



Powered by Zenon

2500VPQSM

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| | | REVISION HISTORY |
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| V1.1 | 6/13/11 | Corrections on pages 28 and 79. |
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| 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.

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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.



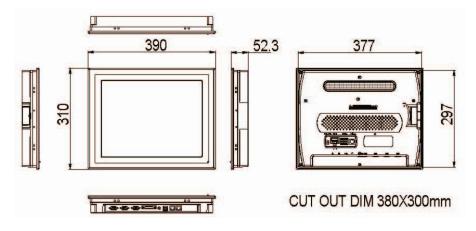
1.2 Visualization Panel Features

1.2.1 Hardware Specifications

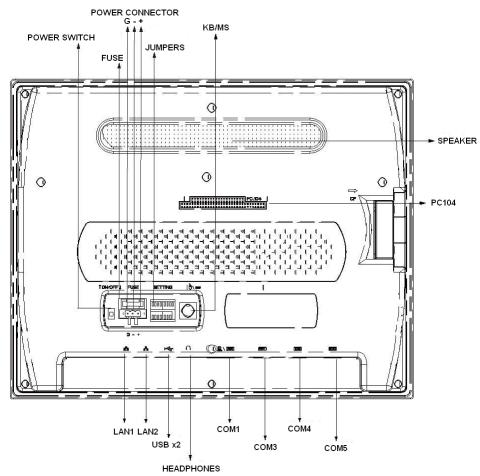
| Processor: Resolution: Brightness: | Intel® Atom™ N270 1.6GHz CPU 15" 1024 x 768 XGA Color TFT LCD Super Bright 550 cd/m² |
|--|--|
| Touchscreen: | 8-wire, Analog Resistive |
| Memory: | 2GB of DDR2 |
| Storage: | 16GB Compact Flash Card |
| | 64GB Internal SSD Hard Drive (Optional) Part #: 700-00038 |
| 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") |

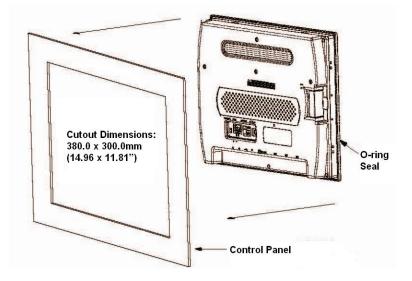




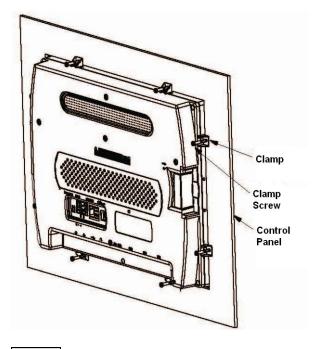


1.3 HMI Installation in Control Panel

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.

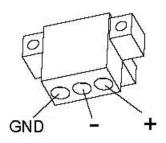


Step 3:

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

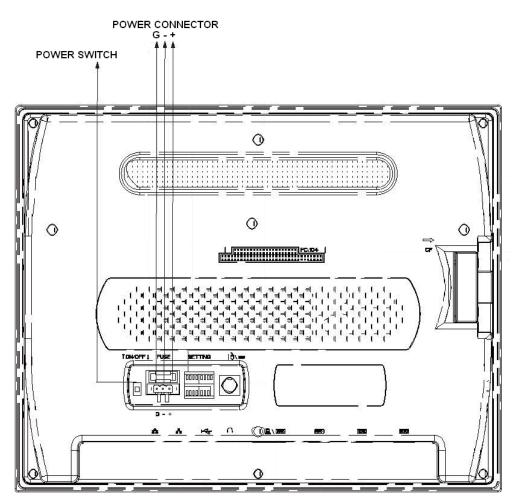
1.4 Connecting Power to HMI Panel

- **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.





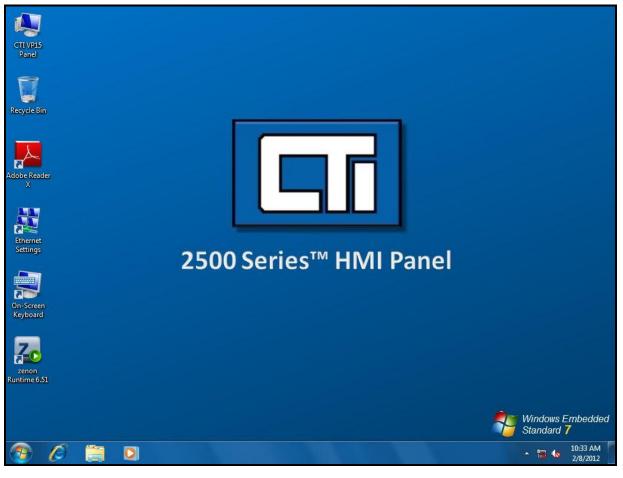
Plug the DC power connector into the receptacle on the back of the panel.



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.

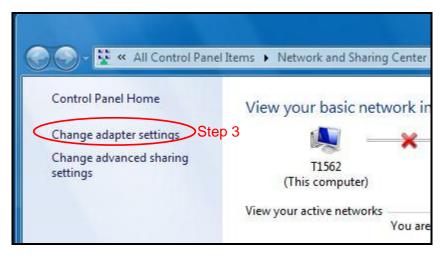


1.6 Setting the IP address

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.

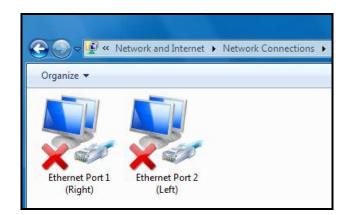


Step 2: After your HMI panel has booted to the Windows desktop, the IP address can be set by double tapping on the *Ethernet Settings* icon.





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.

| Realtek PCle | GBE Family Cont | roller #2 | |
|---|---------------------|----------------|------------|
| | | | Configure |
| his connection use | | 1000 | |
| Client for N | | | |
| ✓ ➡ File and Pr ✓ ➡ QoS Pack | | ICTOSOTE IVEEW | OIKS |
| Link-Layer | | erv Manner I/ | 0 Driver |
| Link-Layer | 1985 - 1 | | |
| Reliable M | ulticast Protocol | | |
| Constant States and | otocol Version 6 (| March 10 | Step 5 |
| 🗹 🔺 Internet Pr | otocol Version 4 (* | TCP/IPv4) | |
| Install | Uninstal | | Properties |
| Description | | | |
| All. | outer to access res | ources on a | Microsoft |
| Allows your comp | | ourood on a . | |

Step 5:

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

| eneral | | |
|---|---|-----------------------|
| | d automatically if your network supp need to ask your network administra | |
| 🔘 Obtain an IP address auto | matically | |
| () Use the following IP addres | ss: | Ethernet |
| IP address: | 199 . 189 . 175 . 32 | Settings |
| Subnet mask: | 255 . 255 . 255 . 0 | |
| Default gateway: | | |
| Obtain DNS server address Ouse the following DNS server Preferred DNS server: | | On-Screen Keyboard |
| Alternate DNS server: | | |
| Validate settings upon exi | t Advance | ed |

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 onscreen 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 255.255.0 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: Free Hard Drive Space: Memory: Processor: Port for Dongle: Programming Port: Optical Drive: Windows XP SP3, Vista, or 7 2GB Minimum 2GB Minimum Pentium Class 1 GHz or better 1x USB 1x Ethernet Port DVD-ROM Drive

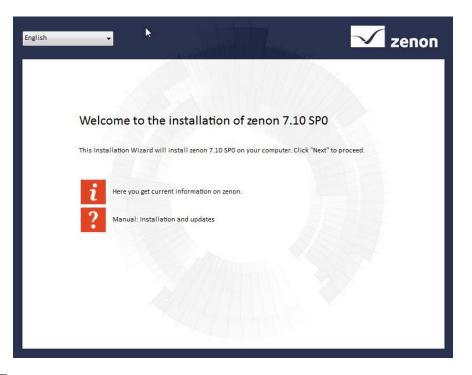
NOTE It is recommended that the user close any open programs and temporarily halt virus protection software during the installation of the Zenon Editor software.

2.1.2 Starting the Installation



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.





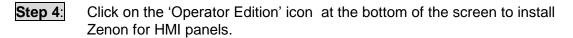
Step 2: When the installation welcome menu appears on the screen, click the 'NEXT' button to begin installation. Then accept the license agreement to continue.

