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GXSW

Switching Instruments

GX6384-1

GX6384-2

GX6384-3

Configurable High-Density Switch Matrix Board

User's Guide

Last Updated: December 15, 2016

MARVIN TEST SOLUTIONS

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Chapter 1 - Introduction

Manual Scope and Organization

Manual Scope

This manual provides all the information necessary for installation, operation, and maintenance of the **GX6384-1/, GX6384-2/ GX6384-3** PXI Configurable High-Density Switch Matrix Board. The manual also covers the **GXSW** software package that includes the GX6384 driver. This manual assumes the reader has a general knowledge of PC based computers, Windows operating systems, and a general knowledge of modular test equipment.

Manual Organization

The GX6384 manual is organized in the following manner:

Chapter	Content
Chapter 1 – Introduction	Introduces the GX6384 manual and shows warning conventions used in the manual.
Chapter 2 – Overview	Provides the GX6384 list of features, description of the board, architecture, specifications and the virtual panel description and operation.
Chapter 3 –Installation and Connections	Provides instructions about how to install a GX6384 board and the GXSW software.
Chapter 4 – Functions Reference	Provides a list of the GXSW driver functions for the GX6384. Each function description provides syntax, parameters, and any special programming comments.

Conventions Used in this Manual

Symbol Convention	Meaning
	Static Sensitive Electronic Devices. Handle Carefully.
	Warnings that may pose a personal danger to your health. For example, shock hazard.
	Cautions where computer components may be damaged if not handled carefully.
	Tips that aid you in your work.

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Formatting Convention	**Meaning**
`Monospaced Text`	Examples of field syntax and programming samples.
Bold type	Words or characters you type as the manual instructs. For example: function or panel names.
Italic type	Specialized terms. Titles of other references and information sources. Placeholders for items you must supply, such as function parameters

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Chapter 2 - Overview

Introduction

The Marvin Test Solutions PXI GX6384 is a 384-crosspoint high-speed configurable switch matrix card that fits in a single PXI/CompactPCI 3U bus slot. The GX6384 offers ultrahigh-density switch configurations in PXI with the ability to create up to 6x64 switch matrix. The GX6384 is offered in tree configurations: two groups of 2x32 (GX6384-1), two groups of 4x32 (GX6384-2) or two groups of 6x32 (GX6384-3). All three board configurations can be programmatically changed to a single group with same number of rows but double the number of columns as single group of 2x64 (GX6384-1), single group of 4x64 (GX6384-2) or single group of 6x64 (GX6384-3). That capability enables unprecedented flexibility for different testing requirements.

The PXI GX6384 is ideal for high-channel-count automated test configurations. Featuring compact reed relays with high switching speeds provides maximum throughput in a test system for signals up to 170 VDC/170 VAC or 0.5 A. combined with •user friendly 78 pin sub-D type interface connector.

Features

The GX6384 is a single slot 3U PXI high-density switch matrix instrument supporting the following features:

- High-speed reed relays switch matrix.
- 384-crosspoint matrix switching in a single 3U PXI slot
- Tree configurations: two groups of 2x32 (GX6384-1), two groups of 4x32 (GX6384-2) or two groups of 6x32 (GX6384-3).
- All configurations can be programmatically combined both groups with double the columns.
- Signals up to 170 VDC/170 VAC or 0.5 A max
- User friendly 78 pin sub-D type interface connector.
- Fits in a single PXI/CompactPCI 3U bus slot

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Board Description

The Marvin Test Solutions PXI GX6384 is a 384-crosspoint high-speed configurable switch matrix card that fits in a single PXI/CompactPCI U bus slot. The GX6384 offers ultrahigh-density switch configurations in PXI with the ability to create up to 6x64 switch matrix. The GX6384 is offered in tree configurations: two groups of 2x32 (GX6384-1), two groups of 4x32 (GX6384-2) or two groups of 6x32 (GX6384-3). All three board configurations can be programmatically changed to a single group with same number of rows but double the number of columns as single group of 2x64 (GX6384-1), single group of 4x64 (GX6384-2) or single group of 6x64 (GX6384-3). That capability enables unprecedented flexibility for different testing requirements.

The PXI GX6384 is ideal for high-channel-count automated test configurations. Featuring compact reed relays with high switching speeds provides maximum throughput in a test system for signals up to 100 VDC/100 VAC or 0.5 A. combined with the user friendly 78 pin sub-D type interface connector.



Figure 2-1: GX6384-2 Matrix Switching Card (256 cross points)

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Figure 2-2: GX6384-1 Matrix Switching Card model (128 cross points)

Architecture

The Marvin Test Solutions PXI GX6384 is a 384-crosspoint high-speed configurable switch matrix card that fits in a single PXI/CompactPCI 3U bus slot. The GX6384 offers ultrahigh-density switch configurations in PXI with the ability to create up to 6x64 switch matrix. The GX6384 is offered in tree configurations: two groups of 2x32 (GX6384-1), two groups of 4x32 (GX6384-2) or two groups of 6x32 (GX6384-3). All three board configurations can be programmatically changed to a single group with same number of rows but double the number of columns as single group of 2x64 (GX6384-1), single group of 4x64 (GX6384-2) or single group of 6x64 (GX6384-3). That capability enables unprecedented flexibility for different testing requirements. Featuring compact reed relays with high switching speeds provides maximum throughput in a test system for signals up to 100 VDC/100 VAC or 0.5 A. combined with •user friendly 78 pin sub-D type interface connector.

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Switch Matrix Groups

The GX6384 all configurations have two switching groups A and B. The two switching groups can be combined to create a single group with double the number of columns.

GX6384-1 switch Matrix Dual 2x32 configured as two groups A and B each with 32 columns

Figure 2-3 demonstrates the GX6384-1 model in its default configuration settings.

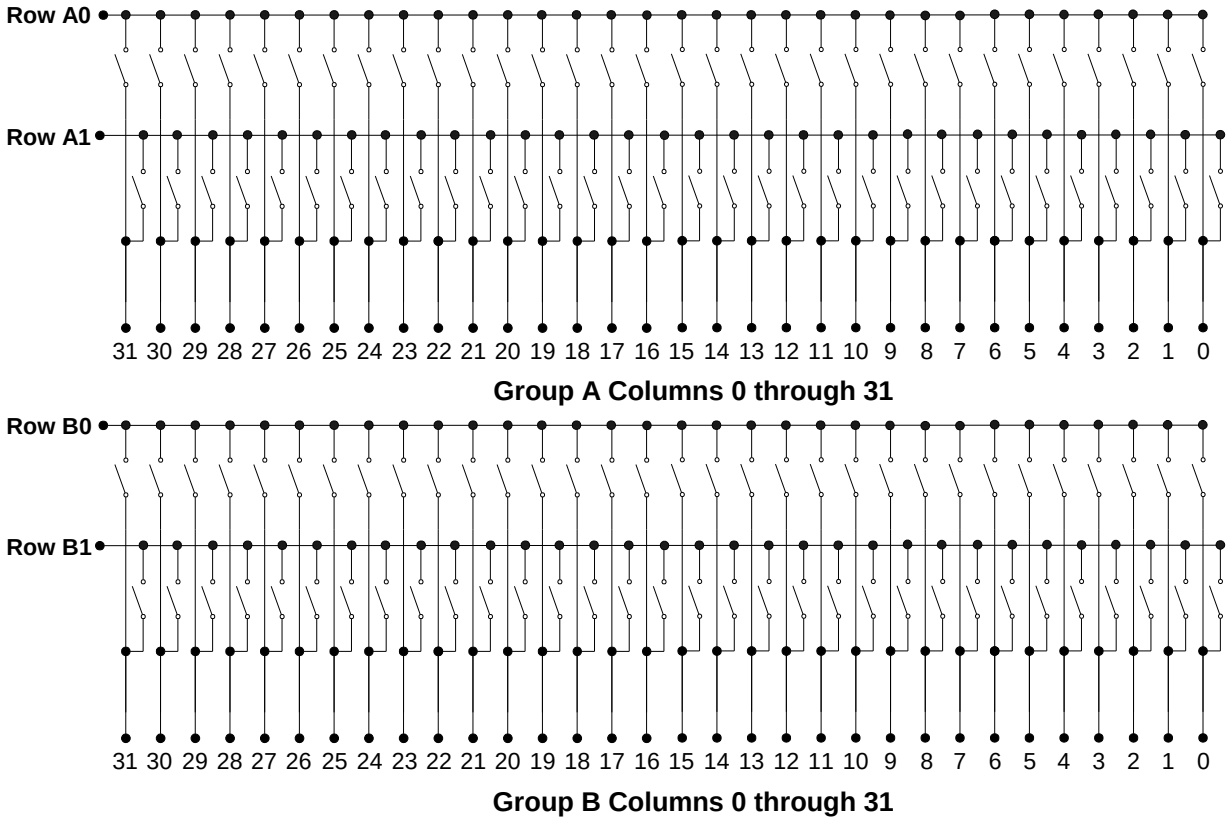


Figure 2-3: GX6384-1 - A and B Switching Groups

GX6384-1 switch Matrix Dual 2x32 configured as single group of 2x64:

Figure 2-4 demonstrates the GX6384-1 model when configured programmatically to as a single group A with 64 columns.

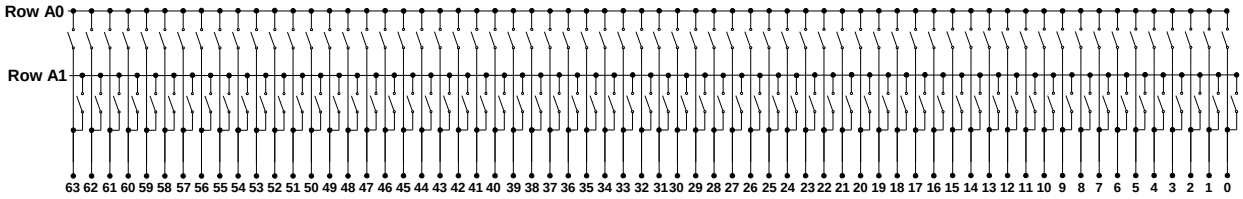


Figure 2-4: GX6384-1 Switching Groups A and B configured as a single group A with 64 columns

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GX6384-2: switch Matrix Dual 4x32 configured as two groups A and B each with 32 columns

Figure 2-5 demonstrates the GX6384-2 model in its default configuration settings.

