Control Technology Inc.

CTI 2500 Visualization Panel

QUICK START MANUAL

Version 1.4

CTI Part # 062-00386-014

Powered by Zenon

2500VPQSM

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REVISION HISTORY		
V 1.0	3/17/11	Initial Release
V1.1	6/13/11	Corrections on pages 28 and 79.
V1.2	2/8/12	Revise Manual for Windows 7 Embedded
V1.3	7/7/12	Revise Manual for Zenon 7.00 Operator
V1.4	9/30/13	Revise Manual for Zenon 7.10 Operator

PREFACE

This ***Quick Start Manual*** provides reference information for the CTI 2500-VP15 Visualization Panel. The information in this manual is directed to individuals who will be installing and operating the panel as well as those who will be designing systems that use the panel.

USAGE CONVENTIONS

NOTE
Notes alert the user to special features or procedures.

CAUTION
Cautions alert the user to procedures that could damage equipment.

WARNING
Warnings alert the user to procedures that could damage equipment and endanger the user.

TABLE OF CONTENTS

CHAPTER 1 HARDWARE OVERVIEW AND INSTALLATION

1.1 Introduction

The CTI 2500-VP15 Visualization Panel is a 15” color, touchscreen HMI (Human Machine Interface) panel. It is especially suitable for process control applications that require advanced graphical process visualization, intuitive operational controls, process data trending, and process alarm history. The 2500-VP15 HMI panel is available either integrated with powerful Zenon® HMI / Scada software or as a user configurable Windows 7 Embedded operator panel ready for use with your own software.

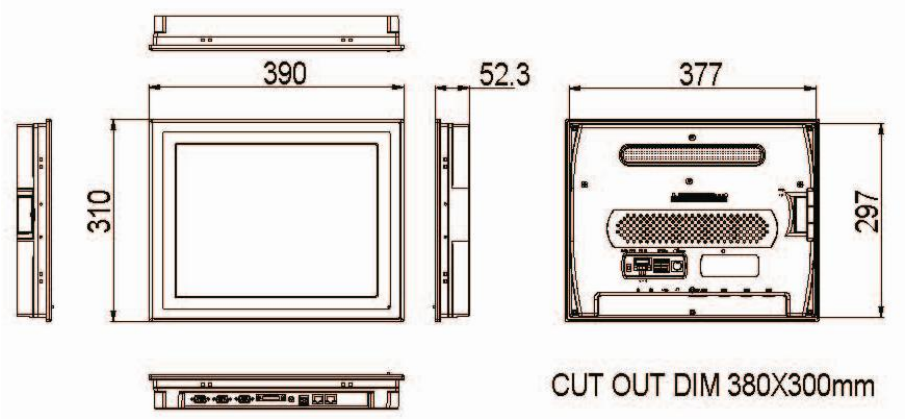
1.2 Visualization Panel Features

1.2.1 Hardware Specifications

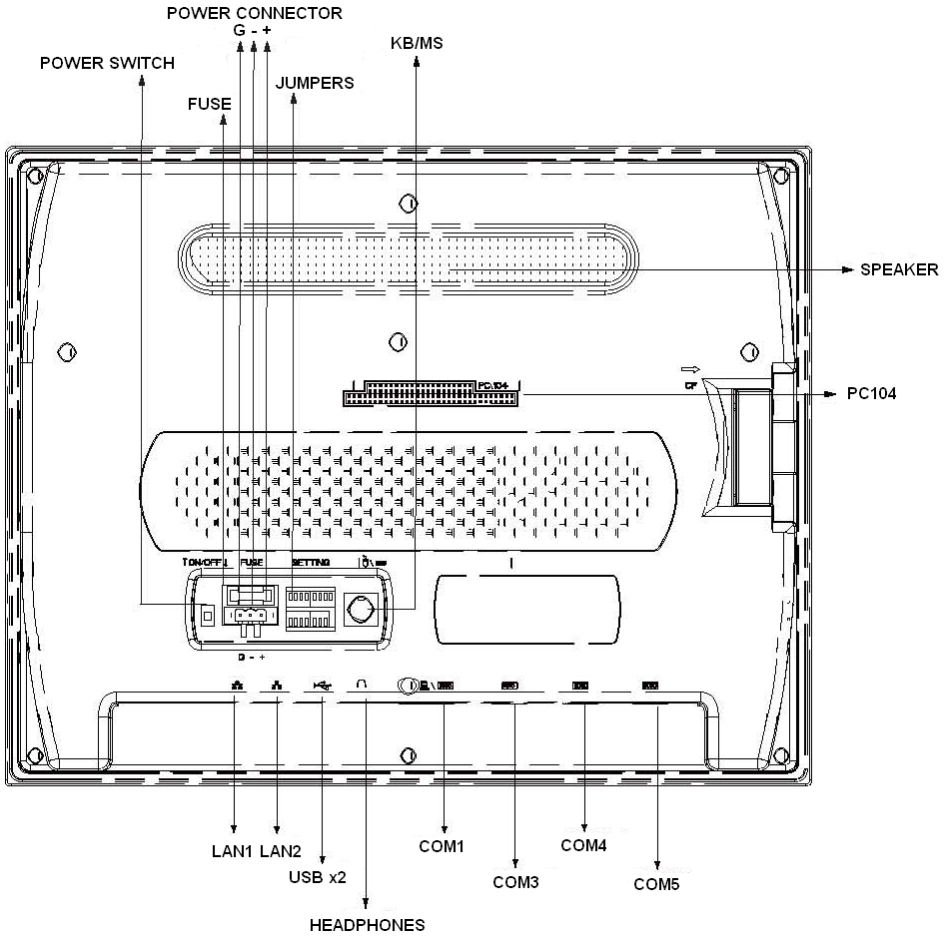
Processor:	Intel® Atom™ N270 1.6GHz CPU
Resolution:	15” 1024 x 768 XGA Color TFT LCD
Brightness:	Super Bright 550 cd/m²
Touchscreen:	8-wire, Analog Resistive
Memory:	2GB of DDR2
Storage:	16GB Compact Flash Card 64GB Internal SSD Hard Drive (Optional) Part #: 700-00038
Serial Port:	2 x Isolated RS-232 ports; 2 x Isolated RS-422/485 ports (with optical isolation design of 3.75KV)
Parallel Port:	1 x LPT
USB Port:	2 x USB 2.0 (Host)
KB/MS:	1 x PS2 Keyboard and Mouse
LAN:	2 x Gigabit Ethernet controllers
Chassis:	Front Panel NEMA4/IP65 Compliance
Materials:	Aluminum (Front Panel), PC + ABS (Bezel)
Cooling:	Passive; Fanless
Power Input:	DC 9 ~ 33V
Consumption:	45W
Op. Temp.:	0 ~ 50°C (32 ~ 122ºF)
Weight:	4.4 kg (9.7 lb)

1.2.2 Dimensions and Panel Cutout

Weight: 4.4kg (9.7lbs)
Dimensions: 390.0 x 310.0 x 52.3 [WxHxD]
Panel Cutout: 380.0 x 300.0 (14.96 x 11.81”)

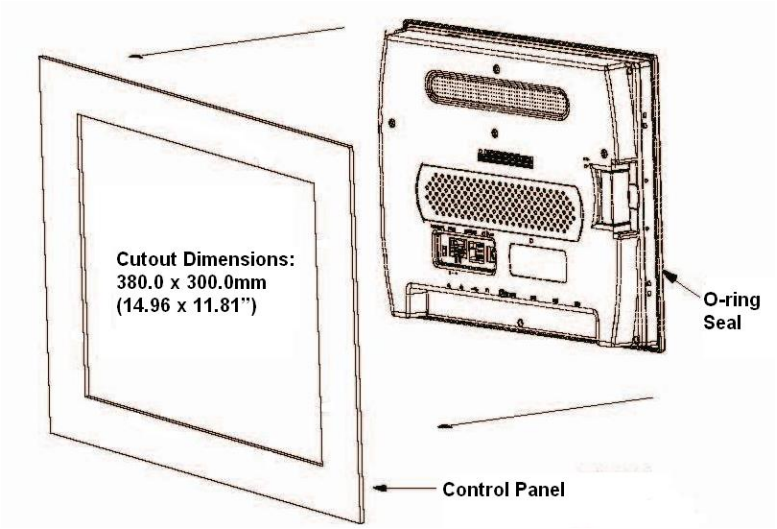


1.2.3 IO Connections Diagram

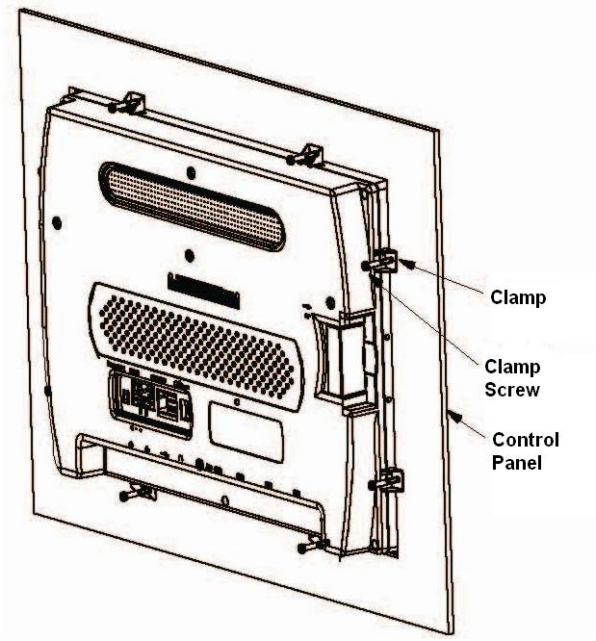


1.3 HMI Installation in Control Panel

Step 1: Install rubber o-ring gasket in the grove on the backside of the bezel.



Step 2: Insert the back of HMI panel into the control panel cutout.

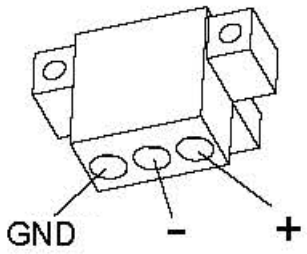


Step 3: Install 8x mounting clamps and tighten screws against the inside face of the control panel.

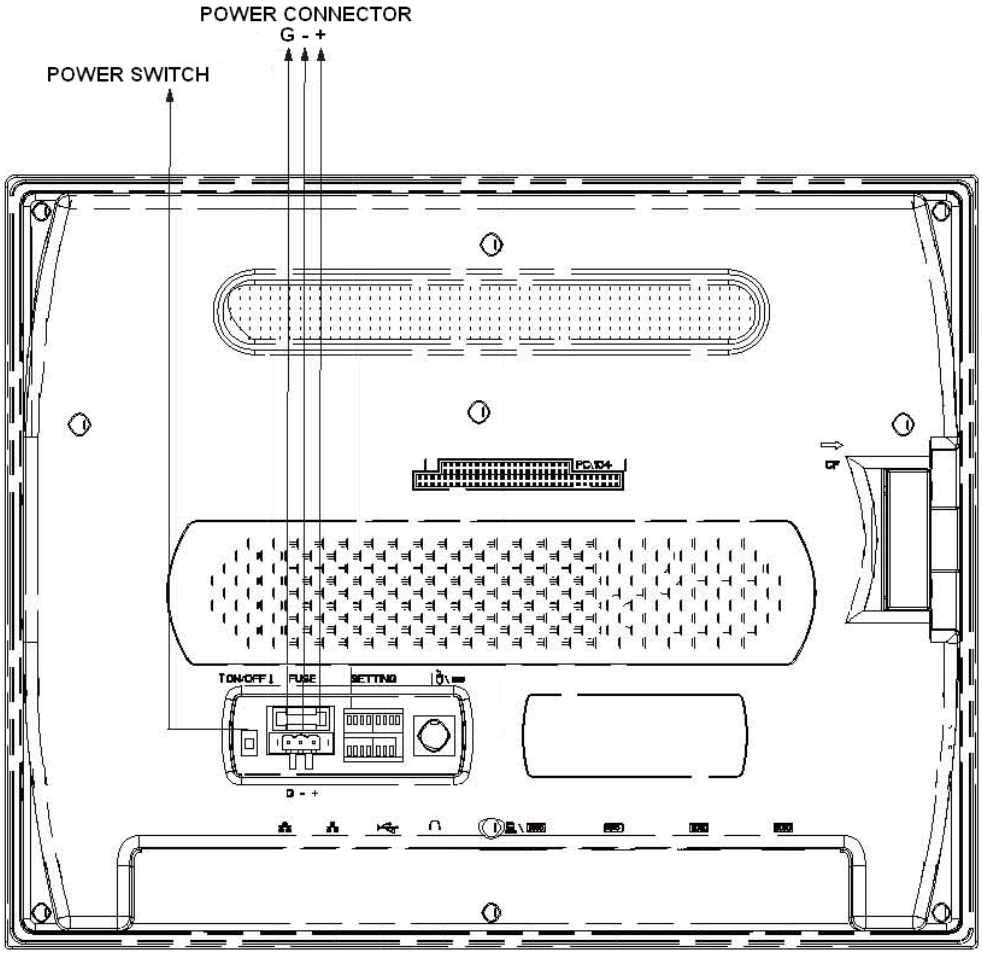
1.4 Connecting Power to HMI Panel

Step 1: Verify that the power switch on the back of the HMI panel is on the 'OFF' position.

Step 2: Terminate 9~33VDC power to included power plug. The HMI panel draws 45 watts of power. Make sure your DC power supply has sufficient capacity.



Step 3: Plug the DC power connector into the receptacle on the back of the panel.

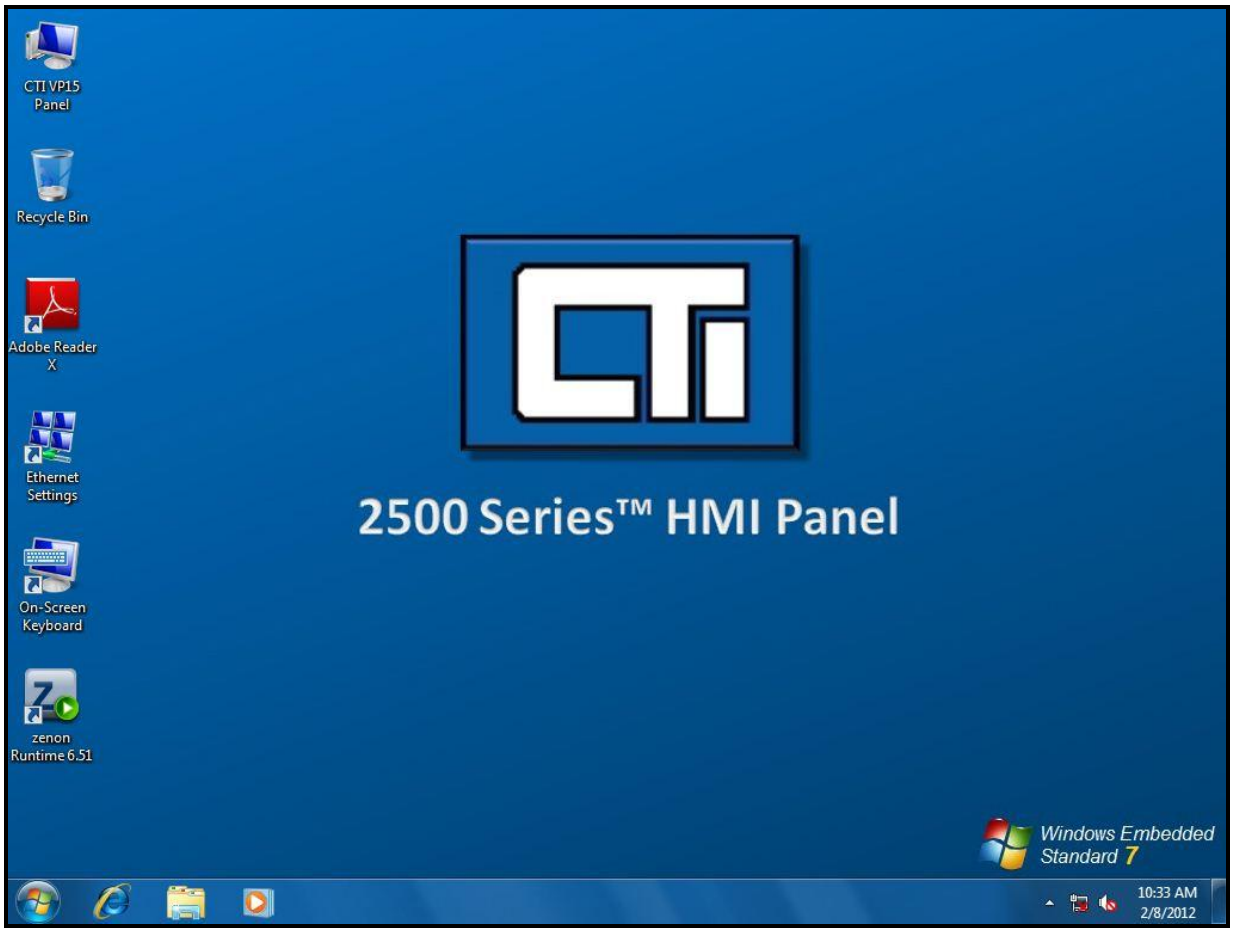


1.5 Ethernet Connectivity

Your 2500-VP15 has two onboard gigabit ethernet controllers. When viewing the HMI panel from the screen side, port 1 is on the right and port 2 is on the left. *See the IO Connections Diagram in Section 1.2.3.*

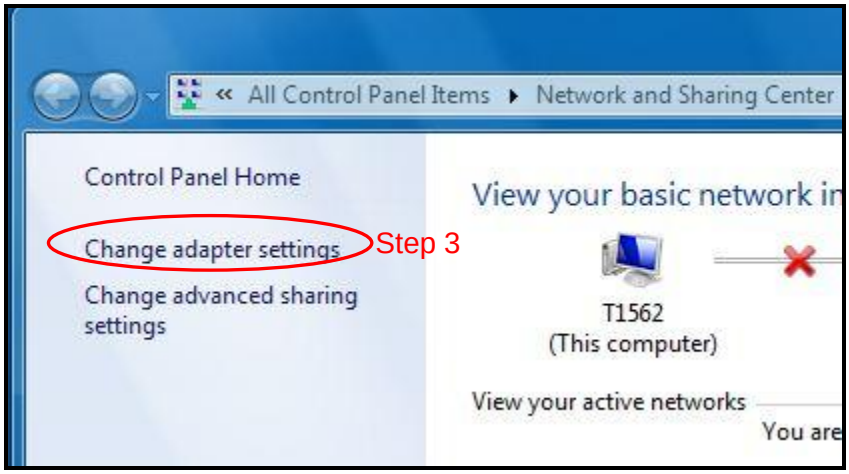
NOTE
When connecting the 2500-VP15 HMI panel to a CTI 2500 Series CPU, it is important to remember that only up to three devices can share communications on the 2500 series CPU ethernet port.

1.6 Setting the IP address

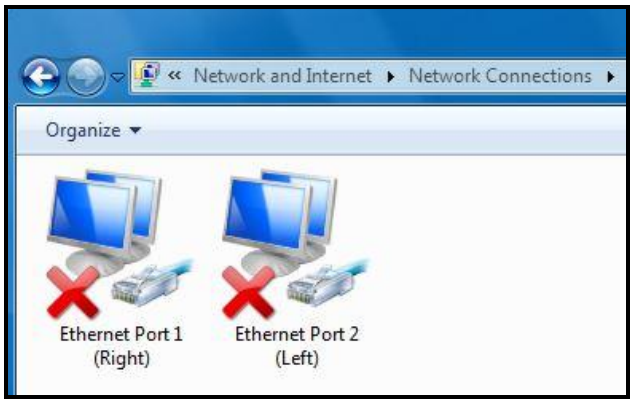


Step 1: Turn on the power switch on the back of the 2500-VP15 panel in order to boot the panel to the Windows 7 operating system desktop.

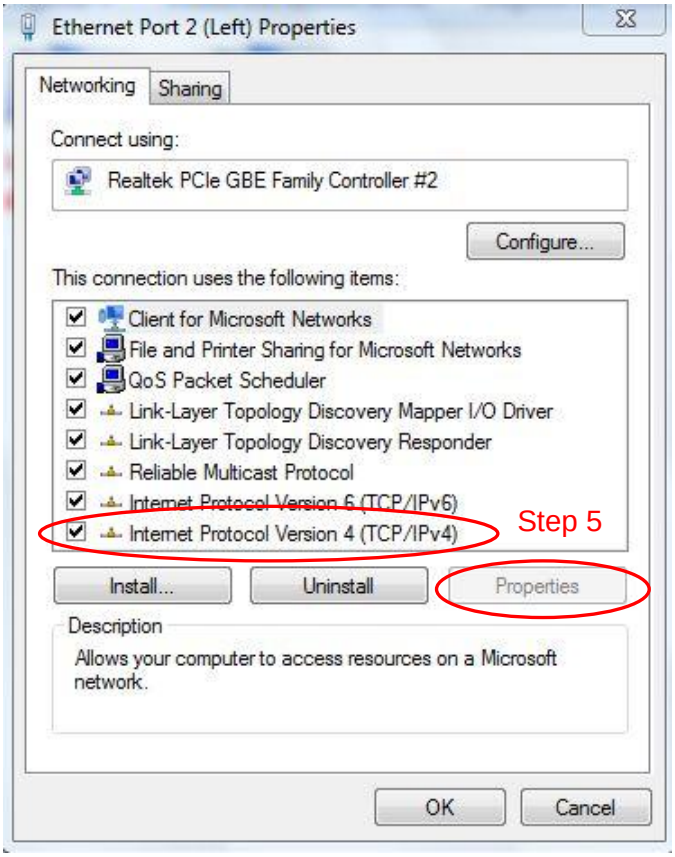
Step 2: After your HMI panel has booted to the Windows desktop, the IP address can be set by double tapping on the *Ethernet Settings* icon.



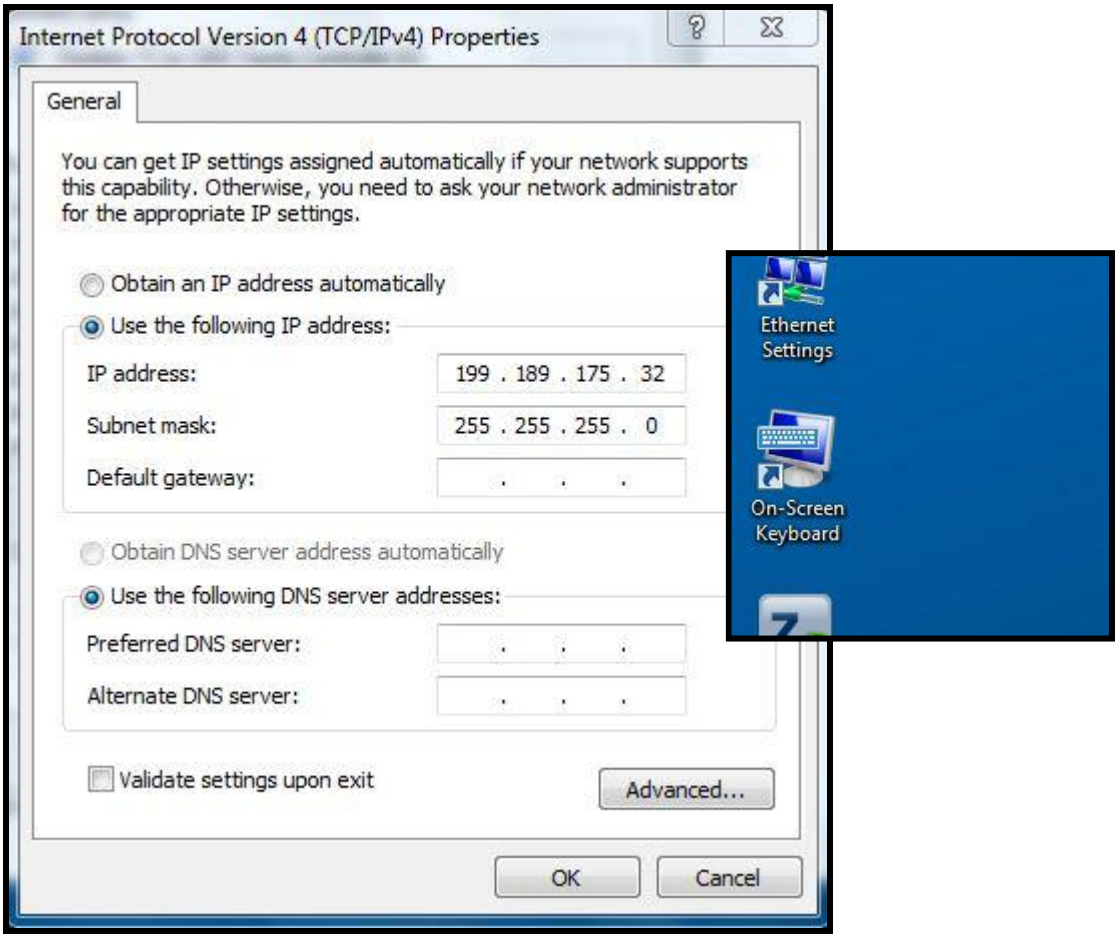
Step 3: When the Network and Sharing Center window appears, double tap the *Change adapter settings* menu item.



Step 4: Double tap the icon of the port to which the network connection will be made. *Ethernet Port 1* is the right-most port from the front side of the panel. *Ethernet Port 2* is the left-most port from the front side of the panel.



Step 5: Tap to select the *Internet Protocol Version 4 (TCP/IPv4)* connection, and then tap the *Properties* button.



Step 6: Enter a static (fixed) IP address for the panel and the appropriate subnet mask that matches the network class to which you will be connecting. An on-screen keyboard is available on the windows desktop. A USB or PS2 keyboard can also be connected to the panel.

NOTE
It is recommended that a 'static' (manual) IP address be used for the HMI panel. Using automatic addressing (DHCP) may cause loss of communications between your HMI panel and other devices.

NOTE
You must choose your IP address and subnet mask to match the class of network in which your control system will reside. For example, a class 'C' network has a subnet mask of 255.255.255.0 and the first three numbers of all of the IP addresses on the network must match.

CHAPTER 2 ZENON EDITOR INSTALLATION

The installation of the Zenon Editor consists of the following steps:

1) Reading this Chapter
2) Installing the Zenon Editor Software
3) Connecting the USB Dongle
4) Entering the Serial and Activation Numbers

2.1 Installation of Zenon Editor Software

2.1.1 Computer Considerations

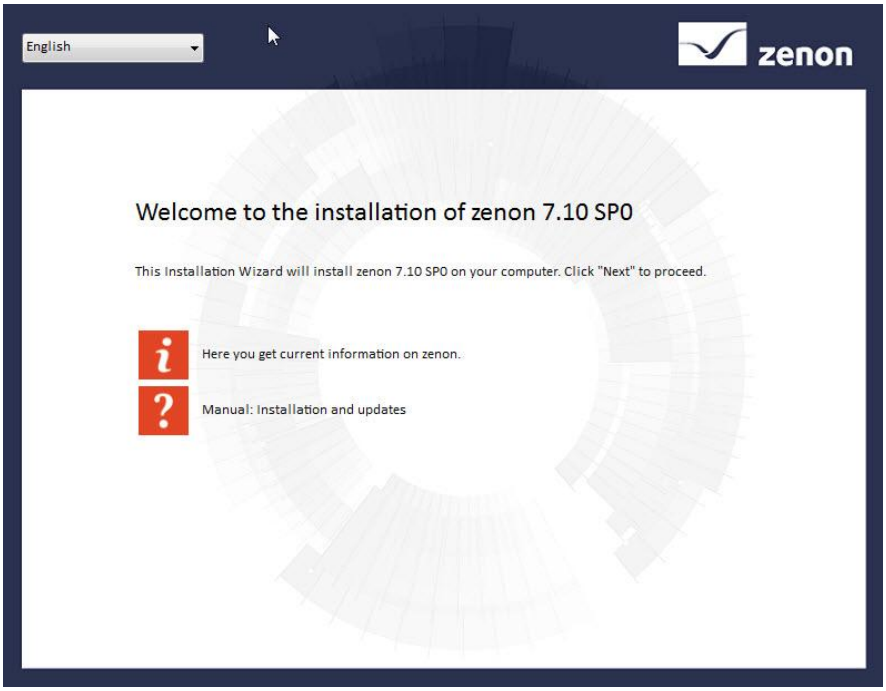
Before installing the Zenon Editor software on your PC, you should be sure that your computer meets the following compatibility criteria:

Operating System:	Windows XP SP3, Vista, or 7
Free Hard Drive Space:	2GB Minimum
Memory:	2GB Minimum
Processor:	Pentium Class 1 GHz or better
Port for Dongle:	1x USB
Programming Port:	1x Ethernet Port
Optical Drive:	DVD-ROM Drive

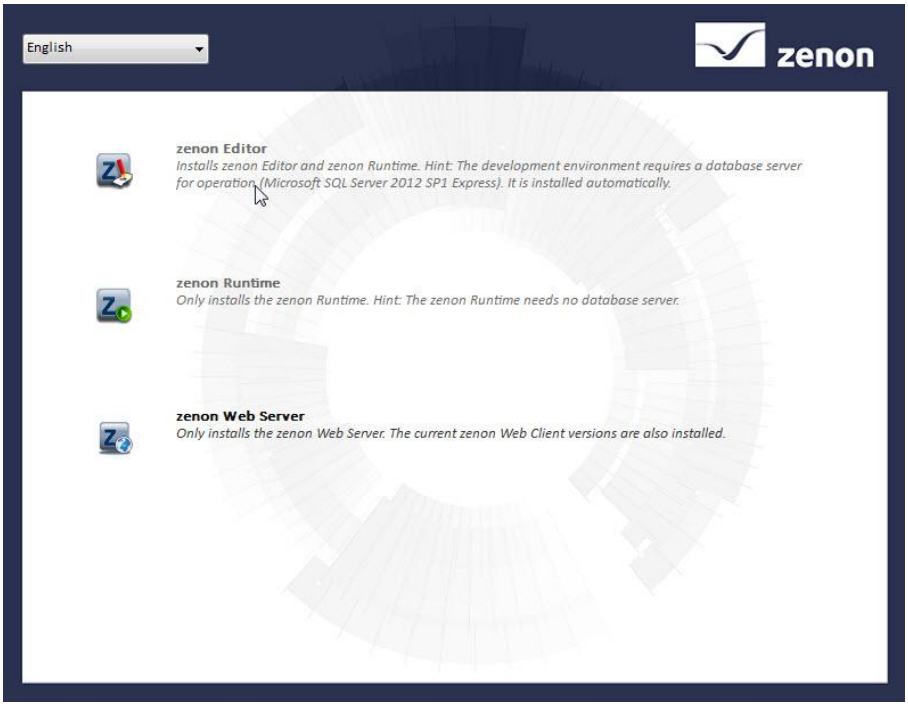
NOTE
It is recommended that the user close any open programs and temporarily halt virus protection software during the installation of the Zenon Editor software.

