

CRSC

Compact Router System Configurator

User's Guide

UG0032-05

30 May 2014



Copyright & Trademark Notice

Copyright © 2014, Belden, Inc.. All rights reserved.

Belden, Belden Sending All The Right Signals, and the Belden logo are trademarks or registered trademarks of Belden Inc. or its affiliated companies in the United States and other jurisdictions. Miranda, NVISION, CR Series and CRSC are trademarks or registered trademarks of Miranda Technologies Partnership. Belden Inc., Miranda Technologies Partnership, and other parties may also have trademark rights in other terms used herein.

Terms and Conditions

Please read the following terms and conditions carefully. By using CRSC documentation, you agree to the following terms and conditions.

Miranda Technologies Partnership (“Miranda”) hereby grants permission and license to owners of CRSC Routers to use their product manuals for their own internal business use. Manuals for Miranda products may not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose unless specifically authorized in writing by Miranda.

A Miranda manual may have been revised to reflect changes made to the product during its manufacturing life. Thus, different versions of a manual may exist for any given product. Care should be taken to ensure that one obtains the proper manual version for a specific product serial number.

Information in this document is subject to change without notice and does not represent a commitment on the part of Miranda.

Warranty information is available in the Support section of the Miranda Web site (www.miranda.com).

Title	CRSC Routers User’s Guide
Part Number	UG0032-05
Revision	3.0 (28 May 14)

Change History

Rev.	Date	ECO	Description	Approved
1.0	17 Nov 08	14426	Initial Release	D. Cox
1.1	31 Mar 09	15703	New format	D.Cox
1.2	12 Oct 09	16114	Restructured online help. New software features	DEM
2.0	29 Mar 10	16912	Addition of CQX routers	DEM, SM, TS
2.1	31 Mar 12	18826	Improvements to CQX series.	D.Cox
2.2	15 Nov 13	19038	—	D.Cox
3.0	28 May 14	19241	Added CR6464. Changes to the crosspoint page.	D.Cox

Notices

FC FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Declaration of Conformance (CE)

All of the equipment described in this manual has been designed to conform with the required safety and emissions standards of the European Community. Products tested and verified to meet these standards are marked as required by law with the CE mark.

When shipped into member countries of the European Community, this equipment is accompanied by authentic copies of original Declarations of Conformance on file in the Miranda GVD offices in Grass Valley, California USA.

Software License Agreement and Warranty Information

Contact Miranda for details on the software license agreement and product warranty.

Important Safeguards and Notices

This section provides important safety guidelines for operators and service personnel. Specific warnings and cautions appear throughout the manual where they apply. Please read and follow this important information, especially those instructions related to the risk of electric shock or injury to persons.

WARNING

Any instructions in this manual that require opening the equipment cover or enclosure are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any service other than that contained in the operating instructions unless you are qualified to do so.

Restriction on Hazardous Substances (RoHs)

Miranda is in compliance with EU Directive RoHS 2002/95/EC governing the restricted use of certain hazardous substances and materials in products and in our manufacturing processes.

Miranda has a substantial program in place for RoHS compliance that includes significant investment in our manufacturing process, and a migration of Miranda product electronic components and structural materials to RoHS compliance.

It is our objective at Miranda GVD to maintain compliance with all relevant environmental and product regulatory requirements. Detailed information on specific products or on the RoHS program at Miranda is available from Miranda Customer Support at

1-800-719-1900 (toll-free) or
1-530-265-1000 (outside the U.S.).

Symbols and Their Meanings



The lightning flash with arrowhead symbol within an equilateral triangle alerts the user to the presence of dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle alerts the user to the presence of important operating and maintenance/service instructions.



The Ground symbol represents a protective grounding terminal. Such a terminal must be connected to earth ground prior to making any other connections to the equipment.



The fuse symbol indicates that the fuse referenced in the text must be replaced with one having the ratings indicated.



The presence of this symbol in or on Miranda equipment means that it has been designed, tested and certified as complying with applicable Underwriter's Laboratory (USA) regulations and recommendations.



The presence of this symbol in or on Miranda equipment means that it has been designed, tested and certified as essentially complying with all applicable European Union (CE) regulations and recommendations.

General Warnings

A warning indicates a possible hazard to personnel which may cause injury or death. Observe the following general warnings when using or working on this equipment:

- Heed all warnings on the unit and in the operating instructions.
- Do not use this equipment in or near water.
- This equipment is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting the equipment inputs or outputs.
- Route power cords and other cables so they are not likely to be damaged.
- Disconnect power before cleaning the equipment. Do not use liquid or aerosol cleaners; use only a damp cloth.
- Dangerous voltages may exist at several points in this equipment. To avoid injury, do not touch exposed connections and components while power is on.
- Do not wear rings or wristwatches when troubleshooting high current circuits such as the power supplies.

-
- To avoid fire hazard, use only the specified fuse(s) with the correct type number, voltage and current ratings as referenced in the appropriate locations in the service instructions or on the equipment. Always refer fuse replacements to qualified service personnel.
 - To avoid explosion, do not operate this equipment in an explosive atmosphere.
 - Have qualified service personnel perform safety checks after any service.

General Cautions

A caution indicates a possible hazard to equipment that could result in equipment damage. Observe the following cautions when operating or working on this equipment:

- When installing this equipment, do not attach the power cord to building surfaces.
- To prevent damage to equipment when replacing fuses, locate and correct the problem that caused the fuse to blow before re-applying power.
- Use only the specified replacement parts.
- Follow static precautions at all times when handling this equipment.
- This product should only be powered as described in the manual. To prevent equipment damage, select the proper line voltage on the power supply(ies) as described in the installation documentation.
- To prevent damage to the equipment, read the instructions in the equipment manual for proper input voltage range selection.
- Some products include a backup battery. There is a risk of explosion if the battery is replaced by a battery of an incorrect type. Dispose of batteries according to instructions.
- Products that have (1) no on/off switch and (2) use an external power supply must be installed in proximity to a main power outlet that is easily accessible.
- To reduce the risk of electrical shock, plug each power supply cord into a separate branch circuit having a separate service ground.

toc

Table of Contents

1 Introduction	1
Hardware Summary	1
The CR6400 Family	1
Existing Products	1
Routers	2
Control Panels	2
Remote Panel Modules	2
Usage	3
CRSC Summary	5
CRSC Features	5
CRSC User Interface	6
Creating a CRSC Network	9
IP Addresses	9
Rotary Switches	10
CQX Networks	11
Mode Rotary Switch	11
Usage Tips	12
Network Speed	12
Cabling	12
Power-Up Re-initialization	12
Uploading Firmware	12
Panels Locked at Reset	12
System Design	12
Design Issues	12
Setting Up Your Configuration PC	13
How to Configure your PC's IP Address(es)	14
How to Create Multiple Subnets	16
Installing CRSC	16
Installation Testing	19
Getting Started	20
2 NVISION Products Online Page	21
3 Ethernet Settings Page	23
Summary	23
Usage	24
How to Add Routers to a Network	24
How to Add Remote Panel Modules to a Network	25
How to Change Ethernet Settings	25

4 Router Levels Page	27
Summary	27
Background Information	28
CR6400 Routers	28
Using the Router Levels Page	29
Active Subnet	30
Signal Types	30
How to Update a Level	30
How to Add a Level	31
How to Delete a Level	32
5 Machine Control Routers Page	35
Summary	35
Background Information	36
Machine Control Port Types	36
Terms	36
Machine Control Router Crosspoints	38
Using the Machine Control Router Page	39
How to Select a Machine Control Router	40
How to Change a Port Type	40
6 Remote Panels Page	41
Summary	41
Page Layout	42
Network Frame Summary	42
Remote Panel Configuration Options	43
Background Information	43
Terms	43
"Captive" Panels	44
Remote Panel Modes	44
Salvos	45
Using the Remote Panels Page	46
Selecting a Remote Panel Module	46
CQX Panels	46
Defining Button Functions	47
Selecting a Panel Mode	47
Destination Selection Buttons	47
Level Buttons	49
Salvo Buttons	49
Source Selection Buttons	50
Unused	51
How to Upload an Existing Panel Configuration	51
How to Create a New Panel Configuration	51
How to Change a Button Function	52
How to Change the Panel Mode	53

7 Router Crosspoints Page 55

Summary	55
Buttons	57
The Table View	57
The Graphic View	58
Page Basics	58
Graphic View	58
Table View	59
Context Menu	59
Copying and Pasting Crosspoint Data	60
Copy	60
Paste	61
Salvos	62
Save as Salvo	62
Load Salvo	62
Jumping to Outputs	62
Diagonal Takes	63
How to Perform a Diagonal Take in the Table View	64
How to Perform a Diagonal Take in the Graphic View	66
Range Takes	67
How to Perform a Range Take in the Table View	67
How to Perform a Range Take in the Graphic View	68
About AES Crosspoints	68
Using the Crosspoints Page	69
How to View a Crosspoint Configuration	69
How to Perform a Simple Take in the Graphic View	70
How to Perform a Simple Take in the Table View	71
The Diagonal Take Shortcut	72
The Shortcut Vertical Take	73

8 Firmware Updates Page 75

Summary	75
Page Features	75
Device Table	75
Selection Options	76
Function Buttons	76
Stopping an Update	77
Using the Page	78
How to Update Firmware	78
How to Reset Frames	79
How to View Past Update Reports	80

9 Locks Page 81

Summary	81
Using the Lock Maintenance Page	82
How to Release Selected Locks	83

10 NV9000 Remote Panel Settings Page 85

Summary	85
Page Features	86
Using the Page	87

Appendix A: Tutorials	89
Routing Overview	89
What is a Router?	90
Inside the Router	91
Sources and Destinations	91
What is a Control Panel?	91
Signals	92
A Note About AES Signal Types	92
A Note About Machine Control Signals	93
Partitions and Levels	93
Router Control	94
Remote Panel Operating Modes	94
Standard Mode	94
Enhanced Mode	95
Salvos	95
Cabling	96
Cable Types	96
Connectors	96
Serial Connector	96
DB25 Connectors	97
RJ-45 Connectors	97
Making Connections	97
Sample Configuration	98
Equipment	98
Analysis	98
Partitioning	99
Operational Considerations	101
Cabling Diagram	101
Products	103
Summary	103
Routers	104
CQX Routers	104
CR6400 Family	105
Control Panels	105
Remote Panel Modules	105
Usage	106
CQX Usage	107
CR6400 Usage	107
Benefits	108
The Routers	108
Digital Video Routers	111
3Gig Video Routers	111
HD Video Routers	111
SD Video Routers	111
NR Video Routers	111
CQX Video Routers	112
Analog Video Routers	114
Digital Audio Routers	114
Analog Audio Routers	116
Machine Control Routers	116
Background Information	117
Controlling or Controlled	118
Dynamic	118
Master or Slave	118
Configuration	118

The Control Panels 118
 1RU Panels 118
 CQX Panel..... 119
 2RU Panels 119
The Remote Panel Modules..... 120

Appendix B: Operation 123

Control Panel Buttons 123
 Button Types..... 124
 Panel Modes 125
 Red Buttons 125
 Button Order 125
 Spatial Ordering 125
 Temporal Ordering 125
 Button Illumination 126
 Source Button Lighting 126
 Destination Button Lighting 126
 Level Button Lighting..... 126
 CQX Panel Buttons 127
Power Up and Reset..... 128
 Routers at Power-Up 128
 Remote Panel Modules at Power-Up 128
Performing Takes 128
 Normal Takes 129
 Example — Normal Take in Standard Mode..... 129
 Example — Normal Take in Enhanced Mode..... 129
 Breakaway Takes 130
 Example — Breakaway in Standard Mode..... 130
 Example — Breakaway in Enhanced Mode without Hold — Variant 1 131
 Example — Breakaway in Enhanced Mode without Hold — Variant 2 132
 Example — Breakaway in Enhanced Mode with Hold..... 132
 CP3201 Takes 133
 Example — Normal Take for CP3201..... 133
 Example — Breakaway for CP3201 in Standard Mode 133
 Example — Breakaway for CP3201 in Enhanced Mode with Hold 134
 Example — Breakaway Take for CP3201 in Enhanced Mode without Hold..... 135
 Machine Control Takes 135
 CQX Takes 136
Performing Locks 136
 Panel Lock 136
 Destination Locks 136
 Simple Locks 137
 Complex Locks 137
 CP3201 Locks and Unlocks..... 138
Executing Salvos 138
Performing Level Selection 139
 Level Selection in Standard Mode..... 139
 Button Order 139
 Level Selection in Enhanced Mode..... 141

Table of Contents

Glossary	143
Index	145
Contact Us	153

1 Introduction

Chapter 1 provides concepts and definitions that are needed to understand CRSC—the Compact Router System Configurator.

The following material is summary information. Refer to the *CR Series Compact Router User's Guide* and to the *CR6400 Family User's Guide* for complete detail.

Topics

<i>Hardware Summary</i>	1
<i>CRSC Summary</i>	5
<i>Usage Tips</i>	12
<i>Setting Up Your Configuration PC</i>	13
<i>Installing CRSC</i>	16
<i>Getting Started</i>	20

Hardware Summary

The CR Series products include compact routers, (compact) control panels, and (compact) remote panel modules.

CR Series products include 1RU and 2RU video and audio routers in several formats, and machine control routers.

There are 3Gig, HD, and SD versions of the video routers. The HD routers also support SD. The 3Gig routers also support HD and SD. The CR Series also includes analog video routers, AES and analog audio routers, and machine control routers.

The CR6400 Family

New to the CR Series is the CR6400 family of 64×64 routers and control panel. The family includes two routers and a control panel.

- CR6464-3Gig — a 2RU 64×64 video router
- CR6464-AES — a 2RU 64×64 AES router
- CP6464 — a 2RU 64×64 control panel

The CR6400 family products are modular in construction and similar in many ways to other CR Series products. The CR6400 family products work together and do not interoperate (yet) with other CR Series products.

Existing Products

The matrices in the 1RU routers range from 16×2 to 16×16. The matrices in the 2RU routers ranges from 32×4 to 32×32. Video, audio, and machine control routers can be combined in a system to represent multiple signal levels.

Control panels in the CR Series are designed to mount on the front of either compact routers or remote panel modules. (Remote panel modules are used in a compact router network. They transmit commands from the panels mounted on them to the routers in the network and receive status messages from the routers in the network.)

Control panels that mount directly on compact routers are termed “captive panels.”

Control panels that mount on remote panel modules are termed “remote panels.”

The CR Series includes CQX (“clean and quiet”) routers that support several smooth transition types (including cross-fades) and rates.

Routers

With the exception of the machine control routers, all the compact routers are X/Y routers having $n \times m$ crosspoint matrices. An input can be routed to any or all of the outputs.

The machine control routers (also called *port routers*) are point-to-point routers. An input can be connected to at most one output. (The connections are RS-422 and bidirectional, typically with commands in one direction and responses in the other direction.)

Each of the 3 “clean and quiet” (CQX) router models routes 16 inputs to 2 “clean and quiet” outputs or to 6 auxiliary (normal) outputs. For the clean and quiet outputs, the router performs smooth transitions. The transitions are governed by transition type and transition rate, selectable on the CP1602-CQX control panel. The CQX routers also provide 2 bypass inputs. The 2 clean and quiet outputs switch to the bypass inputs if the router loses power.

Control Panels

A CR Series control panel mounts on the front of a router or on the front of a remote panel module. The panel provides direct visual and tactile control of the router (or the routers in a network). (You can install or uninstall one easily in a few seconds.) However, any of the routers can also operate without a control panel, under network control or through automation.

The CP3201 is special case: it is a 1 RU panel that controls 32 sources and 1 destination. It does not mount on the front of a router and is used only in a CRSC Network.

The CP1602-CQX is also a special case: it is a 1RU control panel used in conjunction with any of the CQX routers. This panel has 16 source buttons, 2 “clean and quiet” destination buttons, 6 auxiliary destination buttons, 4 transition type buttons, 3 transition rate buttons, and 7 function buttons (5 undefined).

The CP6464 mounts on, and controls, only CR6400 routers.

Remote Panel Modules

A “remote panel module” is a device that sends control messages to a network of routers (and receives status messages from the routers in the network). A remote panel module receives take and lock commands from an attached control panel and must have a control panel attached to be useful. We say the panel module is “remote” because it and its control panel can be located apart from the routers (from a few inches to several hundred meters, subject to cable limitations).

A remote panel is defined as a control panel mounted on a remote panel module.

A remote panel module can be configured to operate (with its mounted control panel) as either (1) a CRSC remote panel or (2) an NV9000 panel in a system controlled by an NV9000 family router control system.

When it is set up for use as a panel in a CRSC network, it is configured in CRSC. When it is set up for use as an NV9000 panel, it must be configured in NV9000-SE Utilities.

▲ Remote panels cannot (yet) be used with CR6400 products.

Usage

There are several different ways to use compact routers and panels:

- A single stand-alone router with a “captive” control panel or with automation.
- A network of stand-alone routers, possibly with remote panels, possibly with captive panels, and with or without automation.
- A CRSC network of routers and remote panels with or without automation. *Here, the panels and routers are configured using CRSC.*
- A network of routers under an NV9000 family router control system.
- A single stand-alone CQX router with a “captive” CQX control panel or with automation.
- A CQX router with a remote CQX control panel.

▲ A *captive* panel is one attached directly to a router. A *remote* panel is one mounted on a remote panel module.

▲ Automation is up to the customer.

▲ The CR6400 products do not (yet) operate in a CRSC network or in an NV9000 network.

Routers and remote panel modules come from the factory ready for stand-alone operation. They must be configured for use either in a CRSC network or in an NV9000 network. Once configured, they must be reset if they are to work again in stand-alone mode.

A remote panel module must be configured to work either in a CRSC network or in an NV9000 network. The two configuration modes are not compatible.

Figure 1-1 compares a stand-alone router with a captive panel to a router network with remote panel modules:

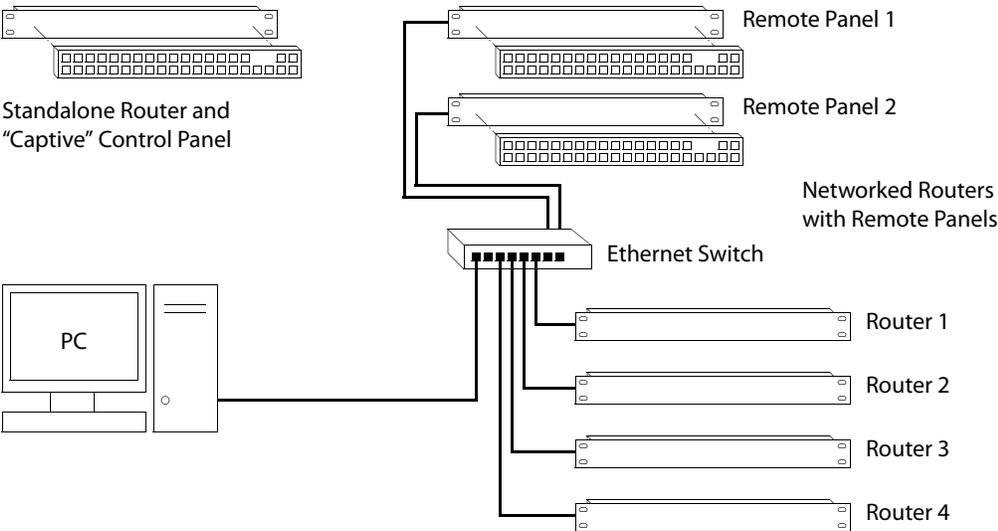


Fig. 1-1: Standalone Router vs. a Network of Routers

A CRSC network has the same topology as a stand-alone network, except (1) the routers and remote panel modules have been configured under CRSC which provides a more elegant solution to system design than a stand-alone network.

Figure 1-2 shows a sample NV9000 network, one of several possible topologies:

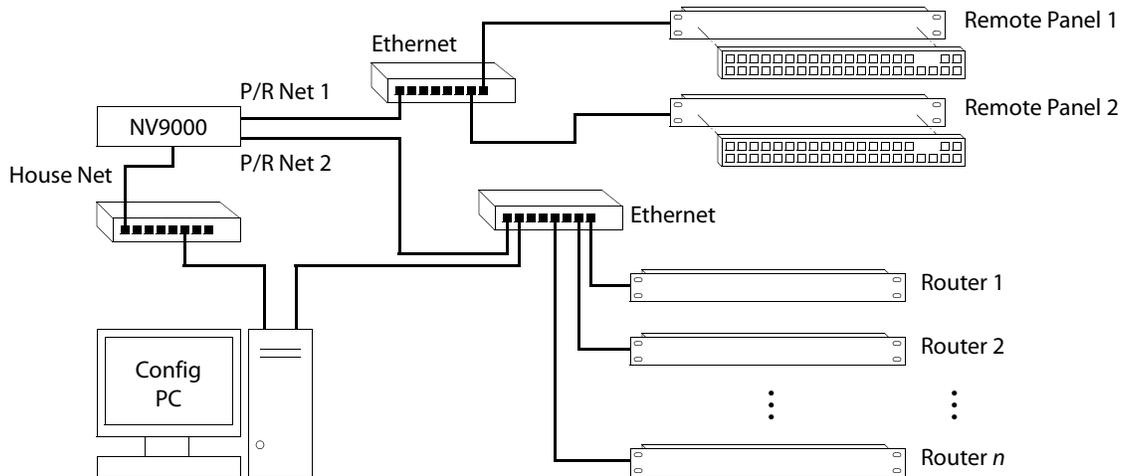


Fig. 1-2: NV9000 Network of Routers

An NV9000 network supports a larger number of routers. Commands issue from the remote panels to the NV9000 which then dispatches the instructions to the routers. The routers return status to the NV9000 which in turn relays the status to the remote panels.

CR Series routers can be used with a NV9000 family router control system. These router control systems extend the capabilities of the compact routers.

An NV9000 network is constructed and operated according to the requirements of the NV9000 router control system. Configuration and control of the routers is entirely within the scope of NV9000-SE Utilities, although you can use CRSC to designate IP addresses.

Figure 1-3 shows the ways a “clean and quiet” router can be connected:

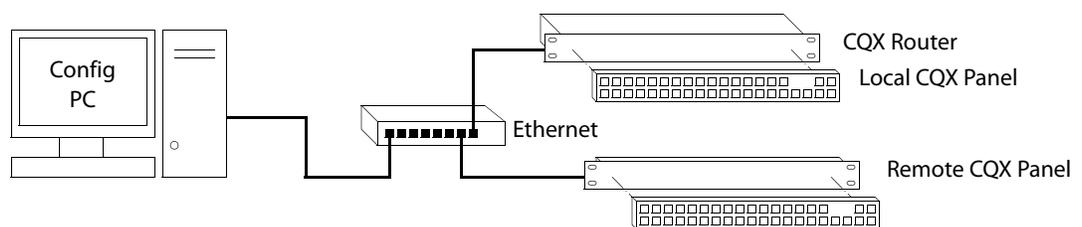


Fig. 1-3: CQX Network

At present, the CQX connections are limited. One CQX router with a local (or captive) CQX panel or a remote CQX panel (or both) can exist on any subnet. (You can have more than one subnet, however.)

At present there is little to configure other than the IP address of the router (and possibly the remote panel module).

CRSC Summary

CRSC (the Compact Router System Configurator) is configuration software that runs on your PC.

- ▲ If you have very old compact routers and remote panel modules, they should be updated with new firmware that is compatible with CRSC.

You can also use CRSC to initialize your remote panel module(s) for use with a NV9000 network and to restore those remote panel module(s) to use under CRSC.

CRSC Features

Using CRSC, the following benefits can be realized:

- Configurable panels

A stand-alone system is not configurable.

In a CRSC system, you can create and configure router levels, and exercise control over network device addresses. You can also save and restore panel configuration files. CRSC supports 3 panel operating modes.

- Partitioning

A stand-alone system does not allow router partitioning.

A CRSC network allows partitioning. A "level" is equivalent to a partition.

- Configurable networks

A stand-alone network comprises up to 4 routers and up to 16 remote panels. IP addresses depend on the devices' rotary switches and router levels are limited to the range 1–4.

A CRSC network supports up to 4 routers, up to 8 levels, and up to 16 remote panels. IP addresses are configurable.

You can create many compact router networks. If you do, CRSC can manage them all at once as long as your configuration PC has the network connections to do so. CRSC treats multiple CRSC networks as "subnets."

- Efficient multi-level 'takes' and breakaway

In a stand-alone system, panel buttons have a fixed and limited association with router inputs and outputs.

In a CRSC network, remote panel buttons have a configurable association with router inputs and outputs. In fact, remote panels control *sources* and *destinations*, not merely inputs and outputs. Consequently, CRSC systems can use less equipment and do so more effectively.

Remote panels configured in "enhanced" mode provide automatic level selection. Remote panels in a CRSC system provide breakaway status.

- CRSC systems can perform salvos. (Salvos are stored take sequences.)
- CRSC itself can perform system monitoring. You can examine and set crosspoints and view and clear locks from your PC.
- CRSC simplifies firmware updates with a single file for all CR Series devices. All CR Series devices can (and should) be updated at the same time.

In addition to the benefits of using CRSC, configuration changes can be made easily and quickly. CRSC has 4 primary configuration functions:

- Organize devices on your Ethernet LAN.

- Define levels and router partitions.
- Specify machine control port settings.
- Configure control panels.

There are also 3 secondary (maintenance and monitoring) functions:

- View router crosspoints.
- Upload firmware to the routers and remote panel modules.
- Examine, and clear, destination locks.

CRSC User Interface

When you launch CRSC, you will momentarily see its “splash” screen:



Then the CRSC window appears with its “welcome” page displayed:



- CR Series Ethernet Settings

The 'CR Series Ethernet Settings' page lists all the CR Series products detectable on the networks to which your configuration PC is connected. These include only compact routers and remote panel modules.

It is in this page that you assign the devices IP addresses on a CRSC network.

(See [Ethernet Settings Page](#) on page 23.)
- Configure Router Levels

Use this page to define the levels associated with the routers. A router corresponds to at least one level. A level is the same thing as router partition and essentially defines the size and type of a switching matrix.

 - ▲ Do not assign a level to a CR6400 router. Doing so places the router in what CRSC calls "config" mode and the router will either malfunction or not function at all. If you accidentally do this, you can easily restore the router to its factory default state.

(See [Router Levels Page](#) on page 27.)
- Set Up Machine Control Router

Use this page to designate the port types for machine control routers.

(See [Machine Control Routers Page](#) on page 35.)
- Program Remote Panels

Use this page to configure the buttons of remote panels.

(A *remote panel* is a CR Series control panel mounted on a remote panel module.)

(See [Remote Panels Page](#) on page 41.)
- View Router Crosspoints

Use this page to view the native crosspoint matrices of various compact routers and to perform primitive tasks in those routers.

(See [Router Crosspoints Page](#) on page 55.)
- Firmware Updates

It is in this page that you can update the firmware of selected compact router and remote panel modules.

(See [Firmware Updates Page](#) on page 75.)
- Lock Maintenance

Use this page to examine, set, and clear locks and protects made by various users.

(See [Locks Page](#) on page 81.)
- Set Up NV9000 Remote Panel

Use this page to change a panel from one that operates in CRSC mode to one that operates in NV9000 mode or vice versa. The two modes are not compatible.

(See [NV9000 Remote Panel Settings Page](#) on page 85.)
- Open Help System

This entry in the navigation pane does not select a page in the work area, but launches CRSC's interactive help system. (The interactive help is an on-line version of this manual.)
- About CRSC

This page provides the CRSC version number and Miranda contact information.

Creating a CRSC Network

CR Series products (and CRSC) communicate on an Ethernet LAN. There are three main reasons to create a network:

- To perform multi-level operations, such as 'takes' and locks.
- To operate routers or a network of routers remotely (e.g., from a separate room).
- To make use of CRSC features, such as configuring remote panels. Remember that it is actually the remote panel *module* that is configurable.

CRSC can include multiple subnets. Each subnet can include the following items:

- From 1 to 16 remote panel modules (with attached control panels).
- From 1 to 4 compact routers. You can mix CR Series routers of any size and type according to your requirements.

If you are also using any CQX routers and control panels, a second, separate subnet must be created for the CQX products.

CR6400 routers and panels cannot be used in a CRSC network.

The control panels and routers communicate by sending messages across the network. If any routers or control panels on the network have duplicate IP addresses, the devices are not distinguishable and the network will not function properly. CRSC will notify you of any duplicate IP addresses and which frames are inaccessible on a specific subnet.

You can create multiple CRSC subnets. CRSC can detect and manage all subnets as long as your configuration PC has enough network connections to support the different subnets.

IP Addresses

An IP address is a 32-bit number usually expressed by four 8-bit values (octets) in decimal notation separated by periods: 192.168.2.87 (for example). The 32-bit number comprises a subnet identifier and a device address within the subnet.

For example, if a router's full IP address is 192.168.2.87, and the subnet is 24 bits, the router's address is 87 and the subnet is 192.168.2.xxx.

Subnets

A subnet allows a single large network to be organized into smaller sub-networks. Typically, a subnet may represent all the machines at one geographic location or on the same local area network (LAN).

A CQX router and control panel must be on its own subnet.

A router can receive commands only from a control panel on the same subnet.

Subnet Masks

A subnet mask is a set of bits that Ethernet uses to divide an IP address into a subnet field and a field for a device address that exists in that subnet. For compact routers, the typical subnet mask is 24 bits (out of 32):

```
11111111 11111111 11111111 00000000
```

and this is typically represented by 255.255.255.0. For such a subnet, there are 256 possible device addresses. The addresses 0 and 255 are reserved. Device addresses can therefore range from 1 to 254.

The subnet masks need not be 24 bits. If it differs, the device address range will be something other than 1–254.

Rotary Switches

The 16-position 'Frame ID' rotary switches (located at the front of a router or remote panel module) are used in the following circumstances:

- When a router is stand-alone or in a stand-alone network.
- In a CRSC network, when the router or remote panel module is still in its default state (e.g., when you are in the process of adding a router or remote panel module to the CRSC network).

Otherwise, in a CRSC network, the rotary switch settings have no importance.

Adding Devices to a CRSC Network

When you are adding a router or remote panel module to a CRSC network, the 16-position rotary switch determines its *initial* IP address. Routers and remote panel modules usually come from the factory with the rotary switch set to position 1.

The 16 positions are numbered (in hex) from 0–F. In hex notation, letters represent the number greater than 9:

A = 10, B = 11, C = 12, D = 13, E = 14, F = 15

The value of the switch is then added to a fixed number to create the initial IP address for the router or remote panel module. Letting the subnet be represented by xxx.yyy.zzz,

For CQX routers, the IP address = xxx.yyy.zzz.sss where sss = switch value + 200. Use only a switch setting in the range 1–4 (resulting in an address range of 201 to 204).

For other compact router routers, the IP address = xxx.yyy.zzz.sss where sss = switch value + 100 (resulting in an address range of 101 to 104).

For remote panel modules, IP address = xxx.yyy.zzz.sss where sss = switch value + 50. Use only a switch setting in the range 1–15 (resulting in an address range of 51 to 65).

Note carefully that if a rotary switch is set to zero, the router or panel reverts to the factory default state, not to a previously set state. Do not use a switch setting of 0 when you are adding a router or remote panel module to a CRSC network!

A router and a remote panel module can have the same switch setting because each is being added to a different base number. However, two routers or two control panels cannot have the same switch setting because the resulting number would be the same creating identical IP addresses.

After the devices are added to your network, you can use CRSC to assign them specific IP addresses. (The new addresses must be written to the devices from CRSC.) After that, the devices are no longer in their default state, but belong to the CRSC network and the rotary switches are irrelevant.

Remember that each device must have a unique IP address.

Remember that CQX routers and control panels must be on a separate subnet from other compact routers.

CQX Networks

A CQX router must be operated with a CQX control panel (or automation). Do not place a CQX router on a subnet with other routers. However, you can have more than one subnet dedicated to CQX routers.

Figure 3-3 shows the ways a “clean and quiet” router can be connected:

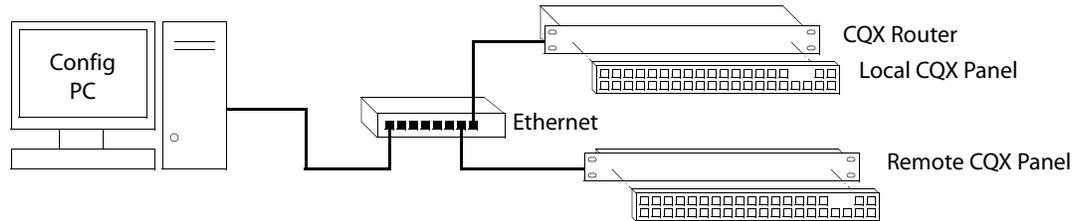


Fig. 1-4: Figure 3-3. CQX Network

The CQX panel can be local (mounted on a CQX router) or it can be remote (mounted on a remote panel module). The remote CQX panel then must be connected to the CQX router by an Ethernet switch. It is possible to use both a captive panel and a remote panel.

Unlike other compact routers, the CQX routers have two rotary switches. You must set both switches to an appropriate value.

Mode Rotary Switch

The 16-position ‘Mode’ rotary switch configures the router’s video format. Set the rotary switch to a position in the range 0–9, A, B, C, or D, according to this table:

Setting	Format	Setting	Format	
0	1080i, 59.94 or 60 1080p, 29.97 or 30 1080psf, 29.97 or 30	6	1080p, 59.94 or 60	<i>Switch positions 6 and 7 correspond to video according to SMPTE 425 level A.</i>
		7	1080p, 50	
1	1080i, 50 1080p, 25 1080psf, 25	8	2 × 1080i, 59.94 or 60	<i>Switch positions 8 and 9 correspond to video according to SMPTE 425 level B.</i>
		9	2 × 1080i, 50	
2	525i, 59.94	A	720p, 29.97 or 30	
3	625i, 50	B	720p, 25	
4	720p, 59.94 or 60	C	720p, 23.98 or 24	
5	720p, 50	D	1080p, 23.98 or 24, 1080psf, 23.98 or 24	
		E	<i>reserved</i>	
		F	<i>reserved</i>	

The default is 1080i, 59.94 Hz (switch setting 0). Positions E and F are not valid positions.

Where a switch setting supports multiple formats, the format is governed by the video reference applied to the router and must be compatible with that reference format.

- ▲ When a control panel is mounted on a router or remote panel module, it conceals the rotary switch. You must remove the control panel when you are setting the rotary switch.
- ▲ Every time you make a switch change, power-cycle the router or remote panel module.

Usage Tips

Network Speed

Compact router networks are Ethernet LANs (100Mb/s, UDP). That means they are reasonably fast, and have potentially many network configuration options. However, no matter how fast the network is, the amount of network traffic increases exponentially with the number of devices on the network. At some point, the traffic exceeds the capacity of the network. The practical limit is 4 compact routers and about 16 remote panel modules.

Cabling

Compact routers generally use 75Ω BNC cable for signal connections. However, machine control connectors are RJ-45 and analog audio connectors are DB25. Each DB25 connector supports 8 audio channels (4 stereo pairs). You will need to acquire breakout cables to connect individual analog audio devices, such as Miranda's WC0053 breakout cable.

The CR Series devices use RJ-45 connectors for Ethernet.

Power-Up Re-initialization

A router or remote panel module re-initializes to its factory default settings if you power it up with the rotary switch set to zero (0). If you reset the frame by accident, and the frame is in your network, you will have to add the frame again and reconfigure it.

Uploading Firmware

You will receive a firmware file when you receive CRSC. You can receive firmware updates periodically or upon request.

We recommend that when you receive a firmware file, you upload the firmware to all your compact routers and remote panel modules before proceeding. See [How to Update Firmware](#) on page 78.

Panels Locked at Reset

After a reset, a panel is locked. Before you can use a panel, you must unlock the panel by pressing the red 'Panel Lock' button.

System Design

By the time you are ready to use CRSC, most of the compact router system design decisions have likely already been made and implemented. However, it may be helpful to review the following sections to ensure all issues have been captured in your system design.

Design Issues

What signals does your system manage? How many are there?

What are the signal types? Do you need or have machine control routers?

Are you using CQX ("clean and quiet") routers? If so, CQX routers only operate by themselves with CQX control panels and must be on a separate subnet from other routers.

CR6400 routers (and CP6464 panels) must also exist on their own subnet. They cannot be mixed with routers on a CRSC network and should not be mixed with routers of other types in a stand-alone network.

A compact router has a maximum of 16 or 32 inputs or outputs. (An AES router in mono mode has a 64×64 matrix although it is still considered a 32×32 router.) How you partition a router depends in part on the organization of buttons on your control panels and similarly the organization of buttons depends in part on router partitions.

Router partitions are contiguous sets of connectors. For example, you cannot alternate SD and HD signals on odd and even connectors. You cannot keep multiple AES connectors (e.g., AES 1/2, 3/4, 5/6, and 7/8) clustered together; they must be separated.

Router partitions, especially for AES or machine control routers, depend on many factors:

- AES partitions — number of AES channels. Number of embedded audio channels.

- Machine control partitions — what kind of devices you have that require machine control.

HD routers can switch SD signals. You do not need a separate SD router. If you have a 3Gig router, it can switch HD and SD signals as well as 3Gig signals.

You can switch analog signals using analog video (AV) and analog audio (AA) routers. You can also use analog-to-digital (A/D) and digital-to-analog (D/A) converters in conjunction with HD, SD, and AES routers when you have analog signals. Whether this is an effective solution depends on factors that include your budget, whether you need or already have A/D and D/A converters, and how much delay you can tolerate in your video or audio.

Whether your video signals contain embedded audio is another issue: Do you actually need any audio routers?

CR Series routers and panels do not start, stop, rewind, cue, or otherwise control any media. You might need to purchase equipment that performs those tasks. You must consider how that equipment works in conjunction with CR Series products.

For additional information, review the [Sample Configuration](#) on page 98. It illustrates design issues that you might encounter.

Setting Up Your Configuration PC

Your configuration PC must be assigned an IP address on one or more of the subnets you intend to use for the CRSC network.

If you have multiple subnets in your compact router system, you will probably have to add those subnets to your PC's network configuration. Doing this is especially important for CQX routers.

How to Configure your PC's IP Address(es)

- 1 From the PC's Start menu, choose 'Settings > Network Connections' or 'All Programs > Accessories > Communications > Network Connections', whichever is available. The 'Network Connections' dialog box appears:

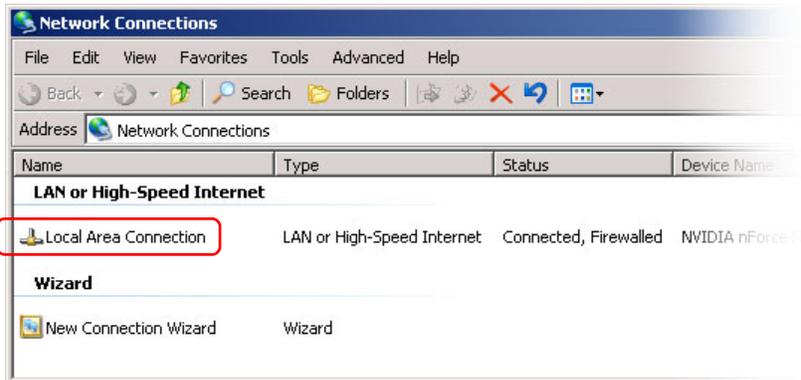


Fig. 1-5: Network Connections Window

- 2 Double-click 'Local Area Connection'. The 'Local Area Connection Status' dialog box appears:

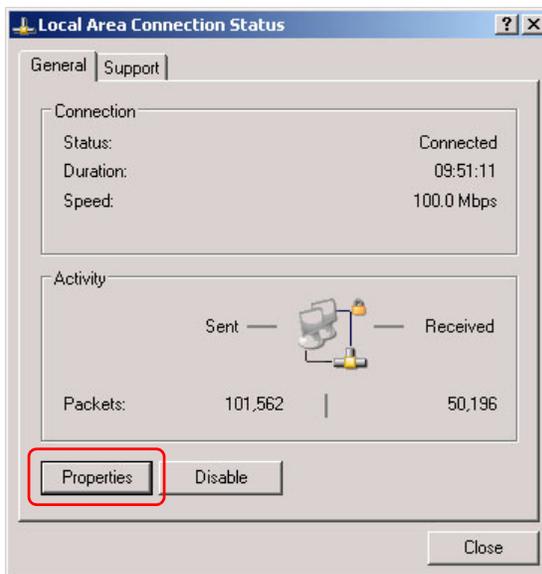


Fig. 1-6: Local Area Connection Status Dialog Box

- 3 Choose the 'General' tab and click **Properties**. The 'Local Area Connection Properties' dialog box appears.

