

Media Converters

VMC/MVMC/VMCR PRODUCTS

Instruction Manual



071852800
DECEMBER 2006



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ISO 9001:2000

Scope:

The design, manufacture and support of video hardware and software products and related systems.

This Certificate is valid until: June 14, 2009
This Certificate is valid as of: August 30, 2006
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Grass Valley Web Site

The www.thomsongrassvalley.com web site offers the following:

Online User Documentation — Current versions of product catalogs, brochures, data sheets, ordering guides, planning guides, manuals, and release notes in .pdf format can be downloaded.

FAQ Database — Solutions to problems and troubleshooting efforts can be found by searching our Frequently Asked Questions (FAQ) database.

Software Downloads — Download software updates, drivers, and patches.



END-OF-LIFE PRODUCT RECYCLING NOTICE

Grass Valley's innovation and excellence in product design also extends to the programs we've established to manage the recycling of our products. Grass Valley has developed a comprehensive end-of-life product take back program for recycle or disposal of end-of-life products. Our program meets the requirements of the European Union's WEEE Directive, the United States Environmental Protection Agency, and U.S. state and local agencies.

Grass Valley's end-of-life product take back program assures proper disposal by use of Best Available Technology. This program accepts any Grass Valley branded equipment. Upon request, a Certificate of Recycling or a Certificate of Destruction, depending on the ultimate disposition of the product, can be sent to the requester.

Grass Valley will be responsible for all costs associated with recycling and disposal, including freight. However, you are responsible for the removal of the equipment from your facility and packing the equipment to make it ready for pickup.



For further information on the Grass Valley product take back system please contact Grass Valley at + 800 80 80 20 20 or +33 1 48 25 20 20 from most other countries. In the U.S. and Canada please call 800-547-8949 or 530-478-4148, and ask to be connected to the EH&S Department. Additional information concerning the program can be found at: www.thomsongrassvalley.com/environment



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Preface

About This Manual

This manual provides safety, regulatory, installation, configuration, and operation instructions for the optional video media converters (VMC and MVMC) and rack mount and tabletop frames (VMCR) offered by Grass Valley.

Safety Summary

Read and follow the important safety information below, noting especially those instructions related to risk of fire, electric shock or injury to persons. Additional specific warnings not listed here may be found throughout the manual.

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 servicing other than that contained in the operating instructions unless you are qualified to do so.

Safety Terms and Symbols

Terms in This Manual

Safety-related statements may appear in this manual in the following form:

WARNING Warning statements identify conditions or practices that may result in personal injury or loss of life.

CAUTION Caution statements identify conditions or practices that may result in damage to equipment or other property, or which may cause equipment crucial to your business environment to become temporarily non-operational.

Terms on the Product

The following terms may appear on the product:

DANGER — A personal injury hazard is immediately accessible as you read the marking.

WARNING — A personal injury hazard exists but is not immediately accessible as you read the marking.

CAUTION — A hazard to property, product, and other equipment is present.

Symbols on the Product

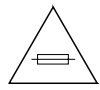
The following symbols may appear on the product:



Indicates that dangerous high voltage is present within the equipment enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



Indicates that user, operator or service technician should refer to product manual(s) for important operating, maintenance, or service instructions.



This is a prompt to note fuse rating when replacing fuse(s). The fuse referenced in the text must be replaced with one having the ratings indicated.



Identifies a protective grounding terminal which must be connected to earth ground prior to making any other equipment connections.



Identifies an external protective grounding terminal which may be connected to earth ground as a supplement to an internal grounding terminal.



Indicates that static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Warnings

The following warning statements identify conditions or practices that can result in personal injury or loss of life.

Dangerous voltage or current may be present — Disconnect power and remove battery (if applicable) before removing protective panels, soldering, or replacing components.

Do not service alone — Do not internally service this product unless another person capable of rendering first aid and resuscitation is present.

Remove jewelry — Prior to servicing, remove jewelry such as rings, watches, and other metallic objects.

Avoid exposed circuitry — Do not touch exposed connections, components or circuitry when power is present.

Use proper power cord — Use only the power cord supplied or specified for this product.

Ground product — Connect the grounding conductor of the power cord to earth ground.

Operate only with covers and enclosure panels in place — Do not operate this product when covers or enclosure panels are removed.

Use correct fuse — Use only the fuse type and rating specified for this product.

Use only in dry environment — Do not operate in wet or damp conditions.

Use only in non-explosive environment — Do not operate this product in an explosive atmosphere.

High leakage current may be present — Earth connection of product is essential before connecting power.

Dual power supplies may be present — Be certain to plug each power supply cord into a separate branch circuit employing a separate service ground. Disconnect both power supply cords prior to servicing.

Double pole neutral fusing — Disconnect mains power prior to servicing.

Use proper lift points — Do not use door latches to lift or move equipment.

Avoid mechanical hazards — Allow all rotating devices to come to a stop before servicing.

Cautions

The following caution statements identify conditions or practices that can result in damage to equipment or other property

Use correct power source — Do not operate this product from a power source that applies more than the voltage specified for the product.

Use correct voltage setting — If this product lacks auto-ranging power supplies, before applying power ensure that the each power supply is set to match the power source.

Provide proper ventilation — To prevent product overheating, provide equipment ventilation in accordance with installation instructions.

Use anti-static procedures — Static sensitive components are present which may be damaged by electrostatic discharge. Use anti-static procedures, equipment and surfaces during servicing.

Do not operate with suspected equipment failure — If you suspect product damage or equipment failure, have the equipment inspected by qualified service personnel.

Ensure mains disconnect — If mains switch is not provided, the power cord(s) of this equipment provide the means of disconnection. The socket outlet must be installed near the equipment and must be easily accessible. Verify that all mains power is disconnected before installing or removing power supplies and/or options.

Route cable properly — Route power cords and other cables so that they are not likely to be damaged. Properly support heavy cable bundles to avoid connector damage.

Use correct power supply cords — Power cords for this equipment, if provided, meet all North American electrical codes. Operation of this equipment at voltages exceeding 130 VAC requires power supply cords which comply with NEMA configurations. International power cords, if provided, have the approval of the country of use.

Use correct replacement battery — This product may contain batteries. To reduce the risk of explosion, check polarity and replace only with the same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Troubleshoot only to board level — Circuit boards in this product are densely populated with surface mount technology (SMT) components and application specific integrated circuits (ASICs). As a result, circuit board repair at the component level is very difficult in the field, if not impossible. For warranty compliance, do not troubleshoot systems beyond the board level.

