

# ZTVX-Series RF Signal Routing Assembly 2 x N Port Switch Matrix 50Ω

A Mini-Circuits Self-Contained Integrated Assembly

## User's Manual



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# 1 INTRODUCTION

Thank you for choosing Mini-Circuits custom test equipment to meet your needs! The purpose of this User's Manual is to instruct you on basic installation and setup of your ZTVX-unit, to advise you on general precautions to be taken when installing and handling the equipment, and to provide instruction on installing and using the control software for this unit.

We're here to support you every step of the way. For technical support and assistance, please find the following points of contact for your convenience:

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## 2 WARNINGS

### 2.1 Safety Hazards



**Electrical Danger**

The ZTVX-unit contains live 110/220V contacts and should be used and handled only by qualified professionals. When performing any activity in and around ZTVX-unit box, user must exercise extreme caution to avoid touching any parts where live voltage may be present to prevent injury or death due to electrical shock.



Figure 1: Live 110 / 220V contacts inside ZTVX-UNIT box.



**Heavy Object**

The ZTVX-unit box is heavy and requires caution to prevent damage to the equipment and ensure user safety. User must follow safe lifting protocols and use any necessary lifting aids to prevent muscle strain or back injury. The unit must be supported in rack structure by securely fastened side rails or shelving to avoid potentially damaging the equipment.



**High Speed Fan Blades**

The ZTVX-unit module contains cooling fans with rotating blades that can cause serious injury or cut. Remove any loose articles before working inside the ZTVX-unit case to avoid getting caught in moving machinery.



Figure 2: Fan blades inside the ZTVX-Unit case

## 2.2 Additional Precautions

**! Air Flow:** ZTVX-unit box must be mounted by customer to maintain minimum 1U (1.75”) free air space above and below each box with unobstructed access to room ambient airflow for proper operation.

**! Electrostatic Discharge:** Any person operating the ZTVX-unit must have Electrostatic Discharge (ESD) protection to prevent damage to any components.

**! Rear Panel Safety Blocks:** The ZTVX unit is supplied with two rear panel safety blocks that must be installed by the customer. Failure to install safety blocks may result in damage to the product. Refer to section 7.2 for additional instructions.



**! Opening & Tampering:** This equipment is designed to be serviced only by professional electrical technicians. Case openings by any person other than qualified personnel authorized by Mini-Circuits or customer will void any and all terms of the Limited Warranty.<sup>1</sup>

<sup>1</sup>Although top and bottom panels create intended accessibility, it is important that caution be taken when connecting or disconnecting any electrical or RF connection; moving, removing, or replacing any wires, cables, connections, switches, or other components within the boxes to avoid potentially damaging or dislodging any other cables or connections.

### 3 PHYSICAL DESCRIPTION

Mini-Circuits' ZTVX-Series of 2 x N switch matrices come housed in an aluminum alloy chassis measuring 19" wide x 3.48" (2U) high x 20" deep (483 x 89 x 508mm). The front panel is fabricated with an array of slots to allow adequate air flow from the inside of the case and facilitate cooling. The front panel of the unit is also configured with SMA-F or N-F connectors for 2 RF inputs (labeled A1 and A2) and up to 16 RF outputs (labeled N1 - N16), depending on your model. Note that all switch ports are bi-directional and may be used as inputs or outputs as desired. When the unit is on, RF input A1 is identified by a green LED light, and RF input A2 is identified by an orange LED light. The unit is powered on with the power switch at the center of the front panel which illuminates green when in the ON position. Two handles at left and right ends of the front panel facilitate lifting and moving the unit, and the slotted holes on the outer left and right extrusions allow secure mounting to a standard 19" (483mm) rack support structure.



Figure 3: Front panel of the ZTVX-unit. 2 x 10 configuration shown.

On the rear panel of the equipment case is the input for a 90-260V AC power supply with caution label (right side). At the bottom right of the rear panel is a clearly marked grounding terminal. It is recommended that this terminal be connected to a Common Bonding Network (CBN) to properly ground the unit case. In the center of the rear panel is a cooling fan with a protective cover. The identification sticker at the left of the rear panel displays the equipment model name, serial number and internal control board number. At the far left of the rear panel are connection ports for USB and RJ45 (LAN), allowing you to communicate with the equipment from your PC.



Figure 4: Rear panel of the ZTVX-unit

## 4 FUNCTIONAL DESCRIPTION

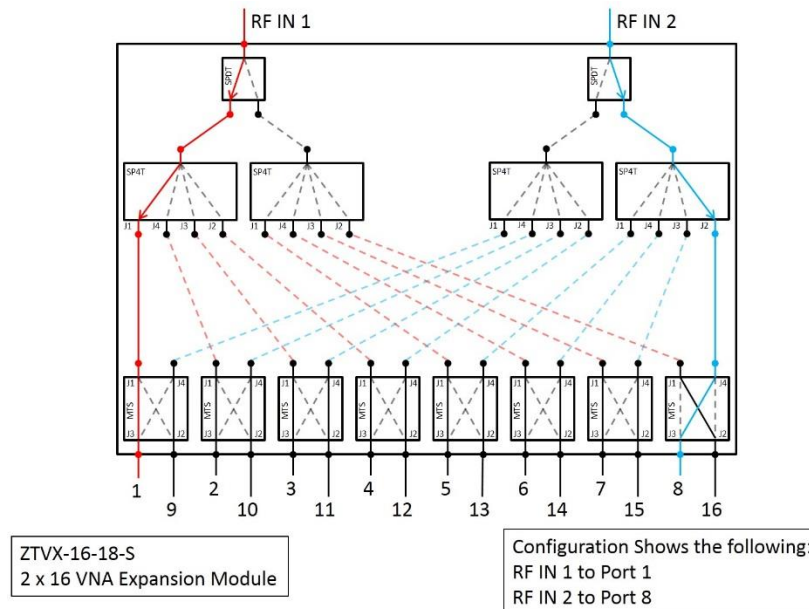


Figure 5: ZTVX-unit functional block diagram. 2 x 16 port, DC-18 GHz configuration shown.

Mini-Circuits' ZTVX-Series 2 x N switch matrices are capable of routing signal from two input ports (A1 and A2) to any of up to 16 output channels (N1 - N16) through a network of low-loss, high-isolation electromechanical switches. Models are available with various output port counts and frequency ranges of DC to either 12 GHz or 18 GHz to meet your needs. The switches in the system are bidirectional, and all ports may be used as inputs or outputs as needed. This capability allows easy management of complex signal traffic in test environments. ZTVX systems have proved particularly useful for testing of multiple DUTs in parallel as well as testing of DUTs with higher port counts without repeatedly disconnecting and reconnecting test cables, significantly reducing test time and increasing throughput.

This equipment operates on a 90 to 260V; 47 to 63 Hz AC line supply. The unit contains Mini-Circuits' patented absorptive electromechanical switches with extra-long switching life, performance qualified to 100 million switch cycles with proper maintenance. The firmware for the equipment includes a switch cycle counting function, allowing you to monitor the number of switch cycles elapsed on each switch in the system and alerting you when routine maintenance is required - every 10 million cycles per switch. See application note [AN-83-001](#) for additional information on switch life and maintenance.

The equipment may be controlled via USB or Ethernet (HTTP and Telnet Protocols) connections, allowing setup flexibility and easy remote test management. All units come supplied with Mini-Circuits' user-friendly Graphical User Interface (GUI) program and DLLs for 32-bit and 64-bit Windows® operating systems. Full programming support is provided for a wide range of programming environments on both Windows and Linux® operating systems, supporting control through your native test software.



## 5 NAMING SCHEME

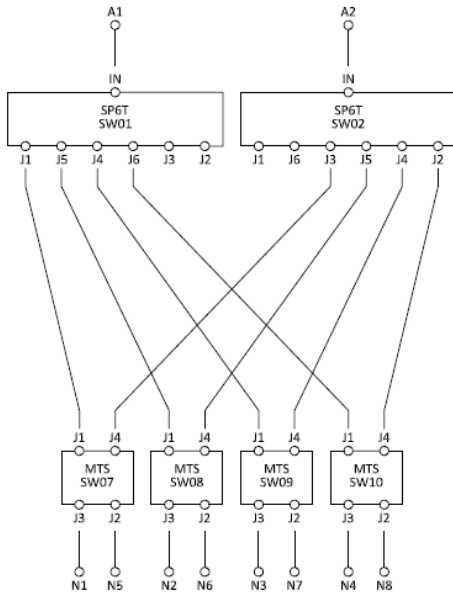
ZTVX- A - B - C

Code	Description
A	Number of Output Ports (8, 10, 12, 16)
B	Frequency (12, 18)
C	Connector Type (S, N)