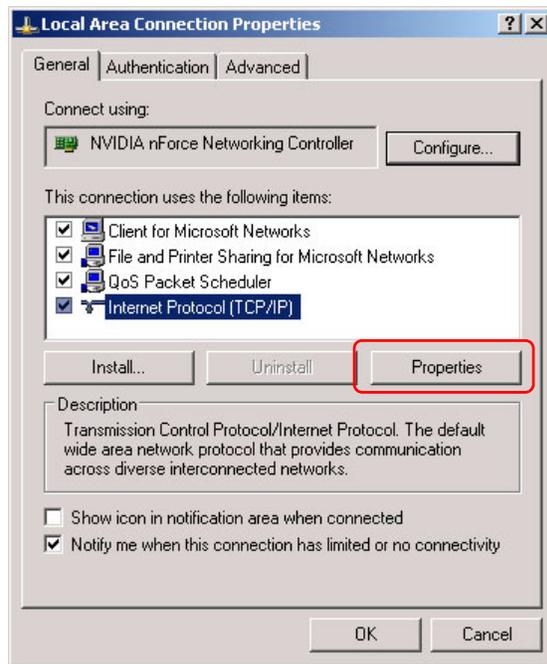


Fig. 1-7: Local Area Connection Properties Dialog Box

- 4 Select 'Internet Protocol (TCP/IP)' and click **Properties**. The 'Internet Protocol (TCP/IP) Properties' dialog box appears.

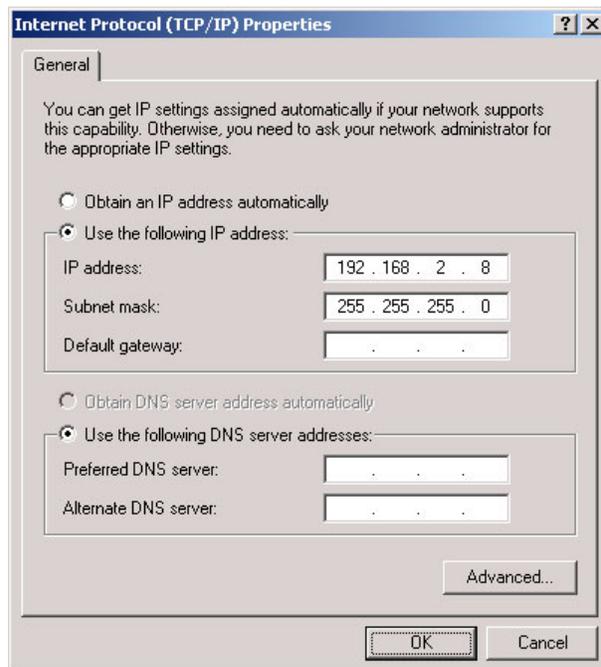


Fig. 1-8: Internet Protocol (TCP/IP) Properties Dialog Box

- 5 Select 'Use the following IP address' and enter the IP address for your PC. It is recommended that you use the default subnet 192.168.2.xxx and the subnet mask 255.255.255.0.
Any unique IP address will work as long as it is on one of the subnets of your CRSC network. The PC's address on the subnet must not be the same as any of the frames (routers or remote panels) on the subnet. It is recommended that you use Avoid addresses in the 50, 100 and 200 range. CRSC uses those as defaults. For details, see [IP Addresses](#) on page 9.
- 6 Click **OK** to save your changes.

How to Create Multiple Subnets

- 1 Starting from step 4 in the preceding procedure, click **Advanced**.
- 2 In the 'Advanced' window, click **Add** and enter an IP address for your PC on each of the subnets. Repeat this step for additional subnets.
- 3 After adding IP addresses for your subnets, click **OK**.

Installing CRSC

CRSC is available on the software and documentation CD (SB0033-xx) that ships with the equipment. CRSC is a Java application and the installer installs a Java runtime support package.

You can also obtain the installer from Miranda customer service.

The installer creates a desktop shortcut for CRSC and makes an entry in Windows' Start menu for CRSC. The software installation process takes about one minute.

Follow these steps to install CRSC:

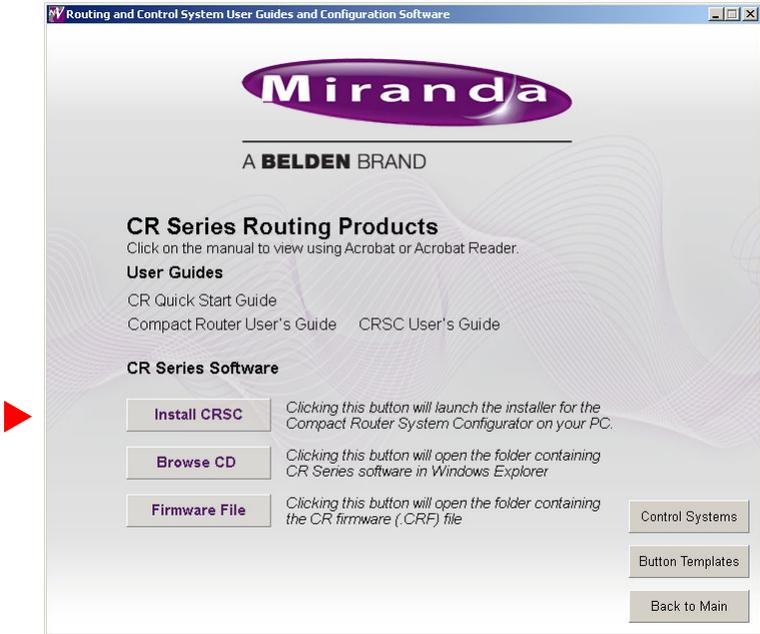
- 1 Insert the CD in your CD drive.

Wait for the initial screen:



Click the 'CR Series Routing Products' button.

2 The 'CR Series Routing Products' page appears:



Click 'Install CRSC'.

3 The installation script will begin to run:



Click 'Next'.

- 4 A window appears in which you can designate the location on your PC in which to install MRC:



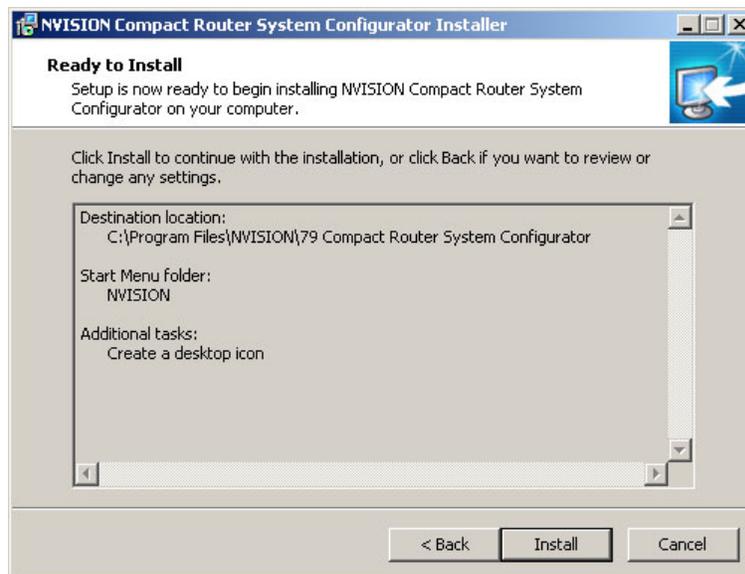
The window presents the default location. If you prefer another location, click 'Browse' to navigate to a different folder.

Uncheck 'Create a desktop icon' if you do not want a CRSC shortcut to appear on your PC desktop.

The window tells you the disk space needed for the installation. If you do not have that much space, the installation will fail.

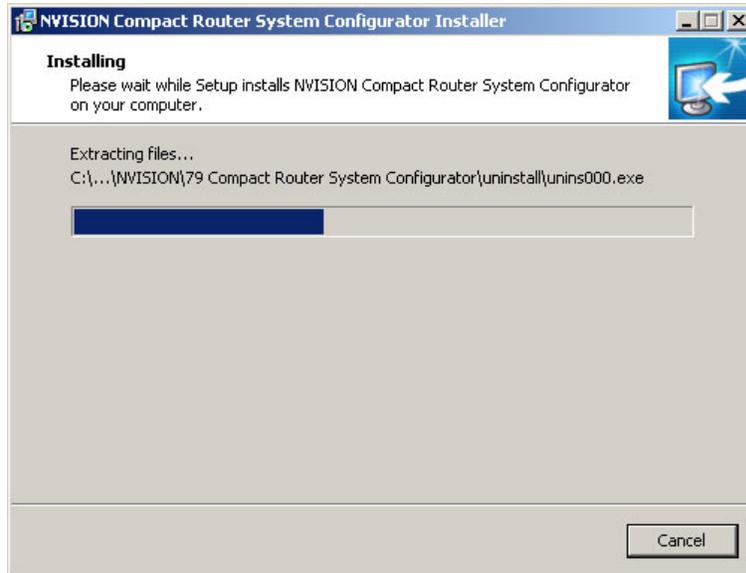
When you are satisfied with the pathname and options, click 'Next'.

- 5 A confirmation window appears:

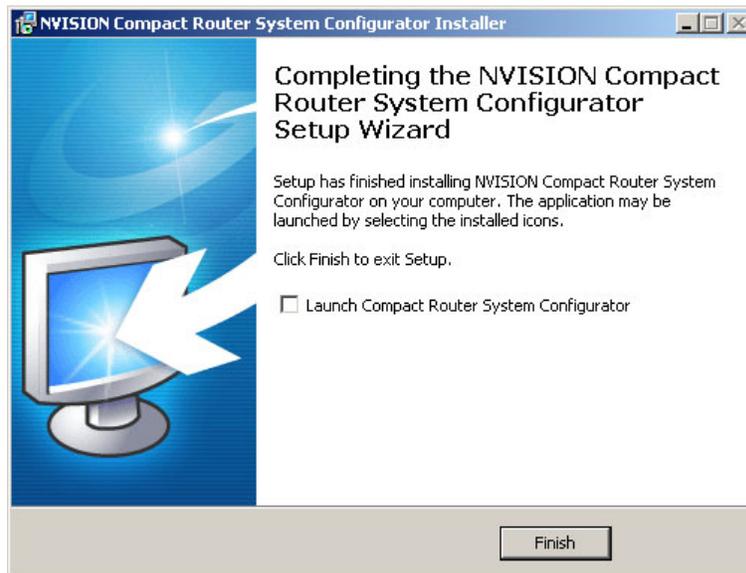


If the options presented are not correct, click 'Back' to go back to the previous window and re-enter a pathname or change options.

Otherwise, click 'Next' to start the installation or click 'Cancel' to stop the installer.
When you start the installation, a progress window appears:



6 After several seconds, the installation will complete. The completion window appears:



Uncheck 'Launch Compact Router System Configurator' if you do not want to run CRSC immediately.

7 Click 'Finish'.

Installation Testing

After installing CRSC, launch CRSC by clicking its desktop icon or selecting 'NVISION > Compact Router System Configurator' from the Windows 'Start' menu. Go to the 'CR Series Ethernet Settings' page. Click 'Refresh List'.

Examine the list of devices and note whether any of the following conditions exist:

- No entries in the list.

You have no network (or no devices on your network) or the network is not properly connected to your PC. Ensure that your PC has an Ethernet connection to the Ethernet switch for the network.

Click the 'Network Interfaces' button in CRSC's 'NVISION Series Products Online' page to determine to which subnets your configuration PC is connected.

- Entries read "IP Conflict." To correct this, find and change IP address so that all IP addresses are distinct.
- If you determine that IP addresses are not a problem, one or more of the frames might be disconnected, have no power, or might be defective. Again, check Ethernet connections, power connections, and power supplies. A power supply light and the power indicators on all routers, remote panel modules, and control panels should be on.
- Entries read "Different Subnet." These are frames that are detectable by CRSC, but are not on a currently available subnet. To view available subnets, hover your mouse over the text "Different Subnet." A popup list of available subnets appears.

There are several options for such entries:

Change the IP address of the frame to the current subnet.

Change the IP address or subnet of the configuration PC.

Change the IP address in some other way, but leaving the device on some other subnet.

Physically remove the frame from the network by disconnecting the connecting cables.

Fix any problems and click **Refresh List** on the 'CR Series Ethernet Settings' page to view an updated list of devices. When the network is functioning properly, you are ready to use CRSC to perform other tasks.

Getting Started

Before you can use all the features of CRSC effectively, you should complete the following tasks:

- 1 Optionally, upload new compact router firmware using CRSC. See [Uploading Firmware](#) on page 12.
- 2 Be sure that any control panels are unlocked. See [Panels Locked at Reset](#) on page 12.
- 3 Using CRSC assumes that your compact router network is designed and connected. See [System Design](#) on page 12 and [Creating a CRSC Network](#) on page 9.
CR6400 only: You do not need CRSC to configure CR6400 routers or CR6400 networks (because there is nothing to configure). You can, however, use CRSC to view or set cross-points in CR6400 routers.
- 4 Set up your configuration PC and install CRSC. See [Setting Up Your Configuration PC](#) on page 13.
- 5 Test the CRSC installation to verify that everything is working properly. See [Installation Testing](#) on page 19.

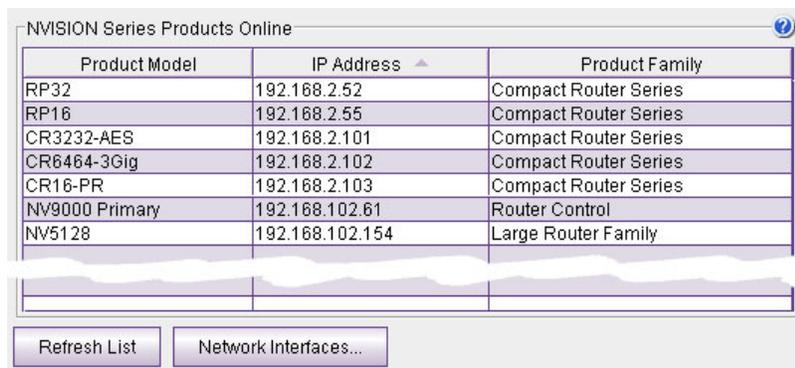
If you are unfamiliar with routing, networking concepts, or CR series products, we recommend that you read the [Tutorials](#) on page 89.

Please refer to the *CR Series User's Guide* and the *CR6400 Family User's Guide* for details about the many compact routers and (compact) control panels.

NVISION Products Online Page

The 'Show NVISION Products Online' page lists *all* NVISION series products — compact routers, remote panels, large routers, router control systems — detectable on the networks to which the configuration PC is connected.

Click 'Show NVISION Products Online' in the navigation pane to open the 'NVISION Series Products Online' page:



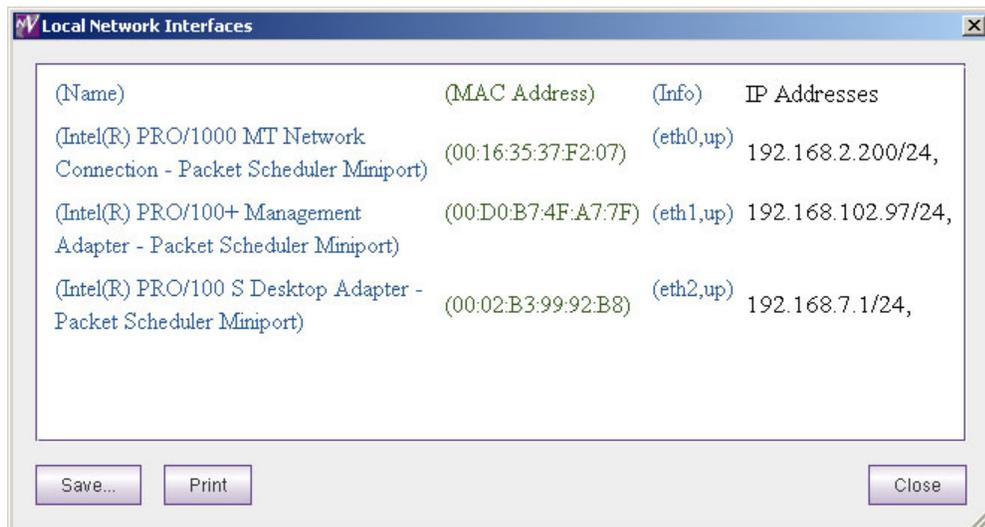
Product Model	IP Address	Product Family
RP32	192.168.2.52	Compact Router Series
RP16	192.168.2.55	Compact Router Series
CR3232-AES	192.168.2.101	Compact Router Series
CR6464-3Gig	192.168.2.102	Compact Router Series
CR16-PR	192.168.2.103	Compact Router Series
NV9000 Primary	192.168.102.61	Router Control
NV5128	192.168.102.154	Large Router Family

Refresh List Network Interfaces...

Fig. 2-1: NVISION Series Products Online Page

The page shows, for each product, the product name and model, its IP address, and the device family. Use this page for reference when determining which products can be configured. The page is for information only.

Click **Network Interfaces** to get a report about the NIC or NICs (network interface cards) in your configuration PC:



(Name)	(MAC Address)	(Info)	IP Addresses
(Intel(R) PRO/1000 MT Network Connection - Packet Scheduler Miniport)	(00:16:35:37:F2:07)	(eth0,up)	192.168.2.200/24,
(Intel(R) PRO/100+ Management Adapter - Packet Scheduler Miniport)	(00:D0:B7:4F:A7:7F)	(eth1,up)	192.168.102.97/24,
(Intel(R) PRO/100 S Desktop Adapter - Packet Scheduler Miniport)	(00:02:B3:99:92:B8)	(eth2,up)	192.168.7.1/24,

Save... Print Close

You can, at any time, click **Refresh List** to view the most recent state of detectable products.

Ethernet Settings Page

Summary

The 'CR Series Ethernet settings' page lists compact routers and remote panel modules available on the CRSC network. Click 'CR Series Ethernet Settings' in the navigation pane to view the 'CR Series Ethernet Settings' page:

Update	Name	Frame Type	IP Address	Subnet Mask	Gateway IP	Mode	Identify CP
<input type="checkbox"/>	RP32	RP32	192.168.2.52	255.255.255.0	192.168.2.1	NA	Identify CP
<input type="checkbox"/>	RP16	RP16	192.168.2.55	255.255.255.0	192.168.2.1	NA	Identify CP
<input type="checkbox"/>	AES	CR3232-AES	192.168.2.101	255.255.255.0	192.168.2.1	Config	Identify CP
<input type="checkbox"/>	64-3Gig	CR6464-3Gig	192.168.102.152	255.255.255.0		Default+IP	Identify CP
<input type="checkbox"/>	PR	CR16-PR	192.168.2.103	255.255.255.0	192.168.2.1	Config	Identify CP

Refresh List Apply Updates

Fig. 3-1: CR Series Ethernet Settings Page

The table columns presents the following option or information:

Column	Description
Update	Check the check box to select the device listed on that row for updating.
Name	Name assigned to the compact router or remote panel.
Frame type	Type (or model number) of compact router or remote panel.
IP address	IP address currently assigned to the device.
Subnet mask	Subnet mask currently assigned to the device. It is recommended that you leave the subnet mask at 255.255.255.0.
Gateway IP	Gateways are not used except by third-party systems or occasionally by an NV9000 system. Developers may use the gateway and subnet mask fields in any way they find useful. A gateway setting is not needed for a normal compact router setup.
Mode	The 'Mode' column is status-only and displays how the particular router or remote panel module is configured. These are the 3 possible "modes": NA — The device is either a remote panel module or a router with old software. Config — The device is a router configured by CRSC. Default — No settings have been changed and the device is a router in the factory default mode. Default+IP — For CR6400 routers only, this means that no settings have been changed except the IP address, and the device is a router in the factory default mode.

Column	Description
Identify CP	When you click 'Identify CP', the control panel listed mounted on the device listed on that row identifies itself, physically, by displaying a moving pattern of button lights. This feature is helpful if you forget which panel of possibly many panels is represented by the particular IP address. The moving button lights continue indefinitely. To turn off the pattern, either press any button on the panel or click 'Identify CP' again.

There are two buttons at the bottom of the page.

Click **Refresh List** at any time to cause the page to display the current state of the devices on the network.

The **Apply Updates** button remains dimmed until you have made a change to a setting in the page. When you have made changes, the software automatically checks the check box in the rows you have change and the **Apply Updates** button becomes enabled. Click **Apply Updates** to cause those changes to be applied.

You can also check or uncheck the check boxes manually.

Usage

The 'CR Series Ethernet Settings' page lets you can change the name, IP address, subnet mask, or gateway IP address of any compact router or remote panel module.

Use the page to add routers and remote panel modules to your CRSC network. The process of adding these devices involves making physical Ethernet connections and then, in CRSC, changing the devices' IP addresses and other data from their defaults to what you want.

(If you have previously configured a router or remote panel module, and you are adding it to your CRSC network, it might already be configured the way you want.)

Note:

A CQX router must be operated using a CQX control panel, either mounted on the CQX router itself or on a remote panel module.

It is important to assign each CQX router and CQX panel a subnet separate from other compact routers or control panels. You can, of course, have more than one subnet.

How to Add Routers to a Network

Note: the limitation of 4 routers on a subnet is a physical limit imposed by the amount of network traffic that the routers can handle. CRSC, however, will allow you to have any number of routers on a subnet. Although you can exploit this capability for ease of configuration, you must ensure that your compact router system observes the network limits when it is running.

Routers from the factory are usually all set to the same subnet: 192.168.2.xxx. Routers that are freshly reset to default also use that subnet.

Adding a router to the CR system creates a *new level*. Routers are assigned to a subnet and no more than 8 levels *in any single subnet* are allowed. CRSC will not let you delete a router you just added because each router must correspond to at least one level. Either disconnect the router physically, delete one or more levels (other than those just added), or move the router to another subnet. Levels are managed using the 'Router Levels' page. See [Router Levels Page](#) on page 27.

Follow these steps to add routers to your network:

- 1 Connect up to 4 routers to your network with unique rotary switch settings in the range 1 to F (hex).

Note

Remember to cycle power after you change a rotary switch. However, if a rotary switch is set to zero (0), and you then power-cycle the router or remote panel module, the device reverts to the factory default state, and loses its previously configured state.

- 2 Go to the 'CR Series Ethernet Settings' page.
- 3 Verify that all routers appear in the list. Click 'Refresh List' if necessary.
- 4 For each router, click on the cell in the 'IP Address' column to edit the field. Enter a unique IP address.
- 5 Repeat steps 1 through 4 for additional router. Remember that no more than 4 routers can operate to a single subnet.
- 6 Click **Apply Updates** to send the changes to the selected frames. Only those frames with 'Update' checked in the table rows are updated. The data are stored in the frames internally.

How to Add Remote Panel Modules to a Network

Follow these steps to add remote panel modules to your network:

- 1 Connect up to 15 remote panel modules to the network with unique rotary switch settings in the range 1 to F.

Note

Remember to cycle power after you change a rotary switch. However, if a rotary switch is set to zero (0), and you then power-cycle the router or remote panel module, the device reverts to the factory default state, and loses its previously configured state.

- 2 Go to the 'CR Series Ethernet Settings' page.
- 3 Verify that all added remote panel modules appear in the list.
- 4 For each remote panel module, click on the cell in the 'IP Address' column to edit the field. Enter a unique IP address according to the following formulas:
- 5 Repeat steps 1 through 4 for additional remote panel modules.
- 6 Click **Apply Updates** to send the changes to the selected frames. Only those frames with 'Update' checked in the table rows are updated. The data are stored in the frames internally.

How to Change Ethernet Settings

- 1 Go to the 'CR Series Ethernet Settings' page.
- 2 Locate the router or remote panel module you want to update.
- 3 In that row, click the cell you want to change: the IP address, subnet mask or gateway IP address. The field opens for editing.

4 Type in the new value.

We recommend that you leave the subnet masks at 255.255.255.0.

5 To record your change, press <enter> or <tab>, or click in another field. Press <Esc> to cancel your change.

6 Repeat steps 2–5 for additional changes. The 'Update' check box automatically displays a check mark if you update any of the information.

7 Click **Apply Updates** to send the changes to the selected frames. Only those frames with 'Update' checked in the table rows are updated. The data are stored in the frames internally.

4 Router Levels Page

Summary

The 'Router Levels' page lets you view and change router levels:

The screenshot shows two main sections of the 'Router Levels' page. The top section, titled 'Setup Crosspoint Ranges for Levels', contains a table with columns for Level Number, Level Name, Router Name, Signal Type, Physical Input Start, Physical Input End, Controller Source Start, Physical Output Start, Physical Output End, and Controller Destination Start. Below the table are buttons for 'Update Router Levels', 'Add Level...', and 'Delete Level...', along with an 'Active Subnet' dropdown menu.

The bottom section, titled 'Network Frame Summary', has two tabs: 'Routers' (selected) and 'All CR Frames'. It contains a table with columns for Name, Frame Type, Level(s), IP Address, and Subnet Mask. Below the table is a 'Refresh Summary' button.

Level Number	Level Name	Router Name	Signal Type	Physical Input Start	Physical Input End	Controller Source Start	Physical Output Start	Physical Output End	Controller Destination Start
1	HD	D_32HD	HD or SD Digital Video	1	32	1	1	32	1
2	AES	D_32AES	Synchronous AES Mono	1	64	1	1	64	1
3	MC	D_PR	Machine Control Reverse	1	32	1	1	32	1

Name	Frame Type	Level(s)	IP Address	Subnet Mask
D_32HD	CR3232-HD	1	192.168.97.22	255.255.255.0
D_PR	CR32-PR	3	192.168.97.23	255.255.255.0
D_32AES	CR3232-AES	2	192.168.97.24	255.255.255.0

Fig. 4-1: Configure Router Levels Page

The page is divided into two parts: above is the table of "crosspoint ranges" (or partitions) and at the bottom is a network frame summary.

The upper table lets you view the levels defined for the subnet you select in the 'Active Subnet' drop-down list:

Active Subnet: ▼

The lower table lets you review the devices on all networks detectable by your PC.

Click 'Refresh Summary' to be sure that you are viewing the most current information.

Background Information

You may define up to 4 levels in any single router. A *level* is a router partition defined by (1) its size (or bounds) and (2) its signal type. A level is created either when you create a router partition or when you add a router to the network. When you add a router to a CRSC network, the level that is added for that router is a *default* level for that router type.

You may define up to 8 levels for any single subnet.

Levels within a router may overlap or they may be distinct. A level may be the entire router or may be limited to specific inputs and outputs.

IMPORTANT

CQX routers are designed *not* to use levels. For proper functioning, do *not* configure levels in a CQX router.

Adding a router to a CRSC network creates a new level. Routers are assigned to a subnet and no more than 8 levels *in any single subnet* is allowed.

Note: CRSC will not let you delete a level for a router you just added because each router must correspond to at least one level. If, by adding a router, you created a level problem, you can either disconnect the router physically, delete one or more levels (other than the one just added), or move the router to another subnet.

Note: Miranda does not guarantee system performance beyond 4 routers in a subnet.

Levels and Partitions

Partitions define boundaries within the router used to organize switching. Partitions also define what signal format is in use.

Signals are switched within a partition. It is not possible to switch an input from one partition to the output of another partition. Every router must include at least one partition. One partition for an entire router might be desirable.

In CRSC, partitions are called levels. CRSC allows you to define up to 8 levels for each subnet and up to 4 levels for each router.

CR6400 Routers

The CR6400 family products must be used exclusively: do not mix these routers (and the CP6464 panel) with routers and panels of other types on the same subnet.

The levels of CR6400 family routers must *not* be updated in this page. If you do not change a level, it will not be updated. If you do change the level of a CR6400 router, it will enter "config" mode, and not operate correctly. Config mode is meant only for CRSC networks and not for stand-alone routers or stand-alone networks. A CR6400 family router operates correctly only as a stand-alone router or in a stand-alone network.

Using the Router Levels Page

At the top of the page, the 'Setup Crosspoint Ranges for Levels' table displays all levels currently added to the selected subnet and lets you add, delete, and change levels as needed.

In the lower section of the page the 'Network Frame Summary' has two tabs — 'Routers' and 'All CR Frames' — that list the devices detectable by your PC. The 'Routers' tab lists only CR Series routers. The 'All CR Frames' lists all CR Series devices.

The 'Setup Crosspoint Ranges for Levels' table display the following information for each level:

Column	Description
Level Number	A number assigned to the level. The number must be unique and from 1 to 250. The numbers are automatically generated.
Level Name	A name you assign to the level. The name is limited to 16 characters.
Router Name	The name of the router that contains the level. The router names are not editable.
Signal Type	The type of signal switched on that level. See Signal Types on page 30.
Physical Input Start	Use these fields to define the <i>physical</i> start and endpoints of the level within the router.
Physical Input End	
Physical Output Start	
Physical Output End	
Controller Source Start	I/O numbering in a remote panel might not match the physical I/O numbers of the router. Use these fields to map the router's numbering to the NV9000's numbering. (The remote panel's source <i>end</i> and destination <i>end</i> values are derived from the physical start and end and the source start and destination start values.) If there is no remote panel in your system, you can ignore these fields.
Controller Destination Start	

The 'Network Frame Summary' presents the following information:

Tab	Column	Description
Routers	Name	The name of the compact router.
	Frame Type	The type of router.
	Level(s)	Level numbers associated with the router. Each level is assigned a unique number.
	IP Address	IP address currently assigned to the device.
	Subnet Mask	Subnet mask currently assigned to the device.
All CR Frames	Frame Type	The type of router or remote panel.
	Level(s)	Level numbers associated with routers.
	Subnet Mask	Subnet mask currently assigned to the device.

None of this information is editable.

Active Subnet

CRSC detects all subnets for which there are connections in your configuration PC. You can place different frames on different subnets and use any available subnet you want. Choose the subnet from the 'Active Subnet' drop-down list.:

Active Subnet: ▼

The page refreshes its lists of levels after you choose a different subnet.

The designation "active" applies only in CRSC itself: it is the subnet you are configuring. In the actual network, all subnets operate independently and concurrently.

Signal Types

In general, the CR Series routers can switch these signal types.

AV	Analog Video or Timecode
AA	Analog Audio or Timecode
AES	Synchronous AES Mono
SD	SD Digital Video
HD	HD or SD Digital Video
3Gig	3Gig, HD, or SD Digital Video
PR	Machine Control Reverse

The signal type for CR6464-AES routers is 'Asynchronous AES' and the signal type for CR6464-3Gig routers is '3Gig, HD, or SD Digital Video'.

(Any one CR Series router switches one signal type.)

Among routers other than CR6400 routers, AES (audio) signals and machine control signals are handled differently from video signals. If you are unfamiliar with the various signal types, please review [Signals](#) on page 92.

How to Update a Level

- 1 Go to the 'Router Levels' page.
- 2 Optionally, select the subnet on which you want to change routers levels.
- 3 In the 'Setup Crosspoint Ranges for Levels' table, locate the row listing the level you want to change.
- 4 Optionally, in that row, click in the 'Level Number' or 'Level Name' cell to activate the field and enter new values. Level numbers must be unique in the range 1 to 250. Level names are limited to 16 characters.
- 5 Define the physical start and end numbers for the level. These numbers identify physical connections on the router. The numbers you enter will of course depend on what you want to do with the router.

The default level for the router covers the entire span of inputs and outputs. For example, the default values for a 32×32 video router are

input start = 1, input end = 32,
output start = 1, output end = 32.

- 6 If you have a remote panel in your system, you might need to specify 'Controller Input Start' and 'Controller Destination Start' values for the level.

Click the field to enter a value in the field.

(The controller end values are derived from the controller start fields and the physical start and end fields.)

- 7 When you have finished changing level data, click **Update Router Levels** to send the level configuration data to the routers. You should see a confirmation message:



Note that the 'Update Router Levels' button updates only the levels that were changed. Other levels remain unaffected. This is particularly important for the levels of CR6400 routers.

How to Add a Level

- 1 Go to the 'Configure Router Levels' page.
- 2 Optionally, select the subnet on which you want to add routers levels.
- 3 Click the **Add Level . . .** button.

If your subnet has more than one router, a dialog appears:



Choose a router from the drop-down list and click OK. (The routers you choose are those that exist in the selected subnet.)

If your subnet has no routers, you will receive a message stating that CRSC cannot create levels where there are no routers.

If your subnet has more than 8 levels, you will receive a message stating that a subnet cannot have more than 8 levels.

- 4 If there were no failures in step 3, CRSC creates a new level, with a new (unique) level number for the router you chose.

If your subnet has only a single router, CRSC simply adds a level identical to the existing level.

If your subnet has more than one router, CRSC adds a default level for the router you chose in the dialog of step 3.

You can now edit the parameters for this level. (See [How to Update a Level](#) on page 30.)

- 5 Repeat steps 2–4 for additional levels.

When you have finished adding levels, click **Update Router Levels** to send the level configuration data to the routers. You should see a confirmation message:



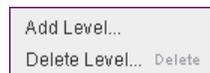
Note that adding a level creates an additional level for one of the routers that already exists on the subnet. You cannot create levels that do not correspond to a router.

This is especially useful when you are planning to use an AES router to switch multiple AES levels, as illustrated in this example:

Level Number	Level Name	Router Name	Signal Type	Physical Input Start	Physical Input End	Controller Source Start	Physical Output Start	Physical Output End	Controller Destination Start
1	HD	D_32HD	HD or SD Digital Video	1	32	1	1	32	1
2	AES12	D_32AES	Synchronous AES Mono	1	32	1	1	32	1
3	AES34	D_32AES	Synchronous AES Mono	33	64	1	33	64	1
4	MC	D_PR	Machine Control Reverse	1	32	1	1	32	1

Here the AES router switches two levels, AES1/2 and AES3/4. Each of these levels includes 16 AES pairs (32 mono channels). These levels can be switched nearly simultaneously under a multi-level take performed at a remote panel. Note that the controller start values for both of these levels is 1 (and the controller end values, derived and not shown, are 32.)

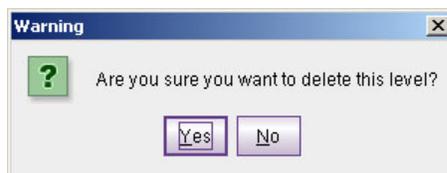
There is a shortcut. Right-click a row to cause the context menu to appear:



Choose 'Add Level . . .' The "Select a Router" dialog appears with the router identified in the row you clicked selected. You can use that router or choose a different router. In that dialog, click **OK** to choose the router or click **Cancel** if you change your mind.

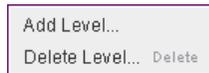
How to Delete a Level

- 1 Go to the 'Configure Router Levels' page.
- 2 Optionally, select the subnet on which you want to delete routers levels.
- 3 Click on row in the crosspoint ranges table to select that level.
- 4 Click the **Delete Level . . .** button. A dialog appears:



Click **Yes** to delete the level. Click **No** to cancel.

There is a shortcut. Right-click a row to cause the context menu to appear:



Choose **Delete Level . . .** and respond **Yes** or **No** to the dialog (shown above) that appears.

When you have finished deleting levels, click **Update Router Levels** to send the level configuration data to the routers. You should see a confirmation message:



Machine Control Routers Page



Summary

Click the 'Setup Machine Control Router' entry in the navigation pane to access the machine control routers page:

The screenshot shows a web interface with two main sections. The top section is titled 'Machine Control Port Settings' and contains a table with 17 rows. The first row is highlighted. Below the table is an 'Update Router' button. The bottom section is titled 'Network Frame Summary' and has three tabs: 'Machine Control Routers', 'Levels', and 'All CR Frames'. The 'Machine Control Routers' tab is active, showing a table with one row containing a radio button, the name 'D_PR', the frame type 'CR32-PR', and the IP address '192.168.97.23'. Below this table is a 'Refresh Summary' button.

Port Number	Port Type
1	SMPTE 207M Controlling
2	SMPTE 207M Dynamic
3	SMPTE 207M Dynamic
4	SMPTE 207M Dynamic
5	SMPTE 207M Dynamic
6	SMPTE 207M Dynamic
7	SMPTE 207M Dynamic
8	SMPTE 207M Dynamic
9	SMPTE 207M Dynamic
10	SMPTE 207M Dynamic
11	SMPTE 207M Dynamic
12	SMPTE 207M Dynamic
13	SMPTE 207M Dynamic
14	SMPTE 207M Dynamic
15	SMPTE 207M Dynamic
16	SMPTE 207M Dynamic
17	SMPTE 207M Dynamic

Update Router

Network Frame Summary

Machine Control Routers Levels All CR Frames

Edit	Name	Frame Type	IP Address
<input checked="" type="radio"/>	D_PR	CR32-PR	192.168.97.23
<input type="radio"/>			

Refresh Summary

The page has two regions. Above is a table in which you can configure each port of a machine control router.

Below is a 'Network Frame Summary'. You can select a machine control router in its 'Machine Control Routers' tab by clicking the radio button in the row for that machine control router. If your system has no machine control routers, this table will be empty.

Click 'Refresh Summary' at any time to be sure that you are viewing the most current information.

Background Information

CR Series machine control routers are different from other compact routers:

- Machine control routes are bidirectional. Unlike video or audio routers, information flows both ways.
- Machine control routes are point-to-point— one input connects to one output at most. (Some ports might be tristated in which case they connect to nothing.)
- The ports of machine control routers are RS-422 using RJ-45 connectors. Each port can be configured as a receiver or as a transmitter, either during configuration or dynamically as needed.

For more information about machine control signals, see [Signals](#) on page 92.

Note

Some external devices must be placed in “remote” mode to work with a machine control router.

Machine Control Port Types

Machine control routers do not have X/Y crosspoints *per se*, but allow point-to-point connections. One input may connect to (at most) one output.

The 1RU machine control router has 16 bidirectional serial ports (RJ-45). It supports up to 8 routes.

The 2RU machine control router has 32 bidirectional serial ports (RJ-45). It supports up to 16 routes.

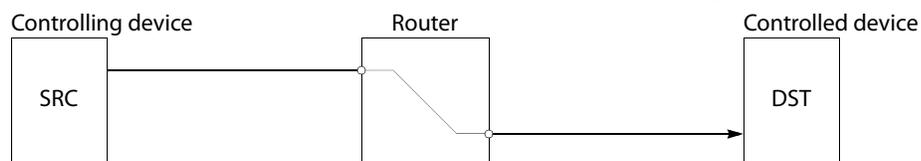
Machine control routers convey serial data, typically commands in one direction and responses in the other direction. Because the connections are bidirectional, a port is both an input and an output.