Regulatory Notices

Certifications and Compliances

FCC Emission Control

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. Changes or modifications not expressly approved by Grass Valley Group can affect emission compliance and could void the user's authority to operate this equipment.

Canadian EMC Notice of Compliance

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicte par le ministère des Communications du Canada.

EN55022 Class A Warning

For products that comply with Class A. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian Certified Power Cords

Canadian approval includes the products and power cords appropriate for use in the North America power network. All other power cords supplied are approved for the country of use.

Canadian Certified AC Adapter

Canadian approval includes the AC adapters appropriate for use in the North America power network. All other AC adapters supplied are approved for the country of use.

Laser Compliance

Laser Safety Requirements

The device used in this product is a Class 1 certified laser product. Operating this product outside specifications or altering from its original design may result in hazardous radiation exposure, and may be considered an act of modifying or new manufacturing of a laser product under U.S. regulations contained in 21CFR Chapter 1, subchapter J or CENELEC regulations in HD 482 S1. People performing such an act are required by law to recertify and reidentify this product in accordance with provisions of 21CFR subchapter J for distribution within the U.S.A., and in accordance with CENELEC HD 482 S1 for distribution within countries using the IEC 825 standard.

Laser Safety

Laser safety in the United States is regulated by the Center for Devices and Radiological Health (CDRH). The laser safety regulations are published in the "Laser Product Performance Standard," Code of Federal Regulation (CFR), Title 21, Subchapter J.

The international Electrotechnical Commission (IEC) Standard 825, "Radiation of Laser Products, Equipment Classification, Requirements and User's Guide," governs laser products outside the United States. Europe and member nations of the European Free trade Association fall under the jurisdiction of the Comité Européen de Normalization Electrotechnique (CENELEC).

For the CDRH: The radiant power is detected through a 7 mm aperture at a distance of 200 mm from the source focused through a lens with a focal length of 100 mm.

For IEC compliance: The radiant power is detected through a 7 mm aperture at a distance of 100 mm from the source focused through a lens with a focal length of 100 mm.

FCC Emission Limits

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. This device has been tested and found to comply with FCC Part 15 Class B limits for a digital device when tested with a representative laser-based fiber optical system that complies with ANSI X3T11 Fiber Channel Standard.

Certifications

Media Converter Modules (VMC and MVMC)		
Category	Standard	Designed/tested for compliance with:
Regulatory Compliance	TUV	EN/IEC 60825 and EN/IEC 60950
	CDHR	FDA CFR 21 Subchapter J
	UL/CSA	UL 1950
	FCC	Subpart 15, Class B

VMCR-18-X-X Frames Without VMC Modules				
Category	Requirement	Condition	Status	
Agency Certification	FCC	Class A, Subpart 15	Passed	
	UL	UL 1950	UL File # E218469	
	CE		73/23/EEC (IEC/EN-60950-1:2000	E2184690-A1-UL-1
			89/336/EEC (EN55022:1998 - Class A)	Passed

Video Media Converters

Overview

This manual provides basic installation and operation information for the video media converters (VMCs) and mini video media converters (MVMCs) available from Grass Valley. Each media converter is a self-contained unit with a BNC and a fiber connector allowing conversion of video from electrical to fiber/fiber to electrical (receiver or transmitter).

Media converters can be used with SD or HD video and are available in several different models. A Video Media Converter Rack frame (VMCR) is also available and can house up to 18 channels. The VMCR frame comes in two versions: rack mountable and desktop.

BNC to Fiber SD/HD Video Media Converters

The BNC to Fiber video media converters (VMCs) ([Figure 1](#)) can transmit or receive HD or SD video to or from a BNC connector to optical data links for uni-directional communication over single-mode fiber. These VMC devices, can be used with any product where video is accessible from a standard BNC connector. Video is reclocked in these models. Transmitters have a red cover and receivers are blue for easy identification

The VMCs can be used as stand-alone devices powered by a separate power supply with wall plug and Mini-XLR connector or up to 18 VMCs can be installed in a rack mount or desktop converter frame.

Figure 1. Video Media Converters (VMCs)



This device is available in four models:

- VMC-R-H-2 – a BNC to Fiber device that accepts HD/SD video on the fiber connection input, converts the signal to electrical, and outputs the signal to the BNC connector for feeding an electrical device.
- VMC-T-H-2 – a BNC to Fiber device that accepts HD/SD video on the BNC connection input, converts the signal to optical, and outputs the signal to the fiber connector for feeding a fiber device.
- VMC-R-S-2 – a BNC to Fiber device that accepts SD video on the fiber connection input, converts the signal to electrical, and outputs the SD signal to the BNC connector for feeding an electrical device.
- VMC-T-S-2 – a BNC to Fiber device that accepts SD video on the BNC connection input, converts the signal to optical, and outputs the SD signal to the fiber connector for feeding a fiber device.

For a installation and operation instructions, refer to [BNC to Fiber SD/HD Video Media Converters](#) on page 17.

Mini BNC to Fiber SD/HD Video Media Converters

The mini BNC to Fiber media converters (MVMCs) handle HD or SD video conversion to or from a BNC connector to optical data links for uni-directional communication over single-mode fiber. These devices can be used with any product where specified video is fed to or from a standard BNC connector. Video is not reclocked in these models. Transmitters have a red arrow area and receivers have blue for easy identification.

For installation and operation instructions, refer to [Mini Video Media Converters \(MVMCs\)](#) on page 23.

Figure 2. Mini Video Media Converters (MVMCs)



This device is available in three models:

- MVMC-T-H-2 – a mini BNC to Fiber device that accepts HD/SD video on the BNC connection input, converts the signal to optical, and outputs the signal to the fiber connector for feeding a fiber device.
- MVMC-R-H-2 – a mini BNC to Fiber device that accepts HD/SD video on the fiber connection input, converts the signal to electrical, and outputs the signal to the BNC connector feeding an electrical device.
- MVMC-T-H-3L – a mini BNC to Fiber device that accepts HD/SD video on the BNC connection input, converts the signal to optical and outputs the signal at 1550 nanometers.

18 Channel HD/SD Video Media Converter Frames

Two 1 RU media converter frame models can hold up to 18 channels of video media converters (VMCs) or mini video media converters (MVMCs). Any combination of VMCs and MVMCs can be installed in the frames allowing convenient configuration of any needed applications in a patch panel configuration.

