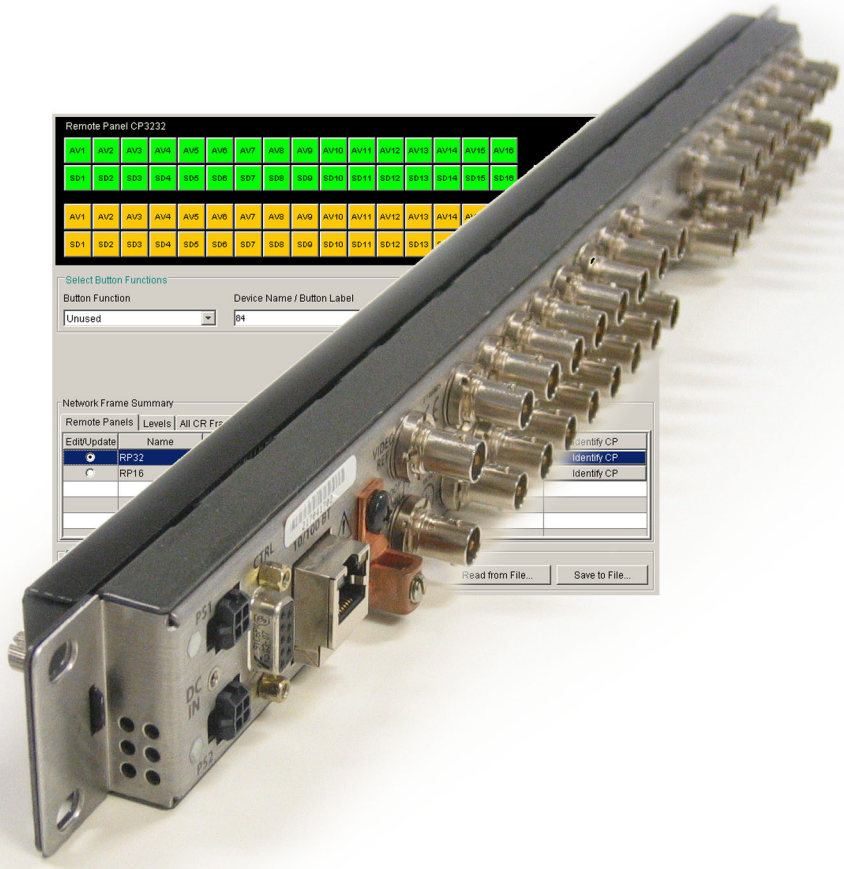
Compact Router System Configurator

User's Guide



Miranda

Miranda Technologies Inc.
3499 Douglas B. Floreani
Montreal, Quebec
Canada H4S 2C6

- **Revision**: 2.0
- **Software Version**: 1.6.0
- **Part Number**: UG0032-03

Notice

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.

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. (See Symbols and Their Meanings on page v.)

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

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Software License Agreement and Warranty Information

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

Technical Support Contact Information

Miranda has made every effort to ensure that the equipment you receive is in perfect working order and that the equipment fits your needs. In the event that problems arise that you cannot resolve, or if there are any questions regarding this equipment or information about other products manufactured by Miranda, please contact your local representative or contact Miranda directly through one of the appropriate means listed here.

- Main telephone: 530-265-1000 (9 am to 9 pm PST)
  Fax: 530-265-1021

  In the Americas, call toll-free: +1-800-224-7882 (9 am to 9 pm EST)
  In Europe, the Middle East, African or the UK, call +44 (0) 1491 820222 (9 am to 6 pm, GMT)
  In France, call +33 1 55 86 87 88 (9 am to 5 pm, GMT + 1)
  In Asia, call +852-2539-6987 (9 am to 5 pm, GMT + 8)
  In China, call +86-10-5873-1814
- Emergency after hours: toll-free: +1-800-224-7882
  Tel: +1-514-333-1772
- E-Mail:

  In the Americas, support@miranda.com
  In Europe, the Middle East, African or the UK, eurotech@miranda.com
  In France, eurotech@miranda.com
  In Asia, asiatech@miranda.com
  In China, asiatech@miranda.com
- Website: http://www.miranda.com
- Mail / Shipping

  Miranda GVD
  P.O. Box 1658
  Nevada City, CA 95959, USA

  Miranda GVD
  125 Crown Point Court
  Grass Valley, CA 95945, USA

Note Return Material Authorization (RMA) required for all returns.

Change History

The table below lists the changes to the Compact Router User's Guide.

- User's Guide Part # UG0032-03
- Software version: 1.6.0

Rev	Date	ECO	Description	Approved By
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

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.

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 master control 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 output that is easily accessible.

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Table of Contents

1. What Is New

Before using the Compact Router System Configurator (CRSC), please review the following list of feature enhancements and system changes.

Changes

CQX ("Clean and Quiet") Products

CRSC supports the new CQX ("clean and quiet") router and CQX control panel. The CQX router and CQX panel are designed to work together as a single unit and are not usable as a separate router or panel at this time.

A CQX router performs smooth transitions in both HD and SD video and audio. The CQX control panel has 4 dedicated transition type buttons (cut, v-fade, cut-fade, and fade-cut). Transitions may be slow (3 seconds), medium (2 seconds) or fast (1 second). The number of frames used for a transition depends on the video frame rate, as follows:

- 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.

A CQX router operates only with a CQX control panel. 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 must be connected to the CQX router by an Ethernet switch. However, the transition rate or transition type buttons of a CQX control panel mounted on a remote panel module do not operate.

All CQX routers and control panels must exist on a separate subnet from other CR Series products. For more information, see CR Series Ethernet Setttings on page 19.

New IP Addresses

The default IP address for routers and remote control panels have been changed. Previously, the default IP addresses were:

Routers — 192.168.x where x= the switch setting plus 20.

Remote Panel Modules — 192.168.*x* where *x* = the switch setting plus 24.

The current default IP addresses are now:

Routers — 192.168.*x* where *x* = the switch setting plus 100.

Remote Panel Modules — 192.168.*x* where *x* = the switch setting plus 50.

(xxx.yyy.zzz denotes the subnet determined by the router or remote panel module. The default is 192.168.2.).

For instructions on managing IP addresses, see Chapter 4.

Persistent IP Addresses and Levels

After routers and remote panels are configured for your network, IP addresses and levels are no longer associated with rotary switches. IP addresses can be whatever suits your purposes. The CRSC software can detect and manage multiple independent router networks (subnets) if your configuration PC has the appropriate network connections.

You can define up to 4 partitions (i.e., levels) for any router, subject to a limit of 8 levels in any subnet. CRSC does not support more than 4 routers in a subnet. Gateways are supported for third-party system developers. See CR Series Ethernet Setttings on page 19.

Single Control Panel and Multiple Routers

When a control panel is mounted on a router, and several routers are connected to that router network, the control panel can control all connected routers. If CRSC is used to make any configuration changes on the router to which the control panel is attached, the control panel will only control the router it is attached to. To resolve this issue, attach the control panel to a remote panel module. Once attached to a remote panel module, the control panel is once again able to control all attached routers.

If the routers are no longer in default mode, the control panel must be configured. “0” reset will return the router to default mode.

Note Setting the rotary switch on the control panel to “0” (reset) will return the router to default mode.

Configurable Remote Panels

Any button — except the lock buttons — on a remote panel can be programmed as a source button, destination button, salvo button, or level selection button.

Captive panels — those mounted on routers — cannot be configured. They act in default default-mode and control only the router on which they are mounted.

Remote panels can be configured in any of 3 different modes:

- Standard Mode on page 68.
- Enhanced Mode, with hold, on page 68.
- Enhanced Mode, without hold, on page 68.

Salvos

A salvo is a set of pre-defined low-level takes. Salvos can rapidly perform many repeatable tasks. To learn about salvos, see Salvos on page 69. For instructions on adding salvos and salvo buttons, see About Salvos on page 39.

Sources and Destinations No Longer Tied to I/O Position

Sources and destinations are no longer tied to the position of input and output connections on the routers. Control panel “real estate” is more effectively utilized. Sources and destinations are defined in the course of panel configuration. (See chapter 7 on page 37.)

Lock Management and Crosspoint View

After your CRSC network is running, you can use CRSC software for maintenance and diagnostics of your network. The ‘Lock Management’ page enables you to view and clear any or all locks. (See chapter 10 on page 57.) The ‘View Router Crosspoints’ page lets you perform takes from your PC and view, in real time, the takes that operators make on the their control panels. (See chapter 8 on page 49.)

Easy Firmware Updates

Update all devices in your network at once with just a few clicks. (See chapter 9 on page 53.)

New Compact Routers Supported

CRSC now supports Miranda’s line of non-reclocked compact routers and 8×8 compact routers.

1. What Is New

Changes

2. Before Using CRSC

Before Compact Router System Configurator (CRSC) can be used effectively, the following tasks must first be completed:

1 If you are new to CRSC, review About CRSC on page 5.

2 Upload new firmware using CRSC. See Upload Recent Firmware on page 6.

3 Be sure that any reset panels are unlocked. See Panel Locked at Reset on page 7.

4 If you have not already done it, create a system design. See System Design on page 7.

5 Create a network and add compact routers or remote panels to the network. (A remote panel is a control panel mounted on a remote panel module.) See Creating a Network on page 8.

6 Set up the configuration PC and install CRSC. See Setting Up the Configuration PC and Installing CRSC on page 12.

7 Test the CRSC installation to ensure that everything is working properly. See Installation Testing on page 16.

Once these tasks are complete, you are ready to start using CRSC. If you are unfamiliar with routing, networking concepts, or Compact Router Series products, it is strongly recommended that you review the Tutorials on page 63. It provides overviews on several relevant topics, such as routing, signal types and levels. For detailed information on using a specific compact router or control panel, refer to that product's documentation.

About CRSC

CRSC (Compact Router System Configurator) is configuration software that runs on your PC. A compact router network developed using CRSC offers many benefits:

CRSC might require that your older routers and remote panel modules be updated with firmware compatible with CRSC. This should present no problem to you other than the few minutes it takes.

You can 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.

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.
- CRSC can perform system monitoring. You can examine and set crosspoints and view and clear locks on your PC.
- CRSC simplifies firmware updates with a single file for all Compact Router Series devices. All Compact Router 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, set, or clear destination locks.

Upload Recent Firmware

We strongly recommend that when you receive CRSC that you upload the most recent firmware to all your compact routers and remote panel modules before proceeding. This is done after the frames have been added to the CRSC network. For instructions, see How to Update Firmware on page 54.

Panel Locked at Reset

At reset, a panel is locked. The panel lock button (at the top right) is red. Before using a panel, you must unlock the panel by pressing the red 'Panel Lock' button.

System Design

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

Because design issues require an understanding of routing, if you are unfamiliar with routing concepts, see What is a Router? on page 63.

Design Issues

What signals do you intend to manage? How many are there?

What are the signal types? Will you need 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.

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 unless you have more than 32 HD devices. 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?

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

For additional assistance, review the Sample Configuration on page 72. It illustrates design issues that you might encounter.

Creating a Network

Compact Router Series (CR Series) products and CRSC communicate through a network. 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.

A CRSC network can be comprised of:

- From 1 to 16 remote panel modules (with attached control panels).

  You can *add* at most 16 remote panel modules at any one time. Once added—with network addresses assigned in CRSC—the frames remain identifiable and configurable and more frames can be added.
- From 1 to 4 compact routers. You can mix CR Series routers of any size and type according to your requirements.

  You can *add* at most 4 routers at any one time. If the routers you are adding are already set to use different subnets, the limit of 4 does not hold. However, routers from the factory are usually set to the same subnet: 192.168.2. Routers that are freshly initialized also use that subnet.

The network must also include:

- One or more PCs (running Windows XP or Vista) on which you have installed CRSC or other configuration software.
- An Ethernet switch (or hub) capable of 100 MB/s operation with enough ports to accommodate your routers, remote panels, and PCs.

If you are using only CR Series routers, the typical network uses a single Ethernet switch, a single subnet, and a variety of routers, panels, and configuration PCs connected at the switch. If you are also using any CQX routers and control panels, a second, separate subnet must be created for the CQX products. The control panels and routers communicate by sending messages across the network. The different devices on the network are identifiable by their unique numbers (IP addresses).

If any routers or control panels on the network have identical IP addresses, the devices are not distinguishable and the network may not functions properly. CRSC notifies you of any identical IP addresses and which frames are inaccessible on a specific subnet.

Figure 2-1 shows a sample network of routers with remote panel modules.

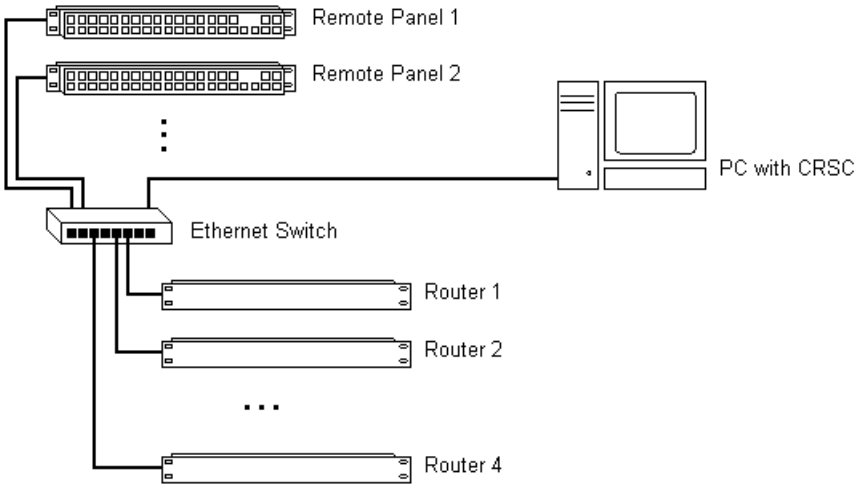


Figure 2-1. Sample Network

You can create multiple CRSC networks. CRSC can detect and manage all networks as long as two conditions are met:

- Each network is defined as a distinct subnet.
- Your configuration PC has enough network connections to support the different subnets.

What is a Subnet?

A subnet is an identifiably separate part of an organization's network that allows a single large network to be broken down into smaller ones. Typically, a subnet may represent all the machines at one geographic location or on the same local area network (LAN). All CR Series routers and control panels must be on a separate subnet from any CQX routers and control panels. However, devices must be on the same subnet to communicate with each other. For example, a router can only receive commands from a control panel on the same subnet.

What is a Subnet Mask?

A subnet mask is the technique used by the IP protocol to create a subnet address. Or, to put it another way, a subnet mask is a screen of numbers used for routing traffic within a subnetwork. In CRSC, the subnet mask is typically: 255.255.255.0. The subnet masks need not be 255.255.255.0, but if it differs, the frame address range will be something other than 1–254.

What is an IP Address?

An IP address is a 32-bit number given by four 8-bit values (octets) separated by periods: 192.168.2.87 (for example). The number is comprised of a subnet and a frame address. Each network must be a distinct subnet in CRSC and CR Series routers and CR Series panels must be on a separate subnet from CQX routers and CQX control panels.

Using that subnet, a router’s or remote panel’s frame address is the last octet in the address. For example, if the router’s full IP address is 192.168.2.87, the router’s frame address is 87 and the subnet is 192.168.2. A frame address can range from 1 to 254. The values 0 and 255 are not allowed because they have special meaning.

Rotary Switches

The 16-position rotary switch located on the front of a router or remote panel module is used to determine a device's initial IP address. Routers and remote panel modules usually come from the factory with the switch set to 1. Once the frames are added to your network, you can use CRSC to assign a different IP addresses, if you want. After that, the rotary switches are generally irrelevant.

The switches have hexadecimal position numbers from 0 to 9 and A to F. In hex notation, each letter represents the following:

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

The switch is then added to a present number to create the initial IP address for the router or panel. If a rotary switch is set to zero (0), the router or panel reverts to the factory default state, not to a previously set state.

In the following, the subnet is represented by xxx.yyy.zzz:

For CR Series routers, IP address = xxx.yyy.zzz.sss where sss = switch value + 100.

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

For remote panel modules, IP address = xxx.yyy.zzz.sss where sss = switch value + 50.

Using these formulas, a router and a control panel can have the same switch setting because each is being added to a unique 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.

Remember that each device must have a unique IP address. If the devices are on the same subnet, use the rotary switch setting plus the value listed above to create the default, IP address making sure that the frame number is unique.

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

For instructions on setting switch settings, see How to Add Routers to a Network on page 20 and How to Add Remote Panels to a Network on page 21. After you add the router or remote panel to the network, you can change its IP address using CRSC. See How to Change Ethernet Settings on page 22.

Initial Assembly

During the initial physical assembly of routers, panels, and remote panel modules, you need to ensure that:

- All routers and remote panel modules have their rotary switches set to unique settings before adding them to the network
- The switch settings of the routers and remote panel modules are non-zero and distinct.

Powering Up Re-initializes

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.

Network Speeds

Compact router networks are Ethernet LANs (100 Mb/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

In general, router networks and machine control ports use ordinary Ethernet cable and connectors (RJ-45). However, some frames have DE9 connectors. To make network connections to these devices, you will need to acquire DE9-to-RJ45 cables.

Analog audio connectors are DB25. Each 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.

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:

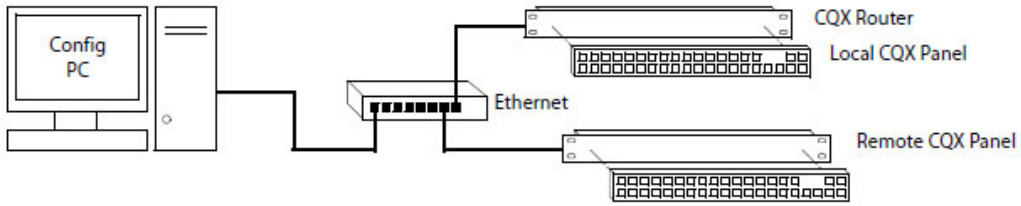


Figure 2-2. Figure 3-3. CQX Network

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 'Mode' rotary switch configures the router's video format. Set this 16-position rotary switch to a position in the range 0–5 according to this table:

Setting	Format
0	1080i, 59.94
1	1080i, 50
2	525i, 59.94
3	625i, 50

Setting	Format
4	720p, 59.94
5	720p, 50

The 1080p formats are not yet available. The default is 1080i, 59.94 Hz (switch setting 0).

Note Every time you make a switch change, power-cycle the router.

Frame ID Rotary Switch

You must set up the IP addresses for the router (and a remote panel, if you have one). First, use the rotary switch on the router (and remote panel module) to set an initial IP address. For a CQX router, the address = switch value + 200. The default IP address is 192.168.2.address. Thus, address ranges from 201 to 215. However, use only a switch setting in the range 1–4 (addresses 201 to 204).

For remote panel modules, address = switch value + 50. The default IP address is 192.168.2.address. Here, address ranges from 51 to 65.

The numbers on the rotary switch are in hexadecimal: 0–F. Do not use 0 because 0 causes the router or remote panel module to be reset. After you perform the setup using the rotary switches, you can use CRSC to change the IP addresses from the defaults.

Note Every time you make a switch change, power-cycle the router.

Setting Up the Configuration PC and Installing CRSC

After the CRSC network is setup, you are ready to configure the PC that will run CRSC. Once the PC is configured, you can install the CRSC application on that computer.

The PC must be assigned an IP address on one of the subnets you intend to use for the CRSC network. Usually the subnet is 192.168.2 because that is the default subnet assigned to all Compact Router Series products.

