



SOFTWARE MANUAL

VISILOGIC: UTILITIES

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Table of Contents

About Utilities.....	2
VisiLogic: Internal Utilities.....	2
SD Cards	2
Data Tables.....	48
String Library	65
Web Server	72
Trends.....	78
Alarms.....	85
Information Mode	87
Remote Access: Accessing a PLC via PC	92
Creating Project files (Clone files)	98
PTO Functions: Simple Motion Control	1
Unitronics' Standalone Software Utilities	8
SD Card Suite.....	8
Remote Operator	16
Remote Access	20
UniVision Licensing.....	41
VisiLogic Version Swapper.....	1
DataXport	1
UniOPC Server.....	14
UniDDE.....	37
Implementing DDE.....	42
Creating the Excel file.....	43
PID Server	47

VisiLogic: Utilities

About Utilities

Vision controllers offer a broad range of utilities.

VisiLogic offers internal, built-in utilities.

Standalone Software Utilities are developed by Unitronics. They may be freely downloaded from <http://www.unitronics.com/Content.aspx?page=Downloads>

VisiLogic: Internal Utilities

SD Cards

Enhanced Vision controllers support SD cards. The V570 supports standard-sized SD cards; V130, V350 and V1070 support micro SD cards. In the V570 series, the slot is located at the top of the controller; in V130, V350 and V1070 the slot is located on the right side.

What can I do with an SD card?

- "Clone" a complete PLC, via Information mode or via SD Clone Ladder elements.
- SD Ladder Functions enable you to read/write data between an SD Card and PLC memory operands, including blocks of file data, Data Tables, and Trend data.
- Store Alarms History on SD.
- Use Information Mode or SD Clone Ladder elements to upload/download OS firmware and compressed VisiLogic Applications, Data Tables, and operand values to/from an SD card, and to backup and even completely 'clone' a PLC.
- Use Unitronics' SD Card Explorer, included in the SD Card Suite, to transfer SD files from PLC to PC--or, if the PLC comprises an Ethernet card, send files via email attachment.
- View and execute files on the PLC display via the HMI element SD Browser.
- Host complex Web pages using the program in the .zip file located at: <http://www.unitronics.com/data/uploads/communication/WebServer.zip>.
- Use the tools in SD Card Suite to:
 - Format the SD Card.
 - Convert, view, and read/write the data to/from PC.
 - Export that data to Excel or as an .csv file.
 - Remotely view, open, copy, or delete SD card files via serial, CANbus, or Ethernet.

This standalone software is available from:

<http://www.unitronics.com/Content.aspx?page=Downloads>.



<p>Note ♦</p>	<p>Previous to the year 2008, controller models V570, V130, and V350 were produced with stickers covering the SD slots. In order to use the SD slot, peel off the sticker.</p>
	<p>VisiLogic V7.00 and OS versions OS 1.3.00 and up support SD Cards. OS versions 2.23 and higher support SDHC (SD High Capacity) cards.</p>
<p>♦</p>	<p>Use fast SD cards from a reputable manufacturer with a capacity of at least 1G.</p>
<p>♦</p>	<p>The PLC supports SD cards with a single partition, which may be equal to the capacity of the card.</p>

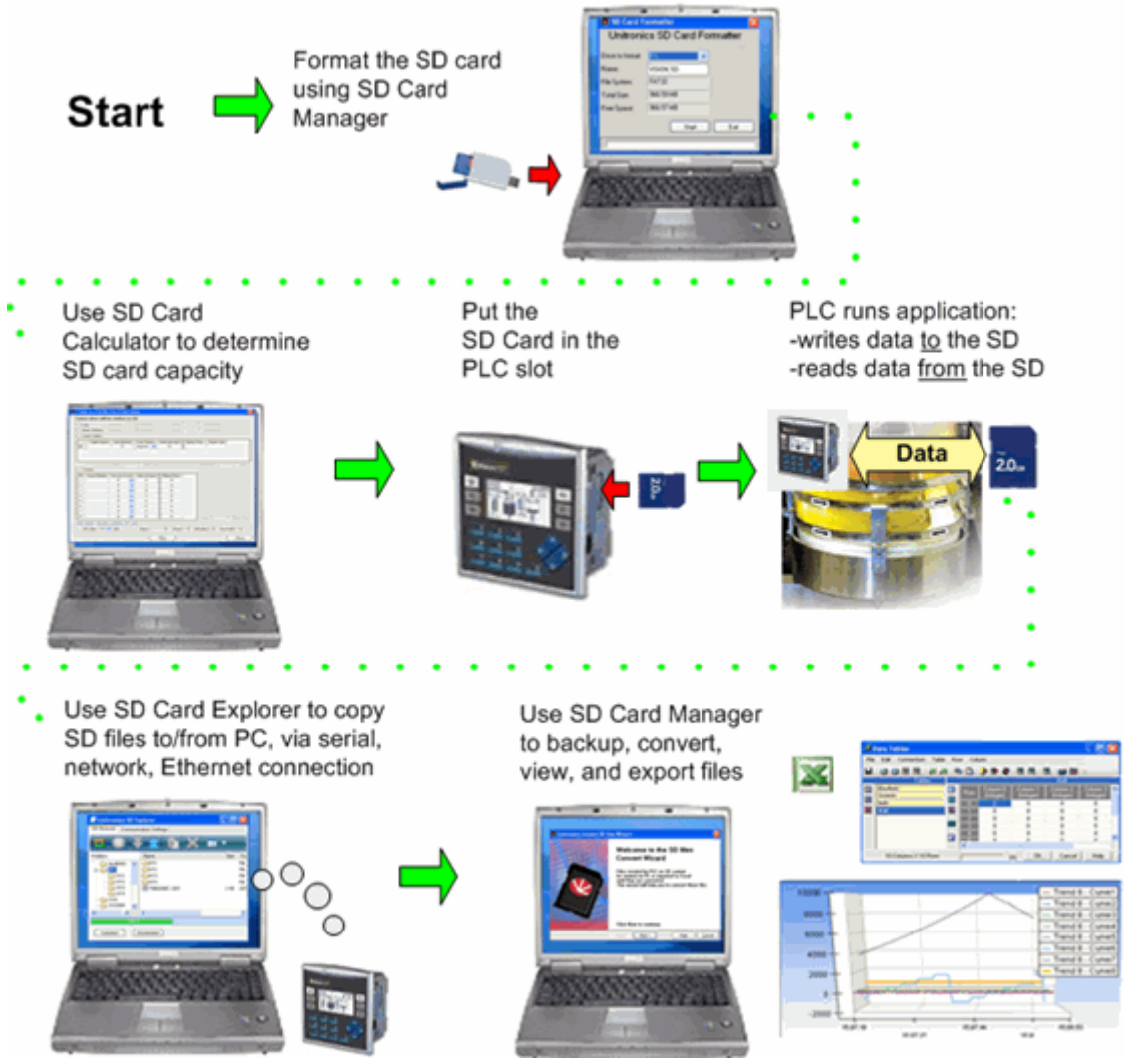
Before you begin: SD Card Suite

First, you must download and install the SD Card Suite from the Downloads page at <http://www.unitronics.com>. The Suite contains the SD Card Manager and utilities you must have to work with an SD card.

Before you insert the SD card into the PLC, you must connect the card to your PC and **format it according to the instructions in the SD Card Manager**. This formatter embeds the necessary framework, creating a folder structure on the SD card; when the application writes data to the SD, it will write it to the appropriate folder.

The SD Card Manager also contains a calculator which reports how long your application will take to fill the card to capacity. Run this before you insert the card.

To insert the card, slide it into the slot and lightly press it until it clicks into place. This click engages the spring that holds the card. To remove the card, press it lightly and release; the spring pops the card up.



SD and Information Mode

When you enter Information Mode and select SD, you see buttons representing all available categories of data that can be downloaded to the SD and uploaded to the controller. Press a button, and then select upload or download. You can use these features to back up applications and values, transfer operand and Data



Tables between controllers--even to clone a complete PLC application including data.

In all cases, you first select the category of data, and then the direction of the action, Download to SD or Upload to PLC. After this, follow the on-screen directions.

Note ♦ You can only download data to an SD Card that is guarded with a password. Information mode requests the password before carrying out the operation. The only exception is Firmware.

Information Mode Actions

Note ♦ These actions have parallel Ladder functions: SD Clone functions.

Firmware	You can download an OS to the SD card; the extension of the resulting file will be: <ul style="list-style-type: none"> • V130: .O13 • V350: .O35 • V570: .O57
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You can download either Application or Application + .vlp from the PLC to the SD card; the extension of the resulting files will be:

- V130: .V13
- V350: .V35
- V570: .V57

You can upload these applications from the SD card to the PLC via Information Mode.

You can also create V13, .V35, and .V57 files via VisiLogic, by selecting Project> Create Project files. You can then store them in this folder, and install them via Information Mode>Application> Upload to PLC, or via the SD Clone functions.

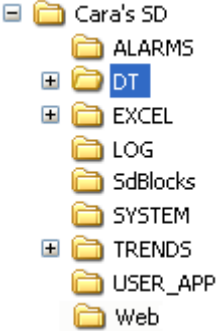
Application	If you select this category, and download the application to SD, the application will not include an editable upload image--even if the application in the controller was downloaded including the Burn Upload option.
Application + .vlp	Note that you can only select this category if the application in the controller was downloaded including the Burn Upload option. If you select this category, and download the application to SD, the application includes an editable upload image. Then, if you use Information Mode to upload the application to a PLC, you can upload the application to VisiLogic for editing.

Data Table	If you use Information Mode to download a Data Table from the PLC to an SD Card, it creates a single .fdt file in this folder. This
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	<p>file copies the entire Data Table section from the PLC's RAM memory--all 120k. When you upload the .fdt to the PLC, it overwrites the entire Data Table section</p>
Operand	<p>If you download operand data from the PLC to an SD Card, it takes all of the current operand values and creates a single file; the extension of the resulting file will be:</p> <ul style="list-style-type: none"> • V130: .D13 • V350: .D35 • V570: .D57 <p>If you upload this to the PLC it overwrites all PLC operand data.</p>
Cloning	<p>The process described below enables you to effectively 'clone' a PLC, if both support SD cards. The process takes all of the data: the Ladder control program (including an upload file if this option was selected at download) the HMI application including fonts and images, the OS, complete Data Tables including data, webserver definitions, String Library, and all operand values.</p> <p>Note ♦ The SD Card password and the Clone File password must be identical.</p> <ol style="list-style-type: none"> 1. Insert a formatted SD card into the PLC you want to clone. 2. Enter Information mode. 3. Select the SD option. 4. Select Clone, then Download to SD. The PLC will create a Clone file containing the OS, the HMI and Ladder applications, all operand values, Data Tables and their values, web server settings, fonts, HMI images. <ul style="list-style-type: none"> • V130: .C13 • V350: .C35 • V570: .C57 <p>Note that you can also open these files with VisiLogic, and edit the application.</p> <ol style="list-style-type: none"> 5. Remove the SD card, and insert it into another PLC of the same model. 6. Select Clone, then Upload to PLC; Information Mode installs the clone application <p>You can also create .Cxx files via SD Clone Functions, or in VisiLogic, by selecting Project> Create Project files. You can then store them in this folder, and install them via Information Mode, or via the SD Clone functions.</p>

SD Card: Folders and File Types

The following figure shows the folders that are created by SD Tools. These folders may contain the files described below.

	Folder	Purpose
	Alarms	<p>If a PLC contains an SD card, the PLC application comprises Alarms, and Log to History is selected in the Alarms Configuration, the PLC stores Alarms in a .ual file in this folder.</p> <p>Note that SB 352 SD: Write Alarm History to SD (OFF by default) must be turned ON.</p>
	DT	<p>This can contain two kinds of files:</p> <ul style="list-style-type: none"> • .fdt - When a user uses Information Mode to download a Data Table from the PLC to an SD Card, it creates a single .fdt file in the main DT folder. • .udt - The Ladder function DT to SD creates .udt files and saves them in this folder, or in one of four sub-folders. Note that the main DT folder and subfolders DT1, DT2, DT3, DT4 can each contain 64 files, for a total of 320 .udt files.
	EXCEL	<p>The Ladder function Create Delimited Line pulls PLC data, including text strings and saves it to a vector of operands. The function Write Delimited Line uses this data to build either a .csv or .txt line, and can write it to (or create) an Excel file in this folder, or in one of four sub-folders. Note that the main EXCEL folder and subfolders EXCEL0, EXCEL1, EXCEL2, EXCEL3 can each contain 64 files, for a total of 320 .csv files.</p>
	Log	<p>When the Ladder function Write Log Line to SD runs, it logs lines from the specified table to a single file called UNILOG.ulg in this folder.</p>
	SdBLocks	<p>Your Ladder application can create up to 4 SD Data Block .udb files in this folder: Block0.udb, Block1.udb, Block2.udb, and Block3.udb. SD Block functions read/write blocks of raw data between operands and these .udb files.</p>
	System	<ul style="list-style-type: none"> • When you upload/download an OS from the PLC using Information Mode, it is via this folder. These may be .O13, .O35, or .O57 files. • When you create a Clone file via

		Information Mode, the file is stored in this folder. When you install Clone file from an SD card to a PLC, Information Mode looks in this folder for the appropriate file: .C13, .C35, or C57
	Trends	When the Ladder function Write Trend SD runs, it creates .utr files in this folder. Note that you can use this function to create up to 4 subfolders in your Ladder application. These are named Trends1, Trends2, Trends3, Trends4. Note that the main Trends folder and subfolders can each contain 64 files, for a total of 320 .utr files.
	User_App	<ul style="list-style-type: none"> • Via either Ladder function or Via Information Mode, you can create a compressed application from the PLC into this folder; these files will use extensions as follows: V130: .V13, V350: .V35, V570: .V57 • You can backup all current operand values; these files will use extensions as follows: V130: .D13, V350: .D35, V570: .D57
	Web	You can use Windows Explorer to store any type of file into this folder, such as .html or .jpg. Your Ladder application can read these files in 'chunks' of 512 bytes via the SD File functions.

SD System Operands

#	Description	Turns ON when:	Turns OFF when:	Reset by:
SB 217	SD Card Present	An SD Card is in the slot, and is formatted to FAT32	SD Card is not found, or is incorrectly formatted	OS
SB 218	SD Card Write Enabled	Write is enabled: the card's write-protect lock is off	Write is disabled: the card's write-protect lock is on	OS
SB 219	SD FIFO Empty (SD Card may be Ejected)	<ul style="list-style-type: none"> • Power-up • No SD Card is in Slot • No SD requests exist 	There are no SD requests pending, such as Data Table Copy/Log, Alarms, or from Info Mode	OS

SBs 324-29 are linked to the SD File utilities.

SB 324	SD: Open File (Read to SD) (Status messages in SI 67)	When Ladder function SD File: Open successfully activates a file for Read	When Ladder function SD File: Close finishes closing an open file and SB 327 (EOF) turns ON	OS. At Power-up and at SD File: Close
SB 325	SD File: Read Chunk in Progress (a Chunk is 512 bytes long)	When the Ladder function SD: Get Next File Chunk is reading a chunk into a vector	When the Ladder function SD: Get Next File Chunk has finished reading the chunk	OS. At Power-up
SB 326	SD Read File: End Of File (EOF, entire file has been read)	When the When the Ladder function SD: Get Next File Chunk reads the	When the last chunk has been read, and when Ladder function SD File: Close start	OS. At Power-up and at SD

		final Chunk		File: Close
SB 327	SD: Open File (Write to SD) (Status messages in SI 67)	When Ladder function SD File: Open successfully activates a file for Write on a SD card		
SB 328	SD File: Write Chunk in Progress (a Chunk is 512 bytes long)	When the Ladder function SD: Get Next File Chunk is writing a chunk into a vector		
SB329	SD Write File: End Of File (EOF, entire file has been read)	When the When the Ladder function SD: Get Next File Chunk writes the final Chunk		
SB 340	Log to SD in Progress	Row is being copied from DT to SD Card	When copy is complete	OS
SB 341	Write Data Table from PLC to SD in Progress	Entire Data Table is being copied from DT to SD Card	When the Write process is complete	OS
SB 342	Read Data Table from SD to PLC in Progress	Entire Data Table is being copied from SD Card to DT	When the Write process is complete	OS
SB 343	File Report in Progress	While Report process is in progress	When the Report is complete	OS
SB 345	Email Send in Progress	ON when function is busy		
SB 344	Write delimited line to SD in Progress	While line is being written	When the Write process is complete	OS
SB 346	SD Data Block 0 Busy	When a Write or Read utility is being run on a Data Block	When no utility is running	OS
SB 347	SD Data Block 1 Busy			
SB 348	SD Data Block 2 Busy			
SB 349	SD Data Block 3 Busy			
SB 352	SD: Enable writing Alarm History to SD	Turned ON by user to write Alarm History to SD Card	Off by default. Causes the PLC to write Alarm History to the PLC	At Power-up, or by user
SB 358	SD: Delete File in Progress	ON when function is busy	OFF when function is not busy	OS
SB 359	Folder Report Function in Progress	ON when function is busy	OFF when function is not busy	OS
SB 366	Clone in Progress (Process can take from several seconds to several minutes)	ON when function is busy	OFF when function is not busy	OS

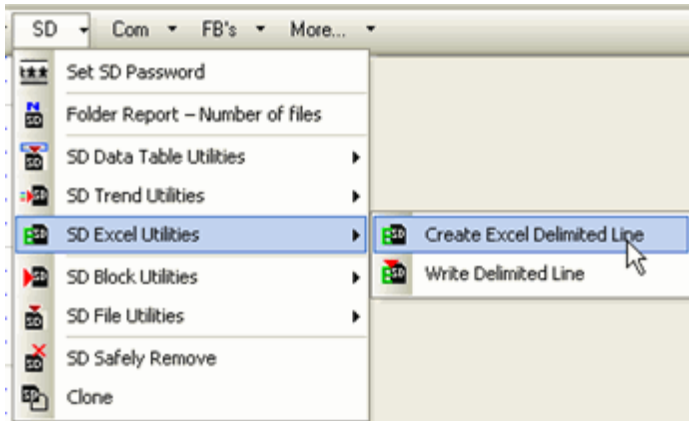
#	Description	Value	Comments
SI 63	Maximum number of Trend files that can be saved (read-only)	0-64 The maximum amount of Trend files (*.utt files) in a single folder is 64. The value in SI 63 shows the number of remaining *.utr files; if 5 *.utr files exist, SI 63 = 59	<ul style="list-style-type: none"> • Initialized at Power-up • Updated when: SB 217 is ON and SB 341 turns ON
SI 64	Maximum number of DT files that can be saved (read-only)	0-64 The maximum amount of Data Table files (*.udt files) in a single folder is 64. The value in SI 64 shows the number of remaining *.udt files; if 5 *.udt	<ul style="list-style-type: none"> • Initialized at Power-up • Updated when: SB 217 is ON and SB 341 turns ON

		files exist, SI 64 = 59	
SI 66	SD Card Status Messages	<p>This SI is a bitmap; a bit turns ON to indicate status.</p> <ul style="list-style-type: none"> All bits OFF – No errors Bit 1 – Read: End Of File indication Bit 2 – Can't open file Bit 3– Error while writing to a file Bit 4 – Error while reading from a file Bit 5 – Failed to close a file Bit 6 – SD is full Bit 7 – Path not found Bit 14 - Turns ON when SD is inserted into slot and PLC runs checks, turns OFF when SB 217 turns ON 	<ul style="list-style-type: none"> Initialized at Power-up. While the application is running, the user application must reset the bits.
SI 67	SD Card, Read Files: Status	<p>Value</p> <p>0= No error 1= No SD card in Slot 2= Vector is not long enough to contain data (may be at upper address limit of that data type) 3= Path to SD file not found 4=Another file is currently open 5 = File is closed 6 = Busy: previous request in progress 7 = File Open Error 8 = Read Error 9 = File Close error</p>	<p>SI 67 reports status for the following SD File utilities:</p> <ul style="list-style-type: none"> Read SD File: Open Read Next File Chunk Read SD File: Close
SI 68	SD Card, Write Files: Status	<p>Value</p> <p>0 = No error 1 = No SD card in Slot 2 = Vector is not long enough to contain data (may be at upper address limit of that data type) 3 = Path to SD file not found 4 = Another file is currently open 5 = File is closed 6 = File Open error 7 = Write Error 14 = File Close error</p>	<p>SI 68 reports status for the following SD File utilities:</p> <ul style="list-style-type: none"> Write SD File: Open Write Next File Chunk Write SD File: Close
SI 69	SD Card: File Open Time (may signal file fragmentation)	<p>Time required to open SD files, in units of 10mSec.</p>	<p>Each time a file is opened, the OS updates this value. A typical first write (open + write) = approx. 500mSec, typical first read (open + read)= approx. 60mSec</p> <p>Over time, this may increase due to file fragmentation.</p> <p>If the time becomes to great, the card should be reformatted Reset at Power-up and when SD card is removed.</p>
SI 76	SI 76 Number of Alarms currently in History Buffer	<p>Shows the number of Alarms in the history buffer.</p>	<p>If SB 352 SD: Write Alarm History to SD is ON, the Alarms in the buffer are automatically written to the SD</p>

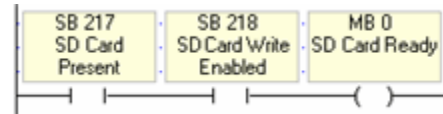
			card. Initialized by the user, or when the PLC is initialized.
SI 160	SD Trend 1 status	<p>This SI is a bitmap; a bit turns ON to indicate status when the function Start Saving Trend to SD runs.</p> <ul style="list-style-type: none"> All bits OFF – No errors Bit 4 – Start Saving Trend is in progress for another Trend Bit 7 – This Trend does not exist (may result when an MI is used to provide the Trend number, and the value points to a non-existent Trend) Bit 8 – Start Saving Trend is in progress for this Trend Bit 9 – Start Saving Trend failed 	
SI 161	SD Trend 2 status		
SI 162	SD Trend 3 status		
SI 163	SD Trend 4 status		
SI 164	SD Trend 5 status		
SI 165	SD Trend 6 status		
SI 166	SD Trend 7 status		
SI 167	SD Trend 8 status		
SI 330	SD: Write DT from PLC to SD - Total Amount of Data to be Copied (blocks of 512 bytes)	When the application runs the function Copy Data Table to SD, SI 330 shows the total number of blocks of data to be copied from the PLC.	Initialized at Power-up
SI 331	SD: Write DT from PLC to SD - Remaining Amount (blocks not yet copied)	Shows how many blocks of data remain to be copied. The value increases by 1 each time a block is copied.	<p>Initialized:</p> <ul style="list-style-type: none"> When the PLC begins to copy a new block of data to the SD card At Power-up.
SI 332	SD: Read DT SD to PLC - Total Amount of Data to be Copied (blocks of 512 bytes)	When the application runs the function Copy Data Table to PLC, SI 332 shows the total number of blocks of data to be copied from the SD.	Initialized at Power-up
SI 333	SD: Read DT from SD to PLC - Remaining Amount (blocks not yet copied)	Shows how many blocks of data remain to be copied. The value increases by 1 each time a block is copied.	<p>Initialized:</p> <ul style="list-style-type: none"> When the PLC begins to copy a new block of data from the SD card At Power-up.
#	Description	Value	Comments
SDW 59	SD Card: Free space (bytes)	Capacity given in 512-byte chunks. The value is written when SB 217 turns ON, and is updated at each write operation. The operand is reset when SB 217 turns OFF.	<ul style="list-style-type: none"> Initialized at Power-up.

SD Ladder Functions

Use the SD ladder functions to read and write data to and from an SD card. The functions are located on the SD menu on the Ladder toolbar.



If you include SD functions in your application, build a net that uses SB 217 to check that the SD card is in the PLC and correctly formatted, and SB 218 to check that the card is write-enabled, if it contains a write-protection tab



SD card Functions

<u>Category</u>	<u>Purpose</u>	<u>Functions</u>
SD Password	Use this to guard SD data.	Set SD Card Password
Folder Report	Reports the number of files currently in an SD folder, and the number of files can still be created in that folder.	Folder Report Function
<u>SD Data Table</u>	Use these to read and write data between Data Tables and SD card.	Log Data Table Row to SD Card Copy PLC Data Table to SD Copy SD to PLC Data Table Find Index or Tag in .udt
SD Trend	Record an entire or partial trend to a .utr file in the SD card Trends folder	Save Trend to SD Card Stop Saving Trend to SD
SD Excel	Use Create Excel Line to pull numeric data or text strings from the PLC and use delimiters to structure a line; then use the function Write Delimited Line to create an Excel file on an SD Card. The functions can create .csv and .txt lines	Create Excel Delimited Line Write Excel Delimited Line to SD
Data Blocks	Use these to create data storage areas in the SdBLOCKS folder on a SD card. SD Data Blocks may reach a total of 4G, or a single Block may be up to 4G. A Data Block comprises Sub-Blocks of 512 Bytes	Create SD Block Read from SD Block to Vector Write from Vector to SD Block
Data Files	Use Windows Explorer to store any type of file onto an SD card, such as .html or .jpg. The SD File Functions enable your Ladder application to read and write these files in 'chunks' of 512 bytes. You can also use these functions to pull data from the PLC and create files on the SD card.	SD File: Open Read/Write next Chunk SD File: Close Delete SD File SD File Info Rename SD File
Safely Remove SD	Use this to ascertain when an SD card may be safely removed from the PLC	Remove SD
Clone to/from	Use this to clone a complete PLC and application, Data	Clone to/from SD

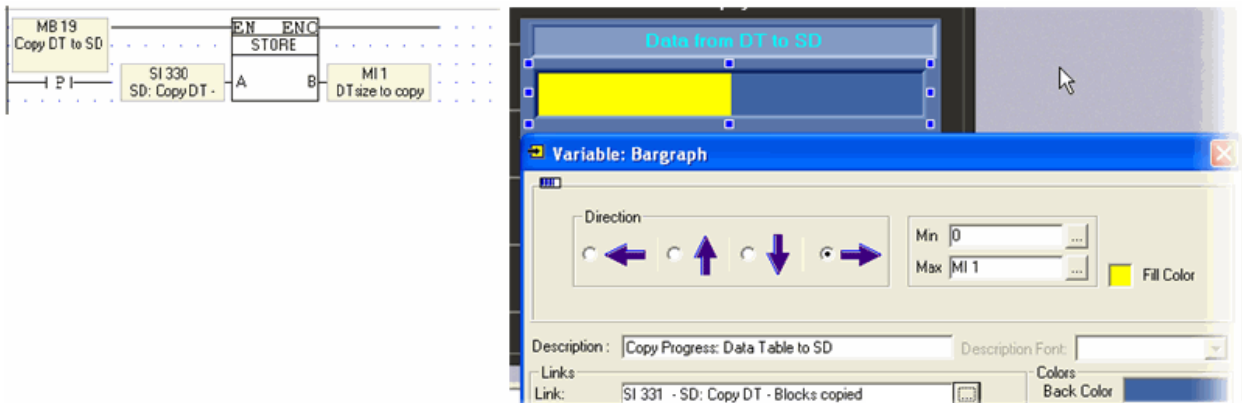
SD	Tables, or operand values from a PLC or install such clone files to a PLC of the same model	
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PLC Name

If you apply a PLC name, the PLC writes this name to the files it creates on the SD Card.

HMI Progress Bar

You can use SI 330 and SI 331 to create a progress bar on an HMI display that shows when the PLC is writing data to the SD; and SI 332 and SI333 to show data being written from the SD to the PLC. To create a progress bar, use the elements shown in the following image. Note that the PLC copies data at a rate of .5k per second. This means that a PLC requires approximately 24 seconds to transfer a Data Table comprising 120k to an SD card.



Removing the SD Card

To indicate that the SD card may be safely removed, you can link an HMI element to SB 219 SD FIFO Empty (SD Card may be Ejected).

Set SD Card Password

You can guard the SD card with a password.

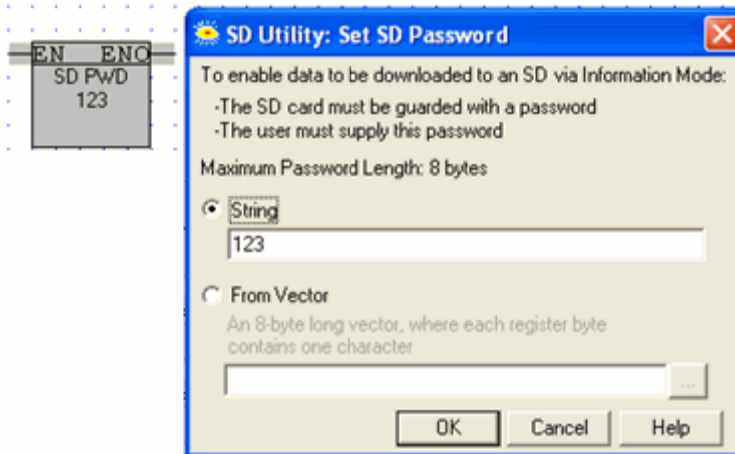
Note that when the PLC is in Information Mode, a user can only download data to an SD card:

- If the SD is guarded with a password.
- If the user can supply the password. The only exception is Firmware, which may be downloaded without password.

Note ♦ | The SD Password is case-sensitive

The maximum Password length is 8 bytes. Each register byte contains one character.

1. Place a Set SD Password function in the Ladder; you can either directly assign a text password, or provide it via MI.

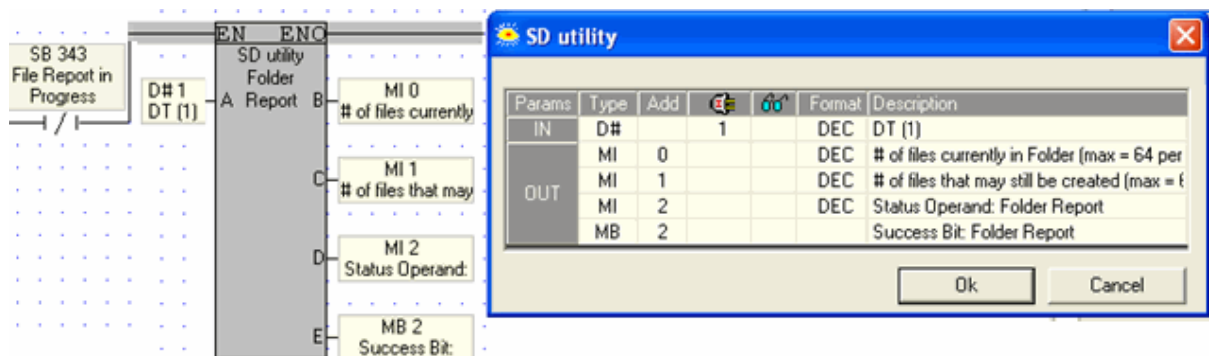


SD Card: Folder Report Function

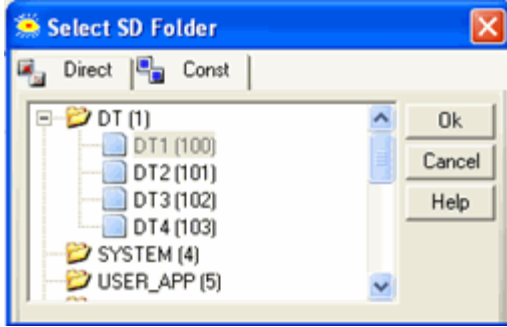
Use this Function to see:

- The number of files are currently in an SD folder
- The number of files can still be created in that folder

Notes ♦	The function reports only on the types of files that are linked to a particular folder. For example, each Data Table folder (DT) may contain a maximum of 64 .udt files. If Folder Report is set to DT folders, it only reports the number of .udt file. If there are other file types present in the folder, they are ignored.
♦	If there are fewer files than the maximum allowed, but the SD card capacity is exceeded, SI 66 will indicate SD Card Full.
♦	Use SB 343,SD: File Report in Progress, as a condition to running the function



Parameter	Name	Purpose
Input	SD Folder: Select SD Folder	Either select a folder, or link an operand. To use an operand value to access folders, use the numbers shown in Select SD Folder; where '1' will access the main DT folder, and '101 will access folder DT2.

		
Output	Number of files currently in Folder	The number of files currently in Folder (max = 64 per folder)
	Number of Files that may still be created	The number of files that may still be created (max = 64 per folder)
	Folder Report: Status Operand	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 - SD Card internal error • Bit 2 - SD file is incorrect type • Bit 3 - There is no SD card in the slot • Bit 4 - The SD card has failed (Check SI 66) • Bit 5 - Path not found
	Folder Report: Success Bit	Turns ON when the Report is complete. It remains ON until it is reset by the application, or until the application calls the function.

Note SB 359: Folder Report Function in Progress (ON when function is busy)

SD Card and Data Table Functions (Ladder)

These functions enable you to:

- Log a single row of data from a Data Table into a .ulg file located on the SD card
- Write all or part of a Data Table into a .udt file located on the SD card
- Read all or part of an SD card .udt file to a Data Table
- Search for tagged sections in a .udt file



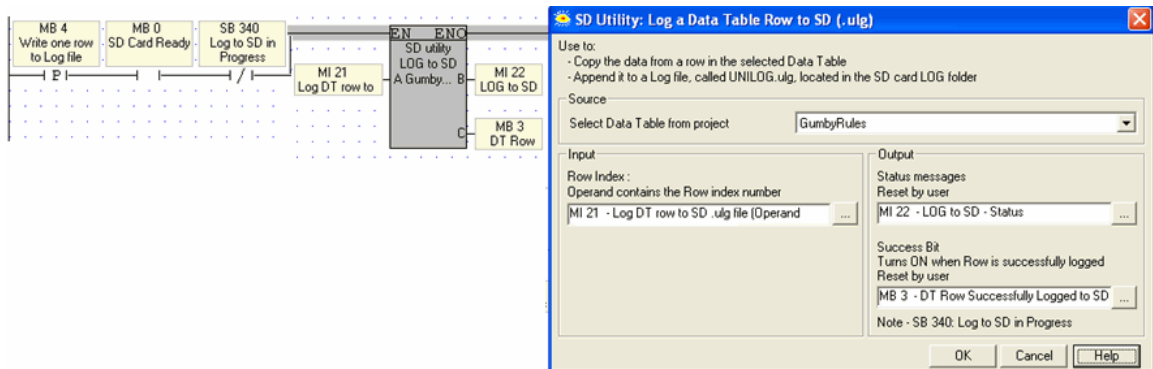
If a Data Table is marked as Part of Project, you **cannot** copy it or log lines from it to an SD card.

#	Description	Value	Comments
SI 64	Maximum number of DT files that can be saved (read-only)	0-64 The maximum amount of Trend files (*.udt files) in a single folder is 64. The value in SI 634 shows the number of remaining *.udt files; if 5 *.udt files exist, SI 64 = 59	<ul style="list-style-type: none"> • Initialized at Power-up • Updated when: SB 217 is ON and SB 341 turns ON

Log Data Table Row to SD Card

- To log a row from a Data Table, build a net that includes the function SD> Write Log Line to SD.
Use SB 340 to ensure that the PLC is not currently logging a row to the SD card.

When the application writes this type of data to the SD card, it creates a single file called UNILog.ulg in the LOG folder, and then appends each new line from the selected Data Table to this log file.



Parameter Name	Purpose
Source	Selects the Data Table you want to log from.
Row index	Determines which row in the table will be logged.
Status messages	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <p>All bits OFF – No errors, and the SD card is idle Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions. Bit 2 – The data in the SD is not compatible with the data in the Data Table Bit 3 – Data checksum error Bit 4 – Failed to open file Bit 5 - Failed to write to the SD file Bit 6 - Failed to close file Bit 7 - In progress Bit 8 - No SD card found Bit 9 - SD error, check SI 66 for error message Bit 10 – Requested Data Table does not exist</p>
Success Bit	Turns ON when the data is successfully written to the SD card. It remains ON until it is reset by the application, or until the application calls the function.

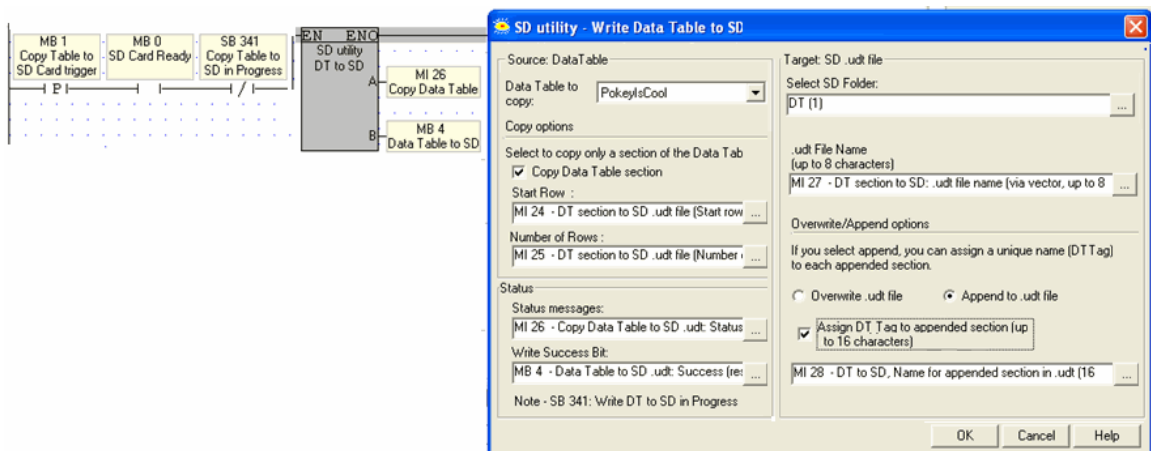
Data Table To / From SD Card

The Ladder function DT to SD creates .udt files and saves them in the main DT folder or in one of four sub-folders. DT1, DT2, DT3, DT4. Each folder can contain 64 files, for a total of 320 .udt files.

Write Data Table to SD (Copy DT to SD)

1. To copy an entire or partial Data Table, build a net that includes the function SD> Write DataTable to SD.
Use an inverted contact of SB 341 to ensure that the PLC is not currently writing to the SD card.
2. Set the options to copy all or part of a Data Table.

When the application writes this type of data to the SD card, it creates a file with the extension .udt in the selected DT folder.



Parameter Name	Purpose
Source: Data Table to copy	Selects the Data Table you want to write from.
Copy options	Select to copy all or part of a Data Table. Selecting Copy enables the Start Row and Number of Rows parameters.
Target: SD Folder	This is where the .udt file will be stored on the SD card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 1=the main DT folder, 100=DT1, 101=DT2, 102=DT3, and 103=DT4.
.udt File Name	Can be up to 8 characters long, and may be provided by constant text or register. Note that if the name comes from an MI, the function copies a vector 8 bytes long, or until it finds a 'null' character.
Overwrite/Append	If the function finds a .udt file in that folder of the same name, <ul style="list-style-type: none"> • Selecting Overwrite replaces the file. • Selecting Append adds the new data to the existing .udt file. You can assign a unique name (DT Tag) to each appended section, marking the sections for later use in your program. The Tag may contain up to 16 characters.
Status messages	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <p>All bits OFF – No errors, and the SD card is idle</p> <p>Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions.</p> <p>Bit 2 – The structure of the .udt file and the Data Table are not identical</p> <p>Bit 3 – Data checksum error. Please send application and any related information to support@unitronics.com.</p> <p>Bit 4 – Failed to open file</p> <p>Bit 5 - Failed to read from file</p> <p>Bit 6 - Failed to close file</p> <p>Bit 7 - In progress</p> <p>Bit 8 - No SD card found</p> <p>Bit 9 - SD error, check SI 66 for error message</p> <p>Bit 10 – Requested Data Table does not exist</p>
Success Bit	Turns ON when the data is successfully written to the SD Card. It remains ON until it is reset by the application, or until the application calls the function.

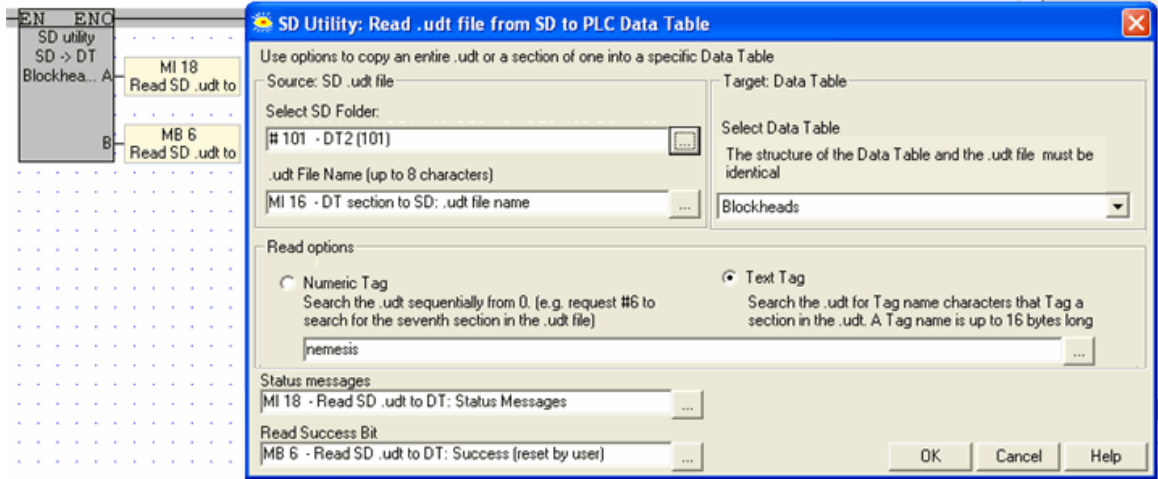
Note ♦ | The maximum number of Data Table files that can be created in a folder SD card is 64, including the main DT folder.

Read .udt file from SD to PLC Data Table (Copy SD >DT)

1. To copy .udt data from an SD card into a Data Table, build a net that includes the function SD> Copy Data to PLC Data Table.

Use an inverted contact of SB 342 to ensure that the PLC is not reading writing from the SD card.

Note that in order to copy data, the Data Table structure in both PLC and SD card must be identical: equal number of rows, equal numbers of columns, and column data types.



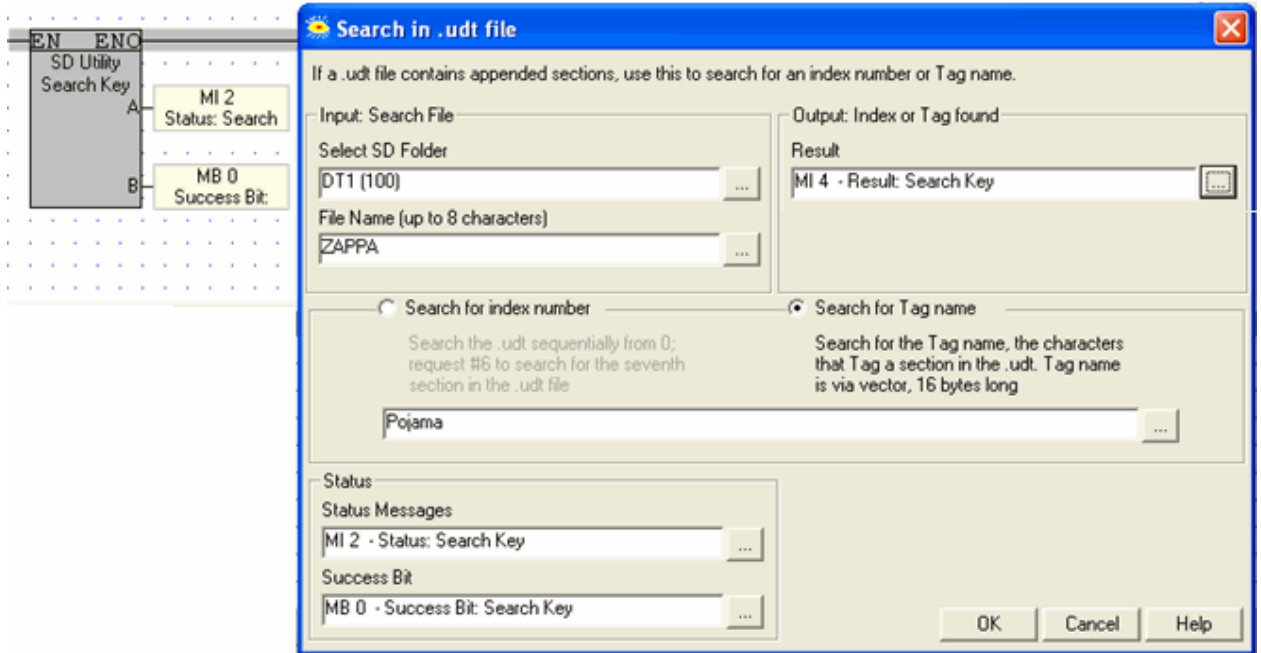
Parameter Name	Purpose
Select SD Folder	This is where the source .udt file is on the SD Card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 1=the main DT folder, 100=DT1, 101=DT2, 102=DT3, and 103=DT4.
File Name	The Table Name can be up to 8 characters long, and may be provided by constant text or register.
Read Options	If the .udt file contains appended sections, you can search for a Numeric or Text Tag.
Target: Data Table	Click on the drop-down arrow to select a Data Table in the project. The Table Name can be up to 8 characters long, and may be provided by constant text or register. Note that if the name comes from an MI, the function copies a vector 8 bytes long, or until it finds a 'null' character.
Status Operand	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <ul style="list-style-type: none"> • Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions. • Bit 2 – The data in the SD is not compatible with the data in the Data Table • Bit 3 – Data checksum error • Bit 4 – Failed to open file • Bit 5 - Failed to read from file • Bit 6 - Failed to close file • Bit 7 - In progress (SB 342 ON) • Bit 8 - No SD card found (SB217 (ON) • Bit 9 - SD error, check SI 66 for error message • Bit 10 – Requested Data Table does not exist

Success Bit | Turns ON when the data is successfully read. It remains ON until it is reset by the application, or until the application calls the function.

Search .udt for Tag or Index#

If a .udt file was created using appended sections, you can search it for the index number or tag name.

Use an inverted contact of SB 342 to ensure that the PLC is not reading writing from the SD card.



Parameter Name	Purpose
Select SD Folder	This is where the source .udt file is on the SD Card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 1=the main DT folder, 100=DT1, 101=DT2, 102=DT3, and 103=DT4.
File Name	The Table Name can be up to 8 characters long, and may be provided by constant text or register.
Tag Type	Search for a Numeric or Text Tag.
Table	Click on the drop-down arrow to select a Data Table in the project. The Table Name can be up to 8 characters long, and may be provided by constant text or register. Note that if the name comes from an MI, the function copies a vector 8 bytes long, or until it finds a 'null' character.
Status Operand	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions. • Bit 2 – The data in the SD is not compatible with the data in the Data Table

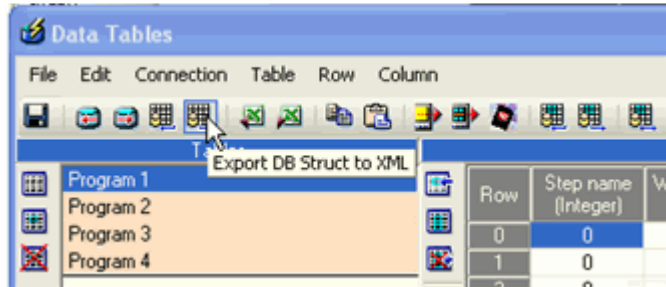
	<ul style="list-style-type: none">• Bit 3 – Data checksum error• Bit 4 – Failed to open file• Bit 5 - Failed to read from file• Bit 6 - Failed to close file• Bit 7 - In progress (SB 342 ON)• Bit 8 - No SD card found (SB217 (ON)• Bit 9 - SD error, check SI 66 for error message• Bit 10 – Requested Data Table does not exist
Success Bit	Turns ON when the tag is found. It remains ON until it is reset by the application, or until the application calls the function.

Import data from an SD card into a PLC Data Table

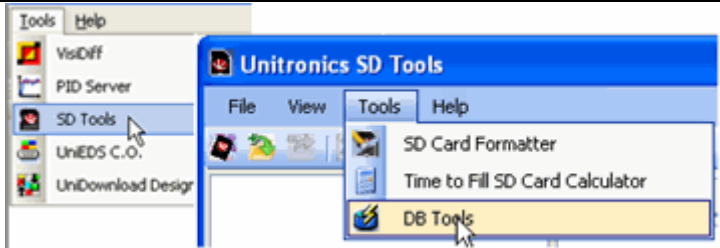
This imports data from a Data Table on the SD card into a Data Table in the PLC.

The Data Tables must be identical. In order to ensure this, follow the recipe below.

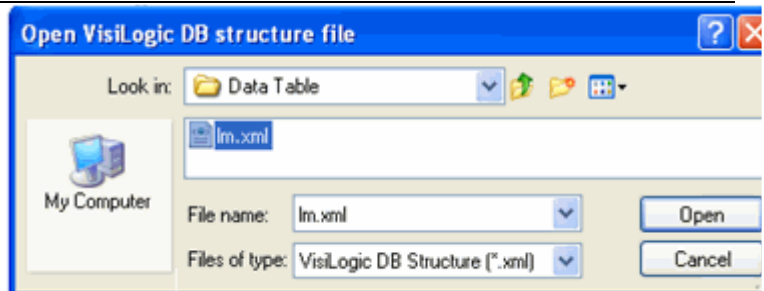
1. Open the Data Table, and click Export the Data Table Structure to convert the table to an .xml file.



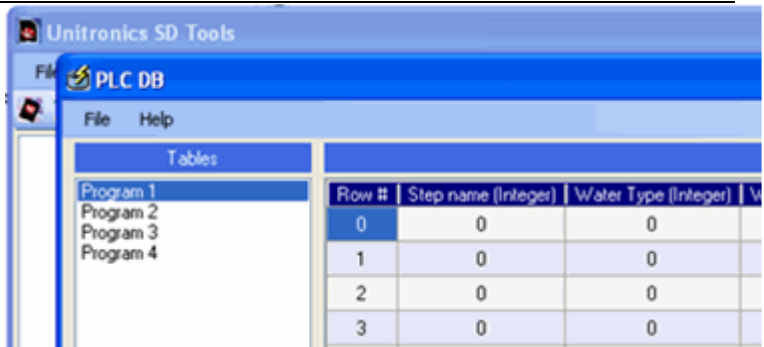
2. From the VisiLogic Tools menu, open SD Tools.
3. From the SD Tools Tools menu, open DB Tools.



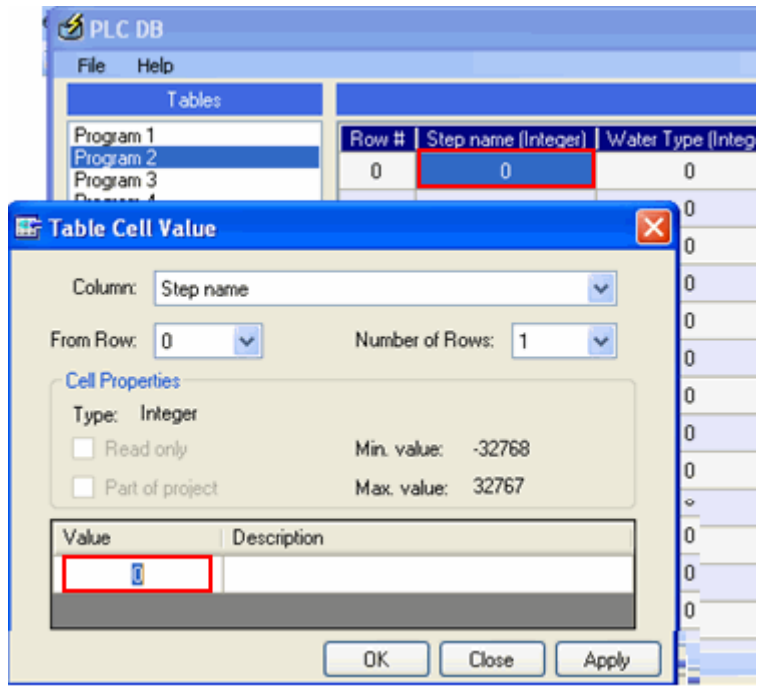
4. Navigate to and select the .xml file.



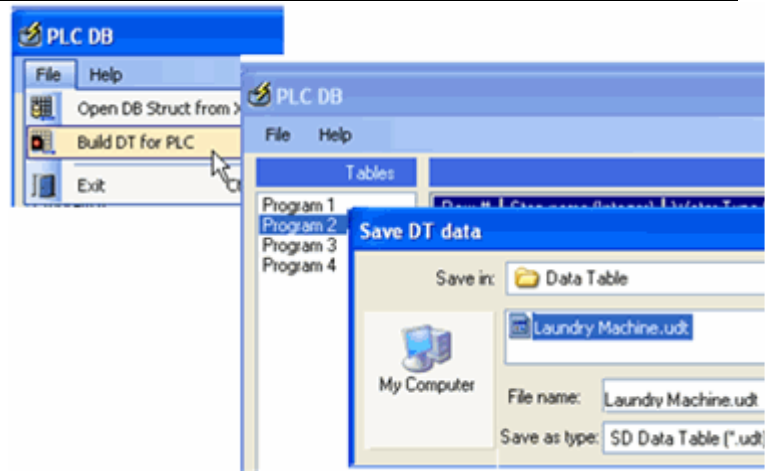
5. SD Tools opens the file for editing.



- Click on table cell to edit the values.



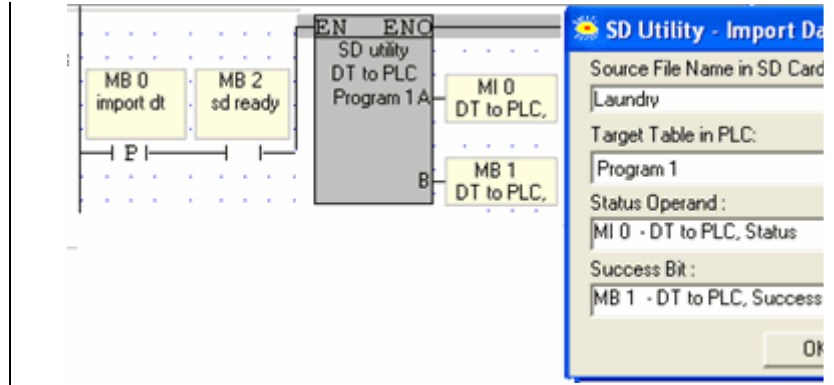
- From the File menu, select Build DT for PLC.



- Copy the resulting .udt file to the SD card, and then place it in the PLC.



- Build a net including the SD utility DT to PLC.

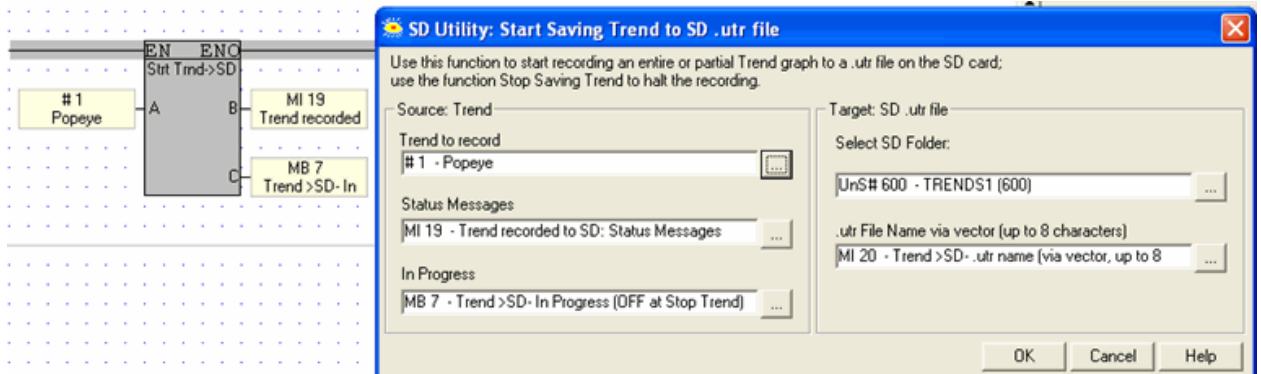


When the Program runs, it will copy the values from the Data Table on the SD card into the PLC Data Table cells.

SD Card and Trends

Use the Start Saving Trend to SD to record an entire or partial trend; and Stop Saving Trend to halt the recording process.

When the application writes this type of data to the SD card, it creates a file with the extension .utr in the Trends folder. Each time you start and stop saving the Trend, the application adds a new segment to the file.



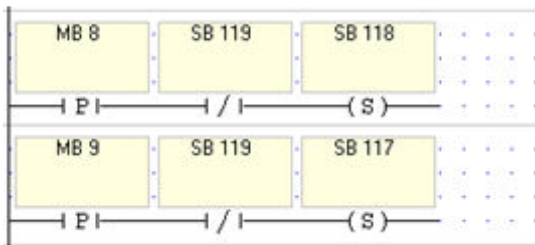
Parameter Name	Purpose
Source Trend Number	Click on the drop-down arrow to select a Trend in the project.
Target SD .utr file	Link an operand to provide a file name. Note that you MUST provide a file name. If the linked register is empty, the Trend will not be recorded to the SD. This is where the .udt file will be stored on the SD card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 1=the main DT folder, 100=DT1, 101=DT2, 102=DT3, and 103=DT4.
Status Operand	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions.

	<ul style="list-style-type: none"> • Bit 2 – The data in the SD is not compatible with the data in the Data Table • Bit 3 -.Data checksum error • Bit 4 – Failed to open file • Bit 5 - Failed to read from file • Bit 6 - Failed to close file • Bit 7 - In progress • Bit 8 - No SD card found • Bit 9 - SD error, check SI 66 for error message
Success Bit	Turns ON when the data is successfully written to the PLC Data Table. It remains ON until it is reset by the application, or until the application calls the function.

Displaying the saved Trend

You can display Trend curves directly from a .utr file by using the HMI element Trend from SD.

Link SBs 117 and 118 with HMI buttons to enable users to jump between segments. Use the inverted contact of SB119 as a condition as shown below.



When you save a Trend to an SD card, each time you start and stop the save, another segment is added to the .utr file.

#	Description	Turns ON :	Turns OFF :	Reset by:
SB 116	SD Trends to SD: Set to Overwrite .utr	User application	User application	User

Use these to control the display of Trend segments on the HMI screen. Use the inverted contact of SB119 as a condition.

SB 117	SD Trends: Jump to next segment	User application	User application	User
SB 118	SD Trends: Jump to previous segment	User application	User application	User
SB 119	SD Trends: System busy - Draw Trend is gathering data	User application	User application	User

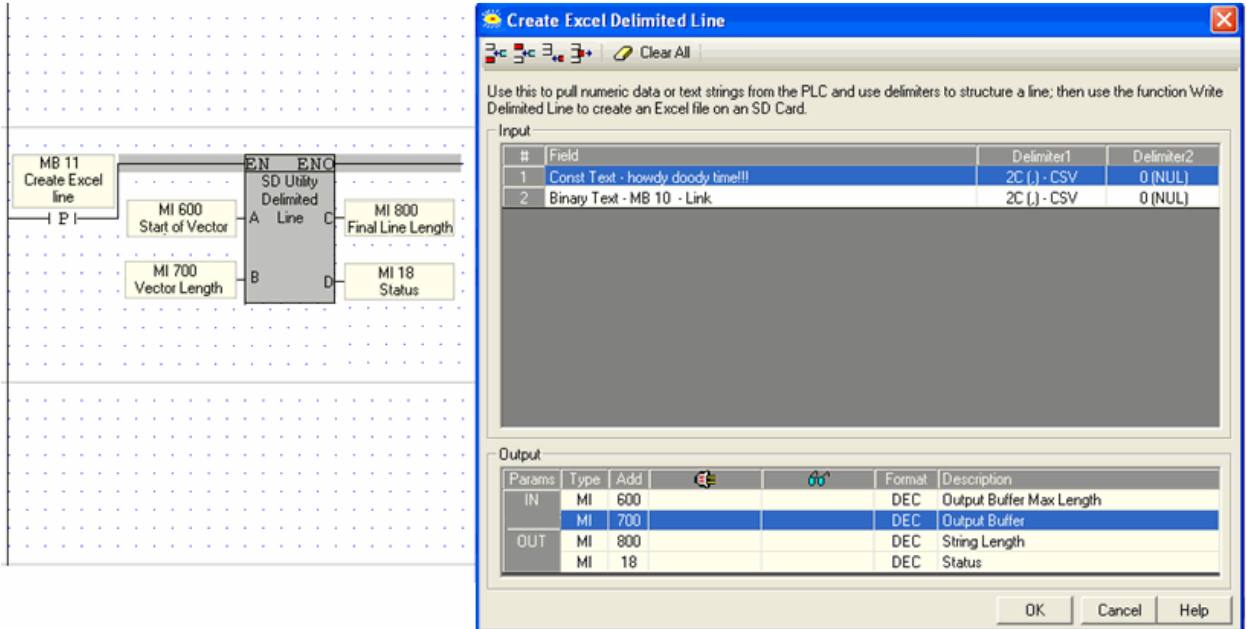
SD Card: Data to Excel

You can write PLC data to Excel files an the SD card using the functions Create Delimited Line to structure a line, and Write Delimited Line to send it to a specified Excel file on an SD Card.

<p>Note ♦</p>	<p>Note that the main EXCEL folder and subfolders EXCEL0, EXCEL1, EXCEL2, EXCEL3 can each contain 64 files, for a total of 320 .csv files.</p>
<p>♦</p>	<p>The .csv file name cannot exceed 8 characters. It may include only English characters and numbers: 0 - 9, A - Z, a - z, and the underscore character "_".</p>

Create Delimited Line

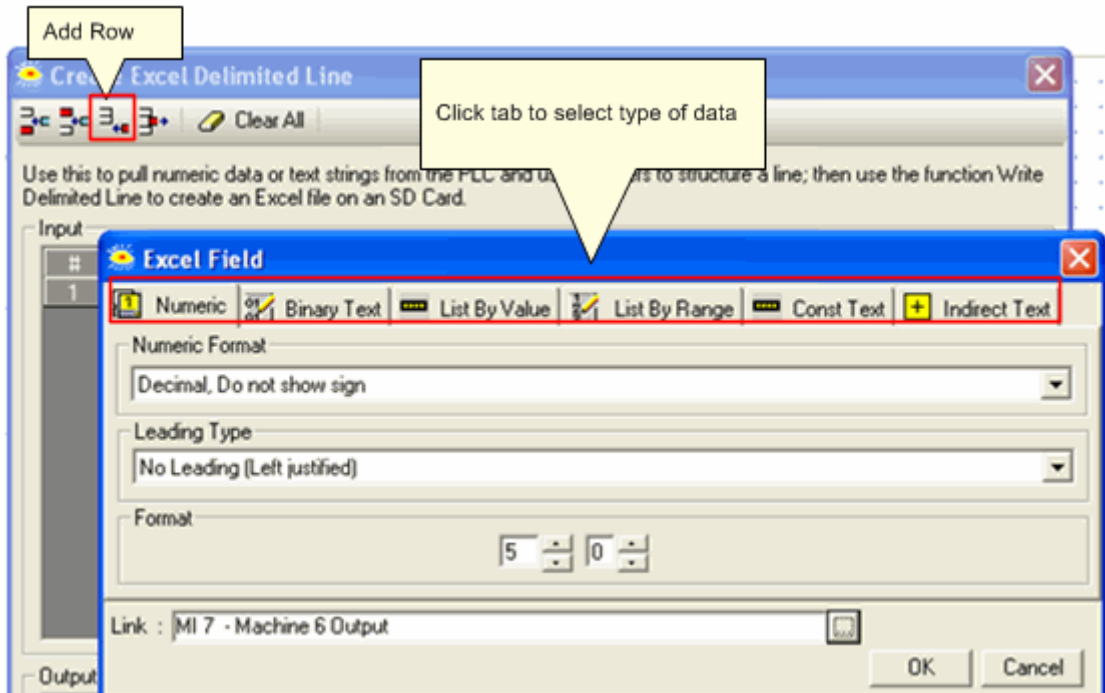
Use this function to select PLC data, including numeric data and text strings, structure it, and save the resulting line to a vector of operands.



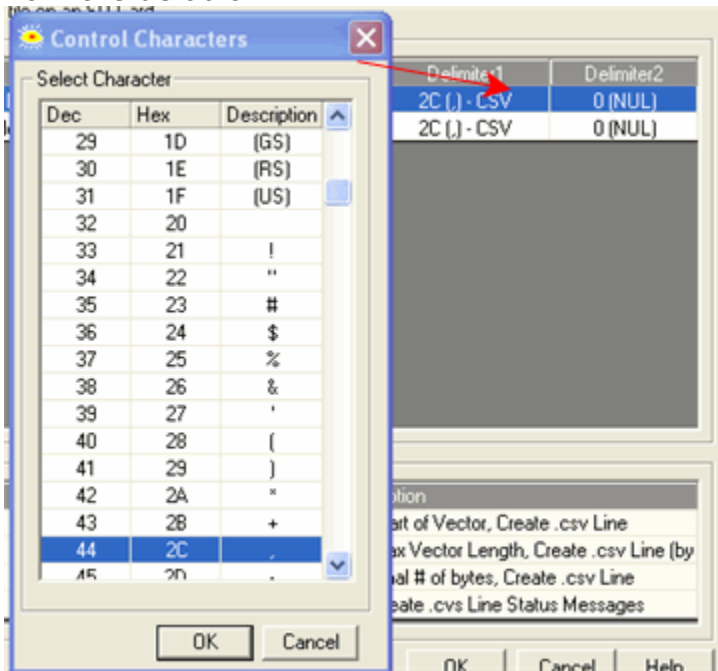
Defining a Line

Each row in the table displayed under Input will be a cell in the Excel line.

1. Click the Add Row icon to open the Excel Field dialog box.
2. Click a tab to select the type of data.



3. Click the Delimiter cells to select a Delimiter character that is different from the default.



4. Add and delete row by using the icons at the top of the function

Type	Parameter	Purpose
Source: Define Data	Field	Use this to specify data for a cell in the Excel line.
	Delimiters	Control characters that delimit the data for that cell
Target: Data Buffer	SD: Start of Vector, Create .csv Line	Select the operand that will be start of the vector the function uses to store the data selected for the line, plus its delimiters. Use this operand for the function Write Delimited Line
	SD: Max Vector Length, Create .csv Line (bytes)	Sets the maximum length of the vector in bytes.
	SD: Final # of bytes, Create .csv Line	Reports the actual number of bytes sent to the vector
Status	SD: Create .csv Line Status Messages	This is a bitmap; a bit turns ON to indicate status. It is initialized when the function starts. <ul style="list-style-type: none"> • Bit 1 - The line is truncated • Bit 2 - Fail to open the file. • Bit 3 - Fail to write the file • Bit 4 - SD full • Bit 5 - No SD card (SB [217]) • Bit 6 - Path not found • Bit 7 - Unknown error - please check SI 66

Write Delimited Line

Use Write Delimited Line to pull the data from the vector used by Create Delimited, and use it to write to (or create) an Excel file in this folder, or in one of four sub-folders.

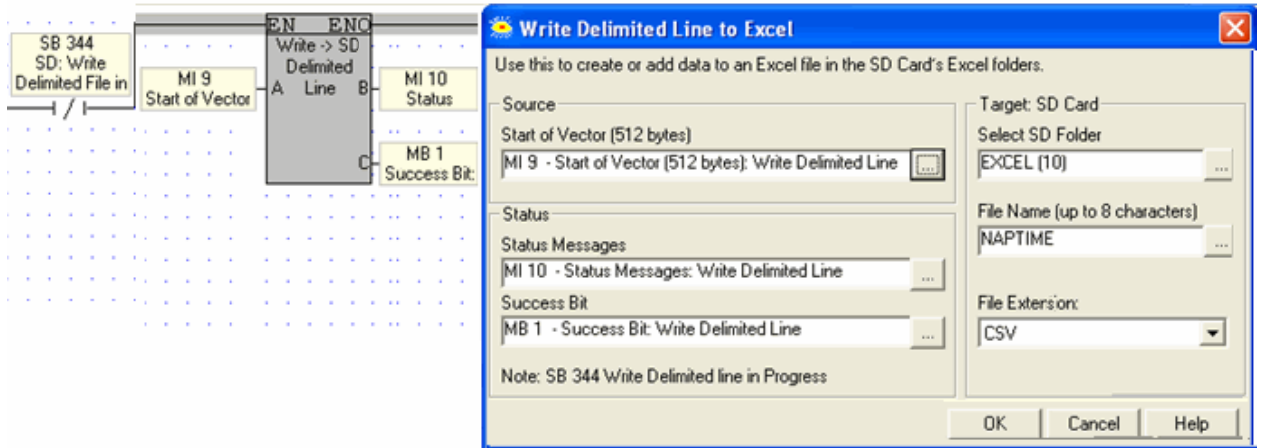
Notes ♦

Write Delimited Line **pulls data from the vector in chunks of 512 bytes, and writes this entire 512 bytes to the SD card.**

Write Delimited line is not linked in any way to Create Delimited Line. In Create Delimited Line, the parameters SD: Max Vector Length and SD: Final # of bytes, do not influence Write Delimited line.

♦

Use SB 344, Write delimited line to SD in Progress, as a condition to running the function.



Type	Parameter	Purpose
Source	Start of Vector	Use the operand that is the Start of Vector for the Create Delimited Line function.
Target	Select SD folder	This is where the line will be stored on the SD card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 10=the main Excel folder, 1000= Excel1, 1001= Excel2, 1002= Excel3, and 1003= Excel4.
	File Name	Either enter a name, or link an operand to provide a file name. Note that you MUST provide a file name. If the linked register is empty, the file will not be created to the SD. If the folder does not contain a file of that name, the function will create one.
	File Extension	Select .txt or csv
Status	SD: Write .csv Line Status Messages	This is a bitmap; a bit turns ON to indicate status. It is initialized when the function starts. <ul style="list-style-type: none"> • Bit 1 - Wrong data • Bit 2 - Fail to open the file. • Bit 3 - Fail to write the file • Bit 4 - SD full • Bit 5 - No SD card (SB [217]) • Bit 6 - Path not found • Bit 7 - Unknown error - please check SI 66
	Success Bit	Turns ON when line is successfully written

SD Block Functions

SD Data Blocks are data storage files in the SdBlocks folder on a SD card.

SD Data Blocks may reach a total of 4G, or a single Block may be up to 4G. A Data Block comprises Sub-Blocks of 512 Bytes. The SD Block functions enable you to read/write blocks of raw data between operands and these files.

SD Data Block Functions

- Create SD Block
Creates an SD Data Block in the SdBlocks folder.