The HD/SD Video Media Converter frame models include:

- VMCR-18-R – 18 Channel HD/SD Video Media Converter Rack Mount Frame ([Figure 3](#))
- VMCR-18-T – 18 Channel HD/SD Video Media Converter Desktop Frame ([Figure 4 on page 20](#))

For installation, configuration, video specifications, and operation information, refer to [18 Channel Media Converter Rack Mount and Desk Top Frames on page 25](#).

Figure 3. VMCR-18-R Converter Rack Mount Frame

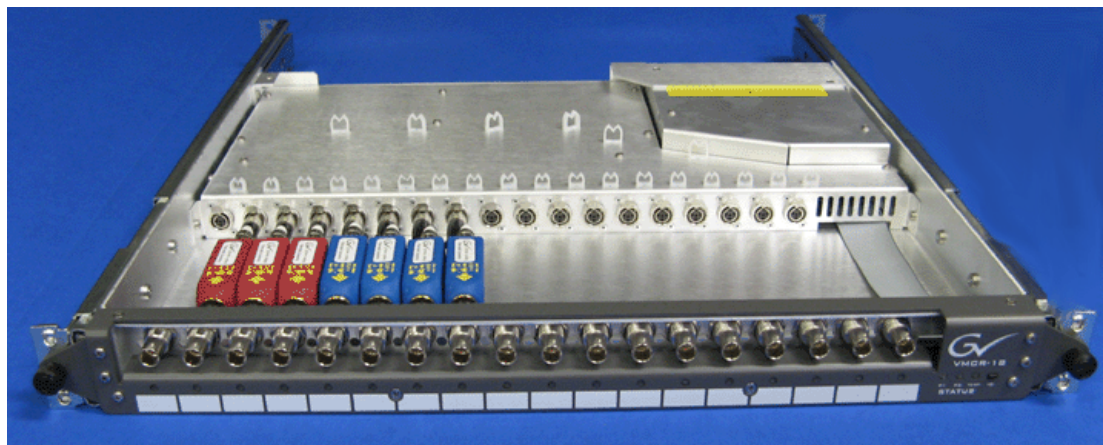


Figure 4. VMCR-18-T Desktop Version



Other features of the Video Media Converter frames include the following:

- Up to 18 BNC to Fiber VMCs or MVMCs can be installed in one frame unit, with any combination of receivers or transmitters
- Rack mount or desktop models
- 110/240V power supply supporting frame and VMCs installed
- Front panel transmitter/receiver LED indicators to reflect type and status of installed VMCs
- Front panel power supply and temperature status LED
- Network connection for remote status reporting

Power Supplies

Video media converters are powered by a separate wall plug power supply (+5V) as shown in [Figure 5](#), or by the frame power supply when installed in one of the frame units.

The available power supplies for standalone operation includes the following:

- VMC-PS-E, Power Supply (Europe)
- VMC-PS-D, Power Supply (U.S. and Japan)
- VMC-PS-U, Power Supply (UK)
- VMC-PS-A, Power Supply (Australia)

Figure 5. Standalone Power Supply-VMC-PS-D



Installation and Operation

This section provides a detailed overview of each video media converter device and how to install and use them.

Video Media Converters (VMCs)

The BNC to Fiber VMCs can be attached directly to any video device with a standard BNC connector. The VMC devices can receive or transmit the signal depending on the VMC model used.

VMC transmit devices are red in color and will indicate on the case whether they are for SD or HD signals. The VMC device shown in [Figure 6](#) is a VMC-T-H-2 (HD transmit, 1310nm, single mode). This unit inputs an electrical HD signal on the BNC and transmits an optical signal out the optical connector. The signal is reclocked in the device. The protective dust cover is shown installed on the optical connector.

Figure 6. Video Media Converter (VMC) –Transmitter



VMC receivers have a blue case as shown in the VMC-R-2 in [Figure 7](#). These units receive an optical signal on the optical connector and outputs an electrical signal out the BNC.

Figure 7. Video Media Converter (VMC) –Receiver

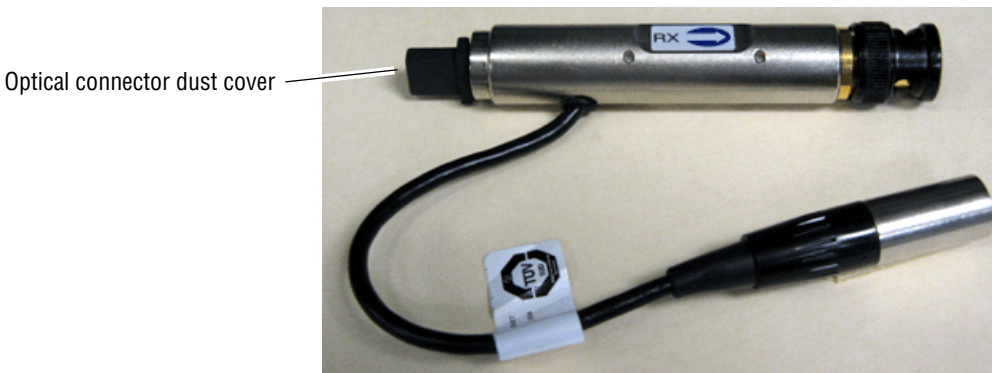


Mini Video Media Converters (MVMCs)

The mini BNC to Fiber video media converters (MVMCs) can be attached directly to any HD video device with a standard BNC connector. The MVMC devices can receive or transmit an HD signal depending on the MVMC model used.

MVMC receive devices are identified on the case by a label with RX and an arrow indicating direction in a blue field. The MVMC device shown in [Figure 8](#) is a MVMC-R-H-2 (HD receiver, 1310nm, single mode). This unit inputs an optical signal on the optical connector and transmits an electrical signal out the BNC connector. The signal is not reclocked in these devices. The protective dust cover is shown installed on the optical connector.

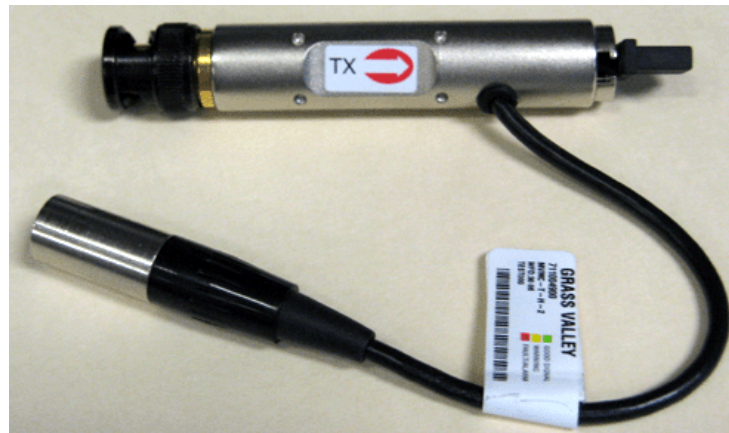
Figure 8. Mini Video Media Converter Transmitter



Optical connector dust cover

MVMC transmitters have a TX on the label and an arrow showing direction of the output signal in a red field as shown in [Figure 7](#). These units receive an electrical signal on the BNC connector and outputs an optical signal out the optical connector.

