

Product Manual

QIP™ IPTV Encoders



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Firmware 2.4.0



4355 Excel Pkwy, Suite 600, Addison, TX, 75001
Phone: 972-931-2728 • Toll-Free: 888-972-2728 • Fax: 972-931-2765
E-Mail: Support@crwww.com Website: <http://www.contemporaryresearch.com>

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Overview



QIP-HDMI 2

QIP-SDI 2

QIP-SDI HDMI

The new QIP series of IPTV encoders offer a totally new technology for H.264 IPTV encoding and distribution. All models feature dual encoders to achieve a lower cost per IP stream. Dual hardware scalers offer total control over video resolution, widescreen formatting and bitrate. Conversion of VGA and PAL video is fully supported as well.

Both SPST streams can be encoded as MPEG4 H.264 or MPEG2, and sent as UDP or RTP Unicast or Multicast streams.

Models are available with HDMI or SDI inputs, as well as Composite for video or captioning data. Captioning is also encoded from embedded SDI 708/608 data. Audio options include embedded audio, digital SPDIF, and analog stereo – and SAP second audio language programs can be defined as well. Closure and voltage inputs are available to trigger an EAS broadcast. Both streams will switch to a defined input, and will revert to current inputs when the event ends. QIP IPTV Encoders can be set up and monitored via onboard Web pages, and updates can be performed over IP or USB.

There are three QIP models that support a mix of HDMI, SDI, Component and Composite inputs – allowing a wide choice of sources using one or two QIP encoders in one rack space.

QIP-HDMI 2

- Two HDMI inputs (unencrypted)
- Two Composite/CC video inputs for encoding, or captioning,
- Two analog mini Stereo and two RCA SPDIF coax audio inputs

QIP-SDI 2

- Two SDI inputs, up to 3G (8 SDI audio pairs)
- Two Composite/CC video inputs for encoding, or captioning,
- Two analog mini Stereo and two RCA SPDIF coax audio inputs

QIP-SDI HDMI

- One SDI (up to 3G, 8 SDI audio pairs) and one HDMI input (unencrypted)
- Two Composite/CC video inputs for encoding, or captioning,
- Two analog mini Stereo and two RCA SPDIF coax audio inputs

Shared Features

- Creates up to two high-definition SPTS UDP or RTP Unicast or Multicast IPTV streams, encoded as H.264 or MPEG2, two programs can be carried in one MPTS stream if required
- Converts stereo and PCM to stereo AAC or MP12, passes through AC-3 audio
- Can create SAP dual-language audio for each program
- Accepts 608/708 embedded captioning, decodes Line 21 captioning from composite video inputs
- Dual hardware scalers accept up to 1080p 3G video, including 60/30 Hz, 1080psf24 and PAL formats, and can deliver programs at a fixed or native resolution
- Contact and voltage inputs can trigger EAS broadcasts
- Setup and monitor with front-panel menus or Ethernet/USB Web pages
- Updates over Ethernet or front-panel USB, one app updates all models
- May be rack-mounted two-across, delivering up to 4 IPTV streams in one rack space, with a mix of inputs

Video and Audio Assignment

Each QIP model has a set of rules regarding how video and audio is selected for Program A and B, with limits primarily for SDI inputs and audio. The X/Y table for each shows valid input combinations for Programs A and B. For example, reading across Program A for the QIP-SDI 2, you can select SDI 1, SDI 2, or Video 2. Reading down for Program B, you can select SDI 1, SDI 2, or Video 1.