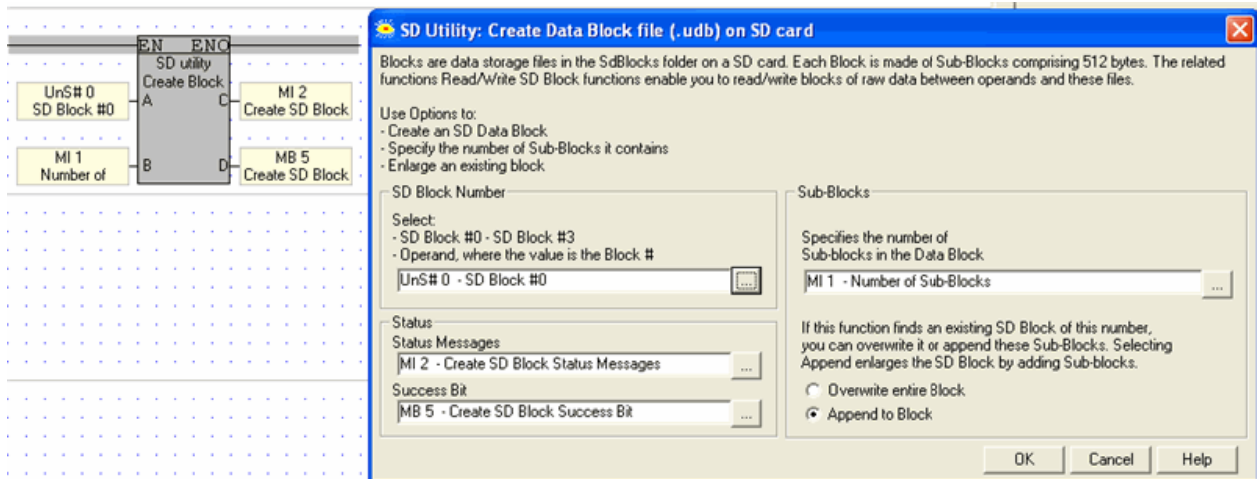
- Read from SD Block to Vector
Reads a specified Sub-Block from a specified Data Block to an operand vector that is 512 bytes long.
- Write from Vector to SD Block
Writes 512 bytes from an operand vector to a specified Sub-Block in a Data Block

Create SD Block

Use this function to:

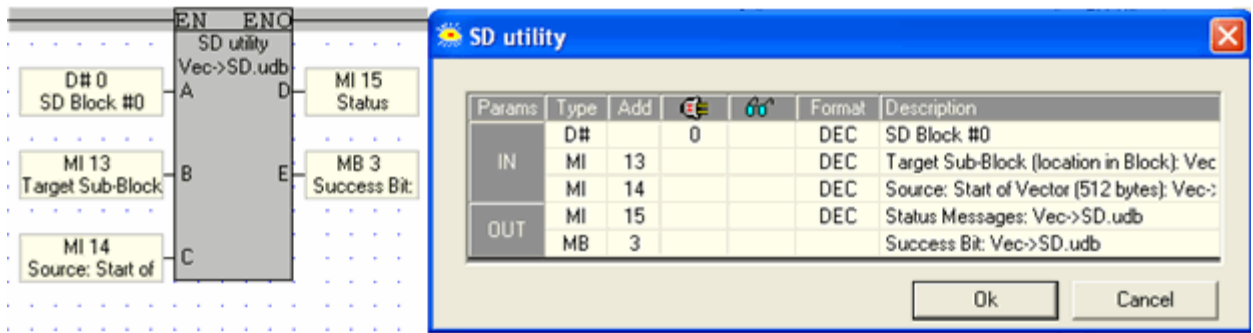
- Create an SD Data Block. You can create up to 4 SD Data Block: Block0.udb, Block1.udb, Block2.udb, and Block3.udb
- Specify the number of Sub-Blocks it contains.
- Enlarge an existing block.

You can also specify the number of Sub-Blocks the block will contain. This may be used to enlarge the Block by appending Sub-Blocks.



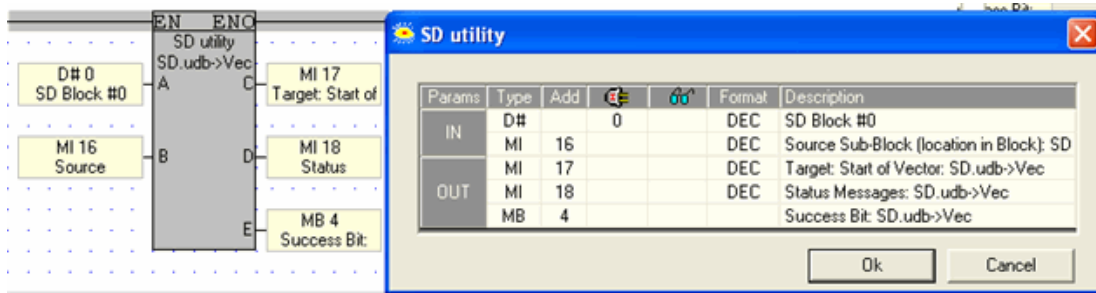
Parameter	Purpose
SD Block number	Select the Block number, 0-3, or use an operand to assign a number at run time.
Sub-Blocks	Use this to specify the number of Sub-blocks in the Data Block.
Overwrite/Append	If this function finds an existing SD Block of this number, you can overwrite it or append these Sub-Blocks. Selecting Append enlarges the SD Block by adding Sub-blocks.
Status Operand	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – The SD card is busy. • Bit 2 – No SD card found, or the card is locked (Write-enable OFF) • Bit 6 - Internal error
Success Bit	Turns ON when the Block is created. It remains ON until it is reset by the application, or until the application calls the function.

Read from Vector to SD Block



Parameter	Purpose
SD Block number	Select the Block number, 0-3, or use an operand to assign a number at run time.
Target Sub-Block (location in Block): Vec->SD.ldb	The data will be written to this sub block. The number is the sequential number of the sub-block in the .ldb file.
Source: Start of Vector (512 bytes): Vec->SD	Select the operand that is the start of the 512-byte long vector that provides the data that is written to the .ldb file.
Status Messages	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – The SD card is busy. • Bit 2 – No SD card found, or the card is locked (Write-enable OFF) • Bit 3 -. There are less than 512 bytes in this vector (can happen if the start of the vector is too close to the end of the operand address range) • Bit 4 – The SD Data Block number is invalid (valid numbers are 0-3. This error may result when using indirect addressing) • Bit 5 - SD card function was called while the SD is busy • Bit 6 - Internal error • Bit 7 - Data Block size exceeds 4G • Bit 8 - SD card is full • <p>Bits 10-13 can occur because the SD card does not have an SD_Blocks folder, or because a file of that name has not been created in the SD_Blocks folder.</p> <ul style="list-style-type: none"> • Bit 10 - Can't open file/path not found • Bit 11 - Error while writing to a file/path not found • Bit 13 - Failed to close a file/path not found • Bit 14 - Create SD Block: Do not overwrite is selected, but the number of Sub-blocks is less than the number of sub-blocks already in the Data Block
Success Bit	Turns ON when the data is successfully written to the Block. It remains ON until it is reset by the application, or until the application calls the function.

Write from SD Block to Vector



Parameter	Purpose
SD Block number	Select the Block number, 0-3, or use an operand to assign a number at run time.
Source Sub-Block (location in Block): SD.ldb-> Vec	This is the sequential number of the sub-block in the .ldb file.
Target: Start of Vector: SD.ldb-> Vec	The function will write 512 bytes of data to the PLC, starting with this operand.
Status Messages	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – The SD card is busy. • Bit 2 – No SD card found, or the card is locked (Write-enable OFF) • Bit 3 -.There are less than 512 bytes in this vector (can happen if the start of the vector is too close to the end of the operand address range) • Bit 4 – The SD Data Block number is invalid (valid numbers are 0-3. This error may result when using indirect addressing) • Bit 5 - SD card function was called while the SD is busy • Bit 6 - Internal error • Bit 8 - SD card is full • Bit 9 - Read: End Of File indication <p>Bits 10-13 can occur because the SD card does not have an SD_Blocks folder, or because a file of that name has not been created in the SD_Blocks folder.</p> <ul style="list-style-type: none"> • Bit 10 - Can't open file/path not found • Bit 12 - Error while reading from a file/path not found • Bit 13 - Failed to close a file/path not found
Success Bit	Turns ON when the data is successfully written to the Block. It remains ON until it is reset by the application, or until the application calls the function.

SD File Functions

You can use Windows Explorer to store any type of file onto an SD card, such as .html or .jpg. The SD File Functions enable your Ladder application to read and write these files in 'chunks' of 512 bytes.

Note ♦ These functions can only run on files that observe the 8.3 naming convention; the file name cannot exceed 8 characters, and the file extension cannot exceed three.

Using SD File Functions

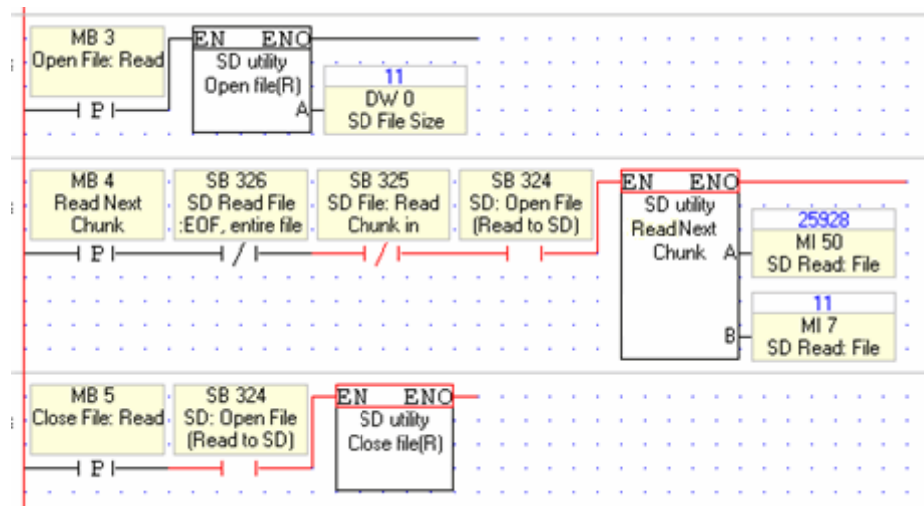
Each read or write operation requires three functions: Open File, Read or Write, and Close File. The functions are located on SD>SD File Utilities.

- **Open SD File**
 Note that there are separate Open File functions for both Read and Write. Open File must be used to activate the correct file in the correct folder before running a read or write function.
- **Read Next Chunk**
 Reads a specified file from a specified folder to an operand vector in 'chunks' that are 512 bytes long.
- **Write Next Chunk**
 Writes data chunks 512 bytes from an operand vector to a specified file on the SD card.
- **Close File.**
 There are separate Close File functions for both Read and Write.

The examples below show the functions and the System operands required to run read and write operations.

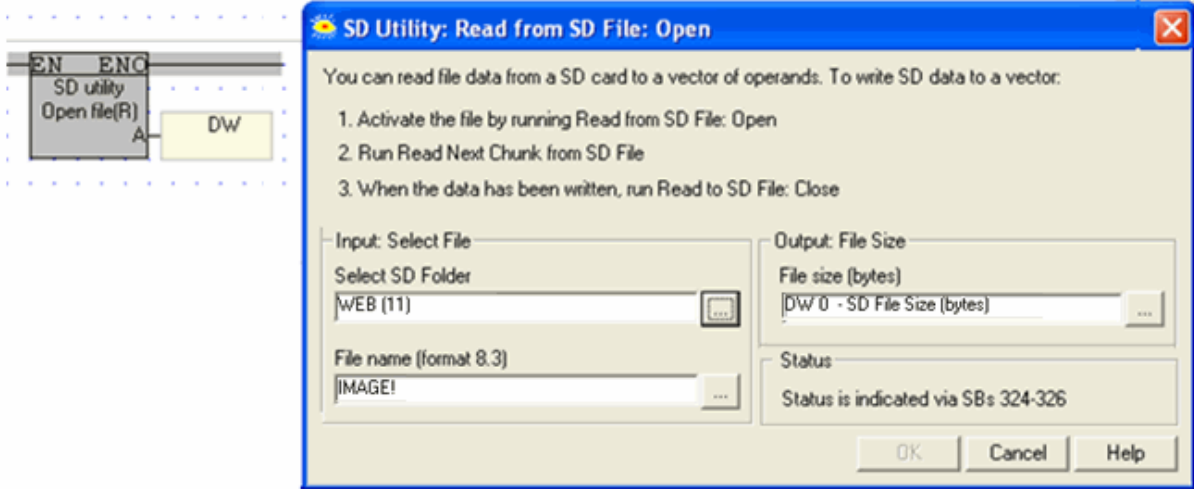
Read File: Example

Note the use of SBs 324, 325, and 326. These enable the Read Next Chunk function to continue reading data chunks until it has completed reading the entire file.



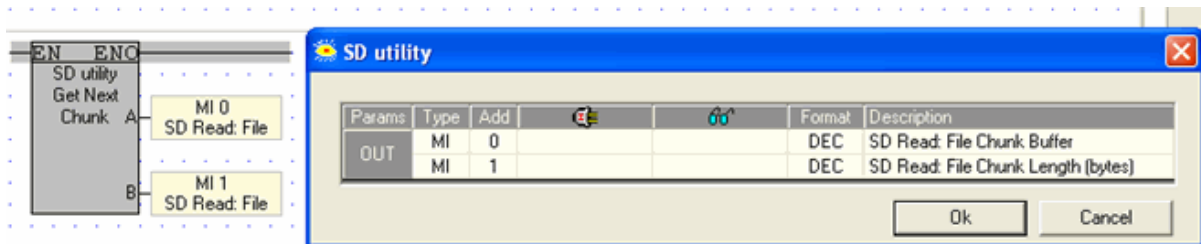
Write File: Example

Read From SD File: Open



Parameter	Purpose
Select Folder	Select the folder, or use an operand to assign a number at run time using the following values: Alarms: 0 ♦ DT main folder: 1 ♦ DT1-4: 101 to 103 ♦ Log: 3 ♦ System: 4 ♦ User_app: 5 ♦ Trends main folder - 600 ♦ Trends1-4: 600 to 603 ♦ SdBLOCKS: 9 ♦ Excel main folder: 100 ♦ Excel1-4: 1000 to 1003 ♦ Web: 11
File name	Either enter the file name, or provide it via operand.
File size	When the function runs, this reports the size of the file, in bytes.

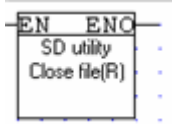
Read File: Get Next Chunk



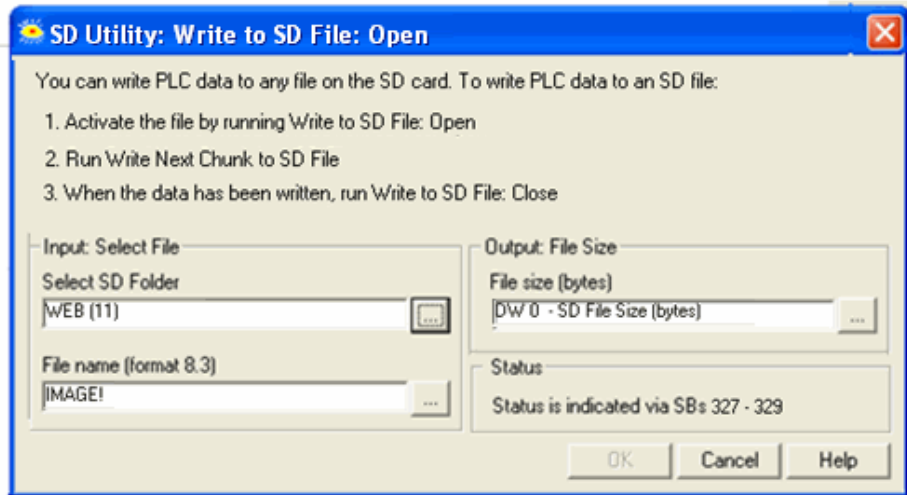
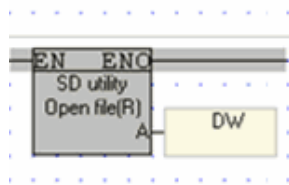
Parameter	Purpose
Read: File Chunk Buffer	This the start of the vector that holds the data read from the file. This vector is 512 bytes long.
Read: File Chunk Length	This shows the length of the chunk that is currently read. Note that the final chunk, containing the last of the file data, will generally be LESS than 512 bytes.

Read File: Close

Run this when entire files has been read.

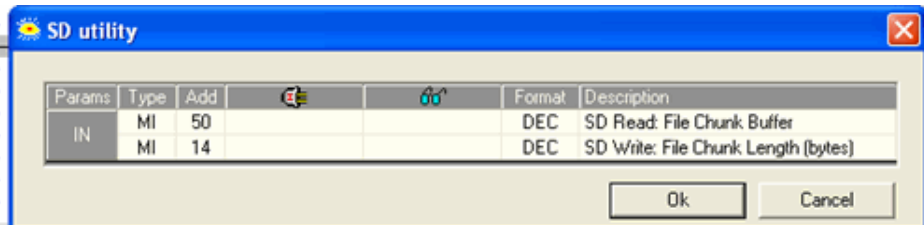
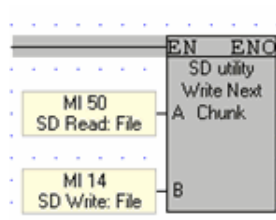


Write From SD File: Open



Parameter	Purpose
Select Folder	Select the folder, or use an operand to assign a number at run time using the following values: Alarms: 0 ♦ DT main folder: 1 ♦ DT1-4: 101 to 103 ♦ Log: 3 ♦ System: 4 ♦ User_app: 5 ♦ Trends main folder - 600 ♦ Trends1-4: 600 to 603 ♦ SdBlocks: 9 ♦ Excel main folder: 100 ♦ Excel1-4: 1000 to 1003 ♦ Web: 11
File name	Either enter the file name, or provide it via operand. Note that: -If the file does not exist on the SD -and the SD card is Write-enabled the function will create the file.
File size	When the function runs, this reports the size of the file, in bytes.

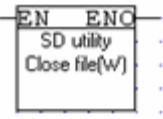
Write File: Get Next Chunk



Parameter	Purpose
Write: File Chunk Buffer	This the start of the vector that holds the data that will be written to the file. The function takes 512 bytes of data.
Write: File Chunk Length	Enter the number of bytes to be written to the SD file.

Write File: Close

Run this when entire files has been written.

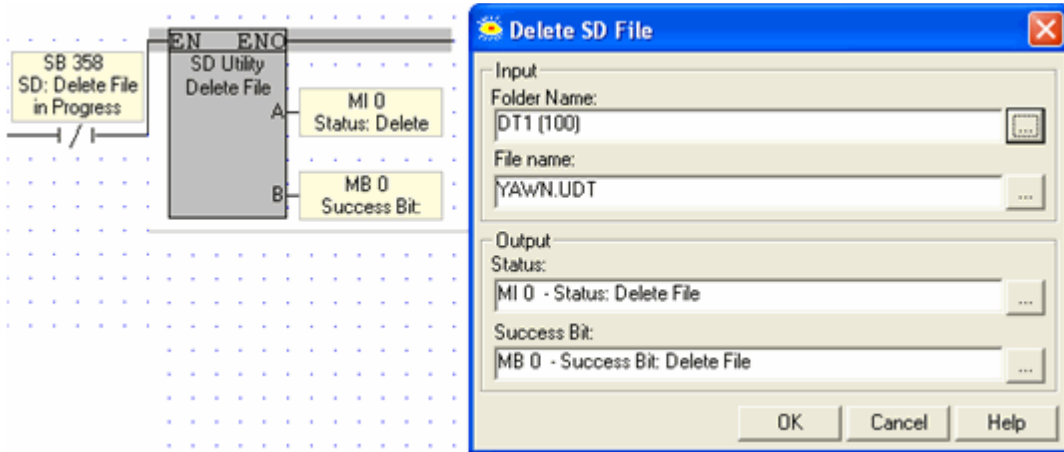


Delete File

Use this to delete any file on the SD card

Note ♦ These functions can only run on files that observe the 8.3 naming convention; the file name cannot exceed 8 characters, and the file extension cannot exceed three.

♦ Use SB 358, Delete File in Progress, as a condition to running the function



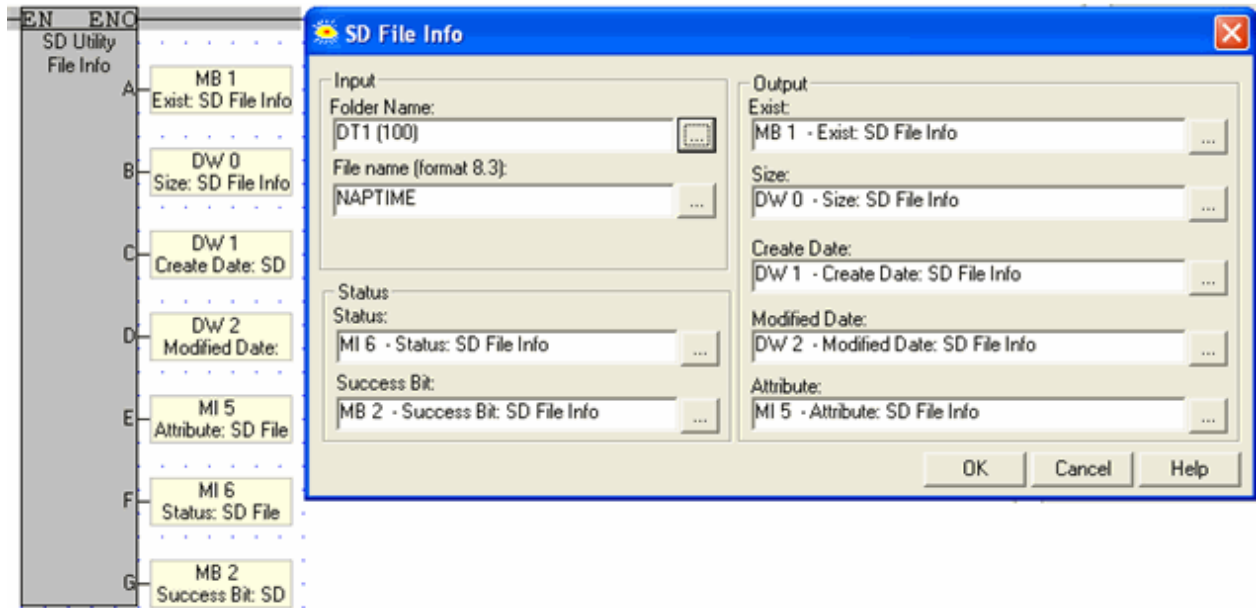
Parameter	Purpose
Select Folder	Select the folder, or use an operand to assign a number at run time using the following values: Alarms: 0 ♦ DT main folder: 1 ♦ DT1-4: 101 to 103 ♦ Log: 3 ♦ System: 4 ♦ User_app: 5 ♦ Trends main folder - 600 ♦ Trends1-4: 600 to 603 ♦ SdBLocks: 9 ♦ Excel main folder: 100 ♦ Excel1-4: 1000 to 1003 ♦ Web: 11
File name	Either enter the file name, or provide it via operand. Note that: -If the file does not exist on the SD -and the SD card is Write-enabled the function will create the file.
Status Messages	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – SD Card internal error. • Bit 2 – Delete Failed • Bit 3 - No SD card found, or the card is locked (Write-enable OFF) • Bit 5- Path not found • Bit 7 - The SD card has failed (Check SI 66)

Success Bit | Turns ON when the data is successfully written to the Block. It remains ON until it is reset by the application, or until the application calls the function.

SD File Information

Use this function to check if a specific file is located in a specific SD folder, and get specific file details.

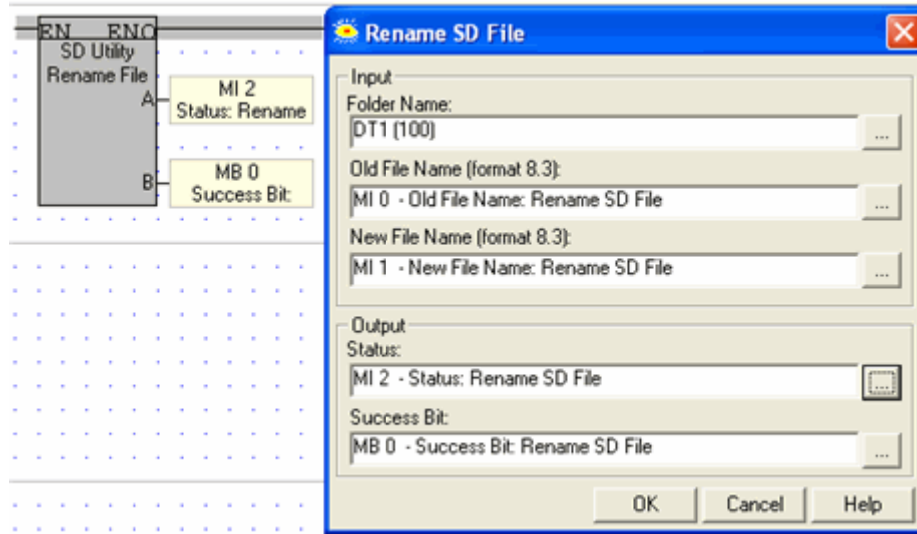
Note | Use SB 359, File Info function in Progress, as a condition to running the function



Parameter	Purpose
Select Folder	Select the folder, or use an operand to assign a number at run time using the following values: Alarms: 0 ♦ DT main folder: 1 ♦ DT1-4: 101 to 103 ♦ Log: 3 ♦ System: 4 ♦ User_app: 5 ♦ Trends main folder - 600 ♦ Trends1-4: 600 to 603 ♦ SdBLocks: 9 ♦ Excel main folder: 100 ♦ Excel1-4: 1000 to 1003 ♦ Web: 11
File name	Either enter the file name, or provide it via operand.
Status Messages	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – SD Card internal error. • Bit 2 – Cannot read file • Bit 3 - No SD card found, or the card is locked (Write-enable OFF) • Bit 4– The SD card has failed (Check SI 66) • Bit 5 - Path not found
Success Bit	Turns ON when the data is successfully written to the Block. It remains ON until it is reset by the application, or until the application calls the function.

Rename SD File

Use this to rename any file on the SD card.



Parameter	Purpose
Select Folder	Select the folder, or use an operand to assign a number at run time using the following values: Alarms: 0 ♦ DT main folder: 1 ♦ DT1-4: 101 to 103 ♦ Log: 3 ♦ System: 4 ♦ User_app: 5 ♦ Trends main folder - 600 ♦ Trends1-4: 600 to 603 ♦ SdBLocks: 9 ♦ Excel main folder: 100 ♦ Excel1-4: 1000 to 1003 ♦ Web: 11
Old/New File name	Either enter the file name, or provide it via operand.
Status Messages	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • All bits OFF – No errors, and the SD card is idle • Bit 1 – SD Card internal error. • Bit 2 – Rename Failed • Bit 3 - No SD card found, or the card is locked (Write-enable OFF) • Bit 5 - Path not found • Bit 7 - The SD card has failed (Check SI 66)
Success Bit	Turns ON when the data is successfully written to the Block. It remains ON until it is reset by the application, or until the application calls the function.

SD: Cloning via Ladder

SD Clone functions can:

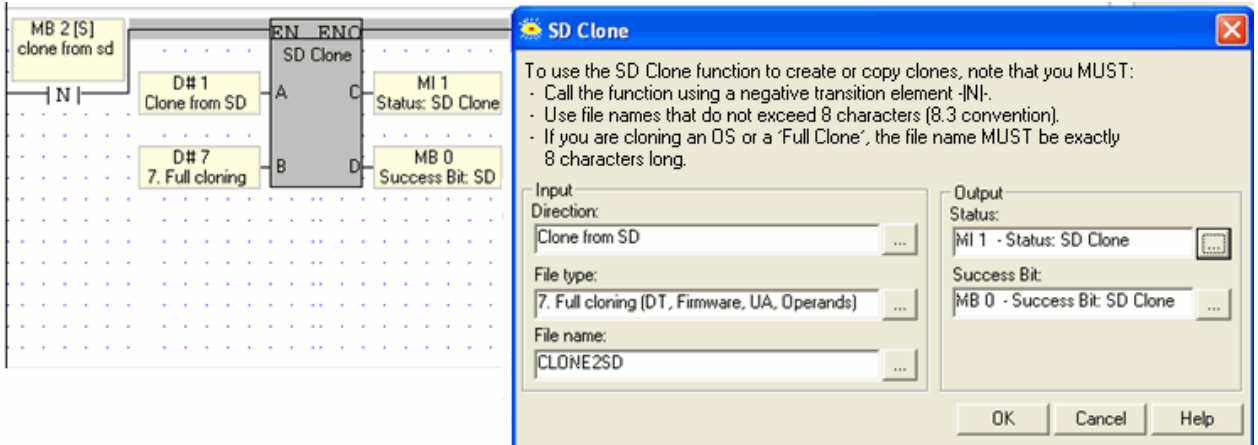
- Create compressed data files and store them on an SD card.
- Upload compressed files from an SD card to a PLC.


You can 'clone' a complete PLC or data using the SD Ladder functions

These Ladder functions are parallel to the actions you can carry out via Information Mode.

- Note** ♦ The SD Card password and the Clone File password must be **identical**.
-
- ♦ You can use Unitronics' SD Card Explorer, included in the SD Card Suite, to access SD card files and either upload them to a PC for viewing and editing, or transfer them into another PLC's SD card.

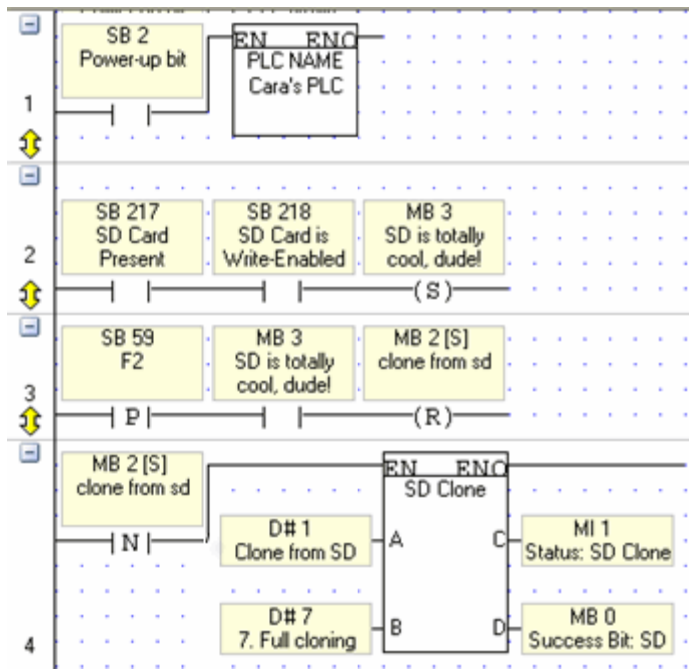
This function must be used with a negative transition element.



Parameter	Purpose
Direction	Clone To SD: Creates a compressed data file in the correct SD card folder Clone From SD: Installs a compressed data file from an SD card folder into the PLC
File Type	Select Direct or Constant. If you select Direct, the value in the register determines the data file that the function creates/installs according to the following legend: 2 = Full Data Table (*.fdt files) 4 = Firmware (*.Oxx files: .O13, .O35, or .O57) 5 = User Application (+VLP if exists) (*.vxx files: .V13, .V35, .V57) 7 - Full cloning (DT, Firmware, UA, Operands)(*.Cxx) .C13, .C35, or C57) 8 = Operands (*.Dxx files: .D13, .D35, .D57) Note that the file extension numbers relate to the Vision model: .x13 =V130, .x35 =V350, .x57 =V570
File Name	This is limited to 8 characters. The file extension is automatically assigned by the PLC according to the file type.  If you are cloning an OS or a 'Full Clone', the file name MUST be exactly 8 characters long.
Status	This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts. <ul style="list-style-type: none"> • All bits OFF – No errors, and the process is idle • Bit 1 – No SD card found, or the card is locked (Write-enable OFF) • Bit 2 – Clone utility busy • Bit 3 -File type not found (*.FDT,*.Oxx,*.Vxx,*.Dxx,*.Cxx) • Bit 4– Incompatible Boot Version/Firmware/Clone file • Bit 5 - Internal use • Bit 6- Timeout exceeded • Bit 7 - - Safe to Remove Bit is ON • Bit 8 - Path not found (Install Clone) • Bit 9 - Password error
Success Bit	Turns ON when the data is successfully written to the SD. It remains ON until it is reset by the application, or until the application calls the function.

SB 366: Clone in Progress. Note that the process can take from several seconds to several minutes.

The following nets show the conditions required to run the function.



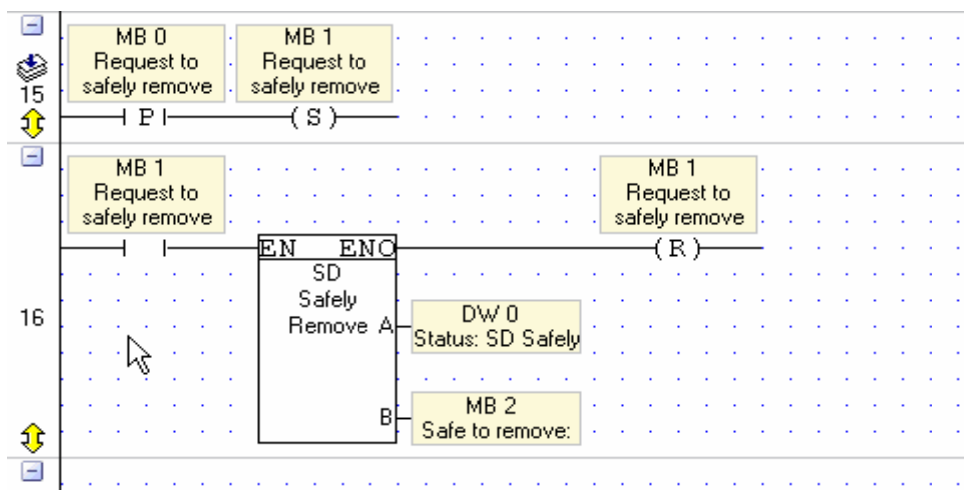
SD: Safely Remove

Use SD: Safely Remove to prevent the card from being physically removed while an SD function is in progress.

When SD: Safely Remove is called, it:

- Checks to see if any SD functions are running.
- If so, Safe to Remove indicates which function is active via the Status DW.
- It allows a current task to be completed, but prevents new ones from starting.

When the SD card is completely free, the Safe to Remove bit turns ON. This must be reset by the user.



The Status DW is a bitmap.
 Bits and their indications are shown in the following table. When a bit is ON, the related function is active.

Bit	Function
0-5 (reserved)	
6	Start Saving to SD is running: SD Trend 8
7	Start Saving to SD is running: SD Trend 7
8	Start Saving to SD is running: SD Trend 6
9	Start Saving to SD is running: SD Trend 5
10	Start Saving to SD is running: SD Trend 4
11	Start Saving to SD is running: SD Trend 3
12	Start Saving to SD is running: SD Trend 2
13	Start Saving to SD is running:SD Trend 1
14	HMI function Trend from SD
15	SD File Info
16	Delete SD File
17	Folder Report: Number of Files
18	Create Excel Delimited Line
19	SD File Utilities: SD File Write
20	SD File Utilities: SD File Read
21	SD Block Utilities: Read/Write to Block 3
22	SD Block Utilities: Read/Write to Block 2
23	SD Block Utilities: Read/Write to Block 1
24	SD Block Utilities: Read/Write to Block 0
25	HMI Variable SD Browser
26	PC Utility is communicating with SD
27	Information Mode is accessing SD
28	SD Data Table Utilities: Log DT Row
29	SD Data Table Utilities: Read from DT /Search DT for Tag or Index
30	SD Data Table Utilities: Write to DT
31	Alarm History is being logged to SD

SD Card Browser

Placing this variable on screen enables a user to press a button to display all of the files in the specified folder.

- Touch Screens (V570/V350): The user presses the Browse SD on-screen button. If file selection is enabled, the user touches file names to select them.
- Non-Touch Screens (V130): The user presses the Enter button, and navigates between files using the arrow keys.

SD Ladder Functions enable you to read/write data between an SD Card and PLC memory operands, including blocks of file data, Data Tables, and Trend data.

You can also enable the user to delete files, or to copy the file name to an operand vector. You can control whether to display the Delete button by using the Hide Delete File MB.

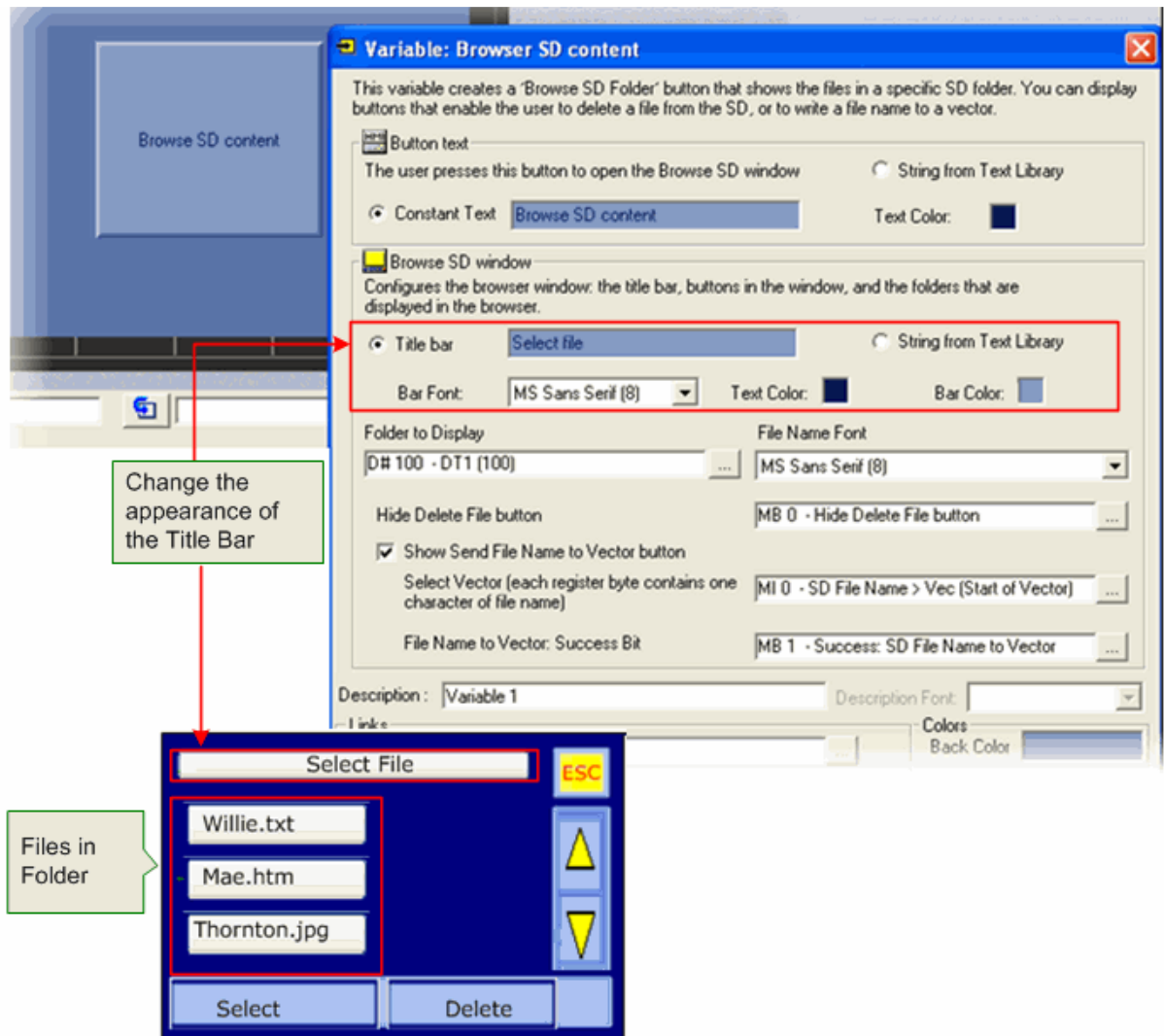
Note ◆

The SD Card Browser only displays file types that are relevant for the requested folder. For example, when you view DT files, you will only be able to see .udt and .fdt files; if there are other files in the folder they will not be displayed.

In the Web folder, all file types are displayed

Note that in VisiLogic versions earlier than 8.0.46, EXCEL folders cannot display .txt

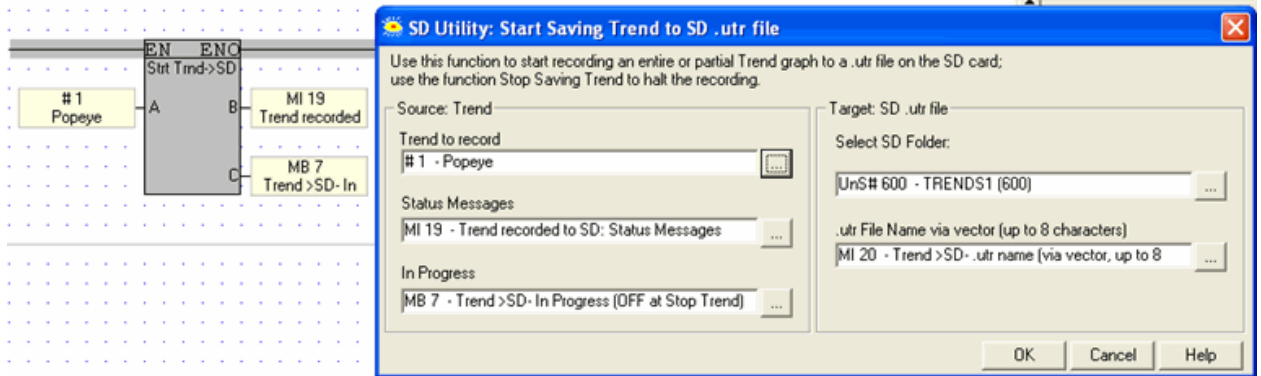
files. In addition, PLCs running an OS earlier than 3.0.59 do not support .txt display.



SD Card and Trends

Use the Start Saving Trend to SD to record an entire or partial trend; and Stop Saving Trend to halt the recording process.

When the application writes this type of data to the SD card, it creates a file with the extension .utr in the Trends folder. Each time you start and stop saving the Trend, the application adds a new segment to the file.

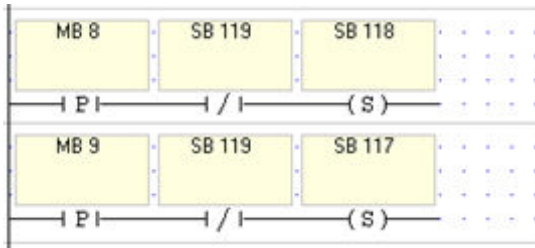


Parameter Name	Purpose
Source Trend Number	Click on the drop-down arrow to select a Trend in the project.
Target SD .utr file	Link an operand to provide a file name. Note that you MUST provide a file name. If the linked register is empty, the Trend will not be recorded to the SD. This is where the .utr file will be stored on the SD card. You can select the folder, or provide the Folder number via register. Values point to folders as follows: 1=the main DT folder, 100=DT1, 101=DT2, 102=DT3, and 103=DT4.
Status Operand	<p>This MI is a bitmap; a bit turns ON to indicate status. The MI is initialized when the function starts.</p> <ul style="list-style-type: none"> • Bit 1 – The SD card was formatted in an SD Tools version that is not compatible with the VisiLogic application in the PLC. or VisiLogic version is not compatible with the PLC OS. Check to see if you need to update versions. • Bit 2 – The data in the SD is not compatible with the data in the Data Table • Bit 3 -.Data checksum error • Bit 4 – Failed to open file • Bit 5 - Failed to read from file • Bit 6 - Failed to close file • Bit 7 - In progress • Bit 8 - No SD card found • Bit 9 - SD error, check SI 66 for error message
Success Bit	Turns ON when the data is successfully written to the PLC Data Table. It remains ON until it is reset by the application, or until the application calls the function.

Displaying the saved Trend

You can display Trend curves directly from a .utr file by using the HMI element Trend from SD.

Link SBs 117 and 118 with HMI buttons to enable users to jump between segments. Use the inverted contact of SB119 as a condition as shown below.



When you save a Trend to an SD card, each time you start and stop the save, another segment is added to the .utr file.

#	Description	Turns ON :	Turns OFF :	Reset by:
SB 116	SD Trends to SD: Set to Overwrite .utr	User application	User application	User

Use these to control the display of Trend segments on the HMI screen. Use the inverted contact of SB119 as a condition.

SB 117	SD Trends: Jump to next segment	User application	User application	User
SB 118	SD Trends: Jump to previous segment	User application	User application	User
SB 119	SD Trends: System busy - Draw Trend is gathering data	User application	User application	User

Data Tables

About Data Tables

You can store data into the Data Table memory section of your controller, then access the data in accordance with program requirements. They are useful in implementing Program Recipes, a collection of ingredients or values that are used to prepare a batch of product or to perform a specific task.

Data Tables can be used to contain parameters for pre-programmed recipes. Vision controllers can contain up to 120K of Data Tables (RAM); Data Tables (that are marked Part of Project) can take up to 192K (Flash) in V230/260/280/290.

You create tables in VisiLogic, define their structure, then download them to the controller. Data within the tables can be copied and pasted to and from third-party tools such as Excel.

You can also store Data Tables or log lines from them onto SD Cards.

Note •	Data Tables are based on bytes, not on registers.
•	Data Table sections that are marked Part of Project: the data are downloaded with the project, and burned into the Flash memory. You can use this feature to preserve certain, unchanging data, such as lists of names or recipe data.
•	A Data Table marked as Part of Project cannot be copied to an SD card.


Data tables consist of columns and rows.

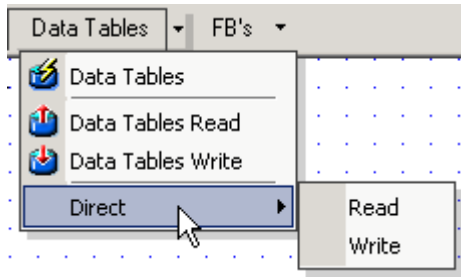
The screenshot shows the 'Data Tables' editor window. The interface includes a menu bar (File, Edit, Connection, Column), a toolbar with various icons, and a main workspace. On the left, a 'Tables' list shows 'Program 1' through 'Program 6'. The main workspace displays a table for 'Program 1' with columns: Row, Step name (Integer), Water Type (Integer), Water fill (Boolean), Water level (Integer), Temp. (Integer), and Heat (Boolean). The table contains data for rows 7 through 12. Several green callout boxes provide additional information:

- 'On-line mode shows values currently in the PLC Data Tables.' (pointing to the table)
- 'All elements within a column are of the same data type: Boolean, byte, single/double register or string. Elements may also be linked to an addressed element such as an MI.' (pointing to the column headers)
- 'Click a table to open it.' (pointing to the 'Tables' list)
- 'Each row has an index number.' (pointing to the 'Row' column)
- 'A single cell in a column can contain up to 100 elements.' (pointing to a cell in the 'Water Type' column)

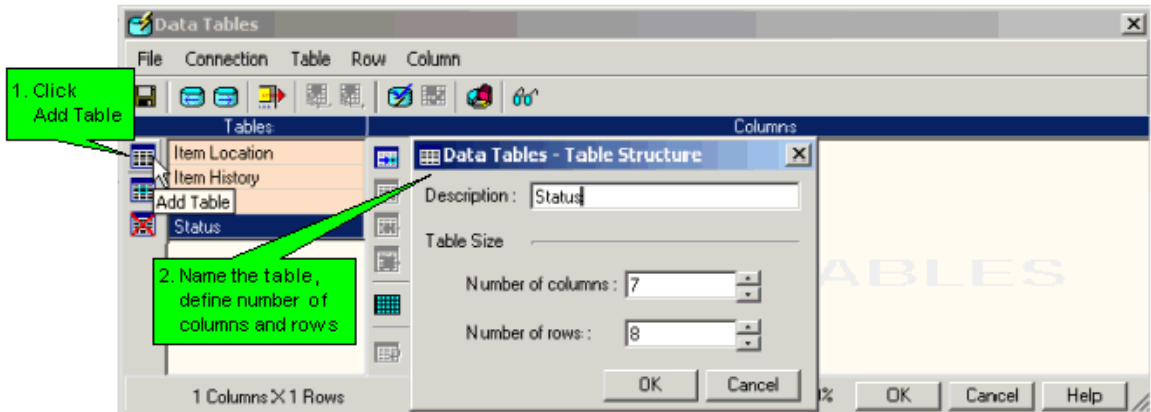
The status bar at the bottom indicates '13 Columns X 20 Rows' and '0%'.

Creating a Data Table


1. Open the Data Tables editor by clicking the PLC Data Tables  on the toolbar, or by selecting it from the Data Tables menu.

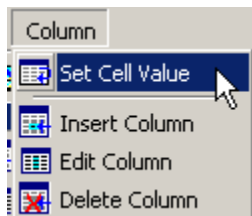


2. Create a table by clicking the Add Table icon, then name the table and define the number of columns and rows.



Note • The grid that appears represents only the table's column and row structure. Each column in the table can contain up to 100 elements, such as MIs.

3. Define a table's columns by selecting the column, then clicking the Edit button , or by right-clicking and selecting Edit from the Column menu.



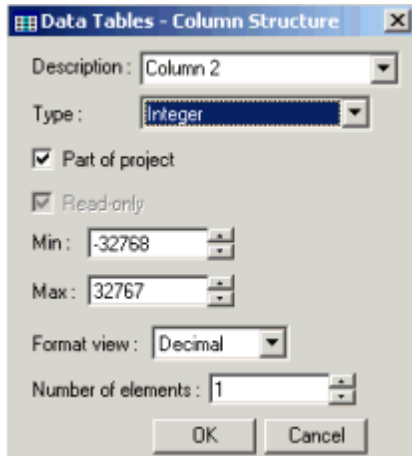
Data Table Options

Menu Name	Option
File	Import/Export Data Tables can be exported from an application as . upd files, then imported into any VisiLogic program. When you import the file, you can select to: Add individual tables to the structure. If tables of the same name already exist, the tables are automatically renamed. Delete existing tables and import the new structure. Memory Requirements Displays pie charts that show the amount of memory that will be required by the data tables when the project is downloaded.
Connection	All of the Connection commands require that the PLC be connected to the PC. Read Structure from PLC Imports the structure of the data tables within the PLC into the project.

	<p>Verify: Tables Structure Compares the table structure in the project to the structure of tables within the PLC. The commands below also require that the table structure in the PLC be identical with the table structure in the current project.</p> <p>Read Range Reads the values of the selected cells from within the PLC data table into the project.</p> <p>Write Range Writes the values of the selected cells from the project data table into the PLC.</p> <p>Read Write Table Reads or write the values of an entire Data Table.</p> <p>Verify Cell Value: by Range Compares the values of the cells in the project to the values within the PLC.</p>
Table	<p>Table options have short-cut buttons on the left side of the Tables pane. Right-clicking the pane also opens the Table menu.</p> <p>Add Table Adds a new data table.</p> <p>Edit Table Enables you to change the name of the data table and the number of rows and columns.</p> <p>Delete Table Deletes the entire table, both values and structure.</p> <p>Duplicate Table Creates a new table, including both the values and the structure of the table being duplicated.</p> <p>Select All Selects the entire table.</p>
Row	<p>Edit Number of Rows Enables you to change the name of the data table and the number of rows and columns.</p> <p>Insert Row Enables you to insert a row at any point in the table.</p> <p>Delete Row Enables you to delete a row from any point in the table. Note • Inserting or deleting a row changes the index number of all successive rows; impacting your data operations.</p>
Column	<p>Set Cell Value Enables you to enter values for a cell or range of cells within a column.</p> <p>Insert Column Inserts a column.</p> <p>Edit Column Enables you to name the column, set a data type for the entire column, define the number of elements held by each cell in the column and make other selections based on the data type that has been assigned to the column.</p> <p>Delete Column Deletes a column.</p>

Column Parameters (Part of Project)

The column structure options change according to the data type selected.



Parameter	Function																		
Description	Assign a unique name.																		
Type	A column is assigned to the data type selected. Data types may be directly assigned, or linked via address.																		
Part of Project, Read-only	Select this to burn the data into the PLC's Flash memory at program download. You can use Part of Project to preserve unchanging data, such as lists of names or recipe data. Recommended column order <table border="1" data-bbox="438 891 1212 1070"> <thead> <tr> <th>Row</th> <th>Item Number (String, P, R, 10)</th> <th>Aisle (Integer, P, R)</th> <th>Row (Integer, P, R)</th> <th>Compartment (Integer, P, R)</th> <th>Currently Accessed (Boolean, P, R)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Jw-451.01</td> <td>18</td> <td>36</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>Jw-451.02</td> <td>18</td> <td>36</td> <td>2</td> <td>0</td> </tr> </tbody> </table> <p style="text-align: center;"> Standard Read only Part of Project </p>	Row	Item Number (String, P, R, 10)	Aisle (Integer, P, R)	Row (Integer, P, R)	Compartment (Integer, P, R)	Currently Accessed (Boolean, P, R)	0	Jw-451.01	18	36	1	0	1	Jw-451.02	18	36	2	0
Row	Item Number (String, P, R, 10)	Aisle (Integer, P, R)	Row (Integer, P, R)	Compartment (Integer, P, R)	Currently Accessed (Boolean, P, R)														
0	Jw-451.01	18	36	1	0														
1	Jw-451.02	18	36	2	0														
Min/Max	Enables you to set limits for the value of an element in the column.																		
Format View	Choose between decimal and hexadecimal.																		
Number of elements	A column can contain a maximum of 100 elements.																		

Data Tables, Read/Write

For information regarding Data Tables, refer to the manual VisiLogic – Utilities. Read enables you to copy values from a Data Table to PLC operands. Write functions enables you to copy operand values from a PLC to Data Tables.

Read/Write functions are located on the Data Tables menu.

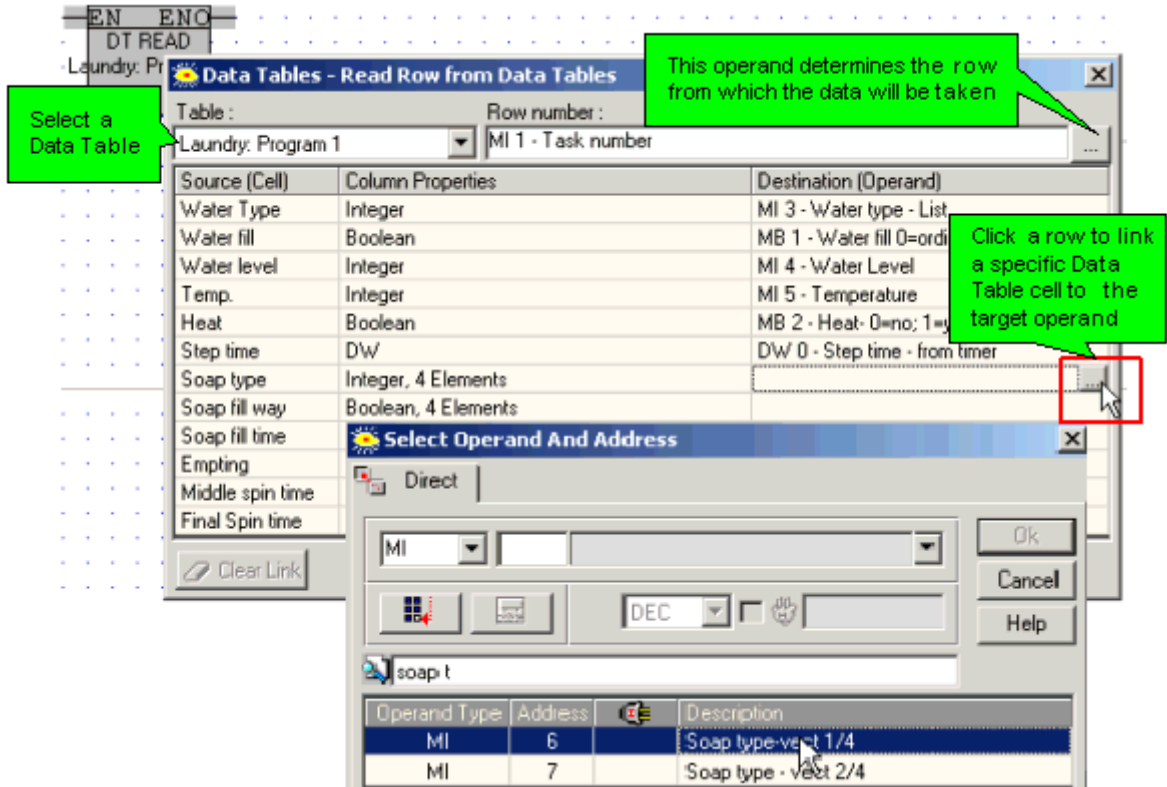
Note ♦ The maximum number of operands of **any** type for a Read/Write operation is 128.

Rows

Read Row

Use the Read function to select Data Table rows and read their data into PLC memory operands. Values are read from the Data Table into the operands that

are linked to it in the Read function. Note that the number of rows read cannot exceed the number of rows that are in the Data Table.

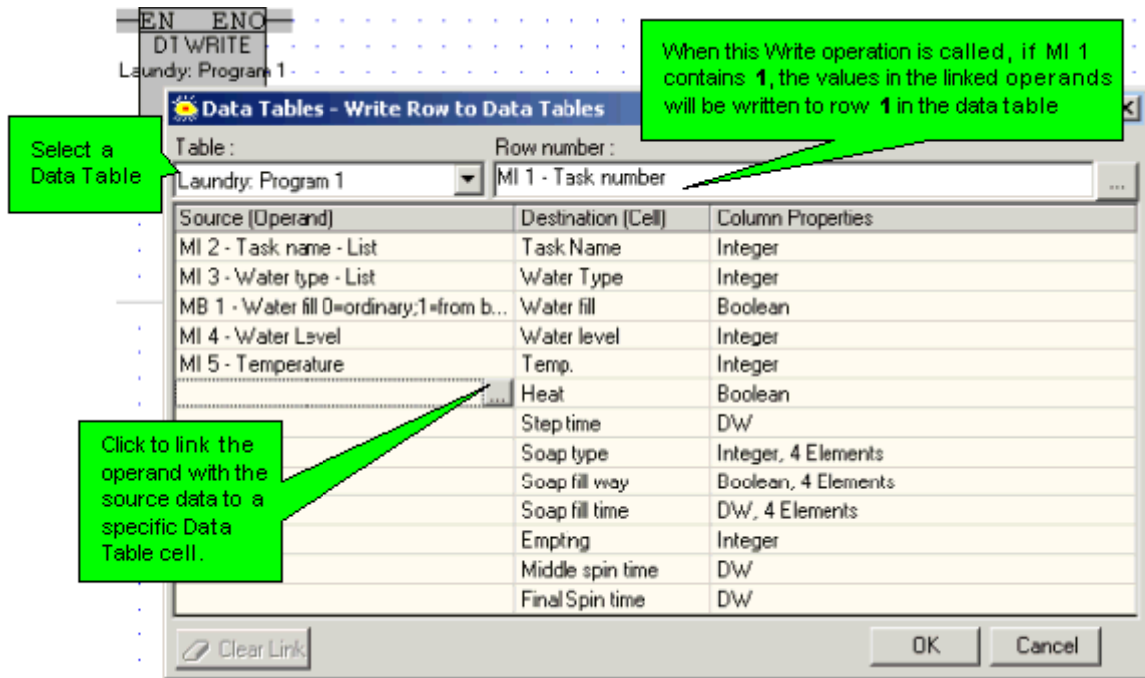


Write Row

Use the Write function to select PLC memory operands and read their data into Data Table rows.

Values are read from the PLC into the Data Table cells that are linked to it in the Write function.

Note that you provide a Start Address for the PLC memory operands; the Write function will take a vector of operands that will fit the number of rows in the Data Table.



Writing to flash via ladder

Columns

Note ♦	'Part of Project' Data cannot be included in Write Column functions.
♦	Not all Data Types are supported: <ul style="list-style-type: none"> ● Unsupported types: Boolean, Byte, String, all 'Address of' types. ● Supported Data Types: Integer (16-bit), Long, Float, Timer (32 bit)
♦	When longer data types are copied to shorter data types, the longer values are truncated. <div style="text-align: center; margin-top: 10px;"> </div>
♦	When shorter data types are copied to longer types, each source value is copied to the lower bytes of the destination. <div style="text-align: center; margin-top: 10px;"> </div>

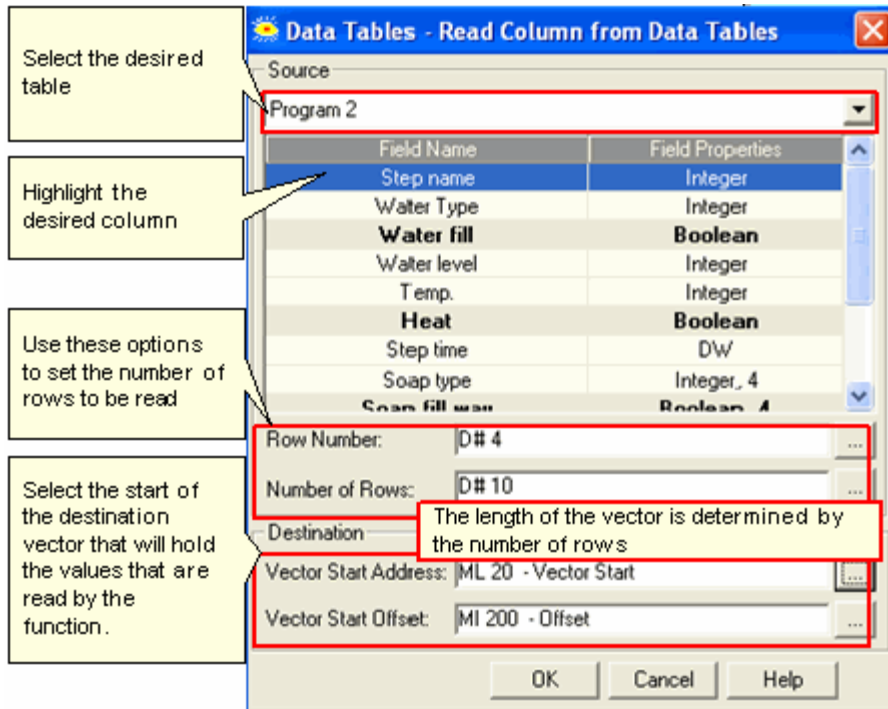
Supported Read Write

Data Table	PLC Operand	Read	Write Result
Byte	Integer	1 Byte is read into the	The first 8 bits of the Integer are

Byte	Long Integer	first 8 bits of Integer (LSB).	written into a Byte. The last 8 bits of the Integer (MSB) are discarded.
Integer	Integer		
Integer	Long Integer	1 Integer is read into the first 16 bits of a Long.	The first 16 bits of the Long are written into an Integer. The last 16 bits of the Long are discarded.
Long Integer	Integer	First 16 bits of Long are read into an integer. The last 16 bits of the Long are discarded.	An Integer is written into the first 16 bits of a Long.
Long Integer	Long Integer		
Timer	Timer		
Float	Float		

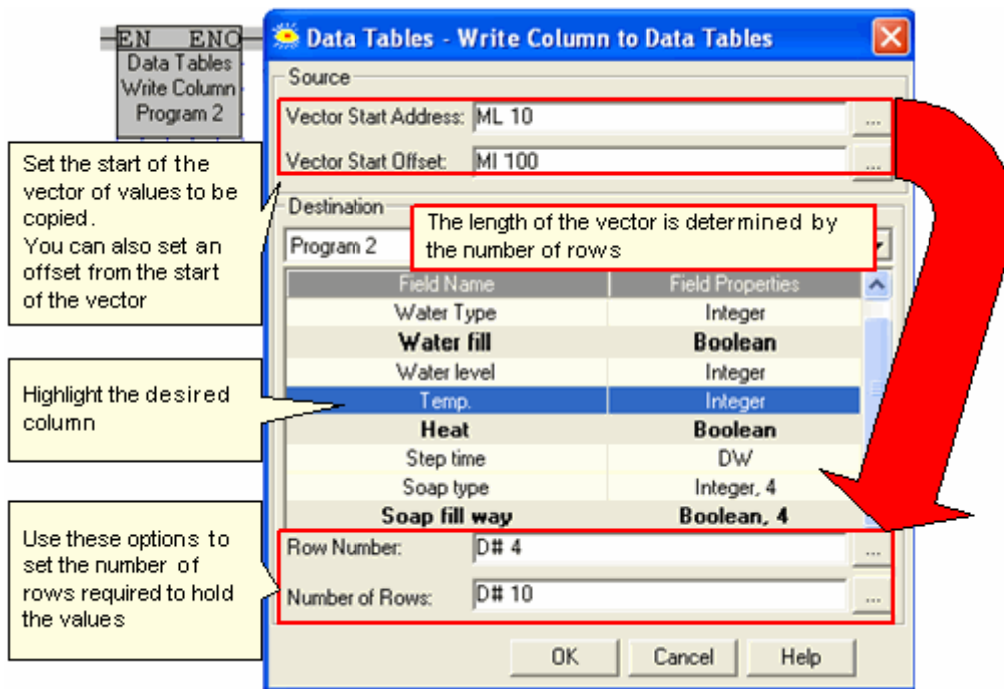
Read Column

A column in a Data Table is the source for the Read function. Values are read from the Data Table into the operands that are linked to it in the Read function, according to FIFO.



Write Column

PLC operands are the source for the Write function. Values are read into the Data Table cells that are linked to it in the Write function. Values are read from the operands into the Data Table according to FIFO.



Read/Write Direct

These operations access the values in the database **without** reference to table structure

Database: Read Direct

The Read Direct operation copies data from the data tables into a vector of registers within the controller.

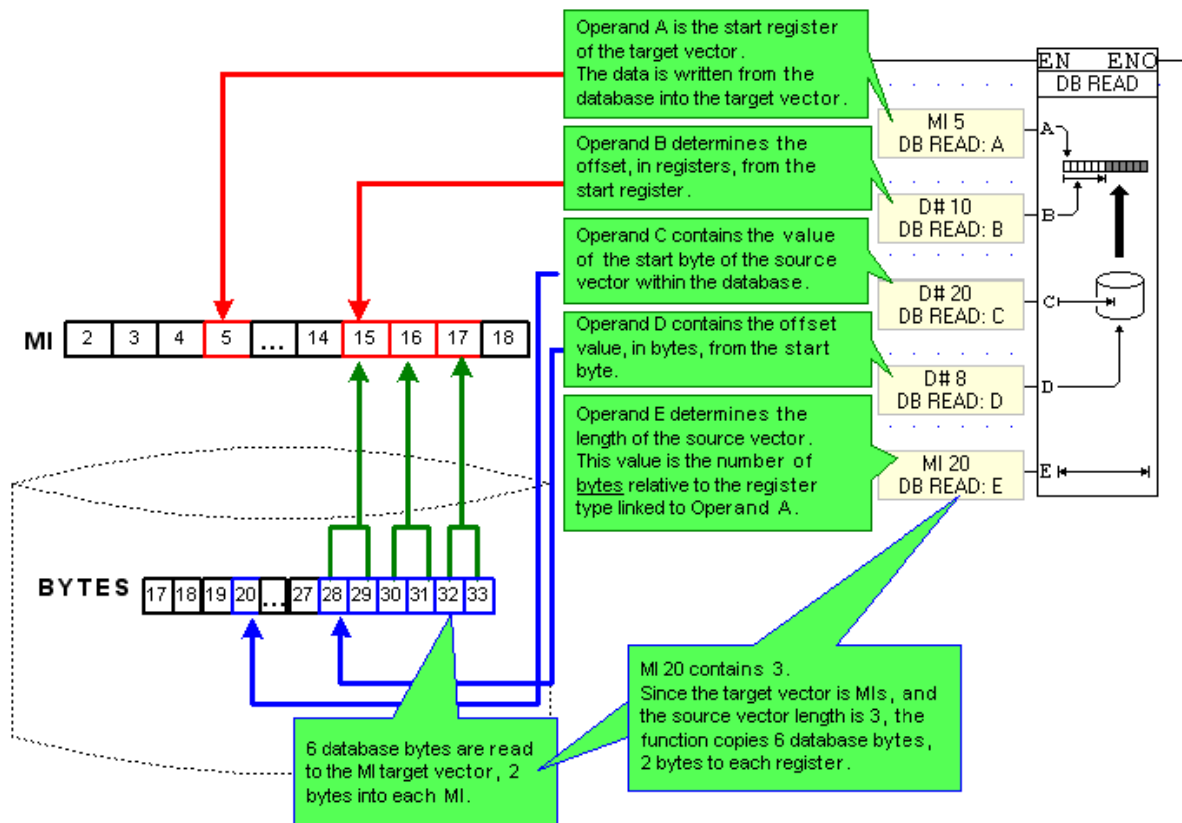
1. Select Direct: Read from the Data Tables menu.
2. Place the function in the desired net.
3. Link the desired Operands and Addresses.
 - Operands A & B determine the **data's destination --to where** the data from the data table will be copied.
 - Operand A: sets the register type for the target vector and the start register.
 - Operand B: determines the offset, in registers, from the start register.
 - Operands C, D, & E determine the **data's source --from where** in the data table the data will be copied.
 - Operand C: contains the start byte of the source vector within the data table.
 - Operand D: determines the offset, in bytes, from the start register.
 - Operand E: determines the length of the source vector.

Note that the length is relative to the **type** of register linked to Operand A. For example, if Operand A is linked to an MI and Operand E contains 5, 10 bytes of data will be copied from the data table into 5 MIs, 2 bytes into each MI.

If Operand A is linked to a double register; ML or DW; and Operand E contains 2, 8 bytes of data will be copied into 2 double register.

Read Example

Below, database bytes 28, 29, 30, 31, 32, and 33 are read and written into MIs 15, 16, and 17.



Database: Write Direct

The Write operation copies data a vector of registers into the database.

1. Select Data Block Read from the Data Tables menu.
2. Place the function in the desired net.
3. Link the desired Operands and Addresses.
 - Operands A & B determine the **data's source** --**from which** registers the data will be copied.

Operand A: sets the register type for the target vector and the start register.

Operand B: determines the offset, in registers, from the start register.

- Operands C, D, & E determine the **data's destination--to where** in the database the data will be written.

Operand C: contains the start byte of the source vector within the database.

Operand D: determines the offset, in bytes, from the start register.