Figure 9. Mini Video Media Converter Receiver



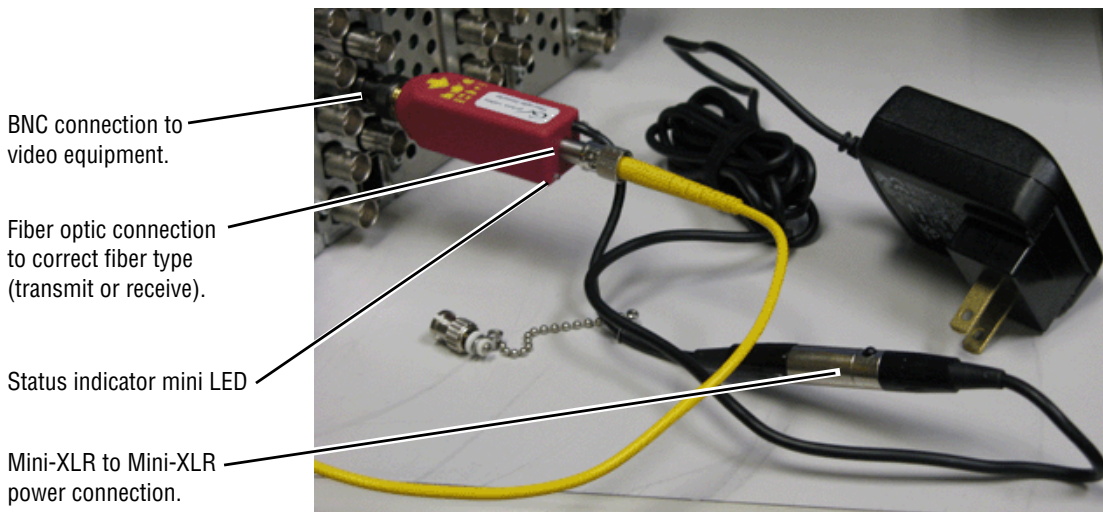
To connect a VMC or MVMC in a standalone application ([Figure 10](#)), do the following:

1. Connect the VMC or MVMC receiver or transmitter to the BNC of the video device.

CAUTION These are Class A laser devices, use caution when handling laser signals.

2. Remove the protective dust plug on the fiber optic connector and attach the correct fiber optic link to the VMC or MVMC.
3. Connect the Mini-XLR connection on the VMC or MVMC to the correct type of wall plug power supply for your region of the world. Refer to [Power Supplies on page 21](#) for the different models.
4. Connect the wall plug to a power source (not shown).

Figure 10. VMC in Standalone Configuration



Both the VMC and the MVMC have mini-LEDs on the rear of the unit that light to indicate the status of the signal ([Figure 10](#) for the VMC module). The color and action of the LEDs are given in [Table 1](#).

Table 1. VMC and MVMC TX/RX Mini LED Status Conditions

Mini LED Status	TX (transmitter)	RX (receiver)
Green	Normal operation	Normal operation
Red	Transmit fault	Optical input signal out of range
Orange	N/A	Re-clocker not locked (VMC only)
Blinking Green	No cable connected	LOS (no optical input signal)
Blinking Red	DDMI Alarm ¹	DDMI Alarm ¹
Blinking Orange	DDMI Warning	DDMI Warning

¹ For DDMI (Digital Diagnostics Monitoring Interface) information, refer to [DDMI Web Page Status Monitoring on page 37](#).

18 Channel Media Converter Rack Mount and Desk Top Frames

The VMCR-18-R and VMCR-18-T frame models allow up to 18 media converter devices (both VMC and MVMC device types) to be housed in a frame in any combination of receivers or transmitters. This configuration is ideal for more robust applications where a larger number of channels are required. Power is supplied internally to each device from the frame power supply. The VMCR-18-R model can be mounted in a video rack as described in [Rack Mounting the VMCR-18-R on page 27](#).

Rear Frame Overview

The rear of the two available VMCR frames are identical and are shown in [Figure 11](#). Two AC power inputs are provided for the internal power supplies. A Digital Diagnostics Monitoring Interface (DDMI) Ethernet port is provided on the far right of the frame for accessing diagnostic information with a web browser.

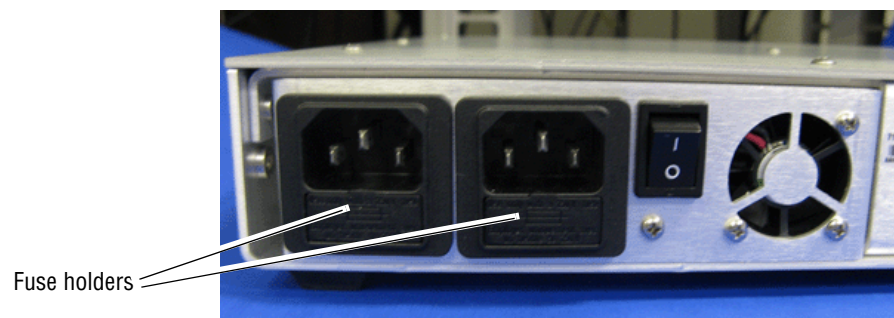
Figure 11. Frame Rear Overview



AC Power Inputs and Power Switch

The VMCR-18-R and VMCR-18-T are equipped with two AC power inputs ([Figure 12](#)). Power may be supplied to the units using one or both AC inputs. If both AC inputs are used they will act as redundant supplies (if either one fails the other is capable of fully powering the system). The rating for the AC power input to the system is 90 to 264V, 47 to 63 Hz.

Figure 12. AC Power Inputs and Power Switch



Each power input has a user-replaceable fuse located below the plug receptacle. If the fuse needs to be replaced, first remove power from the frame by unplugging both AC line cords. Replace the fuse with a 2 A (type 5x20) fuse. Both the fuse requirements and the AC inputs are marked on a label to the right of the power inputs for reference. Use a standard IEC type line cord with a plug appropriate for the region of use and a standard IEC connector.