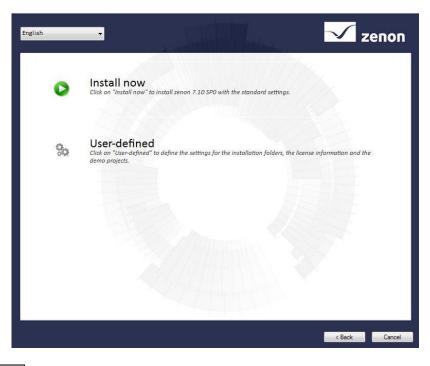




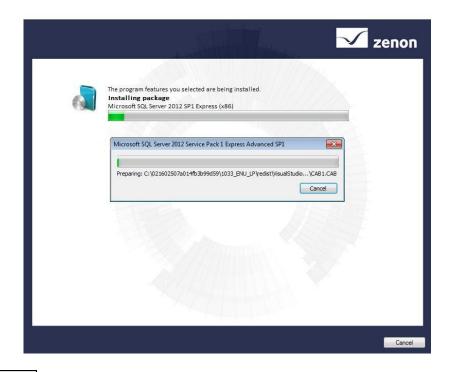
Click on the 'Z with Red Pencil' icon to install the Zenon Editor.

| English | - zenon |
|---------|--|
| NH4 | Supervisor Edition The platform-independent SCADA-System, professionalizes the comprehensive visualization and control of large plants and aids the optimization of production processes. The large range of drivers ensures excellent connectivity. |
| | Energy Edition The industry-specific SCADA solution for substation automation and network control technology. Compliance with international standards such as IEC 61850, IEC 60870, IEC 61400-25 and DNP3 is auaranteed. Other hiahliahts are: Topoloaical colorina. fault location. secure commands. and more. |
| | Pharma Editon The industry-specific SCADA solution for automation projects in the pharmaceutical industry. Developed on the basis of the recognized validation model GAMP 5, it meets all requirements for complete documentation and safe automated oroduction. |
| 28 | Operator Edition The HMI system for all Windows operating systems, specialized in simple and ergonomic machine and equipment control. With its clear overview and intuitive operation, the operator orientates themselves to the reauirements of modern eraonomics and usability. |
| | < Back Cancel |

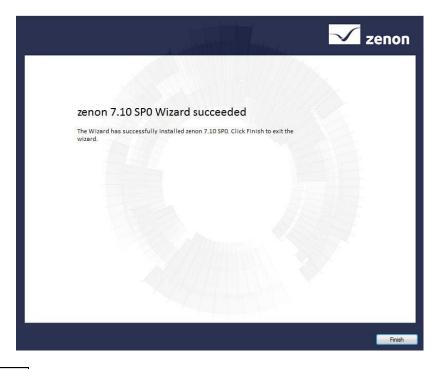


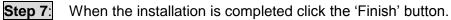


Step 5: Choose 'Install now' to install Zenon Operator with standard settings. You may choose user-defined installation if standard settings are not sufficient.



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





2.2 USB License Dongle

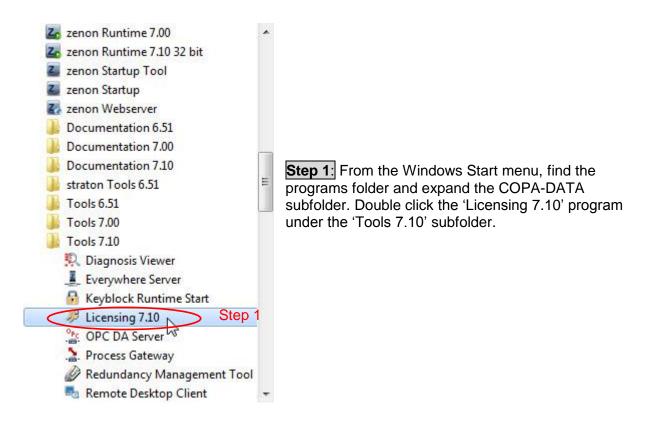
The Zenon editor is licensed with a USB dongle. The dongle can be moved from one computer to another. This allows the editor software to be installed on mulitple computers. When the dongle is connected, the user will be able to run the Zenon editor software in licensed mode.

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.



| | nsing r the license information of your license form / license badge, which you received after longle license. Care for correct capitalization. The entered numbers are saved with OK. |
|----------------------------|--|
| serial numb generated a | ng ng a soft license you will receive a license form with a serial number. Please enter this er and then execute 'Get soft license'. Thus a hardware specific license number is and saved in a text file. Send this file to your distributor. Then you will receive a valid umber. Enter the activation number in this dialog and confirm with OK. |
| | m is not suitable for licensing of older versions. Please use the licensing software for your version. |
| | editor / Runtime Web Server Analyzer |
| Serial numb | er |
| 51000450. | 190f3ade.0.0.1 |
| Activation n | umber |
| | |

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 <u>sales@controltechnology.com</u>.

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.

| File Edit Screens Elem | L] ients Control elements | | ere ike 1 | 1 | |
|--|--|--|---|-------|--|
| | - 1 5 0 kg 🛞 1009 | and the second | A. Las 4 | 1 773 | 目前目 [임미슈] 영화학원 (종內조) 중 영정(과학) 요. |
| | and the second sec | | | | |
| | | • | • A: A: A | | |
| Project Manager | | | | = 4 | S HOME - DEMO1 × |
| Workspace C: Users' Workspace C: Users' Workspace C: Users' Workspace C: Users' C: DEMO 1 State Screens C: Screens C: Recipes Workspace C: Users' C: Screens C: Recipes Workspace C: Users' Programming C: Recipes Workspace C: Users' Programming C: Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Workspace C: Users' Screens Workspace C: Users' Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Screens Workspace C: Users' Workspace C: Users' Screens Workspace C: Users' Screens Screens Workspace C: Users' Screens Scree | E SYMBOLS: MOME SYMBOLS: PULSINPL SYMBOLS: MENU_DE SYMBOLS: MENU_DE SYMBOLS: | 3 Standard Standard 2 Standard Chronologic event list E Standard 5 Standard | Image: Constraint of the second se | | HOME 32767 |
| Menus Report Gener | total / 11 filte topology | | MAIN | 4 × | |
| | | | | _ | General General properties of the screen. |
| General Window style Size | General Name: | HOME | | Â | Read more in the online manual This property is available in VBA (with class name) and in the XML export (without class |
| Execution | Screen type: | Standard | | | name) under: "Picture" |
| | Frame: | MAIN WIZARD | | | |
| | Background color: | have good to be a second of the second of th | | | |
| | Visible under CE | | | = | |
| | | | | | |
| | Eile namei | 21022075 chiff idea 200f ibc7216-0 | flan | | |
| | File name: | a1e2ae75-c04f-4dce-ac8f-4bc7216a8 | | | |
| | | a1e2ae75-c04f-4dce-ac8f-4bc7216a8 < no equipment group linked > | fba | | |
| | Equipment groups: | < no equipment group linked > | | | |
| | | < no equipment group linked > | | | |

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'.

| File | Edit Options Window Help | |
|--------------|--------------------------|---|
| 1 | Project new | |
| - | Insert existing project | |
| 5.50 4 00 | Insert project 5.50 | 1 |
| 4 | Restore project backup | - |
| | Workspace | • |
| | Standard configuration | |
| a | Print screenshot | - |

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

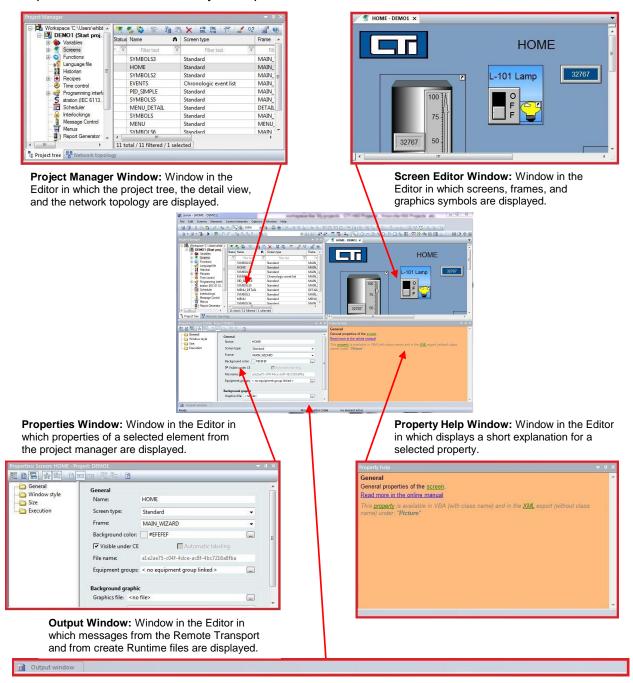
| w project | |
|--|-------|
| Project | ОК |
| Project type | Cance |
| 📲 Standard project 🗳 Global project | |
| Project name | Help |
| CTIHMI1 Step 1 | |
| Base folder | |
| C:\Users\Public\Documents\zenon_Projects\ | |
| | |
| Workspace | |
| Add to active workspace | |
| Create new workspace | |
| Workspace name Step 2 | |
| My Projects | |
| | |
| Runtime folder | |
| C:\Users\Public\Documents\zenon_Projects\My Projects\CTIHMI1 | |
| Options | |
| Multiuser project | |
| Project server | |
| | |
| | 111 |

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.