QIP-SDI 2

Program A	Program B			
	SDI 1	SDI 2	Video 1	Video 2
SDI 1	✓	✓	X	✓
SDI 2	✓	✓	✓	X
Video 1	X	✓	✓	✓
Video 2	✓	X	✓	✓

Audio Restrictions - You cannot select:

- SDI 1 pairs if Video 1 is selected as a video input.
- SDI 2 pairs if Video 2 is selected as a video input.
- More than two SDI 1 or SDI 2 pairs (of 8 pairs)
- Both SPDIF inputs and more than one SDI pair from the same SDI input
- The same audio pair for Programs A and B If one SDI input is patched to both encoders

Captions - You cannot select:

- SDI 1 closed captions if Video 1 is selected
- SDI 2 closed captions if Video 2 is selected

QIP-SDI HDMI

Program A	Program B			
	SDI	HDMI	Video 1	Video 2
SDI	✓	✓	X	✓
HDMI	✓	✓	✓	X
Video 1	X	✓	✓	✓
Video 2	✓	X	✓	✓

Audio Restrictions - You cannot select:

- SDI pairs if Video 1 is selected
- More than 2 SDI pairs
- Both SPDIF inputs and more than 1 SDI pair

Captions: You cannot select:

- SDI closed captions if Video 1 is selected

QIP-HDMI RGB

Program A	Program B				
	HDMI	YPbPr	RGBHV	Video 1	Video 2
HDMI	✓	✓	✓	✓	X
YPbPr	✓	✓	X	X	✓
RGBHV	✓	X	✓	X	✓
Video 1	✓	X	X	✓	✓
Video 2	X	✓	✓	✓	✓

No audio or caption restrictions

Installation Overview

First Things

Always start by defining video and audio inputs by selecting the **QUICK** menu. Press SETUP, move left or right and press SELECT. Use Up - Down and Right – Left, then SELECT to save your choices. You can test streams offline via a PC and VLC software (see page 15).

Inputs

Just a few things to know:

- **HDMI** – the input can't pass encrypted HDCP content, accepts up to 1080p (output as 1080p with Auto Resolution on) and can work with 60/30 Hz, VGA standard, and PAL video. For more information, view our Support Blog on [Using HDMI Sources](#).
- **SDI** – Accepts up to 1080p video, as well as 30/60 and PAL refresh rates. Captioning can be embedded or from the CC port, audio is embedded or from a separate audio input
- **Video** – Accepts NTSC or PAL video, check the previous page for rules
- **None** – Choose None for the Program B, to make the encoder a single-program unit

PC and Other Source Scaling

In general, PC video via HDMI 1080p will be very close edge-to-edge, as the data from HDMI provides the information needed to exactly scale the image. Some TVs vary in how they present the scaled image, the best for LG will be the Just Scan mode, Normal for Visio, or similar for other brands. In Auto Resolution mode, 1080p will be output as 1080p.

Advanced Setup

Once you get to the more advanced options, such as setting up MPEG2/H.264, Unicast and Multicast operation– you can still use the front-panel menus, but the Web pages will be quicker. See page 9 to learn how to use the front-panel USB port to view the Web pages. Once you set the feature, you can plug and play with all QIP Encoders.

IPTV

There can be up to 2 SPTS (Single Program Transport Stream) streams, one from each encoder, set to MPEG4 H.264 or MPEG2, at a fixed or variable bitrate, set for each Program. Ethernet format can be UDP or RTP. Unicast, where the stream is pointed at one specific player, works on all networks, bandwidth permitting. Multicast will only work if all of the site's routers and switches support Multicast IGMP operation. In the rare case that the site wants two programs in one stream (MPTS Multiple Program Transport Stream), that option can be set in the Advanced menu.

EAS Emergency Alert Service

You can select any video and audio input as the EAS source. A latching contact closure (NO – SW and GND) or 5-24 VDC voltage will trigger the event (GND and V+), and restore to the previous inputs when released.

Reset Options (Just a short press on designated buttons)

- Pressing the **Left** and **Right** arrows does a soft encoder reboot (some components like HDMI aren't reset)
- Resetting **power** will reset all system components without changing settings
- Pressing **Left** and **Right** arrows during power-up resets to custom AV settings (see Advanced menu page).
- Pressing **Up** and **Down** during power-up **clears everything**, resets to factory settings – use with caution

Installation - Settings

The following menus are the same for all QIP IPTV Encoders. We will base the examples on the **QIP-HDMI 2**, the unique video and audio input selections are noted on Page 4.