To turn the unit on and off, set the power switch to 1 or 0.

DDMI Interface Port

On the far right rear of the frame is an Ethernet port (Figure 13) for interfacing to the Digital Diagnostics Monitoring Interface (DDMI). This is an Ethernet 10/100T compliant web-enabled port which allows remote monitoring of the VMCR and its installed VMC and MVMC modules.

To connect the CAT5 jack on the rear of the frame directly to a computer (without the use of a router or hub), a CAT5 crossover cable is required. Set the TCP/IP connection to the following:

- The default IP address of the device is shown above the rear connector (10.0.0.65 in the example in Figure 13).
- The Subnet Mask is 255.255.0.0
- The Gateway is 0.0.0.0 (none)

You may connect the device to a network router or hub on the same network as your PC. Use a DOS Prompt window to ping the IP address of the device to verify it is present on the network. Then use your web browser (with Java 1.4.2 or later) to access this device by typing the IP address of the device into the web browser address line.

Note For more advanced Telnet access to the device, check with your system administrator.

Diagnostic information and other functionality such as changing the IP address for this device is discussed in the Frame Monitoring section of this manual under [DDMI Web Page Status Monitoring on page 37](#).

Figure 13. DDMI Ethernet Port

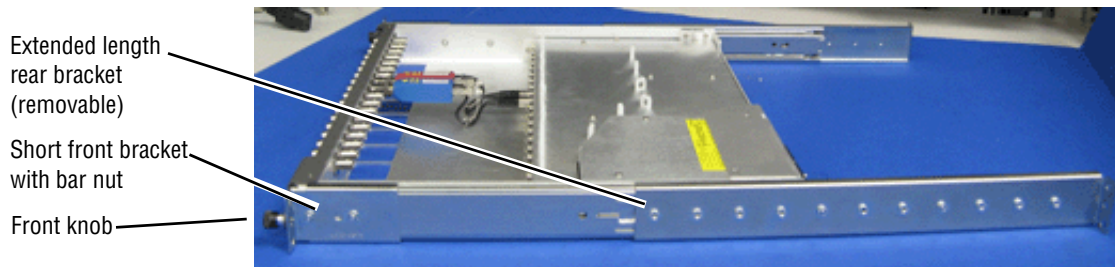


Rack Mounting the VMCR-18-R

The VMCR-18-R is shipped with a short front bracket and an extended length rear bracket mounted to the unit (Figure 14). This slide version rack mount should accommodate most video racks with some adjustments.

Note Another long rear bracket is included with the additional parts that accompany this frame. It can be used in place of either the front or rear bracket as described in the rack mount instruction pamphlet provided with the additional parts.

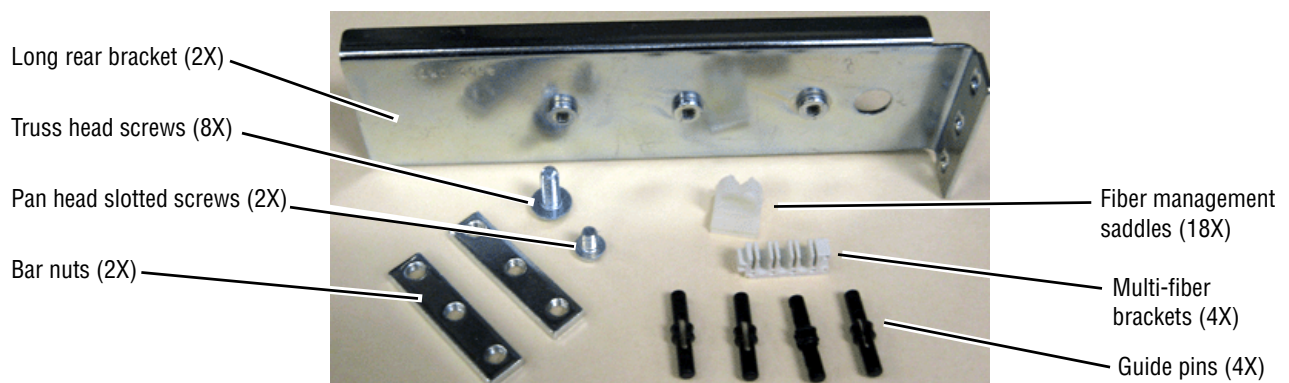
Figure 14. Rack Mount Factory Installed



The following additional parts come in a separate bag shipped with every VMCR-18-R frame (Figure 15):

- Installation instruction pamphlet for rack mounting the frame
- Two long rear brackets (used for other applications)
- Two #10-32 three-position bar nuts (for use on rear rack mount)
- Eight #1-32x.50" truss head Phillips screws (for standard video racks)
- Two #8-32x0.25 pan head slotted screws
- Four guide pins
- 18 self-adhesive fiber cable guides
- Four self-adhesive multi-fiber brackets

Figure 15. Additional Parts Shipped



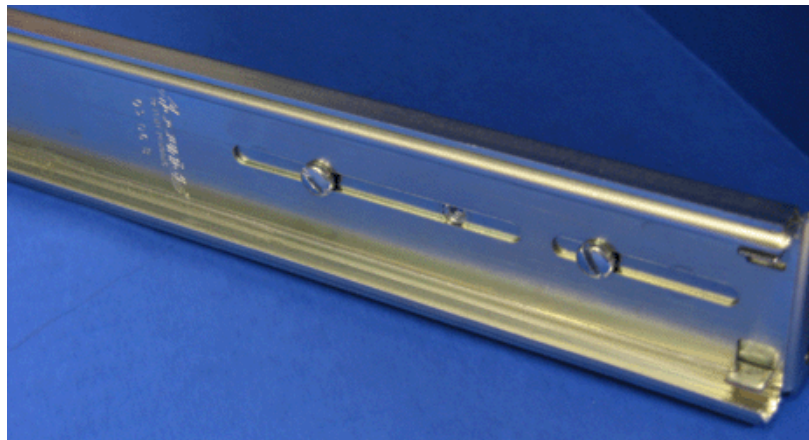
Adjusting Rack Length

For more detailed instructions on installing the unit in different video rack types and information on the additional parts included, refer to the pamphlet included in the plastic bag.

The rack mount rails installed on the frame are set to the shortest length for ease of packaging. If you need to adjust the side rails to fit your video rack, refer to the abbreviated instructions below or use the more detailed instructions in the pamphlet described above.