2.1.2 Starting the Installation

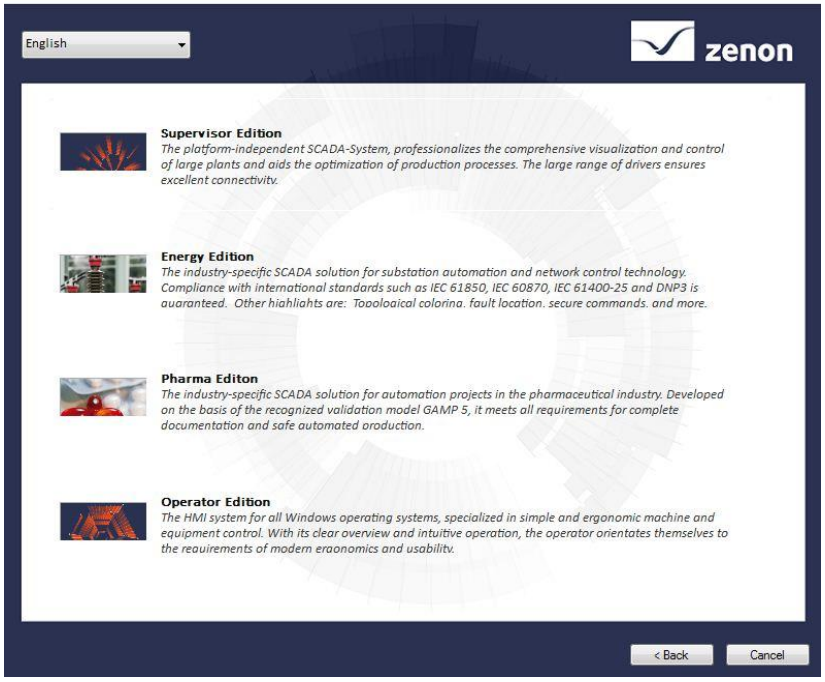
Step 1: Insert the CTI Zenon Editor installation DVD into your DVD-ROM drive. The installation process should begin automatically. If the installation does not automatically commence, run the program 'Start' from the DVD.



Step 2: When the installation welcome menu appears on the screen, click the 'NEXT' button to begin installation. Then accept the license agreement to continue.

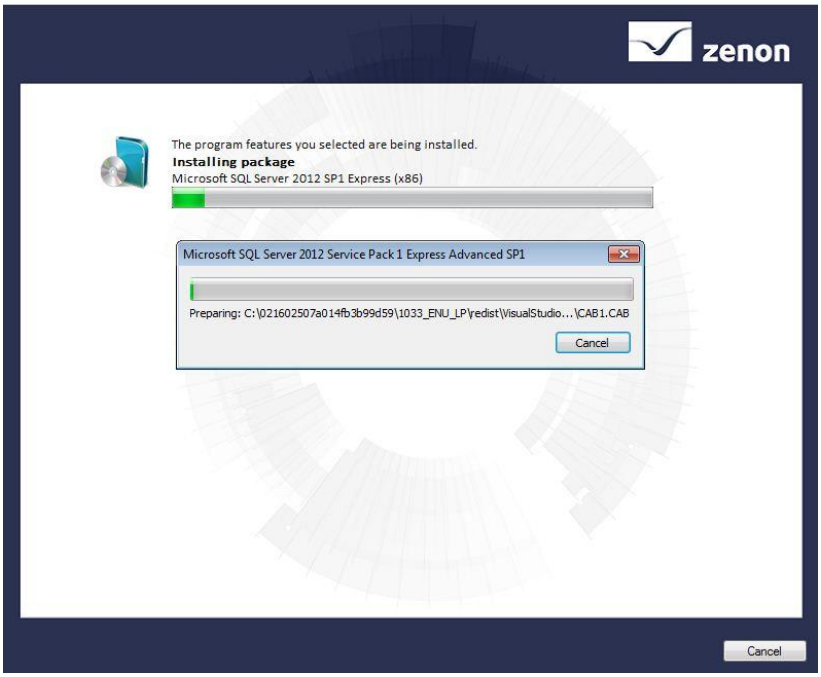


Step 3: Click on the 'Z with Red Pencil' icon to install the Zenon Editor.



Step 4: Click on the 'Operator Edition' icon at the bottom of the screen to install Zenon for HMI panels.

Step 5: Choose 'Install now' to install Zenon Operator with standard settings. You may choose user-defined installation if standard settings are not sufficient.



Step 6: Zenon and support software will now be installed. The installation process will take 30 minutes or more to complete.

Step 7: When the installation is completed click the ‘Finish’ button.

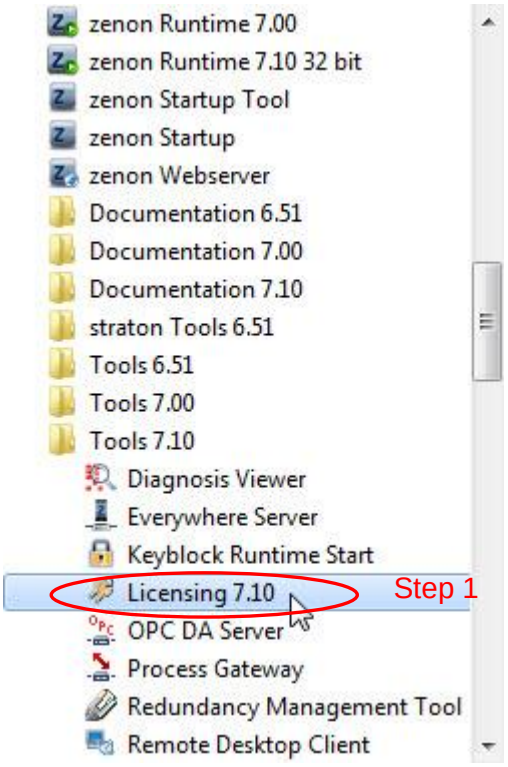
2.2 USB License Dongle

The Zenon editor is licensed with a USB dongle. The dongle can be moved from one computer to another. This allows the editor software to be installed on mulitple computers. When the dongle is connected, the user will be able to run the Zenon editor software in licensed mode.

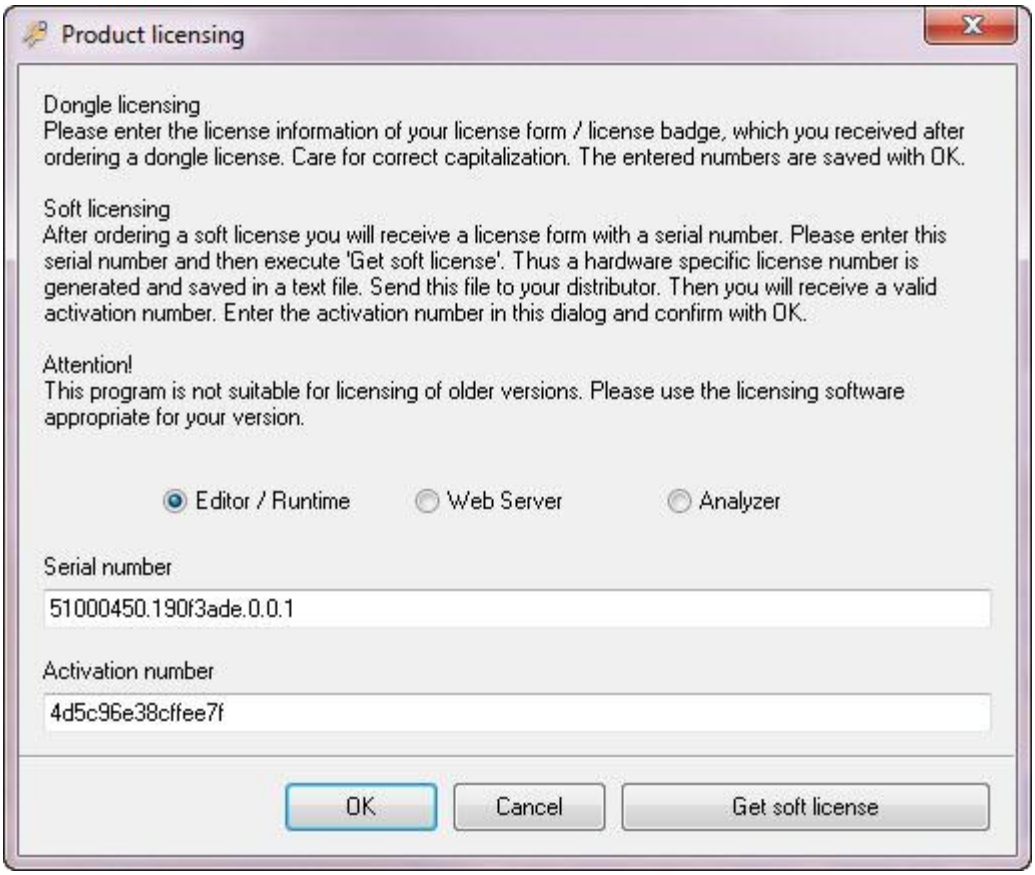
Once the Zenon editor is installed, connect the USB dongle to one of the computer's available USB ports.

2.3 Licensing the Zenon Editor Software

Your Zenon Editor software package includes a license / activation document. This license sheet has the serial number and activation code that works exclusively with the included USB licensing dongle. The 8-digit number printed on the dongle will match the first 8 digits of the serial number on the license sheet. This license and activation can be used on multiple computers but only the computer with the USB dongle connected will be licensed.



Step 1: From the Windows Start menu, find the programs folder and expand the COPA-DATA subfolder. Double click the 'Licensing 7.10' program under the 'Tools 7.10' subfolder.



Step 2: Enter the serial and the activation numbers from the license sheet supplied with your editor software. After entering the numbers into the Product Licensing screen correctly, click the 'OK' button. The Zenon editor software is now licensed and ready for use.

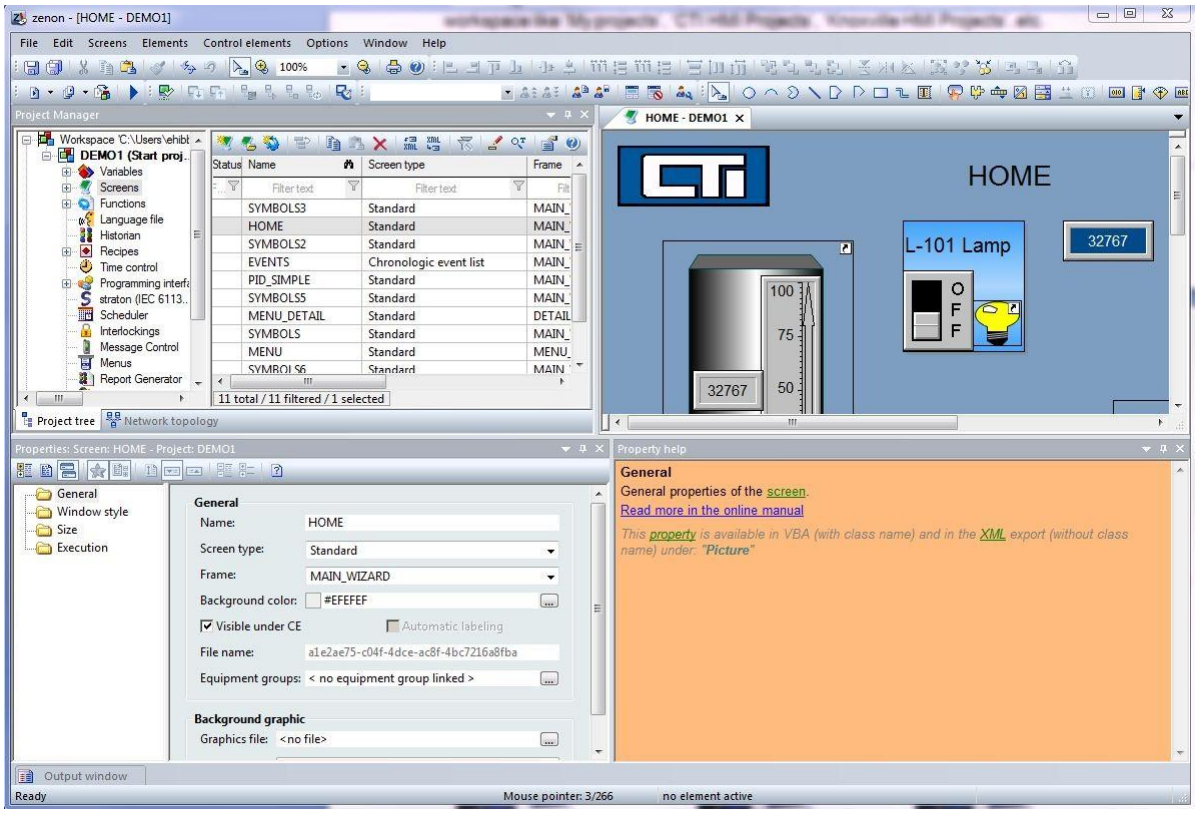
NOTE
Keep the license sheet in a safe place. Any time the Zenon editor software needs to be reinstalled the license sheet will be required along with the dongle in order to license your software. If you misplace your license sheet, please call CTI toll-free at 1-800-537-8398 or email us at sales@controltechnology.com.

CHAPTER 3 Using the Zenon Editor

To begin this chapter, you must have successfully installed and licensed the Zenon editor as detailed in chapter 2.

3.1 Starting the Editor

Start the Zenon editor by clicking on the Zenon Editor icon from the Windows start menu or the Windows desktop. If you have more than one version of the Zenon Editor installed on your computer, then you should use the Zenon Startup Tool to start the Editor.

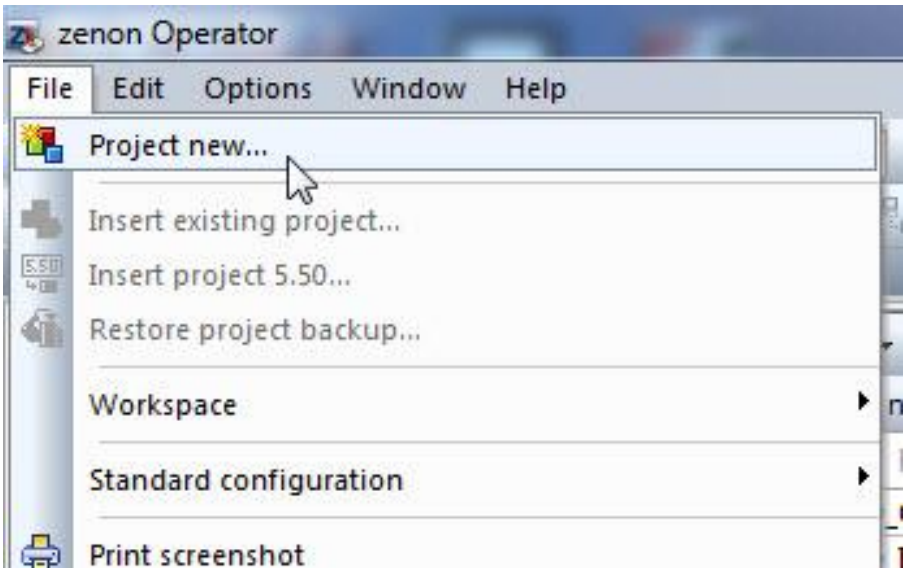


The Zenon Editor when it starts will open a default Zenon Demo project.

3.2 Creating a New Workspace and Project

Sections 3.2 through 3.4 are to be used for those starting a new project without the CTI project template. If you wish to start a project using the CTI project template then you should read sections 3.2-3.4 but skip to section 3.5 to start your project.

From the file menu in the Zenon Editor, select ‘New Project’.



3.2.1 Definitions of a Project and a Workspace

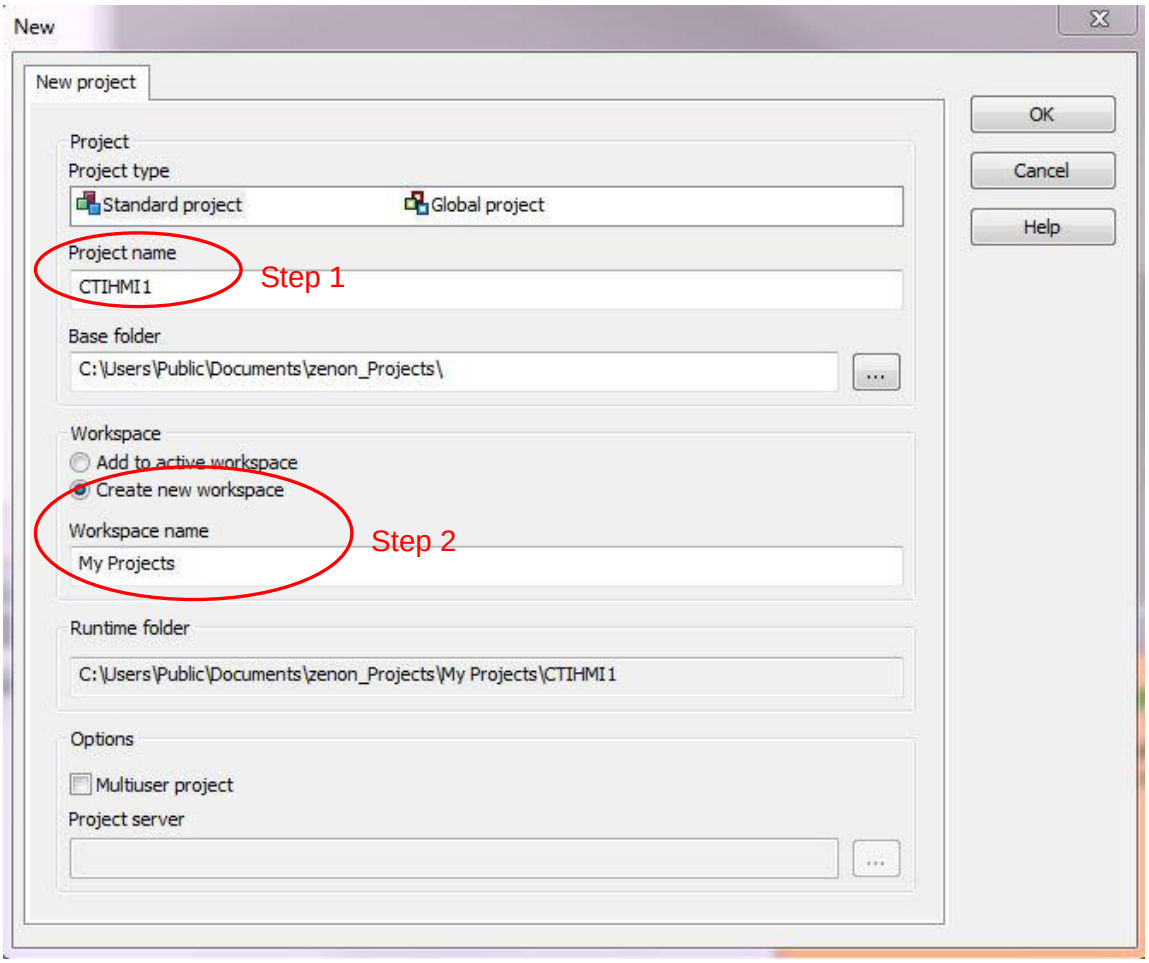
A *project* is a summary of settings, screens, functions, variables, recipes, etc. for displaying on a HMI panel. Projects are created in the Editor and downloaded to the HMI panel to be displayed in the Runtime software embedded on the CTI HMI panel. Only one project can be displayed on an HMI panel at a time. Project file storage can take place locally on the Editor computer or on a server. A backup of a project can be created anytime and can be read back on the same or a different computer.

A *workspace* is an administrative unit in the Zenon Editor in which projects can be grouped. A workspace is like a folder in which to keep an HMI project. The Operator version of Zenon only allows one project for each workspace.

3.2.2 Naming a Project and Creating a Workspace

Step 1: Enter a *project name* that is descriptive of the HMI application that you will be creating. Example: HMI_Furnace1

Step 2: Select the 'Create new workspace' option in the new project window and then enter a 'Workspace name'. Example: Furnace1

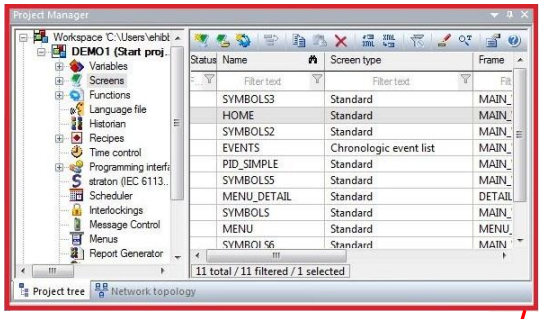


3.2.3 Storing Projects on a Server

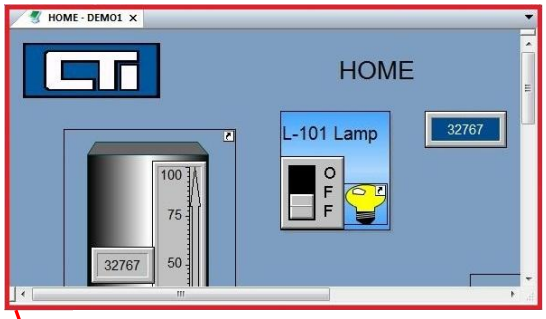
If you will be keeping your projects on a central server, then select the 'Multiuser project' option and enter the name of the server on your company network where the projects will be stored. You may also browse the company network to choose the server name. You may need to change the 'base folder' and 'runtime folder' locations if you are storing your projects on a network server.

3.3 Learning the Zenon Editor Layout

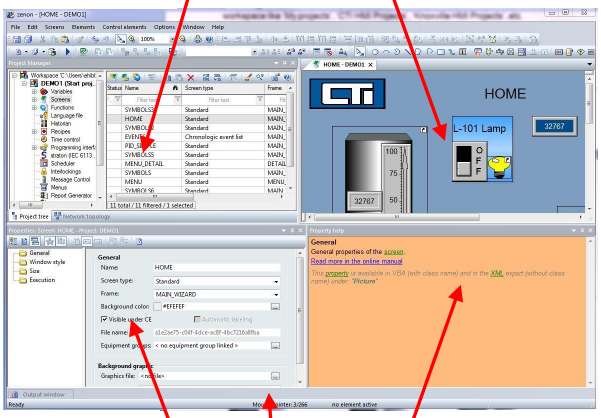
In this section, you will need to familiarize yourself with the layout of the Zenon Editor Screen. The default Editor layout contains five windows. There is a project manager window, a screen editor window, a properties window, a property help window, and an output window. The default layout is pictured below.



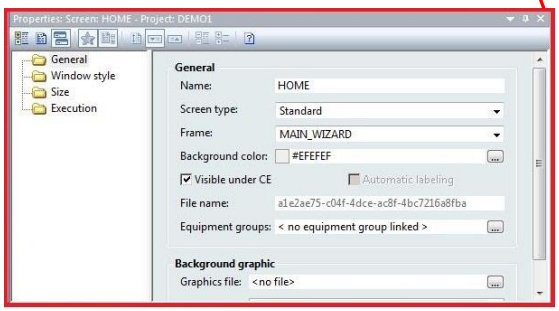
Project Manager Window: Window in the Editor in which the project tree, the detail view, and the network topology are displayed.



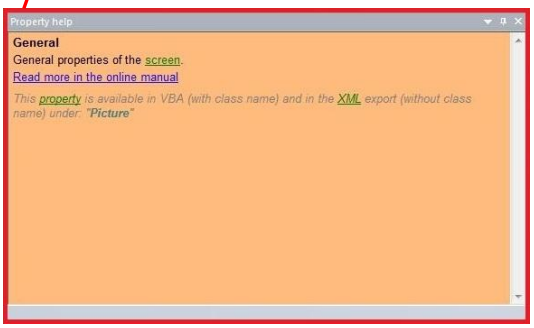
Screen Editor Window: Window in the Editor in which screens, frames, and graphics symbols are displayed.



Properties Window: Window in the Editor in which properties of a selected element from the project manager are displayed.



Property Help Window: Window in the Editor in which displays a short explanation for a selected property.



Output Window: Window in the Editor in which messages from the Remote Transport and from create Runtime files are displayed.

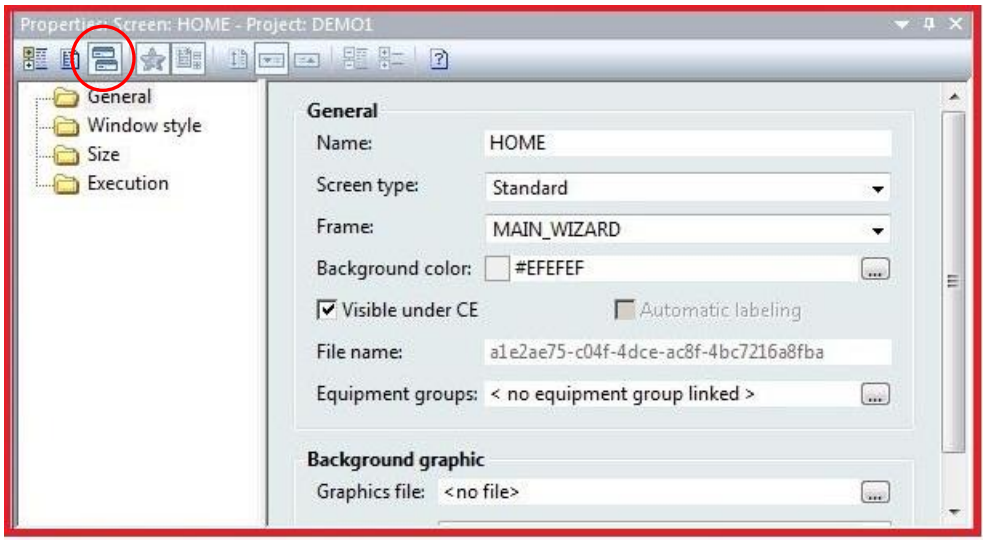
3.4 Required Zenon Project Settings for the 2500-VP15 Panel

There are a number of settings that are required in every Zenon project in order for the project to display properly on the CTI 2500-VP15 panel. This section will guide you in making necessary project settings so that your project will work on the CTI panel.

NOTE

There is a CTI Project Template file available for download on the Control Technology website www.controltechnology.com. All of the required settings of this section have already been applied to the template file. Section 3.5 of this guide gives instructions on how to use the CTI project template.