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

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:

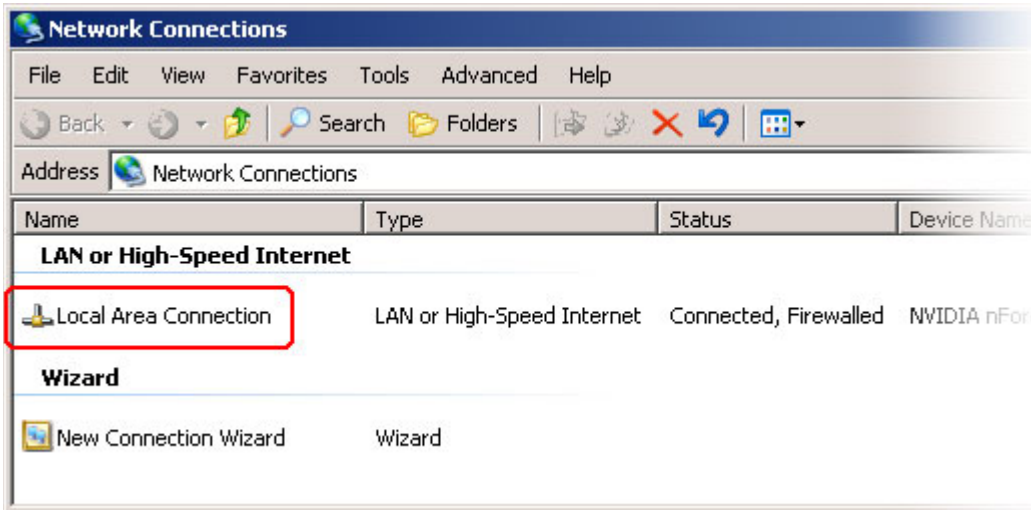


Figure 2-3. Network Connections Window

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

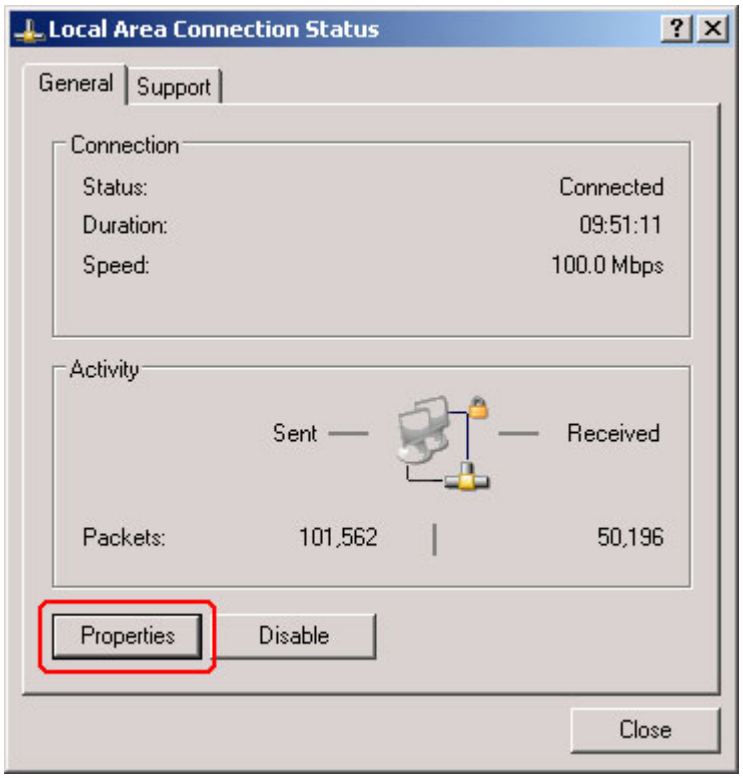


Figure 2-4. Local Area Connection Status Dialog Box

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

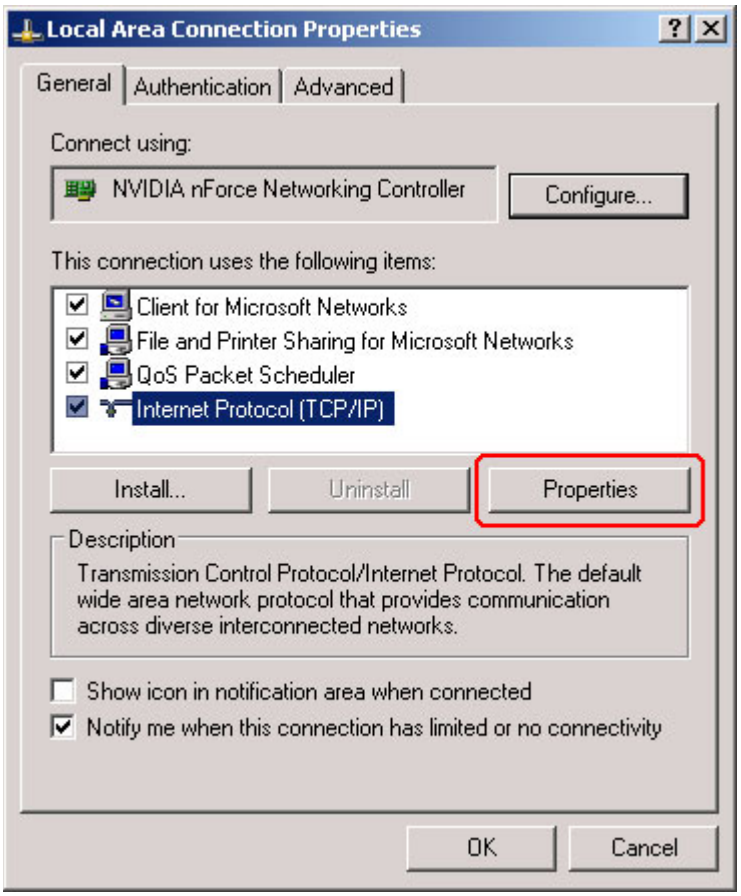


Figure 2-5. Local Area Connection Properties Dialog Box

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

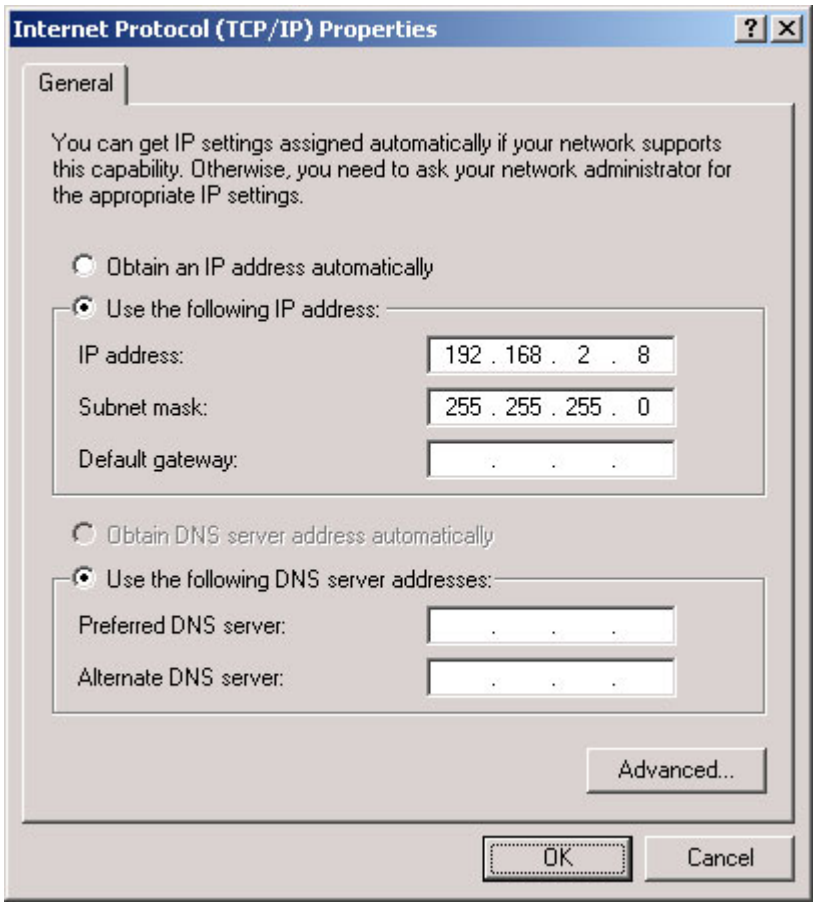


Figure 2-6. Internet Protocol (TCP/IP) Properties Dialog Box

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 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 What is an IP Address? 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.

How to Install CRSC

The CR Series (Compact Router) is available on the CD (SB0033-xx) that ships with the equipment. CRSC is a Java application and the installer installs a Java runtime support package. The installer creates a desktop shortcut for CRSC and makes an entry in Windows' Start menu for CRSC.

To install, place the CD in the CD drive of your PC. The CD should autoplay and present an option to run the CRSC installer. Choose the option and follow the instructions. The software installation process takes about one minute.

Installation Testing

After installing CRSC, launch CRSC by clicking the desktop icon or selecting 'NVISION > Compact Router System Configurator' from the 'Start' menu. Click the 'Compact Router Series Ethernet Settings' link to open the 'Compact Router Series Ethernet Settings' page and view list of devices in your network.

Examine the list of devices and note if any of the following exist:

- No entries in the list. Either you have no 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.
- Entries read "IP Conflict." There might be a duplicate IP address. To fix this issue, adjust the rotary switch setting on your frames. The switch settings for each router must be unique from any other router; the switch settings for each remote panel module must be unique from any other remote panel module. (See Rotary Switches on page 10.)

  If you determine that IP addresses are not a problem, one 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, move the mouse pointer and hover over "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 'Compact Router Series Ethernet Settings' page to view an updated list of devices. Once the network is functioning properly, you are ready to use CRSC to perform other tasks.

3. Show Products Online

The ‘NVISION Series Products Online’ page lists all products — compact routers, remote panels, large routers, router control systems — detectable on the networks to which the CRSC PC is connected.

The page lists the product name and model, the IP address, and the device family for all detectable products. Use this page for reference when determining what products can be configured. The page is for information only.

To open the ‘Show NVISION Products Online’ page, from the navigation pane click ‘Show NVISION Products Online’ under the ‘Home’ bar. The ‘Show NVISION Products Online’ page appears in the right-hand pane. At any time, click Refresh List to view the most recent list of products.

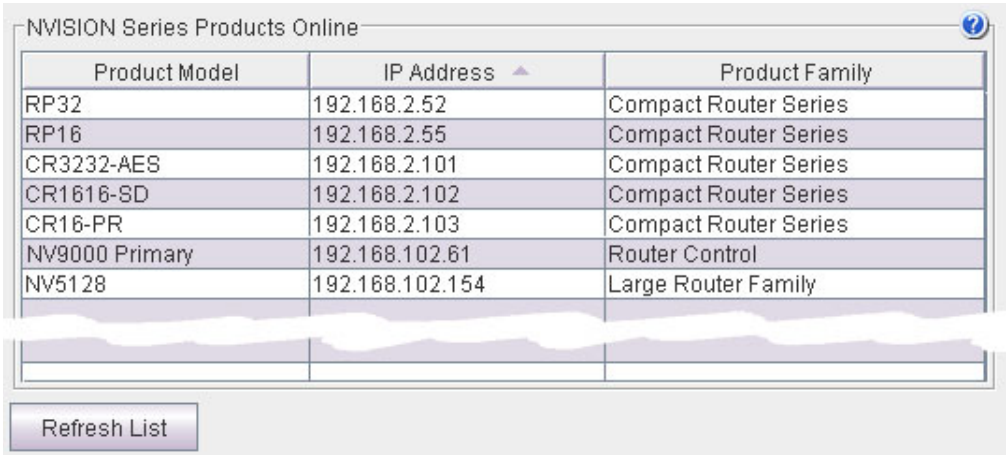


Figure 3-1. Show NVISION Products Online Page

3. Show Products Online

4. CR Series Ethernet Setttings

Using the ‘CR Series Ethernet Settings’ page you can change the name, IP address, subnet mask, or gateway IP address of any compact router or remote panel module. In order for routers and panels to be able to communicate they must be part of a network. (Click ‘Show NVISION Products Online’ to see a list of routers and panels on the network.) Each device has a unique IP address assigned to it. For information on setting up the initial network, see Creating a Network on page 8.

Routers and panels are also assigned a subnet mask. A subnet mask is an identifiably separate part of an organization's network. Typically, a subnet mask may represent all the machines at one geographic location or on the same local area network (LAN). This manual assumes a basic knowledge of networks. If you are unsure about any IP address, subnet mask or gateway information required, contact your System Administrator.

CQX Routers — Separate Subnet

The CQX router must be operated with a CQX control panel, either mounted on a CQX router (local) or on a remote panel module (remote). When setting up the network it is important to assign all CQX routers and CQX panels a subnet separate from other Compact Router Series (CR Series) routers or control panels. CQX products and CR Series products cannot be on the same subnet. See CQX Networks on page 11.You can also setup more than one subnet on a single switch. For detailed instructions, see the *CR Series Compact Router User’s Guide*.

To open the ‘CR Series Ethernet Settings’ page, from the navigation pane, click ‘CR Series Ethernet Settings’ under the ‘CR Series Network Setup’ bar. The ‘CR Series Ethernet Settings’ page appears in the right-hand pane.At any time, click Refresh List to view the latest network details.

An Overview of Networking

The Compact Router System Configurator (CRSC) resides on a PC connected to a network. This network includes the router and remote panel modules that CRSC manages. If you are unfamiliar with networks, please review Creating a Network on page 8.

Using the 'CR Series Ethernet Settings' Page

The 'Ethernet settings' page lists compact routers and remote panel modules available on the CRSC network.

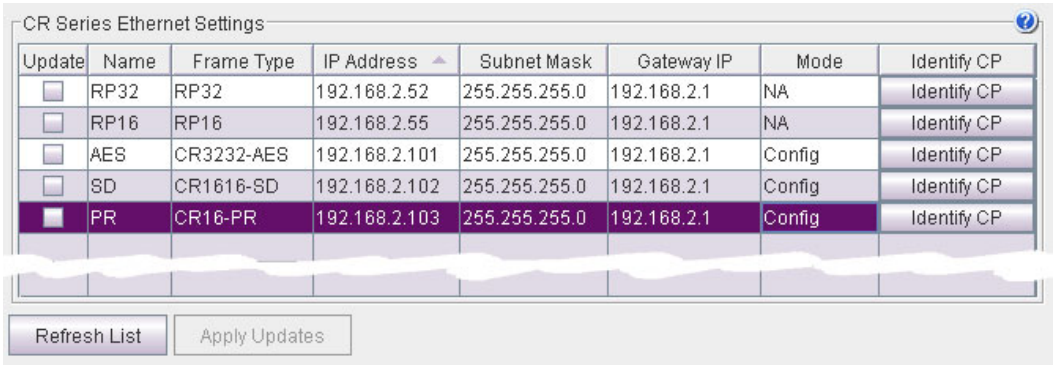


Figure 4-1. CR Series Ethernet Settings Page

Each column presents the following option or information:

Column	Description
Update	Check the check box to select the frame listed on that row for updating.
Name	Name of the compact router or remote panel.
Frame Type	Type (model #) of compact router or remote panel, such as CP3232.
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 deem 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 frame is either a remote panel module or a router with old software. Config — The frame is a router configured with CRSC. Default — No settings have been changed and the frame is a router in the factory default mode.
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.

How to Add Routers to a Network

You can only *add* up to 4 routers at any one time because there can only be 4 routers in a subnet. If the routers being added are already set to use different subnets, the limit of 4 does not apply. However, routers from the factory are usually set to the same subnet: 192.168.2. Routers that are freshly initialized 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* is 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 'Setup Router Levels' page. See Configuring Router Levels on page 25.

Only CQX control panels can be used with CQX routers. Both the CQX router and CQX panel must be on the same subnet, but a different subnet than other CR Series routers and panels. See Creating a Network on page 8.

Note If your subnet mask is 255.255.255.0, CRSC does not allow a frame address outside the range 1–254. You can use other subnet masks and other address ranges.

1 Connect one or more remote panel modules (16 or fewer) to your network with unique rotary switch settings from 0 to 15. See Rotary Switches on page 10. The switches have hexadecimal position numbers from 0 to 9 and A to F. In hex notation, the letters mean the following:

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

   Note If a rotary switch is set to zero (0), the router reverts to the factory default state, not to a previously set state.

2 From the side navigation pane, click 'CR Series Ethernet Settings' page under the 'CR Series Network Setup' bar.

3 On the 'CR Series Ethernet Setting page', verify that all routers appear in the list.

4 For each router, click on the cell in the 'IP Address' column to activate the field. (A check mark appears in the 'Update' check box). Enter a unique IP address according to the following formulas:

   CR Series routers – xxx.yyy.zzz.s where s = the switch setting plus 100.

   CQX routers – xxx.yyy.zzz.s where s = the switch setting plus 200. Use only a switch setting in the range 1–4 (addresses 201 to 204).

   Each IP address must be unique. The default subnet (xxx.yyy.zzz) for CR Series routers and panels is 192.168.2. *CQX routers and CQX panels must exist on a separate subnet.*

5 Repeat steps 1 through 4 for each router. Remember that no more than 4 routers can be added to a single subnet.

6 *Important!* Click Apply Updates to send the changes to the selected frames. Only those frames with 'Update' checked are updated. The changes are stored in the frames' internal configuration data.

7 Remember to cycle power after you change a rotary switch.

How to Add Remote Panels to a Network

You can only *add* up to 16 remote panel modules at any one time because there are only 16 switch positions. If your subnet mask is 255.255.255.0, CRSC does not allow a frame address outside the range 1–254. You can use other subnet masks and other address ranges.

Only CQX control panels can be used with CQX routers. Both the CQX router and CQX panel must be on the same subnet, but a different subnet than other CR Series routers and panels. See Creating a Network on page 8.

1 Connect the remote panel modules (16 or fewer) to the network with unique rotary switch settings from 0 to 15. The switches have hexadecimal position numbers from 0 to 9 and A to F. In hex notation, the letter mean the following:

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

Note If a rotary switch is set to zero (0), the panel reverts to the factory default state, not to a previously set state.

2 From the side navigation pane, click 'CR Series Ethernet Settings' page under the 'CR Series Network Setup' bar.

3 On the 'CR Series Ethernet Setting page', verify that all added remote panels appear in the list.

4 For each remote panel, click on the cell in the 'IP Address' column to activate the field. (A check mark appears in the 'Update' check box). Enter a unique IP address according to the following formulas:

Remote panel modules — xxx.yyy.zzz.s where s = the switch setting plus 50.

Each IP address must be unique. The default subnet (xxx.yyy.zzz) for CR Series routers and panels is 192.168.2. *CQX routers and CQX panels must exist on a separate subnet.*

5 Repeat steps 1 through 4 for each remote panel. Remember that no more than 16 remote panels can be added to a single subnet.

6 *Important!* Click Apply Updates to send the changes to the selected frames. Only those frames with 'Update' checked are updated. The changes are stored in the frames' internal configuration data.

7 Remember to cycle power after you change a rotary switch.

How to Change Ethernet Settings

Only CQX control panels can be used with CQX routers. Both the CQX router and CQX panel must be on the same subnet, but a different subnet than other CR Series routers and panels. See Creating a Network on page 8.

1 From the navigation pane, click 'CR Series Ethernet Settings' under the 'CR Series Network Setup' bar to open the 'CR Series Ethernet Settings' page.

2 Locate the row listing the frame you want to update.

3 In the same row, click in cell listed in the column displaying the 'IP Address', 'Subnet Mask' or 'Gateway IP' information you want to update. The field activates.

4 Type in the new value. It is recommended that you leave the subnet masks at 255.255.255.0 unless you are a developer. If updating IP addresses, click the cell in the 'IP Address' column and use the following formulas:

CR Series routers — xxx.yyy.zzz.s where s = the switch setting plus 100.

CQX routers — xxx.yyy.zzz.s where s = the switch setting plus 200. Use only a switch setting in the range 1–4 (addresses 201 to 204).

Remote panel modules — xxx.yyy.zzz.s where s = the switch setting plus 50.

Each IP address must be unique. The default subnet (xxx.yyy.zzz) for CR Series routers and panels is 192.168.2. *CQX routers and CQX panels must exist on a separate subnet.*

5 To save your current changes, press Enter or Tab on your keyboard, or click in another field.

Or

Press Esc to cancel changes.

6 Repeat steps 2 through 5 until all changes have been made. The ‘Update’ check box automatically displays a check mark if you update any of the information.

7 *Important!* Click Apply Updates to send the changes to the selected frames. Only those frames with ‘Update’ checked are updated. The changes are stored in the frames’ internal configuration data.

5. Configuring Router Levels

The ‘Configure Router Levels’ page enables you to define up to 4 levels in a router. In CRSC, a *level* is created (1) when you create a router *partition* or (2) when you add a router to the network. Levels within a router may overlap or they may be distinct. A level may also be the entire router or just specific inputs and outputs.