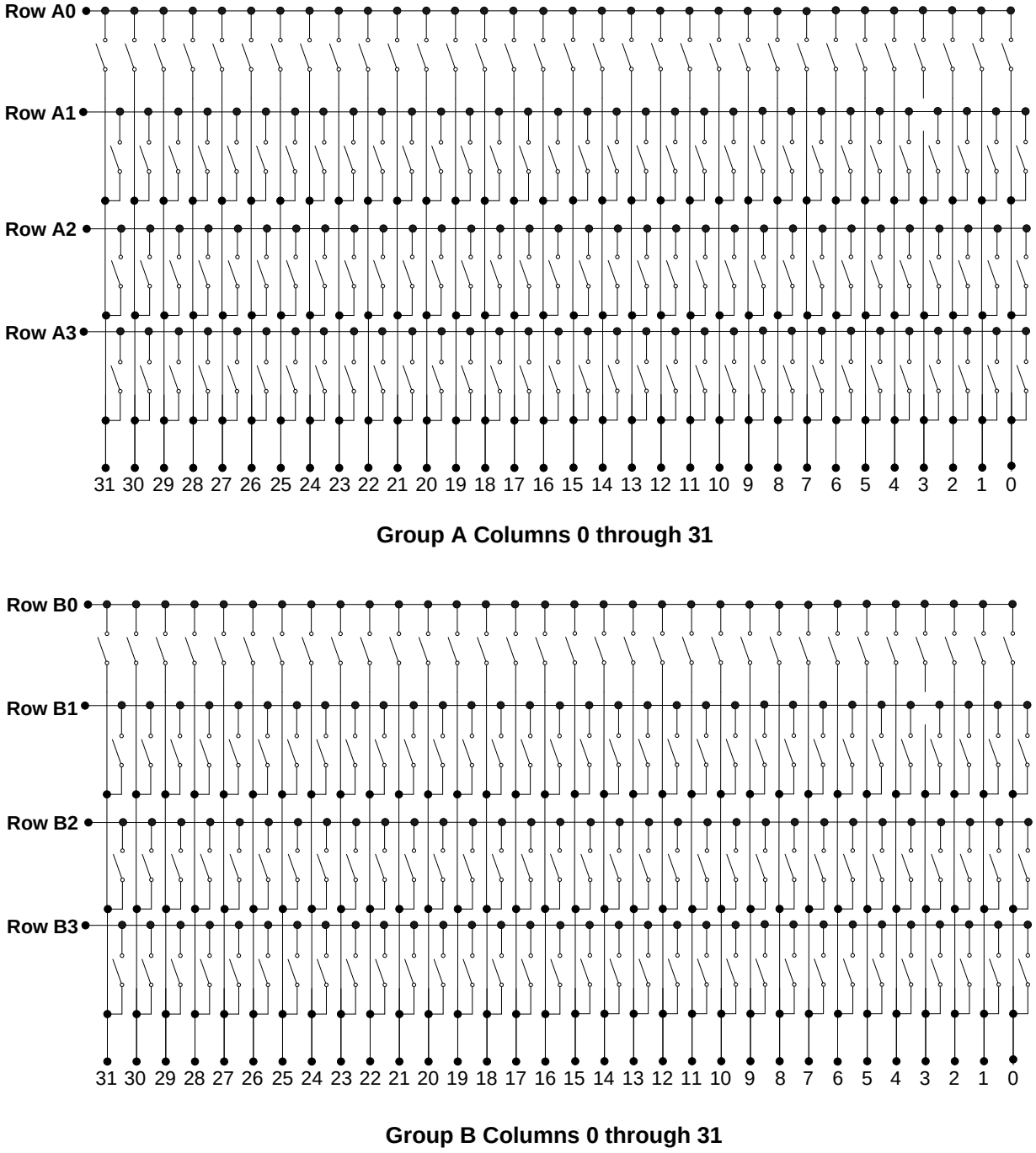


Figure 2-5: GX6384-2 - A and B Switching Groups

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GX6384-2: switch Matrix Dual 4x32 configured as single group of 4x64:

Figure 2-6 demonstrates the GX6384-2 model when configured programmatically to as a single group A with 64 columns.

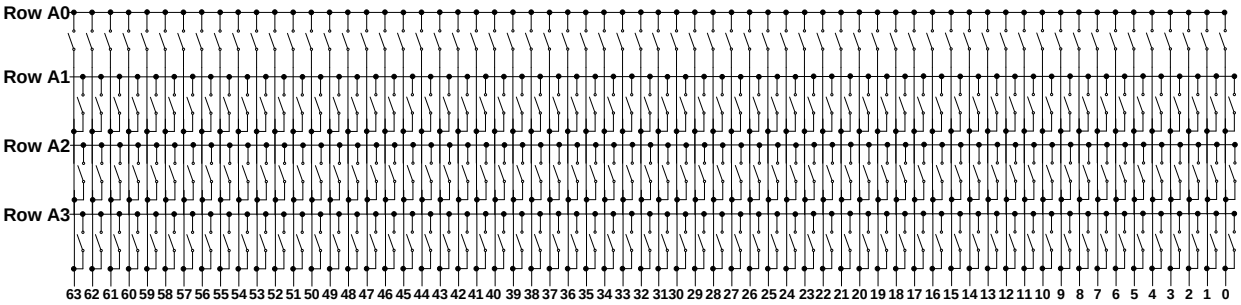


Figure 2-6: GX6384-2 Switching Groups A and B configured as a single group A with 64 columns

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GX6384-3: switch Matrix Dual 6x32 configured as two groups A and B each with 32 columns

Figure 2-7 demonstrates the GX6384-3 model in its default configuration settings.

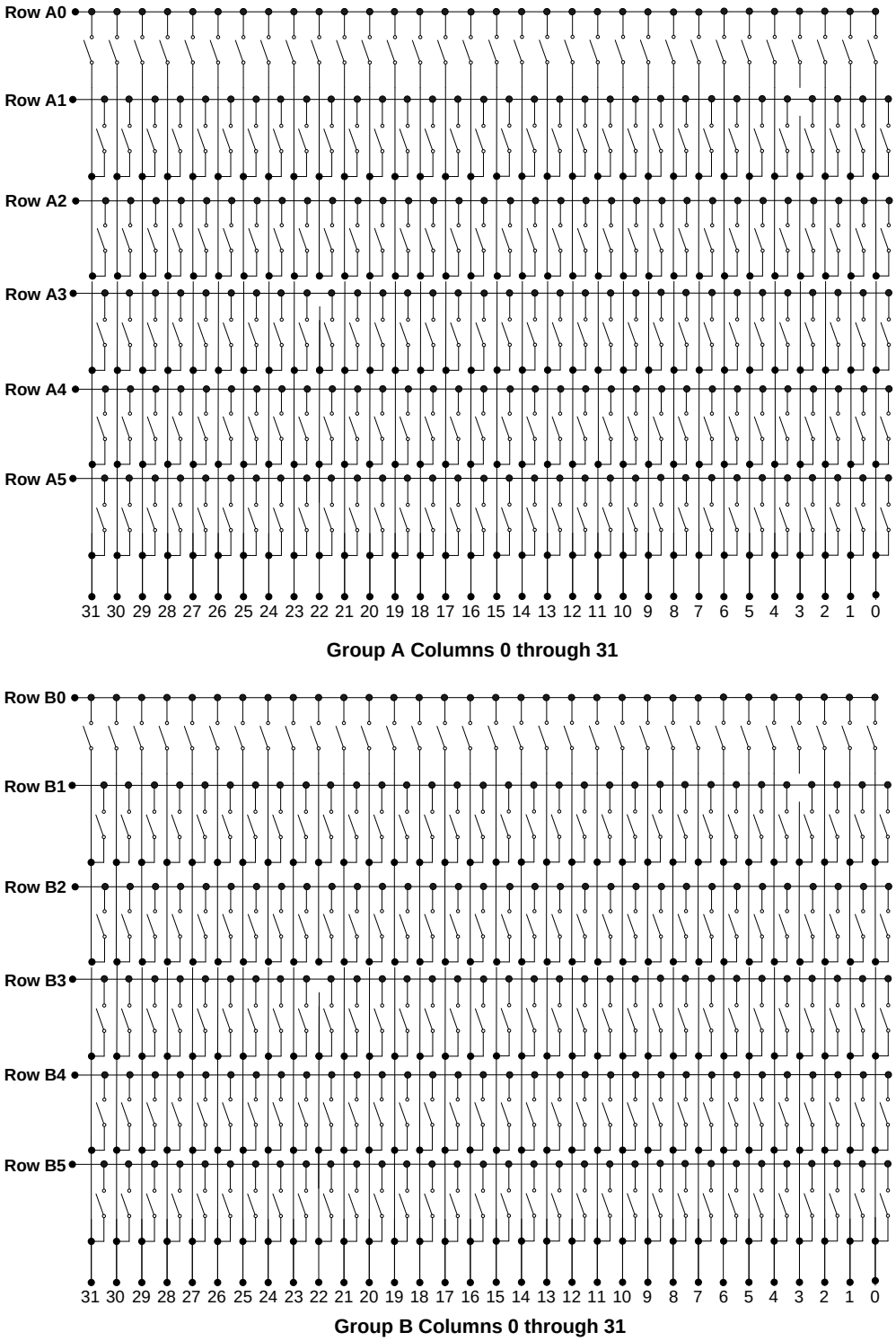


Figure 2-7: GX6384-3 - A and B Switching Groups

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GX6384-3: switch Matrix Dual 6x32 configured as single group of 6x64:

Figure 2-8 demonstrates the GX6384-3 model when configured programmatically to as a single group A with 64 columns.