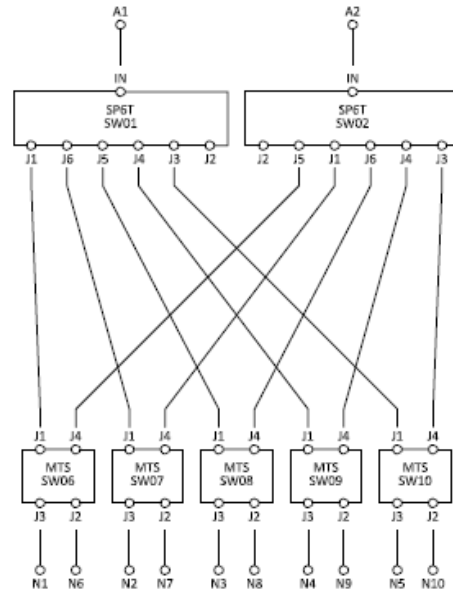
Example Models			
Model Name	Number of Output Ports	Frequency	Connector Type
ZTVX-8-12-S	8	DC - 12 GHz	SMA
ZTVX-8-18-S	8	DC - 18 GHz	SMA
ZTVX-10-12-S	10	DC - 12 GHz	SMA
ZTVX-10-18-S	10	DC - 18 GHz	SMA
ZTVX-12-12-S	12	DC - 12 GHz	SMA
ZTVX-12-18-S	12	DC - 18 GHz	SMA
ZTVX-16-12-S	16	DC - 12 GHz	SMA
ZTVX-16-18-S	16	DC - 18 GHz	SMA
ZTVX-8-12-N	8	DC - 12 GHz	N
ZTVX-8-18-N	8	DC - 18 GHz	N
ZTVX-10-12-N	10	DC - 12 GHz	N
ZTVX-10-18-N	10	DC - 18 GHz	N
ZTVX-12-12-N	12	DC - 12 GHz	N
ZTVX-12-18-N	12	DC - 18 GHz	N
ZTVX-16-12-N	16	DC - 12 GHz	N
ZTVX-16-18-N	16	DC - 18 GHz	N

If what you need isn't part of the options above, please feel free to contact us.

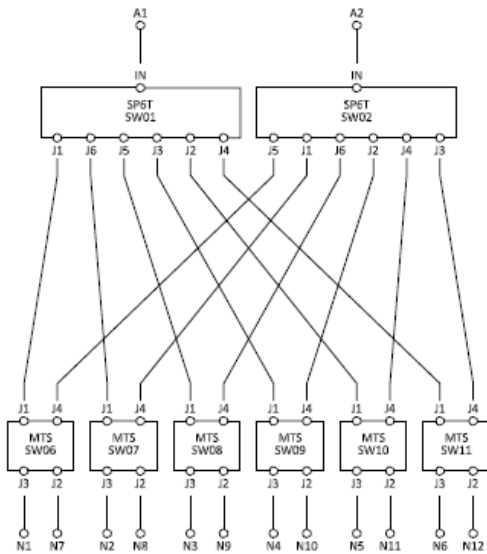
## 6 ELECTRICAL SCHEMATICS



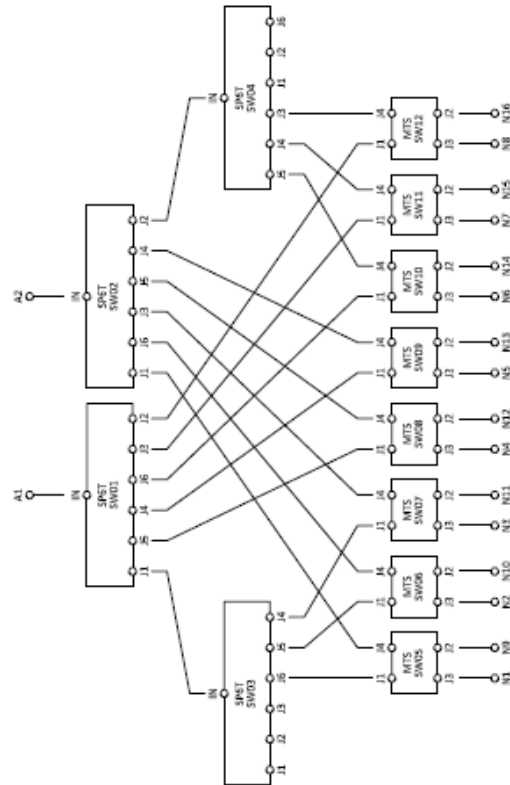
**ZTVX-8-12**  
2 x 8 port, DC - 12 GHz configuration



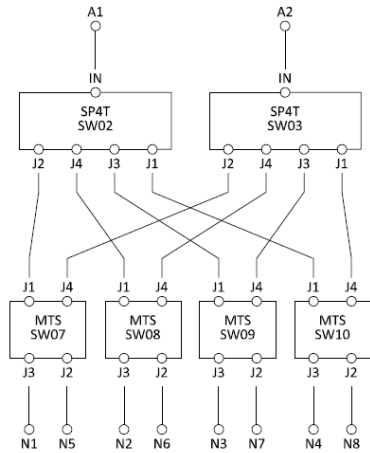
**ZTVX-10-12**  
2 x 10 port, DC - 12 GHz configuration



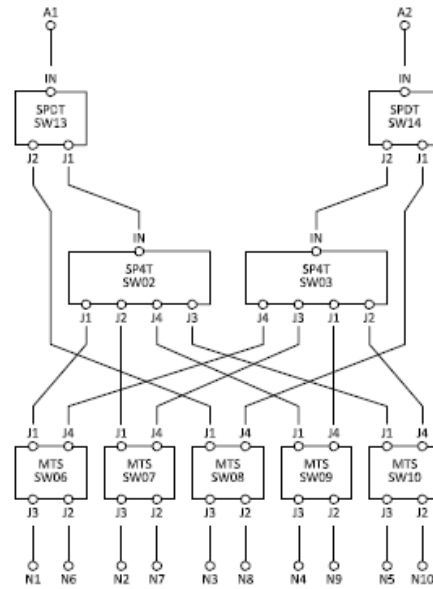
**ZTVX-12-12**  
2 x 12 port, DC - 12 GHz configuration



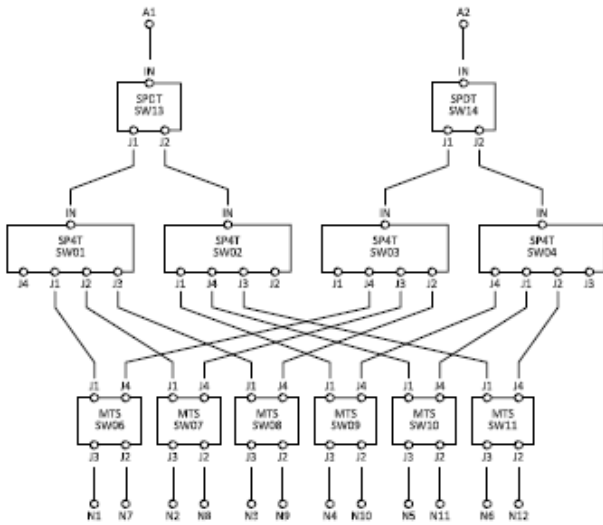
**ZTVX-16-12**  
2 x 16 port, DC - 12 GHz configuration



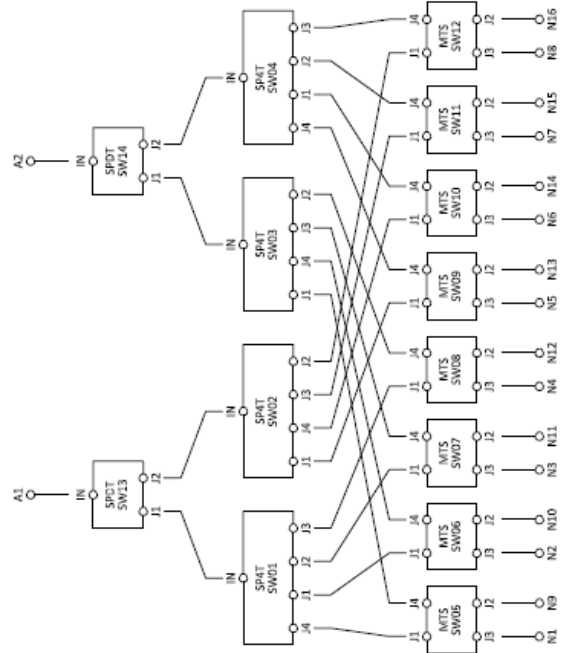
**ZTVX-8-18**  
2 x 8 port, DC - 18 GHz configuration



**ZTVX-10-18**  
2 x 10 port, DC - 18 GHz configuration



**ZTVX-12-18**  
2 x 12 port, DC - 18 GHz configuration



**ZTVX-16-18**  
2 x 16 port, DC - 18 GHz configuration

## 7 UNPACKING

### 7.1 Unpacking Process

The equipment ships in a single large cardboard carton measuring 7.5 x 25.125 x 23" pictured in the figure below.