- **Front Panel.** Press the SETUP button use the Up/Down buttons to move through menus, Left/Right to change settings, then press SELECT to store the changes at each step.
 - Select a menu group (Quick, A, B, Common, Advanced), then SELECT to view that group's menus
 - Press SETUP to move back to other menu groups
 - Pressing the left and right buttons together will reboot the unit
- **Ethernet.** Access the onboard Web pages. Helpful for remote access when system is fully integrated with site Ethernet.
- **USB-Web.** Access Web pages from front-panel USB port, simplest solution for full setup, requires no IP setup or connection, connect from the front of the equipment rack.

Front Panel Menus

There are five groups of menus you can choose from:

- **Quick Setup** supplies just the few settings for video and audio inputs.
- **Program A** goes deeper in to all the options for the first source
- **Program B** does the same for the second program
- **Common** menus set the core values for the entire QIP, such LCD brightness, unit name and other options
- **Advanced** menus set special options for Program A and B, Common settings

Quick (selections for QMOD-HDMI 2 shown below)

Video A Inpt	Selects the video input for Program A HDMI 1 HDMI 2 Video 1 Video 2
Audio A Inpt	Selects the audio input for Program A None HDMI 1 HDMI 2 SPDIF 1 SPDIF 2 Analog 1 Analog 2
Video B Inpt	Selects the video input for Program B None HDMI 1 HDMI 2 Video 1 Video 2
Audio B Inpt	Selects the audio input for Program B None HDMI 1 HDMI 2 SPDIF 1 SPDIF 2 Analog 1 Analog 2

Program A and Program B

There are two separate menus for Program A and B (examples below for the QIP-HDMI 2)

Encoder Settings	Sets video and audio properties for the program
Video Input	Select the video input (Program B adds the option to select NONE) HDMI 1 HDMI 2 Video 1 Video 2
Input Res	Displays resolution of current source
Output Res	Set the Program output resolution, auto resolution will override this setting 1080i 720p 480p 480i 576i
Auto Out Res	When set to On , the QIP will automatically output the program as the same resolution as the source, including 1080p. Default is On. On Off
Vid Bitrate	Bitrate is adjustable in half steps from 9-20 Mbps for MPEG2 , 5-10 for H.264 HD, less for SD. Default rate will be 18 or 9 Mbps, set to 18 or below for dual-channel operation.
Video Format	Select MPEG2 or H.264
Aspect Ratio	Menu visible when there is a 480i source. Sets the video to display the 480i video as 4:3 or 16:9. 4:3 16:9
Aud 1 Input	Sets audio for the currently selected source. If you plan on switching sources in your application, select each video input, then select the associated audio. The audio will then automatically follow the selected video input. None HDMI 1 HDMI 2 SPDIF 1 SPDIF 2 Analog 1 Analog 2 (SDI can now select pairs 1-8)
Aud 1 Format	Selects audio format for stereo PCM or analog audio. AAC MP12
Aud 1 Lang	Displays metatext for audio channel language. English Spanish Portuguese French German
Aud 2 Input	Sets the source for the second SAP audio track for the selected video input. Audio will be in MPEG 1 Layer 2 format None HDMI 1 HDMI 2 SPDIF 1 SPDIF 2 Analog 1 Analog 2 (SDI can now select pairs 1-8)
Aud 2 Lang	Displays metatext for SAP audio channel language. English Spanish Portuguese French German
Chan Name	Enters channel (Program) short name, up to 7 characters. QIP A or QIP B is default text. Press right or left arrow to start editing, use Up and Down arrows to select character.
No Vid Color	Sets background color displayed when no video is present Orange Purple (default) Green
Sync TrigLev	May help how fine details are displayed for component input 1-4 . Only on Web page.
Clock Phase	RGB/Component input, can improve sharpness for some videos or signage 1-6
CC Source	Selects source for captioning, Line 21 from NTSC, 708/608 from SDI (ex: QIP-SDI2) None Video 1 Video 2 SDI 1 SDI 2
Horiz Freq	Shows horizontal frequency of source
Vert Freq	Shows vertical frequency of source
Horiz Adjust	At the Horizontal menu, press the SELECT button to start the process – you will see a white bar in the middle of the QIP display. - Up zooms the video horizontally, while Down scales the video down - Left moves the video left, Right moves the image right - The solution is automatically saved for that resolution. Repeat for other resolutions, if needed
Vert Adjust	Same as above, Up/Down positions video, L/R zoom and shrink
IP Settings	Defines streaming properties
Eth Protocol	Selects UDP or RTP Ethernet protocol
UDP Mode	Selects UDP mode, sub menus change depending on mode Unicast Multicast
Dest Uni Addr	Enter destination IP address for unicast
DstMultiAddr	Enter IP address for multicast
Dest IP Port	Enter UDP port for unicast or multicast