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 <u>www.controltechnology.com</u>. 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

| Properties: Screen: HOME - Pro | oject: DEMO1 | | - | ά× |
|---------------------------------|---------------------|--------------------------------------|---|----|
| | | | | |
| General Window style Size | General Name: | HOME | | Ń |
| Execution | Screen type: | Standard | - | |
| | Frame: | MAIN_WIZARD | • | |
| | Background color: | #EFEFEF | | E |
| | Visible under CE | 🗖 Automatic labeling | | |
| | File name: | a1e2ae75-c04f-4dce-ac8f-4bc7216a8fba | | |
| | Equipment groups: | < no equipment group linked > | | |
| | Background graphic | 2 | | |
| | Graphics file: < no | | | - |

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.

| Workspace 'C:\Users\Public\[| us Identification 🔥 🕅 | 말 🗙 🗟 🖌 약 Description | File name |
|---|-----------------------|--------------------------|---------------|
| Variables | 7 Filter text 7 | Filter text | Filter text 🛛 |
| p 1 Datatypes | Driver for system va | | SYSDRV |
| Reaction matrix | Driver for mathema | | MATHDR32 |
| → Allocations | Driver for internal v | | Intern |
| Screens Functions Functions Functions Functiona Recipes Trime control Straton (IEC 61131-3) Scheduler Message Control Message Control Menus Fles Genot Generator Files Fles | | | |

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.

| Available drivers | |
|--|--------|
| 🗄 – 🧰 BCI | |
| 🕸 💼 Beckhoff | |
| 🗄 🧰 Berg | 10 |
| 🕀 🔚 Bernecker + Rainer | |
| 🕸 💼 Biffi-Tyco Flow Control | |
| 🗄 🔚 Brodersen | |
| 🕸 📲 Buderus | |
| 🖅 💼 Copalp | |
| Costronic | |
| ф-🔄 СП | |
| | |
| | |
| 🕸 💼 Danfoss | |
| 😥 💼 DataTaker | |
| 🕀 🔚 Dateien | |
| n 🔁 Datashashas | |
| Driver name | |
| CTI driver | |
| Driver information | |
| Description: | |
| Driver for CTI PLCs,, Texas Instruments TI 505 PLCs or Simatic 545/555 PLCs. The | driver |
| support the protocols CAMP and NITP with Packed Task Codes. | 1 |
| Supported PLC types: | |
| CTI PLCs, Ti505, Simatic 545, Simatic 555 | |
| | |
| Supported connection types: Ethernet | |
| culemet | |
| Supported communication protocols: | |
| NITP; CAMP | |
| | |

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 | |
|-------------------|-----------|-----------------------|
| Mode: | | Cancel |
| Hardware | ~ | Help |
| Keep update lis | in memory | Ste Co ap Co |
| | | |
| Variable image | emanent | |
| Update time glo | pal | ap |
| Global updatetime | n ms: | Co |
| 1000 | | |
| Priority | 1000 ms | |
| high | | |
| higher | | |
| highest | | |
| | | |

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.

| figuration | | | | 25 |
|--------------------|--------------------------------|--|-----------|----------------|
| eneral Connections | | | | |
| Connections | | Edit connection | | ОК |
| Connection name | Net address | 0 Connection na PLC1 IP address | . 177 . 1 | Cancel Help |
| < New Step | 111 Delete Ec 3 5 | | Cancel | |

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.

| Connections | | Edit connection | |
|-----------------|----------------|---|--|
| Connection name | Net address | Net address | |
| PLC1 | 0 | 0 | |
| | | Connection name | |
| | | PLC1 | |
| | | IP address 199 . 184 . 177 . 1 | |
| | | and the second se | |
| | | Timeout [ms] | |
| | | 3000 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| • | m] > | | |

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.

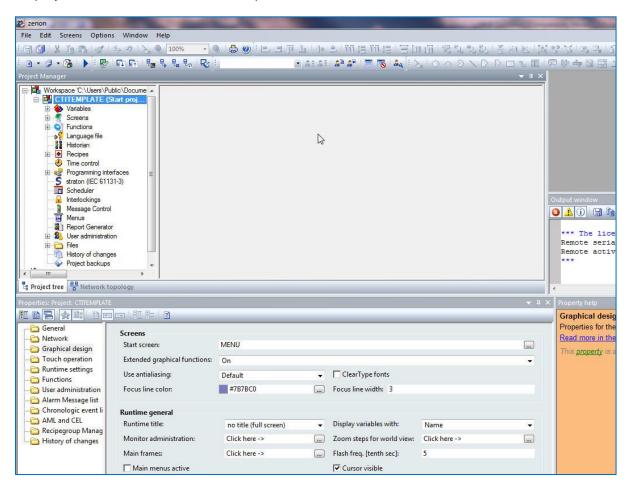
| Connections | | Edit connection | ок |
|-----------------|-------------|---|-------|
| Connection name | Net address | Net address | Cance |
| PLC1 PLC2 | 0 | Connection name | Help |
| | | PLC2 | |
| | | IP address | |
| | | 199 . 184 . 177 . 2 Timeout [ms] 3000 | |
| ٠ [١ | • | | |



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.

| Properties: Project: CTITEMPLATE | 2 | | | | | → ♯ × |
|--|---|---|---|--|--|--------------|
| | | | | | | |
| General Step 2 Network Step 2 Graphical design Touch operation Runtime settings Graphical design User administration | Screens Start screen: Extended graphical functions: Use antialiasing: Focus line color: | MENU On Default #787BC0 | • | ClearType fonts Focus line width: 3 | | • |
| Alarm Message list Chronologic event li AML and CEL Recipegroup Manag History of changes | Runtime general Runtime title: < Monitor administration: Main frames: Main menus active Display not translated keywo Adjustable dialog font | Step no title (full screen) Click here -> Click here -> Step 4 | 3 | Flash freq. [tenth sec]: | Name Click here -> 5 2 - Standard font2 | • |
| | Locked/Interlocked elements Interlocked buttons: Graphical identification actin Line color of the lock symbol: Locked graphics file: | Normal ve #000000 <no file=""></no> | | Background color lock symbo Interlocking graphics file: | | ••• |
| < <u> </u> | | | | | | |

- **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.

| Physical monitors | Monitor profiles | OK |
|---|---|--------|
| Number 1 Change | Standard | Cancel |
| /irtual monitors Number 1 Change | Copy Rename Delete Step 6 | |
| Names | Standard On a remote computer you must enter the monitor profile manually in the zenon6.ini if necessary: [DEFAULT] ScreenProfile='Profile name' Monitor resolution Step 6 Width/Height_PixeI | |
| Rename | 1024 768 Apply from current monitor The monitor resolution determines the base size of all frames. If you change it, all frames, screens, fonts etc. are adapted accordingly! | |

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.

| Online menu Show online menu Display time [s] 10 Change label for button "Cancel" Label (% shows the remaining time) CANCEL = % | | Appearance in the Runtime Adjust to monitor resolution Consider title bar Consider main menu Show scrollbars | | OK Cancel Help | | | |
|---|--------------|--|--------------------|----------------------|-------------------------------|---------------|--|
| | s the menu | | | Virtual monito | rs | | |
| Name | Position | Allocation | tion Online dialog | Name | Name Allocation Online dialog | Online dialog | |
| M_00 | 0/0/1024/768 | | yes | V_00 | M_00 | no | |
| Change | Step | 7 | | Change. | | | |

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.

| Define physical monitor | |
|-------------------------------------|--|
| Name | |
| M_00 | |
| Position | |
| Monitor does not exist, allocate to | |
| top 0 left 1024 bottom | 768. The 'top' and 'left' boxes should |
| Options Show in the online menu | contain zeros. Click 'OK' when you are done. |
| OK Cancel H | elp |

3.5 Starting a New Project Using the CTI Project Template

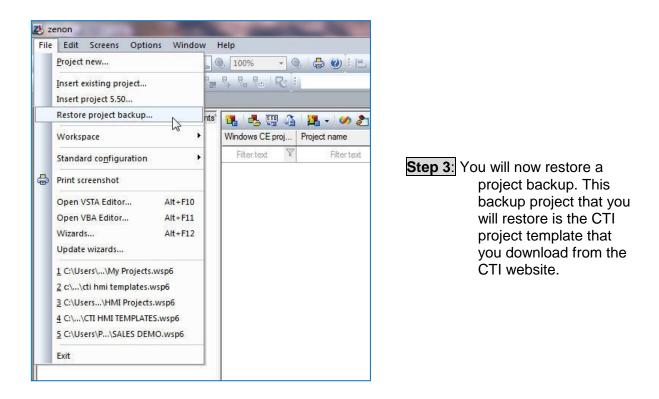
On the Control Technology Website <u>www.controltechnology.com</u>, there is a CTI HMI Project Template available for download. This section will give instructions on how to start a new project using the CTI project template. The CTI project template is preconfigured with the correct settings for the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

| 2 z | enon | Contraction of the local division of the loc | |
|------|--|--|---|
| 5 zi | Edit Screens Options Window Project new Insert existing project Insert project 5.50 Insert project backup Restore project backup Workspace Image: Complexity of the screen shot Image: Complexity of the screen shot | Help | Step 1 : You will need to create a new workspace. A workspace is lik a folder in which |
| | Open VSTA Editor Alt+F10 Open VBA Editor Alt+F11 Wizards Alt+F12 Update wizards | Close Create backup Restore backup | to keep a collection of HM projects. A proje |
| | 1 c:\\cti hmi templates.wsp6 2 C:\Users\HMI Projects.wsp6 3 C:\\CTI HMI TEMPLATES.wsp6 4 C:\Users\P\SALES DEMO.wsp6 5 C:\\CTI HMI TEMPLATES.wsp6 Exit | | can only be edit if it is added to workspace. Und the <i>File</i> menu a the <i>Workspace</i> menu item, click on the submenu |

| workspace | ОК |
|--|--------|
| Workspace | |
| Name | Cancel |
| <workspace></workspace> | Help |
| C:\Users\Public\Documents\zenon_Projects\ | |
| Norkspace file | |
| C:\Users\Public\Documents\zenon_Projects\ <workspace>\<workspace>.wsp6</workspace></workspace> | |