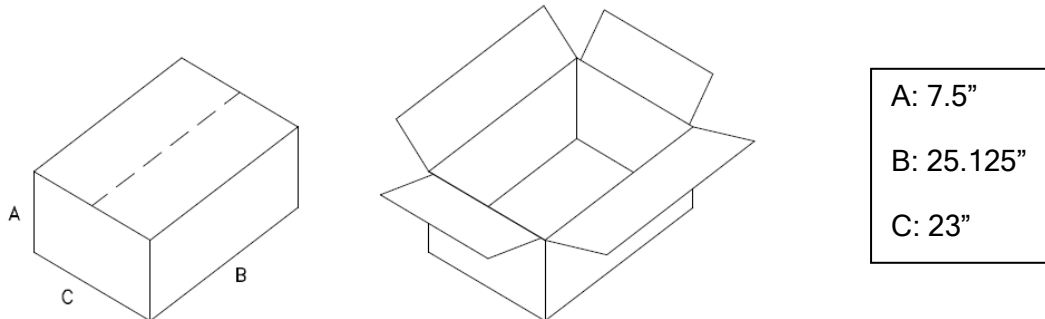


Figure 5: Shipping carton

Within the carton, the ZTVX unit is protected by pink foam inserts on the top and bottom, front and back, and a pink anti-static bag. The unit can be unpacked following the steps pictured below.



### 7.2 Package Contents

Table 1: Package Contents

Item Description	Quantity
ZTVX-Series Switch Matrix Assembly	1
CBL-3W-US Black 3-prong AC Cord (7.5 ft.)	1
USB-CBL-AB-7+ USB Cable (6.8 ft.)	1
CBL-RJ45-MM-5+ RJ45 Cable (5 ft.)	1
HT-4-SMA SMA Cable Wrench*	1



\*We've included the SMA connector wrench as a gift just to make your life easier.

This tool simplifies and expedites removal and tightening of cable connectors in crowded port configurations.


## 8 LAYOUT AND INSTALLATION


### 8.1 Rack Mounting

ZTVX-unit should be fastened to rack support structure through the slotted rack mounting holes (4x) on the front panel of each box.



Figure 6: Slotted rack mounting holes in front panel of ZTVX-UNIT box.

 ZTVX-unit must be mounted to maintain minimum of 1U (1.75") clearance above top panel and below bottom panel with unobstructed access to room ambient airflow for proper operation.

 Additionally, **due to weight, box must be supported by means other than the front panel.** This can be facilitated by side rails or by a shelf, sufficiently secured to a standard, high grade, 19 inch equipment rack.

### 8.2 Rear Panel Safety Blocks



Figure 6: Safety Blocks come in a clearly labeled plastic bag



Figure 5: Install as shown using a Phillips head screwdriver

### 8.3 Rear Panel Grounding Stud

The rear panel of the ZTVX-unit is constructed with a #10-32 x ½” long grounding stud to ground the box.



Figure 7: Rear Panel Grounding Stud

## 9 SOFTWARE

### 9.1 Software Overview

The Mini-Circuits ZTVX-unit is supplied with easy-to-install, user-friendly GUI software to control the unit and manage signal paths in your test setup. If you prefer to create your own program through your native test software, a full set of DLLs for 32- and 64-bit Windows® and Linux® programming environments is also included.

This section will acquaint you with the features of the ZTVX GUI user interface. For programming support and additional information on writing your own test programs for this equipment, please reach out to the contacts provided on page 4.

### 9.2 Installing the GUI Software

- 1) Save all work and close any other open applications.
- 2) Download the latest version of the GUI software, unzip to your PC, and run the setup program.

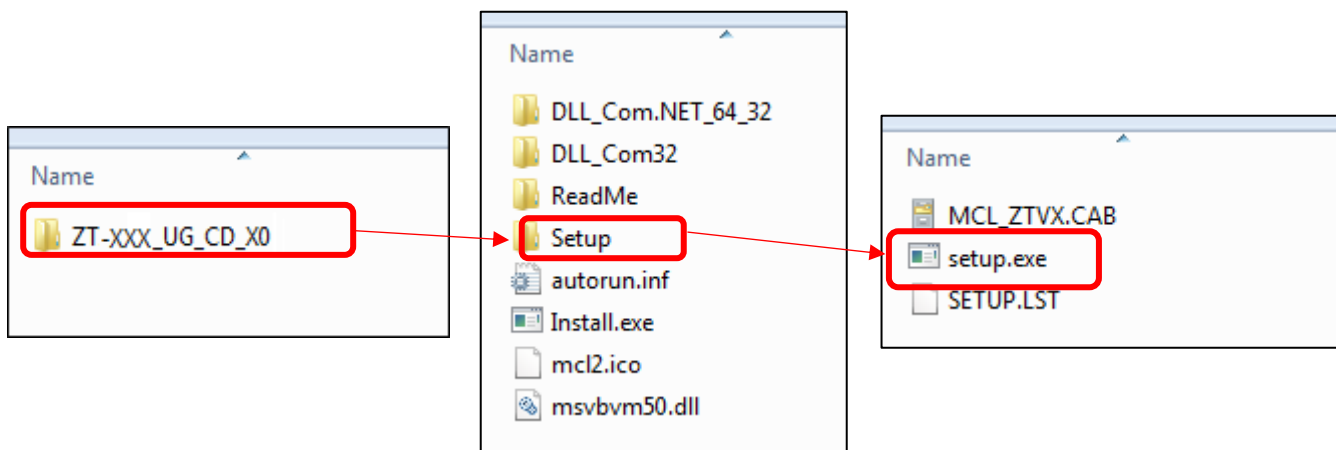


Figure 8: Installing ZTVX-UNIT GUI software

- 3) The software license agreement will appear. Review the agreement, select “I agree,” and click “Continue.”

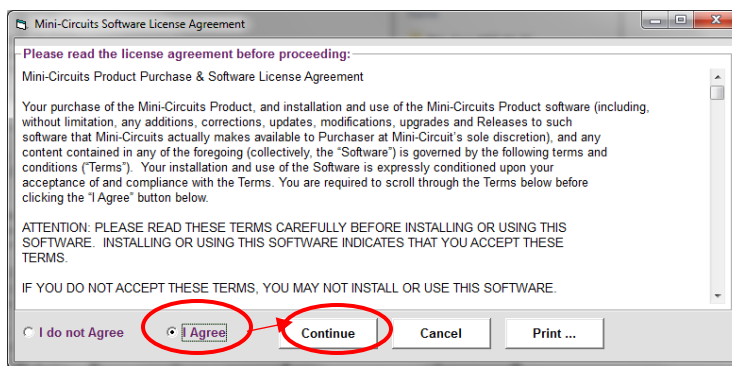


Figure 9: Software License Agreement

- 4) Be sure all open work in other applications has been saved and closed. Click “OK” to proceed.

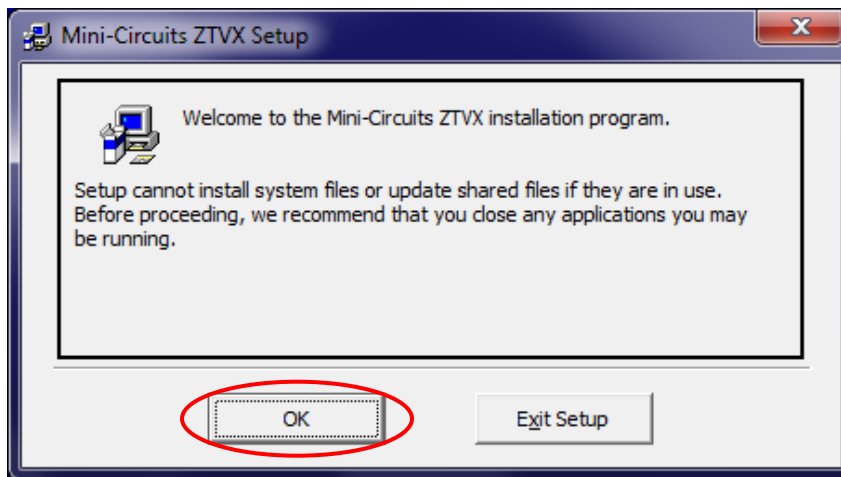


Figure 10: Close Other Applications

- 5) The Destination Directory Window will appear. This allows you to specify where the GUI software will be saved on your computer’s hard drive. At this point, it’s a good idea to take a second and confirm the full destination address for the software. The default destination directory will be shown here. Change it if you prefer by clicking “Change Directory”, and be sure record the full destination address for your records. Then click the large button at the top-left to continue.

