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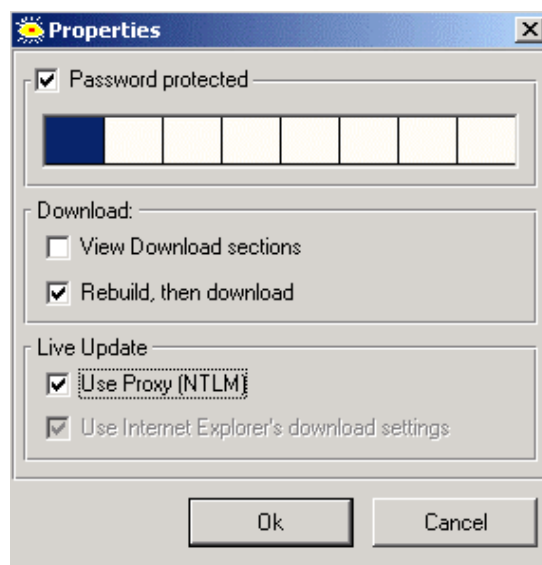
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FB Library

Unitronics offers a function block library for advanced functions, such as SMS messaging and MODBUS communications. Note that you must use a condition (RLO) to activate any FB that requires Configuration in your application, such as MODBUS or SMS.

To install an updated FB library, select Update from the Web from the FBs menu or Help menu, then follow the on-screen instructions. Note that at the end of the download, you must close and then restart VisiLogic. The new FBs will appear on the FBs menu.

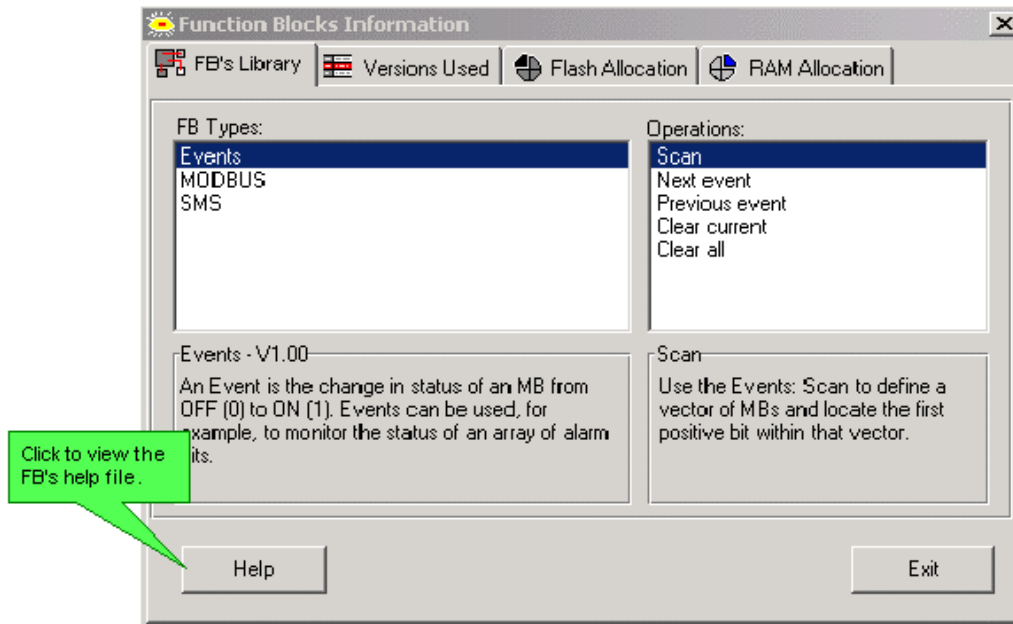
Note that to enable Live Update, you can select to use a proxy server in Program Properties.



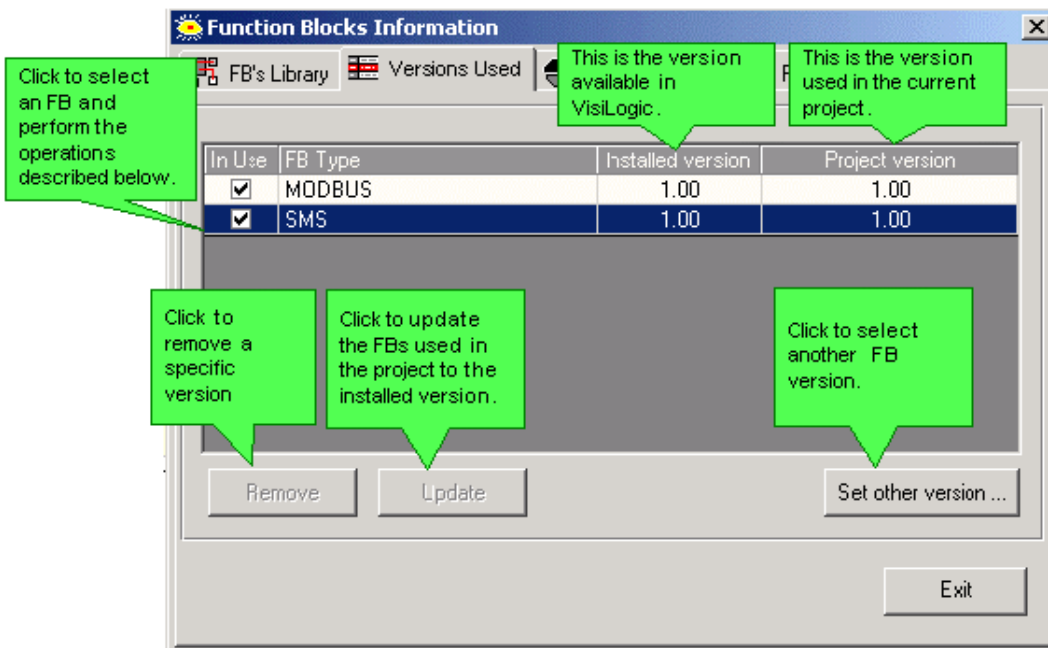
Use Function Blocks Information to check:

- Which FBs are installed in your library.
- Which FB versions are installed, which versions are used in the open project, and to manage FB versions.
- FB memory usage.

FB Library



Versions Used



Com Port: Init

Com Init is located on the FB menu. Use this function block:

- To initialize communication port settings and enable the controller to communicate with external devices such as modems.
- To synchronize port settings, enabling the controller to engage in inter-device communications via protocols such as MODBUS.

Note that you should activate COM Init via a one-shot transitional contact.

This section enables you to configure the PLC's Com Port. Use this, for example, to synchronize the Com Ports of PLCs networked via CANbus or MODbus.

Check Use Modem to activate this section; this enables you to edit modem initialization strings, set Time Out and Dial Type.

Check Use GSM to activate this section; this enables you to select the modem type, enter a PIN number and use Auto detect.

MODBUS

MODBUS enables you to establish master-slave communications with any connected device that supports the MODBUS protocol. Any controller in the network may function as either master or slave using any of the controller's existing Com ports.

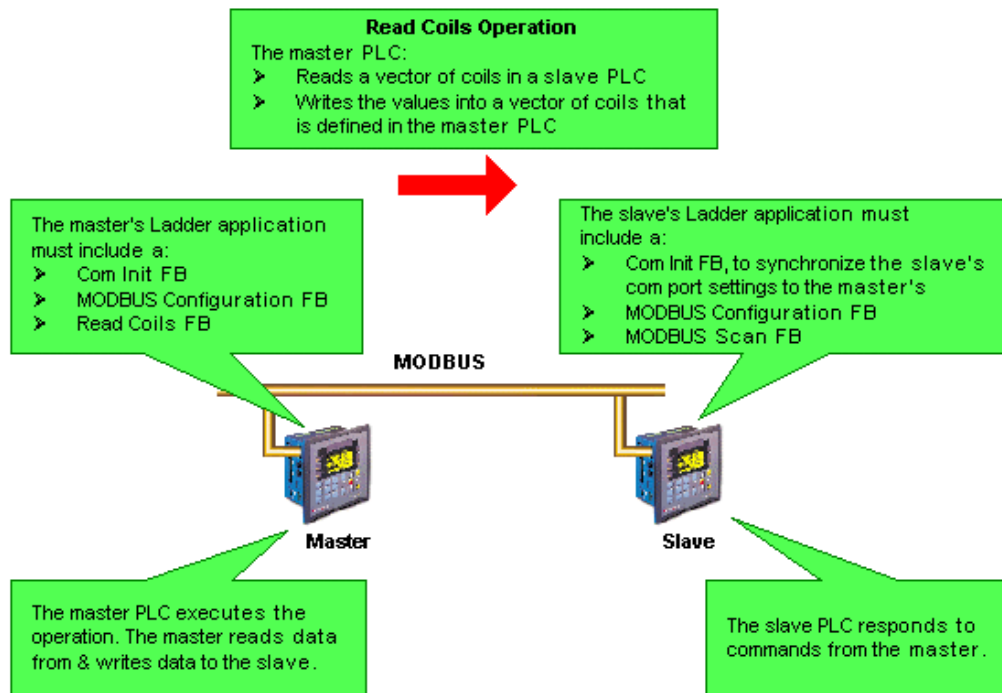
Unitronics currently supports RTU (binary) transmission mode.

Using MODBUS

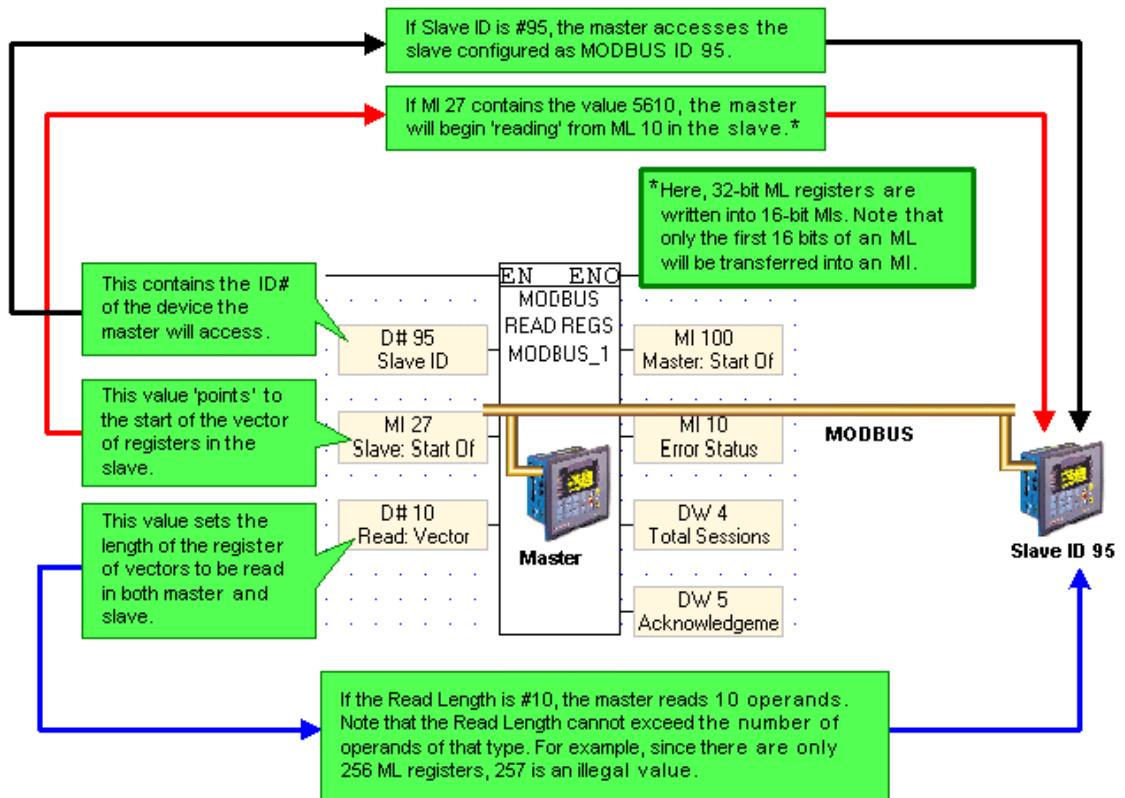
Before using a MODBUS operation in your application, you must:

- Synchronize the communication port settings of master and slave devices. This is done by placing Com Port Init FBs, set with identical parameters, in the ladder application of both master and slave.
- Include at least 1 MODBUS Configure FB in the ladder application of both master and slave. The port you select must be the same port selected in the Com Port Init FB.
- Enable slave devices to be accessed by placing a Scan FB in the slave's Ladder application.

The figure below shows the elements required to carry out a Read Coils Operation.

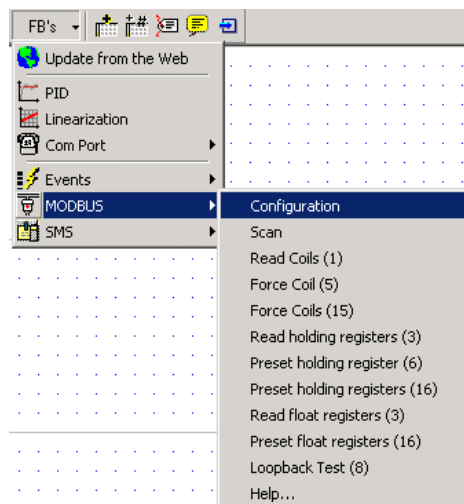


Note that the operand addresses in slave PLCs are indirect addresses (pointers).