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 2:

| tore project backup | |
|-------------------------------------|----------------|
| Settings | |
| Backup file | 6 |
| C:\ProgramData\COPA-DATA\SQL\BACKUP | (|
| 🔲 create new project | Step 4 |
| Backup details | etop i |
| Name | |
| Project ID | |
| - 72 se | |
| Description | |
| | |
| | |
| | |
| | |
| | OK Cancel Help |

Step 4:

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

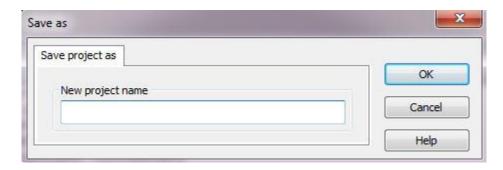
| | | Size | Туре | Date modified | · · · | |
|--|---|--------|------------------|--------------------|---------------|---|
| | | | | Datemouneu | Name | Favorites |
| | | | File folder | 4/28/2011 10:55 AM | CTITEMPLATE | |
| | | | File folder | 4/13/2011 10:34 AM | DEMO1 | libraries |
| | 3 | 183 KB | Compressed (zipp | 4/28/2011 10:55 AM | 🚺 ctitemplate | Documents |
| | | | | | | J Music |
| | | | | | | E Pictures |
| | | | | | | Videos |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - |
| | | | | | | 🚪 Temp (CTIFPS) |
| | | | | | | Utility (CTIFPS) |
| | | | | | | |
| | | | | | | Network |
| | | | | | | |

Step 5:

Find and select the file 'CTI_Template_V710.zip' that you downloaded and click 'Open'.

| Settings Backup file C:\ProgramData\COPA-DATA\SQL\BACKUP\ctitemplate.zip create new project Step 6 Backup details Name CTITEMPLATE Project ID | tore project backup | 2 <mark>- ×</mark> |
|--|--|--------------------|
| C:\ProgramData\COPA-DATA\SQL\BACKUP\ctitemplate.zip | Settings | |
| Image: Create new project Step 6 Backup details Name CTITEMPLATE Project ID | Backup file | |
| Backup details Name CTITEMPLATE Project ID | C:\ProgramData\COPA-DATA\SQL\BACKUP\ctite | emplate.zip |
| Name CTITEMPLATE Project ID | Create new project Step 6 | |
| CTITEMPLATE Project ID | Backup details | |
| Project ID | Name | |
| | CTITEMPLATE | |
| | Project ID | |
| 773d5c0a-9817-4e49-8773-58878e36026b | 773d5c0a-9817-4e49-8773-58878e36026b | |
| Description | Description | |
| Project Template for CTI 2500-VP15 HMI Panel | Project Template for CTI 2500-VP15 HMI Panel | |
| | | |
| | | |
| | | |
| OK Cancel Help | | OK Cancel Help |

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

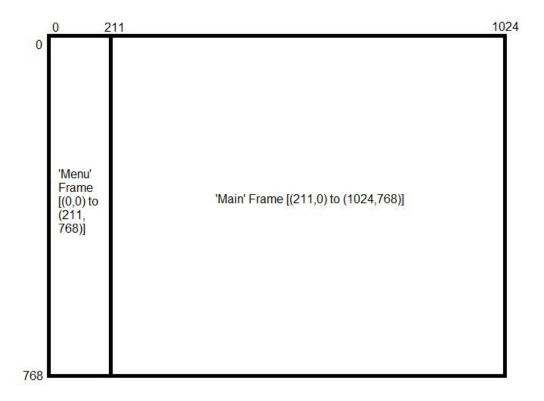
3.6 Building a Project with the Zenon Editor

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.

| zenon - Frames - CTITEMPLATE | | the second s | | |
|---|----------------|--|---------------------------|---|
| File Edit Elements Options Window | Help | | | |
| i 🖯 🕼 🕺 🖞 🗇 📐 🍳 | 50% | 🔍 🖨 🕐 🗉 🗉 | s <u>r</u> f <u>r</u> f E | s i î î î î î î î î î î î î î î î î î î |
| i 🗅 • 🖉 • 😘 i 🕨 i 😰 i 🖓 i 🦦 i | | | • A: A: | 🗢 🖉 🔚 📆 |
| Project Manager | | | | → ‡ × |
| Workspace 'C:\Users\Public\Documents | N 10 C | P D B X S | | QT 📲 🕖 |
| CTITEMPLATE Step 2 | Status Display | Name A | Background color | Freely defineable fra |
| | Filter V | Filter text. | Filter text 🛛 🖓 | Filter text |
| Frames | | DETAIL | #C4C6DB | |
| Eont List Step 1 | | MAIN | #EFEFEF | |
| Palettes | | ALARM STATUS LINE | #FF0000 | |
| Project symbol library Si Functions | | MENU | #E4EBF1 | |
| w Language file | 1 (ki) (ki | | hi Al | |
| | | | | |
| | | | | |
| Time control | | | | |
| | | | | |
| Scheduler | | | | |
| | | | | |
| Message Control | | | | |
| Menus | | | | |
| Report Generator | | | | |
| Ber administration Files | | | | |
| History of changes | | | | |
| Project backups | | | | |
| CTIZENONDEMO (Start project) | | | | |
| Global symbol library | | | | |
| | | | | |

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 M | Background color | Freely defineable fram | Left [pixels] | Top [pixels] | Right [pixels] | Bottom [pixels] |
|----------------|-------------------|------------------|------------------------|---------------|---------------|----------------|-----------------|
| Filter 🖓 | Filter text. | Filter text | Filter text. | Filter text 🛛 | Filter text 🛛 | Filter text 🛛 | Filter text |
| | DETAIL | #C4C6DB | | 211 | 708 | 1024 | 768 |
| V | MAIN | #EFEFEF | | 211 | 0 | 1024 | 768 |
| \checkmark | ALARM STATUS LINE | #FF0000 | | 0 | 0 | 1024 | 18 |
| | MEAU | #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.

| MENU | TAIN |
|--------------------|--------------------------|
| Left: 0 - Top: 0 | Left: 211 - Top: 0 |
| Width 211 - Height | Width: 813 - Height: 768 |
| ringin. Err mögne. | |
| | |
| | |
| | |
| | |
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| | |
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| | |
| | |
| | |
| | |
| | |
| | |
| | DETAIL |
| | Left: 211 - Top: 708 |
| | |

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

| zenon - [HOME - CTITEMPLATE] | - | | | |
|--|--------|-------------------------|--|--------------------------------|
| File Edit Screens Elements Control ele | ments | Options Window | Help | |
| 🗒 🗊 X 🖻 💁 🍼 🦐 🤊 📐 🍳 | 2 10 | 0% 💽 🤤 🥵 | 2 4 d T E E 🗐 | 1111 III |
| 🖸 • 🖉 • 🚰 l 🕨 🔛 🖙 l 🧤 | | - Po - Po - | - a: a: A | a 🔏 👔 |
| roject Manager | 5 | Step 2 | | |
| Workspace C:\Users\Public\Documents | | 5 S 12 16 6 | x 🔝 📲 🛣 🗹 🔍 | 1 0 |
| CTITEMPLATE (Start project) Start project) | Status | Name / M | Screen type | Frame |
| | | | | |
| | = | Filter text 🛛 🍸 | Filter text | 1.530 V |
| | =V | Filter text 🛛 🍸 | Filter text T Alarm Message list | 1.530 V |
| Screens | =Y | | 1 must tune | Filter |
| E Screens SF Frances Font lists SP Palettes | ▼ | ALARM | Alarm Message list | Filter |
| Franks Franks Franks Palettes Project symbol library | Y | ALARM EVENTS | Alarm Message list Chronologic event list | Filter MAIN MAIN MAIN |
| Screens Franks Franks Font lists Palettes | Y | ALARM EVENTS HOME | Alarm Message list Chronologic event list Standard | Filter MAIN MAIN |

Step 1:

Click on the 'Screens' icon in the Project tree.