Machine control routers are defined as “data reverse” routers. Each port can be configured as dynamic, master, slave, controlling, or controlled.

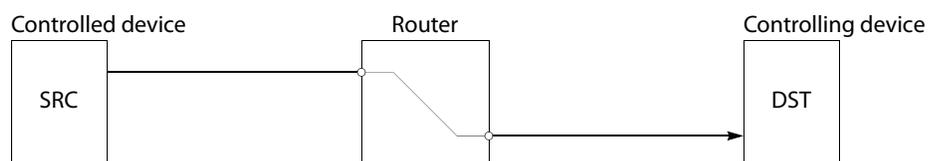
The machine control routers support serial communication up to 1 Mb/s.

Terms

A device can be considered a “controlled” device or a “controlling” device.



Above, the source device is a controlling device. A destination can also be the controlling device:



A controlling device sends commands to a controlled device. The controlled device passes responses (such as status) back to the controlling device. A source device can be a controlling device or a controlled device. A destination device can be a controlling device or a controlled device.

▲ Some external devices must be placed in “remote” mode to work with a port router.

A *controlling* port is one connected to a *controlling* device.

A *controlled* port is one connected to a *controlled* device.

The compact machine control routers operate in “data reverse” mode. This means that in any connection, the destination device is the controlling device by default. The default can be overridden by port type.

The 5 port types are variations of “controlled” or “controlling”:

Controlling	Master	Dynamic
Controlled	Slave	

It is in CRSC’s machine control routers page that you can specify the individual port types for a machine control router. See [How to Change a Port Type](#) on page 40.

Controlling or Controlled

These port settings fix the direction of the router port to “controlling” or “controlled.” The port’s connection for Tx and Rx—made during configuration—is static and does not change during operation.

Dynamic

A dynamic port in the router can be a controlling or controlled port depending on whether it is connected to a master port or slave port in the router. The port’s configuration is dynamic and can change during operation.

Dynamic ports are typically assigned to VTRs.

Master or Slave

Any dynamic port of the router connected to a “master” port of the router will be changed to a *controlled* port. A “slave” port is the opposite of a “master” port: any dynamic port connected to a slave port will be changed to a *controlling* port.

The compact router applies logic to the port direction setting when a master port is connected to a dynamic port. In this case, the machine at the dynamic port is always controlled and the machine at the master port is always *controlling*.

Machine Control Router Crosspoints

The display of machine control “crosspoint matrices” is different from that of other matrices.

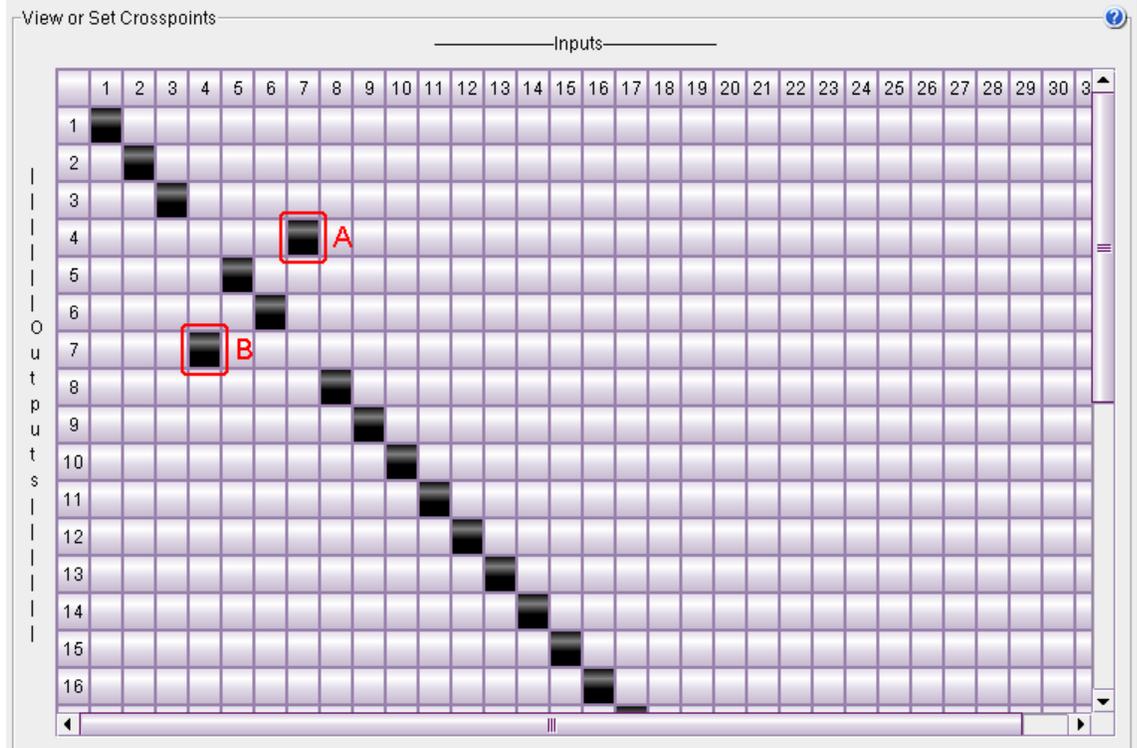


Fig. 5-1: Machine Control Crosspoints

See [Router Crosspoints Page](#) on page 55.

In the matrix of Figure 5-1, ports 4 and 7 are connected. The square (A) at row 4 and column 7 is highlighted. The square (B) at row 7 and column 4 is also highlighted.

For machine control crosspoints only, when you click on a square in column C and row R, the squares at positions (C,R) and (R,C) become highlighted.

If the two ports (in this example, ports 4 and 7) are dynamic ports, then clicking box A and clicking box B give different results. Either way connects ports 4 and 7, but clicking box B makes port 7 “controlled” whereas clicking box A makes port 7 “controlling.”

Clicking box A has the same effect as pressing destination (DST) 7 then source (SRC) 4 on a control panel.

Clicking box B has the same effect as pressing DST 4 then SRC 7 on a control panel.

Reminder: A controlling port is defined as one that is connected to a controlling device. A controlled port is one connected to a controlled device.

Reminder: A dynamic port is one that can change direction during operation. If a port is not dynamic, it cannot change from its configured state.

Thus, in general, clicking column C, row R has the same effect as pressing DST C then SRC R: columns are destinations and rows are sources.

Be aware that when a port appears on the diagonal of the matrix, it is tri-stated or disabled. It neither transmits nor receives. (Clicking a column head for a machine control router is a no-op.)

You can click the upper left corner of the crosspoint matrix (above and to the left of column 1, row 1) to force a “diagonal” take for the router. This places all the ports into tristate and they all appear on the diagonal of the displayed matrix.

Using the Machine Control Router Page

The ‘Machine Control Port Settings’ table displays all port types for the machine control router you select in the ‘Machine Control Routers’ table at the bottom of the page.

To change the port type, click an entry in the ‘Port Type’ column and select type from the drop-down list:

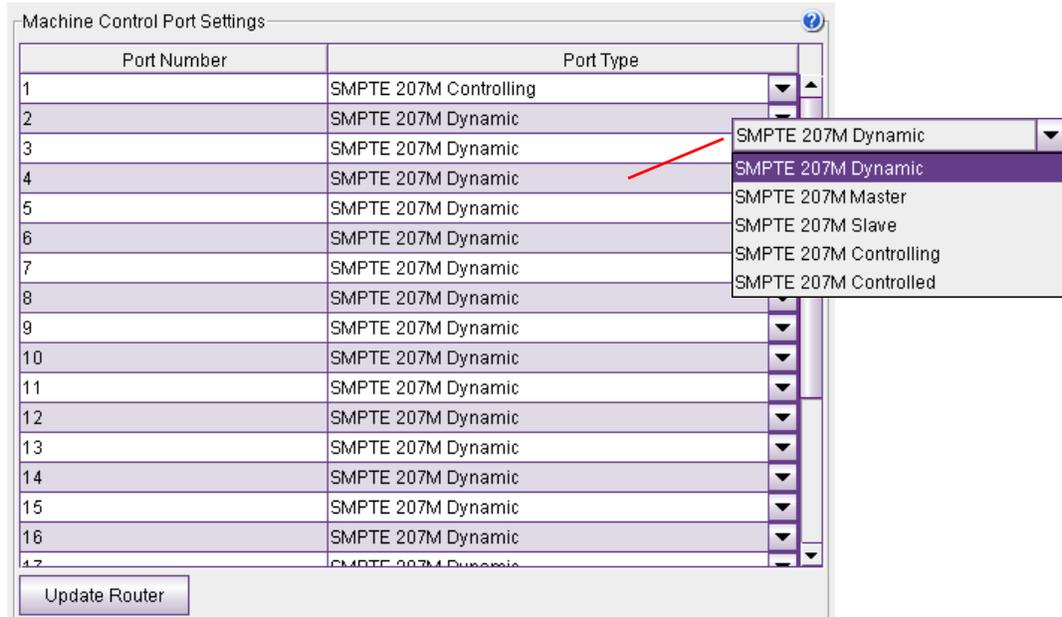


Fig. 5-2: Machine Control Port Specification

The ‘Machine Control Port Settings’ section displays the following:

Column	Description
Port Number	Port number of a port on the machine control router. Because machine control ports are bidirectional, these numbers represent both inputs and outputs.
Port Type	Port type assigned to the port. There are five port types. (See Machine Control Port Types on page 36.) Port types are selected from the drop-down list.

The 'Network Frame Summary' presents the following option and information:

Tab	Column	Description
Machine Control Routers	Edit	Select the radio button on the row listing the router you want to view or edit in the 'Machine Control Port Settings' table.
	Name	Name of the router.
	Frame Type	Type (model number) of router.
	Level(s)	Level numbers associated with the router.
	IP Address	IP address currently assigned to the device.
	Subnet Mask	Subnet mask currently assigned to the device.
Levels	Level	The level names (with level numbers).
	Signal Type	Type of signal(s) assigned to the level.
	Router	Router to which the level is assigned.
	Physical Inputs	The physical input and output ranges of the routers.
	Physical Outputs	
	Controller Sources	The "logical" input and output ranges of the router — as they might be identified on a remote panel.
	Controller Dest	
All CR Frames (lists all frames in the system)	Name	Name assigned to the router.
	Frame Type	Type (model number) of router.
	IP Address	IP address currently assigned to the router.
	Subnet Mask	Subnet mask currently assigned to the device.

How to Select a Machine Control Router

To select a specific router, locate the router in the 'Machine Control Routers' table of the 'Network Frame Summary' section and click on that row.

Details of the port settings for that router appear in the 'Machine Control Port Settings' table.

How to Change a Port Type

- 1 Select a machine control router. In the 'Machine Control Port Settings' table, locate the row listing the port number you want to change.
- 2 Click the field in the 'Port Type' column. In the drop-down menu that appears, choose a port type. There are five types of ports:
ControlledControllingDynamicMasterSlave
- 3 Repeat step 2 for other ports you want to change.
- 4 Click **Update Router**. CRSC uploads the port configurations to the router.

6 Remote Panels Page

Summary

Click the 'Program Remote Panels' entry in the navigation pane to access the remote panels page:

Remote Panel CP3232

Select Button Functions

Button Function: Device Name / Button Label: Panel Mode:

Configure Button's Inputs

Level	Input
1) HD	1
2) AES12	1
3) AES34	1
4) MC	1

Clear Table
Delete Row

Network Frame Summary

Remote Panels | Levels | All CR Frames

Edit/Update	Name	Frame Type	Panel Type	IP Address	Identify CP
<input type="radio"/>	D_RP32	RP32	CP3232	192.168.97.21	Identify CP

Refresh Frames | Remote Panel Configuration Options

Refresh Summary | New | Read Panel | Update Panel | Read from File... | Save to File...

A remote panel is a control panel mounted on a remote panel module. Using this page, you perform two major functions:

- Assign a control panel type to the remote panel module. (It is important actually to mount a control panel of that type to the remote panel module. Otherwise, the remote panel will perform incorrectly, if at all.)
- Configure the remote panel module to support control panel functions for the panel type you selected. (This can be complex.)

Page Layout

There are 4 sections in the page:

- Near the bottom of the page, a 'Network Frame Summary'.
This section has 3 tabbed table. Use the 'Remote Panels' tab to select a remote panel module for editing or to change the panel type associated with the remote panel module. The other two pages are for information only.
- At the top of the page, a control panel image. This section is empty (black) if you have not selected a remote panel module in the 'Remote panels' tab. This image shows the buttons of the panel possibly with mnemonic labels. Click on any button in the image to view the button's present configuration and to edit the button's configuration.
- In the middle of the page, a place to configure the buttons you select in the graphic image.
- At the very bottom of the page are 6 buttons.
Click 'Refresh Summary' at any time to be sure that you are viewing the most current information.
The other 5 buttons are configuration options.

Network Frame Summary

These are the fields of the tabs in the 'Network Frame Summary':

Tab	Column	Description
Remote Panels	Edit/Update	Click the radio button in the row displaying the remote panel module you want to view or edit.
	Name	Name of the remote panel.
	Frame Type	Type of remote panel module by model number.
	Panel Type	Click this field if you wish to change the panel type assigned to the remote panel module.
	IP Address	IP address currently assigned to the device.
	Identify CP	When you click Identify CP , the remote panel listed on that row identifies itself by displaying a moving pattern of button lights. This feature is helpful if you forget which panel of possibly many is represented by the particular IP address. The moving button lights continue indefinitely. To turn off the pattern, click any button on the panel or click Identify CP again.
Levels	Level	The level name and number.
	Router	The router to which the level is assigned.
	Frame Type	The type (model number) of router.
	Router IP	The IP address assigned to the router.
	Physical Inputs	The physical input and output ranges of the routers.
	Physical Outputs	
	Controller Sources	The "logical" input and output ranges of the router —as they might be identified on a remote panel.
	Controller Dest	

Tab	Column	Description
All CR Frames	Name	Name assigned to the CR Series device.
	Frame Type	Type (model number) of CR Series device.
	Panel Type	Type (model number) of control panel associated with a remote panel module. The field is blank if the device is not a remote panel module.
	Subnet Mask	Subnet mask currently assigned to the device.

Remote Panel Configuration Options

These are the 5 configuration options:

- **New**
Click this button to create a new configuration for the selected remote panel module.
- **Read Panel**
Click this button to upload the configuration from the selected remote panel module.
- **Update Panel**
Click this button to download the present configuration to the selected remote panel module. Clicking this button is required to complete the remote panel configuration.
- **Read from File**
Click this button to get the configuration from a saved configuration file.
- **Save to File**
Click this button to save the present configuration to a file. You can use the saved file to configure one or more remote panel modules.

For general information on operating a panel, see [Operation](#) on page 123. For more detailed information see the *CR Series Compact Router User's Guide*.

Background Information

A remote panel is a control panel mounted on a remote panel module.

A remote panel sends control messages to a network of routers and receive status information from the network.

These panels are "remote" because they need not be attached to a router and can be used at a distance, as far as cable restrictions allow.

Terms

It is a good idea to review the following definitions:

- An **input** or an **output** is a single port at the rear of a compact router. Different routers have different kinds of connectors (e.g., BNC, DB25, RJ-45).
- A **source** is a set of inputs on one or more routers, on one or more levels. The inputs might, or might not, belong to a single physical device.
- A **destination** is a set of outputs on one or more routers, on one or more levels. The outputs might, or might not, belong to a single physical device.

- A **salvo** is a list of 'takes' that execute, in the order you define them, when a panel operator presses a salvo button. A take in a salvo comprises 3 values: level, input and output. A single take involves both an input and an output on a single level.

Operators control a CRSC system using remote panels. An operator is presented with a large number of arbitrary button definitions. It is the configurator's task to produce a panel that is easy to understand and to use:

- When your system has multiple panels, exercise caution so that you do not create panel configurations that conflict with each other.
- Avoid configuring source buttons and destination buttons that do not match the actual router connections and the numbering given by the router partitions.
- Create meaningful button legends that accurately describe what the button does. There are button templates available on the installation CD (SB0033-xx).

"Captive" Panels

Captive panels are control panels that are mounted on a compact router and not on a remote panel module. CRSC cannot detect or configure captive panels.

When a router is in CRSC mode, the captive panel controls only that router.

However, when the router is in default mode, the captive panel controls that router and all routers in the router's stand-alone network.

A captive panel displays status according to the inputs and outputs of the compact router on which it is mounted.

Remote Panel Modes

Remote panels operate in one of three modes: standard, enhanced hold and enhanced no-hold.

Standard Mode

In standard mode, takes are performed on (manually) selected levels only.

Level selection is persistent and at the discretion of the panel operator. Once the operator makes a level selection, it remains until the operator changes the selection. The current level selection enables some sources and destinations and disables others. The sources and destinations that are enabled depend on which level button has precedence.

If no levels are selected, no sources or destinations are enabled. A take cannot occur.

If the panel has no level buttons, all of a destinations' levels are always selected and all destinations are enabled.

Which level button has precedence depends on the order of level buttons on the panel and the order in which the operator presses the level buttons.

Standard mode allows breakaway. A breakaway is when you route to some, not all, of a destination's levels. By default, all valid levels are automatically selected when you set up a take. By creating a breakaway, you route only to the levels you have individually selected. To determine what sources are presently routed to a destination might require a few button presses.

Enhanced Mode (Hold and No-hold)

'Takes' are performed on all the levels specified by the destination.

In enhanced mode, level selection is applicable only to breakaway. Level selection governs the selection of sources for the breakaway. All sources and destinations are always enabled. The choice between hold mode and no-hold mode is meant to accommodate operator or administrator preferences.

Enhanced mode has 2 submodes:

- Hold mode— the level selection persists after the destination button is pressed (initiating a take) and until the operator changes it. This allows an operator to try different sources. To clear a breakaway, the operator starts a new normal take to that destination.
- No-hold mode— a level selection reverts to the levels defined by the destination after the operator presses a source button (completing a take). To clear a breakaway, either start a new normal take to that destination or press a source without a level selection.

Salvos

A “salvo” is a list of predefined (simple) takes. Salvos are usually defined because their operations are commonly repeated over and over. By assigning a salvo to a button, an operator need only press the one button to execute the take sequence rather than many. When an operator presses a salvo button, the ‘takes’ execute very rapidly and in sequence, but not simultaneously. The salvo button lights turns bright during the salvo execution and returns to dim at completion.

Salvos do not:

- Execute source selections, destination selections, or level selection functions.
- Execute other salvos. (That is, salvos cannot be nested.)
- Contain loops or branches.

A simple take is expressed in CRSC as 3 values: level, input and output. These three values uniquely define a crosspoint in the set of routers and router partitions.

A salvo can include up to 32 simple takes. A panel configuration can have up to 32 individual salvo buttons. (In practice, a panel would rarely have that many salvo buttons.) Each panel can have a different set of salvos.

If multiple salvos execute simultaneously, it is likely that their effects will be in conflict. There is an exception: if two or more salvos have no outputs in common, they can safely run at the same time. It is not possible to execute multiple salvos simultaneously from a single panel.

If a salvo attempts an impossible take (e.g., one on a non-existent level), it will try the take and wait for a response 5 times before proceeding. This means that salvos that have errors take noticeably longer to execute than salvos without errors. A salvo without errors should take only a fraction of a second to execute.

Using the Remote Panels Page

Selecting a Remote Panel Module

At the bottom of the page, in the 'Network Frame Summary' is a 'Remote Panels' tab:

Remote Panels						
Levels						
All CR Frames						
Edit/Update	Name	Frame Type	Panel Type	IP Address	Identify CP	
<input checked="" type="radio"/>	D_RP32	RP32	CP3232	192.168.97.21	Identify CP	
<input type="radio"/>	D_RP16	RP16	CP1616	192.168.97.20	Identify CP	

Fig. 6-1: Remote Panels Tab

Click the radio button in the row of the remote panel module that want to view or edit.

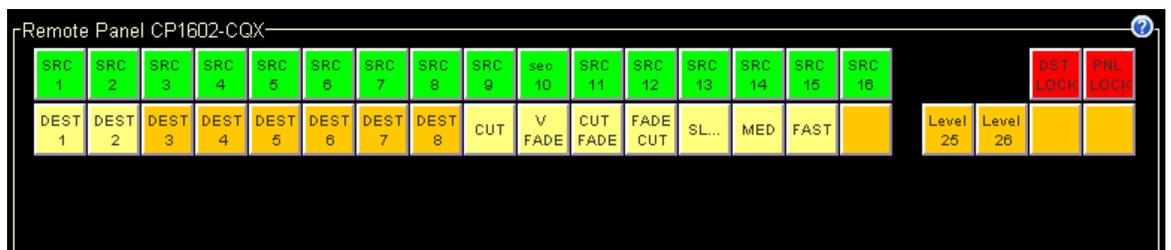
You can specify the panel type that is assigned to this remote panel module by clicking in the 'Panel Type' field of the selected row. A drop-down list of panel types appears. Choose a panel type from that list.



CQX Panels

The 'Remote Panels' page supports remote panel modules to which a CP1602-CQX is attached. Because the CP1602-CQX is unique, the support for it is unique.

If you have a CP1602-CQX mounted on an RP16, you can select "CP1602-CQX" in the 'Panel Type' drop-down list. The page will display an image of the CP1602-CQX as the panel graphic:



However, the configuration of the CP1602-CQX is *fixed*. You cannot edit the configuration. Nor can you change the panel mode.

Nevertheless, you must click 'Update Panel' to assign the CP1602-CQX configuration to the remote panel module. (Or click 'Save to File . . .' to save the configuration for later use.)

Assigning the CP1602-CQX configuration to the remote panel module allows operators to control transition rate and transition types remotely.

Defining Button Functions

After you have selected a remote panel module and assigned it a panel type, the remaining task is to configure the panel. This takes a certain amount of planning — away from CRSC — to know what you want your panel to do.

There are two steps:

- Select a panel mode: (1) standard, (2) enhanced with hold, or (3) enhanced without hold. The button functions differ subtly depending on the mode.
- Define one or more button functions.

Any button on any remote panel can be configured to perform one of 4 functions: destination selection, level selection, source selection, and salvo execution.

Buttons that you do not define remain undefined (“unused” in the drop-down list) and are unlit (dark) when the panel is in use.

The buttons in the graphic image of the configuration page correspond in number and position to the buttons of the actual control panel.

The ‘Destination Lock’ and ‘Panel Lock’ buttons (both red in the panel graphic) are not configurable.

Selecting a Panel Mode

In the ‘Panel Mode’ field, select a mode of operation from the drop-down list:

- ‘Standard’
- ‘Enhanced — Hold’
- ‘Enhanced — No Hold’

For a description of each mode, see [Remote Panel Modes](#) on page 44.

Destination Selection Buttons

To configure a button as a destination button:

- 1 Click on the image of the button you want to configure.
- 2 Choose ‘Destination’ from the ‘Button Function’ drop-down list. The ‘Configure Button’s Outputs’ table appears. It has 8 rows. Each row is a level/output pair. Remember that a level is equivalent to a partition. See [Partitions and Levels](#) on page 93.

Select Button Functions		
Button Function	Device Name / Button Label	Panel Mode
Destination	DEST 5	Standard

Configure Button's Outputs		
Level	Output	
1) HD	5	
2) AES12	5	
3) AES34	5	
4) MC	5	

Clear Table
Delete Row

Fig. 6-2: Destination Button Fields

At the right are two buttons, 'Clear Table' and 'Delete Row'. 'Clear Table' erases the entire list of levels. 'Delete Row' removes a single row (i.e., a single level) from the table.

3 Enter (level, output) pairs on rows of the table. Click on 'Level' field to select a level from drop-down list. Click in the 'Output' field to enter an output number.

The purpose of the table is to identify the output ports that compose the destination. Each output belongs to a different router partition or level.

The outputs you specify are *in the range you specified as the "Controller Outputs"* in the 'Router Levels' page. See [Using the Router Levels Page](#) on page 29.

For example, suppose a 32x32 AES router is divided into 4 equal partitions:

Level A = outputs 1–8,

Level B = outputs 9–16,

Level C = outputs 17–24,

Level D = outputs 25–32 where each level starts counting at output 1.

When entering an output on level C, you specify an output in the range 1–8, not 17–24. Output 3 of level C is router output 19 (in this example). You would specify (level C, output 3) in the table and run cable to the router's output BNC numbered 19.

Entries in the 'Level' column are drop-down lists and list all available levels. The number of choices diminishes as you add levels to the destination button's list. CRSC does not allow you to represent the same level more than once.

How you organize levels is up to you. It is recommended that you place, as the first entry in the list, the level you want to be considered the primary level. Typically this would be a video level.

Special Case:

The CP3201 does not have destination buttons. The CP3201 is a single-destination control panel. The panel has an implicit destination that is not operator-selectable. (The button does, however, appear, *in the configuration page for a CP3201*, just to the left of the **Destination Lock** button.)

To configure the implicit destination of a CP3201, select the button labeled 'DEF DEST' and specify its levels and outputs as you would any ordinary destination.

The default destination does not correspond to any physical button an operator can press.

Level Buttons

A level is a partition within a router. A group of levels identifies the router partitions that can be switched simultaneously by a take performed at a control panel.

To configure a button as a level button,

- 1 Click on the image of the button you want to configure.
- 2 Choose 'Level' from the 'Button Function' drop-down list. A drop-down list of defined levels appears in the 'Level Setup' section. Select a level from the drop-down list.

Select Button Functions

Button Function: Level | Device Name / Button Label: Level 1 | Panel Mode: Standard

Level Setup

Select a Level: 1) HD

Fig. 6-3: Level Button Fields

A panel requires at least one level button for every level to be controlled at the panel. 'Takes' do not occur on unselected levels. A level cannot be selected unless it is on a button, with one exception: If a panel has **no** level buttons defined, 'takes' and locks occur on **all** levels defined for the destination selected.

Salvo Buttons

A salvo is a stored set of simple takes. A simple take connects one router input to one router output, on a designated level. You can define up to 32 different salvos for a panel.

To configure a button as a salvo button:

- 1 Click on the image of the button you want to configure.
- 2 Choose 'Salvo' from the 'Button Function' drop-down list. A table appears that shows the sequence of takes. The salvo (one of 32) is identified by number at the left.

Select Button Functions

Button Function: Salvo | Device Name / Button Label: Salvo 3 | Panel Mode: Standard

Configure Salvo Buttons

Salvo	Level	Input	Output
3	1) HD	1	1
	2) AES12	1	1
	3) AES34	1	1
	4) MC	1	1

Buttons: Clear Table, Delete Row

At the right are two buttons, 'Clear Table' and 'Delete Row'. 'Clear Table' erases the entire list of takes. 'Delete Row' removes a single row (i.e., a single take) from the table.

See [Salvos](#) on page 45.

- 3 Choose the salvo number you want to use for the salvo button in the 'Salvo' drop-down list at the left. (Salvos are numbered from 1 to 32.)
- 4 Enter simple take data in each row of the table until you have completed the salvo. (A salvo can include up to 32 simple takes.)

A simple take entry consists of a level specification in the 'Level' column, a router input in the 'Input' column and a router output in the 'Output' column.

The input and output numbers are "controller" numbers, not physical I/O numbers.

A zero value in any of the fields renders the take a no-op.

A salvo can perform up to 32 'takes'. The 'takes' execute sequentially.

Salvos execute in the remote panel. Salvos do not contain loops. It is indeterminate what happens when salvos from more than one remote panel execute simultaneously.

Source Selection Buttons

To configure a button as a source button:

- 1 Click on the image of the button you want to configure.
- 2 Choose 'Source' from the 'Button Function' drop-down list. The 'Configure Button's Inputs' table appears. It has 8 rows. Each row is a level/output pair. Remember that a level is equivalent to a partition.

Level	Output
1) HD	4
2) AES12	4
3) AES34	4
4) MC	4

Fig. 6-4: Source Button Fields

At the right are two buttons, 'Clear Table' and 'Delete Row'. 'Clear Table' erases the entire list of levels. 'Delete Row' removes a single row (i.e., a single level) from the table.

- 3 Enter (level, output) pairs on rows of the table. Click on 'Level' field to select a level from drop-down list. Click in the 'Output' field to enter an output number.

The purpose of the table is to identify the input ports that compose the sources. Each input belongs to a different router partition or level.

The inputs you specify are *in the range you specified as the "Controller Inputs"* in the 'Router Levels' page. See [Using the Router Levels Page](#) on page 29.

For example, suppose a 32×32 AES router is divided into 4 equal partitions:

Level A = outputs 1–8,

Level B = outputs 9–16,

Level C = outputs 17–24,

Level D = outputs 25–32 where each level starts counting at output 1.

When entering an input on level C, you specify an input in the range 1–8, not 17–24. Input 3 of level C is router input 19 (in this example). You would specify (level C, input 3) in the table and run cable to the router's input BNC numbered 19.

Entries in the 'Level' column are drop-down lists and list all available levels. The number of choices diminishes as you add levels to the source button's list. CRSC does not allow you to represent the same level more than once.

How you organize levels is up to you. It is recommended that you place, as the first entry in the list, the level you want to be considered the primary level. Typically this would be a video level.

Unused

A fifth entry appears in the 'Button Functions' drop-down list—*unused*. Buttons that you designate "unused" perform no function (and remain unlit on the panel).

How to Upload an Existing Panel Configuration

You can upload, view, and modify a panel configuration from a remote panel module.

- 1 Go to the 'Program Remote Panels' page.
- 2 In the 'Remote Panels' tab at the bottom of the page, click the radio button in the 'Edit/Update' field of the remote panel module you want to upload.

The CRSC software automatically reads the configuration from the remote panel module and displays its details in the panel image. If there is no configuration, a default configuration is automatically created.

How to Create a New Panel Configuration

- 1 Go to the 'Program Remote Panels' page.
- 2 In the 'Remote Panels' tab at the bottom of the page, click the radio button in the 'Edit/Update' field of the remote panel module for which you want to create a new configuration.
- 3 Click **New**. A 'New Control Panel' dialog box appear:



- 4 Select a control panel type from the drop-down list.
- 5 If your panel type is CP1602-CQX, skip to step 8.

Note that if you are creating a configuration for a CP1602-CQX, the treatment of the configuration is unique among panel types. See [CQX Panels](#) on page 46.

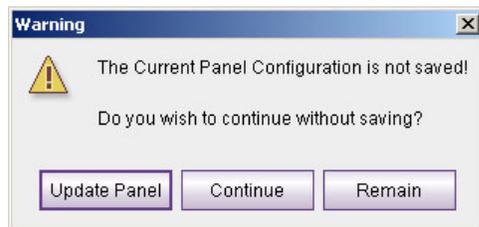
- 6 Choose a panel mode: 'Standard', 'Enhanced – Hold', or 'Enhanced – No Hold'.
See [Remote Panel Modes](#) on page 44
- 7 Define button functions:
 - a Click on the image of a button in the panel graphic at the top of the page.
 - b From the 'Button Function' drop-down list, select a button function (or do nothing and accept the present button definition).
 - c Fill in each field as needed for the type of button. The fields vary with the button function:
 - [Destination Selection Buttons](#) on page 47.
 - [Level Buttons](#) on page 49.
 - [Salvo Buttons](#) on page 49.
 - [Source Selection Buttons](#) on page 50.
 - [Unused](#) on page 51.
 - d In the 'Device Name/Button Label' field, enter a mnemonic for the button and press <enter> on your keyboard. The mnemonic you enter appears in the panel graphic at the top of the page (only).
- 8 Save the panel configuration. Either . . .
Click **Update Panel** to write the button configuration to the remote panel module.

Note

The configuration is stored in the remote panel module. If you later change the panel type assigned to the remote panel module, it might not work properly with this configuration.

Or, click **Save to File** to save the configuration in your PC's file system. The extension for panel configuration files is . pfg. You can later open this file or other saved files to download to remote panel modules.

- 9 If you leave the remote panels page before you have saved your remote panel configuration, CRSC will give you a warning:



How to Change a Button Function

- 1 Go to the 'Program Remote Panels' page.
- 2 In the 'Remote Panels' tab at the bottom of the page, click the radio button in the 'Edit/Update' field of the remote panel module for which you want to create a new configuration.
- 3 In the panel graphic at the top of the page, click on the button you want to change.
 - a From the 'Button Function' drop-down list, select a function — if you want to change the function type.

b Fill in each field as needed for the type of button. The fields vary with the button function:

- [Destination Selection Buttons](#) on page 47.
- [Level Buttons](#) on page 49.
- [Salvo Buttons](#) on page 49.
- [Source Selection Buttons](#) on page 50.
- [Unused](#) on page 51.

c In the 'Device Name/Button Label' field, enter a mnemonic for the button and press <enter> on your keyboard. The mnemonic you enter appears in the panel graphic at the top of the page (only).

4 When you have finished defining button functions, click **Update Panel** to write the button configuration to the remote panel.

5 *Important!* Click **Save to File** to save the configuration in your PC's file system. The extension for panel configuration files is .pfg.

How to Change the Panel Mode

- 1 Go to the 'Program Remote Panels' page.
- 2 In the 'Remote Panels' tab at the bottom of the page, click the radio button in the 'Edit/Update' field of the remote panel module for which you want to create a new configuration.
- 3 In the 'Panel Mode' field, select a mode of operation from the drop-down list:
 - 'Standard'
 - 'Enhanced—Hold'
 - 'Enhanced—No Hold'

For a description of each mode, see [Remote Panel Modes](#) on page 44.

7 Router Crosspoints Page

Summary

Click 'View Router Crosspoints' in the navigation pane to access the crosspoints page.

The screenshot displays the 'View or Set Crosspoints' interface. It features two tabs: 'Graphic View' (selected) and 'Table View'. The main area is a 14x30 grid representing the router matrix. The columns are labeled 'Inputs' (1-30) and the rows are labeled 'Outputs' (1-14). Black squares indicate active crosspoint connections, and a red square indicates a locked connection. The connections are as follows:

Output	Input 1	Input 2	Input 3	Input 4	Input 5	Input 6	Input 7	Input 8	Input 9	Input 10	Input 11	Input 12	Input 13	Input 14	Input 15	Input 16	Input 17	Input 18	Input 19	Input 20	Input 21	Input 22	Input 23	Input 24	Input 25	Input 26	Input 27	Input 28	Input 29	Input 30
1	Black																													
2					Black																									
3						Black																								
4							Black																							
5											Red																			
6										Black																				
7															Black															
8																														
9																														
10																														
11																														
12																														
13																														
14																														

Below the grid is the 'Network Frame Summary' section, which includes tabs for 'Routers', 'Levels', and 'All CR Frames'. The 'Routers' tab is active, showing a table with the following data:

Select	Name	Frame Type	IP Address	Reference
<input checked="" type="radio"/>	D_32HD	CR3232-HD	192.168.97.22	NONE
<input type="radio"/>	D_PR	CR32-PR	192.168.97.23	NONE
<input type="radio"/>	D_32AES	CR3232-AES	192.168.97.24	NONE
<input type="radio"/>	D_6464	CR6464-3Gig	192.168.97.25	NONE

At the bottom of the summary section are four buttons: 'Refresh Summary', 'Undo Last Take', 'Diagonal Take...', and 'Range Take...'.

In this page, you can view router crosspoints and perform 'takes' (i.e., make crosspoint connections). The upper portion of the page provides either a graphic or a tabular representation of the router matrix.

Each black (or red) square is a crosspoint connection. Empty squares represent the absence of a connection. (A red square indicates that a crosspoint connection is locked.)

Router Crosspoints Page Summary

The grid that appears in the graphics view crosspoints page represents a router's *entire* crosspoint matrix, without regard to partitioning. The table view also represents the router's entire crosspoint matrix without regard to partitioning.

This is a sample of the tabular view of the crosspoints page that represents the same crosspoint state as the graphic view shown previously:

View or Set Crosspoints
?

Graphic View Table View

Output	Input	Locked	Lock Id	Locked By Panel	Status
1	5				
2	3				
3	6				
4	7				
5	11				
6	9				
7	4				
8	4				
9	15				
10	16				
11	16				
12	16				
13	16				
14	16				
15	9				
16	16				
17	17				
18	14				
19	17	🔒	0000	Self	
20	17				
21	15				
22	5				
23	1				
24	1				
25	17				
26	5				

Network Frame Summary

Routers Levels All CR Frames

Select	Name	Frame Type	IP Address ▲	Reference
<input checked="" type="radio"/>	D_32HD	CR3232-HD	192.168.97.22	NONE
<input type="radio"/>	D_PR	CR32-PR	192.168.97.23	NONE
<input type="radio"/>	D_32AES	CR3232-AES	192.168.97.24	NONE
<input type="radio"/>				

🔄 Refresh Summary
↶ Undo Last Take
📐 Diagonal Take...
📏 Range Take...

Near the bottom of the page is a 'Network Frame Summary'. This section has 3 tabbed tables. Use the 'Routers' tab to select a router for which you can view or change the crosspoints. The other two tables are for information only.

Buttons

At the very bottom of the page are 4 buttons:

- Refresh Summary.
Click **Refresh Summary** at any time to be sure that you are viewing the most current information.
- Undo Last Take.
Click **Undo Last Take** if you make a mistake and perhaps forget what you did.
The 'Undo Last Take' can undo multiple takes — one at a time, the most recent one first.
- Diagonal Take.
Click **Diagonal Take** to perform a diagonal take. See [Diagonal Takes](#) on page 63 for information.
- Range Take.
Click **Range Take** to perform a diagonal take. See [Range Takes](#) on page 67 for information.

The Table View

You can use the table view to perform takes and to see lock status and take status for each of the router's outputs. The columns of the table are as follows:

Column	Description
Output	Each row in the table is a router output. The number in the output column identifies the output.
Input	The input that has been routed to the output
Locked	A lock icon in this column means the output is locked. If a field of the column is clear, the output is unlocked.
Lock ID	An identification number for the user that applied a lock.
Status	When a take is performed, the column indicates the success of the take. You can hover your mouse over an entry in the column to show the time the take occurred and a summary of the take. Typical status results are "Success" or "Destination Locked."

In the table view, you can select a range of outputs (multiple contiguous rows) for the purpose of a copy or a range take. See [Copying and Pasting Crosspoint Data](#) on page 60. It is not possible to make a disjoint selection.

The Graphic View

Columns in the graphic view (or grid) are inputs; rows are outputs. There are as many rows and columns as supported by the router. For example, a 16x4 router will have 16 columns and 4 rows.

There are exceptions:

- 1 Except for the CR6464-AES, the grid for AES routers shows twice as many rows and columns because there are two channels for a single input or output. For example, a 32x32 AES router has a 64x64 matrix. AES routers have additional behavioral aspects. (See [About AES Crosspoints](#), following.)

The CR6464-AES has a 64x64 matrix of stereo pairs. For the CR6464, the crosspoint view displays a 64x64 grid.

- 2 The display for CQX routers is a special case. The first two rows represent the 2 CQX outputs. The remaining 6 rows represent the router's "auxiliary" outputs.
- 3 The grid for machine control routers shows rows and columns as if there were a crosspoint matrix in the router. But, as you might recall, machine control routers are point-to-point routers and their connectors are bidirectional. Consequently, two black squares represent a machine control route. For instance, if you route port 5 to port 9, the square at (row, column) = (5,9) and the square at (9,5) are both black. That is because each port is both an input and an output.

If a black square appears on the diagonal of a machine control matrix, it means the port is tristated (i.e. disconnected).

In the graphic view, you cannot select any outputs as you can in the table view.

Page Basics

You can use the 'View Router Crosspoints' page to view or set crosspoints (i.e., perform "takes"), to view output status, and to save and load crosspoint matrix data.

You can perform the same operations using the graphic view or the table view.