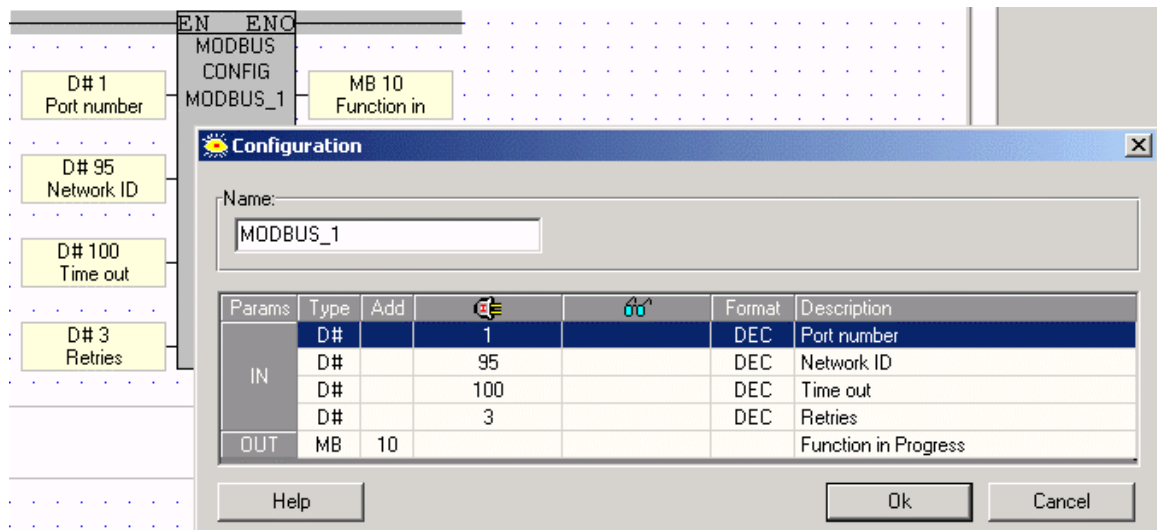
MODBUS Operations

The MODBUS FBs are grouped under MODBUS on the FB's menu.



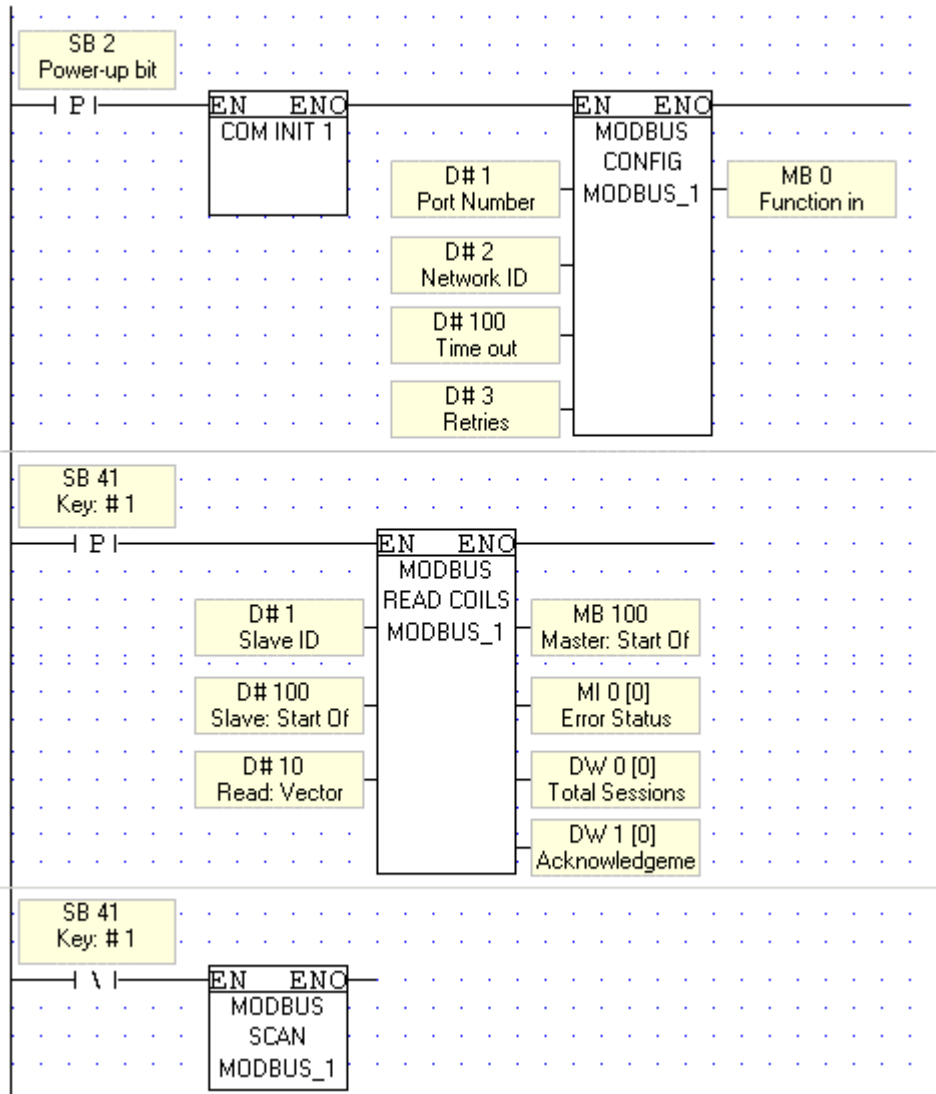
MODBUS: Configuration

A MODBUS Configuration FB must be included in both master and slave Ladder applications as shown below.



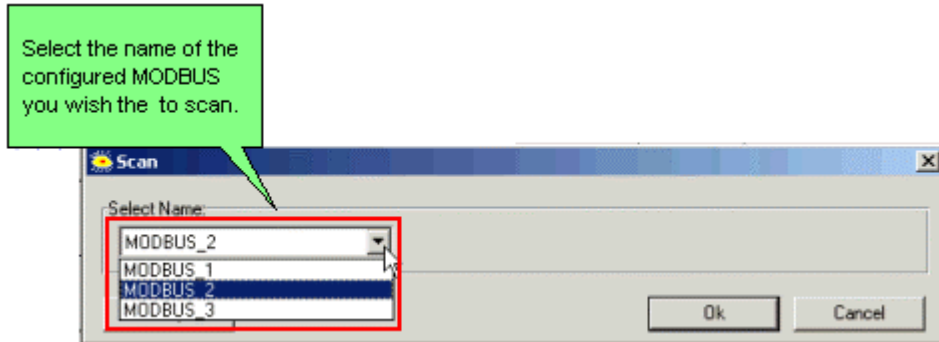
Parameter	Type	Function
Port Number	Constant	Click the drop-down arrows to view available ports; click the port you want to use.
Network ID	Constant	This number identifies the device on the network. You can assign any number from 0-255. Do not assign the same ID number to more than one device.
Time out	Constant or MI	This is the amount of time a master device will wait for an answer from a slave. Time out units are defined in 10 msec; a Time out value of 100 is equal to 1 second.
Retries	Constant or MI	This is the number of times a device will try to send a message.
Function in Progress	MB	This bit is ON when MODBUS is active. Use this as a condition bit for MODBUS operations to avoid communication conflicts.

The Ladder application below enables the controller act as a MODBUS master and read coils in a slave PLC. The Scan operation in the final net enables the controller to also act as a slave.



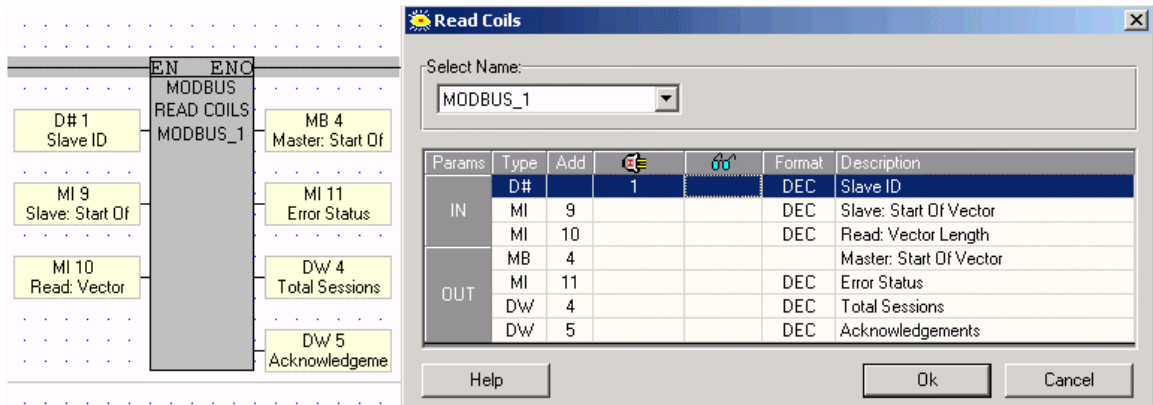
MODBUS: Scan

This enables a master device to access a slave PLC.



Read Coils (1)

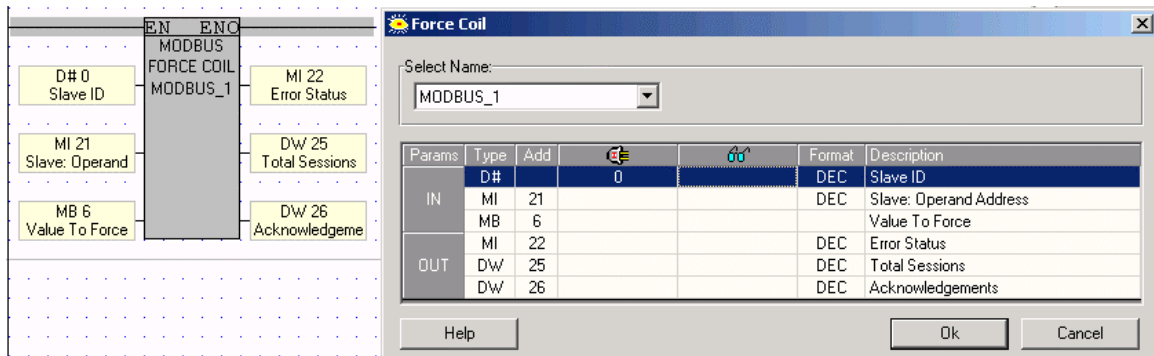
Use this command to read the status of a selected group of coils and write them into a vector. The coil's status is written into a vector of MBs in the master PLC.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the slave device containing the coils to be read (data source).
Slave:Start of Vector	Constant, MI, ML, or DW	The start of the vector of coils to be read (data source).
Read: Vector Length	Constant or MI	The vector length.
Master: Start of Vector	MB	This is the start of a vector of MBs that will contain the coils' status in the master (data destination)
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Force Coil (5)

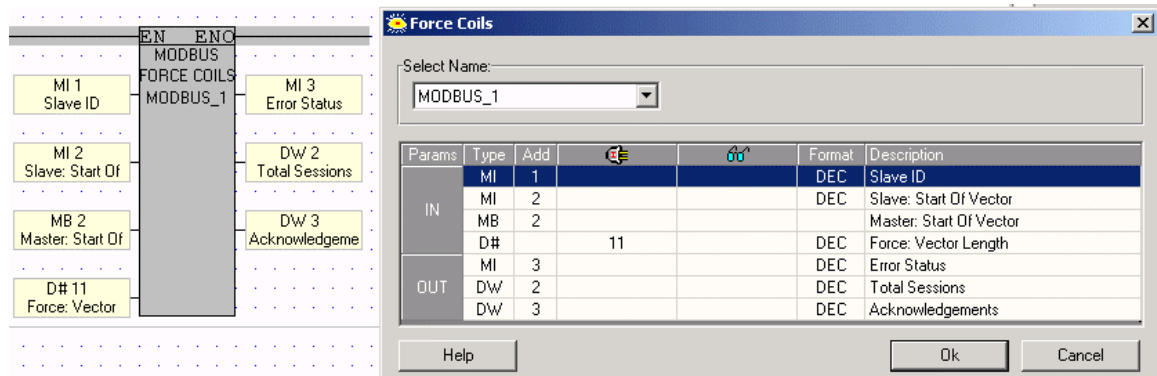
Use this command to force the status of a selected coil in a slave PLC. The coil's status is forced according to the status of a selected MB in the master PLC.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the coil to be forced (data source).
Slave Address	Constant, MI, ML, or DW	The address of the coil to be forced (data source).
Value to Force	M, SB, I, O, T	This MB is located in the master PLC; this MB contains the status to be forced. If, for example, the status of this MB is OFF, the status of the coil in the slave will be forced to OFF.
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Force Coils (15)