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

Adding a router to the Compact Router Series system creates a new level. Routers are assigned to a subnet and no more than 8 levels *in any single subnet* is allowed. See An Overview of Networking on page 19. 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. Miranda does not guarantee system performance beyond 4 routers.

To open the ‘Configure Router Levels’ page, from the navigation pane, click ‘Configure Router Levels’ under the ‘CR Series Network Setup’ bar. The ‘Configure Router Levels’ page appears in the right-hand pane.

At any time, click Refresh Summary at the bottom of the page to repopulate the ‘Configure Router Levels’ page. This is important to do periodically so that accurate data displays, particularly when you make new physical connections.

Overview

Levels and Partitions

Partitions are boundaries within the router used to organize switching. This defines what signal format is in use and enables the control card to determine the correct switching rules and reference requirements.

Signals are switched within a partition, not between partitions. Inputs can be switched only to outputs contained in the same partition. Every switching matrix must contain at least one partition. It is not required that different signal formats be split into separate partitions, and in fact, one partition for an entire router may be desirable.

CRSC uses virtual partitions instead of physical partitions, called “levels”. In CRSC, levels are analogous to partitions. A *level* is automatically created (1) when you create a router partition or (2)

when you add a router to the network. CRSC allows you to define up to 8 levels in total and up to 4 levels per router.

Important

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

Using the 'Configure Router Levels' Page

At the top of the page, the 'Setup Crosspoint Ranges for Levels' displays all levels currently added and enables you to add and update levels as needed. In the lower section of the page the 'Network Frame Summary' has two tabs that display data related to routers for easy reference. Each tab displays either 'Routers' or 'All CR Frames' (compact routers) defined in your network.

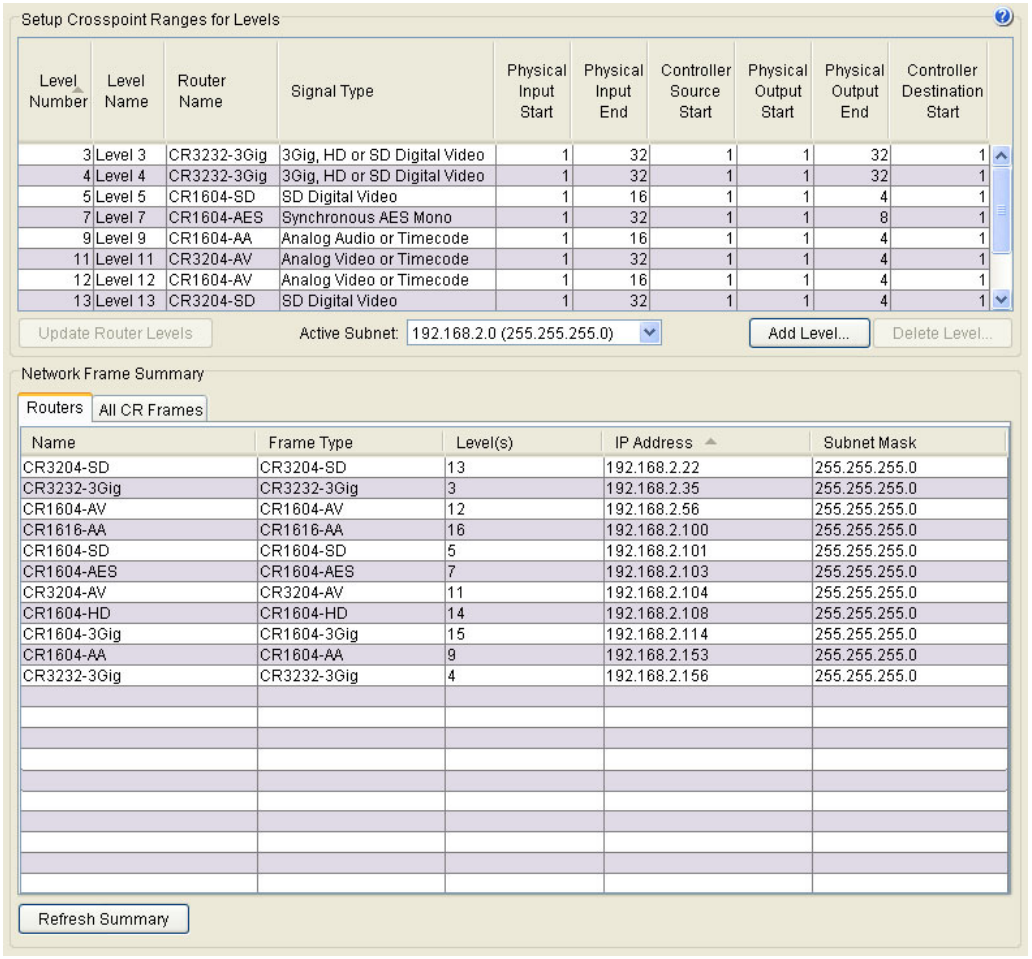


Figure 5-1. Configure Router Levels Page

The ‘Setup Crosspoint Ranges for Levels’ section display the following information:

Column	Description
Level Number	Number assigned to the level. The number must be unique and between 1 and 250.
Level Name	Name assigned to the level. Usually this is a signal type and limited to 16 characters.
Router Name	Router that contains the level.
Signal Type	Type of signal switched on that level. See Signal Types on page 28.
Physical Input Start	Use these fields to define the physical 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 the system controller may not match the physical I/Os in the router. Use these fields to map the router I/Os to the system controller I/O numbering.
Controller Destination Start	

The ‘Network Frame Summary’ presents the following information:

Tab	Column	Description
Routers	Name	Name of the compact router or remote panel.
	Frame Type	Type of router or remote panel.
	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. It is recommended that you leave the subnet masks at 255.255.255.0 unless you are a developer.
All CR Frames	Frame Type	Type of compact router.
	Level(s)	Level numbers associated with the router.
	Subnet Mask	Subnet mask currently assigned to the device. It is recommended that you leave the subnet masks at 255.255.255.0 unless you are a developer.

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

The designation “active” applies only in Compact Router itself: it is the subnet you are configuring. In the actual network, all subnets operate independently and concurrently. An Ethernet switch is usually required for each subnet.

Signal Types

The Compact Router Series routers can switch one or more 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

AES signals and machine control signals are unique from video signals. If you are unfamiliar with the various signal types, please review Signals on page 65.

How to Create or Update a Level

All level information can be updated except for router names and signal types. These are automatically generated. For every level you define, the 'Signal Type' column displays the signal for that level. See Overview on page 25., Signal Types.

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

1 From the left-hand navigation area, expand the 'CR Series Network Setup' pane and click 'Configure Router Levels'.

2 On the 'Configure Router Levels' page, in the 'Setup Crosspoint Ranges for Levels' section locate the row listing the level being updated and make changes as described in the following steps.

Or

To add a new level:

a Click **Add Level**. The 'Select a Router' dialog box appears.

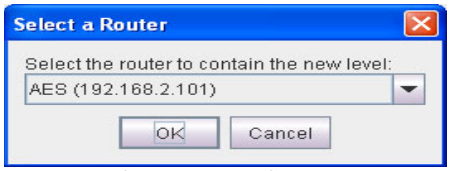


Figure 5-2. Select a Router Dialog Box

b Click the arrow to the right of the field and from the drop-down list select a router and then click **OK**. A row is added to the 'Setup Crosspoint Ranges for Levels' section unless you have already defined 8 levels.

3 On the same row, click in the 'Level Number' or 'Level Name' cell to activate the field and enter new values, if desired. Level numbers are limited to 1 to 250 and must be unique. Level names are limited to 16 characters.

4 Define the physical start and endpoints for the level. These are the actual I/O connections on the router:

a In the row, in the 'Physical Input Start' column, enter the starting input number.

b In the same row, in the 'Physical Input End' column, enter the ending input number.

c In the row, in the ‘Physical Output Start’ column, enter the starting output number.

d In the same row, in the ‘Physical Output End’ column, enter the ending output number.

5 In the ‘Controller Input Start’ and ‘Controller Destination Start’ columns, assign a starting point to the partitions. In the example in Figure 5-3, inputs and outputs are numbered from 1 to 32 in both partitions, even though the partitions use different parts of the router.

The numbers entered in the ‘Controller Source Start’ and ‘Controller Destination Start’ fields are used for the destination and source buttons in the ‘Program Remote Panels’ page. See Programming Remote Panels on page 37.

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
2	AES A	AES	Synchronous AES Mono	1	16	1	1	16	1
3	AES B	AES	Synchronous AES Mono	17	32	1	17	32	1

Figure 5-3. Example of Levels for AES Signals

6 When you have finished defining levels, click Update Router Levels to send the partition data to the routers.

How to Create Multiple Levels

Important

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

To create multiple levels for a router, add levels that reference the same router. For example, a CR3232-AES router might have two partitions:

Level 2, 32 inputs × 32 outputs, numbered from 1 to 32
Level 3, 32 inputs × 32 outputs, numbered from 33 to 64

The resulting configuration would resemble Figure 5-4.

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
2	AES A	AES	Synchronous AES Mono	1	16	1	1	16	1
3	AES B	AES	Synchronous AES Mono	17	32	1	17	32	1

Figure 5-4. Example of Levels for AES Signals

How to Delete a Level

1 From the left-hand navigation area, expand the ‘CR Series Network Setup’ pane and click ‘Configure Router Levels’.

2 On the ‘Configure Router Levels’ page, click on the row listing the level and click Delete Level.

3 Click Update Router Levels to send the updated partition data to the routers.

5. Configuring Router Levels

Overview

6. Setting Up Machine Control Routers

The ‘Setup Machine Control Router’ page enables you to configure port types for machine control routers. In general, machine control routers are switched separately from other routers because of the differences in the behavior of the ports. Unlike other routers, machine control routers have bi-directional ports and routes are port-to-port.

To open the ‘Setup Machine Control Router’ page, from the navigation pane, click ‘Setup Machine Control Router’ under the ‘System Configuration’ bar. The ‘Setup Machine Control Router’ page appears in the right-hand pane.

At any time, click Refresh Summary to view the latest list of machine control routers in the system.

An Overview of Machine Control Routers

Compact machine control routers are different from other compact routers because they can receive signals from both controlled and controlling devices depending on the their port settings. A controlling port is defined as one that is connected to a controlling device. A controlled port is one connected to a controlled device.

Machine control routers have unique features:

- Machine control routers have bidirectional ports. Because machine control routers have bidirectional ports (A to B, B to A), whatever connections you make appear twice in the ‘View Router Crosspoints’ page twice: once in the lower left portion of the matrix and once in the upper right.
- Machine control routes are point-to-point — one input, one output. Outputs only appear once in a column on the ‘View Router Crosspoint’ page.

For more information about machine control signals, see Signals on page 65.

Viewing Machine Control Router Crosspoints

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

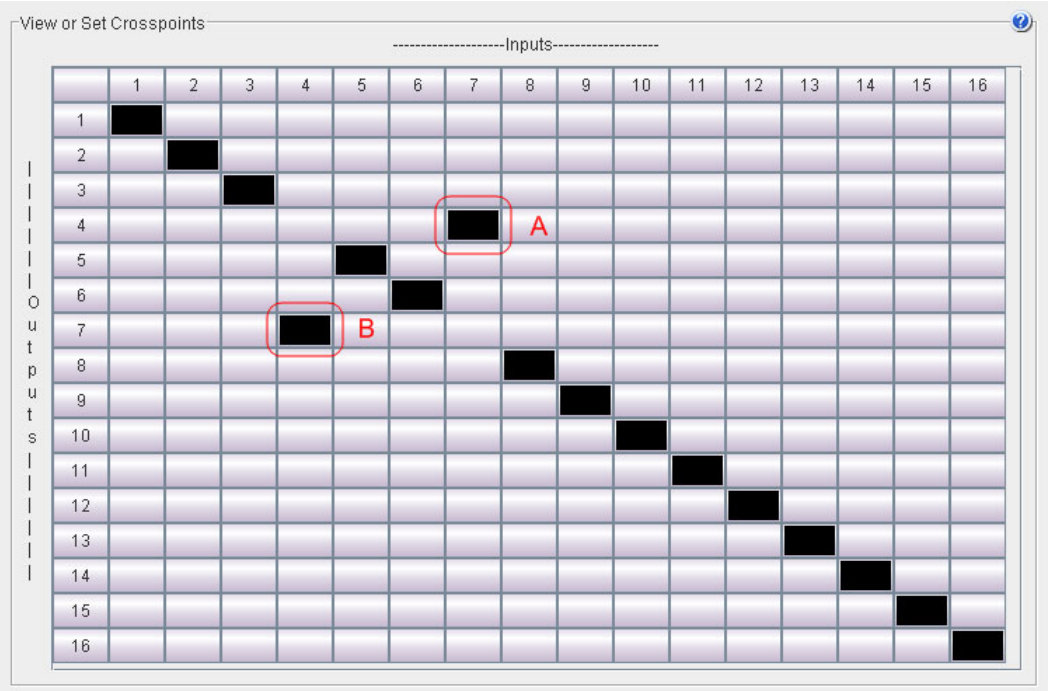


Figure 6-1. View Router Crosspoints Page

In this matrix, 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.

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.

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

A dynamic port is one that can change. If a port is not dynamic, its configuration does not change.

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

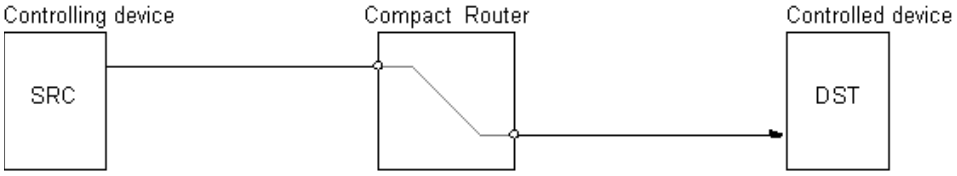
In general, clicking column C, row R has the same effect as pressing DST C then SRC R: columns are destinations and rows are sources.

When a port is on the diagonal, it is tri-stated or disabled. It neither transmits nor receives. Clicking a column head for a machine control router is a no-op.

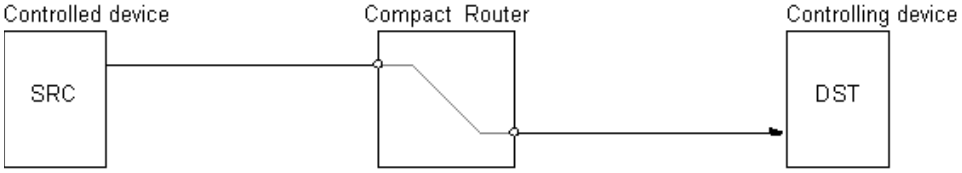
Machine Control Router Port Types

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

The illustration below shows that the source device is a controlling device.



A destination can also be the controlling device, as shown below.



Note Some external devices must be placed in "remote" mode to work with a machine control 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. That is the default. It can be overridden by port type.

Machine control routers have five port types, each of which is a variation of "controlled" or "controlling":

- Controlling or Controlled

  The 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.

  A dynamic port may connect to any port.

- 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.

  A master port must connect to either a dynamic or controlled port. A slave port must connect to either a dynamic port or 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.

In general, a controlling port connects to a controlled port. (Dynamic, master, and slave port types are variants of "controlled" and "controlling.")

Using the 'Setup Machine Control Router' Page

In the upper portion of the 'Setup Machine Control Router' page, the 'Machine Control Port Settings' section displays all currently added ports and the port type. Using this section you can change the port type. In the lower portion of the page the 'Network Frame Summary' section has three tabs that display data related to machine control routers for easy reference. Each tab displays either 'Machine Control Routers', 'Levels' or 'All CR Frames' (compact routers) defined in the network by Name, Frame Type, IP Address and Subnet Mask.

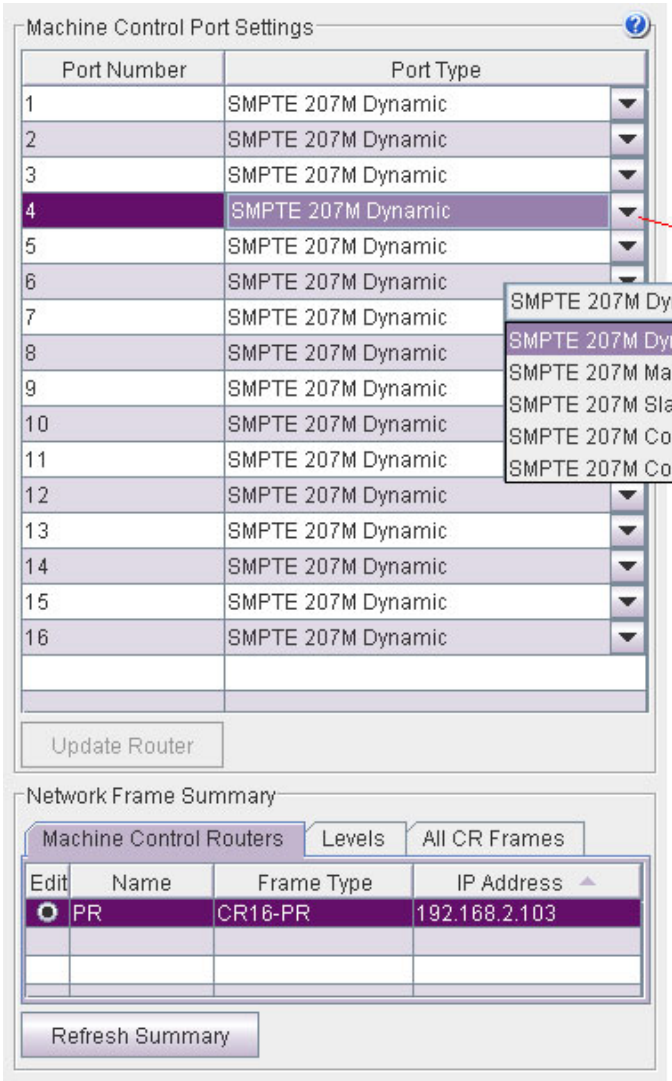


Figure 6-2. Setup Machine Control Router Page

The 'Machine Control Port Settings' section displays the following:

Column	Description
Port Number	Port number of a port on the machine control router.
Port Type	Port type assigned to the port. There are five port types. (See Machine Control Router Port Types on page 32.) 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 edit. Details display in the ‘Machine Control Port Settings’ section. Once selected, router information can be updated.
	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. We recommend that you leave the subnet masks at 255.255.255.0 unless you are a developer.
Levels	Level	The level name. Level names map to the level number.
	Signal Type	Type of signal(s) assigned to the 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	I/O numbering in the system controller may not match the physical I/Os in the router. Use these fields to map the router I/Os to the system controller I/O numbering.
	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. It is recommended that you leave the subnet masks at 255.255.255.0 unless you are a developer.

How to Select a Machine Control Router

To select a specific router, locate the router in the ‘Network Frame Summary’ section and click on that row. Routers are listed by three different categories. Click the related tab to bring that tab forward:

- Machine Control Routers — Lists machine control routers by ‘Name’, ‘Frame Type’ and ‘IP Address’
- Levels — Lists all routers by ‘Level’, ‘Signal Type’, ‘Routers’, ‘Inputs and Outputs’, and ‘Controller Destinations’.
- All CR Frames — Lists compact router frames by ‘Name’, ‘Frame Type’ and ‘IP Address’.

Details of the port settings for that router display in the ‘Machine Control Port Settings’ section.