- ▲ Crosspoint changes you make in this page are immediately made in the crosspoint matrix of the router.

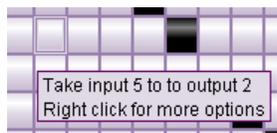
The crosspoints page can change because of external events. That is, panel operators can perform takes and locks at any time, changing the router crosspoints. Any crosspoint change made by a panel operator is reflected (almost) immediately in the 'View Router Crosspoints' page.

Graphic View

You can perform simple takes in the graphic view of the crosspoints page by clicking a cell where an input (column) intersects an output (row). For example, to take input 7 to output 11, click the cell at column 7 and row 11. The cell turns black indicating that it is a crosspoint connection.

(There are some exceptions to this and variations of this. When an output is locked, a take does to that output not occur. The display and router behavior is different when the router is AES stereo (except for the CR6464-AES). The display and router behavior is different when the router is a machine control router.)

If you hover your mouse over a square, a help message appears:



This message tells you the connection you will make if you click the square.

(The message also tells you that you can right-click the crosspoint matrix to obtain a context menu that has 7 additional commands. See [Context Menu](#), following.

Note: to undo the most recent take, click **Undo Last Take** at the bottom of the page.

Table View

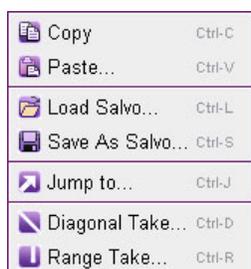
You can perform simple takes in the table view of the crosspoints by entering a new port number in the input field of a row that corresponds to the desired output. The status field of that row indicates whether the take succeeded.

(There are some exceptions to this and variations of this. When an output is locked, a take does to that output not occur. The display and router behavior is different when the router is AES stereo (except for the CR6464-AES). The display and router behavior is different when the router is a machine control router.)

(You can right-click the crosspoint table to obtain a context menu that has 7 additional commands. See [Context Menu](#), next.

Context Menu

The context menu (obtained by right-clicking within the graphic view or table view has a set of 7 commands:



The following describes the context menu commands:

Menu Option	Icon	Description
Copy		Copies either selected rows or the entire crosspoint matrix to the Windows clipboard. See Copying and Pasting Crosspoint Data , following.
Paste		Initiates a dialog in which you can paste the clipboard contents (which must be a valid set of outputs and inputs) into the current crosspoint view. Doing this affects the router as well as the 'View Router Crosspoints' page. See Copying and Pasting Crosspoint Data , following.

Menu Option	Icon	Description
Load Salvo		Opens a salvo file and executes it. A salvo is a “snapshot” of the entire crosspoint matrix that has been saved earlier. See Salvos on page 62.
Save As Salvo		Saves the entire crosspoint matrix as a salvo file (a “snapshot”) for later use. See Salvos on page 62.
Jump to ...		Opens the ‘Jump to ...’ dialog. This command causes CRSC to display the specified input and output in the crosspoint view. See Jumping to Outputs on page 62.
Diagonal Take		Opens the ‘Diagonal Take’ dialog. In this dialog, you can connect a contiguous range of inputs to a contiguous range of physical outputs. For example, input 1 to output 1, input 2 to output 2, and so on. You can click Reverse in the dialog to obtain a reverse diagonal take. See Diagonal Takes on page 63.
Range Take		Opens the ‘Range Take’ dialog. Using this dialog, you can connect one input to a contiguous range of outputs. See Range Takes on page 67.

Copying and Pasting Crosspoint Data

Using the **Copy** and **Paste** commands (available in the context menu) you can transfer crosspoint data to and from any file in your file system that will accept the data (which is plain text). Microsoft Excel, Word, and Notepad are suitable file formats.

You can copy or paste a selected part of a crosspoint as small as a single row, or you can copy or paste entire matrix. Any set of selected rows will always be contiguous.

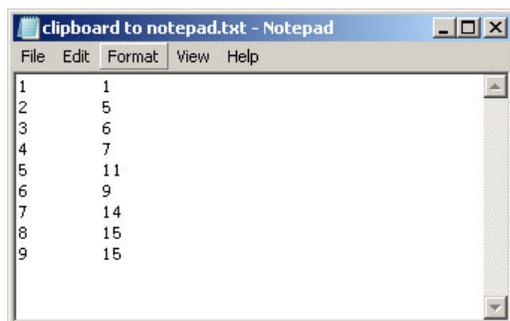
Copy

To copy a portion of a crosspoint matrix (to the clipboard), select a set of rows in the displayed crosspoint matrix. Then type Ctrl-C or select **Copy** from the context menu.

To copy an entire crosspoint matrix (to the clipboard), deselect all rows in the displayed crosspoint matrix. Then type Ctrl-C or select **Copy** from the context menu.

A copy places the data on the Windows “clipboard.” As long as the data remain on the clipboard, you can paste it any document that will accept the data.

This is an example of a range of crosspoint data copied to NotePad:



Paste

The 'Paste' command updates the currently displayed crosspoint matrix with the contents of the Windows clipboard.

If the clipboard represents a range of outputs smaller than the crosspoint matrix, only those outputs are changed. If the clipboard represents the entire matrix, then of course, the entire matrix is changed.

Pasting *replaces* the crosspoint data with the data on the clipboard. Outputs that are not specified in the clipboard data are not affected.

To issue the paste command, type Ctrl-V or select **Paste** from the context menu. The 'Paste Crosspoints' dialog opens, displaying the clipboard contents:



(The clipboard contents must be a valid list of crosspoints.)

Using this dialog, you can preview the data to be pasted. (You cannot edit the data to be pasted.)

There are 3 options in the dialog:

- Output

Treat the first column of the clipboard data as *outputs*. The second column then holds inputs.

- Input

Treat the first column of the clipboard data as *inputs*. The second column then holds outputs.

- Preview Final Result

If you check this check box, *all* the inputs of the crosspoint matrix are shown in the paste dialog as they will appear after the paste.

If you do not check this check box, the input fields for outputs not listed in the clipboard contents are left blank.

Salvos

A salvo is a “snapshot” of the crosspoint state that you save in a file.

Save as Salvo . . .

The ‘Save as Salvo . . .’ command saves the current crosspoint state in a salvo file. Salvo files have the extension *.salvo* or *.svo*.

- ▲ Be careful with salvo file names. Other software can create salvo files having *.svo* (or *.salvo*) extensions. If you store CRSC salvos in a folder used by other software, you might not remember which files are CRSC salvos.

When you click this command, CRSC presents an dialog in which you browse your file system to name the file and place it in a folder of your choice.

Subsequently, you can use the salvo file to restore the crosspoint matrix to a previous state.

Load Salvo . . .

The ‘Load Salvo . . .’ command executes a salvo. When you click this command, CRSC presents a dialog in which you browse your file system to locate the salvo file you want. When you click OK in that dialog, CRSC executes the salvo. That is, it replaces the current crosspoint state with the crosspoint state saved in the salvo file.

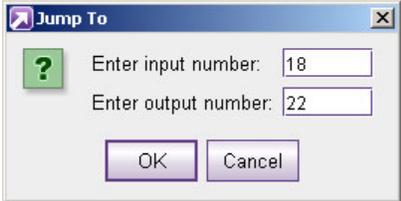
Jumping to Outputs

The crosspoints page has a ‘Jump to . . .’ command. The command causes the crosspoint view to scroll so that the output (and input) you want to view is displayed in the top row, and as close horizontally to the center of the window as possible.

To jump, right-click the crosspoint view. Then click the ‘Jump to . . .’ command.

The dialog in the graphic view is slightly different from the dialog in the table view.

This is the dialog under the graphic view:



It has 2 field in which to enter an output and an input. Simply enter numbers in those fields and click OK.

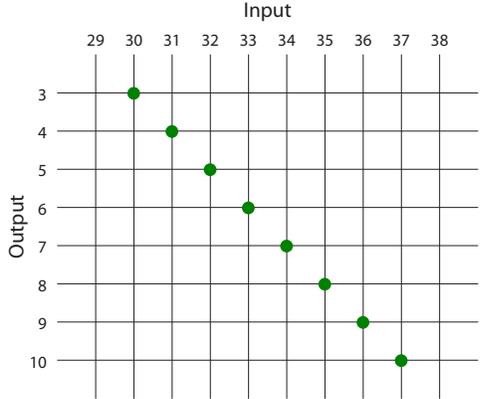
This is the dialog under the table view:



It has only an output field. Simply enter an output number in that field and click OK.

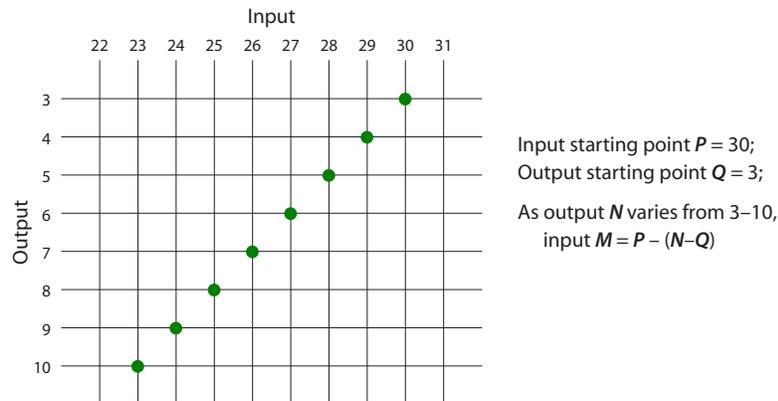
Diagonal Takes

A diagonal take connects inputs M to outputs N , in *ascending* order, given an input starting point that you specify:



Input starting point $P = 30$;
Output starting point $Q = 3$;
As output N varies from 3–10,
input $M = P + (N - Q)$

A reverse diagonal take connects inputs M to outputs N , in *descending* order, given an input starting point that you specify:



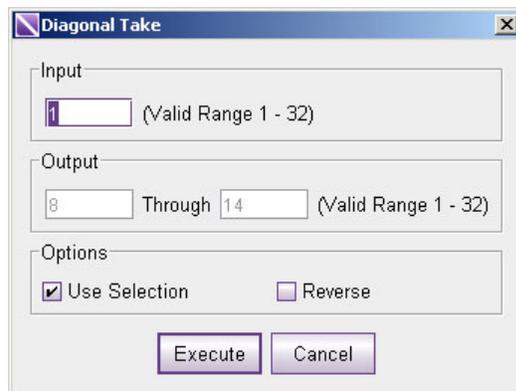
If the resulting input would fall out of the absolute range of the crosspoint matrix, an individual take is not performed. CRSC will perform as many takes, in the range you specify, as it can.

You can perform diagonal and reverse diagonal takes.

Under the table view, you can select a range of outputs and perform a diagonal take for those outputs.

How to Perform a Diagonal Take in the Table View

- 1 Optionally perform a selection of outputs. Use standard click, shift-click, and ctrl-click methods to make the selection.
- 2 Either click the 'Diagonal Take' button at the bottom of the page or right-click the crosspoint view and choose the 'Diagonal Take . . .' command from the context menu that appears.
- 3 The 'Diagonal Take' dialog appears.



- 4 If you made a selection of outputs in step 1, the 'Use Selection' check box will be checked and the diagonal take will apply to those outputs. You can, of course, uncheck that option and specify any output range you prefer, in the 'Output' section.

The range of valid destinations appears at the right.

- 5 (Optional) Check the **Reverse** check box to perform a *reverse* diagonal take.

- 6 Enter a starting input number in the 'Input' section. If you checked 'Reverse', the number you enter must be the highest input number of the range that will be generated. Otherwise, the number you enter must be the lowest input in the range.

A diagonal take counts inputs *upward* from the starting point.

Output	Input	Locked	Lock ID	Status
1	1	<input type="checkbox"/>		Success
2	2	<input type="checkbox"/>		Success
3	3	<input type="checkbox"/>		Success
4	4	<input type="checkbox"/>		Success
5	5	<input type="checkbox"/>		Success
6	6	<input type="checkbox"/>		Success
7	7	<input type="checkbox"/>		Success
8	8	<input type="checkbox"/>		Success
9	9	<input type="checkbox"/>		Success
10	10	<input type="checkbox"/>		Success
11	11	<input type="checkbox"/>		Success
12	12	<input type="checkbox"/>		Success
13	13	<input type="checkbox"/>		

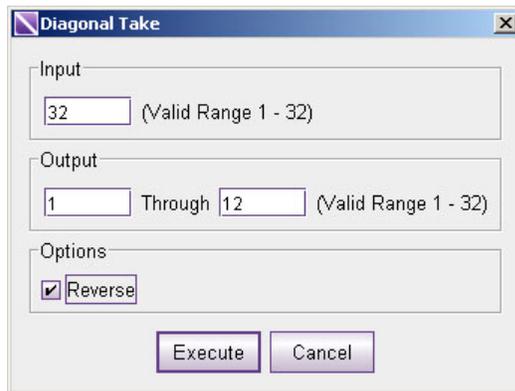
A reverse diagonal take counts inputs *downward* from the starting point.

Output	Input	Locked	Lock ID	Status
1	12	<input type="checkbox"/>		Success
2	11	<input type="checkbox"/>		Success
3	10	<input type="checkbox"/>		Success
4	9	<input type="checkbox"/>		Success
5	8	<input type="checkbox"/>		Success
6	7	<input type="checkbox"/>		Success
7	6	<input type="checkbox"/>		Success
8	5	<input type="checkbox"/>		Success
9	4	<input type="checkbox"/>		Success
10	3	<input type="checkbox"/>		Success
11	2	<input type="checkbox"/>		Success
12	1	<input type="checkbox"/>		Success
13	13	<input type="checkbox"/>		

- 7 Click **Execute**. The take is performed. Click **Cancel** to leave the dialog without performing any takes.
- 8 CRSC shows the status of the affected entries in the 'Status' column. (If an output is locked, the status will be "Destination Locked" and the take to that output will not occur.)

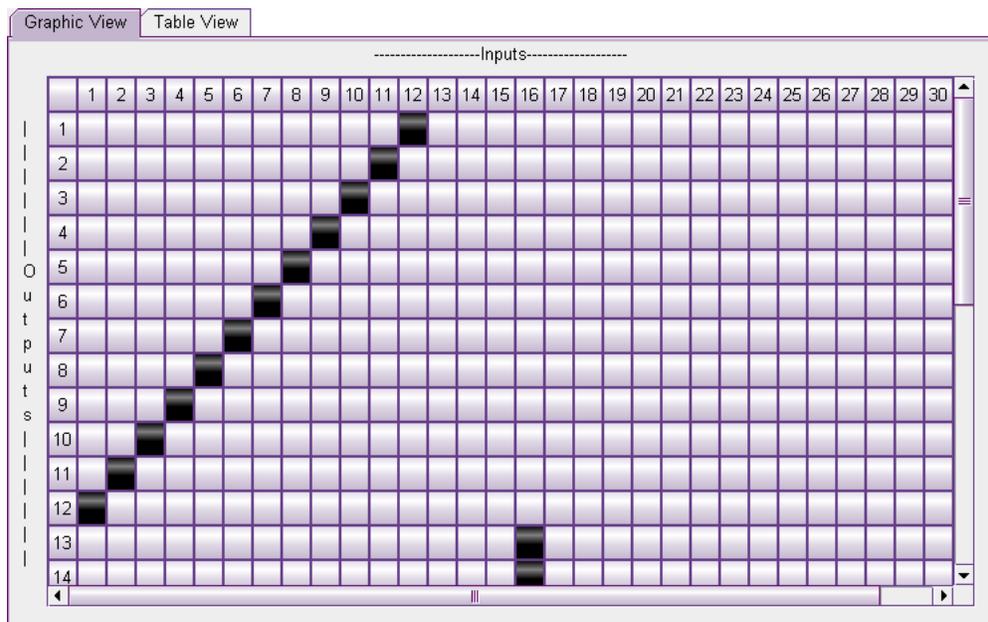
How to Perform a Diagonal Take in the Graphic View

- 1 Either click the 'Diagonal Take' button at the bottom of the page or right-click the crosspoint view and choose the 'Diagonal Take . . .' command from the context menu that appears.
- 2 The 'Diagonal Take' dialog appears.



- 3 Enter a range of outputs in the 'Output' section. The range of valid destinations appears at the right. Enter a starting number in the left-hand field and an ending number in the right-hand field. All outputs in that range are selected.
- 4 (Optional) Check the **Reverse** check box to perform a *reverse* diagonal take.
- 5 Enter a starting input number in the 'Input' section. If you checked 'Reverse', the number you enter must be the highest input number of the range that will be generated. Otherwise, the number you enter must be the lowest input in the range.

A diagonal take counts inputs *upward* from the starting point. A reverse diagonal take counts inputs *downward* from the starting point.



This illustration show a reverse diagonal take of inputs 1–12 to outputs 1–12.

6 Click **Execute**. The take is performed. Click **Cancel** to leave the dialog without performing any takes. (If any output is locked, the take to that output will not occur.)

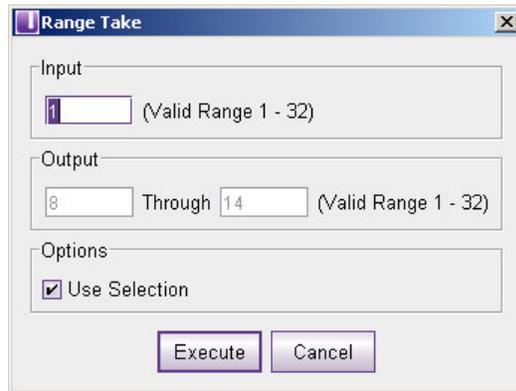
▲ See also [The Diagonal Take Shortcut](#) on page 72.

Range Takes

A range take switches a single input to multiple outputs. Input 1 could be switched to outputs 1 through 12, for example. The outputs can be contiguous or non-contiguous.

How to Perform a Range Take in the Table View

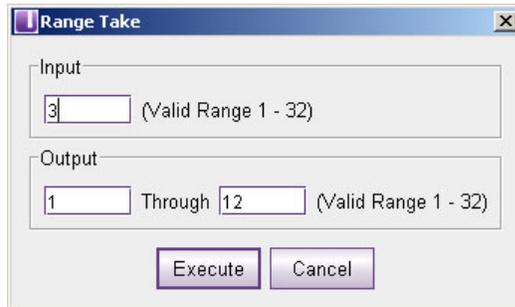
- 1 Optionally perform a selection of outputs. Use standard click, shift-click, and ctrl-click methods to make the selection.
- 2 Either click the 'Range Take' button at the bottom of the page or right-click the crosspoint view and choose the 'Range Take . . .' command from the context menu that appears.
- 3 The 'Range Take' dialog appears.



- 4 Enter a range of outputs in the 'Output' section. The range of valid destinations appears at the right. Enter a starting number in the left-hand field and an ending number in the right-hand field. All outputs in that range are selected.
- 5 In the 'Input' field, enter the input to be switched to the destinations.
- 6 Click **Execute**. The take is performed. Click **Cancel** to leave the dialog without performing a range take.
- 7 CRSC shows the status of the affected entries in the 'Status' column. (If an output is locked, the status will be "Destination Locked" and the take to that output will not occur.)

How to Perform a Range Take in the Graphic View

- 1 Either click the 'Range Take' button at the bottom of the page or right-click the crosspoint view and choose the 'Range Take . . .' command from the context menu that appears.
- 2 The 'Range Take' dialog appears.



- 3 If you made a selection of outputs in step 1, the 'Use Selection' check box will be checked and the range take will apply to those outputs. You can, of course, uncheck that option and specify any output range you prefer, in the 'Output' section.

The range of valid destinations appears at the right.

- 4 In the 'Input' field, enter the input to be switched to the destinations.
 - 5 Click **Execute**. The take is performed. Click **Cancel** to leave the dialog without performing any takes. (If any output is locked, the take to that output will not occur.)
- ▲ See also [The Shortcut Vertical Take](#) on page 73.

About AES Crosspoints

- ▲ The crosspoint of the CR6464-AES is a 64×64 matrix of stereo pairs. There are no options. The following material applies to AES routers *other than* the CR6464-AES.

AES routers have paired signals for each input and output. Usually the signals are stereo pairs, but this is not a requirement. Because of this pairing, an AES crosspoint has 2 inputs for every input connector and 2 outputs for every output connector. As an example, a 32×4 AES crosspoint matrix has 64 inputs and 8 outputs. Therefore the crosspoint view for that router has 64 columns and 8 rows.

If a video reference signal is present (at the AES router), the AES router operates in *synchronous* mode. Otherwise, the router operates in *asynchronous* mode.

Compact routers cannot resolve mono signals without a video reference signal.

When the router is in synchronous mode, the router's level type is 'Synchronous AES Mono'.

When the router is in asynchronous mode, the router's level type is *undefined*, but it *appears* as though it were 'Synchronous AES Mono'.

Audio router 'takes' differ depending on the mode:

- Synchronous mode— Takes performed in the crosspoint page are "mono" meaning that any individual channel can be taken to any individual output channel.
- Asynchronous mode— Takes performed in the crosspoint page are "stereo" meaning that you can take only paired input channels to paired output channels. A pair of channels is always an (odd/even) pair, where the even number = the odd number + 1. Thus (1,2) is a valid "stereo" pair, but (2,3) is not and (1,5) is not.

Using the Crosspoints Page

The page is divided into two sections. At the top is the crosspoint graphic. At the bottom of the page, the 'Network Frame Summary' has three tabs that display a list of 'Routers', 'Levels', or 'All CR Frames' (compact routers) defined in the network. Use the 'Routers' tab to select a router crosspoint.

The 'Network Frame Summary' presents the following information:

Tab	Column	Description
Routers	Select	Click the radio button to select the router listed on that row.
	Name	Name of the compact router.
	Frame Type	Type of router.
	IP Address	IP address currently assigned to the router.
	Reference	Lists the reference signal for the router, if any, and whether it is an audio or video reference.
Levels	Level	Level name and level number. For CQX routers, only one level appears.
	Signal Type	Type of signal(s) associated with that level.
	Router	Router to which the level is assigned.
	Physical Inputs	These fields show the physical start and endpoints of the level within the router.
	Physical Outputs	
	Controller Sources	The "logical" input and output ranges of the router —as they might be identified on a remote panel.
	Controller Dest	
All CR Frames	Name	Name assigned to the compact router or remote panel module.
	Frame Type	Type (model number) of the router or remote panel module.
	IP Address	IP address assigned to the router or remote panel module.
	Subnet Mask	The subnet mask currently assigned to the router or remote panel module.

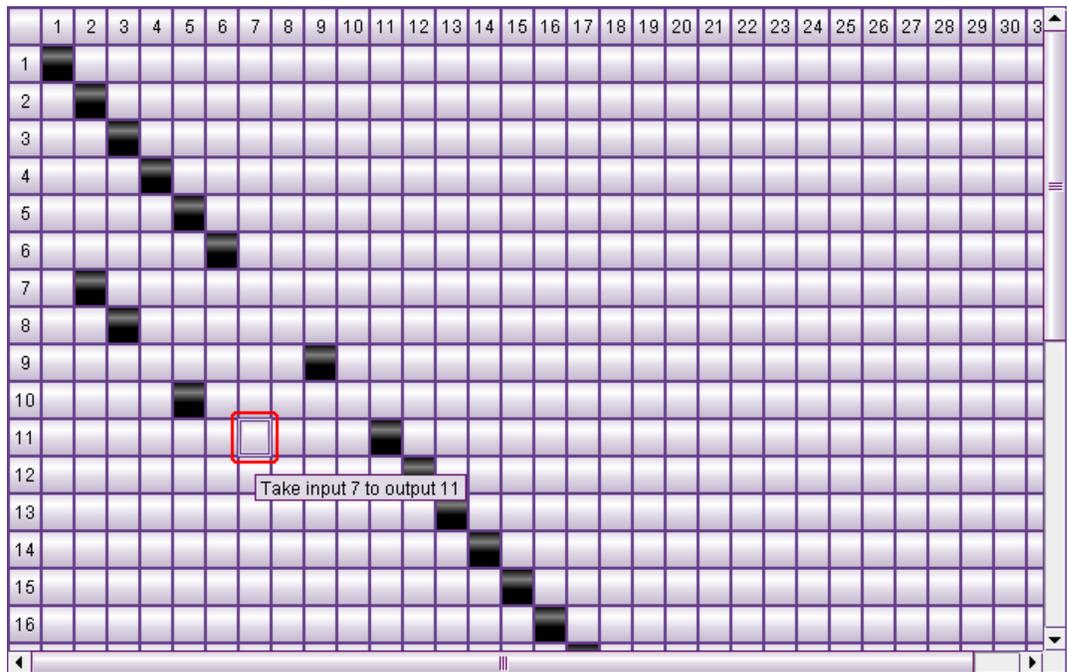
How to View a Crosspoint Configuration

- 1 Go to the crosspoints page.
- 2 In the 'Routers' tab at the bottom of the page, click the radio button on the row listing the router whose crosspoint matrix you want to view. Details of the crosspoints appear in the graphic view or the table view of the crosspoint matrix, which you have selected.

How to Perform a Simple Take in the Graphic View

- For video routers, synchronous AES routers, and other audio routers, including the CR6464-AES.

To perform a take — i.e., connect an input to an output — click any cell at the intersection of the input (a column) the output (a row). For example, to take input 7 to output 11, click the square at the intersection of column 7 and row 11:

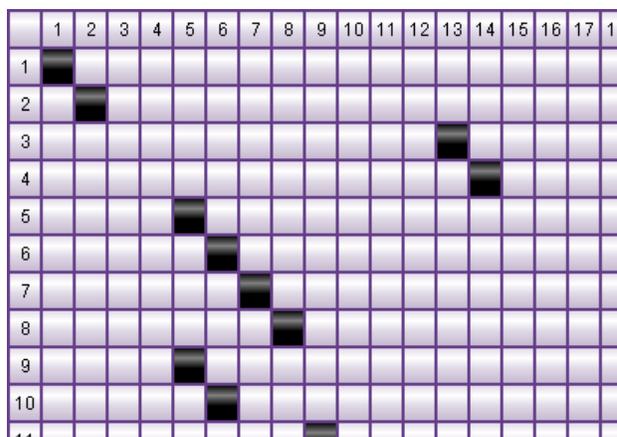


The square turns black indicating that it is a crosspoint connection.

(A red square indicates that crosspoint connections that are locked. You cannot perform a take to a destination that is locked.)

- For asynchronous AES routers (which do *not* include the CR6464-AES)

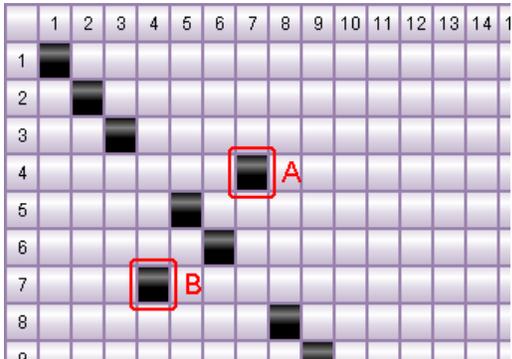
You must click the intersection of odd rows and columns:



Asynchronous AES takes occur in adjacent pairs. This diagram illustrates, for example, that inputs (13,14) are taken to outputs (3,4).

- Machine control routers

Machine control takes also occur in pairs (in the display):



However, how you choose the row and column affects the outcome.

If the two ports (in this example, ports 4 and 7) are dynamic ports, then clicking box A and clicking box B give different results. Either way connects ports 4 and 7, but clicking box B makes port 7 “controlled” whereas clicking box A makes port 7 “controlling.”

How to Perform a Simple Take in the Table View

- For video routers, synchronous AES routers, and other audio routers, including the CR6464-AES.

To perform a simple take, enter a port number in the input field of any output (row) of the table. The status of the take appears in the ‘Status’ field of that row.

- For asynchronous AES routers (which do *not* include the CR6464-AES)

To perform a simple take, enter an *odd* numbered port in the input field of any *odd* numbered output (row) of the table. The take status appears in the ‘Status’ field of that row:

View or Set Crosspoints					
Graphic View		Table View			
Output	Input	Locked	Lock Id	Locked By Panel	Status
1	7		0234	192.168.2.52	Desination Locked
2	8		0234	192.168.2.52	
3	5				Success
4	6				
5	5				
6	6				
7	7				
8	8				

The illustration above shows that input 5 was taken to output 3 (successfully). Because AES signals are switched as stereo pairs, input 6 was switched also to output 4. Thus the pair (5,6) was switched to pair (3,4).

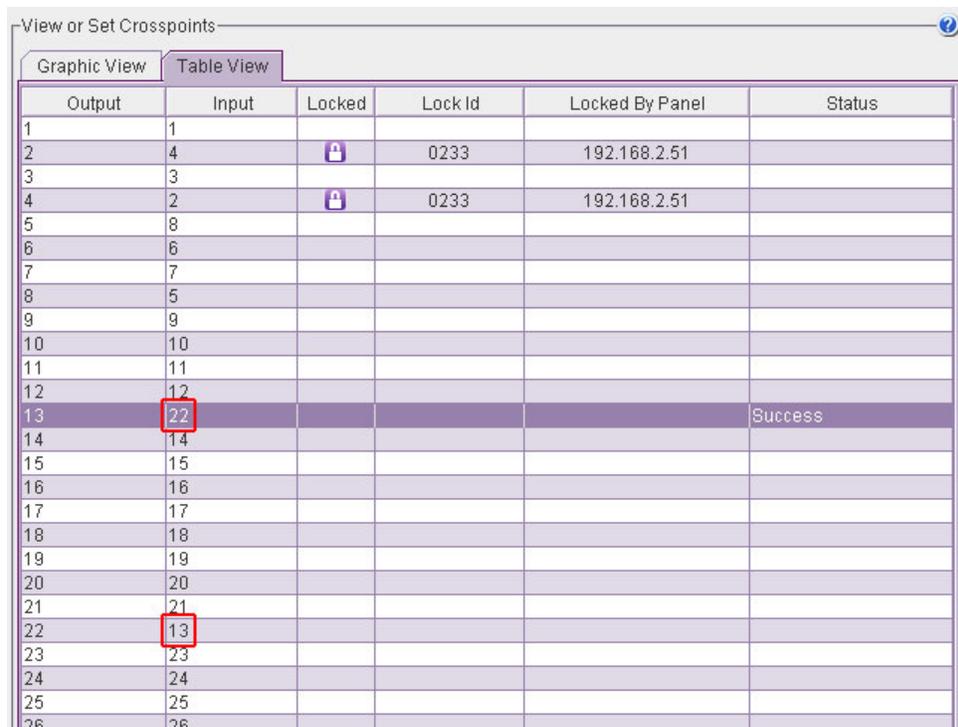
If you attempt to switch an even input or an even output, you will see a message similar to the following:



Note also that locks apply to stereo pairs. The illustration preceding shows that the 'Status' field displays 'Destination Locked' only for the odd-numbered row of the pair.

- Machine control routers

To perform a simple take, enter a port number in the input field of any output (row) of the table. The status of the take appears in the 'Status' field of that row:



Output	Input	Locked	Lock Id	Locked By Panel	Status
1	1				
2	4	🔒	0233	192.168.2.51	
3	3				
4	2	🔒	0233	192.168.2.51	
5	8				
6	6				
7	7				
8	5				
9	9				
10	10				
11	11				
12	12				
13	22				Success
14	14				
15	15				
16	16				
17	17				
18	18				
19	19				
20	20				
21	21				
22	13				
23	23				
24	24				
25	25				
26	26				

Because machine control routes are bidirectional, two rows show modification, in the same way that two squares are affected in the graphic view of the crosspoint.

In the illustration above, input 22 was taken to output 13. Thus, input 13 also appears as the input to output 22.

Note that locks also appear in pairs. The illustration above shows that ports 2 and 4 form a route and the route is locked.

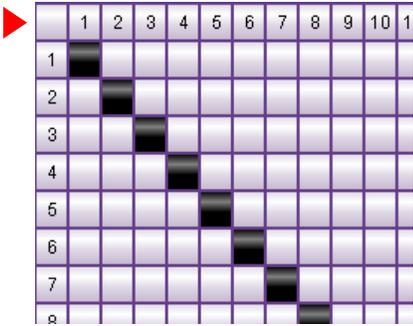
The Diagonal Take Shortcut

This shortcut is something you can do in the graphic view only.

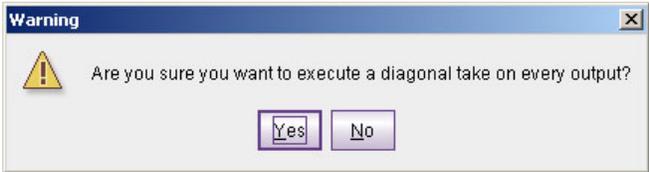
A diagonal take is where input n is connected to output n for all n . (The black squares are arranged diagonally.)

The shortcut creates a diagonal take across the entire crosspoint matrix. That is, input n is connected to output n for all n .

To perform a diagonal take, click the top left corner of the grid, scrolling if necessary:



CRSC displays a warning message:



Click **Yes** to perform the take or click **No** to cancel the take.

For machine control routers, the meaning of a diagonal take is different from diagonal takes for other routers. Entries on the “diagonal” of a machine control matrix graphic are tristated (or disconnected).

Remember that machine control routers are point-to-point routers and do not have a matrix *per se*. The matrix in the crosspoints page, for machine control routers, is a convenient fiction.

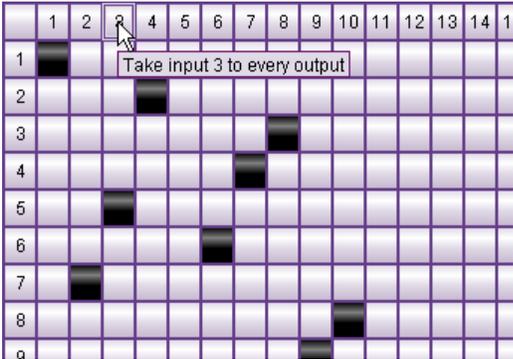
The Shortcut Vertical Take

This shortcut is something you can do in the graphic view only.

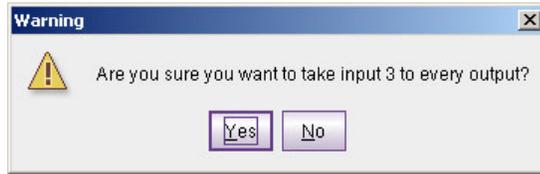
A vertical take is where input n is connected to *all* outputs. (The black squares are arranged vertically.)

The shortcut is a special range take connects input m is connected to output n for all n .

To perform a vertical take, click the input number at the top of a column:



CRSC displays a warning message:



Click **Yes** to perform the take or click **No** to cancel the take.

The result is that all outputs are taken to the input you clicked:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1			█													
2			█													
3			█													
4			█													
5			█													
6			█													
7			█													
8			█													
9			█													
10			█													
11			█													

For asynchronous AES routers, stereo input pair n is connected to all stereo output pairs. The pattern is vertical, but occupies two columns in alternation. For synchronous AES routers, the result is a single column for any input you choose:

Asynchronous AES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1			█												
2				█											
3			█												
4				█											
5			█												
6				█											
7			█												
8				█											
9			█												

Synchronous AES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1				█											
2				█											
3				█											
4				█											
5				█											
6				█											
7				█											
8				█											
9				█											

(Note that AES takes performed at a control panel are always paired.)

For machine control routers, vertical takes are not possible.

Firmware Updates Page

Summary

The 'Firmware Updates' page lets you upload firmware to selected devices and reset selected devices:

Select	Name	Frame Type	IP Address	CRF Version	Boot Version	Application Version	FPGA Version
<input checked="" type="checkbox"/>	K_CR3232-3Gig	CR3232-3Gig	192.168.102.104	SV0877-10A	SV0770-01A0 v1.2.0.0	SV0794-06B v6.0.0.30	SV0654-06A0 v6.0.0.0
<input type="checkbox"/>	R_CR1616-AV	CR1616-AV	192.168.102.109	SV0877-14A	SV0770-01A0 v1.2.0.0	SV0794-07A v6.2.0.63	SV0680-01A0 v1.0.0.0
<input type="checkbox"/>	R_CR3232-3G	CR3232-3Gig	192.168.102.142	SV0877-15A	SV0770-01A0 v1.2.0.0	SV0794-07A v6.2.0.63	SV0999-05A0 v5.0.0.0
<input type="checkbox"/>	CR6464-3Gig	CR6464-3Gig	192.168.102.152	SV0877-17	NA	SV1199-00A v6.0.0.103	SV0098-01A0 v1.0.0.0
<input type="checkbox"/>	A_CR3232-3Gig	CR3232-3Gig	192.168.102.163	SV0877-14A	SV0770-01A0 v1.2.0.0	SV0794-07A v6.2.0.63	SV0654-06A0 v6.0.0.0
<input type="checkbox"/>	MC SD	CR3232-HD	192.168.102.170	SV0877-06A	SV0770-01A0 v1.2.0.0	SV0794-06B v6.0.0.30	SV0654-06A0 v6.0.0.0
<input type="checkbox"/>	P_CR3232-3Gig	CR3232-3Gig	192.168.102.241	Unknown	SV0770-01A0 v1.2.0.0	SV0794-053 v5.0.1.1	SV0654-05A0 v5.0.0.0
<input type="checkbox"/>	MC 1080	CR3232-HD	192.168.102.250	SV0877-01A	SV0770-01A0 v1.2.0.0	SV0794-05A v5.0.1.6	SV0654-05A0 v5.0.0.0

Options: Only update if versions are different

Refresh Frames: Selected Frame Options:

The upper part of the page is a table that lists all compact routers and remote panel modules in the networks detectable by your PC.

Below the table are selection options and function buttons.

When you update firmware (by selecting devices and clicking 'Update Firmware'), CRSC presents a dialog in which you can navigate to locate a firmware file. Firmware files have a .crf extension. You can obtain a .crf file from Miranda customer service.

The firmware file will contain all the necessary firmware to update all the devices you have.

Page Features

Device Table

The columns in the table of devices present the following options and information:

Column	Description
Select	Check the check box to select the device listed on that row for updating.
Name	Name of the compact router or remote panel module.

Column	Description
Frame Type	Type of compact router or remote panel module, such as CR3232-HD.
IP Address	IP address currently assigned to the device.
CRF Version	The version of the CRF file last used to update the firmware.
Boot Version	Boot code for the device.
Application Version	Application code for the device.
FPGA Version	Firmware for the device.

Selection Options

To perform an update, you must select one or more devices in the table. You can do this manually using the check boxes in the 'Select' column of the table.

However, there are two shortcut buttons that you can click: 'Select All' and 'Select None'.

Firmware updates take time. To shorten the time it takes to perform multiple updates, you can check the 'Only update if versions are different' check box. When this box is checked, CRSC will not perform an update for those devices that are already updated, i.e., those that have the same version of firmware that are present in the firmware file you are using for the update.