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

| Status | Name / M | Screen type | Frame |
|--------|-----------------|------------------------|-------------|
| 7 | Filter text 🛛 🍸 | Filtertext | Filter text |
| | ALARM | Alarm Message list | MAIN |
| | EVENTS | Chronologic event list | MAIN |
| | HOME | Standard | MAIN |
| 11 | KEYBOARD | Keyboard | KEYBOARD |
| | MENU | Standard | MENU |
| | NUMPAD | Keyboard | NUMPAD |
| | PLC_MENU | Standard | DETAIL |
| | SCREEN1 | Standard | MAIN |
| | SCREEN2 | Standard | MAIN |
| | SCREEN3 | Standard | MAIN |
| | SCREEN4 | Standard | MAIN |
| 11 | SCREEN5 | Standard | MAIN |
| | Screen 0 | Standard | MENU |



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

| Status | Name / | Screen type | Frame |
|---------|----------------------------|--|-----------------|
| Y | Filter text 🛛 🖓 | Filtertext | Filter text 🛛 🖤 |
| | ALARM | Alarm Message list | MAIN |
| | EVENTS | Chronologic event list | MAIN |
| | HOME | Standard | MAIN |
| | KEYBOARD | Keyboard | KEYBOARD |
| | MENU | Standard | MENU |
| | NUMPAD | Keyboard | NUMPAD |
| | PLC_MENU | Standard | DETAIL |
| | SCREEN1 | Standard | MAIN |
| | SCREEN2 | Standard | MAIN |
| | SCREEN3 | Standard | MAIN |
| | SCREEN4 | Standard | MAIN |
| | SCREEN5 | Standard | MAIN |
| | Screen 0 | Standard | MENU |
| • | | Alarm Message List Filter Archive revision Chronologic event list Chronological Event List Filte Extended trend HTML Keyboard Login Notepad Recipegroup Manager Report | er |
| 13 to | tal / 13 filtered / 1 sele | Scheduler | |
| | | Standard Standard regimes | |
| E ?) | | Standard recipes Time filter Variable diagnosis Video | |
| | | Worldview overview | |

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.

| Status | Name | Screen type | Frame 🏟 |
|--------|-----------------|------------------------|--------------------|
| | Filter text 🛛 🌱 | Filtertext | Filter text 🛛 🖓 |
| | ALARM | Alarm Message list | MAIN |
| | EVENTS | Chronologic event list | MAIN |
| | HOME | Standard | MAIN |
| | KEYBOARD | Keyboard | KEYBOARD |
| | MENU | Standard | MENU |
| | NUMPAD | Keyboard | NUMPAD |
| | PLC_MENU | Standard | DETAIL |
| | SCREEN1 | Standard | MAIN |
| | SCREEN2 | Standard | MAIN |
| | SCREENB | Standard | MAIN |
| | SCREEN4 | Standard | MAIN |
| | SCREEN5 | Standard | MAIN |
| | Screen 0 | Standard | MENU |
| | | | DETAIL KEYBOARD |
| | | | MAIN MENU |

Step 5:

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

| Status | Name / M | Screen type | Frame | Background color | Start function | End function |
|--------|-----------------|------------------------|-----------------|------------------|-----------------|-----------------|
| = 🖓 | Filter text 🛛 🖓 | Filter text 🛛 🍸 | Filter text 🛛 🍸 | Filter text 🛛 🏹 | Filter text 🛛 🍸 | Filter text 🛛 🗑 |
| | ALARM | Alarm Message list | MAIN | #EFEFEF | < no function | < no function |
| | EVENTS | Chronologic event list | MAIN | #EFEFEF | < no function | < no function |
| | HOME | Standard | MAIN | #EFEFEF | < no function | < no function |
| (| KEYBOARD | Keyboard | KEYBOARD | #EFEFEF | < no function | < no function |
| | MENU | Standard | MENU | #E4EBF1 | scrSTART | < no function |
| | NUMPAD | Keyboard | NUMPAD | #EFEFEF | < no function | < no function |
| | PLC_MENU | Standard | DETAIL | #C4C6DB | < no function | < no function |
| | SCREEN1 | Standard | MAIN | #EFEFEF | < no function | < no function |
| 1 | SCREEN2 | Standard | MAIN | #EFEFEF | < no function | < no function |
| | SCREEN3 | Standard | MAIN | #EFEFEF | < no function | < no function |
| | SCREEN4 | Standard | MAIN | #EFEFEF | < no function | < no function |
| | SCREEN5 | Standard | MAIN | #EFEFEF | < no function | < no function |
| | Screen 0 | Standard | MAIN | #EFEFEF | < no function | < no function |

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.

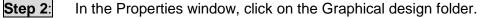
3.6.1.3 Setting the Project Start Screen

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.

| Ceneral | Screens | | | | | \sim |
|--|-------------------------------|------------------------|---|----------------------------|--------------------|----------|
| Graphical design | Start screen: | MENU | | | Step 3 | |
| Touch operation | Extended graphical functions: | On | | | • | \smile |
| Runtime settings | Use antialiasing: | Default | | ClearType fonts | | |
| 🛅 User administration | Focus line color: | #7B7BC0 | | Focus line width: 3 | | |
| 🚞 Alarm Message list 🛅 Chronologic event li | Runtime general | | | | | |
| AML and CEL | Runtime title: | no title (full screen) | • | Display variables with: | Name | • |
| History of changes | Monitor administration: | Click here -> |) | Zoom steps for world view: | Click here -> | |
| | Main frames: | Click here -> | | Flash freq. [tenth sec]: | 5 | |
| | Main menus active | | | Cursor visible | | |
| | Display not translated keywo | ords | | | | |
| | Adjustable dialog font | | | Dialog font: | 2 - Standard font2 |) |



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

| CTITEMPLATE | | h n 1 | | | |
|-------------|--------|-----------------|------------------------|-----------------|------------|
| | Status | Name | Screen type | Frame | Backgro |
| | = | Filter text 🛛 🖓 | Filter text 🛛 🍸 | Filter text 🛛 🝸 | Filter |
| | | SCREEN5 | Standard | MAIN | #EF |
| | | ALARM | Alarm Message list | MAIN | #EF |
| | | MENU | Standard | MENU | #E4 |
| | 1 | HOME | Standard | MAIN | #EF |
| | | SCREEN3 | Standard | MAIN | #EF |
| | | PLC_MENU | Standard | DETAIL | # C |
| | | KEYBOARD | Keyboard | KEYBOARD | #EF |
| | | EVENTS | Chronologic event list | MAIN | #EF |
| | | NUMPAD | Keyboard | NUMPAD | #EF |
| | | SCREEN1 | Standard | MAIN | #EF |
| | | SCREEN4 | Standard | MAIN | #EF |
| | | SCREEN2 | Standard | MAIN | #EF |
| | | SCREEN4 | Standard | MAIN | |

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 25 | 500 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 | | | | |

| | 1 | |
|--------------------------------------|------------|----|
| 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.

| zenon | | | | | | | |
|---|----------------------|---------------|--------------------|----------------------------------|------------------|-------------|--------|
| File Edit Screens Options Window I | Help | | | | | | |
| 日日は 131313139136 | 100% | - 🧠 😓 🤇 | [E _ I : () | <u>t[. [] [</u> | <u>*</u> 111 E | 111 | 11 |
| 🖻 • 🔮 • 😘 l 🕨 🔛 🖓 🖓 | ₽, ₽, ₽ _Φ | R: 1 | | • A: A: | 1 4ª 4ª 1 | • | 24 |
| roject Manager | Ste | p 2 | | | | | |
| ⊡ 🖬 Workspace ℃:\Users\Public\Documents | | PIRAX | 1 肥・ 🛯 🤇 | V 💿 🕼 | XIIL 🛃 - | 70 - | 77 |
| CTITEMPLATE (Start project) | Status Name | CL STID | Contraction of the | Net address | Data block | Offset | Bit n |
| | 🔤 🐳 Var | iable new In: | Filter text | Filter text 🛛 | Filter text | Filt | Filter |
| 🕀 🛒 Screens | Insuranting | THE OF LOUIS | 1 HEGE EGOLE | | | | |
| Functions | x4 | THE COLU | | 0 | 0 | 4 | |
| | x4 x5 | | THEST COL | Contraction of the second second | A DELENGTING | | |
| | | | | 0 | 0 | 4 5 3 | |
| | x5 | | | 0 | 0 | 4 | |

Step 2:

In the Detail View window, click on the Variable new icon.

| x6 Stor | 2 | |
|--------------------------------------|-----------------------------|------------------|
| Driver Step | 5 | |
| CTI - CTI driver | | • |
| Driver object type | | |
| X-Memory | | |
| Datatype | | |
| BOOL | | |
| Array settings | | |
| Start index is 0 | | |
| Start index is 1 | | |
| Dim 1 | Dim 2 | Dim 3 |
| 0 | 0 | 0 |
| | | |
| Addressing options | | |
| Automatic addre | essing | |
| Addressing acco | rding to data type offset a | and start offset |
| 🔘 Manual addressi | ng | |
| 🕖 Each datatype s | tarts with new offset | |
| Automatic addressi | ng | |
| Activate all elem | ents | |
| Activate element | | |

Step 3:

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

| Create variable | |
|--|--|
| Settings Name: x6 x6 Driver CTI - CTI driver Driver object type | Step 4 |
| X-Memory | |
| Alarm-Variable C-Memory Driver variable Drum K-Memory Loop-Variable STW-Memory Timer/Counter V-Memory WX-Memory WX-Memory WY-Memory Y-Memory Y-Memory | Step 5 |
| Step 4: In the Create variab | ble window, select the PLC driver. |
| Step 5: In the Driver object | <i>type</i> list box, select the variable type |