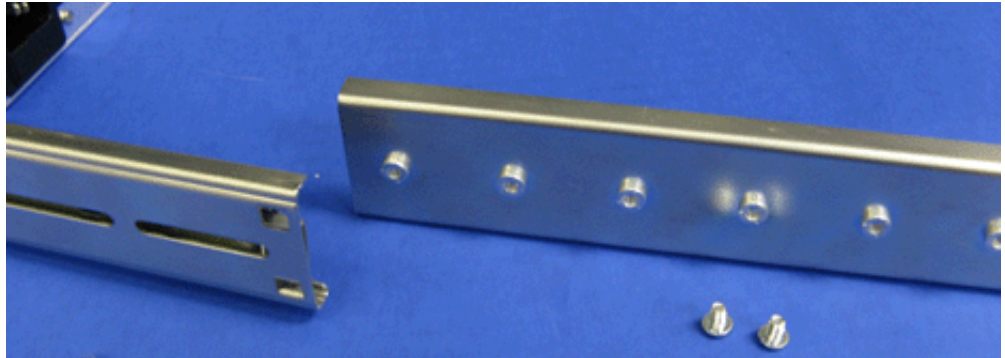
1. On your video rack, measure the distance from the front rack rails to the rear rack rails. Compare this to the length of the side racks as they come from the factory.
2. To lengthen each side, undo the bar nut behind the front brackets holding the slide in place by turning the front knobs on either side of the frame to the left (shown in [Figure 14 on page 27](#)). This will disengage the bar nuts and allow the rack sides to slide out.
3. Extend each side of the rack mount slides to their maximum length.
4. The extended length rear bracket ([Figure 14 on page 27](#)) is removable and can be readjusted to fit the correct rack depth.
5. On the inside end of the extended length rear bracket, remove the two screws holding it to the slide ([Figure 16](#)).

Figure 16. Extended Length Rear Bracket Screws



6. After removing the two screws, carefully snap off the extended length rear bracket (Figure 17).

Figure 17. Extend Length Rear Bracket Removed



7. Determine where to reinstall the extended length rear bracket so it is the correct length for your rack and snap it back on.
8. Reinstall the two screws in two of the positions provided but do not fully tighten rear bracket mounting screws until final adjustment is made. Install the screws as far apart as possible for strength.

Rack Mounting

To install the frame in the rack, follow the instructions below:

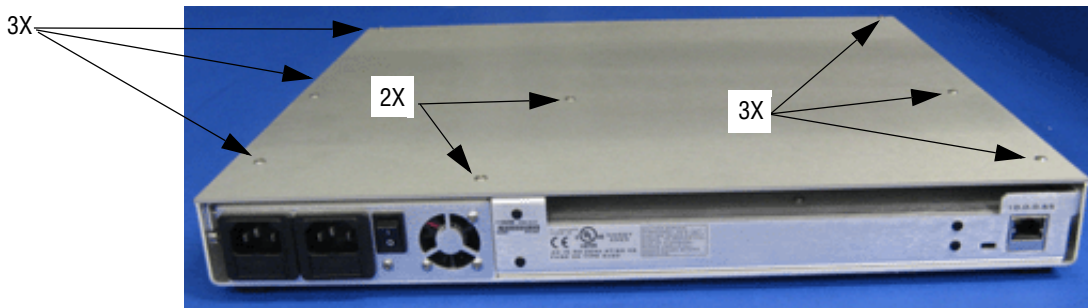
1. Insert the guide pins provided in the additional parts into the middle hole of each of the four brackets (see instruction pamphlet for illustration).
2. Insert the frame into the rack using the guide pins to position the brackets in the correct locations.
3. Fully extend the rails. The guide pins will support the slide while the rack screws are attached.
4. Once the rack is in place and in the correct position, tighten the inside screws on the extended length rear bracket.

VMC and MVMC Module Installation in VMCR Frames

Before installing a VMC or MVMC module or make changes in optical cabling in a VMCR-18-T (desktop) frame type, do the following:

1. Turn off power to the VMCR-18-T by turning the power switch to 0.
2. Unplug one or both of the AC line cords if present. Remove the top cover of the VMCR-18-T by removing the eight screws on the top of the frame cover (shown in [Figure 18](#)).

Figure 18. VMCR-18-T Top Cover Removal



VMCR-18-R Rack Mount Frame

For a VMCR-18-R rack mount frame, changes in optical cabling and module installation can be done either prior to or after rack mounting ([Rack Mounting the VMCR-18-R on page 27](#)).

Note It is recommended to slide the rack completely out before cabling the modules in the VMCR-18-R. This ensures that cable lengths will be sufficient when the frame is pulled out on the slides.

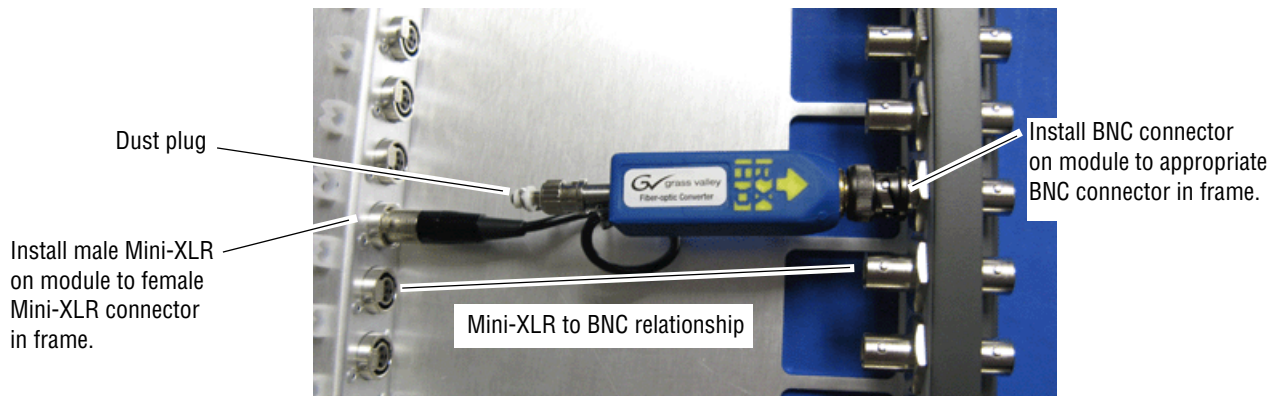
To make changes after rack mounting, unscrew the black knob on the mounting brackets and slide the frame forward in the rack to gain access to the module area. Modules can be installed or removed without powering down the sliding rack.