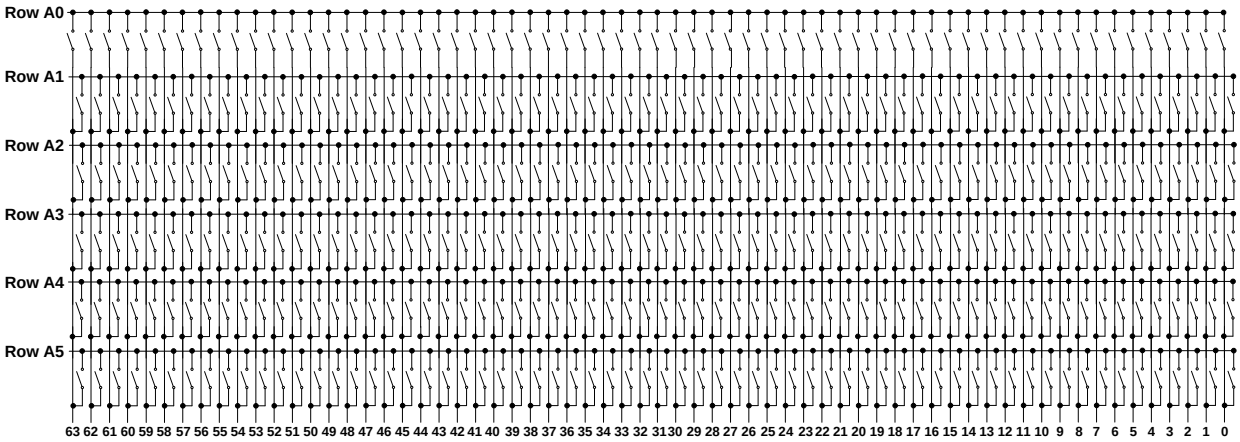


Figure 2-8: GX6384-3 - Switching Groups A and B configured as a single group A with 64 columns

Ground and Guard

All the shielding on the GX6384 board is connected to a chassis signal. JP1 can be installed to connect the chassis and Ground.

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Specifications

The following table outlines the specifications of the GX6384:

Contact Specifications

Matrix Configuration	Programmatically: GX6384-1: two groups of 2x32 or single group of 2x64 GX6384-2: two groups of 4x32 or single group of 4x64 GX6384-3: two groups of 6x32 or single group of 6x64
Relay Contact Resistance	<0.1Ω
Contact Life	1 x10e9 cycles (Rating At 5 VDC @ 10mA)
Maximum Switchable Voltage	170 VDC or 170 peak VAC
Maximum Switchable Current	500 mA
Contact Carry Current	1 Maximum
Operate Time	100uS (including bounce)
Release Time	20 µS
Max number of relays closed at any given time	128

Physical

Relay type	Reed
Relay contact material	Rhodium
Size	3U PXI
Weight	10.6 oz.
Power Requirements	
3.3V Power	0.5A Max
5V Power	0.6A Typical

Environmental

Environmental	
Temperature:	0 to +40 °C Operating -10 to +70 °C Storage
Vibration	5g at 500Hz
Shock	5g for 6mS ½ Sine

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Virtual Panel Description

The **GXSW** software includes a virtual panel program, which provides full access to the various configuration settings and operating modes. To fully understand the front panel operation, it is best to become familiar with the functionality of the board.

To open the virtual panel application, select **GX6384 Panel** from the **Marvin Test Solutions**, **GXSW** menu under the **Start** menu. The GX6384 virtual panel opens as shown here:

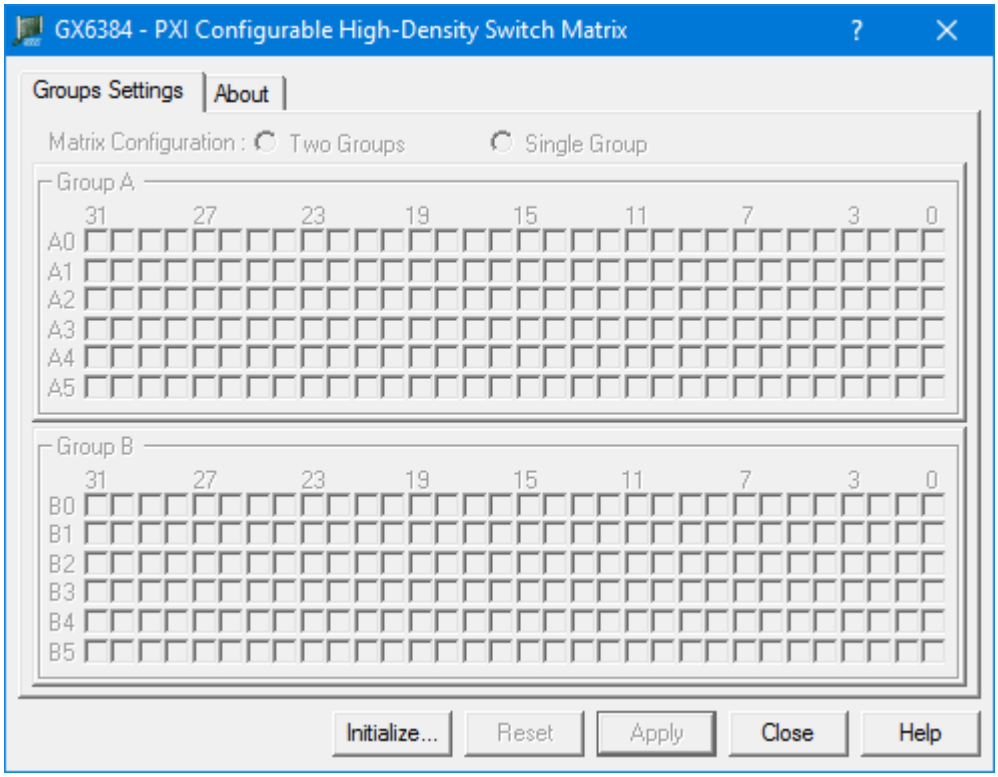


Figure 2-9: GX6384 Virtual Panel

Initialize – Opens the Initialize Dialog (see Initialize Dialog paragraph) in order to initialize the board driver. The current settings of the selected board will **not change after calling initialize**. The panel will reflect the current settings of the board after the Initialize dialog closes.

Reset – Resets the PXI board settings to their default state and clears the reading.

Apply – Applies changed settings to the board.

Close – Closes the panel. Closing the panel **does not affect** the board settings.

Help – Opens the on-line help window. In addition to the help menu, the caption shows a **What's This Help** button (?) button. This button can be used to obtain help on any control that is displayed in the panel window. To displays the What's This Help information click on the (?) button and then click on the control – a small window will display the information regarding this control.

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Virtual Panel Initialize Dialog

The Initialize dialog initializes the driver for the selected board. The board settings **will not change** after initialize is called. Once initialized, the panel will reflect the current settings of the board.

The Initialize dialog supports two different device drivers that can be used to access and control the board:

1. **Use Marvin Test Solutions' HW** – This is the device driver installed by the setup program and is the default driver. When selected, the **Slot Number** list displays the available GX6384 boards installed in the system and their slots. The chassis, slots, devices and their resources are also displayed by the HW resource manager, **PXI/PCI Explorer** applet that can be opened from the Windows Control Panel. The **PXI/PCI Explorer** can be used to configure the system chassis, controllers, slots and devices. The configuration is saved to PXISYS.INI and PXIeSYS.INI located in the Windows folder. These configuration files are also used by VISA. The following figure shows the slot number 0x10C (chassis 1 Slot 12). This is the slot number argument (*nSlot*) passed by the panel when calling the driver **Gx6384Initialize** function which is used to initialize the driver for the specified board.

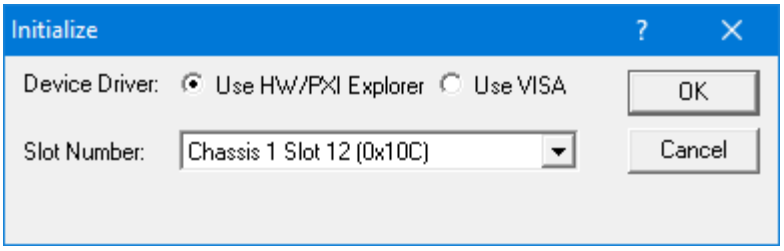


Figure 2-10: Initialize Dialog Box using Marvin Test Solutions' HW driver

2. **Use VISA** – This is a third-party device driver usually provided by National Instrument (NI-VISA). When selected, the Resource list displays the available boards installed in the system and their VISA resource address. The chassis, slots, devices and their resources are also displayed by the VISA resource manager, Measurement & Automation (NI-MAX) and by Marvin Test Solutions PXI/PCI Explorer. The following figure shows PXI10::11::INSTR as the VISA resource (PCI bus 10 and Device 11). This is a VISA resource string argument (szVisaResource) which is passed by the panel when calling the driver Gx6384InitializeVisa function which initializes the driver for the specified board.

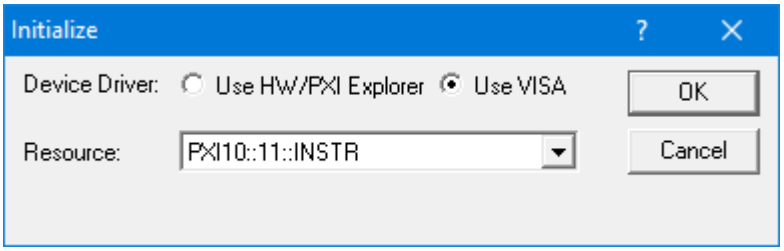


Figure 2-11: Initialize Dialog Box using VISA resources

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Virtual Panel Setup Page

After the board is initialized the panel is enabled and will display the current setting of the board. The following picture shows the **Group page** settings:

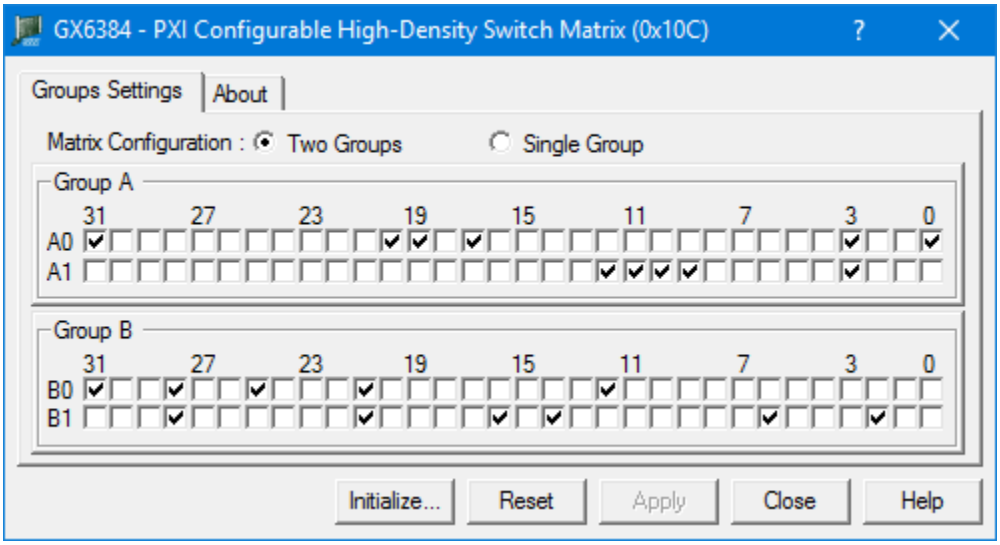


Figure 2-12: GX6384 Virtual Panel Initialized (Switch Matrix configured as Two Groups with 32 columns each)

The following controls are shown:

Matrix Configuration (radio button): Set/Displays the current Matrix relays configuration. Configuration options are:

Two Groups: Two individual groups (A and B) with 32 columns each (see Figure 2-12).