3.4.1 Setting Properties Window Format



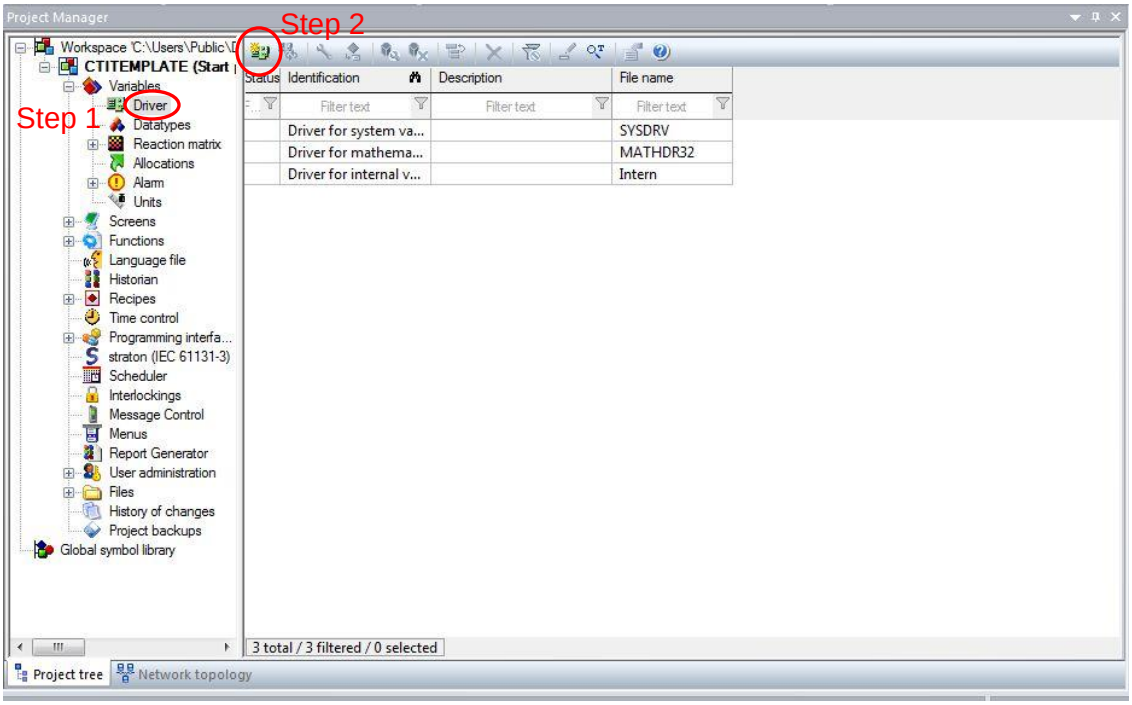
It is recommended that the properties window in the lower left corner of your Zenon editor desktop be set to display information in the dialog view format as pictured above. Property settings changes will be explained in this manual using only the dialog view format. The dialog view format can be displayed by clicking on indicated icon in the above image of the properties window.

3.4.2 Adding a PLC Driver to the Project

The first component that must be added to the new project is the PLC driver. This driver will allow the HMI to communicate with a PLC. The 2500-VP15 can communicate with a large variety of PLC brands and types. This manual will deal exclusively with the CTI 2500 series PLC.

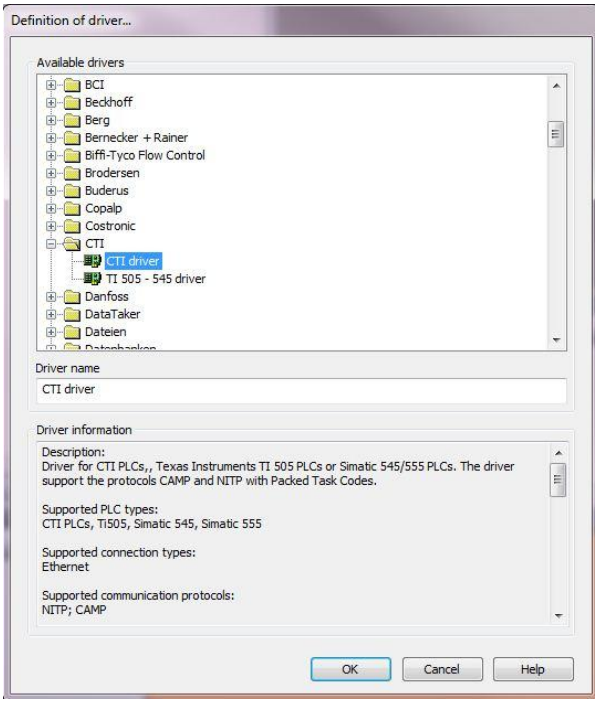
NOTE

The CTI panel can communicate with up to three different PLC drivers at a time. Only one instance of each driver can be used in a project. A single instance of the CTI driver can communicate with multiple CTI PLC processors.

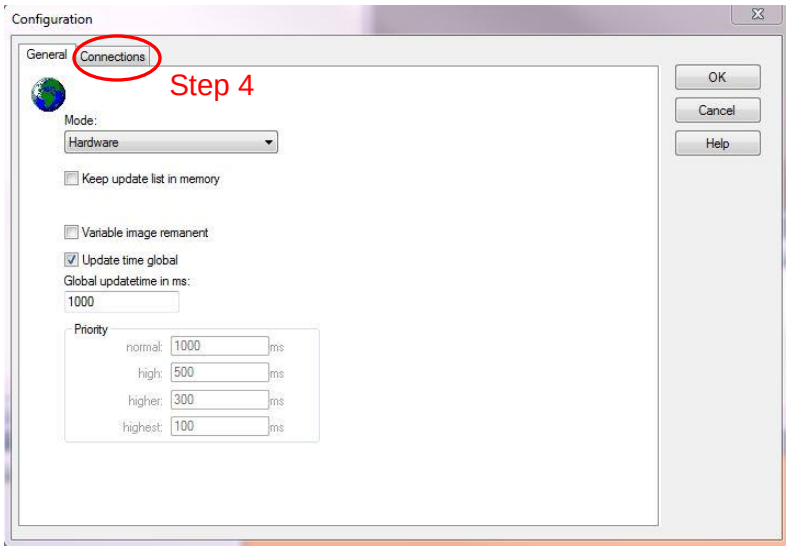


Step 1: In the *Project Manager* window, expand the *Variables* branch of the project tree and click on the 'Driver' icon. A list of the installed device drivers will appear in the *Detail View* window to the right of the project tree.

Step 2: Click on the 'new driver' icon as noted in the picture above. A '*Definition of driver'* window will now appear.



Step 3: Find and expand the *CTI* folder in the driver list. Select the *CTI driver* and click 'OK' on the bottom of the window.

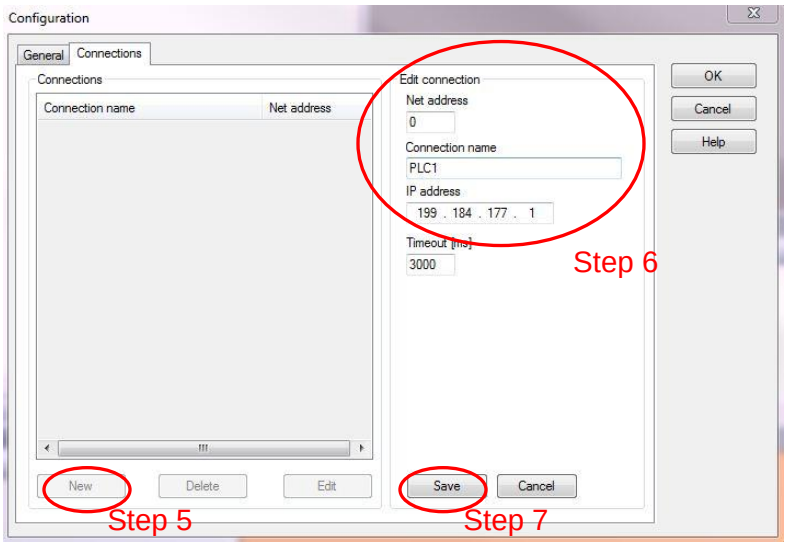


Step 4: When the *Configuration* window appears, click on the *Connections* tab.

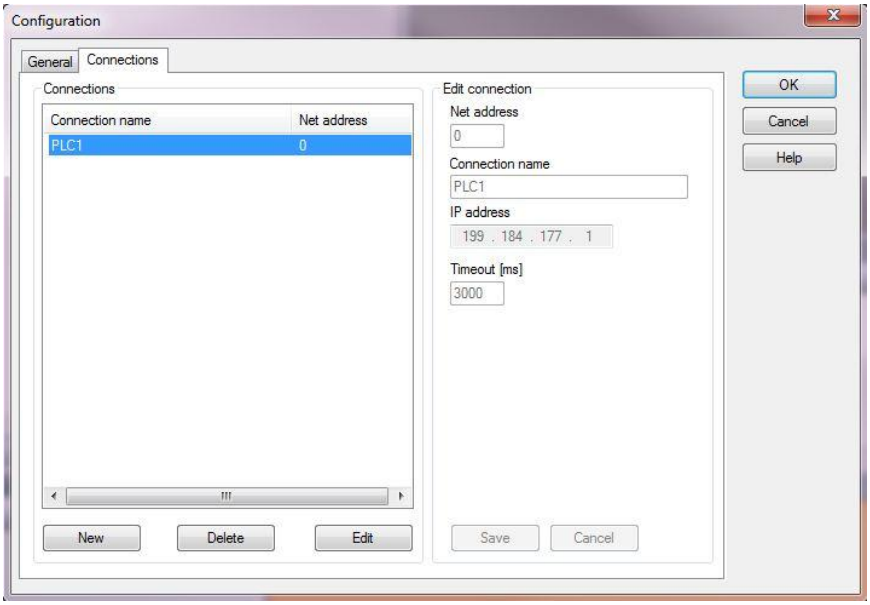
Step 5: Under the 'Connections' tab, click the 'New' button to add a new PLC connection.

Step 6: Enter a unique Net address and Connection name. Enter IP address of the PLC processor.

Step 7: After entering the connection information for your PLC, click on the 'Save' button to add the new PLC connection to the CTI driver.

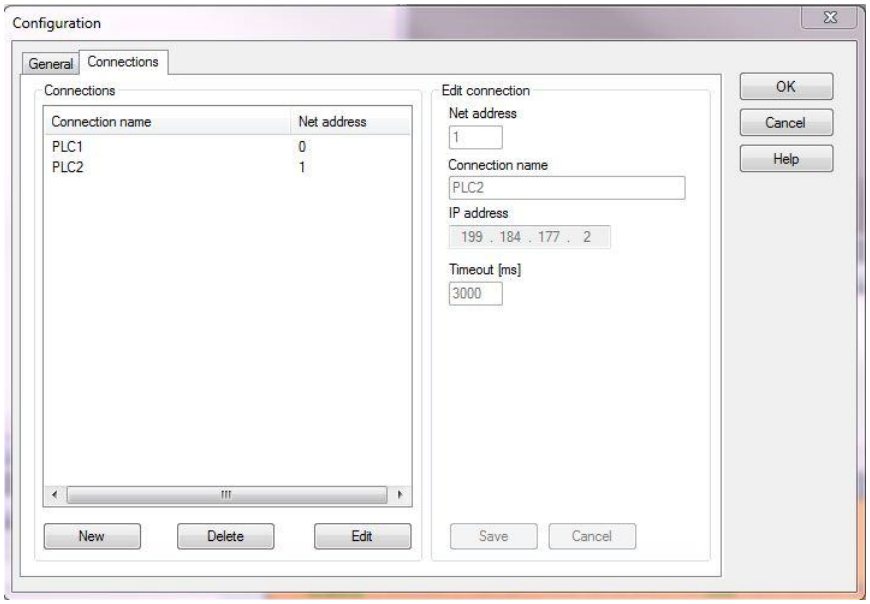


NOTE
Be sure that you have entered the correct IP address of the PLC processor to which you the HMI panel will communicate. If the IP address entered does not match the PLC address, the HMI panel and PLC will not communicate.



Step 8: The project now contains a connection to the CTI PLC processor at the IP address entered.

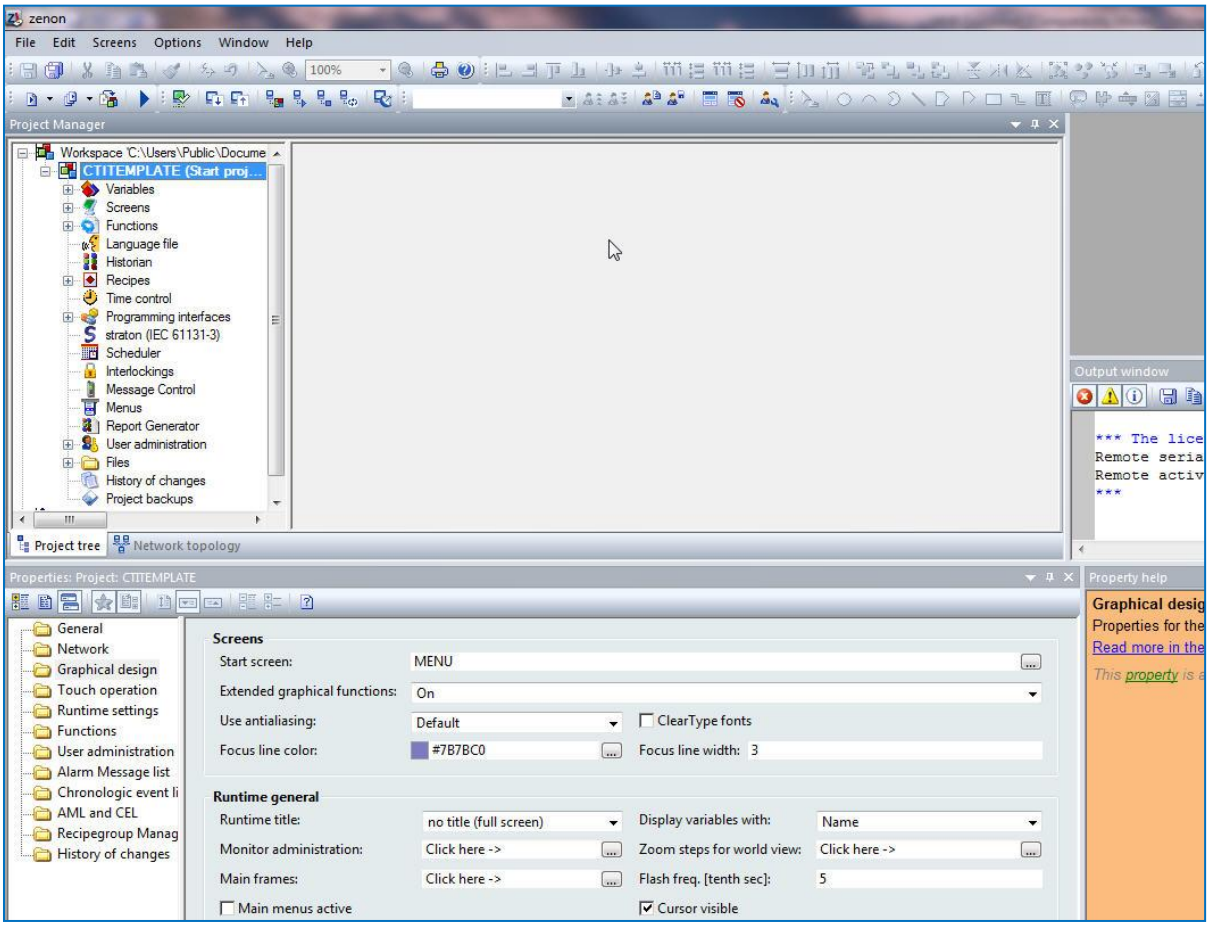
NOTE
Each PLC connection will require a unique net address, connection name, and IP address. Up to three PLC connections can be made under the CTI PLC driver.



Step 9: Additional connections to other CTI processors may be added by repeating the procedure of section 3.4.2.

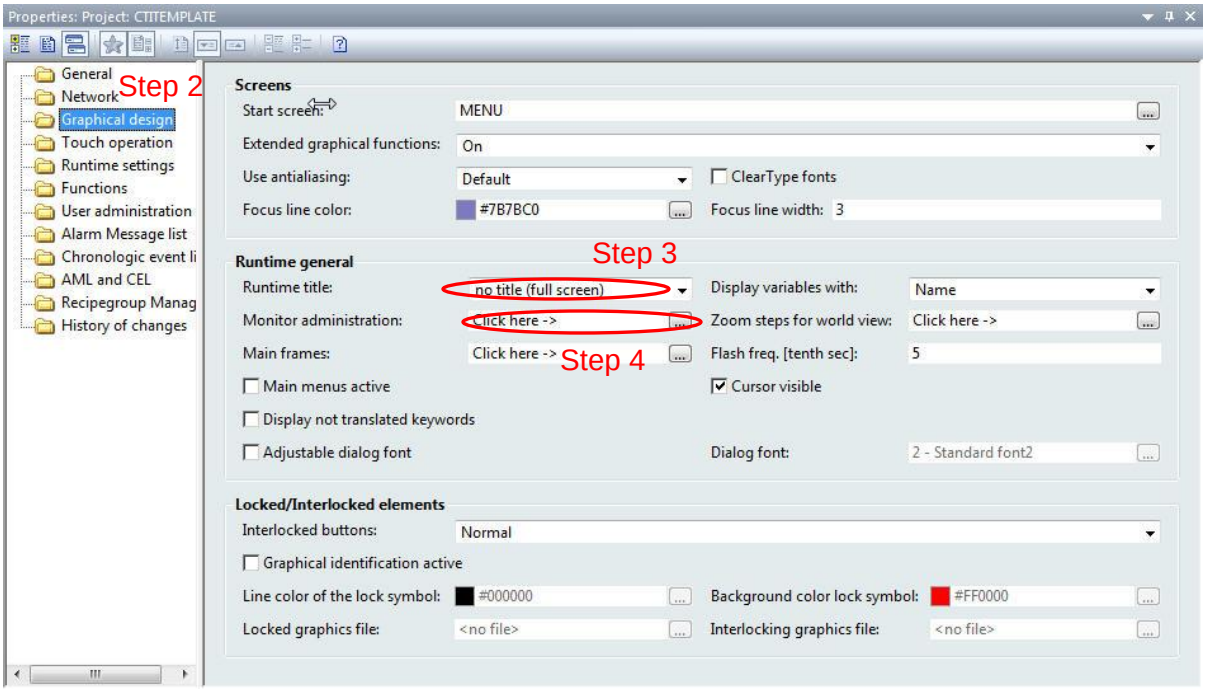
3.4.3 Configuring Zenon Runtime Graphical Settings

The maximum display resolution of the CTI 2500-VP15 panel is 1024x768 pixels. Your Zenon project must be configured to the proper screen resolution. When you begin to create frames and screens for your project, you must keep in mind that the maximum displayable screen size is 1024x768 pixels.



Step 1: Click on the name of your project in the project tree. The property settings for your project will display in the *Properties Window*.

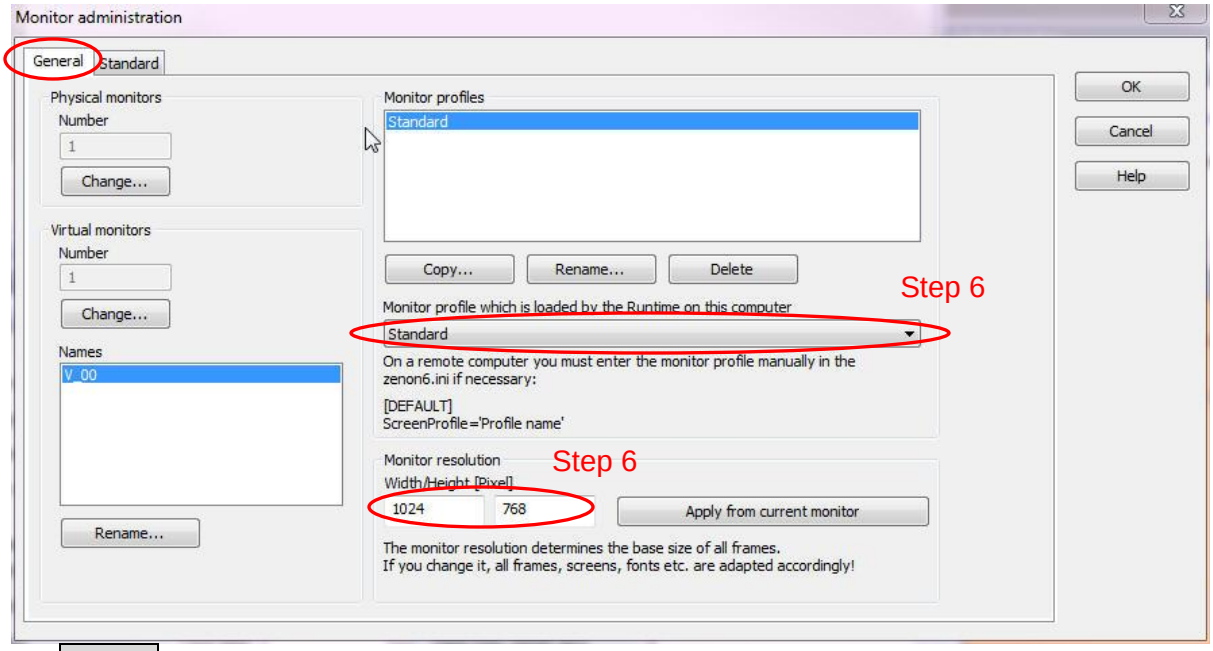
NOTE
The Properties Window should be set to the dialog view option. See Section 3.5.1.



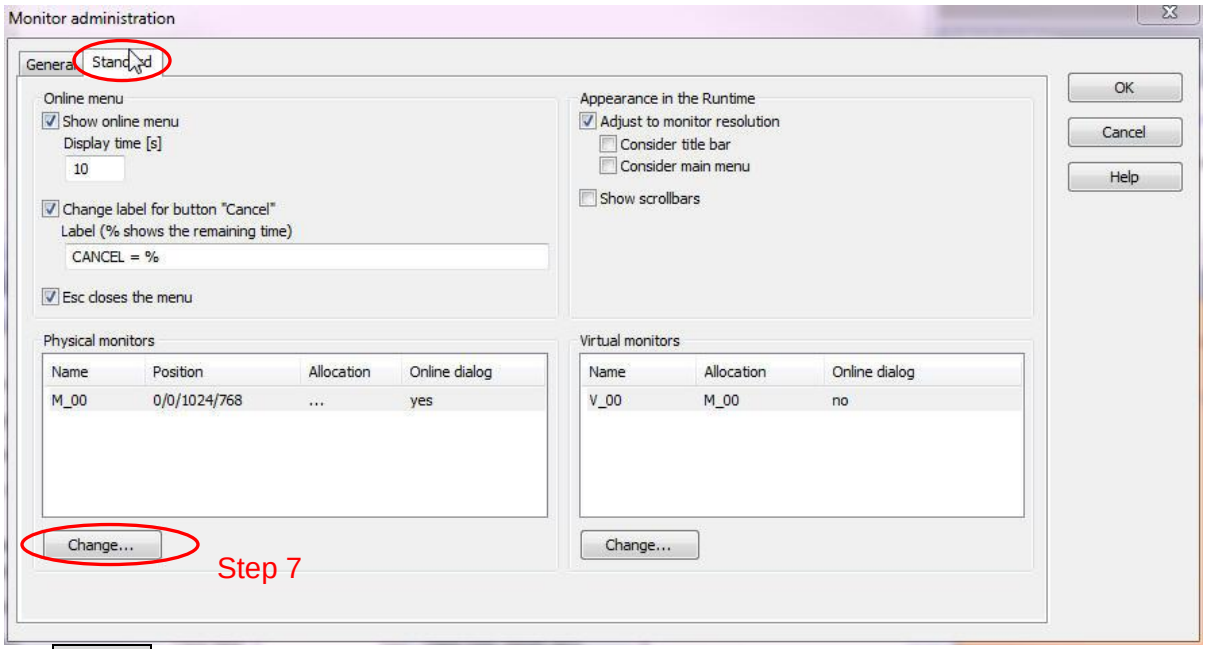
Step 2: Click on the *Graphical design* tab in the *Properties* window to view the graphical properties for your runtime project.

Step 3: In the *Runtime title* list box, select 'no title (full screen)' from the drop down menu. This setting will allow your project to be displayed full screen without a title bar on the HMI panel.

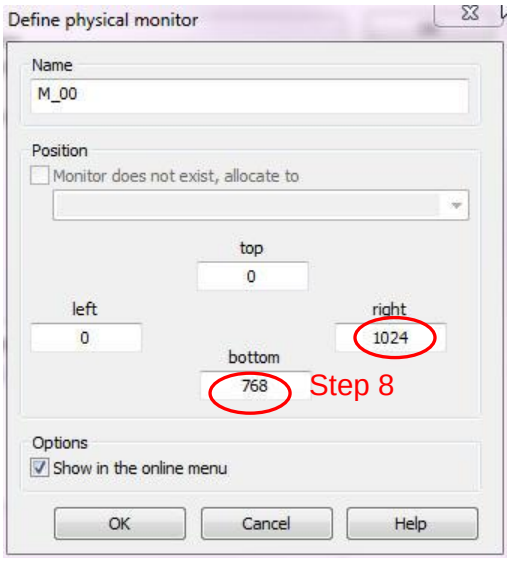
Step 4: Click on the button beside the *Monitor administration* property to open the *Monitor Administration* window.



Step 6: In the *Monitor Administration* window, under the *General* tab, make sure that the 'standard' monitor profile is selected and the monitor resolution is set to 1024x768.



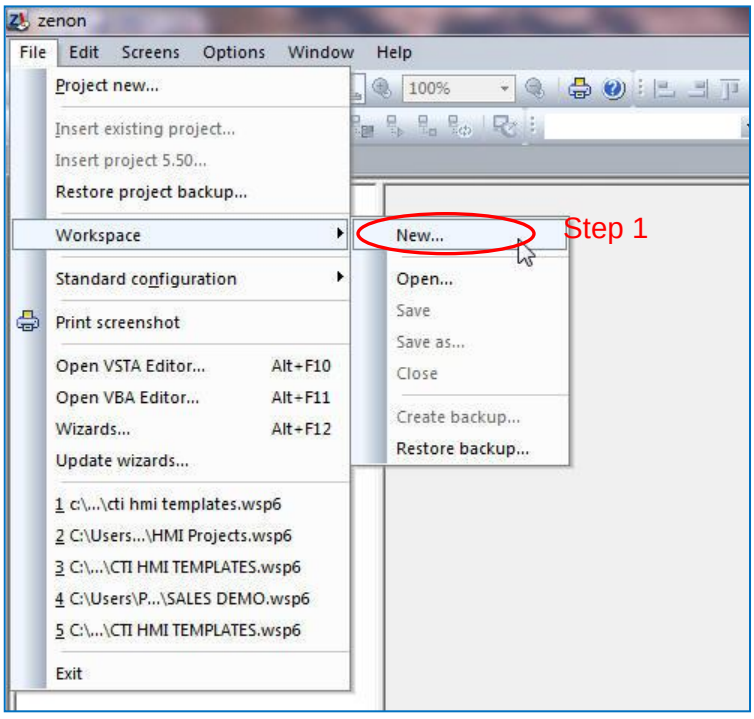
Step 7: In the *Monitor Administration* window, under the *Standard* tab, click on the 'change' button on the bottom left of the Monitor administration window under the *Physical monitors* display box.



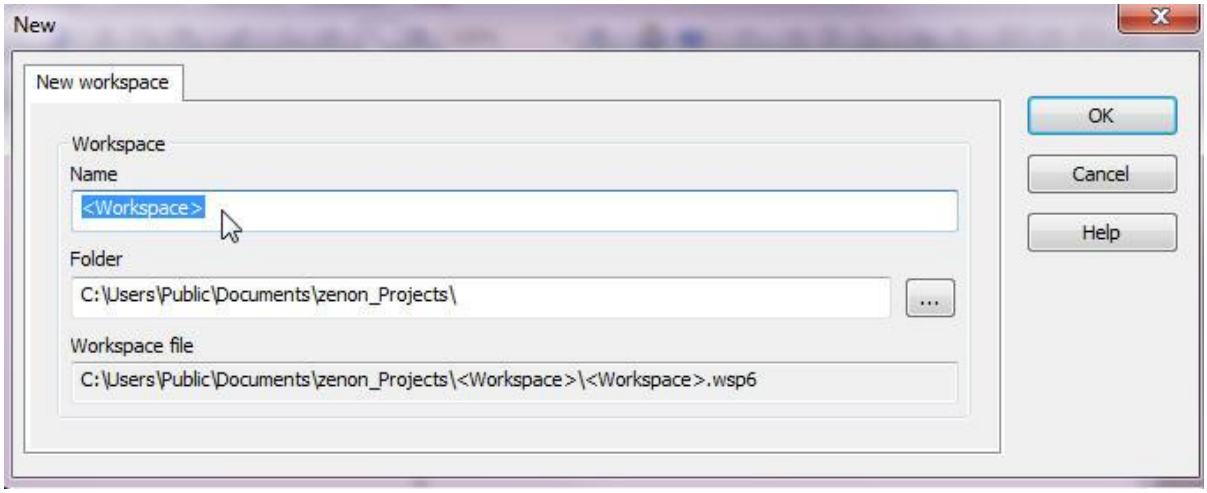
Step 8: In the *Define physical monitor* window, click in the 'right' box and enter the number 1024. Then, click in the 'bottom' box and enter the number 768. The 'top' and 'left' boxes should contain zeros. Click 'OK' when you are done.