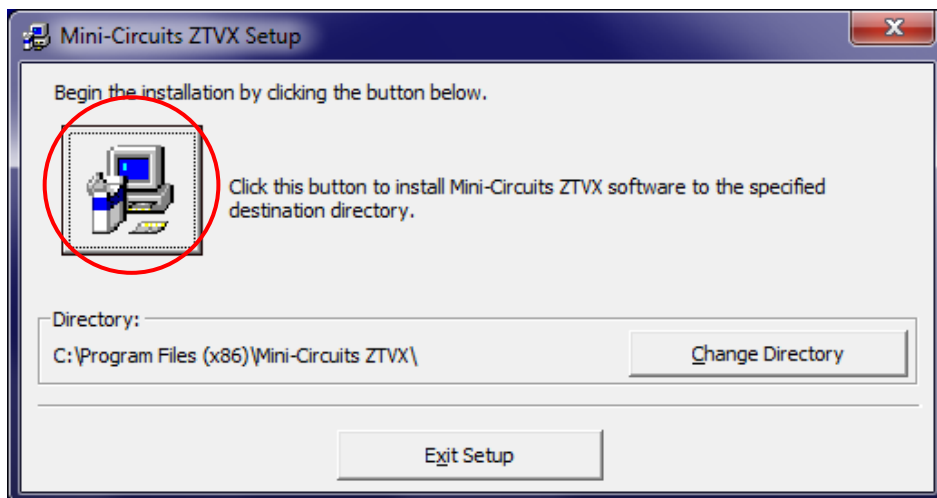


Figure 11: Directory Selection Window



- 6) The Program Group window will pop up. The Program Group window allows you to select the program group under which the link for the signal generator GUI program in the Start Menu will be created. If you change the Program Group for this software, be sure to record that information together with your destination address for your own reference. Click on “Continue” to proceed.

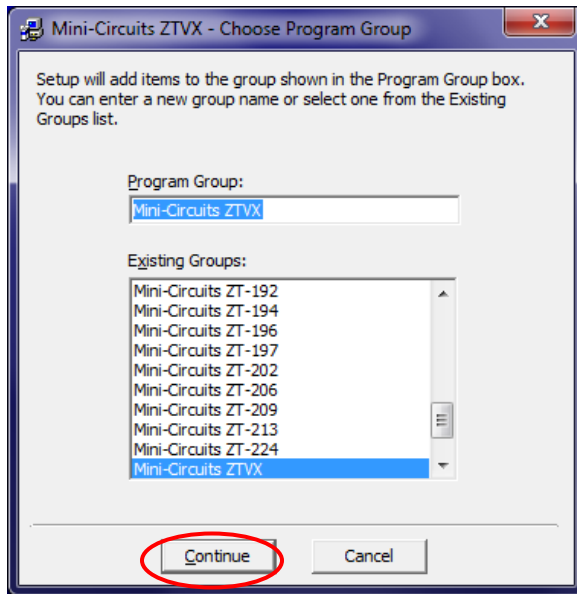
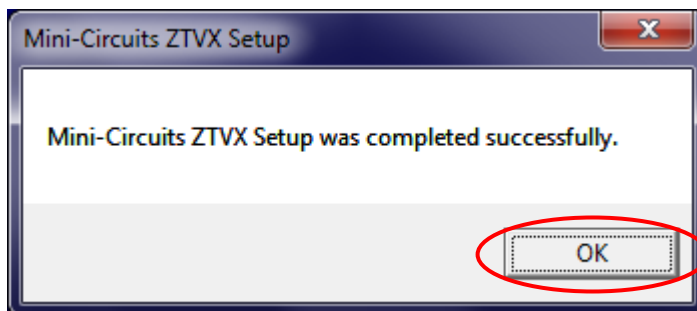


Figure 12: Program Group Window

- 7) An “Installation Complete” message will appear once the software is successfully installed. Click “OK” to close the installer.



### 9.3 Using the ZTVX GUI

After you've installed the software and opened the program on your PC, the ZTVX GUI main screen will appear. The ZTVX GUI main screen displays features and controls that allow you to easily manage the various signal paths and send commands to individual switches in the unit.

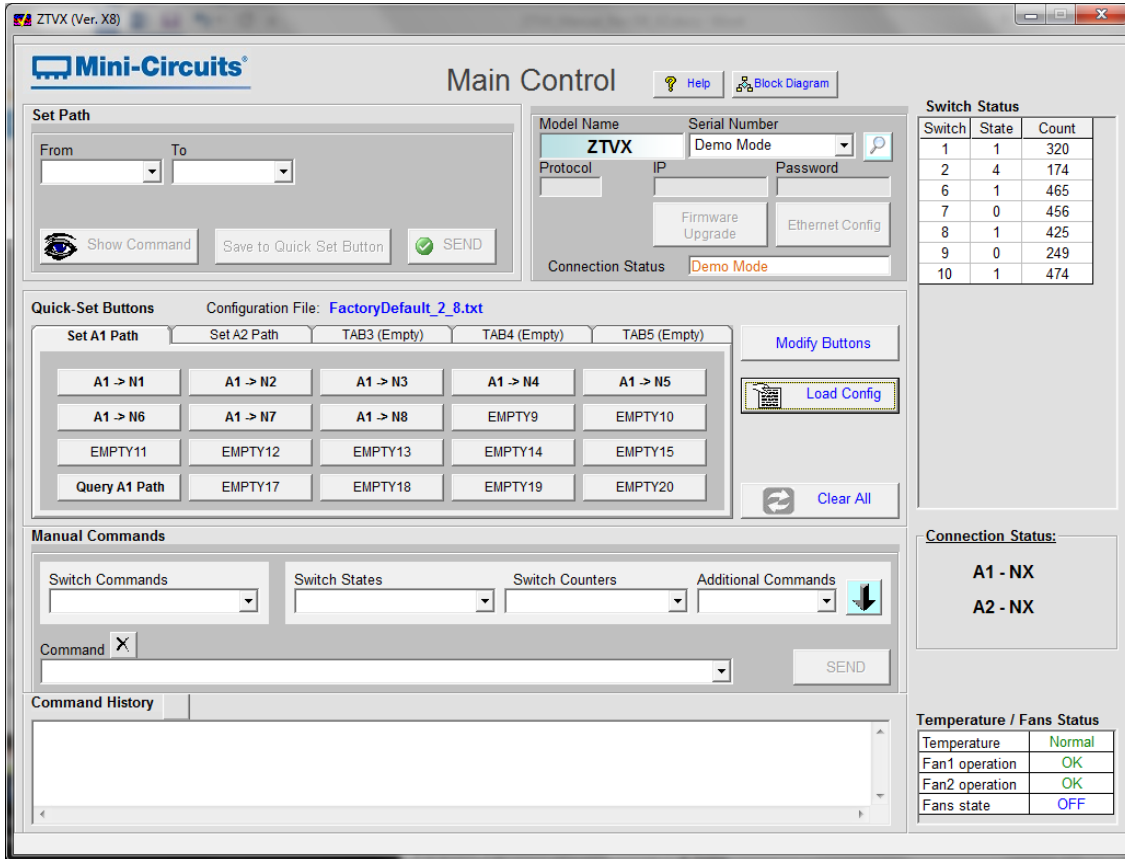


Figure 13: ZTVX GUI Main Screen

#### 9.3.1 Connecting to the ZTVX

Once the GUI program is open, you should first establish a connection with the ZTVX using USB or Ethernet. The software also provides an option to explore the GUI in “Demo Mode,” without actually connecting to the unit. The controls to connect to the unit are located at the top of the GUI main screen:

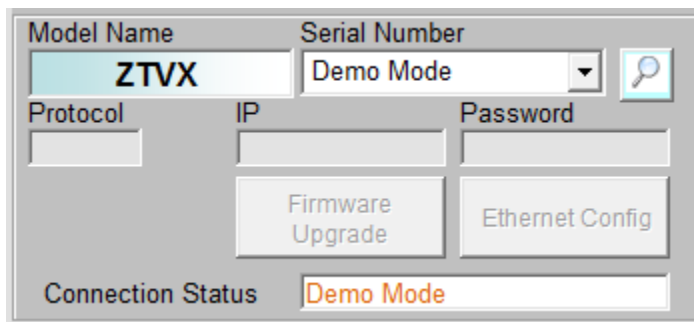


Figure 14: Connection status display and controls

## A. Connecting via USB

- 1) Make sure the ZTVX unit is connected to your PC via the supplied USB cable and the power is turned ON.
- 2) In the GUI main screen, open the drop-down in the “Serial Number” field. Options should appear displaying the serial number of the unit with different connection options. Select the option displaying the serial number of the unit with the suffix “-USB”.

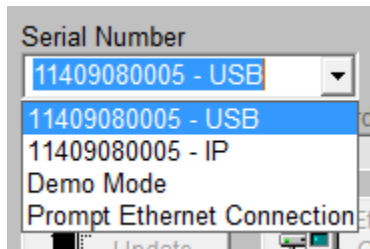


Figure 15: Drop-down with connection options - USB

- 3) When connected to the ZTVX via USB, the “Protocol” field will read “USB”, and the “Connection Status” field will read “Connected”.