How to Change a Port Type

1 From the left-hand navigation area, expand the ‘System Configuration’ pane and click ‘Setup Machine Control Router’.

2 Select the router and locate the row listing the ‘Port Number’ you want to update.

3 On the row, click in the ‘Port Type’ column. A drop-down menu appears:

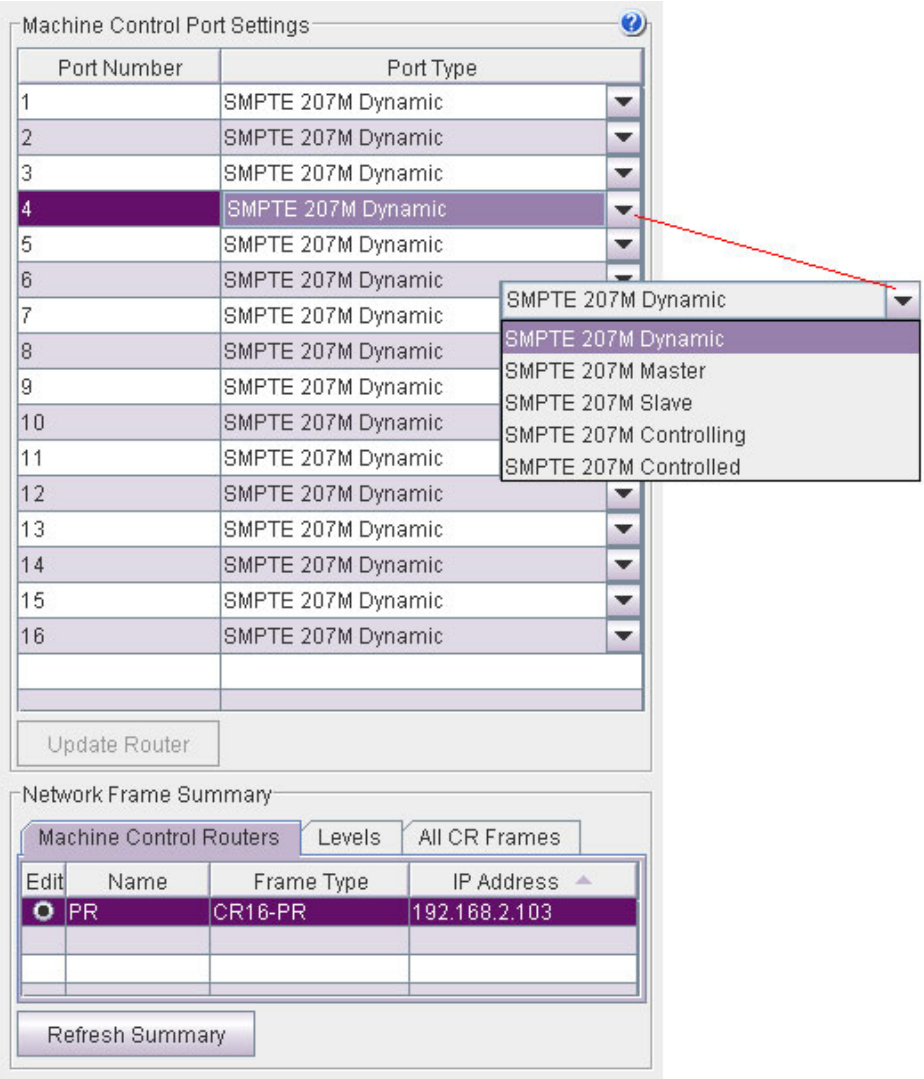


Figure 6-3. Setup Machine Control Router Page

4 From the drop-down menu, select a new port type. There are five types of ports: ‘Controlled’, ‘Controlling’, ‘Dynamic’, ‘Master’ and ‘Slave’. For a complete description, see An Overview of Machine Control Routers on page 31.

5 Click Update Router. CRSC uploads the port configurations to the router.

7. Programming Remote Panels

Using the ‘Program Remote Panels’ page you can choose a panel type and define the button functions for that panel. You can save the panel configuration to a file or upload a saved control panel configuration to one or more remote panels. Each remote panel in the network requires configuration. A remote panel is the combination of a control panel that is mounted on a remote panel module.

A remote panel module can send control messages to a network of routers and receive station information from the network. Remote panel modules must be attached to a control panel to be used. The combination of a remote panel module and control panel is called a remote panel. These panels are “remote” because they do not need to be directly attached to a router and can be used remotely as far as cable restrictions allow. Once attached, a remote panel module can send take and ‘Lock’ commands to the control panel.

Important | CQX panels are not configurable through CRSC at this time.

For general information on configuring a panel for operators and operating a panel, see Operating Panels on page 93. For more detailed information see the *CR Series Compact Router User’s Guide* or that panel’s related documentation.

To open the ‘Program Remote Panels’ page, from the navigation pane, click ‘Program Remote Panels’ under the ‘System Configuration’ bar. The ‘Program Remote Panels’ page appears in the right-hand pane.

At any time, click **Refresh Summary** to update the list of panels that display.

Overview

Configuring Remote Panels

Before configuring remote panels, 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 ports (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 the) when a panel operator presses a salvo button. A take in a salvo is comprised of 3 values: level, input and output. A single take involves both an input and an output on a single level.

Operators control a Compact Router Series system using remote panels. Remote panels are control panels mounted on remote panel modules. Remote panels must be attached to a control panel to be used. All but two of a panel's buttons are configurable. An operator is presented with a large number of arbitrary button definitions. It is the configurer's task to produce a panel that is easy 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. CRSC cannot detect or configure captive panels.

A captive panel controls only the router on which it is mounted when the router is in configuration mode. 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. It does not display any level information.

Remote Panel Modes

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

Important | CQX panels have a default configuration and are not configurable at this time.

Standard Mode

'Takes' are performed on selected levels only.

Level selection is persistent and at the discretion of the panel operator. Once the operator makes a 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 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 a subset of available valid levels, not to all valid levels. By default, all valid levels are automatically selected when preparing for a take. By creating a breakaway, you route only to the levels you have individually selected. To determine what sources are routed to a destination might require a few button presses. Clearing a breakaway is relatively simple.

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 preferences.

Enhanced mode has 2 submodes:

- Hold mode — the level selection persists after the destination button is pressed and until the operator changes it. This allows an operator to try different sources. To clear a breakaway, start 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. To clear a breakaway, either start a new normal take to that destination or press a source without a level selection.

About Salvos

A "salvo" is a list of preset actions or routes. Usually these are routes that are commonly repeated over and over. By assigning a salvo to a button, an operator need only press the one button rather than several to perform a route. 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.

Important | CQX panels are not configurable through CRSC at this time.

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 basic 'takes'. A panel configuration can have up to 32 individual 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 ‘Program Remote Panels’ Page

Important CQX panels have a default configuration and are not configurable at this time.

The ‘Program Remote Panels’ page has three parts. At the top of the page is the ‘Remote Panel’ section that displays an image of the buttons for your selected panel type. In the middle of the page is the ‘Select Button Functions’ section in which you assign button functions and specify the panel’s mode of operation. At the bottom of the page, the ‘Network Frame Summary’ has three tabs that display a list of ‘Remote Panels’, ‘Levels’, or ‘All CR Frames’ (compact routers) defined in your network. Use the ‘Remote Panels’ tab to select a remote panel to view or update. When you choose one of the remote panels in the ‘Remote Panels’ list, CRSC reads the panel configuration and displays it in the top two sections.

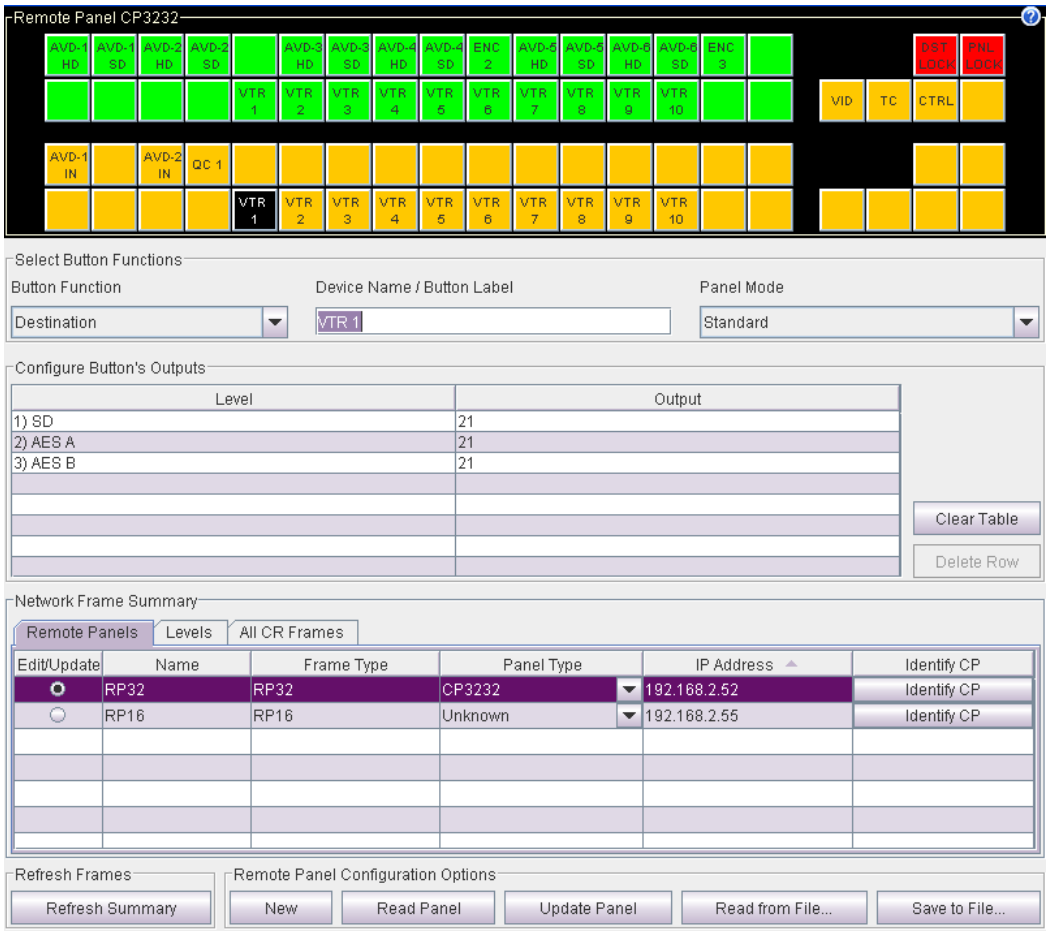


Figure 7-1. Program Remote Panels Page

The ‘Remote Panel’ section provides a visual representation of the remote control panel. How the buttons display in this section mimics how the buttons display to the operator using the control panel. Click on any button to select it. When selected, fields related to configuring that button appear in the ‘Select Button Functions’ section.

The ‘Select Button Functions’ section provides fields and drop-down lists that enable you to select the button’s function, label and other related features. The options available change depending on

the button function selected. For a full description of each button function and related options, see Button Functions on page 42.

Tab	Column	Description
Remote Panels	Edit/Update	Click the radio button on the row displaying the remote panel you want to update. All details of the panel display in the 'Remote Panel' and 'Select Button Functions' sections. Once selected, panel information can be updated.
	Name	Name of the remote panel.
	Frame Type	Type of remote panel module by model number.
	Panel Type	Type of control panel by model number.
	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	Number assigned to the level. This number maps to the level name.
	Router	Router to which the level is assigned.
	Frame Type	Type (model number) of router.
	Router IP	IP address assigned to the router.
	Physical Inputs	These fields show the physical start and endpoints of the level within the router.
	Physical Outputs	
	Controller Sources	I/O numbering in the controller may not match the physical I/Os in the router. Use these fields to map the router I/Os to the controller I/O numbering.
	Controller Dest	
All CR Frames	Name	Name assigned to the compact router.
	Frame Type	Type (model number) of compact router.
	Panel Type	Type (model number) of control panel associated with the compact router.
	Subnet Mask	Subnet mask currently assigned to the device. It is recommended that the subnet mask not be changed unless you are a developer.

At the very bottom of the page are 6 function buttons:

- Refresh List — Updates the list of remote panels.
- New — Creates a new panel configuration. (You will be prompted to save unsaved configurations.)
- Read Panel — Retrieves the button configuration that currently exists in the remote panel.
- Update Panel — Sends the button configuration to the remote panel.

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

Note Because a configuration is stored in the underlying remote panel module, captive panels, those mounted on routers, cannot be configured.

- Read from File — Retrieves a configuration from your PC's file system.
- Save to File — Saves the configuration in your PC's file system. The extension for panel configuration files is.pfg.

Button Functions

Any button on any remote panel can be configured to perform one of five functions: destination, level, salvo, source or unused.

Important CQX panels are not configurable through CRSC at this time.

Destination

To configure a button as a destination button, choose 'Destination' from the 'Button Function' drop-down list. A configuration table appears in the 'Configure Button's Outputs' section. 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 67.

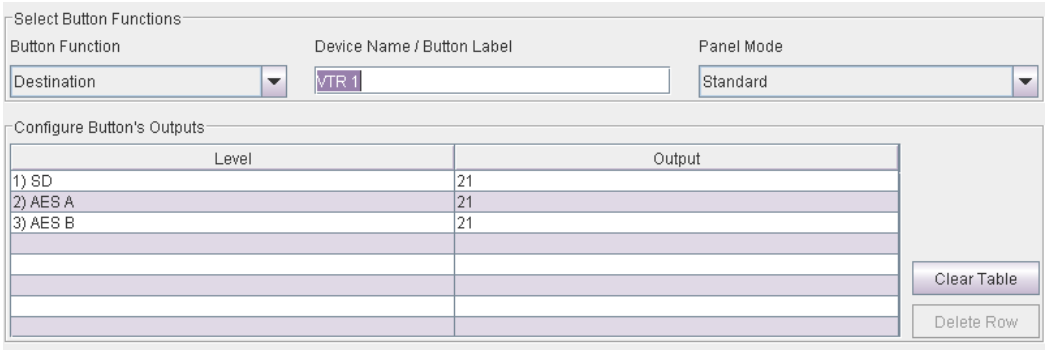


Figure 7-2. Example of Destination Button Fields

The table identifies the output ports that belong to the destination. The outputs you specify are *relative* to the level specified in the 'Configure Router Levels' page. See Using the 'Configure Router Levels' Page on page 26.

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

> Level A = outputs 1–8, Level B = 9–16, Level C = 17–24, Level D = 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 an SD or HD video level.

There are two shortcut buttons at the right: **Clear Table** clears all entries in the table; **Delete Row** deletes only the selected row.

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.

Levels

A level is a partition within a router. An input can only be switched to an output in the same level. See Partitions and Levels on page 67. To configure a button as a level button, 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. Levels are defined in the 'Configure Router Levels' page. See Configuring Router Levels on page 25.

Level numbers range from 1 to 250. Up to 8 levels are permitted. The level numbers must be unique.

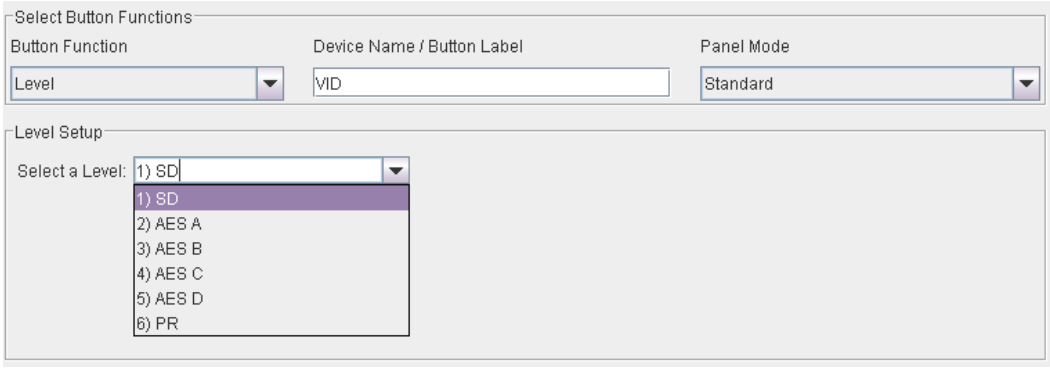


Figure 7-3. Example of Level Button Fields

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.

Salvos

To configure a button as a salvo button, choose 'Salvo' from the 'Button Function' drop-down list: A configuration table appears in the 'Configure Salvo Buttons' section. See About Salvos on page 39.

Choose one of the 32 salvos listed in the drop-down salvo list. Salvos are numbered from 1 to 32. Entries in the 'Level' column are drop-down lists. Entries in the 'Input' and 'Output' columns are input and output connector numbers. The numbers must be in the range your configuration defines

for the level (partition). Exercise care that the inputs and outputs you specify correspond to the physical inputs and outputs you actually use.

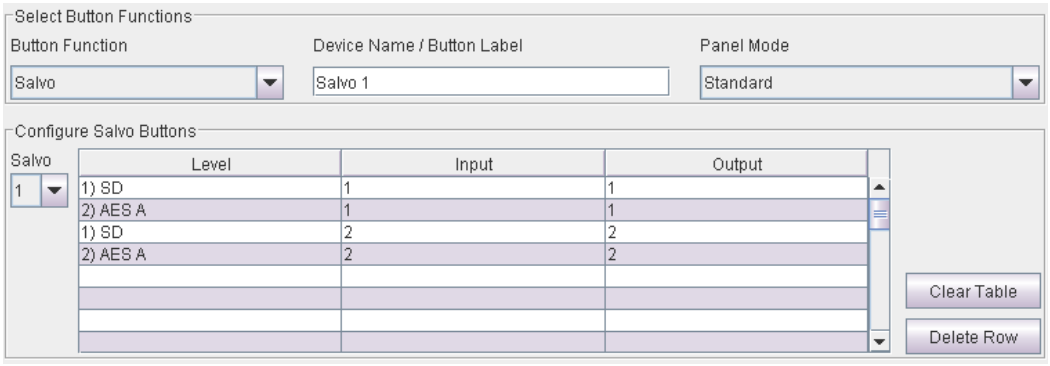


Figure 7-4. Example of Salvo Button Fields

After you have chosen the salvo, you must enter at least one take for it to be of any value. When you are configuring a salvo, the software displays a table of ‘takes’, as shown above. Each take comprises a level, an input number and an output number. The level, input, and output form a single crosspoint. 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.

There are two shortcut buttons at the right: Clear Table clears all entries in the table; Delete Row deletes only the selected row.

Sources

To configure a button as a source button, choose ‘Source’ from the ‘Button Function’ drop-down list. A configuration table appears in the ‘Configure Button’s Inputs’ section. It has 8 rows. Each row is a level/input pair. Remember that a level is equivalent to a partition. See About Salvos on page 39.

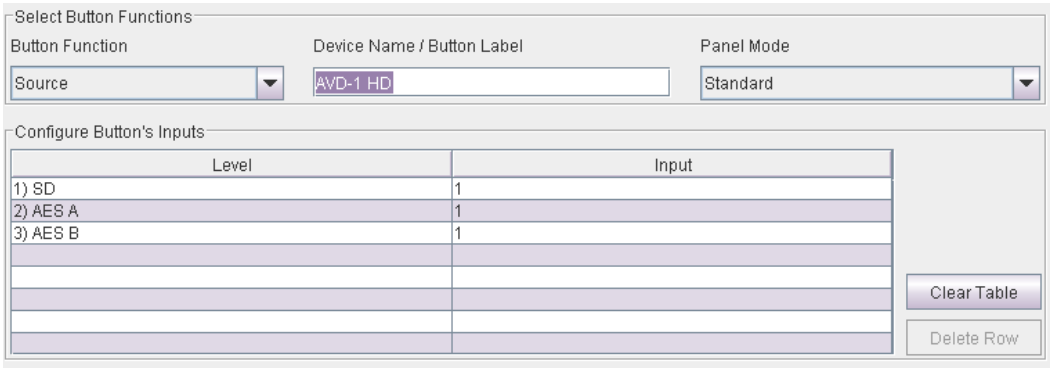


Figure 7-5. Example of Source Button Fields

The table identifies the input ports that belong to the destination. The inputs you specify are *relative* to the level you specified in the ‘Configure Router Levels’ Page. See Configuring Router Levels on page 25 page.

For example, suppose you divide an 32×32 AES router into 4 equal partitions:

Level A = outputs 1–8, Level B = 9–16, Level C = 17–24, Level D = 25–32 where each level starts counting at input 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.

There are two shortcut buttons at the right: Clear Table clears all entries in the table; Delete Row deletes only the selected row.

Unused

The button is not used and has no function. This informs the operator that the button can be ignored.

How to View an Existing Panel Configuration

You can read a panel configuration from the remote panel module on which the control panel is mounted.