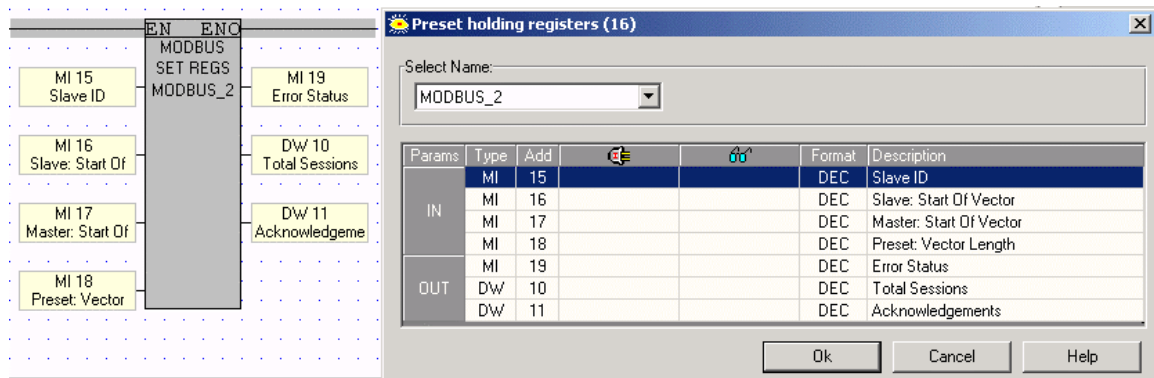
Use this command to force the status of a selected group of coils in a slave PLC. The coils' status is forced according to the status of a group of MBs in the master PLC.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the slave device containing the coils to be forced (target).
Slave:Start of Vector	Constant, MI, ML, or DW	The start of the vector of coils to be forced (data source).
Master: Start of Vector	M, SB, I, O,T	This is the start of a vector of MBs that will contain the coils' status in the master (data destination)
Force: Vector Length	Constant or MI	The vector length.
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Read Holding Registers (3)

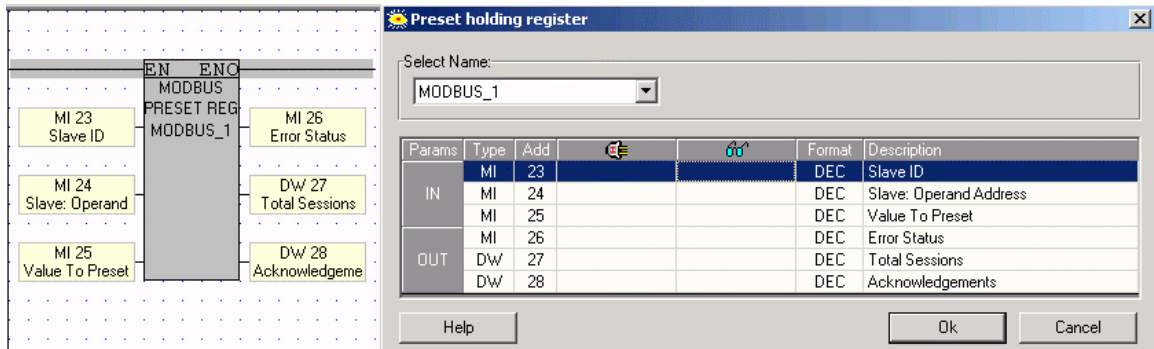
Use this command to read the values of a selected group of registers in a slave PLC and write them into a defined vector of registers in the master.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the registers to be read (data source).
Slave: Start of Vector	Constant, MI, ML, or DW	The start of the vector of registers to be read (data source).
Preset: Vector Length	Constant, MI, ML, or DW	The vector length.
Master: Start of Vector	MI, ML, or DW	This is the start of a vector of MIs that will contain the registers' values in the master (data destination)
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Preset Holding Register (6)

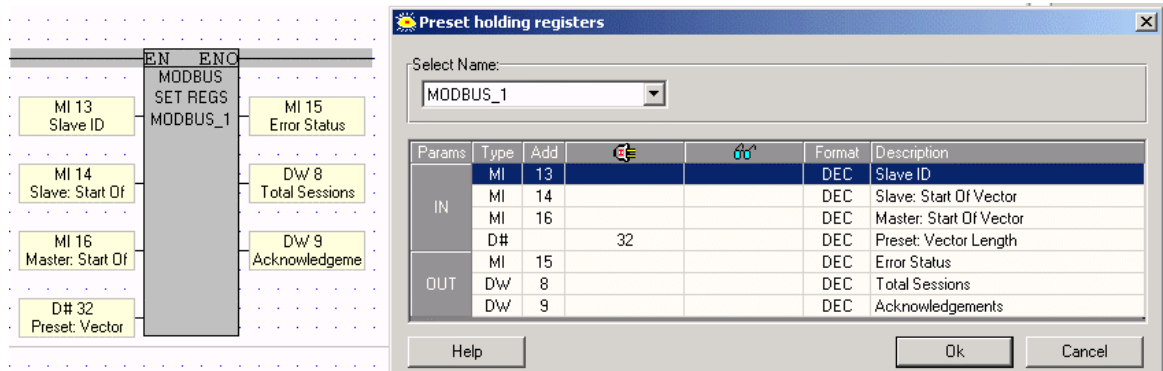
Use this command to preset the value of a single register in a slave PLC. The value is set in a register contained in the master PLC.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the register to be preset (target).
Slave: Operand Address	Constant, MI, ML, or DW	The address of the register to be preset (target).
Value to Preset	Constant, MI, SI, ML, SL, DW, SDW or T	This is the address of the register containing the value in the master PLC (source). This value will be written into the slave's register, the register that is to be preset.
Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Preset Holding Registers (16)

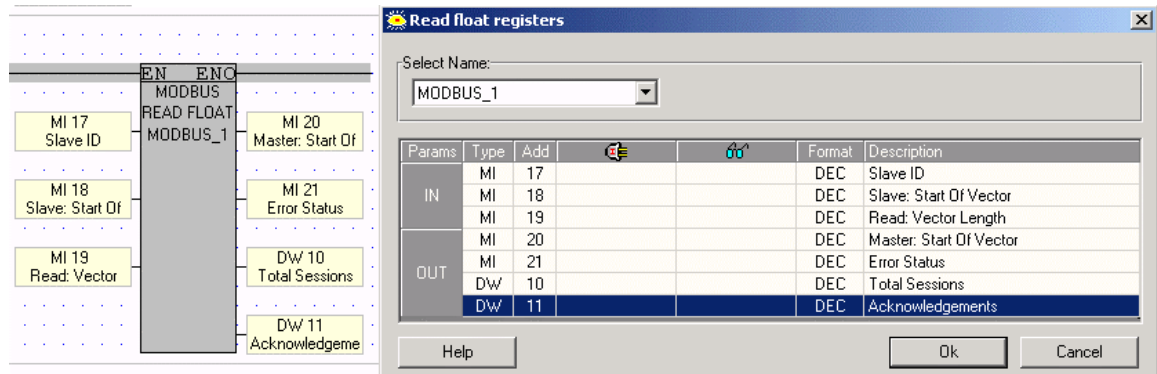
Use this command to preset the value of a group of registers in a slave PLC. The values are set in a vector of registers contained in the master PLC.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the registers to be preset (target).
Slave: Start of Vector	Constant, MI, ML, or DW	The start of the vector of registers to be preset (target).
Master: Start of Vector	Constant, MI, SI, ML, SL, DW, SDW or T	This is the start of a vector of MIs that will contain the registers' values in the master (data source)
Preset: Vector Length	Constant, MI, ML, or DW	The length of the vector of registers in both master and slave.
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Read Float Registers (3)

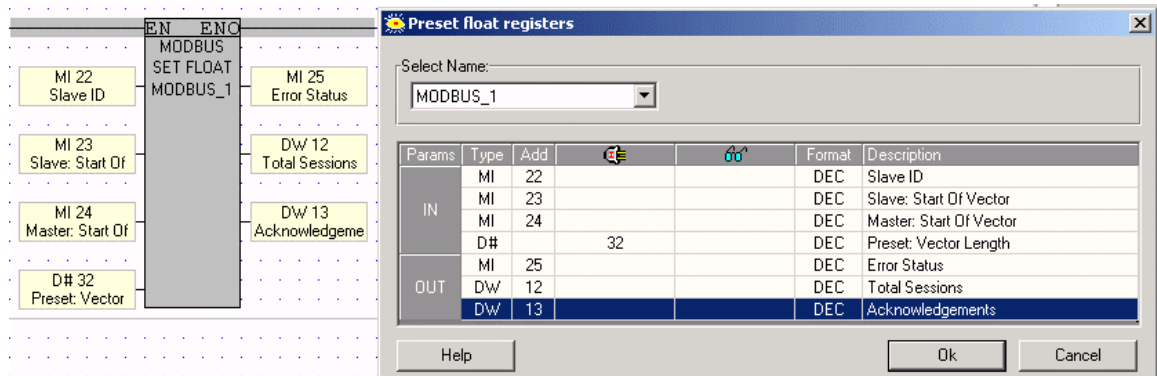
Use this command to read the values of a selected group of floating point registers in a slave device and write them into a defined vector of registers in the master. Values after the decimal point are rounded to the nearest whole value.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the registers to be read (data source).
Slave: Start of Vector	Constant, MI, ML, or DW	The start of the vector of registers to be read (data source).
Read: Vector Length	Constant, MI, ML, or DW	The vector length.
Master: Start of Vector	MI	This is the start of a vector of MIs that will contain the registers' values in the master (data destination)
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Preset Float Registers (16)

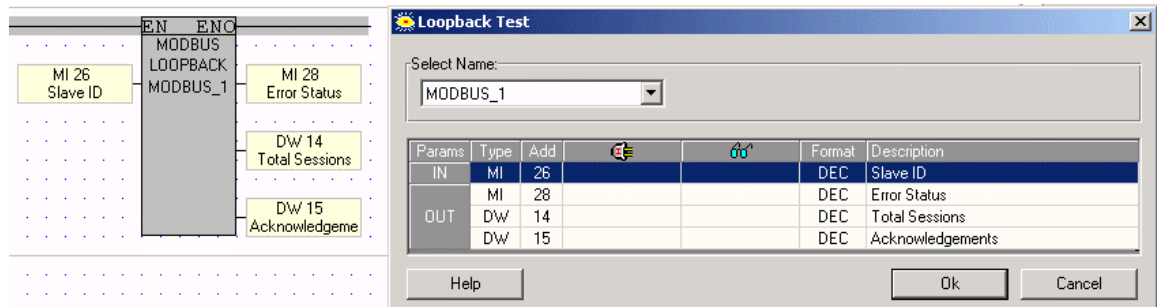
Use this command to preset the value of a group of floating point registers in a slave PLC. The values are set in a vector of registers contained in the master PLC. Values after the decimal point are rounded to the nearest whole value.



Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the register to be preset (target).
Slave: Start of Vector	Constant, MI, ML, or DW	The address of the register to be preset (target).
Master: Start of Vector	MI, SI, ML, SL, DW, SDW or T	This is the address of the register containing the value in the master PLC (source). This value will be written into the slave's register, the register that is to be preset.
Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements	DW	This is the number of times the slave device answers.

Loopback Test (8)

Use this command to send a test message to a slave device and receive Acknowledgements when communications are functioning properly.

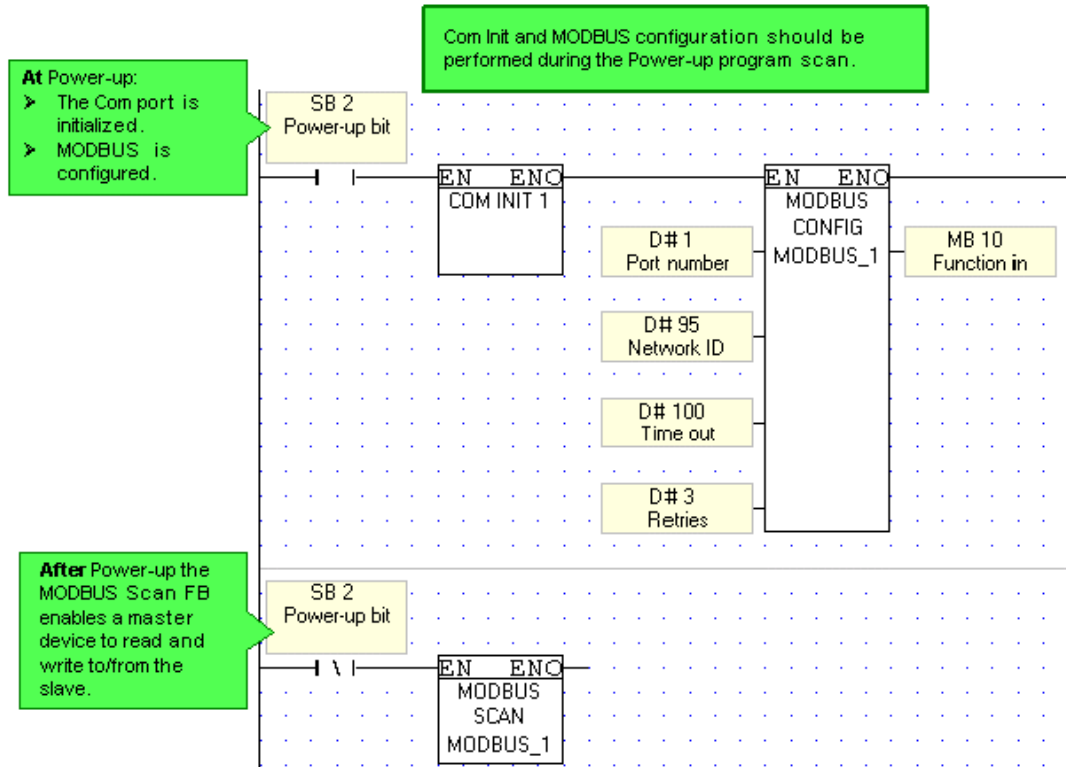


Parameter	Type	Function
Slave ID	Constant or MI	The ID of the device containing the coil to be forced (data source).
Error Status	MI	Shows an error message number. To diagnose the error, check the MODBUS Error Table.
Total Sessions	DW	This is the number of times the master PLC will attempt to access the slave device. Note that this is a simple incremental counter. Initialize it by storing 0 into the selected DW.
Acknowledgements DW		This is the number of times the slave device answers.