3.5 Starting a New Project Using the CTI Project Template

On the Control Technology Website www.controltechnology.com , there is a CTI HMI Project Template available for download. This section will give instructions on how to start a new project using the CTI project template. The CTI project template is preconfigured with the correct settings for the 2500-VP15 panel.

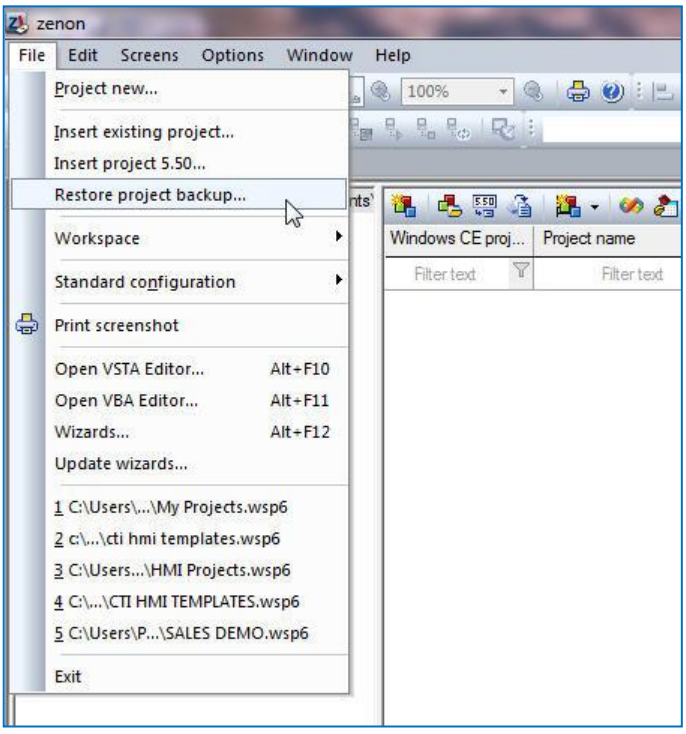


Step 1: You will need to create a new workspace. A workspace is like a folder in which to keep a collection of HMI projects. A project can only be edited if it is added to a workspace. Under the *File* menu and the *Workspace* menu item, click on the submenu item *New*.

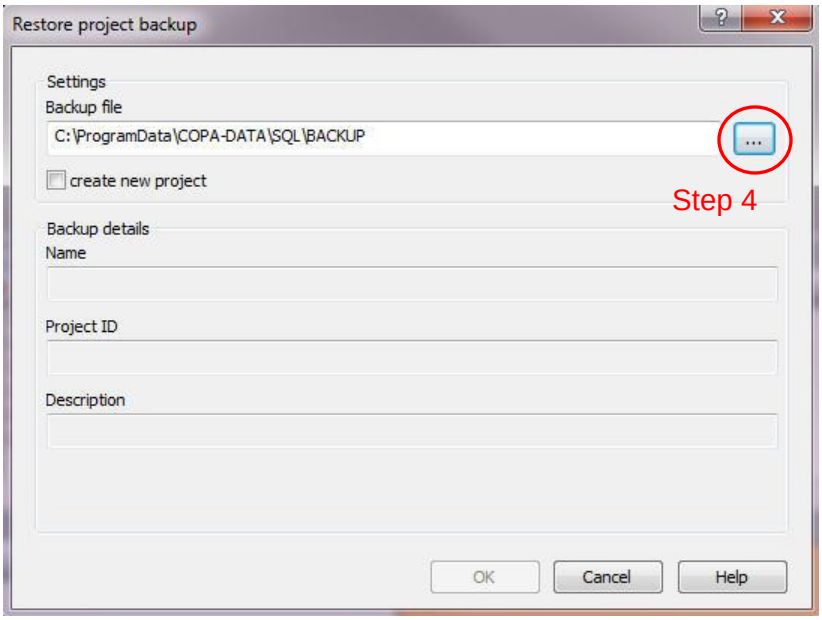


Step 2: Enter a name for your workspace and click 'OK'. A workspace is like a folder where you will store your project.

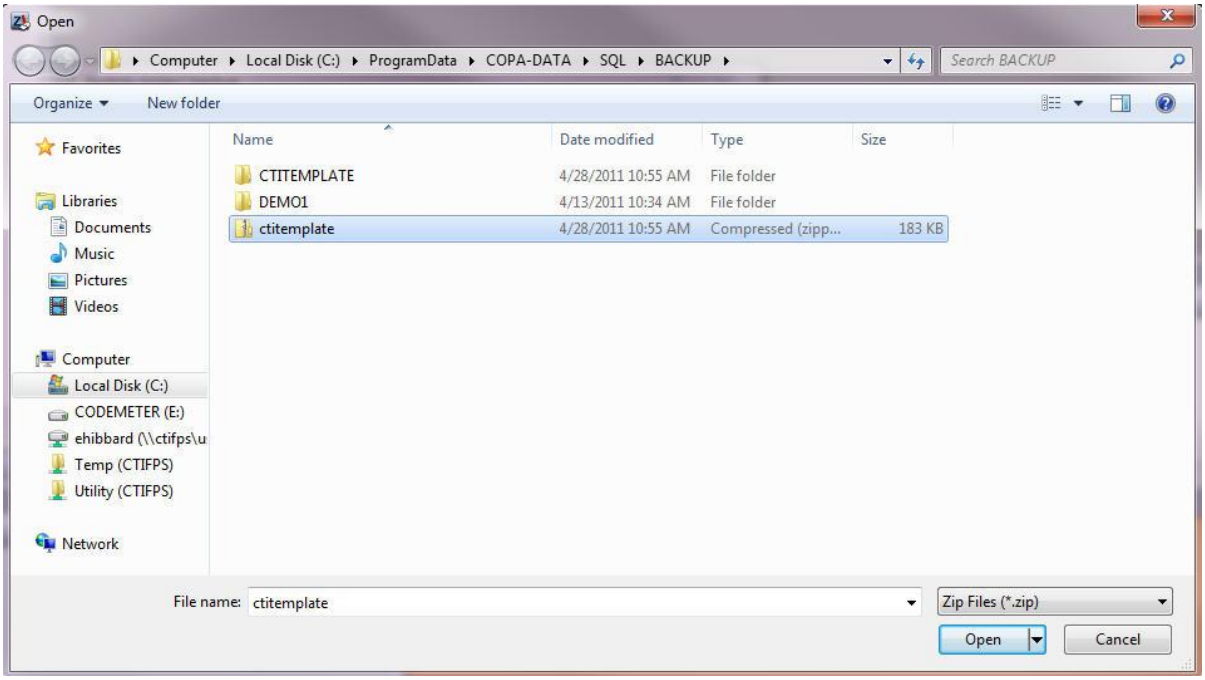
Example of Workspace name: Winder1HMI



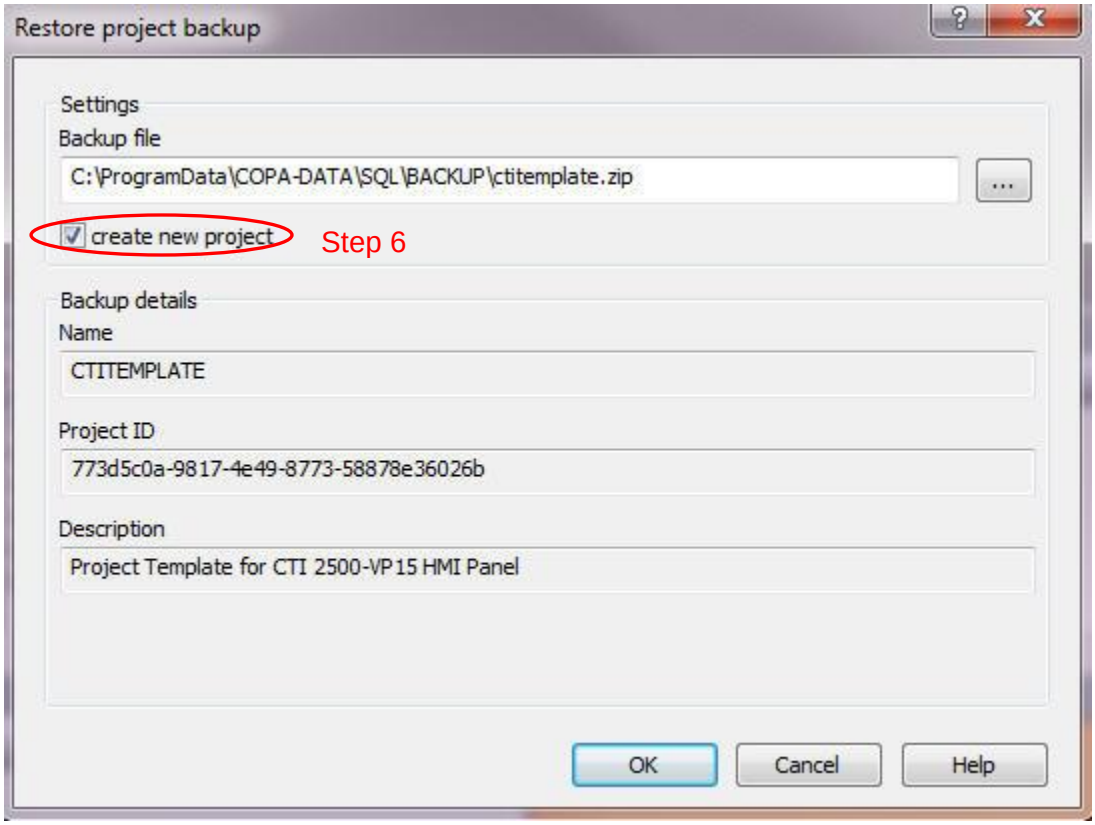
Step 3: You will now restore a project backup. This backup project that you will restore is the CTI project template that you download from the CTI website.



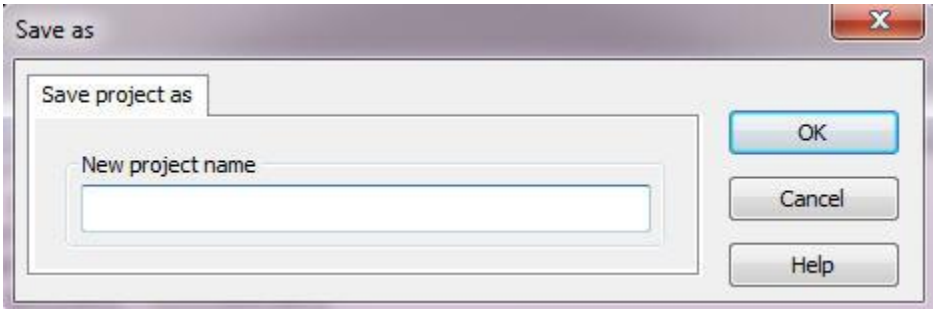
Step 4: To select a project file to restore, click on the browse button indicated in the image above.



Step 5: Find and select the file ‘CTI_Template_V710.zip’ that you downloaded and click ‘Open’.



Step 6: Click in the box 'create new project' and then click 'OK'.



Step 7: Enter a name for your project and click 'OK'. You are now ready to build your project.

Examples: KnoxvillePlantHMI1
WinderHMI1
FurnaceHMI

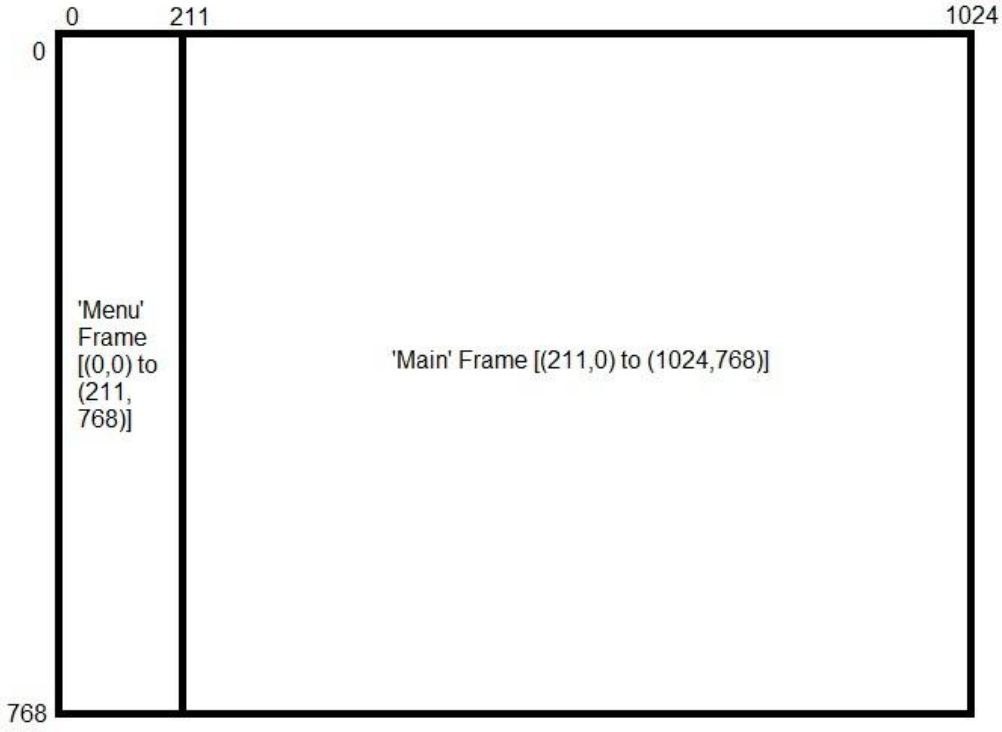
3.6 Building a Project with the Zenon Editor

This section will familiarize you with how to create frames, screens, variables, buttons, functions, numerical value displays, and trend elements. These basic elements will allow you to build a project. You will also learn how to test the functionality of your project by starting the runtime on your editor computer.

3.6.1 Adding Frames and Screens

A *Frame* defines the size and location of an area on the monitor in which screens are displayed in the Runtime. A frame must be created before you can draw your first screen. A frame is like a template for a screen. You can define certain settings for a frame which are then transferred to all screens which are based on the particular frame.

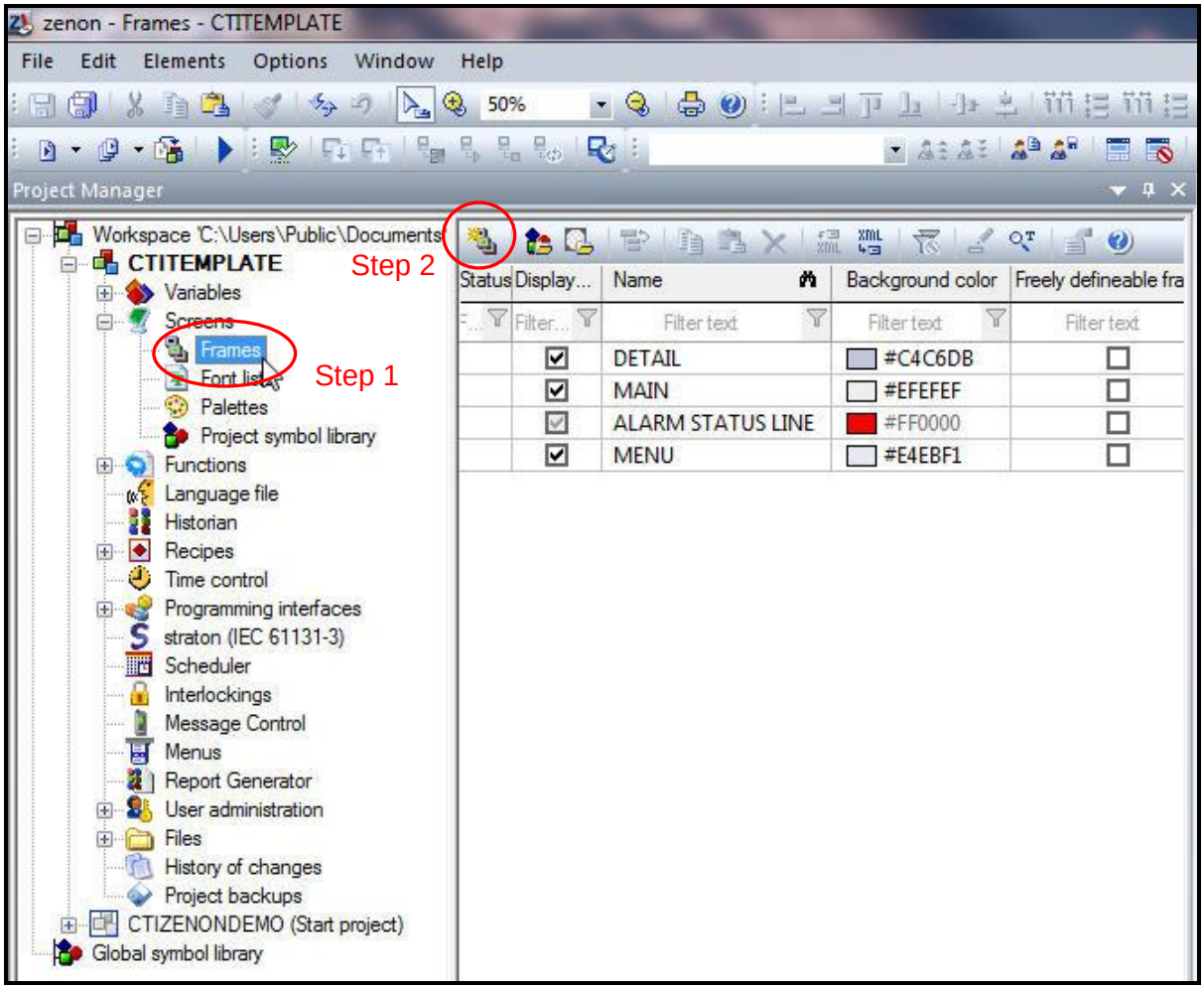
A *Screen* is a limited area on the monitor which contains elements/objects for operating, controlling, monitoring, evaluating, etc. machinery, equipment, and processes. There are different types of screens which bring along predefined functions. Screens are always based on frames which define their location on the monitor.



The CTI 2500-VP15 panel has a screen resolution of 1024x768 pixels. The frames that you create must fit within the displayable screen size. Above is an example of a two frames that are sized to fit the CTI HMI screen. The 'Main' frame would be used to create your main screens and the 'Menu' frame would be used to create menu screens. All screens draw their size and position properties from the linked frame.

If you are using the CTI template to create your project, then some frames and screens have already been created for you. You can adjust the properties of the existing frames in the detail view or the properties window.

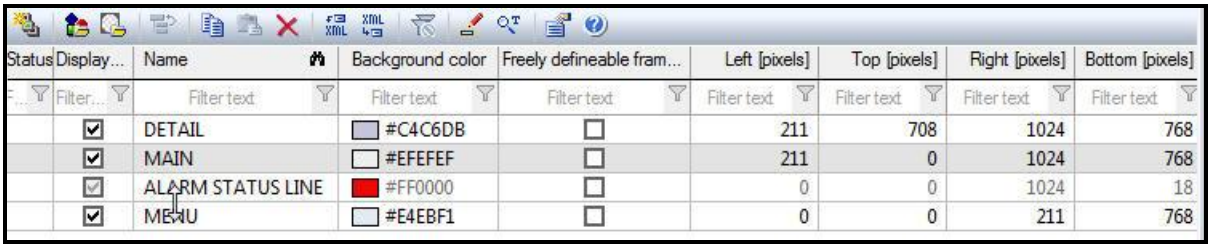
3.6.1.1 Adding a Frame



Step 1: Click on the 'Frames' icon in the Project tree under the 'Screens' branch.

Step 2: Click on the 'New Frame' icon in the detail view of the Property tree. See the image above.

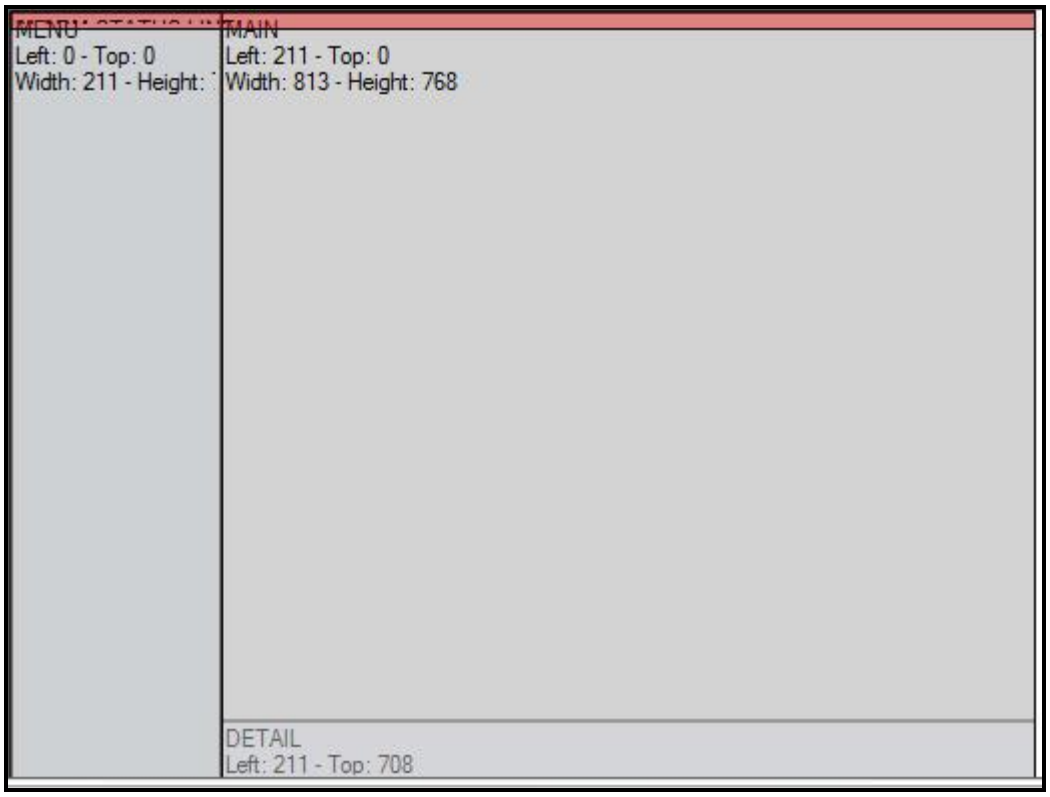
Step 3: Adjust the size and position of your new frame. Frames can be sized and positioned in the Detail View of the Project Tree, in the Screen Editor Window, and in the Properties Window.



Status	Display...	Name	Background color	Freely defineable fram...	Left [pixels]	Top [pixels]	Right [pixels]	Bottom [pixels]
	☑	DETAIL	#C4C6DB	☐	211	708	1024	768
	☑	MAIN	#EFEFEF	☐	211	0	1024	768
	☑	ALARM STATUS LINE	#FF0000	☐	0	0	1024	18
	☑	MENU	#E4EBF1	☐	0	0	211	768

Detail View

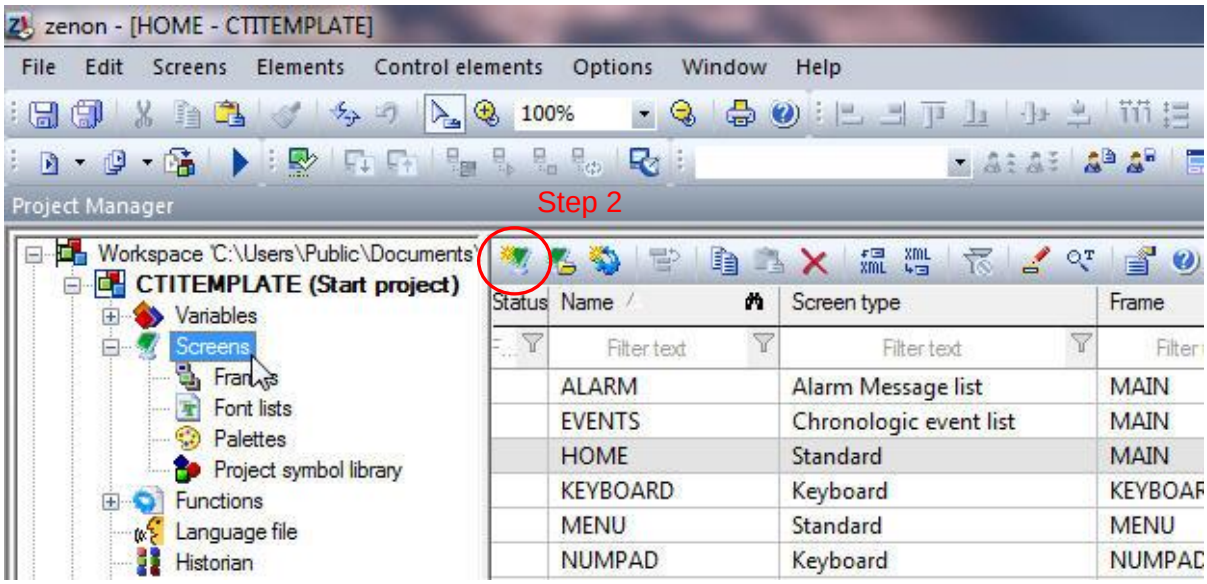
In the Detail View of the Project tree, a frame's size and position can be changed numerically. This same numerical data is available in the Properties Window.



Screen Editor Window

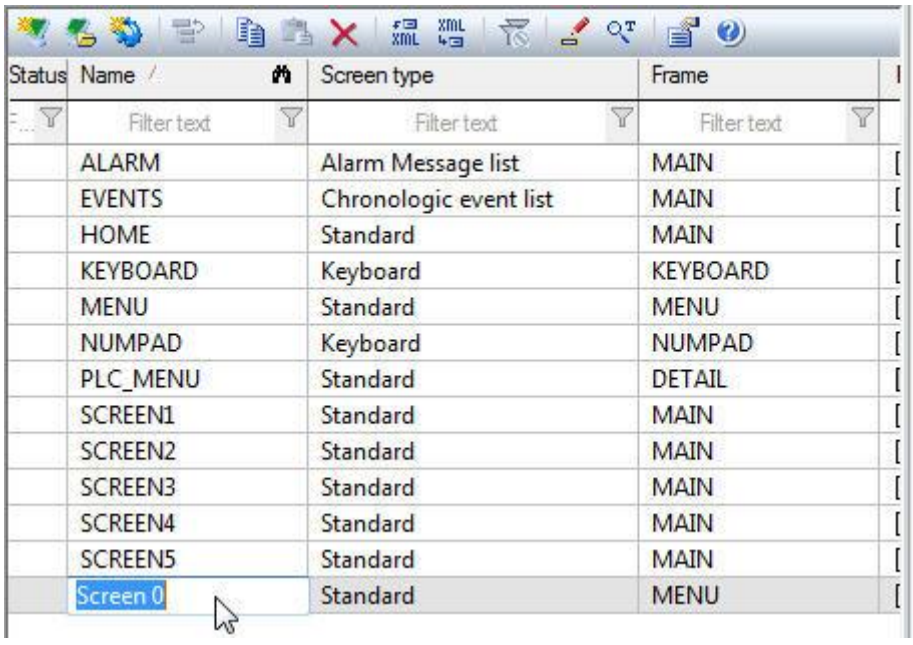
In the Screen Editor Window, a frame's size and position can be changed graphically by dragging and stretching the frame.