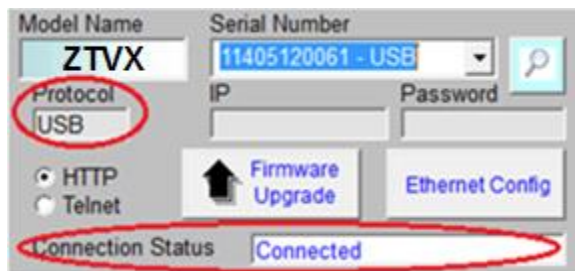


Figure 16: Displaying active connection to ZTVX via USB

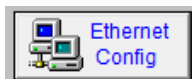
## B. Connecting via Ethernet

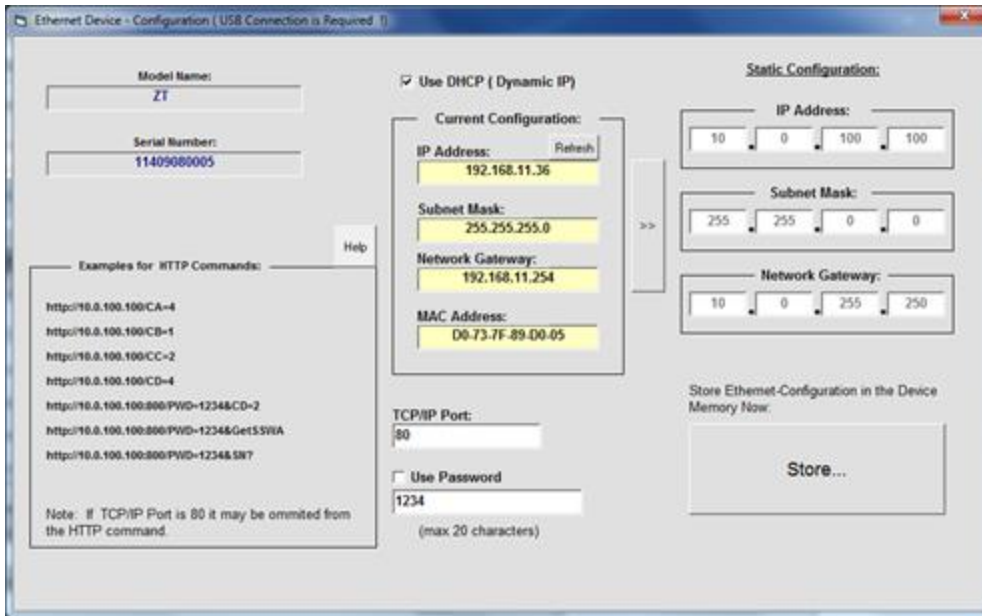
### 1) Managing IP Settings:

To connect to the ZTVX via Ethernet-TCP/IP, first connect to the unit via USB as described above in the Connecting via USB section to configure the IP settings for the unit.

**NOTE:** The ZTVX must be connected via USB to set manage IP settings.



Clicking  from the GUI main screen opens the Ethernet Configuration Window:



**Figure 17: Ethernet Configuration Window**

The Ethernet Configuration Window enables the user to control the following IP settings:

**Use DHCP (Dynamic IP)** - Checking this box enables Dynamic Host Control Protocol, which will cause the ZTVX to derive the IP address, network gateway, and subnet mask settings automatically from the server to which it is connected. Unchecking this box disables the automatic mode so that the IP parameters can be set manually.

**IP Address:** this (Internet Protocol) address allows other devices (such as computers) to communicate with the ZTVX over an Ethernet Network.

**Subnet Mask:** this parameter tells the ZTVX which part of its address it can share with other devices in the same network.

**Network Gateway:** This parameter represents the address of the network server.

**MAC Address:** This address is constant and cannot be changed. It identifies the ZTVX's physical address for the network server.

**TCP/IP port:** This parameter represents a port for communicating with the ZTVX using HTTP or Telnet protocols. The default port for HTTP protocol is 80; the default port for Telnet protocol is 23.

**Use Password:** Checking this box implements a password requirement to connect to the ZTVX via Ethernet. Enter your desired password in the field below, and record it for your own reference.

**NOTE: IF YOU LOSE YOUR PASSWORD, YOU CAN RECOVER IT BY CONNECTING TO THE ZTVX BY USB AND OPENING THE ETHERNET CONFIGURATION WINDOW.**

## 2) Establishing a Connection:

Once your IP settings are set as desired, return to the GUI main screen and open the drop-down in the “Serial Number” field. Select the option that displays the serial number of your unit and the suffix “-IP”.

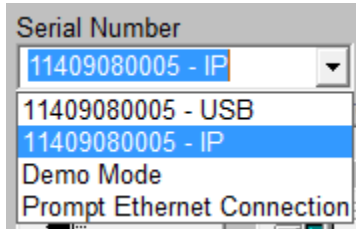


Figure 18: Drop-down with connection options - IP

Selecting the IP connection option will open the Ethernet Configuration prompt shown below:

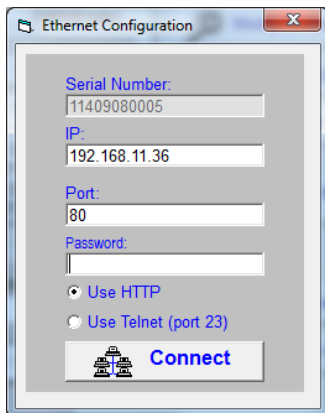


Figure 19: Ethernet Configuration prompt

You should see the serial number of your unit, IP address and the TCP/IP port number from Ethernet Settings displayed in their respective fields. The default TCP/IP port is 80. You should not have to change the entries in these fields.

If you selected “Use Password” in your Ethernet settings, enter your password in the “Password” field. You then have the option to communicate with the ZTVX using HTTP or Telnet protocols. Select the protocol you wish to use and click “Connect.”

Once the connection is established, the protocol field will read “IP” with the appropriate communication protocol (HTTP or Telnet) selected, the IP address of the unit will be displayed in the “IP” field, and the “Connection Status” field will read “Connected”.

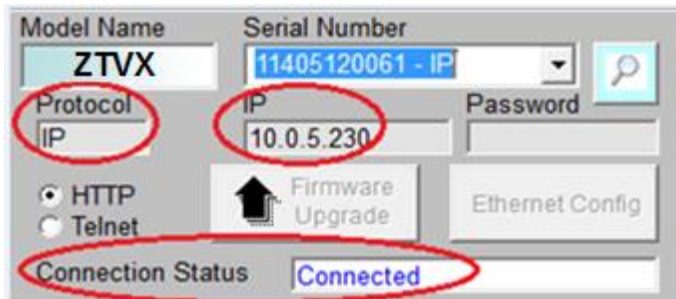


Figure 20: Displaying active connection to the ZTVX via Ethernet (HTTP protocol shown)

### 3) Firewall Access:

If your computer firewall is enabled, you may receive an alert message saying that Windows Firewall has blocked some features of the program. If this occurs, choose the networks you want to allow the ZTVX GUI to communicate with, and click “Allow Access.”



Figure 21: Firewall Alert Message

### C) Demo Mode

Running the GUI in Demo Mode allows the user to explore most GUI features for demonstration without actually connecting to the ZTVX unit. To explore the ZTVX GUI in demo mode, select “Demo Mode” from the drop-down in the Serial Number field.

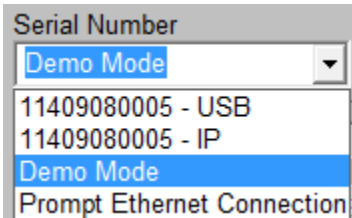


Figure 22: Drop-down with connection options - Demo Mode

The Connection Status field should then display that Demo Mode is active.

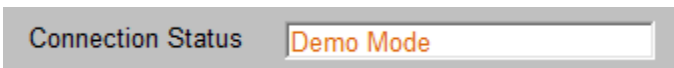


Figure 23: Connection Status indicating the ZTVX GUI is running in Demo Mode

### 9.3.2 GUI Displays and Built-In Reference

The ZTVX GUI main screen features several information displays and built-in references for your convenience. These are described below:

**Configuration File:** This field displays the current configuration file loaded in the GUI.

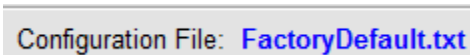



Figure 24: Configuration File

**Command History:** This field logs a history of commands sent to the ZTVX descending from oldest to most recent with time and date stamps. Clicking the  button clears all entries in the Command History field.

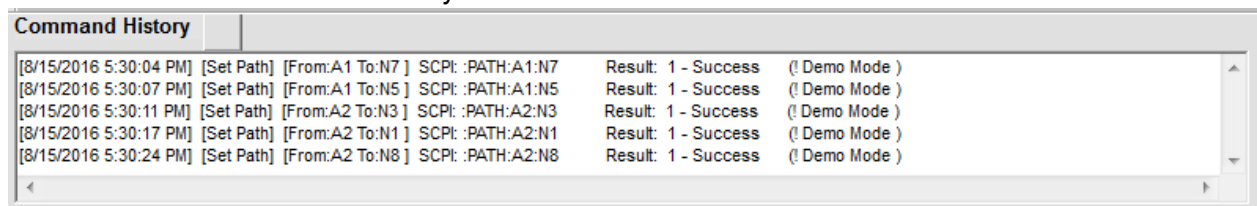


Figure 25: Command History

**Switch Status and Temperature / Fans Status Display:** The Switch Status field shows the current state of every switch in the ZTVX and the count of elapsed switch cycles on each switch. The Temperature / Fans Status display shows the status of the unit temperature and internal cooling fans.