- 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.

| Caneral General | Addressing | | | | |
|--|---------------------|------------------|----------------|-------|------------|
| Value calculation | Net address: 0 |) | Data block: | 0 | |
| 🛅 Write set value | Offset: 0 |) | Bit number: | 0 | Step 2 |
| Limits | Alignment: 0 |) | String lengt | . 0 | |
| 🛅 Alarm handling 🛅 Harddisk data storac | Secondary object: | Preset (TCP) | | | |
| Additional settings | | Surrent (TCC) | | | |
| 🛅 External settings | Driver connection | Preset (TCP) | | | |
| | Driver: | CTI - CTI driver | | | |
| | Datatype: | INT | | | • |
| | Driver object type: | Timer/Counter | ✓ Priority: No | ormal | <u>ج</u> ک |
| | Only read from st | andby | | | 5 |
| | | | | | |



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'.

| Properties: Variable: Timer 1 Pre | set - Project: CTITEMPLATE | | | | 💌 🗜 |
|--|---|------------------|--|-------------|-----|
| | | | | | |
| General Stee General Stee Addressing Value calculation Write set value Limits Alarm handling Harddisk data storage Additional settings | Addressing Net address: 0 Offset: 1 Alignment: 0 | Step 2 | Data block: Bit number: String length: | 0 0 0 | • |
| External settings | Driver connection | | | | |
| | Driver: | CTI - CTI driver | | | |
| | Datatype: | INT | | | • |
| | Driver object type: | Timer/Counter | Priority: No | rmal | - C |
| | Only read from sta | ndby | | | 2 |



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.



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.

| Properties: Variable: x1 - Project | | | | | ▲ † |
|------------------------------------|----------------------|----------------------|---------------------|------------------------|------------|
| E E E 🔁 🔂 🗉 🖂 | | | | | |
| Addressing | Limits | | | | |
| Dalue calculation | {Limit new}: Click | here -> | | | |
| Write set value | Reaction matrix | | | | |
| | Reaction matrix | active | | | 2 |
| Limit[2] | Reaction matrix: | | | | - Z |
| Alarm handling | | L | | | |
| Additional settings | Limit[1] | | | | |
| External settings | Limit active | | Click h | ere -> | |
| | Limits[1] | | | | |
| | Limit text: | | | | 2 |
| | Limit: | 0 | Minimum/Maximum: | Minimum | - |
| | Threshold value: | 0.000000 | Delay time [s]: | 0 | 2 |
| | Dynamic limit a | tive | Variable: | < no variable linked > | Z |
| | AML/CEL[1] | | | | |
| | In Alarm Messag | | In Chronological Ev | ent List | 2 |
| | 🔽 To acknowledge | | 🗹 🥅 To delete | | 2 |
| | Fint Print | | | | 2 |
| | Alarm group: | 0 - < not used > | | | ج ک |
| | Alarm class: | 0 - < not used > | | | ح ک |
| | Function[1] | | | | |
| | Function: | < no function | n linked > | | ? |
| | Call via button in | i Alarm Message List | | | 2 |
| | Additional attribute | | | | |
| | Limit color: | #FF0000 | | | |
| | Invisible | | E Flashing | | 2 |
| | User property 1: | | | | 7 |
| | User property 2: | | | | |
| | Help[1] | | | | |

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.

| Properties: Variable: x1 - Projec | t: CTITEMPLATE | | | | → ¤ × |
|-----------------------------------|----------------------|----------------------|-------------------------|------------------------------|--------------|
| H 🗈 🚍 🖕 🕮 🗅 🖻 | | | | | |
| General | Limits | | | | <u>^</u> |
| Addressing Value calculation | {Limit new}: Click | here -> | | | |
| Write set value | | | | | |
| | 3 Reaction matrix | | | | |
| | Reaction matrix | active | | | 2 |
| Limit[2] | Reaction matrix: | | | | - Z |
| Harddisk data storac | | | | | |
| | Limit[1] | Step 4 | | | |
| External settings | ✓ Limit active | | Cli {Delete limit}: Cli | ck here -> |] |
| | Limits[1] | | | | |
| | Limit text: | | | | 2 |
| | Limit: | Step 5 | Minimum/Maximu | im: Minimum | |
| | Threshold value: | 0.000000 | Delay time [s]: | 0 | 2 |
| | Dynamic limit a | tive | ☑ Variable: | < no variable linked > | |
| | | | | ene tandore inited i | |
| | AML/CEL[1] | | | | |
| | In Alarm Messag | e List | In Chronologica | I <mark>l Event Lis</mark> t | 2 |
| | 🔽 To acknowledge | | 🗷 🥅 To delete | | ۲ |
| | Frint Print | | | | C |
| | Alarm group: | 0 - < not used > | | | - C |
| | Alarm class: | 0 - < not used > | | | - C |
| | | | | | |
| | Function[1] | | | | |
| | Function: | < no function linked | > | | S |
| | Call via button in | n Alarm Message List | | | 5 |
| | Additional attribute | d1) Otom 5 | | | |
| | Limit color: | s[1] Step 5 | | | |
| | Invisible | | E Flashing | | 2 |
| | User property 1: | | | | 2 |
| | User property 2: | | | | |
| | | | | | |
| - III | Help[1] | | | | |

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.

| perties: Variable: x1 - Proje | ct: CTITEMPLATE | | | | | - |
|---|---|-------------------|---------------------|------------------------|------------------------|------------|
| | | | | | | |
| General Addressing Value calculation Write set value | Help[1] Help file: <n Help chapter:</n | o file> | | | | |
| Limits Step Limit[1] Limit[2] | Limit[2] |) Ste | p 7 | ☑{Delete limit}: Click | here -> | |
| Harddisk data storaç Additional settings External settings | Limits[2] Limit text: | | | | | Z |
| | Limit: | | Stop 9 | Minimum/Maximum: | Maximum | - Z |
| | Threshold value: | 0.000000 | Step 8 | Delay time [s]: | 0 | 3 |
| | 🗖 Dynamic limit a | ctive | | 🗷 Variable: | < no variable linked > | Z |
| | AML/CEL[2] | | | | | |
| | 🔽 In Alarm Messa | ge List | | In Chronological E | vent List | 2 |
| | 🔽 To acknowledg | 2 | | 🗷 🥅 To delete | | 3 |
| | Frint Print | | | | | 2 |
| | Alarm group: Alarm class: | 0 - < not used | > | | | <u>ج</u> ک |
| | | 0 - < not used | > | | | × 7 |
| | Function[2] | | | | | |
| | Function: | | ono function linked | > | | Z |
| | Call via button i | n Alarm Message L | ist | | | 2 |
| | Additional attribute | | Ctop 0 | | | |
| | Limit color: | #00FF00 | Step 8 | 2011/2-091 | | |
| | Invisible Invisible | | | Flashing | | 2 |
| | User property 1: | | | | | 2 |
| | User property 2: | | | | | |
| | Help[2] | | | | | |
| | Help file: <n< td=""><td>o file></td><td></td><td></td><td></td><td></td></n<> | o file> | | | | |
| 4 111 | Help chapter: | | | | | 2 |

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.

| General Addressing Value calculation Write set value | Limits {Limit new}: Click here -> | Step 9 |
|--|---|-----------------------------|
| Write set value Limits Limits Limit[1] Limit[2] Alarm handling | Reaction matrix Reaction matrix active Reaction matrix: | 5 |
| 🛅 Harddisk data stora <u>c</u> 🛅 Additional settings 🎦 External settings | Limit[1] | ☑{Delete limit): Click here |

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.

| File Edit Screens Elements Cont | trol elements Options Windo | w Help | |
|--|---|---------------------|-------------------------------|
| | 📐 🤁 100% 🔹 🤤 🧲 | | 小鸟 顺度 而信 语 |
| | termine the second s | | |
| D • @ • 😘 🕨 💀 का का | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | i di | at at at at 🗖 🐻 🗛 |
| roject Manager | Step 2 | | ▼ ‡ : |
| 🗆 🖬 Workspace 'C:\Users\Public\Docu | | X 1 1 1 1 1 | ्र 📑 🕖 |
| CTITEMPLATE (Start projetion) Output: Contemplation of the start project of the sta | ect) Statut Name | Туре | Parameter |
| Screens | 🔤 📢 New function | Ins Filter text 🛛 🖤 | Filter text |
| Functions Step 1 | scrSCREEN4 | Screen switch | SCREEN4 |
| | scrSCREEN3 | Screen switch | SCREEN3 |
| Historian | scrSCREEN2 | Screen switch | SCREEN2 |
| Recipes Time control | scrEVENTS | Screen switch | EVENTS - [*][*]-[T,Rel:0d,1h, |
| Programming interfaces | scrNUMPAD | Screen switch | NUMPAD |
| 5 straton (IEC 61131-3) | scrKEYBOARD | Screen switch | KEYBOARD |
| Scheduler | scrALARM | Screen switch | ALARM - [*][*]-[T,Rel:0d,1h, |
| - 🔒 Interlockings | ExitRuntime | Exit Runtime | |
| Message Control | ReloadProject | Reload project onli | changed objects |
| Menus | StartIExplorer | Start program | \windows\iesample.exe |
| Report Generator | scrMENU | Screen switch | MENU |
| By User administration Files | scrSTART | Screen switch | HOME |
| History of changes | scrSCREEN1 | Screen switch | SCREEN1 |
| Project backups | scrPLC_Menu | Screen switch | PLC MENU |

Step 1:

Step 2:

In the Project tree, click on the Functions icon.