Configuring a MODBUS slave device

The Ladder section below shows what elements are necessary to enable a master device to read from a slave. Note that the MODBUS Scan operation should **not** be performed during the initial program scan.

Note that you must use a condition (RLO) to activate the MODBUS Configuration.



Slave Address Tables

The value in a pointer causes operands in a slave to be accessed as follows:

Registers

Unitronics' slave devices can return requested data in floating point format. Values after the decimal point are rounded to the nearest whole value.

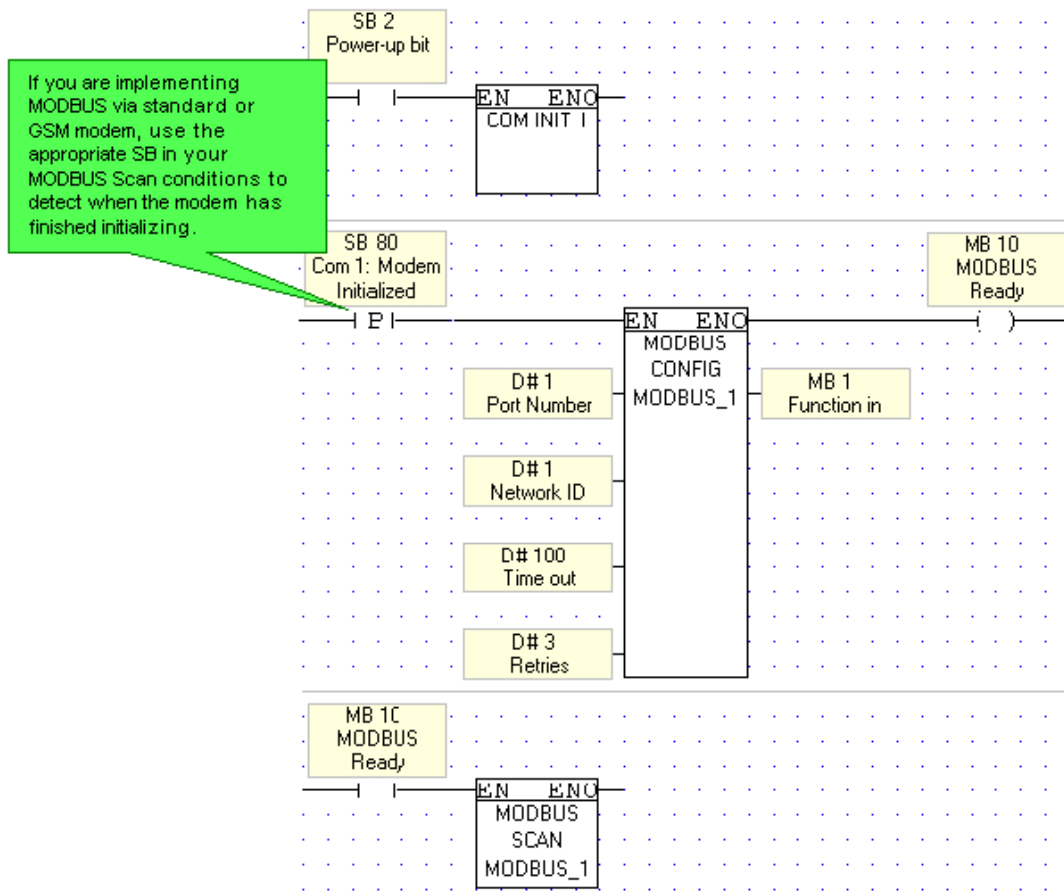
Pointer Value	Operand type	Register size	Convert to Float
From:			
0000	MI	16 bit	No
2000	MI	16 bit	Yes
4000	SI	16 bit	No
4550	SI	16 bit	Yes
5100	ML	32 bit	No
5600	ML	32 bit	Yes
6100	SL	32 bit	No
6200	SL	32 bit	Yes
6300	MDW	32 bit	No
6500	MDW	32 bit	Yes
6700	SDW	32 bit	No
6800	SDW	32 bit	Yes
6900	Timer preset	32 bit	No
7200	Timer current	32 bit	No

Coils

Note that you may use MODBUS 'coil' operations' to refer to any bit operand.

Pointer Value	Operand type
From:	
0000	MB
3000	SB
4000	I
5000	O
6000	T

MODBUS via GSM or Standard Modem



MODBUS Error Table

Error #	Error Message
0	No Errors
1	Illegal Function
2	Illegal Data Address
3	Illegal Data Value
4	Master--Time Out
5	No Communication
6	Mismatched Unit ID
7	Mismatched Command
8	Length of message
9	Function not supported
10	Illegal format
11	Mismatched received data

SMS Messaging

SMS messaging is a feature offered by cellular telephone services. SMS-enabled controllers can use SMS messaging to send and receive data to and from a cell phone or other cellular device. Both fixed text and variable data can be communicated. This feature can be used to transmit data and for remote diagnostics.

SMS messaging is featured in several sample applications; these may be found by selecting VisiLogic Sample Projects from the Help Menu.



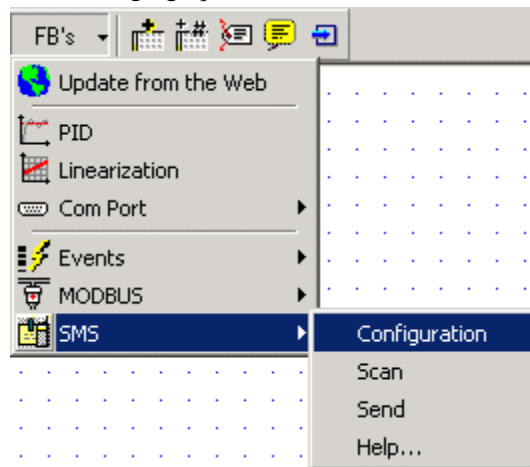
In order to use this feature, you must connect an SMS-enabled PLC to a modem that supports connection to a cellular network.

SMS messaging is subject to the limitations of cellular networks, such as network availability.

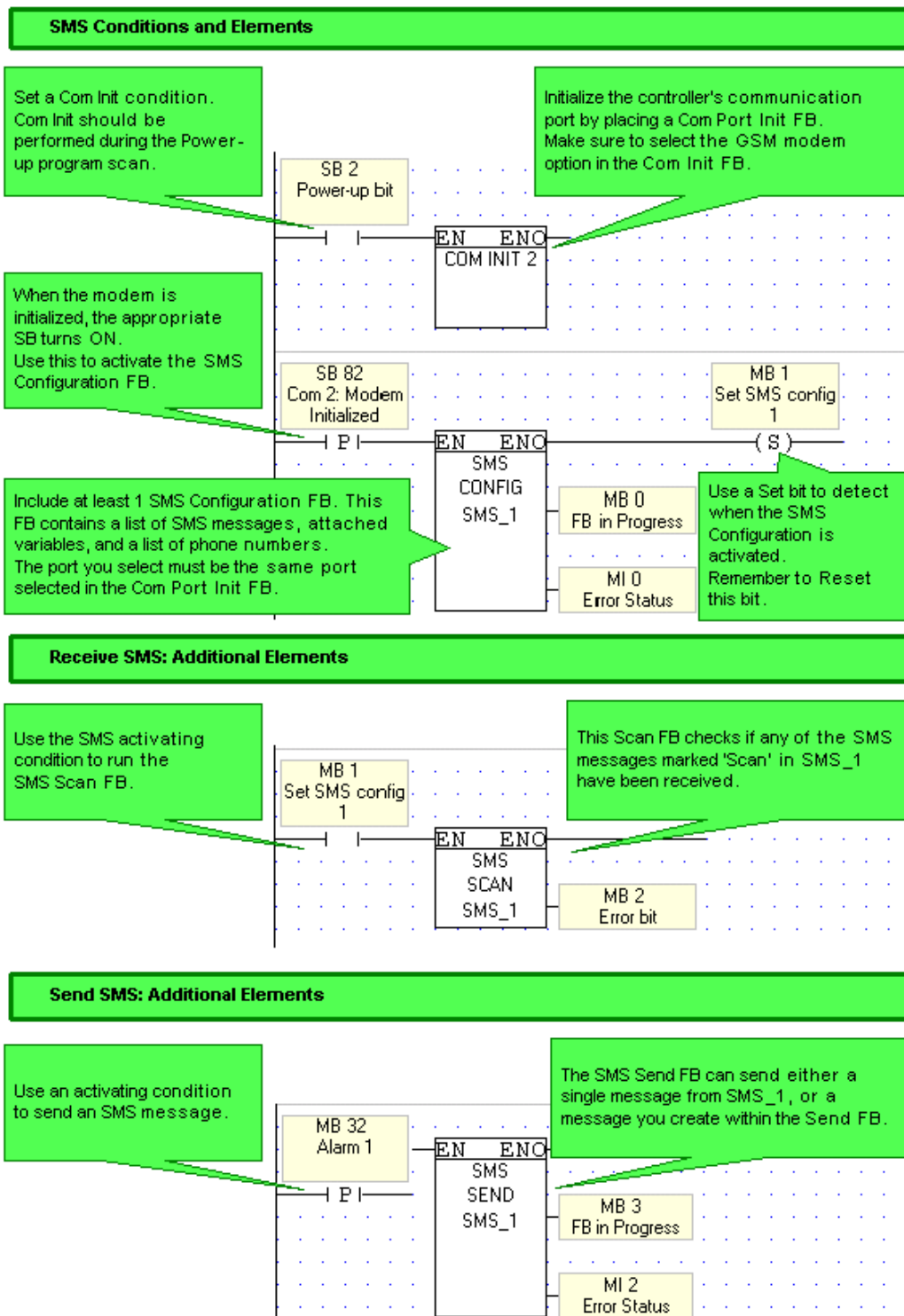
Note that SMS messages are limited to the English character set.

Using SMS Messaging

To enable a controller to use SMS messaging, you must use a modem that supports connection to a cellular network. SMS messaging operations are located on the FBs menu.

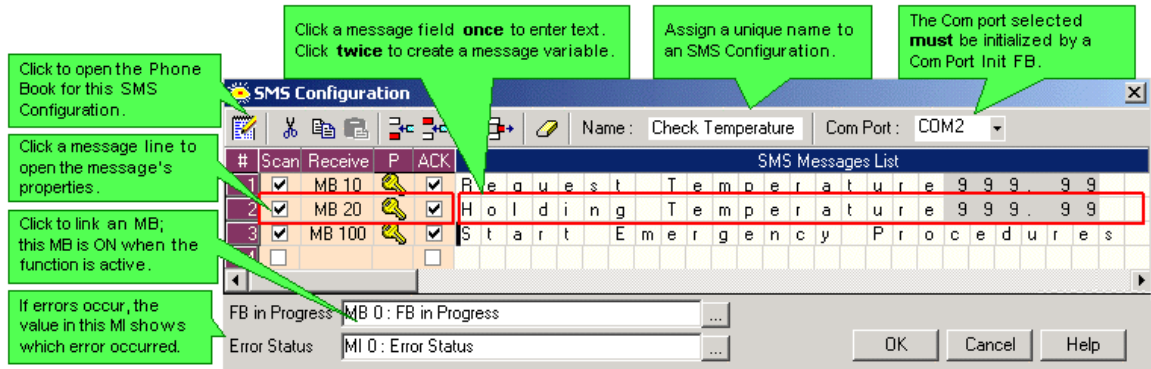


SMS Message Conditions and Elements



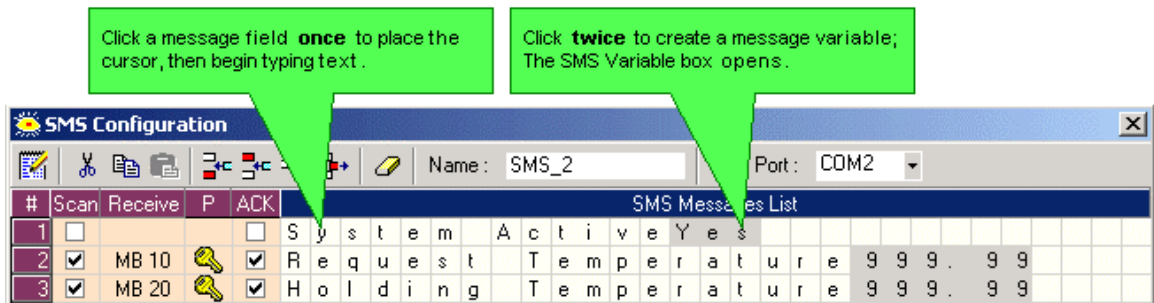
SMS: Configuration

An SMS Configuration contains a list of SMS messages with attached variables and a phone book that is unique to that configuration. SMS Configuration is also where you define Message Properties.