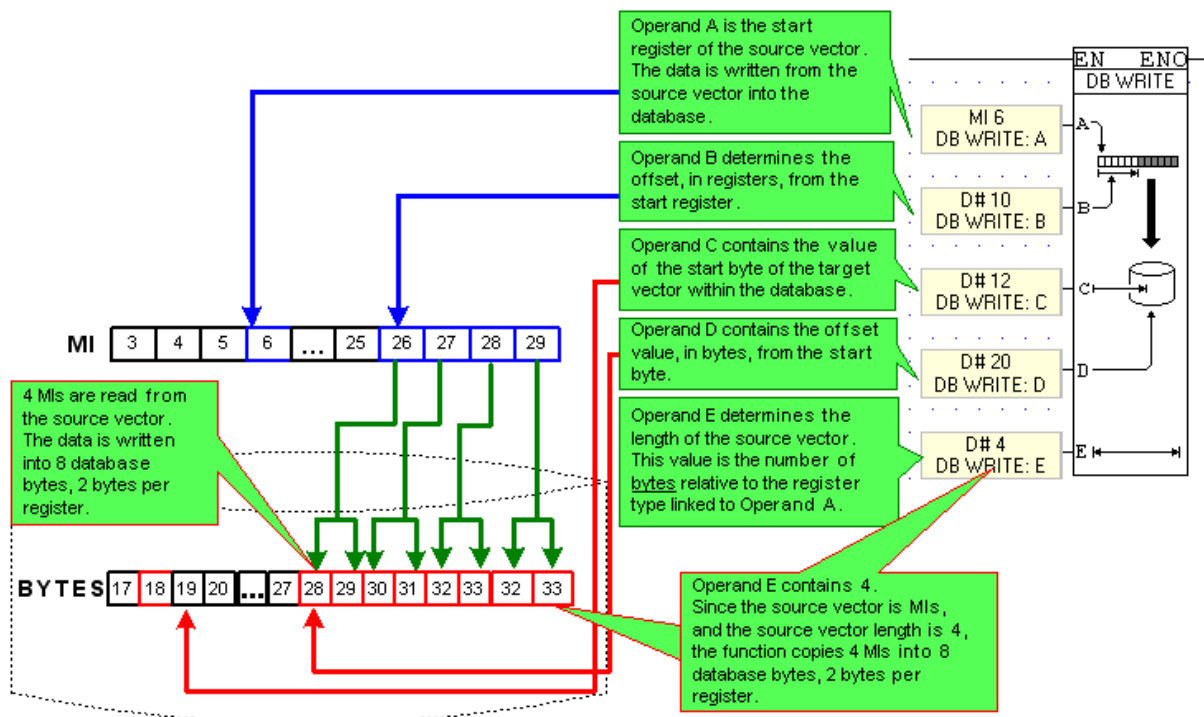
Operand E: determines the length of the source vector.

Note that the length is relative to the **type** of register linked to Operand A. For example, if Operand A is linked to an MI and Operand E contains 5, the data from 5 registers will be copied into 10 database bytes, 2 bytes per MI.

If Operand A is linked to a double register; ML or DW; and Operand E contains 2, the data from 2 double registers will be copied into 8 database bytes, 4 bytes per ML or DW.

Write Example

Below, MIs 26, 27, 28, 29 are written into database bytes 28 through 33; each register is copied into 2 bytes within the database.

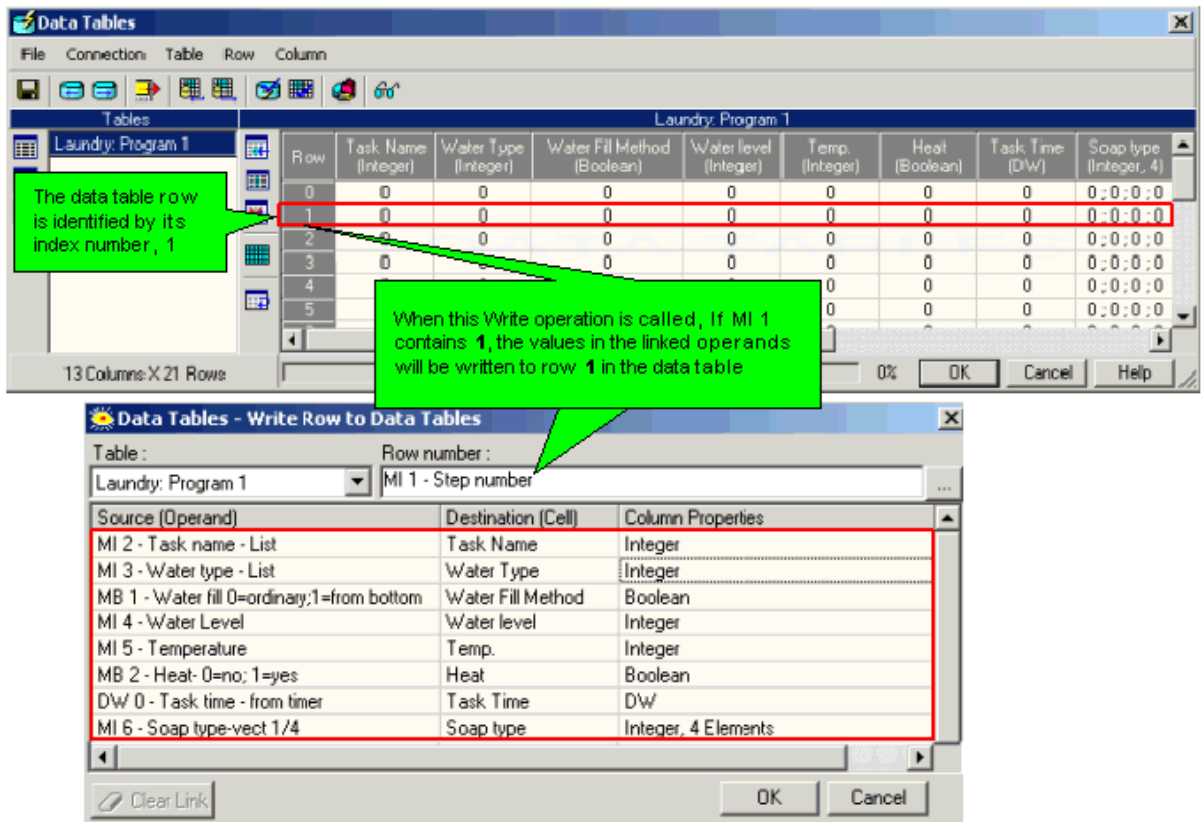


Program Recipes

A recipe is a collection of ingredients or values that are used to prepare a batch of product or to perform a specific task.

Data Tables can be used to contain parameters for pre-programmed recipes.

For example, assume that a laundry machine performs different tasks such as 'Fill', 'Wash' and 'Rinse'. A Data Table is created that contains 1 row for each task. Each row contains cells; each cell holds a specific parameter required for the task assigned to that row. The parameter values are transferred into the cells via a **Write to Data Tables** function. Within the Write function, the operands containing the parameter values are linked directly to the appropriate cells.

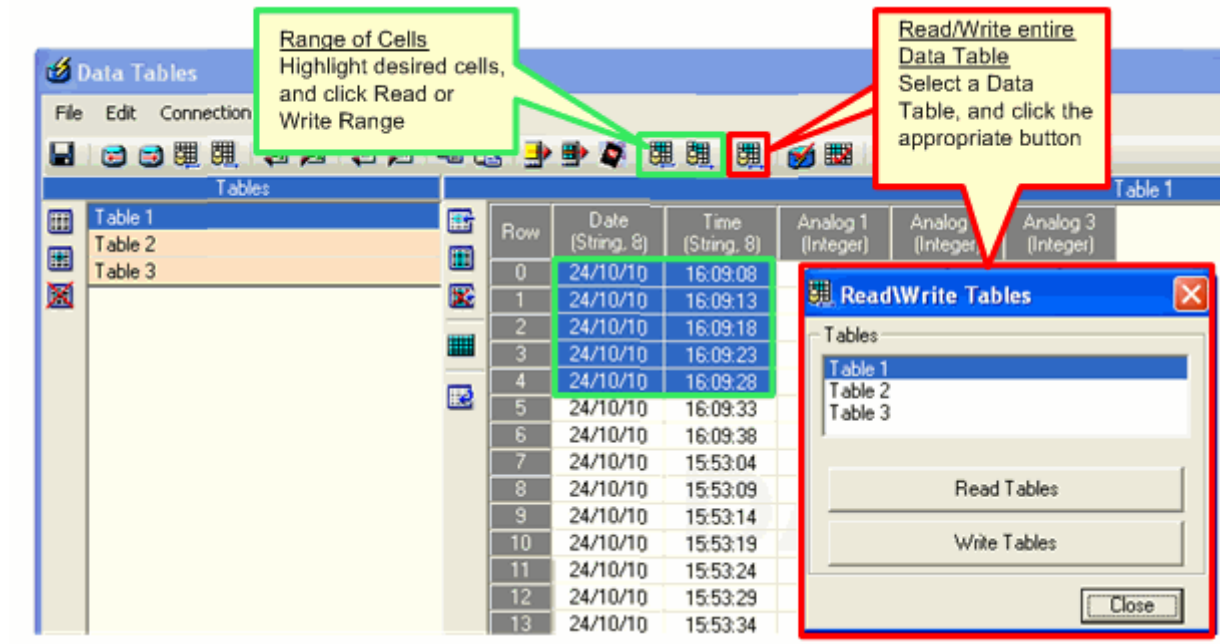


Data Tables, Excel, and .csv

Data can be imported to and exported from Excel and .csv files.

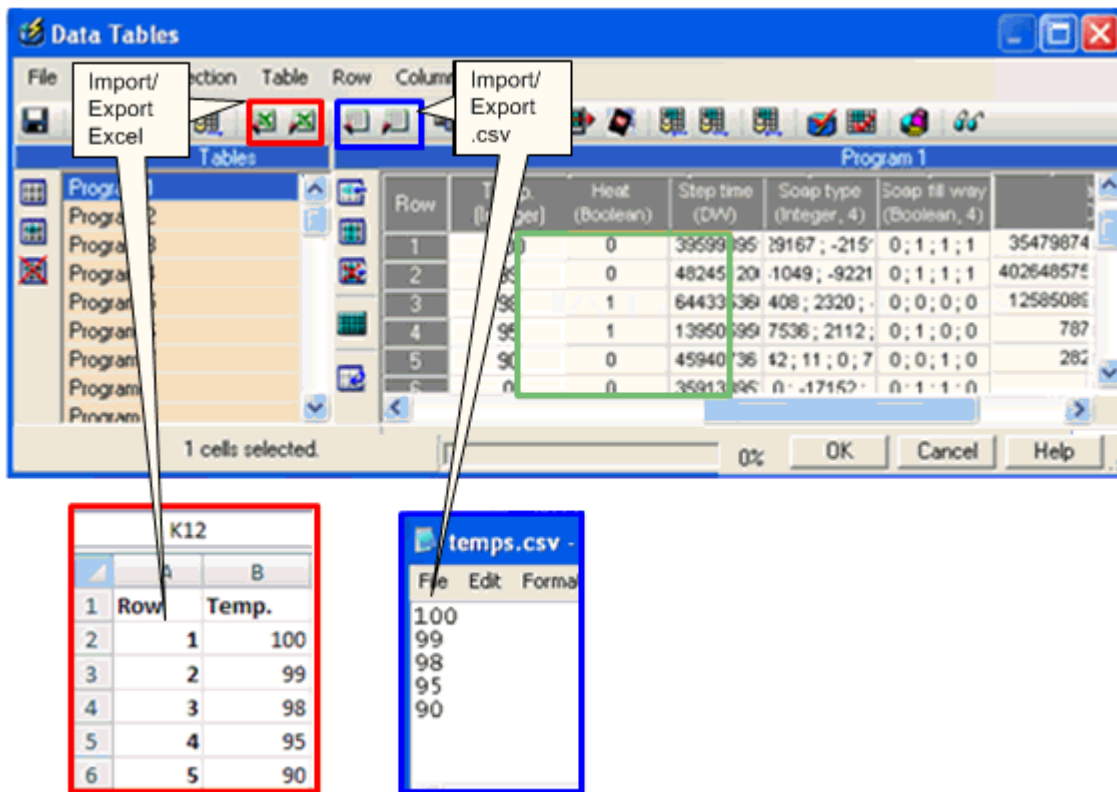
Export

Note that you can include the current values by establishing a communication connection with the PLC and reading or writing values from specific cells, or from an entire Data Table **within the PLC into the Data Table in VisiLogic**



To export data

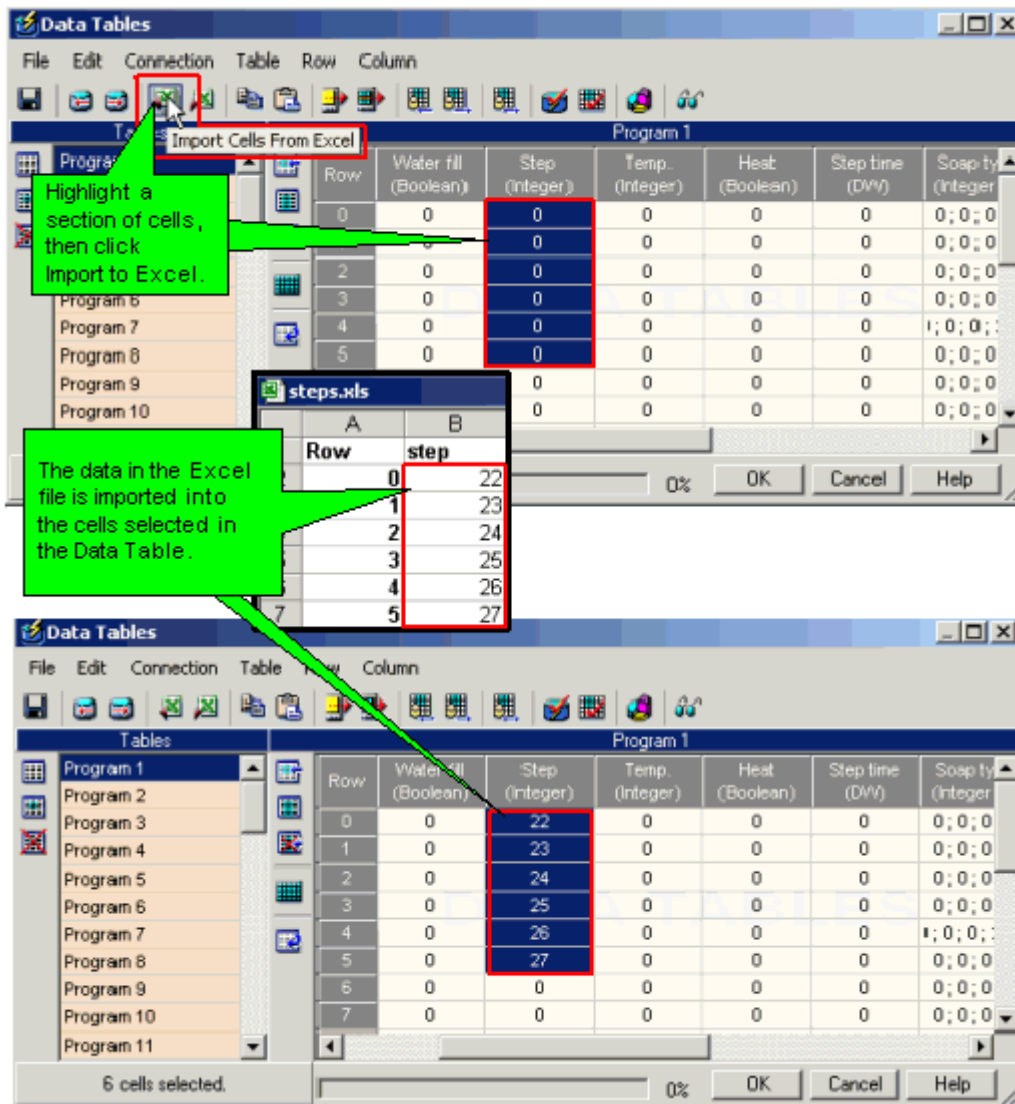
1. Highlight the cells containing the desired data.
Click the Export to Excel or Export to .csv button.
2. Follow the on-screen instructions; data is exported into the desired file type.



Import
To import data

1. Click the Import to Excel or Import to .csv button.
2. Follow the the on-screen instructions; data is exported into the desired file type.

The data is copied as shown below.



Copy & paste data

To copy/paste data to and from Data Tables and Excel.

1. Select data. You can select individual cells, rows, columns, or contiguous groups of cells.
2. Copy the values to the Clipboard either by pressing **<ctrl>+ <c>** or by clicking the Copy button.
3. Click the cursor in the Paste location, then paste the either press **<ctrl>+ <v>** or click the Paste button.

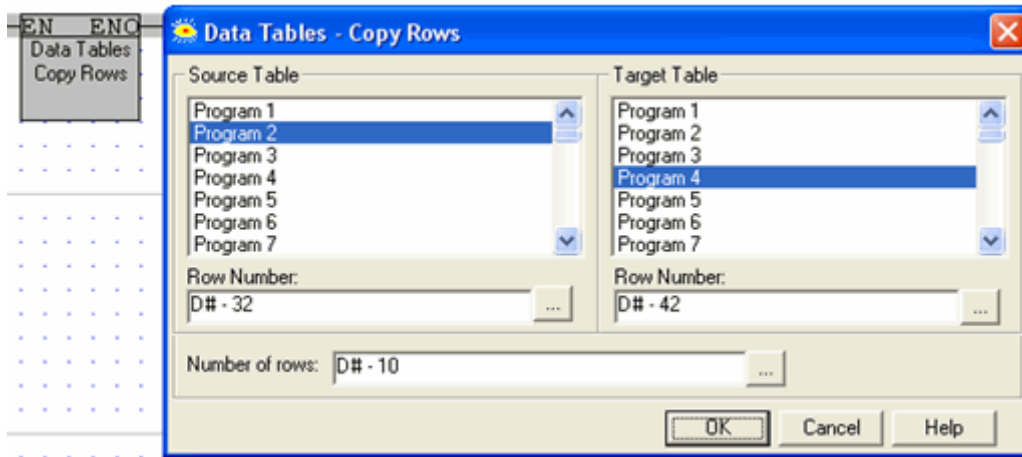
Note ♦ The selection is pasted towards the right and down. When you paste from Excel to Data Tables, the Data Table must have enough rows and columns to contain the Paste selection.

Data Table to Data Table: Copy

These functions enable you to transfer values within the same or between different Data Tables. They are located on the Data Tables menu.

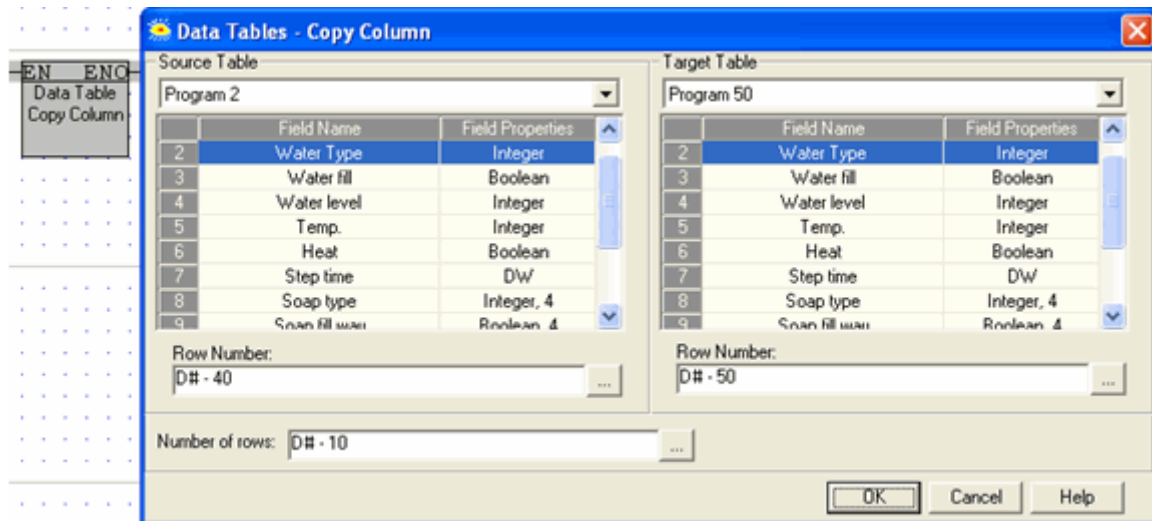
Copy Rows

Select the source table and target table, and make the appropriate selections.



Copy Column

Note that the columns you select must have the same structure.

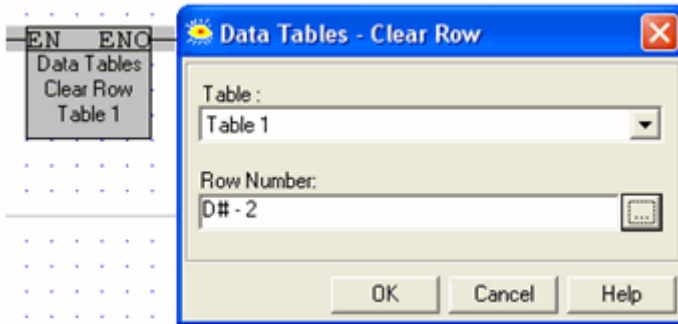


Data Tables: Clear, Row, Column, Table

These functions are located in the Data Tables menu. Clear enables you to use a Ladder condition to delete values in a particular table.

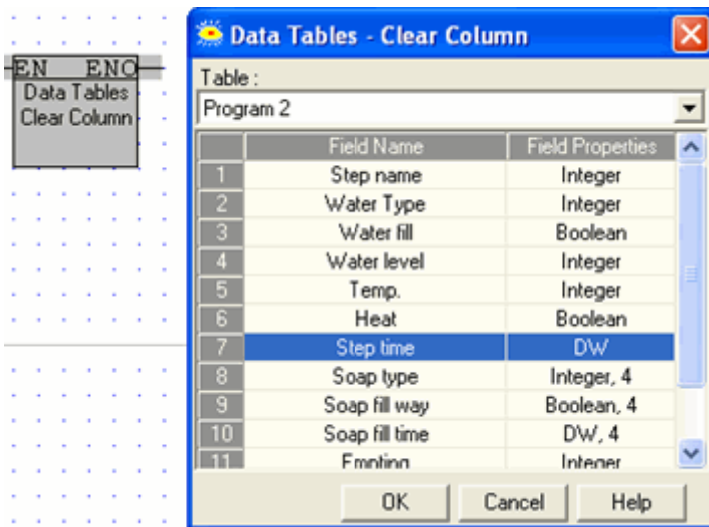
Clear Row

Select the desired Data Table. You can determine which row will be cleared either by entering the row number, or linking to an MI address containing the row number.



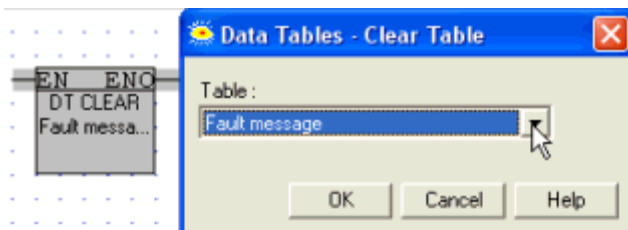
Clear Column

Select the desired Data Table to display its columns. You determine which column will be cleared by clicking it.



Clear Table

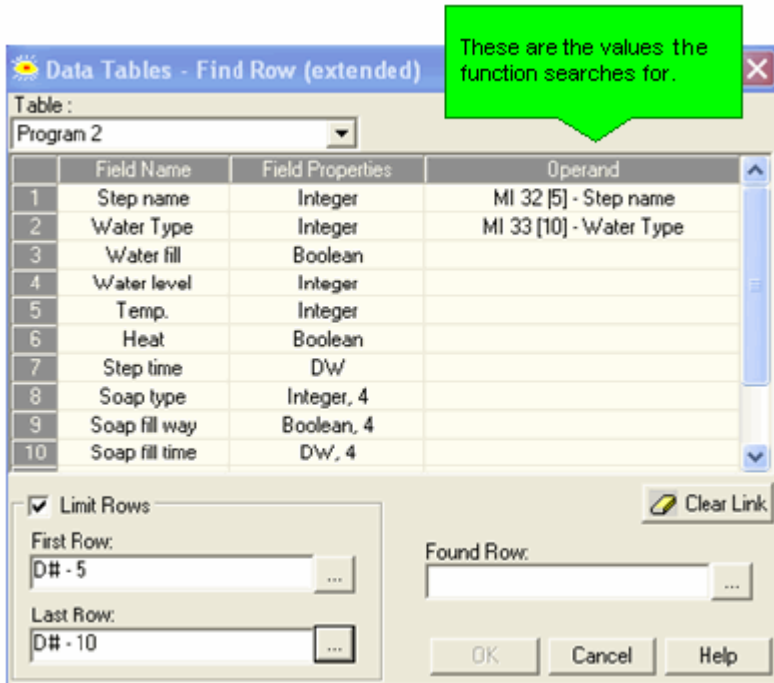
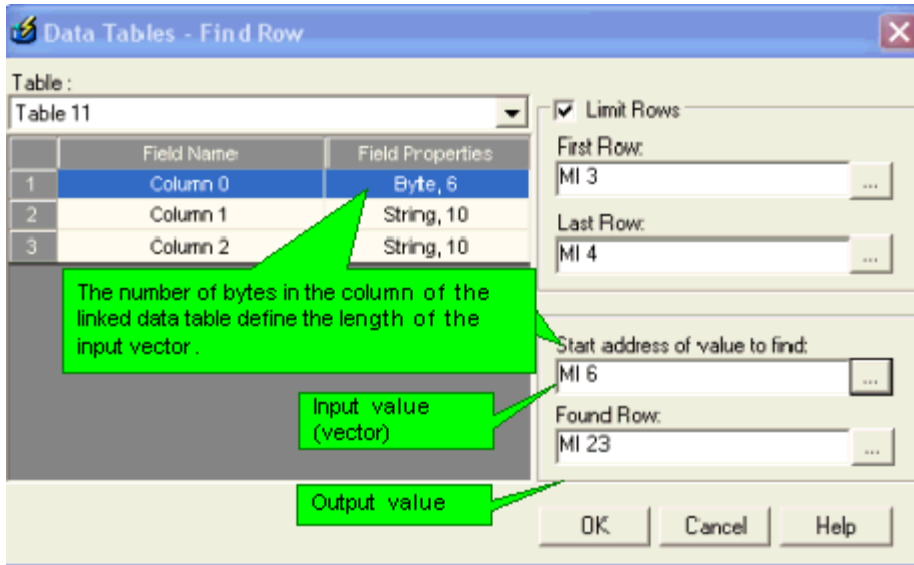
Select the desired Data Table. When the function is activated, all of the tables values will be cleared.



Data Tables: Find Row, Find Row Extended

Find Row and Find Row Extended are located on the Data Tables menu. These functions search through a data table, comparing the input value with the values in the data table.

- Find Row:
If a matching value is found, the number of the row is stored in the output value.
- Find Row Extended:
This function enables you to search for more than one value. The number of the row containing all of the values is stored in the output value.



Parameter Name	Purpose
Table	Click on the drop-down arrow to select a table from the project, then click the desired column. The number of bytes in the column of the linked data table define the length of the input vector.
Limit Rows	Check this option to limit the number of rows the function will search.
Start Address	The length of the input vector is determined by the number of bytes in the selected data table column. If, for example, the column contains 6 bytes, the vector will be 3 MIs long. Note that a string must end with a null (0) character.
Found Row	If a matching value is found, the number of the row is stored in the output value.

Note that:

- if the value is not found, -1 will be the value returned by the function.
- if the row is not found, if, for example, the number given for the first row is higher than the number given for the last row, the value will be -2.

String Library

Use String Library to store text strings within the controller's FLASH memory, and then display them on the controller's LCD. You can, for example, organize text into different String Libraries—for example, separate libraries for Spanish, English and Italian—pull strings into HMI objects, and then switch libraries to change the display language.

These strings can be displayed in the following HMI elements:

- Frame
- Button
- Fixed Text

String Libraries also provide the text for Alarms, and can be used in Trend Curve Properties.


Note that

- The number of libraries changes according to controller type. The final 512 strings in each library are 'grey'; these strings are reserved for system use, as for example to provide the text for Alarm screen buttons.
- Each string can contain up to 128 characters.

	V570/V1040/1240	V350	V130
Number of Libraries	8 or 16	4, 8, or 16	4, 8, or 16
Number of Strings	4096	2048	4 =2048, 8= 2048, 16 =1024*
Total Library Memory	64K	32K	32K for 4 libraries, 16K for 8, 8k for 16

* *Switching from 4 to 8 libraries downsizes the library memory capacity from 32K to 16K. If your library exceeds 16K you will not be able to download the project.

**Switching to 16 libraries downsizes the library memory capacity to 8K. If your library exceed 8Ks you will not be able to download the project. Note that in each library the System Strings (grey background) are preserved, and Strings 0-511 will be copied to the new, smaller libraries. Strings 512 and higher will be deleted.

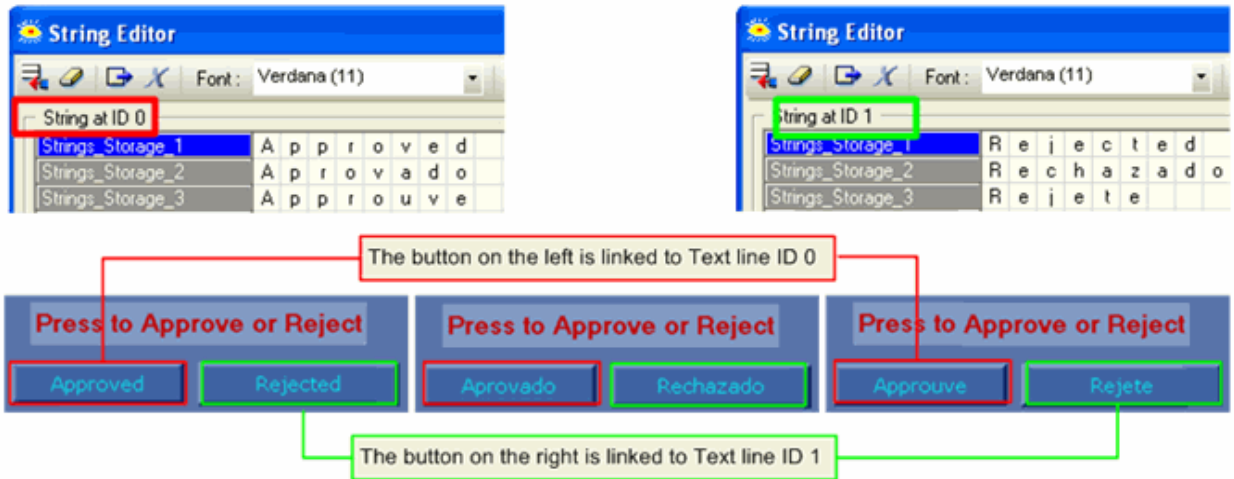
 This feature is not available in Standard Vision controllers.

How String Library works

Only one library is active at a time. This means that at any given time, all elements that pull text from a library are using the **same** library.

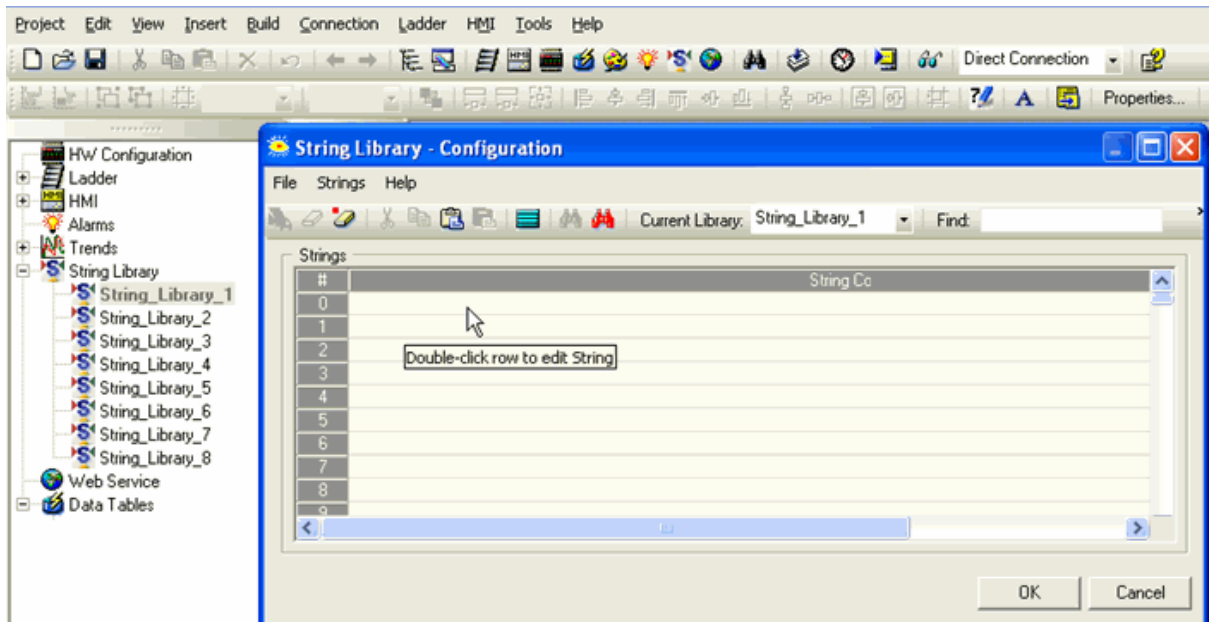
However, **each** HMI element may be linked to a **different** line ID # within that String Library.

In the following figure, the buttons are linked to different text lines. Each time a different String Library is called, the button text changes.

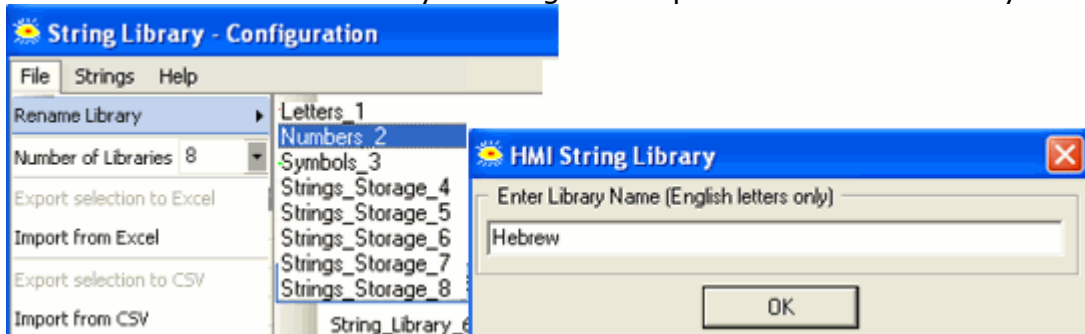


Configuring Strings

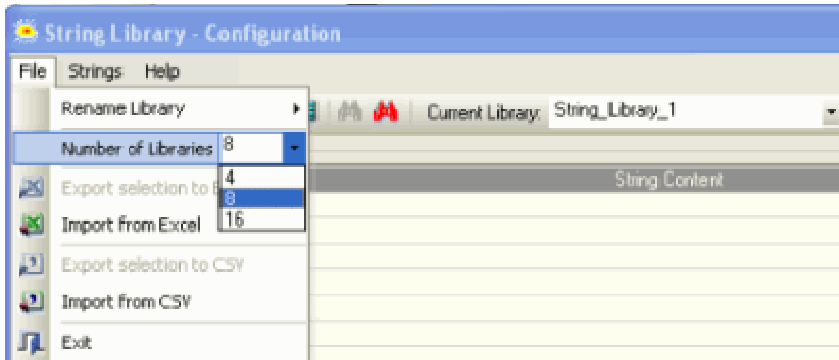
1. Click the String icon on the navigation tree or toolbar to open the Strings editor.



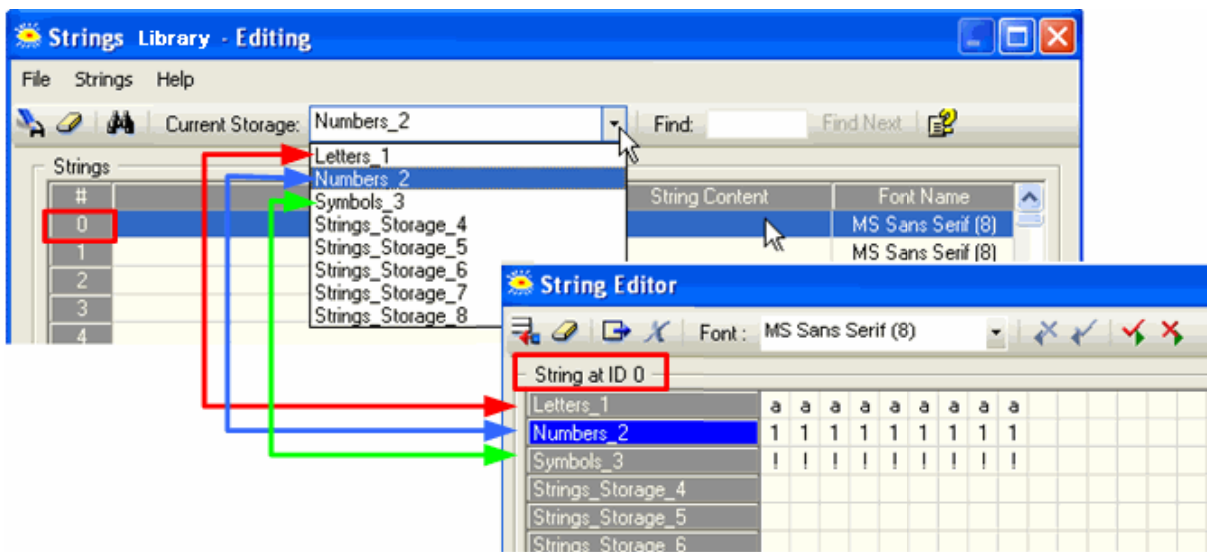
2. Click on File> Rename Library to assign a unique name to the Library



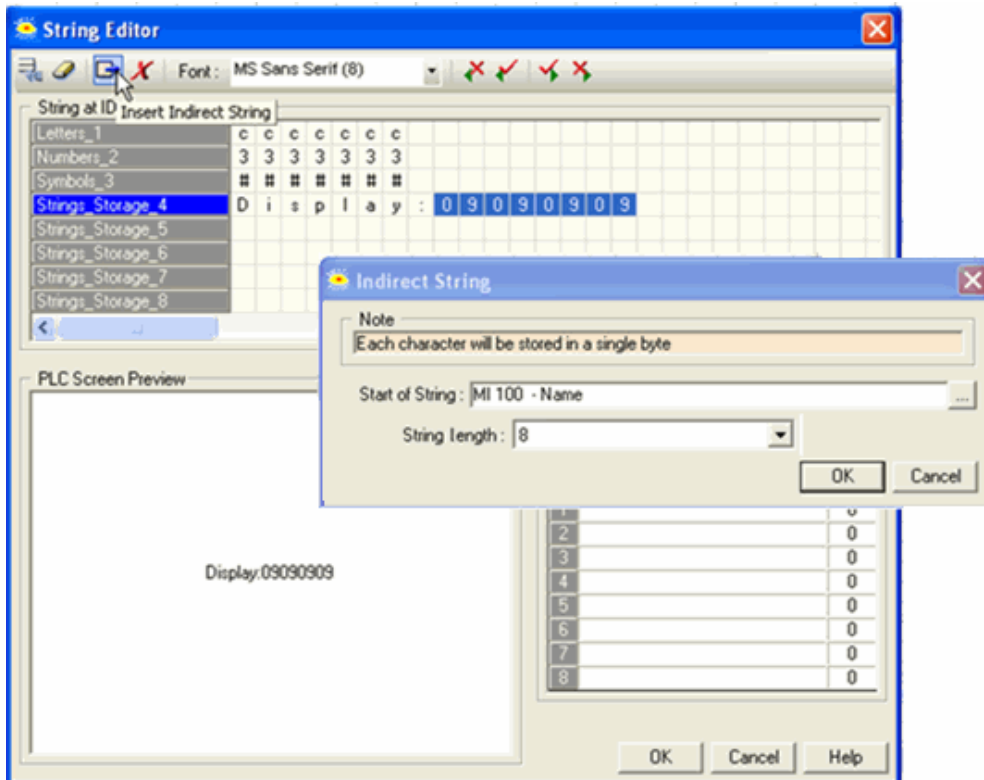
3. Click Number of Libraries to edit the number.



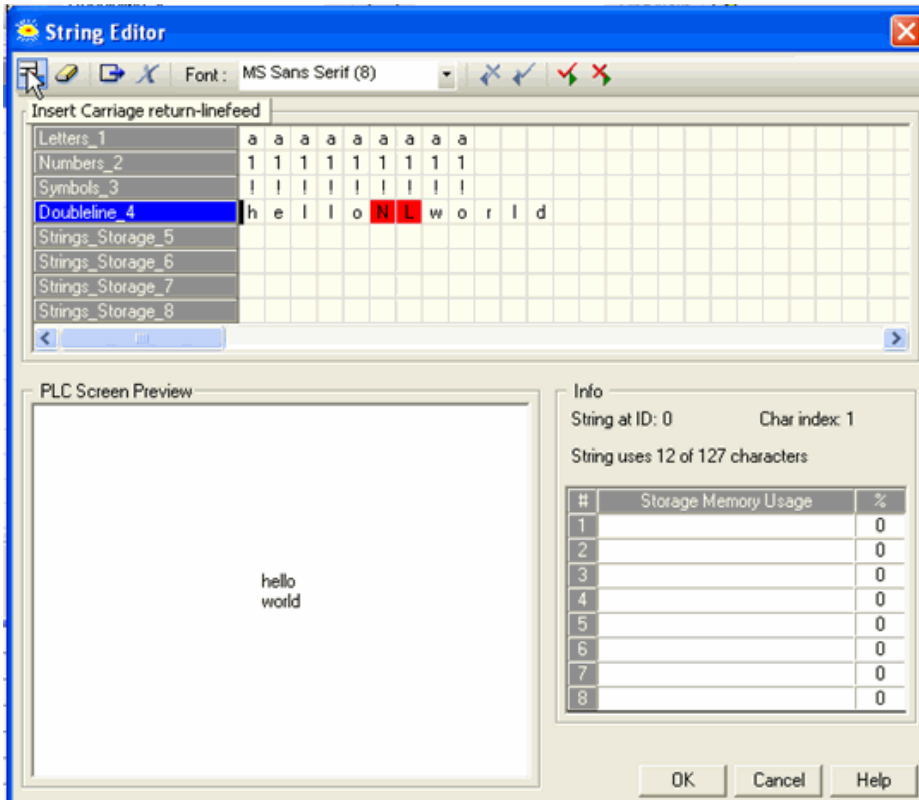
- Double-click on a row to open the String Editor. Note that the String Editor opens strings according to the ID #. In the following figure, the first three messages are displayed for String Libraries Letters_1, Numbers_2, and Symbols_3.



- Place your cursor in the desired String Library row, and type in text. You can also include indirect text from an MI vector. The text is displayed in the PLC Preview window.



You can also break text lines by including Carriage Return + Line Feed characters.



Note that you can find Unreferenced Strings via the binoculars icon on the String Library toolbar.

Importing/Exporting Strings to/from Excel or .csv

These tools are located on the String Library File menu.

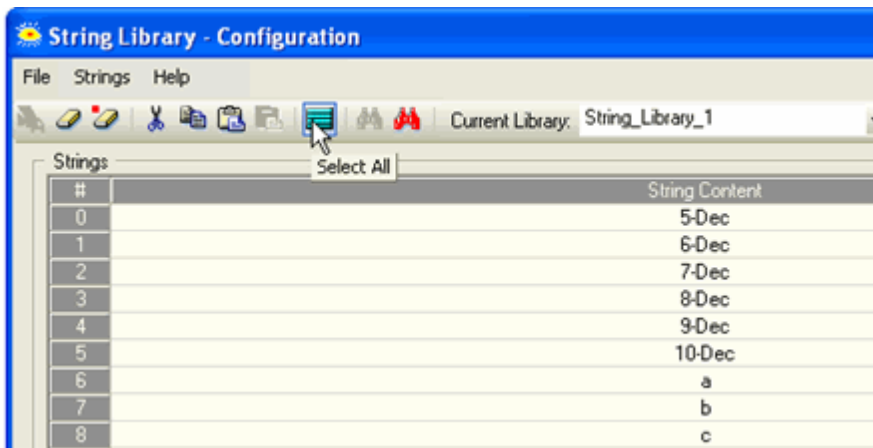


Excel: you cannot create an Excel file and import it. You must export a String Library from a String Library, delete any undesired information, and then enter your own strings.

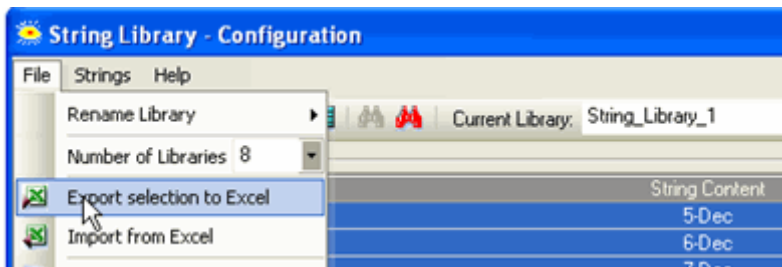
.csv: you must use a delimiter that does not appear within the string's data, or the values will not be separated according to expectations.

Import/Export from Excel

1. Select all of the Strings in a Library. and then select Export



2. From the File menu, select Export to Excel.

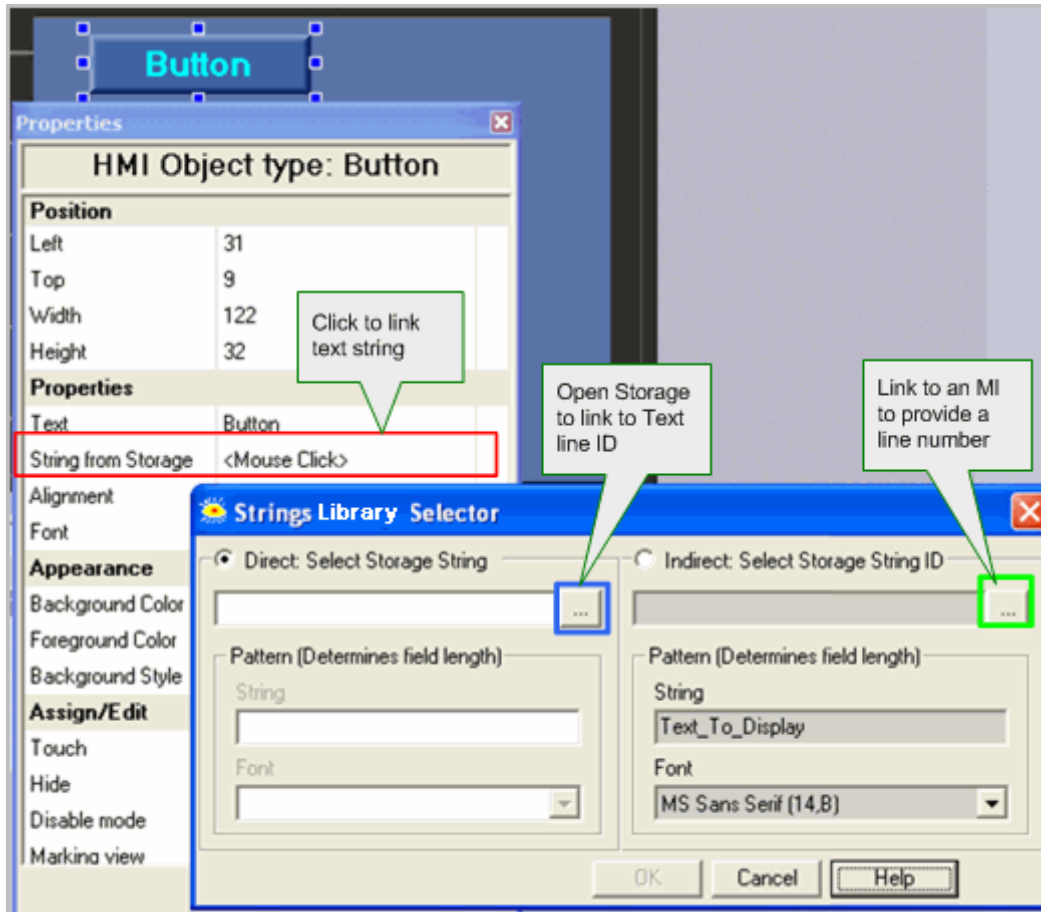


3. Open and edit the Library, and then import it into any Library.

Linking HMI Elements to Text in a String Library

1. Place a Frame, Button, or Fixed Text HMI element. Within the element properties, click the String from String Library option. You can either link a Text ID line directly, or use an MI to indirectly provide the Text line ID.

Note that the size of the HMI element must be large enough for the longest text line it may hold.



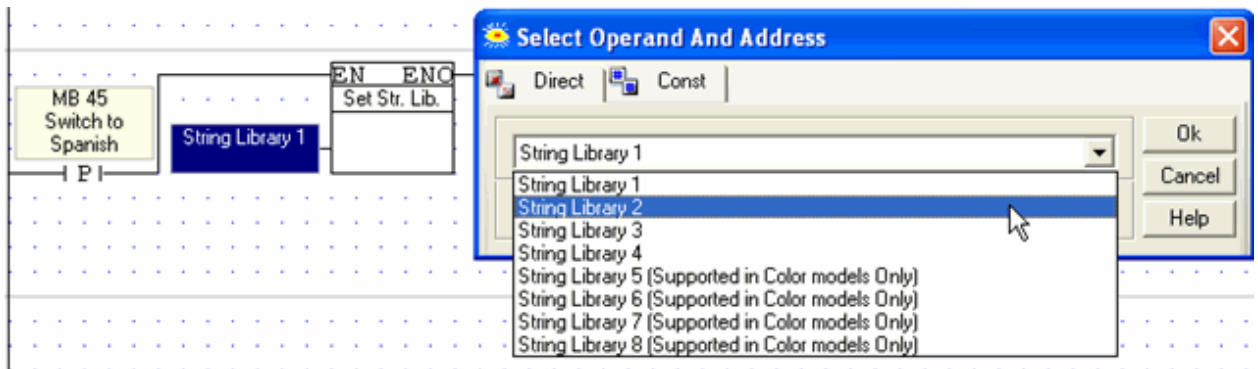
Switching Libraries

To switch Libraries, use one of these methods:

- Use the Ladder function Strings>Set String Library
- Write a value to SI 491 Switch current Text Library

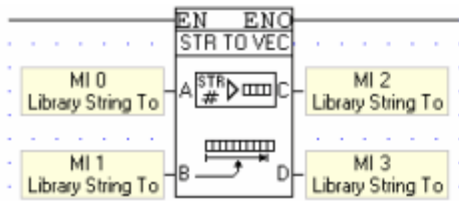
Set String Library

Use this function to switch String Libraries.



String from String Library to ASCII

This function, located on the Strings menu, enables you to save text from the String Library as ASCII.



Parameter	Purpose
A	The ID number of the String in the Current Library
B	The length of the destination vector. This must be equal or greater than the number of character in the string
C	The start of the destination vector
D	Status Message 0 - Action completed successfully 1 - The Library does not exist (Library is not defined) 2 - The String does not exist 6 - The length of the string exceeds the length of the destination vector, or exceeds 128.

Web Server

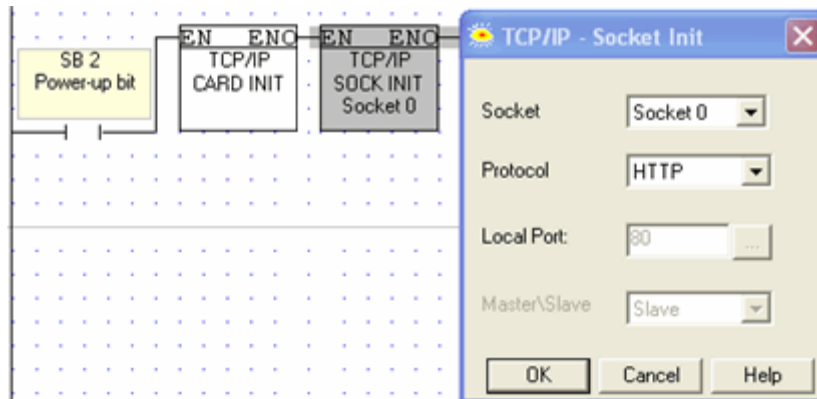
Enhanced Vision controllers can host web pages. The controller must comprise a TCP/IP port, and must be connected to an Ethernet network. If the controller contains web pages, a remote user can enter the IP address of the controller into a web browser and view the pages.

You can also host complex Web pages using the program in the .zip file located at: <http://www.unitronics.com/data/uploads/communication/WebServer.zip>

Ladder Application

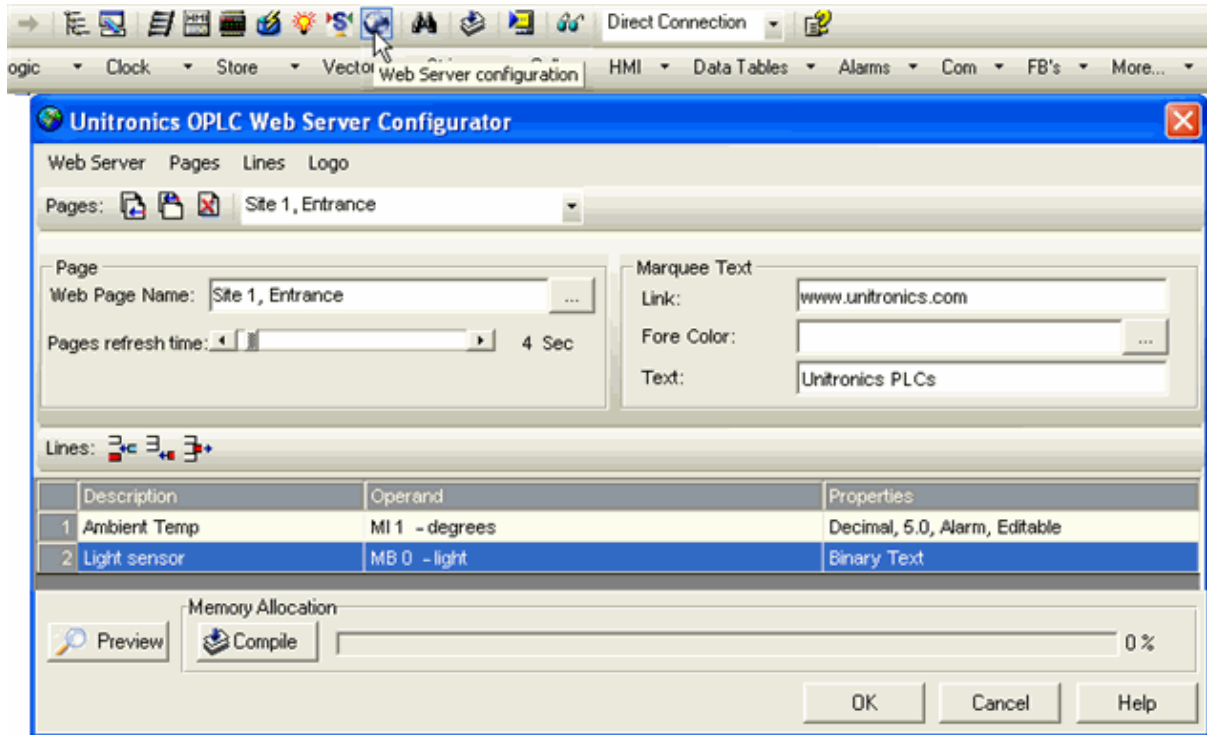
1. Configure Ethernet in your application by building a net that comprises the following elements:
 - a. Com>TCP/IP> Card Init function.
 - b. Com>TCP/IP>Socket Init function, set to HTTP.

Selecting HTTP sets the local port to 80 and the controller to slave.



Configuring Web Pages

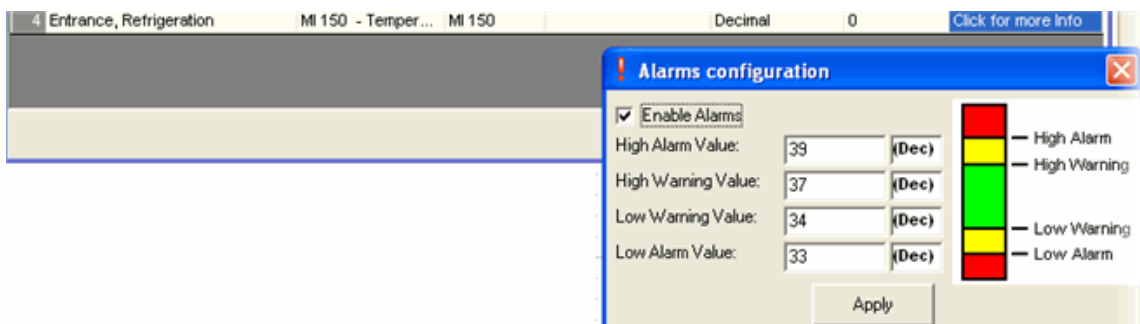
1. Click the Web Server Configuration icon on the VisiLogic toolbar to open the utility.
2. Click in the Web Page Name field and type in a page name.
3. You can also edit the Marquee text, which scrolls across the web page. The default causes the words 'Unitronics PLCs' to scroll across the page; clicking those words opens the Unitronics web site. You can replace the default text, change the website to another, or delete all of the text to remove the Marquee.



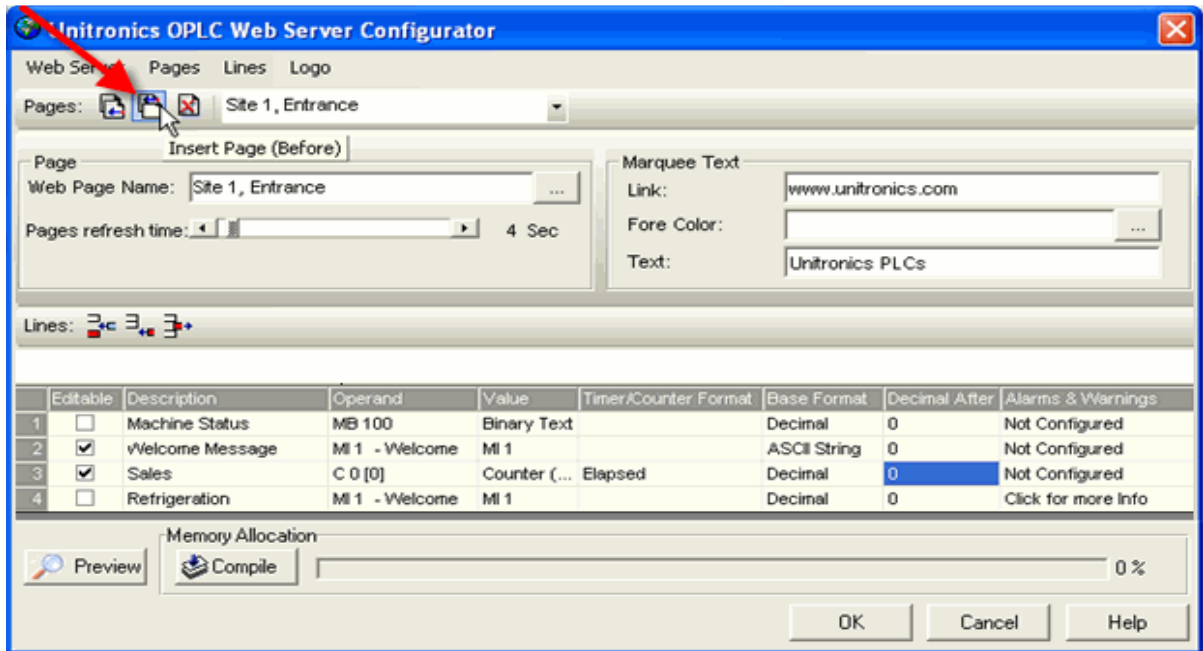
3. Select Editable if you want to enable users to edit register, counter, timer, and even text messages values online via the web page. Click on the different fields in the line to assign a Description and Operand. Note that the Operand type you select determines other options such as: Value, Timer/Counter Format, Base Format, Decimal, and Alarms and Warnings.

	Editable	Description	Operand	Value	Timer/Counter Format	Base Format	Decimal After	Alarms & Warnings
1	<input type="checkbox"/>	Entrance, Machine	MI 0	MI 0		Decimal	0	Not Configured
2	<input checked="" type="checkbox"/>	Entrance, Sales	C 0 [0]	Counter	Elapsed	Decimal	0	Not Configured
3	<input checked="" type="checkbox"/>	Welcome Message	MI 1 - Welcome	MI 1		ASCII String		Not Configured

Note ♦ | When data is being edited, the page will not refresh. You can also configure Alarm colors for register values by clicking in the Alarms & Warnings column.



- Use the toolbar to add and delete line and pages. You can use the slider to adjust the refresh time; this controls the frequency at which values are updated when the page is viewed via PC. Note that you cannot display an ASCII string longer than 32 characters.



- Click Page>Preview Pages to check your work.



When the pages in the PLC is viewed via PC, the page will look as it did in preview mode, with the real-time values displayed.



[Home](#)

Site 1, Entrance

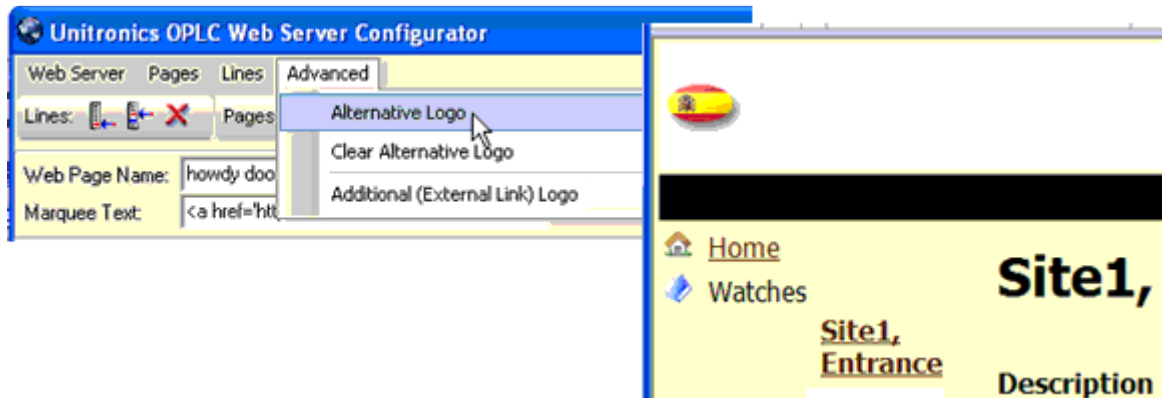
[Watches](#)

- [Site 1, Entrance](#)
- [Site 2, 1st Floor](#)

Description	Value
Entrance, Machine Status	OFF
Entrance, Number of Sales	64
Entrance, Sales Total	395.00
Entrance, Refrigeration	33

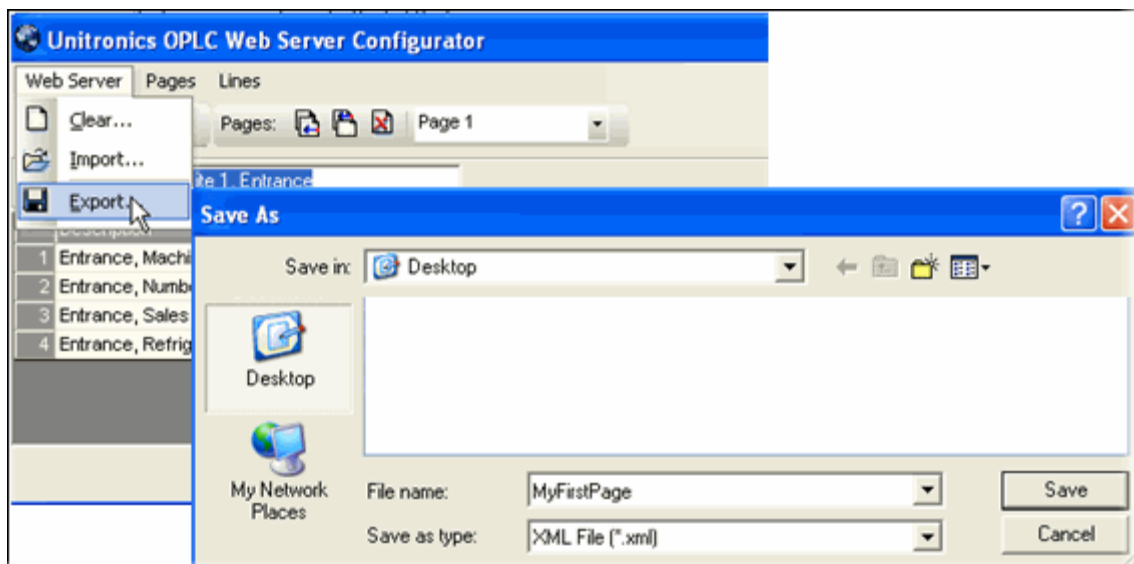
Logos

You can customize the logo via the Advanced menu. You can either import a logo, or link to a .url.



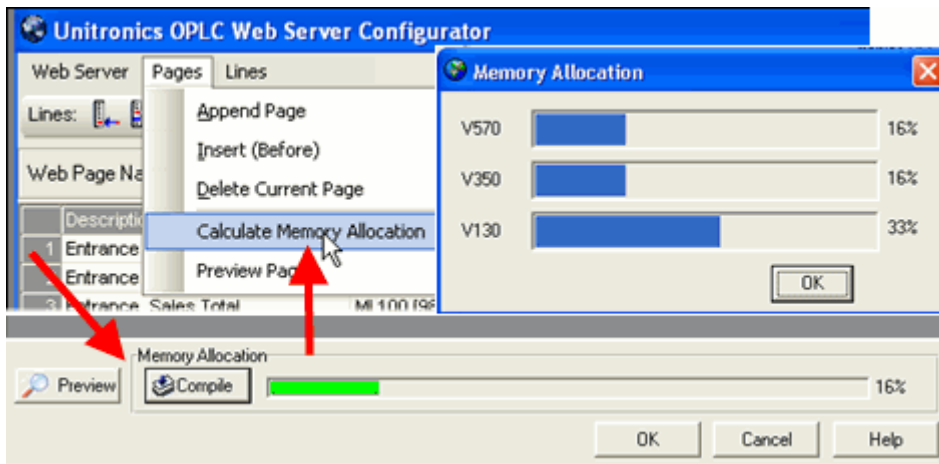
Import/Export

You can export and import the configuration by selecting option on the Web Server menu.



Web Page Capacity

The capacity for controllers from the V570 and V350 series is 128k. The capacity of the V130 series is 64K. You can check the requirements of your pages by clicking the Compile button and then checking Pages>Calculate Memory Allocation.



Flickering

By default, the controller displays the web page using AJAX technologies to automatically refresh variable data on the page. Note that AJAX may not be compatible with certain older browsers. If this applies to your application, you can disable AJAX by clicking it on the Web Server> Use AJAX option.

Trends

A Trend graph displays a dynamically changing value graph that tracks a single, dynamic value such as a temperature value, as a curve on the Vision screen.

Note | Trends (Legacy) Function Block
If your project is configured to Standard Vision controllers that do not support HMI object Trend graphs, the Trend objects will not be displayed in the Project Navigation Window. In these models, use the Trends (Legacy) Function Block.

Trends are displayed in the Project Navigation Window. The number of Trends and Curves that can be displayed depends on controller model:

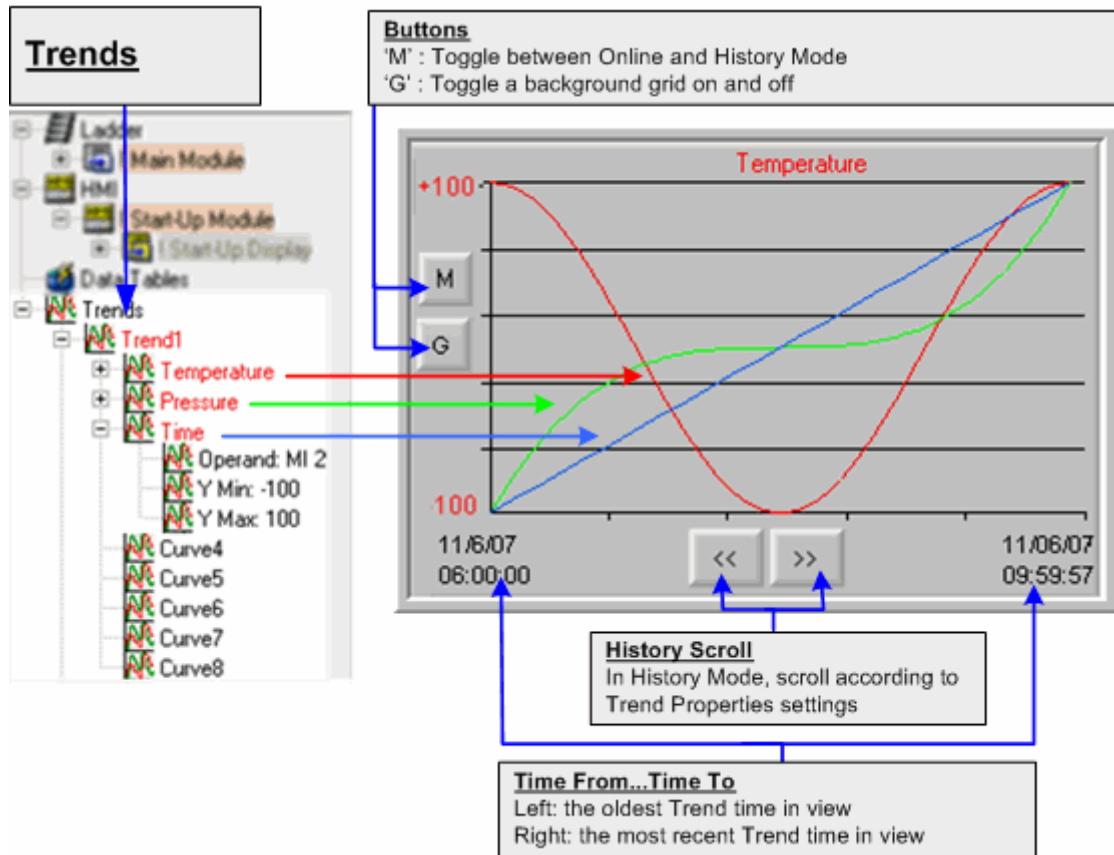
- **V570/V350**
Up to 8 Trends, each displaying up to 8 Curves
- **V130**
Up to 4 Trends, each displaying up to 2 Curves

Each Curve may be linked to a different register, and can be configured to a different color.

Trends have a default touch property that causes a touched Curve to be brought forward. In the following figure, the Temperature curve is in front.