3.6.1.2 Adding a Screen

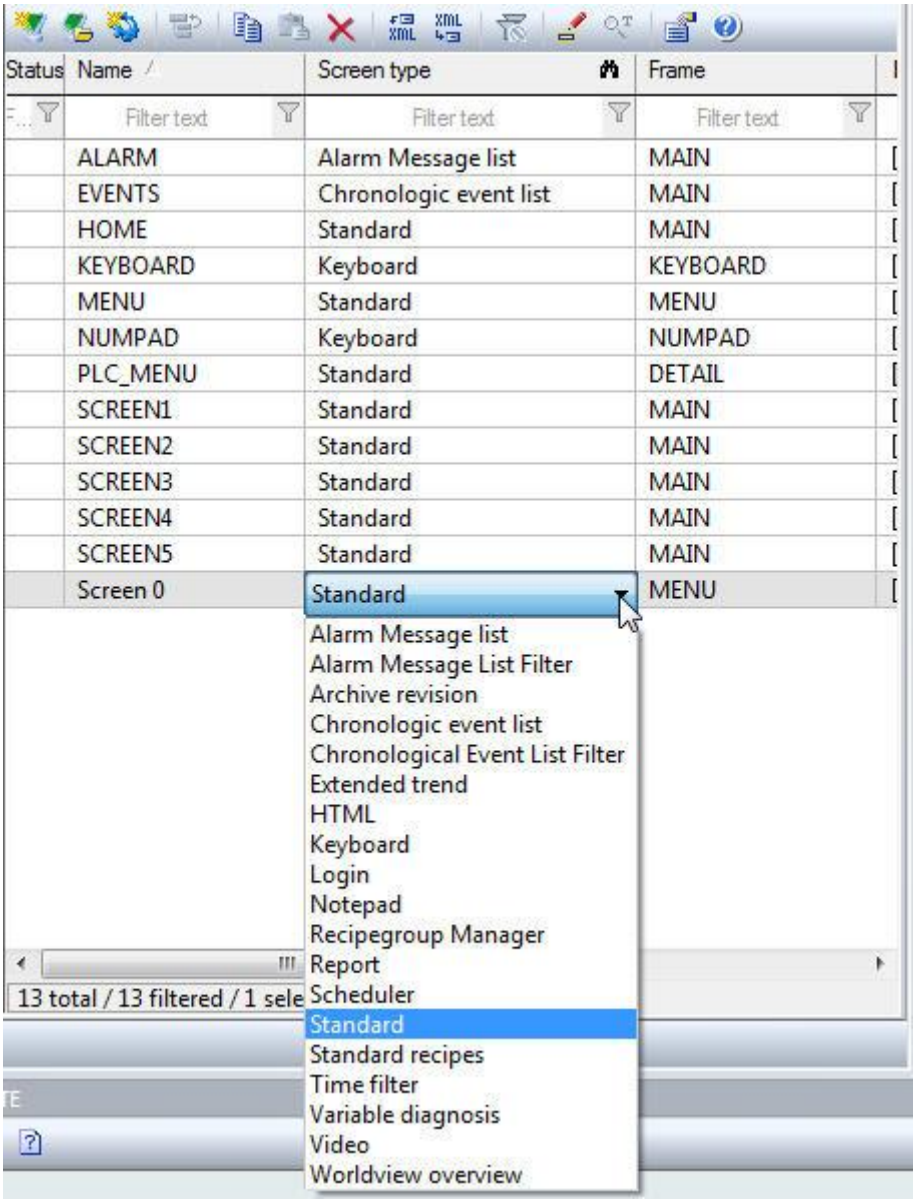


Step 1: Click on the 'Screens' icon in the Project tree.

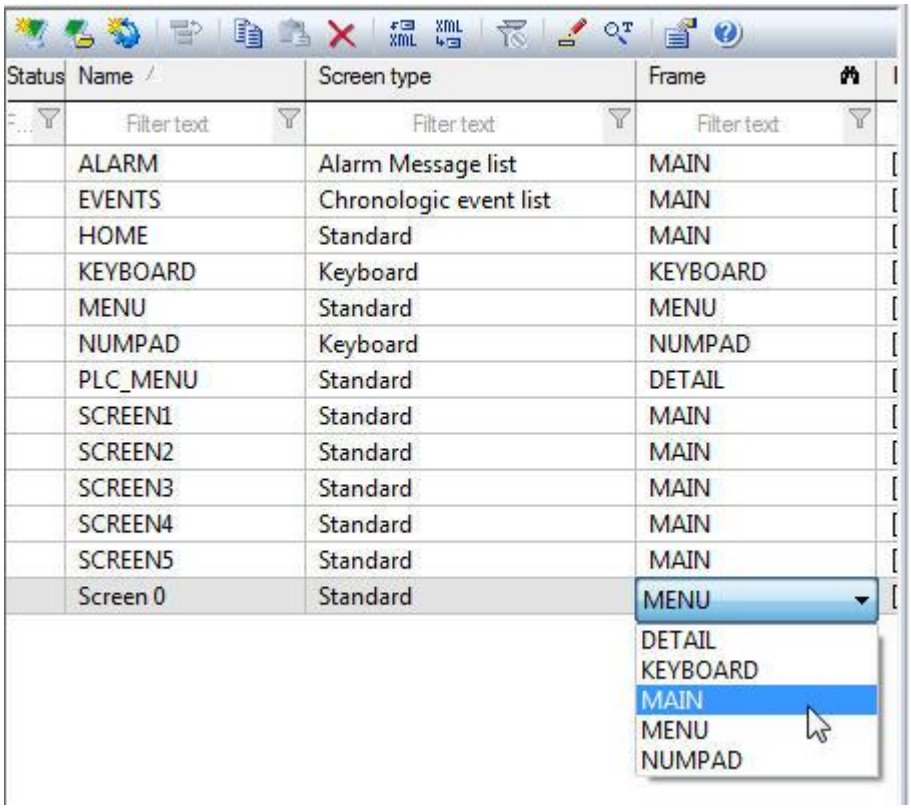
Step 2: Click on the 'New Screen' icon in the Detail View window.



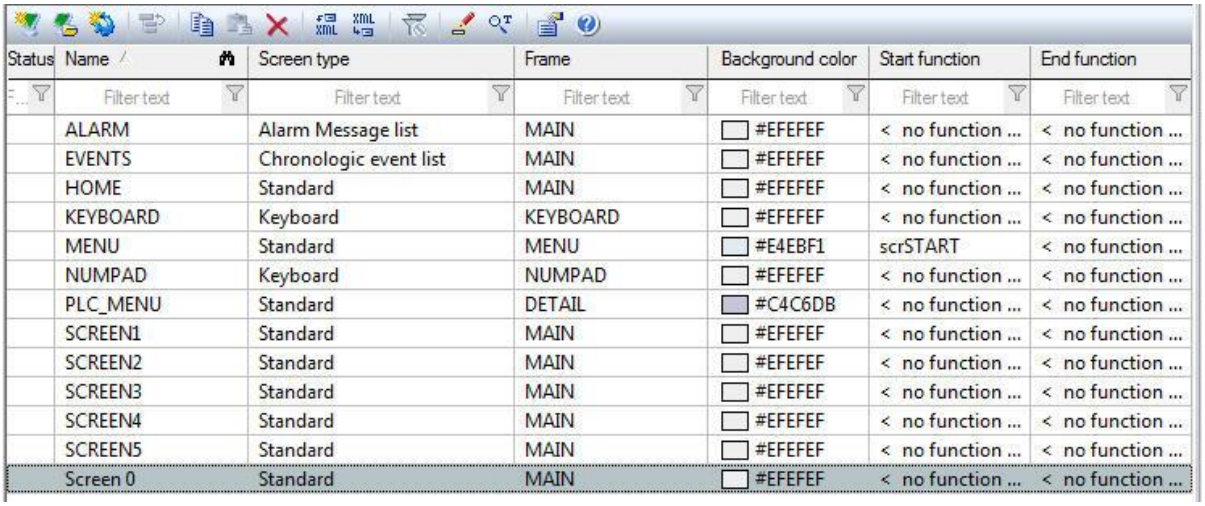
Step 3: Type a name for your new screen. The default name is 'Screen 0'.



Step 4: Select the *Screen type* for your new screen. The default type is 'Standard'. Most screens that you will create will be of the 'Standard' type.



Step 5: Select one of your project's Frames to use as the new screen's template.

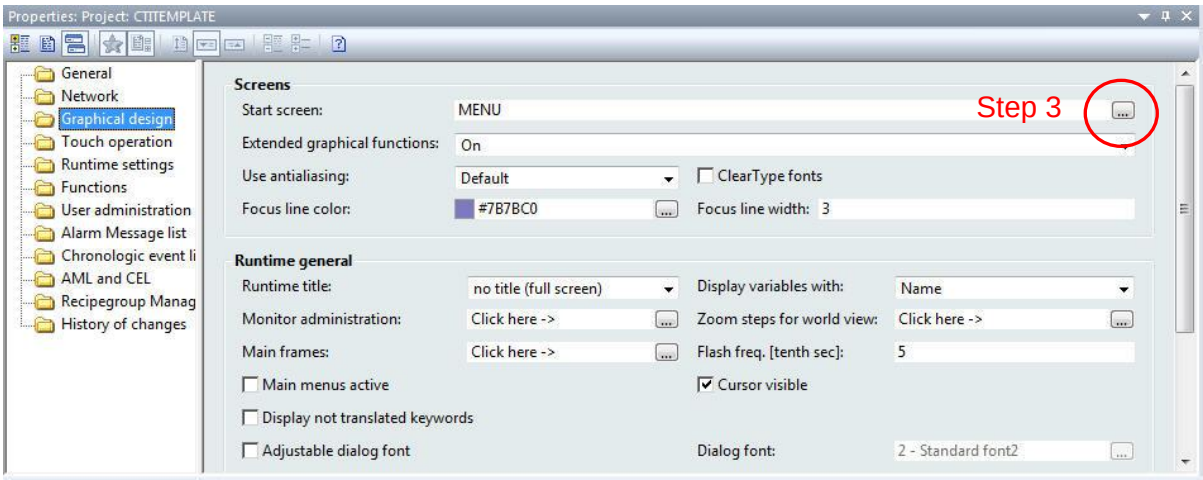


Step 6: You can change the background color of your screen, set the Start function and End function from the Detail View window. The *Start function* is a function that is executed just after your screen has been opened. The *End function* is a function that is executed when the screen is closed.

3.6.1.3 Setting the Project Start Screen

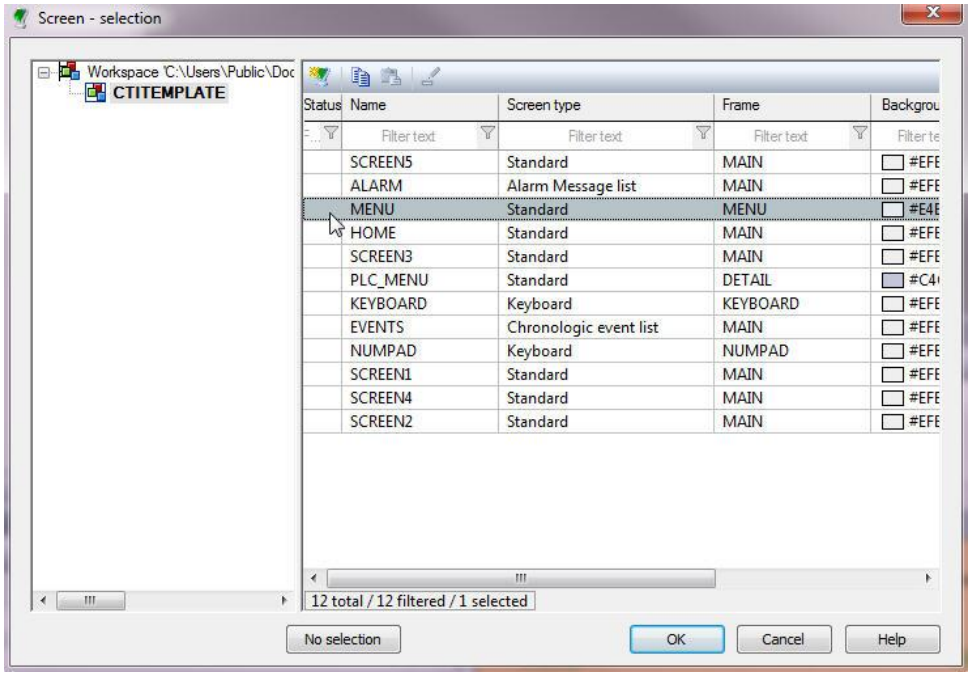
Your project must have a starting screen that is called when the project runtime is started.

Step 1: Click on your project's name in the Project tree.



Step 2: In the Properties window, click on the Graphical design folder.

Step 3: In the Properties detail window, click on the button for setting the Start screen.



Step 4: In the Screen selection window, select your desired starting screen and click the OK button.

3.6.2 Adding Variables to Your Project

A variable represents a value in the memory of the control system. Variables are based on a data type and a driver object type. All variables are linked to an object driver. Some variables are linked to an internal driver and some are linked to an external driver. The CTI 2500 Series driver is an external driver.

A PLC driver must be added to your project in order to create variables mapped to that PLC. See section 3.5.2 for instructions on adding a PLC driver.

CTI 2500 Series Variable Types				
Driver Object Type	**Channel Type**	**Read / Write**	**Supported Data Types**	**Description**
V memory	64	R / W	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	Programmable Data Memory
K memory	65	R	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	Constant Memory
STW memory	66	R / W	INT,UINT	PLC Status Word Memory
WX memory	67	R / W	INT,UINT	Analog Input Memory
WX memory	68	R / W	INT,UINT	Analog Output Memory
X memory	69	R / W	BOOL	Digital Input Memory
Y memory	70	R / W	BOOL	Digital Output Memory
C memory	71	R / W	BOOL	Control Relay Memory
Time/Counter	72	R / W	INT	Timer and Counter Memory
Drum	73	R / W	INT	Drum Variable Memory
Loop variable	74	R / W	INT,UINT,REAL	PID Loop Variable Memory
Alarm variable	75	R / W	INT,UINT,REAL	Alarm Variable Memory

In the above table, the different *Driver Object types* or *Variable types* are listed for the CTI 2500 Series driver. All variable types can be read and written except the K memory which is read only. The supported data types are also listed for each variable type.

Some variable types like timers, counters, loops, and alarms have a *Secondary Object type*. These variable types have more than one value associated with them. For example, a timer has a preset value and a current count value. CTI has chosen to make these values accessible under the timer object type as secondary objects.

The following table contains the available Secondary Object types available with the CTI 2500 Series driver.

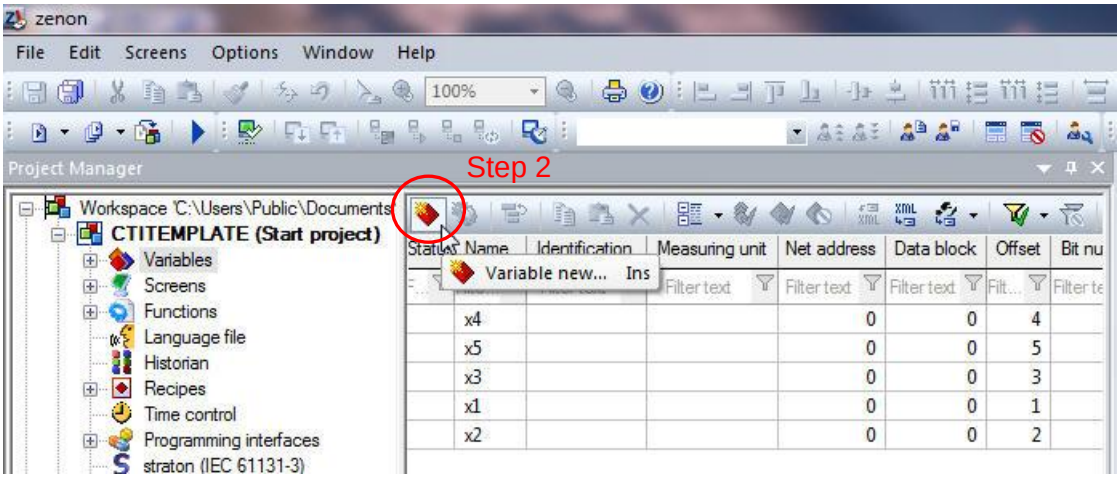
CTI 2500 Series Secondary Variable Types		
Secondary Object Type	**Data Type**	**Object Value**
Timer / Counter		
Preset (TCP)	INT	0
Current (TCC)	INT	1
Drum		
Step Preset (DSP)	INT	0
Step Current (DSC)	INT	1
Count Preset (DCP)	INT	2
Count Current (DCC)	INT*	3
Loop Variable		
Gain (LKC.)	REAL	0
Reset Time - min (LTI.)	REAL	1
Rate Time – min (LTD.)	REAL	2
Sample Rate – sec (LTS)	REAL	3
Process Variable (LPV)	REAL, INT	4
PV High Limit (LPVH)	REAL	5
PV Low Limit (LPVL)	REAL	6
Set Point (LSP)	REAL, INT	7
SP High Limit (LSPH)	REAL, INT	8
SP Low Limit (LSPL)	REAL, INT	9
Output (LMN)	REAL, INT	10
Bias (LMX)	REAL, INT	11
Error (empty)	REAL, INT	12
High-High Alarm Limit (LHHA)	REAL, INT	13
High Alarm Limit (LHA)	REAL, INT	14
Low Alarm Limit (LLA)	REAL, INT	15
Low-Low Alarm Limit (LLLA)	REAL, INT	16
Alarm Deadband (LADB)	REAL, INT	17
Orange Dev Alarm Limit (LODA)	REAL, INT	18
Yellow Dev Alarm Limit (LYDA)	REAL, INT	19
Rate of Change Alarm Limit (LRCA)	REAL	20
Alarm Acknowledge Flags (LACK)	UINT	21
Deriv Gain Limiting Coeff (LKD)	REAL	22

Loop Status	UINT	23
Loop Mode	UINT	24
Loop V-Flags (LVF)	UINT	25
Control Flags – MSW (LCFH)	UINT	26
Control Flags – LSW (LCFL)	UINT	27
Ramp/Soak Status Flags (LRSF)	UINT	28
Ramp/Soak Step Number (LRSN)	INT	29
Alarm Variable		
Sample Rate – sec (ATS)	REAL	0
Process Variable (APV)	REAL, INT	1
PV High Limit (APVH)	REAL	2
PV Low Limit (APVL)	REAL	3
Set Point (ASP)	REAL, INT	4
SP High Limit (ASPH)	REAL, INT	5
SP Low Limit (ASPL)	REAL, INT	6
Error (AERR)	REAL, INT*	7
High-High Alarm Limit (AHHA)	REAL, INT	8
High Alarm Limit (AHA)	REAL, INT	9
Low Alarm Limit (ALA)	REAL, INT	10
Low-Low Alarm Limit (ALLA)	REAL, INT	11
Alarm Deadband (AADB)	REAL, INT	12
Orange Dev Alarm Limit (AODA)	REAL, INT	13
Yellow Dev Alarm Limit (AYDA)	REAL INT	14
Rate of Change Alarm Limit (ARCA)	REAL, INT	15
Alarm Acknowledge Flags (AACK)	UINT*	16
Alarm V-Flags (AVF)	UINT*	17
Alarm Control Flags – MSW (ACFH)	UINT	18
Alarm Control Flags – LSW (LCFL)	UINT	19

* Read Only

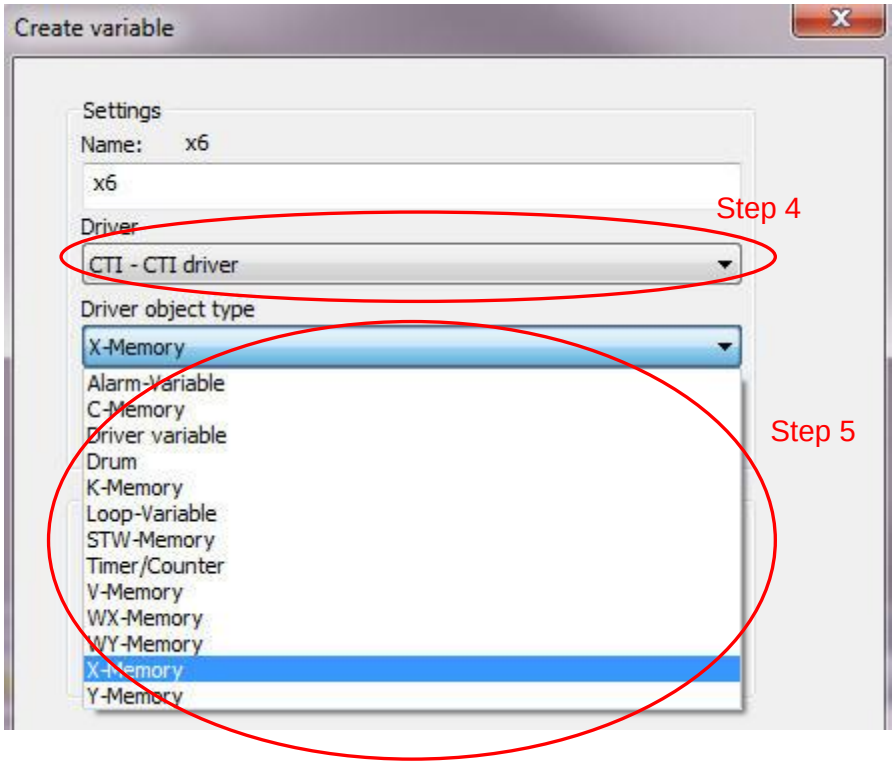
3.6.2.1 Creating a New Variable

Step 1: In the Project tree, click on the *Variables* branch.



Step 2: In the Detail View window, click on the *Variable new* icon.

Step 3: When the Create variable window appears, enter a name for your variable in the name box.



Step 4: In the Create variable window, select the PLC driver.

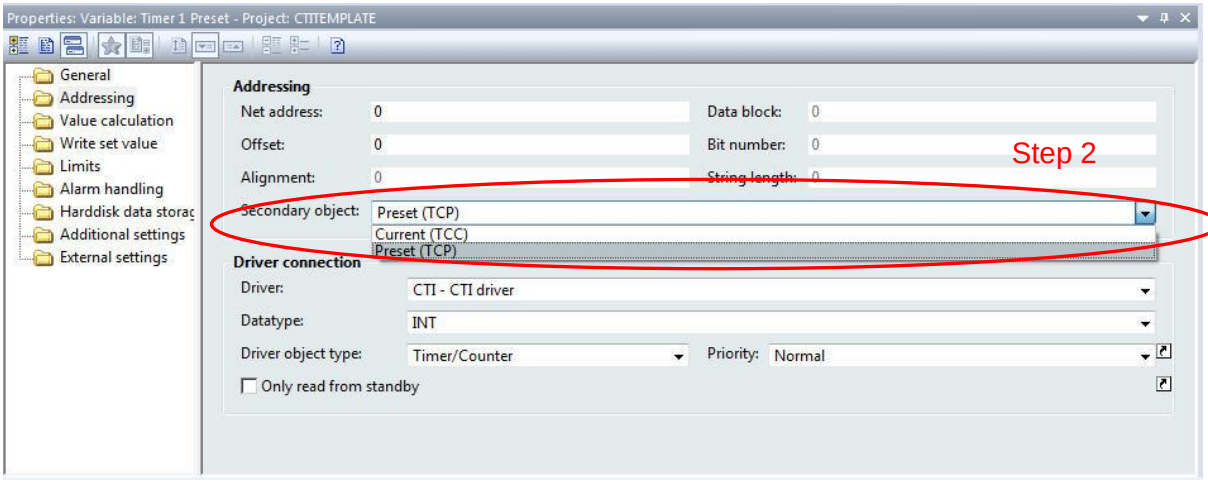
Step 5: In the *Driver object type* list box, select the variable type that you wish to create.

Step 6: Click the finish button when you are done.

3.6.2.2 Selecting a Secondary Object Type

Timer, counter, drum, loop, and alarm variables in the CTI 2500 Series PLC are known as secondary object variables. These secondary object variables have multiple memory registers whereas standard variable types like 'V', 'X', 'C', and 'Y' variables have one associated value in memory. For example, a timer variable has a preset (TCP) value and a current (TCC) value. When creating a secondary object variable in the Zenon Editor, it is necessary to specify the variable's secondary object type. Only the CTI driver uses secondary object types.

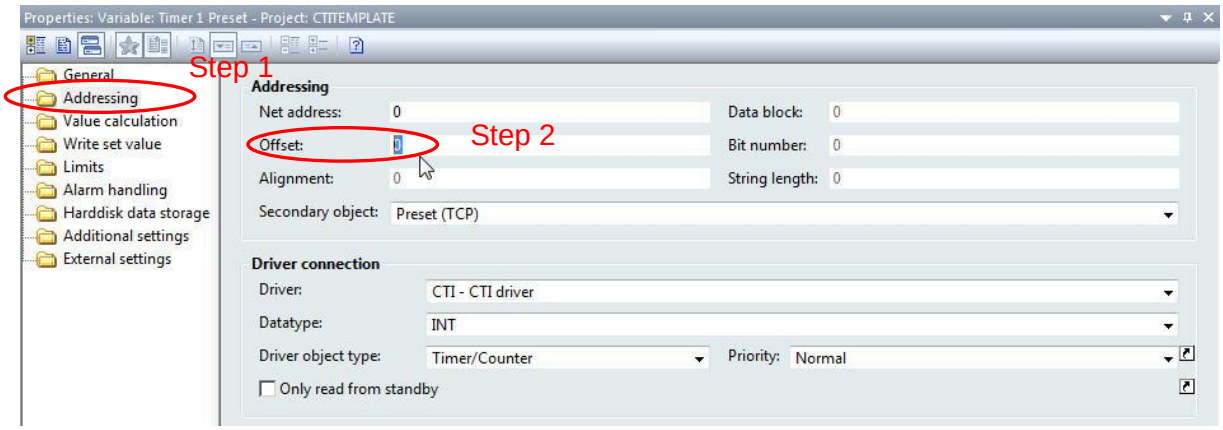
Step 1: In the Variables Detail window, select the variable that requires a secondary object.



Step 2: Under the Addressing folder in the Properties window, select the Secondary Object type from the list box.

3.6.2.3 Setting the Variable Offset

Another necessary step after creating a new variable is setting the variable's offset. The offset value corresponds to the memory address of the PLC variable to which you are connecting. For example, for the X memory type of the CTI PLC, the offset value is '1' for digital input 'x1'. If there was a counter 2 variable in the CTI PLC the offset would be a value of '2'.



Step 1: In the Variables Properties window, click on the *Addressing* folder.

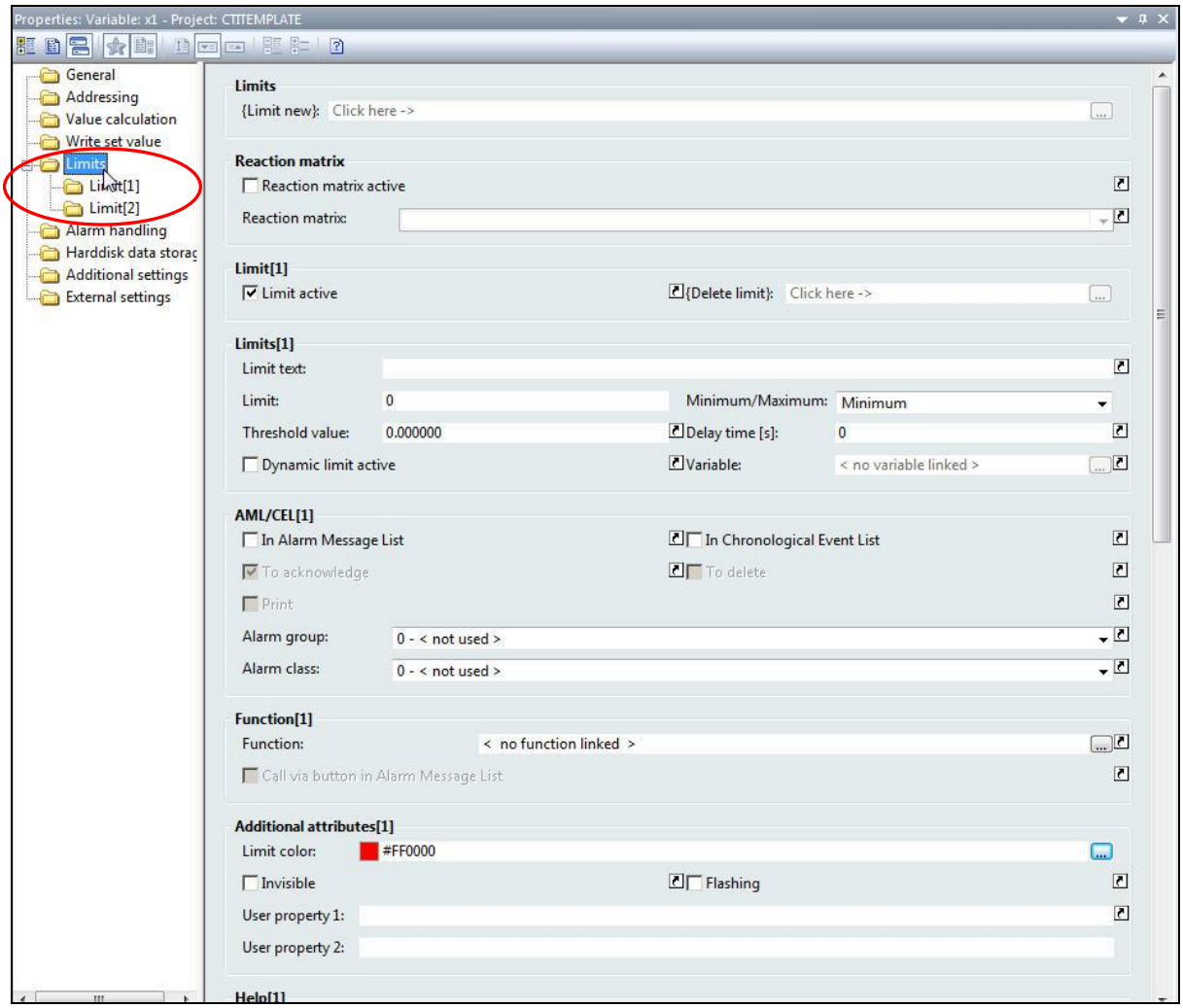
Step 2: Enter the Offset value in the Properties detail window.