**NOTE:** When any switch in the system is due for calibration, the counter in the Switch Status Display will turn red to alert you that it's time for a tune-up.

Switch Status		
Switch	State	Count
1	3	324
2	0	178
6	1	469
7	0	460
8	0	429
9	1	253
10	0	478

Temperature / Fans Status	
Temperature	Normal
Fan1 operation	OK
Fan2 operation	OK
Fans state	OFF

Figure 26: Switch Status display and Temperature / Fans Status display


**Connection Status:** The Connection Status display shows the current active signal path from A1 and A2 to the corresponding activated “N” ports.

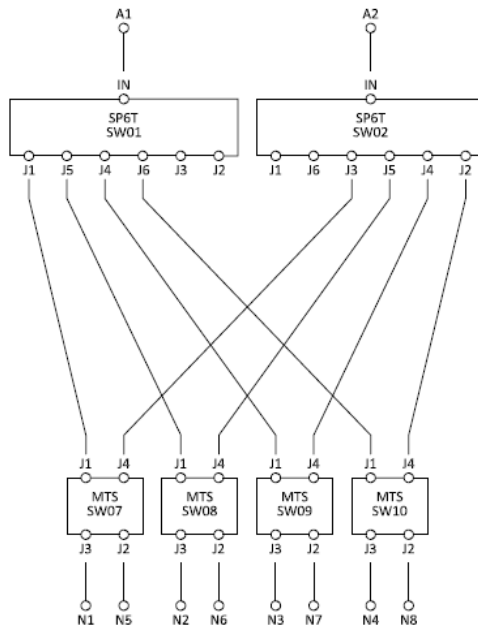
Connection Status:	
A1 - NX	
A2 - NX	

Figure 27: Connection Status display

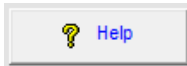


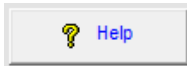


**Block Diagram:** Clicking the  button opens the ZTVX block diagram in a separate window for your reference.




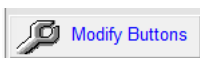
**Figure 28: Block Diagram display (2 x 8 configuration shown)**

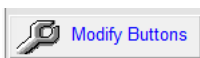


**Help File:** Clicking the  opens the Read Me file for the ZTVX which contains information about communicating with the ZTVX via HTTP and Telnet protocols as well as a complete list of the command structures with definitions for each.




The Help File also contains a  button which links to a PDF of the most recent version of this user manual. Whenever changes are made to the ZTVX software or other features of the equipment, you can find updates to the user guide by clicking this button.



: Modify Buttons opens the Modify Buttons Menu to save a variety of functions to the Quick Set Buttons. This feature is discussed below in section 8.3.3 (A)(1).



: The GUI will automatically load the factory-setting configuration file for the connected ZTVX unit (see section 7.3.3). The Load Config button opens the destination directory for all additional saved configuration files. From here you can load custom settings you've saved as desired. Configuration files are discussed further in section 7.3.3 (B)(2).



: The Clear All button resets the Switches to their default states.

### 9.3.3 Sending Commands

The ZTVX GUI main control provides a full toolbox of controls for you to manage signal paths or send commands to individual components in the system. These controls are separated into 3 groups as follows:

- A) Set Path
- B) Quick Set Buttons
- C) Manual Commands [Attenuator Settings](#)

Each of these groups is discussed in detail in the sections below.

#### A) Set Path

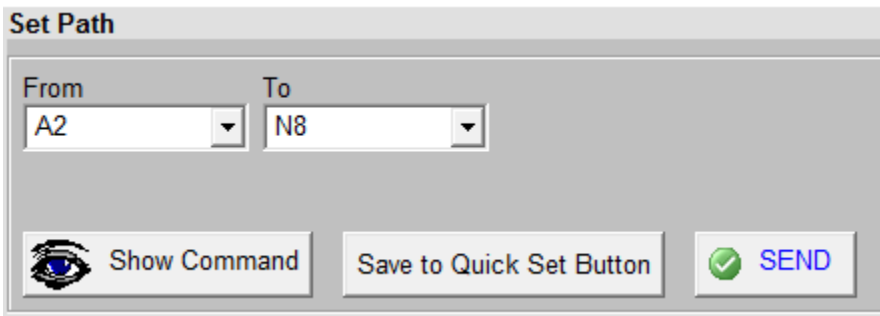


Figure 29: Set Path controls

The “Set Path” controls allow you to specify any signal path in the ZTVX system by selecting from drop-down menus specifying desired signal input (“From”) and signal output (“To”).

Other related functions include:

**Show Command:** This button will display the specific command string corresponding to your signal path selection in the “From” and “To” drop-downs. The command string will appear in the “Command” field of the Manual Commands panel near the bottom of the GUI main screen.



Figure 30: Clicking the Show Command button displays the specific command string corresponding to a given path selection.

**Save to Quick Set Button:** This button saves the current selected path from the Set Path panel to any Quick Set Button of your choice. Choose the button you wish to save the selected path to from the drop down menu. That button will then be renamed with the syntax (From)>(To). Also see the section on Quick Set Buttons for more information.

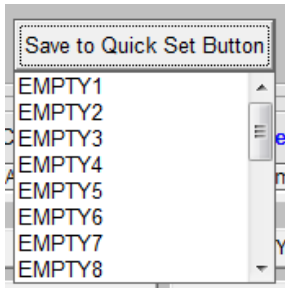


Figure 31: Save to Quick Set Buttons opens a drop-down allowing you to choose a button to save the current selected path to.

**Send:** This button activates the selected signal path. Commands will not be sent to the ZTVX until you click “Send”.

## B) Quick Set Buttons

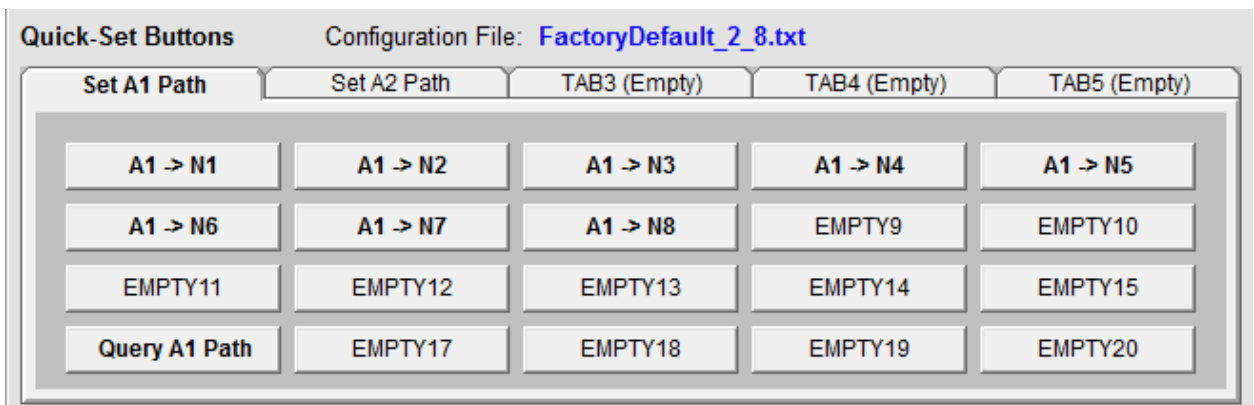


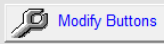
Figure 32: Quick-Set Buttons control panel with factory settings automatically loaded.

Quick-Set Buttons enable easy, one-click activation of any signal path or individual switch command specified by the user. Buttons are organized into 5 tabs, each with 20 buttons for up to 100 pre-defined functions for quick activation. Quick-Set Buttons send commands to the ZTVX immediately once you click a button.

This feature also allows you to rename tabs and buttons as well as to save all your settings as a configuration file to load and reuse in future tests.

The GUI will automatically load the factory settings configuration file for your ZTVX unit when connected to the hardware. The factory settings include a quick-set button for each signal path in your system as shown in Figure 32. The first tab displays buttons for all paths from port A1 to each of the N-ports. The second tab displays buttons for all paths from port A2 to each of the N-ports.