Touch the Mode button to toggle between:

- **Run Mode:**
Shows the Trend being drawn in real-time
- **History Mode:**
Stops the Trend, displays History Scroll buttons; touch these to scroll back and forth between different Trend graph sections



V130

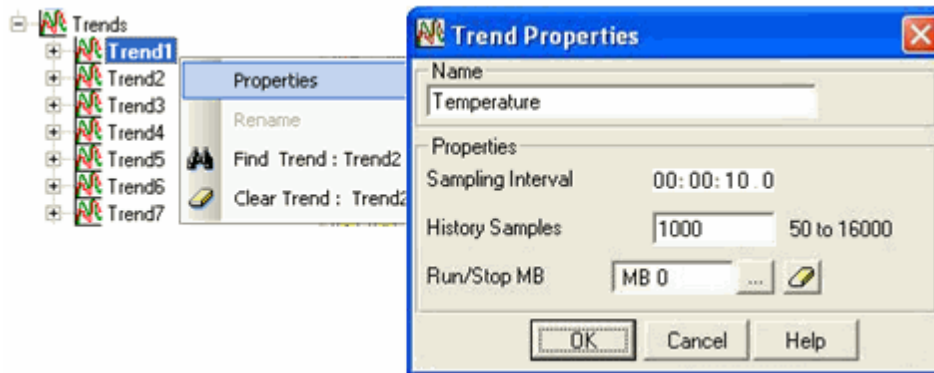
Since the V130 does not offer a touch screen, you use the Keypad arrow buttons to enter and navigate through History Mode

Enter History Mode	Up arrow
Exit to Online Mode	Down arrow
Scroll through History	Left and right arrows

Creating a Trend graph

1. Define a Trend:

Right-click the desired Trend to open and set Trend Properties.

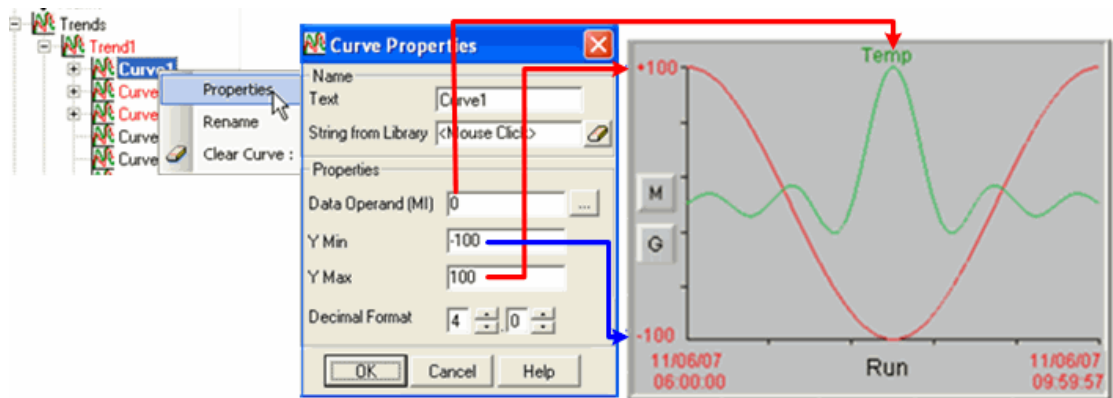


Property	Function
Name	Assign a unique name to the Trend.
Sampling Interval	Defines how often the Trend draws Curves, resolution = deciseconds (0.1.)
History Samples	<p>Total number of samples that may be stored in History for ALL Trends is 32000. The minimum number that may be allocated to a Trend is 50. To view the total History Allocation, right-click Trends in the Project Navigation Window</p>
Run / Stop MB	<p>0= Stop 1=Run Status rises from 0 to 1:</p> <ul style="list-style-type: none"> • The PLC begins to draw the Trend Curves

- The History is initialized
- 'Run' is displayed at the bottom of the graph
- Falls 1 to 0
- Trend freezes
- Under can press Mode button to enter History and scroll through Trend
- 'Stop' is displayed at the bottom of the graph

2. Define Curves

Right-click the desired Curve to open and set Curve Properties.



Property	Function
Name	Assign a unique name to the Curve for display on the HMI screen. You can also use the String Library. The string you select will be displayed as the Curve name on the HMI screen; however, note that the string you select will not appear on the Project Navigation tree.
Data Operand	This is the value represented by the Curve
Y Min, Y Max	These define the axis range for that Curve. Note that you can also set a decimal value.

Once you configure a Trend and at least a single Curve, you can place the graph in different HMI displays and set specific properties for the Trend in that display, such as the Trend background color and Curve colors.

3. Place a Trend Graph in an HMI Display
 - a. Click the Trend icon on the HMI toolbar, and then drag the cursor across the screen to draw the Trend.

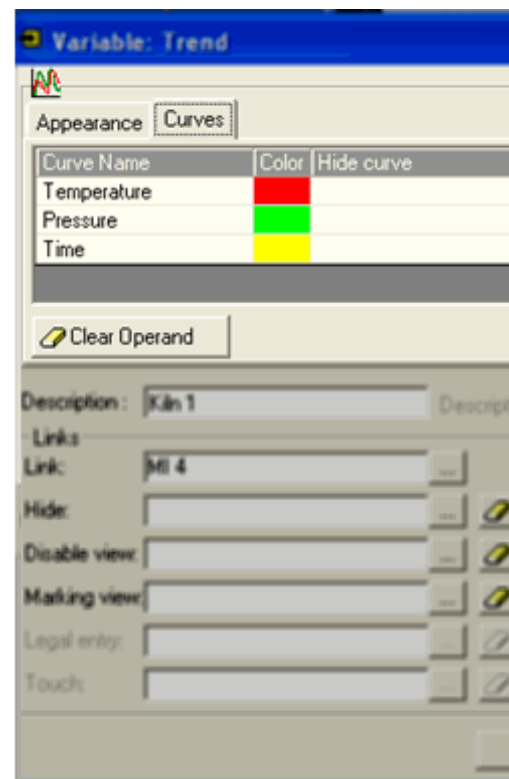
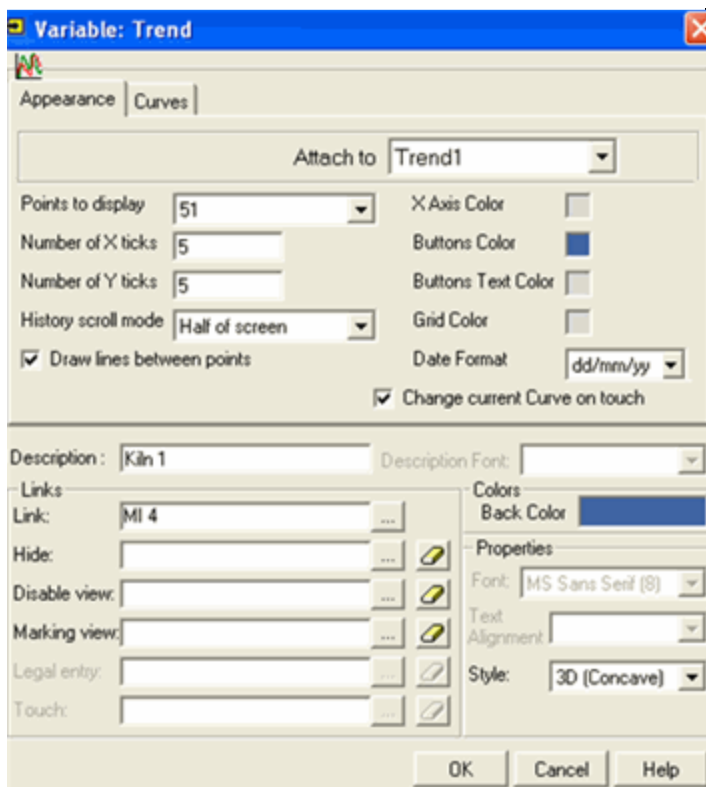


b. Release the mouse button, and define the Trend Variable properties.

Note

Under Links, note that the Link MI shows which Curve is currently forward

- V570 1= Curve 1, 2=Curve 2, etc. Therefore when the MI contains 3, Curve number 3 will be forward
- V130:2=Curve 2. 1, or any other value causes Curve 1 to be forward



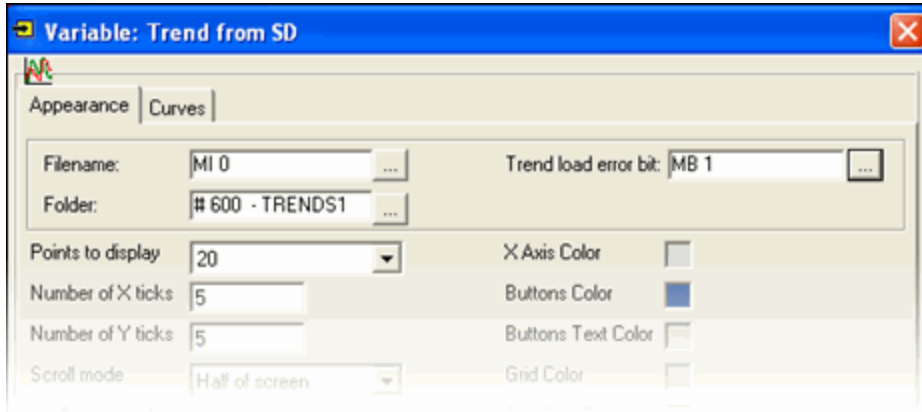
Tab	Property	Function
Appearance	Points to Display	Sets the number of actual points that will be shown on the screen at any one time
	Number of X ticks, Y ticks	Set the number of gradations on the axes

	History scroll mode	Sets the paging size for History view
	Draw lines between points	If this is not selected, the Curves will be drawn as a series of points
	X Axis Color	Note that the Y Axis color always changes to match the Curve than is in front
	Buttons Color	Sets the color for the Mode, Grid, and History Scroll buttons
	Grid Color	Set the color for the background Grid
	Change current Curve on Touch	Checked by default. Curves have a built-in touch property that causes the touched Curve to be brought forward.
Curves	Color	Click to set a color
	Hide Curve	if you assign a Hide Curve MB, turn it ON to hide the Curve.

Note that the Link MI determines which curve is forward. In the case of the V570, touching the curve writes the curve value to the MI, bringing the touched curve forward.

Trend from SD

Note that you can also display a Trend Curve from the Trend History that is stored on an SD Card. The parameters are the same as in Variable: Trend, given above.



- Control the Trend by toggling on the Run/ Stop MB. Start and stop the Trend as shown below.



To learn more about Trends, check Trends - Color Vision.vlp in the Help> Examples.

#	Description	Value	Comments
SI 63	Maximum number of Trend files that can be saved (read-only)	0-64 The maximum amount of Trend files (*.utr files) in a single folder is 64. The value in SI 63 shows the number of remaining *.utr files; if 5 *.utr files exist, SI 63 = 59	Initialized at Power-up. Updated when: - when SB 217 is ON - when Trend file is created.

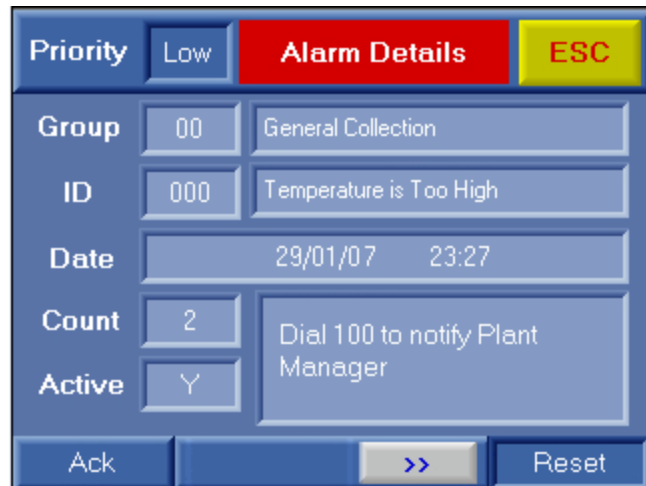
Alarms

An Alarm is an event that is reported to the machine operator via a set of built-in displays.

The event is a change in the Alarm’s Trigger condition, which may be linked to either a Boolean or a numeric value.

An Alarm can:

- Show Alarm status
- Report the event to the machine operator
- Provide instructions
- Require operator action
- Play an active role in the conditions enabling the running of the process



In VisiLogic, you use the Alarm Configuration utility to create Alarms and set their features. The Ladder application determines when the Alarms are displayed on the controller’s screen.

Vision controllers support Alarms according to the following table:

Vision Type	Number of Alarms	Number of Alarms in History
V570	128	254
V350	64	62
V130	16	14

Alarms may be divided into up to 16 groups, per application.



While the Alarms displays are on the screen, the PLC application continues to run. This includes both the Ladder, including subroutines, and the HMI application. This means that the current HMI display, the one on the screen when the PLC enters Alarms, may not be the same one displayed when the PLC exits Alarms.

Note •

This feature is not available in Standard Vision controllers.

Alarms: Ladder Application

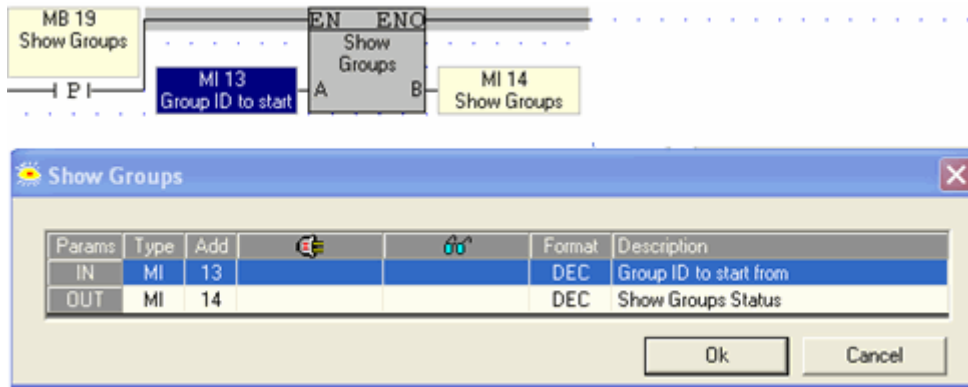
The Alarms displays are shown according to the Ladder application. When the Ladder application calls the Alarms, the displays will only appear if the Alarms are Active.

The functions are located on the Alarms menu in the Ladder toolbar.

Show Groups

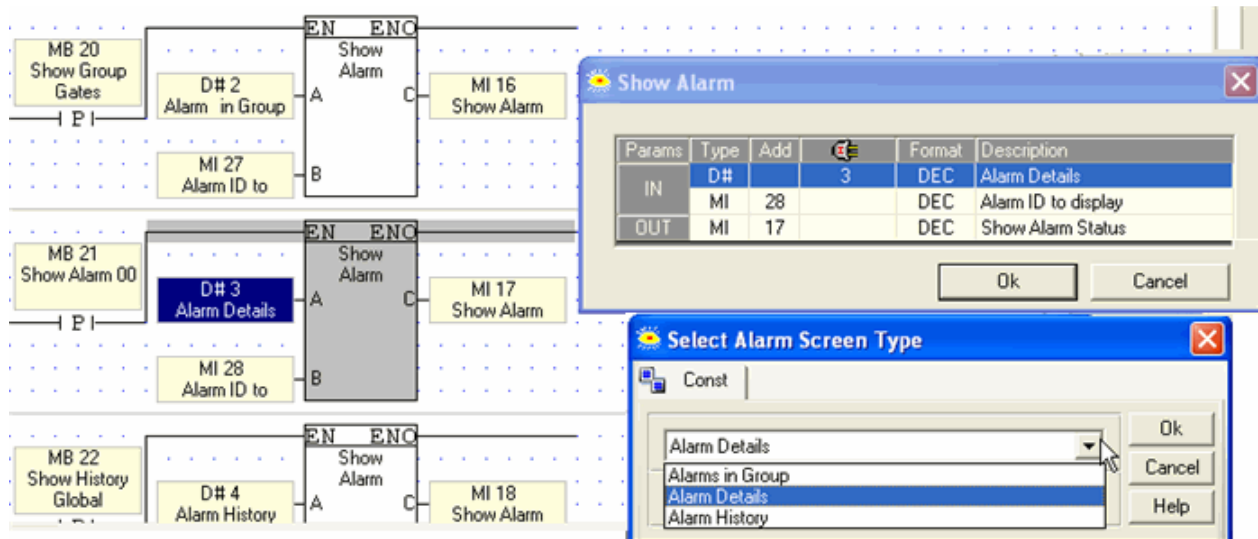
This function shows the Alarms in Group display, according to the number in the MI Group ID to Start From.

Note that the status MI will read 0 if no such group exists.



Show Alarm

This function can show a specific display for a specific Alarm. You can show the Alarm in the Alarms in Group display, or go directly to the Alarm Details or History.



Clear History Buffer

Use this function to erase the Alarm History.

Information Mode

Information Mode is a utility that is embedded in the operating system of the controller. Via Information Mode, you can view data on the LCD screen, use the controller's keyboard to directly edit data, and perform certain actions such as resetting the controller. You can enter Information Mode at any time without regard to what is currently displayed on the LCD screen.



Viewing data does not affect the controller's program. Performing actions, such as initializing the controller, can influence the program.

Note that when you use Information Mode, the keyboard is dedicated to that purpose. The keys return to normal application functions when you exit Information Mode.

Entering Information Mode

1. To enter Information mode:
 - Non-touchscreen models:** press the <i> key on the Vision's keyboard.
 - Touchscreen models:** touch the screen in an area that is not occupied by a Keypad Entry variable or other screen object that has been assigned a Touch Property. Maintain contact for several seconds
2. The controller enters Information Mode and requests a password.
3. Enter your password. The default password is 1111. Note that at every power-up, this password is restored. To maintain a different password after power-up, use SB 2-Power-up as a condition to store the desired password value into SI 253.
To change the password, access the controller via VisiLogic, then run On-line Test mode and changing the value. This value will be erased at power-up.
4. The controller enters Information Mode, showing the first category, Data Types. Use the <Enter> key to enter a category.
5. Press the <ESC> key to exit a category, and to exit Information mode.



The controller will block entry into Information mode until the correct password has been entered. This is why you must record any password you set for your controller.

The data in Information Mode is arranged in Categories. Each Category contains several Subjects. You navigate Information Mode by using the keyboard buttons.

To exit Information mode, press the <ESC>button on the Vision’s keyboard. Each press returns one level up. Press the number of times necessary to exit.

- Notes**
- When you reenter Information Mode, the controller will return to the last Category viewed.

Info System Operands

#	Description	Turned ON	Turned Off	Comments
SB 36	INFO mode	Turns ON when Info Mode is entered by OS, Remote Access, or program	Turns OFF when user exits Info Mode	Delay time to enter Info Mode is 4 seconds, may be modified via SI 50

#	Description	Value	Comments
SI 50	INFO Mode: Entry Delay Time	Default by O/S (every power up) = 4 seconds	<ul style="list-style-type: none"> ▪ Units: seconds. ▪ Legal values: 0, 3 to 20. ▪ If you force or store '0' into equal Zero – INFO is disabled. ▪ For V290 – Touching the <i> key on the touch screen starts Info Mode – Touching a legal Ladder application variable clears the INFO time.

SI 253	Password: Info Mode	<p>Note that at every power-up, the default password to Info Mode, 1111, is restored. To maintain a different password after power-up, use SB 2-Power-up as a condition to store the desired password value into SI 253.</p> <p>The password may also be modified by accessing the controller via VisiLogic, then running On-line Test mode and changing the value. This value will be erased at power-up.</p>	
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The categories of available information depend on the controller model. The table below shows the basic categories of information.

Category	Subject	Possible Actions
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Data Types	Memory Bits	<ul style="list-style-type: none"> View bit status
	System Bits	<ul style="list-style-type: none"> Change bit status (Set/Reset)
	Memory Integers	<ul style="list-style-type: none"> View integer/long integer/double word value.
	System Integers	<ul style="list-style-type: none"> Change values
	Memory Longs	<ul style="list-style-type: none"> Toggle Base: view the value in decimal or hexadecimal form.
	System Longs	
	Memory Double Words	
	System Double Words	
	Inputs	<ul style="list-style-type: none"> View input status. Force input status to 1 (FR1) or 0 (FR0). Forced values stay in effect until Normal mode (NRM) is selected, or until the controller is initialized or reset. <p>Note • Forced values do influence your program. This can be useful in testing the effect of an input condition on an output status.</p>
	Outputs	<ul style="list-style-type: none"> View output status. Force output status to 1 (FR1) or 0 (FR0). Note that forced output values do not affect your program. Set/Reset output status.
	Timers	<ul style="list-style-type: none"> Enter a Preset Timer value. View the current timer value and status by selecting the R.T. option.
	TCP/IP (Standard Vision, Visible when Ethernet card is installed)	Enables you to view and edit IP address and socket settings.
System	Model & O/S Ver	<ul style="list-style-type: none"> Check the controller’s model number and operating system version. Check whether the controller is in Run or Stop mode.
	Working Mode	<ul style="list-style-type: none"> Check whether the controller is in Run or Stop mode. Reset the controller. This restarts your program; restoring power-up values to all data types except for those protected by the battery backup. The battery protects Real Time Clock (RTC), all operand, and Data Table values. Initialize the controller. This restarts your program and initializes all values, restoring 0 values to all data types.

	Time & Date	<ul style="list-style-type: none"> View the Real Time Clock (RTC) settings. Note that the RTC settings control all time-based functions. Change the RTC settings via the controller's keyboard.
	Unit ID	<p>The Unit ID number identifies a networked controller. You can:</p> <ul style="list-style-type: none"> Change the ID number. The new ID number will remain in effect until the controller is reset. Burn the ID number into the controller's FLASH memory. This is a permanent change.
	Serial Port 1 Serial Port 2	<ul style="list-style-type: none"> View and edit communication settings. Select to Change or Burn the new settings.
	Ethernet (Enhanced Vision, if an Ethernet card is installed)	Enables you to view and edit IP address, Socket settings, and other TCP/IP settings.
	Monitor Communications (Enhanced only)	<p>This is a built-in communications 'sniffer'</p> <ul style="list-style-type: none"> Touch screen models: select Serial or Ethernet, then press Monitor. Note the button that allows you to toggle between Hex and ASCII Non-touch screen models: Select Communication, then select Serial or Ethernet> COM Buffer. Use F2 to toggle between Hex and ASCII. In addition, press Enter, and then the Down key to toggle between. Tx and Rx.
	CANbus	<ul style="list-style-type: none"> Built-in CANbus communications 'sniffer' Change the CANbus baud rate.
	Touchscreen (Touchscreen models only)	Enables you to calibrate the touchscreen, if it is not responding accurately to screen taps.
SD Card (Enhanced Division)	Removable memory storage	Enables you to upload and download VisiLogic applications, OS firmware, and Data Table data from/to an SD card. You can use these features to 'clone' a PLC application.
Function Block	Reserved for future use	
Hardware Configuration		<ul style="list-style-type: none"> Check if I/O Expansion Modules are installed. Note that I/O Expansion Modules are represented by letters. Identical module types are represented by identical letters as shown below. Shows if an I/O module is short-circuited.



Remote Access: Accessing a PLC via PC

Use VisiLogic to activate access a remote Vision controller and:

- Download and upload projects
- Remotely operate the controller's HMI through your PC
- Run On-Line Test mode on the remote controller
- Run Information Mode.

You can access:

- Stand-alone controllers that are directly connected to the PC via a cable.
- Controllers within a CANbus or TCP/IP network
- Either stand-alone or networked controllers via GSM or landline modem.



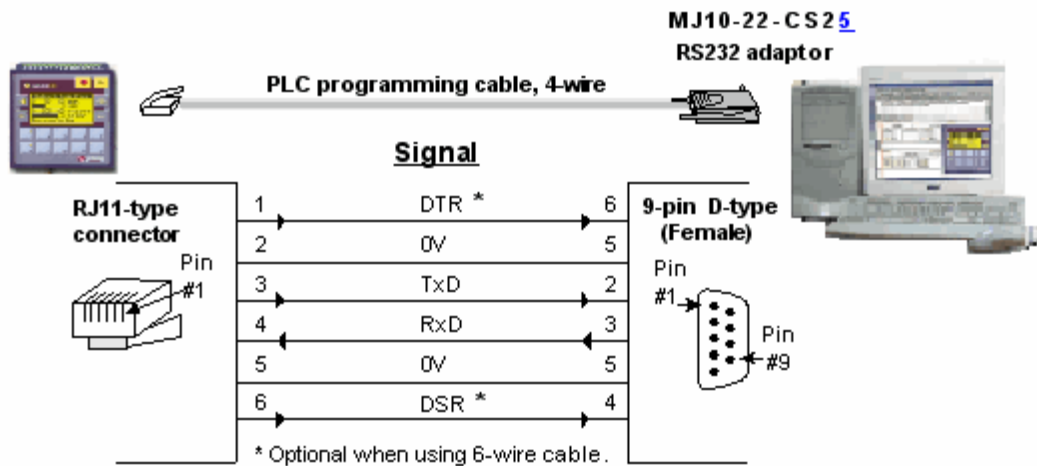
Note • In addition to using VisiLogic to access a remote Vision, Unitronics provides a stand-alone utility called Remote Access. This utility can also access Unitronics M90/91 and Jazz controllers. It may be freely downloaded from <http://www.unitronics.com>.

Accessing a PLC via VisiLogic

Before you can access a controller, you must establish a communication link:

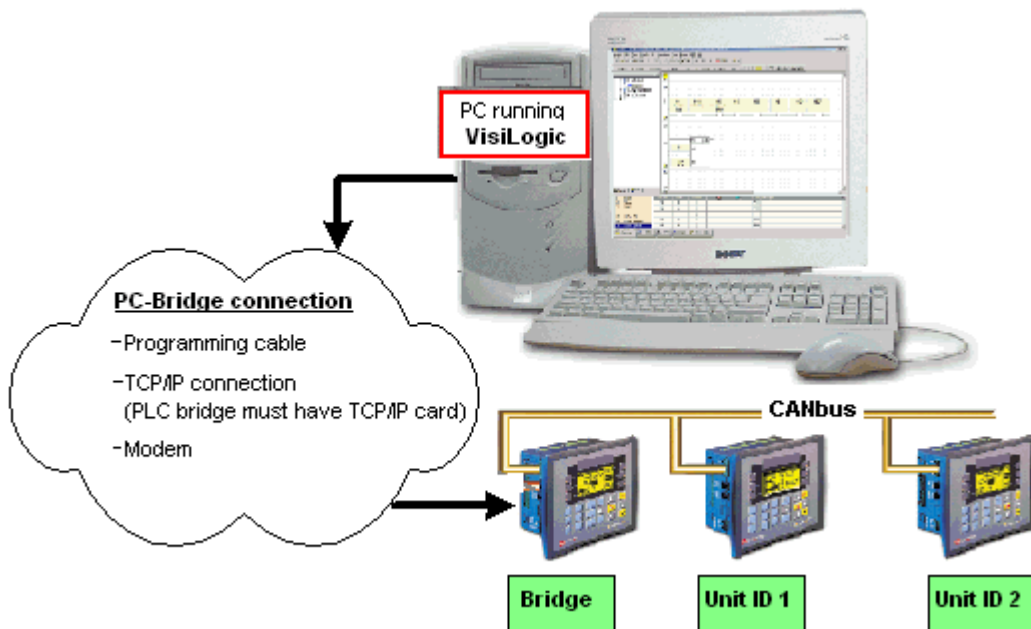
Direct Connection: PC-Controller

1. Connect your PC to any controller using the programming cable supplied with the controller kit.
In the case of the V1040, the USB cable may be used; note that COM port 1 function is suspended when this port is physically connected to a PC



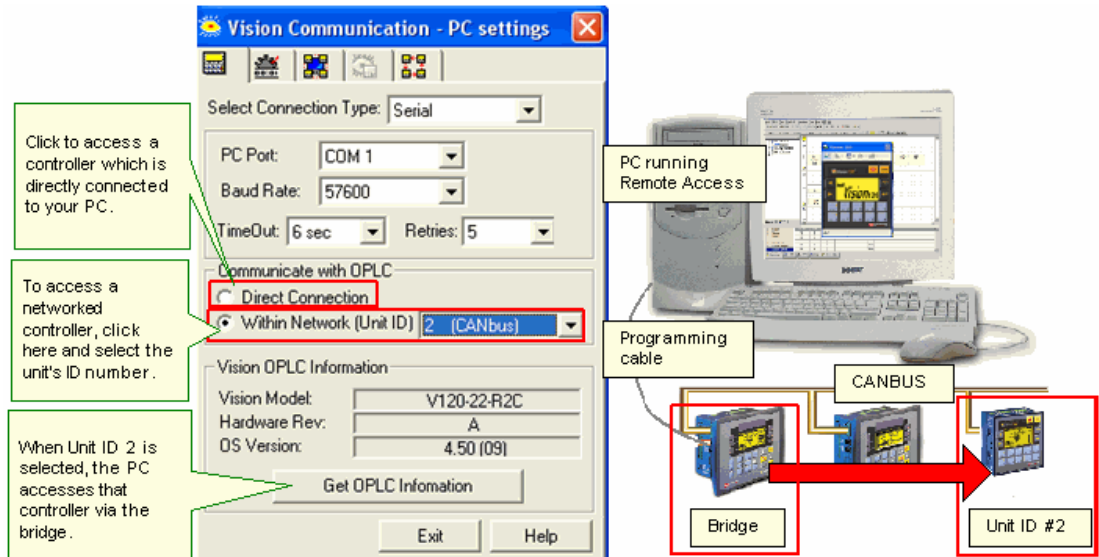
Accessing a Networked Controller

2. Connect your PC to any controller in the network using the programming cable supplied with the controller kit.

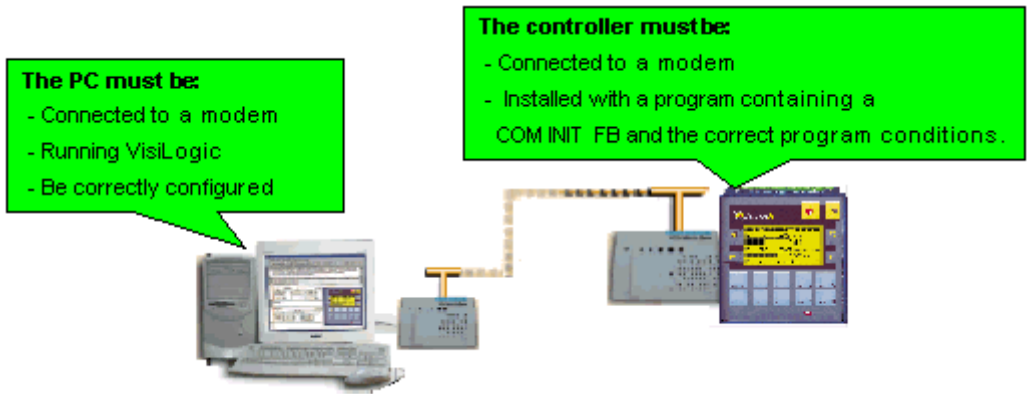


Note • Different PCs can access a network at the same time, using different controller units as bridges. However, 2 different PCs cannot simultaneously access the same controller unit.

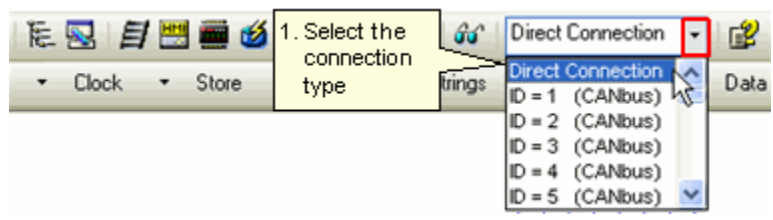
3. Select a networked controller by opening Communication & OS from the Connection menu, and then entering the Unit ID number.



Accessing a Controller via Modem



1. Prepare and connect your PLC-side modem as described in the topic PLC-side Modems, in the section 'How to enable a controller to communicate via landline, GSM/GPRS modem'.
2. Prepare the PC-side modem as described in the topic PC-Side Modems (Modem Services), in the section 'How to Configure a PC-side Modem'.
3. Via Connection>Modem Services, dial the remote PLC's controller to establish the data link.
4. Select a connection type using the drop-down selection box on the toolbar.

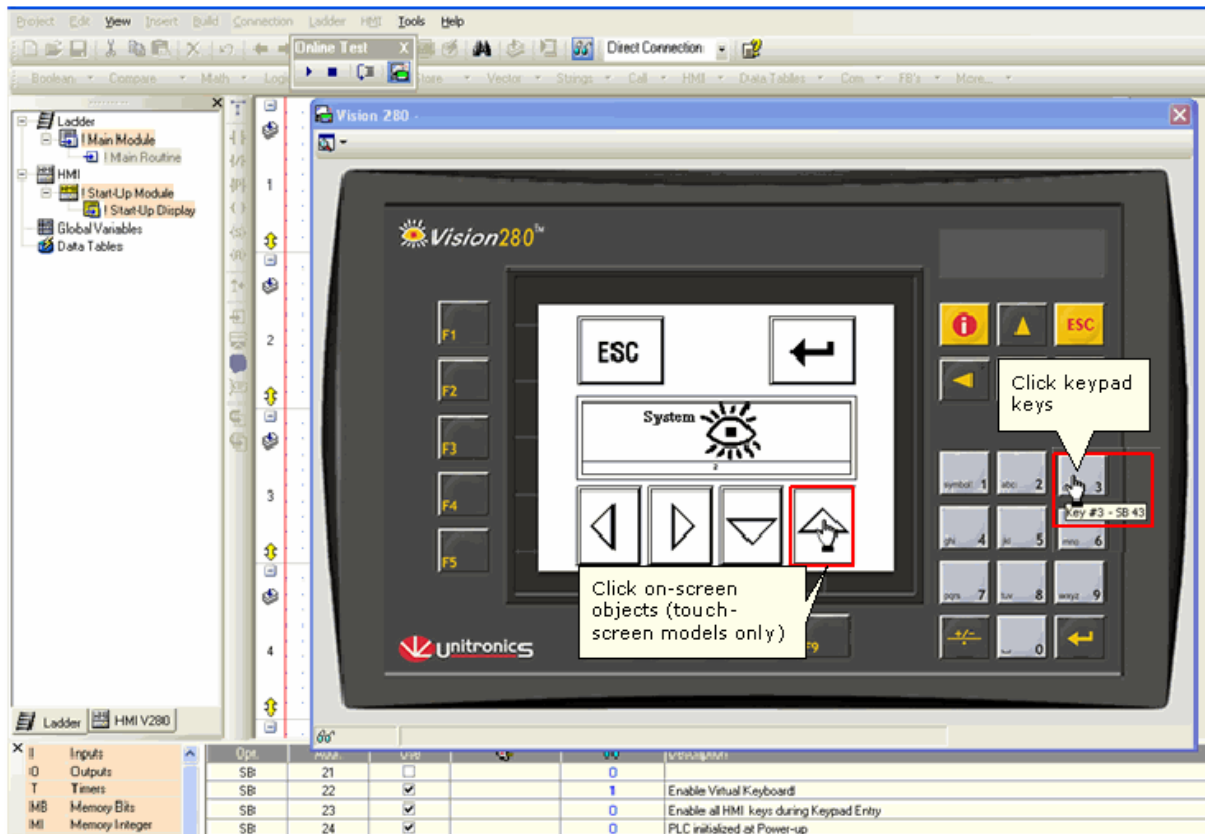


5. Click the On-line Test mode button or press <F9> to enter On-Line Test mode; the left Ladder rail turns red and real-time values are displayed in the Output window.
6. Click the Remote Access button on the On-line Test toolbar to display the remote controller on your PC screen. You can toggle the controller image on and off using <Shift>+<F9>.



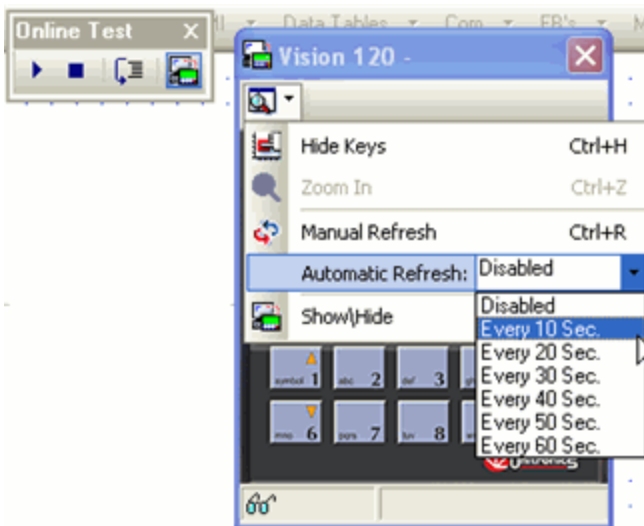
7. Remotely operate the controller's HMI by using:
 - Your PC keyboard, pressing arrow, alphanumeric, and function keys (<F1> to <F8>). Note that the Vision <ESC> key is the <E> key on the PC keyboard
 - Your mouse to click keypad keys on the Remote Access image on the PC screen. In the case of touch-screen models, you can also click on-screen objects.

To enter Information Mode, press the <i> key on your PC keyboard, or by clicking it on-screen with your cursor.



Remote Access options

Use the options to set display options and refresh rate.



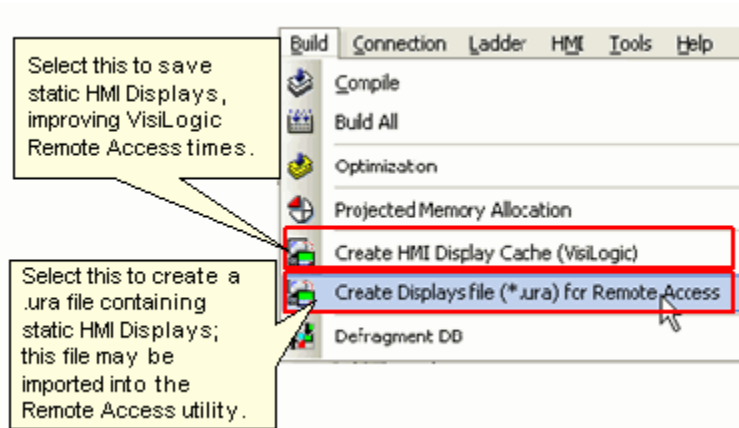
Note • The Zoom option can be activated only if you select Hide Keys. Zoom cannot be used with or V280 controllers.

Improving Remote Access run times:

Cache files enable Displays to load more quickly. These files enable Remote access to refer to HMI elements stored in the PC, instead of taking them from the PLC. If you have been provided with a static HMI file, select it to improve Remote Access run times.

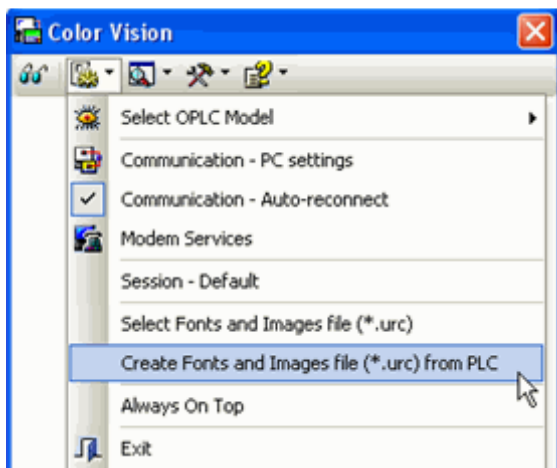
Monochrome Vision only

- To use a temporary memory cache during a session, select Project> Cache from the Build menu.
- The HMI cache files are in .ura format. To create a .ura file containing static displays, select Export Displays to



Color Vision only

The static HMI files are in .urc format. Such files can be created in Remote Access by selecting the option Create Fonts and Images (*.urc) from PLC shown in the following figure. The .urc file may include either fonts, images, or both. However, note that if the .urc file does not include graphics, Remote Access will not display images.



Note • When Remote Access creates a .urc file, the Vision enters 'System Mode'; the PLC continues running while displaying a system image. The HMI application is not visible. In addition, note that an interruption in communications may leave the PLC inaccessible. In this case, the PLC may require reset, which requires an operator to be **physically** present near the PLC.

Creating Project files (Clone files)

Project files contain application data in compressed format *.dvi, *.vdf *.urc, and *.ura. There are several kinds of files.

- **Clone Files:**

These can contain complete applications in compressed format, including Ladder and HMI applications and OS. Clone files are very convenient for OEMs, or for those wanting to 'Clone' a PLC and its application. These files can be created in VisiLogic as well as via SD Clone Ladder functions or in Information mode.

- **Project Files: UniDownloader Designer**

These files include both the Ladder and HMI applications, Data Tables, and an Upload file.

- Standard Vision: .dvi files

- Enhanced Vision: .vdf

Note that the DownLoader files you create here are compatible with UniDownloader 4.0.0 and later; provide your users with the correct UniDownloader version.

- **Cache files: Remote Access and Remote Operator**

These are compressed HMI Displays. They improve Remote Access reaction times, and must be used to display graphic images when using Remote Operator.

- Monochrome Vision (.ura files)

A .ura cache file enables Remote Operator to load Displays more quickly. Note that V130, which loads displays quickly, does not use .ura files.)

- Color Vision (.urc files).

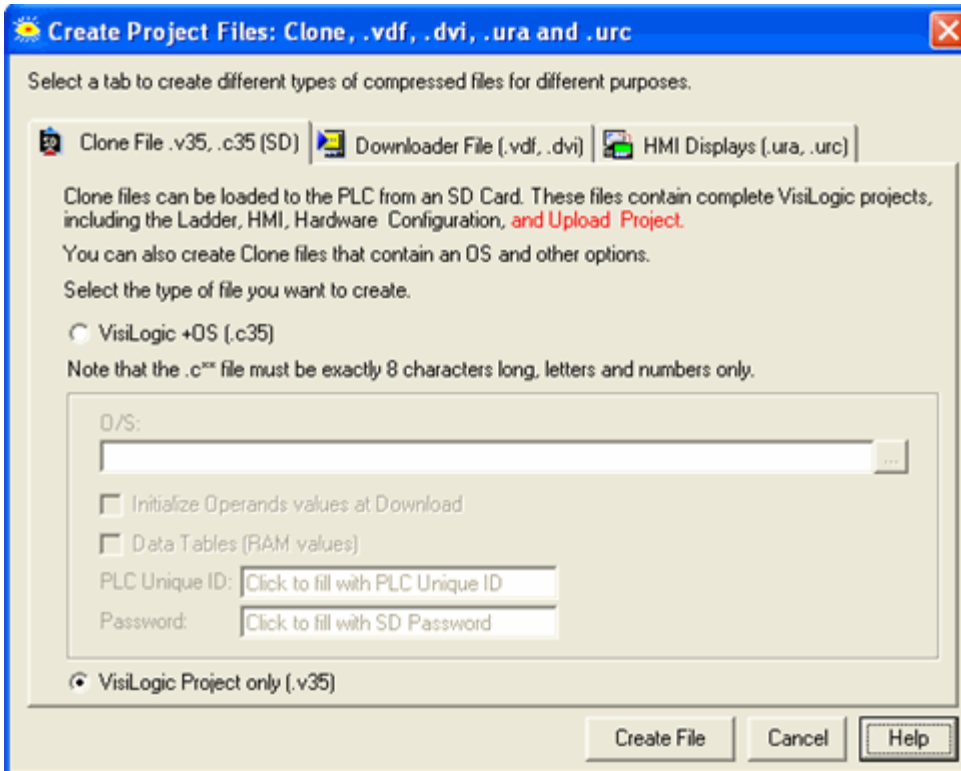
If a .urc is not used, images are not displayed and fonts may be distorted.

A cache file includes fonts, and can include images.

If the file does not include images, a red 'X' displays in place of graphics.

To create Project files:

1. Click on the Project menu and select Create Project files.
2. Select the appropriate tab and follow the on-screen directions.



Notes •

.c35 Files

- **PLC Unique ID**
Each PLC has a unique ID number, which is shown in SDW9. Use this number to restrict a program to a particular PLC.
- **Password:**
This is assigned to the SD Card via the Set SD Card Password function.

- Both the controller you use to make the download file (source), and the controller that is installed with the file (target) should be installed with the same OS Version.
- To avoid errors in the file, the creation process must run smoothly, without being aborted or affected by PC faults.

Checking the integrity of the .dvi file

Although you do not need to have Remote Access installed on your PC in order to create .dvi files, you need to install it in order to check .dvi files.

1. After you have created the .dvi file, save the project from which it was downloaded.
2. Open a new, empty project and download it to the controller.
3. Start Remote Access and select the appropriate Vision model.
4. Click on the Project Downloader which is located on the Remote Access Tools menu.
5. Navigate to the .dvi file and download it into the controller.

6. Reopen the original Ladder project used to create the .dvi file.
7. Select Verify from the Controller menu; the Verify process will compare the project in your PC with the .dvi application installed in the controller.

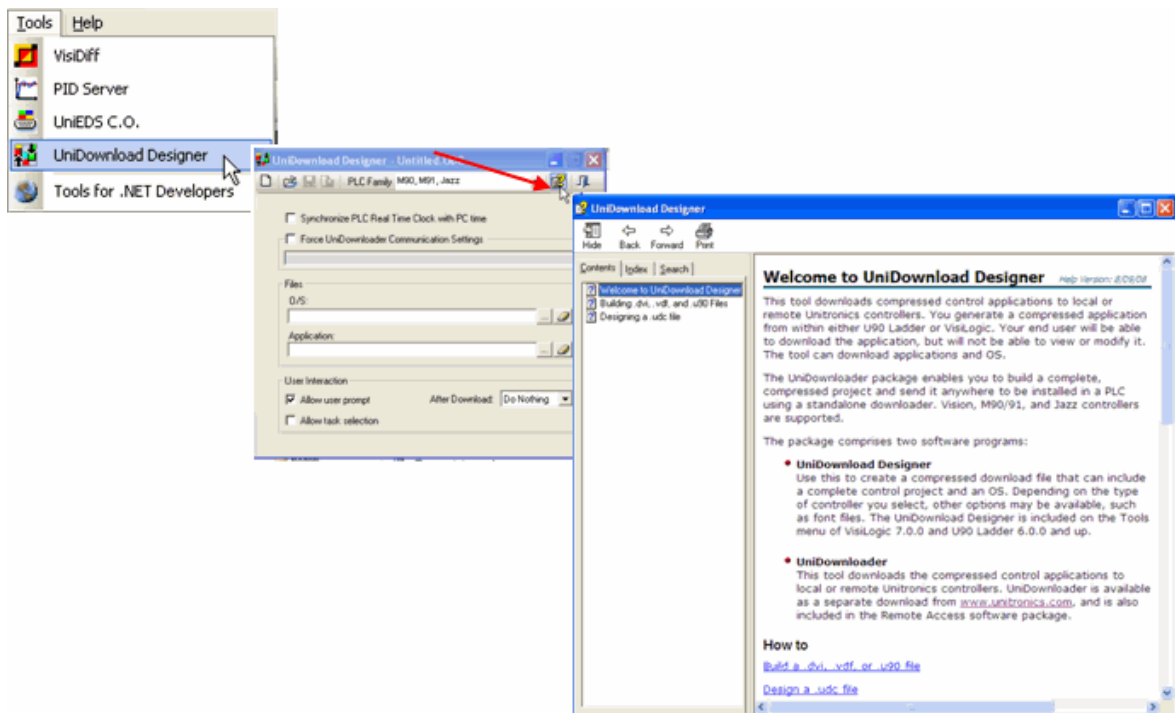
If the Verify process is successful, the .dvi file is valid.

UniDownloader Designer

The UniDownloader package enables you to build a complete, compressed project and send it anywhere to be installed in a PLC using a standalone downloader. Your end user will be able to download the application, but will not be able to view or modify it. The tool can download applications and OS.

The package comprises the UniDownload Designer, located on the Tools menu, and the UniDownloader, available as a separate download from www.unitronics.com.

To learn about UniDownloader, click on the Tools menu in VisiLogic, U90 Ladder, or Remote Access, select UniDownloader Designer, and then access the UniDownloader Designer Help.



PTO Functions: Simple Motion Control

You can implement motor control by controlling the high-speed outputs of certain Vision controllers using PTO functions, controlling up to three independent axes.

In this way you can, for example, build speed profiles that are appropriate for stepper motors. Note that the PTO control functions are open-loop, and do not rely on positional feedback.

Supported Modes:

- Pulse
Uses a single high-speed output
- Pulse + Direction
Uses 2 high-speed outputs, one for the pulse, and the second to control direction
- Clockwise/Counter Clockwise
Uses 2 high-speed outputs, one for clockwise, the other for counter-clockwise

Channels and Outputs

A Channel comprises the outputs that are required to implement a Mode.

The number of channels, the possible modes, and the outputs used to implement them vary from model to model. The following tables show the possible combinations, according to Vision model.

Notes • When an Output is not being used in a channel, it may be used as a general-purpose output (not high-speed)

Caution These functions are based on programming logic, and therefore do not have the safeguards generally provided by electro-mechanical controls. It is the user's responsibility to implement those safeguards required by his system, such as override and/or emergency stop mechanism.

V130/V350-TR34

Channel	Possible Mode Combinations				
Channel 0	Pulse	Pulse + Direction	Pulse + Direction	Pulse	Clockwise/Counter Clockwise
Channel 1	Pulse	Pulse + Direction	Pulse	Pulse + Direction	Disabled
Channel 2	Pulse	Disabled	Disabled	Pulse	Pulse

Channel	Output used per Channel				
Channel 0	Pulse (O0)	Pulse (O0) + Direction (O2)	Pulse (O0) + Direction (O2)	Pulse (O0)	Clockwise (O0) / Counter Clockwise (O1)
Channel 1	Pulse (O1)	Pulse (O1) +	Pulse (O1)	Pulse (O1) +	Disabled

		Direction (O3)		Direction (O3)	
Channel 2	Pulse (O2)	Disabled	Disabled	Pulse (O2)	Pulse (O2)

V130/V350-TRA22

The following table shows all of the possible PTO mode combinations for this model.

Channel	Possible Mode Combinations				
Channel 0	Pulse	Pulse + Direction	Pulse + Direction	Pulse	Clockwise/Counter Clockwise
Channel 1	Pulse	Pulse + Direction	Pulse	Pulse + Direction	Disabled

Channel	Output used per Channel				
Channel 0	Pulse (O0)	Pulse (O0) + Direction (O2)	Pulse (O0) + Direction (O2)	Pulse (O0)	Clockwise (O0) / Counter Clockwise (O1)
Channel 1	Pulse (O1)	Pulse (O1) + Direction (O3)	Pulse (O1)	Pulse (O1) + Direction (O3)	Disabled

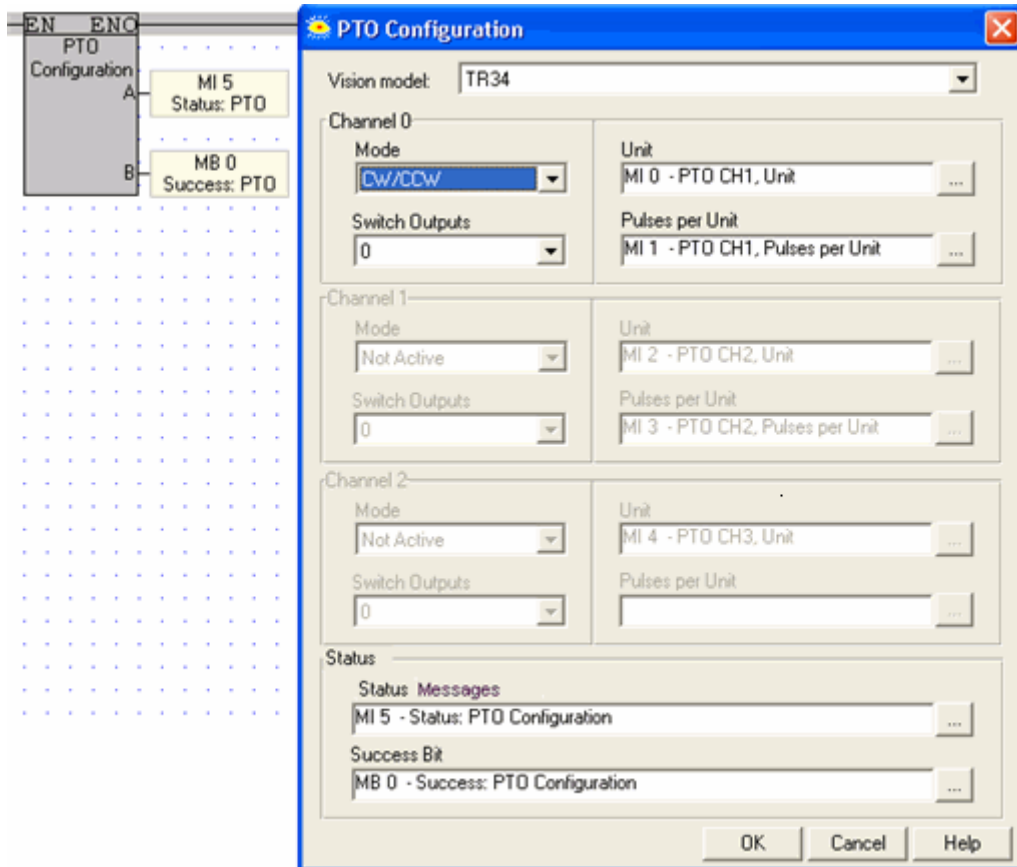
V130/V350-TR20, TR6

Channel	Possible Mode Combinations		
Channel 0	Pulse	Pulse + Direction	Clockwise/Counter Clockwise
Channel 1	Pulse	Disabled	Disabled

Channel	Output used per Channel		
Channel 0	Pulse (O0)	Pulse (O0) + Direction (O1)	Clockwise (O0) / Counter Clockwise (O1)
Channel 1	Pulse (O1)	Disabled	Disabled

PTO Configuration

In this function you select a Vision model, which determines the available Channels and Modes. Those not available are disabled.



Parameter Name	Purpose
Vision Model	Select the appropriate model
Channel	A Channel comprises the inputs used to carry out the PTO function, and determines their function
Mode	The possible modes are: <ul style="list-style-type: none"> • Pulse • Pulse + Direction • Clockwise/Counter Clockwise The tables in the previous section give all possible combinations and output assignments, based on model.
Switch	Switch reverses the tasks of the PTO outputs that are assigned to the channel in modes Pulse + Direction or CW/CCW. This can be helpful to fix cases where the output wiring is reversed.
Unit	PTO functions rely on Units. This is where you determine the number of pulses per Unit. Note that neither values for Unit nor Pulses per Unit may exceed 1000 Note - To control your output using straight frequency, set 1 pulse = 1 unit. Calculate Frequency to Units according to the following $\text{Units per Second} \times \frac{\text{Pulse}}{\text{Units}} = \text{Pulses per Second}$ $\text{Units} \times \frac{\text{Pulse}}{\text{Unit}} = \text{Frequency}$
Status Messages	0 - No error 1 - Invalid configuration data 2 - VisiLogic/OS mismatch; this OS version 3 - Vision outputs do not support function 4 - Invalid structure 5 - Invalid configuration channel 6 - Unit or Pulse per Unit exceed limits (1-1000)

7 - Channel already initialized
 8 - Currently in motion (function cannot be performed during acceleration or deceleration)

Success Bit | Turns ON when the Status MI =0

Set Profile

Use Set Profile to define the motion profile for a particular Channel in the configuration.

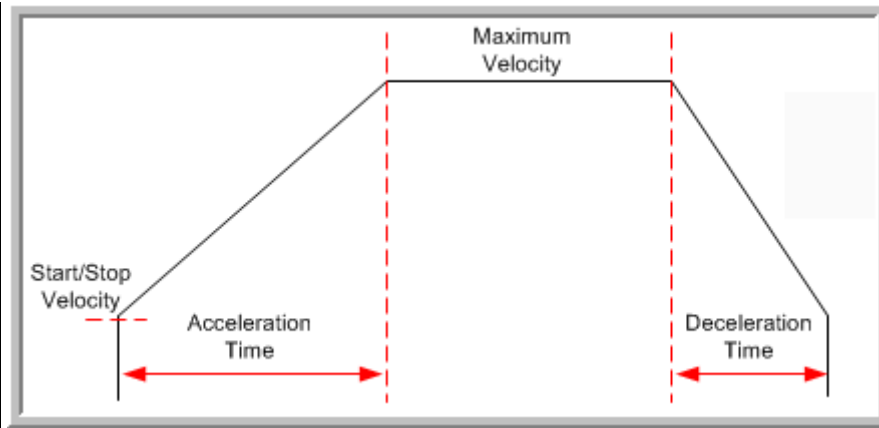
Params	#	Type	Add	Format	Description
IN	A	D#	0		Channel 0
	B	DW	0		Start/Stop Velocity: PTO Set Profile
	C	DW	1		Maximum Velocity: PTO Set Profile
	D	MI	5		Acceleration Time (mS): PTO Set Profile
	E	MI	6		Deceleration Time (mS): PTO Set Profile
	F	MI	7		Jerk Factor: PTO Set Profile
OUT	G	MI	8		Status: PTO Set Profile
	H	MB	1		Success: PTO Set Profile

Ranges

Note the minimum and maximum ranges for your motion profile.

Minimum	Maximum
5 Hz	15 kHz
10 Hz	20 kHz
305 Hz	133 kHz
610 Hz	200 kHz

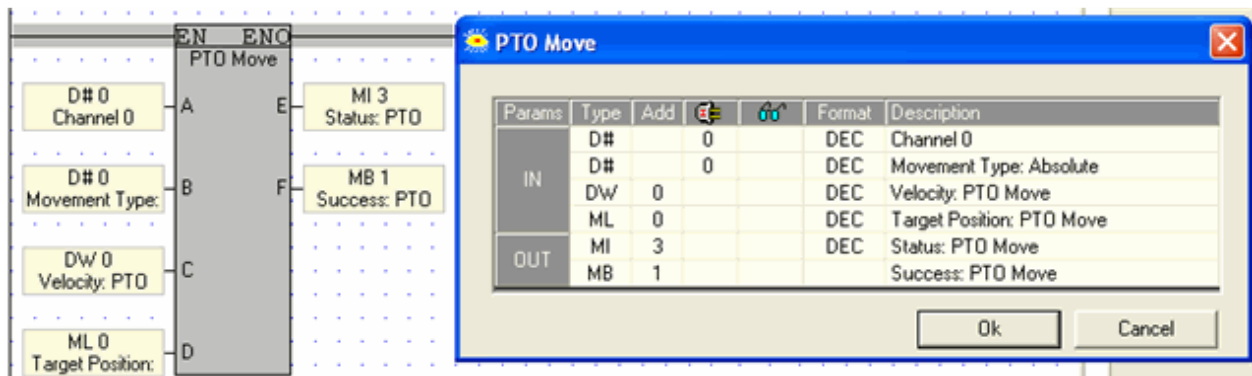
Parameter Name	Purpose
Channel	Select the relevant channel
Start/ Stop Velocity	These parameters determine the limits of the motion profile for the channel. Note that the resolution of velocity is according to the units set in the PTO Configuration.
Maximum Velocity	
Acceleration Time (mS)	
Deceleration Time (mS)	



Jerk Factor	Controlling for jerk influences the shape of your motion curve. Legal values are from 1 to 16, where 1=trapezoidal curve and 16 =perfect S.
Status Messages	0 - OK 1 - Invalid configuration data 2 - Currently in motion (function cannot be performed during acceleration or deceleration) 3 - Invalid channel 4 - PTO Configuration block does not exist 5 - Out of range 6 - Maximum value is out of range
Success Bit	Turns ON when the Status MI =0

PTO Move

In this function you determine the parameters of movement.



Parameter Name	Purpose
Channel	Select the relevant channel
Movement Type	This sets the type of movement: <ul style="list-style-type: none"> Absolute Position This causes movement to the exact position requested, without considering the current position. Relative Position Here the movement is relative to the current position.
Velocity	Note that the resolution of velocity is according to the units set in the PTO Configuration
Target Position	Sets the desired goal
Status Messages	0 - Idle / OK 1 - Configuration data is invalid 2 - Invalid channel 3 - Channel not initialized, or Vision outputs do not support function 4 - Absolute Movement cannot be performed

	5 - Currently in motion (function cannot be performed during acceleration or deceleration)
Success Bit	Turns ON when the Status MI =0

PTO Stop

Use this to stop movement

Parameter Name	Purpose
Channel	Select the relevant channel
PTO Stop	<ul style="list-style-type: none"> Immediate Intended to cause an immediate, emergency stop with no regard for position or any other parameter (requires parameter reset) Normal Stops motion according to the rate of deceleration set in the PTO Configuration.
Status Messages	0 - Idle / OK 1 - Already stopped 2 - Invalid channel 3 - Channel isn't initialized 4 - unknown command
Success Bit	Turns ON when the Status MI =0

Read Status

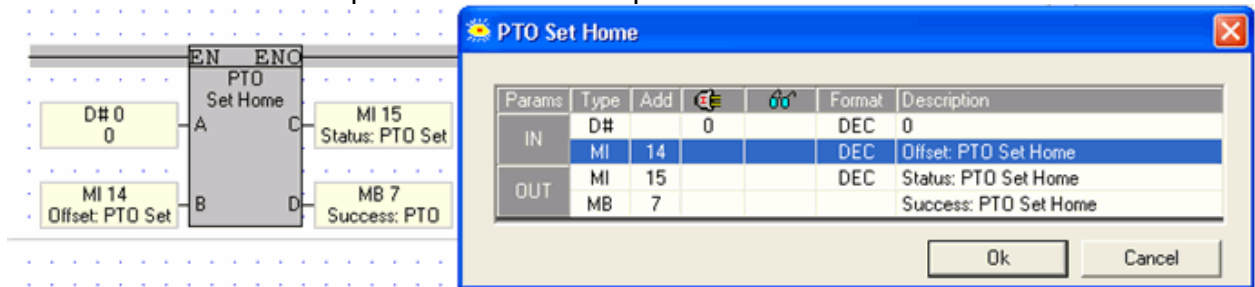
Use this to ascertain the current position.

Parameter Name	Purpose
Channel	Select the relevant channel

Current Position	Use these as a reference for Move functions Note that the resolution of velocity is according to the units set in the PTO Configuration
Velocity	Configuration
In Progress	This turns Off after the values have been read.
Status Messages	0 - Idle / OK 1 - Currently in motion (function cannot be performed during acceleration or deceleration) 2 - Channel is not configured 3 - Invalid channel 4 - Read Timeout
Success Bit	Turns ON when the Status MI =0

PTO Set Home

Use this to set a Home position for Move operations set to Absolute Position



Parameter Name	Purpose
Channel	Select the relevant channel
Offset: PTO Set Home	The channel uses this value to set the reference point for the next move operation. If, for example, the Absolute target is set to 600, and the Offset to 200, the channel will move to 400.
Status Messages	0 - OK 1 - invalid channel 2 - precondition error 3 - Channel is currently accelerating or decelerating (Movement can only be performed when system is Idle of in steady state)
Success Bit	Turns ON when the Status MI =0

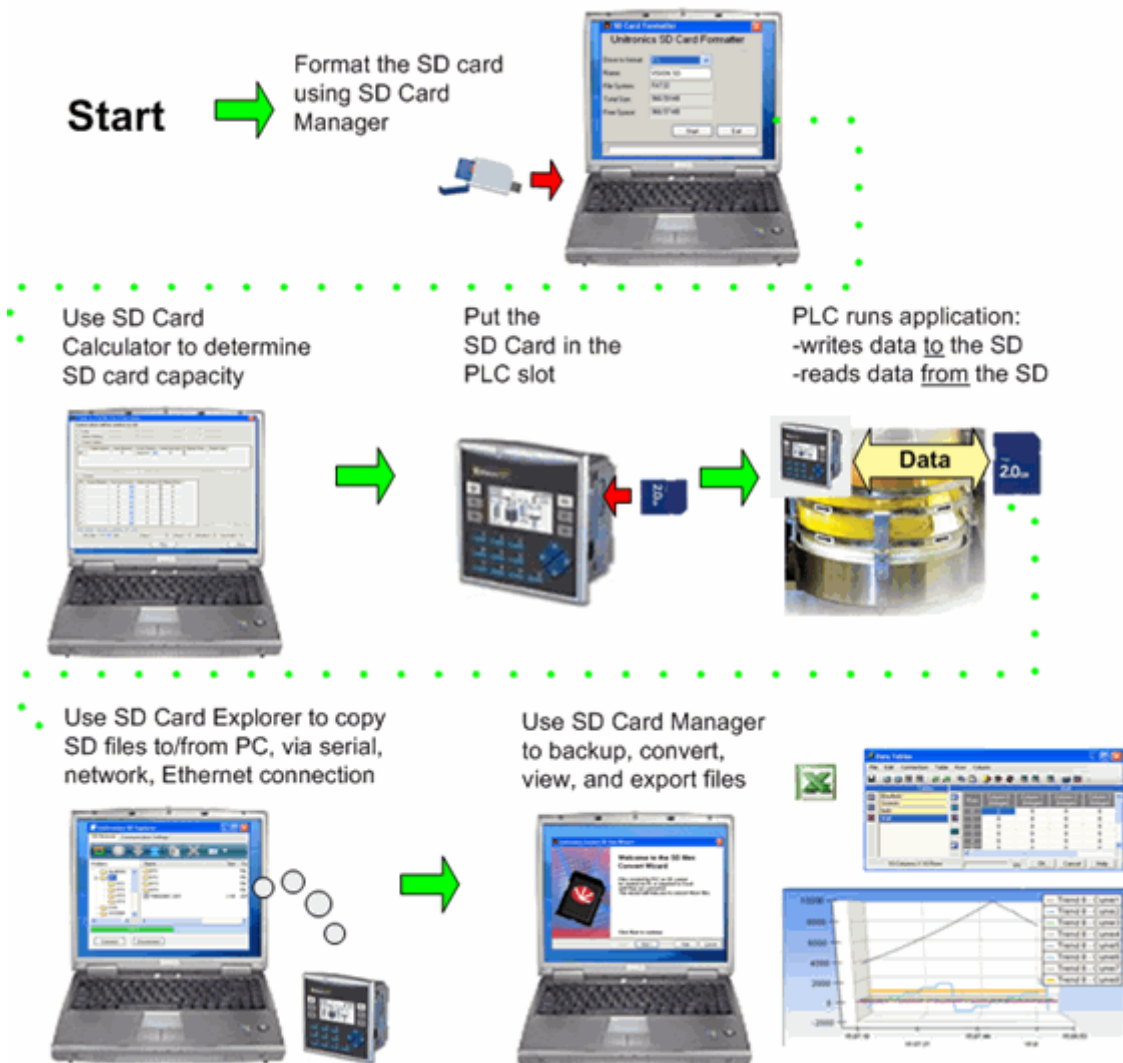
Unitronics' Standalone Software Utilities

These utilities can be freely downloaded from
<http://unitronics.co.il/Content.aspx?page=Downloads>.

SD Card Suite

The SD Card Suite contains several applications that you need to work with SD cards:

- Tools
Includes the Card Formatter (**note that a card must be formatted before use**), the HTML Compiler for webpages served from the SD, and the Fill Time Calculator which enables you to determine how long your application will take to fill up the SD Card.
- SD Card Explorer
Use a PC to access, read and write files on an SD Card that is installed in a Vision controller
- SD Card Manager
Import SD files: Trends, Logs, Alarms, and Data Tables, view them, and export them to Excel or .csv files.
- Data Tables Editor
View, export, and edit Data Table files.



SD Tools (Card Formatter, HTML Compiler, Fill Time Calculator)

Click a tab to access the desired tool.

SD Card Format

A Unitronics PLCs can only work with an SD Card that is correctly formatted.

To format the card:

1. Place the card in an SD card reader and plug the reader into a computer's USB port.

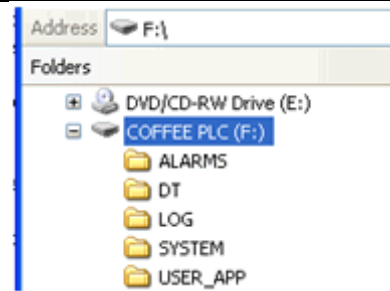


2. Open SD Tools and select SD Card Format.
3. Select the drive that holds the SD card. Enter a name for the card, and then click Start.



3. The SD Card Formatter displays a message, warning you that the process erases all card data; click OK to begin the formatting process.
4. When it is complete, the application shows the File System as FAT 32, and shows the total capacity and the amount of free space on the card.

6. View the card in Windows Explorer. The Formatter creates a directory structure which the PLC uses to write files to the SC card
The SD card is now ready to insert into the PLC.



7. To insert the SD card into the PLC, locate the SD card slot on the controller. The slot is located on the side of models V130, V350, V1040, and on the top of the V560 and V570. Press the card down lightly until it clicks into place.



V130/350/V1040




V560/V570

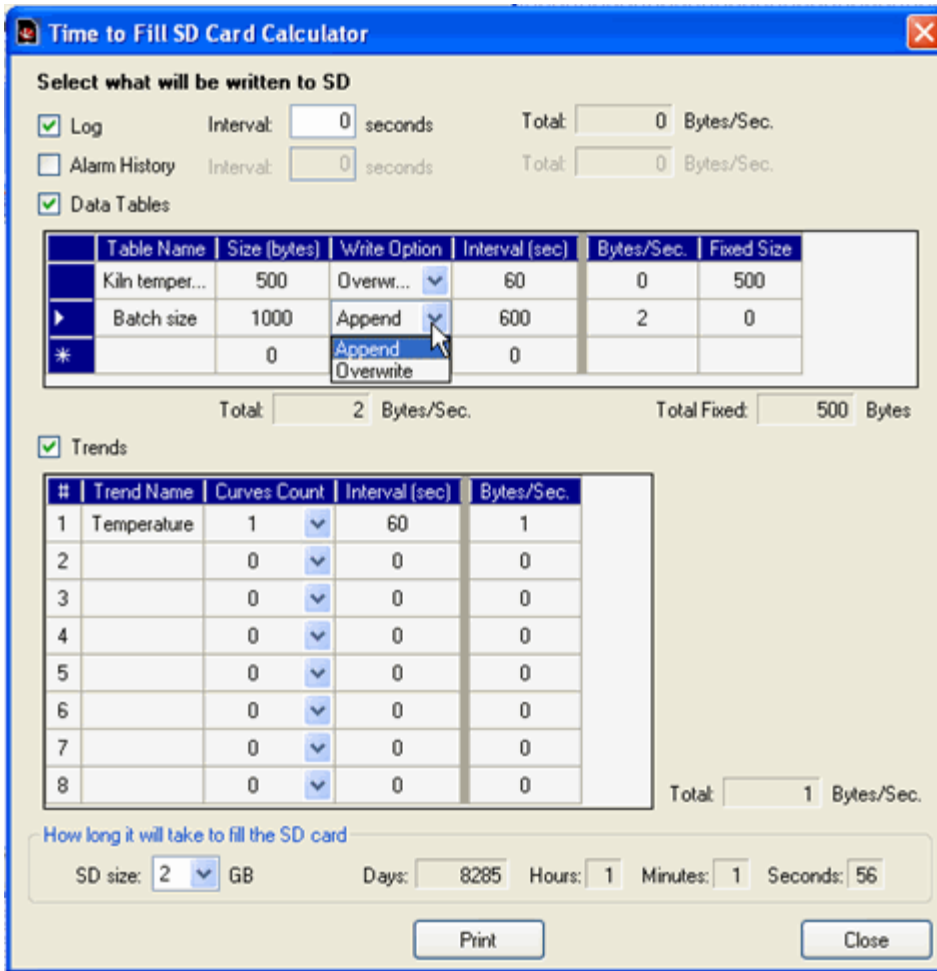
Once you have formatted the card, you may want to calculate its capacity in accordance with your application demands.