To install a VMC or MVMC module in either frame type, follow the instructions below:

Note For ease of installation, it is recommended that slots are populated from left to right to allow room for easier access to the Mini-XLR power connectors.

3. Install a TX or RX module in either frame type by first plugging the male Mini-XLR type connector on the module into an open female Mini-XLR type power receptacle in the frame (Figure 19). (The plugs and receptacles are keyed so that they cannot be improperly installed.)
4. Once the Mini-XLR connector (power) has been mated, connect the BNC on the module to the appropriate BNC bulkhead in the frame. The appropriate bulkhead connector is slightly above the selected Mini-XLR connector when viewing the frame as shown in Figure 19.

Figure 19. Installing VMC Modules



5. Install a MVMC module in the same manner as shown in Figure 20.

Figure 20. Installing MVMC Module



6. Install up to 18 modules in either frame type of any mix of TX/RX and VMC/MVMC modules. Six VMC modules are shown installed in [Figure 21](#).

VMC and MVMC Module Cabling in VMCR Frames

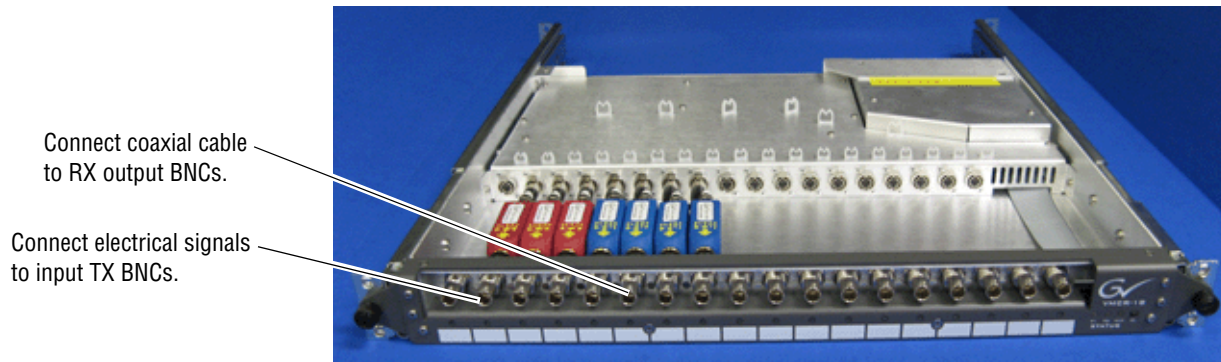
Once modules have been installed in either frame type, cable the RX and TX BNC connections for either VMCs or MVMCs as detailed below.

Note If you have installed the VMCR-18-R in a rack, pull the frame out to its maximum length before cabling to allow sufficient cable length for pulling the frame in and out.

Electrical (BNC) Connections

1. For TX (electrical to fiber) modules, connect the electrical signals to be converted to fiber to the corresponding TX BNCs on the frame.
2. For RX (fiber to electrical) modules, connect coaxial cable for the electrical outputs to the corresponding RX BNCs.

Figure 21. Modules Installed



Fiber Optic Connections

On each VMC or VMCR converter in the frame, remove the dust plug (shown in [Figure 19](#) and [Figure 20 on page 31](#)) from the optical interface on the module before cabling.

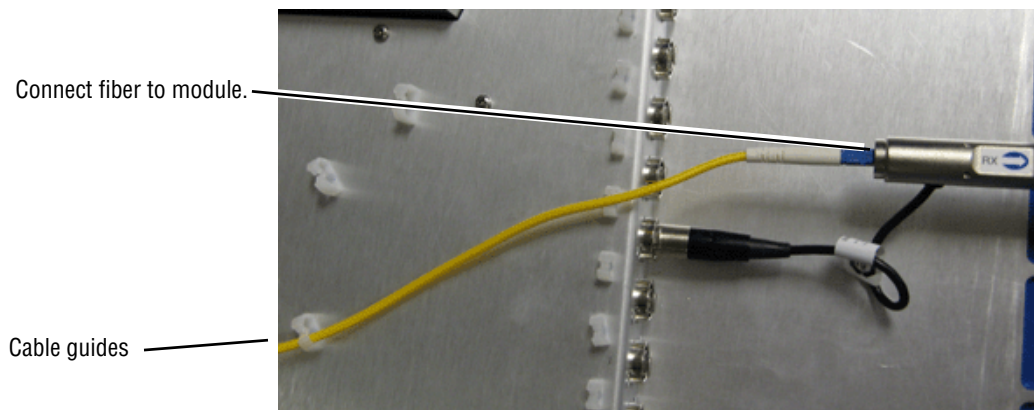
CAUTION Follow fiber optic cautions when handling fiber cable and connectors.

Connect fiber optic cables to the fiber connectors on each module as follows ([Figure 22](#)):

1. For TX (electrical to fiber) modules, connect the fiber optic signal output connectors to the corresponding TX fiber connectors on the VMC or MVMC converters.
2. For RX (fiber to electrical) modules, connect the fiber optic input to corresponding RX fiber connectors on the VMC or MVMC converters.
3. Use the existing cable guides in frame to route the optical fiber to the rear of unit ([Figure 22](#)).

Note More cable guides are provided with the additional parts if needed (see [Figure 15 on page 27](#)).

Figure 22. Connect Fiber Cable



Frame Monitoring

Once you have finished installation of all modules and cabling and the unit is powered up, you can monitor the status of the frame and each installed VMC and VMCR from the front panel of the frame.

The front panel (Figure 23) of the VMCR has 18 LEDs (one per channel) which display the status (and type of module) of the modules installed, two LEDs for displaying the status of the power supplies and one LED for displaying frame temperature status.

The front panel also has a momentary ID switch which turns off the power supply and temperature LEDs and changes the per-channel LEDs to indicate the type of module installed on that BNC. Below each channel status LED is an ID strip that can be labeled using a dry erase marker for identifying information about the channel. Each of these functions are described in detail in this section.

Figure 23. Front Panel Overview



Module Status LEDs

The front panel has 18 LEDs corresponding to each channel in the frame. There are multi-colored/multi-function LEDs that can indicate the type of module installed and the signal status of each channel.

During normal operation (ID button not pressed), each LED will show the signal status of an installed channel (Figure 24). The meanings of the LED states for the TX and RX are given in Table 2 on page 35.