Single Group: Single group (group A) with 64 columns (see Figure 2-13).

Matrix Group A and B Display Area: Displays the current relay setting (closed or open). When a box in the matrix is checked, the relay in that row/column is closed. Similarly, unchecked boxes mean relays are open.

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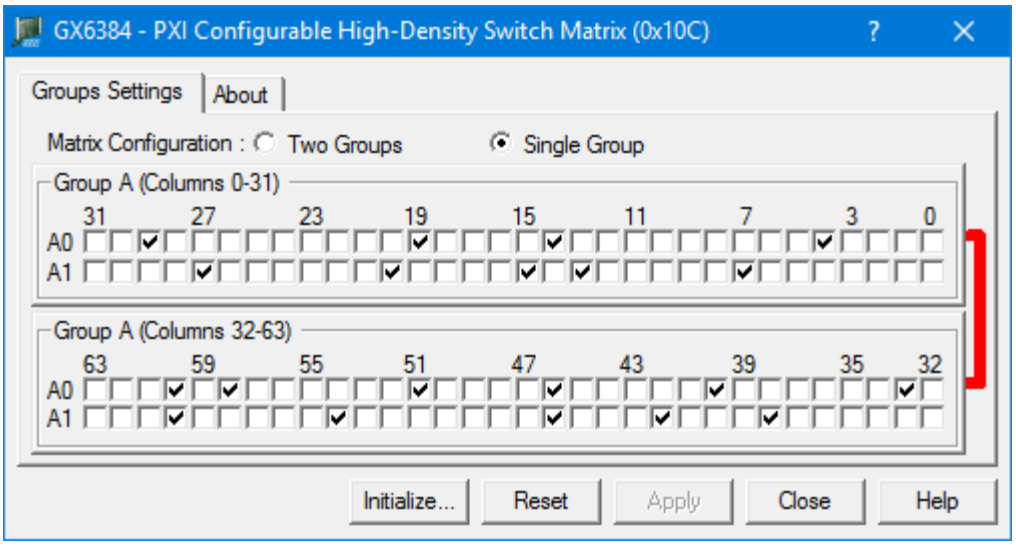


Figure 2-13: GX6384 Virtual Panel Initialized with Switch Matrix configured as Single Group with 64 columns

Virtual Panel About Page

Clicking on the **About** tab will show the **About page** as shown in Figure 2-14:

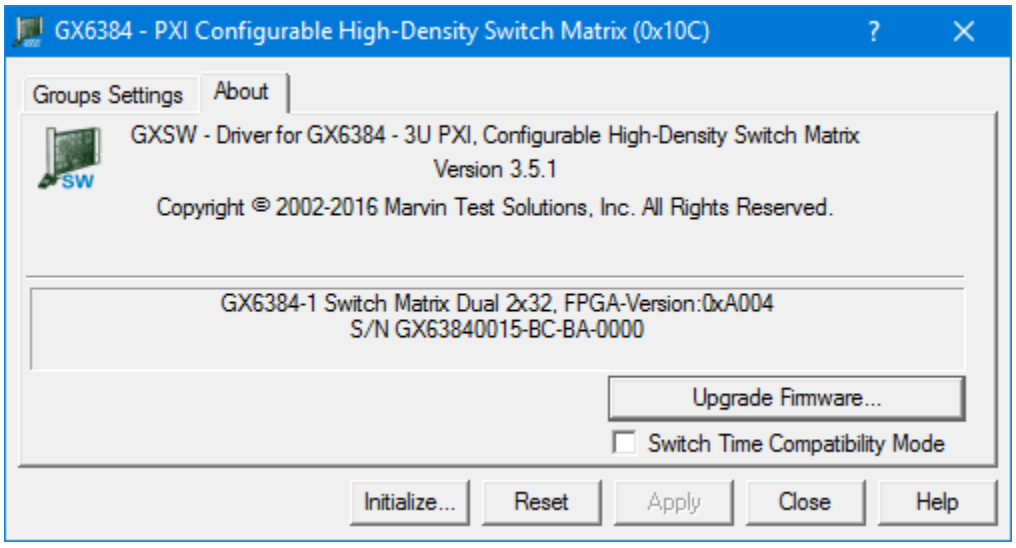


Figure 2-14:GX6384 Virtual Panel – About Page

The following controls are shown in the About page:

The top part of the **About** page displays version and copyright of the GXSW driver. The bottom part displays the board summary.

The **About** page also contains a button **Upgrade Firmware…** which is used to upgrade the board's FPGA firmware. This button maybe used only when the board requires upgrade as directed by Marvin Test Solutions support. The upgrade requires a firmware file (.jam) that is written to the board FPGA. After the upgrade is complete, you must shut down the computer to recycle power to the board.

Switch Time Compatibility Mode (checkbox): When checked switching, time will be the same as it was in previous GxSw driver versions regardless of the board's firmware or revision. If unchecked (default), switching time will be much faster using the faster switching algorithm.

Note: In GxSw driver versions 3.3 and above the switching time for all Gx6384 board revisions (B, C, D and above) were optimized to deliver faster switching time. Gx6384 boards revisions C and above with firmware 0xC022 and above deliver even faster switching time.

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Chapter 3 - Installation and Connections

Getting Started

This section includes general hardware installation procedures for the GX6384 board and installation instructions for the GX6384 (GXSW) software. Before proceeding, please refer to the appropriate chapter to become familiar with the board being installed.

To Find Information on…	Refer to…
Hardware Installation	This Chapter
GX6384 Driver Installation	This Chapter
GX6384 Function Reference	Chapter 4

Packing List

All GX6384 boards have the same basic packing list, which includes:

1. GX6384 Board
2. CD that includes the GXSW software

Unpacking and Inspection

After removing the board from the shipping carton:



Caution - Static sensitive devices are present. Ground yourself to discharge static.

1. Remove the board from the static bag by handling only the metal portions.
2. Be sure to check the contents of the shipping carton to verify that all of the items found in it match the packing list.
3. Inspect the board for possible damage. If there is any sign of damage, return the board immediately. Please refer to the warranty information at the beginning of the manual.

System Requirements

The GX6384 instrument board is designed for use with a 3U or 6U cPCI or PXI compatible chassis. The software is compatible with any computer system running Windows XP SP3, VISTA, 7, 8, and 10 (32/64 bit) operating systems. In addition, Microsoft Windows Explorer version 4.0 or above is required to view the online help.

Each board requires one unoccupied 3U PXI bus slot.

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Installation of the GXSW Software

Before installing the board, it is recommended that you install the GXSW software as described in this section. To install the GXSW software, follow the instruction described below:

1. Insert the Marvin Test Solutions CD-ROM and locate the GXSW.EXE setup program. If your computer's Auto Run is configured, when inserting the CD, a browser will show several options. Select the Marvin Test Solutions Files option, then locate the setup file. If Auto Run is not configured, you can open the Windows explorer and locate the setup files (usually located under \Files\Setup folder). You can also download the file from Marvin Test Solutions' web site (www.MarvinTest.com).
2. Run the GXSW setup and follow the instruction on the Setup screen to install the GXSW driver.

   Note: When installing under Windows, you may be required to restart the setup after logging-in as a user with Administrator privileges. This is required in-order to upgrade your system with newer Windows components and to install kernel-mode device drivers (HW.SYS and HWDEVICE.SYS) which are required by the GXSW driver to access resources on your board.
3. The first setup screen to appear is the Welcome screen. Click Next to continue.
4. Enter the folder where GXSW is to be installed. Either click Browse to set up a new folder, or click Next to accept the default entry. The default entry for 32 bit machines is **C:\Program Files\Marvin Test Solutions\GXSW**, and for 64 bit Windows **C:\Program Files (x86)\Marvin Test Solutions\GXSW**.
5. Select the type of Setup you wish and click Next. You can choose between Typical, Run-Time and Custom setups types. The Typical setup type installs all files. Run-Time setup type will install only the files required for controlling the board either from its driver or from its virtual panel. The Custom setup type lets you select from the available components.

The program will now start its installation. During the installation, Setup may upgrade some of the Windows shared components and files. The Setup may ask you to reboot after completion if some of the components it replaced were used by another application during the installation – do so before attempting to use the software.

You can now continue with the installation to install the board. After the board installation is complete you can test your installation by starting a panel program that lets you control the board interactively. The panel program can be started by selecting it from the Start, Programs, GXSW menu located in the Windows Taskbar.

Setup Maintenance Program

You can run the Setup again after GXSW has been installed from the original disk or from the Windows Control Panel – Add Remove Programs applet. Setup will be in the Maintenance mode when running for the second time. The Maintenance window show below allows you to modify the current GXSW installation. The following options are available in Maintenance mode:

- **Modify**. When you want to add, or remove GXSW components.
- **Repair**. When you have corrupted files and need to reinstall.
- **Remove**. When you want to completely remove GXSW.

Select one of the options and click **Next** and follow the instruction on the screen until Setup is complete.

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Overview of the GXSW Software

Once the software is installed, the following tools and software components are available:

- **GXSW Panel** – Configures and controls the GX6384 various features via an interactive user interface.
- **GXSW driver** - A DLL based function library (GXSW.DLL, located in the Windows System folder) used to program and control the board.
- **Programming files and examples** – Interface files and libraries for support of various programming tools such as C#, C++, VB, VB6, LabVIEW. A complete list of files and development tools supported by the driver is included in subsequent sections of this manual.
- **Documentation** – On-Line help and User's Guide for the GX6384 board, GXSW driver and panel.