Calculator: Time to Fill SD

This enables you to determine how long your application will take to fill up the SD Card.

To use the Calculator, check the relevant elements. This enables the text boxes that allow you to enter parameters or select options.

 **Data Tables:** Remember that using the Overwrite option causes the same section of card to be reused; therefore the card will not fill up.



HTML Compiler

The complex webserver application available from http://www.unitronics.com/Content.aspx?page=Third-party_Utills streams data in packets that are 512 bytes long. To prevent values from being chopped off, run your pages through the HTML Compiler. Click on the HTML Compiler tab, and follow the on-screen directions.

SD Card Explorer

SD Card Explorer enables you to use a PC to access an SD Card that is installed in a Vision controller. The controller may be directly connected to the PC, or remotely located.

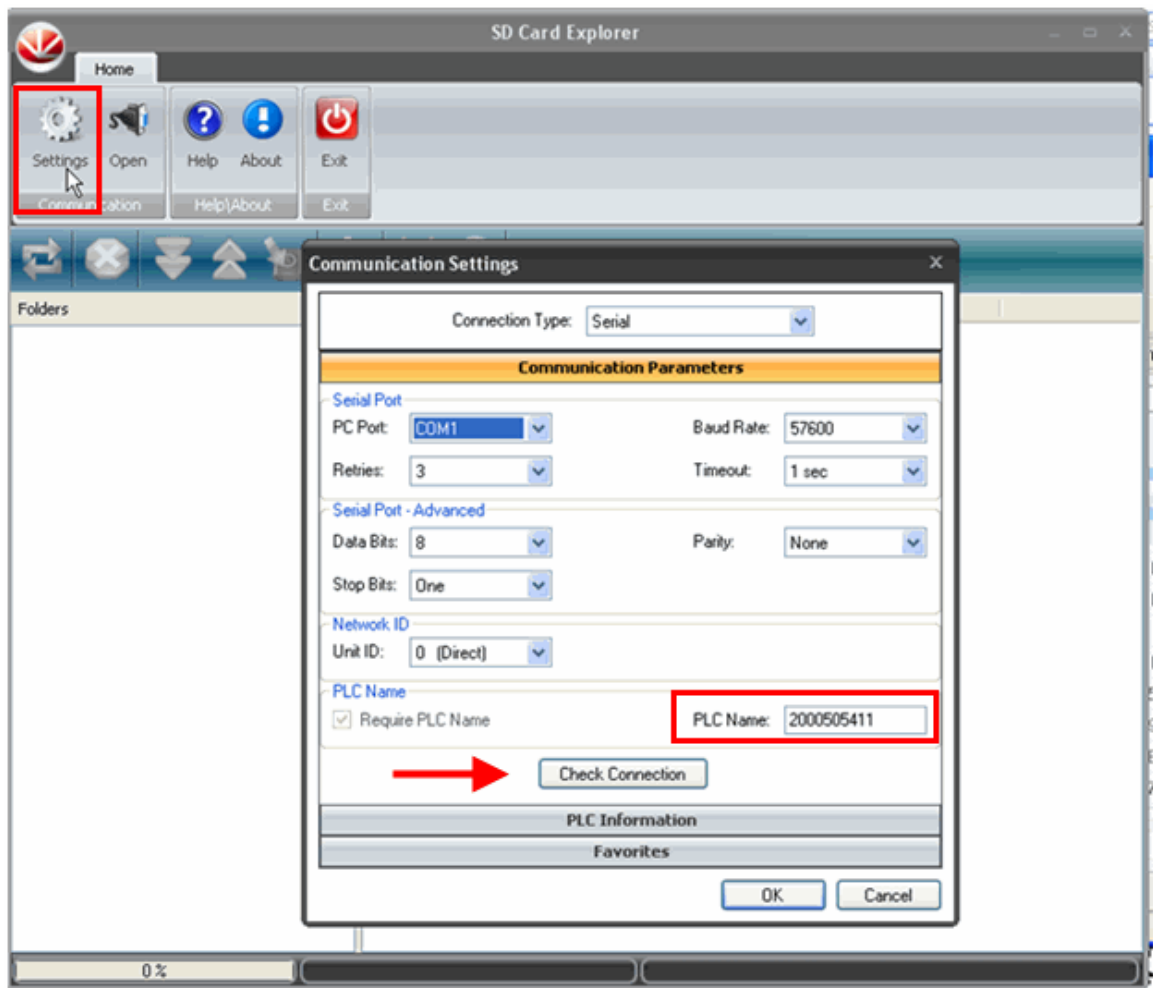
Once you establish PC-PLC communications, you can:

- Read files from the SD to the PLC
- Write files from the PLC to the SD
- Delete files from the SD

To begin using SD Explorer:

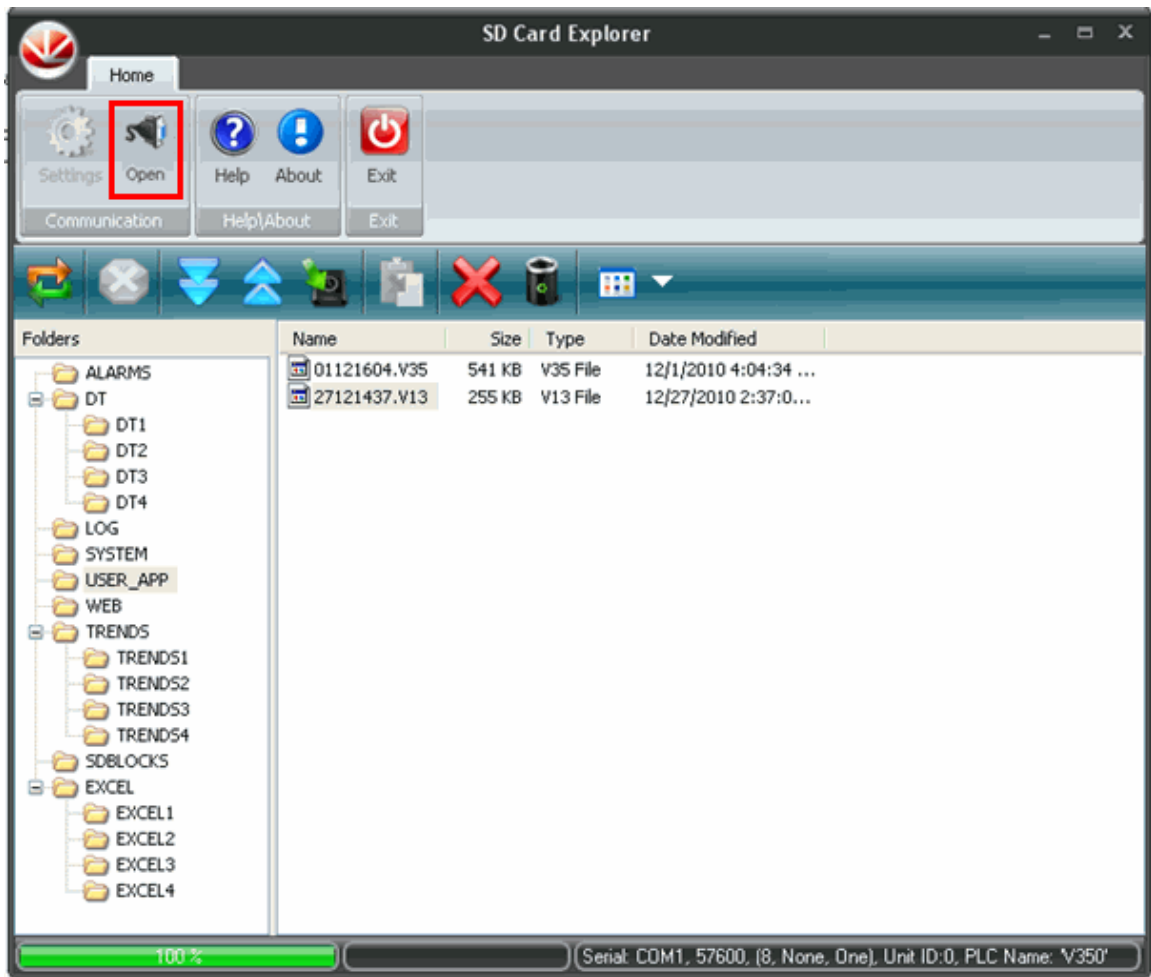
1. Open it from SD Card Suite, and then click Click Settings.

2. Select the Connection type, and then set the communication parameters.



Parameter	Purpose
Connection Type	Select Ethernet or Serial. The communication parameter options will change accordingly. Fill in the parameters according to your requirements.
PLC Name	This is required. If a name has not been assigned, you can use the default name in Information Mode (Located in Information Mode under Version> Software)

3. To access the SD Card, click Open; Explorer builds a list of SD Card contents.



4. Use the toolbar icons to read files from and write files to the SD Card. Clicking the Backup button starts a wizard that enables you to copy the entire card contents to a PC drive.



Note that you can double-click on Data Table files to open them up in the Data Table Editor.

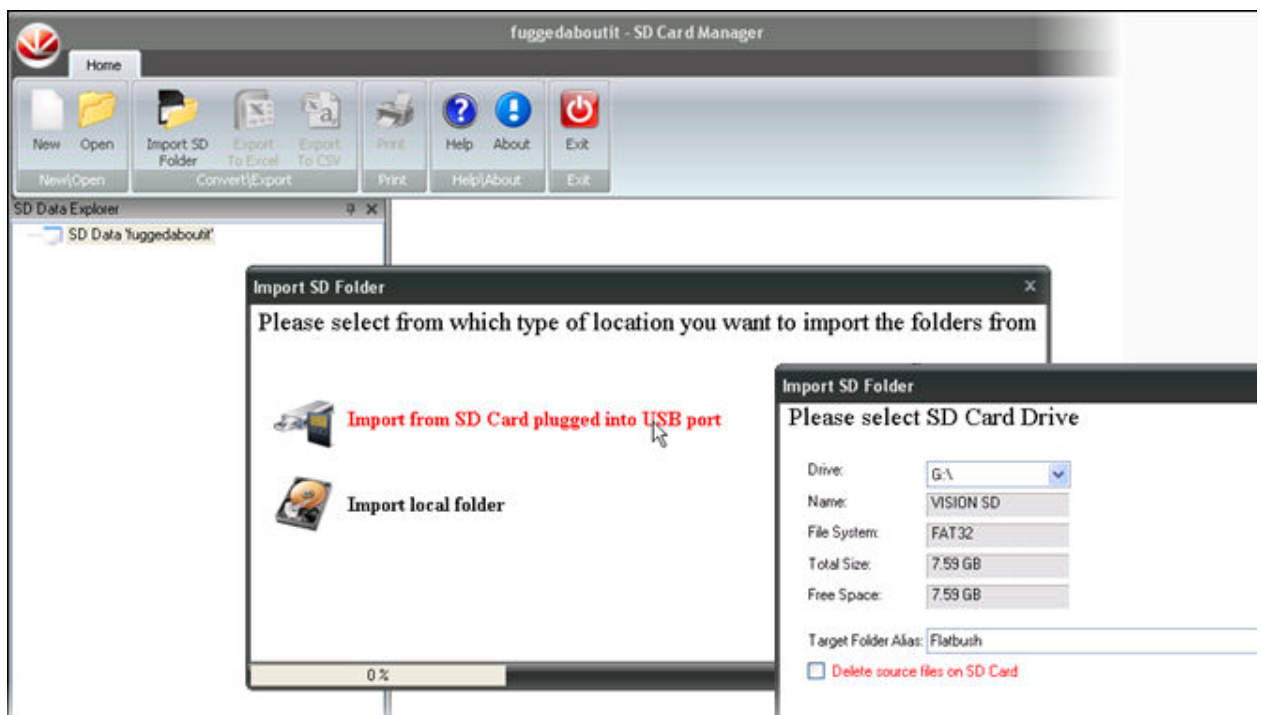
SD Card Manager

SD Card data table, trend, and log files are in a format that can only be read by a PLC and must be converted to a user-friendly format using the SD Card Manager.

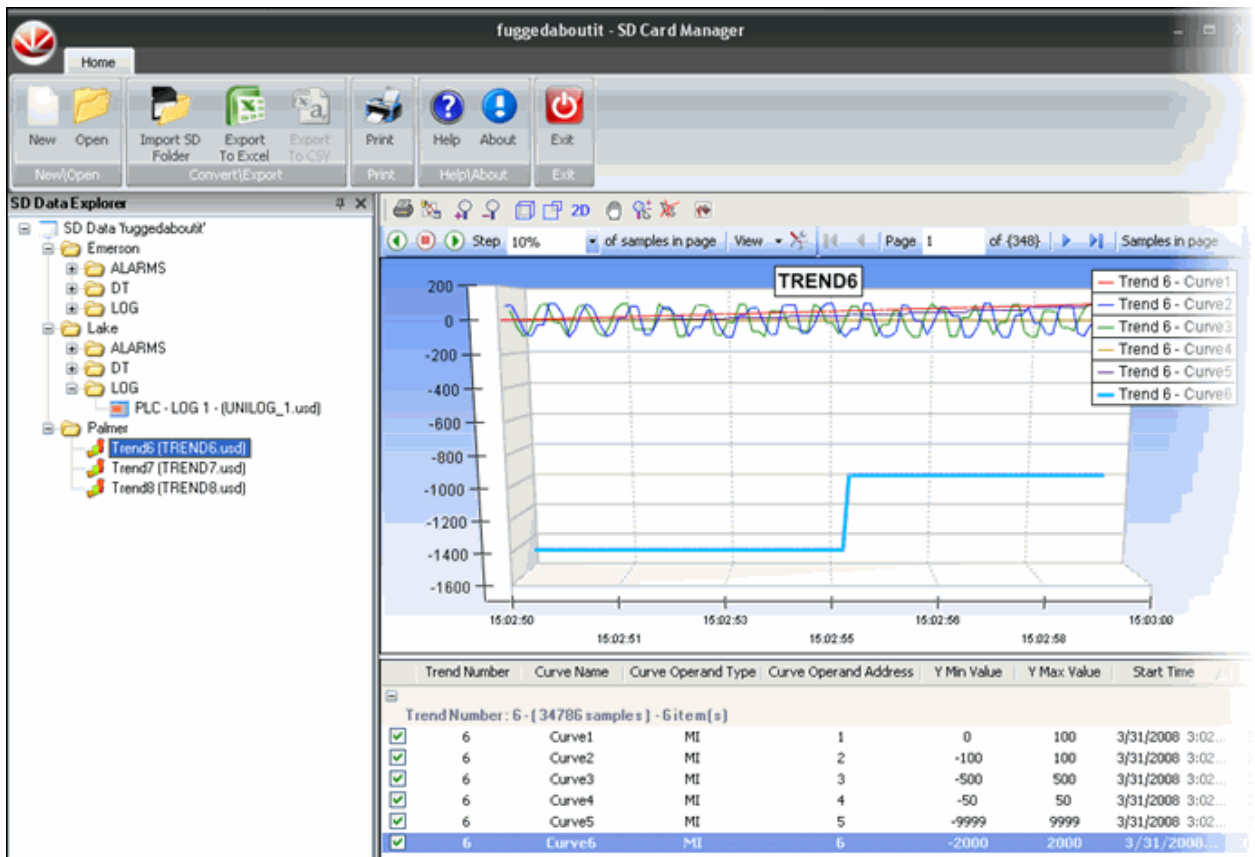
Before you can do this, you must copy the files to a PC.

If the files are on an SD Card that is installed in a Vision, you can copy them to your PC using the SD Card Explorer.

If the SD Card is connected to your PC's USB port, open SD Card Manager, select Import Folder and follow the wizard's directions. This process copies the Alarms, DT, Log, and Trend folders onto your PC hard drive.



You can now click a file to view it within the SD Card Manager, or you can export it to Excel/.csv.



Data Table Editor

You can use the Data Table Editor to work with .fdt and .udt files.

1. Click Open, and navigate to the desired folder.
2. Select cells, and use the toolbar buttons to export and edit values.

The screenshot shows the 'FILE1.UDT - Data Tables Editor' application. The main area displays a grid of data with the following structure:

Tables	Column 0 (Int16)	Column 1 (Int16)	Column 2 (Int16)	Column 3 (Int16)
00				
01				
02	19	19	19	19
03	3	3	3	3
04	3	3	3	3
05	3	3	3	3
06	3	3	3	3
07	3	3	3	3
08	3	3	3	3
09	3	3	3	3
0A	3	3	3	3
0B	3	3	3	3
0C	3	3	3	3
0D	3	3	3	3
0E	3	3	3	3
0F	3	3	3	3

Remote Operator

Remote Operator enables you to use a PC to view and work with a remote controller's HMI panel.

You can define any number of controllers, then open multiple sessions to view them simultaneously, while docking or cascading windows according to your preferences.

During a session, the remote controller is displayed, on-line, on your PC screen. You can 'press' keypad keys and touch-screen objects of:

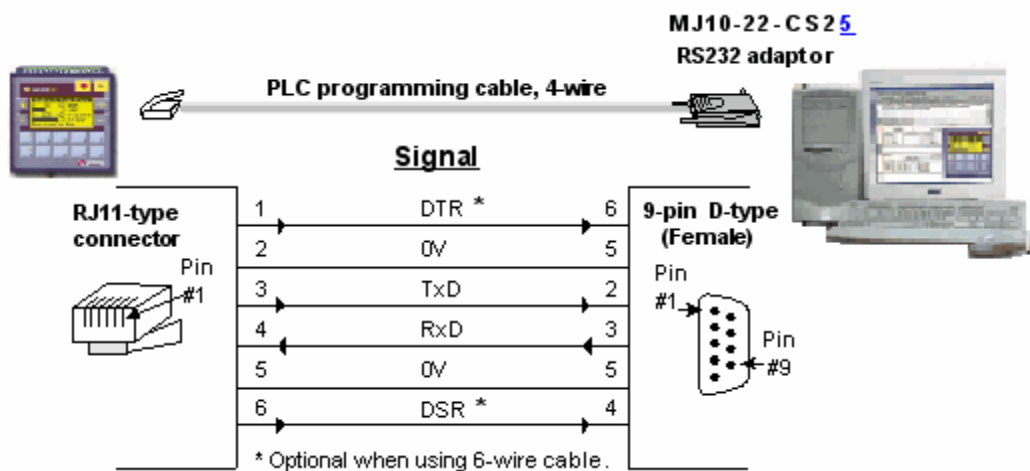
- Stand-alone controllers that are directly connected to the PC via a cable.
- Controllers within a network.
- Devices with IP addresses, via Ethernet.

This utility can be used with Vision, M90/91, and Jazz controllers. Enhanced Vision controllers require O/S versions 5.00 and higher; other series are compatible regardless of OS version.

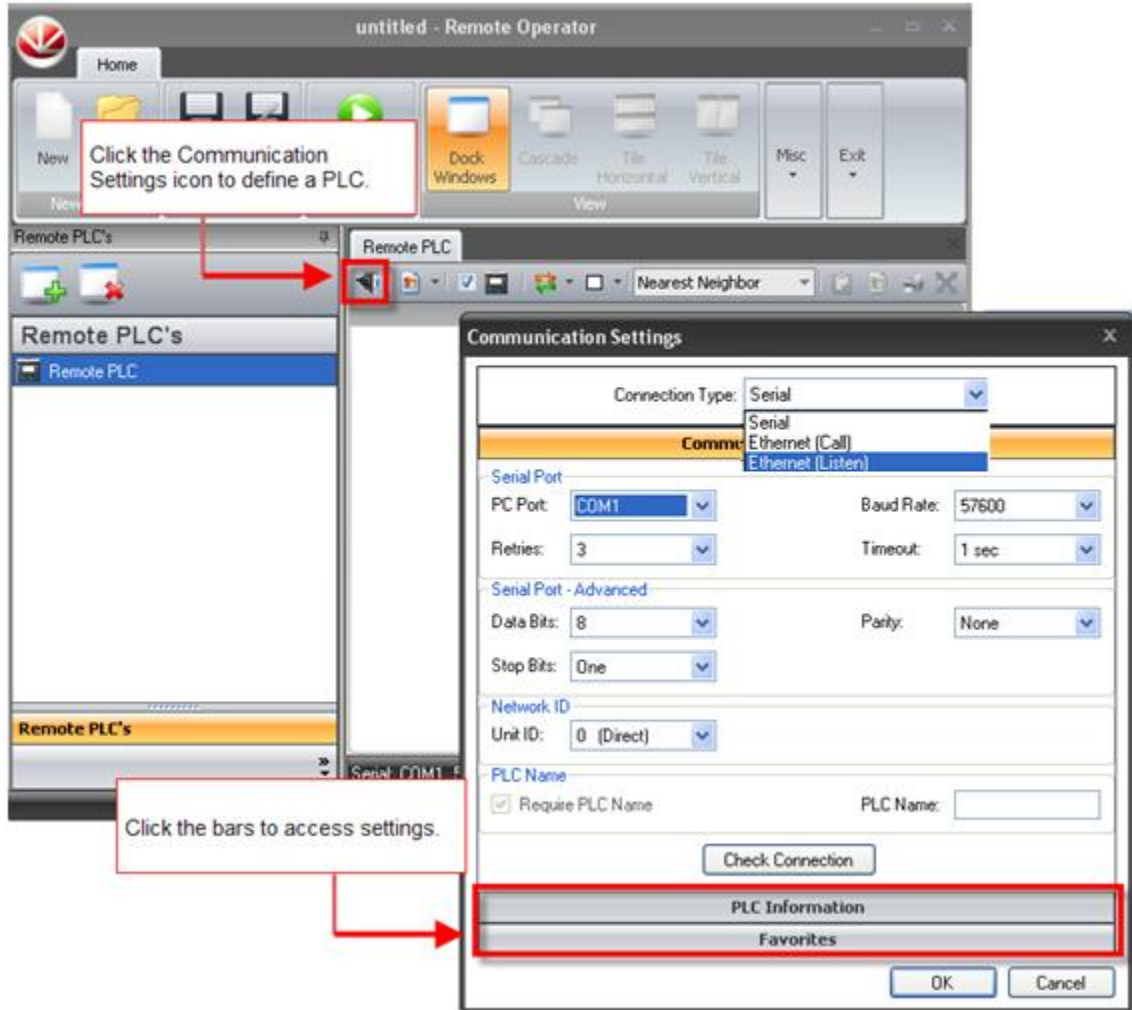
Using Remote Operator

Define the PLC

By default, Remote Operator opens with a single PLC named Remote PLC, defined by default as directly connected to your PC using the programming cable supplied with the controller kit.



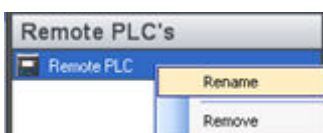
1. To define the PLC, click the Communication Settings icon.



2. Under Connection Type, use the drop-down arrow to select Ethernet or Serial. The communication parameter options will change accordingly.
3. Fill in the parameters according to your requirements. If you are accessing a PLC in a CANbus/RS485 network, enter the Unit ID number. Connect your PC to any controller in the network using the programming cable supplied with the controller kit.

Note ♦ Different PCs can access a network at the same time, using different controller units as bridges. However, 2 different PCs cannot simultaneously access the same controller unit.

4. If you are accessing a Vision PLC, enter the PLC Name. This is required for Vision PLCs only.
Note that you can save these definitions to Favorites, by clicking the Favorites bar and selecting the first icon.
5. Test the connection by clicking the Check Connection button.
Note that you can change the default name by right-clicking it.



Cache Files (Vision only)

When you use Remote Operator to access **monochrome** Vision controllers, you will always see both the images and the text that are in the HMI application.

However, if you are accessing **color** Vision controllers, you will see only text. In order to see the images, you must use a .urc file that contains images.

.ura and .urc: HMI cache files (Vision only)

HMI cache files enable Remote Operator to refer to HMI elements stored in the PC, instead of taking them from the PLC.

- **Monochrome Vision**

A cache file enables Remote Operator to load Displays more quickly.

The HMI cache files are in .ura format.

(note that V130, which loads displays quickly, does not use .ura files.)

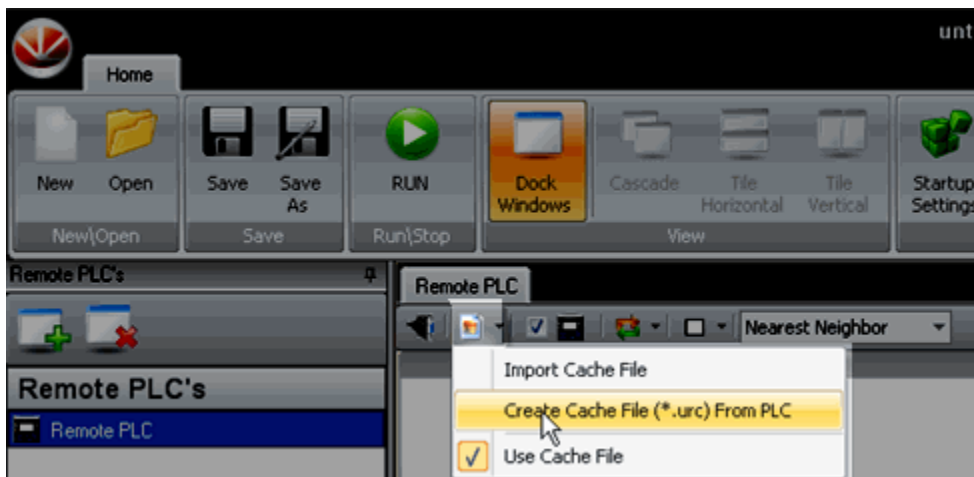
- **Color Vision**

If a cache file is not used, images will not be displayed and fonts may be distorted.

A cache file includes fonts, and can include images. However, note that if the file does not include images, Remote Operator will display a red 'X' in place of graphics.

The HMI cache files are in .urc format.

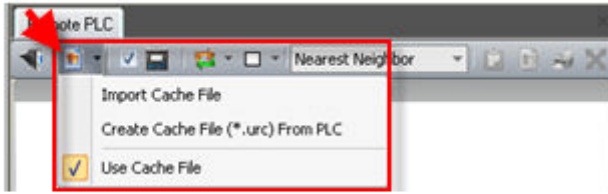
Such files can be created in Remote Operator by selecting the option Create Fonts and Images (*.urc) from PLC.



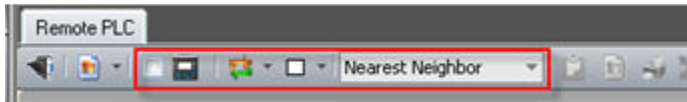
Note ♦

When Remote Operator creates a .urc file, the Vision enters 'System Mode'; the PLC continues running while displaying a system image. The HMI application is not visible.

In addition, note that an interruption in communications may leave the PLC inaccessible. In this case, the PLC may require reset, which requires an operator to be **physically** present near the PLC.



Other options



Show Case: Select this to hide or display the PLC enclosure around the Display screen.

Refresh: Select to assign a display refresh rate or opt for Manual refresh.

Background Color: This will provide the background color in the window displaying this PLC

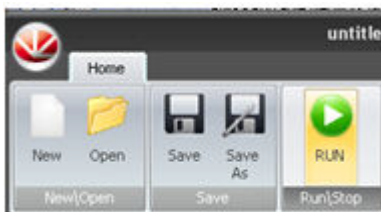
Interpolation Mode: Different modes may display differently on your PC screen

Save Sessions

You can save a Remote Operator session as a file.

1. Open Remote Operator, and define PLCs together with their communication settings.
2. Click Save on the toolbar. Enter a name for the Session, and then click Save.

Once you have configured Remote Operator, enter Online mode by clicking Run.



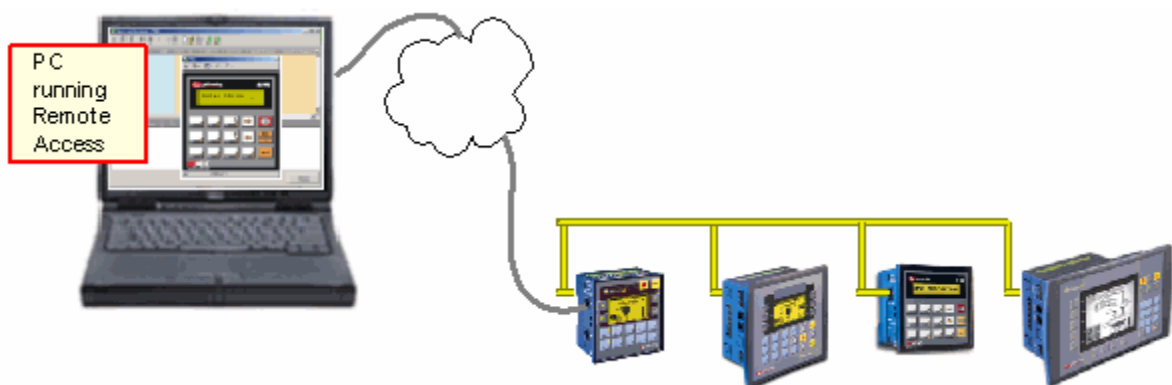
In this mode, you can:

- Use your cursor to operate the controller keypad and activate touch-screen objects (relevant models).
- Use your PC keyboard to operate the controller keypad (numeric keys, function keys <F1> to <F8>). Note that the Vision <ESC> key is <E> on the PC keyboard.
- Enter Information Mode by pressing the <i> key with your cursor.

Remote Access

Remote Access enables you to use a PC to access a remote controller. During a Remote Access session, the remote controller is displayed, on-line, on your PC screen. You can 'press' keypad keys and touch-screen objects, check system status and run-time values, as well as test and troubleshoot problems in remote controllers and applications. You can access:

- Stand-alone controllers that are directly connected to the PC via a cable.
- Controllers within a network.
- Either stand-alone or networked controllers via GSM or landline modem.
- Devices with IP addresses, via Ethernet.



The Remote Access package includes additional utilities:

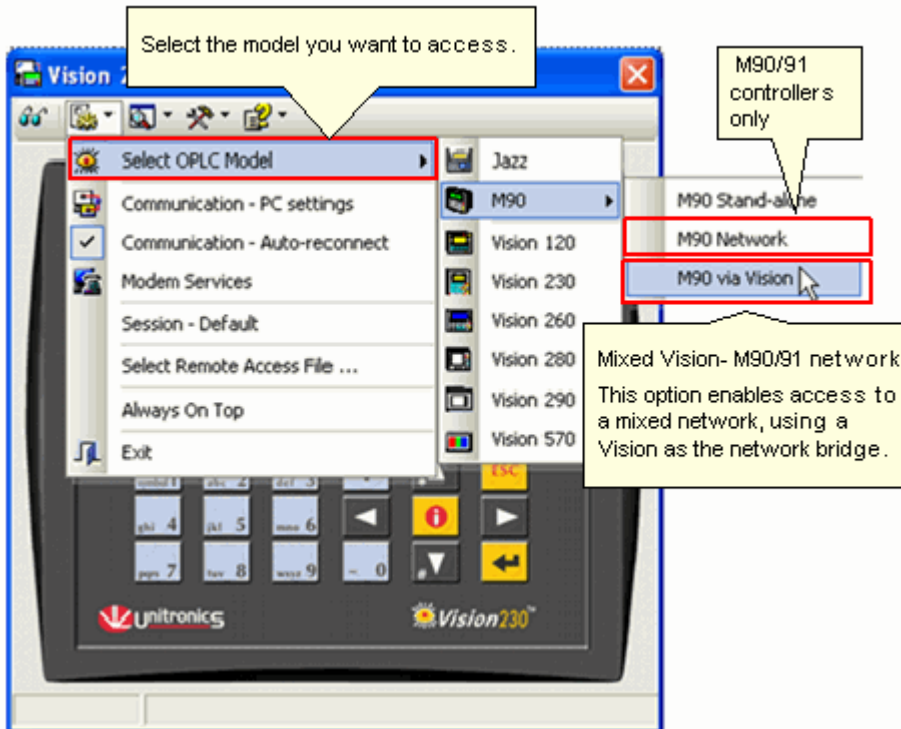
- UniDownloader Designer
- Operand Access
- Data Tables

Remote Access can be used with Vision, M90/91, and Jazz controllers. Vision controllers require O/S versions 2.96 and higher; M90/91 require V3.00 and higher.

Using Remote Access

Selecting an OPLC model

Select the controller model from the Configuration menu.



Note ♦ Vision model controllers:
 Select the model. If the controller is in a network, open Communication-PC Settings from the options menu, and select the controller's ID number.

♦ M90/91model controllers within a network:
 Select which type of network, and then select the controller's ID number.

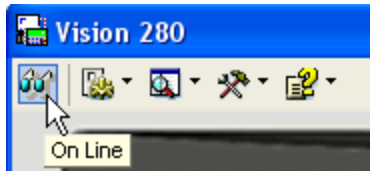
♦ Located on the Configuration menu. Auto-reconnect causes Remote Access to automatically attempt to renew a broken communication link. When you select Auto-reconnect, messages signaling broken communication links are suppressed.

After you select the model, access the controller according to the connection type:

- Communication-PC Settings for direct PC-PLC connection, networked controllers via bridge, or TCP/IP
- Modem Services for landline and cellular modems

Note ♦ When you use Remote Access to access **monochrome** Vision controllers, you will always see both the images and the text that are in the HMI application. However, if you are accessing **color** Vision controllers, you will see only text. In order to see the images, you must use a .urc file that contains images.

Once you have established a communication link according to the connection type,, you can click the OnLine icon to enter Test (Debug) mode.



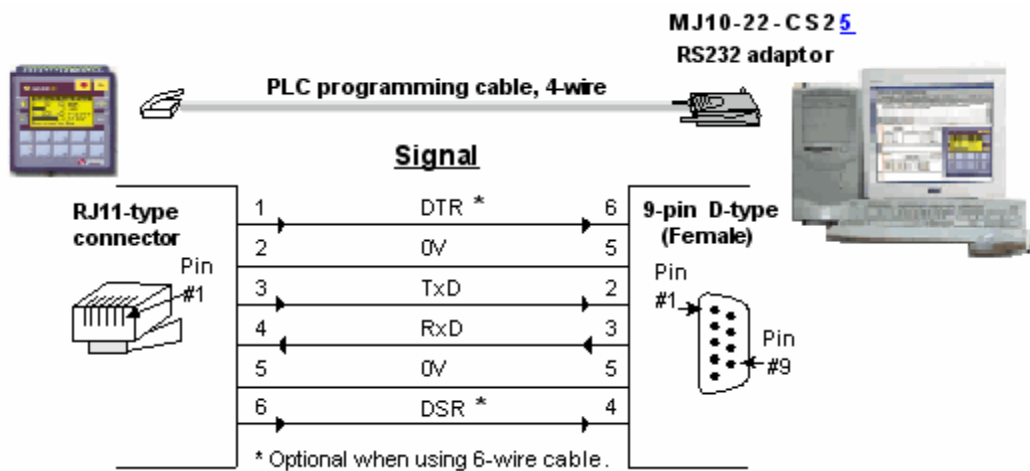
Communication-PC Settings

This enables you to check communication parameters and perform certain actions.

- PC Communication Settings
- Run, Reset, Initialize
- Get Com Parameters and PLC status
- Check Network Status

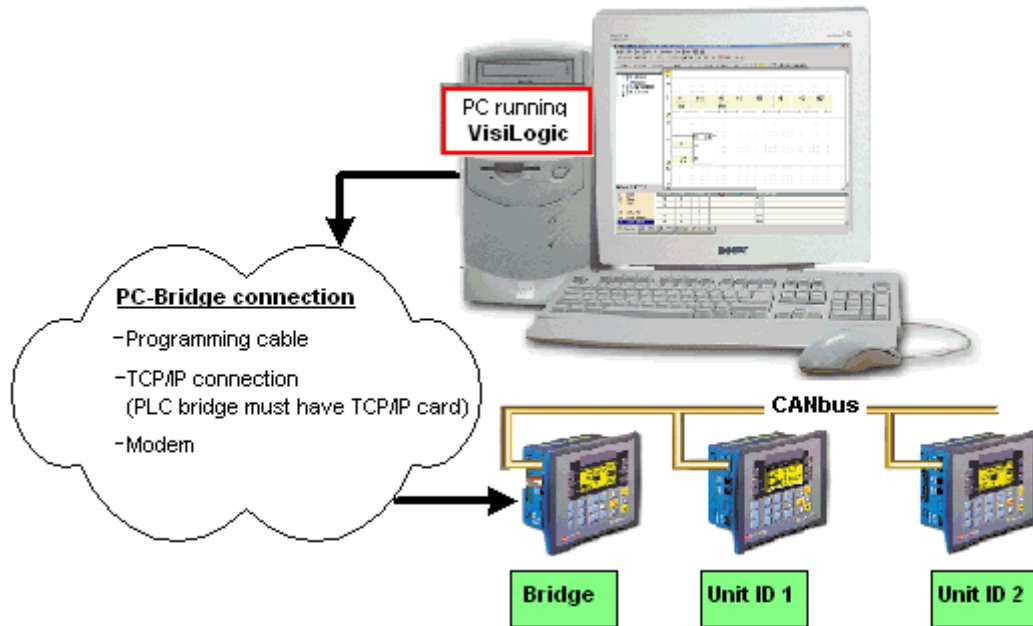
Direct Connection: PC-Controller

Connect your PC to any controller using the programming cable supplied with the controller kit.



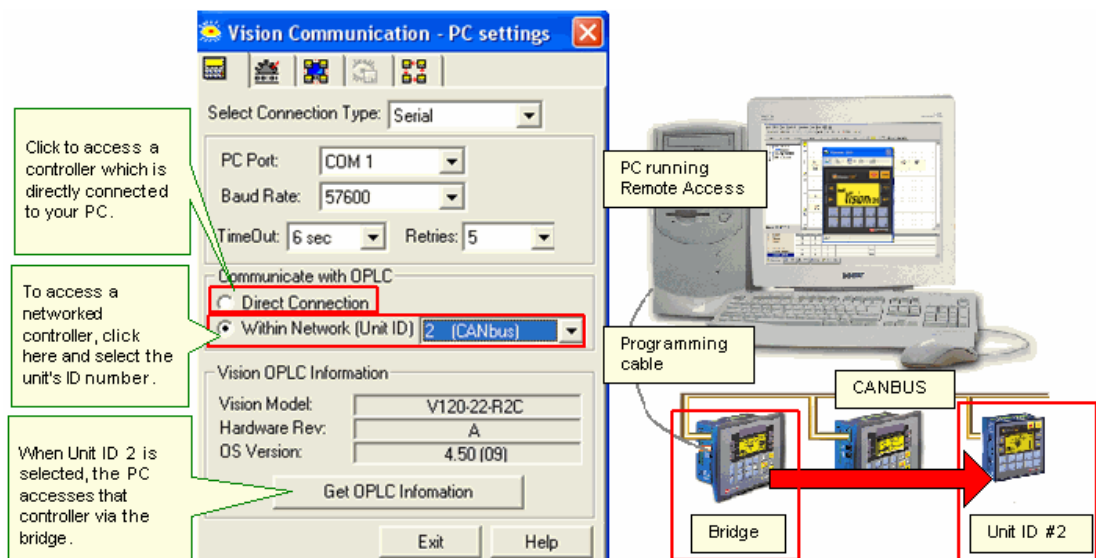
Accessing a Networked Controller

1. Connect your PC to any controller in the network using the programming cable supplied with the controller kit.



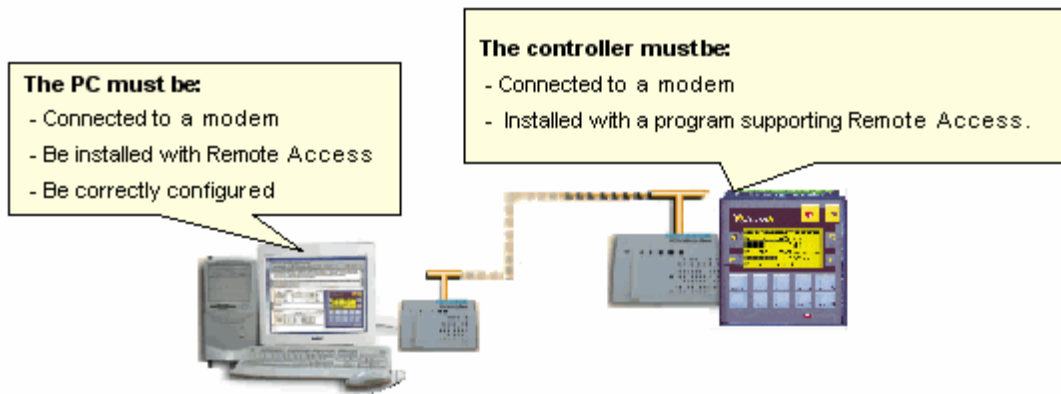
Note ♦ Different PCs can access a network at the same time, using different controller units as bridges. However, 2 different PCs cannot simultaneously access the same controller unit.

2. Select a networked controller by opening Communication & OS from the Tools menu, and then entering the Unit ID number.



Remote Access via Modem

To access either stand-alone or networked controllers via GSM or landline modem:



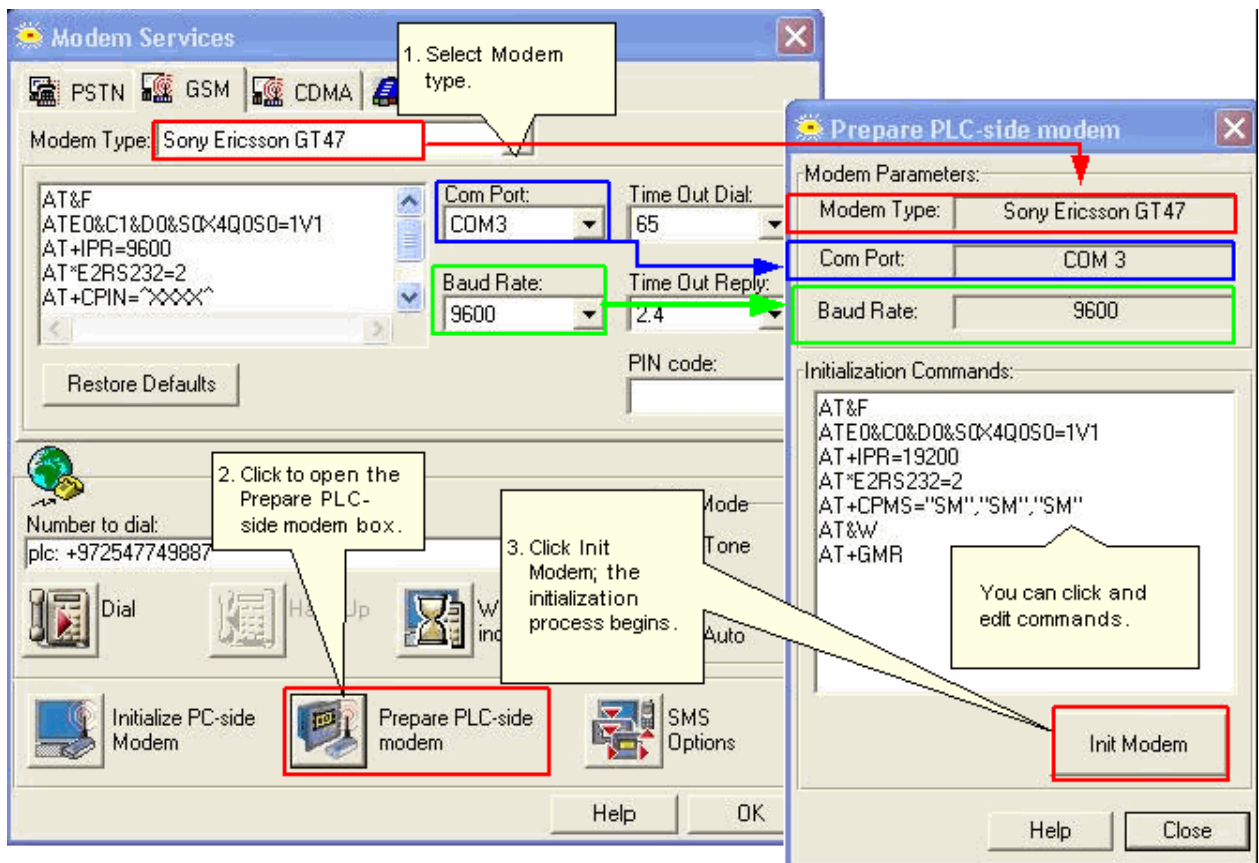
Before integrating modems into your applications, check the topics Modems-Tips & Cautions, and PLC to Modem Connections and Pin-outs.

Modems: Setting Up

PLC-side Modem

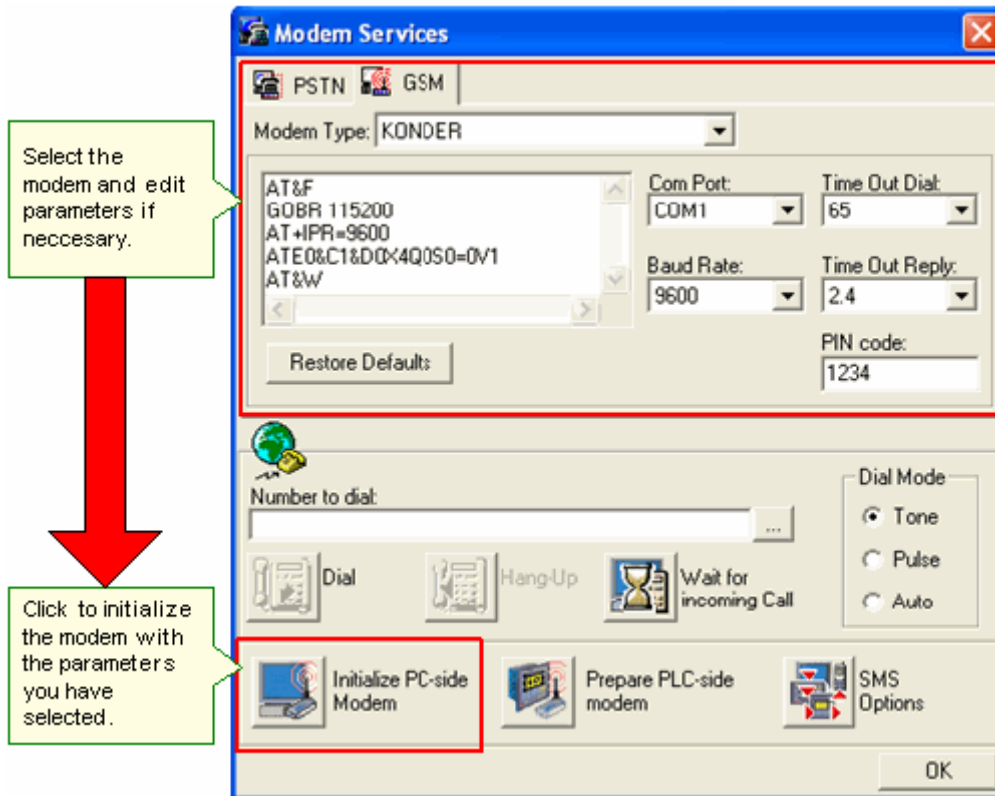
To enable a modem to work with a PLC, it must be properly initialized.

1. Connect the modem to a PC, using the **cable supplied by the modem manufacturer**.
2. Open Connection>Modem Services, and select the modem type. If required, you can edit other parameters:
 - Com Port, baud rate, Time Out, and Time-Out Reply: use the drop down boxes
 - PIN code: click to enter the number.
3. Click the Prepare PLC-side Modem button to open the dialog box shown below.
4. If required, edit initialization commands by clicking in the field and entering text.
5. When all parameters are set, click the Init Modem button; the PC establishes communication with the modem and initializes it.



PC-side Modem

1. Connect the modem to a PC, using the **cable supplied by the modem manufacturer**. Check the PLC to Modem Connections and Pinouts for more information.
2. Open Modem Services from the Connection menu.
3. Select and enter the modem parameters:
 1. At the top of Modem Services, select a tab; the Modem Type selection box shows the options.
 2. Select the PC modem type; the initialization strings change accordingly.
 3. If required, you can edit other parameters:
 - Initialization commands: click in the field and enter text.
 - Com Port, baud rate, Time Out, and Time-Out Reply: use the drop down boxes
 - PIN code: click to enter the number.
4. When all parameters are set, click the Initialize PC Modem button; the PC establishes communication with the modem and initializes it.



How to use the PC modem to access a PLC

1. Prepare and connect the PLC-side modem as described above.
2. Dial the PLC to establish the communication link:
 - c. In Tools>Modem Services, click the button to the right of the Number to Dial field to open Favorites and select a number.
 - d. Click a line to enter or select a number and description. To access outside lines, enter the access number required, a comma, then the phone number.
 - e. Click Dial.

Once Remote Access establishes the communication link, click the OnLine icon to enter Test (Debug) mode.

To break the data link, click Hang-Up.

Wait for Incoming Call

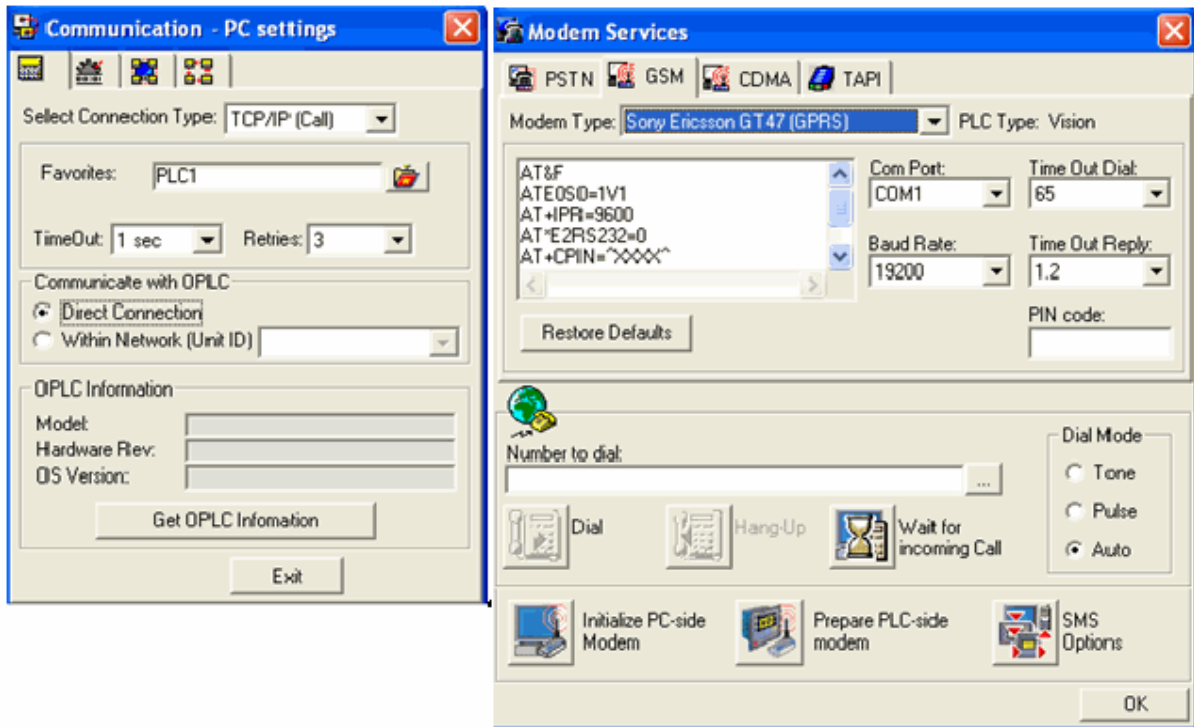
Click the Wait for Incoming Call button in Modem Services to place the PC modem in auto-answer mode.

Additional options

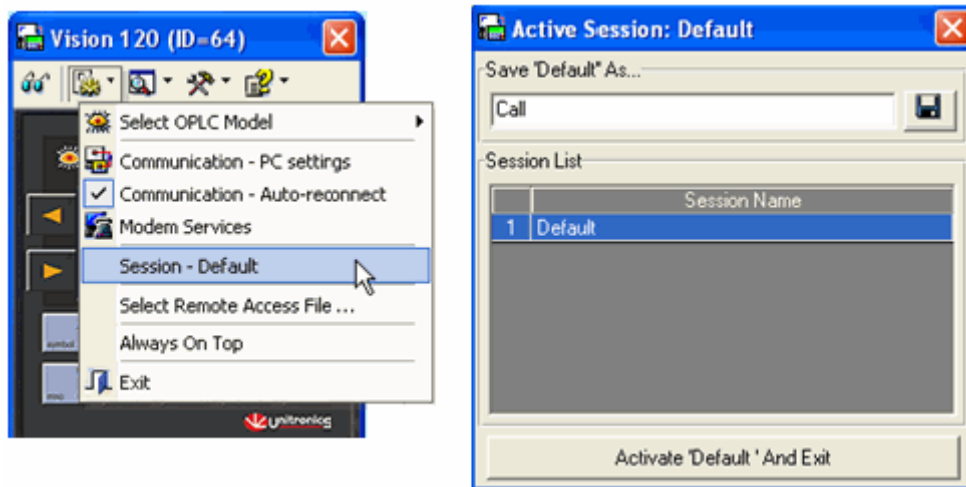
Sessions

Sessions enable you to save communication settings, and restore them at any time.

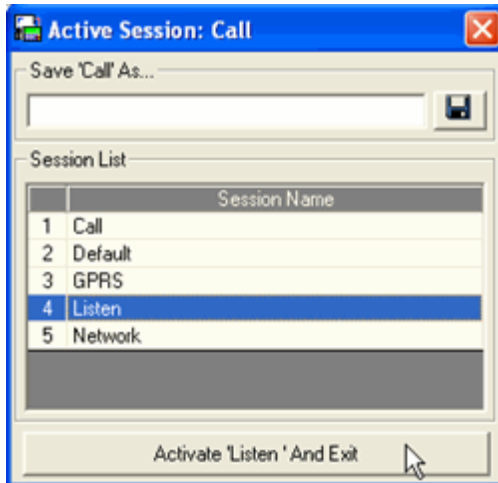
1. Open Remote Access, and select the appropriate communication options in Communication - PC settings and Modem Services.



2. Select Session from the Tools menu. Enter a name for the Session, and then click Save to add it to the Session list.

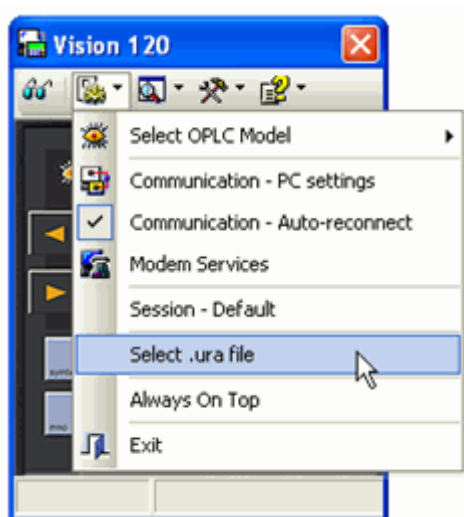


3. To select a Session, highlight it and click the Activate button.



.ura and .urc: HMI cache files (Vision only)
HMI cache files enable Remote Access to refer to HMI elements stored in the PC, instead of taking them from the PLC.

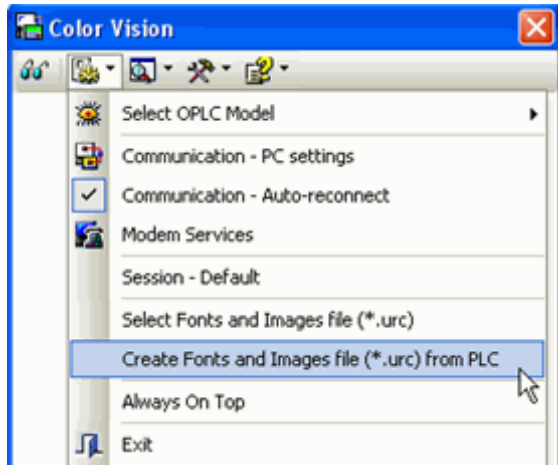
- Monochrome Vision
A cache file enables Remote Operator to load Displays more quickly.
The HMI cache files are in .ura format.
(note that V130, which loads displays quickly, does not use .ura files.)



- Color Vision
If a cache file is not used, images will not be displayed and fonts may be distorted.
A cache file includes fonts, and can include images. However, note that if the file does not include images, Remote Access will display a red 'X' in place of graphics.
The HMI cache files are in .urc format.
Such files can be created in Remote Access by selecting the option Create Fonts and Images (*.urc) from PLC.

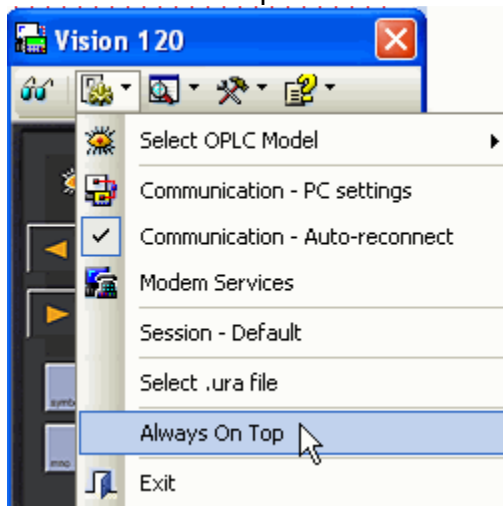
Note ◆

When Remote Access creates a .urc file, the Vision enters 'System Mode'; the PLC continues running while displaying a system image. The HMI application is not visible.
In addition, note that an interruption in communications may leave the PLC inaccessible. In this case, the PLC may require reset, which requires an operator to be **physically** present near the PLC.




Always on Top


Select this to keep Remote Access displayed on top of all other applications.



Online Mode

Once you have configured Remote Access, enter Online mode by clicking the button .

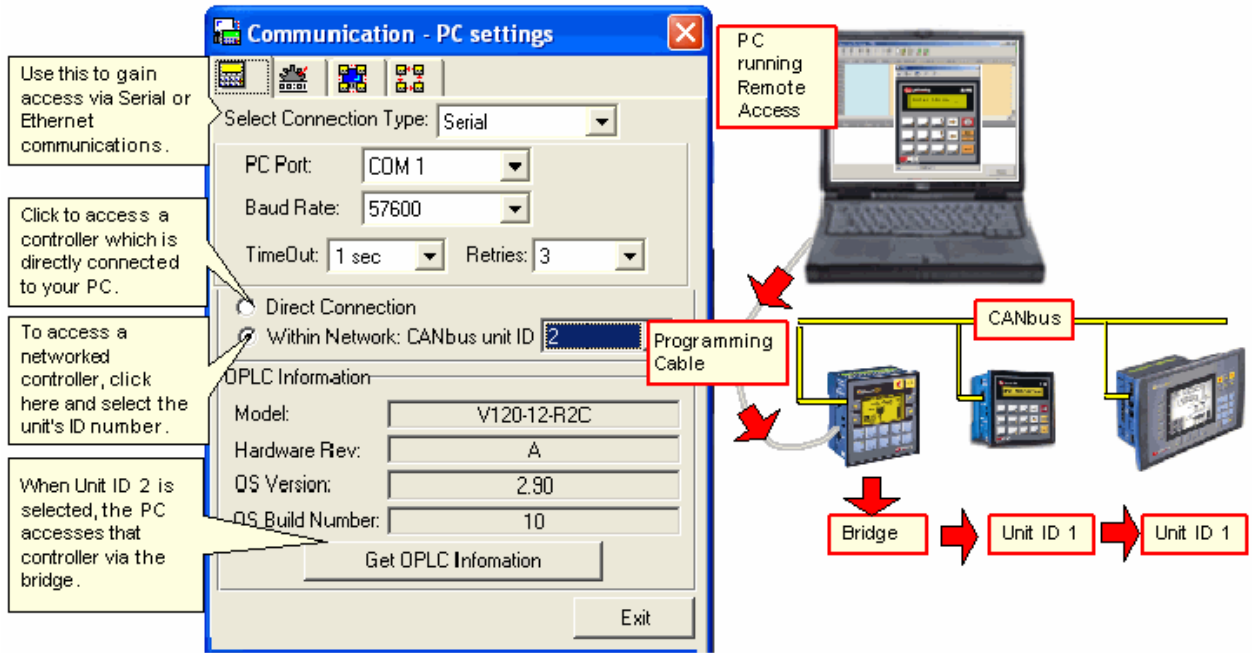
In this mode, you can:

- Use your cursor to operate the controller keypad and activate touch-screen objects (relevant models).
- Use your PC keyboard to operate the controller keypad (numeric keys, function keys <F1> to <F8>). Note that the Vision <ESC> key is <E> on the PC keyboard, and that <F9> is reserved for activating Online mode.
- Enter Information Mode by pressing the <i> key with your cursor.
- Select a View .

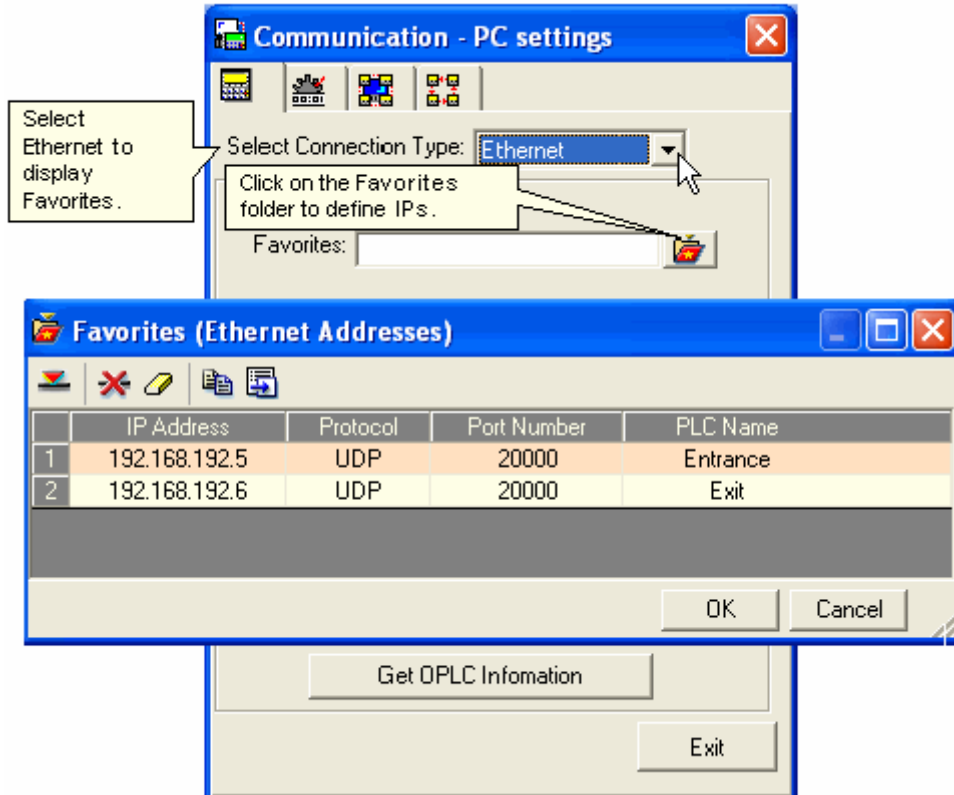
Note ♦ The Zoom option on the View menu can be activated only if you select Hide Keys. Zoom cannot be used with M90/91 or V280 controllers.

PC Com Parameters (non-modem)

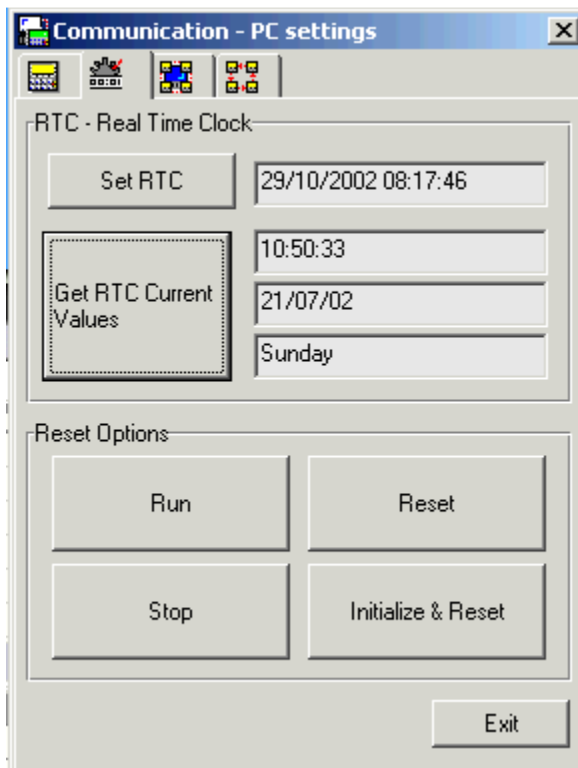
Display the current communication settings by selecting Communication - PC Settings from the Options menu.



<p>Select Connection type</p>	<p>Use the drop-down arrow to select serial or Ethernet.</p>
<p>PC Com Parameters</p>	<p>Port, Retries and Time-Out are the communication settings between Remote Access and the controller. Note that if you are working with a network, the TimeOut should be <u>greater</u> than 1 second.</p>
<p>Communicate with OPLC</p>	<p>Use these options to communicate with networked controllers. Direct Connection: select this to communicate with any controller that is connected to your PC via the download cable, including a network bridge. Within Network:select this to communicate with a controller that is integrated into a network, then select the controller's ID number</p>
<p>OPLC Information</p>	<p>Click Get OPLC Information to display information about the controller you have selected in Communicate with OPLC.</p>



Run, Reset, Initialize

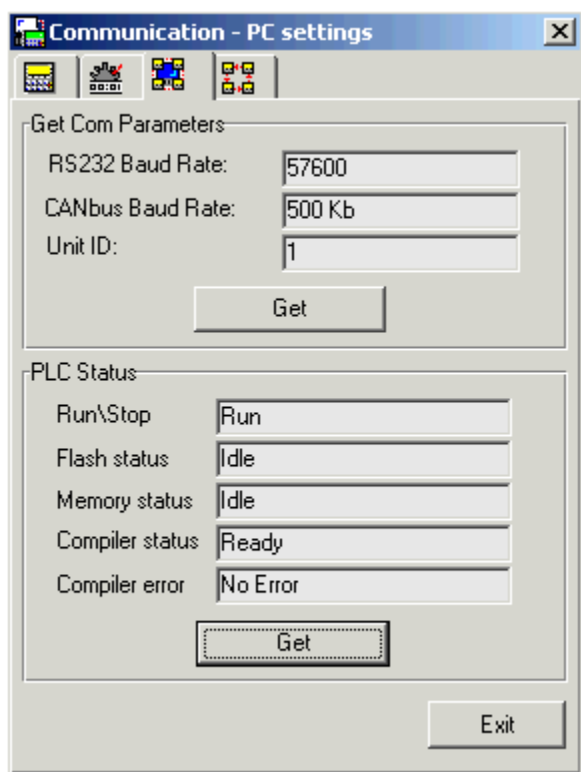


Note ♦ When you click a button, your PC will access the controller selected in **PC Communication Settings**.

Set RTC	These are the values of your PC's clock. Click Set RTC to import these values into the RTC of the controller.
Get Vision RTC Current Values	Click to view the current PLC settings

Run	Click to run the current program in the PLC.
Stop	Click to stop the current PLC program.
Reset	Click to reset the PLC, and reinstall any values preset in the program, such as Timers.
Reset & Initialize	Click to reset, reinstall any preset values, and initialize all memory operands

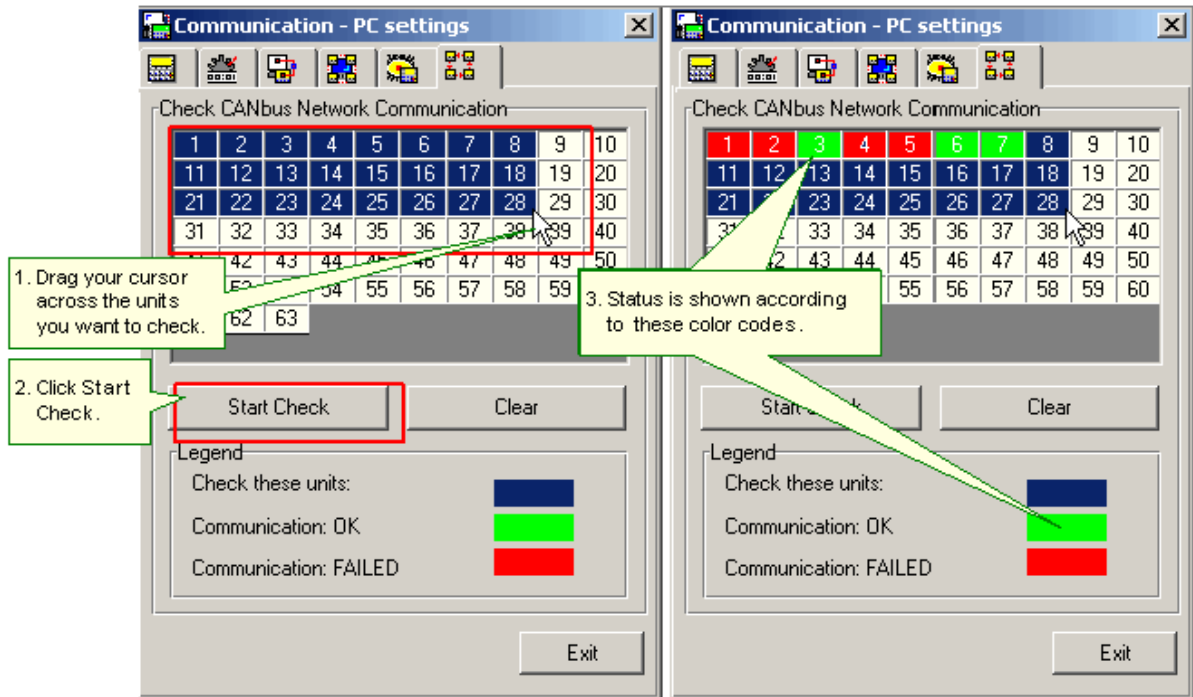
Get Com Parameters and PLC status



Select Get to view communication parameters and PLC status in the controller you are currently communicating with. This is the controller selected in **PC Communication Settings**.