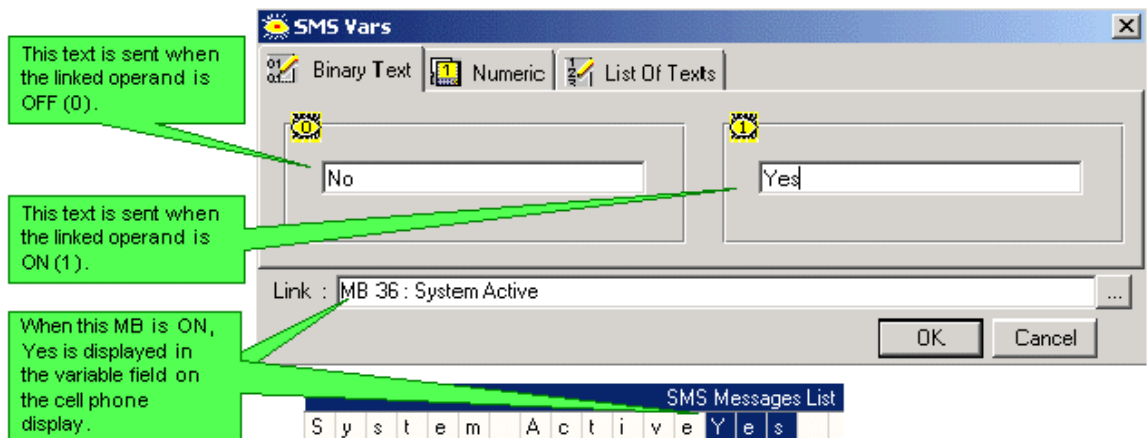
Creating SMS Messages & Variables

A single SMS message can be up to 140 characters long, and can contain both fixed text and up to 10 variables. Note that although the PLC can send Binary Text, Numeric, and List of Texts variables, it can only receive Numeric variables.



Binary Variable

This type of variable displays different text in the SMS variable field according to the status of a bit operand.



Number Variable

A Number Variable enables you to:

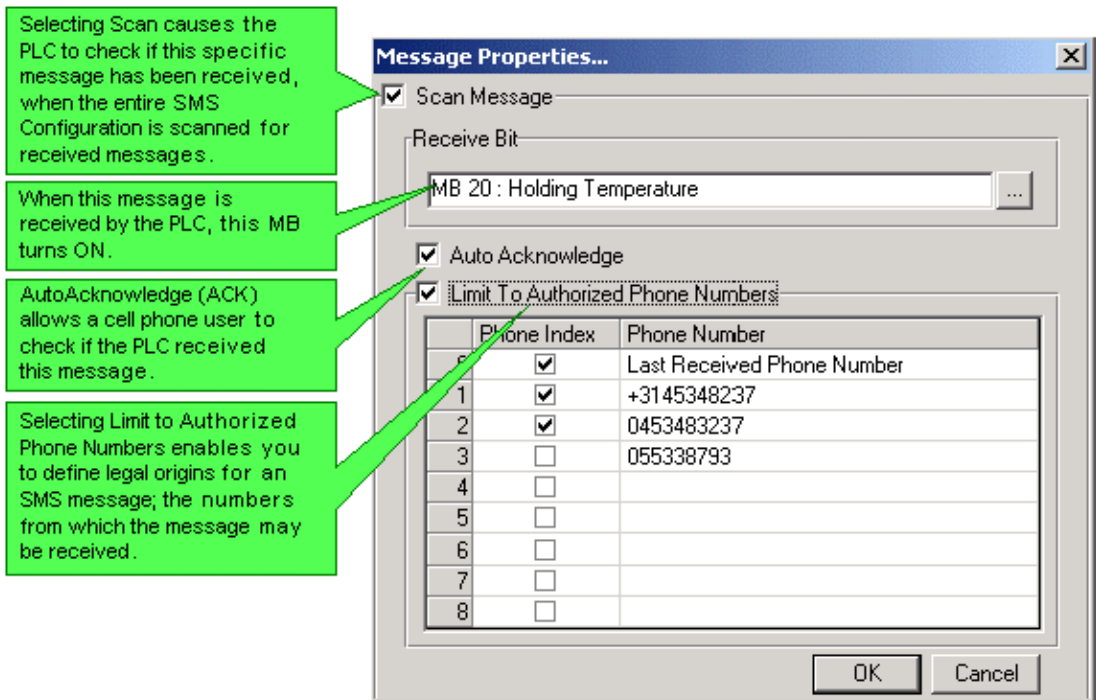
- Show any numeric value within a message.
- Control the format in which that value is shown, including the placement of a decimal point and leading zeros.
- Use Linearization to show a converted value, such as an analog temperature converted to degrees Celsius.

List of Texts: by Pointer

This type of variable contains numbered lines of text. You link the Variable to an operand. The value within that operand 'points' to the number of a line within the list. When the operand value is equal to a particular line number, the text of that line is shown in the Display.

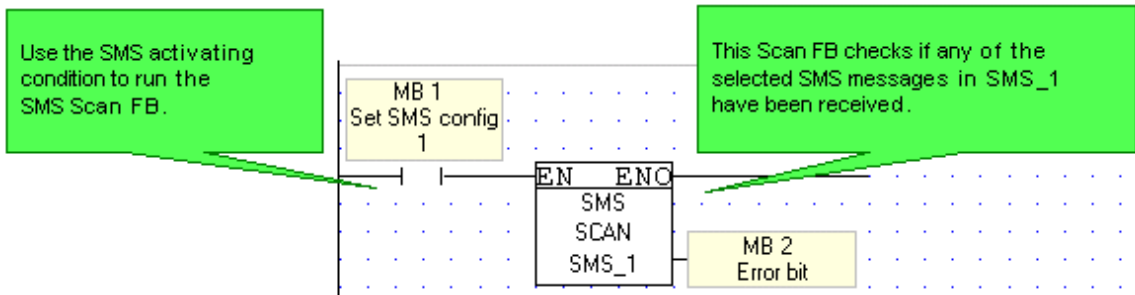
Message Properties

This defines how the PLC deals with a specific SMS message that is **received** by the system. Note that a SMS Scan FB must be placed in the Ladder to enable the PLC to check a specific SMS Configuration for received messages.



SMS: Scan

To enable the PLC to check a specific SMS Configuration for received messages, place an SMS Scan FB in your Ladder application..



When the PLC scans the SMS configuration, the Message Properties of each message define how the PLC deals with that message.

Scan Message
 Receive Bit
 MB 20 : Holding Temperature

Auto Acknowledge
 Limit To Authorized Phone Numbers

Phone Index	Phone Number
0	<input checked="" type="checkbox"/> Last Received Phone Number
1	<input checked="" type="checkbox"/> +3145348237
2	<input checked="" type="checkbox"/> 0453483237
3	<input type="checkbox"/> 055338793
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6	<input type="checkbox"/>
7	<input type="checkbox"/>
8	<input type="checkbox"/>

OK Cancel

Selecting Scan causes the PLC to check if this specific message has been received, when the entire SMS Configuration is scanned for received messages.

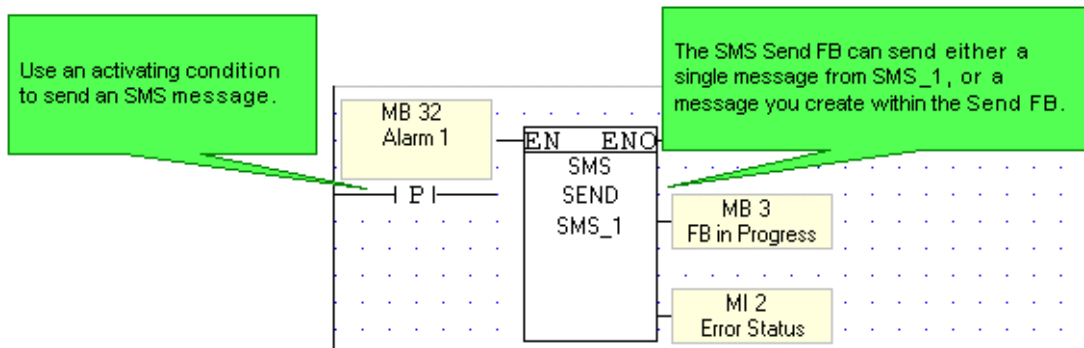
When this message is received by the PLC, this MB turns ON.

AutoAcknowledge (ACK) allows a cell phone user to check if the PLC received this message.

Selecting Limit to Authorized Phone Numbers enables you to define legal origins for an SMS message; the numbers from which the message may be received.

SMS: Send

To send an SMS, place an SMS Send operation in your Ladder application. Before you can send an SMS, you must initialize a Com port to use a GSM modem, create an SMS Configuration, and set conditions as explained in Using SMS Messaging.



Note that you can send only one SMS message at a time, but that you may send it to multiple phone numbers.

Name: Check Temperatur Com Port: COM2
 Compose Message Select From List

SMS Messages List

#	System	Active	Yes
1			

FB in Progress MB 3 : FB in Progress
 Error Status MI 2 : Error Status

OK Cancel Help

Select the SMS Configuration you wish to use. If you compose a message, it will be sent via the Com port selected in the SMS Configuration.

Click to open the Phone Book and select number(s).

Select this tab to write a message.

Click to link an MB; this MB is ON when the function is active.

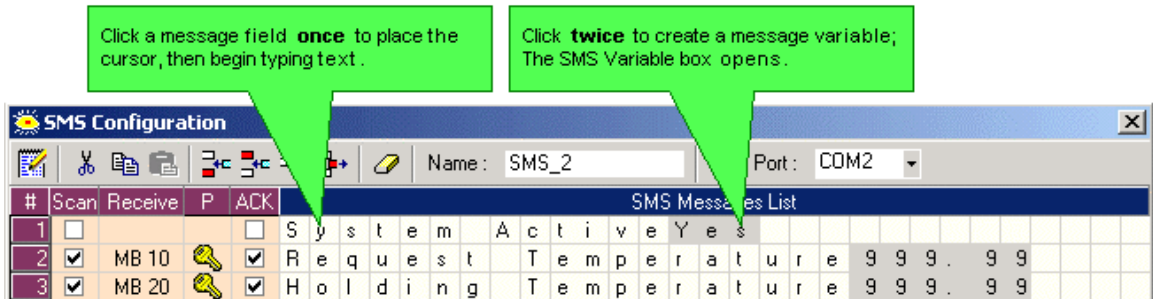
If errors occur, the value in this MI shows which error.

Select this tab to select a message from the SMS configuration.

SMS Variables

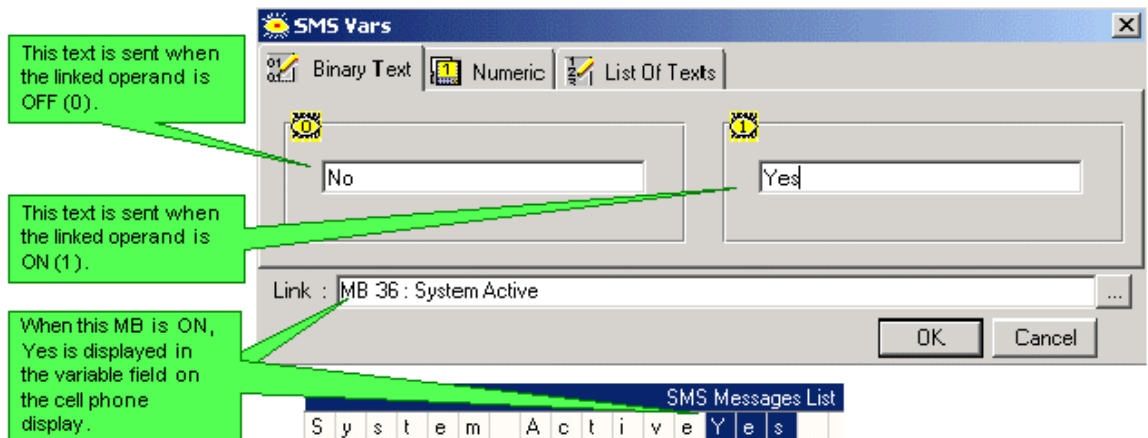
A single SMS message can contain both fixed text and up to 10 variables. Note that SMS variables are not related to HMI variables.

Although the PLC can send Binary Text, Numeric, and List of Texts variables, it can only receive Numeric variables.



Binary Variable

This type of variable displays different text in the SMS variable field according to the status of a bit operand. The value currently visible is the last value sent.



Number Variable

A Number Variable enables you to:

- Show any numeric value within a message.
- Control the format in which that value is shown, including the placement of a decimal point and leading zeros.
- Use Linearization to show a converted value, such as an analog temperature converted to degrees Celsius.

SMS Vars

Binary Text | **Numeric**

Entry Limits
 Min: 39 Max: 42

Format: 3 . 2
 999.99
 Leading zeros

Linearization

Display: Max 0 Min 100
 Op Value: Min 0 Max 1023

Link: MI 10 : Requested Temperature

OK Cancel

SMS Messages List
 R e q u e s t T e m p e r a t u r e 9 9 9 . 9 9

Callouts:
 - Prevents the entry of an 'illegal' value. (points to Entry Limits)
 - Set the range for a 'legal' value. (points to Min/Max)
 - Use these to determine:
 - the number of digits to be displayed.
 - decimal point position. (points to Format)
 - Allows you to convert values, for example from analog to digital. (points to Linearization)
 - This is the range for the 'y' axis value. (points to Op Value Max)
 - This is the range for the 'x' axis value. (points to Op Value Min)
 - The numeric value will be shown in the variable field. (points to the variable field)

List of Texts: by Pointer

This type of variable contains numbered lines of text. You link the Variable to an operand. The value within that operand 'points' to the number of a line within the list. When the operand value is equal to a particular line number, the text of that line is shown in the Display.