Common

This series of menus sets global values for QIP operation. Gray sections cannot be changed on Web pages.

LCD Contrast	Contrast 1-15
LCD Bright	Display brightness 1-16 (if you set too low, you can change via Web page)
Clear PWD	Press Select to clear password – accessible only in the front-panel menu
IP Mode	Static or DHCP
IP Address	192.168.001.231 Left/Right steps through each group, click Up or Down arrow to step one at a time, hold down to move faster. Address also appears on LCD when QIP restarts.
Gateway	192.168.001.010 Quad address – Left/Right steps through each group, click Up or Down arrow to step one at a time, hold down to move faster.
Subnet Mask	255.255.255.000 Subnet has a limited range of combinations, so this function is simplified Left/Right steps through each group, click Up or Down arrow for options
Mac/SN	Displays Mac address - the last 3 pairs identify the serial number
Unit Name	Create unique name for the QIP
QMOD* Version	Starts with current version, use left and right arrows for versions of all software modules

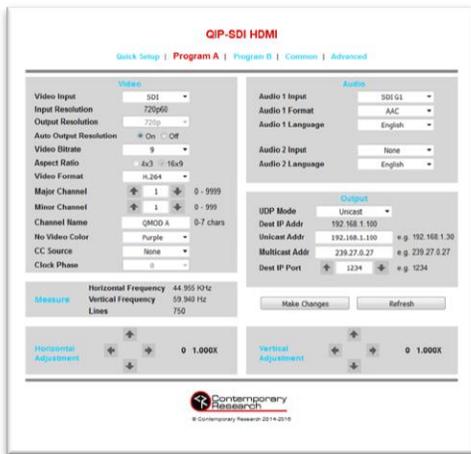
**At present, a few settings use QMOD as both encoders share similar menus.*

Advanced

This series of menus sets global values for QIP operation.