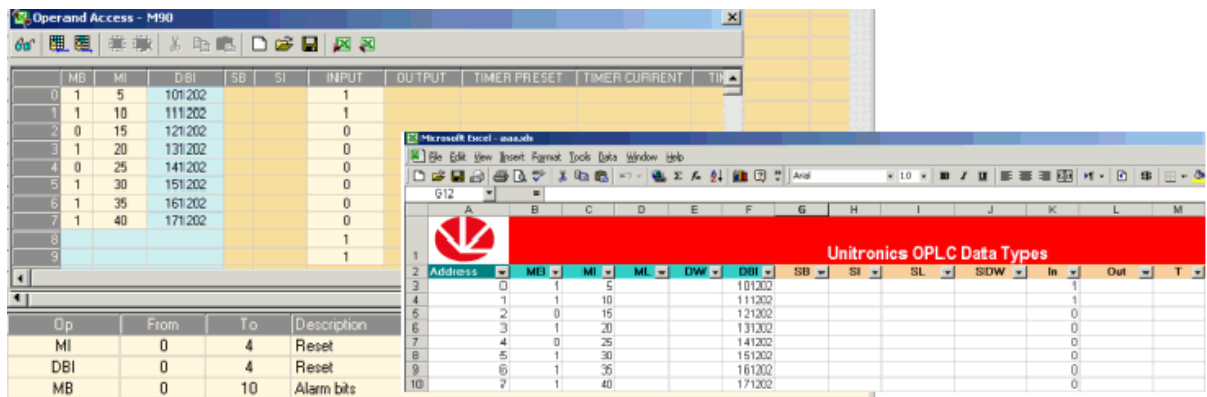
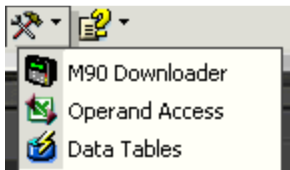
Check Network Status

The network status is checked via the bridge.



Operand Access

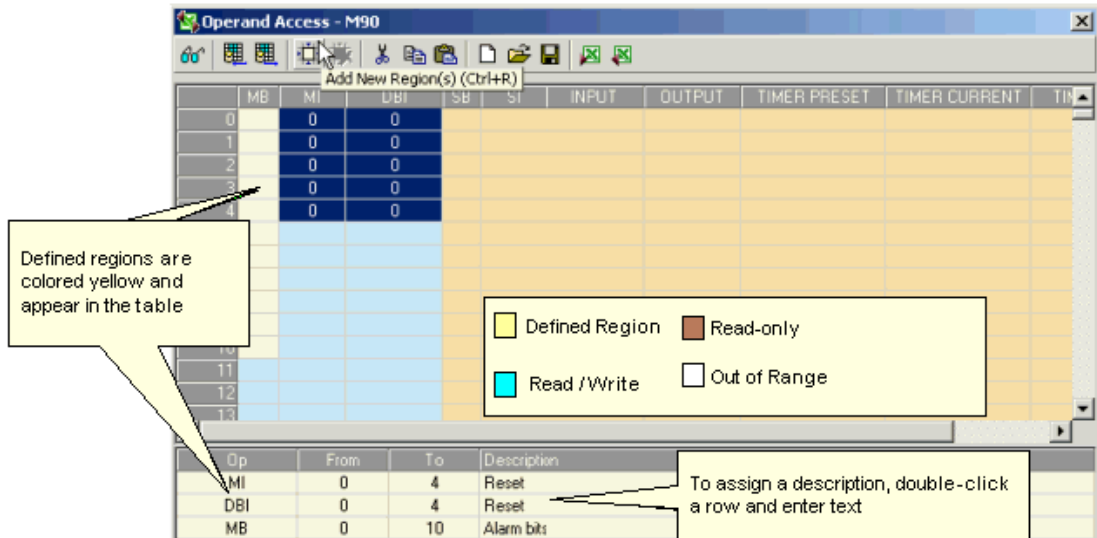
Operand Access is located on the Tools menu. This utility enables you to access operands in a local or remote controller and perform the operations listed below.



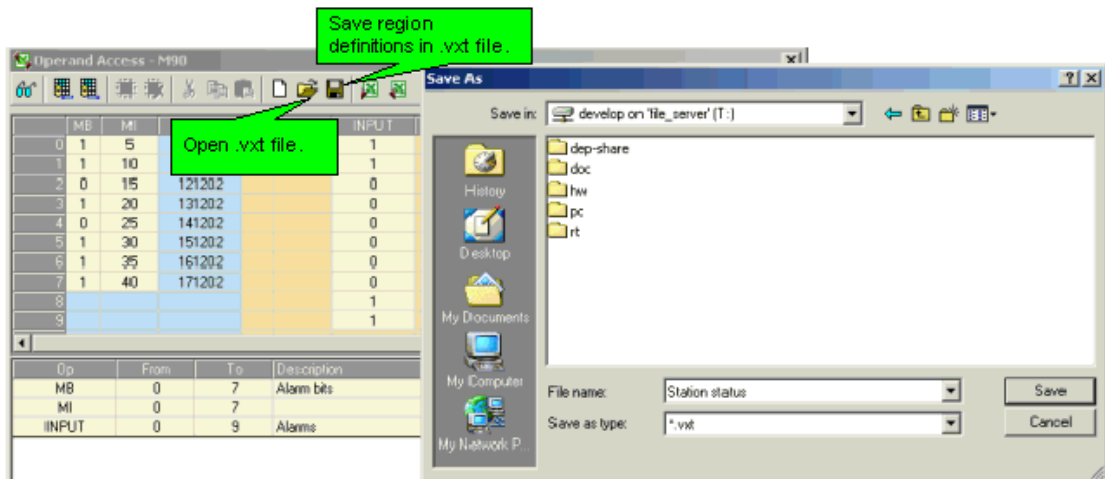
- View remote operands in the Operand Access table, then define and name regions.

To define regions:

1. Click and drag the cursor over regions to select them.
2. Click the Add New Region button.



- Save region definitions in .vxt files.



In order to open a .vxt file, you must select the controller series (Configure>OPLC model, either Vision or M90/91) which was selected when the .vxt file was saved.

- **View real-time operand values in Online mode.**

1. Click the Online icon; real-time values appear in blue.

Op	From	To	Description
MI	0	4	Reset
DBI	0	4	Reset
MB	0	10	Alarm bits

- **Read operand values from the controller.**

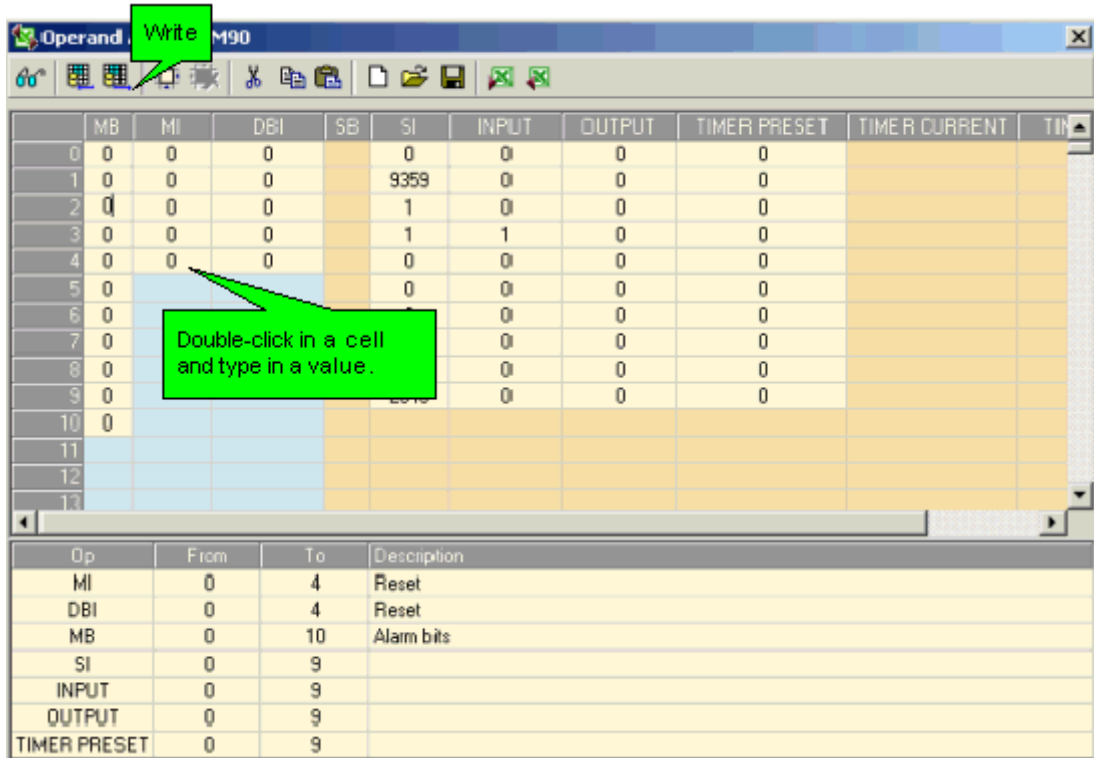
1. Click the Read icon; all values are read in all of the defined regions.

Op	From	To	Description
MI	0	4	Reset
DBI	0	4	Reset
MB	0	10	Alarm bits
SI	0	9	
INPUT	0	9	
OUTPUT	0	9	
TIMER PRESET	0	9	

- **Write MB, MI, ML and DW values to the controller.**

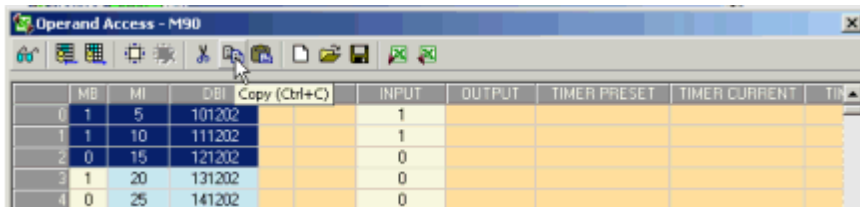
Note ♦ You can also write values to the M90 Database integers.

1. Enter values, then click write; all of the values in all of the defined regions are written to the controller.



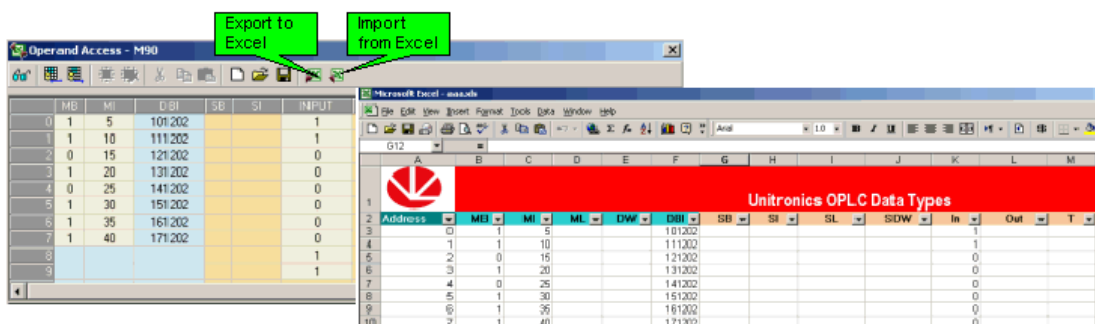
- Use the Windows Clipboard to Cut/Copy/Paste values to/from the Operand Access table and third-party editors such as Excel.

Note ♦ The Paste destination within Operand Access must be large enough to hold the Clipboard contents. Clipboard contents are pasted to the right and down.



- Export/Import Operand values to/from an Excel spreadsheet customized to Unitronics' PLC Data Types.

Within Excel, values can be edited, imported to Operand Access, then written to the controller

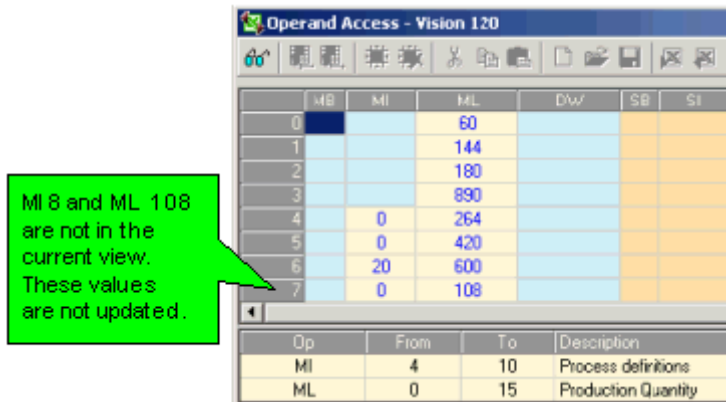


To export real-time values from the PLC to Excel:

1. Create a region containing the operand values you wish to export.
2. Select Read Regions in order to update those values,.
3. Select Export to Excel.

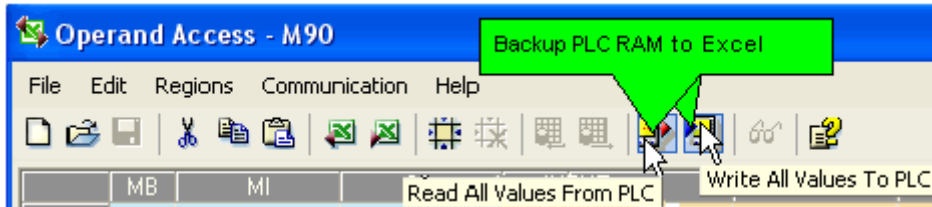
Note ♦ Not all operand values are updated with real-time values when you run On Line mode. When you run On Line mode, only the values that are displayed within the Operand Access window are updated. Operands that are not displayed in the Operand Access window during On Line are not updated.

Therefore, running On Line mode immediately before Export to Excel does not guarantee the export of all updated operand values.



• Backup PLC RAM

You can read all PLC RAM values into an Excel file, and to write these Excel values into the PLC's RAM.



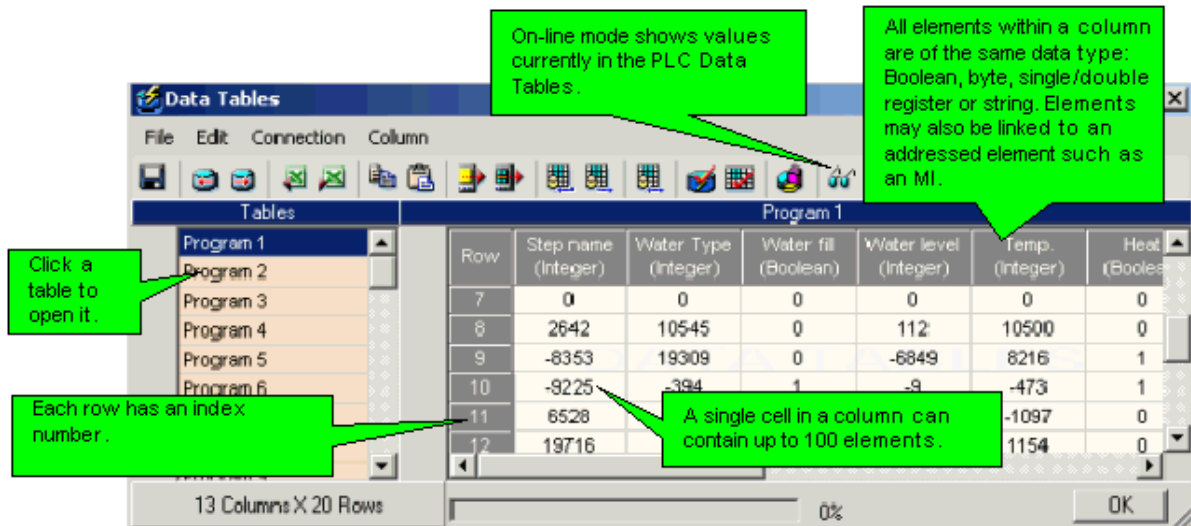
Data Tables

Vision controllers contain Data Tables that can be used to store data, such as parameters for recipe files or data logs.

Data within the tables can be copied and pasted to and from third-party tools such as Excel.

- Note** ♦
- ♦ Data Tables are based on bytes, not on registers.
 - ♦ Data Table sections that are marked Part of Project: the data are downloaded with the project, and burned into the Flash memory. These values can not be edited in Remote Access.

Data tables consist of columns and rows.



Data Table Options

Menu Name	Option
File	<p>Import/Export Data tables can be imported and exported from Excel. Data Tables can also be exported from an application as . upd files, then imported. When you import the file, you can select to:</p> <ul style="list-style-type: none"> • Add individual tables to the structure. If tables of the same name already exist, the tables are automatically renamed. • Delete existing tables and import the new structure. <p>Memory Requirements Displays pie charts that show the amount of memory occupied by the data tables.</p>
Edit	Copy/Paste enable you to copy values and paste them into another location.
Connection	<p>All of the Connection commands require that the PLC be connected to the PC.</p> <p>Read Structure from PLC Imports the structure of the data tables within the PLC into the project.</p> <p>Read Structure and Values from PLC Select this to import the values in the data tables together with the table structure.</p> <p>Verify: Tables Structure Compares the table structure in the project to the structure of tables within the PLC. The commands below also require that the table structure in the PLC be identical with the table structure in Remote Access.</p> <p>Read Range Reads the values of the selected cells from within the PLC data table into the project.</p> <p>Write Range Writes the values of the selected cells from the project data table into the PLC.</p> <p>Verify Cell Value: by Range Compares the values of the cells in the project to the values within the PLC.</p>
Column	<p>Set Cell Value Enables you to enter values for a cell or range of cells within a column.</p>

Data Tables, Excel, and .csv

Data can be imported to and exported from Excel and .csv files.

Export

Note that you can include the current values by establishing a communication connection with the PLC and reading or writing values from specific cells, or from an entire Data Table **within the PLC into the Data Table**.

To export data

1. Highlight the cells containing the desired data.
Click the Export to Excel or Export to .csv button.
2. Follow the on-screen instructions; data is exported into the desired file type.

Import

To import data

1. Click the Import to Excel or Import to .csv button.
2. Follow the on-screen instructions; data is exported into the desired file type.

The data is copied as shown below.

Copy & paste data

To copy/paste data to and from Data Tables and Excel.

1. Select data. You can select individual cells, rows, columns, or contiguous groups of cells.
2. Copy the values to the Clipboard either by pressing <Ctrl>+ <C> or by clicking the Copy button.
3. Click the cursor in the Paste location, then paste the either press <Ctrl>+ <V> or click the Paste button.

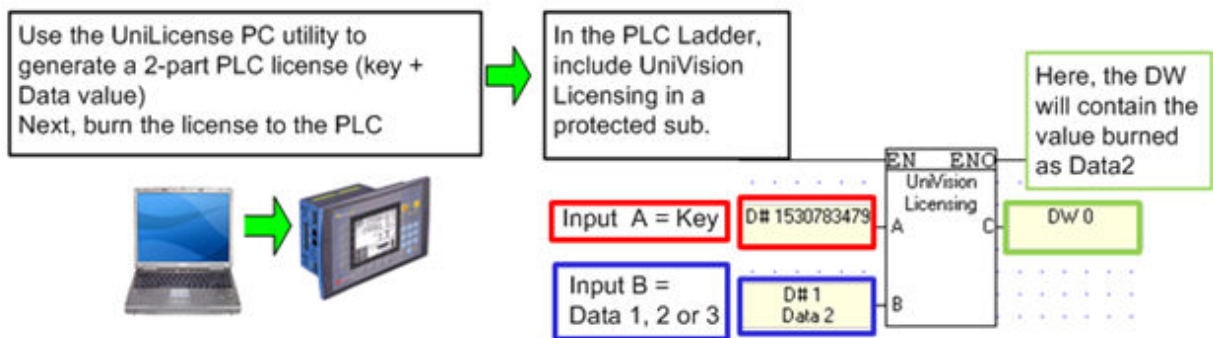
Note ♦ | The selection is pasted towards the right and down. When you paste from Excel to Data Tables, the Data Table must have enough rows and columns to contain the Paste selection.

UniVision Licensing

You can create a PLC license number and burn it into a secured, hidden sector in the PLC.

You can then use this license in your Ladder to control how your program functions.

To license the PLC, use the UniVision Licensing function on the Utils menu may be used in conjunction with the UniVision Licensing stand-alone utility, which may be freely downloaded from <http://unitronics.com/Content.aspx?page=Downloads>



The result of the License operation can then be used to activate or deactivate different sections of your application.

The UniVision Licensing utility enables you to create two kinds of licenses:

- One that licenses the program, but that is not bound to a particular PLC
- One that licenses the program, and incorporates a specific PLC ID number. This type will only license the specific PLC it is generated for. Note that you can use this type to license a remote end user's PLC.

Generate and burn a license, without PLC ID number

1. In the UniVision Licensing utility, click on the first tab, Programmer: Create & Burn License.
2. Enter the key number.
This is the first part of the license (input A).
3. Enter the values for Data1, Data2, and Data3.
This is the second part of the license (input B).
4. You can use the Generate buttons to create these values.
The fact that there are 3 values enables you to create levels of access.
5. Establish a communication connection to the PLC, and press Burn License to PLC.

UniVision Licensing

Home

Help About Exit

Misc Exit

Programmer: Create & Burn License Programmer: Generate for Customer Customer: Get License

Create and burn a PLC license into a secure, hidden sector in the PLC. Use these values in your Ladder to activate/deactivate different sections of your application. Enter values in the fields below, or click the Generate buttons. When you are done, establish communications and click Burn to PLC.

NOTE: Enter values in decimal according to these rules 1) Key and Data values cannot be identical. 2) The value must fill 4 bytes, and in hex cannot repeat values (ex., CC CC) or use 00, FF, AA, or 55.

Key: 122345678

Data1: 34538791

Data2: 19783456

Data3: 56234589

Communication

Serial

Ethernet (Call)

Select Communication Parameters

PC Port	Baud Rate	Retries	Timeout	Unit ID	Data
COM1	57600	3	3 sec	0 (Direct)	8

Generate and burn a license comprising a PLC Unique ID number

In this case, you must establish a communication link with the specific PLC which is to be licensed, and generate a KeyGen number. The KeyGen number encrypts the PLC's Unique ID Number. You use this number to generate the license, which is **specific to that PLC**. This license number will not work in any other PLC.

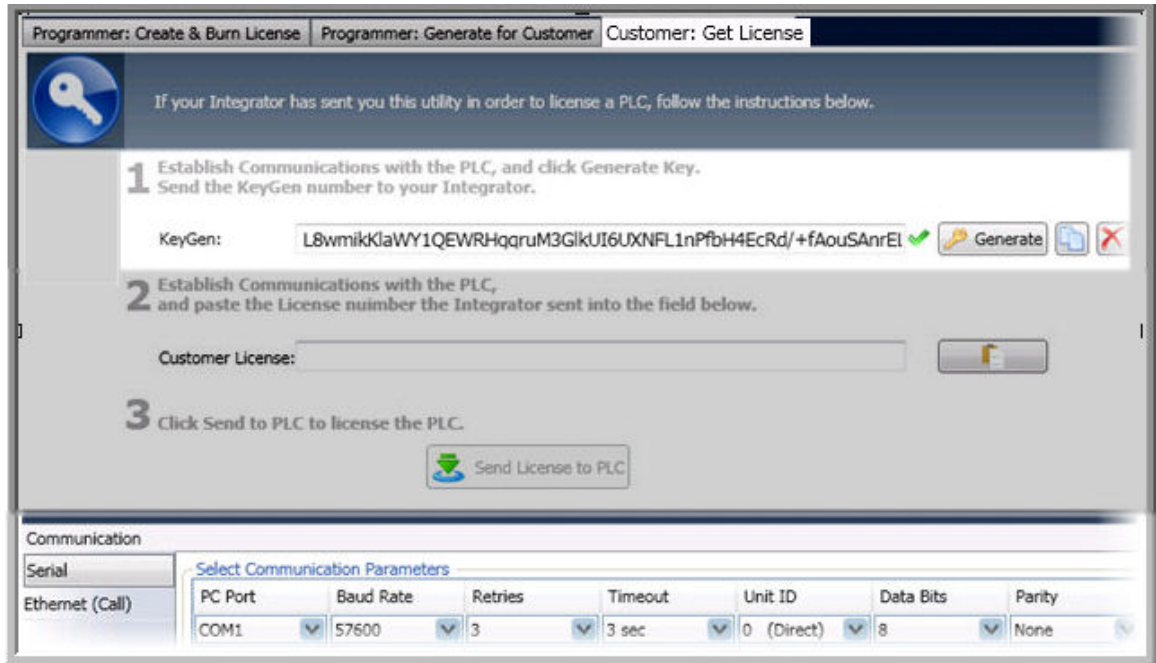


Providing a license to a remote customer

Note that you can send the UniVision Licensing utility to a customer. The customer can email you the KeyGen number; you use this to generate the license number and send it back to the customer, who can then license the PLC.

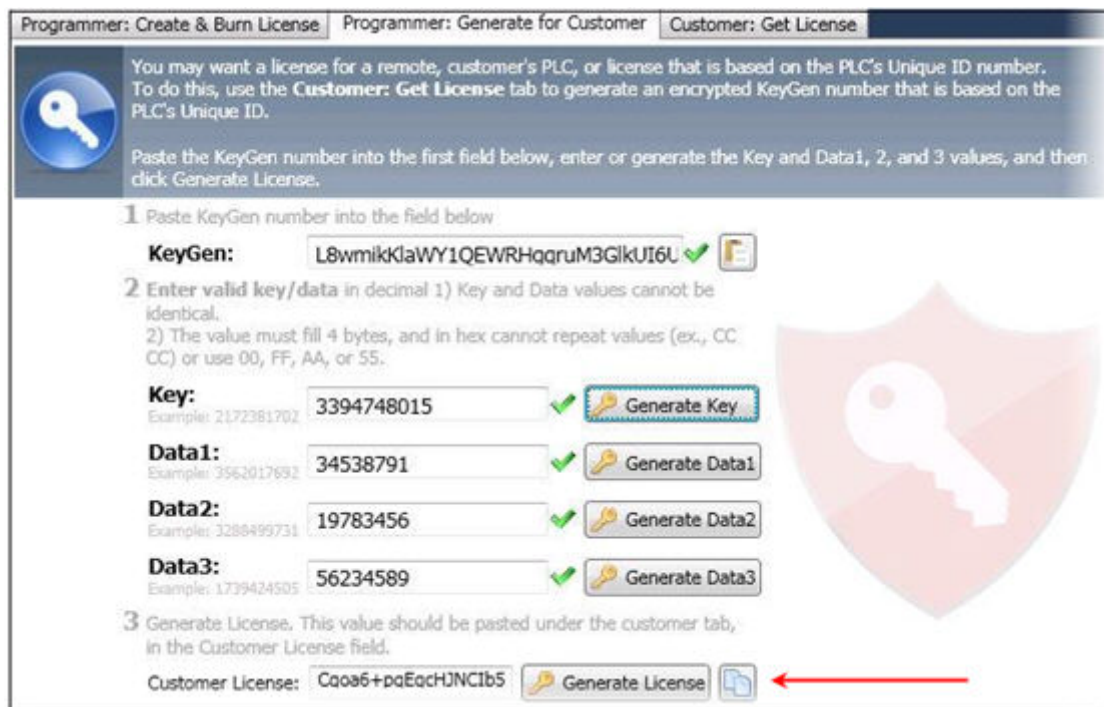
First, get the KeyGen number:

1. In the UniVision Licensing utility, click the Customer: Get License tab.
2. Establish a communication connection to the PLC.
3. Click Generate, and then the Copy button.



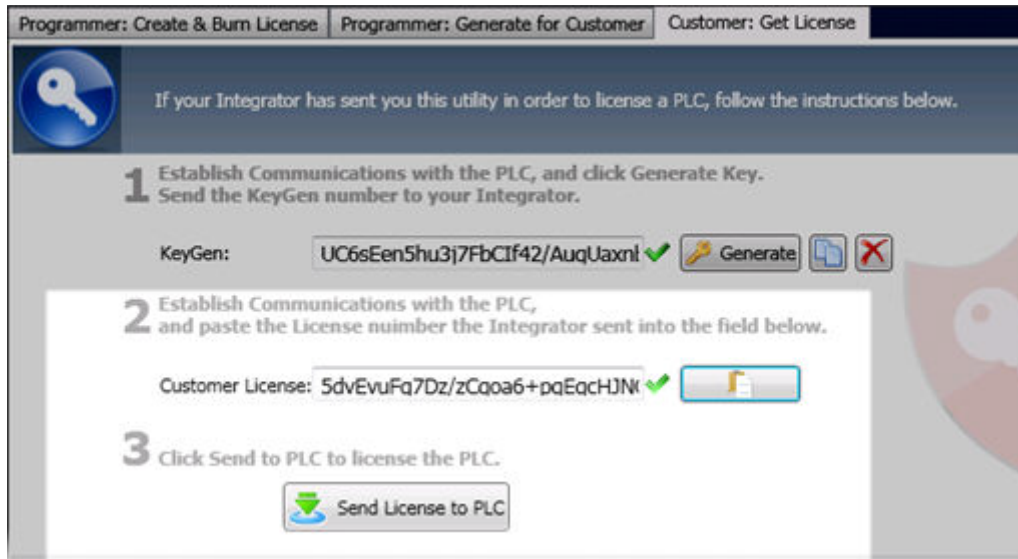
Next, generate the license:

- Paste the value into the KeyGen field, and fill in the Key and Data values
- Click Generate License, and then the Copy button..



Now, license the PLC:

6. Paste the number into the Customer License field, and press Send License to PLC to burn it to the PLC.



VisiLogic Version Swapper

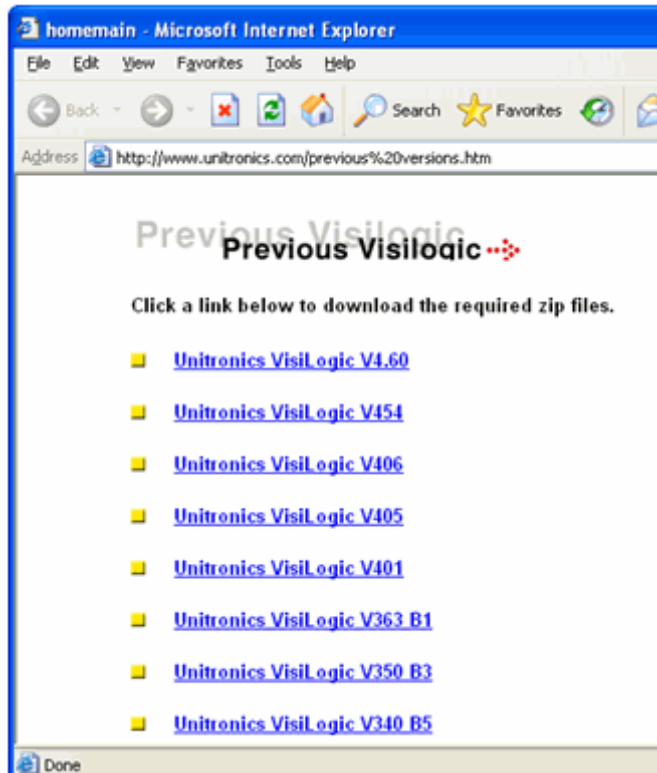
You can roll back and forth between VisiLogic versions by using the VisiLogic Version Swapper utility. Swapper is part of the VisiLogic installation version 4.70 and later.

To use Swapper:

1. Create folders containing different VisiLogic Versions.
2. To obtain VisiLogic versions either:
 - Use the Unitronics Setup CD. The CD contains a folder VisiLogic\Current\Installs\VisiLogic Old versions.
Copy these folders to the Unitronics directory, which is typically located in C:\Program Files\Unitronics.

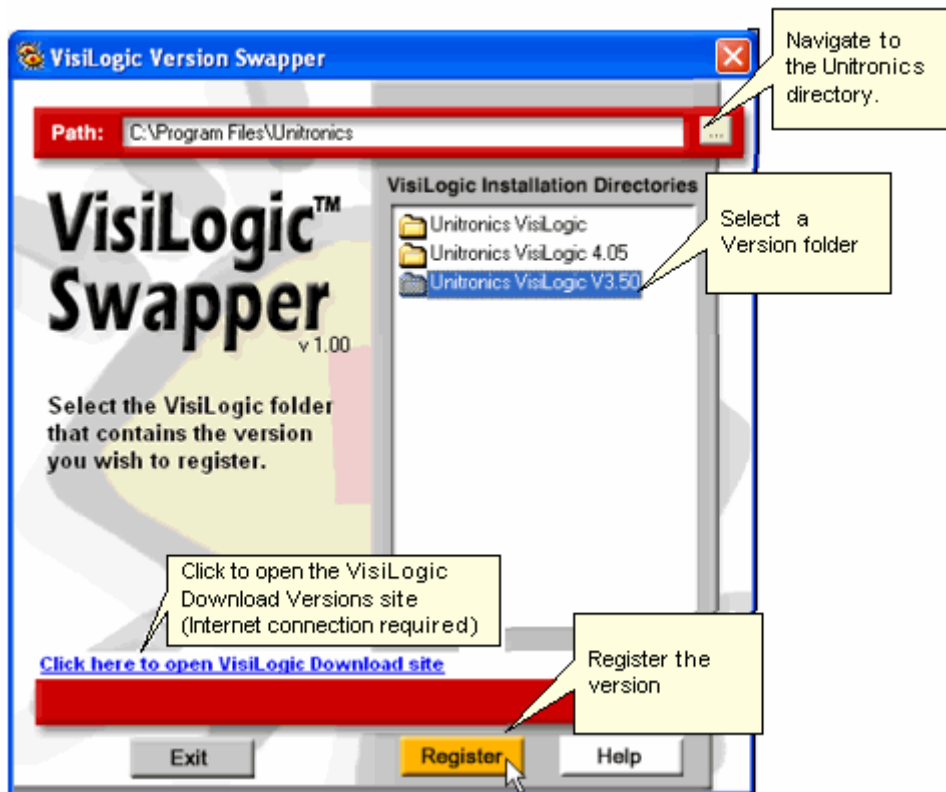
-or-

- From within the Swapper, click on the link [Click here](#) to open the VisiLogic Download site. If you are connected to the Internet, this will open a page in the Unitronics' website that contains different VisiLogic versions. Click on the desired version to download it as a .zip file, and then extract them to the Unitronics directory.



2. If VisiLogic is open, close it.

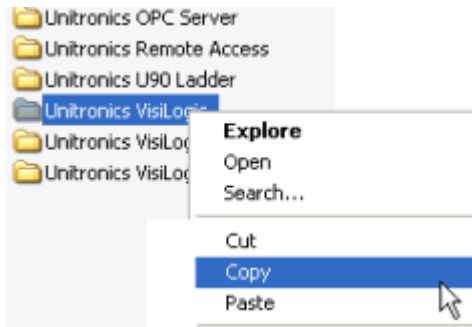
3. Open Swapper from Programs>Unitronics>VisiLogic> VisiLogic Version Swapper.
4. Navigate to the Unitronics folder containing the desired version.
5. .select a version folder ,In the Vision Installation Directories window
6. .dlls of the selected VisiLogic version.Windows will register the ;Click the Register button .asks if you want a shortcut placed on your desktop Swapper ,When registration is complete .You can now start the registered version .Swapper closes automatically ;Select Yes



When you install a newly-released VisiLogic version, you may want to keep the former version to use with the Swapper.

When VisiLogic installs into a PC with an existing VisiLogic installation, it overwrites the Unitronics VisiLogic folder. This is one way to save the existing installation:

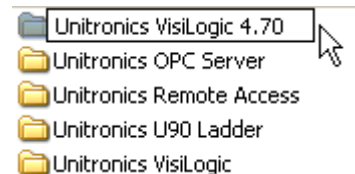
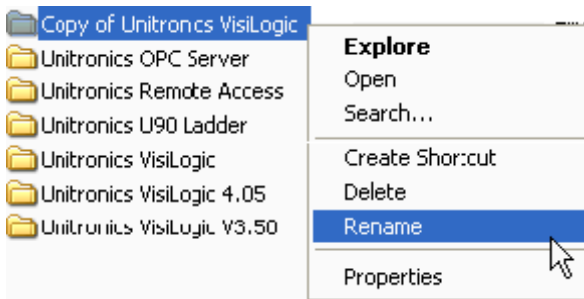
1. In Windows Explorer, right-click the folder Unitronics VisiLogic.
2. Select Copy from the right-click menu.



3. Select Paste from the right-click menu. When you paste the folder into the same directory, most versions of Windows will create a new 'Copy of' folder.

When Windows finishes creating Copy of Unitronics VisiLogic, install your new VisiLogic version.

4. After you complete the installation, rename the Copy of Unitronics VisiLogic folder with the true version name, for example Unitronics VisiLogic 4.70.

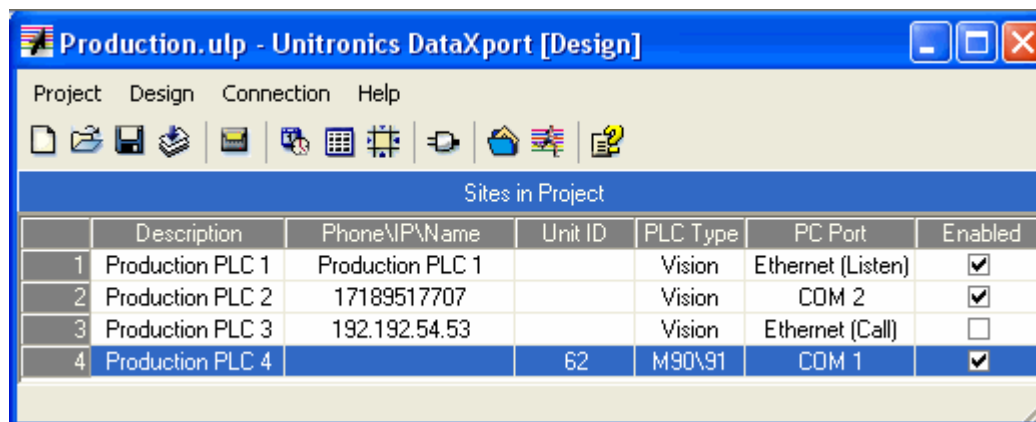


DataXport

DataXport creates logs of run-time or stored data from Data Tables and operand regions within Unitronics PLCs. DataXport saves the data logs in .ulp format. You can open these data logs using DataXport's companion application, DataXIs, and then export the data to Excel files.

Via DataXport, you can:

- Log data according to a date/time-based schedule.
- Simultaneously log data from one or more Unitronics PLCs.
- Access PLCs and log data via a direct, network, Ethernet, or modem connection.
- Save the data that is logged during each session to an Excel file, and automatically email it at the end of a session.

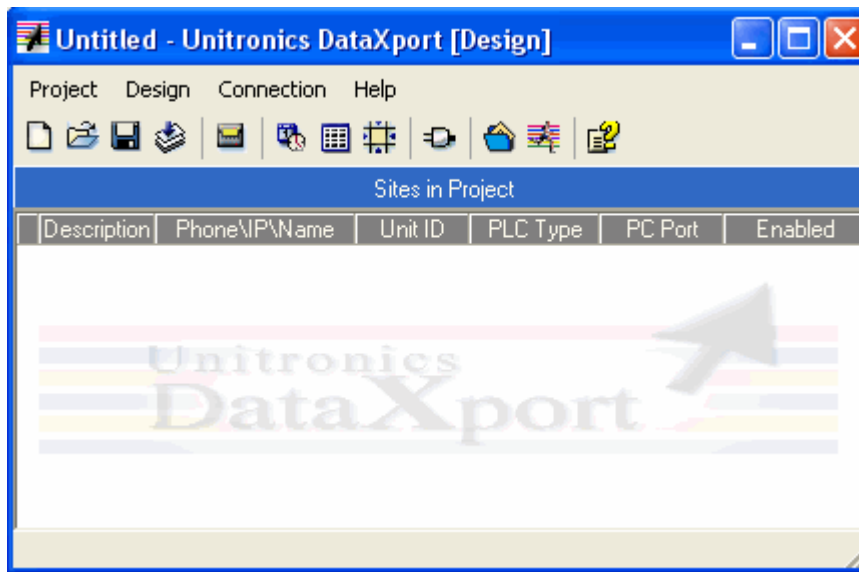


Building a DataXport Project

Start DataXport:

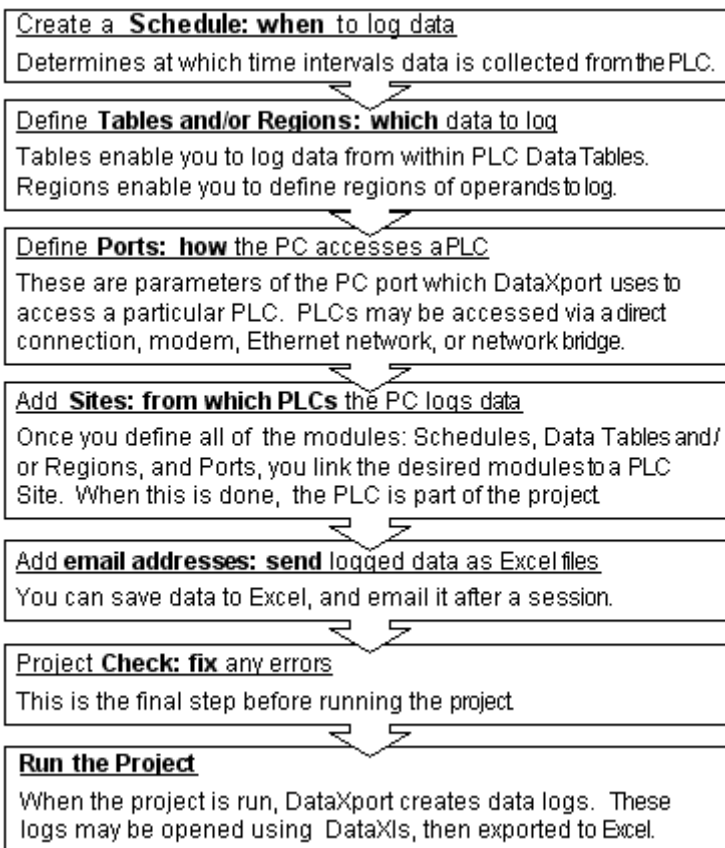
1. Go to Start > Programs > Unitronics > DataXport.
-or-
Open the Unitronics folder located on the Desktop, then double-click on the DataXport icon. Note that DataXport is installed in the Unitronics program group by default. It is stored elsewhere only if you specified another program group during installation.
2. The DataXport design window opens.

The DataXport Design window displays the list of Site you include in the project, together with the parameters of how the PLC within the Site is accessed.



To build a DataXport project, you first define the project's modules listed on the right. These modules determine when the data is logged, which data is logged, and how the PLC can be accessed.

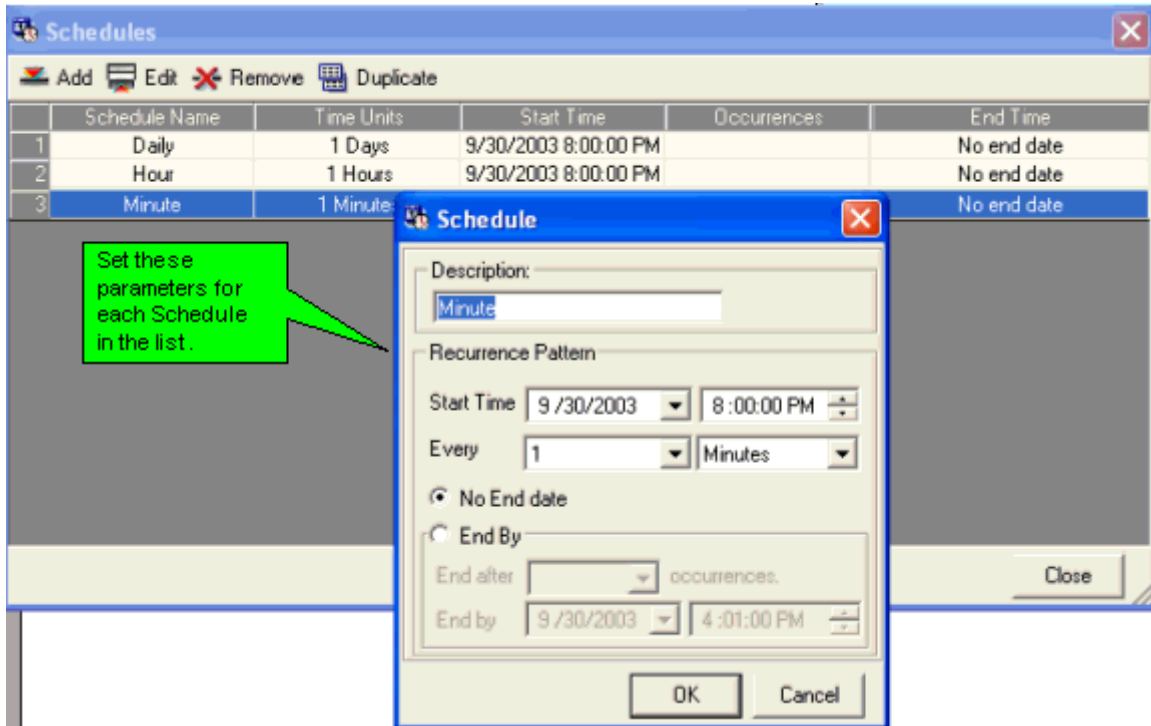
Once their parameters are defined, all of these modules are global to the entire DataXport project and may be linked to any PLC in the Site List. The Site List comprises all of the PLCs in the project together with all of the linked parameters.



Module 1: Schedules - When to Log

The Schedule determines the time intervals data between data log actions.

1. Select Schedules from the Design menu.
2. Click Add to create a new schedule, click Edit or double-click a line to redefine an existing schedule; the Schedule opens.
3. Make the appropriate entries, then click OK to add the Schedule to the list.



Module 2: Tables & Regions - What to Log

DataXport can log data either from Data Tables, an M90/91 PLC's Database, or from Regions of operands.

Vision Data Tables

To log data from PLC Data Tables within Vision PLCs, DataXport must first import Data Table structures from the PLC. To do this, DataXport can access the PLC via direct connection, modem, Ethernet, or CANbus/ RS485.

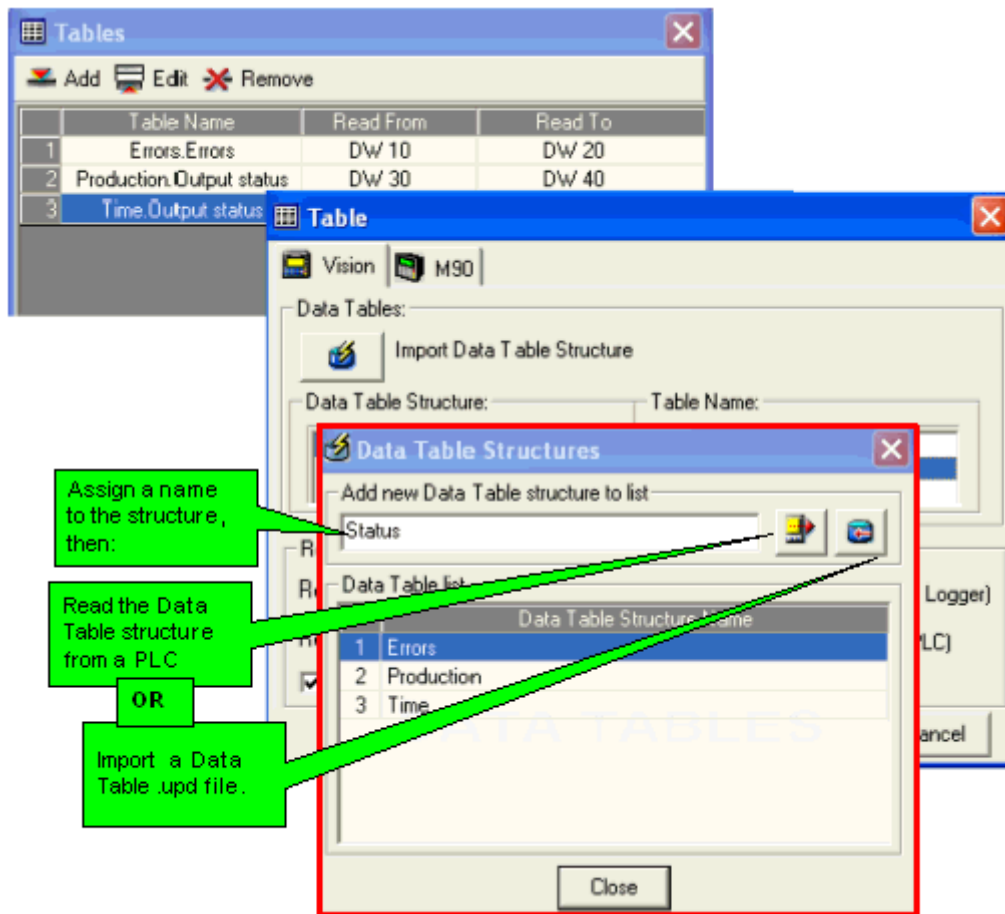


Check the related topic, [Linking to a PLC to Import Data Tables](#).

Table assigns a working name to the data that is harvested from a PLC Data Table.

1. Select Tables from the Design menu.
2. Click on the Import Data Table Structure button, then click Add to append it to the list.
3. Name the Data Table Structure, then either:
 - Read the structure from the PLC
 - or-

- Import a .upd file.

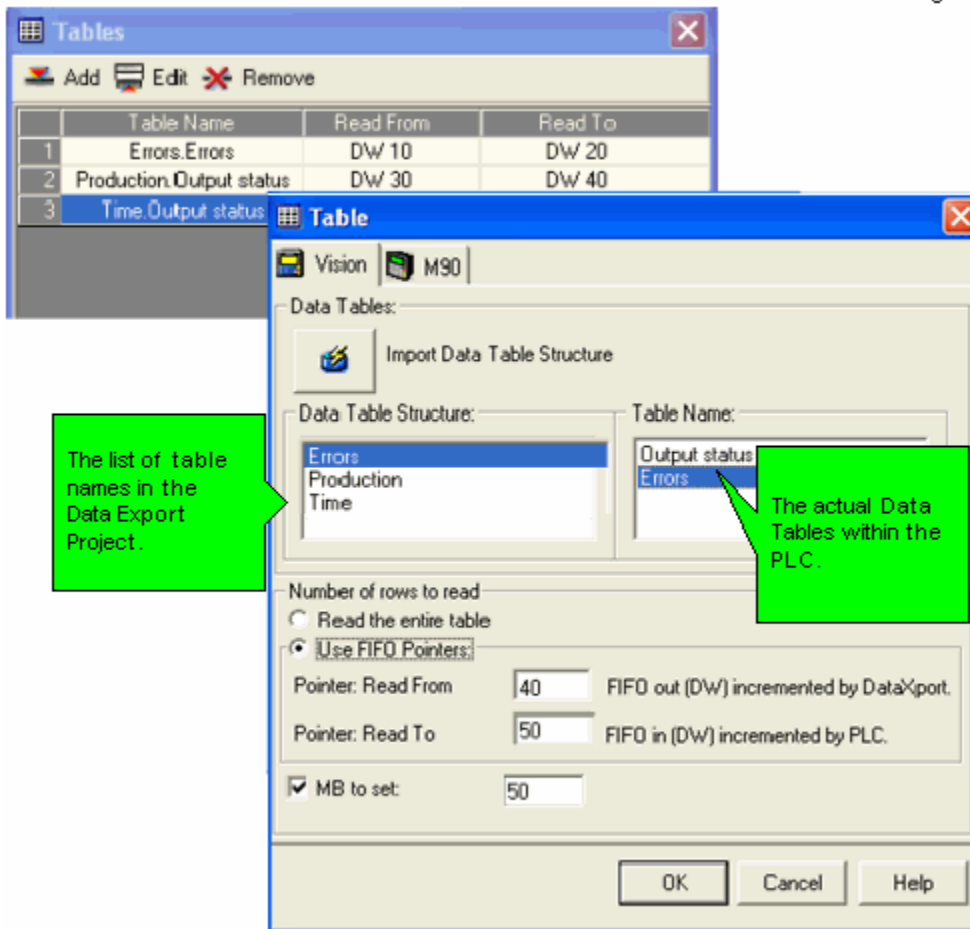


- Notes** ♦
- ♦ If the PC does not have a working communications link to the PLC as described in the topic Linking to a PLC to Import Data Tables, you will not be able to import Table structures..
 - ♦ If your project includes more than one PLC, and the Data Tables in these PLCs are identical, you do not have to import them from each PLC. Importing un-needed Data Tables will make the project very 'heavy'.

Once the Data Tables have been imported from the PLC, they are listed in the Data Table Structure left-hand pane as shown below. Highlighting one displays the Table names in the right hand pane.

4. Click a Structure, select a Table within the structure, and then enter Rows to Read for that specific table. The Read From and Read To pointers are linked to DWs in the PLC. The DW values determine the length of the block of data that is collected from the PLC Data Table **each** time the site is scanned.
You can also select the Read Entire The PLC can now read an entire table

during a session, without using FIFO pointers.



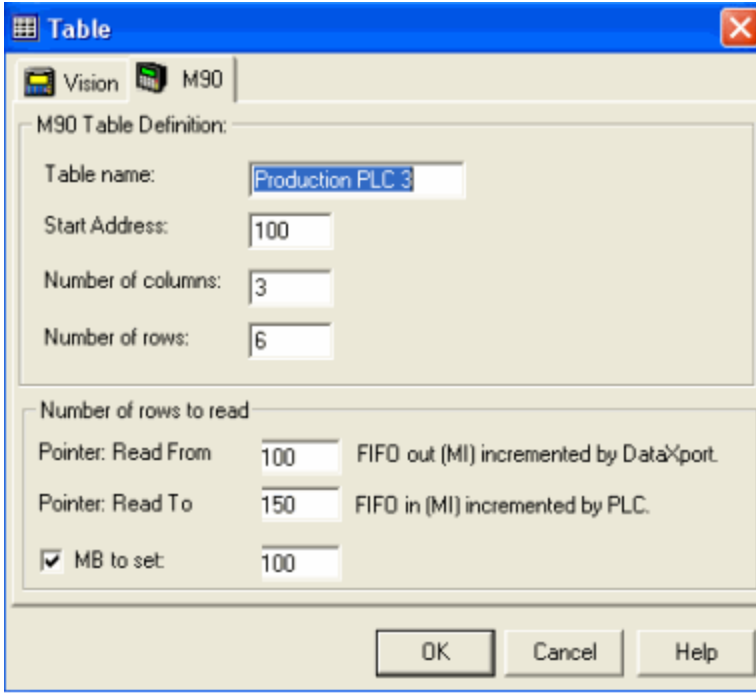
M90 Database

The M90 OPLC has a special memory area containing integers that are function as a database. These integers are not related in any way to system or memory integers. Within the database, you can access and use integers 0 through 1023 via SI 40 and SI 41.

Since, unlike Vision PLCs, the M90 database is not structured, there is no structure to import.

Table assigns a working name to the data that is harvested from a PLC Data Table.

1. Select Tables from the Design menu.
2. Click on the M90 tab.
3. Name the Data Table Structure, enter the Start Address and other parameters; and then click OK; the Table is added to the list.

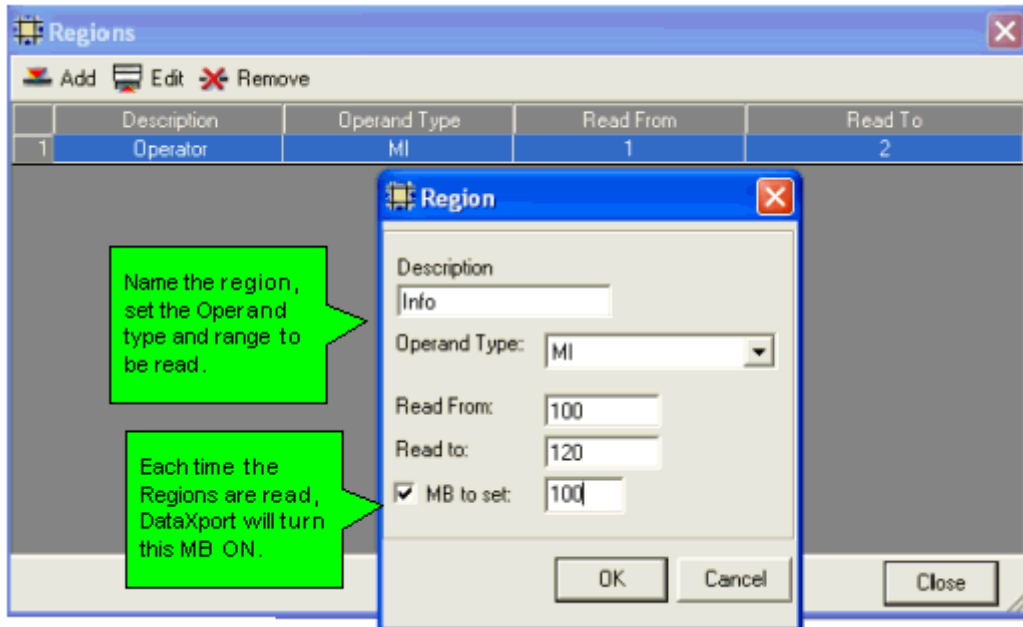


Notes ♦ An Invalid FIFO pointers error results if a FIFO pointer is out of the range of MI addresses used for the M90 Database.

Data Regions

Defining regions enables you to harvest data from the operands within a PLC.

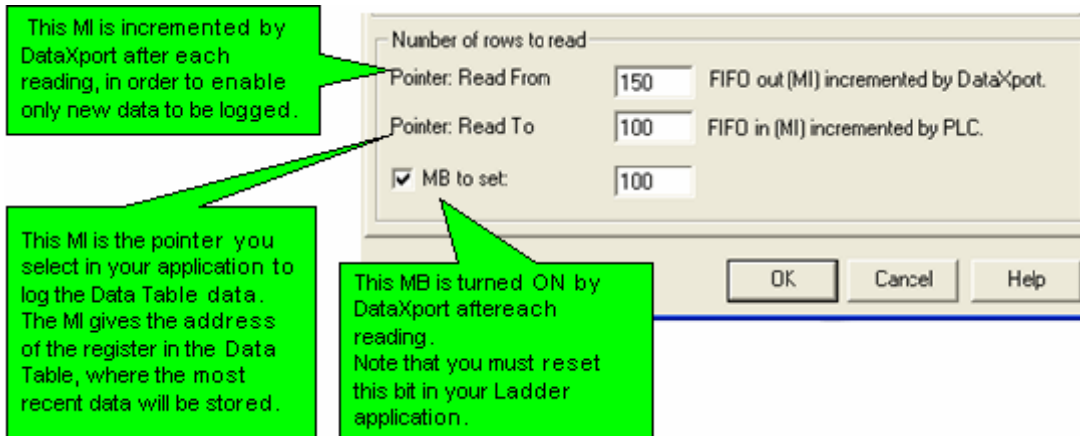
1. Select Regions from the Design menu; the Regions window opens.
2. Enter parameters as shown below.



Reading values: FIFO Pointers

The FIFO pointers determine the size of the block of data read during a DataXport call.

- Pointer: Read from / FIFO out (MI), incremented by DataXport. This MI is incremented by DataXport after each reading. It should not be used for any other purpose in your Ladder application.
- Pointer: Read to / FIFO In (MI), incremented by PLC. This is the MI you use in your Ladder application to indicate which data is to be logged. It is generally the MI you use to fill the Data Table.
- MB to set (optional): this MB is turned ON by DataXport after each reading. You must reset this bit in your application after each reading.



Example

An application stores a temperature value into a PLC Data Table every minute. Each time the temperature is stored into a Data Table register, MI 150 is incremented by one. The incrementing value enables the temperature to be stored into consecutive Data Table registers. Within the DataXport project, MI 150 is the Pointer: Read to / FIFO In, and MI 100 is the Pointer: Read from / FIFO Out.

The DataXport application is set to call the PLC and log data every 20 minutes. When the application starts running, both MI150 (PLC pointer) and MI100 (PC pointer) hold 0. MI 150 is incremented by 1 every minute, when the temperature is stored into the PLC. After 20 minutes, the value of MI 150 will be 19.

DataXport then calls the PLC. During the call, DataXport logs Data Table values from register 0 to 19, and then writes '19' into MI100. The PLC application continues running; each minute the temperature is stored and MI 150 is incremented by 1.

At the beginning of the next DataXport call, 20 minutes later, the value of MI 150 will be 39, while the value of MI100 will still be 19. During the call, DataXport will log the new values--from 20 to 39--and will write '39' into MI 100.

Notes

An Invalid FIFO pointers error results if a FIFO pointer is:

- Less than 0.
- Greater than or equal to the number of rows in the Data Table.

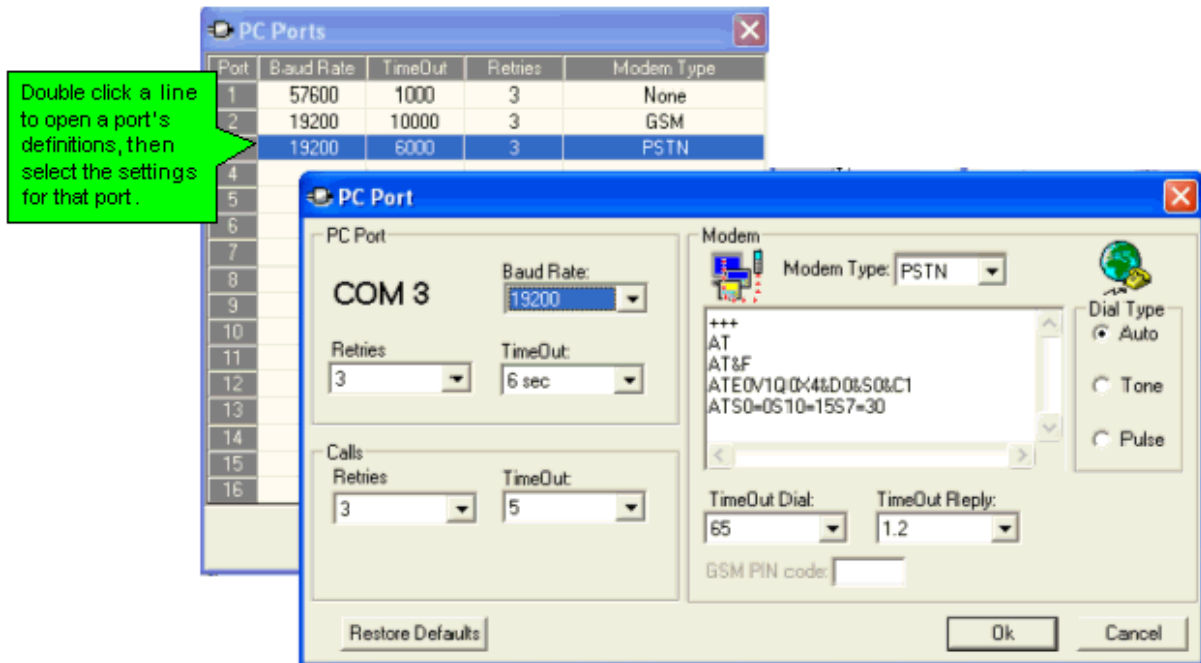
Module 3: Ports - How to Access the PLC

Ports determine the parameters of the communication link that is used by the PC running DataXport in order to access a PLC and log data.

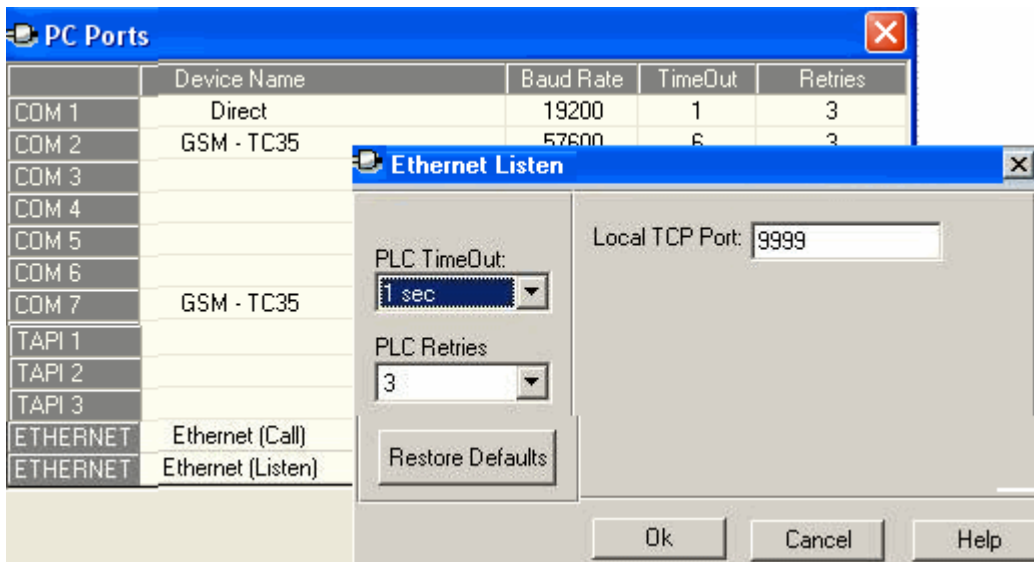
Note ♦ The Connection menu options are **not** related to the way the PC (DataXport) will access a PLC in order to log data. Connection menu options are **only** used to access a PLC in order to import Data Table structures from Vision PLCs.

- ♦ The PLC name **must be identical** to the name assigned in the controller's Ladder application via Set PLC Name.
 1. Select Ports from the Design menu; the PC Ports window opens.
 2. Double-click a line to open PC Port Settings, then make the desired selections..

Note that the lower lines in the PC Ports windows can be configured for TAPI, and the last 2 lines for Ethernet.



Ethernet Listen sets a particular PC port, via which PLCs can 'call' and connect to the PC. Once the connection is established, the PC will export whatever data is set for that PLC.



Linking PLCs to Modules: the Site List

Once all of the modules have been defined, you can create the Site List.

1. Select Add Site from the Design menu; the PLC window opens.
2. In the left-hand pane, enter the PLC name, then select the module parameters displayed on the right-hand side of the PLC window as shown below.



The PLC name **must be identical** to the name assigned in the controller's Ladder application via Set PLC Name.

3. Make the appropriate selections regarding PLC type.
4. Select a PC port, the COM ports that are offered are the ones defined in the Ports Module. The required parameters in this section change according to the port you select. For example, if you select a port connected to a modem, you fill in a phone number; if you select an Ethernet port, relevant parameters such as IP address are required.
5. Select MB to set if you want a specific MB to turn ON when this PLC is accessed.
6. Select Enabled if the PC is to include this specific PLC site when the DataXport project is run. If Enabled is not selected, data will not be logged from this PLC even though it appears in the project.
7. If the PLC is in a network, select that option and the correct Network ID.
8. Select Excel files to cause DataXport to create an Excel file whenever a data log is created. Note that DataXport creates a separate Excel file for each data log.

Note

If you do not select the Use Excel Template option, DataXport will use a default Excel template. To cause DataXport to use a customised Excel template:

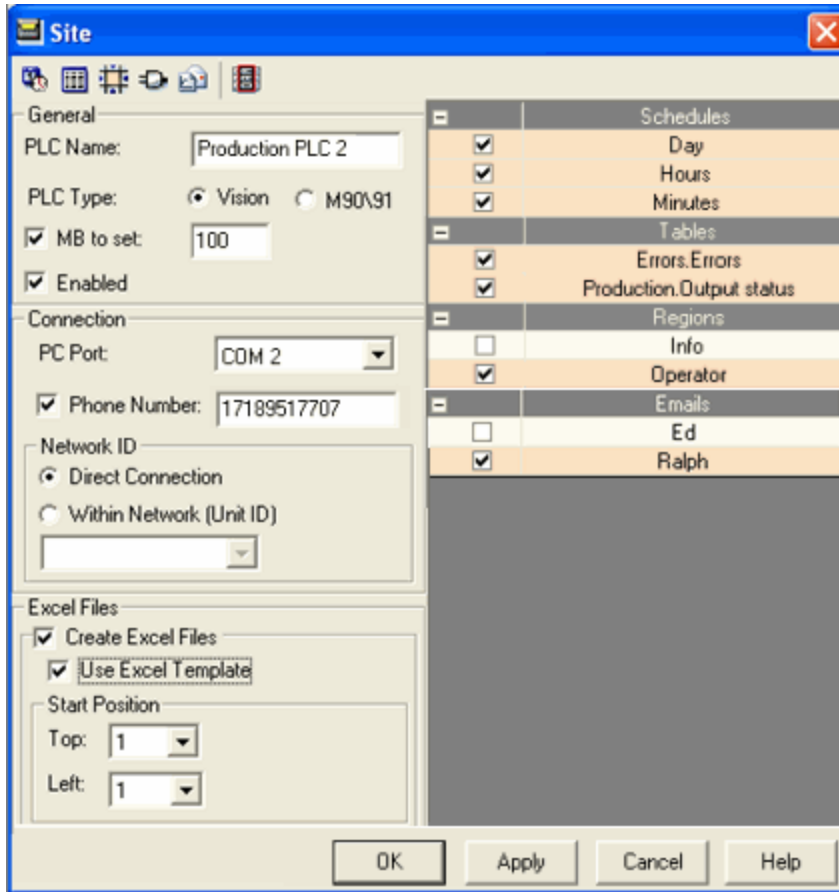
- a. Select Use Excel Template.
- b. Store the template in the folder :::\DataXport\Excel Templates.

The name of the Excel template must be **identical** to the PLC Name

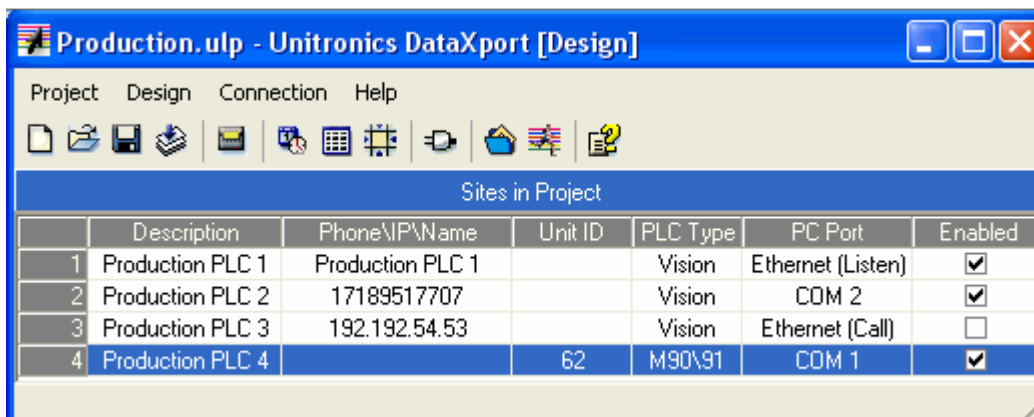
- given in the Site.
- In the right-hand pane, select the desired
 - Schedules,
 - Tables and/or Regions,
 - Emails

These are all of the parameters that have already been defined in the project.