HW driver and PXI/PCI Explorer applet – HW driver allows the GXSW driver to access and program the supported boards. The explorer applet configures the PXI chassis, controllers and devices. This is required for accurate identification of your PXI instruments later on when installed in your system. The applet configuration is saved to PXISYS.ini and PXIeSYS.ini and is used by Marvin Test Solutions instruments HW driver and VISA. The applet can be used to assign chassis numbers, Legacy Slot numbers and instrument alias names. The HW driver is installed and shared with all Marvin Test Solutions products to support accessing the PC resources. Similar to HW driver, VISA provides a standard way for instrument manufacturers and users to write and use instruments drivers. VISA is a standard maintained by the VXI Plug & Play System Alliance and the PXI Systems Alliance organizations (http://www.ivifoundation.org, http://www.pxisa.org/). The VISA resource manager such as National Instruments **Measurement & Automation** (NI-MAX) displays and configures instruments and their address (similar to Marvin Test Solutions' PXI/PCI Explorer). The GXSW driver can work with either HW or VISA to control an access the supported boards.

Installation Folders

The GX6384 driver files are installed in the default folder **C:\Program Files\Marvin Test Solutions\GXSW**,or on 64 bit machines they are installed in the default folder **C:\Program Files (x86)\Marvin Test Solutions\GXSW**. You can change the default GXSW folder to one of your choosing at the time of installation.

During the installation, GXSW Setup creates and copies files to the following folders:

Name	Purpose / Contents
…\ Marvin Test Solutions\GXSW	The GXSW folder. Contains panel programs, programming libraries, interface files and examples, on-line help files and other documentation.
…\ Marvin Test Solutions\HW	HW device driver. Provide access to your board hardware resources such as memory, IO ports and PCI board configuration. See the README.TXT located in this directory for more information.
…\ATEasy\Drivers	ATEasy drivers folder. GXSW Driver and example are copied to this directory only if ATEasy is installed to your machine.
…\Windows\System32, or …\Windows\SysWOW64 when running 64 bit Windows	Windows System directory. Contains the GXSW DLL driver, HW driver shared files and some upgraded system components, such as the HTML help viewer, etc.

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Configuring Your PXI System using the PXI/PCI Explorer

To configure your PXI/PCI system using the **PXI/PCI Explorer** applet follow these steps:

1. **Start the PXI/PCI Explorer applet**. The applet can be start from the Windows Control Panel or from the Windows Start Menu, **Marvin Test Solutions**, **HW**, **PXI/PCI Explorer**.
2. **Identify Chassis and Controllers**. After the PXI/PCI Explorer is started, it will scan your system for changes and will display the current configuration. The PXI/PCI Explorer automatically detects systems that have Marvin Test Solutions controllers and chassis. In addition, the applet detects PXI-MXI-3/4 extenders in your system (manufactured by National Instruments). If your chassis is not shown in the explorer main window, use the Identify Chassis/Controller commands to identify your system. Chassis and Controller manufacturers should provide INI and driver files for their chassis and controllers which are used by these commands.
3. **Change chassis numbers, PXI devices Legacy Slot numbering and PXI devices Alias names.** These are optional steps and can be performed if you would like your chassis to have different numbers. Legacy slots numbers are used by older Marvin Test Solutions or VISA drivers. Alias names can provide a way to address a PXI device using a logical name (e.g. "DMM1"). For more information regarding slot numbers and alias names, see the **Gx6384Initialize** and **Gx6384InitializeVisa** functions.
4. **Save your work**. PXI Explorer saves the configuration to the following files located in the Windows folder: PXISYS.ini, PXIeSYS.ini and GxPxiSys.ini. Click on the **Save** button to save your changes. The PXI/Explorer will prompt you to save the changes if changes were made or detected (an asterisk sign ' *' in the caption indicated changes).

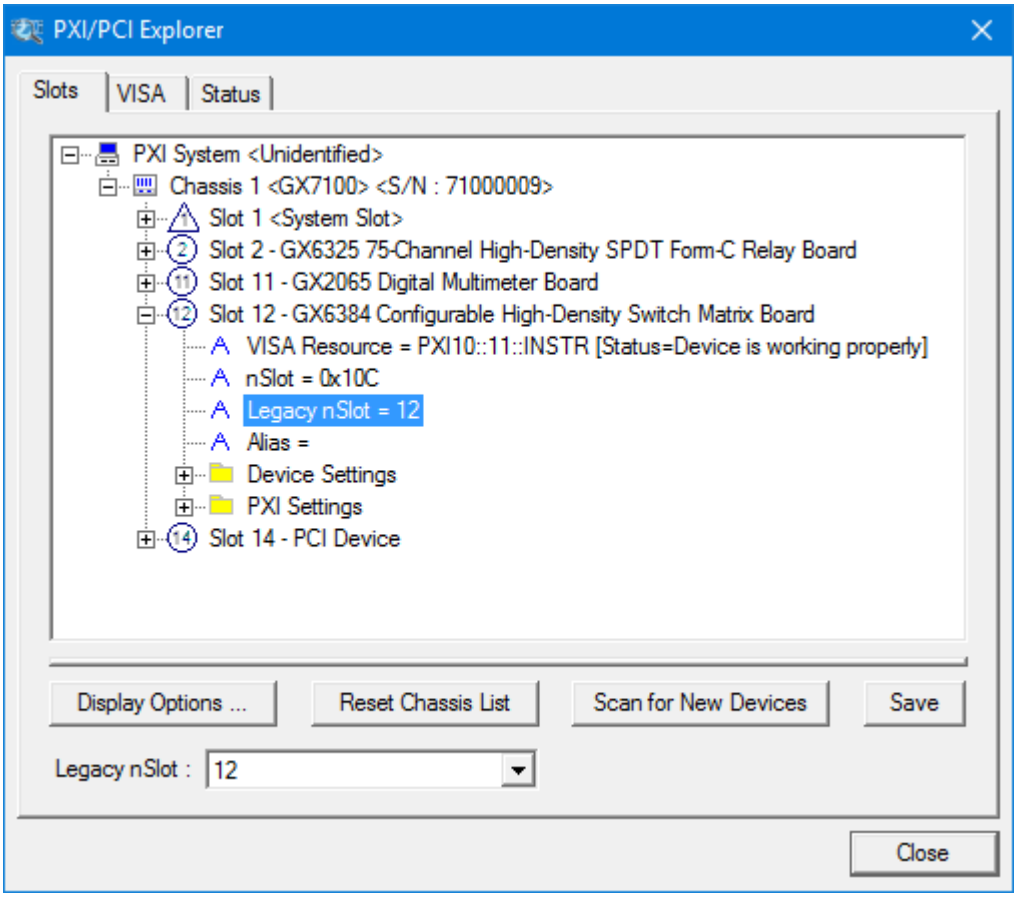


Figure 3-1: PXI/PCI Explorer

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Board Installation

Before you Begin

- Install the GXSW driver as described in the prior section.
- Configure your PXI/PC system using **PXI/PCI Explorer** as described in the prior section.
- Verify that all the components listed in the packing list (see previous section in this chapter) are present.

Electric Static Discharge (ESD) Precautions

To reduce the risk of damage to the GX6384 board, the following precautions should be observed:

- Leave the board in the anti-static bags until installation requires removal. The anti-static bag protects the board from harmful static electricity.
- Save the anti-static bag in case the board is removed from the computer in the future.
- Carefully unpack and install the board. Do not drop or handle the board roughly.
- Handle the board by the edges. Avoid contact with any components on the circuit board.

Caution – Do not insert or remove any board while the computer is on. Turn off the power from the PXI chassis before installation.

Installing a Board

Install the board as follows:

1. Install first the GXSW Driver as described in the next section.
2. Turn off the PXI chassis and unplug the power cord.
3. Locate a PXI empty slot on the PXI chassis.
4. Place the module edges into the PXI chassis rails (top and bottom).
5. Carefully slide the PXI board to the rear of the chassis, make sure that the ejector handles are pushed **out** (as shown in Figure 3-2).

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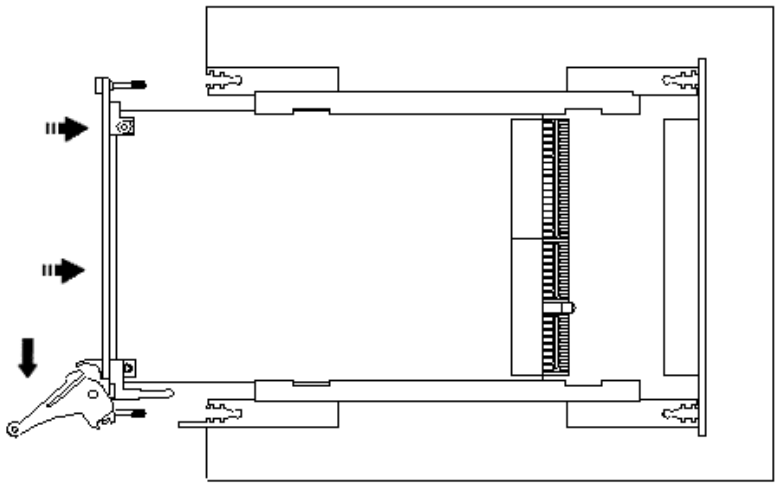


Figure 3-2: Ejector handles position during module insertion

6. After you feel resistance, push in the ejector handles as shown in Figure 3-3 to secure the module into the frame.

Error! Objects cannot be created from editing field codes.

Figure 3-3: Ejector handles position after module insertion

7. Tighten the module's front panel to the chassis to secure the module in.
8. Connect any necessary cables to the board.
9. Plug the power cord in and turn on the PXI chassis.

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Plug & Play Driver Installation

Plug & Play operating systems such as Windows notifies the user that a new board was found using the **New Hardware Found** wizard after restarting the system with the new board.

If another Marvin Test Solutions board software package was already installed, Windows will suggest using the driver information file: HW.INF. The file is located in your Program Files\Marvin Test Solutions\HW folder. Click **Next** to confirm and follow the instructions on the screen to complete the driver installation.

If the operating system was unable to find the driver (since the GXSW driver was not installed prior to the board installation), you may install the GXSW driver as described in the prior section, then click on the **Have Disk** button and browse to select the HW.INF file located in **C:\Program File\Marvin Test Solutions\HW**. On 64 bit systems the HW.INF file is located in **C:\Program File (x86)\Marvin Test Solutions\HW**.

If you are unable to locate the driver click **Cancel** to the found New Hardware wizard and exit the New Hardware Found Wizard, install the GXSW driver, reboot your computer and repeat this procedure.

The Windows Device Manager (open from the System applet from the Windows Control Panel) must display the proper board name before continuing to use the board software (no Yellow warning icon shown next to device). If the device is displayed with an error, you can select it and press delete and then press F5 to rescan the system again and to start the New Hardware Found wizard.