SMS Vars

Binary Text | Numeric | **List Of Texts**

	Text
0	Pressure Low
1	Pressure Within Limits
2	Pressure High
3	

Link: MI 4 : Pressure Gauge

OK Cancel

SMS Messages List
 P r e s s u r e S t a t u s : P r e s s u r e H i g h

Callouts:
 - The text on a line is linked to a number. (points to list item 2)
 - When the value in M4 is 2, 'Pressure High' will be shown in the variable field. (points to Link)

Sending SMS messages from a GSM cell phone

To send SMS messages from your cell phone to your PLC, you must:

- Create and download a project to your PLC that includes SMS Configurations, set Message Properties, and define conditions as described in Using SMS Messaging.
- Write an SMS message in your cell phone.
- Send the message to the PLC's GSM modem

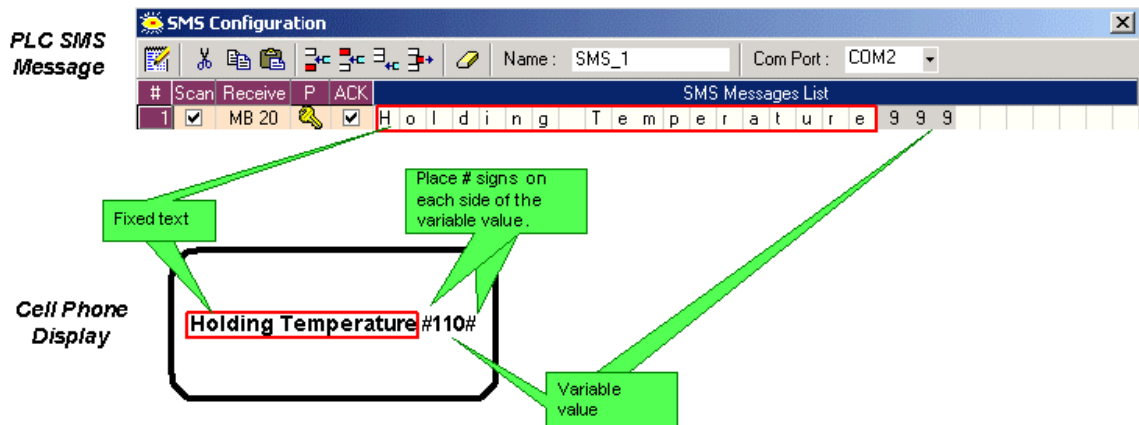
Note that you can only send messages that are already part of an SMS Configuration in the PLC. In addition, if the Limit to Authorized Phone Numbers option is selected in the SMS configuration, the cell phone number must be in the list .

Writing SMS messages in your cell phone

You write an SMS message using your cell phone keypad. Make sure that:

- The fixed text in your cell phone is identical to the message in the PLC's SMS Configuration **in every detail**: spaces, characters--and note that characters are case-sensitive.
- You bracket variable values with number signs (#) as shown below. These signs '#' do **not** count as spaces.
- The variable field in the SMS message is big enough to hold the value.

The figure below shows the same SMS message: as it appears on a cell phone display, and as it appears in the PLC's SMS Configuration.



When you send this message from your cell phone, the value 110 will be written into the variable in the PLC.

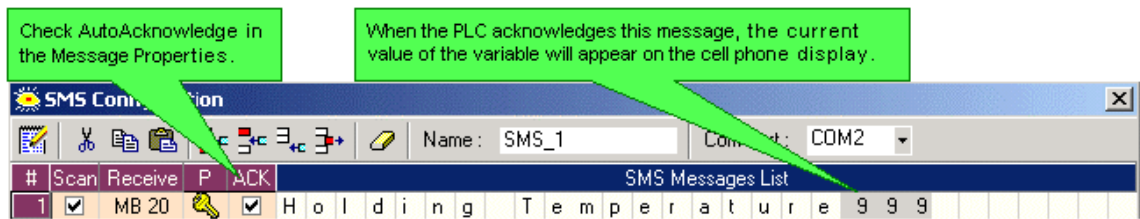
Sending the message to the PLC

1. Enter the number of the PLC's GSM modem exactly as you would enter any GSM cell phone number, then send the message.

Checking that the PLC has received the SMS message

You can check if the PLC received your message by using the Acknowledge feature:

2. Select 'Acknowledge' in Message Properties, the **ACK** box is checked as shown below.



- Use your cell phone to send the message "**Holding Temperature:#110#**" to the PLC.

Cell Phone Display



- The PLC receives this SMS message; AutoAcknowledge causes the PLC to immediately return the message to your cell phone, together with the current variable value.
- You can now view this SMS message on your cell phone display, together with changes in the variable value.

Cell Phone Display



Note that although the PLC can send SMS messages that include Numeric, Binary, and List variables, the PLC can only receive Numeric variables.

Modem SBs, SIs and Error Messages

System Bits & Integers

Modem status can be checked via the System Bits listed below.

SB	Description
80	Modem Initialized: COM 1
81	Modem Initialization Failed: COM 1
82	Modem Initialized: COM 2
83	Modem Initialization Failed: COM 2
84	Modem Initialized: COM 3
85	Modem Initialization Failed: COM 3

Modem Status and Error Messages may be found in the System Integers listed below.

SI	Description
80	Modem Status: COM 1
81	Modem Error Code: COM 1
82	Modem Status: COM 2
83	Modem Error Code: COM 2
84	Modem Status: COM 3
85	Modem Error Code: COM 3

Modem Status Messages (SI 80, 82, 84)

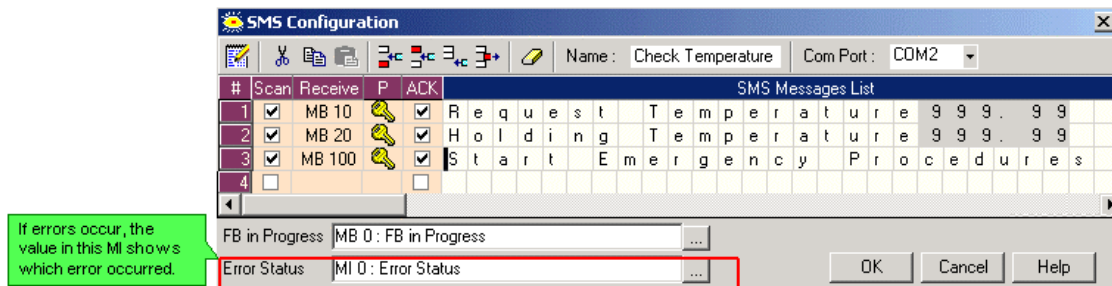
Value	Message
0	Modem idle
1	Initialization in progress
2	Initialization: successful
3	Initialization: failed
4	Hang-up in progress
5	Dial in progress

Error Messages (SI 81, 83, 85)

Value	Message
0	No error
1	TimeOut time exceeded: no reply
2	Reply Error
3	Wrong PIN number
4	Registration failed
5	PUK number needed

SMS Error Messages

The error code will be placed in the Error Status MI.



Value Message

0	No error
1	Phone number is not in book, or is not in the correct format
2	Non-existent SMS message index number
3	SMS received from unauthorized phone number
4	The SMS received does not exist in the SMS configuration
5	TimeOut time exceeded: no reply
6	The variable received does not exist in the SMS configuration, or is not in the correct format
7	Modem Reply Error
8	Unknown Modem Reply
9	SMS is in the incorrect format and may not be transmitted

Events: Registering an MB status change

An Event is the change in status of an MB from OFF (0) to ON (1). Events can be used, for example, to monitor the status of an array of alarm bits.

The Event: Scan enables you to:

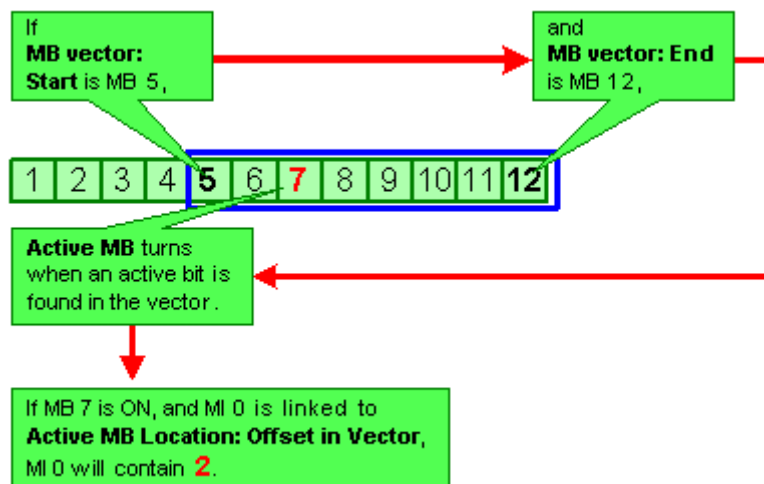
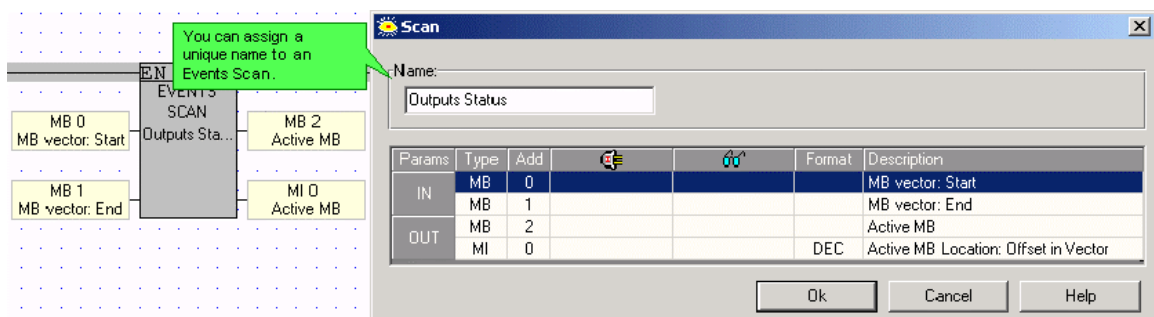
- Define a vector of MBs.
- Locate the **first** MB that is ON (active) within that vector
- Record the MB's location.

Other Event operations enable you to:

- Move between the active MBs within that vector
- Change MB status from ON to OFF.

Events: Scan

Use the Events: Scan to define a vector of MBs and locate the first positive bit within that vector. Once you have defined a vector of MBs using the Events Scan FB, you can perform other actions within that vector using Event operations.

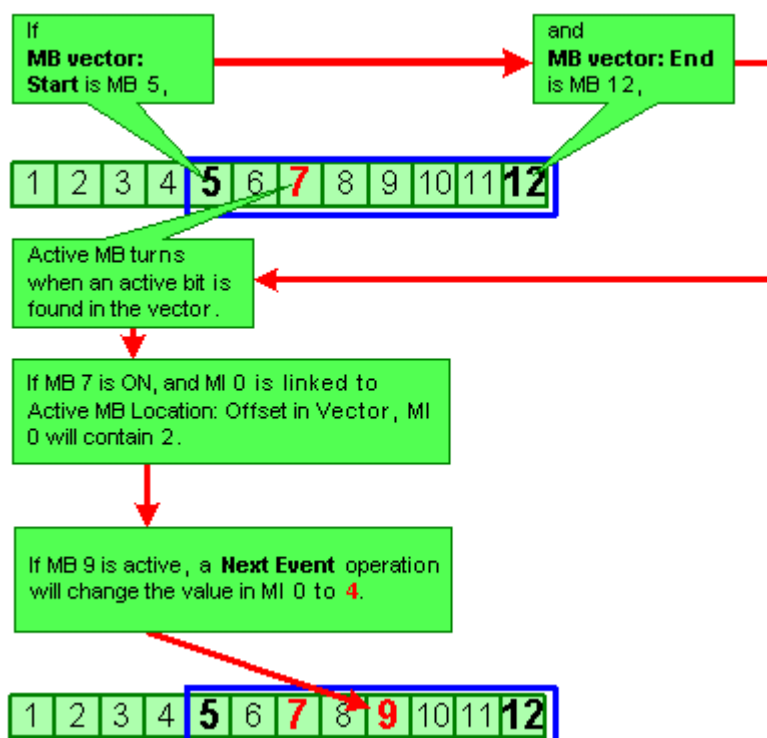
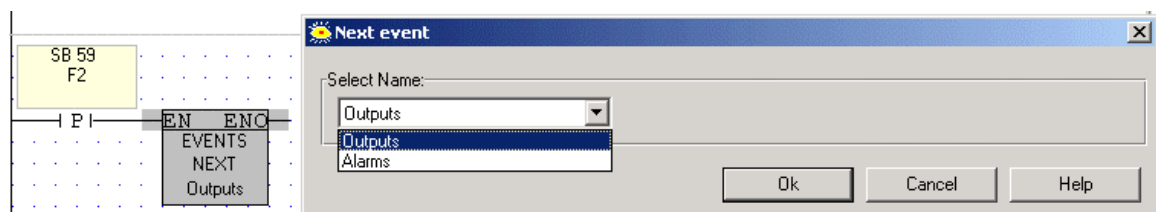


Operand	Function
MB Vector: Start	The first MB of the vector to be scanned.
MB Vector: End	The last MB of the vector to be scanned.
Active MB	Turns ON when an active bit is located.
Active MB Location: Offset in Vector	Contains the location of the Active MB, relative to the beginning of the defined vector.