A-Pgm Number	Sets specific Program number, default is 1 for A, 2 for B. Often used to match program number for emulating Guide channel in cable systems. 1-9999
A-Bitrate Mode	Only visible when QIP outputs on Ethernet only. Selects Constant or Variable rate
A-QMODIPPort*	Sets Source IP port for streaming (2728 default)
A-Mcast TTL	This Time To Live function assures that multicast streams don't loop forever when they're not being used. 0-255 - Typical settings: 0- restricted to the same host, will not be forwarded by any interface 1-restricted to the same subnet, won't be forwarded by router 32-(default) restricted to the same site 64- restricted to the same region 128- restricted to the same continent
A-AVDropped	Counts the number of frames dropped for testing, press right arrow to clear
A-MPEG2DcdDly	Sets encoding MPEG2 delay from 200 to 500 ms. Note that internal buffer operation adds 150 ms.
A-MPEG4DcdDly	Sets encoding MPEG4 delay from 300-500 ms. See above.
B-Pgm Number	Sets specific Program number, default is 1 for A, 2 for B. Often used to match program number for emulating Guide channel in cable systems. 1-9999
B-Bitrate Mode	Selects Constant or Variable rate
B-QMODIPPort*	Sets Source IP port for streaming (2729 default)
B-Mcast TTL	This Time To Live function assures that multicast streams don't loop forever when they're not being used. 0-255
B-AVDropped	Counts the number of frames dropped for testing, press right arrow to clear
B-MPEG2DcdDly	Sets encoding MPEG2 delay from 200 to 500 ms. Note that internal buffer operation adds 150 ms.
B-MPEG4DcdDly	Sets encoding MPEG4 delay from 300-500 ms. See above.
Fan Speed	Fan speed in percent, operation is automatic
Temperature	Processor temperature, tends to hover around 139 degrees
EAS Video	Selects video input to use when an Emergency Alert has been triggered, may be any input
EAS Audio	Selects audio input to use when an Emergency Alert has been triggered, may be any input
IP TS Mode	Sets SPTS or MPTS for IPTV streaming. When set to MPTS, the A and B IP Ports will have the same address, using the last defined address.
CVCT	Activates inclusion of virtual channel ID and short Name in the video stream. On (default) Off
Telnet Port	23 (default) IP port for Telnet communication – Click or hold Up or Down to set.
Setup Lockout	On or Off On locks out Setup button Pressing Setup and the Right key will unlock Setup until the QIP is reset.
Save Data	Custom Reset – saves current settings to use for Reset
Reset	Select Factory Default or Custom settings
IP Speed	Auto 100 Mbps
Reboot	Left or Right arrow cycles between Reboot, AV Dropped, FIFO Full counts, reset from Web page

Web Pages



You can also access all the settings via the onboard Web pages. Access by pointing your browser to the unit's IP address.

Or use the front-panel USB port this way:

- Go to Windows Control Panel /Network and Sharing Center/Change Adapter Settings
- Right-click on the **USB Ethernet/RNDIS Gadget**, and right-click **Properties**
- Select **Internet Protocol Version 4**, select **Properties** and enter
 - IP Address: 192.168.227.228
 - Subnet mask: 255.255.255.0
- Enter 192.168.227.227 in your browser to see the QIP web pages
- Once this is set, the same settings apply to all QIP units

Firmware Updates

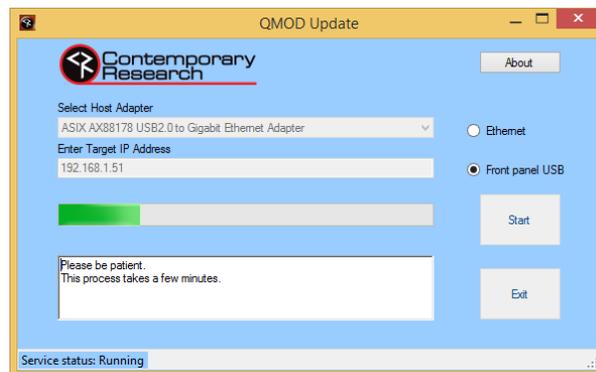
An installer you can download from our website will create a standard **Windows** application that you will use for all new-gen QIP and QIP encoders. The software will select the correct firmware for each model.

There are two ways to access the download:

- Go to our site and select **Support**, then **Software Updates** and look in the **HDTV Origination** section
- Select **Products**, your QIP and click the link in **Downloads**

After downloading, run the QIP Update Vxxx.exe file, as you would for any new software app. Later updates will follow the same process; the installer will add the latest firmware.

After you run the installer, look in **All Programs/Contemporary Research/QIP Update** and run the app.



You have two options for firmware updating, Ethernet or Front panel USB. Ethernet is always the quickest; USB is handy when you don't have an IP connection. You'll find the IP address of the QIP by pressing **Setup**, then select **Common**, and use the **Up** or **Down** arrows to find the address.

- Select the correct network adapter from the pull-down list.
- Click **Start**
- Wait until the app turns green, as shown above, Red means the update process was not completed.

If the program starts, but can't start the install, **Windows Firewall may be blocking the app** (USB and Ethernet updates are both IP processes). Go to the Windows Firewall/Allowed Apps tool and enable the **QIP Update** app for all cases.