Removing a Board

Remove the board as follows:

1. Turn off the PXI chassis and unplug the power cord.
2. Locate a PXI slot on the PXI chassis.
3. Disconnect and remove any cables/connectors connected to the board.
4. Un-tighten the module's front panel screws to the chassis.
5. Push out the ejector handles and slide the PXI board away from the chassis.
6. Optionally – uninstall the GXSW driver.

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Connectors and Jumpers

Figure 3-4 shows the GX6384 board connectors and jumpers followed by their description:

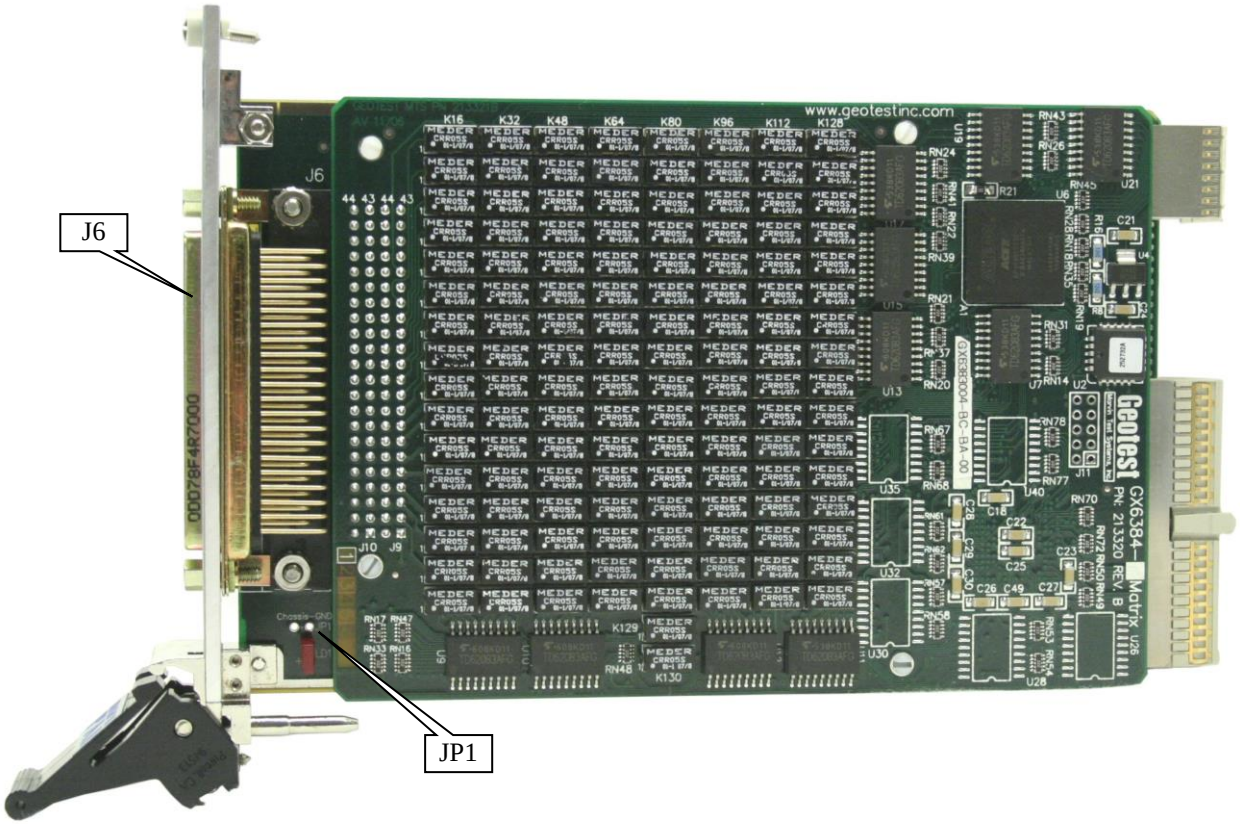


Figure 3-4: GX6384 Connectors and Jumpers

J6 – Front Connector: J6 (78 Pin D Type) front connector.

JP1- Guard Ground: Used to connect the relay ground layer to ground.

Connectors and Accessories

The following accessories are available from Marvin Test Solutions for GX6384 switching instruments.

Part / Model Number	Description
GT96002	Connector, D-Type 78 pin male with solder pins
GT96078	78 pin connector to screw terminal interface
GT96107	3’ harness, 78 pin male connector on both ends
GT97102	3’ harness, 78 pin male connector on one end, loose wires (numbered) other end
GT97103	1’ harness, 78 pin male connector on one end, loose wires (numbered) other end
GT97104	1’ harness, 78 pin male connectors on both ends

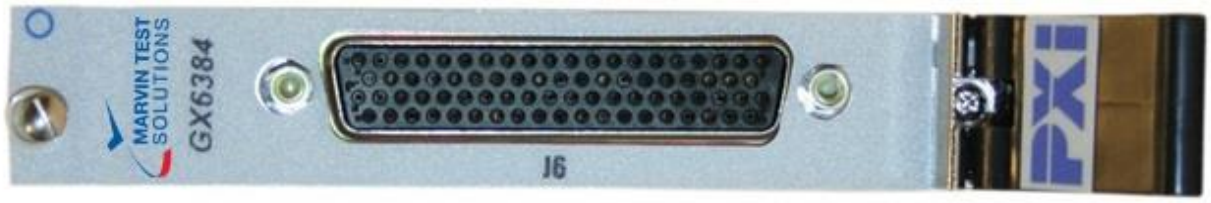


Figure 3-5: GX6384 front Connectors

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J6 Connector – Default mode (Matrix configured as two groups A and B)

The J6 main connector pin assignments changes according to the board's groups configuration mode. When set to default configuration (after power-up or whenever issued reset command) the connector will have two groups A and B each with 32 columns. The following table describes the J6 (78 Pin D Type) connector's pin out:

Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	Col A0	21	Col A16	40	Col B0	60	Col B16
2	Col A1	22	Col A17	41	Col B1	61	Col B17
3	Col A2	23	Col A18	42	Col B2	62	Col B18
4	Col A3	24	Col A19	43	Col B3	63	Col B19
5	Col A4	25	Col A20	44	Col B4	64	Col B20
6	Col A5	26	Col A21	45	Col B5	65	Col B21
7	Col A6	27	Col A22	46	Col B6	66	Col B22
8	Col A7	28	Col A23	47	Col B7	67	Col B23
9	Col A8	29	Col A24	48	Col B8	68	Col B24
10	Col A9	30	Col A25	49	Col B9	69	Col B25
11	Col A10	31	Col A26	50	Col B10	70	Col B26
12	Col A11	32	Col A27	51	Col B11	71	Col B27
13	Col A12	33	Col A28	52	Col B12	72	Col B28
14	Col A13	34	Col A29	53	Col B13	73	Col B29
15	Col A14	35	Col A30	54	Col B14	74	Col B30
16	Col A15	36	Col A31	55	Col B15	75	Col B31
17	Row A0	37	Row A1	56	Row B0	76	Row B1
18	Row A2	38	Row A3	57	Row B2	77	Row B3
19	Row A4	39	Row A5	58	Row B4	78	Row B5
20	CHASSIS			59	GND		

Table 3-1: Connector J6

Signal name	Comments
Col A0 – A31	Group A columns 0 through 31
Col B0 – B31	Group B columns 0 through 31
Row A0 – A5	Group A rows 0 - 5
Row B0 – B5	Group B rows 0 - 5
CHASSIS	Chassis ground

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J6 Connector – Single Group mode (Matrix configured as single A with 64 columns)

The J6 main connector pin assignments changes according to the board's groups configuration mode. When set to Single Group configuration (set programmatically) the connector will have a single group A with 64 columns. The following table describes the J6 (78 Pin D Type) connector's pin out:

Pin	Name	Pin	Name	Pin	Name	Pin	Name
1	Col A0	21	Col A16	40	Col A32	60	Col A48
2	Col A1	22	Col A17	41	Col A33	61	Col A49
3	Col A2	23	Col A18	42	Col A34	62	Col A50
4	Col A3	24	Col A19	43	Col A35	63	Col A51
5	Col A4	25	Col A20	44	Col A36	64	Col A52
6	Col A5	26	Col A21	45	Col A37	65	Col A53
7	Col A6	27	Col A22	46	Col A38	66	Col A54
8	Col A7	28	Col A23	47	Col A39	67	Col A55
9	Col A8	29	Col A24	48	Col A40	68	Col A56
10	Col A9	30	Col A25	49	Col A41	69	Col A57
11	Col A10	31	Col A26	50	Col A42	70	Col A58
12	Col A11	32	Col A27	51	Col A43	71	Col A59
13	Col A12	33	Col A28	52	Col A44	72	Col A60
14	Col A13	34	Col A29	53	Col A45	73	Col A61
15	Col A14	35	Col A30	54	Col A46	74	Col A62
16	Col A15	36	Col A31	55	Col A47	75	Col A63
17	Row A0	37	Row A1	56	Row A0	76	Row A1
18	Row A2	38	Row A3	57	Row A2	77	Row A3
19	Row A4	39	Row A5	58	Row A4	78	Row A5
20	CHASSIS			59	GND		

Table 3-2: Connector J6

Signal name	Comments
Col A0 – A63	Group A columns 0 through 63
Row A0 – A5	Group A rows 0 - 5
CHASSIS	Chassis ground

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Chapter 4 - Functions Reference

Introduction

The GX6384 driver functions reference chapter is organized in alphabetical order. Each function is presented starting with the syntax of the function, a short description of the function parameters description and type followed by a Comments, an Example (written in C), and a See Also sections.