Note ♦ All modules; Schedules, Ports, Tables and/or Regions; are global to the entire DataXport project. You can link any module to any number of Sites.



- When the PLC has been defined, click OK, the PLC is added to the list and will be displayed in the DataXport Design window. When the list is complete, save and name the project.



To edit the parameters of a PLC that is already in the list, double-click the line to open it.

Checking the Project

When the project is complete, Select Check from the Actions menu to find any errors.

After correcting any errors, you can run the project

Running the DataXport Project

Run, located on the Actions menu, activates the DataXport project.

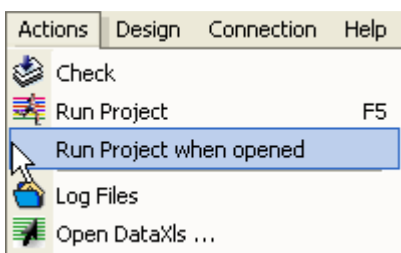
1. Select Run from the Actions menu, DataXport begins exporting the requested data from Data Tables and operands within the target PLCs, via the defined ports and according to the defined schedules.

Note that you can also force a call.

Log Status							
No.	Site Name	Call Time	Status	Schedule	Retry Index	Retries Count	First Call Time
5	Production PLC 1	3/25/2004 10:30:00 AM	Success	Minutes	1	3	3/25/2004 10:30:00 AM
4	Production PLC 1	3/25/2004 10:20:00 AM	Success	Minutes	1	3	3/25/2004 10:20:00 AM
3	Production PLC 1	3/25/2004 10:14:00 AM	Success	User Request	1	3	3/25/2004 10:14:00 AM
2	Production PLC 1	3/25/2004 10:14:00 AM	Success	User Request	1	3	3/25/2004 10:14:00 AM
1	Production PLC 1	3/25/2004 10:13:00 AM	Success	User Request	1	3	3/25/2004 10:13:00 AM

Next Call: 6/9/2004 10:30:00 AM Site:Production PLC 1 Schedule:Minutes Stop

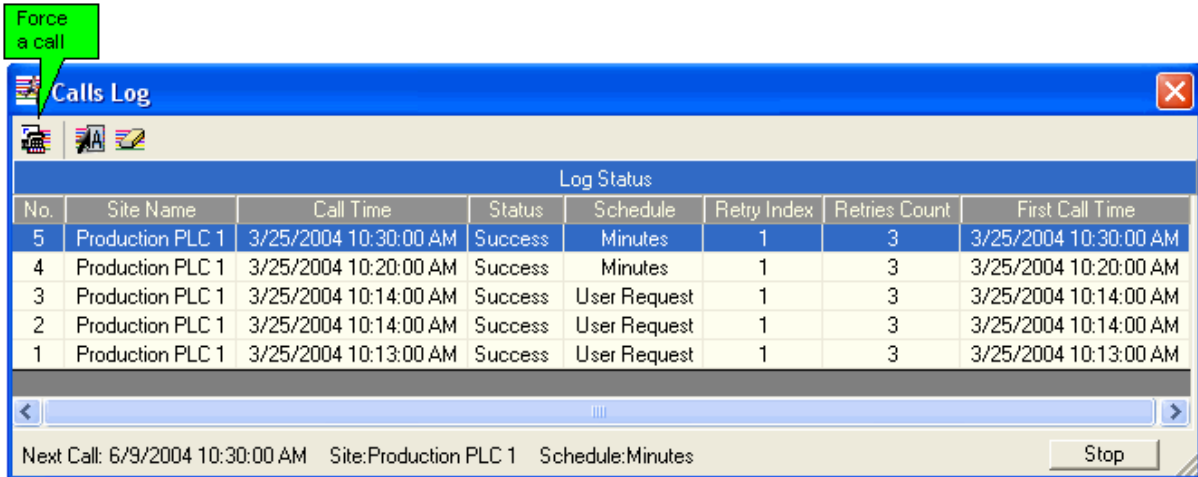
You can also cause a DataXport project to enter Run Mode whenever the project is opened by selecting that option from the Actions menu.



Force Call

You can force the PC to call a PLC and export the data tables/regions defined for that PLC in one of two ways:

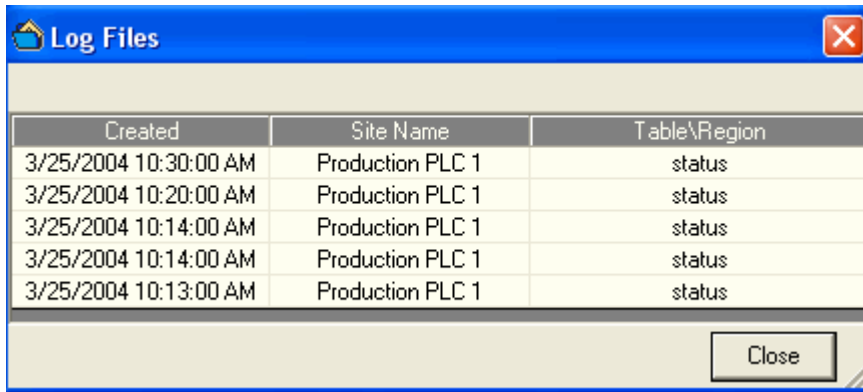
- By sending an SMS message to the PC's GSM modem. Assuming that the name of the site is Production 1, the SMS must read **DATAEXPORT CALL TO: Production 1**. Note the capital letters and semicolon.
- By selecting Run Project, and then clicking the Force Call button shown below.



Viewing Logs

View, located on the Project menu, shows the DataXport log calls. To view the logged data, use DataXIs.

1. Select View from the Project menu, Site status is displayed.



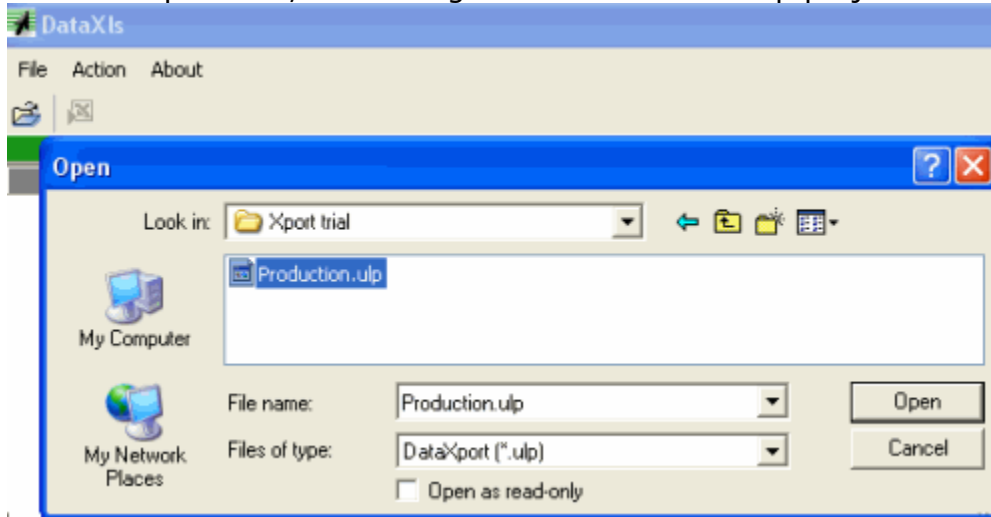
DataXIs: Accessing Data Logs

DataXIs enables you to open the logs in Excel format. You can then manipulate the data in Excel.

Start DataXIs:

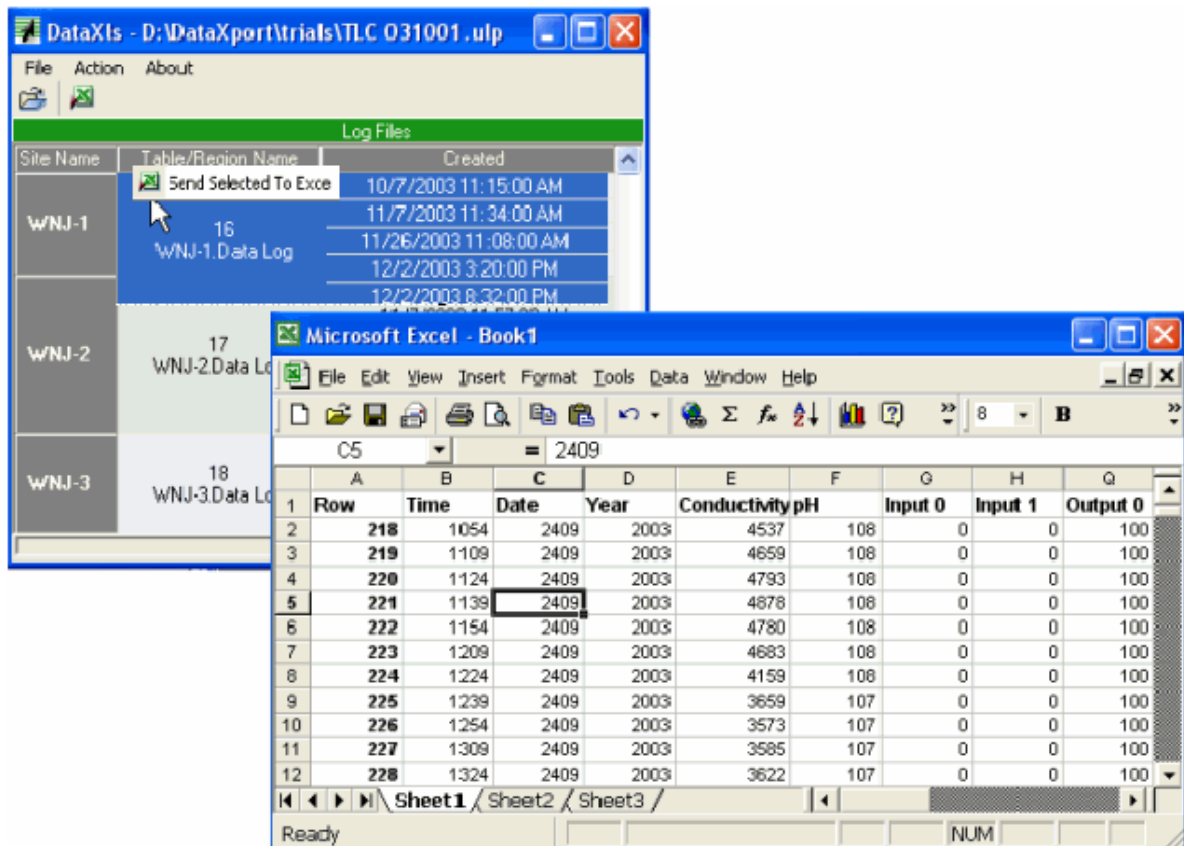
1. Go to Start > Programs > Unitronics> DataXIs.
-or-
Open the Unitronics folder located on the Desktop, then double-click on the DataXIs icon.

- Click the Open icon, then navigate to the desired .ulp project and click Open.



DataXIs opens the project as shown below.

- To view files in Excel, drag the mouse over a log to highlight it, then either:
 - Select the Excel icon from the toolbar, or
 - Right-click the highlighted area and select Send Selected to Excel.



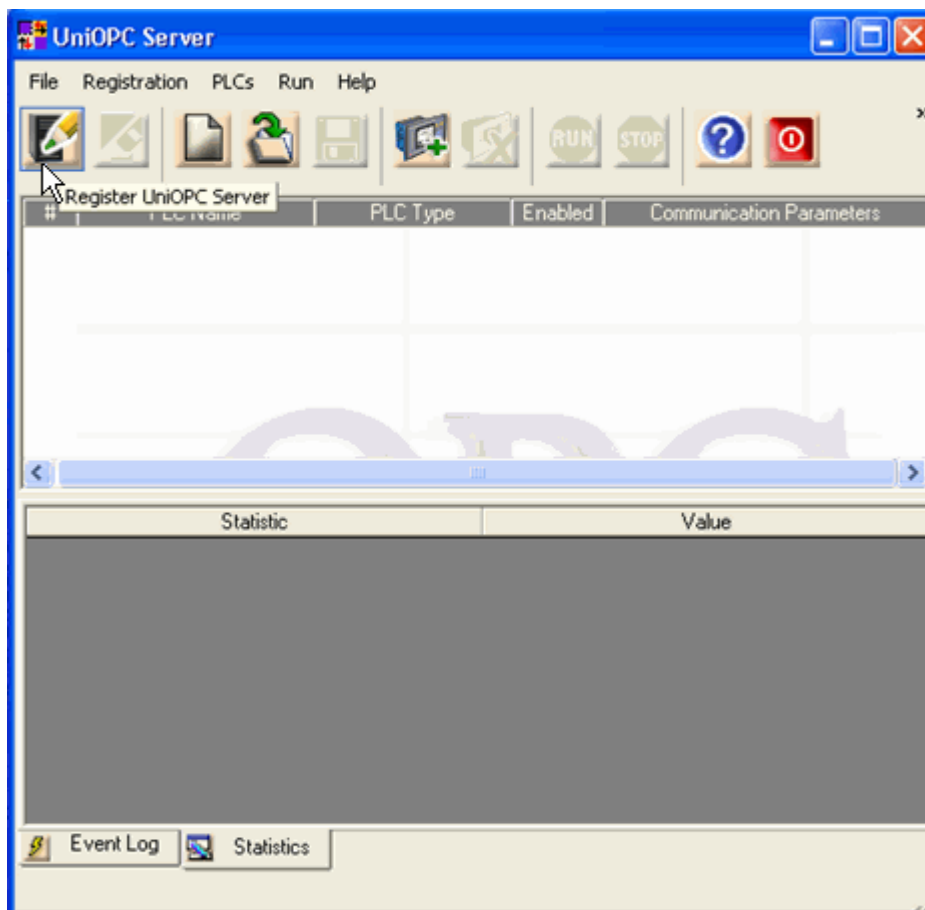
UniOPC Server

UniOPC Server (Unitronics OPC Server) enables you to read and write data between Unitronics PLCs and applications that support OPC, such as SCADA programs. UniOPC Server is compliant with the OPC Foundation's Data Access Custom Interface Standards through to Version 3.00.

UniOPC Server runs independently of other Unitronics software.

Registering UniOPC Server

In order for UniOPC Server to be registered in your PC's list of OPC servers, you must register UniOPC Server the first time you run the program, either by clicking the Register button or selecting Register from the Registration menu. Once it is registered, UniOPC will appear in your OPC client software's server list. To remove UniOPC Server from the client's list, select UnRegister from the Registration menu.



UniOPC Server - DCOM

Installation Prerequisites

Operating System

Although it is possible to run OPC using Windows 95, Windows 98, Windows NT, Windows 2000, this requires specific dlls. Therefore, we strongly recommend using Windows XP.

Privileges

In order to be able to set all the required DCOM properties, the user must log on with administrator privileges.

UniOPCServer installation

Although OPC servers can be installed by any user having administrator privileges, we recommend that installation be done under local administrator log-on. In compliance with the OPC DA v2.x specifications, it is recommended to use the OPCEnum application, which enables OPC clients to browse the available OPC servers. This application is installed together with UniOPC Server.

User groups

If several users have access rights to a given OPC server, we recommend you create a user group. This group should be duplicated on all the PCs where the OPC Server will be installed.

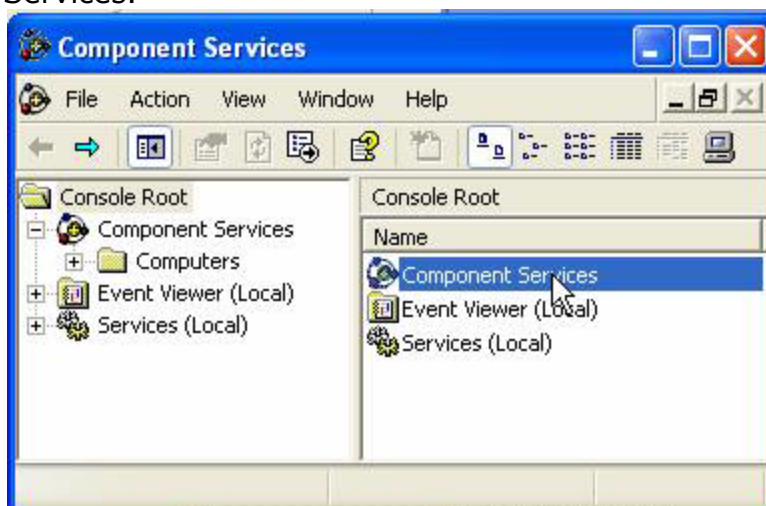
PC Server Settings

Since OPC security is based on DCOM security, default security settings selected for the OPC server and OPC client machines will affect all executables irrespective of their link to OPC.

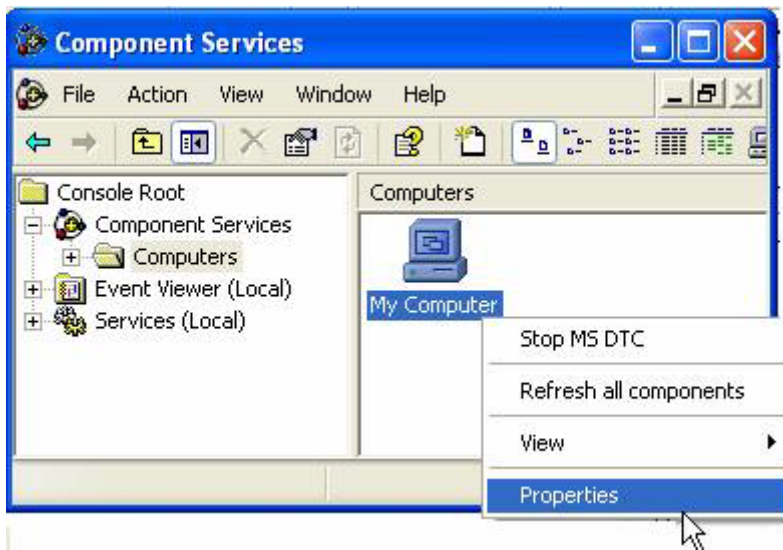
The settings recommended in this document allow broad access to the executables installed on the PC, while restricting access to the critical OPC servers, meaning those that allow access to actual devices.

Setting Default Permission

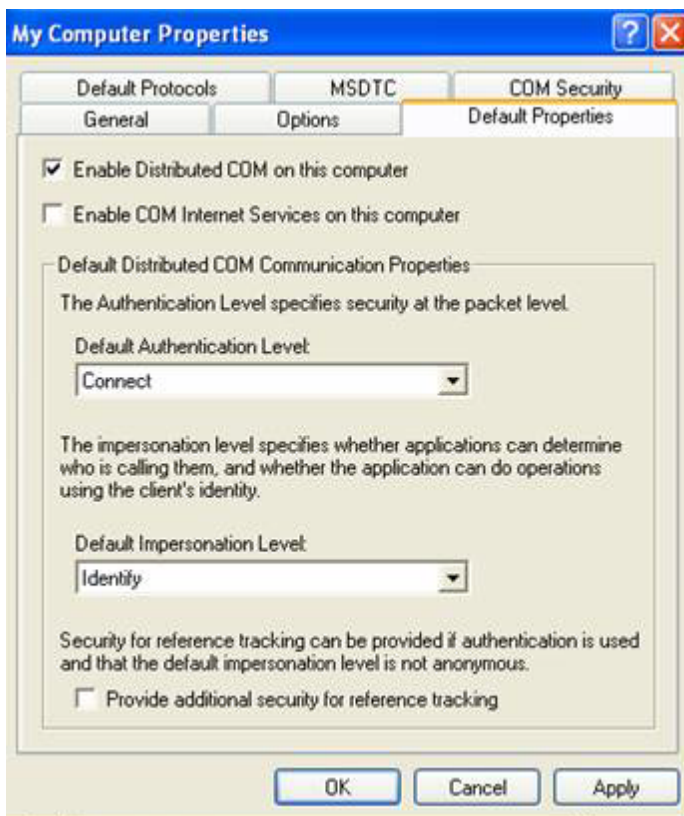
1. Open Start>Settings>Control Panel> Administrative Tools> Component Services.



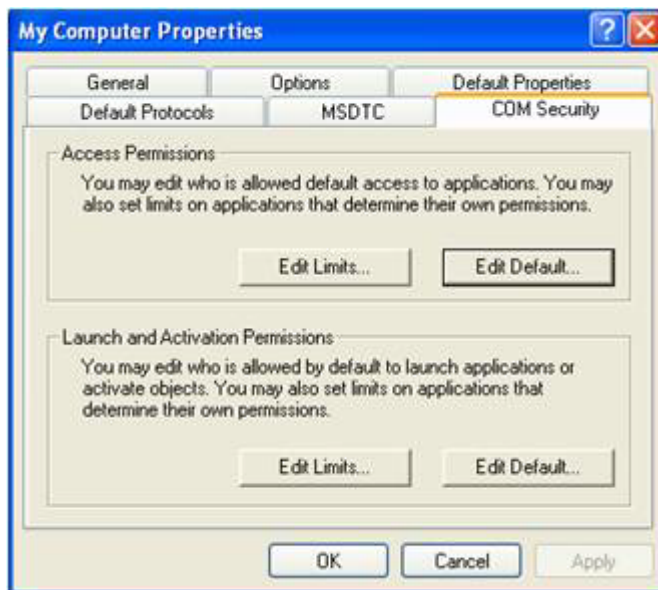
2. Click on Component Services, and then right-click My Computer.



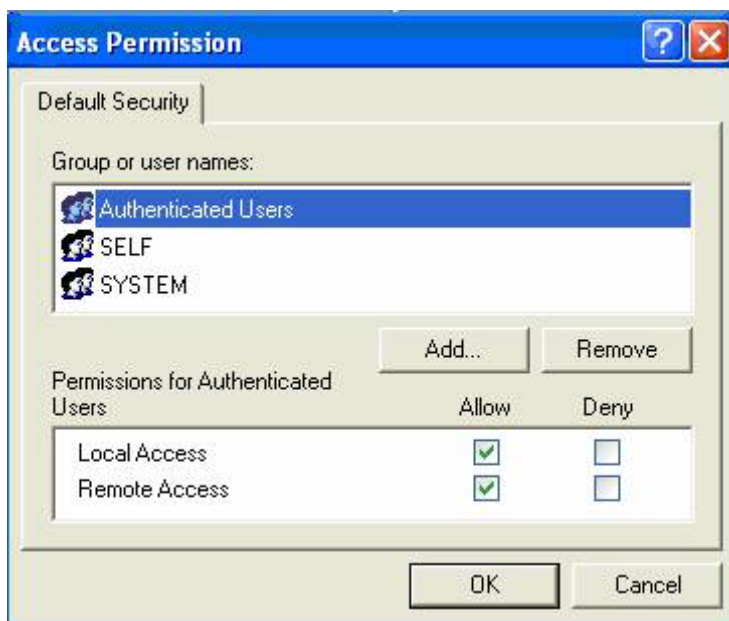
3. Click on Properties, and then select the Default properties Tab.
4. Select the settings shown below, and then click Apply.



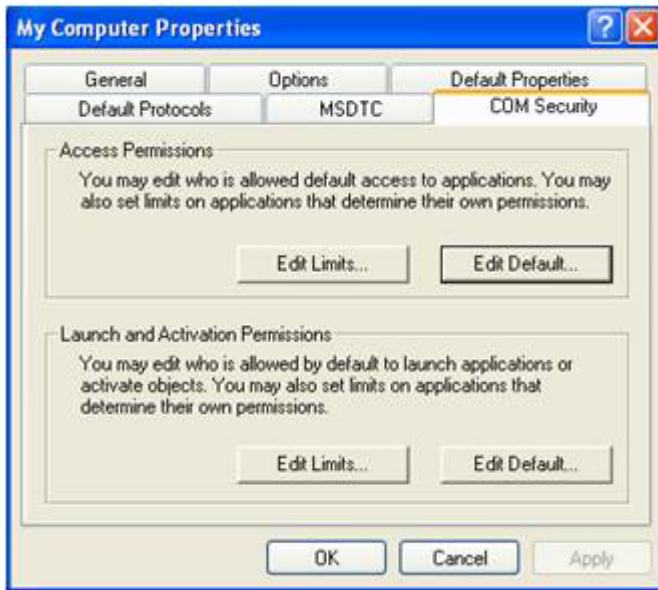
5. Select the COM Security tab.



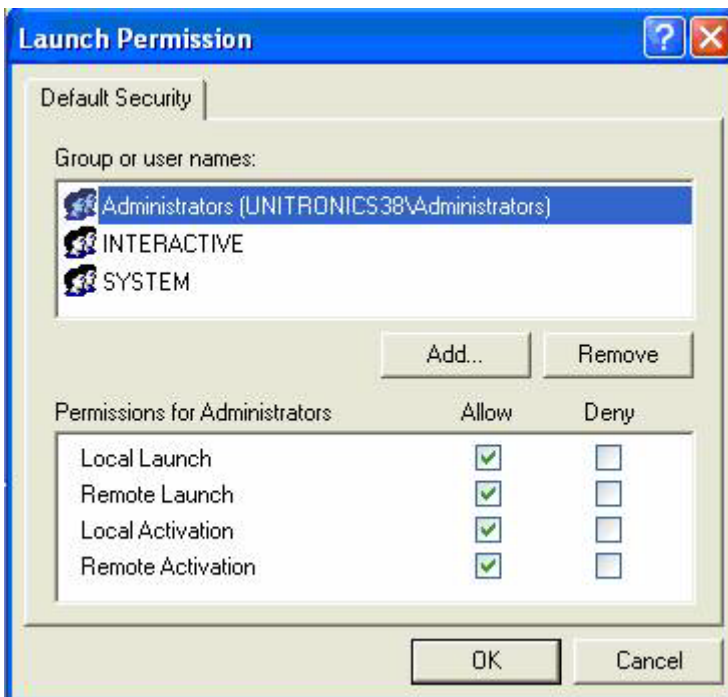
6. In order to add users, open the Default Access Permission window by clicking on the corresponding Edit Default button.
7. Set the appropriate user access rights, and then click OK.



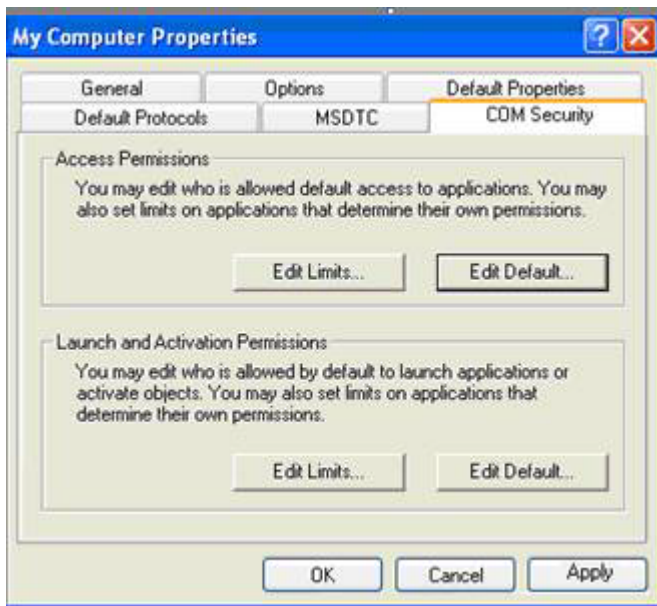
8. Set Default Launch Permissions by clicking on the corresponding Edit Default button and adding users.



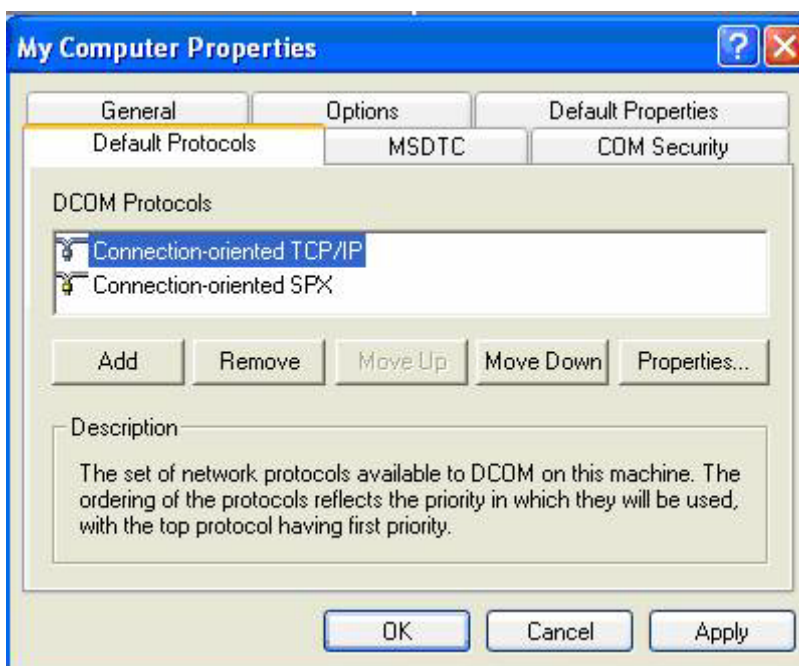
9. Set the appropriate user access rights, and then click OK.



10. Click on Apply in the COM Security window.



11. Click the Default Protocols tab. The default protocols should appear as shown in the figure below; if they do not, update them.



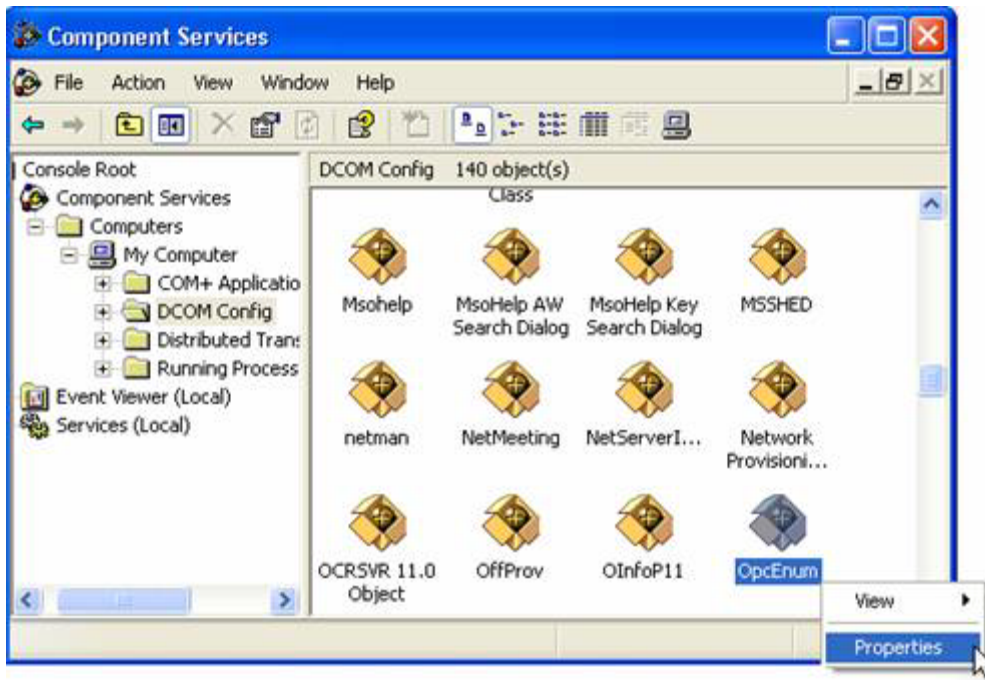
12. Click OK.

OPCenum Settings

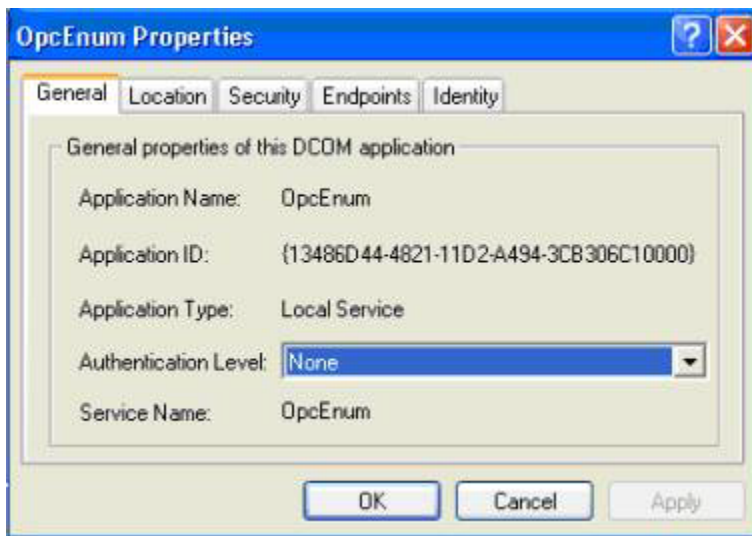
Once the settings have been applied, configure the settings of the OPCenum application. OPCenum is the application used by any OPC DA2.0 client to browse the available OPC servers on the local machine. The required settings are the default ones. They are accessible from the Component Services window:

1. Select Component Services>My Computer>DCOM Config.

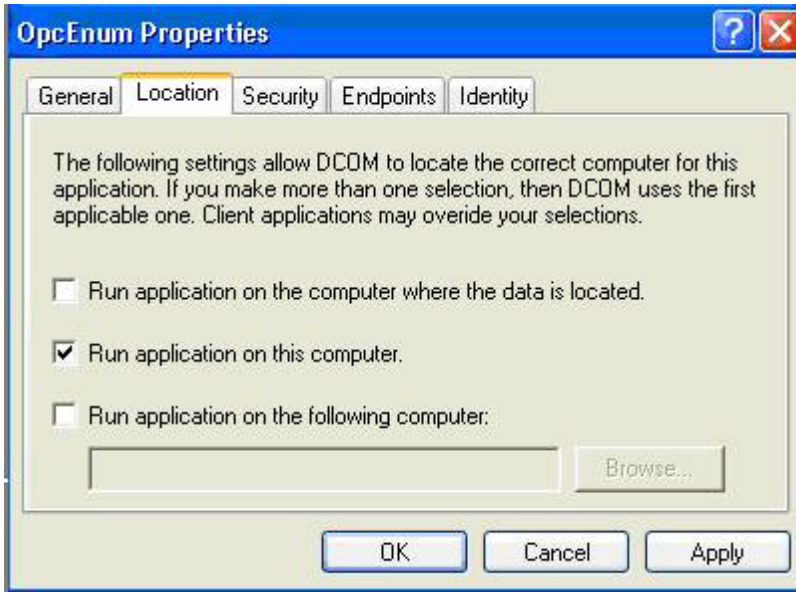
- 2. Click on OpcEnum.



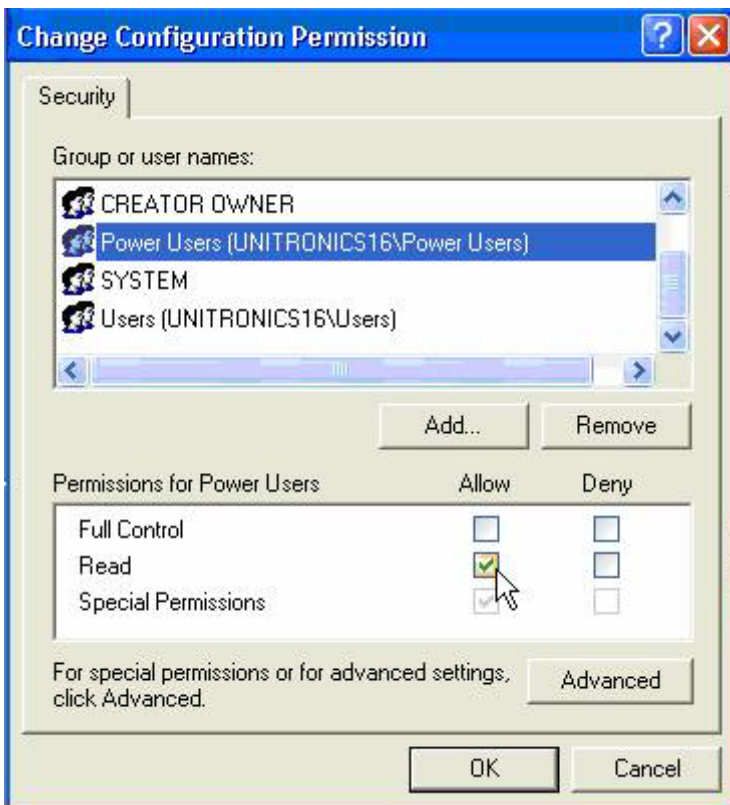
- 3. Right-Click on OPCEnum and select Properties.
- 4. The default settings in the General tab are displayed in the next figure.



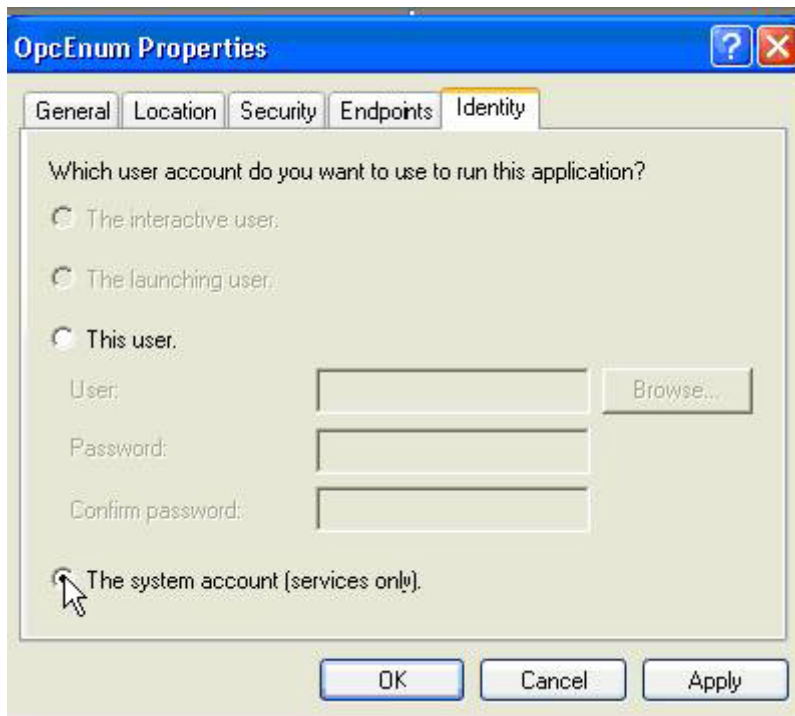
- 5. In the Location tab, enter the choices displayed in the next figure.



6. Click on the Security tab, and then enter the choices displayed in the next figure.
7. In the Configuration Permission window, reduce the privileges of the Power Users as shown in the next figure.



8. In the Identity tab window, enter the choices shown in the next figure

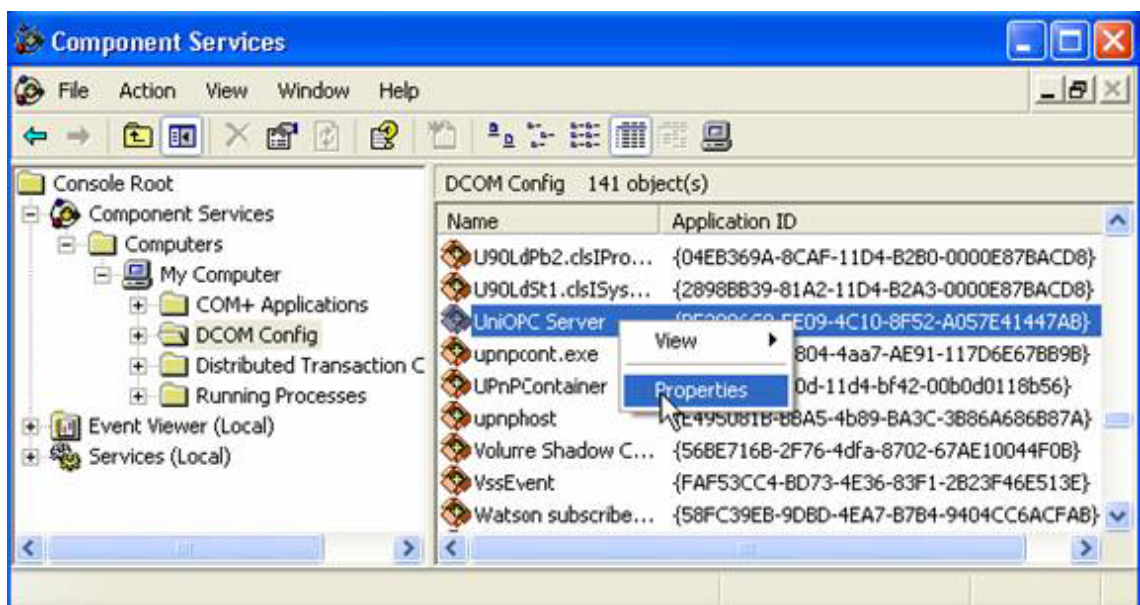


9. In the "Endpoints" window, keep the default settings.

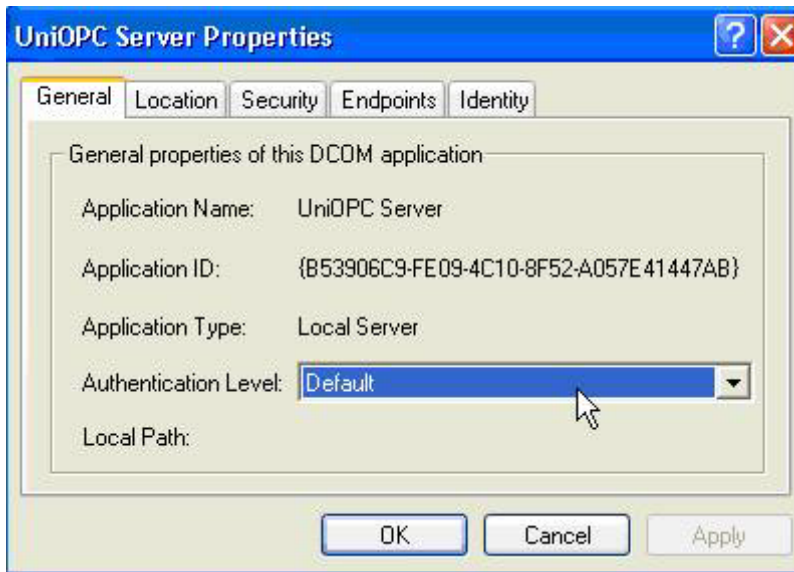
UniOPC Server Settings

Next, you need to configure UniOPC Server's settings

1. Right-click on UniOPC Server in the main dcomcnfg window, and then click on Properties. A tabbed window opens, enabling you to edit UniOPC Server settings.



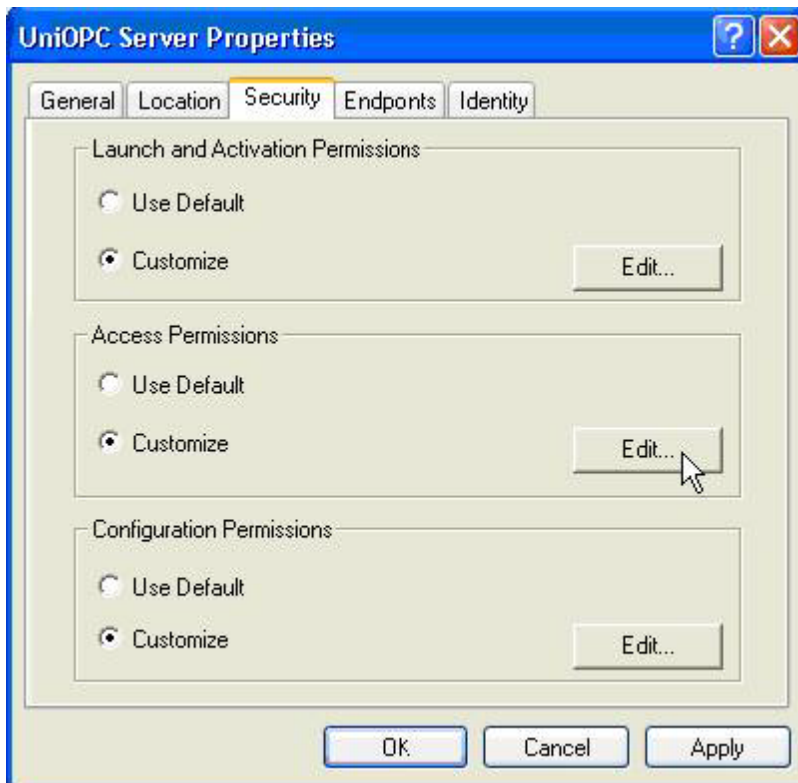
2. Under General, Authentication Level should be set to Default.



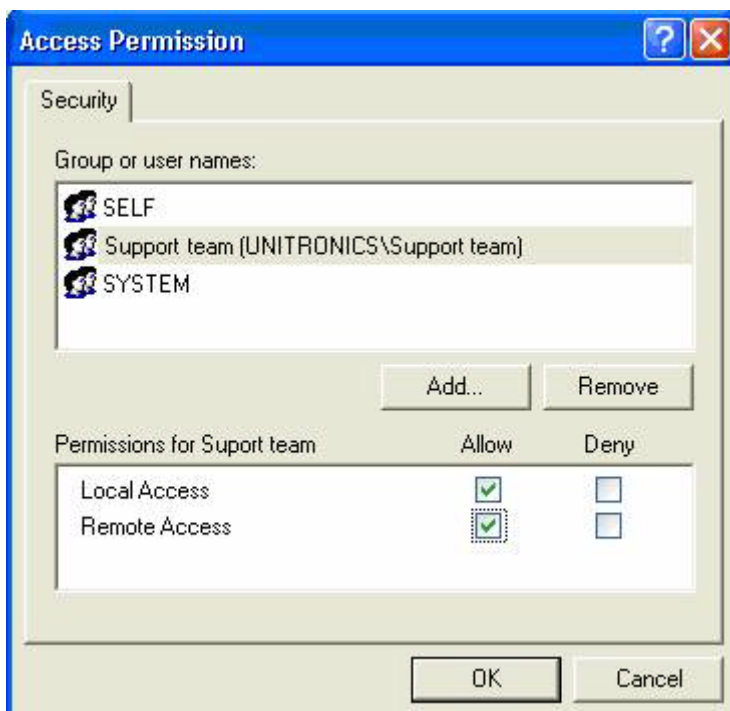
3. Under Location, select Run application on the computer. This is because the program is installed on the local machine.



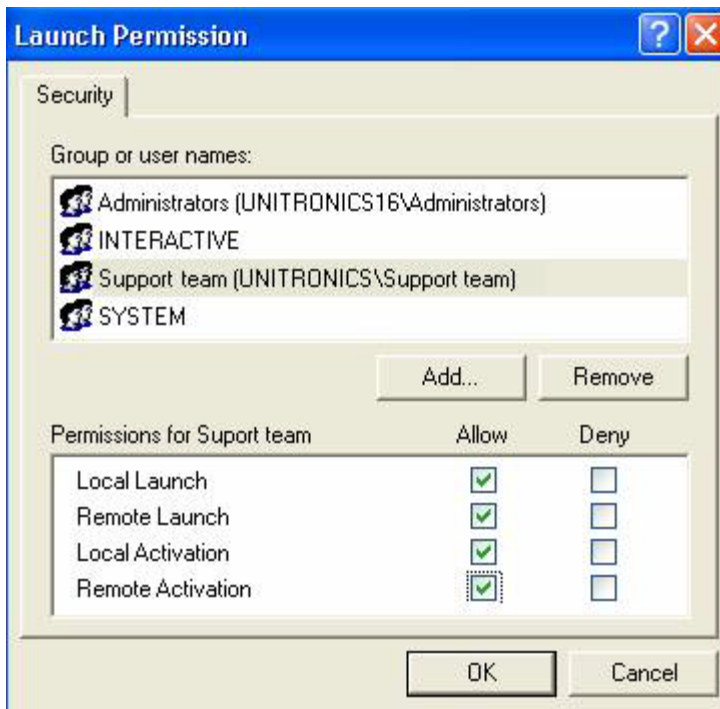
4. Under Security, change the default settings as shown below. These settings restrict remote access to the defined users group.
5. Under Access Permissions, press Edit.



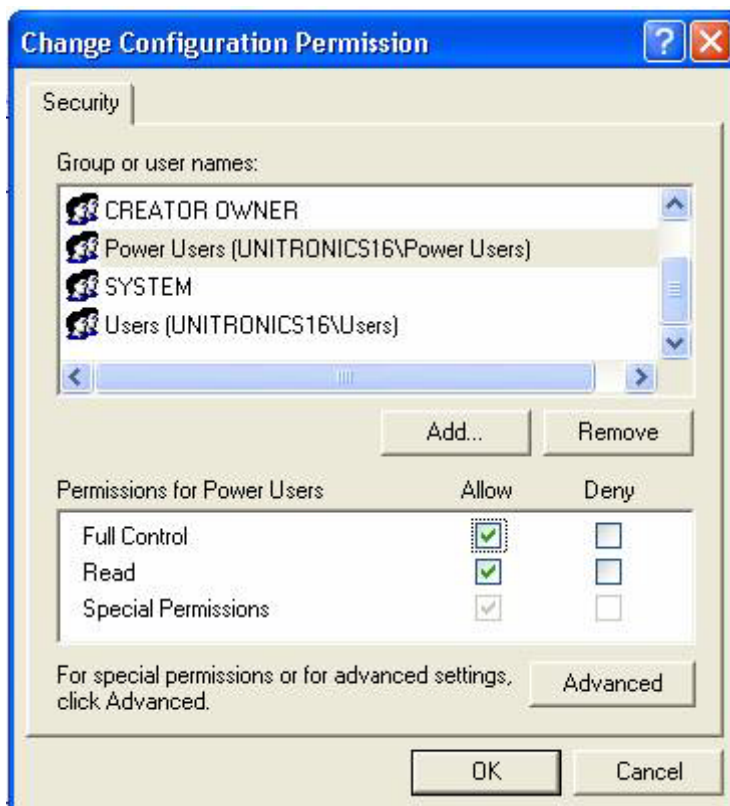
6. Set the same access rights for all groups as shown below.



7. Under Launch Permissions, press Edit. Set the same access rights for all groups as shown below.

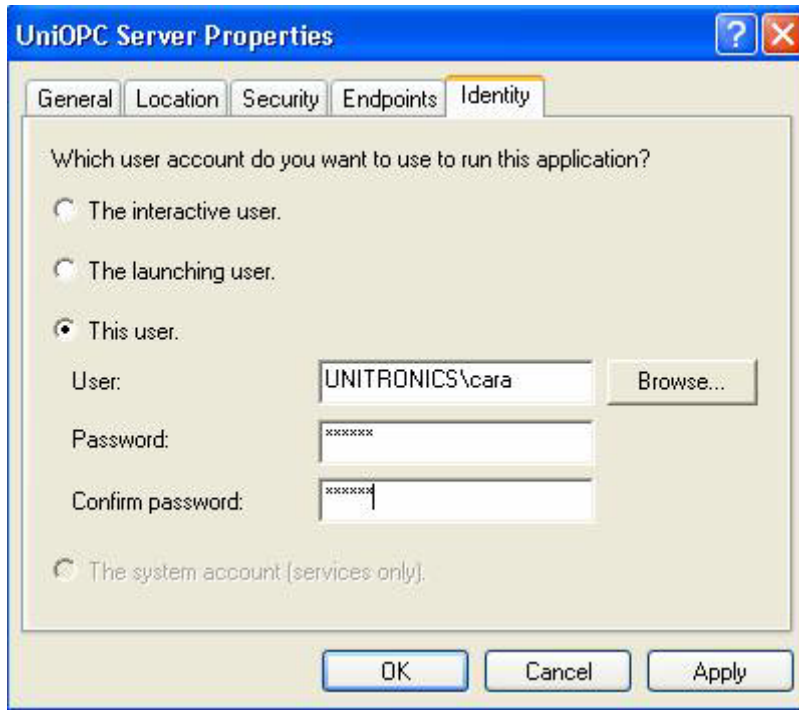


- Under Configuration Permissions, press Edit. Set the same access rights for all groups as shown below. Set special privileges to Power Users if different than default.

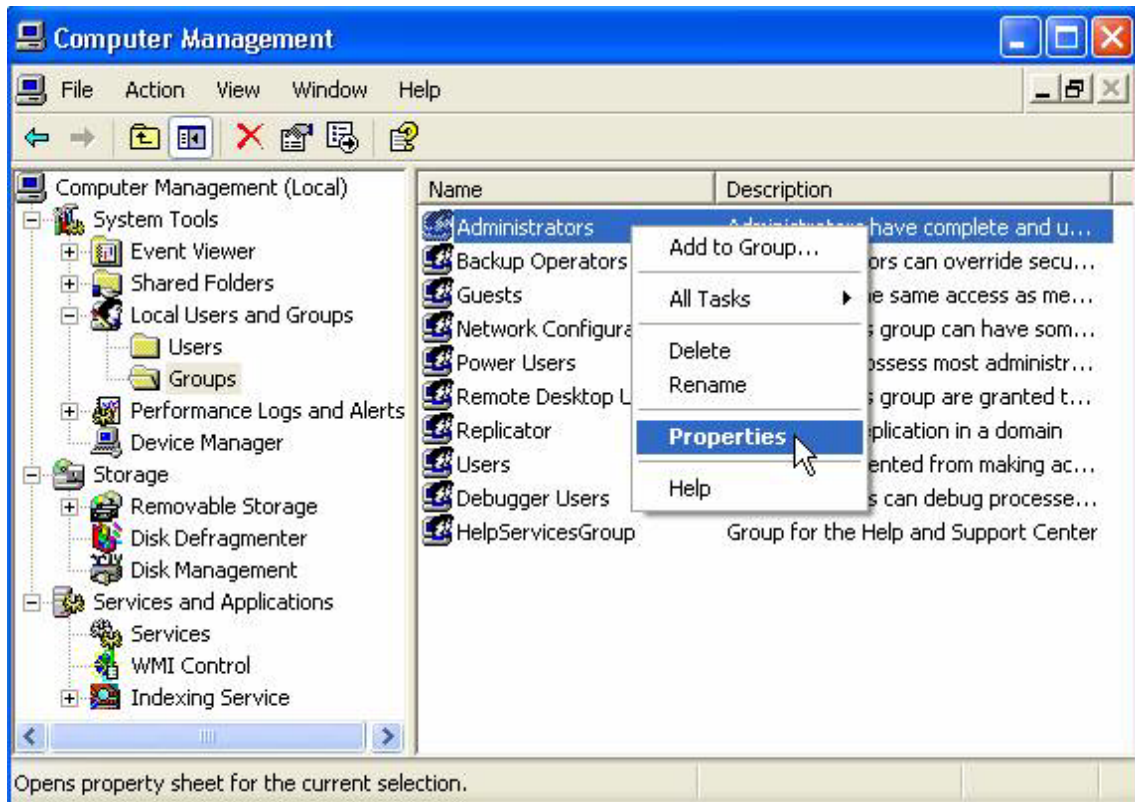


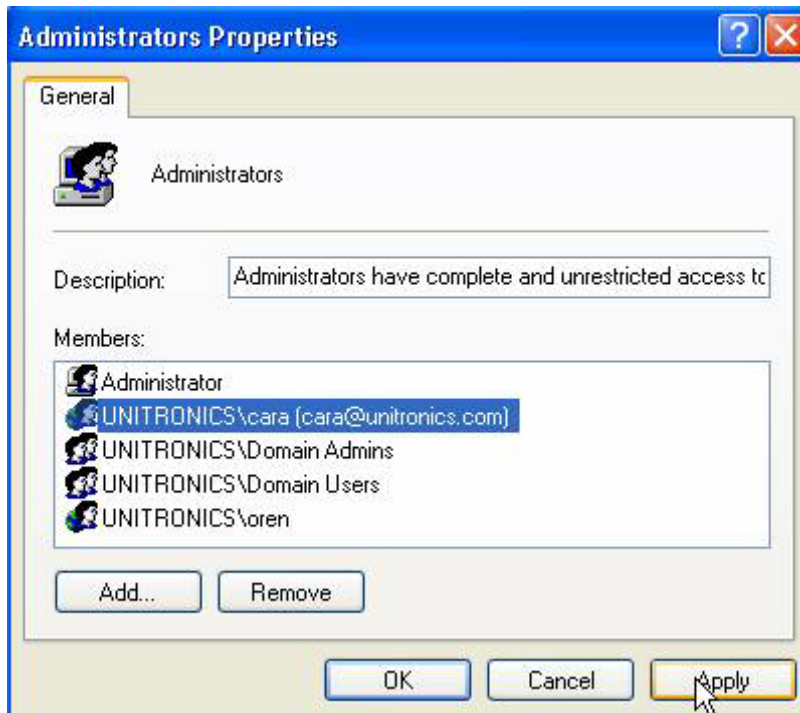
- For the Identity property, you must select a given user. If Launching is selected, several OPC server instances may be created when different users will try to connect. This is usually not possible if the OPC server

instances require access to a given resource (e.g. PC Card). If “interactive” is selected, the OPC server will not be able to start without any active user session. The selected user must be member of the locally created group.



10. To include this account in the local administrator group, right-click Administrators, and then select Properties.





11. The Endpoint property must be set to default.

Configuring the Windows Firewall

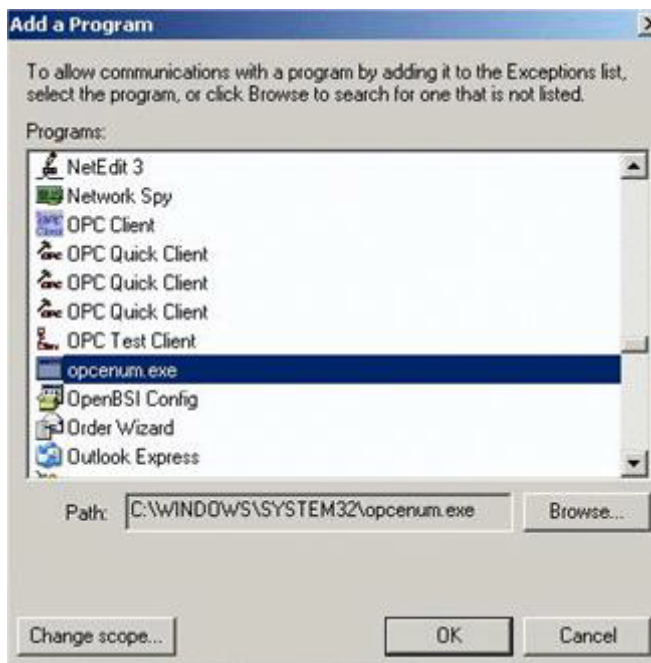
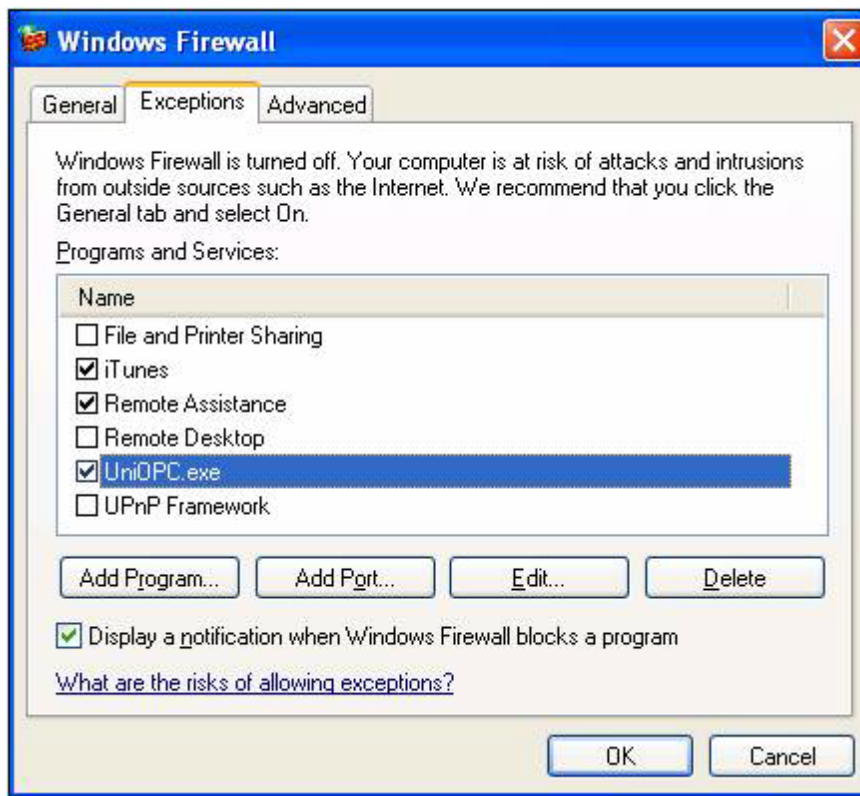
The Windows Firewall allows traffic across the network interface when initiated locally, but by default stops any incoming “unsolicited” traffic. However, this firewall is “exception” based, meaning that the administrator can specify applications and ports that are exceptions to the rule and can respond to unsolicited requests.

The firewall exceptions can be specified at two main levels, the application level and the port and protocol level. The application level is where you specify which applications are able to respond to unsolicited requests and the port and protocol level is where you can specify the firewall to allow or disallow traffic on a specific port for either TCP or UDP traffic.

By default, Windows Firewall is set to “On”. This setting is recommended by Microsoft and by OPC. However, you may need to temporarily turn off the firewall in order to check if the firewall configuration is causing communication failures.

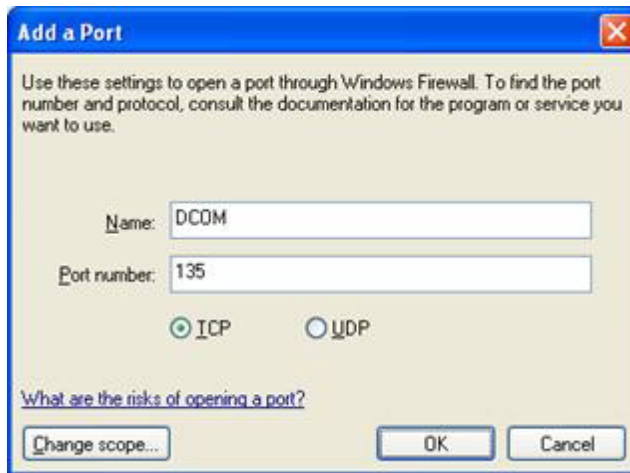
1. Open Windows Firewall by clicking on the Firewall icon in the Windows Control Panel.
2. Click on the Exceptions tab, and then add all OPC Clients and Servers to the exception list. In addition, add the Microsoft Management Console (mmc.exe found in the Windows\System32 directory) and the OPC utility OPCEnum (opcenum.exe found in the Windows\System32 directory). Note that these two files may not appear in the Add a Program list and will have to be found by using the Browse button. Lastly, you

need to ensure that File and Printer Sharing is checked. This is not typically enabled on new installations of the Operating System.



3. Add TCP port 135. This port is needed to initiate DCOM communications, and allow for incoming echo requests. In the Exceptions tab of the Windows Firewall, click on Add Port.

4. In the Add a Port dialog, fill out the fields as shown below:



Add a Port

Use these settings to open a port through Windows Firewall. To find the port number and protocol, consult the documentation for the program or service you want to use.

Name: DCOM

Port number: 135

TCP UDP

[What are the risks of opening a port?](#)

Change scope... OK Cancel

Using UniOPC Server

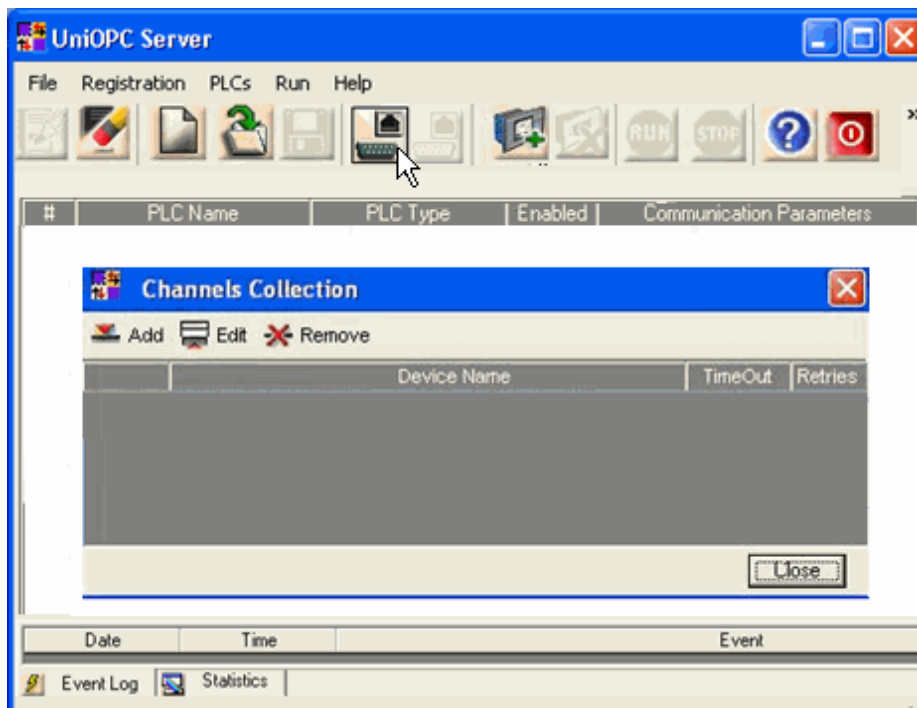
To use UniOPC Server, you first define a communication channel list. Next, you define the PLCs you want to access with UniOPC Server, and then click Run to enable UniOPC Server.

Note that the data is gathered by a client application, such as a SCADA program, according to client requests, without regard to how often UniOPC Server harvests data from the PLCs. UniOPC does not initiate data calls to the client.

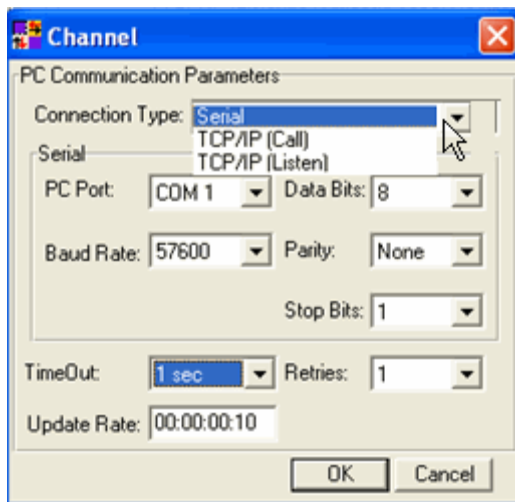
Creating a Channel list

A Channel includes the port and other PC communication parameters. The PC uses the channel to access a PLC and gather data.

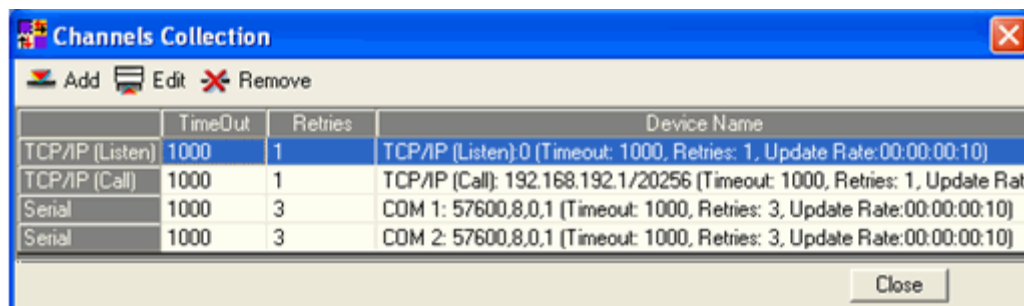
1. Click the Channel icon, Channels Collection opens.



2. Click Add; Channel opens.
3. Under Connection type, click the drop-down arrow to select Serial or TCP/IP. The options change according to your selection, enabling you to fill in the PC Communication Parameters.
The Update Rate is the frequency at which UniOPC Servers harvest data from the PLCs linked to the channel. Note, however, that the rate at which the client takes data from UniOPC Server is set within the client application.

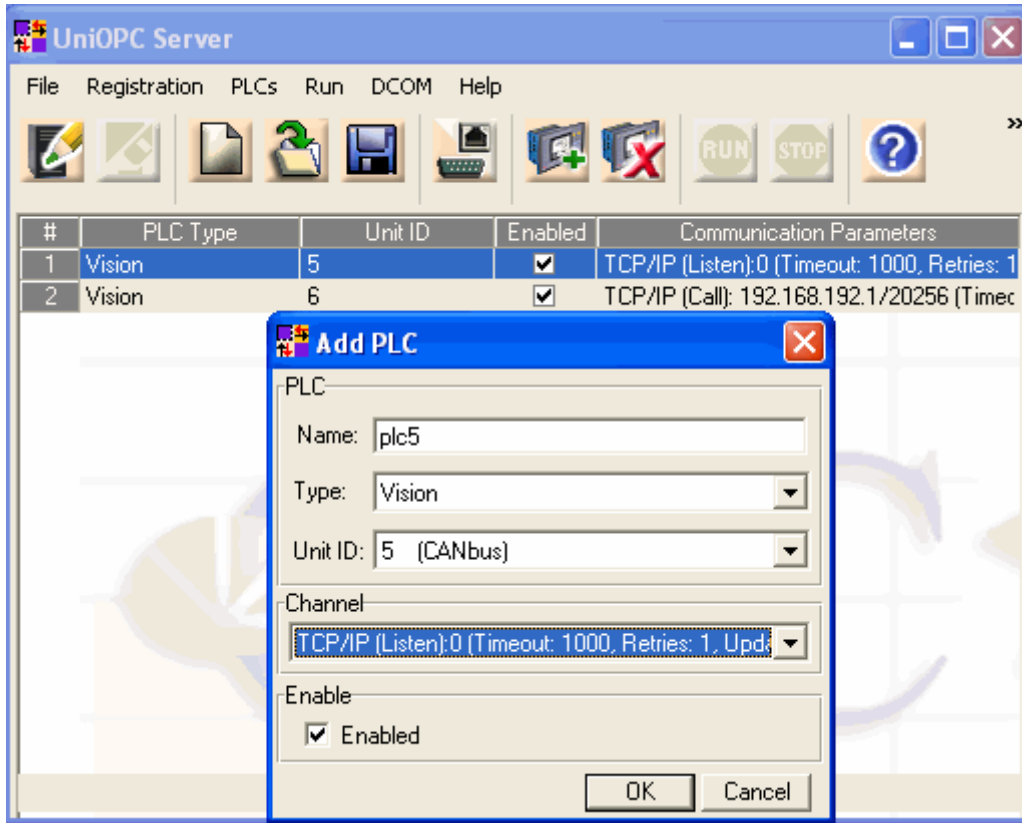


4. Click OK to add the Channel to the Channel Collection



Creating a PLC list

1. Click Add PLC.
2. Enter a unique PLC name, then select the PLC type and Unit ID.
Note that the Enable option is selected by default; this enables a client application to access the PLC.
3. Select a Channel; and then click OK.