3.6.2.4 Setting Variable Limits

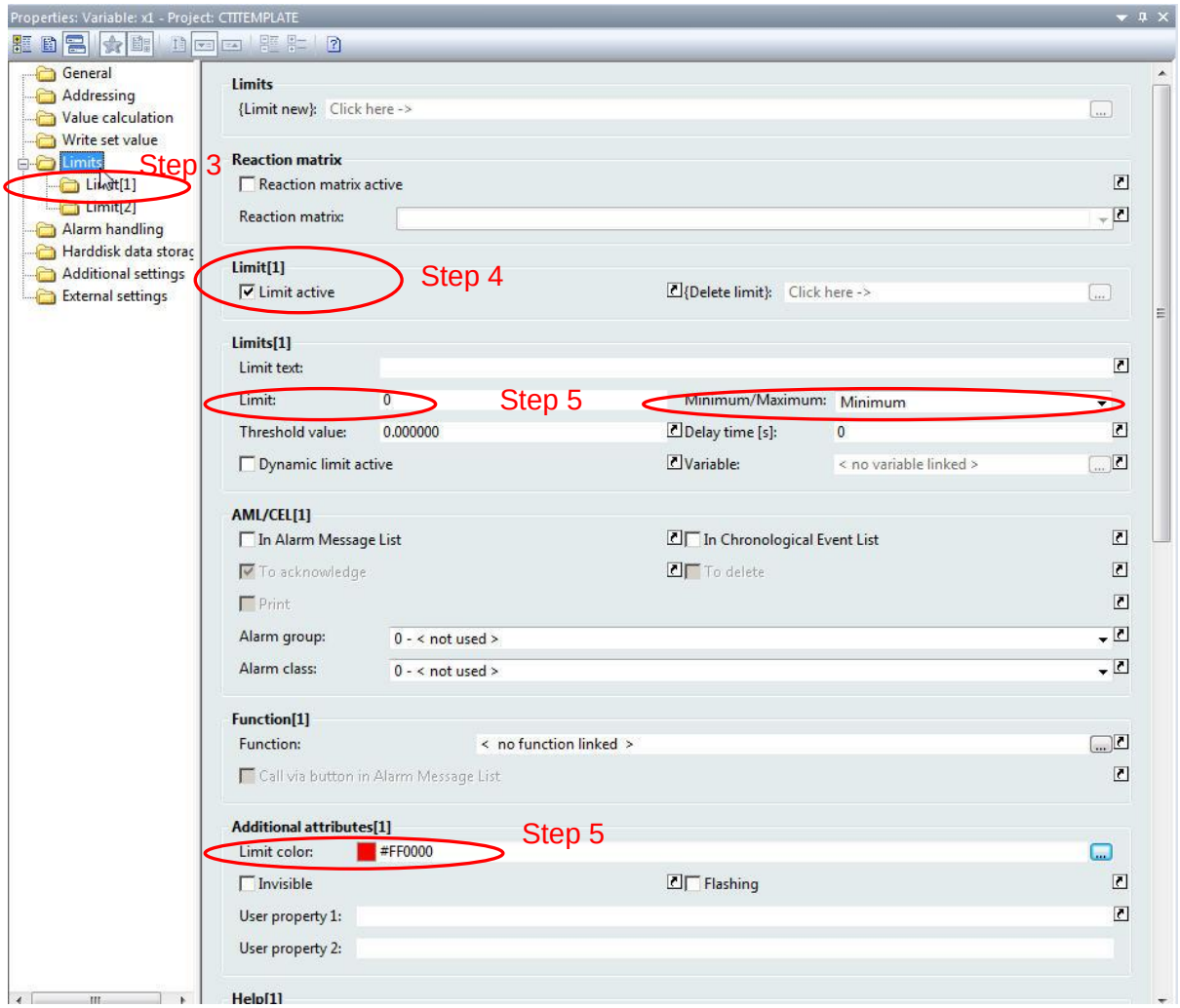
The Limit property of a variable is a very important feature for obtaining variable status and triggering alarms. Limits are handled in the properties of the variable not in the properties of an onscreen object. If, for example, you would like a picture of a valve to turn red when closed and green when opened, then you must use the limit property of the variable tied to the valve position.

Example: A valve has a position switch wired to digital PLC input ‘X1’. This switch gives a full signal when the valve is opened and no signal when the valve is closed.

Step 1: Create a variable for the CTI driver named ‘X1’. This variable will be an X memory variable with an offset of 1. See Section 3.7.2.1 for instructions to create a new variable.



Step 2: In the Properties window for the new variable that you just created, expand the *Limits* folder. You will see two limits already defined by Zenon by default.

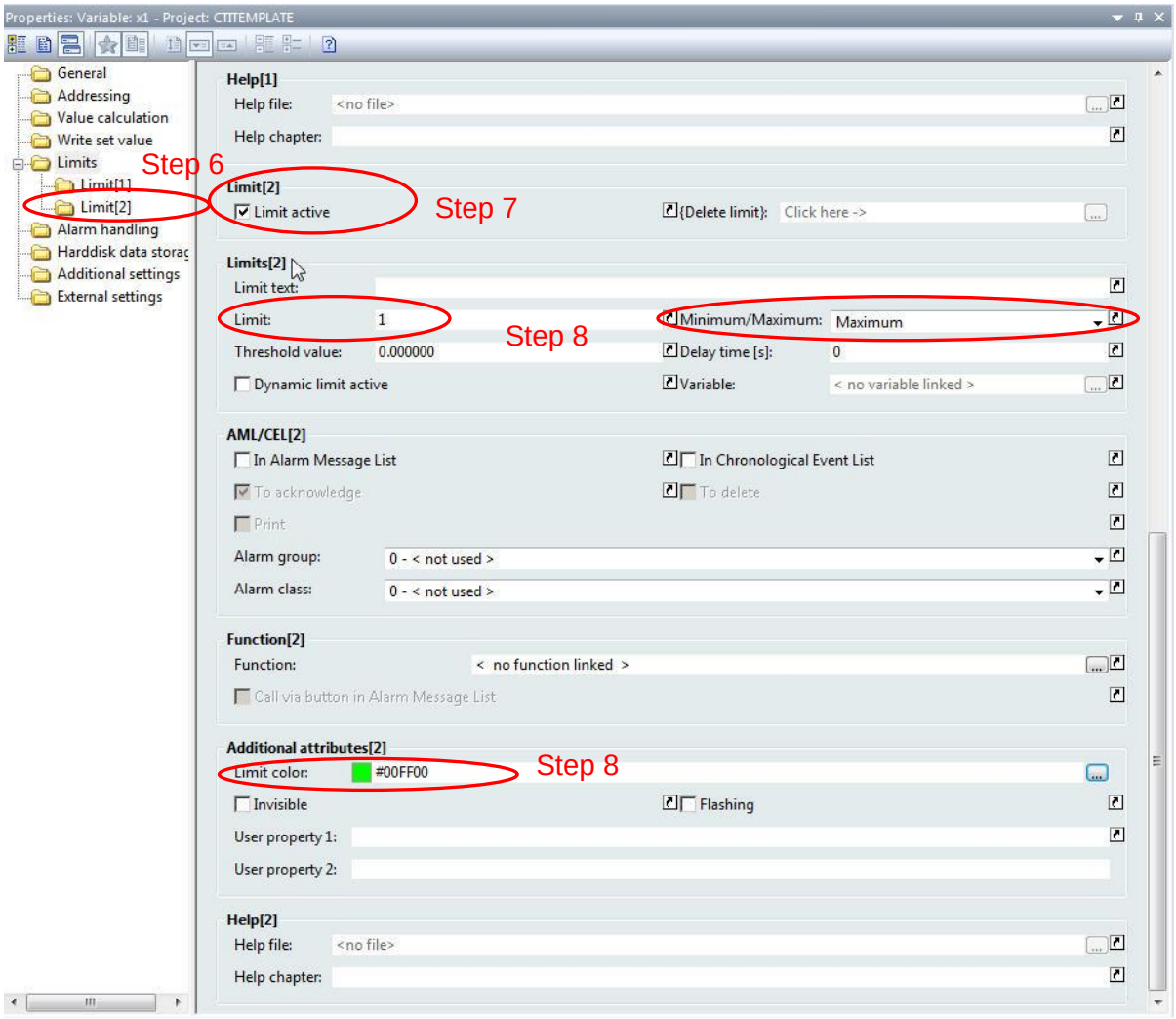


Step 3: Click on the *Limit[1]* folder.

Step 4: Notice that the *Limit active* checkbox is checked. In order for a limit to be enabled, the *Limit active* box must be checked.

Step 5: Notice that Limit 1 has been preconfigured to be a minimum limit of value ‘0’ with a limit color of red. What this means is that when X1 is equal to zero then the limit color of red is triggered.

A *Minimum* limit is triggered when a variable value is equal to or less than the minimum limit value.



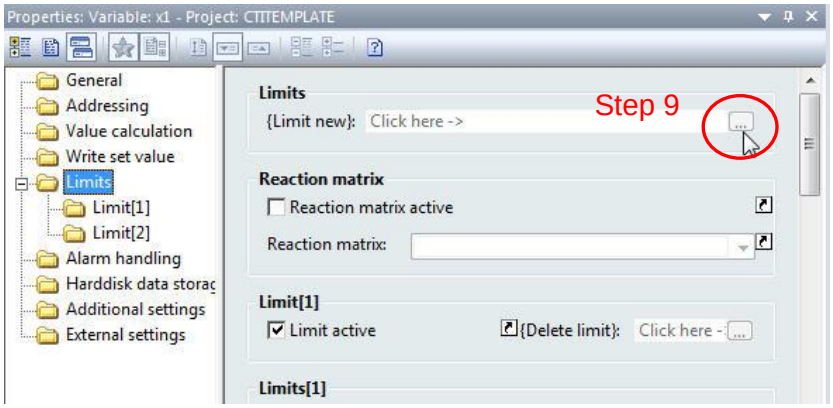
Step 6: Click on the *Limit[2]* folder.

Step 7: Notice that the *Limit active* checkbox is checked. In order for a limit to be enabled, the *Limit active* box must be checked.

Step 8: Notice that Limit 2 has been preconfigured to maximum limit of value ‘1’ with a limit color of green. This means that when X1 is equal to ‘1’ then the limit color of green is triggered.

A *Maximum* limit is triggered when a variable value is equal to or greater than the maximum limit value.

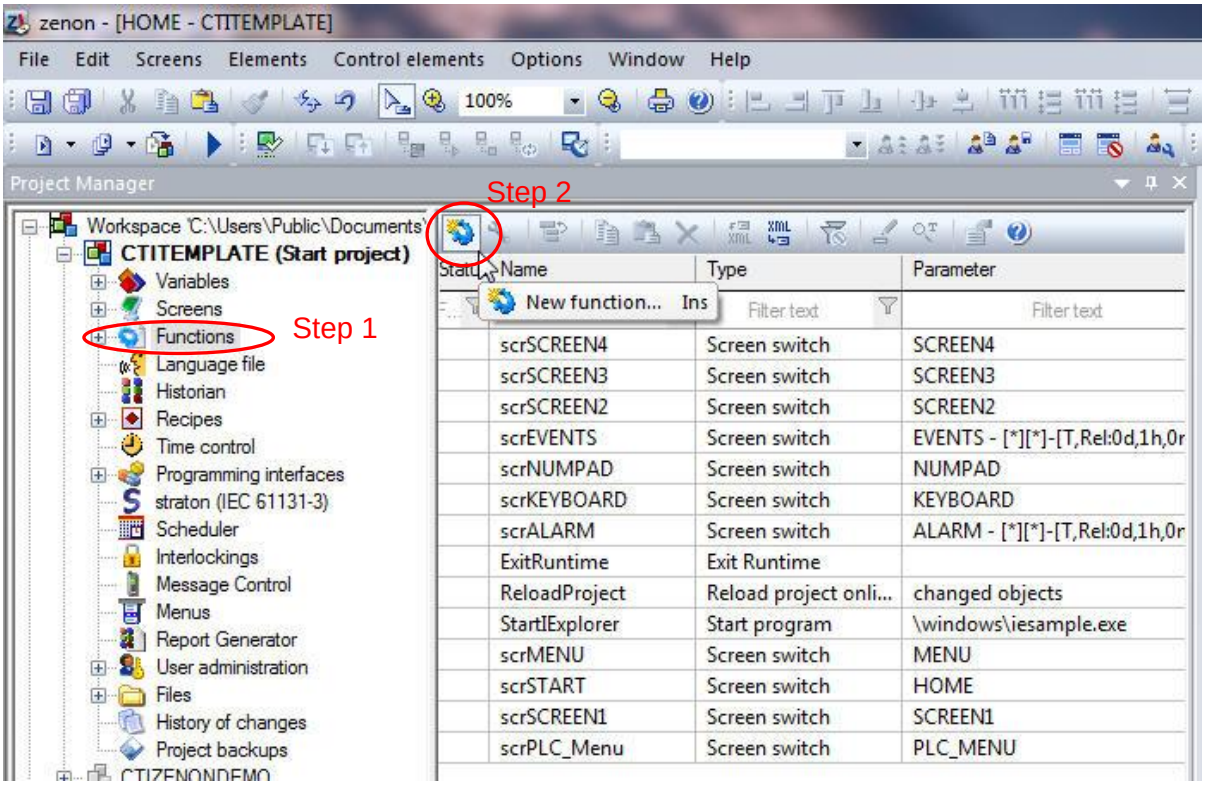
For integer or real type variables, multiple limits can be added and configured.



Step 9: To add a new limit, click on the *Limit new* button in the Limits folder.

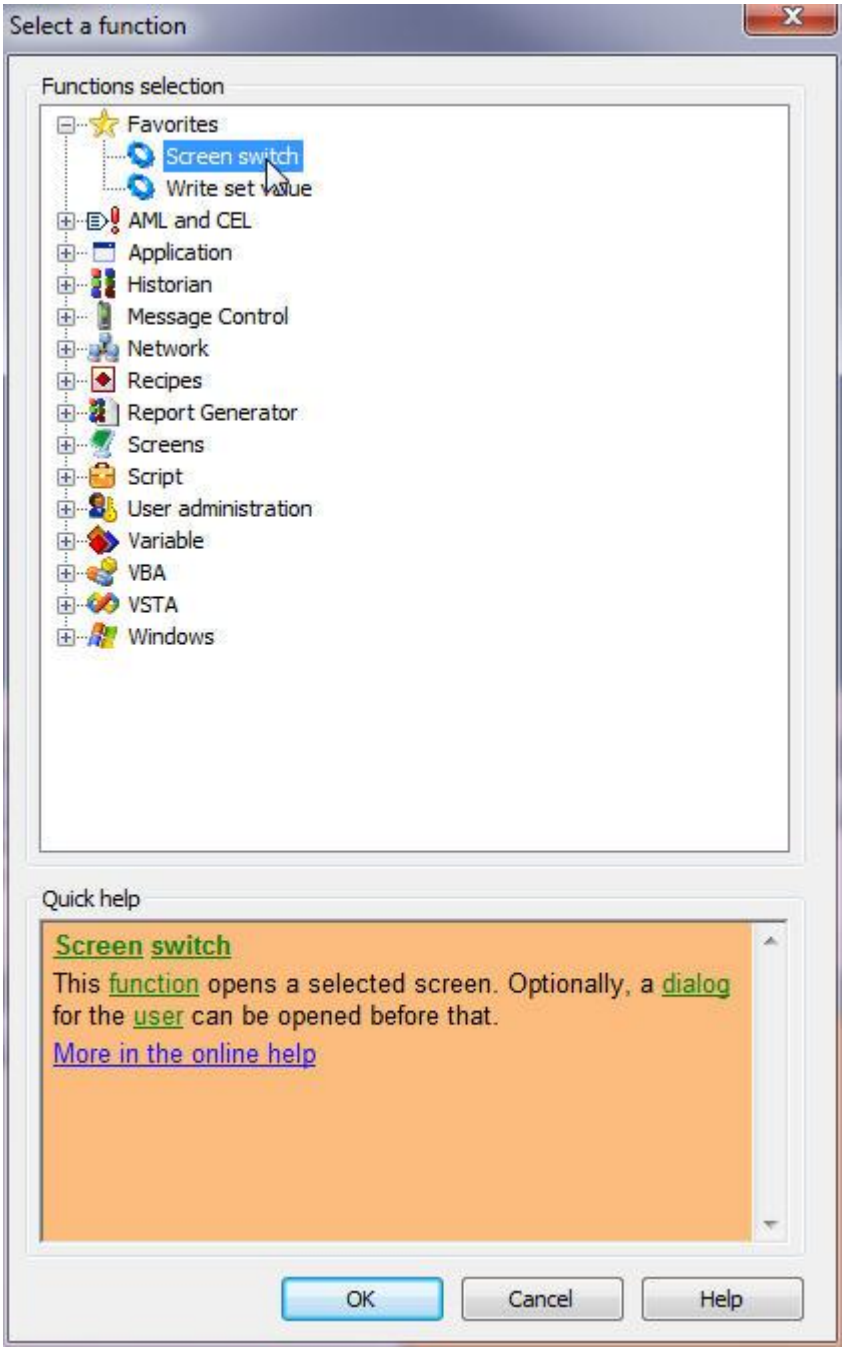
3.6.3 Creating Functions

A function is a predefined action which can be triggered in the Runtime; e.g. a screen switch or a file operation, etc. Before a button can be added to your project, you must first create the function that the button will activate. Two of the most common functions that you will use are the *screen switch* and *write set value* functions.

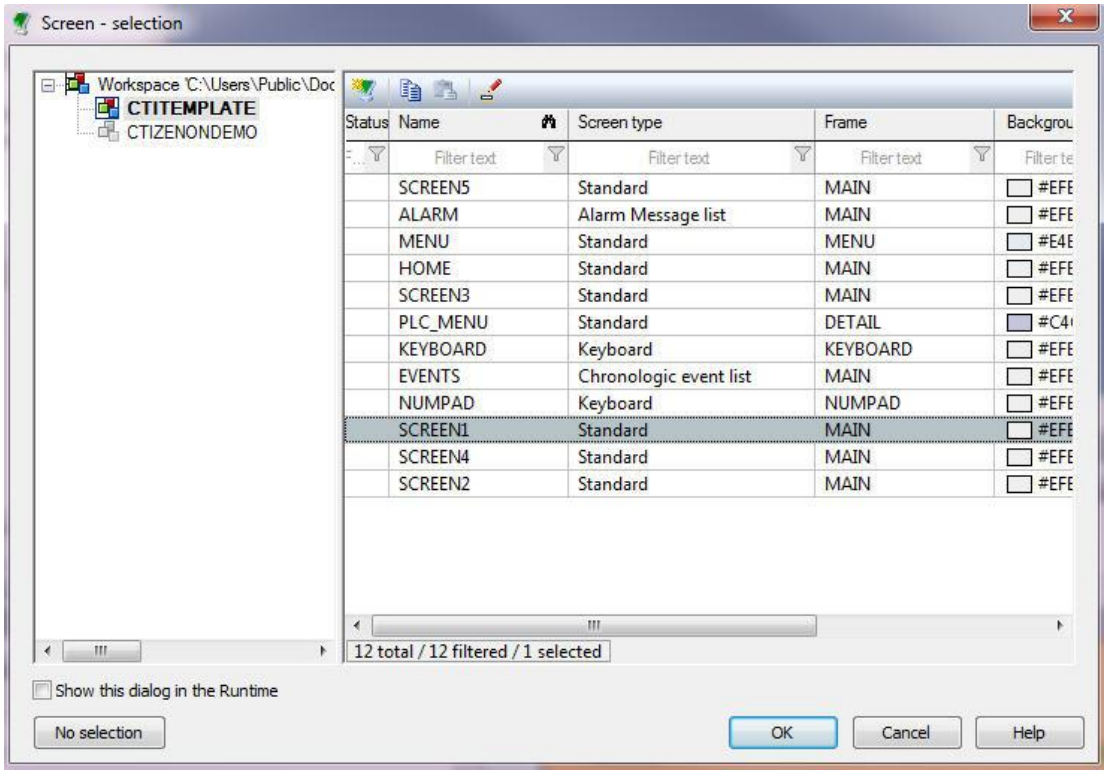


Step 1: In the Project tree, click on the *Functions* icon.

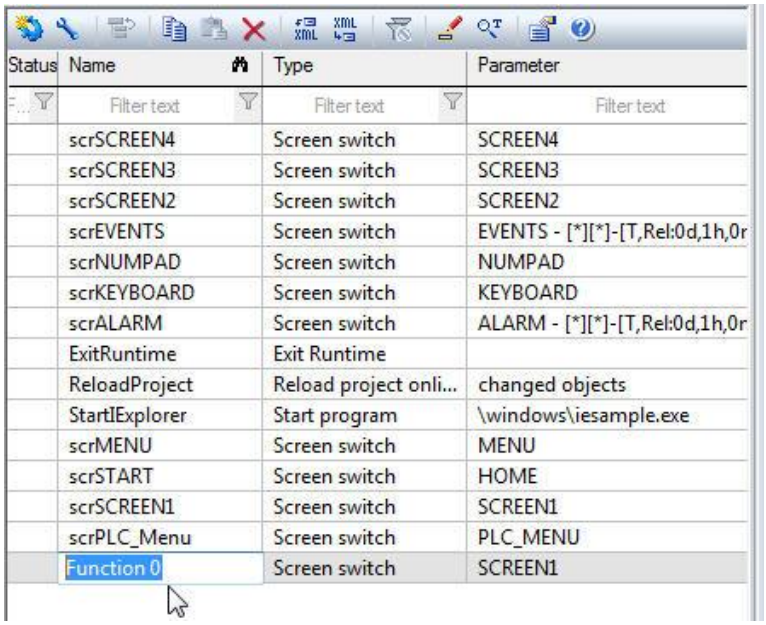
Step 2: In the Detail view, click on the *New function* icon.



Step 3: When the *Select a function* window appears, select a function from the list and then click the OK button. In this example, the screen switch function is selected.



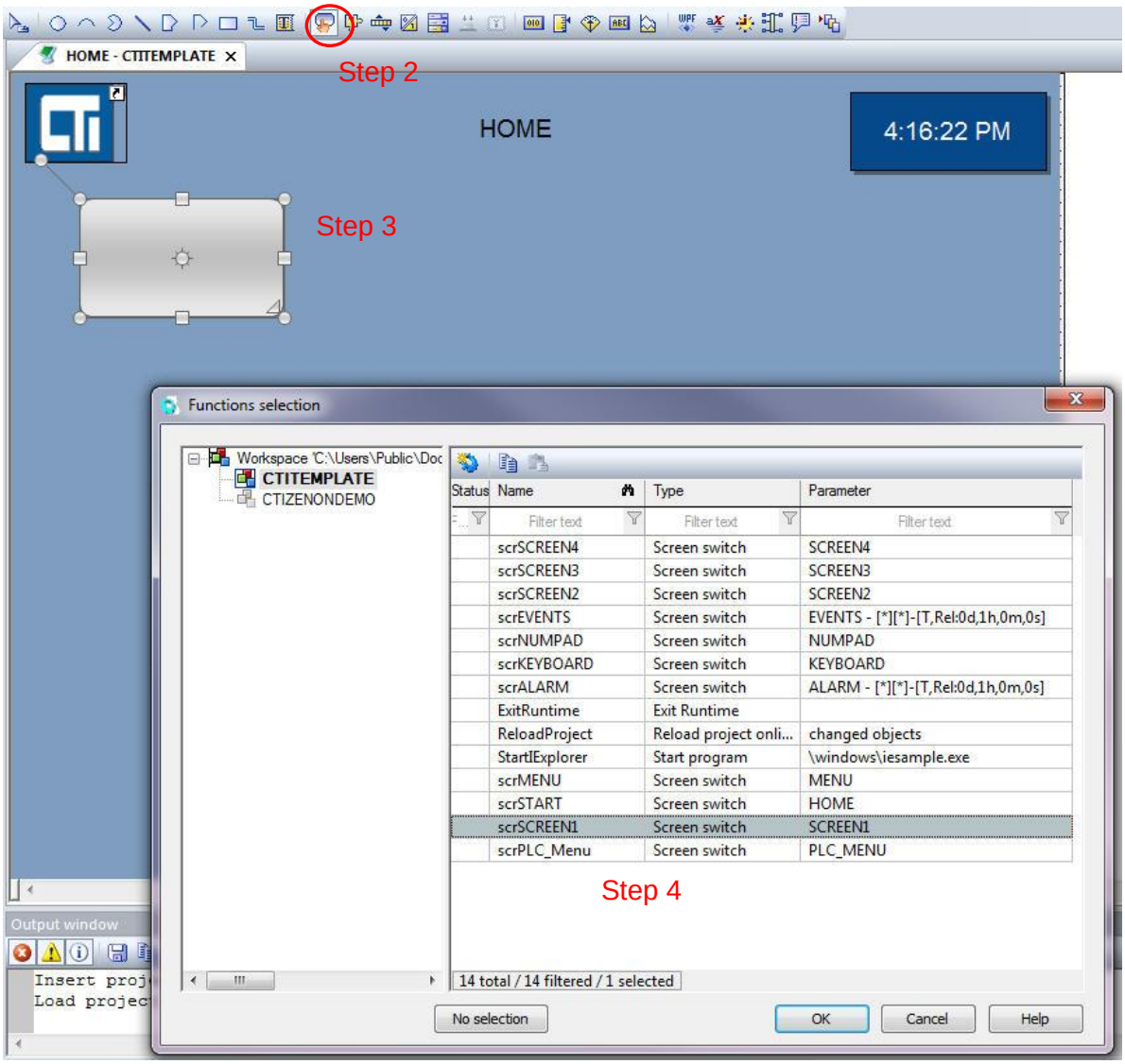
Step 4: When the *Screen - selection* window appears, select a screen from the list and then click the OK button.



Step 5: In the Detail View, you can click on the new function to rename it.

3.6.4 Creating Buttons

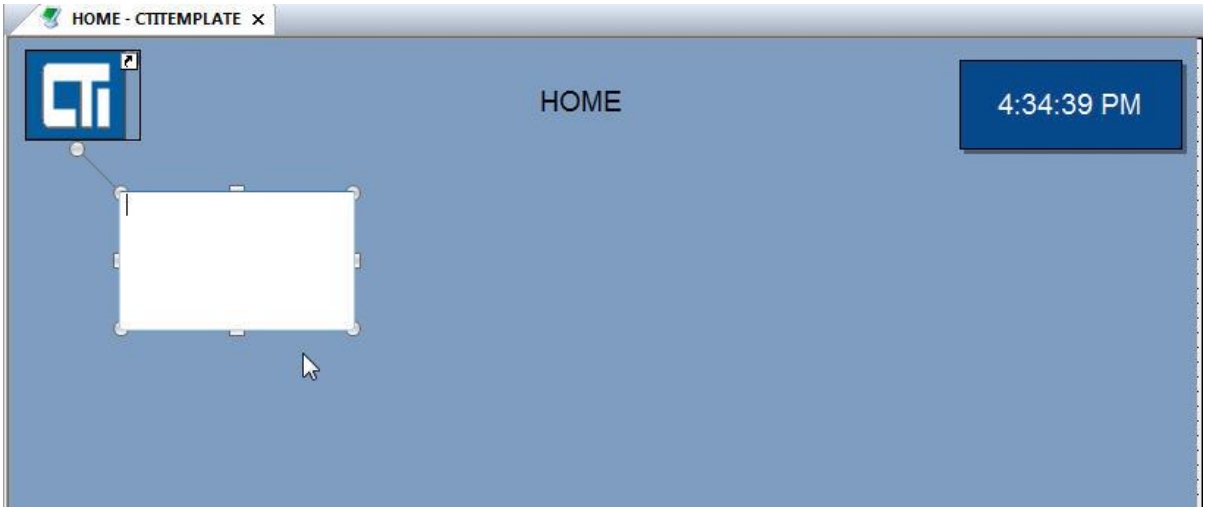
Step 1: In the Project tree, click on the Screens icon. In the Detail View, double click on the screen in which you will be placing a new button.



Step 2: Click on the icon for *Create a button*.

Step 3: In the *Screen Editor* window, click and drag a new button on the screen.