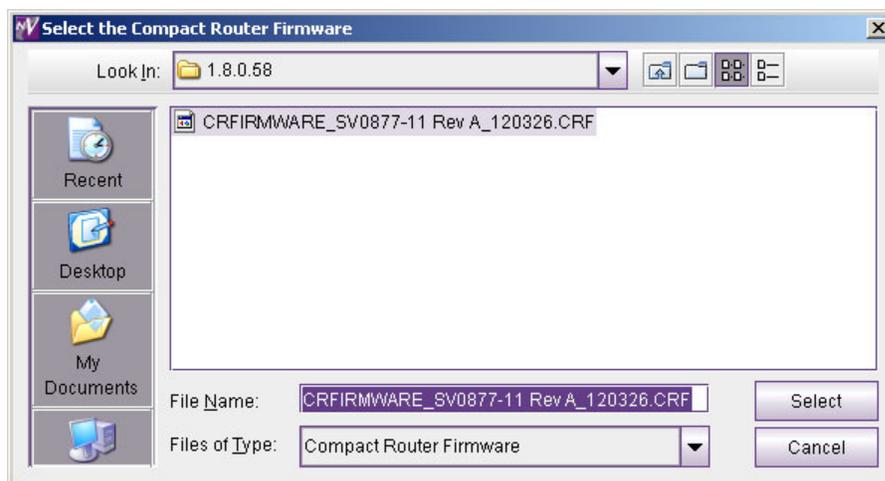
Function Buttons

Among the function buttons is 'Refresh List'. Click this button at any time to be sure that you are viewing the most current information.

Two buttons execute the primary functions of the page:

- Update Firmware

Click this button to start a firmware update for all selected devices. When you click this button, CRSC presents an open dialog in which you can navigate to select a firmware file:



Choose a .crf file. Then click 'Select'.

After you make a selection, the update begins and the 'Stop Update' button becomes enabled. You can click the 'Stop Update' button at any time during the update and CRSC will stop the firmware update.

If the 'Only update if versions are different' check box is checked, CRSC will not perform an update for devices that are already up-to-date.

- **Reset Frames**

Click this button to reset all selected devices. Usually there is no need to reset any frame in operation.

A third button, 'View Past Update Logs . . .' displays CRSC's update log. You can view the log, save the log to a file, or print the log.

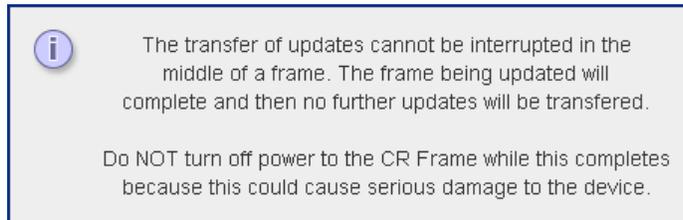
Stopping an Update

If you click the 'Stop Update' button while an update is running, CRSC presents a confirmation message:



Click **Yes** if you wish to stop the update and **No** if you wish to continue.

When the update terminates, CRSC notifies you that it will complete the current process and then perform no more updates:



Occasionally, stopping an update will cause the update to fail with this error message:



The device for which the failure occurred will report 'Update Failed' in one of its fields:

Boot (uC) Version
Update failed
SV0770-01A0 Version 1.2.0.0
SV0770-01A0 Version 1.2.0.0

The best course of action in the case of an update failure is to try the update again for the failed device.

Using the Page

How to Update Firmware

- 1 Go to the 'Firmware Updates' page.
- 2 Select individual compact routers or remote panel modules by checking the check box in 'Select' column on the row listing the device.
Or, click **Select All** to select all devices.
You can unselect devices by clearing their individual check boxes or by clicking **Select None**.
To execute a firmware update, you must have selected at least one device in the device list.
- 3 (Optional) Clear the 'Only update if versions are different' check box if you want to force every selected device to be updated. Otherwise, a device is updated only when the new firmware is different from the firmware in the device. CRSC automatically checks the firmware version.
- 4 Click **Update Firmware**. The 'Select the Compact Router Firmware' dialog box appears.

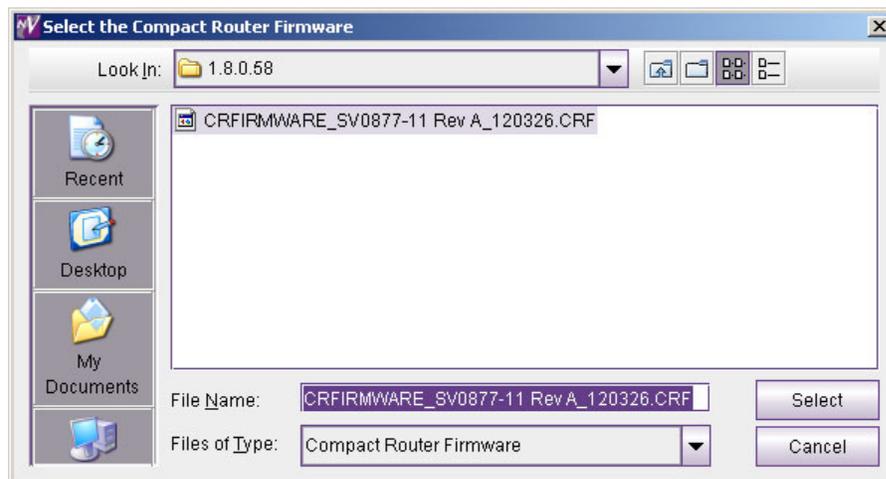


Fig. 8-1: Select the Compact Router Firmware Dialog

- 5 Browse to select a firmware file. (The file extension of a firmware file is .crf.) and click **Select**. The updates begins.
CRSC displays a progress bar in one of the fields of the device it is currently updating — either the 'Boot (uC) Version' field, 'Application (uC) Version' field, or the 'Firmware (FPGA) Version' field — depending on where it is in the process.
The firmware applies to all the devices you have selected. Firmware updates take between 2 and 3 minutes for each device.
While CRSC is performing the update, you can click 'Stop Update' to terminate the update at any time. See [Stopping an Update](#) on page 77.

6 When the firmware update completes, it displays a status report:

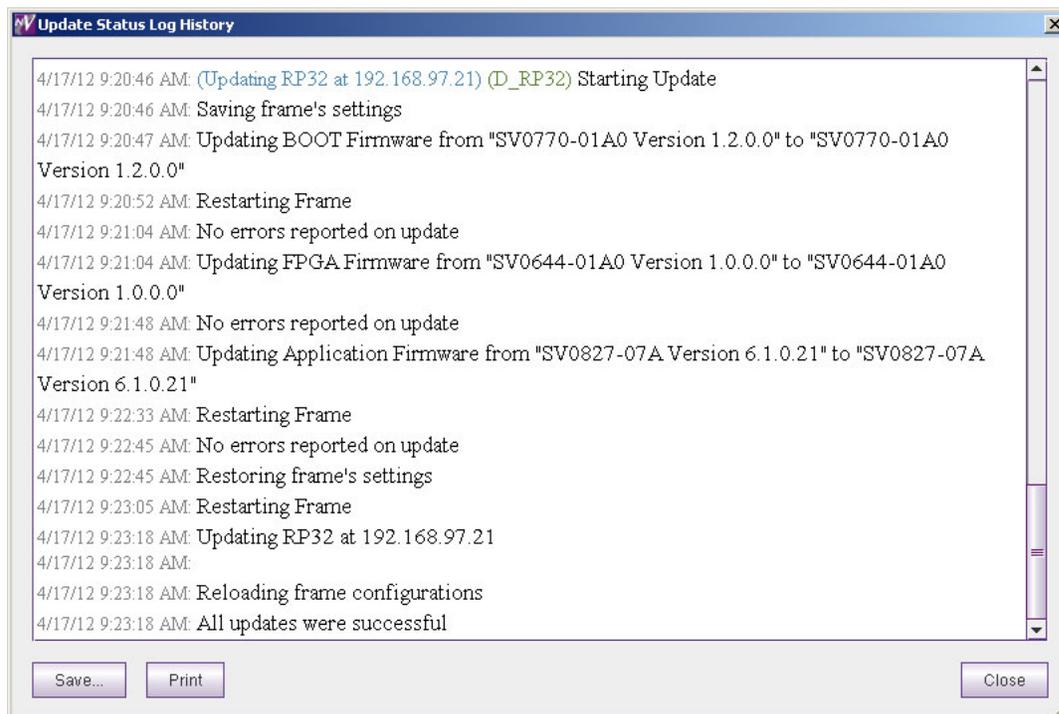


Fig. 8-2: Sample Firmware Status Report

Click **Save . . .** to save this report as a .txt file to archive, to print, or to review later.

Click **Print** to print this report on your local printer.

Note

If CRSC fails to update any frame, try the update again. If the frame fails repeatedly, cycle power, restart, and try the update again. If the frame fails again, contact Miranda Technical Support.

How to Reset Frames

It is usually not necessary to reset any frames in your system. But if you are in doubt about whether any devices are operating correctly, you can reset the devices.

- 1 Go to the 'Firmware Updates' page.
- 2 Select individual compact routers or remote panel modules by checking the check box in 'Select' column on the row listing the device.
Or, click **Select All** to select all devices.
You can unselect devices by clearing their individual check boxes or by clicking **Select None**.
To reset a device, you must have selected at least one device in the device list.
- 3 Click **Reset Frames**. All selected compact routers and remote panel modules are reset. A reset takes a few seconds, but it can take up to a minute for remote panel modules to determine the state of the network.

How to View Past Update Reports

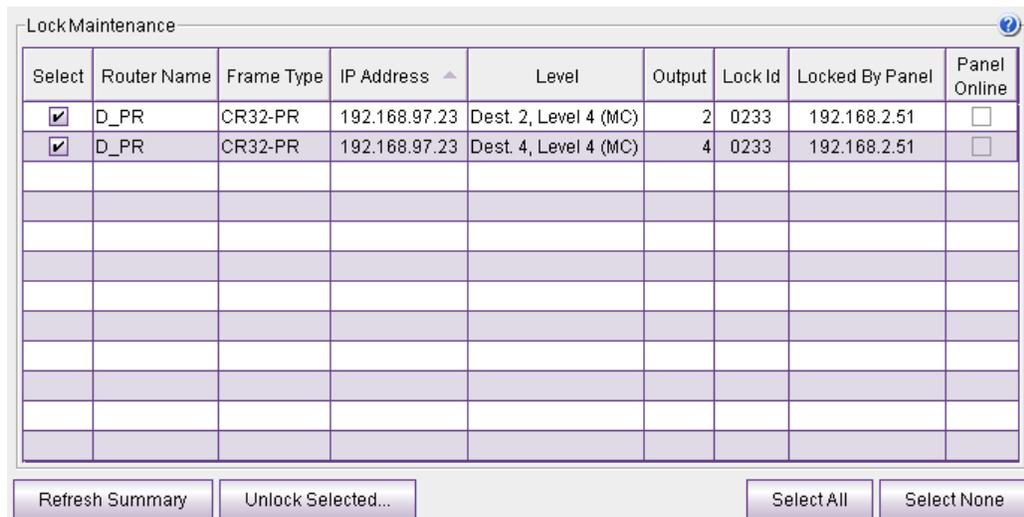
To display all update status messages, click 'View Past Update Logs'. The button is initially disabled (grayed out) and remains grayed out until you have performed an update that can be logged.

The log shows all messages since CRSC was installed on your PC.

9 Locks Page

Summary

The 'Lock Maintenance' page let you view all locks, and to clear selected locks:



The screenshot shows a window titled "Lock Maintenance" containing a table with the following columns: Select, Router Name, Frame Type, IP Address, Level, Output, Lock Id, Locked By Panel, and Panel Online. Two rows are visible, both with the "Select" checkbox checked. Below the table are four buttons: "Refresh Summary", "Unlock Selected...", "Select All", and "Select None".

Select	Router Name	Frame Type	IP Address	Level	Output	Lock Id	Locked By Panel	Panel Online
<input checked="" type="checkbox"/>	D_PR	CR32-PR	192.168.97.23	Dest. 2, Level 4 (MC)	2	0233	192.168.2.51	<input type="checkbox"/>
<input checked="" type="checkbox"/>	D_PR	CR32-PR	192.168.97.23	Dest. 4, Level 4 (MC)	4	0233	192.168.2.51	<input type="checkbox"/>

You can use this page to clear locks that cannot be cleared at a control panel.

You **cannot** use this page to set locks.

The page might be empty. If it is, no locks have been set. Click 'Refresh Summary' at any time to be sure that you are viewing the most current information.

There are two types of locks:

- Panel Lock— Locks the entire panel, preventing accidental changes. Panel locks are neither displayed nor reset in this page.
- Destination Lock— A locked destination is one to which a source may not be routed. This prevents the content delivered at the destination from being changed. When the lock is released, the destination's source can be changed.

Using the Lock Maintenance Page

Locks are listed for each **output** that is locked, not for each *level* nor for each *destination*. A single destination lock usually includes locks on several levels (i.e, several outputs).

Select	Router Name	Frame Type	IP Address	Level	Output	Lock Id	Locked By Panel	Panel Online
<input checked="" type="checkbox"/>	CR3204-AES	CR3204-AES	192.168.2.101	Dest. 2, Level 3 (...)	3	0238	192.168.2.56	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR3204-AES	CR3204-AES	192.168.2.101	Dest. 2, Level 3 (...)	4	0238	192.168.2.56	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR3204-AES	CR3204-AES	192.168.2.101	Dest. 3, Level 3 (...)	5	0233	192.168.2.51	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR3204-AES	CR3204-AES	192.168.2.101	Dest. 3, Level 3 (...)	6	0233	192.168.2.51	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR1616-SD	CR1616-SD	192.168.2.102	Dest. 1, Level 1 (...)	1	0000	Self	<input type="checkbox"/>
<input checked="" type="checkbox"/>	CR1616-SD	CR1616-SD	192.168.2.102	Dest. 2, Level 1 (...)	2	0238	192.168.2.56	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR1616-SD	CR1616-SD	192.168.2.102	Dest. 3, Level 1 (...)	3	0233	192.168.2.51	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	CR1616-SD	CR1616-SD	192.168.2.102	Dest. 5, Level 1 (...)	5	0238	192.168.2.56	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>								
<input checked="" type="checkbox"/>								
<input checked="" type="checkbox"/>								
<input checked="" type="checkbox"/>								

Refresh Summary Unlock Selected... Select All Select None

Fig. 9-1: Lock Maintenance Page

The levels are “flattened” in the lock list displayed on this page. For example, if a 32x32 HD router had two partitions each numbered 1–16 and 1–16, the range reported for the HD router is 1–32 and the output number given is for the *router*, not the *level*.

The case of AES routers is distinct: an AES router output is a stereo pair unless the router is in synchronous mode. Therefore, a single stereo output appears twice in the list.

The case of machine control routers is also distinct: a machine control route is bidirectional. Therefore both ports of the route appear in the lock list.

The page presents the following information:

Column	Description
Select	Select the check box on the row listing the panel you want to unlock.
Router Name	Name of the router.
Frame Type	Type (model) of compact router.
IP Address	IP address currently assigned to the device.
Level	Destination, level number, and level name for each router output that is currently locked.
Output	The output that is locked.
Lock ID	Entries in the ‘Lock ID’ column are hexadecimal values used by automation systems that follow a serial protocol. The automation system uses lock IDs as “passwords” to lock and unlock router outputs. You may safely ignore lock IDs.

Column	Description
Locked By Panel	Lists one of three values: 1) the IP address of the panel that locked the output. 2) 'Self' if the output was locked using a control panel attached to the router. 3) 'Serial' if the output was locked by a control system operating over a serial connection.
Panel Online	Indicates, by a check mark, whether the panel that locked an output is connected on the CRSC network.

To change the ordering of the table, click any column header once for ascending order; click the column header again for descending order. The entire table will re-display ordered according to the data in the column you select.

How to Release Selected Locks

- 1 Go to the 'Lock Maintenance' page.
- 2 Click the 'Select' check box on the rows listing that locks you want to release.
Or, to release all locks, click **Select All**.
To deselect locks, clear the 'Select' check box for the lock or click **Select None**.
- 3 Click the **Unlock Selected . . .** button.

After they are unlocked, locks cannot be reapplied through CRSC. Locks are applied at a control panel only.

Page Features

In the middle of the page is 'Network Frame Summary' in which there are 3 tabbed pages. Use the 'Remote Panels' tab to select a remote panel module (by clicking a radio button). The other two tabs are for information only.

At the top of the page is a check box with which you enable or disable NV9000 mode for the selected remote panel module. Associated with the check box is a field in which you can specify the unit's panel ID (required in NV9000 systems) and another check box in which you can specify whether the panel will have a fixed IP address or whether the NV9000 system will use DHCP¹ to determine its IP address.

At the bottom of the page is a 'Refresh Summary' button. Click this button at any time to be sure that you are viewing the most current information.

The 'Network Frame Summary' presents the following option and information:

Tab	Column	Description
Remote Panels	Edit/Update	Click the radio button on the row displaying the remote panel module you want to convert.
	Name	Name of the remote panel module.
	Frame Type	Type of remote panel module by model number.
	Panel Type	Type of control panel by model number. If the type is unknown, the entry will read "unknown."
	Panel Mode	Either standard, enhanced with hold, or enhanced without hold
	IP Address	IP address currently assigned to the device.
	Identify CP	When you click Identify CP , the control panel mounted on the remote panel module listed on that row identifies itself by displaying a moving pattern of button lights. This feature is helpful if you forget which panel of possibly many is represented by the particular IP address. The moving button lights continue indefinitely. To turn off the pattern, click any button on the panel or click Identify CP again.
Levels	Level	The name and number assigned to the level.
	Signal Type	The signal type of the router to which the level is assigned.
	Router	Router to which the level is assigned.
	Frame Type	Type (model number) of the router to which the level is assigned.
	Router IP	IP address assigned to the router.
	Physical Inputs	The physical start and end points of the level within the router.
	Physical Outputs	
	Controller Sources	I/O numbering in a remote panel might not match the physical I/O numbers of the router. Use these fields to map the router's numbering to the NV9000's numbering.
Controller Dests		

1. Dynamic Host Configuration Protocol

Tab	Column	Description
All CR Frames	Name	Name assigned to the frame.
	Frame Type	Type (model number) of frame.
	IP Address	IP address currently assigned to the frame.
	Subnet Mask	Subnet mask currently assigned to the device.

Using the Page

How to Convert a Remote Panel Module

- 1 Go to the 'NV9000 Remote Panel Settings' page.
- 2 In the 'Remote Panel' tab, click the radio button on the row listing the remote panel module to be converted.
- 3 *Check* the 'Enable NV9000 Mode' check box to convert the remote panel module to use with an NV9000 control system.
Uncheck the 'Enable NV9000 Mode' check box to revert the remote panel module to use in a CRSC network.
- 4 If you have enabled NV9000 mode, enter a panel ID in the 'NV9000 Panel ID' field.
The panel ID must be a number unique within the NV9000 system. It must contain no special characters, spaces, or punctuation marks.
By default, the panel ID is composed of the last two octets of the module's current IP address. For example, if its IP address is 192.168.97.21, then the default panel ID is 97021.
- 5 If you have enabled NV9000 mode, check the 'Use DHCP to acquire IP Address' check box if you want the NV9000 system to use DHCP to determine the remote panel module's IP address. Otherwise, the panel's IP address will be fixed in the NV9000 system and will retain its present IP address.
- 6 Click **Update Remote Panel** to complete the conversion.

A Tutorials

Appendix A provides a conceptual background regarding CR Series products and CRSC.

Topics

<i>Routing Overview</i>	89
<i>Remote Panel Operating Modes</i>	94
<i>Salvos</i>	95
<i>Cabling</i>	96
<i>Products</i>	103

The following topics are designed for users who are unfamiliar with routing and other aspects of CRSC operation. Each topic covers a specific area of information:

- Networks—CRSC and related devices communicate over a network. To learn more about networks, IP addresses, subnets and related topics, see [Creating a CRSC Network](#) on page 9.
- Routing—An overview of how signals are moved from device to device. This section discusses routers, crosspoints, control panels, signal types, partitions and levels, and router controls. See [Routing Overview](#) on page 89.
- Control Panel Modes—Control panels operate in standard or enhanced mode. To learn about how this affects level selection by operators using the panel, see [Remote Panel Operating Modes](#) on page 94.
- Salvos—Salvos let you pre-program a sequence of takes so that one button press on a control panel performs the entire sequence. See [Salvos](#) on page 95.
- Cabling—Devices, such as routers and control panels, are connected using cables. This section discusses in detail the different cables and connectors used. See [Cabling](#) on page 96.
- Products—See [Products](#) on page 103 for a list of Miranda products related to CRSC.

Routing Overview

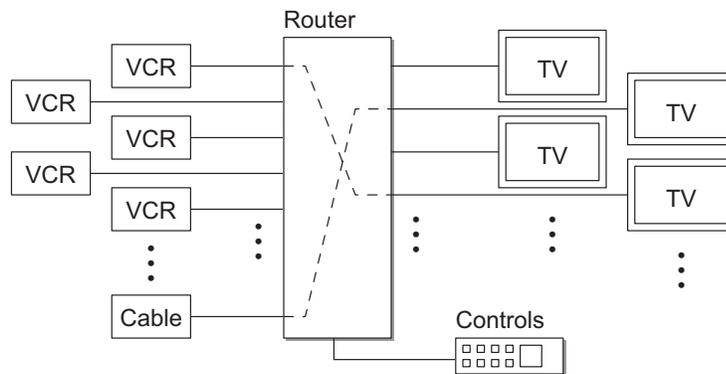
Routing is the movement of signals from one device to another. In general, there are devices that create signals, such as video recorders. These devices send the signals to a router. The router switches the signal from the input to a designated output. Usually routers manage hundreds of incoming and outgoing signals. The output is then sent to another device for distribution, manipulation, and so on. To manage the incoming and outgoing signals, and how they are switched in the router, operators use pre-programmed control panels. Commands from the control panels are sent to the routers telling the routers how to switch the signals.

What is a Router?

Suppose you have two VCRs and one TV. You want to be able to view a movie from either VCR. So you plug the cable from one VCR into the TV. When you want to use the other VCR, you switch cables. After a while, that gets a little tiresome. Wouldn't it be easier if you had a switch you could flip?

Now suppose you have a dozen TVs and a dozen VCRs plus cable service. You want to be able to direct any program from any VCR or from the cable company to any of the TVs. But how? That is what routers do: direct the content from a number of inputs to selected outputs.

A router is a box (containing electronics) that has a number of input connectors and a number of output connectors. Inside the box are switches that "listen" to a control panel. Pressing buttons on the control panel causes one of the switches to connect one of the inputs to one of the outputs, for example, input 3 to output 12.



You can connect your VCRs to the box's inputs, and your TVs to its outputs, punch a few buttons on its control panel, and everyone can view their programs.

If you have DVD players, it is slightly more complicated: there are several signals for each DVD and you will need a router for each of the different signal types. Further, you might need converters if your TVs are older models that cannot receive DVD input.

CR Series routers and control panels allow you to control and route signals to and from your professional-grade equipment.

CR Series routers and control panels do **not** start, stop, rewind, cue, or fast-forward any device. CR Series routers do **not** perform signal conversion.

Inside the Router

In concept, at least, a router contains an array of wires. (Physically, it might be different.)

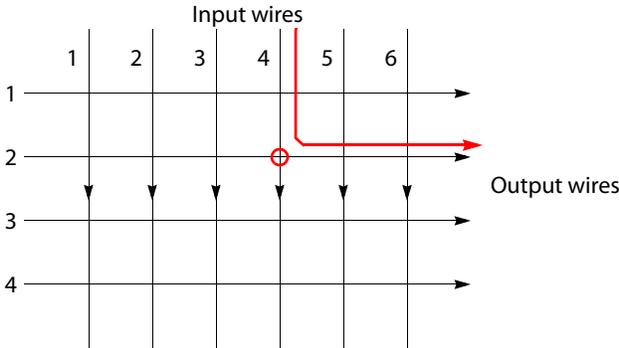


Fig. A-1: A rudimentary switching matrix

If you had the patience and some materials, you could build a simple router. It would be nothing more than a number of wires arranged so they cross over each other. If you pressed two wires together where they cross, a signal could flow (given proper electrical connections) from the input to the output. In Figure A-1, input wire 4 and output wire 2 are connected.

The point where they cross is called a *crosspoint*. The pattern formed by all the points is called a *crosspoint matrix*.

If a matrix has N inputs and M outputs, it has $N \times M$ crosspoints. The 6×4 matrix depicted above has 24 crosspoints. By convention, the number on the left represents inputs; the number on the right, outputs.

In a real router, the matrix is an integrated circuit, and the connection between an input and an output is performed electronically (by a transistor or similar circuit).

Some routers also perform signal conditioning at the output of the matrix.

Sources and Destinations

The signals that routers process come from, and go to, *devices*. "Device" is a generic name for VCRs, DVDs, cameras, video monitors, audio monitors, mixers, video editing workstations, and so on.

A *source* device is one that feeds a signal into a router. The *source* is where the signal originates.

A *destination* device is one that receives a signal from a router. The *destination* is where the signal is going.

What is a Control Panel?

A control panel is the set of buttons, knobs, switches, etc. that operators use to control a router.

Miranda's compact routers and control panels are separate units and more than one router can be controlled from a single panel. This lets you place multiple panels in different rooms.

Miranda's CR Series control panels were designed for very simple operation.

Control panels, under CRSC, operate in one of 3 modes. For details on panel operation modes, see [Remote Panel Operating Modes](#) on page 94.

Signals

Many signal sources (and receivers) have several signal types. In the CR Series, routers can switch one or more signal types.

AV	Analog Video or Timecode
AA	Analog Audio or Timecode
AES	Synchronous AES Mono
CR6464-AES	Asynchronous AES ^a
SD	SD Digital Video
HD	HD or SD Digital Video
3Gig	3Gig, HD, or SD Digital Video
PR	Machine Control Reverse

- a. Asynchronous AES applies only to the CR6464-AES.

Video signals are classified as digital (i.e., 3Gig, HD, SD) or analog. Audio signals are classified as digital or analog and also stereo or mono. For compact routers, digital audio is AES3id (AES for short). There are several different digital video formats and two analog video formats. Video signals might or might not also carry audio signals. Audio carried in a video signal is called *embedded* audio. Digital video can embed (carry) up to 16 individual AES audio channels.

Analog signals are not directly compatible with digital signals, but devices that convert one to the other are available.

The different digital formats are also not compatible, but an HD router will also route SD signals and a 3Gig router will also route HD and SD signals. Most video monitors recognize several different formats and adjust themselves to display the format they receive. See [Digital Video Routers](#) on page 111 and [Digital Audio Routers](#) on page 114 for more information.

A Note About AES Signal Types

AES matrices are different from other matrices. AES signals are numbered as stereo pairs. A 16×16 AES router has a 32×32 matrix. A 32×32 AES router has a 64×64 matrix.

If the AES router detects a video reference signal, the router operates in *synchronous* mode. Otherwise, it operates in *asynchronous* mode.

- Asynchronous Mode

In asynchronous mode, AES 'takes' occur in "stereo" pairs only. AES channels 1 and 2 are a pair, 3 and 4 are a pair, and so on. For example, you can take input pair (1,2) to output pair (5,6).

You cannot choose (even, odd) pairs. For instance, you cannot take (2,3) to any output. You cannot take any input to an (even, odd) output.

- Synchronous Mode

When an AES router is in synchronous mode (i.e., it has a valid video reference signal), the router's level type is 'Synchronous AES Mono'.

AES 'takes' in a "mono" partition are not paired. Each AES channel is independent. The 16x16 router has 32 independent inputs and 32 independent outputs. The 32x32 router has 64 independent inputs and 64 independent outputs.

Note

The same level type (Synchronous AES Mono) appears whether the router is in asynchronous mode or synchronous mode.

When an AES router is in synchronous mode, the video reference type appears in the 'Reference' column of the 'Routers' tab of the 'View Router Crosspoints' page (See [Router Crosspoints Page](#) on page 55). If the router is in asynchronous mode, the word 'None' appears in that **column**.

A Note About Machine Control Signals

Machine control routers operate in "machine control reverse" mode. "Machine control reverse" means that the destination device is the controlling device (as opposed to the controlled device).

Machine control signals operate according to a serial communications protocol called RS-422 (or EIA-422). Typically, control signals originate in an editing machine which sends commands to playback devices. Commands include "rewind," "skip to a certain frame," "stop," and so on.

A machine control signal is *bidirectional*, unlike video or audio. There is a command in one direction and a response in the reverse direction. Each end of the connection is therefore both an input and an output. Machine control routers are *point-to-point*. When a machine control signal connection is made, any prior connections of its input or output are first broken.)

Video, audio, and data signals flow continuously in a stream. Control signals occur asynchronously and intermittently. See [Machine Control Routers Page](#) on page 35

Partitions and Levels

A router may be considered a switching matrix and that matrix can be partitioned into smaller regions. The regions for doing so are many and varied. Partitions are boundaries that organize switching.

A level is a the name given to a signal type. Because each CR Series router offers a single signal type, the term level is often equivalent to the term router. If a router has more than one partition, the term level is equivalent to a router partition. And even if the router has only one partition, we say that the level is equivalent to that single partition.

Note

Partitions and levels do not apply to CQX routers.

Signals are switched within a partition, not between partitions. Inputs can be switched only to outputs contained in the same partition. Every router must contain at least one partition.

Router partitions can overlap.

In CRSC, a level is defined (1) when you create a router partition or (2) when you add a router to your network. CRSC allows you to define up to 8 levels in a single subnet or up to 4 levels per router, with up to 4 routers in a subnet.

Router Control

Large routers usually require large router control systems (such as Miranda's NV9000).

A CRSC network can function efficiently with no external control system. The "intelligence" of a CRSC network resides in the remote panel module(s) in the network. Thus, a CRSC network, by definition, includes at least one remote panel.

A CRSC network provides operators 3 capabilities:

- Performing multi-level 'takes' with or without breakaway.
- Locking or unlocking one or more destinations (or locking and unlocking panels).
- Executing salvos.

The operator performs all operations by pressing buttons on a remote panel. The panel's buttons reflect the state of the routers using different colors and levels of brightness.

Routers are passive; they switch when commanded. Control panels are also passive—they are no more complex than are keyboards and displays. It is the remote panel module that performs the network's control functions.

Remote Panel Operating Modes

Remote panels operate in different modes. There are 3 panel modes:

- Standard.
- Enhanced, with hold.
- Enhanced, without hold.

They differ chiefly in the use of level selection buttons.

Note

Panel modes do not apply to CQX panels.

Standard Mode

Level selection is persistent and at the discretion of the panel operator. Once the operator makes a level selection (manually), it remains until the operator next changes the selection.

The current level selection enables some sources and destinations and disables others. The sources and destinations that are enabled depend on which level button has precedence.

If no levels are selected, no sources or destinations are enabled. A take cannot occur.

However, if the panel has no level buttons, all destinations' levels are always selected and all destinations are enabled.

Which level button has precedence depends on the order of level buttons on the panel and the order in which the operator presses the level buttons.

Standard mode allows breakaway. To determine what sources are routed to a destination might require a few button presses. Clearing a breakaway is relatively simple. For general information on panel operation, see [Operation](#) on page 123.

For detailed information, see the *CR Series User's Guide*.

Enhanced Mode

Level selection is applicable to breakaway and only to breakaway. Level selection governs the selection of sources for the breakaway.

All sources and destinations are always enabled.

Enhanced mode has 2 submodes: hold and no-hold.

- Hold mode: the level selection persists (after the destination button press) until you change it. This allows you to try different sources.

(Clear a breakaway by starting a new normal take to that destination.)

- No-hold mode: a level selection reverts to the levels defined by the destination after you press a source button.

(Clear a breakaway by either starting a new normal take to that destination or just pressing a source without a level selection.)

The choice between hold mode and no-hold mode is meant to accommodate operator preferences. There is no functional difference between these two submodes. For general information on panel operation, see [Operation](#) on page 123.

For detailed information, see the *CR Series Compact Router User's Guide*.

Salvos

A “salvo” is a stored list of simple takes that execute, at a button press, in rapid sequence. Salvos are usually created to carry out commonly repeated tasks.

When an operator presses a salvo button on a panel, the salvo button lights turn bright during the salvo execution and returns to dim at completion.

A simple take is defined by a level, an input, and an output. The input is taken to the output in the specified level. The (level, input, output) triple uniquely defines a crosspoint in the set of routers and router levels you have.

Note

Salvos do not apply to CQX panels.

A salvo can include up to 32 simple ‘takes’. A panel configuration can have up to 32 individual salvo buttons. Each panel can have a different set of salvos.

Salvos do **not** execute source selections, destination selections, or level selection functions.

Salvos do **not** execute other salvos. (That is, salvos cannot be nested.)

Salvos do **not** contain loops or branches.

If multiple salvos execute simultaneously (on different panels), it is likely that their effects will be in conflict. There is an exception: if two or more salvos have no outputs in common, they can safely run at the same time—from different panels. (Their inputs can overlap without ill effect.) It is not possible to execute multiple salvos simultaneously from a single panel.

If a salvo attempts an impossible take (one on a non-existent level, or one that uses non-existent ports) it will try the take and wait for a response 5 times before proceeding. Thus, salvos that have errors will take noticeably longer to execute than salvos without errors. A salvo without errors should take only a small fraction of a second to execute. Under normal conditions, a typical salvo executes in a few milliseconds.

Salvos are not affected by the state of level buttons.

Cabling

Compact routers and control panels are professional- or industrial-grade products. Although they are small and relatively inexpensive, they are actually designed to be used in broadcast systems and professional video editing. They can also be used in conference rooms, digital cinemas, and other facilities.

Routers and control panels are just one part of a system that may include DVDs, VTRs, Monitors, A/D converters, D/A converters, and so on. To connect all these devices you will need cables and connectors. Whatever your application, it requires high-quality cables of various kinds and certain tools to prepare cables of the right length.

Cable Types

There are many cable types. In a compact router system, cables differ primarily by connector type. Most of Miranda's compact routers have BNC connectors.

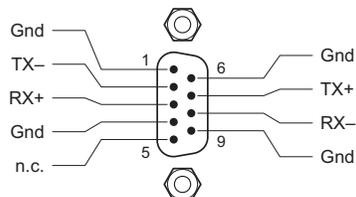
Length limits are as follows:

- SD—Belden 1694A, BNC, up to 350m at 270 MB/s (1312 feet)
- HD—Belden 1694A, BNC, up to 150m at 1.485 GB/s (492 feet)
- 3Gig—Belden 1694A, BNC, up to 100m at 2.97 GB/s (328 feet)
- AV—Belden 8281, BNC connectors, up to 1000 feet.
- AA—Belden 8451, DB25 connectors (each supports 8 shielded twisted pairs), to 1000 feet. See [DB25 Connectors](#) on page 97. Miranda's WC0053 breakout cable can be useful with DB25 connectors.
- Machine control—RJ-45 connectors, cable length to 100m with high-quality cable. machine control routers often connect to machines (VTRs, for example) that have DE9 serial connectors. If that is your case, you will have to fabricate a DE9-to-RJ45 cable. (Miranda's BP-PORT-64 breakout panel can be of some use here.) See [RJ-45 Connectors](#) on page 97.
- Ethernet—RJ-45 connectors, cable length to 100m with CAT5 or CAT6 cable. Beyond 100m, you will probably experience some packet loss or degradation in speed.

Connectors

Serial Connector

The automation connector for all CR Series routers and remote panel modules has this pinout:

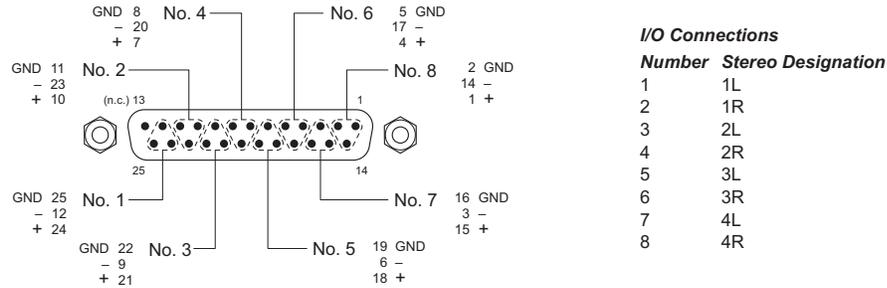


The connector is RS-485, but can be used as RS-422.

Customers who want to operate the router through an automation system may contact Miranda technical support for information.

DB25 Connectors

The analog audio routers use DB25 connectors. Each connector supports 8 inputs (or outputs):



For 16x16 routers, the connectors provide inputs (or outputs) 1–8, 9–16, 17–24, and 25–32, respectively, and are labelled that way on the rear of the router. Inputs (and outputs) are treated as 16 stereo pairs.

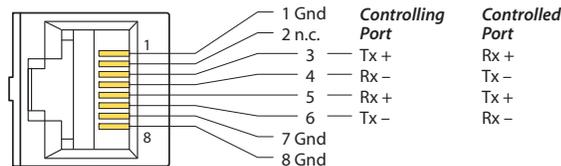
For 32x32 routers, the connectors provide inputs (or outputs) 1–8, 9–16, 17–24, 25–32, 33–40, 41–48, 49–56, and 57–64, respectively, and are labelled that way on the rear of the router. Inputs (and outputs) are treated as 32 stereo pairs.

For 32x4 routers, the connectors provide inputs 1–8, 9–16, 17–24, 25–32, 33–40, 41–48, 49–56, and 57–64, respectively. The inputs and outputs are labelled accordingly. The inputs are treated as 32 stereo pairs. The single output connector provides outputs 1–8 (4 stereo pairs). The inputs and outputs are labelled accordingly.

You can use Miranda's WC0053 breakout cable with DB25 connectors.

RJ-45 Connectors

All machine control ports are serial, RS-422, operating at up to 1 MB/s. The interface is RJ-45. Each port has the following pinout:



A port can be configured as "controlling" or "controlled" or variants (dynamic, master, slave). That is, the definition of the port can be reversed (Tx becomes Rx and vice versa) either during configuration or during operation.

Making Connections

When making connections, you will (1) decide which router inputs and outputs to use for each of your devices and (2) need to remember what you decided. It is strongly recommended that you create and maintain lists of all connections.

Your decisions will be based in part on the button layouts of the control panels you have in your system. Keep in mind that salvos (and salvo buttons) can effect rapid changes that otherwise might require too much thought or activity from a human operator.

If you have only a few destination devices or just one, you can use a control panels with fewer buttons (such as the CP1604, CP1602, or CP3201).

Sample Configuration

Here is a sample cabling configuration. It illustrates some of the issues often encountered during system configuration. This example is for illustration only and is not in any way endorsed by Miranda. The equipment described is theoretical and fictitious.

Equipment

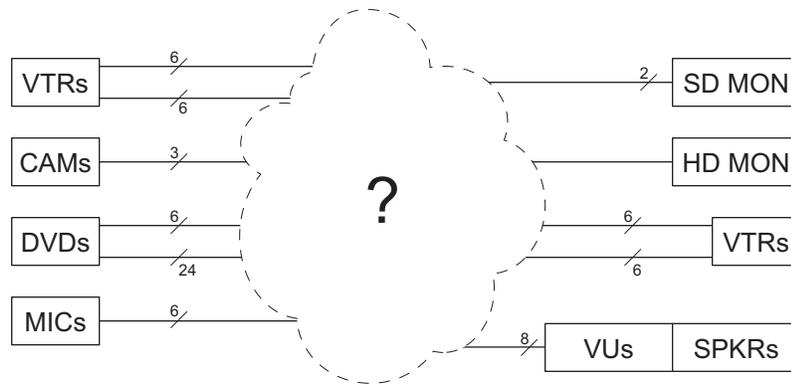
You have 6 VTRs that play, and record, SD and AES 1/2.

You have 2 SD cameras and 1 HD camera and with the cameras are (pairs of) microphones that produce analog audio (stereo).

You have 6 DVD players that produce HD and AES 1/2, 3/4, and 5/6 as Dolby 5.1 output, and produce AES 7/8 as a stereo mix-down of the Dolby. (The DVDs do not record.)

You have 2 SD monitors and 1 HD monitor. You have analog audio speakers (6 set up for Dolby, and 2 as stereo) and perhaps a set of VU meters.