## 1. Modifying Quick-Set Buttons

- a. To save a command to a Quick-Set Button, you can select a path in the Set Path control and use the “Save to Quick-Set Buttons” feature described above in the section on
- b. For more options to configure Quick-Set Buttons, click . The Modify Buttons Menu will appear:

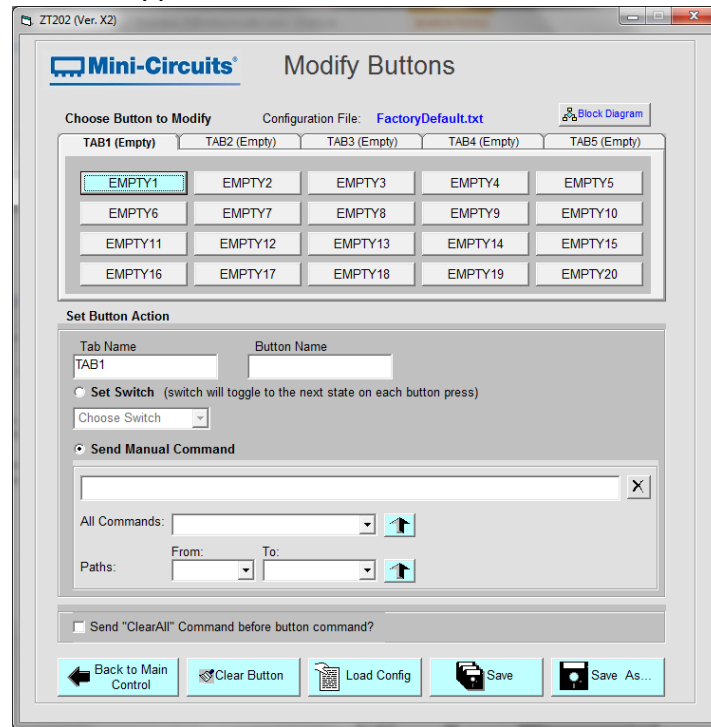


Figure 33: Modify Buttons Menu

The Modify Buttons Menu allows you to save signal paths and individual commands to all Quick Set Buttons as desired. It also provides options to rename buttons, rename tabs, and save your settings as configuration files for later use.

- To modify a button, first click the button you wish to modify in the Modify Buttons Menu:

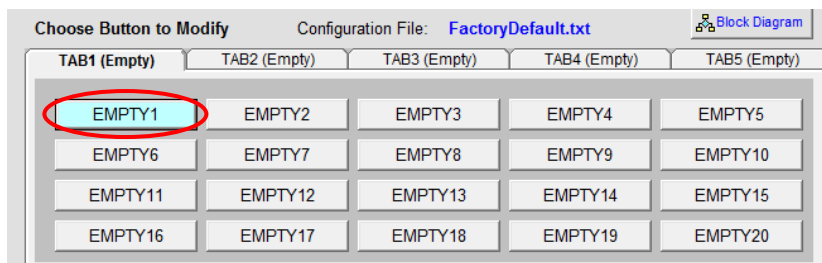


Figure 34: First click the button you wish to modify.

From here you can modify the selected button with the options in the Set Button Action panel:

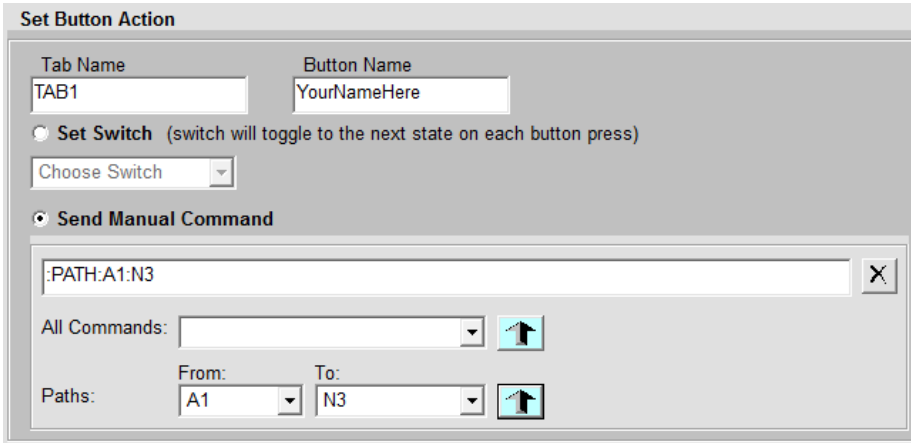



Figure 35: Set Button Action options

The Set Button Action panel includes the following options:

**Tab Name:** To rename a tab, click on the tab of interest and type the desired name in the “Tab Name” field. Then click the  button at the bottom of the screen to save settings. The new name should then appear on the selected tab.

**Button Name:** To rename a button, enter a name for the selected button in this field and save settings. The selected button will then display the new name.

**Set Switch:** Selecting the Set Switch radio button allows you to select a specific switch in the ZTVX from the drop menu. Clicking a button assigned to a given switch will tell that switch to cycle through switch states sequentially.

**Choose Switch:** This drop menu allows you to choose the switch to assign to the selected Quick-Set Button. Note that the button naming function is inactive when assigning a button to a single switch. The button will automatically be named according to its assigned switch. Refer to the ZTVX block diagram to locate individual switch numbers in the system.

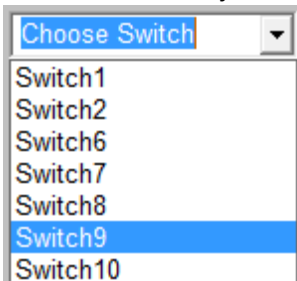


Figure 36: Choose Switch drop menu

**Send Manual Command:** Clicking the Send Manual Command radio button activates options to build a command for the selected button. You can assign commands to the button in one of two ways:

**All Commands:** This drop menu contains a full list of commands for components and signal paths in the ZTVX. Selecting a command will add that command to the string in the Command Display field. Some users may find this feature easier than manually typing out commands.

**From / To Drop-Downs:** These menus allow you to define a signal path by selecting options from the “From” and “To” drop-down menus. The corresponding command string will appear in the Command Display Field.



: Click this button to add a specified command to the Command Display field.

**Command Display Field:** This field allows you to manually enter any string of commands to control any component or signal path in the ZTVX. Commands in a string must be separated by a semicolon. You may type commands yourself or add commands from the All Commands and Paths drop menus below.

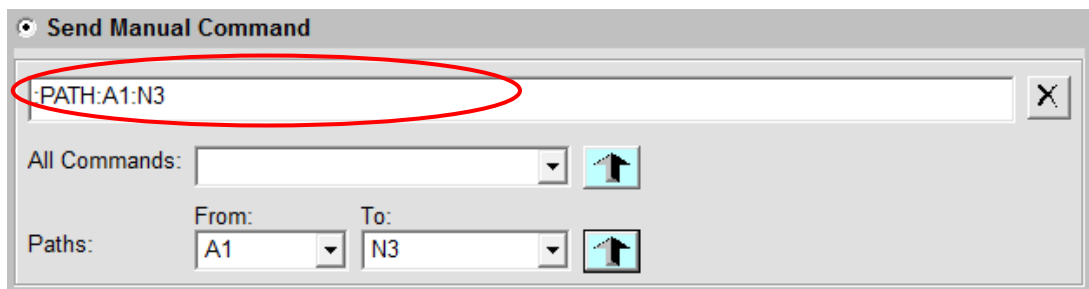
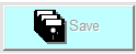


Figure 37: Command Display Field

Click  to save the command string to the selected button.

**Send "ClearAll" Command before button command?** : This check box allows you to choose whether the command string for the selected button should be automatically preceded by the “ClearAll” command.

## 2. Configuration Files

The ZTVX GUI allows you to save all Quick-Set Buttons from a particular application as a .txt “configuration file.” Configuration files can then be easily retrieved for repeated use, saving setup time for tests regularly performed using the ZTVX.

- **To create a new configuration file**, first make sure all Quick-Set Buttons are configured as needed for your test application. Then, open the Modify Buttons Menu and click the button. The “Save Configuration” prompt will pop up:

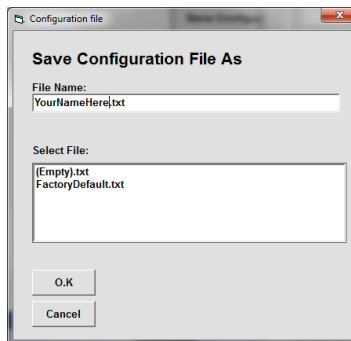



Figure 38: “Save Configuration” prompt

Name the file something easy to remember and click O.K. The configuration file is now saved. The default location for configuration files is:

[C:\Program Files \(x86\)\Mini-Circuits ZTVX\Config](C:\Program Files (x86)\Mini-Circuits ZTVX\Config)

- **To load an existing configuration file**, simply click  and the Load Configuration File prompt will appear:

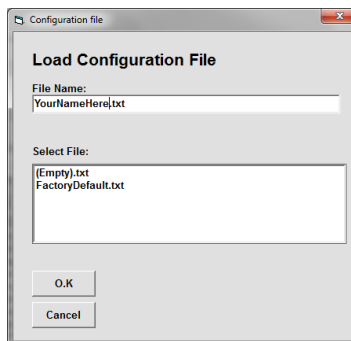

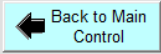


Figure 39: Load Configuration File prompt

Select the desired configuration file and click “O.K.” The GUI will then display the settings last saved in the chosen configuration file.