All function parameters follow the same rules:

- Strings are ASCIIZ (null or zero character terminated).
- Most function's first parameter is *nHandle* (16-bit integer). This parameter is required for operating the board and is returned by the **Gx6384Initialize** or the **Gx6384InitializeVisa** functions. The *nHandle* is used to identify the board when calling a function for programming and controlling the operation of that board.
- All functions return a status with the last parameter named *pnStatus*. The *pnStatus* is zero if the function was successful, or less than a zero on error. The description of the error is available using the **GxSWGetErrorString** function or by using a predefined constant, defined in the driver interface files: GXSW.H, GXSW.BAS, GXSW.PAS or GX6384.DRV.
- Parameter name are prefixed as follows:

Prefix	Type	Example
a	Array, prefix this before the simple type.	*anArray* (Array of Short)
n	Short (signed 16-bit)	*nMode*
d	Double - 8 bytes floating point	*dReading*
dw	Double word (unsigned 32-bit)	*dwTimeout*
l	Long (signed 32-bit)	*lBits*
p	Pointer. Usually used to return a value. Prefix this before the simple type.	*pnStatus*
sz	Null (zero value character) terminated string	*szMsg*
w	Unsigned short (unsigned 16-bit)	*wParam*
hwnd	Window handle (32-bit integer).	*hwndPanel*

Table 4-1: Parameter Prefixes

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GX6384 Functions

The following list is a summary of functions available for the GX6384:

Driver Functions	Description
Gx6384Close	Closes a relay specified by group, row, and column.
Gx6384GetBoardSummary	Returns the board summary.
Gx6384GetChannel	Return the state of the relay in the specified group's row and column.
Gx6384GetGroupRow32Columns	Returns the state of all 32 relays of the specified group's row when configured as two groups with 32 columns each.
Gx6384GetGroupRow64Columns	Returns the state of all 64 relays of the specified group's row when configured as one group with 64 columns.
Gx6384GetGroupsConfiguration	Return the switch matrix configuration.
Gx6384Initialize	Initializes the driver for the board at the specified slot number. The function returns a handle that can be used with other GX6384 functions to program the board
Gx6384InitializeVisa	Initializes the driver for the specified slot using VISA. The function returns a handle that can be used with other GX6384 functions to program the board.
Gx6384Open	Opens a relay specified by group, row, and column.
Gx6384Panel	Opens a virtual panel used to interactively control the GX6384 board.
Gx6384Reset	Opens all the board relays.
Gx6384ResetGroup	Opens all the specified group's relays.
Gx6384SetGroupRow32Columns	Sets the state of all 32 relays of the specified group's row when configured as two groups with 32 columns each.
Gx6384SetGroupRow64Columns	Sets the state of all 64 relays of the specified group's row when configured as one group with 64 columns.
Gx6384SetGroupsConfiguration	Sets the switch matrix configuration.
GxSWGetErrorString	Returns the error string associated with the specified error number.

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Gx6384Close

Purpose

Closes a relay specified by group, row, and column.

Syntax

Gx6384Close (*nHandle, nGroup, nRow, nColumn, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
nColumn	SHORT	Specified column relay number is as follows: 0-31: Switch Matrix is configured as two groups with 32 columns (default configuration). 0-63: Switch Matrix is configured as single group with 64 columns.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. The function closes the specified relay at the specified group's row column. The function ensures that a proper delay is used from the last open command. This prevents relay being closed before a previous switching command is complete.

Caution - The flexibility provided by the switch matrix means that any point could be connected to any other point. Extreme care should be observed when developing the control software to prevent shorts between low-impedance sources (such as power supplies). A typical method to prevent such shorts is to use a resistor in series between the power supplies and the switch matrix if these signals are for measurement purposes only. Before closing a relay, verify that no other low-impedance source is connected to the same Row/Column.

Note: In order to prevent power supply overloading the maximum number of all the relays that can be closed at any given time cannot exceed 128. The function returns an error if trying to exceed the limit.

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Example

The following example closes relay at group A row 1 relay 0:

```
Gx6384Close(nHandle, GX6384_GROUP_A, GX6384_ROW_1, 0, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384GetBoardSummary

Purpose

Returns the board summary.

Syntax

Gx6384GetBoardSummary (*nHandle, szSummary, nSumMaxLen, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
szSummary	PSTR	Buffer to contain the returned board info (null terminated) string.
nSumMaxLen	SHORT	Size of the buffer to contain the board info string.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The GX6384 summary string provides the following data from in the order shown:

- Instrument Name (e.g., GX6384)
- FPGA version (e.g. 0xA002)
- Serial Number (e.g. 63840210)

Example

For example, the returned string looks like the following:

```
"GX6384-2 Switch Matrix Dual 4x32, FPGA-Version:0xA003, S/N 63841234, Extended Serial
Number:GX63841234-WE-QA-5678, Factory Tested on: Thu Apr 12 16:05:22 2007"
```

See Also

GxSWGetDriverSummary, GxSWGetErrorString

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Gx6384GetChannel

Purpose

Return the state of the relay in the specified group's row and column.

Syntax

Gx6384GetChannel (*nHandle, nGroup, nRow, nColumn, pnState, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
nColumn	SHORT	Specified column relay number is as follows: 0-31: Switch Matrix is configured as two groups with 32 columns (default configuration). 0-63: Switch Matrix is configured as single group with 64 columns.
pnState	PSHORT	Returned state of the relay. 1 for close and 0 for open.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetRow** function to retrieve the state of all relays in the specified row and group.

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Example

The following example checks whether relay at group A, row 0, relay 3 is closed:

```
Gx6384GetChannel(nHandle, GX6384_GROUP_A, GX6384_ROW_0, 3, &nState, &nStatus);
if (nClose==1)
    printf("A0-3 relay is closed");
else
    printf("A0-3 relay is open");
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384GetGroupRow32Columns

Purpose

Returns the state of all 32 relays of the specified group's row when configured as two groups with 32 columns each.

Syntax

Gx6384GetGroupRow32Columns (*nHandle, nGroup, nRow, pdwStates, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
pdwStates	PDWORD	Returned state of the relays in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents column 31.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetChannel** function to retrieve the state of a specific relay.

NOTE: The function returns an error if the Switch Matrix is configured as one group with 64 columns.

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Example

The following example returns the columns 0-31 of group A row 0:

```
DWORD dwStates;

Gx6384GetGroupRow32Columns (nHandle, GX6384_GROUP_A, GX6384_ROW_0, &dwStates, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384GetGroupRow64Columns

Purpose

Returns the state of all 64 relays of the specified group's row when configured as one group with 64 columns.

Syntax

Gx6384GetGroupRow64Columns (*nHandle, nGroup, nRow, dwStatesColumns32to63, dwStatesColumns0to31, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
dwStatesColumns32to63	PDWORD	Returned state of relays 0-31 in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents the last column.
dwStatesColumns0to31	PDWORD	Returned state of the relays 32-63 in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents the last column.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

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Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetChannel** function to retrieve the state of a specific relay.

NOTE: The function returns an error if the Switch Matrix is configured as two groups with 32 columns.

Example

The following example returns columns 0-63 group A row 0:

```
DWORD dwStatesColumns32to63, dwStatesColumns0to31;

Gx6384GetRow(nHandle, GX6384_GROUP_A, GX6384_ROW_0, &dwStatesColumns32to63,
             &dwStatesColumns0to31, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384GetGroupsConfiguration

Purpose

Return the switch matrix configuration.

Syntax

Gx6384GetConfiguration (*nHandle*, *pnConfig*, *pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
pnConfig	PSHORT	Switch matrix configurations are: 0. GX6384_CONFIG_AS_TWO_GROUPS_32_CHANNELS: The Switch Matrix configured as two groups with 32 columns. 1. GX6384_CONFIG_AS_ONE_GROUP_64_CHANNELS: The Switch Matrix configured as one group with 64 columns.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetRow** function to retrieve the state of all relays in the specified row and group.

Example

The following example returns the switch matrix configuration:

```
SHORTnConfig;
Gx6384GetConfiguration (nHandle, &nConfig, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384Initialize

Purpose

Initializes the driver for the board at the specified slot number. The function returns a handle that can be used with other GX6384 functions to program the board.

Syntax

Gx6384Initialize (*nSlot, pnHandle, pnStatus*)

Parameters

Name	Type	Comments
nSlot	Short	GX6384 board slot number on the PXI bus.
pnHandle	PSHORT	Returned handle for the board. The handle is set to zero on error and <> 0 on success.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The **Gx6384Initialize** function verifies whether or not the GX6384 board exists in the specified PXI slot. The function does not change any of the board settings. The function uses the HW driver to access and program the board.

The Marvin Test Solutions HW device driver is installed with the driver and is the default device driver. The function returns a handle that for use with other Counter functions to program the board. The function does not change any of the board settings.

The specified PXI slot number is displayed by the **PXI/PCI Explorer** applet that can be opened from the Windows **Control Panel**. You may also use the label on the chassis below the PXI slot where the board is installed. The function accepts two types of slot numbers:

- A combination of chassis number (chassis # x 256) with the chassis slot number. For example, 0x105 (chassis 1 slot 5).
- Legacy nSlot as used by earlier versions of HW/VISA. The slot number contains no chassis number and can be changed using the **PXI/PCI Explorer** applet (1-255).

The returned handle *pnHandle* is used to identify the specified board with other GX6384 functions.

Example

The following example initializes two GX6384 boards at slot 1 and 2.

```
SHORT nHandle1, nHandle2, nStatus;
Gx6384Initilize (1, &nHandle1, &nStatus);
Gx6384Initilize (2, &nHandle2, &nStatus);
if (nHandle1==0 || nHandle2==0)
    {printf("Unable to Initialize the board")
    return;
}
```

See Also

Gx6384Reset, **GxSWGetErrorString**

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Gx6384InitializeVisa

Purpose

Initializes the driver for the specified PXI slot using the default VISA provider.

Syntax

Gx6384InitializeVisa (*szVisaResource*, *pnHandle*, *pnStatus*)

Parameters

Name	Type	Comments
szVisaResource	LPCTSTR	String identifying the location of the specified board in order to establish a session.
pnHandle	PSHORT	Returned Handle (session identifier) that can be used to call any other operations of that resource
pnStatus	PSHORT	Returned status: 0 on success, 1 on failure.

Comments

The **Gx6384InitializeVisa** opens a VISA session to the specified resource. The function uses the default VISA provider configured in your system to access the board. You must ensure that the default VISA provider support PXI/PCI devices and that the board is visible in the VISA resource manager before calling this function.

The first argument *szVisaResource* is a string that is displayed by the VISA resource manager such as NI Measurement and Automation (NI_MAX). It is also displayed by Marvin Test Solutions PXI/PCI Explorer as shown in the prior figure. The VISA resource string can be specified in several ways as follows:

Using chassis, slot, for example: "PXI0::CHASSIS1::SLOT5"

Using the PCI Bus/Device combination, for example: "PXI9::13::INSTR" (bus 9, device 9).

Using alias, for example: "COUNTER1". Use the PXI/PCI Explorer to set the device alias.

The function returns a board handle (session identifier) that can be used to call any other operations of that resource. The session is opened with VI_TMO_IMMEDIATE and VI_NO_LOCK VISA attributes. On terminating the application the driver automatically invokes **viClose**() terminating the session.

Example

The following example initializes a GX6384 boards at PXI bus 5 and device 11.