1. From the left-hand navigation area, expand the 'System Configuration' pane and click 'Program Remote Panels'.
2. Click the 'Remote Panels' tab at the bottom of the page to bring it forward.
3. Click the radio button in the 'Edit/Update' column in the row listing the panel you want to view. This selects the panel. The CRSC software automatically reads the configuration from the remote panel and displays the details. If there is no configuration, a default configuration is automatically created.

How to Create a New Panel Configuration

- **Special Note**: The CP3201 is a single-destination control panel. The panel has an implicit destination that is not operator-selectable. However, the button appears 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.

Important | CQX panels have a default configuration and are not configurable at this time.

1. From the left-hand navigation area, expand the 'System Configuration' pane and click 'Program Remote Panels'.
2. Click New. The 'New Control Panel' dialog box appears.
3. From the drop-down list select a control panel type. The top and middle sections display configuration options for the type of control panel selected.
4. In the 'Remote Panel' section, define functions for each button:

a Click on a button in the ‘Remote Panel’ section at the top of the page. A default function may already be assigned, but it can be changed to any other function available. Usually the default function is ‘SRC’ (source) or ‘DST’ (destination0.

b From the ‘Button Function’ drop-down list in the ‘Select Button Functions’ section, select a function (or do nothing and accept the default assignment).

c Depending on the button, the section below populates with different entry fields. Fill in each field as needed for the type of button:

- Destination on page 42.
- Levels on page 43.
- Salvos on page 43.
- Sources on page 44.
- Unused on page 45.

5 In the ‘Device Name/Button Label’ field, type a name for the button and press **Enter** on your keyboard. The text displays on the button in the top section of the page. Only four characters can be listed on each line; maximum of two lines of text. Punctuation marks are okay.

The name you assign displays in CRSC, but does not display to the panel operator. The actual labels for buttons must be physically created and placed under clear plastic inserts on the panel itself.

6 In the ‘Panel Mode’ field, from the drop-down list select a mode of operation: ‘Standard’, ‘Enhanced – Hold’, or ‘Enhanced – No Hold’. For a description of each mode, see Remote Panel Modes on page 38.

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

Note

The configuration is stored in the remote panel. If you later change the remote panel’s physical panel, it might not work properly with this configuration. Because a configuration is stored in the underlying remote panel module, it follows that captive panels, those mounted on compact routers, cannot be configured.

8 *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 a Button Function

Important

CQX panels have a default configuration and are not configurable at this time.

1 From the left-hand navigation area, expand the ‘System Configuration’ pane and click ‘Program Remote Panels’.

2 Click the ‘Remote Panels’ tab at the bottom of the page to bring it forward and then click the ‘Edit/Update’ radio button in the row listing the panel you want to update. The remote panel’s configuration displays in the page.

3 In the ‘Remote Panel’ section at the top of the page, click on the button you want to update.

   a From the ‘Button Function’ drop-down list in the ‘Select Button Functions’ section, select a new function.

   Or

   If you want to keep the current function type, but change the associated functions, go to Step b.

   b Depending on the button function, the section below populates with different entry fields. Fill in each field as needed for the type of button:

   - Destination on page 42.
   - Levels on page 43.
   - Salvos on page 43.
   - Sources on page 44.
   - Unused on page 45.

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 a Button Label

Important	CQX panels have a default configuration and are not configurable at this time.

1 From the left-hand navigation area, expand the ‘System Configuration’ pane and click ‘Program Remote Panels’.

2 Click the ‘Remote Panels’ tab at the bottom of the page to bring it forward and then click the ‘Edit/Update’ radio button in the row listing the panel you want to update. The remote panel’s configuration displays in the page.

3 In the ‘Remote Panel’ section at the top of the page, click on the button you want to update.

4 In the ‘Device Name/Button Label’ field, type a name for the button and press **Enter** on your keyboard. The text displays on the button.

   Only four characters can be listed on each line; maximum of two lines of text. Punctuation marks are okay. The name you assign displays in CRSC, but does not display to the panel operator. The actual button labels must be physically created and placed under clear plastic inserts on the panel itself.

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

6 Repeat Steps 2 through 5 until all buttons have been defined.

7 *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 Operation Mode

Important CQX panels have a default configuration and are not configurable at this time.

1 From the left-hand navigation area, expand the ‘System Configuration’ pane and click ‘Program Remote Panels’.

2 Click the ‘Remote Panels’ tab at the bottom of the page to bring it forward and then click the ‘Edit/Update’ radio button in the row listing the panel you want to update. The remote panel’s configuration displays in the page.

3 In the ‘Remote Panel’ section at the top of the page, click on the button you want to update.

4 In the ‘Panel Mode’ field, from the drop-down list select a mode of operation: ‘Standard’, ‘Enhanced—Hold’, or ‘Enhanced—No Hold’. For a description of each mode, see Remote Panel Modes on page 38.

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

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

8. Viewing Router Crosspoints

Using the ‘View Router Crosspoints’ page, you can view router crosspoints and perform ‘takes’ (i.e., manipulate router crosspoints). The page provides a visual representation of the router matrix—the inputs and outputs—enabling you to manage the crosspoints through an easy-to-use interface.

A router matrix is organized into levels. Levels are partitions in the matrix. A signal can only be switched from inputs to outputs within the same level. (See Configuring Router Levels on page 25.) Depending on the router, there may be only one level encompassing the entire router, as with CQX routers, or several levels, each representing a portion of the matrix.

The grid that displays on the ‘View Router Crosspoints’ page represents a router’s entire crosspoint matrix. Inputs are columns; outputs are rows. There are as many rows and columns as supported by the router. For example, a 16×4 router will have 16 columns and 4 rows. The grid for AES routers, however, shows twice as many rows and columns because there are two channels for a single input or output. (See About AES Crosspoints on page 49.)

Panel operators can perform ‘takes’ and locks at any time, changing the router crosspoints. Any crosspoint change made by a panel operator is reflected immediately in the ‘View Router Crosspoints’ page.

‘Takes’ can be performed using the page by clicking a cell where an input (column cell) intersects an output (row cell). 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. To undo the last take click Undo Last Take.

To open the ‘View Router Crosspoints’ page, from the navigation pane, click ‘View Router Crosspoints’ under the ‘Tools’ bar. The ‘View Router Crosspoints’ page appears.

At any time, click Refresh Summary to refresh the list of crosspoints.

Discussion

About AES Crosspoints

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, the crosspoint view for AES routers has 2 rows for every output and 2 columns for every input. 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.

For AES routers to operate in synchronous mode, there must be a video reference signal present. If no video reference signal is present, the router operates in asynchronous mode. Compact routers cannot resolve mono signals without a video reference. 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’. In other

words, all levels defined for a single AES router behave identically according to whether the router does or does not have a video reference.

Audio router ‘takes’ differ depending on the mode:

- When the router is in synchronous mode, ‘takes’ performed in the crosspoint view are “mono” meaning that any individual channel can be taken to any individual output channel.
- When the router is asynchronous mode, ‘takes’ performed in the crosspoint view 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 pair, but (2,3) is not and (1,5) is not.

Using the ‘View Router Crosspoints’ Page

The page is divided into two sections. At the top is the ‘View or Set Crosspoints’ section that provides a visual representation of crosspoints. 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 to view.

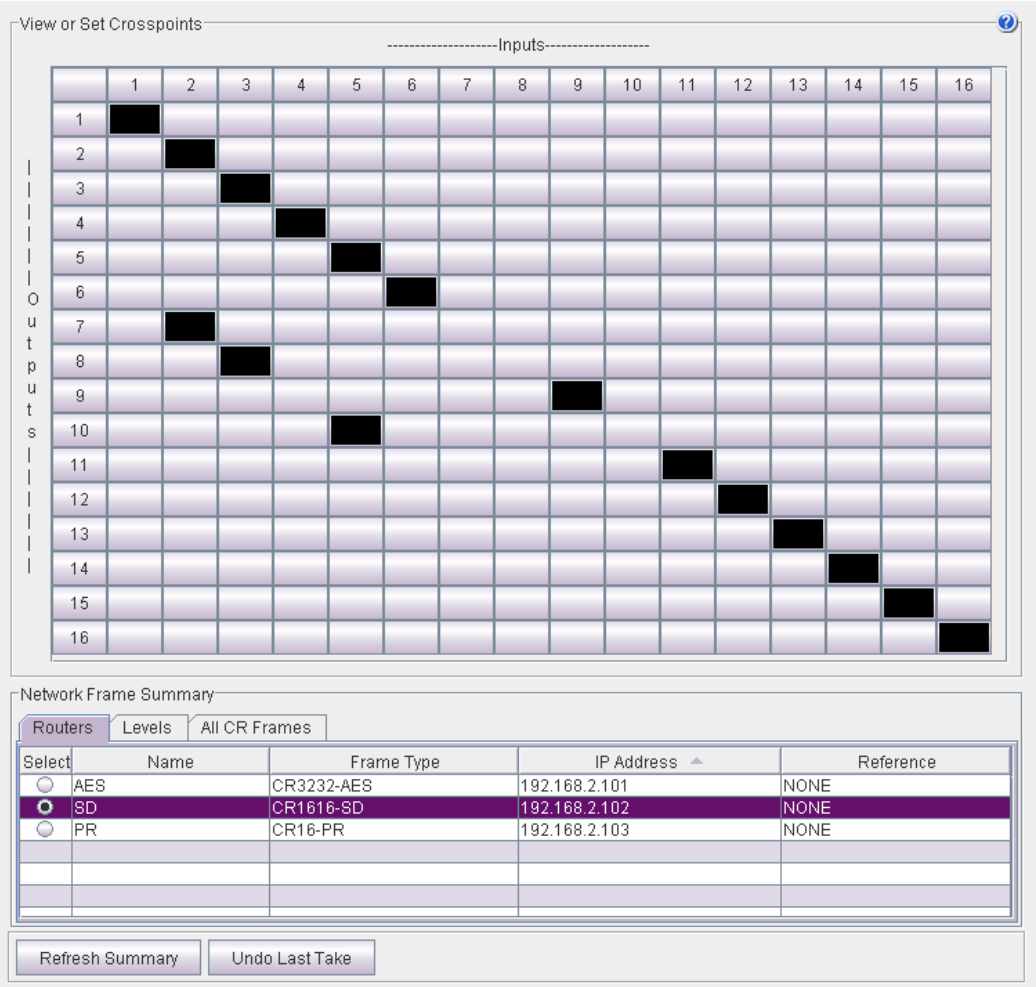


Figure 8-1. Example of the View Router Crosspoint Page

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 and display the crosspoint in the ‘View or Set Crosspoints’ section.
	Name	Name of the compact router or remote panel.
	Frame Type	Type of router or remote panel.
	IP Address	IP address currently assigned to the device.
	Reference	Lists the reference signal for the router, if any, and if it is audio or video.
Levels	Level	Level name, which is mapped to the level number. For CQX routers, only one level displays.
	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	I/O numbering in the system controller may not match the physical I/Os in the router. Use these fields to map the router I/Os to the system controller I/O numbering.
	Controller Dest	
All CR Frames	Name	Name assigned to the compact router.
	Frame Type	Type (model number) of compact router.
	IP Address	IP address assigned to the compact router.
	Subnet Mask	The subnet mask currently assigned to the device. It is recommended that you leave the subnet masks at 255.255.255.0 unless you are a developer.

How to View an Existing Panel Crosspoint Configuration

1 From the left-hand navigation area, expand the ‘Tools’ pane and click ‘View Router Crosspoints’.

2 Click the ‘Routers’ tab at the bottom of the page to bring it forward.

3 Click the radio button on the row listing the router whose crosspoint matrix you want to view. Details of the crosspoints appear in the ‘View or Set Crosspoints’ section.

How to Perform or Undo a Take

If you want to perform a take—alter the crosspoint connections—click any cell at the intersection of a column (input) and row (output). For example, to take input 7 to output 11, click the square at the intersection of column 7 and row 11, as shown in Figure 8-2 on page 52. The square turns black indicating that it is a crosspoint connection.

Or

Click the top left corner of the grid to perform a diagonal take. A diagonal take is where input *n* is connected to output *n* for all *n*. (The black squares are arranged diagonally.)

Exception: for machine control routers, entries on the diagonal represent tri-stated or disabled connections.

Or

Click the number at the top of a column to effect a vertical take. A vertical take is where input *n* is connected to *all* outputs. (The black squares are arranged vertically.) A vertical take is also called a *range take*.

For AES routers, stereo input pair *n* is connected to all stereo output pairs. The pattern is vertical, but occupies two columns in alternation. To perform a take in the crosspoint view of an asynchronous AES router, click on the square at the intersection of an odd row and odd column.

AES takes performed at a control panel are always paired.

Exception: for machine control routers, vertical takes are not possible because connections are point-to-point.

Or

To undo the last take click Undo Last Take. You can only undo the last take.

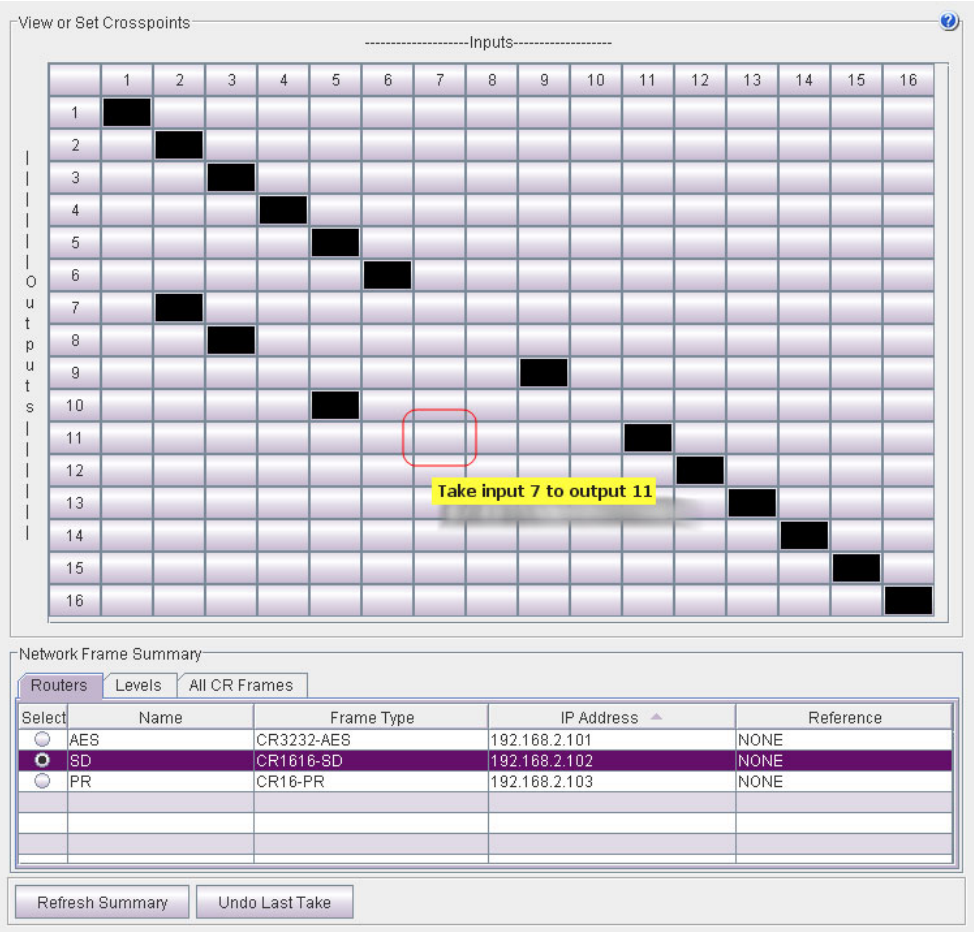


Figure 8-2. Example of Take

9. Firmware Updates

The ‘Firmware Updates’ page enables you to upload firmware to selected devices or reset selected devices. The ‘Firmware Updates’ page displays a list of all compact routers and remote panel modules on your networks.

To open the ‘Firmware Updates’ page, from the ‘Administrative Tools’ pane, click ‘Firmware Updates’.

At any time, click **Refresh List** to regenerate the list of devices.

Discussion

Using the ‘Firmware Updates’ Page

The ‘Firmware Updates’ page provides a quick and easy way to view if devices in the CRSC network have the latest firmware.

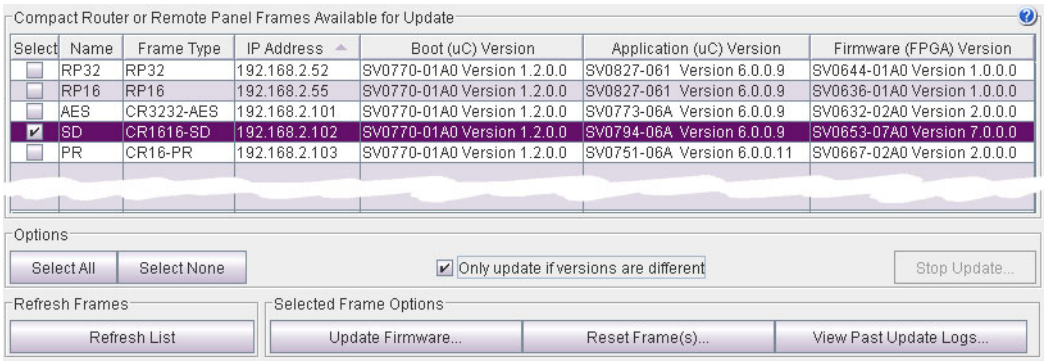


Figure 9-1. Firmware Update Page

The columns 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.
Frame Type	Type of compact router or remote panel, such as CP3232
IP Address	IP address currently assigned to the device.
Boot (uC) Version	Boot code for initial boot up.
Application (uC) Version	Application code that exists on the router.
Firmware (FPGA) Version	Hardware application downloaded to the router.

How to Update Firmware

1 Select individual compact routers or remote panels by checking the check box in 'Select' column on the row listing the device.

Or

Click Select All to select all devices.

To deselect all devices and start again, click Select None. To execute a firmware update, you must have selected at least one device in the device list.

2 (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 firmware is different from the firmware in the device. CRSC automatically checks the firmware version.

3 Click Update Firmware. The 'Select the Compact Router Firmware' dialog box appears.

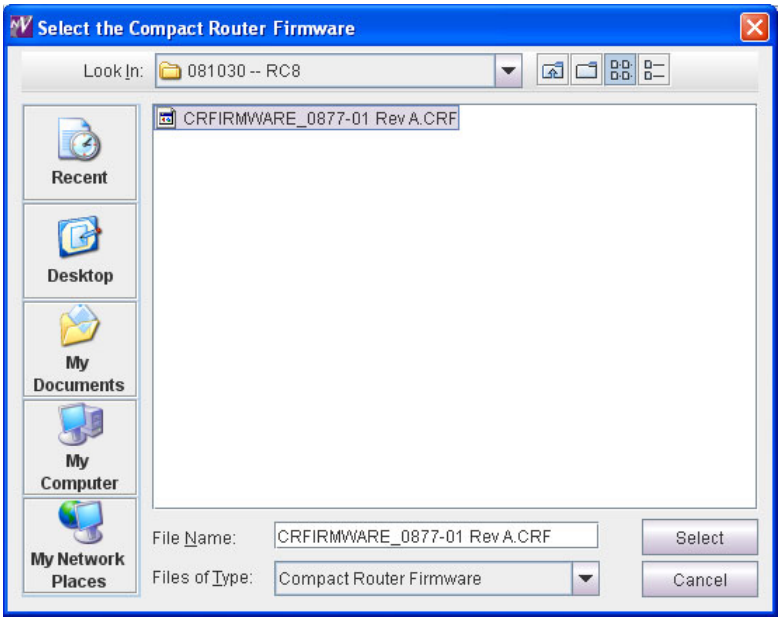


Figure 9-2. Select the Compact Router Firmware Dialog Box

4 Browse to select a firmware file. (The file extension of a firmware file is .CRF.) and click OK. The updates begins and a progress bar displays.

The firmware applies to all the devices you have selected. Firmware updates take between 2 and 3 minutes for each device.

Or

(Optional) Click Stop Update... at any time before the update completes. CRSC will not leave a router or remote panel module in a undefined state. The update terminates at a safe point and leaves the remaining devices as they were.