Next Event

Once a vector of MBs has been defined using the Event Scan FB, the Scan finds the first active MB in the vector.

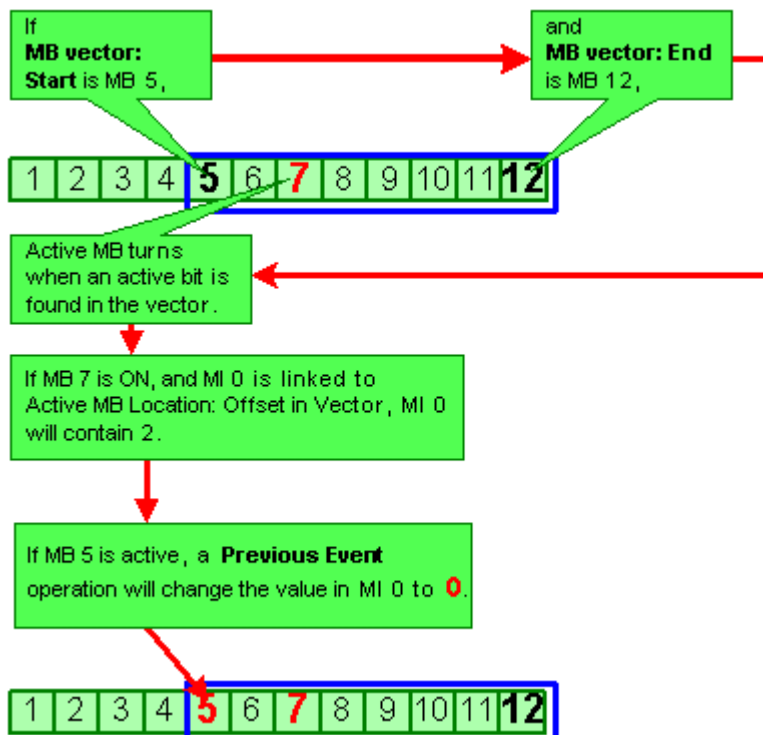
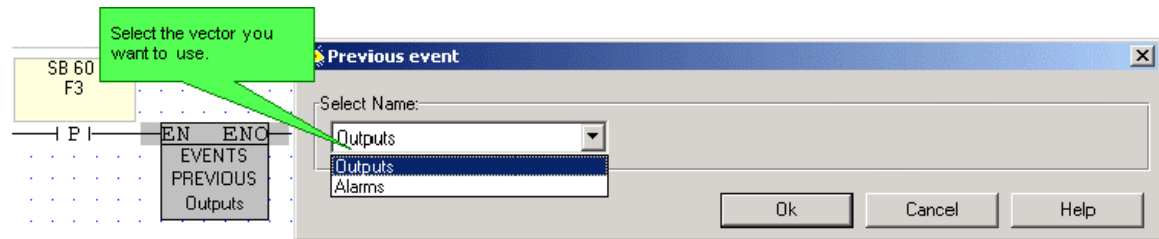
Use the Next Event operation to move to the next active MB in the vector, in the direction of the Most Significant Bit.



Previous Event

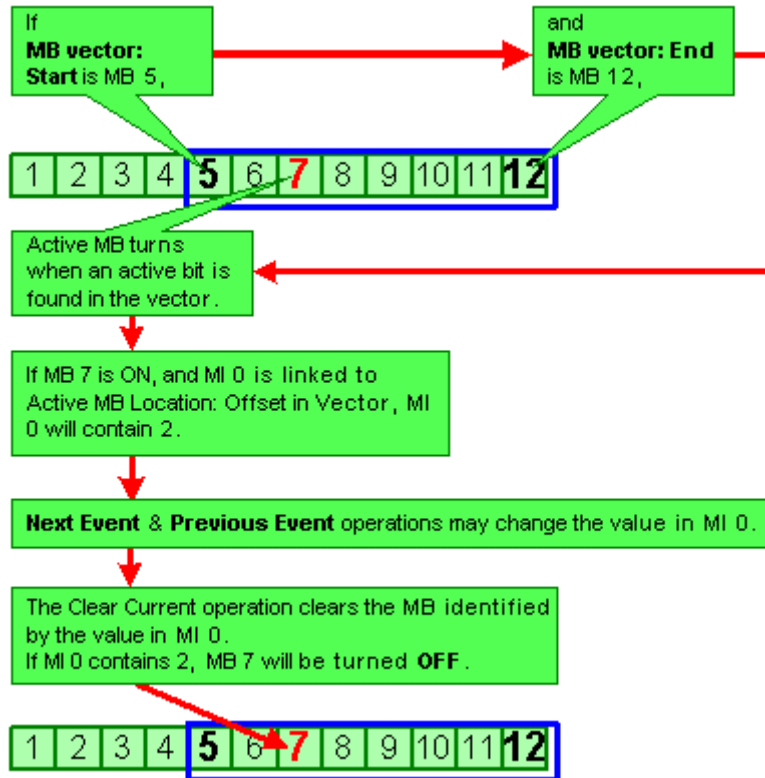
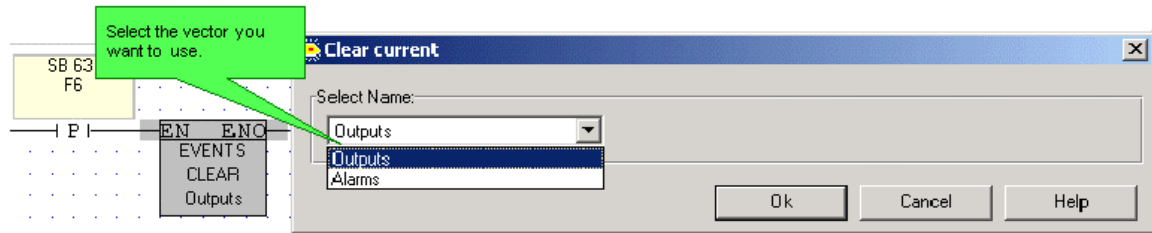
Once a vector of MBs has been defined using the Event Scan FB, the Scan finds the first active MB in the vector.

Use the Previous Event operation to move to the previously active MB in the vector, in the direction of the Least Significant Bit.



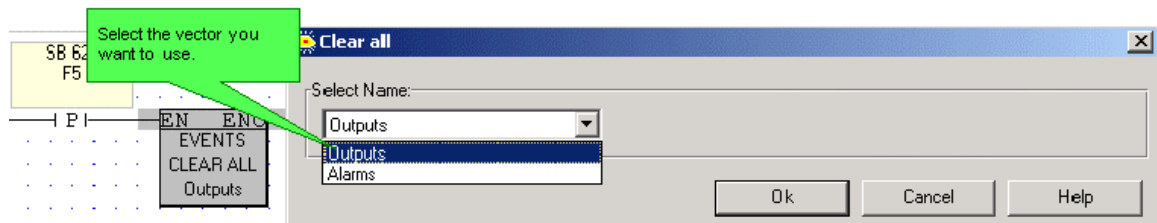
Clear Current

Use the Clear Current operation to reset a currently active MB.



Clear All

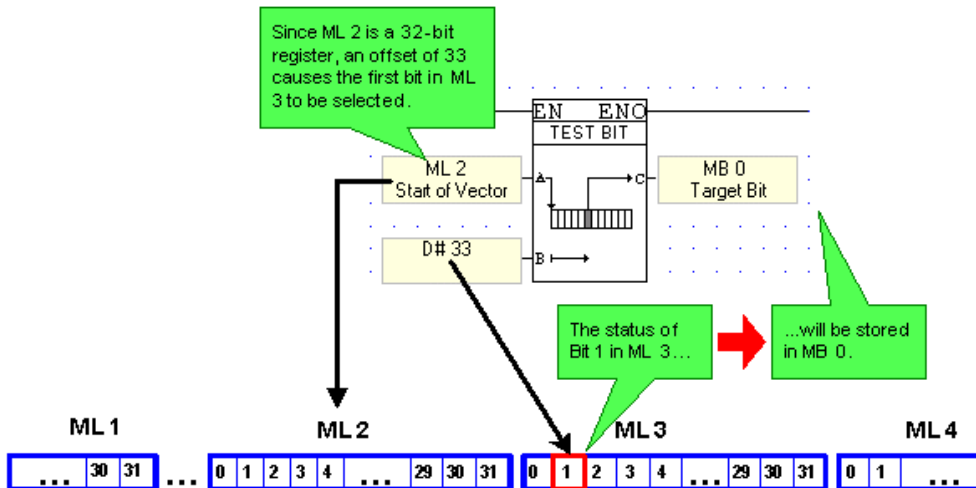
This operation causes **all** of the active MBs in an Event vector to be reset.



Test Bit

Test Bit enables you to select a bit within a vector of registers, and store its status in an MB.

- Operand A, **Start of Vector**, determines the start of the vector of registers.
- Operand B, **Offset in Vector**, selects the bit within that vector.
- Operand C, **Target Bit**, determines where the value of the selected bit will be stored.



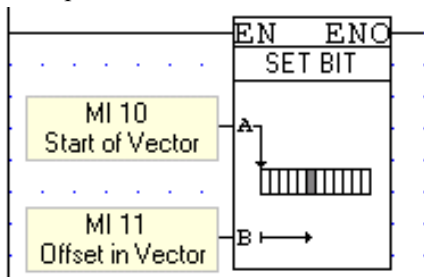
The function is located under the Logic menu on the Ladder toolbar.

Set/Reset Bit

Set Bit enables you to select a bit within a vector of registers, and set it.

Reset Bit enables you to select a bit within a vector of registers, and reset it.

- Operand A, **Start of Vector**, determines the start of the vector of registers.
- Operand B, **Offset in Vector**, selects the bit within that vector.

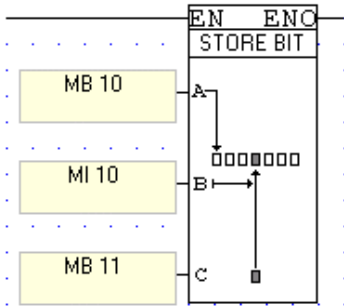


The functions are located under the Logic menu on the Ladder toolbar.

Store Bit Status

Use this to select an MB and store its status in an MB within a defined vector.

- Operand A, **Start of Vector**, determines where the vector begins.
- Operand B, **Offset in Vector**, selects the target bit within that vector.
- Operand C, **Bit Value**, determines the source bit. The status of this bit will be stored into the target bit within the defined vector.

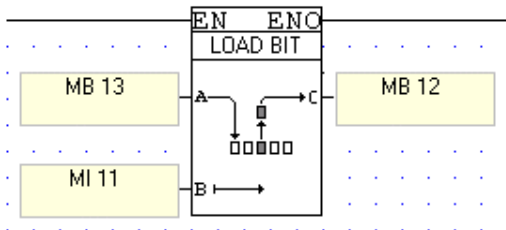


The function is located under the Logic menu on the Ladder toolbar.

Load Bit Status

Use this to select an MB within a defined vector and load its status in an MB outside of that vector.

- Operand A, **Start of Vector**, determines where the vector begins.
- Operand B, **Offset in Vector**, selects the source bit within that vector.
- Operand C, **Bit Value**, determines the target bit--**where** the value of the source bit will be stored.

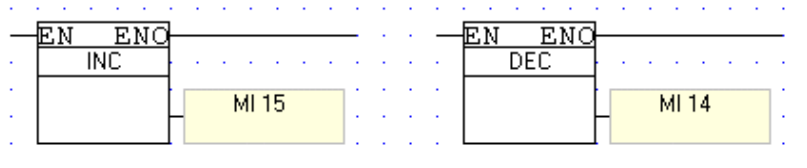


The function is located under the Logic menu on the Ladder toolbar.

Increment/Decrement

Increment increases the value in the selected operand by 1.

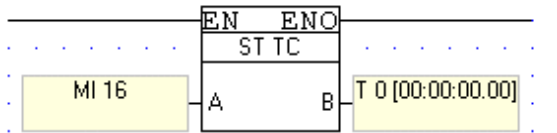
Decrement decreases the value in the selected operand by 1.



Store Timer: Current Value

You can store a current timer value into an operand.

- Operand A: contains the timer value.
- Operand B: this is where the value will be stored.

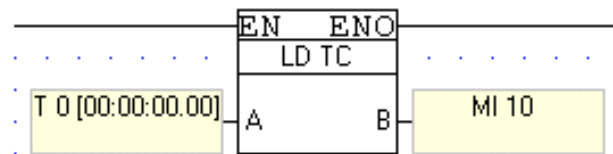


Note that the value that is stored in the Timer is broken down into units of 10 milliseconds. In the above example, if MI 16 is equal to 1023, the value stored into T0 will be 10 seconds and 23 milliseconds.