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.

| Workspace C:\Users\Public\Doc | 🦉 🖣 🖻 🖉 | | | | | | |
|-------------------------------|---------|----------------------------|------------------------|----------------|---------|--|--|
| | Status | Name 🏟 | Screen type | Frame | Backgro | | |
| | =V | Filtertext | Filter text | Filtertext 🛛 🍸 | Filtert | | |
| | - | SCREEN5 | Standard | MAIN | #EF | | |
| | | ALARM | Alarm Message list | MAIN | #EF | | |
| | - | MENU | Standard | MENU | #E4 | | |
| | | HOME | Standard | MAIN | #EF | | |
| | - | SCREEN3 | Standard | MAIN | #EF | | |
| | 1 | PLC_MENU | Standard | DETAIL | #C4 | | |
| | - | KEYBOARD | Keyboard | KEYBOARD | #EF | | |
| | | EVENTS | Chronologic event list | MAIN | #EF | | |
| | | NUMPAD | Keyboard | NUMPAD | #EF | | |
| | | SCREEN1 | Standard | MAIN | #EF | | |
| | | SCREEN4 | Standard | MAIN | #EF | | |
| | | SCREEN2 | Standard | MAIN | #EF | | |
| | 4 | | | | | | |
| b | | tal / 12 filtered / 1 sele | | 1 | | | |
| | 12 00 | tor/ 12 meercu/ 1 sere | cicu | | | | |

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

| Status | Name M | Туре | Parameter |
|--------|-----------------|---------------------|--------------------------------|
| = | Filter text 🛛 🍸 | Filter text 🛛 🍸 | Filtertext |
| | scrSCREEN4 | Screen switch | SCREEN4 |
| | scrSCREEN3 | Screen switch | SCREEN3 |
| | scrSCREEN2 | Screen switch | SCREEN2 |
| | scrEVENTS | Screen switch | EVENTS - [*][*]-[T,Rel:0d,1h,0 |
| | scrNUMPAD | Screen switch | NUMPAD |
| | scrKEYBOARD | Screen switch | KEYBOARD |
| | scrALARM | Screen switch | ALARM - [*][*]-[T,Rel:0d,1h,0 |
| | ExitRuntime | Exit Runtime | |
| | ReloadProject | Reload project onli | changed objects |
| | StartIExplorer | Start program | \windows\iesample.exe |
| | scrMENU | Screen switch | MENU |
| | scrSTART | Screen switch | HOME |
| | scrSCREEN1 | Screen switch | SCREEN1 |
| | scrPLC_Menu | Screen switch | PLC_MENU |
| | Function 0 | Screen switch | SCREEN1 |



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.

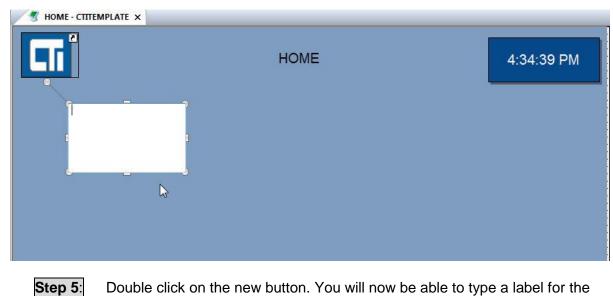
| B00010 |) P 🗆 t 🗉 🕢 🖓 🖶 🖬 🖼 | 💥 🗊 🔟 📑 🍄 🔤 į | a 🐺 ¥ 🐮 🛙 | J *C |
|---------------|--------------------------------|---------------------------------|---------------------|---|
| | | | | |
| | Step 2 | | | |
| | | HOME | | 4:16:22 PM |
| | Step 3 | | | |
| | Functions selection | | - | |
| | Workspace 'C:\Users\Public\Doc | | | |
| | CTIZENONDEMO | Status Name 🖊 | Туре | Parameter |
| | - | Filter text | Filter text 🛛 🍸 | Filter text 🛛 🕅 |
| | | scrSCREEN4 | Screen switch | SCREEN4 |
| | | scrSCREEN3 | Screen switch | SCREEN3 |
| | | scrSCREEN2 | Screen switch | SCREEN2 |
| | | scrEVENTS | Screen switch | EVENTS - [*][*]-[T,Rel:0d,1h,0m,0s] |
| | | scrNUMPAD | Screen switch | NUMPAD |
| | | scrKEYBOARD | Screen switch | KEYBOARD |
| | | scrALARM | Screen switch | ALARM - [*][*]-[T,Rel:0d,1h,0m,0s] |
| | | ExitRuntime | Exit Runtime | The same [][] [] [] (] (] (] (] (] (] |
| | | ReloadProject | Reload project onli | changed objects |
| | | StartIExplorer | Start program | \windows\iesample.exe |
| | | scrMENU | Screen switch | MENU |
| | | scrSTART | Screen switch | HOME |
| | | scrSCREEN1 | Screen switch | SCREEN1 |
| | | scrPLC_Menu | Screen switch | PLC_MENU |
| Output window | | Ste | р 4 | |
| Insert proj | • <u> </u> | 14 total / 14 filtered / 1 sele | cted | |
| Load projec | | No selection | _ | OK Cancel Help |
| | | NO SCIECUUIT | | |
| - | | | | |

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.



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.

| ile Edit Screens Elements Control ele | ments Options Window He | lp | | |
|--|----------------------------|-----------------|---------------|----------|
| B 🗊 🐰 🖻 😤 🛷 🦘 🔊 📐 🤅 | 3 100% 💽 🤤 🕘 | | 😫 111 🖂 111 | e i t |
| D • @ • 🖓 🕨 🔛 🖓 🖓 | | • 4:4: | 🔺 🖉 📰 🐻 | 20 |
| oject Manager | | | | 4 |
| - Workspace 'C:\Users\Public\Documents' | 隆 📩 🗔 🖉 🦧 😰 🛛 | h n × III - I | | 5 |
| CTITEMPLATE (Start project) Start project) | Element name M | Preview | Category | |
| 🗄 📲 Screens | Filtertext | Filter text 🛛 🖓 | Filter text | - |
| Constant Service | +-ISA-S55D | | | |
| Time control Programming interfaces S straton (IEC 61131-3) | +-Misc CE | | | |
| Scheduler Interlockings Message Control Menus | - Motors CE | | | |
| | brake motor CE | | | |
| History of changes Project backups CTIZENONDEMO Global symbol library | -chemical pump CE | | | |
| | simple mixer CE | | | |
| | single level compressor CE | | | |
| | • | III | | |

- **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.

| | | 10 | • u × | S HOME - CTITEMPLATE X | |
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| + Misc CE | | | - | ۹ | |
| Motors CE | | | | | |
| brake motor CE | | | | | |
| -chemical pump CE | | 15 | | | |
| simple mixer CE | | | | | |
| | | | | | |



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'.

| Properties: Linked symbol: brak | e motor CE - Screen: HON | ME - Project: CTITEMPLATE | → ¤ × |
|--|------------------------------------|--|--------------|
| Representation Color Visibility/flashing General Position Size and rotation dyi Runtime Linking rule | Colors dynamic Text/line color: | < no variable linked > < no variable linked > | Step 2 |

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.

| Workspace 'C:\Users\Public\Doc | • | h n 🛃 | | | | |
|--|--------|------------|----------------|------------|-----------------|-------------|
| | Status | Name 🏼 🕅 | Identification | Measur | Net address | Data I |
| , ** - 2017 - 21 - 22 - 22 - 22 - 2 | = 🍸 | Filtertext | Filter text | 7 Filter 7 | Filter text 🛛 🖓 | Filter text |
| | | x4 | | | 0 | |
| | | х5 | | | 0 | |
| | | хЗ | | | 0 | |
| | | <u>x1</u> | | | 0 | |
| | | x2 45 | | | 0 | |
| | | | | | | |
| | | | | | | |

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.