Using VLC Media Player to Test Streaming

The simplest way to test IPTV operation is to use a PC with VLC Media Player onboard. For a streaming test, use your PC and QIP off-line from a network. Use an IP cable between the PC and QIP (it will auto-sense and make it a crossover cable). Set the QIP's quad address to the same as your PC (usually 192.168.0.xxx or 192.168.1.xxx), set the last number on the QIP to be different than your laptop. With this setup, you can test Unicast and Multicast streaming. If you stream over your network, Unicast usually works, but you'll shut down the network if it's not set up for Multicast and IGMP. Get approval from your IT staff before doing a streaming test on an Ethernet network.

QIP Setup

Using the onboard Web Common page or front panel menus:

- Select the **UDP Mode** to Unicast
- Enter the IP Quad address of your PC for the **Unicast Address**
- For **Multicast**, use the default multicast address
- The default **Destination IP Port** is **1234**, you can change if needed
- Click **Make Changes**

If your PC and the QIP are on the same network, the video is now streaming to your PC. I'm using Unicast as most networks aren't set up for Multicast as yet. Unicast will easily work in your home or integrator shop. If you're at a customer's site, you'll want to get approval by the IT department before streaming any content.

VLC Setup



Launch VLC on your PC. If you need to download the software, make sure that you download the app from VideoLAN only – there are many phishing sites that include malware with the VLC download.

- Click the Media menu and select the **Open Network Stream** option
- Enter **udp://@:1234** or the port you defined above
- Click Play to watch the video

Unicast

This form of Video over Ethernet creates a link from the QIP to a specific IP receiver. The pros are that this stream will operate over most current networks and routers. The takeback is that you can only stream to one receiver at a time, and you need to set up the link within the QIP.

Multicast

Multicasting is a more intelligent solution, as you can broadcast the stream with a multicast address, and the routers and switches do the work of sending and copying the stream to receivers that request it.

The usual catch for integration is that not all routers can handle multicasting. All of the site's routers and switches must have multicasting and IGMP enabled, which may require either software updates or new equipment. IGMP protocol restricts the routing of streams to only the receivers that request the media.

Multicast IP addresses range from 224.0.0.1 through 239.255.255.255, which are set aside for multicast streams. However, there are "reserved" combinations in that range that won't work efficiently, so you'll want to use addresses assigned by the IT department. Typical "non-reserved" addresses include:

239.0.0.5	239.0.100.99	239.3.0.1
239.0.0.6	239.1.0.2	239.0.1.1
239.0.100.99		

Specifications

Physical	8.5" [216mm] wide x 1.73" [62mm] height (1RU) x 6.0" [153mm] deep 1.5 lbs [0.68kg] +32° to 122° F operating temperature, convection cooled Rack mounting for one or two units side-by-side optional (RK1, RK2EZ)
Front Panel	Select and directional buttons for menu setup Menu LCD, Blue with 2 lines of 20 white characters each
Scaling	Dual hardware scalers Accepts 1080p - 480i, HD, DS and VGA resolutions, 29.97 - 60 Hz US and PAL refresh rates Edge to edge presentation with zoom, shrink and X/Y axis positioning Auto-resolution or scaled to fixed output resolution, 1080p is output as 1080p in Auto mode
Encoding	MPEG2/H.264 Profile:MP@HL for HD, MP@ML for SD, 1080p, 1080i, 720p, 480p, and 480i/576i output resolution MPEG2 Video Encoding bitrate 10-25 Mbps, HD, 5-6 Mps 480i, or variable bitrate H.264 Video Encoding bitrate 5-10 Mbps, HD, 2-4 Mbps 480i, or variable bitrate Converts PCM or MPEG1, Layer 2 audio to stereo AC-3, AAC or MP12, pass-through AC-3 SAP Dual-language capability, second audio track is MPEG1, layer 2 Dual encoders can stream can output individual SPTS MPEG2 or H.264 streams, with an option to send one MPTS stream if required
Power	2.1mm coaxial jack (inside center conductor positive) 1.1A maximum, 11.5 to 13.5 VDC
Rear Panel	EAS 3 GPI Pins for latching control, SW, NO for closure, V+ 5-12 VDC, Ground
Video Inputs	1080p at 60/59.94Hz, 1080psf24/23.97, 1080i/720p at 59.94/60Hz, or 489p/480i at 29.97Hz, and PAL 1080p scaled to 1080i, others output at fixed or native resolution Most VGA resolutions, Widescreen option for 480i Accepts HDMI/SDI embedded Stereo/AAC/Dolby Digital 48KHz audio (AC-3/AAC pass-through)
HDMI	HDMI 1.4a female, does not accept HDCP protected content
SDI	BNC Female SD-SDI @ 270Mb/s, HD-SDI @ 1.485Gb/s, 3G SDI Level A @ 2.970Gb/s Coax cable auto-equalizer for SD up to 460m, HD up to 230m (RG6)
Composite	NTSC/PAL Video: RCA female (480i/576i), 29.97 Hz, supplies line 21 Captioning
Audio Inputs	Digital SPDIF: Two Coax, PCM 44/48K sample rate Analog L and R: 2 3.5MM stereo jacks HDMI Embedded, 48K sample rate SDI Embedded, 44.1/48K sample rate, select from 8 SDI pairs
Includes	PS12-2 Switching power supply, 2A 12 VDC, standard cable for AC power strips PS12-8Y 8A power supply with Y cable to drive 2-4 QIPs (free at time of order)
Options	RK1 Single Rack Kit , RK2EZ Dual Rack Kit

Rack Mounting

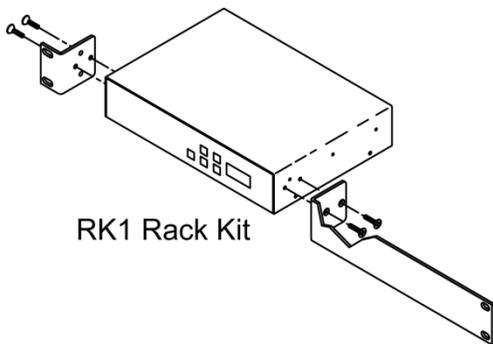
Two options are available for rack-mounting QIP modulators



RK2EZ Dual Rack Kit with Tie Bar Mounting

Use this rack kit for mounting one unit in a half-width rack. QIP enclosures have a slot in the bottom middle of the case. This will accept a tie bar that will lock the two enclosures together without taking the cases apart. Do not mount the QCA9-33 or QDA4-45 units next to QIPs, as the units will block flow-through fan ventilation.

1. Check that your enclosures have the tie bar slot.
2. Slide the included tie bar into the side of one unit and attach with the included screws.
3. Slide the other unit into the tie bar, and attach the screws
4. Add the rack mounts to the sides.



RK1 Single Unit Rack Mount

Attach the long and short rack ears to the side and towards the front of the unit with the four (4) supplied 8-32 by 1/4" (black) countersunk screws

Limited Warranty and Disclaimer

LIMITED 3 YEAR WARRANTY

Contemporary Research warrants most products to be free from defects in material and workmanship under normal use for a period of three years from the date of purchase. Should such a defect occur, Contemporary Research will repair or replace, at their option, the defective product at no cost for parts or labor. This warranty extends to product purchased directly from CR or an authorized dealer.

The Contemporary Research SSV-DX Display Express PC product carries a 6 month limited warranty.

Warranty DOES NOT cover repairs or replacements due to misuse, accident, lightning damage, water damage, unauthorized repair, or other causes not within the control of Contemporary Research.

- Any equipment that has altered or missing serial numbers
- Expendable accessories such as batteries.
- Any modifications to the hardware or software not authorized by Contemporary Research.
- Reception or transmission problems caused by signal conditions, Internet connection, or other communications systems outside the product.
- Problems related to OS updates and issues, if Contemporary Research software has been hacked or damaged by malware or otherwise.
- Damages caused during shipping