Parameters

PLC

- Name: Enter a unique PLC description.
- Type: Select Vision, M90/91 Stand-alone, or M90/91 via Vision.
- Unit ID: Select either Direct, or the PLC's CANbus/RS485 Unit ID number.
- Channel: Select this from the Channel list.
- Enabled: This option must be checked in order for the OPC client application to access the PLC.

Note

A single channel can be linked to up to a number of PLCs.

- ♦ The PLC list relates to the PLC name. This means that UNIOPC will communicate with the correct PLC, without regard to Unit ID.

Note that, in Vision, the PLC name in the channel list must match the one given in the Ladder program by the PLC Name function.

#	PLC Name	PLC Type	Unit ID	Enabled	Communication Parameters
1	PLC 1	Vision	Direct Connection	<input checked="" type="checkbox"/>	TCP/IP (Listen):1 (Timeout: 1000, Retries: 1, Update Ra
2	PLC 2	Vision	Direct Connection	<input checked="" type="checkbox"/>	TCP/IP (Listen):1 (Timeout: 1000, Retries: 1, Update Ra

4. Click Run; a client application can now exchange data with all enabled PLCs in the list.

Note that if UniOPC has not been registered, the Run button is disabled.

Multi-channel applications

Note that if you have a large project, containing a number of PLCs linked to the same channel defined as TCP/IP listen, and the OPC client sends data to a PLC that is off-line, UniOPC stores the data. As soon as the PLC comes on-line and connects to the channel, UniOPC sends the data.

OPC Client: Item Syntax

To enable the OPC client to access the data types in the PLC, the syntax used to define the 'item' must be structured as follows: <PLCName> <ItemPrefix> <Address>

Therefore, to access Memory Bit 3 in PLC Conveyor 1, the correct item syntax is:

PLCConveyor1.MB3

Note that:

- The name of the PLC is exact, including spaces and capital letters.
- The name is followed by a period.
- The Item Prefix is entered in capital letters.

To enable the client application to receive a string giving the status of a PLC, create an item, 'string' data type, with the following syntax:

PLCConveyor1.STATUS

Item Syntax Table

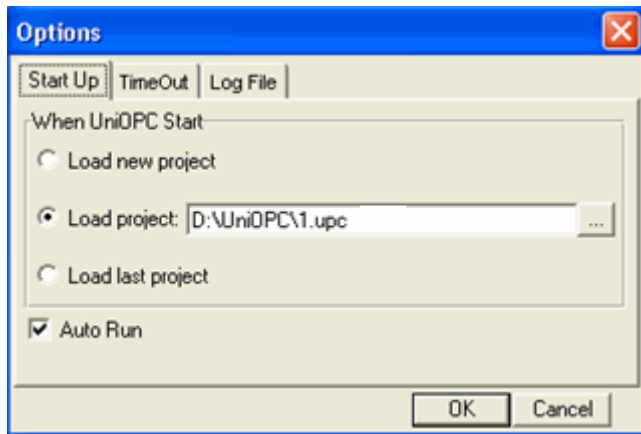
Data Type	Syntax	Notes
Memory Bit	MB	
Memory Integer	MI	<ul style="list-style-type: none"> • Read MI vector: include length in parentheses. For example, PLCCONVEYOR1.MI3(5) reads MIs 3,4,5,6 and 7. • Read String: Include an upper case 's' in square brackets. For example, PLCCONVEYOR1.MI3[S] causes UniOPC to scan 32 successive MIs. Scan stops when it: <ul style="list-style-type: none"> -reaches the 32nd element -encounters a null character -encounters a value outside of the range of 1-254 Requests that exceed legal length will be ignored.
Memory Long Integer	ML	
Memory Double Word	DW	
Input	I	
Output	O	
System Bit	SB	
System Integer	SI	
System Long Integer	SL	
System Double Word	SDW	
Timer Bit	TB	
Timer Value, Current	TC	In client application's item definition, use a string data type
Timer Value, Preset	TP	
Timer Value, Current Long	TCL	In client application's item definition, use a numeric or native data type
Timer Value, Preset Long	TPL	
Counter Bit	CB	
Counter Value, Current	CC	In client application's item definition, use a 16-bit integer data type
Counter Value, Preset	CP	
Memory Float	MF	

UniOPC Server Options

Options are located on the File menu.

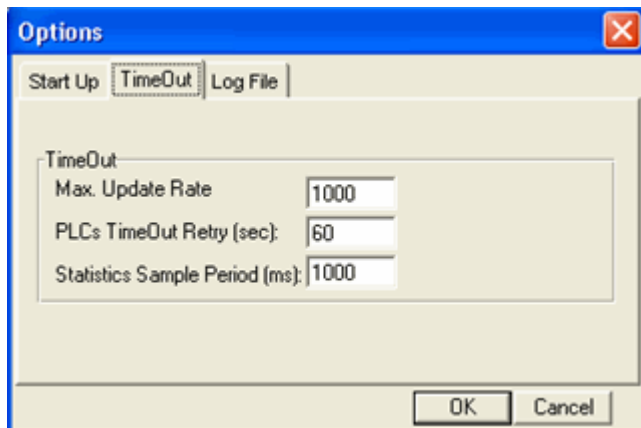
Start Up

Sets the start mode for UniOPC Server.



TimeOut

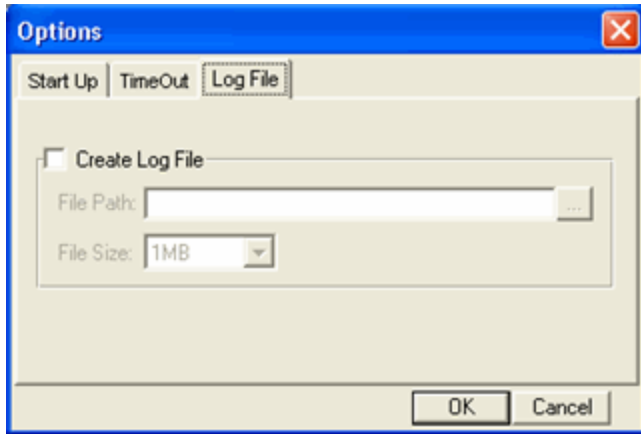
Use these to determine time-based client-server access parameters.



- Max. Update Rate: determines the maximum time during which the client application can access a server data item. The client will attempt to update all of its group data items during this time period. If the client is unsuccessful, the items that were not updated enter the Requests Queue Count shown at the very bottom of the UniOPC Server Window.
Requests Queue Count: 0
If there are requests in the queue, you can adjust the Max. Update Rate.
- PLCs TimeOut Retry: This is the time during which the client can attempt to retry accessing a PLC.
- Statistics Sample Period: the period of time in which Statistics are collected.

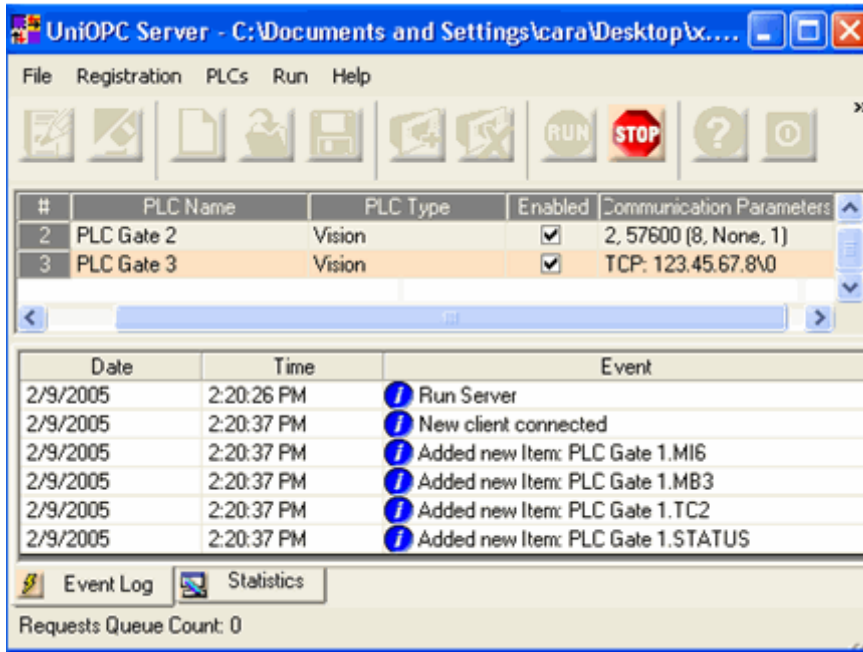
Log File

Select this to create a detailed log file that may be stored to a disk location as a .txt file and limited to a maximum size. This file may be used for debugging purposes.

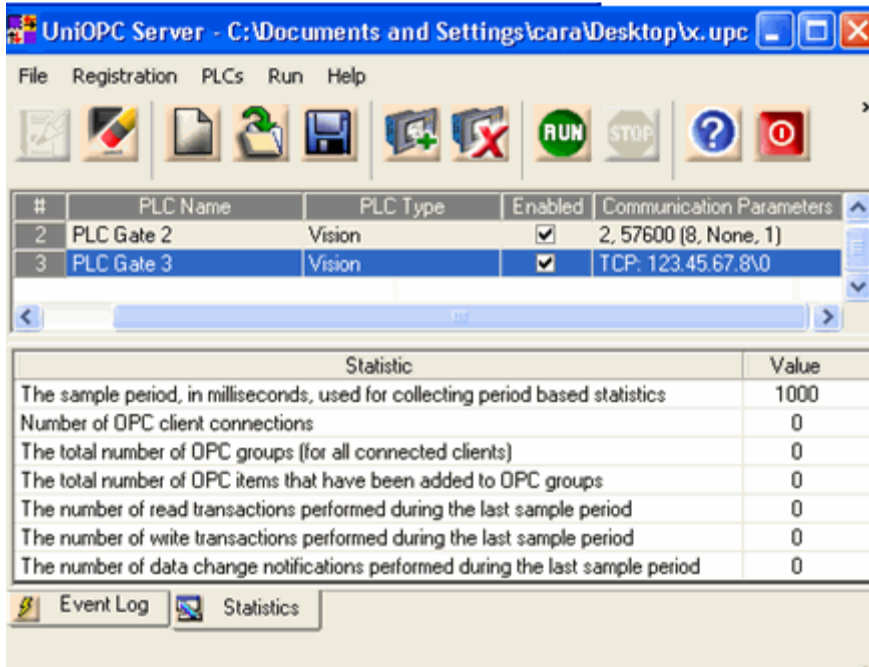


Event Log and Statistics

The Event Log shows events as they occur. The log is limited to 1000 rows.



Statistics show the current UniOPC events during the Statistics Sample Time period. The Events are reported in a cyclic fashion; each reading replaces all previous Events. You can change the Sample Time period via File>Options.



UniDDE

UniDDE (Unitronics Dynamic Data Exchange) enables you to read and write data between Unitronics PLCs and applications that support DDE, such as Excel. Although it is installed as part of the VisiLogic Setup, UniDDE runs independently of other Unitronics software.

To exchange data between PC and PLC via DDE:

1. In UniDDE, define a PLC: name, operands to be accessed, and the connection parameters. Enable PLC must be selected.
2. Copy the resulting Excel Command.
3. Open Excel, then paste the command into the worksheet.
4. Run UniDDE; the Excel worksheet will update with current values.

The figure below shows how to enable UniDDE read a vector of 5 outputs.

The screenshot shows the UniDDE application window with a table of PLC configurations. The table has the following data:

PLC	+	Operand Type	Operand Address	Vector Length	DDE Name	Direction	Enabled	Communication Parameters
PLC 1	+	MI	100	280	!bIDDE(1-280)	Read	<input checked="" type="checkbox"/>	COM 1 ; 57600
PLC 2	+	MI	100	280	!bIDDE(281-560)	Write	<input checked="" type="checkbox"/>	COM 1 ; 57600
PLC 3	+	MB	0	100	!bIDDE(561-660)	Read/Write	<input checked="" type="checkbox"/>	TCP/IP ; 111.111.66.55 ; 0
PLC 4	+	O	0	5	!bIDDE(561-565)	Read	<input checked="" type="checkbox"/>	COM 1 ; 57600

Annotations and steps shown in the image:

1. Define PLCs and the operand Data Source; UniDDE automatically generates the correct Excel command.
2. Right-click & copy the command from DDE.
3. Paste the command into Excel.
4. Run the DDE Project

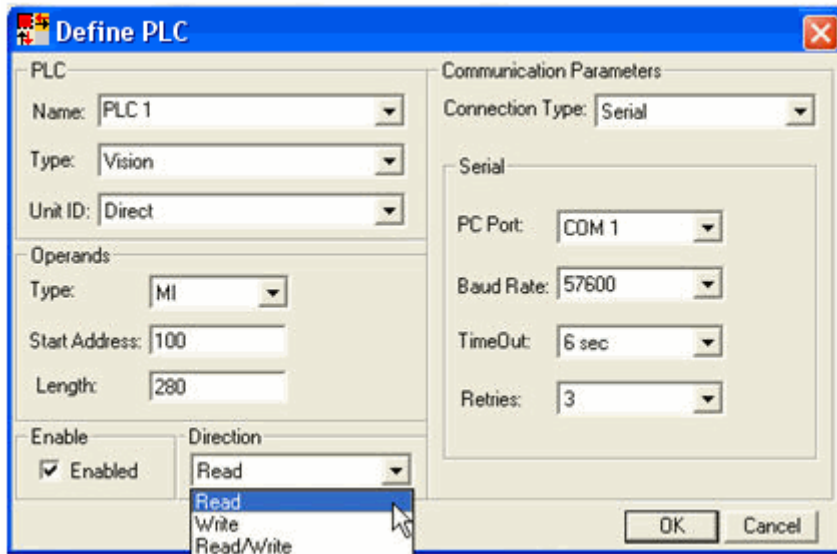
The current status of the 5 outputs are read into the Excel file.

The final Excel file 'PLC data.xls' shows the following data:

	A	B	C	D
1				
2				
3				
4				
5				

Defining a PLC

1. Start UniDDE from Start>Programs>Unitronics>UniDDE.
2. Click Define PLC; then enter the appropriate parameters.

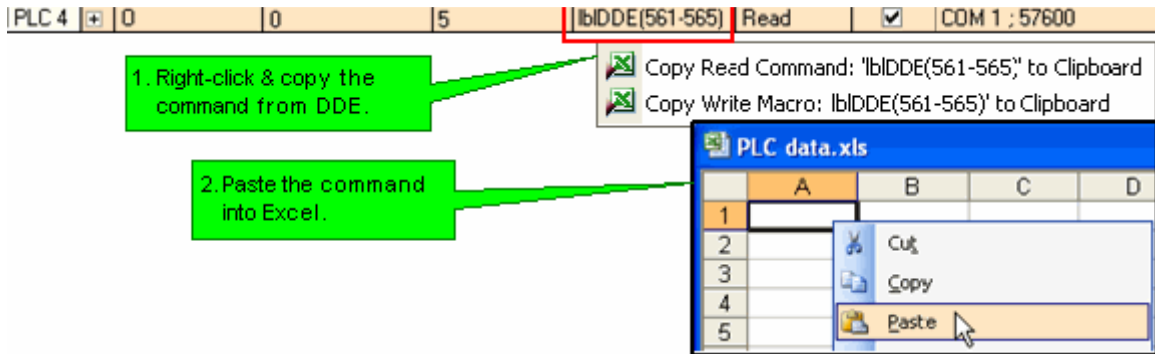


Parameters	
PLC	<ul style="list-style-type: none"> • Name: Enter the PLC description. Once you have entered a PLC Name, you can reselect it using the drop-down arrow. The PLC name is saved with the project. • Type: Select Vision, M90/91 Stand-alone, or M90/91 via Vision. • Unit ID: Select either Direct, or a unit in a CANbus or RS485 network.
Operands	<ul style="list-style-type: none"> • Type: Select any type of operand. • Start Address: Enter the first address of the operand vector. • Length: Enter the number of operands.
Enable	Select this to allow the PC to access the PLC when the DDE project is run. If Enable is not selected, DDE excludes the PLC when the project is run.
Direction	This determines the direction of the data exchange between the PLC and PC. Select Read, Write, or Read/Write. Read/Write enables you to read a dynamic value to an Excel cell, and use a Write macro to enter a value.
Connection Type	This determines the connection that the PC uses to access the PLC. Serial communications are supported; TCP/IP may be used with compatible controllers.

Once the PLC has been defined, you can implement Data Exchange.

1. In UniDDE, select and right-click the desired operand, then copy the Excel 'Read' Command from the UniDDE project.
2. Open Excel, then paste the command into the worksheet.

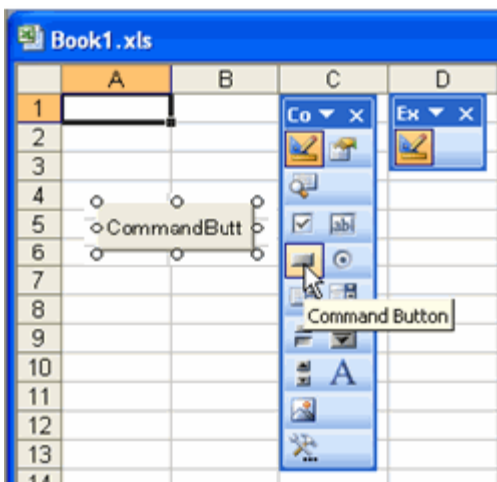
When UniDDE; runs the project, the Excel worksheet will update with current values.



In order to write to operands via Excel, you can create a macro to read Excel cells and write the value to the operands.

One way to do this is to add a Command button and then paste the UniDDE command into the button's VB code.

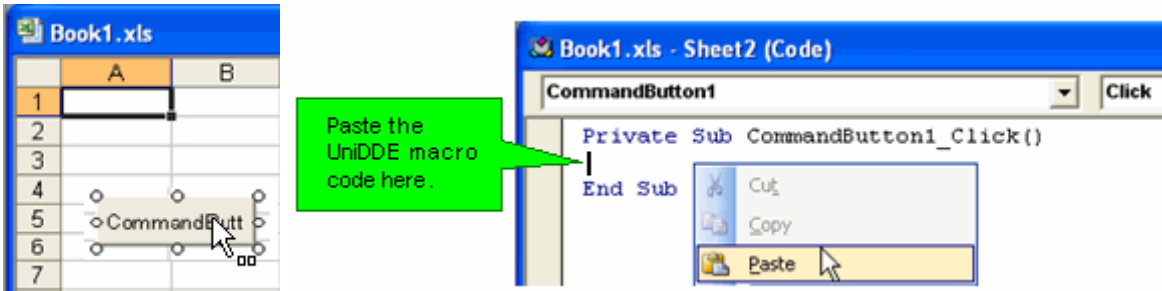
1. In Excel, open the Control Toolbox. (View> Toolbars> Control Toolbox). This causes Excel to enter Design mode.
2. Place a Command button in the Excel worksheet by clicking on the Command Button icon on the Control Toolbox as shown below.



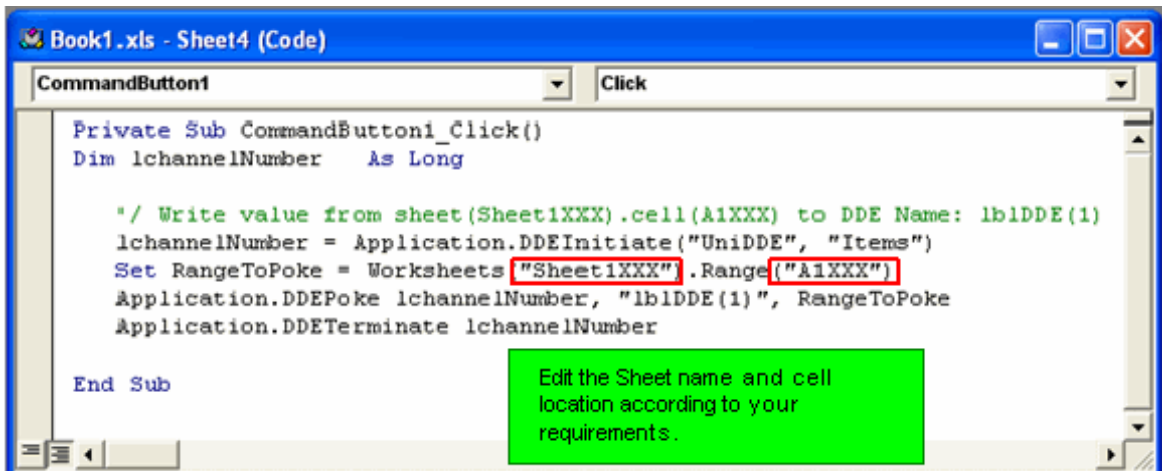
2. In UniDDE, select and right-click the desired operand, then copy the Write Macro command.



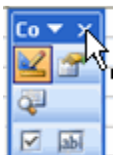
3. In Excel, double-click the Command button to access the macro code, then paste the UniDDE macro code.



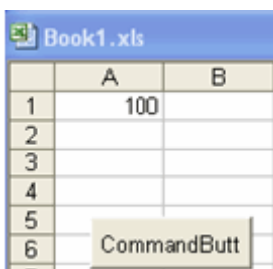
3. Edit the Sheet name and cell location according to your requirements.



4. Exit Design Mode by closing the Control Toolbox.

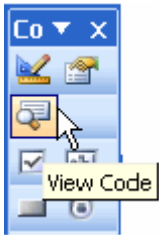


5. According to the code in this example, when UniDDE runs, clicking the Command button will write the value in cell A1 to MI 0 in PLC4.

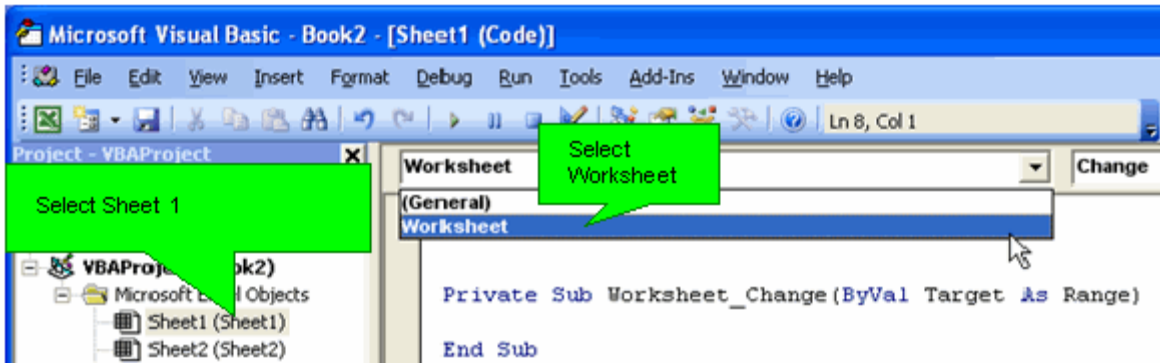


Instead of a command button, you can use a Change Value event. This causes the value you type into an Excel cell to be written to the PLC.

1. Enter Design Mode and open the Visual Basic editor by selecting View Code from the Control Toolbox.



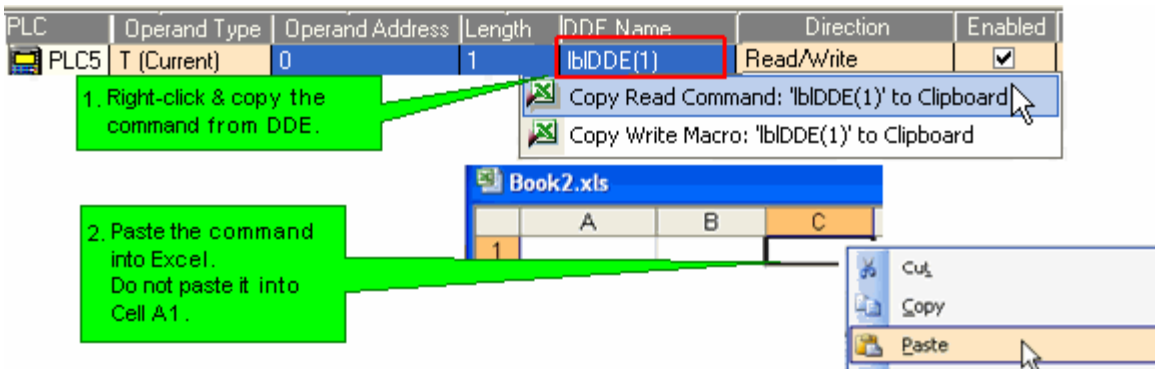
2. Select Sheet1 and Worksheet as shown in the figure below.



Using Read\Write enables you to simultaneously view a running operand value in Excel and update it.

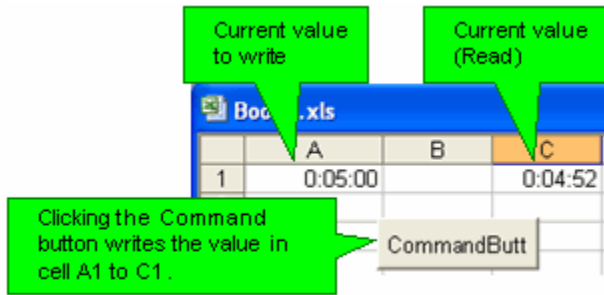
To Read\Write to a PLC operand, you need to format 2 Excel cells, one to Read the value, and another to contain the write value. In order to write to operands via Excel, you can add a Command button and paste the UniDDE command into the button's VB code.

1. In UniDDE, select and right-click the desired operand, then copy the Excel 'Read' Command from the UniDDE project.
2. Open Excel, then paste the command into the worksheet



In order to write to the operand, you can create a macro as explained in the Write section above.

According to this example, when UniDDE runs, clicking the Command button will write the value in cell A1 to T0 in PLC5.



Implementing DDE

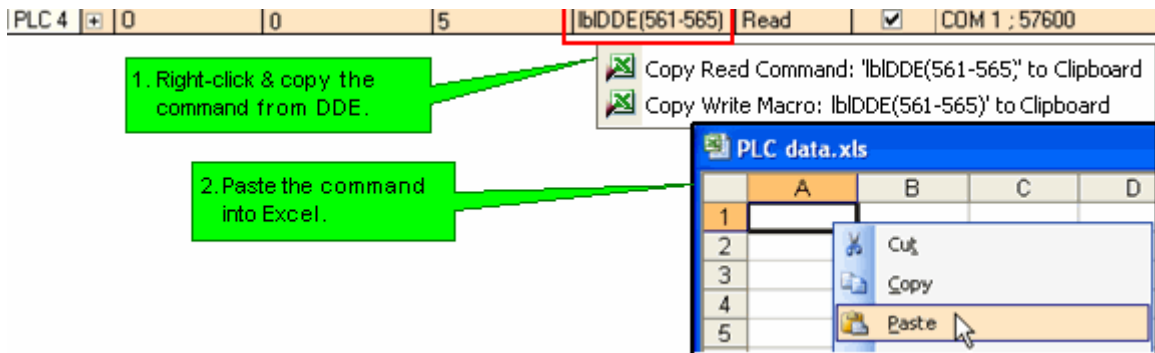
Once you have defined the PLC and the operands to be accessed by UniDDE, you must create an Excel file to exchange data.

Creating the Excel file

Read

1. In UniDDE, select and right-click the desired operand, then copy the Excel 'Read' Command from the UniDDE project.
2. Open Excel, then paste the command into the worksheet.

When UniDDE; runs the project, the Excel worksheet will update with current values.

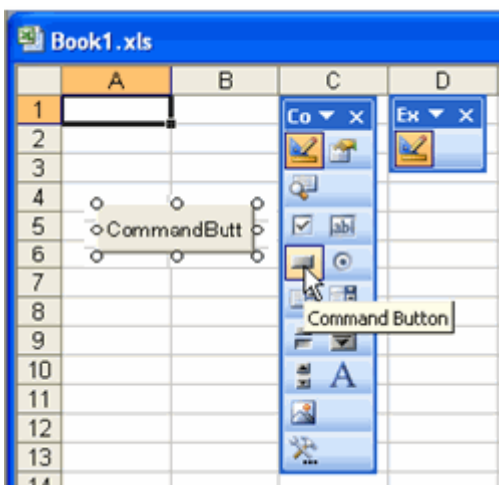


Write

In order to write to operands via Excel, you can create a macro to read Excel cells and write the value to the operands.

One way to do this is to add a Command button and then paste the UniDDE command into the button's VB code.

1. In Excel, open the Control Toolbox. (View> Toolbars> Control Toolbox). This causes Excel to enter Design mode.
2. Place a Command button in the Excel worksheet by clicking on the Command Button icon on the Control Toolbox as shown below.



2. In UniDDE, select and right-click the desired operand, then copy the Write Macro command.

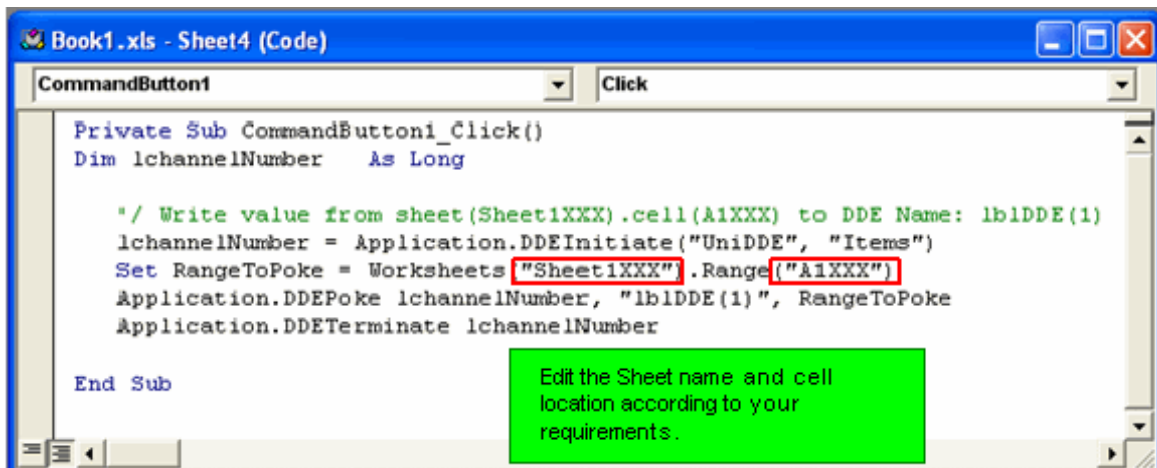
PLC	+	Operand Type	Operand Address	Vector Length	DDE Name	Direction	Enabled
PLC4		MI	0	1	!bIDDE(1)		

Copy Read Command: '!bIDDE(1)' to Clipboard
 Copy Write Macro: '!bIDDE(1)' to Clipboard

- In Excel, double-click the Command button to access the macro code, then paste the UniDDE macro code.



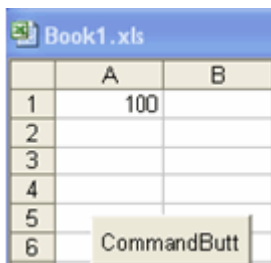
- Edit the Sheet name and cell location according to your requirements.



- Exit Design Mode by closing the Control Toolbox.

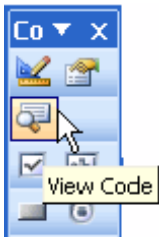


- According to the code in this example, when UniDDE runs, clicking the Command button will write the value in cell A1 to MI 0 in PLC4.

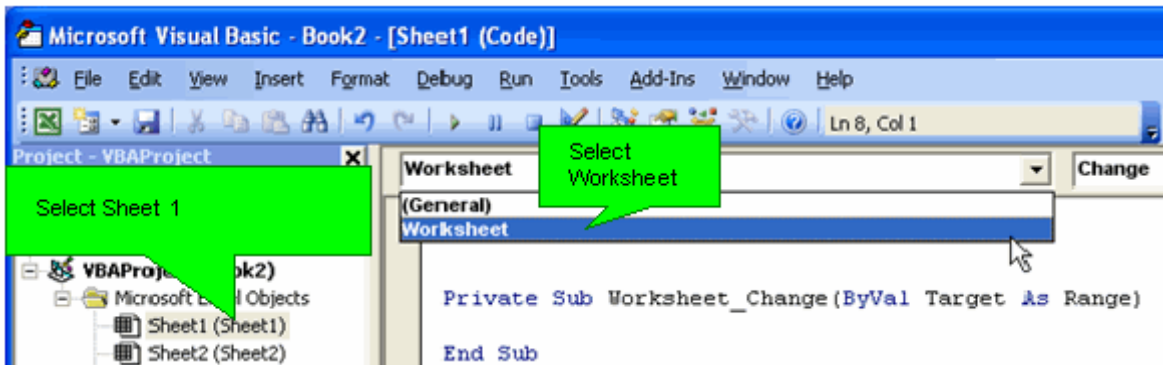


Instead of a command button, you can use a Change Value event. This causes the value you type into an Excel cell to be written to the PLC.

1. Enter Design Mode and open the Visual Basic editor by selecting View Code from the Control Toolbox.



2. Select Sheet1 and Worksheet as shown in the figure below.

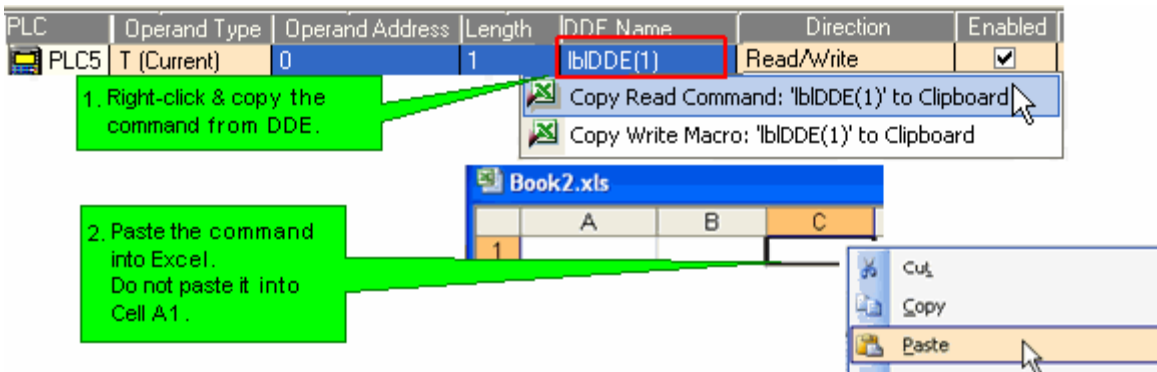


Read\Write

Using Read\Write enables you to simultaneously view a running operand value in Excel and update it.

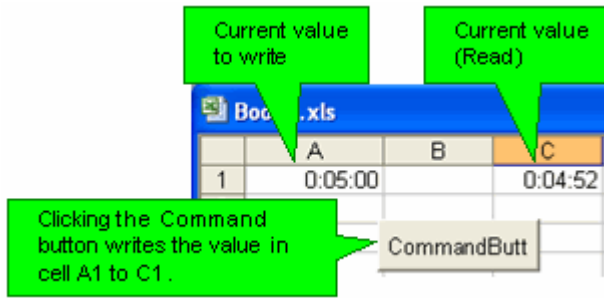
To Read\Write to a PLC operand, you need to format 2 Excel cells, one to Read the value, and another to contain the write value. In order to write to operands via Excel, you can add a Command button and paste the UniDDE command into the button's VB code.

1. In UniDDE, select and right-click the desired operand, then copy the Excel 'Read' Command from the UniDDE project.
2. Open Excel, then paste the command into the worksheet

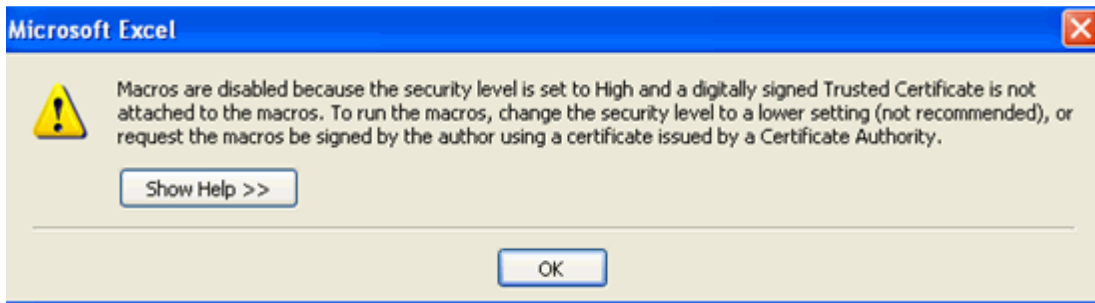


In order to write to the operand, you can create a macro as explained in the Write section above.

According to this example, when UniDDE runs, clicking the Command button will write the value in cell A1 to T0 in PLC5.



You will not be able to use Excel macros if, in Microsoft Excel, your macro security is set to High (Tools>Macros>Security). Note that if you upgrade Microsoft Office, macro security may be automatically reset to high; in this case the following error may be displayed:



To solve this problem, reset Macro security to a lower level.

PID Server

The PID Server PC utility enables you to auto-tune PID loops for both the Vision and M90/91 controller series. Although it is installed as part of the VisiLogic/U90 Setup, PID Server runs independently of other Unitronics software.

How Auto-tune works

The PID Server utility tunes a PID loop by temporarily disabling the PLC's PID function, and tuning the loop while the PC controls the PID output.

To enable a PID loop to be auto-tuned:

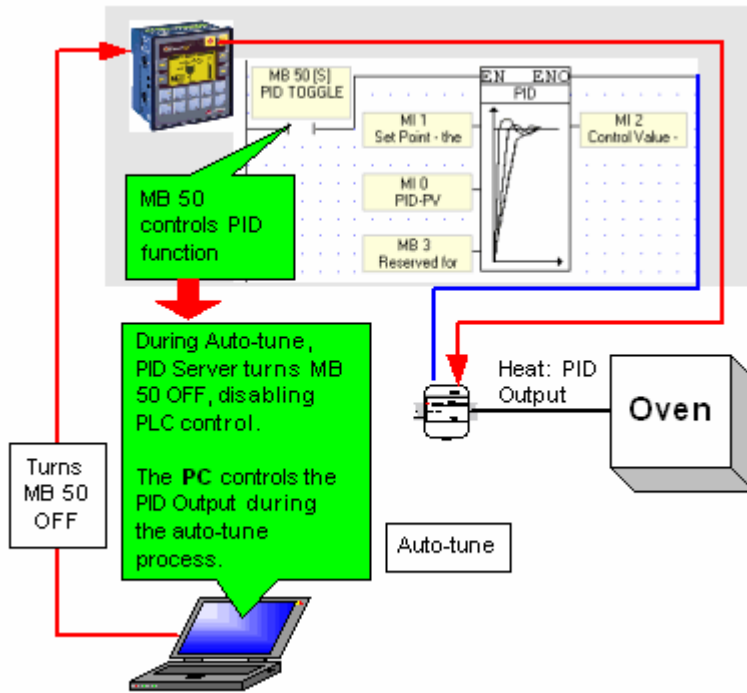
- The controller must be connected to the I/O module whose output feeds energy into PID system.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the PLC's PID function.

Note ♦ | PID Server will only work with Vision 3.73 and U90 3.70 and higher projects saved with the most current version of VisiLogic. To update older projects, open them with the current VisiLogic version and save them.

Vision Auto-tune

Before a PID loop can be auto-tuned:

- The OPLC must be connected to the I/O module whose output feeds energy into the PID-controlled system.
- The OPLC must be installed with a Ladder application that **contains a PID function; the function must be activated by an MB that is used only for that purpose.** When the loop is auto-tuned, the PID Server utility uses this MB to disable the PLC's PID function.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the OPLC's PID function.



Auto-tuning with PID Server (Vision)

1. Start PID Server from:
 - within VisiLogic via the menu bar, Tools> PID Server,
 - or
 - within Windows via Start>Programs>Unitronics> PID Server.
2. Click on the New File icon to create a new PID loop Auto-tune file.
3. Locate Loop Properties in the lower right-hand part of the screen. Link all of the parameters to the same operands used in the PID function within the Ladder application. To link a parameter, click on the Address field and select the desired address. You can also import operand addresses.

Visible	Function	Operand	Addr		Description
<input checked="" type="checkbox"/>	SP	MI	1	1200	Set Point - the target value
<input checked="" type="checkbox"/>	PV	MI	0	891	Process Value - the PID input
<input checked="" type="checkbox"/>	CV	MI	2	302	Control Value - the PID output
<input type="checkbox"/>	ST	MI	4	0	Sample Time - defined in units of 10 mSec. Recomm
<input type="checkbox"/>		MI	5	0	Proportional band - defined in units of 0.1% (P gain)
<input type="checkbox"/>		MI	6	0	Integral time - defined in units of 1 second (I gain)
<input type="checkbox"/>		MI	7	0	Derivative time - defined in units of 1 second (D gain)
<input type="checkbox"/>		MI	8	0	Input Range - Process Value Low limit
<input type="checkbox"/>		MI	10	0	Output Range - Process Value Low limit
<input type="checkbox"/>		MI	11	0	Output Range - Process Value High limit
<input type="checkbox"/>	CV(p)	MI	12	0	Control Value CVp
<input type="checkbox"/>	CV(i)	MI	13	0	Control Value CVi
<input type="checkbox"/>	CV(d)	MI	14	0	Control Value CVd
<input type="checkbox"/>	RST Intgrl	MB	0	0	Reset integral accumulated error; Set to clear
<input type="checkbox"/>	Enable PID	MB	1	0	Enable PID Bit (in ladder)
<input type="checkbox"/>	Rev Action	MB	2	0	0: Reverse(Control type Heating) 1: Direct(Control typ
<input type="checkbox"/>	Tune params	MI	400	0	Auto-tune parameters, 32 MIs

Click the Address field, then on the drop down arrow that appears. Click the desired address.

① Note that the Enable PID bit must be the same MB used to activate the PID function within the Ladder application.

In addition, note that PID Server uses the 32-bit Auto-tune Parameter vector to store values. Do not allow your application to overwrite the vector.

The parameter links must be identical

Enable PID MB

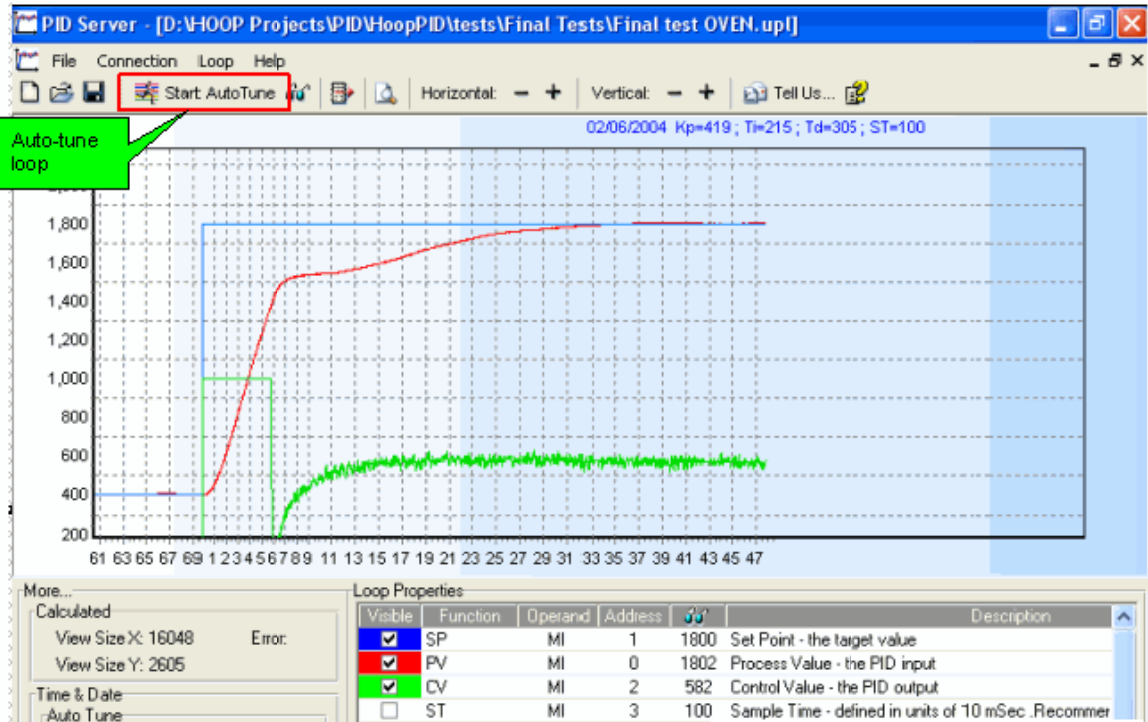
Visible	Function	Operand	Addr	Description
<input checked="" type="checkbox"/>	SP	MI	1 1200	Set Point - the target value
<input checked="" type="checkbox"/>	PV	MI	0 891	Process Value - the PID input
<input checked="" type="checkbox"/>	CV	MI	2 302	Control Value - the PID output
<input type="checkbox"/>	Kp	MI	4 0	Proportional band - defined in units of 0.1% (P gain)
<input type="checkbox"/>	Ti	MI	5 0	Integral time - defined in units of 1 second (I gain)
<input type="checkbox"/>	Td	MI	6 0	Derivative time - defined in units of 1 second (D gain)
<input type="checkbox"/>	SpPv-High	MI	8 100	Input Range - Process Value High limit
<input type="checkbox"/>	SpPv-Low	MI	7 0	Input Range - Process Value Low limit
<input type="checkbox"/>	CV-High	MI	10 1000	Output Range - Process Value High limit
<input type="checkbox"/>	CV-Min	MI	11 0	Output Range - Process Value Low limit
<input type="checkbox"/>	RST Intgrl	MB	2 0	Reset integral accumulated error; Set to clear
<input type="checkbox"/>	Enable PID	MB	50 0	Enable PID Bit (in ladde)

Param	Func	Operand	Address	Format	Description
	PV	MI	0	DEC	PID-PV
	SP	MI	1	DEC	Set Point - the target value
	ST	MI	3 10	DEC	Sample Time - defined in units of 10 mSec (Recomme
	Kp	MI	4	DEC	Proportional band - defined in units of 0.1% (P gain)
	Ti	MI	5	DEC	Integral time - defined in units of 1 second (I gain)
	Td	MI	6	DEC	Derivative time - defined in units of 1 second (D gain)
	Reserved	MI	7	DEC	Reserved for future use
IN	SpPv-High	MI	8 2000	DEC	Input Range - Process Value High limit
	SpPv-Low	MI	9 0	DEC	Input Range - Process Value Low limit
	Cv-High	MI	10 1000	DEC	Output Range - Control Value High limit
	Cv-Low	MI	11 0	DEC	Output Range - Control Value Low limit
	Reserved	MI	12	DEC	Reserved for future use
	Direct	MB	1 RESET		0: Direct(Control type Cooling) 1: Reverse(Control type
	RST Intgrl	MB	2		Reset integral accumulated error; Set to clear
	Ctrl Ntype	MB	3		Reserved for future use
OUT	CV	MI	2	DEC	Control Value - the PID output
	CV(p)	MI	20	DEC	Control Value CVp/(CVp+CVi+CVd)
	CV(i)	MI	21	DEC	Control Value CVi/(CVp+CVi+CVd)
	CV(d)	MI	22	DEC	Control Value CVd/(CVp+CVi+CVd)

- From the Connection menu, click OPLC model, and then select your controller type.
- From the Connection menu, click Communication - PC Settings, and select the appropriate settings.
- Click the Auto-tune icon. The Stages box opens.
- Click on the drop-down arrow to select the number of desired Stages, which is the number of samples that Autotune will use in order to analyze the system.



- Click OK; the PID Server utility begins to run. Note that by checking the Visible option in Loop Properties, you cause PID Server to display a color-coded graphical representation of the Auto-tune process.



Older PID Server Applications

AutoTune Algorithm is a feature added with PID Server V4.00.

- Type A
Previous to V 4.00, PID Server used Type A to tune all PID loops.
- Type B (default)
When this algorithm runs, PID server uses a vector 32 MIs long to store Auto-tune Parameters. Do not overwrite this vector in your application.

The screenshot shows the "AutoTune" dialog box. The "AutoTune Algorithm:" dropdown menu is open, showing "Type B" selected. A green callout bubble points to this dropdown with the text "Selecting Type B causes the Auto-tune Parameters property to display".

Below the dropdown is a "Properties" table:

Visible	Function	Operand	Address	Description
<input checked="" type="checkbox"/>	SP	MI	0 0	Set Point - the target value
<input checked="" type="checkbox"/>	PV	MI	0 0	Process Value - the PID input
<input checked="" type="checkbox"/>	CV	MI	0 0	Control Value - the PID output
<input type="checkbox"/>	ST	MI	0 0	Sample Time - defined in units of 10 mSec .Recomm
<input type="checkbox"/>	Kp	MI	0 0	Proportional band - defined in units of 0.1% (P gain)
<input type="checkbox"/>	Ti	MI	0 0	Integral time - defined in units of 1 second (I gain)
<input type="checkbox"/>	Td	MI	0 0	Derivative time - defined in units of 1 second (D gain)
<input type="checkbox"/>	SpPv-Low	MI	0 0	Input Range - Process Value Low limit
<input type="checkbox"/>	SpPv-High	MI	0 0	Input Range - Process Value High limit
<input type="checkbox"/>	CV-Min	MI	0 0	Output Range - Process Value Low limit
<input type="checkbox"/>	CV-High	MI	0 0	Output Range - Process Value High limit
<input type="checkbox"/>	CV(p)	MI	0 0	Control Value CVp
<input type="checkbox"/>	CV(i)	MI	0 0	Control Value CVi
<input type="checkbox"/>	CV(d)	MI	0 0	Control Value CVd
<input type="checkbox"/>	RST Intgrl	MB	0 0	Reset integral accumulated error; Set to clear
<input type="checkbox"/>	Enable PID	MB	0 0	Enable PID Bit (in ladder)
<input type="checkbox"/>	Rev Action	MB	0 0	0: Reverse(Control type Heating) 1: Direct(Control typ
<input type="checkbox"/>	Tune params	MI	0 0	Auto-tune parameters, 32 MIs

Note ♦ If the system you are tuning has critical limits that are close to the setpoint, you may need to avoid drastically overshooting the setpoint during autotune.
 To accomplish this in, for example, a heating system, run an initial autotune procedure using a setpoint temperature lower than that the desired, final temperature. You can then observe the system temperature reaction, and repeat autotune, gradually increasing the setpoint temperature until the system reaches the desired temperature.

Controlling the Physical Output

Before beginning auto-tune, you may want to control and initialize the actual physical output that feeds energy into the PID-controlled system. If, for example, you are using a V120-12-UN2, you can suspend the action of a high-speed output by using Ladder Logic to turn off the Output's Run MB, and initialize the output by storing 0 into the linked MI in the Ladder program.

The screenshot displays the 'Loop Properties' table and the 'V120-12-UN2' configuration window. The 'Loop Properties' table is as follows:

Visible	Function	Operand	Addr	Description
<input checked="" type="checkbox"/>	SP	MI	1 1200	Set Point - the target value
<input checked="" type="checkbox"/>	PV	MI	0 891	Process Value - the PID input
<input checked="" type="checkbox"/>	CV	MI	2 302	Control Value - the PID output

The 'V120-12-UN2' configuration window shows the 'High Speed Output' section with the following table:

Address	Type	Op	Addr	Description
00	High Speed Output (PWM)	MI	17	Operand for Frequency
		MI	2	Control Value - the PID ou
		MB	40	Run MB

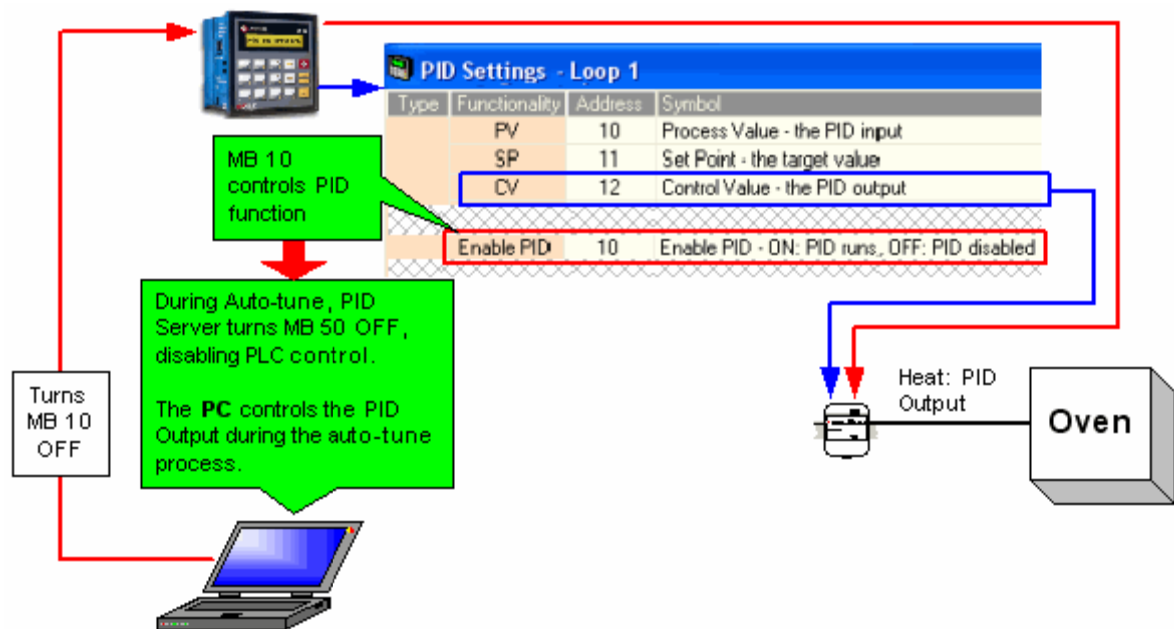
Callouts in the image provide the following instructions:

- Initialize the physical Output by storing 0 to the linked MI.
- Use the Run MB to control HSO action.

M90/91 Auto-tune

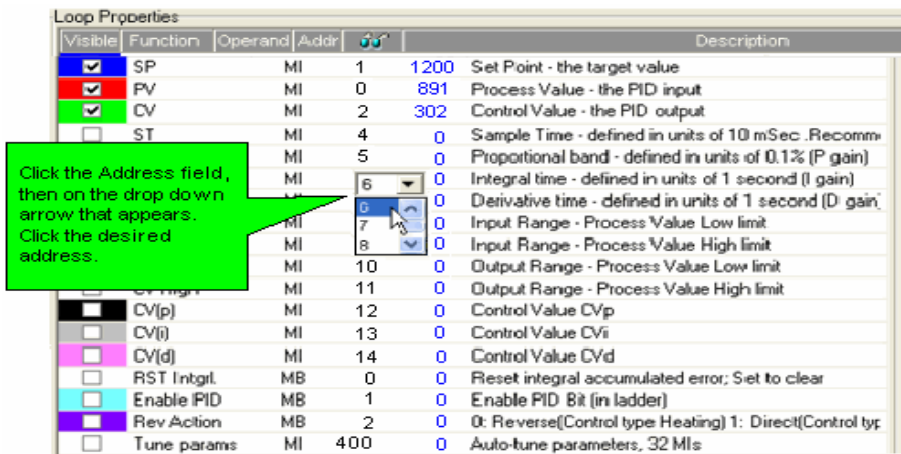
Before a PID loop can be auto-tuned:

- The OPLC must be connected to the I/O module whose output feeds energy into the PID-controlled system.
- The OPLC's Ladder application must **contain a PID function that is activated by an MB that is used only for that purpose**. When the loop is auto-tuned, the PID Server utility uses this MB to disable the PLC's PID function.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the PLC's PID function.

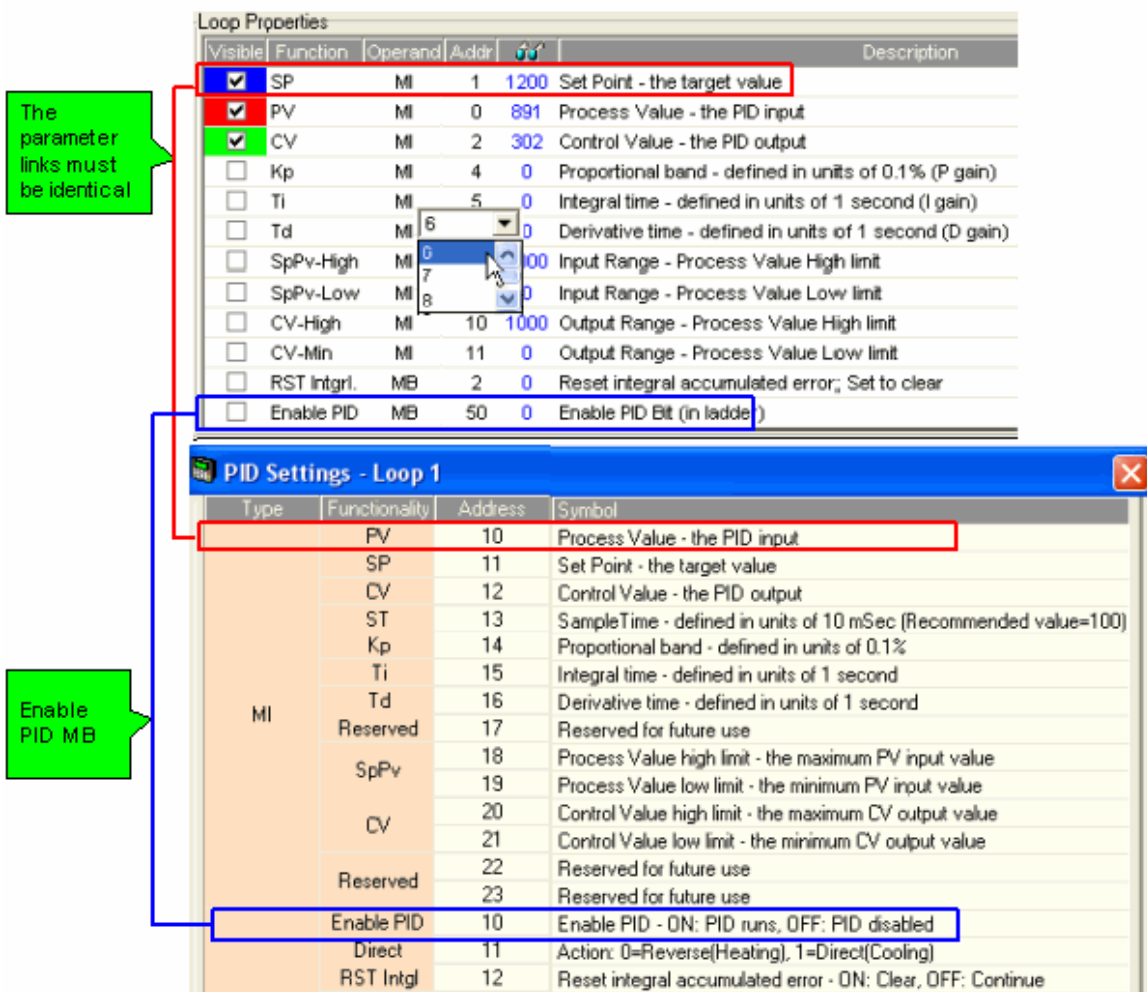


Auto-tuning with PID Server (M90/91)

1. Start PID Server from:
 - within VisiLogic via the menu bar, Tools> PID Server,
 - or
 - within Windows via Start>Programs>Unitronics> PID Server.
2. Click on the New File icon to create a new PID loop Auto-tune file.
3. Locate Loop Properties in the lower right-hand part of the screen. Link all of the parameters to the same operands used in the PID function within the U90Ladder application. To link a parameter, click on the Address field and select the desired address.

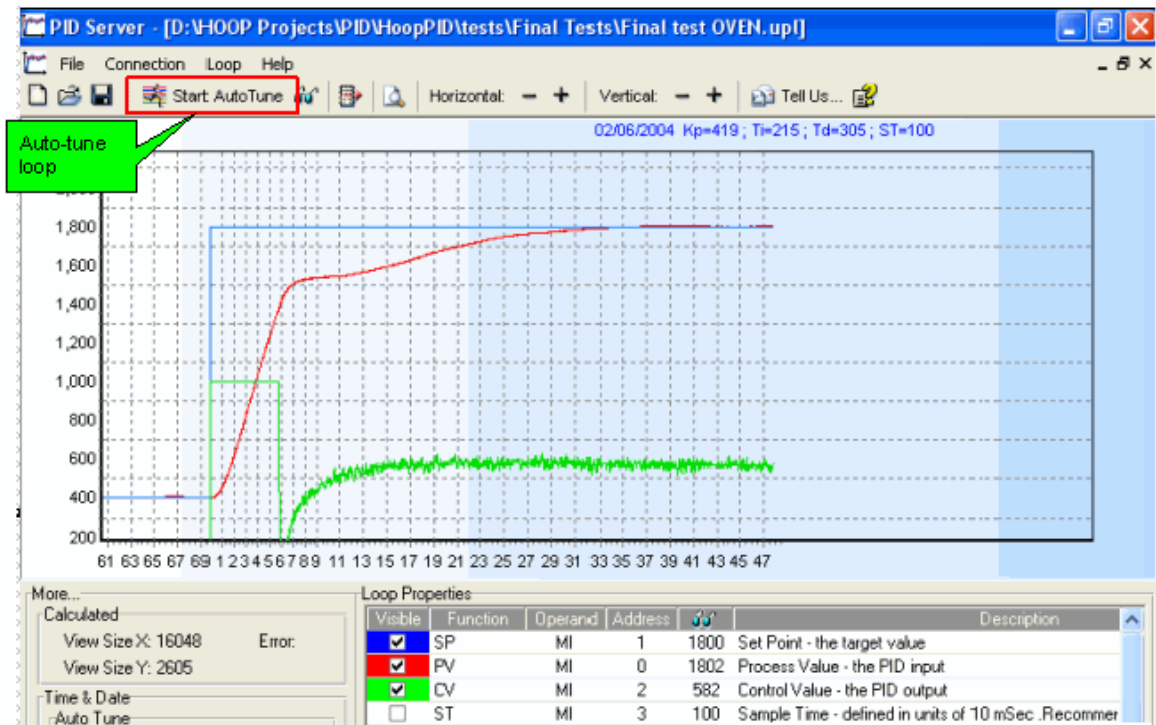


The last parameter is the Enable PID bit, which must be the MB used to activate the PID function within the U90Ladder application.



- From the Connection menu, click OPLC model, and then select your controller type.
- From the Connection menu, click Communication - PC Settings, and select the appropriate settings.
- Click the Auto-tune icon. The PID Server utility begins to run. Note that by checking the Visible option in Loop Properties, you cause PID Server to display a color-coded graphical representation of the Auto-tune

process.



Note ♦ If the system you are tuning has critical limits that are close to the setpoint, you may need to avoid drastically overshooting the setpoint during autotune. To accomplish this in, for example, a heating system, run an initial autotune procedure using a setpoint temperature lower than that the desired, final temperature. You can then observe the system temperature reaction, and repeat autotune, gradually increasing the setpoint temperature until the system reaches the desired temperature.

Controlling the Physical Output

Before beginning auto-tune, you may want to control and initialize the actual physical output that feeds energy into the PID-controlled system. If, for example, you are using an M91-12-UN2, you can suspend the action of a high-speed output by using Ladder Logic to turn off the Output's HSO Enable MB, and initialize the output by storing 0 into the linked MI in the Ladder program.

Visible	Function	Operand	Address	
<input checked="" type="checkbox"/>	SP	MI	1	Set Point - the target value
<input checked="" type="checkbox"/>	PV	MI	2	Process Value - the PID input
<input checked="" type="checkbox"/>	CV	MI	3	Control Value - the PID output

M91-19-4UN2

High Speed Inputs **High Speed Output**

No.	Link	Type	Address	Description
1	High Speed Output	MI	2	HSO frequency
		MI	3	HSO duty cycle
		MB	1	HSO enable

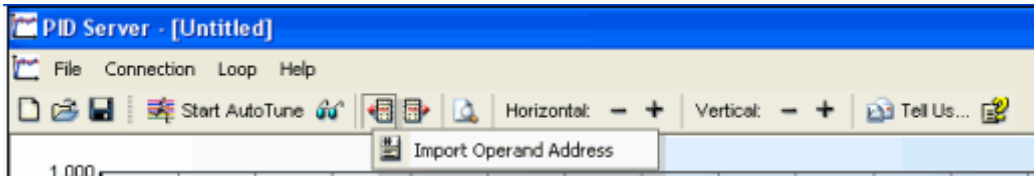
Initialize the physical Output by storing 0 to the linked MI.

Use the HSO enable bit to control HSO action.

PID Server Features

Import operand addresses

The PID function in VisiLogic enables you to export the PID operand addresses in a text file. You can then use the Import operand Address feature to import the text file; the PID operand addresses in the text file will be automatically addresses entered into PID server.

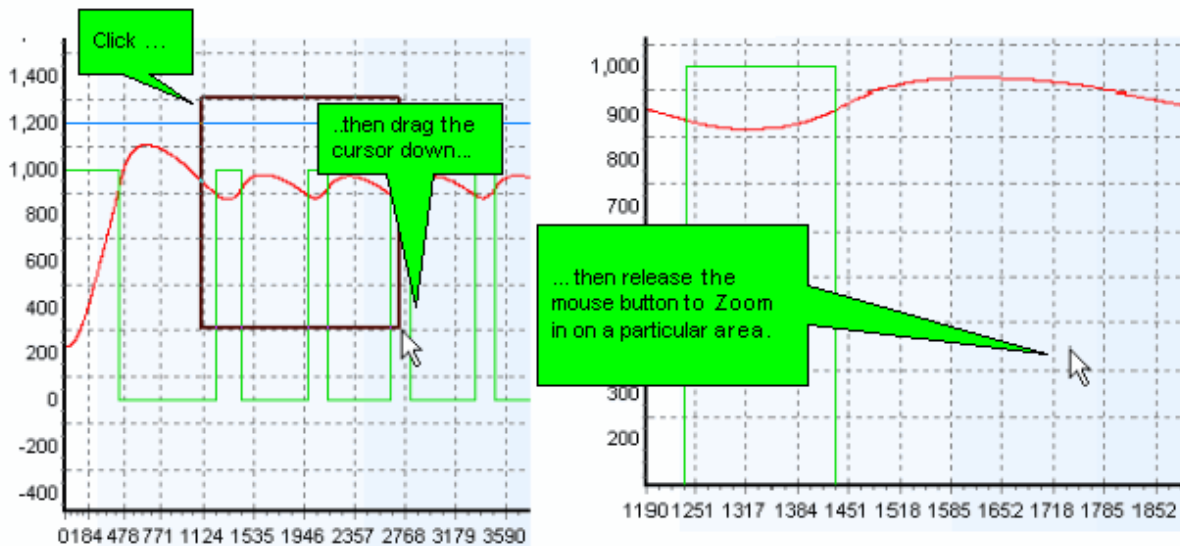


Saving File Parameters

Whenever you click the Save icon, the file is saved as a .upl file. This file may be opened by any PC running PID Server. .upl files include the Loop Properties parameter links, comments, and PID auto-tune data up to the time that you click Save. If you wish to save only the Loop Properties without the data, by creating them, clicking Save, and storing the file.

Zoom

Click, then drag the cursor down, then release the mouse button to Zoom in on a particular area.



Click and drag the cursor up to reverse the Zoom effect.



Increase/Decrease Display View Size

Click the + icon on the toolbar to increase the graph sample size; click the - icon to decrease it.

Export

Located on the Loop menu, Export enables you to either export the auto-tune data to Excel, or to save a .bmp file of the auto-tune graph.

Comments

The Comment field is located in the lower left-hand corner of the PID server window. Any text you enter here is saved together with the .upl file.

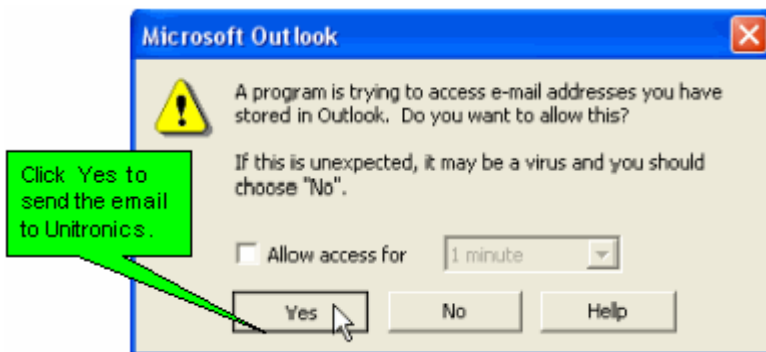
What's this ?

Our mission is to make automation simple and efficient. Unitronics' R&D has developed and field-tested PID Server in order to provide you with fast, easy loop tuning.

To enable us to fine-tune PID Server to suit a broad range of PID applications, we would appreciate your using the 'Tell Us' feature. Clicking 'Tell us' will create an email with an attached copy of your auto-tune and PID process.

If possible, before you send the email, please take a moment to put the details of your application in the body of the email.

Note that in Windows XP, Windows will display the following dialog box; simply click yes to send the message to Unitronics.



.		Ladder element	31, 34
.dvi	98	Log	17, 34
.ura	98	M	
.urc	98	Memory	48
.vdf	98	N	
A		Network	30, 33
Alarms	85	O	
ASCII String	65, 70	O/S	30
C		OPC	14
clone	2, 40	P	
Com Parameters	30	Password	87
Communications	72	PTO	1
D		PWM-Pulse Width Modulation	1
Data	37, 39	R	
Data Blocks	31, 34	RAM	48
Data Exchange	14, 37, 38, 39	Recipes	58, 62
Data Table	15	Remote Access	98, 34, 38
Data Tables	2, 17, 27, 34, 48, 51, 58, 61, 62, 38	Remote Access, SD card data	11
Database, read/write	17, 48, 51, 58, 61	Remote PLC Programming	92
DDE	37, 38, 39	Reset	32
Downloading	98	RTC settings	32
dvi	98	S	
E		SD	2, 16, 17, 27, 31, 34, 40, 44, 11
Ethernet	72	SD Card	15
Excel	27, 58, 38	SD Card Explorer	11
F		Server	14
files	31, 34	String	70
Flash	48	T	
Function	40, 70	TCP/IP	72
H		Text	65
High Speed Output (HSO)	1	Text Variable	65
HMI	65	Touch-screen	87
HTML	31, 34	U	
I		Unidownloader	98
Information Mode	87	V	
Initialize	32	V290	87
L		Values	58
Ladder	17	Variable Types	44
		W	
		Web server	72