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|----------------------|---|
| MOME - CTITEMPLATE X | Numerical value |
| | Create numerical value |

Step 1:

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

| and a second second | | | | | | | | _ |
|---------------------|--|-------------------------------|-------------|-----------|---------------------|----------|---------------|-------------|
| | | | но | ME | | | 11 | :43:11 AM |
| • | Variable selection (Filtered: Numerica | 3 | | | | | | × |
| | 🖂 🖬 Workspace 'C:\Users\Public\Doc | . | 21/ | | | | | |
| | CTITEMPLATE CTIZENONDEMO | Status Na | me | M | Identification | Measur | Net address | Data b |
| | d_ ChileNonDemo | = | Filter text | Y | Filtertext | Pilter T | Filter text 🛛 | Filter text |
| | | x4 | | | | | 0 | |
| | | x5 x3 | | i. | | | 0 | - |
| | | x1 | | | | 1 | 0 | - 1 |
| | | x2 | | | | | 0 | |
| ** | | Ste | эр З | | | | | |
| | ۰ III ا | 5 total / | | ected 5 t | ags used / unlimite | | ole | Help |



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.

| 1 | | 10 |
|---|---|----|
| | 1 | |
| | | |

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

| Properties: Numerical value: Nu 🏭 🖺 🚍 🙀 💷 🕕 📼 | merical value_1 - Screen: | HOME - Project | : CTITEMPLATE | → ‡ X |
|--|--|----------------|-------------------|--------------|
| Representation Color Borders/Shadows Visibility/flashing General | Colors static Text color: ##00 Transparent | 00000 | Background color: | #000 |
| | Colors dynamic Text/line color: | < no variable | linked > | |
| Authorization VBA Write set value Variable / function | Background color: | < no variable | linked > | 23 |

Step 4:

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

| Properties: Numerical value: Nu | - | : HOME - Proje | d: CTITEMPLATE | ★ û × |
|--|------------------------------------|------------------|----------------------|--------------------------|
| | | | | |
| Color Color Color Dorders/Shadows | Write set value | | I propose current | value |
| General Position | Set value / change | e 0 🗸 | Write set value via: | Dialogbi 👻 |
| Size and rotation dyi | External program: | | | |
| Runtime Authorization | ☑ Use screen Key | board | Screen Keyboard: | <no scre<="" td=""></no> |
| | SV limits static Take set value | limits from vari | iable | |
| | Minimum: | 0.000000 | Maximum: 1.00000 | 0 |

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.

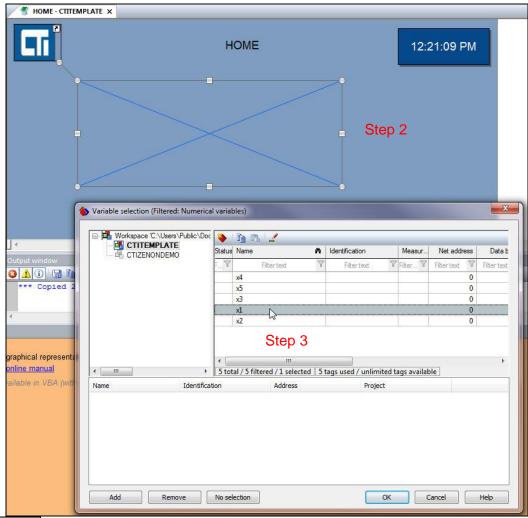
3.6.7 Adding a Trend Element

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.





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.

| personal processing and the second se | element: Trend element_3 - Screen: HOME - Project: CTITEMPLATE | ★ # X |
|--|--|-----------------|
| Represent | Curves {Curve new}: Click here -> | <u>ع</u> الي ال |
| | In the Properties window, click on the <i>Curves</i> folder. | |
| Step 6: | Click the <i>Curve new</i> button. When a variable selection window appears, select a variable from the click the OK button | ne list and |
| x1 01 | click the OK button. | |
| 100%] | | |

| | 12:14:09 PM | 12:16:09 PM | 12:18:09 PM | 12:20:09 PM | 12:22:09 PM | 12:24:09 PM |
|------|-------------|-------------|-------------|-------------|-------------|-------------|
| 25% | ;- | | | | | |
| 50% | - | | | | | |
| 100% | | | | | | |

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.

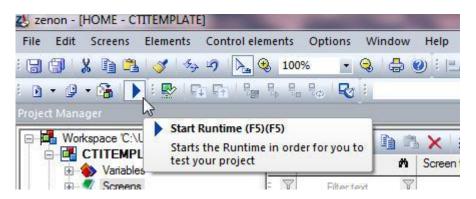
| Properties: Trend element: Tren | id element_1 - Screen | HOME - Project: CT | TTEMPLATE | | ▼ ₽ × |
|---------------------------------|--------------------------|---------------------|-------------|-----------------|--------------|
| | | Ì | | | |
| Color | Curves {Curve new}: (| Click here -> | | | |
| | Curve[1] | | | | |
| - Carlosition | {Delete curve}: | Click here -> | | | |
| 🛅 Runtime 🛅 VBA | Line color: | #000000 | Line type: | [| • |
| | Curve name: | | | | |
| Curve[ht] | Variable: | x1 | | | |
| | Display range st | | 1 | | |
| | | y range from variab | | | |
| | Min. display rar | nge: 0.000000 | Max. displa | ay range: 1.000 | 000 |

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:

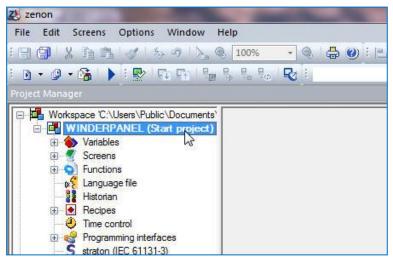
- 1) Reading this Section
- 2) Setting the IP address of your Panel
- 3) Connecting the Editor PC to 2500-VP15 Panel
- 4) Establishing a Remote Transfer Connection
- 5) Transfering Project Files
- 6) Setting the Start Project

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.

| Properties: Project: WINDERPANE | | | | ▼ ‡ × |
|---|---|-----------------------------|---|--------------|
| | | | | |
| General Network Graphical design Touch operation Runtime settings Functions User administration Alarm Message list | General Remote transport: Create RT files for: Windows CE pro Multiuser project | oject | RT changeable data: Project description: Database server: | |
| Chronologic event li | Name/Folder | | | |
| | Project name: \ | WINDERPANEL | | |
| History of changes | Runtime folder: | C:\Users\Public\Documents\: | zenon_Projects\My Projects\WINDERPANEL | |
| | Project ID: 1 | b5613c2-8bcb-4816-b4a6-99 | fe4663fff3 | |
| | Data folder: | | | |
| | File storage: 0 | Click here -> | | |

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.

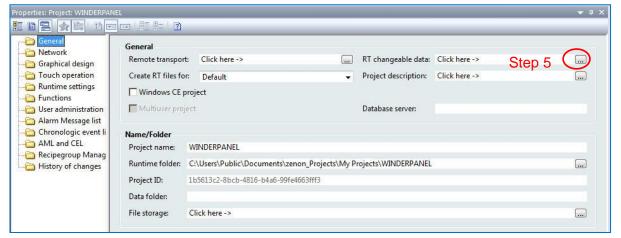
| Sourc | | | | 0 | | |
|-------|--------|--|--------|--------------|---------------------------------|--|
| | active | | Target | Revision | Description A | |
| 1 | | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLA_c:\hard disk\zenon | | Сору | Runtime folder | |
| 2 | - | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLA | | Сору | Graphics | |
| 3 | - | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT | Step 4 | Сору | Texts and formats Multimedia | |
| 4 | | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLA C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLA | otop i | Сору | Table folder (*.xrs | |
| 6 | | C:Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT | | Сору Сору | Help | |
| 7 | | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT | | Сору | Others | |
| 8 | | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT | | Сору | Driver | |
| 9 | | C:\Users\Public\Documents\zenon_Projects\CTI HMI TEMPLATES\CTITEMPLAT | | Сору | straton | |
| | X | | | Сору | Staton | |
| | | | | | | |

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.



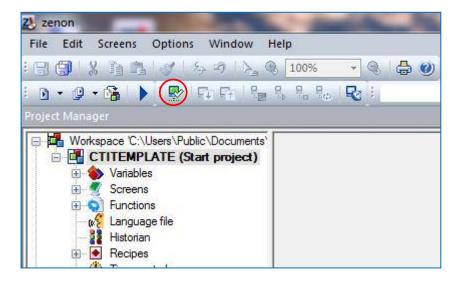
Step 5:

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.

| angeable data | | | |
|---------------------|------------------------------|------------------|------|
| Module | Do not generate and transfer | Do not decompile | OK |
| Recipegroup Manager | | | Help |
| Standard recipes | | | |
| User administration | | | |
| Scheduler | | | |
| Message Control | | | |



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.

| Connection Password | n password | |
|------------------------|---------------------|---------|
| | | |
| No lon | ger display dialog. | |
| [c | hange connection pa | assword |
| Options | | |
| Displa | remote licensing | |

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

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| Project Manager | | | | |
| Workspace "C:\Users\Public\Documents" | | | | |
| CTITEMPLATE (Start project) | | | | |
| | | Name 🏟 | Screen type | |
| | | Filter text | Filter text | |
| | | SCREEN5 | | |
| Font lists | | SCREEND | Standard | |

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.

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

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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.



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

<u>Warranty</u>. 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. <u>Remedies.</u> 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. <u>General.</u> 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. <u>Product Improvement.</u> 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. <u>Exclusive Warranty.</u> 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. <u>Disclaimer and Limitation of Liability.</u> 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. <u>Adequate Remedy.</u> 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. <u>Force Majeure.</u> 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. <u>Governing Law.</u> 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.