5 When the firmware update completes, it displays a status report.

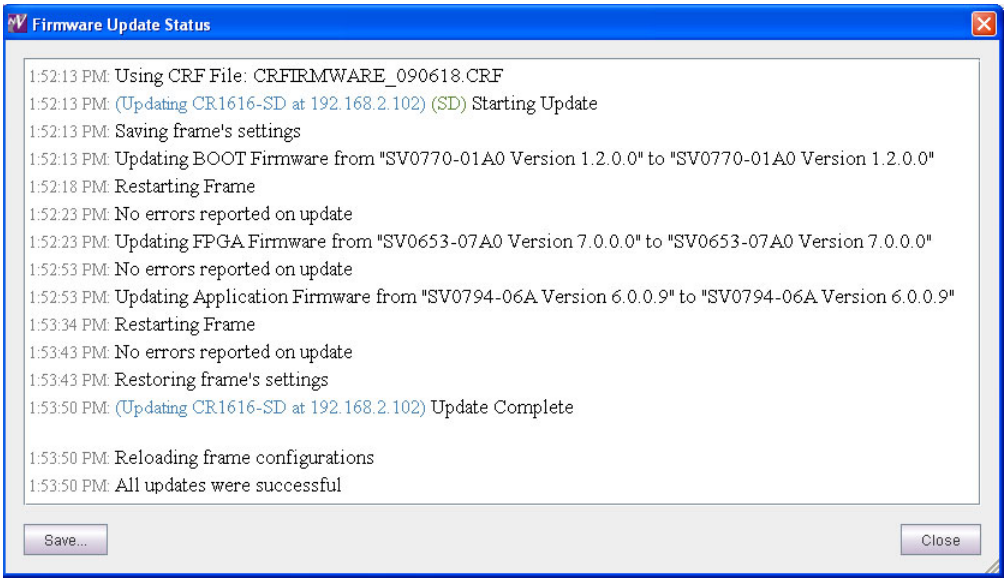


Figure 9-3. Example of Firmware Status Report

6 Click Save... to save this report as a .txt file to print or review later.

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 View Past Update Reports

To display past update status reports, click View Past Update Logs. The button remains greyed out (i.e., inactive) until you have performed an update that can be logged.

How to Reset Frames

After uploading firmware, it is recommended that you reset the frames to ensure that the devices "see" the new firmware.

1 Select individual compact routers or remote panels by checking the check box in 'Select' column on the row listing the device.

Or

Click Select All to select all devices.

To deselect all devices and start again, click Select None. To execute a reset, you must have selected at least one device in the device list.

2 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 panels to "discover" the state of the network.

10. Lock Maintenance

The ‘Lock Maintenance’ page enables you to view all locks, clear individual locks or clear all locks. Using this page, locks can be cleared that cannot be cleared at the control panel. If the page is empty, there are no destination locks set. Locks are available on all control panels, including the CQX panel.

There are two types of locks:

- Panel Lock — Locks the entire panel preventing accidental changes.
- 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.

  the ‘Lock Maintenance’ page manages only destination locks. Panel locks are managed at the individual panel.

  To open the ‘Lock Maintenance’ page, from the ‘Administrative Tools’ pane, click ‘Lock Maintenance’. At any time, click **Refresh Summary** to refresh the list.

Discussion

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.

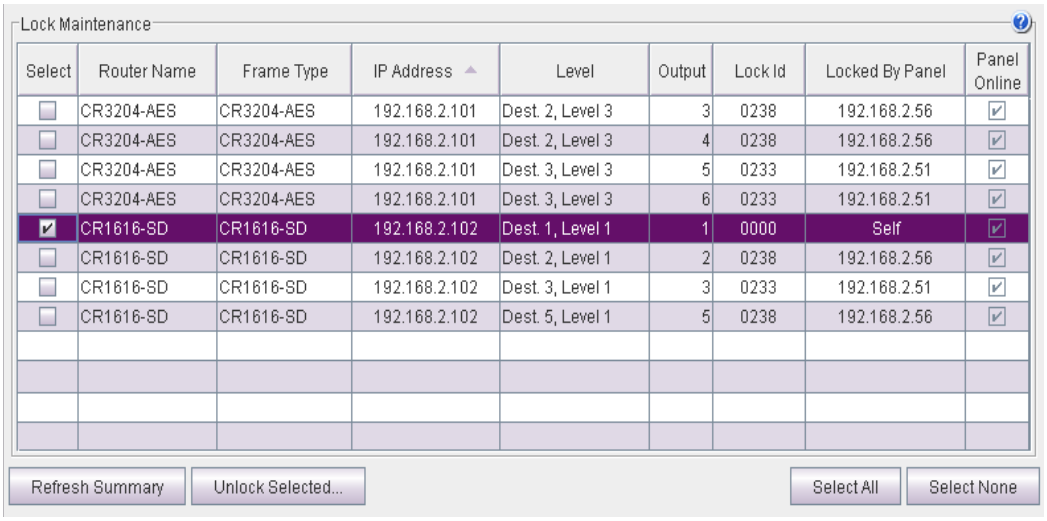


Figure 10-1. Lock Maintenance Page

The levels are “flattened” in the lock list displayed on this page. For example, if a 32×32 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 mono mode. Therefore, a single stereo output appears twice in the list.

To sort a column, click the column header once for ascending order; click the column header again for descending order.

The page presents the following information:

Column	Description
Select	Select the check box on the row listing the panel you want to lock.
Router Name	Name of the router.
Frame Type	Type 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 to which a lock is applied.
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. If you do not have an automation system, you may ignore lock IDs.
Locked By Panel	Lists 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, or 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 compact router network.

How to Unlock an Individual or All Locks

Once unlocked, a lock cannot be reapplied through CRSC. Locks are applied either at the control panel or through a control system, such as NV9000, using NV9000-SE Utilities. See the related control panel, control system or NV9000-SE Utilities documentation for details.

1. From the left-hand navigation area, expand the ‘Administrative Tools’ pane and select ‘Lock Maintenance’.
2. On the ‘Lock Maintenance’ page, locate the row listing the router and panel you want to unlock.
3. To unlock a specific lock, check the ‘Select’ check box on the row listing that lock.

   Or

   To unlock all locks, click Select All.
4. Click Unlock Selected.

11. Setup NV9000 Remote Panel

The Compact Router Series does not have centralized router control. Instead, control is distributed to the remote panel modules. Control panels, through which operators perform switching tasks, are mounted on remote panel modules. This combination is called a remote panel. For systems using compact routers, this is a cost-effective way to control routing until your facility and system needs require robust routers and a system controller.

Using the 'Setup NV9000 Remote Panel' page you can "turn off" a remote panel modules control features enabling an external NV9000 router control system to control the attached control panel. This enables you to control your control panels and routers all from one NV9000.

For an overview of routing and router control, see Routing Overview on page 63.

To open the 'Setup NV9000 Remote Panel' page, from the navigation pane, click 'Setup NV9000 Remote Panel' under the 'Administrative Tools' bar. The page appears in the right-hand pane.

At any time, click **Refresh Summary** to update the list of panels that display.

Discussion

Using the 'Setup NV9000 Remote Panel' Page

The 'Setup NV9000 Remote Panel' page has two parts. At the top of the page is the 'NV9000 Remote Panel Settings' section. This section allows you to enable NV9000 control of a remote panel module. At the bottom of the page, the 'Network Frame Summary' has three tabs that display a list of 'Remote Panels', 'Levels', or 'All CR Frames' (compact routers) defined in the network. Use the 'Remote Panels' tab to select a remote panel module to update.

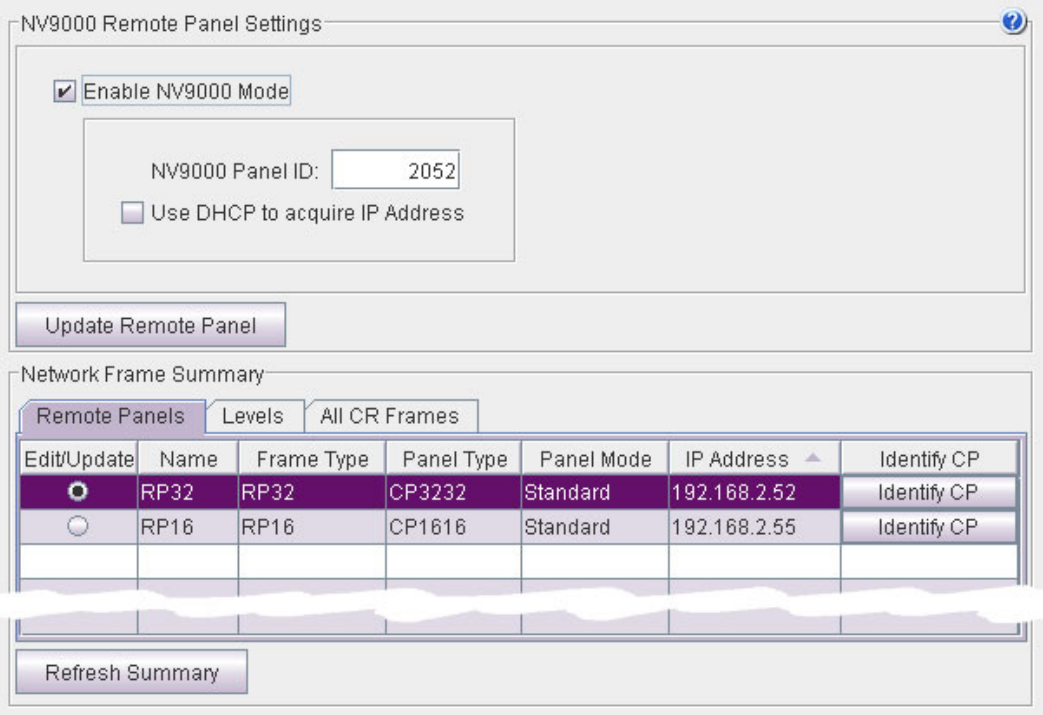


Figure 11-1. Setup NV9000 Remote Panel Page

When a panel is selected in the 'Network Frame Summary' section, the 'Enable NV9000 Mode' check box becomes active. Once checked, a panel ID can be entered and whether the IP address should be acquired using a DHCP or the currently assigned IP address be used.

Dynamic Host Configuration Protocol (DHCP) is an IP standard for allowing dynamic assignment of IP address to a device from a DHCP server. Because every computer on a TCP/IP network must have a unique IP address, DHCP provides an easy way to assign an IP address when moving a device to a different subnet.

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 you want to update. All details of the panel display in the 'Remote Panel' and 'Select Button Functions' sections. Once selected, panel information can be updated.
	Name	Name of the remote panel.
	Frame Type	Type of remote panel module by model number.
	Panel Type	Type of control panel by model number.
	Panel Mode	Lists the panel mode. See Remote Panel Operating Modes on page 68.
	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.

Tab	Column	Description
Levels	Level	Number assigned to the level. This number maps to the level name.
	Router	Router to which the level is assigned.
	Frame Type	Type (model number) of router.
	Router IP	IP address assigned to the router.
	Physical Inputs	These fields show the physical start and endpoints of the level within the router.
	Physical Outputs	
	Controller Sources	I/O numbering in the system controller may not match the physical I/Os in the router. Use these fields to map the router I/Os to the system controller I/O numbering.
	Controller Dest	
All CR Frames	Name	Name assigned to the compact router.
	Frame Type	Type (model number) of compact router.
	Panel Type	Type (model number) of control panel associated with the compact router.
	Subnet Mask	Subnet mask currently assigned to the device. It is recommended that the subnet mask not be changed unless you are a developer.

How to Setup an NV9000 Remote Panel

1 From the left-hand navigation area, expand the ‘Administrative Tools’ pane and click ‘Setup NV9000 Remote Panel’.

2 On the ‘Remote Panel’ tab in the ‘Network Frame Summary’ section, click the ‘Edit/Update’ radio button on the row listing the remote panel being updated.

3 Check the ‘Enable NV9000 Mode’ check box to enable NV9000 control of the panel.

4 Assign an ‘NV9000 Panel ID’ in the field provided. The identification number must be unique and contain no special characters or punctuation marks. By default, the ID number is the last six digits of the panel’s IP address.

5 Check ‘Use DHCP to acquire IP Address’ to have the panel’s currently assigned IP address overridden by an IP address acquired through a DHCP server on the NV9000. If you are unfamiliar with DHCP servers, contact your System Administrator.

Or

Leave the check box unchecked to use the IP address currently assigned to the panel.

6 Click Update Remote Panel to send the updated status to the panel and enable NV9000 control.

How to Disable NV9000 Control

1 From the left-hand navigation area, expand the ‘Administrative Tools’ pane and click ‘Setup NV9000 Remote Panel’.

2 On the ‘Remote Panel’ tab in the ‘Network Frame Summary’ section, click the ‘Edit/Update’ radio button on the row listing the remote panel being updated.

3 Click on the ‘Enable NV9000 Mode’ check box to remove the check mark.

4 Click Update Remote Panel to send the updated status to the panel and disable NV9000 control.

11. Setup NV9000 Remote Panel

Discussion

12. Tutorials

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 via a network. To learn more about networks, IP addresses, subnets and related topics, see Creating a Network on page 8.
- 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 63.
- Control Panel Modes — Control panels operate in standard or enhanced mode. To learn about how this impacts level selection by operators using the panel, see Remote Panel Operating Modes on page 68.
- Salvos — Salvos enable you to pre-program all steps for performing a specific task so that one button press on a control panel performs the entire operation. See Salvos on page 69.
- 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 69.
- Products — See Products on page 77 for a list of Miranda products relevant 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.

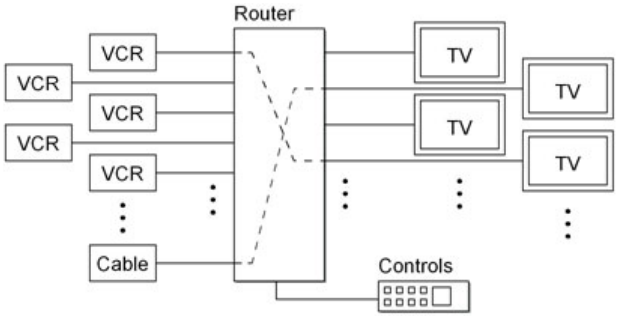
What is a Router?

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.

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

Compact Router Series routers and control panels do **not** start, stop, rewind, cue, or fast-forward any device. Compact Router 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.)

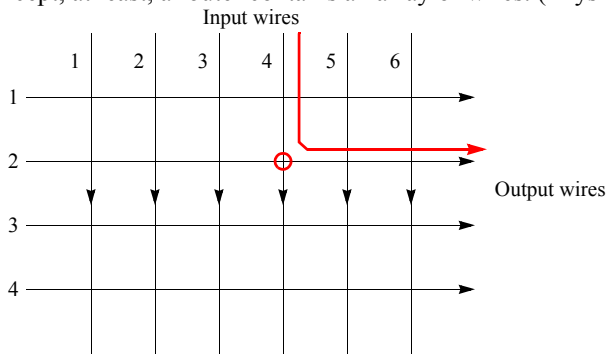


Figure 12-1. A rudimentary switching matrix

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 12-1, 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 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 enables you to place multiple panels in different rooms. Miranda’s Compact Router 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 68.

Signals

Many devices have several signal types. In the Compact Router Series, routers can switch one or more 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

Video signals are classified as digital (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 83 and Digital Audio Routers on page 86 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 16×16 router has 32 independent inputs and 32 independent outputs. The 32×32 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 Viewing Router Crosspoints on page 49). 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.

For most routers, a single input can be taken to any or all of the outputs. However, a router cannot take multiple inputs to a single output. Even if were possible, the result would be sheer noise. That is because a router is not a mixer. It does not blend inputs — it takes them wholly or not at all.

Where control signals are concerned, the routers are a bit different. First, a 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. And because no router can take multiple inputs to a single output, control signals are by definition *point-to-point* or one-to-one. (Thus, when a 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 Setting Up Machine Control Routers on page 31

Partitions and Levels

Partitions are boundaries within the router used to organize switching. After creating partitions, a signal type is selected to associate with each partition. This defines what signal format is in use and enables the control card to determine the correct switching rules and reference requirements.

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 matrix must contain at least one partition. The router's control card will be in an error state (red LED illuminated) if no partition information is found in EE memory on the router motherboard during boot up.

It is not required that different signal formats be split into separate partitions. In fact, there are cases where doing this prohibits system functionality. For example, on a router with 32 x 32 SD video and 32 x 32 analog video with analog-to-digital conversion input and output cards, if the system is divided into two partitions it is not possible to route between the analog and digital partitions even though the conversion cards are designed to allow this. Making one 64 x 64 partition eliminates this issue. In this case the router control system may address the router by specifying physical input and output ports on a single partition.

Many router control systems, and CRSC, support partitioning use virtual instead of physical partitions, called "levels." In CRSC, "levels" are analogous to partitions. 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 total and up to 4 levels per router.

Router Control

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

A compact router 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 requires at least one remote panel.

In a CRSC network, router control means 3 things:

- 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 the remote panel. The buttons reflect the state of the routers using color and brightness.

Routers are passive; they switch when commanded.control panels are also passive — nothing more than keyboard/displays. It is the remote panel modules that perform 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 selection, 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.

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 Operating Panels on page 93. For detailed information, see the *CR Series Compact Router User's Guide* or a panel's documentation.

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.

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 Operating Panels on page 93. For detailed information, see the *CR Series Compact Router User's Guide* or a panel's documentation.

Salvos

A "salvo" is a list of preset actions or routes. Usually these are routes that are commonly repeated over and over. By assigning a salvo to a button, an operator need only press the one button rather than several to perform a route. 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.Such a triple uniquely defines a crosspoint in the set of routers and router levels you have. (A level is the ID of a router or a partition.).

Note Salvos do not apply to CQX panels.

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

When an operator presses a salvo button, the salvo's primitive 'takes' execute rapidly, in sequence. 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.

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

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

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 — 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, cabling 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. Miranda routers have BNC connectors for the most part.

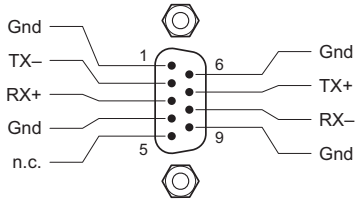
Length limits are as follows:

- SD Belden 1694A, BNC, 350 m at 270 MB/s (1312 feet)
- HD Belden 1694A, BNC, 150 m at 1.485 GB/s (492 feet)
- 3Gig Belden 1694A, BNC, 100 m at 2.97 GB/s (328 feet)
- AVBelden 8281, BNC connectors, to 1000 feet.
- AABelden 8451, DB25 connectors (each supports 8 shielded twisted pairs), to 1000 feet. See DB25 Connectors on page 71. Miranda's WC0053 breakout cable can be useful with DB25 connectors.
- PortRJ-45 connectors, cable length to 100 m with high-quality cable. Port 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 71.
- EthernetRJ-45 connectors, cable length to 100 m with CAT5 or CAT6 cable. Beyond 100 m, you will probably get some packet loss or degradation in speed.

Connectors

Serial Connector

The automation connector for all CR Series Compact Routers has this pinout:



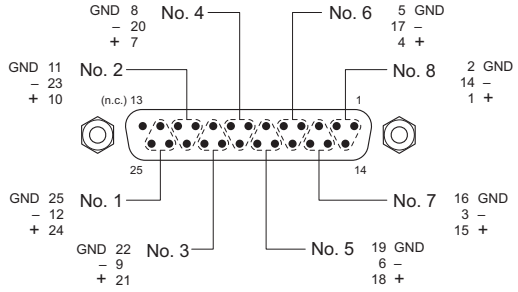
The connector is RS-485, but can be used as RS-422. Most of the compact routers allow RS-485 multi-drop now and eventually all will support it.

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

Note On remote panel modules, the serial port is not active and will be removed from future versions. Automation cannot use Remote Panel Modules.

DB25 Connectors

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



I/O Connections	
Number	***Stereo Designation***
1	1L
2	1R
3	2L
4	2R
5	3L
6	3R
7	4L
8	4R

For 16×16 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.