Load Timer: Current Value

You can load the current value of a Timer into an operand.

- Operand A: this is the Timer's current value.
- Operand B: this is where the value will be stored.




Note that the value in the Timer is in units of 10 milliseconds. In the above example, if T0 is equal to 10 seconds and 23 milliseconds, the value 1023 will be stored into MI 10.

Font Handler

Font Handler enables you to define the fonts and character sets you use to write text in Displays.

Use Font Handler to:

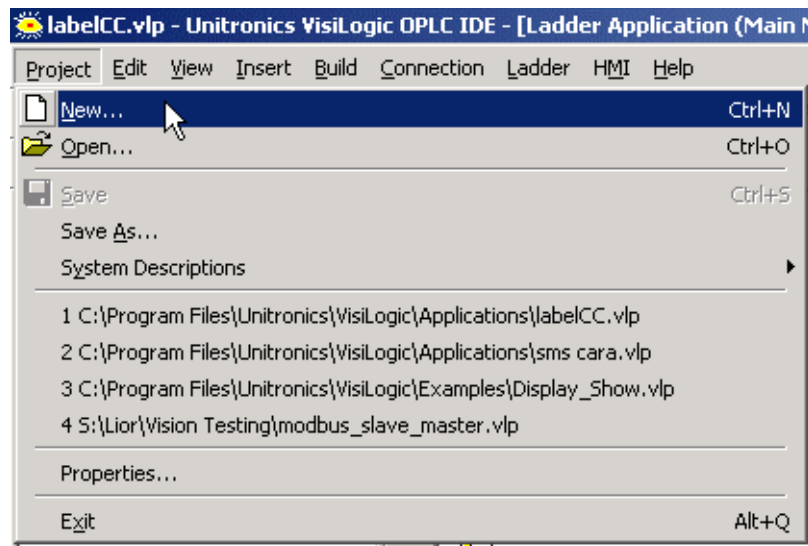
- Add fonts. Note that VisiLogic is supplied with a single default font.
- Define fonts, including size, style, and effect.
- Delete unused fonts, and unused characters. This can dramatically decrease the amount of memory fonts will occupy in the controller once the application is downloaded.
- Select foreign or special characters, such as degree signs.

Open Font Handler by clicking the  icon on the toolbar, or by selecting it from the HMI menu.

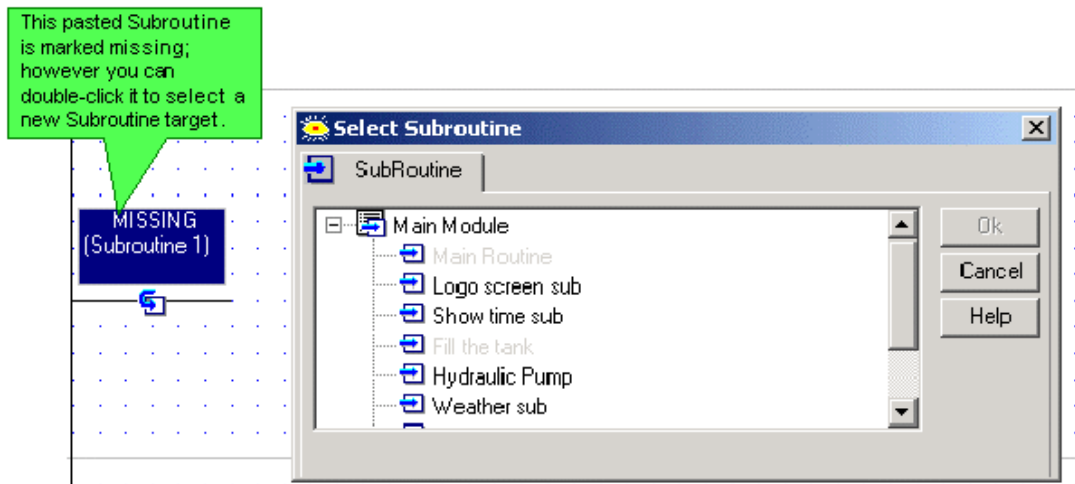
Move, Copy, & Paste Nets Between Projects

You can cut, copy and paste nets **between projects**, subject to the information listed below:

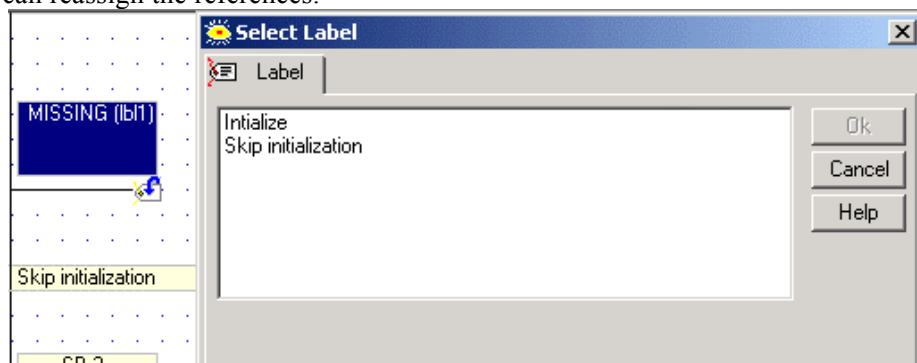
- Once you have cut or copied your selection from the source project, open a target project without closing VisiLogic, either by using the New Project or Open project buttons or via these options on the Project menu. If you close VisiLogic, the selection will be lost.



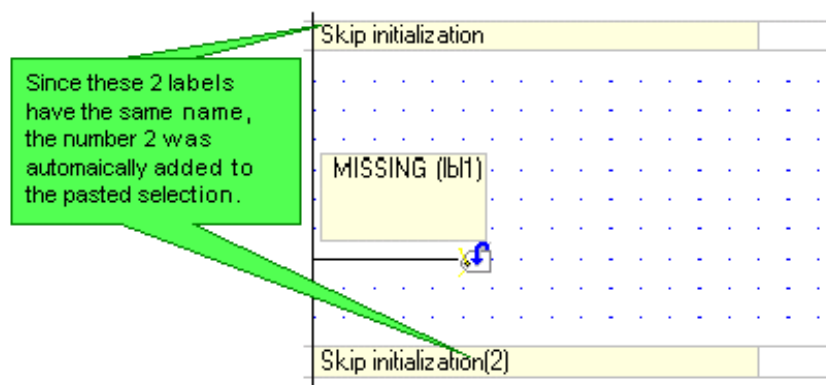
- If the source project contains Call Subroutine or Load HMI operations, note that the referenced elements will be marked as **missing**, even if the target project contains elements of the same name. Note that you can reassign the references.



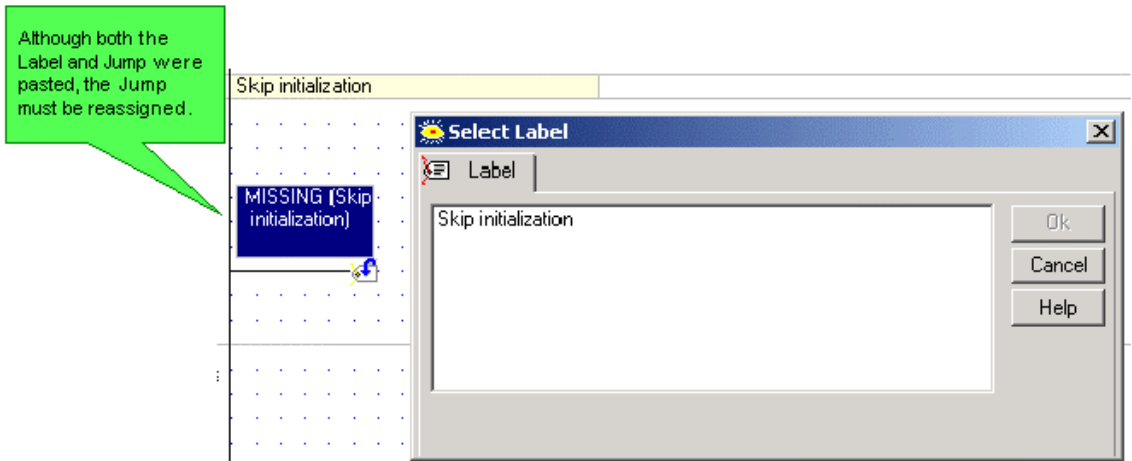
- If the selection contains FBs, and no FBs of that type currently exist in the target project, the pasted FBs will be the version currently in VisiLogic FB library--in other words, if the source selection contains older FB versions, they are automatically updated during the Paste operation.
- If the selection contains FBs, and FBs of that type currently exist in the target project in a **different** version, Paste cannot be completed.
- If your selection contains only Labels, without the attendant Jump to Label, they will be marked as **missing**, even if the target project contains Jumps of the same name. Note that you can reassign the references.



- If the selection contains Labels or Jumps with the same name as those in the target project, these will be automatically renamed by the program when they are pasted.



- If you copy both Labels and Jump to Label, the Jumps will be marked as missing. Note that you can reassign the references.

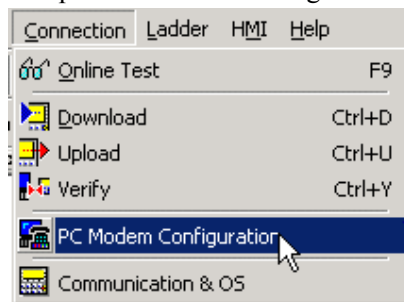


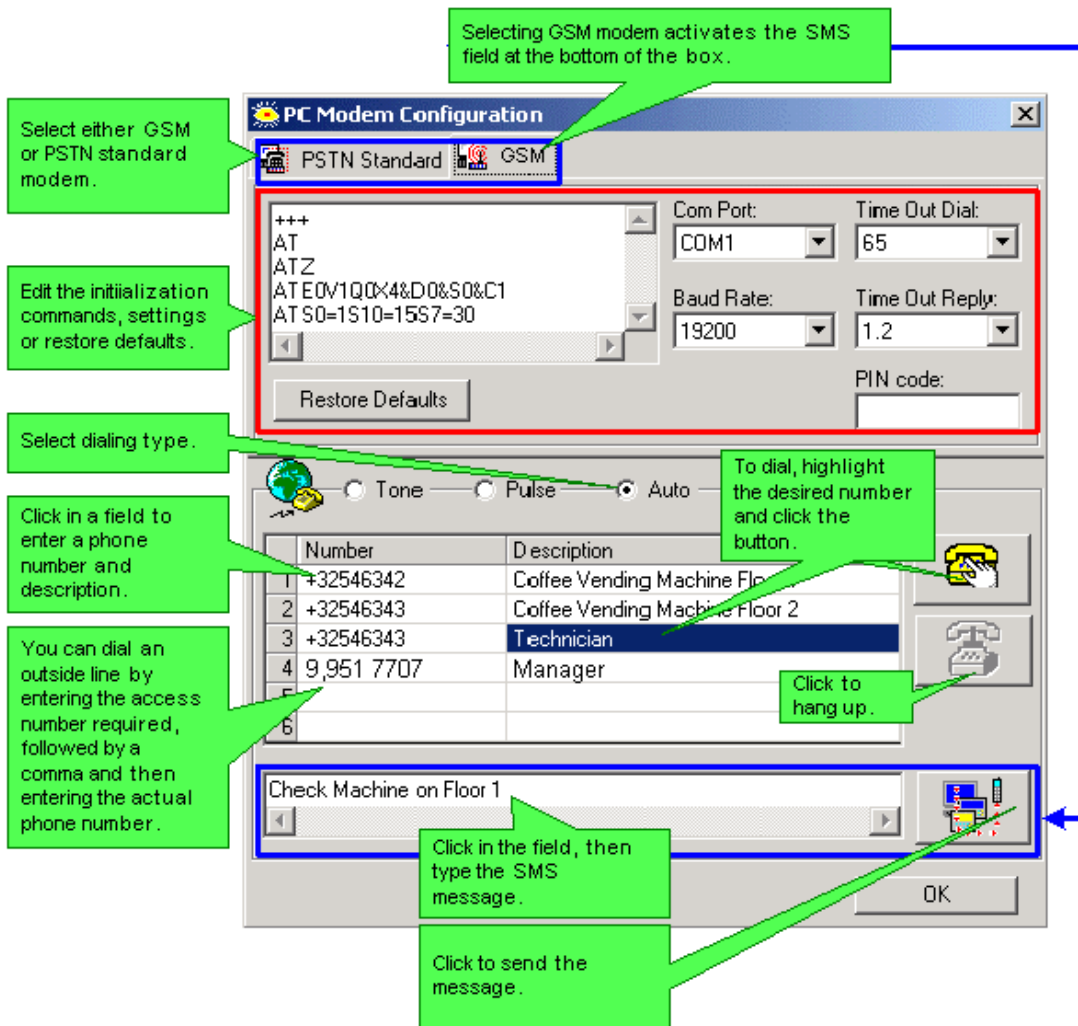
Configuring a PC's Modem

You can access a remote controller via modem to:

- Download and upload applications.
- Test and troubleshoot problems in remote controllers and applications.
- Send SMS messages, if you select GSM modem.

Open PC Modem Configuration from the Connection menu.





Aligning and Resizing Display Elements

When you align and resize elements, be careful not to make them the same size and align them one on top of the other. If elements are 'fused' together in this way, they cannot be separated.