You want to direct any video/audio source to any monitor or to any VTR.



How can it be done?

Analysis

Sources	Destinations
8 SD	8 SD
4 AA (3 mic pairs + silence)	2 HD
8 HD	11 AES
14 AES 1/2	1 AA (mic out)
6 AES 3/4	
6 AES 5/6	
6 AES 7/8	

Totals:

video in = 16, video out = 10

AES in = 32, AES out = 11 (6 AES 1/2 to the VTRs, 3 Dolby + 1 stereo to the D/A, 1 "DDD")
AA in = 3 mic + 1 silence), AA out = 1 (mic out to AES mic in)

The system needs these routers:

CR1616-HD (handling both HD and SD)
CR3232-AES
CR1604-AA

Additional equipment to be purchased:

1 HD-to-SD down-converter (DVD to VTR)
1 analog-to-AES audio converter for mics
4 AES-to-analog converters (4 AES in, 4 analog pairs out) for speakers/VU

As far as panels are concerned, there are 16 sources and 10 destinations. The DVD output uses the 6 Dolby speakers/VUs. The VTR outputs use the 2 stereo speakers/VUs. The VUs and speakers are on the same circuit. The operator can adjust the speaker levels.

Therefore, a CP1616 is sufficient.

The speakers are all analog (and so are the VUs) so the AES outputs will require D/A conversion. The mics require AA to AES conversion. To record the HD of the DVD to a VTR requires (at least) one down-conversion channel.

Partitioning

HD router:

8 SD, 8 HD in, 8 SD out, 2 HD out

Put the 8 SD in & out on the left and the remaining (HD) devices on the right. Could partition the router into 2 levels but that creates an extra level for nothing.

Result one combined SD/HD level. (SD gets routed as SD, HD gets routed as HD.)

Level name = 'SD/HD'

AES router:

12 AES 1/2 in, 6 each AES 3/4, 5/6, 7/8 in, Mic in, DDS (32 in all)

14 out (6 AES 1/2, 4 for speakers, 1 DDD)

The HD with Dolby requires 4 levels: AES12, AES34, AES56, AESLR. Let the SD with just AES 1/2 use the level named AESLR.

Partitions: AES12 = in 1-6, out 1; AES34 = in 7-12, out 2; AES56 = in 13-18, out 3;

AESLR = in 19-32, out 4-32

Total now 5 levels.

AA router:

In 4 pairs (3 mics + silence)

Out (1 pair to A/D to AES mic in)

Note

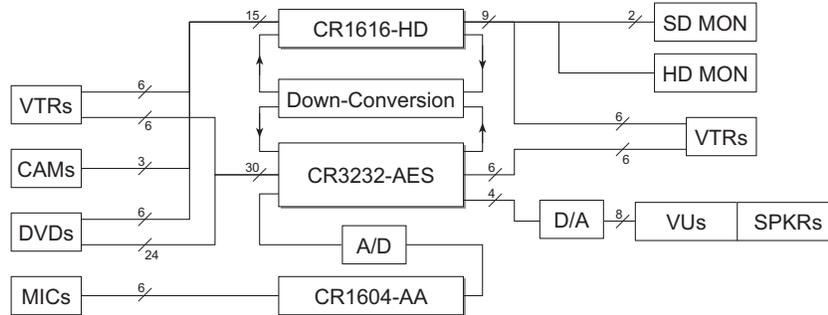
Note the clusters of I/O on the DB25s. 1-8, 9-16, 17-24, 25-32. They are labeled as if mono, but in fact are switched in stereo pairs.

Put the 3 mic pairs on the first DB25 input. The mic out goes on the first DB25 output.

Levels: one additional level ('AA'). The total is now 6 levels.

(So we could have that additional HD/SD level split if it desired. Could also add another AES level if desired.)

Here's the resulting block diagram:



Here is the breakdown for the panel:

Device	Src	Dst	Panel Buttons	Connectors
VTR1	1	1	1, 17	HD in1, out1; AES in25, out25
VTR2	2	2	2, 18	HD in2, out2; AES in26, out26
VTR3	3	3	3, 19	HD in3, out3; AES in27, out27
VTR4	4	4	4, 20	HD in4, out4; AES in28, out28
VTR5	5	5	5, 21	HD in5, out5; AES in29, out29
VTR6	6	6	6, 22	HD in6, out6; AES in30, out30
CAM1	7	—	7	HD in7, AES in31 (mic in)
CAM2	8	—	8	HD in8, AES in31 (mic in)
CAM3	9	—	9	HD in9, AES in31 (mic in)
DVD1	10	—	10	HD in10; AES in 1, 7, 13, 19
DVD2	11	—	11	HD in11; AES in 2, 8, 14, 20
DVD3	12	—	12	HD in12; AES in 3, 9, 15, 21
DVD4	13	—	13	HD in13; AES in 4, 10, 16, 22
DVD5	14	—	14	HD in14; AES in 5, 11, 17, 23
DVD6	15	—	15	HD in15; AES in 6, 12, 18, 24
SDMON1	—	7	23	HD out7, AES out 4
SDMON2	—	8	24	HD out8, AES out 4
HDMON	—	9	25	HD out9, AES out 1-3
MIC1	—	—	(salvo1)	AA in 1,2
MIC2	—	—	(salvo2)	AA in 3,4
MIC3	—	—	(salvo3)	AA in 5,6
MUTE	—	—	(salvo4)	AA in 7,8 (silence)
MICout	—	—	—	AA out 1,2
MICin	—	—	—	AES in 31
DDS	16	—	—	HD in 16, AES in 32
DDD	—	—	32	HD out 16, AES out 32
Level buttons				
SD/HD			26	
AES12			27	
AES34			27	
AES56			28	
AESLR			30	
AA			31 (not essential)	

AES 1/2 is considered (L,R) stereo and so is Dolby 7/8. Therefore the level AESLR represents both.

Please refer to the [Cabling Diagram](#) on page 101.

Operational Considerations

You can view HD sources on the HD monitor and SD sources on the SD monitors.

You can take SD CAM or VTR to any VTR.

The DVDs do not record. Take DVD to VTR in two 'takes': DVD to DDD; DDS to VTR. Between DDD and DDS is a down-converter. There might be a video frame delay (with loss of sync with audio).

To perform a take:

1 Press DDD. 2 Press a DVD. 3 Press a VTR (dest). 4 Press DDS.

The HD CAM would have to go through DDD/DDS as well to reach a VTR.

There are 3 salvos that select microphone (pairs). Pressing a Camera source gets whichever microphone pair you've selected. Mic input is converted to AES.

Each salvo contains one take: (level = AA, input = 1, 2, or 3 as required, output = 1).

You can record to VTR but to view/hear the source on the monitors requires an additional take.

A take (or a double take) does not start, stop, rewind, or cue any media. That you have to do on your own.

Cameras and microphones are assumed to be on at all times. They are not playback devices and there is no stop, start, rewind, etc. for these devices.

The level buttons are not really necessary—except for those times an operator wants a break-away. AA is for the microphones only so its level button could be omitted from the buttons.

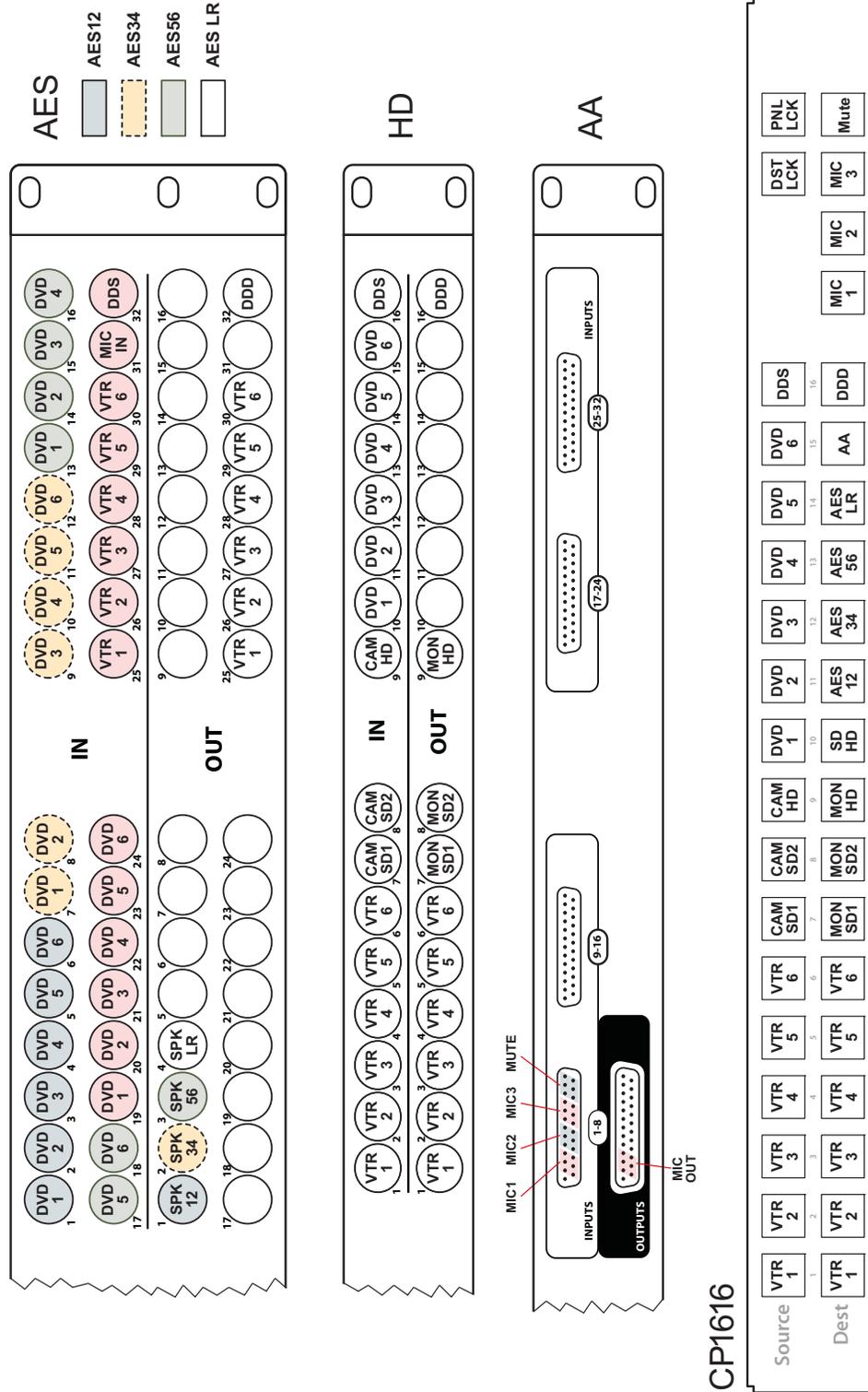
The AA router is under-utilized. It is needed because (1) there is only one ADC channel and (2) there is only one AES input left because of all the DVDs in the system. Take one DVD out and you've got 4 additional AES inputs that could put the mics (through ADCs) directly into the AES router. Then you wouldn't need the AA router.

There is only one (expensive) down-converter channel. So any DVD input routed to a VTR (HD-to-SD down conversion) must go through it. Thus there is one destination (DDD) and one source port (DDS) for the purpose.

The "mute" salvo works by routing silence to the AES MIC input. The mute does not silence other AES inputs. A breakaway to silence could do that. The silence is actually low-level noise and not complete silence. If you ground the mute inputs, you'll get complete silence.

Cabling Diagram

The diagram is on the next page. It shows the I/O connections of all routers in the cabling example and the button assignments for the CP1616 panel used.



Products

The CR Series includes a wide variety of routers and panels. This section provides an overview of all CR Series products. For more details about any product, refer to the device's documentation or contact Miranda.

Summary

CRSC products include 1RU and 2RU routers, control panels, and "remote panel modules." The CRSC includes video and audio routers in several formats, and machine control routers. These are the 1RU compact routers and matching control panels:

1RU Routers		Corresponding 1RU Control Panel	
CR0808-3Gig CR0808-HD CR0808-SD CR0808-AES	8x8, "3Gig" digital video 8x8, HD digital video 8x8, SD digital video 8x8, AES3id digital audio	CP0808	8x8, with 6 function buttons
CR0808-HD-NR CR0808-SD-NR	8x8, HD video, non-reclocking 8x8, SD video, non-reclocking		
CR0808-AA CR0808-AV	8x8, analog audio 8x8, analog video		
CR1616-3Gig CR1616-HD CR1616-SD CR1616-AES	16x16, "3Gig" digital video 16x16, HD digital video 16x16, SD digital video 16x16, AES3id digital audio	CP1616	16x16, with 6 function buttons
CR16-PR	16-port machine control		
CR1616-HD-NR CR1616-SD-NR	16x16, HD video, non-reclocking 16x16, SD video, non-reclocking		
CR1616-AA CR1616-AV	16x16, analog audio 16x16, analog video		
CR1604-3Gig CR1604-HD CR1604-SD CR1604-AES	16x4, "3Gig" digital video 16x4, HD digital video 16x4, SD digital video 16x4, AES3id digital audio	CP1604 CP1602	16x4, with 6 function buttons 16x2, with 6 function buttons
CR1604-HD-NR CR1604-SD-NR	16x4, HD video, non-reclocking 16x4, SD video, non-reclocking		
CR1604-AA CR1604-AV	16x4, analog audio 16x4, analog video		
CR1602-3Gig-CQX CR1602-HD-CQX CR1602-SD-CQX	16x2, HD digital video 16x2, SD digital video	CP1602-CQX	16x8, with 4 transition type buttons, 3 transition rate buttons, and 7 function buttons

These are the 2RU compact routers and matching control panels:

2RU Routers		Corresponding 2RU Control Panel	
CR3232-3Gig	32×32, "3Gig" digital video	CP3232	32×32, with 12 function buttons
CR3232-HD	32×32, HD digital video		
CR3232-SD	32×32, SD digital video		
CR3232-AES	32×32, AES3id digital audio		
CR32-PR	32-port machine control		
CR3232-HD-NR	32×32, HD video, non-reclocking		
CR3232-SD-NR	32×32, SD video, non-reclocking		
CR3232-AA	32×32, analog audio	CP3204	32×4, with 12 function buttons
CR3232-AV	32×32, analog video		
CR3204-3Gig	32×4, "3Gig" digital video		
CR3204-HD	32×4, HD digital video		
CR3204-SD	32×4, SD digital video		
CR3204-AES	32×4, AES3id digital audio		
CR3204-HD-NR	32×4, HD video, non-reclocking		
CR3204-SD-NR	32×4, SD video, non-reclocking		
CR3204-AA	32×4, analog audio	CP6464	64×64, with 12 function buttons
CR3204-AV	32×4, analog video		
CR6464-3Gig	64×64 video router		
CR6464-AES	64×64 AES3id router		

The CP3201 (a 1 RU panel) is special case not listed in the tables above: it controls 32 sources and 1 destination. It does not "correspond" to any router and is used only in a CRSC network. (See [Ethernet Settings Page](#) on page 23.)

Remote Panel Modules		Corresponding Control Panel	
RP16	1RU	CP1616, CP1604, CP1602, CP1602-CQX, CP3201	16×16, 16×4, 16×2, with 6 function buttons. (The CP3201 is a 1RU panel.)
RP32	2RU	CP3232, CP3204	32×32, 32×4 with 12 function buttons.

Routers

The 16×16 routers can switch any of 16 inputs to any of 16 outputs and the 32×32 routers can switch any of 32 inputs to any of 32 outputs. The 8×8 routers switch 8 inputs to 8 outputs. The 16×4 routers switch 16 inputs to 4 outputs. The 32×4 routers switch 32 inputs to 4 outputs.

With the exception of the machine control routers (CR16-PR and CR32-PR), all the compact routers are X/Y routers having $n \times m$ crosspoint matrices. An input can be routed to any or all of the outputs.

The machine control routers (also called *port routers*) are point-to-point routers. An input can be connected to at most one output. (The connections are RS-422 and bidirectional, typically with commands in one direction and responses in the other direction.)

CQX Routers

Each of the 3 CQX ("clean and quiet") routers routes any of 16 inputs to 2 "clean and quiet" outputs or to 6 auxiliary (normal) outputs. For the clean and quiet outputs, the router performs

smooth transitions. The transitions are governed by transition type and transition rate, selectable on the CP1602-CQX control panel. The CQX routers also provide 2 bypass inputs. The 2 clean and quiet outputs switch to the bypass inputs if the router loses power. There are no 2RU clean and quiet routers at present. The CQX routers also provide a GPIO connector, supporting 16 inputs and 4 outputs. The inputs each select one of the video inputs for CQ output 1 and the outputs signal alarms and status.

CR6400 Family

The CR6400 routers are 2RU routers of modular construction. They have removable control cards, crosspoint cards, and a removable fan tray. Because they are removable, they are field-replaceable. Each router has 4 removable I/O cards. If a router is populated with one or more AES cards, it is considered a CR6464-AES. If a router is populated with one or more 3Gig cards, it is considered a CR6464-3Gig. If a router has no I/O cards, it is considered "undefined."

The CR6400 routers switch a 64×64 matrix.

The CR6400 family products should not be mixed (on the same subnet) with other CR Series routers and panels.

Control Panels

A control panel mounts on the front of a router or on the front of a remote panel module and provides direct visual and tactile control of the router or routers connected to the remote panel module. (You can install or uninstall one easily in a few seconds.) However, any of the routers can also operate without a control panel, under network control or through automation.

The CP3201 is special case: it is a 1 RU panel that controls 32 sources and 1 destination. It does not mount on the front of a router and is used only in a CRSC network.

The CP1602-CQX is also a special case: it is a 1RU control panel used in conjunction with any of the 3 CQX routers. This panel has 16 source buttons, 2 "clean and quiet" destination buttons, 6 auxiliary destination buttons, 4 transition type buttons, 3 transition rate buttons, and 7 function buttons.

The CP6464 is the control panel that is used with the CR6400 routers.

Remote Panel Modules

A "remote panel module" is a device that sends control messages to a network of routers (and receives status messages from the routers in the network). A remote panel module receives take and lock commands from an attached control panel and must have a control panel attached to be useful. We say the panel module is "remote" because it and its control panel can be located apart from the routers (from a few inches to several hundred meters, subject to cable limitations).

A remote panel module can be configured to operate (with its mounted control panel) as either (1) a CRSC panel or (2) an NV9000 panel in a system controlled by an NV9000 family router control system. When it is set up for use as a control panel, it is configured in CRSC. When it is set up for use as an NV9000 panel, it must be configured in NV9000-SE Utilities.

Usage

There are several different ways to use compact routers:

- A single stand-alone router with a “captive” control panel or with automation.
- A network of stand-alone routers, possibly with remote panels, possibly with captive panels, and with or without automation.
- A CRSC network of routers and remote panels with or without automation. Here, the panels and routers are configured using CRSC.
- A network of routers under an NV9000 family router control system.
- A single stand-alone CQX router with a “captive” CQX control panel or with automation.
- A CQX router with a remote CQX control panel.

A captive panel is one attached directly to a router. A remote panel is one mounted on a remote panel module.

Automation is a topic left to the customer.

Routers and remote panel modules come from the factory ready for stand-alone operation. They must be configured for use either in a CRSC network or in an NV9000 network. Once configured, they must be reset to work in stand-alone mode.

A remote panel module must be configured to work either in a CRSC network or in an NV9000 network. The two configuration modes are not compatible.

Figure A-3 compares a stand-alone router with a captive panel to a stand-alone router network with remote panel modules:

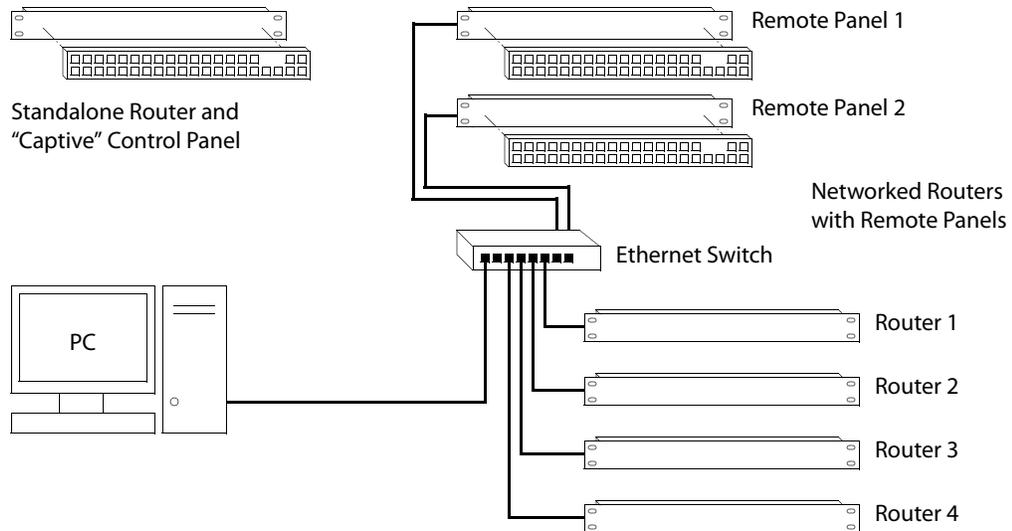


Fig. A-3: Standalone Router vs. a Network of Routers

A CRSC network has the same topology as a stand-alone network, except (1) the routers and remote panel modules have been configured under CRSC which provides a more elegant solution to system design.

Figure A-4 shows a sample NV9000 network, one of several possible topologies:

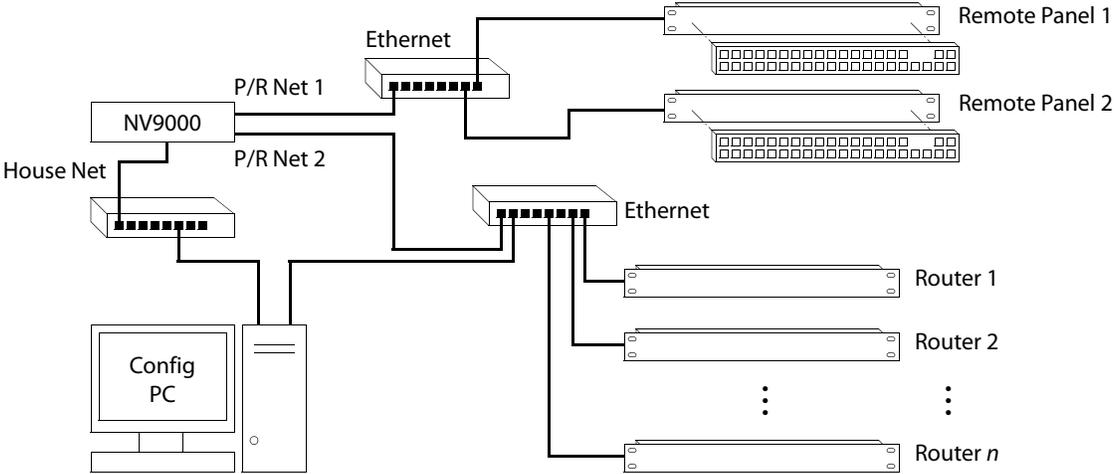


Fig. A-4: NV9000 Network of Routers

An NV9000 network supports a larger number of routers. Commands issue from the remote panels to the NV9000 which then dispatches the instructions to the routers. The routers return status to the NV9000 which in turn relays the status to the remote panels.

CRSC routers can be used with a NV9000 family router control system. These router control systems extend the capabilities of the compact routers.

An NV9000 network is constructed and operated according to the requirements of the NV9000 router control system. Configuration and control of the routers is entirely within the scope of NV9000-SE Utilities, although you can use CRSC to designate IP addresses. See [Ethernet Settings Page](#) on page 23.

CQX Usage

Figure A-5 shows the ways a “clean and quiet” router can be connected:

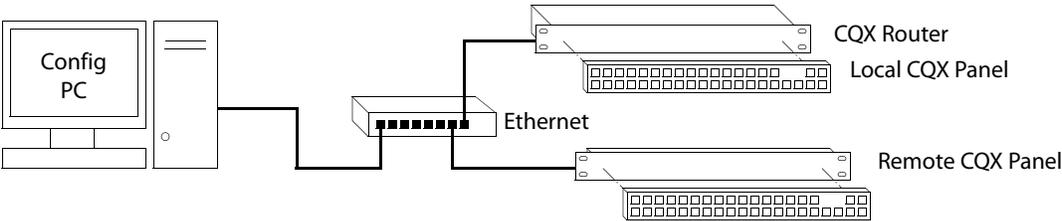


Fig. A-5: CQX Network

At present, the CQX connections are limited. One CQX router with a local (or captive) CQX panel or a remote CQX panel can exist on any subnet. (You can have more than one subnet, however.)

At present there is little to configure other than the IP address of the router or the remote panel module. (You must also specify that the remote panel module supports a CP1602-CQX. See [Using the Remote Panels Page](#) on page 46.)

CR6400 Usage

The CR6400 routers, at first release, operates only in stand-alone mode (also known as “default” mode) either as a single router or in a small network.

Figure A-3 compares a stand-alone router with a captive panel to a stand-alone router network with remote panel modules:

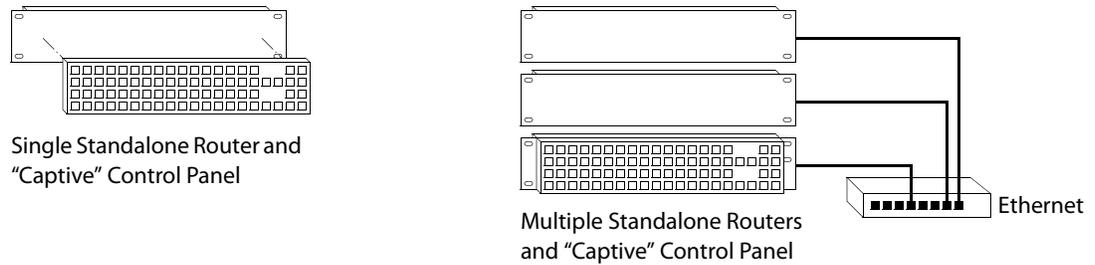


Fig. A-6: CR6400 Usage

Up to 4 CR6400 routers may be controlled with a single CP6464.

Benefits

The CRSC Compact Router System Configurators offer these benefits:

- Miranda performance and quality.
- Very simple operation.
- Low cost.
- Small form factor.
- Easy migration to larger systems.

The Routers

The routers are slim (35–57 mm or 1.38”–2.25”) and mechanically similar, differing principally in the number and type of connectors. The fronts of all the 1RU routers are the same except for their legends and the fronts of all the 2RU routers are the same except for their legends.

The 3Gig, HD, SD, AES, and analog video routers have BNC connectors. The analog audio routers have DB25 connectors (and fans). The machine control routers have RJ-45 connectors.

Figures A-7 through A-19 show front and rear views of the routers.



Fig. A-7: Front View of the CR1616-SD Digital Video Router



Fig. A-8: Rear View of the 16x16 3Gig, HD, SD, or AES Routers

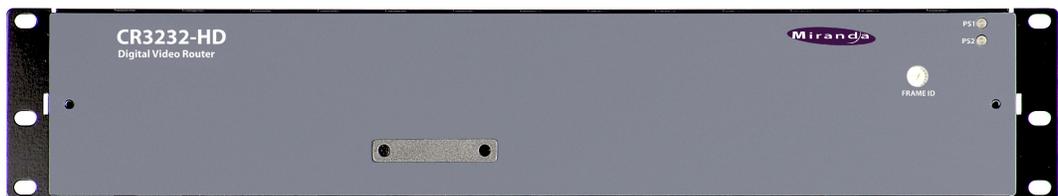


Fig. A-9: Front View of the CR3232-HD Digital Video Router



Fig. A-10: Front View of the CR6400 Digital Router



Fig. A-11: Rear View of the 32x32 3Gig, HD, SD, or AES Routers



Fig. A-12: Rear View of the CR1616-AV Analog Video Router

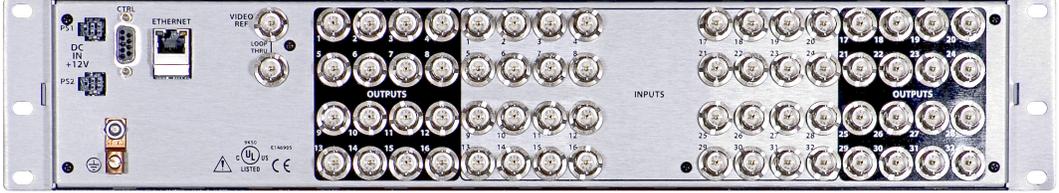


Fig. A-13: Rear View of the CR3232-AV Analog Video Router

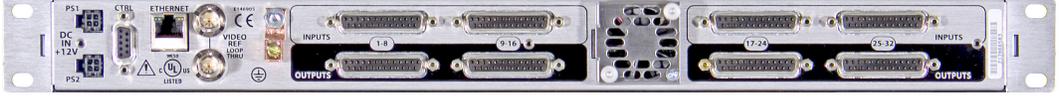


Fig. A-14: Rear View of the CR1616-AA Analog Audio Router



Fig. A-15: Rear View of the CR3232-AA Analog Audio Router



Fig. A-16: Rear View of the CR16-PR Machine Control Router

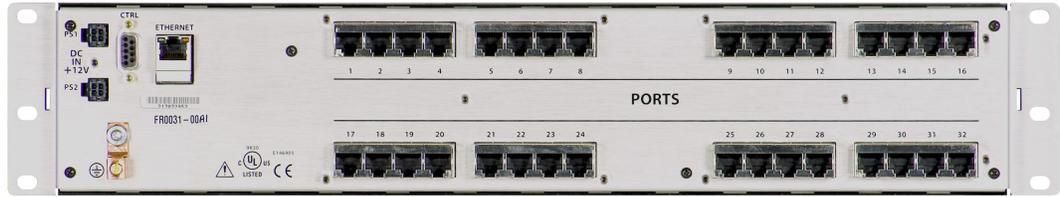


Fig. A-17: Rear View of the CR32-PR Machine Control Router



Fig. A-18: Rear View of the 16x2 CQX Routers (3Gig, HD, or SD)



Fig. A-19: Rear View of a CR6400 Router (CR6464-3Gig)

Some routers (e.g., the CR3204-AA or the CR0808-3Gig) have fewer input or output connectors than shown here.

All compact routers save their state in non-volatile memory. Thus, if a power loss occurs, a router can recover almost instantly. All compact routers require a few seconds to initialize.

All compact routers have an automation port (DE9, RS-422 or RS-485).

All routers except machine control routers accept these video reference rates:

Composite	HD Tri-level		
525i / 59.94 (NTSC)	720p / 23.98	1080i / 47.95	1080p / 23.98
	720p / 24	1080i / 48	1080p / 24
625i / 50 (PAL)	720p / 25	1080i / 50	1080p / 25
	720p / 29.97	1080i / 59.94	1080p / 29.97
	720p / 30	1080i / 60	1080p / 30
	720p / 50		1080p / 50
	720p / 59.94		1080p / 59.94
	720p / 60		1080p / 60

The machine control routers do not receive video reference signals.

The CQX routers accept the same video reference rates.

The video format received must be compatible with the video reference applied.

Digital Video Routers

(See [CQX Video Routers](#), following, for a discussion of the CQX routers.)

The 1RU digital video routers have 16×16, 16×4, or 8×8 crosspoint matrices, depending on the model. The 2RU digital video routers have either 32×32 or 32×4 crosspoint matrices.

Figure A-20 shows a simplified view of the digital video router:

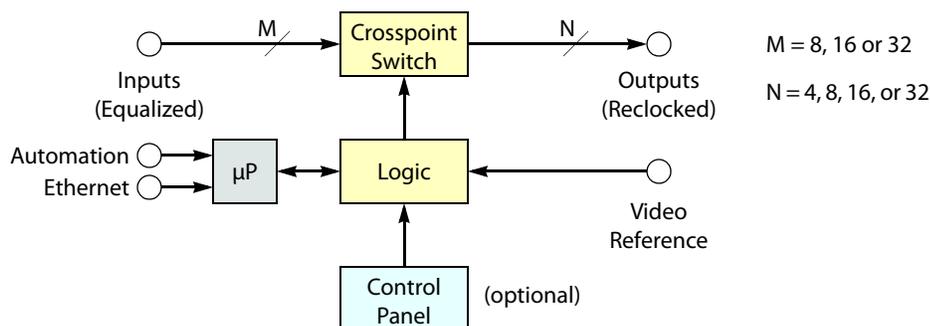


Fig. A-20: Block Diagram of the Digital Video Router

The video routers perform input equalization and, except for the -NR models, perform reclocking of outputs. The -NR models do not perform reclocking. Router outputs are switched in sync with an external video reference if it is present.

All digital video routers accept bi-level or tri-level video references (sync) and switch according to SMPTE RP168-2002.

3Gig Video Routers

All of the “3Gig” routers support 2.966Gb/s, and 2.97 Gb/s video rates as well as a number of HD bit rates and formats. The 3Gig routers reclock at 270 Mb/s, 1.483 Gb/s, 1.485 Gb/s, 2.966 Gb/s, and 2.97 Gb/s. The 3Gig routers bypass re-clocking for other rates. Video references must be nominally 800 mV p-p and bi-level or tri-level in nature.

HD Video Routers

All of the “HD” routers are SWB (super wide band) routers: they support a wide range of SD and HD bit rates and formats, from 10 Mbps to 1.5 Gbps. With the exception of the -NR routers, the HD routers reclock at 143, 177, 270, 360, and 540 Mb/s and 1.483 and 1.485 Gb/s and bypass re-clocking for other rates. Video references must be nominally 800 mV p-p and bi-level or tri-level in nature. The HD routers support DVB-ASI signals.

SD Video Routers

All of the “SD” routers support a wide range of SD serial data rates from 10 Mb/s to 540 MB/s. With the exception of the -NR routers, the SD routers reclock at 143, 177, 270, 360, and 540 Mb/s. The SD routers support DVB-ASI signals.

NR Video Routers

The HD and SD routers are available in non-reclocking models, such as the CR1616-HD-NR and CR3204-SD-NR. These models are less expensive than the models that have reclocking circuitry and work well with relatively noise-free signals. The reclocking models give better performance in noisy environments.

CQX Video Routers

These 1RU “clean and quiet” video routers switch 16 inputs to 2 “clean and quiet” outputs and 6 auxiliary outputs.

The CQX routers have two crosspoint matrices. The first crosspoint routes 16 normal inputs either to an internal mixer or to the second crosspoint matrix.

The mixer has 2 channels. Each channel mixes two inputs and produces an internal “clean” output. One of the inputs is the signal previously routed to that channel and the other input is the signal that *will be* routed to that channel. The mixer produces the transition between the previous input and the next input according to the transition type and transition rate currently selected (at a control panel) for the router.

For the SD and HD CQX routers, each input supports video plus 16 embedded audio channels. The mixer transitions both the video and the audio without artifacts.

The 3Gig router supports both level A and level B of the SMPTE 425M standard. The mixer transitions signals of level A, at 1080p, video and audio without artifacts. It handles level B—two 1080i signals in one stream—somewhat differently. It mixes the 16 audio channels of “link A” (from the two inputs) but passes the 16 audio channels of link B (from the two inputs) through to the output unmixed. “Link B” will undergo a cut transition with possible audio artifacts. Although audio for Link B is not processed and undergoes a cut transition, video for Link B is mixed according to the transition type and rate selected on the CQX control panel.

▲ The 3Gig routers do not accept level B’s 2×720p signals at present.

The second crosspoint matrix receives internal signals and produces the CQX outputs 1 and 2 and the 6 auxiliary outputs (which are normal outputs). A multiplexer selects either the clean output or the emergency bypass input. The emergency bypass input is selected only when power fails. (The multiplexer is controlled by a relay that switches to its relaxed position when power fails.)

The router has 16 normal input BNCs, 2 bypass input BNCs, 2 CQX output BNCs, and 6 aux output BNCs.

Figure A-20 shows a simplified view of the CQX digital video router:

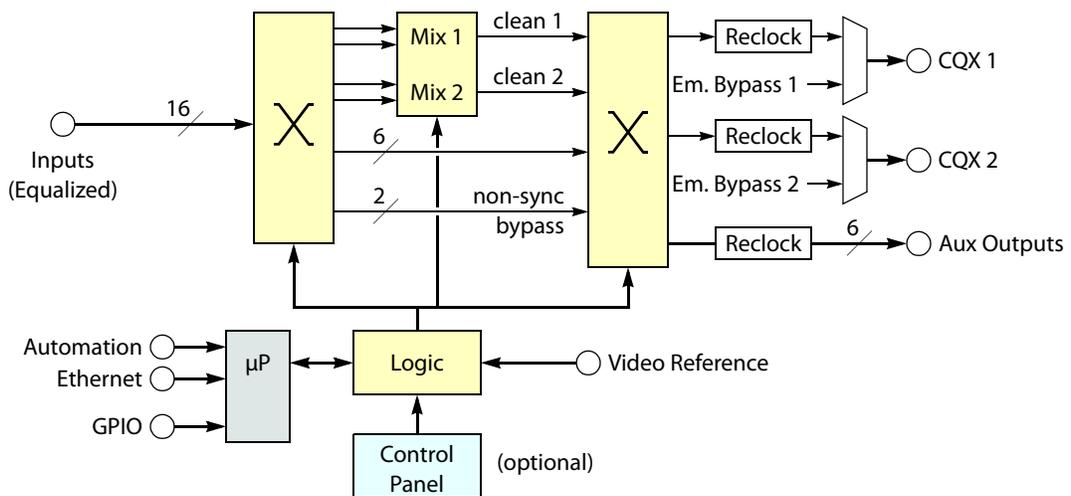


Fig. A-21: Block Diagram of the CQX Digital Video Router

The video routers perform input equalization and perform reclocking of outputs. Router outputs are switched in sync with an external video reference if it is present. The video reference also provides sync for embedded audio.

All CQX video routers accept bi-level or tri-level video references (sync) and switch according to SMPTE RP168-2002.

The CQX video routers also provide a bypass path for non-synchronous input signals. If the two sources chosen for a clean and quiet switch are not of the same format, are off-rate, are not at the same frame rate as the video reference, or do not meet the timing window (± 3 lines), the video processor enters non-sync bypass mode where the source signal bypasses the video processor and goes straight to the outputs. Thus, the clean and quiet output behaves like an aux output in which there is no video or audio processing — with no transition processing. Switches still occur at the specified switchpoint for the video reference, but they will not be “clean and quiet.”

However, if there is no video reference present, the CQX does the cut to the new source as soon as it receives the command from the control panel and does not wait for the switchpoint.

Where one or both of the sources is off-rate or at a frame rate different from that of the video reference, the output will bypass the video processor.

If a clean and quiet output is in a non-sync state but conditions change so that a clean switch is possible, the processor waits for one frame of video before switching to processed video to ensure that the processed video has enough time to pass through the video processing path.

The CQX video routers have a removable fan unit. The fan unit is not visible when a CQX panel is mounted on the router.

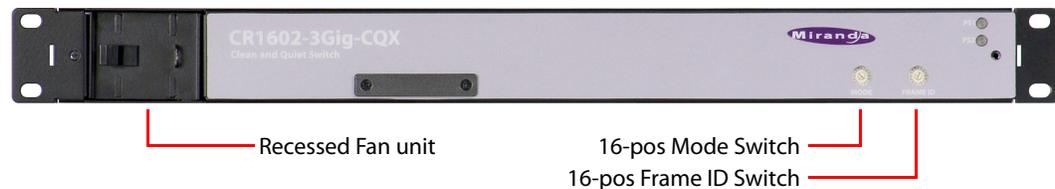


Fig. A-22: Front View of the CQX Video Router

Customers should have no reason to remove the fan unit.

