, drag the "color selector circle" to the desired position on the color wheel. Use the slider below the color wheel to darken or lighten your color. The "Color ID" displays your selected color as a six digit hex number in HTML color format. This number is useful for setting other objects

	and windows to the same color after a selection has been made the first time. Click to check "Limit colors" for optimum performance with 256 color or monochrome displays. Normally the three colors red, green and blue can each take on 1 of 256 different values thus giving 256 X 256 X 256 = 16,777,216 different colors. If "Limit colors" is enabled only 6 different values (00, 33, 66, 99, CC and FF) are allowed for red, green and blue. This gives 6 X 6 X 6 = 216 different colors (or shades of gray). Some important numbers are 000000 Black, 0000FF Dark blue, 00FF00 Green, 00FFFF Light blue, FF0000 Red, FF00FF Magenta, FFFF00 Yellow, FFFFFF White.