```
SHORT nHandle, nStatus;
Gx6384InitializeVisa ("PXI5::11::INSTR", &nHandle, &nStatus);
if (nHandle==0)
{
    printf("Unable to Initialize the board")
    return;
}
```

See Also

Gx6384Initialize, Gx6384Reset, **GxSWGetErrorString**

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Gx6384Open

Purpose

Opens a relay specified by group, row, and column.

Syntax

Gx6384Open (*nHandle, nGroup, nRow, dwColumn, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
nColumn	SHORT	Specified column relay number is as follows: 0-31: Switch Matrix is configured as two groups with 32 columns (default configuration). 0-63: Switch Matrix is configured as single group with 64 columns.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. The function opens the specified relay at the specified group's row column. The function ensures that a proper delay is used from the last open command. This prevents relay being closed before a previous switching command is complete.

Caution - The flexibility provided by the switch matrix means that any point could be connected to any other point. Extreme care should be observed when developing the control software to prevent shorts between low-impedance sources (such as power supplies). A typical method to prevent such shorts is to use a resistor in series between the power supplies and the switch matrix if these signals are for measurement purposes only. Before closing a relay, verify that no other low-impedance source is connected to the same Row/Column.

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Example

The following example opens relay at group A row 1 relay 0:

```
Gx6384Open(nHandle, GX6384_GROUP_A, GX6384_ROW_1, 0, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384Panel

Purpose

Opens a virtual panel used to interactively control the GX6384 board.

Syntax

Gx6384Panel (*pnHandle, hwndParent, nMode, phwndPanel, pnStatus*)

Parameters

Name	Type	Comments
pnhandle	PSHORT	Handle to a GX6384 board. This number may be zero if the board is to be initialized by the panel window.
hwndParent	DWORD	Sets the panel parent window handle. A value of 0 sets the desktop as the parent window.
nMode	SHORT	The mode in which the panel main window is created. 0 for modeless and 1 for modal window.
phwndPanel	PDWORD	Returned window handle for the panel (for modeless panel only).
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The function is used to create the panel window. The panel window may be open as a modal or a modeless window, depending on the *nMode* parameters.

If the mode is set to modal dialog (*nMode*=1), the panel will disable the parent window (*hwndParent*) and the function will return only after the user closed the window. In that case the *pnHandle* may return the handle created by the user using the panel Initialize dialog. This handle may be used when calling other GX6384 functions.

If a modeless dialog was created (*nMode*=0), the function returns immediately after creating the panel window, returning the window handle to the panel - *phwndPanel.* It is the responsibility of the calling program to dispatch window messages to this window, so that the window can respond to messages.

Example

The following example opens the panel in modal mode:

```
DWORD dwPanel;
SHORT nHandle=0, nStatus;
...
Gx6384Panel (&nHandle, 0, 1, &dwPanel, &nStatus);
```

See Also

Gx6384Initialize, **GxSWGetErrorString**

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Gx6384Reset

Purpose

Opens all the board relays.

Syntax

Gx6384Reset (*nHandle*, *pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The function is typically called after calling the **Gx6384Initialize** function.

Example

The following example initializes the driver and then resets the board.

```
Gx6384Initilize (1, &nHandle, &nStatus);
if (nStatus < 0)
    return nStatus;// return error
Gx6384Reset (nHandle, &nStatus);
```

See Also

Gx6384Initialize, **GxSWGetErrorString**

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Gx6384ResetGroup

Purpose

Opens all the specified group's relays.

Syntax

Gx6384ResetGroup (*nHandle*, *nGroup*, *pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The function is typically called after calling the **Gx6384Initialize** function.

Example

The following example resets group A:

```
Gx6384ResetGroup (nHandle, GX6384_GROUP_A, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384SetGroupRow32Columns

Purpose

Sets the state of all 32 relays of the specified group's row when configured as two groups with 32 columns each.

Syntax

Gx6384SetGroupRow32Columns (*nHandle, nGroup, nRow, dwStates, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
dwStates	DWORD	Sets the state of the relays 0-31 in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents the last column.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetChannel** function to retrieve the state of a specific relay.

NOTE: The function returns an error if the Switch Matrix is configured as one group with 64 columns.

Note: In order to prevent power supply overloading the maximum number of all the relays that can be closed at any given time cannot exceed 128. The function returns an error if trying to exceed the limit.

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Example

The following example close relays 0, 1, 4, 8 and 19 in group A, row 0:

```
Gx6384SetGroupRow32Columns (nHandle, GX6384_GROUP_A, GX6384_ROW_0, 0x80113, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384SetGroupRow64Columns

Purpose

Sets the state of all 64 relays of the specified group's row when configured as one group with 64 columns.

Syntax

Gx6384SetGroupRow64Columns (*nHandle, nGroup, nRow, dwStatesColumns32to63, dwStatesColumns0to31, pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nGroup	SHORT	If the Switch Matrix is configured as two groups with 32 columns (default configuration) Group numbers are: 0. GX6384_GROUP_A 1. GX6384_GROUP_B If the Switch Matrix is configured as one group with 64 columns the only Group number is: 0. GX6384_GROUP_A
nRow	SHORT	Row numbers are: 0. GX6384_ROW_0: row number 0 (all models). 1. GX6384_ROW_1: row number 1 (all models). 2. GX6384_ROW_2: row number 2 (models GX6384-2 and GX6384-3 only). 3. GX6384_ROW_3: row number 3 (models GX6384-2 and GX6384-3 only). 4. GX6384_ROW_4: row number 4 (GX6384-3 only). 5. GX6384_ROW_5: row number 5 (GX6384-3 only).
dwStatesColumns32to63	DWORD	Returned state of relays 0-31 in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents the last column.
dwStatesColumns0to31	DWORD	Returned state of the relays 32-63 in the row. Each bit corresponds to a relay in the selected row where a '1' corresponds to a closed relay and '0' to an open relay. The low order bit represents column 0 and the high order bit represents the last column.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

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Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns. All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetChannel** function to retrieve the state of a specific relay.

NOTE: The function returns an error if the Switch Matrix is configured as two groups with 32 columns.

Note: In order to prevent power supply overloading the maximum number of all the relays that can be closed at any given time cannot exceed 128. The function returns an error if trying to exceed the limit.

Example

The following example close relays 0, 1, 4, 8 and 19, 34, 36, 40-44, 63 in group A, row 0:

```
Gx6384SetGroupRow32Columns (nHandle, GX6384_ROW_0, 0x80001f14, 0x80113, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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Gx6384SetGroupsConfiguration

Purpose

Sets the switch matrix configuration.

Syntax

Gx6384GetConfiguration (*nHandle*, *pnConfig*, *pnStatus*)

Parameters

Name	Type	Comments
nHandle	SHORT	Handle to a GX6384 board.
nConfig	SHORT	Switch matrix configurations are: 6. GX6384_CONFIG_AS_TWO_GROUPS_32_CHANNELS: The Switch Matrix configured as two groups with 32 columns. 7. GX6384_CONFIG_AS_ONE_GROUP_64_CHANNELS: The Switch Matrix configured as one group with 64 columns.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The Switch Matrix can be configured via software as two groups with 32 columns or one group with 64 columns.

Note: All the Switch Matrix channels will be opened prior to applying the new configuration settings. Applying the same configuration settings will not change the current group's channels settings.

Use the **Gx6384GetRow** function to retrieve the state of all relays in the specified row and group.

Example

The following example return the switch matrix configuration:

```
SHORTnConfig;
Gx6384GetConfiguration (nHandle, &nConfig, &nStatus);
```

See Also

Gx6384SetGroupRow32Columns, Gx6384SetGroupRow64Columns, Gx6384GetChannel, Gx6384Close, Gx6384Open, Gx6384SetGroupsConfiguration, GxSWGetErrorString

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GxSWGetErrorString

Purpose

Returns the error string associated with the specified error number.

Syntax

GxSWGetErrorString (*nError*, *pszMsg*, *nErrorMaxLen*, *pnStatus*)

Parameters

Name	Type	Comments
nError	SHORT	Error number as returned by the *pnStatus* of any GXSW function. See table below for possible error numbers values. The error number should be a negative number, otherwise the function returns the "No error has occurred" string.
pszMsg	LPSTR	Buffer containing the returned error string (null terminated string).
nErrorMaxLen	SHORT	Size of the buffer *pszMsg*.
pnStatus	PSHORT	Returned status: 0 on success, negative number on failure.

Comments

The function returns the error string associated with the *nError* as returned from other driver functions.

This function returns error value or 0 on success.

The following table displays the possible error values; not all errors apply to this board type:

Resource Errors

-1 Board does not exist in this slot

-2 Unable to open the HW device/Service

-3 Different board exist in the specified PCI slot

-4 PCI slot not configured properly. You may configure it by using the **PCIExplorer** from the Control Panel

-5 Unable to register the PCI device

-6 Unable to allocate system resource or memory for the PCI device

-7 Too many boards

-8 Unable to create panel

-9 Unable to create a Windows timer

Parameter Errors

-20 Invalid parameter

-21 Invalid PCI slot number

-22 Invalid board handle

-23 Invalid channel number

-24 Invalid bus number

-25 Invalid mode

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-26 Invalid group number

-27 Invalid string length

Board specific parameter error

-39 Invalid configuration

-40 Invalid channel number

-41 Illegal bus number

-42 Illegal group number

-43 Illegal row number

-44 Illegal column number

-45 Invalid Relay number

-46 Invalid Daisy Chain Mode

-47 Invalid relay type

-48 Invalid Group Mode

-49 Invalid Section number

-47

Board Errors/Warnings

-60 Error: connection will create a closed loop

-61 Error: specified relay number is out of range

-62 Error: specified number of relays is out of range

-63 Error: specified relays cycles limit is out of range

-64 Error: specified relay cycles array size is out of range

-65 Error: EPROM communication generated timeout

-66 Error: Trying to close more relays then allowed by this board type at any given time.

Miscellaneous Errors

-99 Invalid or unknown error number

Example

The following example initializes the board at slot 3. If the initialization failed the following error string is printed:

```
CHARsz[256];
SHORTnStatus, nHandle;

GX6338Initialize(3, &Handle, &Status);
if (nStatus<0)
{   GxSWGetErrorString(nStatus, sz, sizeof sz, &nStatus);
    printf(sz);// print the error string return;
}
```

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