- To modify an existing configuration file, load the configuration file, and open the Modify Buttons Menu. Make any desired changes to the Quick-Set Buttons, and click the  button. Your changes will then be saved to the current open configuration file.
- To exit the Modify Buttons Menu, click the  button to return to the main control at any time. If you have not saved your settings before closing the Modify Buttons menu, you will be prompted to save your settings before closing.

### C) Manual Commands

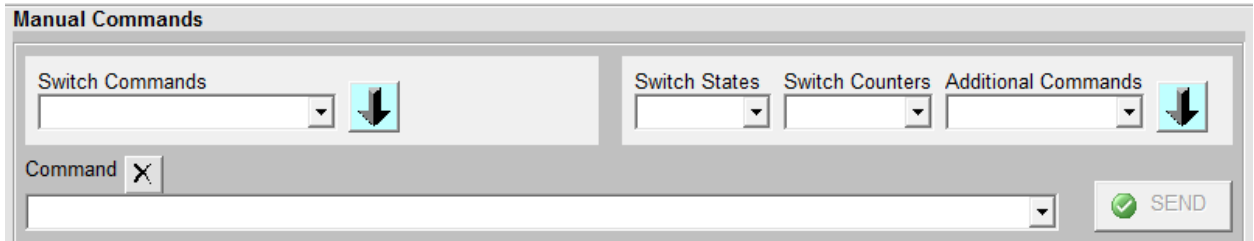


Figure 40: Manual Commands control panel

The Manual Commands control panel allows you to enter and send individual commands or strings of commands manually. From the Manual Commands control, you can send commands to individual components or groups of components in the ZTVX.

**Switch Commands:** This drop-down provides a full list of commands for individual switches in the ZTVX. It also includes a full list of “Path=” commands specifying the full signal path in a single command.

**Switch States:** This drop-down provides a list of commands that return the current state of any switch in the ZTVX.

**Switch Counters:** This drop-down provides a list of commands that return the count of switch cycles elapsed on each switch in the ZTVX.

**Additional Commands:** This drop-down provides a list of additional queries and commands for the ZTVX.



: This button adds the command selected from the dropdown menu to the Command display.

**Command:** This field displays the chosen command or string of commands to send to the ZTVX.

**NOTE:** Commands in a string must be separated by a semicolon (;).

**Send:** This button sends the command or command string in the “Command” field to the ZTVX. Commands will not be executed until the “Send” button is clicked.



## 9.4 Updating Firmware

**⚠ Caution:** interruption of firmware upgrade process (due to USB disconnection, or power failure) may render the unit unresponsive.

**NOTE:** The firmware information and upgrade option are only available via the USB connection.

- 1) To check your firmware version and update firmware when new versions are available, click the “Firmware Update” button at the upper right area of the GUI main screen.

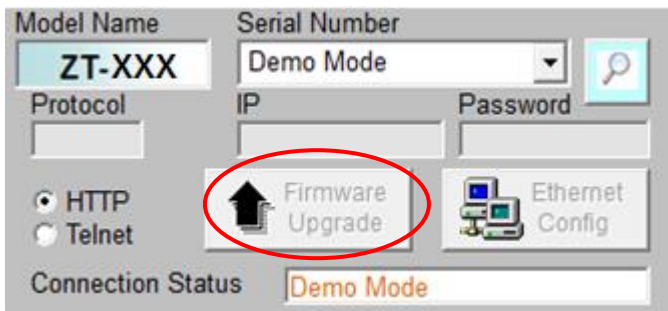


Figure 41: Firmware Update Button

- 2) The Firmware Info Window will appear, displaying the current version of firmware:

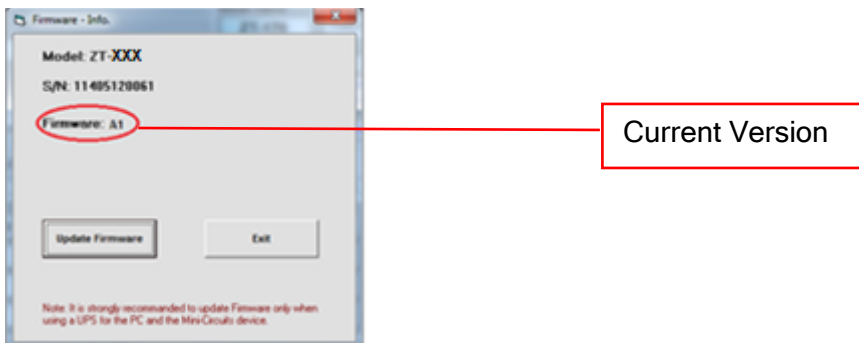


Figure 42: Firmware Info Window

- 3) When firmware updates become available for the ZTVX-UNIT, Mini-Circuits will provide you with the new firmware for download. Save the new firmware file to a desired location on your computer or network. Be sure to note the location of the latest firmware file.

- 4) Once you've downloaded the latest version firmware, you can begin updating by clicking "Update Firmware" in the firmware info window.

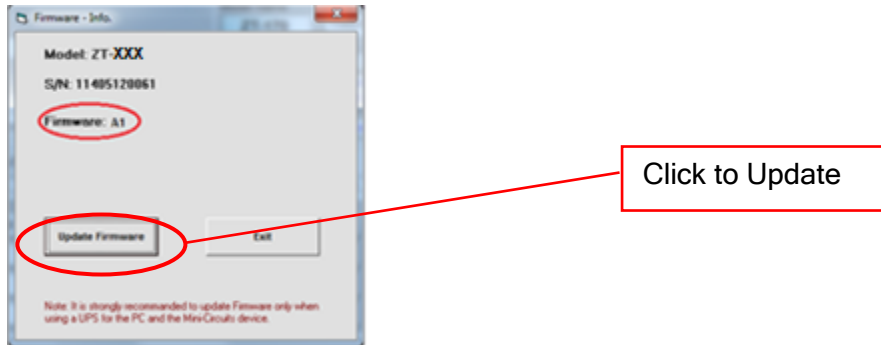


Figure 43: Click "Update Firmware" to initiate the update process.

- 5) The Firmware Browse Window will appear. Select the firmware file from the location where you saved it earlier in (3). Then click "O.K."

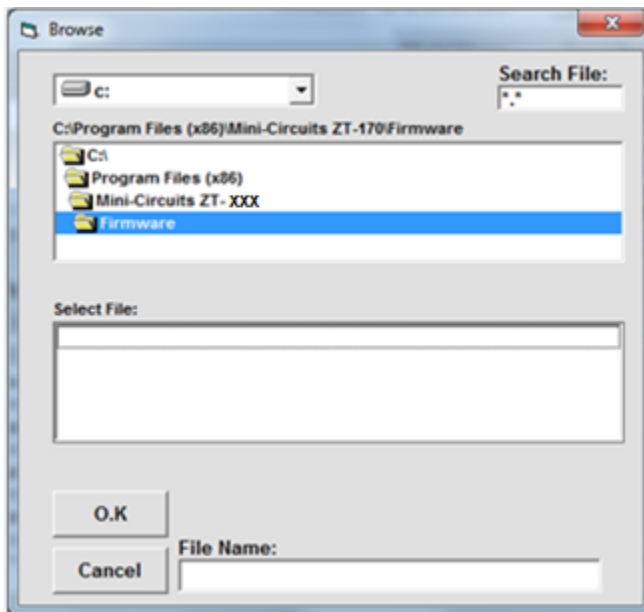


Figure 44: Firmware Browse Window

A status indicator will appear on screen and advise when the update is complete. The ZTVX-UNIT will then restart for the new firmware to take effect.

## 9.5 Programming Support

In addition to the supplied GUI program, you may also create your own control interface for the ZTVX-UNIT. Mini-Circuits offers support for a variety of operating systems, programming environments, and third party applications including (but not limited to):

- Visual Basic<sup>®</sup>, Visual C#<sup>®</sup>, Visual C++<sup>®</sup>
- Delphi<sup>®</sup>
- Borland C++<sup>®</sup>
- CVI<sup>®</sup>
- LabVIEW<sup>®</sup>
- MATLAB<sup>®</sup>
- Python<sup>®</sup>
- Agilent VEE<sup>®</sup>

This unit is supplied with DLLs for 32- and 64-bit Windows<sup>®</sup> systems and complete programming instructions for Windows and Linux<sup>®</sup> environments. If you have any questions or require additional programming support at any time, please feel free to get in touch with us using the contact information on page 4.

## 10 RETURN MATERIAL AUTHORIZATION (RMA) PROCEDURE

If you have received this unit by mistake or wish to return it for evaluation, please reach out to the support contacts listed on page 4. For your convenience, you may also contact our Sales Department at (718) 934-4500 / [sales@minicircuits.com](mailto:sales@minicircuits.com) or your local Mini-Circuits sales representative. They will review your RMA request, and per Mini-Circuits RMA policy, issue an identification number to ensure proper handling. **All returns must be accompanied by appropriate Mini-Circuits identification and documentation to ensure proper handling.**