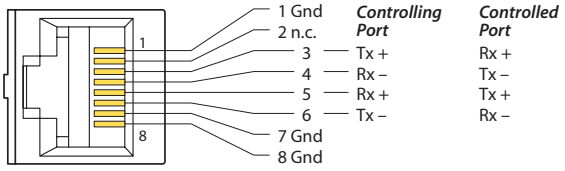
For 32×32 routers, the connectors provide inputs (or outputs) 1–8, 9–16, 17–24, 25–32, 33–40, 41–48, 49–56, and 57–64, respectively, and are labelled that way on the rear of the router. Inputs (and outputs) are treated as 32 stereo pairs.

For 32×4 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

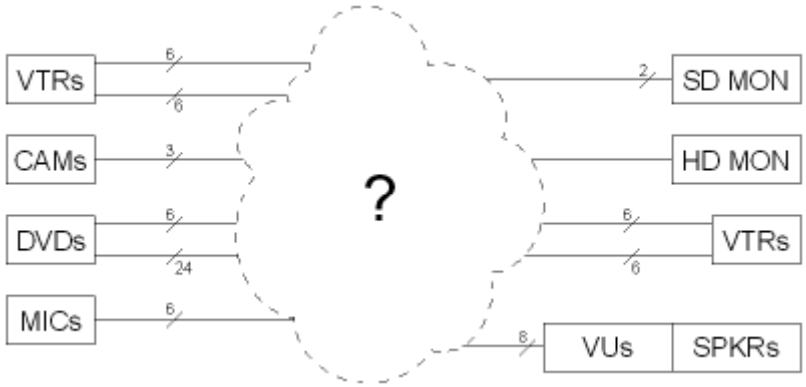
You have 6 VTRs that play, and record, SD and AES 1/2.

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)

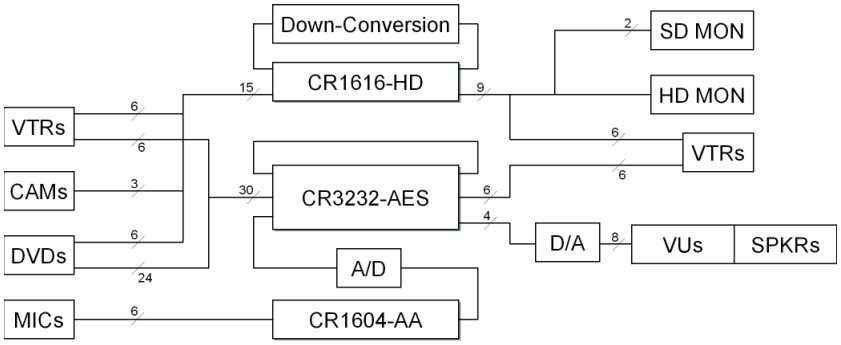
Note Note the clusters of I/O on the DB25s. 1-8, 9-16, 17-24, 25-32. They are labeled as if mono, but in fact are switched in stereo pairs.

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 75.

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 breakaway. 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.

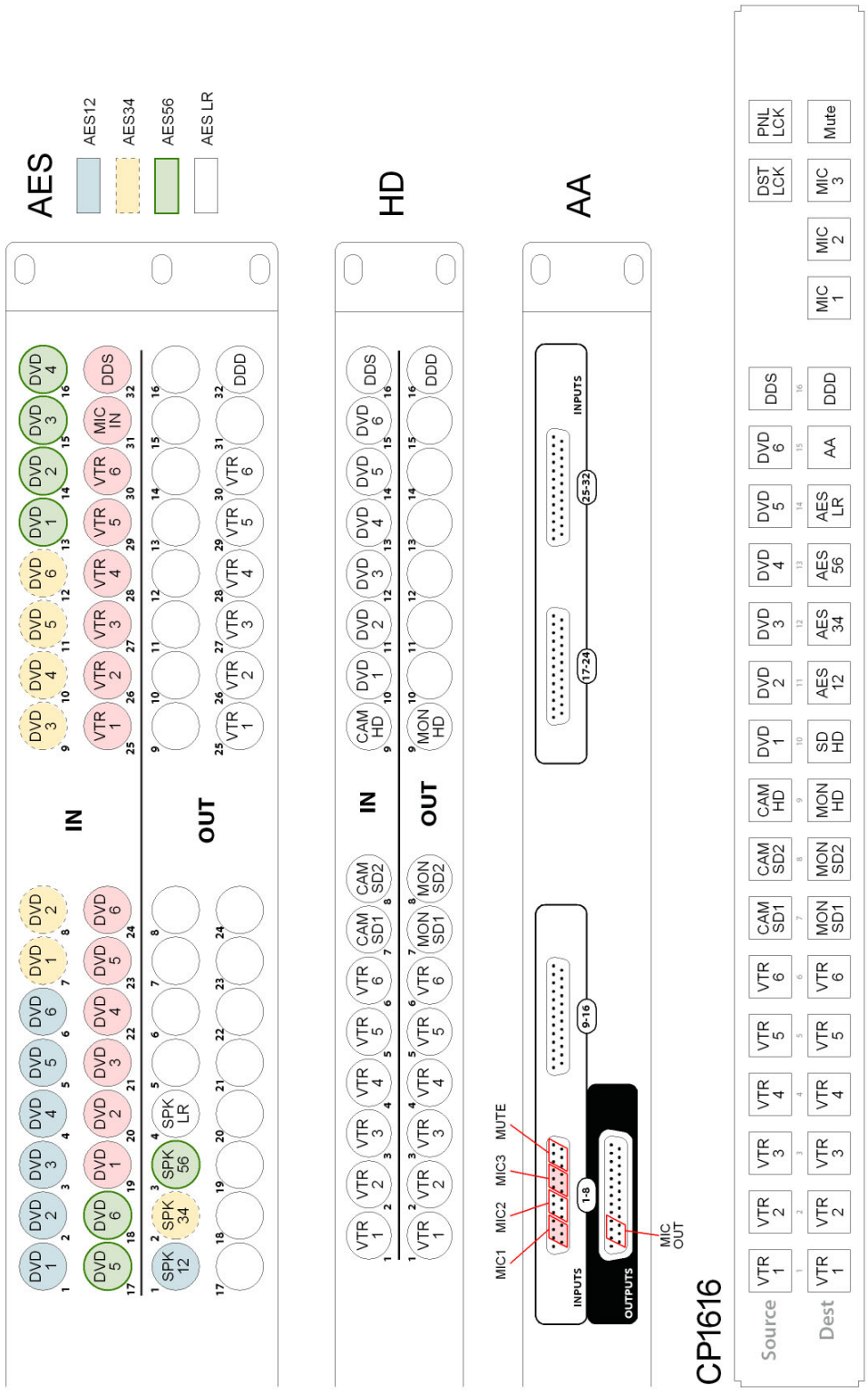


Figure 12-2. Cabling Diagram

Products

The Compact Router Series includes a wide variety of routers and panels. This section provides an overview of all Compact Router Series products. For more details about any product, refer to the device's documentation or contact Miranda.

Summary

CR Series products include 1RU and 2RU routers, control panels, and "remote panel modules." The CR Series 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	8×8, "3Gig" digital video 8×8, high definition digital video 8×8, standard definition digital video 8×8, AES3id digital audio	CP0808	8×8, with 6 function buttons
CR0808-HD-NR CR0808-SD-NR	8×8, HD video, non-reclocking 8×8, SD video, non-reclocking		
CR0808-AA CR0808-AV	8×8, analog audio 8×8, analog video		
CR1616-3Gig CR1616-HD CR1616-SD CR1616-AES	16×16, "3Gig" digital video 16×16, high definition digital video 16×16, standard definition digital video 16×16, AES3id digital audio	CP1616	16×16, with 6 function buttons
CR16-PR	16-port machine control		
CR1616-HD-NR CR1616-SD-NR	16×16, HD video, non-reclocking 16×16, SD video, non-reclocking		
CR1616-AA CR1616-AV	16×16, analog audio 16×16, analog video		
CR1604-3Gig CR1604-HD CR1604-SD CR1604-AES	16×4, "3Gig" digital video 16×4, high definition digital video 16×4, standard definition digital video 16×4, AES3id digital audio	CP1604 CP1602	16×4, with 6 function buttons 16×2, with 6 function buttons
CR1604-HD-NR CR1604-SD-NR	16×4, HD video, non-reclocking 16×4, SD video, non-reclocking		
CR1604-AA CR1604-AV	16×4, analog audio 16×4, analog video		
CR1602-HD-CQX CR1602-SD-CQX	16×2, high definition digital video 16×2, standard definition digital video	CP1602-CQX	16×8, 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 CR3232-HD CR3232-SD CR3232-AES	32×32, “3Gig” digital video 32×32, high definition digital video 32×32, standard definition digital video 32×32, AES3id digital audio	CP3232	32×32, with 12 function buttons
CR32-PR	32-port machine control		
CR3232-HD-NR CR3232-SD-NR	32×32, HD video, non-reclocking 32×32, SD video, non-reclocking		
CR3232-AA CR3232-AV	32×32, analog audio 32×32, analog video		
CR3204-3Gig CR3204-HD CR3204-SD CR3204-AES	32×4, “3Gig” digital video 32×4, high definition digital video 32×4, standard definition digital video 32×4, AES3id digital audio	CP3204	32×4, with 12 function buttons
CR3204-HD-NR CR3204-SD-NR	32×4, HD video, non-reclocking 32×4, SD video, non-reclocking		
CR3204-AA CR3204-AV	32×4, analog audio 32×4, analog video		

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 Compact Router Series network. (See CR Series Ethernet Setttings on page 19.)

Remote Panel Modules		Corresponding Control Panel	
RP16	1RU	CP1616, CP1604, CP1602, 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 × 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 two 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 out-

puts. The inputs each select one of the video inputs for CQ output 1 and the outputs signal alarms and status.

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 Compact Router Series 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.

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 Compact Router Series remote panel or (2) an NV9000 panel in a system controlled by an NV9000 or NV915 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. Please refer to the *NV9000-SE Utilities User’s Guide* (or the NV9000-SE Utilities help system).

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 Compact Router Series 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 or NV915 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.

Routers and remote panel modules come from the factory ready for stand-alone operation. They must be configured for use either in a Compact Router Series 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 Compact Router Series network or in an NV9000 network. The two configuration modes are not compatible.

Figure 12-3 compares a stand-alone router with a captive panel to a stand-alone router network with remote panel modules:

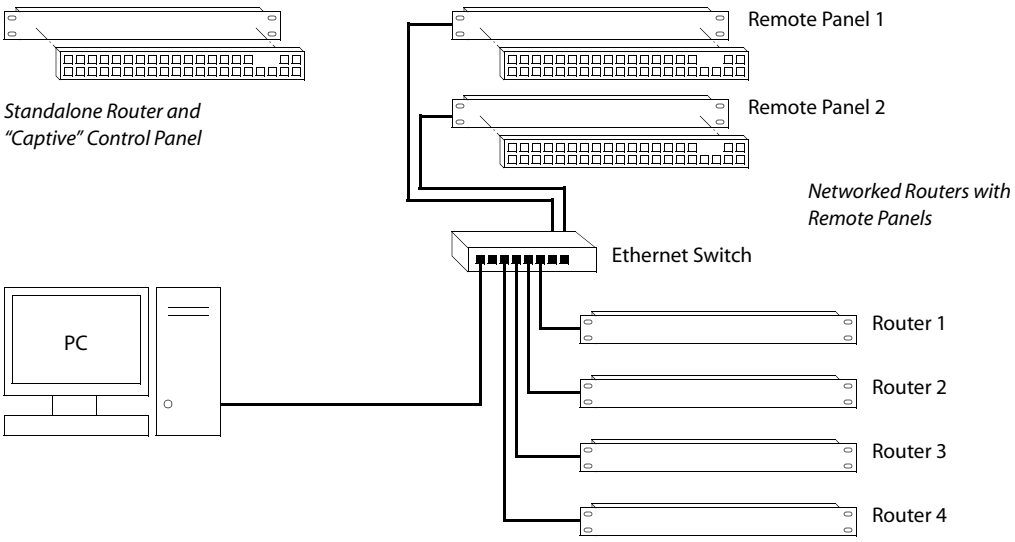


Figure 12-3. Standalone Router vs. a Network of Routers

A Compact Router Series 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 12-4 shows a sample NV9000 network, one of several possible topologies:

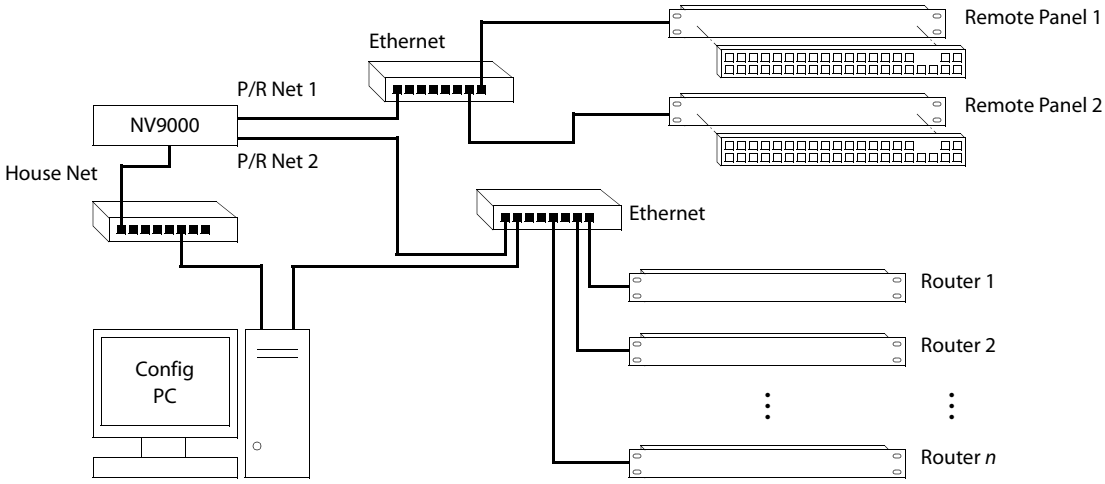


Figure 12-4. NV9000 Network of Routers

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.

CR Series routers can be used with a NV9000 Router Control System or a NV915 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 CR Series Ethernet Setttings on page 19.

Figure 12-5 shows the ways a “clean and quiet” router can be connected:

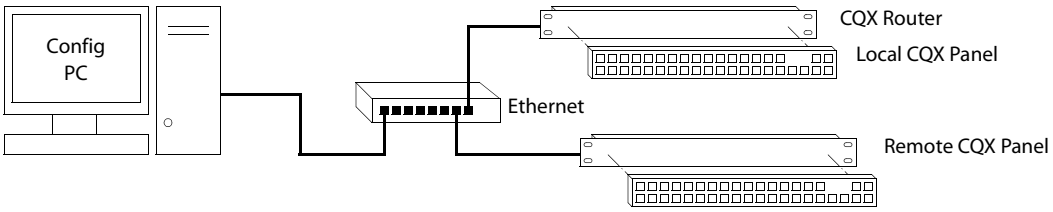


Figure 12-5. CQX Network

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.

Software

CRSC (Compact Router System Configurator) is a configuration and monitoring tool for compact routers and remote panels. Refer to the *CRSC User's Guide* for details. CrConfig (a precursor to CRSC) is no longer supported.

Benefits

The CR Series Compact Routers 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 (35–57mm or 1.38ð–2.25ð) 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 12-6 through 12-16 show front and rear views of the routers.

Figure 12-6. Front View of the CR1616-SD Digital Video Router

Figure 12-7. Rear View of the 16×16 3Gig, HD, SD, or AES Routers

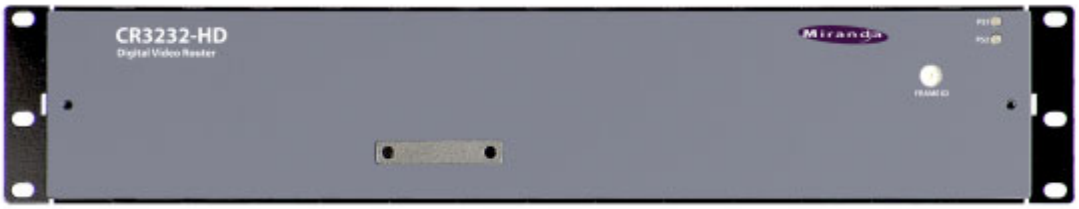


Figure 12-8. Front View of the CR3232-HD Digital Video Router

Figure 12-9. Rear View of the 32×32 3Gig, HD, SD, or AES Routers

Figure 12-10. Rear View of the CR1616-AV Analog Video Router

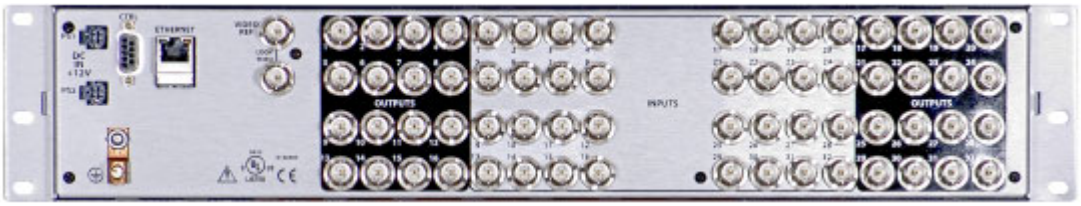


Figure 12-11. Rear View of the CR3232-AV Analog Video Router

Figure 12-12. Rear View of the CR1616-AA Analog Audio Router

Figure 12-13. Rear View of the CR3232-AA Analog Audio Router

Figure 12-14. Rear View of the CR16-PR Machine Control Router

Figure 12-15. Rear View of the CR32-PR Machine Control Router

Figure 12-16. Rear View of the 16×2 CQX Router (HD or SD)

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:

NTSC	(30/1.001) Hz frame rate	525 lines/frame
PAL	25 Hz frame rate	625 lines/frame
HD trilevel	(24/1.001) Hz frame rate	1080p
	24 Hz frame rate	1080p
	25 Hz frame rate	1080i
	(30/1.001) Hz frame rate	1080i
	30 Hz frame rate	1080i
	50 Hz frame rate	1080p, 720p
	(60/1.001) Hz frame rate	1080p, 720p
	60 Hz frame rate	1080p, 720p

The machine control routers do not receive video reference signals.

Digital Video 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 12-17 shows a simplified view of the digital video router:

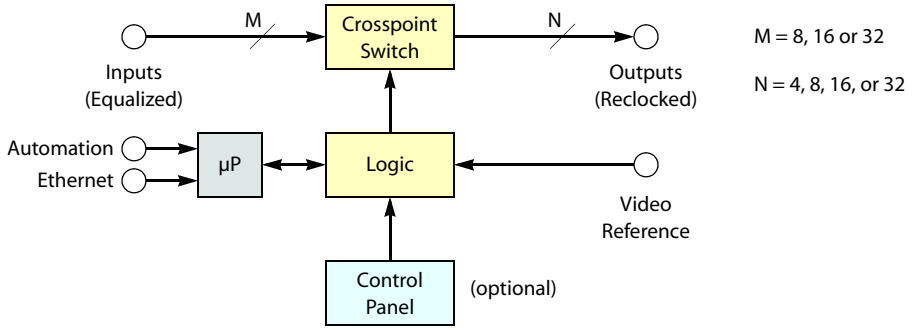


Figure 12-17. Block Diagram of the Digital Video Router

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 2.966 Gb/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 digital video 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.