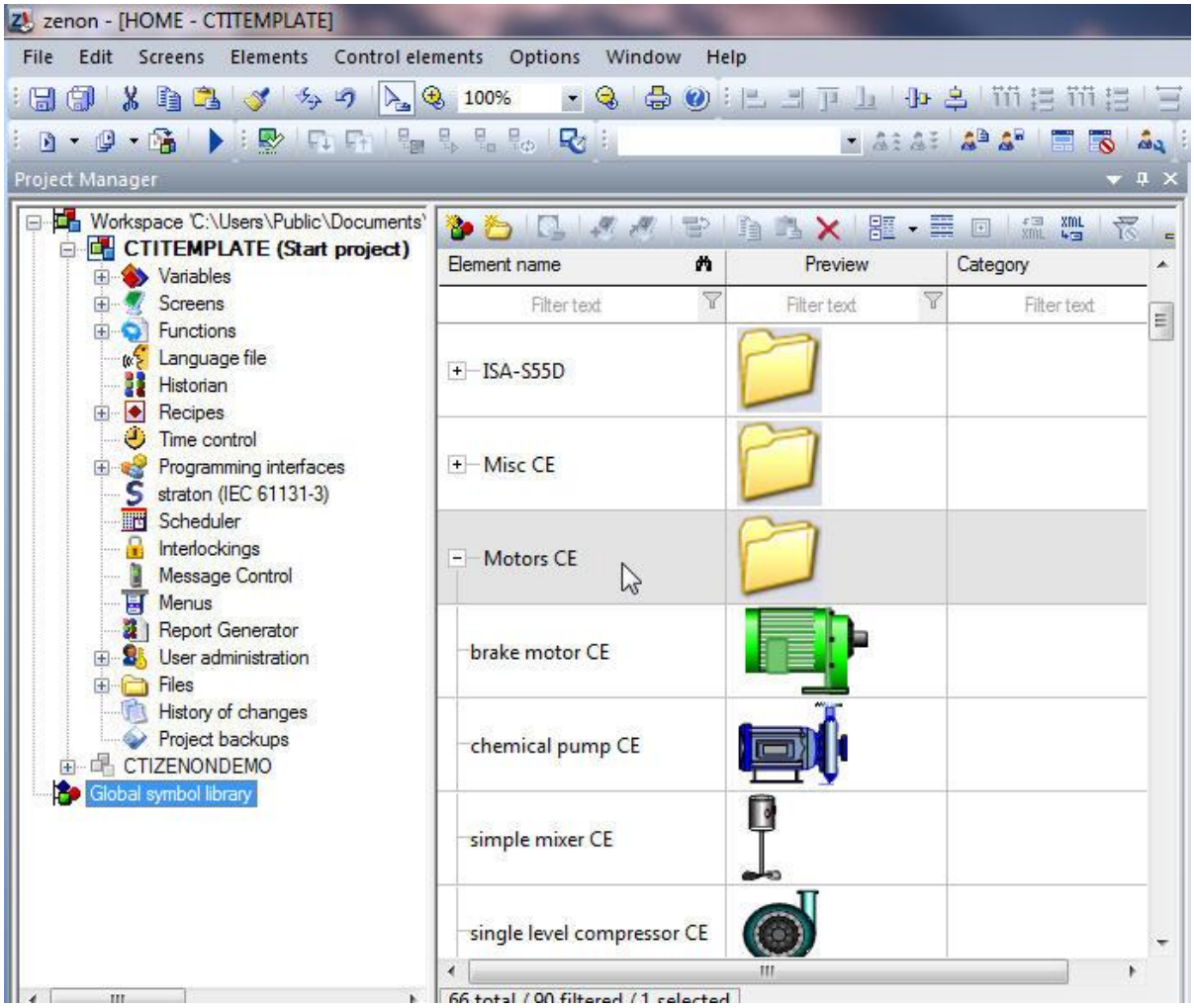
Step 4: You will now need to select a function for your button. When the Functions selection window appears, select the function and click the OK button.



Step 5: Double click on the new button. You will now be able to type a label for the button.

3.6.5 Adding Graphical Symbols

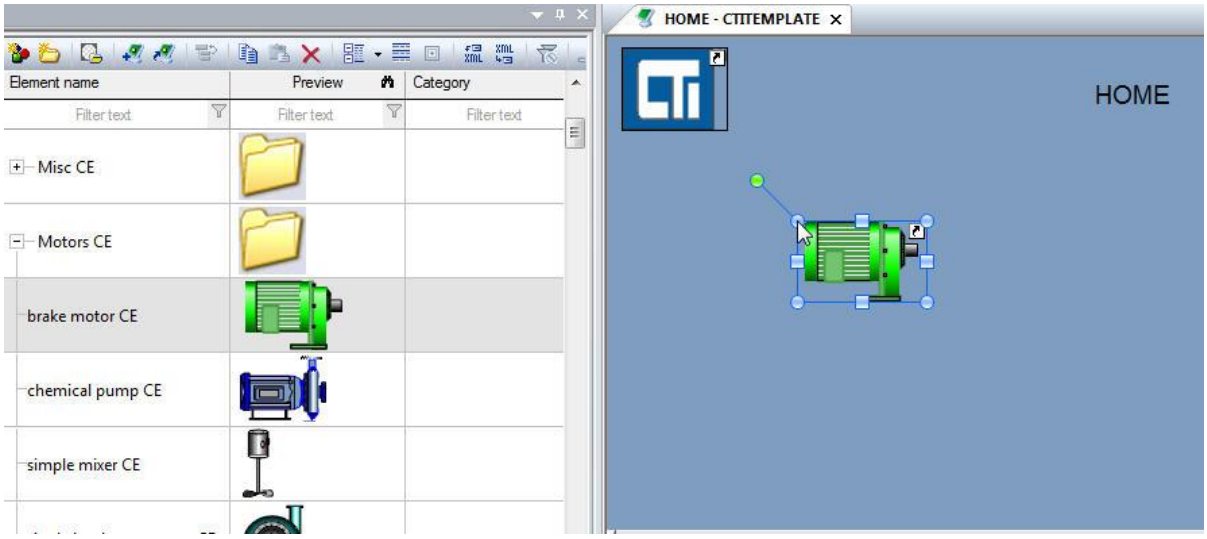
The Zenon Editor has a large graphical symbols library that you may use to create your project screens. You may use these symbols in your project or create your own by editing an existing symbol.



Step 1: To add a graphical symbol to your project screen, click on the *Global symbol library* icon in the Project tree.

Step 2: Find a symbols folder that contains your desired symbol, for example the 'Motors' folder contains a variety of motor and pump symbols.

Step 3: Click on the '+' beside the desired folder to view the symbols contained therein.

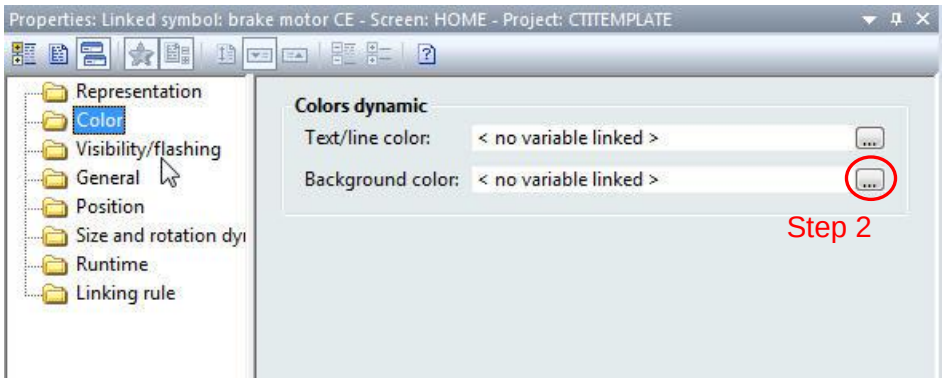


Step 4: Click and drag a symbol from the library folder onto an open screen in the Screen Editor window.

3.6.5.1 Linking a Variable to a Graphics Symbol

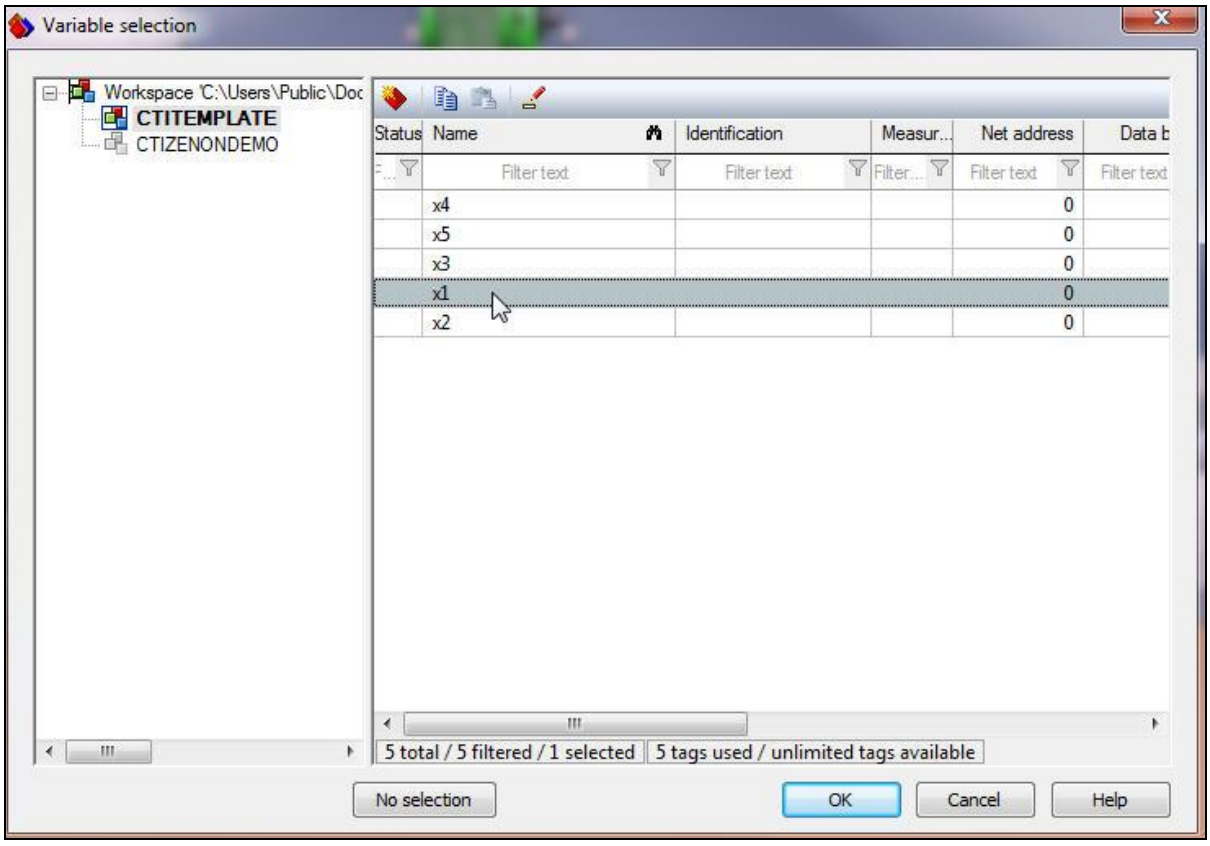
The color and visibility of a graphics symbol can be controlled by linking the symbol to a variable which has defined limits. For example, earlier in section 3.7.2.1, we created a variable which we named 'X1'. Variable 'X1' had two defined limits, one limit that displayed the color red when X1 was equal to '0' and the other limit that displayed the color green when X1 was equal to '1'.

If we link this variable to the background color property of the new graphics symbol that we added to our project, then the motor color will appear red when X1 is equal to zero and it will appear green when X1 is equal to '1'.



Step 1: In the Properties window for the new graphics symbol, click on the *Color* folder. You can also link a variable to *Visability/flashing* properties.

Step 2: Click on the Background color button to link a variable to this property.

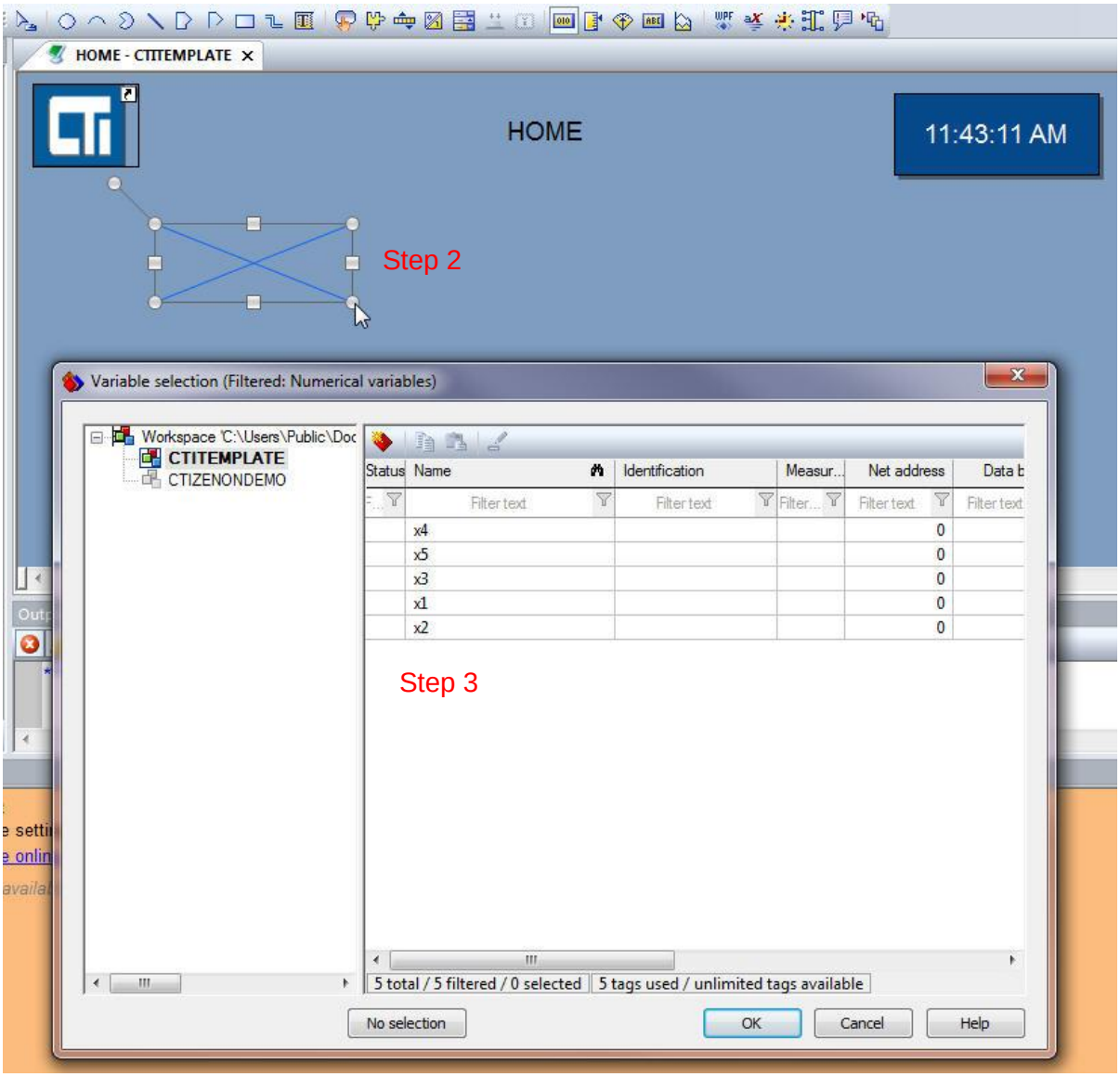


Step 3: Select the variable to link to your symbol and then click the OK button.

3.6.6 Adding Numerical Displays

A Numerical value display box is used to give a graphical readout of a variable value on a project screen.

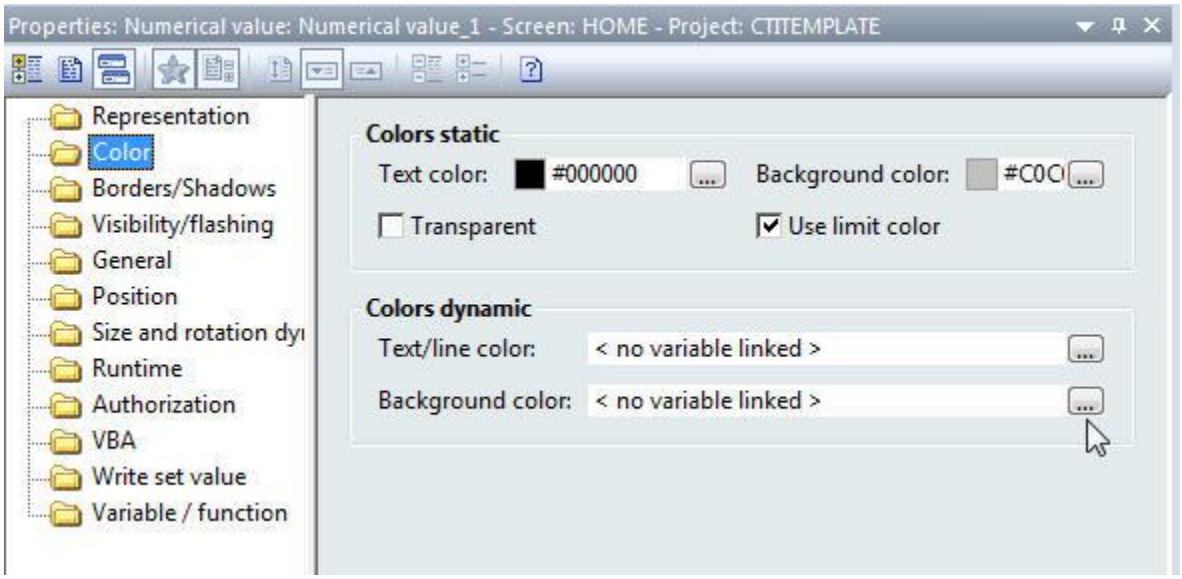
Step 1: To add a *Numerical value* display to your project screen, click on the *Numerical value* icon in the *Elements* toolbar.



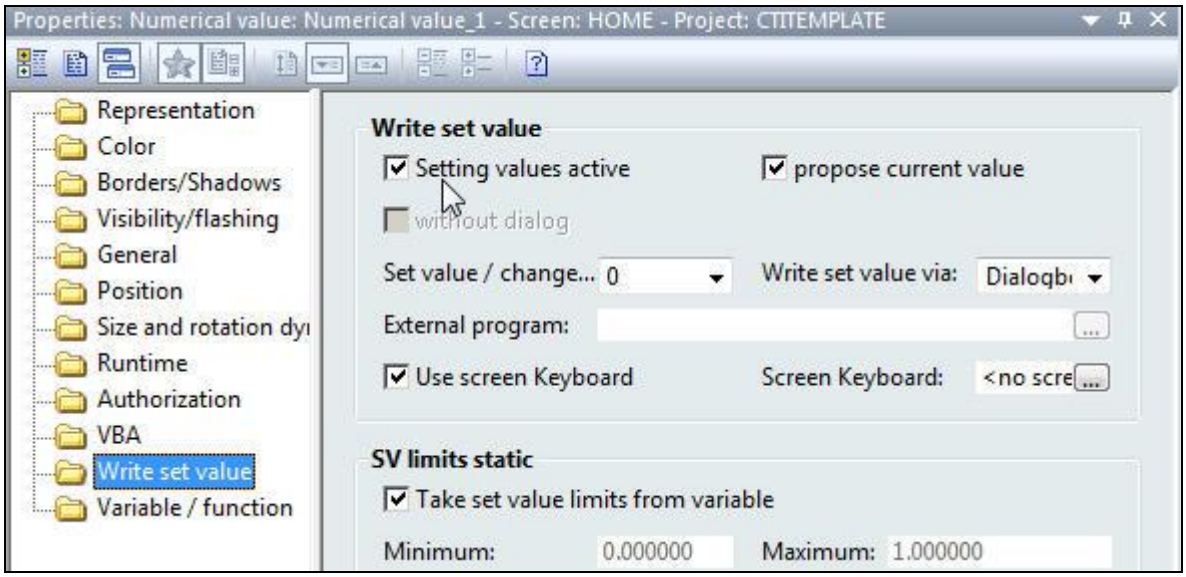
Step 2: Click and drag the numerical display to the desired size.

Step 3: When the variable selection window appears, click to select a variable to display and then click the OK button.

There are a number of properties available to customize your Numerical value display. We will examine a couple of them.



Step 4: Under the color folder, the background color and Text/line color can be link to a variable with defined limits.

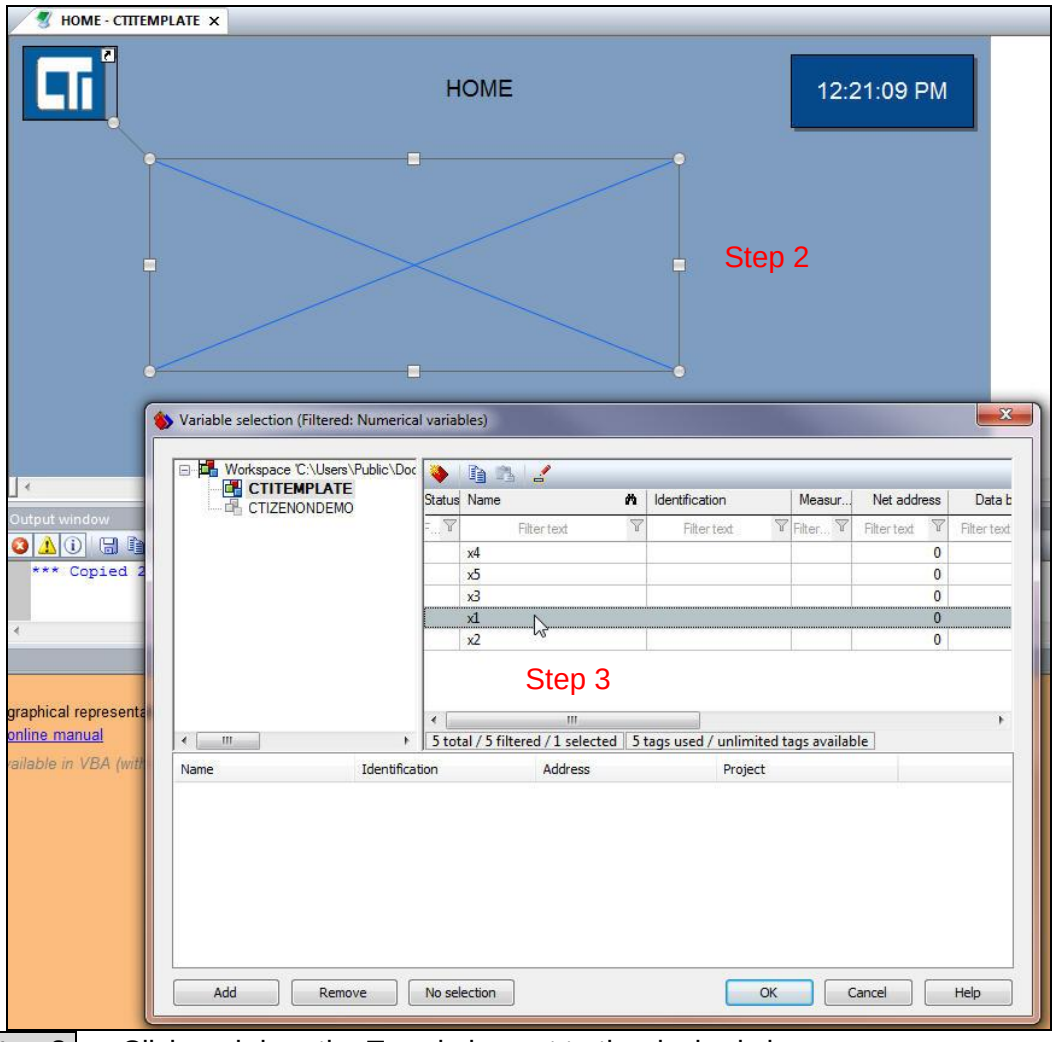


Step 4: Under the Write set value folder, the Setting values active checkbox allows the value in the Numerical value display to be changed in the Runtime by the user. Removing the check from the checkbox disables the Runtime user from being able to change the value from the Numerical value display. If *Setting values active* is selected then you may configure the input method. You may use a dialog box, an onscreen keyboard, a slider, etc. for the input method.

3.6.7 Adding a Trend Element

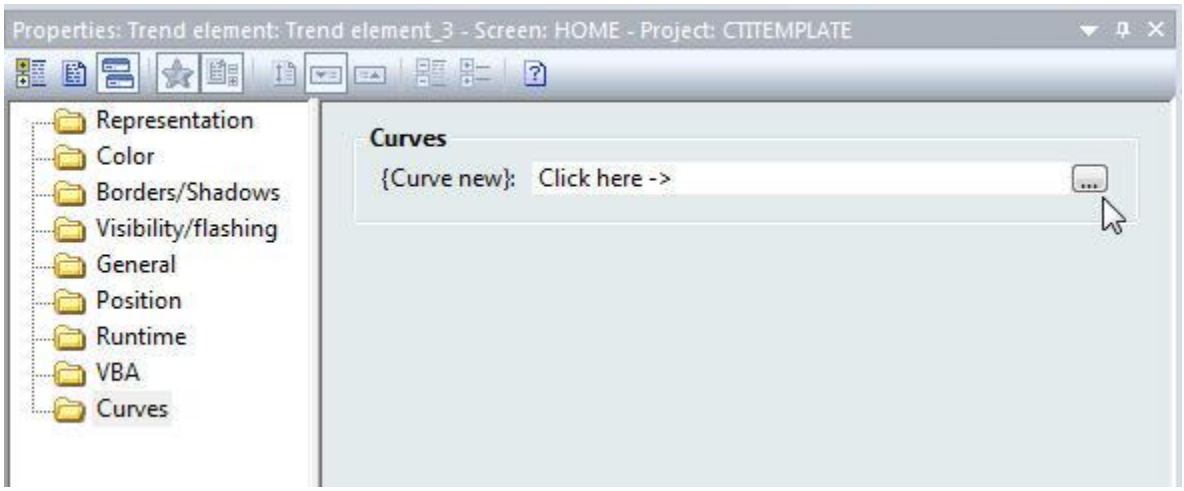
A Trend element is a dynamic element for displaying variable values in trend curves. Trend curves depict the course of value over a selected time interval.

Step 1: To add a *Trend element* to your project screen, click on the *Trend Element* icon in the *Elements* toolbar.



Step 2: Click and drag the Trend element to the desired size.

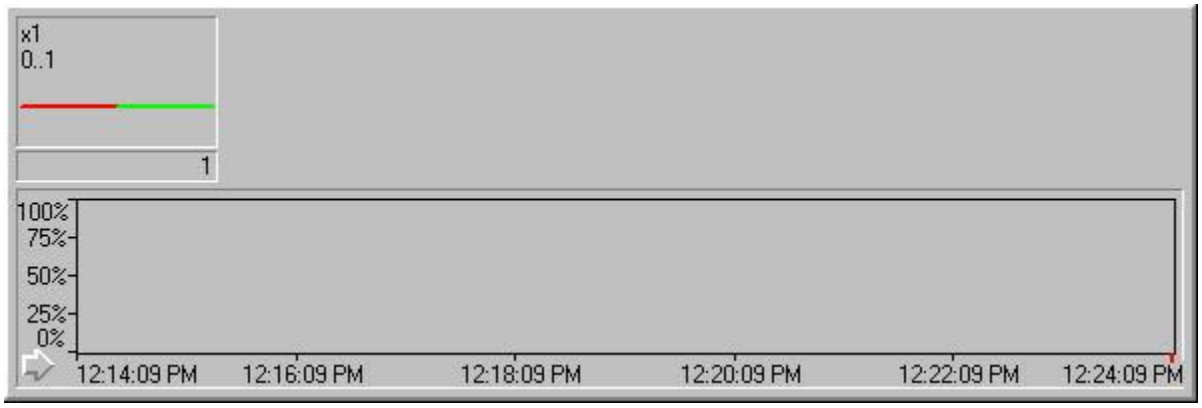
Step 3: Select a variable to display in the trend graph.



Step 4: In the Properties window, click on the *Curves* folder.