The CQX video routers have a “mode” switch in addition to the 16-position frame ID switch. Both are 16-position rotary switches that turn with a small screwdriver. The “mode” switch configures the video format of the router.

Set the rotary switch to a position in the range 0–9, A, B, C, or D, according to this table:

Setting	Format	Setting	Format
0	1080i, 59.94 or 60 1080p, 29.97 or 30 1080psf, 29.97 or 30	6	1080p, 59.94 or 60
1	1080i, 50 1080p, 25 1080psf, 25	7	1080p, 50
2	525i, 59.94	8	2 × 1080i, 59.94 or 60
3	625i, 50	9	2 × 1080i, 50
4	720p, 59.94 or 60	A	720p, 29.97 or 30
5	720p, 50	B	720p, 25
		C	720p, 23.98 or 24
		D	1080p, 23.98 or 24, 1080psf, 23.98 or 24
		E	<i>reserved</i>
		F	<i>reserved</i>

Switch positions 6 and 7 correspond to video according to SMPTE 425 level A. Switch positions 8 and 9 correspond to video according to SMPTE 425 level B.

The default is 1080i, 59.94 Hz (switch setting 0). Positions E and F are not valid positions.

Where a switch setting supports multiple formats, the format is governed by the video reference applied to the router and must be compatible with that reference format.

The CQX routers enter non-sync bypass mode for signals at all other rates.

- ▲ Every time you make a switch change, power-cycle the router.
- ▲ Settings 6 and 7 are for SMPTE 425 level A. Settings 8 and 9 are for SMPTE 425 level B.

Analog Video Routers

The 1RU analog video routers have 16×16, 16×4, or 8×8 crosspoints. The 2RU analog video routers have either 32×32 or 32×4 crosspoints.

Figure A-23 shows a simplified view of an analog video router:

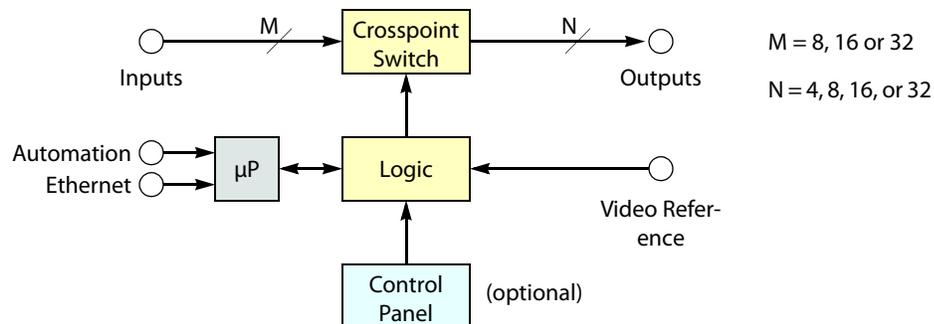


Fig. A-23: Block Diagram of the Analog Video Router

The analog video routers switch NTSC (525i) or PAL (625i) video signals. The router outputs are switched in sync with an external video reference if it is present.

Digital Audio Routers

- ▲ This information does not apply to the CR6464-AES. Please refer to the CR6400 Family User's Guide for details of the CR6464-AES.

The 1RU AES routers have 16×16, 16×4, or 8×8 crosspoints. The 2RU AES routers have either 32×32 or 32×4 (stereo) crosspoints.

Figure A-24 is a simplified view of an AES router:

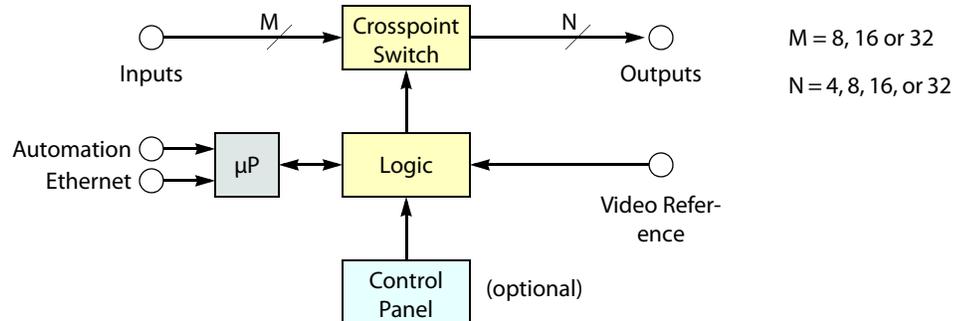


Fig. A-24: Block Diagram of the AES Router

If a video reference is present, the router is considered “synchronous” and regenerates output at 48 kHz (nominally). The routers also perform a certain amount of signal processing if the input is synchronous. If a video reference is not present, the router is asynchronous and passes input signals straight through without any processing.

In synchronous mode, the router can perform mono routing, in which case, the maximum number of signals is $2N$, that is 8, 16, 32, or 64. In asynchronous mode, the router processes AES stereo pairs.

The “AES” routers switch AES3id audio. The AES routers switch in sync with a video reference if one is present.

The two AES modes have different functional characteristics:

- Synchronous mode.

This mode is intended for 48 kHz input. However, the router accepts input from 32 kHz to 192 kHz. The router produces AES3id output at 48 kHz using *adds* and *drops*,¹ as required. If the input itself is locked to the video reference, no adds or drops occur.

The 16×16 router supports either 16×16 stereo switching or 32×32 mono channel switching (when controlled by an external control system). The 32×32 router supports either 32×32 stereo switching or 64×64 mono channel switching (when controlled by an external control system).

A control panel **cannot** and **does not** perform mono switching. It is only in external software (CRSC, CRConfig, NV9000, or third-party software) that you can do that and then only when the router is in synchronous mode (i.e., has a video reference).

1. When the source and output AES streams are not in sync, AES samples arrive at a rate different from the rate at which they leave the router. **Add**: when the source is slower than the output, router software occasionally inserts an extra copy of the most recent sample in the output stream until the source and output are back in sync. **Drop**: when the source is faster than the output, software occasionally does not send the sample(s) to the output until the source and output are back in sync again. Adds and drops are performed on a minute scale, never in large blocks, keeping perceptible distortions to a minimum.

- Asynchronous mode.

The router passes the input stream (32kHz–192kHz) transparently to the output with no audio processing. The output is the same as the input and the output rate is the same as the input rate.

Because the router does no audio processing, it performs *stereo* switching only.

AES routers power up in asynchronous mode. If a video reference is present, the router immediately switches to synchronous mode. If no video reference is present, the router stays in asynchronous mode.

If a video reference is applied at any time after power-up, the router immediately switches from asynchronous to synchronous mode.

Note

When the router is in synchronous mode, and video reference is lost, the router waits 15 minutes (a “grace” period) before reverting to asynchronous mode. If you need to switch from synchronous mode to asynchronous mode in less than 15 minutes, you can cycle power to the router with the video reference disconnected.

Analog Audio Routers

The 1RU analog audio routers have 16×16, 16×4, or 8×8 crosspoints. The 2RU analog audio routers have either 32×32 or 32×4 (stereo) crosspoints. Figure A-25 shows a simplified view of the analog video router:

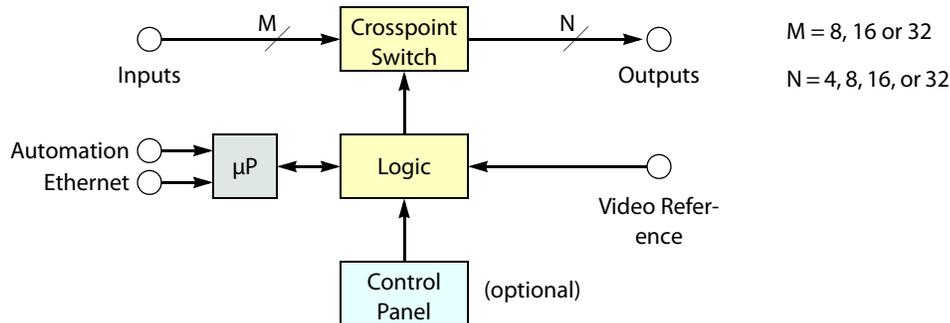


Fig. A-25: Block Diagram of the Analog Audio Router

The analog audio routers switch analog audio signals. Router outputs are switched in sync with an external video reference if the reference is present and are switched asynchronously if no reference is present.

The analog audio router passes input signals transparently to the output with no audio processing or adjustments.

Although the analog audio routers signals are stereo, the connectors are labeled as if the signals were mono. A 16×16 router shows inputs and outputs numbered 1–32. A 32×32 router shows inputs and outputs numbered 1–64. An 8×8 router shows inputs and outputs numbered 1–16.

Machine Control Routers

The machine control routers do not have X/Y crosspoints *per se*, but allow point-to-point connections. One input may connect to (at most) one output.

The 1RU machine control router has 16 bidirectional serial ports (RJ-45). The 2RU machine control router has 32. Figure A-26 shows a simplified view of the machine control router:

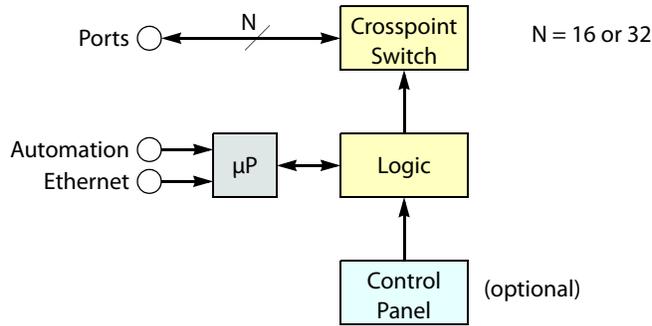


Fig. A-26: Block Diagram of the Machine Control Router

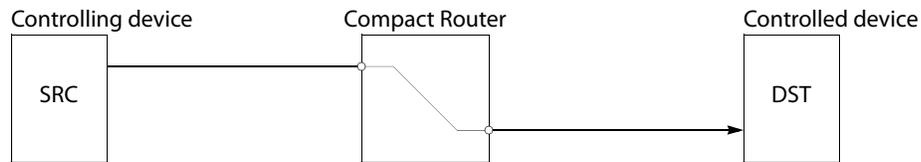
Machine routers channel serial data, typically commands in one direction and responses in the other direction. Because the connections are bidirectional, a port is both an input and an output.

The machine control routers are defined as “data reverse” routers. Each port can be configured as dynamic, master, slave, controlling, or controlled. Either CRConfig or CRSC is a requirement for configuring the ports.

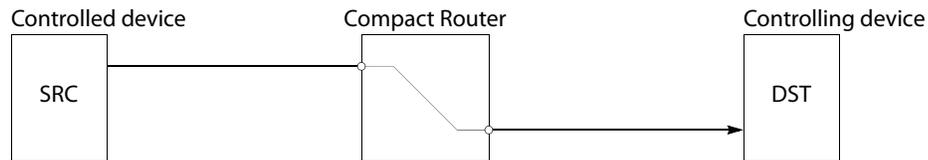
The machine control routers support serial communication up to 1 Mb/s.

Background Information

A device can be considered a “controlled” device or a “controlling” device.



Above, the source device is a controlling device. A destination can also be the controlling device:



A controlling device sends commands to a controlled device. The controlled device passes responses (such as status) back to the controlling device. A source device can be a controlling device or a controlled device. A destination device can be a controlling device or a controlled device.

Some external devices must be placed in “remote” mode to work with a port router.

A *controlling* port is one connected to a *controlling* device.

A *controlled* port is one connected to a *controlled* device.

The compact machine control routers operate in “data reverse” mode. This means that in any connection, the destination device is the controlling device by default. The default can be overridden by port type.

The 5 port types are variations of “controlled” or “controlling”:

Controlling	Master	Dynamic
Controlled	Slave	

Controlling or Controlled

These port settings fix the direction of the router port to “controlling” or “controlled.” The port’s connection for Tx and Rx—made during configuration—is static and does not change during operation.

Dynamic

A dynamic port can be a controlling or controlled port depending on whether it is connected to a master port or slave port. The port’s configuration is dynamic and can change during operation.

Dynamic ports are typically assigned to VTRs.

Master or Slave

Any dynamic port connected to a “master” port will be changed to a **controlled** port. A “slave” port is the opposite of a “master” port: any dynamic port connected to a slave port will be changed to a **controlling** port.

The compact router applies logic to the port direction setting when a master port is connected to a dynamic port. In this case, the machine at the dynamic port is always controlled and the machine at the master port is always **controlling**.

Configuration

Configuring the ports of a machine control router requires CRSC.

The Control Panels

Control panels are optional if you have an automation system.

1RU Panels

The CP1616 control panel has 38 buttons:



Fig. A-27: Front view of the CP1616 Control Panel

The CP1604 control panel resembles the CP1616, but it has 4 buttons in the lower row on the left, instead of 16. The CP1602 has 2 buttons in the lower row on the left.

The CP0808 has 2 rows of 8 buttons at the far left.

In stand-alone systems, a CP1616 has 16 source selection buttons, 16 destination selection buttons, the 2 lock buttons shown, and 4 level selection buttons (as shown).

In a CRSC network, all buttons except the lock buttons (shown) are configurable. In an NV9000 system, all buttons are configurable, including the lock buttons.

You can mount a 1RU panel on any 1RU router or remote panel module.

The CP3201 is a 1RU panel that resembles the CP1616, but it has 32 source buttons (in 2 rows of 16) and no destination buttons. The CP3201 cannot be used as a captive panel. Its design requires a CRSC or NV9000 network.

CQX Panel

The CP1602-CQX is also a 1RU control panel that has 38 buttons:

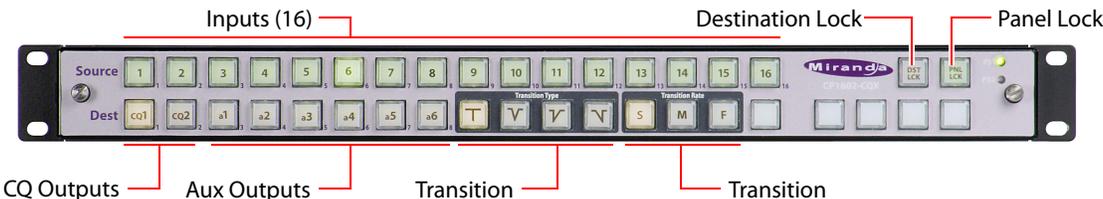


Fig. A-28: Front view of the CP1602-CQX Control Panel

The CP1602-CQX control panel has 16 source buttons, 2 CQX destination buttons, 6 auxiliary destination buttons, 4 transition type buttons, 3 transition rate buttons, and 7 function buttons. Of the function buttons, 5 are presently disabled, reserved for future use, and two are active. The active buttons are 'Destination Lock' and 'Panel Lock'.

2RU Panels

The CP3232 control panel has 76 buttons:



Fig. A-29: Front view of the CP3232 Control Panel

The CP6464 control panel also has 76 buttons, but the panel is slightly different and used exclusively with CR6400 family routers:

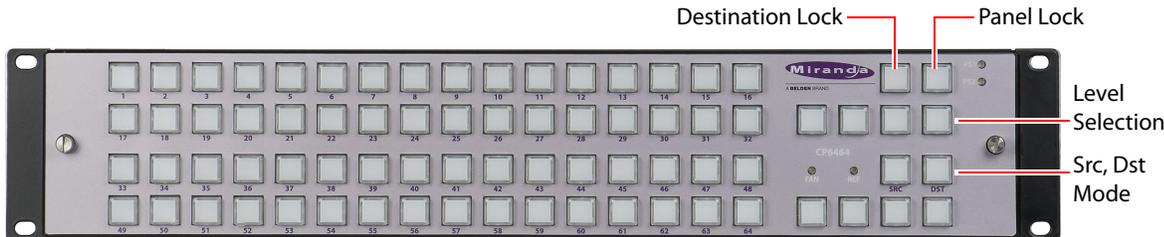


Fig. A-30: Front view of the CP6464 Control Panel

The CP3204 control panel resembles the CP3232, but it has 4 buttons in the lower section on the left, instead of 32.

In stand-alone systems, a CP3232 has 32 source selection buttons, 32 destination selection buttons, the 2 lock buttons shown, and 4 level selection buttons (as shown).

In a CRSC network, all buttons except the lock buttons (shown) are configurable. In an NV9000 system, all buttons are configurable, including the lock buttons.

You can mount a 2RU panel on any 2RU router or remote panel module.

Except under NV9000 control, all control panels have two lock buttons (at the top right):

- Panel Lock. Protects the state of the entire panel.
- Destination Lock. Protects one or more destinations.

Buttons are not labeled at the factory. If you want button legends, you must create your own.

A panel's buttons have color: green, amber, red. In a network, the colors green and amber have no particular meaning. In a CRSC network, the labels 'Source' and 'Dest' that you see on the panel front also have no particular meaning. Any button, regardless of color or position—except for the lock buttons—can be a source, a destination, or have any assignable function.

In stand-alone systems, green means source and amber means destination and the labels 'Source' and 'Dest' do have meaning. The group of buttons labeled 'Source' are (green) source buttons and the group of buttons labeled 'Dest' are (amber) destination buttons.

In CRSC or NV9000 systems, the color of the button means little.

Buttons go high-tally (bright) when selected (pressed) and remain low-tally (dim) when they are not selected.

For all but machine control routers, source buttons represent inputs and destination buttons represent outputs. For machine control routers, a port is both an input and an output. Source button n and destination button n both represent port n .

The function buttons vary in color.

- Unused function buttons are not illuminated.
- The panel lock button, normally low-tally green, goes high tally red when the panel is locked.
- The destination lock button, normally amber, goes high tally red when the currently selected destination is locked. When a destination is locked, the destination button goes high tally red as a warning if you press it. The button color of locked destinations varies with the type of system.

Operating a control panel is usually very simple. See [Operation](#) on page 123.

The Remote Panel Modules

Like the routers, the remote panel modules are slim (35 mm or 1.38"). Except that they have no input or output connectors and no video reference connectors, remote panel modules are virtually the same size and shape as the routers.

Figures A-31 through A-34 show front and rear views of the remote panel modules:



Fig. A-31: Front View of the RP16 Remote Panel Module



Fig. A-32: Rear View of the RP16 Remote Panel Module



Fig. A-33: Front View of the RP32 Remote Panel Module



Fig. A-34: Rear View of the RP32 Remote Panel Module

A remote panel module must have a CR Series control panel attached to be usable. The remote panel module can be set up for operation under CRSC or NV9000.

Under CRSC, when you execute operations on the attached control panel, the remote panel module sends commands to the network of routers and receives status messages from the routers. The attached control panel shows router status on its buttons.

Under NV9000, when you execute operations on the attached control panel, the remote panel module sends commands to the NV9000 and receives status messages from the NV9000 which communicates with the routers. The attached control panel shows router status on its buttons.

A stand-alone network allows up to 16 remote panel modules, up to 4 routers, and up to 4 levels.

A CRSC network allows up to 16 remote panel modules, up to 4 routers, up to 8 levels, and enhanced capabilities.

An NV9000 network allows an indefinite number of remote panels, routers, and levels. The limitations are the number of IP addresses in your network and of course the throughput of the network.

A network requires one or more customer-supplied Ethernet switches.

B Operation

Appendix B provides a summary of panel operating principles.

- ▲ This chapter does *not* apply to the CR6400 family routers and panel. Please refer to the Operations chapter of the *CR6400 Family User's Guide* for information.

Topics

<i>Control Panel Buttons</i>	123
<i>Power Up and Reset</i>	128
<i>Performing Takes</i>	128
<i>Performing Locks</i>	136
<i>Executing Salvos</i>	138
<i>Performing Level Selection</i>	139

Operating a control panel is usually quite simple. The basic operations are the same for all panels except the CP3201. The CP3201 is slightly different because it has a “default destination. Additionally, the CQX (“clean and quiet”) panel features unique buttons for smooth transitions. For detailed information on operating CR Series panels, refer to the *CR Series Compact Router User's Guide*.

For a complete list of panels supported by the Compact Router System Configurator (CRSC), see [Products](#) on page 103.

This section briefly describes how to use the control panel to perform the following tasks:

- Perform ‘takes’ (normal and breakaway). See [Performing Takes](#) on page 128.
- Lock or unlock destination or control panels. See [Performing Locks](#) on page 136.
- Execute salvos. See [Executing Salvos](#) on page 138.
- Select levels. See [Performing Level Selection](#) on page 139.

Although operations are usually straightforward, the meaning of the operations differ according to panel mode. See [Remote Panel Operating Modes](#) on page 94.

Before configuring or using a panel, it is recommended that you become familiar with how control panel buttons are grouped and what different illuminations denote, as described in [Control Panel Buttons](#) on page 123.

Control Panel Buttons

All CR Series control panels have common button features *except* for CQX panels, which have unique buttons for executing smooth transitions. See [CQX Panel Buttons](#) on page 127. In addition, CQX panels only have two functioning default buttons commonly found on other CR Series panels: ‘Panel Lock’ and ‘Destination Lock’.

CR Series control panels were designed before the existence of the Compact Router System Configurator (CRSC). Their button layouts (and button colors) are appropriate to what has been called “default” mode where green buttons are grouped together and labeled “Source” and amber buttons are grouped together and labeled “Dest.” This coloring has no meaning in a CRSC network.

Note

Because captive panels operate in default mode, their button coloring and labeling *is* meaningful. However, they are not configurable and do not operate according to the rules of CRSC.

Figures B-1 and B-2 show the CP1616 and CP3232 respectively. Other panel types are variations of these. The CP1604 for instance has only 4 buttons in the lower row.



Fig. B-1: CP1616



Fig. B-2: CP3232

In CRSC networks, the colors green and amber *have no meaning*. The labels “Source” and “Dest” *have no meaning*. Operators must ignore these colors and these labels.

The color red, however, is meaningful and indicates one of several conditions. See [Red Buttons](#), following. A button that is unlit is either (1) undefined or (2) momentarily turned off.

There are two fixed-function buttons on all control panels (CQX included) at the top right, as shown in Figures B-1 and B-2. The two fixed-function buttons are locks:

- Panel Lock (the rightmost button). Prevents accidental changes on the entire panel.
- Destination Lock. A locked destination is one to which a source may not be routed. This prevents the content delivered at the destination from being changed. When the lock is released, the destination’s content can be changed.

Button Types

Button types are applicable to all panels *except* the CQX panel. All buttons *except* the lock buttons are configurable as:

- Level selection buttons.
- Source buttons.
- Destination buttons.

- Salvo buttons.

Panel Modes

Panel modes are applicable to all panel *except* the CQX panel. Panels can be configured in one of 3 modes:

- Standard
- Enhanced, with hold
- Enhanced, without hold

These modes control level selection in quite different ways. Operators will need to know how levels are managed in the panels they use. See [Remote Panel Operating Modes](#) on page 94 for definitions.

Red Buttons

Depending on context, red means:

- Lock.
- Breakaway. (Applicable to all panels *except* the CQX panel.)
- Occasionally, red can also indicate an unintentional breakaway that occurs as result of an improper configuration. (Applicable to all panels *except* the CQX panel.)

Button Order

The order in which buttons appear on a control panel affects the meaning of level buttons. All panels *except* the CQX panel are affected by button ordering because CQX panels do not have configurable buttons or levels.

Spatial Ordering

Buttons on a control panel are numbered from left to right, and then from top to bottom.

The button order affects the meaning of level buttons in standard mode: level buttons with lower numbers have precedence over level buttons with higher numbers.

Briefly stated, on any button row, level buttons to the left have higher precedence than buttons to the right. All buttons on an upper row have higher precedence than any button on rows below that row.

Some button numbers do not correspond to an actual button. See [Performing Level Selection](#) on page 139.

Temporal Ordering

In standard mode, the order in which you press level buttons affects the outcome. After a level selection, the order in which the buttons were pressed is no longer apparent. Any set of selected levels can therefore represent a number of different sets of sources and destinations. See [Performing Level Selection](#) on page 139.

Button Illumination

Button illumination is applicable to all panels. To discuss button lighting, there are some terms that are helpful when clarifying button states:

Current destination The destination that is currently selected.

Routed source A source that matches or partially matches what is routed to the current destination.

Primary level The first configured level for the destination button.

Primary source The routed source on the primary level.

Figure B-3 illustrates the terms:

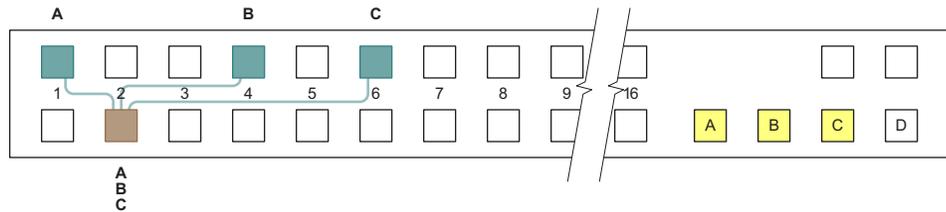


Fig. B-3: Buttons on a Panel

In this illustration, blue buttons are **routed sources**. The brown button is the **current destination**. Yellow buttons are selected levels. Buttons without any specific color are unselected.

In this example, the destination uses levels A, B, and C. Level A is the **primary level** because it is the first. Source 1 is the **primary source** because it routes level A.

The example has blue, brown, and yellow buttons for the purpose of definition. Real CRSC control panels have green, amber, and red buttons.

Source Button Lighting

In a normal take, the (single) source button selected is always high-tally (green or amber).

In a breakaway in enhanced mode, the primary source is high-tally green or amber. Non-primary sources taken are high-tally red.

In a breakaway in standard mode, all taken sources are high-tally green or amber.

Destination Button Lighting

The current destination is high-tally (generally green or amber). All other destinations are unselected and low-tally.

However, if the destination on a button is locked, the button is red, high-tally if selected, and low-tally if not.

Level Button Lighting

Enhanced Mode

- A level button is high-tally (green or amber) if it is selected and represents the primary level.
- A level button is low-tally (green or amber) if it is not selected and represents the primary level.
- A level button will be red (in a breakaway only) if it does **not** represent the primary level. If the level button is selected, it is high-tally. Otherwise it is low-tally.

- A level button is off if the current destination does not include this level.

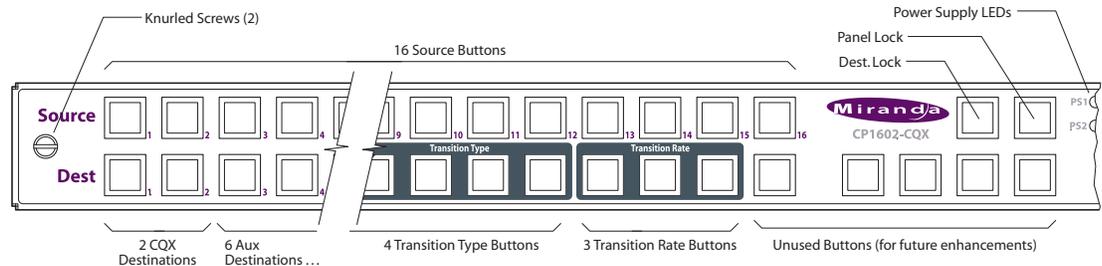
Standard Mode

- A level button is high-tally (green or amber) if it is selected.
- A level button is low-tally (green or amber) if it is not selected.

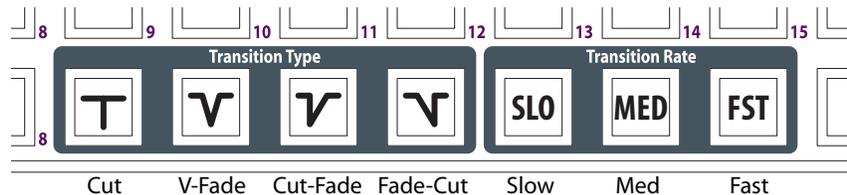
CQX Panel Buttons

CQX (“clean and quiet”) panels feature a unique set of buttons for executing smooth transitions. There are 16 source buttons, 2 “clean and quiet” destination buttons and 6 auxiliary destination buttons: ‘Panel Lock’ and ‘Destination Lock’. See [Control Panel Buttons](#) on page 123. The remaining panel buttons are not configurable at this time.

A CQX router is one that performs smooth transitions in both HD and SD video, and audio. There are two models supporting HD and SD. The CQX control panel is used with the CQX router or a remote panel. Unlike other CR Series panels, the CQX panel has 4 dedicated transition type buttons (cut, v-fade, cut-fade, and fade-cut) and 3 dedicated transition rate buttons (slow, medium, and fast).



The transition buttons appear in this ordering:



The transition rate buttons are not configurable at this time. The rates are fixed at the following transition rates:

- 1080i59.94, NTSC: slow = 90, medium = 60, fast = 30.
- 1080i50, PAL: slow = 75, medium = 50, fast = 25.
- 720p50: slow = 150, medium = 100, fast = 50.
- 720p60: slow = 180, medium = 120, fast = 60.

The result is that slow is 3 seconds, medium is 2 seconds, and fast is 1 second for all CQX routers.

A cut transition is instantaneous for video; its audio ramps down over 3 frames and ramps back up over 3 frames.

(Transition type and rate are selectable on both captive panels and remote panels.)

Power Up and Reset

Operators generally do not need to bother about startup — unless there is a power outage.

At power-up, and at every *reset*, a control panel's 'Panel Lock' button is on and red. An operator must turn the panel lock off before the panel can be used. At power-up, a remote panel (module) "discovers" the state of the routers in the network and illuminates its buttons to reflect the routes and levels that were selected prior to power-up (reset). It can take up to 60 seconds to finish the discovery. The operator can actually start using the panel before the discovery completes.

Routers at Power-Up

At power-up, a router loads stored program code into its internal FPGA and restores its previous operational state. (Its "state" includes the name, crosspoint map, levels, and which of the outputs are locked.)

Note

If a router's rotary switch is set to the 0 position, the router reverts to the *factory default state*, not its previous state. Its entire state and all configuration data are lost.

At power-up, the router detects the presence or absence of a video reference signal.

(The AES routers switch immediately to synchronous mode if a *video* reference is present. Otherwise they remain in asynchronous mode.)

Remote Panel Modules at Power-Up

At power-up, a remote panel module also loads stored program code into its internal FPGA and restores its previous operational state. (Its "state" includes all the button definitions and its own panel mode.)

Note

If a remote panel module's rotary switch is set to the 0 position, the remote panel module reverts to the *factory default state*, not its previous state. Its entire state and all configuration data are lost.

Performing Takes

A take is the switching of a signal from a source to a destination. 'Takes' are performed using the control panel; pressing buttons that have been configured to represent specific sources or destinations. Sources may only be taken to destinations on the same level.

There are five types of 'takes':

- Normal 'takes' have no breakaway; the source and destination are on the same level. See [Normal Takes](#) on page 129.
- A *breakaway* take has multiple sources on different levels to a destination. See [Breakaway Takes](#) on page 130.
- CP3201 'takes' differ slightly because the CP3201 has only a default destination that can neither be selected nor deselected. See [CP3201 Takes](#) on page 133.

- Machine control 'takes' are the same as other compact routers, but the intrinsic nature of the take is different. See [Machine Control Takes](#) on page 135.
- CQX router "clean and quiet" 'takes' employ transition type and rate (for outputs 1 and 2). See [CQX Takes](#) on page 136. CQX routers also perform normal 'takes' similar to other routers on its auxiliary outputs (3 through 8).

Normal Takes

By "normal take" we mean a non-breakaway take.

First press a destination button and then a source button. The take occurs immediately. The previous route (for the destination) is lost.

Please note:

- Takes on CP3201s are different. See [CP3201 Takes](#) on page 133.
- If a destination is locked, the destination button is usually red, high-tally when selected. You cannot perform a take for a destination that is locked. See [Performing Locks](#) on page 136.
- The *meaning* of a take for a machine control router is different from 'takes' on other routers. See [Machine Control Takes](#) on page 135.

Example — Normal Take in Standard Mode

You want to route source S to destination D.

- 1 Optionally, select the levels on which you want the take to occur. Potentially, this changes the sources and destinations enabled for the take. See [Level Selection in Standard Mode](#) on page 139. (Selecting levels prior to the destination does not result in breakaway.)
- 2 Press destination D.



- 3 Press source S.



Pressing another destination button (always) starts a new take.

In standard mode, a normal take occurs on all selected levels.

Example — Normal Take in Enhanced Mode

You want to route source S to destination D.

- 1 Do **not** press any level buttons. Doing so initiates a breakaway for the previously chosen destination.
- 2 Press destination D.



3 Press source S.



Pressing another destination button (always) starts a new take.

In enhanced mode, a normal take occurs on all the levels defined for the destination.

Breakaway Takes

A *breakaway* takes multiple sources, on different levels, to a destination. Breakaway ‘takes’ can be performed on all control panels *except* CQX panels.

To perform a breakaway, first press a destination button. Then alternately press level buttons (one or more) and source buttons. The multiple ‘takes’ occurs immediately when you press the source buttons. The previous route (for the destination) is lost.

Please note:

- Takes on CP3201s are different. See [CP3201 Takes](#) on page 133.
- If a destination is locked, the destination button is usually red, high-tally when selected. You cannot perform a take for a destination that is locked. See [Performing Locks](#) on page 136.
- The *meaning* of a take for a machine control router is different from takes on other routers. See [Machine Control Takes](#) on page 135.

Example — Breakaway in Standard Mode

You want to take SD video from source 1 to destination 2. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4.

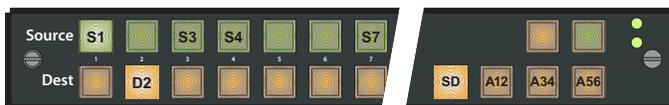
(Assume that these sources and destinations are enabled and remain enabled.)

The level buttons are SD, A12, A34, and A56.

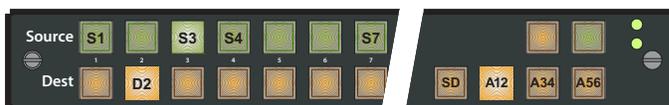
1 Press destination 2. The previous source was source 7 so it is high-tally.



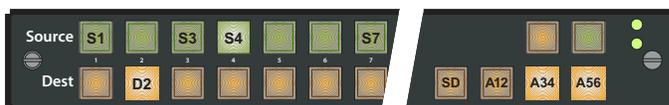
2 Select level SD (only). Press source 1.



3 Select level A12 only. Press source 3.



4 Select levels A34 and A56 only. Press source 4.



Double-press any of the level buttons to highlight the source that contributes that level. You can continue to break sources away, ad infinitum, and you can come back to the destination later and it will still show the breakaway. You could add or remove breakaway sources at that time.

Example — Breakaway in Enhanced Mode without Hold — Variant 1

You want to take SD video from source 1 to destination 2. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4.

The levels defined for the destination are SD, A12, A34, and A56. SD was defined first in the destination description. Therefore it is considered the **primary level**.

- 1 Press destination 2. The previous source was source 7 so it is high-tally.



- 2 Select just level SD. Press source 1.



Source 1 is high-tally because you have taken SD — the primary level — from this source. Source 7 is red because the other levels still come from source 7. (The SD level button is amber because SD is the primary level. The other level buttons are red because they are not primary. All level buttons go high-tally once again, red or amber.)

- 3 Select just level A12. Press source 3.



Source 3 goes high-tally red because it is not the primary source. All level buttons go high-tally once again.

- 4 Select both A34 and A56. Press source 4.



Source 4 goes high-tally red because, like source 3, it is not the primary source. All level buttons go high-tally once again. Source 7 goes dim because no other levels come from source 7.

Pressing another source button without selecting a level would revert the take to a normal take, undoing the breakaway you started.

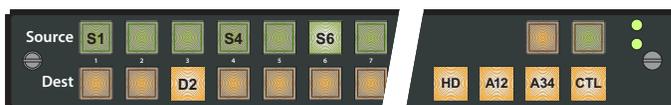
Pressing another destination button (always) starts a new take.

Example—Breakaway in Enhanced Mode without Hold—Variant 2

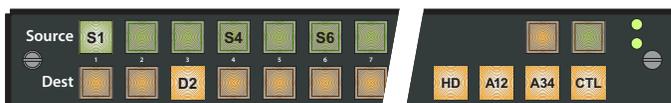
You want to take all levels from source 1 to destination 3 *except* CTRL, which is to come from source 4. Destination 3 is presently connected to source 6.

The levels defined for the destination are HD, A12, A34 and CTRL. HD was defined first in the destination description. Therefore it is considered the *primary level*.

- 1 Press destination 3. The previous source was 6 so it is high-tally.

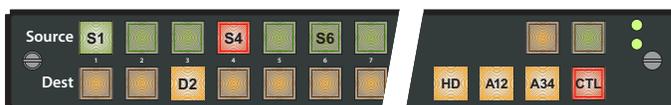


- 2 Do not press a level button. Press source 1.



Source 1 goes high tally because it provides all levels including the primary level. (All level buttons are amber because all levels belong to the primary source.)

- 3 Press level CTL. Press source 4.



Source 4 goes high-tally red because it is not the primary source. All level buttons go high-tally. The CTL level button turns red because now CTL is not from the primary source. The HD, A12, and A34 buttons remain amber because they are from the primary source.

Pressing another source button without selecting a level would revert the take to a normal take, undoing the breakaway you started.

Pressing another destination button (always) starts a new take.

Example—Breakaway in Enhanced Mode with Hold

You want to take SD video from source 1 to destination 2. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4. The previous source was source 7.

The levels defined for the destination are SD, A12, A34, and A56. SD was defined first in the destination description. Therefore it is considered the *primary level*.

- 1 Press destination 2. The previous source was source 7 so it is high-tally.



- 2 Select just level SD. Press source 1.



Source 1 goes high tally because you have taken SD—the primary level—from this source. Source 7 is red, indicating that the other levels still come from source 7. (The SD level button

is amber because SD is the primary level. The other level buttons are red because they are not primary. They are low-tally because this is hold mode and SD remains the only level selection.)

3 Select just A12. Press source 3.



Source 3 goes high-tally red because it is not the primary source. The level buttons remain unchanged. You could choose another source at this point.

4 Select just A34 and A56. Press source 4.



Source 4 goes high-tally red because, like source 3, it is not the primary source. The level buttons remain unchanged. Again, you could choose another source at this point. Pressing another source button without selecting another level simply changes the source for that selected level (or levels).

Pressing another destination button (always) starts a new take. If you wish to clear the breakaway for destination 2, press destination 2, then press a source without selecting any levels.

CP3201 Takes

CP3201 takes are slightly different. A CP3201 has only a default destination that can neither be selected nor deselected.

Example—Normal Take for CP3201

You want to route source S to the default destination. Just press source S. It's a single button press.

A normal take occurs on all the levels defined for the default destination.

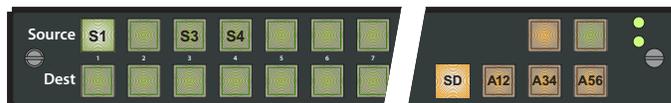
Example—Breakaway for CP3201 in Standard Mode

You want to take SD from source 1 to the default destination. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4.

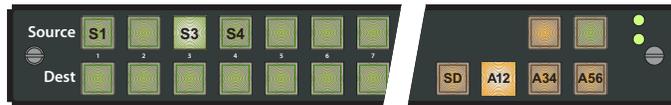
(Assume that these sources and destinations are enabled and remain enabled.)

The level buttons are SD, A12, A34, and A56.

1 Select just level SD. Press source 1.



2 Select just level A12. Press source 3.



3 Select just levels A34 and A56. Press source 4.



If these levels are selected, you can double-press any of the level buttons to highlight the source that contributes that level.