The second crosspoint matrix receives internal signals and produces the CQX outputs 1 and 2 and 6 auxiliary outputs (which are normal outputs). A multiplexer selects either the clean output or the bypass input. The 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 12-18 shows a simplified view of the CQX digital video router:

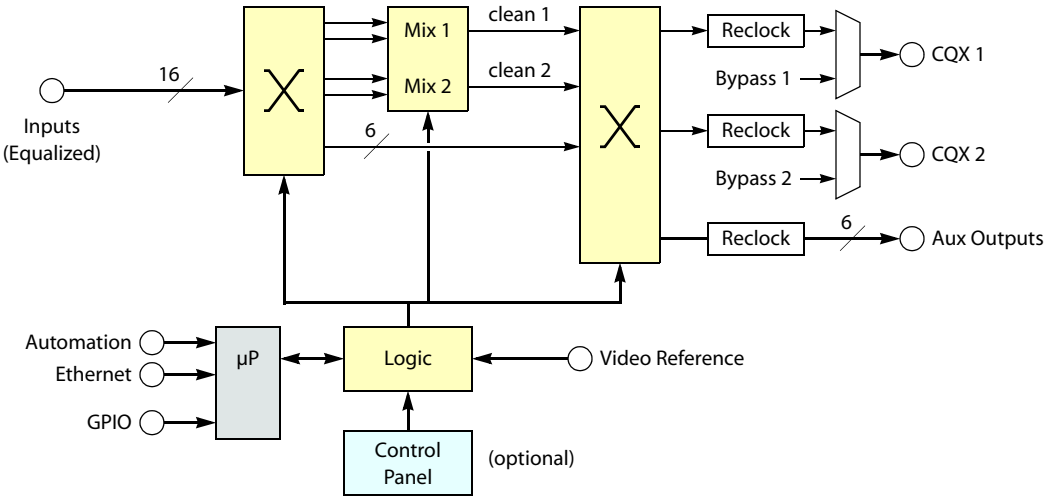


Figure 12-18. Block Diagram of the CQX Digital Video Router

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 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 specified by the user, the video processor enters non-sync mode where the clean and quiet output behaves like an aux output in which there is no video or audio processing. Switches still occur at the specified switchpoint for the video reference, but they will not be “clean and quiet.”

Where two sources are not of the same format but are both synchronous with the video reference, the switch still occurs in the video processor. This allows any eligible subsequent switches to be clean and quiet and it also allows frame alignment of the output.

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.

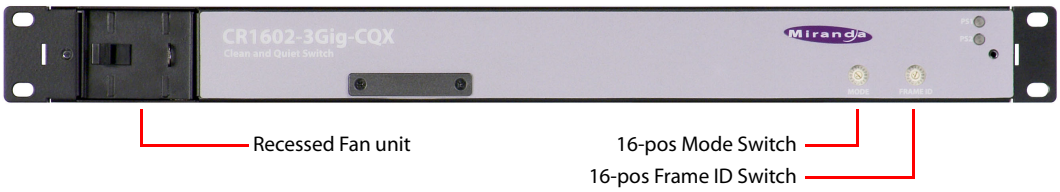


Figure 12-19. Front View of the CQX Video Router

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.

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 12-20 shows a simplified view of an analog video router:

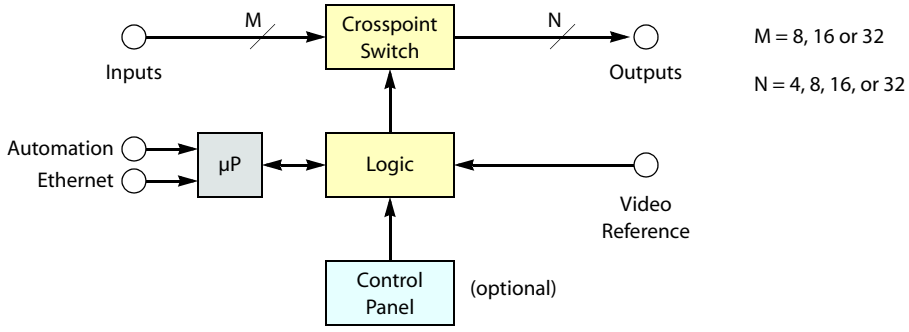


Figure 12-20. Block Diagram of the Analog Video Router

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

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 12-21 is a simplified view of an AES router:

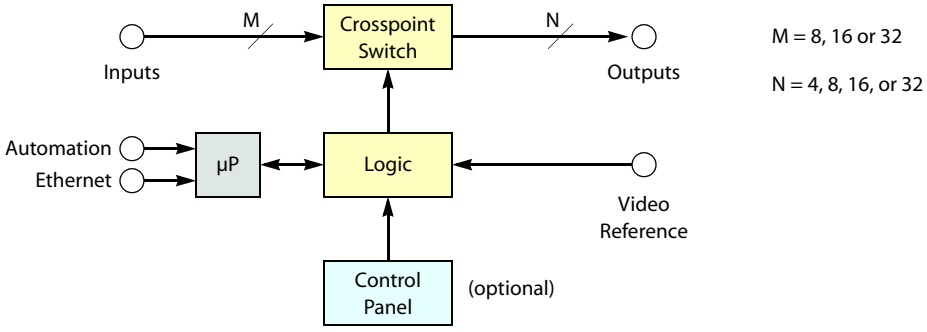


Figure 12-21. Block Diagram of the AES Router

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*, as required. If the input itself is locked to the video reference, no adds or drops occur.

  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.

  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).

- Asynchronous mode.

  The router passes the input stream (32 kHz–192 kHz) 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.

Important

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 12-22 shows a simplified view of the analog video router:

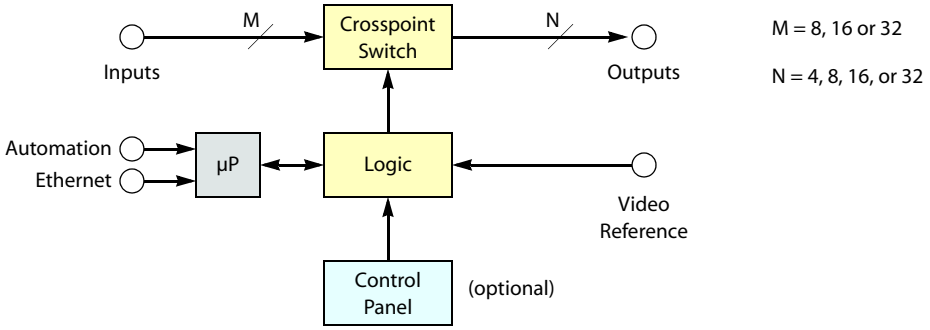


Figure 12-22. Block Diagram of the Analog Audio Router

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 12-23 shows a simplified view of the machine control router:

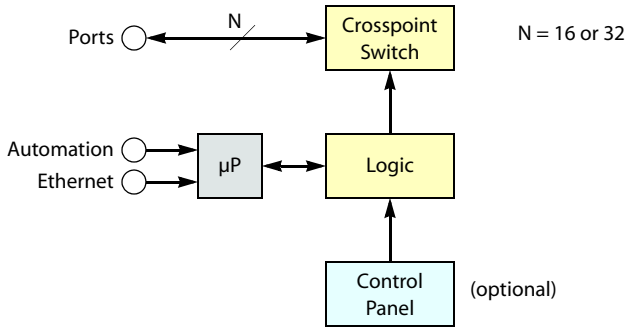


Figure 12-23. Block Diagram of the Machine Control Router

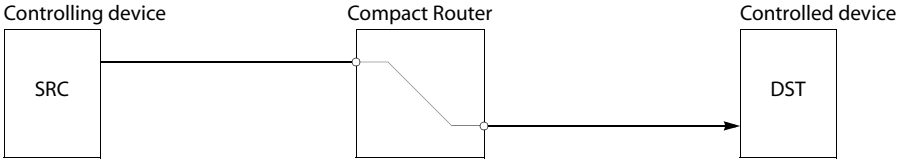
Machine routers channel serial data, typically commands in one direction and responses in the other direction. Because the connections are bidirectional, a port is both an input and an output.

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.

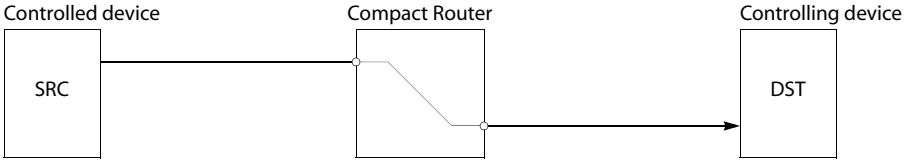
The machine control routers support serial communication up to 1 Mb/s.

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 either CRConfig or CRSC.

The Control Panels

Control panels are optional if you have an automation system.

1RU Panels

The CP1616 control panel has 38 buttons:

Figure 12-24. 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 Compact Router Series system, 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:

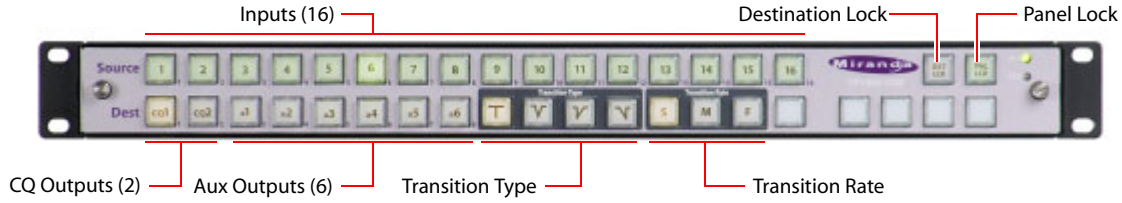


Figure 12-25. Front view of the CP1602-CQX Control Panel

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:

Figure 12-26. Front view of the CP3232 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 Compact Router Series system, 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 Compact Router Series system, the colors green and amber have no particular meaning. In a Compact Router Series system, 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 Compact Router Series 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 Operating Panels on page 93.

The Remote Panel Modules

Like the routers, the remote panel modules are slim (35 mm or 1.38″). Except that they have no I/O connectors and no video reference connectors, remote panel modules are virtually the same size and shape as the routers.

Figures 12-27 through 12-30 show front and rear views of the remote panel modules:

Figure 12-27. Front View of the RP16 Remote Panel Module

Figure 12-28. Rear View of the RP16 Remote Panel Module

Figure 12-29. Front View of the RP32 Remote Panel Module

Figure 12-30. Rear View of the RP32 Remote Panel Module

A remote panel module must have a Compact Router Series control panel attached to be usable. The remote panel module can be set up for operation under the Compact Router Series or NV9000.

Under the Compact Router Series, 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 Compact Router Series 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.

13. Operating Panels

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 Compact Router 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 77.

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 99.
- Lock or unlock destination or control panels. See Performing Locks on page 107.
- Execute salvos. See Executing Salvos on page 109.
- Select levels. See Performing Level Selection on page 109.

Although operations are usually straightforward, the meaning of the operations differ according to panel mode. See Remote Panel Operating Modes on page 68.

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 93.

Control Panel Buttons

All Compact Router Series (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 97. 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 CRSC.

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 13-1 and 13-2 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.

Figure 13-1. CP1616

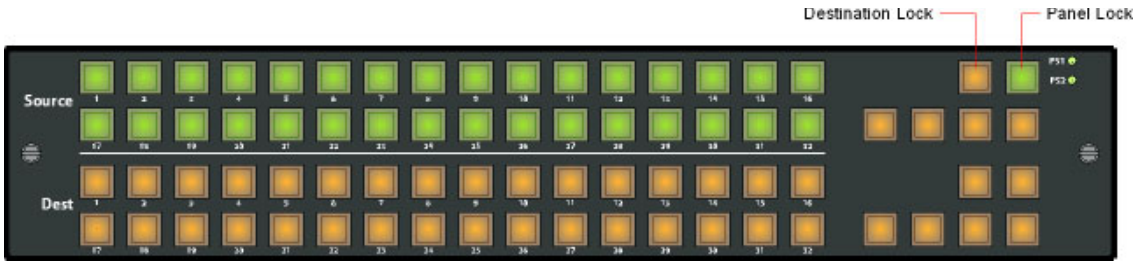


Figure 13-2. CP3232

In a CR Series system, 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 on page 95. 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 13-1 and 13-2.

The tow 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 68 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 display on a control panel affect the meaning of level buttons. All panels *except* the CQX panel are impacted 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 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 109.

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 109.

Button Illumination

Button illumination is applicable to all panels *except* the CQX panel because CQX panels do not have configurable buttons or levels.

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 13-3 illustrates the terms:

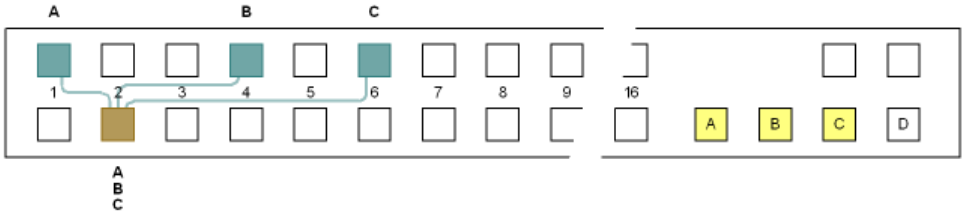


Figure 13-3. Buttons on a Panel

In this illustration, blue buttons are ***routed sources***. The brown button is the ***current destination***. Yellow buttons are selected levels. White buttons 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. CR Series 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.

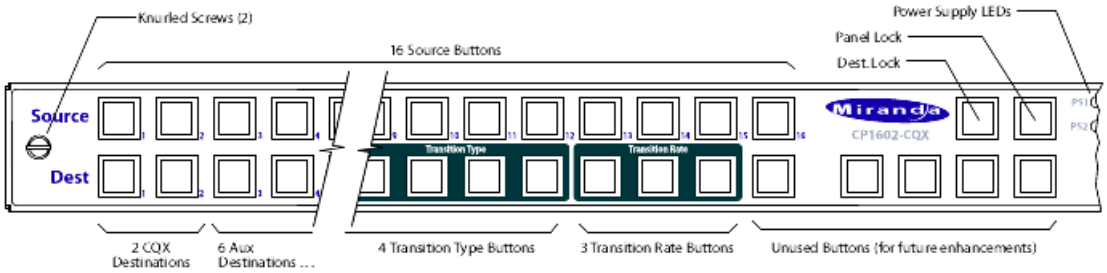
Standard Mode

- 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.

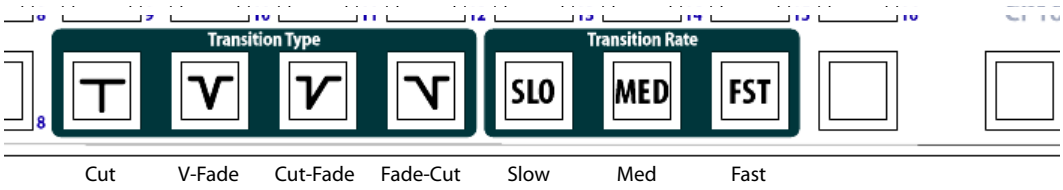
CQX Panel Buttons

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 93. 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:



At present, a remote CQX panel’s transition rate and transition type buttons have no effect on the CQX router’s transitions. The transition rate and type buttons of a captive panel do affect transitions.

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.

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 "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.

During System Construction

The system builder must be aware of several additional facts.

To power up a router or remote panel module, connect the 4-pin connector of the power supply to PS1 or PS2. Then plug the power supply into an AC power outlet. If you have chosen to use two power supplies for redundancy, connect one to PS1 and the other to PS2.

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.

The control panel mounted on a router or a remote panel module obscures the rotary switch.

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 to 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 99.
- A *breakaway* take has multiple sources on different levels to a destination. See Breakaway Takes on page 100.
- CP3201 ‘takes’ differ slightly because only the default destination can be selected or deselected. See CP3201 Takes on page 104.
- 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 106.
- CQX router “clean and quiet” ‘takes’ employ transition type and rate (outputs 1 and 2). See CQX Takes on page 107. CQX routers also perform normal ‘takes’ similar to other routers on its auxiliary outputs (3 through 8).

Normal Takes

By normal take we mean 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 104.
- 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 107.
- The *meaning* of a take for a machine control router is different from ‘takes’ on other routers. See Machine Control Takes on page 106.

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 110. (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' are 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 104.
- 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 107.
- The *meaning* of a take for a machine control router is different from takes on other routers. See Machine Control Takes on page 106.

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 CTL. 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. In a CP3201, only the default destination which cannot be selected or deselected. Presently the configuration page for CP3201s contradicts this.

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

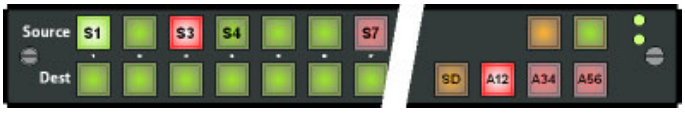
You want to take SD from source 1 to the default destination. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4. The previous source was source 7.

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

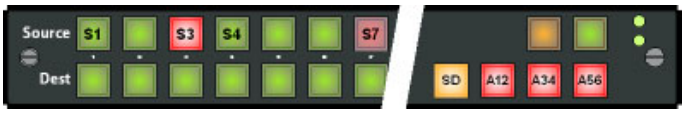
You want to take SD from source 1 to the default destination. But you also want to take AES12 from source 3 and both AES34 and AES56 from source 4. The previous source was source 7.

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 in modes, 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 DST 6/SRC 1 and taking DST 1/SRC 6.

  DST 1/SRC 6Port 1 is “controlling.” Port 6 is “controlled.”

  DST 6/SRC 1Port 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.”

  Internally, the router might change a dynamic port from controlled to controlling or vice versa.

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 108.
- You cannot unlock, at a panel, a destination locked by someone else. It is possible to release those locks using CRSC. See Lock Maintenance on page 57.
- 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.

CQX 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 107.

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 13-4 shows level buttons in the order AV, AES, TC, SD:

Figure 13-4. 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 13-5 shows level buttons in the reverse order (SD, TC, AES, AV):

Figure 13-5. 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 13-6 shows level buttons again in the order AV, A12, TC, SD, but this time with level AV unselected:

Figure 13-6. 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 13-7 shows the same selected level buttons, but this time level SD was pressed last:

Figure 13-7. Temporal Ordering AES, TC, SD

The same level buttons were pressed here as in Figure 13-6, 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 considered this action a “double-press.”

A double-press gives the level ***precedence*** over other selected levels.

In the example of Figure 13-7, If you double-pressed A12, the result would again be like Figure 13-6.

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.

14. Glossary

3Gig	The combination of SD, HD and 3.0 Gb/s video signals. Rates 270, 1,483, 1,485, 2,996, 2,970 Mb/s up to 3.0 Gb/s.
Asynchronous	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).
Breakaway	A *breakaway* takes multiple sources on different levels to a destination.
CE	Conformité Européenne. European health and safety product label.
Captive Panel	The Compact Router System Configurator (CRSC) can detect, but not manage, "captive panels," which are unique control panels that can be mounted onto a compact router and manages only that router in default mode.
CR	Compact Router.
CQX	CQX represents the "clean and quiet" compact routers and panels.
DC	Direct Current.
DCHP	Dynamic Host Configuration Protocol (DHCP) is an IP standard for simplifying management of host IP configuration. Every computer on a TCP/IP network must have a unique IP address. The IP address (together with its related subnet mask) identifies both the host computer and the subnet to which it is attached. When you move a computer to a different subnet, the IP address must be changed. DHCP allows you to dynamically assign an IP address to a client from a DHCP server IP address database on your local network:
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). Video signal rates: SMPTE 259M at 1.483 and 1.485 Gb/s.
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 (RP)	A remote panel is a control panel that is mounted on a remote panel module. In addition to remote panels, the Compact Router System Configurator (CRSC) can manage to a limited degree "captive panels," which are unique control panels that can be mounted onto a compact router converting the compact router into a control panel.
Remote Panel Module	A remote panel module enables a user to connect to a system controller via a network to control a connected compact router. A control panel may be attached to a remote panel module to create a remote panel, which is configurable using the Compact Router System Configurator (CRSC).
RU	Rack Unit. A standard measure or size for frames (1.75 inches).

SD	Standard Definition (SD-SDI). Video signal rates: SMPTE 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	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 16×16 router has 32 independent inputs and 32 independent outputs. The 32×32 router has 64 independent inputs and 64 independent outputs.
Subnet Mask	A subnet is an identifiably separate part of an organization's network. A subnet allows a single large network to be broken down into smaller ones. Typically, a subnet may represent all the machines at one geographic location or on the same local area network (LAN). A subnet mask is the technique used by the IP protocol to create a subnet address. Or, to put it another way, a subnet mask is a screen of numbers used for routing traffic within a subnetwork.
UL	Underwriters Laboratory Incorporated. Develops standards and test procedures for materials, components, assemblies, tools, equipment and procedures, chiefly dealing with product safety and utility.

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