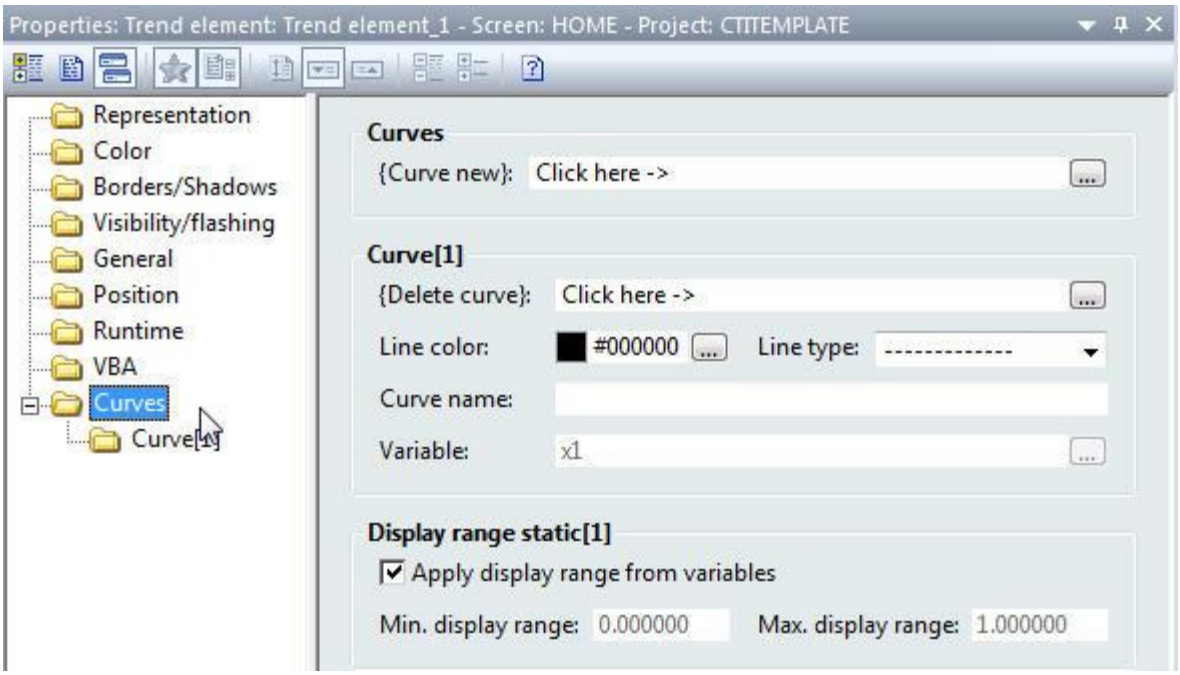
Step 5: Click the *Curve new* button.

Step 6: When a variable selection window appears, select a variable from the list and click the OK button.



The Trend element display contains a data chart area and a variable key.

Step 7: Resize the trend chart as needed to allow for proper viewing of data.

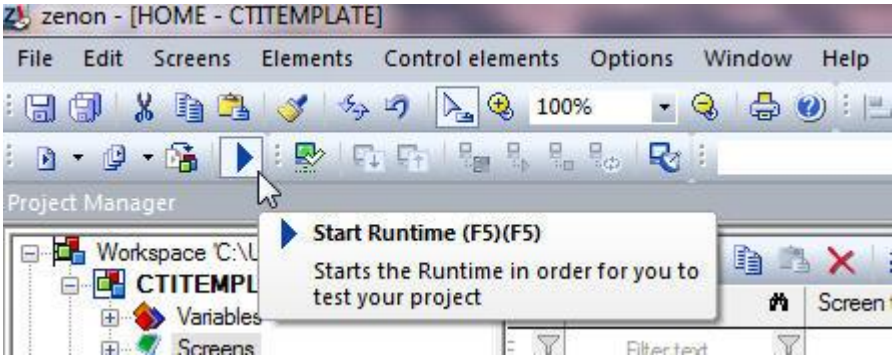


Step 8: Properties for the new Trend curve such as line color and type can be changed in the Properties window under the Curve folder.

Step 9: Additional curves can be added to the Trend element display by clicking on the *Curve new* button.

3.6.8 Testing your Runtime Project

After adding various elements to your project, you can test them by executing a test runtime on your computer.



Step 1: Click the *Start Runtime* button in the Runtime files toolbar to test your Project changes. If you do not have an Exit button defined in your project, press ALT+F4 to exit the runtime.

3.7 Transfering a Project Runtime to the Panel

Transfering a project runtime to your HMI panel consists of the following steps:

1) Reading this Section
2) Setting the IP address of your Panel
3) Connecting the Editor PC to 2500-VP15 Panel
4) Establishing a Remote Transfer Connection
5) Transfering Project Files
6) Setting the Start Project

3.7.1 Configuring Communications Between Editor PC and HMI Panel

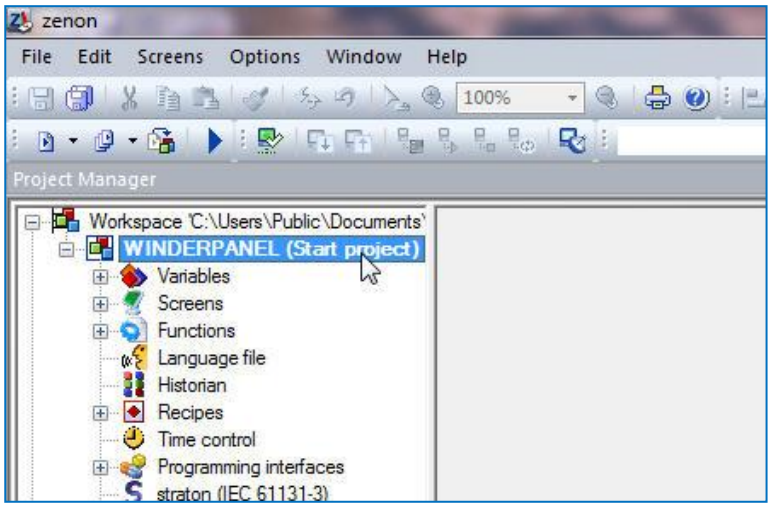
To download a runtime project to your HMI panel you will need to do the following things to establish a communication link:

1. Connect your editor computer to the CTI 2500-VP15 panel with an Ethernet cable. You may also connect through an Ethernet switch or over a network.

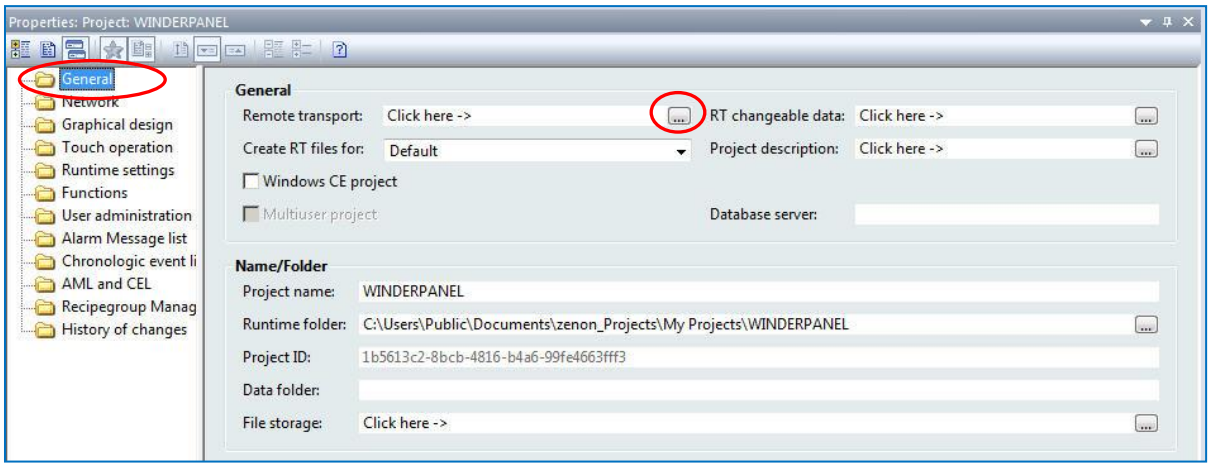
2. Boot your panel to the Windows Desktop.

3. Ensure that you have chosen an IP address and subnet mask for your panel that matches the class of the network to which you are connecting. See section 1.6.

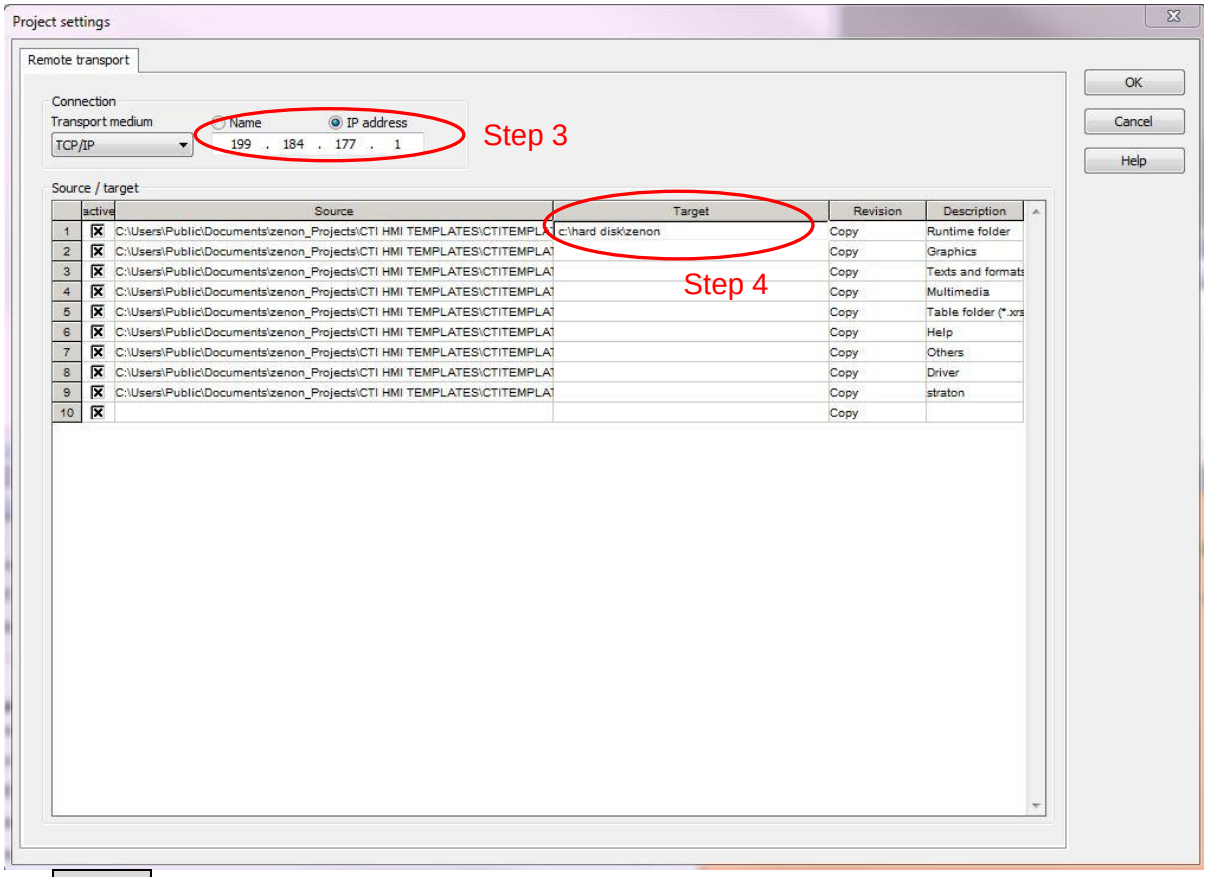
3.7.2 Configuring and Establishing a Remote Transfer Connection



Step 1: Click on the name of your project in the Project tree of your Zenon Editor software.

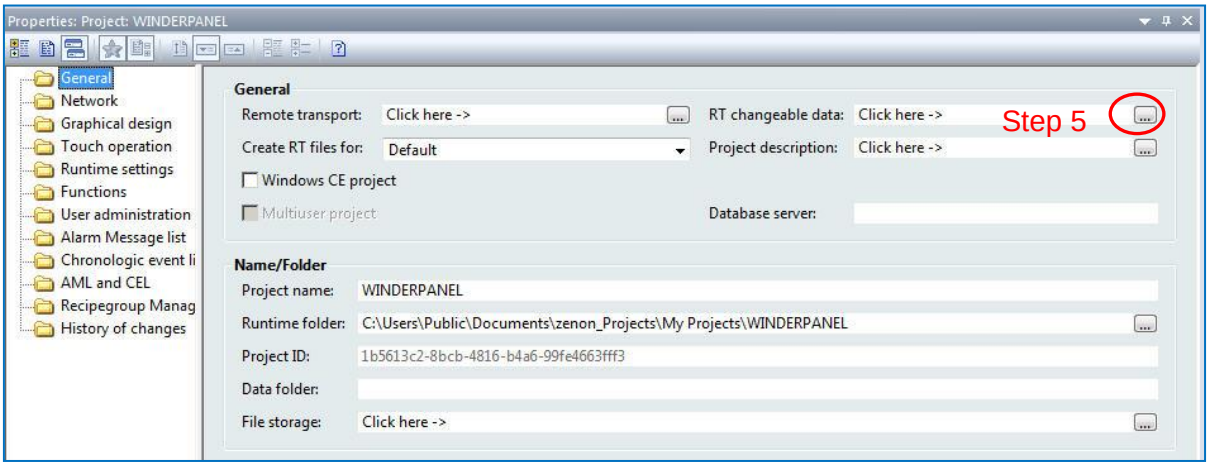


Step 2: In the *Properties* window of the Editor, click on the *General* folder. Then click on the button for *Remote transport* found in the properties detail window.

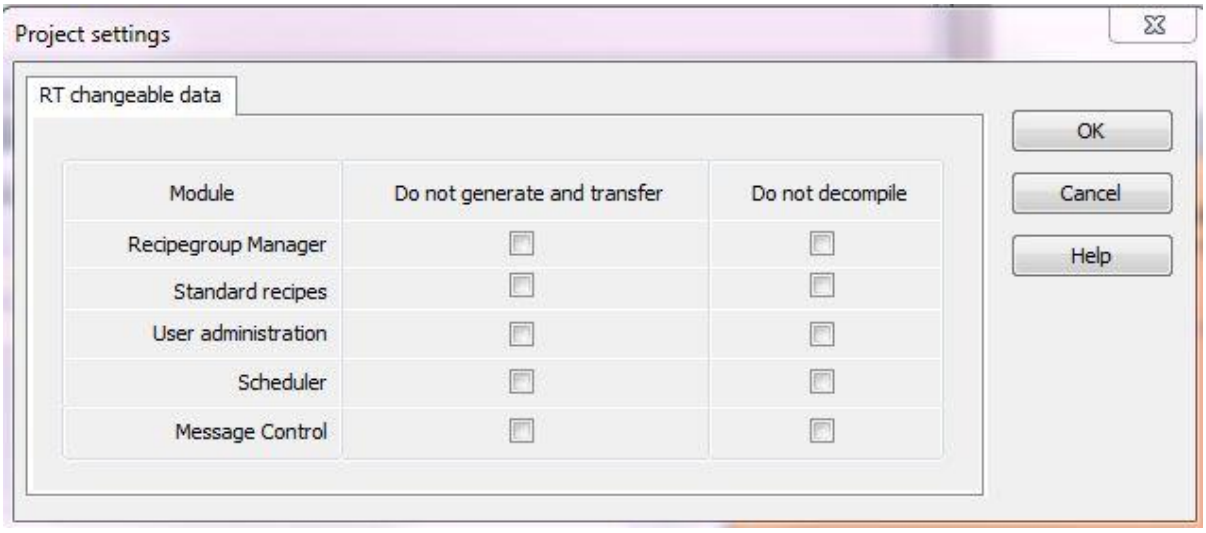


Step 3: Enter the IP address of the CTI panel in the box near the top of the remote transport window.

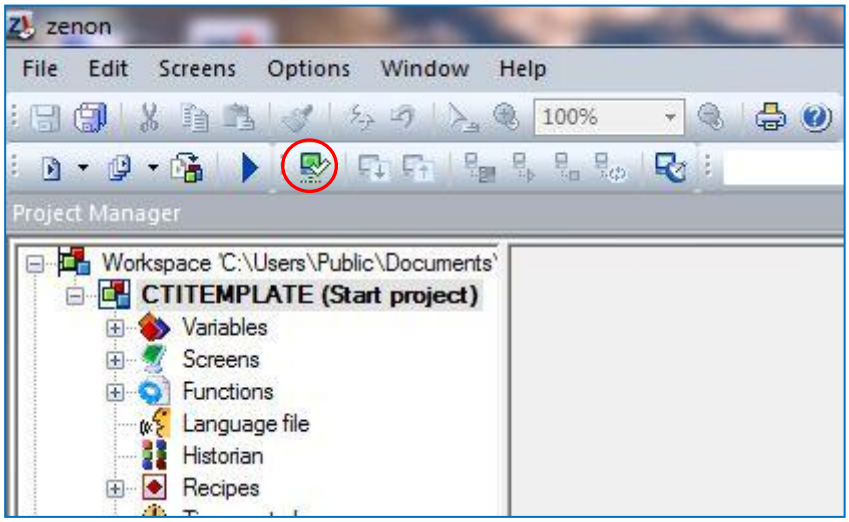
Step 4: Enter the following *Target* location in line 1 of the Source/target table: '*c:\zenon'*. Then, click the OK button.



Step 5: In the *Properties* window of the Editor, click on the *General* folder. Then click on the button for *RT changeable data* found in the properties detail window.



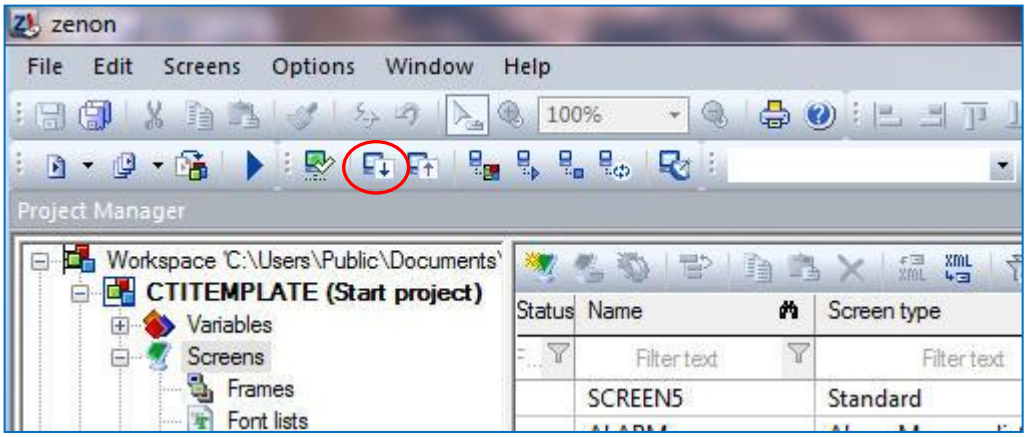
Step 6: Make sure that all of the boxes are empty in the RT changeable data window. If there are any check marks in the boxes, click to remove them. Then click the OK button.



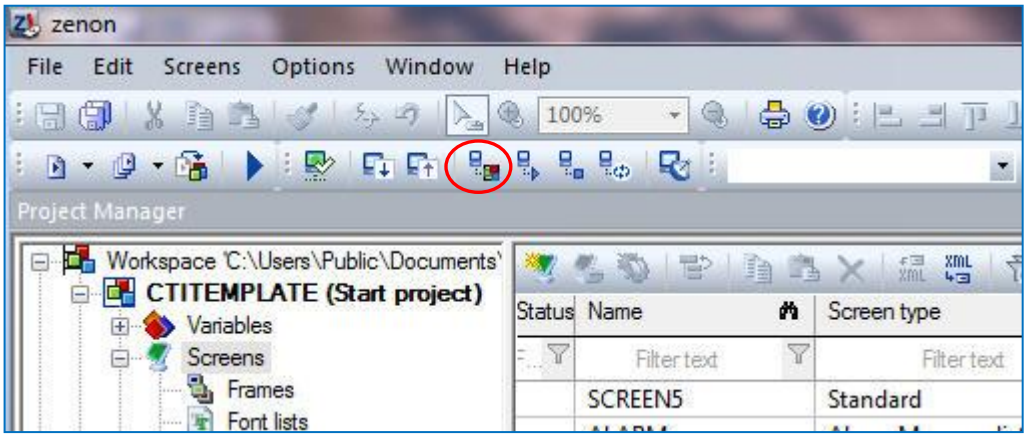
Step 7: Click on the icon for *Establishing a Remote Transport Connection* as indicated in the above image.

Step 8: When the window pictured above appears, click on the OK button. No password is required unless you choose to require a download password.

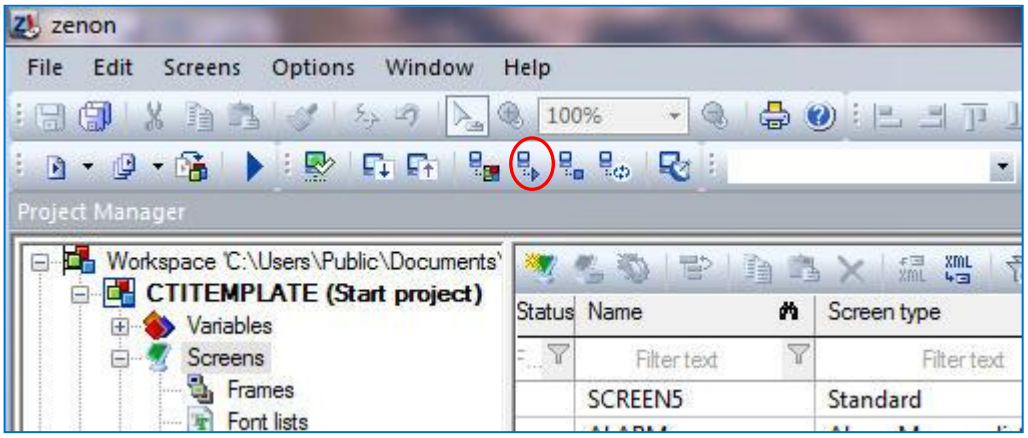
3.7.1 Transferring Project Files and Setting Start Project



Step 1: Click on the icon for *Transfer changed runtime files* as indicated in the image above. In the Output window of the Zenon editor, you will see a number of files being transferred to the CTI Panel.



Step 2: Click on the icon for *Set remote start project* as indicated in the image above.



Step 3: Click on the icon for *Remote: Start runtime* as indicated in the image above. Your project should soon appear on the 2500-VP15 panel.

3.8 Running Your Project for the First Time

After you have successfully transferred your project to the CTI Panel, the panel is ready to be connected to your control system. Once a project is loaded on the CTI panel, the panel will automatically start the project when the panel is rebooted.

Step 1: Connect the Ethernet Cable to the 2500-VP15 that permits it to communicate with the PLC processor(s).

NOTE
The 2500-VP15 has two Ethernet ports. Ensure that you have connected to and configured the correct panel Ethernet port.

NOTE
It is recommended that a 'static' (manual) IP address be used for the HMI panel. Using DHCP may cause loss of communications between your HMI panel and other devices.

NOTE
You must choose your IP address and subnet mask to match the class of network in which your control system will reside. For example, a class 'C' network has a subnet mask of 255.255.255.0 and the first three numbers of all of the IP addresses on the network must match.

Step 2: Reboot the 2500-VP15 panel. Your HMI project should automatically load.

Step 3: Test your project screens for proper data display and control functionality.

NOTE
If there is a communication problem between your HMI panel and target device(s), you will see small, square red dots next to data display items. The red dot indicates that a variable cannot be updated due to failed communications.

LIMITED PRODUCT WARRANTY

Warranty. Control Technology Inc. ("CTI") warrants that this CTI Industrial Product (the "Product") shall be free from defects in material and workmanship for a period of one (1) year from the date of purchase from CTI or from an authorized CTI Industrial Distributor, as the case may be. Repaired or replacement CTI products provided under this warranty are similarly warranted for a period of 6 months from the date of shipment to the customer or the remainder of the original warranty term, whichever is longer. This Product and any repaired or replacement products will be manufactured from new and/or serviceable used parts which are equal to new in the Product. This warranty is limited to the initial purchaser of the Product from CTI or from an authorized CTI Industrial Distributor and may not be transferred or assigned.

2. Remedies. Remedies under this warranty shall be limited, at CTI's option, to the replacement or repair of this Product, or the parts thereof, only after shipment by the customer at the customer's expense to a designated CTI service location along with proof of purchase date and an associated serial number. Repair parts and replacement products furnished under this warranty will be on an exchange basis and all exchanged parts or products become the property of CTI. Should any product or part returned to CTI hereunder be found by CTI to be without defect, CTI will return such product or part to the customer. The foregoing will be the exclusive remedies for any breach of warranty or breach of contract arising therefrom.

3. General. This warranty is only available if (a) the customer provides CTI with written notice of a warranty claim within the warranty period set forth above in Section 1 and (b) CTI's examination of the Product or the parts thereof discloses that any alleged defect has not been caused by a failure to provide a suitable environment as specified in the CTI Standard Environmental Specification and applicable Product specifications, or damage caused by accident, disaster, acts of God, neglect, abuse, misuse, transportation, alterations, attachments, accessories, supplies, non-CTI parts, non-CTI repairs or activities, or to any damage whose proximate cause was utilities or utility-like services, or faulty installation or maintenance done by someone other than CTI.

4. Product Improvement. CTI reserves the right to make changes to the Product in order to improve reliability, function or design in the pursuit of providing the best possible products.

5. Exclusive Warranty. THE WARRANTIES SET FORTH HEREIN ARE CUSTOMER'S EXCLUSIVE WARRANTIES. CTI HEREBY DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. WITHOUT LIMITING THE FOREGOING, CTI SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT, COURSE OF DEALING AND USAGE OF TRADE.

6. Disclaimer and Limitation of Liability. TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, CTI WILL NOT BE LIABLE FOR ANY BUSINESS INTERRUPTION OR LOSS OF PROFIT, REVENUE, MATERIALS, ANTICIPATED SAVINGS, DATA,

CONTRACT, GOODWILL OR THE LIKE (WHETHER DIRECT OR INDIRECT IN NATURE) OR FOR ANY OTHER FORM OF INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND. CTI'S MAXIMUM CUMULATIVE LIABILITY RELATIVE TO ALL OTHER CLAIMS AND LIABILITIES, INCLUDING OBLIGATIONS UNDER ANY INDEMNITY, WHETHER OR NOT INSURED, WILL NOT EXCEED THE COST OF THE PRODUCT(S) GIVING RISE TO THE CLAIM OR LIABILITY. CTI DISCLAIMS ALL LIABILITY RELATIVE TO GRATUITOUS INFORMATION OR ASSISTANCE PROVIDED BY, BUT NOT REQUIRED OF CTI HEREUNDER. ANY ACTION AGAINST CTI MUST BE BROUGHT WITHIN EIGHTEEN (18) MONTHS AFTER THE CAUSE OF ACTION ACCRUES. THESE DISCLAIMERS AND LIMITATIONS OF LIABILITY WILL APPLY REGARDLESS OF ANY OTHER CONTRARY PROVISION HEREOF AND REGARDLESS OF THE FORM OF ACTION, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR OTHERWISE, AND FURTHER WILL EXTEND TO THE BENEFIT OF CTI'S VENDORS, APPOINTED DISTRIBUTORS AND OTHER AUTHORIZED RESELLERS AS THIRD-PARTY BENEFICIARIES. EACH PROVISION HEREOF WHICH PROVIDES FOR A LIMITATION OF LIABILITY, DISCLAIMER OF WARRANTY OR CONDITION OR EXCLUSION OF DAMAGES IS SEVERABLE AND INDEPENDENT OF ANY OTHER PROVISION AND IS TO BE ENFORCED AS SUCH.

7. Adequate Remedy. The customer is limited to the remedies specified herein and shall have no others for a nonconformity in the Product. The customer agrees that these remedies provide the customer with a minimum adequate remedy and are its exclusive remedies, whether based on contract, warranty, tort (including negligence), strict liability, indemnity, or any other legal theory, and whether arising out of warranties, representations, instructions, installations, or non-conformities from any cause. The customer further acknowledges that the purchase price of the Product reflects these warranty terms and remedies.

8. Force Majeure. CTI will not be liable for any loss, damage or delay arising out of its failure (or that of its subcontractors) to perform hereunder due to causes beyond its reasonable control, including without limitation, acts of God, acts or omissions of the customer, acts of civil or military authority, fires, strikes, floods, epidemics, quarantine restrictions, war, riots, acts of terrorism, delays in transportation, or transportation embargoes. In the event of such delay, CTI's performance date(s) will be extended for such length of time as may be reasonably necessary to compensate for the delay.

9. Governing Law. The laws of the State of Tennessee shall govern the validity, interpretation and enforcement of this warranty, without regard to its conflicts of law principles. The application of the United Nations Convention on Contracts for the International Sale of Goods shall be excluded.

REPAIR POLICY

In the event that the Product should fail during or after the warranty period, a Return Material Authorization (RMA) number can be requested orally or in writing from CTI main offices. Whether this equipment is in or out of warranty, a Purchase Order number provided to CTI when requesting the RMA number will aid in expediting the repair process. The RMA number that is issued and your Purchase Order number should be referenced on the returning equipment's shipping documentation. Additionally, if the product is under warranty, proof of purchase date and serial number must accompany the returned equipment. The current repair and/or exchange rates can be obtained by contacting CTI's main office at 1-800-537-8398 or go to www.controltechnology.com/support/repairs/.

When returning any module to CTI, follow proper static control precautions. Keep the module away from polyethylene products, polystyrene products and all other static producing materials. Packing the module in its original conductive bag is the preferred way to control static problems during shipment. Failure to observe static control precautions may void the warranty.