You can continue to break sources away, ad infinitum.

To clear the breakaway, select all levels and then press a source.

Example — Breakaway for CP3201 in Enhanced Mode with Hold

You want to take SD from source 1 to the default destination. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4. The previous source was source 7.

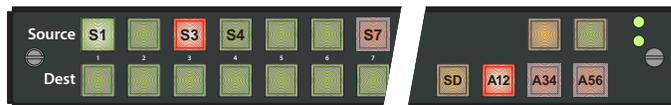
The levels defined for the destination are SD, A12, A34, and A56. SD was defined first in the destination description. Therefore it is considered the *primary level*.

1 Select just level SD. Press source 1.



Source 1 goes high tally because you have taken SD—the primary level—from this source. Source 7 is red indicates that the other levels still come from source 7. (The SD level button is amber because SD is the primary level. The other level buttons are red because they are not primary. They are low-tally because this is hold mode and SD remains the selection.)

2 Select just A12. Press source 3.



Source 3 goes high-tally red because it is not the primary source. The level buttons remain unchanged. You could choose another source at this point.

3 Select just A34 and A56. Press source 4.



Source 4 goes high-tally red because, like source 3, it is not the primary source. The level buttons remain unchanged. Again, you could choose another source at this point. Pressing another source button without selecting another level simply changes the source for that selected level (or levels).

To clear the breakaway, select all levels for the default destination and then press a source.

Example—Breakaway Take for CP3201 in Enhanced Mode without Hold

You want to take SD from source 1 to the default destination. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4. The previous source was source 7.

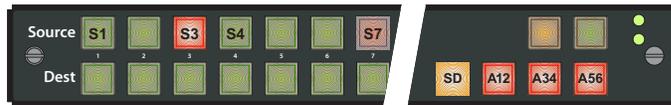
The levels defined for the destination are SD, A12, A34, and A56. SD was defined first in the destination description. Therefore it is considered the *primary level*.

- 1 Select just level SD. Press source 1.



Source 1 is high-tally because you have taken SD—the primary level—from this source. Source 7 is red because the other levels still come from source 7. (The SD level button is amber because SD is the primary level. The other levels are red because they are not primary.)

- 2 Select just A12. Press source 3.



Source 3 goes high-tally red because it is not the primary source. All level buttons go high-tally once again.

- 3 Select both A34 and A56. Press source 4.



Source 4 goes high-tally red because, like source 3, it is not the primary source. All level buttons go high-tally once again.

Pressing another source button without selecting a level reverts the take to a normal take, clearing the breakaway you performed.

Machine Control Takes

The method for performing a machine control take is the same as for any other compact router: first press a DST button and then a SRC button. However, for machine control routers, the intrinsic nature of the take is different:

- A machine control router is a point-to-point router whereas the other compact routers are X/Y routers. In an X/Y router, a source can be routed to multiple destinations. In a machine control router, a new route breaks all previous connections to the source and all previous connections to the destination prior to making the new connection.
- Port router connections are bidirectional. A port is both an input and an output. Thus, if you take SRC1 to DST6, SRC6 is also connected to DST1.
- For dynamic ports (only), there is a difference between taking DST6/SRC1 and taking DST1/SRC6.

DST1/SRC6 Port 1 is “controlling.” Port 6 is “controlled.”

DST6/SRC1 Port 6 is “controlling.” Port 1 is “controlled.”

Thus, it is the destination that is “controlling.” That is because compact machine control routers are “data reverse.”

See [Machine Control Routers](#) or [Port Configuration](#) for definitions of terms and more information.

Note

Machine control ‘takes’ do not start or stop machines, nor do they pre-roll or position any media.

CQX Takes

Takes on a CQX panel involve transition type and rate when the destination selected is one of the two CQX destinations. Takes do not involve transition type and rate when the destination is one of the 6 auxiliary outputs.

To perform a CQX take, first choose a CQX destination, then select a transition type and rate. You do not need to do this if the currently selected transition type and rate are what you want. The take occurs immediately when a source is selected.

To perform an auxiliary take, press an AUX output (aux DST) button and then a SRC button. The take occurs immediately (without a transition effect).

When you press the DST button, it tallies high (amber). The button for the source that corresponds to the selected DST also tallies high (green). When you press a SRC button, the old connection is lost (after the transition), the old SRC button goes low tally, and the new SRC button goes high tally.

If a destination is locked, it will be low-tally red. If you select a locked destination, it will go high-tally red. You cannot perform a take for a destination that is locked.

Performing Locks

Panel Lock

Pressing a ‘Panel Lock’ button disables the control panel. Panel locks apply to all control panels, including CQX panels. Only the ‘Panel Lock’ button remains enabled. Pressing it again re-enables the control panel. Panel locks are available on all panels, including the CQX panel.



When the control panel is locked, the lock button is high tally red and the state of the entire control panel is protected. Changes from the control panel are disabled.

Destination Locks

When the operator presses a ‘Destination Lock’ button, the current destination is locked to its source(s). No operator may choose another source for that destination at any panel. Destination locks are available on all panels, including the CQX panel.

A destination lock occurs on all the levels defined for the destination *except those levels that have been deselected*.

A **simple lock** protects a destination on *all levels defined for the destination*.

A **complex lock** protects a destination only on the *levels defined for the destination that are selected*. Sources may still be taken to the destination on other levels.

Unlocking a locked destination can be simple or moderately complex.

You *can* route the source that feeds a locked destination to any number of other destinations:

- A destination lock on a CP3201 is slightly different because a CP3201 has only a “default destination.” See [CP3201 Locks and Unlocks](#) on page 138.
- You cannot unlock, at a panel, a destination locked by someone else. It is possible to release those locks using CRSC. See [Locks Page](#) on page 81.
- A destination might be locked (at another panel) on levels that you cannot see or control on your panel. If that is the case, you cannot route any source to it.

Simple Locks

Press the destination, then press ‘Destination Lock’.

Under a simple lock, the destination button is:

- High-tally red when it is selected and at least one of the levels on which it is locked is selected.
- High-tally amber when it is selected and none of the levels on which it is locked is selected.
- Dark (in standard mode) when none of its levels are selected. (The destination cannot be selected.)
- Low-tally red when it is not selected.

The ‘Destination Lock’ button is:

- High-tally red when the destination is selected and at least one of the levels on which it is locked is selected.
- Low-tally amber otherwise.

To undo a simple lock, press the destination and then press ‘Destination Lock’.

Complex Locks

Press the button for a destination, then alternately select a level (or levels) and press ‘Destination Lock’.

Under a complex lock, the destination button is the same as for a simple lock:

- High-tally red when it is selected and at least one of the levels on which it is locked is selected.
- High-tally amber when it is selected and none of the levels on which it is locked is selected.
- Low-tally red when it is not selected.

The ‘Destination Lock’ button is the same as for a simple lock.

- High-tally red when the destination is selected and at least one of the levels on which it is locked is selected.
- Low-tally amber otherwise.

To undo a complex lock, select all levels, press the destination and then press ‘Destination Lock’. You might have to press the lock button twice. That is because the first press might actually lock a level you did not know was unlocked.

CP3201 Locks and Unlocks

Because the CP3201 has only a default destination, locks are different.

Simple Lock—CP3201

Select all levels and press the destination lock button. The destination is locked on all levels defined for the destination: its current source(s) cannot be changed on any level.

The destination lock button remains red until you press it again to unlock the default destination.

To undo a simple lock, select all levels and then press 'Destination Lock'. You might have to press the lock button twice. That is because the first press might actually lock a level you did not know was unlocked.

Complex Lock—CP3201

Select one or more levels and press the destination lock button. The destination is locked on all selected levels: its current source(s) cannot be changed on any of those levels.

The destination lock button is high-tally red if you have selected any levels and low-tally amber otherwise.

To undo a complex lock, select all levels and then press 'Destination Lock'. You might have to press the lock button twice. That is because the first press might actually lock a level you did not know was unlocked.

To unlock a single locked level, select that level only and then press 'Destination Lock'.

Executing Salvos

A salvo is a pre-defined list of up to 32 basic 'takes'. A salvo is assigned to a control panel button. When the operator presses a salvo button, the 'takes' defined in the salvo execute in order. Salvos do not loop and must not execute simultaneously. An attempt to run two or more salvos at once will have unpredictable results.

Salvos are available on all panels, *except* the CQX panel.

No instructions are required for pressing a salvo button. However, the configurer should let the operator know at least what the general effect of the salvo is. Meaningful button labels help.

If a level specified in the salvo is not enabled, or if the input or output does not exist, the take(s) on that level do not occur. Salvos with errors take longer to execute because of multiple attempts to perform 'takes' and the resulting time-outs. There is no error reporting or warning if a salvo fails at any point.

A salvo button goes high-tally when it is executing and returns to low-tally when the salvo completes. As a rule of thumb, no salvo should require more than a few hundred milliseconds.

Performing Level Selection

Level buttons enable or disable levels. When a level button is high-tally, the level is enabled. The levels enabled at any particular time are called the *selected levels*. A panel must have a level button for each level it controls. The panel will not switch a source on a level for which there is no level button. The exception to this is that when a panel has no level buttons, all levels defined for the destination are selected. Level selection has no effect on routed signals until you perform a take.

Note

By default, CQX routers are assigned a single level that encompasses the entire router. For this reason CRSC does not allow level configuration for a CQX router. Therefore, no level selection is performed on CQX panels. See [CQX Takes](#) on page 136.

The result of level selection depends on panel mode: standard, enhanced with hold, or enhanced without hold.

Level Selection in Standard Mode

A level selection affects all 'takes' made after the level selection. The levels you select persist until you change them. This is true for normal 'takes' and for breakaway.

In most cases, the level buttons are toggles: press the level button to select the level if it is unselected or deselect the level if it is selected. However, there are 2 exceptions:

- When you have selected *all* the levels on the panel, pressing any level button deselects the *other* levels and leaves the one you pressed selected.
- When you have only one level on your panel, pressing the level selection button has no effect. The single level is always selected.

Level selection in standard mode is affected by button order.

Button Order

The ordering of buttons on a panel affects the meaning of level selection under standard mode. We call this *spatial ordering*.

The order in which the operator presses level buttons affects the meaning of level selection under standard mode. We call this *temporal ordering*.

To illustrate, the following examples use a set of 6 sources and 6 destinations. Three of the sources and three of the destinations have AV, AES, and TC levels. The remaining sources and destinations have SD, AES, and TC levels. The level buttons are AV, AES, TC, and SD.

Button order is important only in standard mode. The examples are for panels in standard mode.

In standard mode, pressing level buttons enables certain sources and destinations and disables other sources and destinations. The button for a disabled source or destination is off. The operator may perform 'takes' only for enabled destinations and sources.

Spatial Ordering

Rule 1: when *all* levels are selected, the sources and destinations that are enabled are those that include the level that is controlled by the level button with the lowest button number. If no levels are selected, no sources and destinations are enabled.

The level on the level button with the lowest button number has *precedence* or priority over other levels.

These examples show the difference between two orderings of level buttons. Figure B-4 shows level buttons in the order AV, AES, TC, SD:



Fig. B-4: Spatial Ordering AV, AES, TC, SD

Level AV is on the left and has the lowest button number. All levels are selected. Therefore, sources and destinations that include level AV are enabled and other sources and destinations are disabled.

Figure B-5 shows level buttons in the reverse order (SD, TC, AES, AV):



Fig. B-5: Spatial Ordering SD, TC, AES, AV

Level SD is now on the left and has the lowest button number. Again, all levels are selected. Sources and destinations that include level SD are now enabled and other sources and destinations are disabled.

Thus, with one level button ordering, AV sources are enabled. With the other, SD sources are enabled.

If a panel's level buttons are scattered across the panel, one should remember the ordering method: (1) buttons in any row have higher precedence than buttons in lower rows and (2) within a row, buttons to the left have higher precedence than any to the right.

Temporal Ordering

Rule 2: when not all levels are selected, the sources and destinations that are enabled are those that include the level that you select *last*. If no levels are selected, no sources and destinations are enabled.

Figure B-6 shows level buttons again in the order AV, A12, TC, SD, but this time with level AV unselected:



Fig. B-6: Temporal Ordering AES, TC, SD

Although it is not visually apparent, when the A12 button is pressed last, the sources and destinations that include A12 are enabled.

Figure B-7 shows the same selected level buttons, but this time level SD was pressed last:



Fig. B-7: Temporal Ordering AES, TC, SD

The same level buttons were pressed here as in Figure B-6, but in different order with a very different result. Sources and destinations having level SD are enabled.

The Double-Press

To reselect a level, first deselect the level, then select the level. That is, press the level button twice. You can consider this action a “double-press.”

A double-press gives the level **precedence** over other selected levels.

In the example of Figure B-7, if you double-pressed A12, the result would again be like Figure B-6.

Standard Mode Summary

Rule 1: when *all* levels are selected, the sources and destinations that are enabled are those that include the level that is controlled by the level button with the lowest button number.

Rule 2: when not all levels are selected, the sources and destinations that are enabled are those that include the level that you select *last*.

‘Takes’ occur on all selected levels. Destinations (and sources) are enabled by the level with precedence:

- (Rule 1) precedence given by the lowest level button number.
- (Rule 2) precedence given by the most recently pressed level button.

‘Takes’ can occur only for enabled destinations and sources.

Level Selection in Enhanced Mode

In enhanced mode, level buttons do not *enable* or *disable* levels, but *select* levels. What enables and disables the levels is the destination: whatever levels the destination includes are enabled *when you press the destination button* to begin a take. These levels remain enabled during the take. Other levels are disabled and remain disabled during the take.

Enhanced mode has two submodes: hold and no-hold. The submodes affect breakaway. In fact, level selection applies only in breakaway:

- In **no-hold mode**, the selected levels persist only until you press a breakaway source. Then they revert to the levels of the destination.

Not pressing a level button before pressing a source results in a normal take from that source. It clears the breakaway condition during the take.

- In **hold mode**, the selected levels persist until you change the level selection or you press another destination. (This allows the operator to try different sources.)

Clearing a breakaway condition during the take requires more effort in hold mode than in no-hold mode.

Clearing a breakaway *after a take* (perhaps after many intervening ‘takes’ to other destinations) is as simple as performing a normal take to a destination that has breakaway.

For normal ‘takes’ in enhanced mode, the levels selected are always exactly those included in the destination’s level list.

In enhanced mode, all defined sources and destinations remain enabled without regard to level selection. Button ordering (spatial or temporal) is not a factor in enhanced mode.

G

Glossary

3Gig	Video at 2.97 or 2.967 Gbps. In Miranda routers, 3Gig cards support HD and SD signals as well. Video at 3Gig conforms to SMPTE standard 424M.
Asynchronous mode	As it applies to the compact AES routers, “asynchronous” means switched without a video reference signal. In asynchronous mode, the AES router passes the input to the output unmodified. In asynchronous mode, AES ‘takes’ occur in “stereo” pairs only.
Breakaway	A <i>breakaway</i> takes multiple sources, on different levels, to a destination.
CE	Conformité Européenne. European health and safety product label.
Captive Panel	A “captive” panel is one that is mounted on a router and not on a remote panel module. CRSC can detect, but not configure, captive panels.
CR	Compact Router.
CR6400	A family of 2RU routers with the CR Series that have a 64×64 switching matrix and modular construction. The family includes a 2RU control panel.
CQX	CQX represents the “clean and quiet” compact routers and panels.
DC	Direct Current.
DHCP	DHCP (Dynamic Host Configuration Protocol) is an IP standard for simplifying the management of host IP configuration. A DHCP server assigns a device an IP address using an IP address database on a local network. Such assignments are made dynamically and the devices do not have fixed IP addresses.
EIA	Electronic Industries Alliance. A trade organization for electronics manufacturers in the United States. The organization helps develop standards on electronic components, consumer electronics, electronic information, telecommunications, and Internet security.
HD	High definition (HD-SDI). In Miranda routers, HD cards support SD signals as well. HD video conforms to SMPTE standard 292M.
IEC	International Electrotechnical Commission. An international standards organization dealing with electrical, electronic and related technologies.
IEEE	Institute of Electrical & Electronics Engineers. An international non-profit, professional organization for the advancement of technology related to electricity.
I/O	Input/Output.
LAN	Local Area Network.
Remote Panel	A remote panel is a control panel that is mounted on a remote panel module. Remote panels are different from “captive” panels.
Remote Panel Module	A remote panel module is a CR Series device, resembling a router without I/O connectors, that issues commands to routers when a control panel is mounted on it. The remote panel module also returns router status to the control panel mounted on it.
RU	Rack Unit. A standard measure or size for frames (1.75 inches).

Glossary

SD	Standard definition (SD-SDI). SD video conforms to SMPTE standard 259M at 143, 177, 270 and 360 Mb/s and SMPTE 344M at 540 Mb/s.
SMPTE	Society of Motion Picture and Television Engineers. www.smpte.org . An international professional association, based in the United States of America, of engineers working in the motion imaging industries.
Synchronous	As it applies to the AES routers, "synchronous" means switched in relation to the sync obtained from a video reference signal. The AES routers perform certain functions when in "synchronous" mode, namely (1) outputting an AES stream at 48kHz, and (2) switching mono channels.
Subnet Mask	<p>A subnet is an identifiably distinct portion of an organization's network. A subnet allows a single large network to be broken down into smaller ones. A subnet mask is a bit pattern used by the IP protocol to identify a subnet and a device within the subnet.</p> <p>In CRSC networks, all routers and panels that communicate must be on the same subnet.</p>
UL	Underwriters Laboratory Incorporated. Develops standards and test procedures for materials, components, assemblies, tools, equipment and procedures, chiefly dealing with product safety and utility.

Index

Symbols

.crf (extension)	75–76
.pfg (extension)	52–53

0–9

16×16 control panel, photo	118
16×16 remote panel module, photo	120–121
16×16 router	
front view (photo)	108
rear view (photo)	108–109
16×2 CQX router	
front view (photo)	113
rear view (photo)	110
32×32 control panel, photo	119
32×32 remote panel module, photo	121
32×32 router	
front view (photo)	108
rear view (photo)	109–110
3Gig	1, 30, 92, 96, 112
3Gig video routers	103–104, 111
3Gig, defined	143
3Gig, HD, or SD digital video	30, 92

A

AA	30, 96
About CRSC (page)	8
Active subnet	30
Add Level... (button)	31
Adding Devices to a CRSC Network	10
Adding remote panel modules	25
Adding router levels	31
Adding routers	24
AES	30
asynchronous	115–116
mono switching	115, 144
router	114–115
stereo switching	116
synchronous	115
AES crosspoints	68
AES routers	103–104
AES signals	92
AES3id	92, 115

Africa, contact	153
Agreement, license	iii
Amber buttons	124
Americas, contact	153
Analog	
audio router	103–104, 116
audio router, rear view	109
video router	103–104, 114
video router, rear view	109
Analog audio	92
Analog audio or timecode	30, 92
Analog video	92
Analog video or timecode	30, 92
Appendices	
A, Tutorials	89
B, Operation	123
Application version	76
Apply Updates (button)	25
Apply updates (button)	24–26
Asia, contact	153
Asynchronous AES routers	70–71, 74, 82, 115–116
Asynchronous mode	68, 92
Audio	
router, AES	103–104
router, analog	103–104, 116
router, digital	103–104, 114–115
Audio routers	103
Audio signals	92
Automation connector	96
Automation, third-party systems	2, 96–97, 105
AV	30, 96

B

Belden 8281	96
Bidirectional ports	36
Block diagram	
AES router	115
analog audio router	116
analog video router	114
CQX digital video router	112
digital audio router	115
digital video router	111
machine control router	117
BNC connectors	96, 108
Boot version	76
Breakaway	5, 94–95, 123, 125, 130, 141

-
- Breakaway, defined 143
 - Breakout cable 97
 - Button color 120
 - Button labels 44
 - Button order 125, 139, 141
 - Button types 124
 - Buttons 136
 - add level 31
 - amber 124
 - apply Updates 25
 - apply updates 24–26
 - control panel 118, 120
 - delete level 32
 - destination 47, 118, 120, 136
 - destination lock 48
 - execute 65, 67–68
 - function 120
 - functions 47
 - green 124
 - identify CP 86
 - illumination 136
 - level 49
 - new 43
 - network interfaces 21
 - print 79
 - read from file 43
 - read panel 43
 - red 124–125
 - refresh list 20–21, 24
 - refresh summary 27, 35, 42, 57
 - reset frame 79
 - reset frames 77
 - salvo 49
 - save 79
 - save to file 43, 52–53
 - select all 76, 78–79, 83
 - select none 76, 78–79, 83
 - source 50, 118, 120, 136
 - stop update 77–78
 - undo last take 57, 59
 - unlock selected 83
 - unused 51
 - update firmware 75–76, 78
 - update panel 43, 52–53
 - update remote panel 87
 - update router 40
 - update router levels 31–33
 - view past update logs 80
 - C**
 - Cable types 96
 - Cabling 96
 - network 12
 - Cabling diagram 102
 - Captive panel, defined 143
 - Captive panels 3, 44, 106
 - Cautions vi
 - CE iii
 - Change history iii
 - Changing Ethernet settings 25
 - Changing port types 40
 - Chapters
 - 1, Introduction 1
 - 2, NVISION Products Online Page 21
 - 3, CR Series Ethernet Settings Page 23
 - 4, Router Levels Page 27
 - 5, Machine Control Routers Page 35
 - 6, Remote Panels Page 41
 - 7, Router Crosspoints Page 55–56
 - 8, Firmware Updates Page 75
 - 9, Locks Page 81
 - 10, NV9000 Remote Panels Settings Page 85
 - China, contact 153
 - clean and quiet (see CQX)
 - Clearing locks 81
 - Compact router 96
 - Compact router, defined 143
 - Compact routers 1, 103–104, 108
 - Complex locks 137–138
 - Configuration PC 13, 21
 - Configurations
 - panel, creating 51
 - panel, uploading 51
 - Configuring panels 43
 - Connectors
 - automation 96
 - BNC 96, 108
 - DB25 96–97
 - DE9 96
 - RJ-45 36, 96–97
 - Contact information 8
 - Contact Miranda 153
 - Control panel 120
 - Control panels 1–2, 11, 103–105, 111–112, 114–120
 - definition 91
 - modes 94
 - Control panels, configuring 43
 - Control system 2, 105
 - NV9000 family 2, 4, 105–107, 115
 - Controlled device 93
 - Controlled port 36, 97
 - Controlling device 93
 - Controlling port 36, 97
 - Controlling v. controlled 36–37, 117–118, 135–136
 - Convert remote panel modules 85
 - Copy (command) 59–60
 - Copying crosspoint data 60
 - Corporate office, contact 153
 - CP0808 103
 - CP1602 103–104, 118

CP1602-CQX	46, 103, 105
front view, photo	119
CP1604	103–104, 118
CP1616	103–104, 118–119
front view, photo	118
CP3201	104–105, 123, 130, 137
CP3201 takes	133
CP3204	104, 119
CP3232	104, 119–120
front view, photo	119
CP6464 control panel, photo	119
CQX control panel, photo	119
CQX control panels	11, 46
CQX networks	11
CQX routers	2–4, 11, 104, 106–107, 112
CQX, defined	143
CR series Ethernet settings (page)	8, 23
CR series products	1–2, 4, 96, 103, 105, 107–108, 115
CR0808-3Gig	103
CR0808-AA	103
CR0808-AES	103
CR0808-AV	103
CR0808-HD	103
CR0808-HD-NR	103
CR0808-SD	103
CR0808-SD-NR	103
CR1602-3Gig-CQX	103
CR1602-HD-CQX	103
CR1602-SD-CQX	103
CR1604-HD	103
CR1604-HD-NR	103
CR1604-SD	103
CR1604-SD-NR	103
CR1616-3Gig	103
CR1616-AA	103
CR1616-AES	103
CR1616-AV	103
CR1616-HD	103
CR1616-HD-NR	103
CR1616-SD	103
CR1616-SD-NR	103
CR16-PR	103–104
CR3204-3Gig	104
CR3204-AA	104
CR3204-AES	104
CR3204-AV	104
CR3204-HD	104
CR3204-HD-NR	104
CR3204-SD	104
CR3204-SD-NR	104
CR3232-3Gig	104
CR3232-AA	104
CR3232-AES	104
CR3232-AV	104
CR3232-HD	104
CR3232-HD-NR	104

CR3232-SD	104
CR3232-SD-NR	104
CR32-PR	104
CR6400 router	
front view (photo)	109
rear view (photo)	110
CR6400, defined	143
Creating panel configurations	51
Crosspoint matrix	91
Crosspoints	55, 91
AES	68
CRSC	5
CRSC networks	3–5, 9–10, 85, 94, 106, 121
CRSC version number	8
CRSC, installing	13, 16
Current destination	126
Customer service	75
Customer support	153

D

Data reverse mode	37, 117
DB25 connectors	96–97
DC, defined	143
DCHP, defined	143
DE9 connectors	96
Declaration of Conformance	iii
Default destination	123
Defining a salvo button	49
Delete level ... (button)	32
Deleting router levels	32
Design issues	12
Destination button lighting	126
Destination buttons	47, 118, 120, 124, 136
Destination lock (button)	48
Destination locks	55, 70, 81, 120, 123–124, 136
Destinations	91
Device table	75
Devices	91
DHCP	86–87
Diagonal take (command)	60
Diagonal take (dialog)	64, 66–68
Diagonal takes	63–64, 66, 72
Diagram, sample cabling configuration	102
Different subnet (message)	20
Digital audio	92
router	103–104, 114–115
Digital video	92
router	103–104, 111–112
Document	
revision	iii
Double-press	141
Dynamic	37, 118
Dynamic port	36

E

EIA, defined 143
 E-mail address 153
 Enable NV9000 mode (option) 87
 Enhanced mode 5, 45, 52–53, 94–95, 125, 129,
 131–132, 134–135, 139, 141
 Equalization 111–112
 Ethernet
 changing settings 25
 networks, creating 9
 Ethernet port 96
 Europe, contact 153
 Execute (button) 65, 67–68

F

Factory default state 128
 Fax number 153
 FCC statement iii
 Figures
 16×16 control panel (photo) 118
 16×16 remote panel module (photo) 120–121
 16×16 router, front view (photo) 108
 16×16 router, rear view (photo) 108–109
 16×2 CQX router, front view (photo) 113
 16×2 CQX router, rear view (photo) 110
 32×32 control panel (photo) 119
 32×32 remote panel module (photo) 121
 32×32 router, front view (photo) 108
 32×32 router, rear view (photo) 109–110
 block diagram, AES router 115
 block diagram, analog audio router 116
 block diagram, analog video router 114
 block diagram, CQX digital video router 112
 block diagram, digital audio router 115
 block diagram, digital video router 111
 block diagram, machine control router 117
 CP1602-CQX, front view (photo) 119
 CP1616, front view (photo) 118
 CP3232, front view (photo) 119
 CP6464 control panel (photo) 119
 CQX control panel (photo) 119
 CR6400 router, front view (photo) 109
 CR6400 router, rear view (photo) 110
 Filter, output 62
 Firmware, important notice 12
 Firmware updates 5
 Firmware updates (page) 8, 75
 FPGA version 76
 Frame address 9
 France, contact 153
 Function buttons 47, 120

G

Glossary 143
 Grace period 116
 Green buttons 124

H

Hardware symbols v
 Hazardous substance iv
 HD 1, 30, 92, 96, 111–112
 HD or SD digital video 30, 92
 HD routers 103–104, 111
 HD, defined 143
 High tally 120
 Hold (mode) 45, 47, 52–53, 94–95, 132, 134–135, 139, 141
 Hours of operation 153
 How to change the panel mode 53
 How to convert a remote panel module 87
 How to create multiple subnets 16
 How to perform a diagonal take 72
 How to perform a take 70–71
 How to perform a vertical take 73
 How to release selected locks 83

I

I/O, defined 143
 Identify CP (button) 86
 Identifying panels 24
 IEC, defined 143
 IEEE, defined 143
 Input equalization 111–112
 Installation, verification 19
 Installing CRSC 13, 16
 IP Addresses 14
 IP addresses 9, 21, 86

J

Jump to ... (command) 60, 62

L

Labels, button 44
 LAN, defined 143
 Level button lighting 126
 Level buttons 49, 124–125, 139
 Level selection 94–95, 123, 125, 139, 141
 Levels 5, 28, 93–94

Levels, adding	31
Levels, deleting	32
Levels, router	27
Levels, updating	30
license	iii
LID	57
Limits, network	12, 24, 28
Load salvo (command)	60
Lock maintenance (page)	8, 81
Locks	136
destination	81, 120, 123–124, 136
panel	81, 120, 123–124, 136
Locks, clearing	81
Locks, destination	55, 70
Low tally	120, 136

M

Machine control reverse	30, 92–93
Machine control router	2
changing port types	40
selecting	40
Machine control router, rear view	109–110
Machine control routers	71–72, 74, 82, 93, 97, 104, 110, 116
port types	36
ports	36
Machine control routers (page)	8, 35
Machine control signals	93
Machine control takes	135
Master	37, 118
Memory, non-volatile	110
Middle East, contact	153
Miranda	97
Miranda contact information	8
Miranda customer service	75
Miranda, contact	153
Mode	
asynchronous	92
data reverse	37, 117
enhanced	5, 52–53, 94–95, 125, 129, 131–132, 134–135, 139, 141
hold	45, 47, 52–53, 94–95, 132, 134–135, 139, 141
no hold	45, 47, 52–53, 95
operating	123, 125
standard	47, 52–53, 94, 129–130, 133, 139
synchronous	92
synchronous AES	68
Mode rotary switch	113
Modes of operation	91, 94
Modes, panel	44, 52
Mono AES switching	115, 144
Multi-level takes	5
Multiple subnets	16

N

Navigation pane	7
Network Interfaces (button)	21
Network limits	12, 24, 28
Networks	
adding remote panel modules	25
adding routers	24
cabling	12
creating	9
router	105
routers	2
speed	12
New (button)	43
No hold (mode)	45, 47, 52–53, 95
Non-reclocking router	103–104, 111
Non-volatile memory	110
Normal takes	129
NTSC	110
NV9000 systems	2–4, 94, 105–107, 120
NV9000 family	
router control system	2, 4, 105–107, 115
NV9000 networks	3, 4–5, 107, 121
NV9000 panels	2
NV9000 remote panel modules	87
NV9000 remote panel settings (page)	8, 85
NVISION products online (page)	7, 21

O

Octets	9
Office hours	153
On-line help	8
Only update if versions are different (option)	78
Operating modes	91, 94, 123, 125
Operation	123
Ordering, buttons, spatial	139
Ordering, buttons, temporal	125, 139–140
Output, reclocking	111
Output filter	62
Outputs, locating	62
Outputs, viewing	62

P

Pages	
about CRSC	8
CR series Ethernet settings	8, 23
firmware updates	8, 75
lock maintenance	8, 81
machine control routers	8, 35
NV9000 remote panel settings	8, 85
NVISION products online	7, 21

- quick-start guide 7
 - remote panels 8, 41
 - router crosspoints 8, 55
 - router levels 8, 27
 - welcome 6
 - PAL 110
 - Pane, navigation 7
 - Panel lock 81, 120, 123–124, 136
 - Panel lock button 128
 - Panel modes 44, 52, 91, 94, 123, 125
 - enhanced 45
 - standard 44
 - Panel reset state 12
 - Panel, control 120
 - Panel, remote 2, 104
 - Panels
 - configuring 43
 - creating configurations 51
 - uploading configurations 51
 - Panels, captive 44, 106
 - Panels, control .. 1–2, 11, 91, 103–105, 111–112, 114–120
 - Panels, CQX 11, 46
 - Panels, NV9000 2
 - Panels, remote 1, 41
 - Partitions 5, 28, 93
 - Paste (command) 59–61
 - Pasting crosspoint data 60–61
 - PC, configuration 13, 21
 - Performing a diagonal take 64, 66
 - Performing a range take 67–68
 - Performing takes 55
 - Photos
 - 16×16 control panel 118
 - 16×16 remote panel module 120–121
 - 16×16 router, front view 108
 - 16×16 router, rear view 108–109
 - 16×2 CQX router, front view 113
 - 16×2 CQX router, rear view 110
 - 32×32 control panel 119
 - 32×32 remote panel module 121
 - 32×32 router, front view 108
 - 32×32 router, rear view 109–110
 - CP1602-CQX front view 119
 - CP1616 front view 118
 - CP3232 front view 119
 - CP6464 control panel 119
 - CQX control panel 119
 - CR6400 router, front view 109
 - CR6400 router, rear view 110
 - Point-to-point connections 36
 - Port, Ethernet 96
 - Port types 37, 39
 - Port types, changing 40
 - Port, controlled 97
 - Port, controlling 97
 - Ports, machine control routers 36
 - Power up 128
 - Powering up 12
 - PR 30
 - Primary level 126, 132, 134–135
 - Primary source 126
 - Print (button) 79
 - Products, list of 103
- ## Q
- Quickstart guide (pages) 7
- ## R
- Range take (command) 60
 - Range takes 67–68
 - Read from File (button) 43
 - Read panel (button) 43
 - Reclocking 111
 - Red buttons 124–125
 - Reference video 111–112, 114–116
 - Refresh list (button) 20–21, 24
 - Refresh summary (button) 27, 35, 42, 57
 - Re-initializing 12
 - Releasing locks 81
 - Remote panel (definition) 2
 - Remote panel module 2, 94, 104
 - Remote panel module, defined 143
 - Remote panel modules 1–2, 41, 43, 85, 96, 103, 105,
..... 120–121
 - adding 120–121
 - converting to NV9000 mode 87
 - Remote panel, defined 143
 - Remote Panels, function buttons 47
 - Remote panels 41
 - configuring 43
 - Remote panels (page) 8, 41
 - Removing router levels 32
 - Reports, firmware update 80
 - Reset frames (button) 77, 79
 - restrictions iv
 - Reverse (check box) 64, 66
 - Reverse diagonal takes 64, 66
 - revision, document iii
 - RJ-45 connectors 36, 96–97
 - RoHS iv
 - Rotary switch 11, 114
 - Rotary switches 10, 25, 113, 128
 - Routed source 126
 - Router
 - 3Gig video 103–104, 111
 - AES 103–104, 114–115
 - analog audio 103–104, 116
 - analog video 103–104, 114

asynchronous, AES	115–116
audio	114–115
digital audio	103–104, 114–115
digital video	103–104, 111–112
HD	103–104, 111
machine control	2
non-reclocking	103–104, 111
SD	103–104, 111
synchronous, AES	115
Router control	94
Router control system	2, 105
NV9000 family	2, 4, 105–107, 115
Router crosspoints (page)	8, 55
Router levels (page)	8, 27
Router network	105
Router partitions	93
Routers	2
adding	24
asynchronous AES	70–71, 74, 82
audio	103
definition	90
machine control	71–72, 82, 93, 97, 104, 110, 116
network	2
synchronous AES	74
video	103
viewing crosspoints	69
Routers, machine control	35
Routing overview	89
RP16	104, 120–121
photo	120–121
RP32	104, 121
photo	121
RS-422	93, 96–97
RS-485	96
RU, defined	143

S

Safeguards	iv
Safety notices	iv
Salvo buttons	49, 125
Salvos	5, 45, 94–95, 123, 138
Sample cabling configuration	98
Save... (button)	79
Save as salvo (command)	60
Save to file (button)	43, 52–53
SB0033 (installation disk)	16, 44
SD	1, 30, 92, 96, 112
SD digital video	92
SD video router	103–104, 111
SD, defined	144
Select all (button)	76, 78–79, 83
Select none (button)	76, 78–79, 83
Selecting a machine control router	40
Selecting a panel mode	47

Selecting a remote panel module	46
Selecting levels	94–95
Selection of levels	123, 125, 139, 141
Setting up NV9000 remote panel modules	87
Signal types	30, 92
Simple locks	137–138
Simple takes	95
Slave	37, 118
SMPTE, defined	144
Software license	iii
Source button lighting	126
Source buttons	50, 118, 120, 124, 136
Sources	91
Spatial ordering, buttons	125, 139
Stand-alone network	3, 10
Stand-alone networks	106, 121
Stand-alone router	10, 106
Stand-alone routers	3
Standard mode	44, 47, 52–53, 94, 129–130, 133, 139
Startup	128
State, factory default	128
Stereo AES switching	116
Stop update (button)	77–78
Subnet	9
Subnet mask, defined	144
Subnet masks	9
Subnet, active	30
Subnets	9
Super wide band (see SWB)	
Support, contact	153
SWB (super wide band)	111
Switch, rotary	11, 114
Switches, rotary	10, 25, 113, 128
Switching	
mono	144
mono, AES	115
stereo, AES	116
Symbols, meaning	v
Synchronous AES mode	68
Synchronous AES mono	30, 92–93
Synchronous AES router	115
Synchronous AES routers	74
Synchronous mode	92
System design	12

T

Takes	5, 55, 94, 123, 139
async AES routers	70
diagonal	72
machine control	135
normal	129
simple	95
vertical	73
Tally, high or low	120, 136

Technical support	153
Telephone numbers	153
Temporal ordering, buttons	125, 139–140
Third-party automation systems	2, 96–97, 105
Tutorials	89
Types	
button	124
cable	96
port	37, 39
signal	92

U

UL, defined	144
Undo last take (button)	57, 59
United Kingdom, contact	153
Unlock Selected ... (button)	83
Unused buttons	51
Update firmware (button)	75–76, 78
Update panel (button)	43, 52–53
Update remote panel (button)	87
Update router (button)	40
Update router levels (button)	31–33
Updates, firmware	75
Updates, firmware	5
Updating routers levels	30
Uploading panel configurations	51
Use DHCP to acquire IP address (option)	87

V

Verification of installation	19
Version	
application	76
boot	76
FPGA	76
Version number, CRSC	8
Vertical takes	73
Video	
reference	111–112, 114–116
router, 3Gig	103–104, 111
router, analog	103–104, 114
router, digital	103–104, 111–112
router, HD	103–104, 111
router, SD	103–104, 111
Video reference rates	110
Video reference type	93
Video routers	103
Video signals	92
View past update logs (button)	80
Viewing firmware update reports	80
Viewing router crosspoints	69

W

Warnings, hardware	v
Warranty	iii
WC0053 breakout cable	97
Web site	153
Welcome (page)	6
Work area	7



Miranda Technical Support

For technical assistance, please contact the Miranda Technical Support center nearest you:

Americas

Office hours: 9:00 a.m. – 9:00 p.m. (EST)
Telephone: +1-800-224-7882
Fax: +1-514-335-1614
E-mail: techsupp@miranda.com

Asia

Office hours: 9:00 a.m. – 5:00 p.m. (GMT+8)
Telephone: +852-2539-6987
Fax: +852-2539-0804
E-mail: asiotech@miranda.com

Europe, Middle East, Africa, UK

Office hours: 9:00 a.m. – 6:00 p.m. (GMT)
Telephone: +44 118 952 3444
Fax: +44 118 952 3401
E-mail: eurotech@miranda.com

China

Telephone: +86-10-5873-1814
E-mail: asiotech@miranda.com

France

Office hours: 9:00 a.m. – 5:00 p.m. (GMT+1)
Telephone: +33 1 55 86 87 88
Fax: +33 1 55 86 00 29
E-mail: eurotech@miranda.com

Corporate Head Office

Miranda Technologies Inc.

3499 Douglas-B.-Floreani, St-Laurent, Quebec, Canada H4S 2C6

Telephone: 514-333-1772
Fax: 514-333-9828
Web: www.miranda.com