Figure 24. Module Status LED (Normal Operation)



Table 2 gives the different LED color conditions for a TX and RX module.

Table 2. VMC and MVMC TX LED Conditions (in Frame)

Status	TX (transmitter)	RX (receiver)
Green	Normal operation	Normal operation
Red	Transmit fault	Optical input signal out of range
Orange	N/A	Re-clocker not locked (VMC only)
Blinking Green	No cable connected	Loss of signal (no optical input)
Blinking Red	DDMI alarm ¹	DDMI alarm ¹
Blinking Orange	DDMI warning	DDMI warning
Blinking Blue	Power short on module	Power short on module

¹ For DDMI (Digital Diagnostics Monitoring Interface) information, refer to [DDMI Web Page Status Monitoring on page 37](#).

ID Button

Pressing and holding the ID button (shown in [Figure 26 on page 36](#)) will light the LEDs corresponding to channels populated with media converters. The type of module installed will be reported on the front panel LEDs. Blue indicates a receiver module and red indicates a transmitter module as shown in [Figure 25](#).

Figure 25. Module Status LEDs (ID button Held Down)



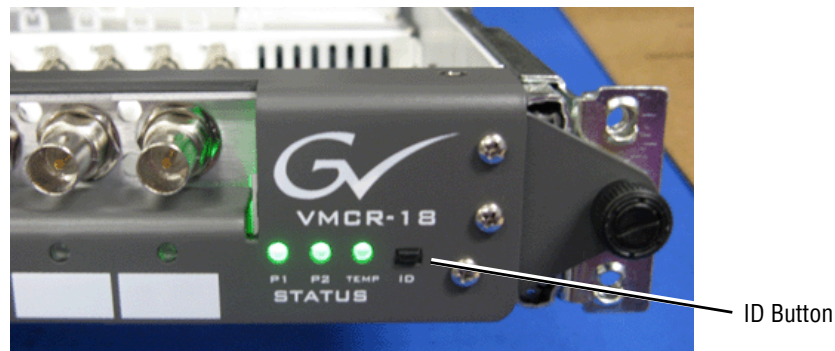
Power Supply Indicator LEDs

The two LEDs labeled P1 and P2 (Figure 26) indicate the status of the VMCR dual power supplies. A properly functioning power supply will light green. If there is a fault in either power supply, the corresponding LED will light red.

Temperature Indicator LED

The TEMP LED (Figure 26) indicates the frame internal temperature status. A red LED indicates internal temperature has exceeded factory set temperature levels caused by failure of cooling fan or airflow blockage. A green LED indicates normal operation.

Figure 26. Power and Temperature LEDs



DDMI Web Page Status Monitoring

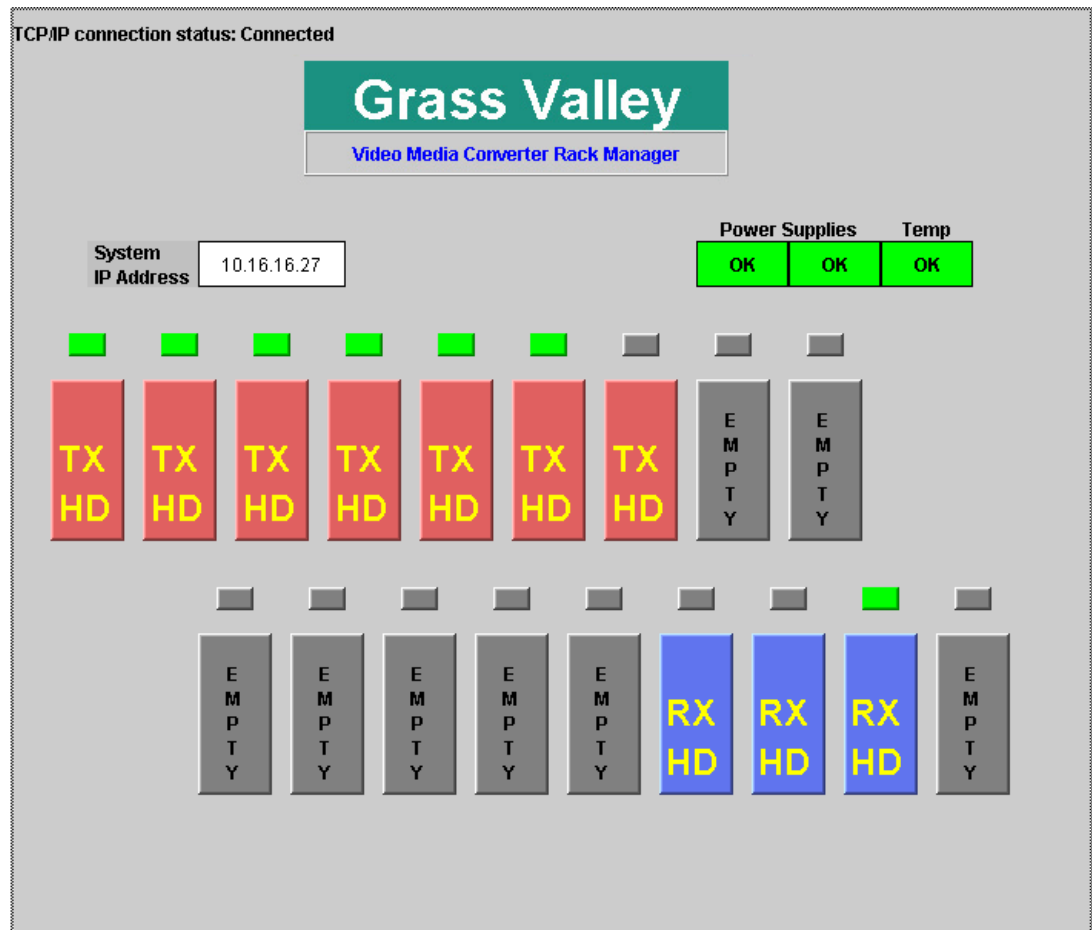
A CAT5 Ethernet port is provided for remotely accessing the internal module status information (Video Media Converter Rack Manager) for the unit via a web browser. Refer to [DDMI Interface Port on page 26](#) for Ethernet cabling and setup information.

To access the web interface, you will need a web browser and Java 1.4.2 or later. Once you have the device connected to your network, type the IP address (silk-screened on the frame above the Ethernet port) in the browser address bar and press **Enter**. The unit may need up to a minute from power up to access the network.

Note If only a gray box appears and a message in the lower left hand corner stating applet not initialized, you do not have the correct Java version.

Once the main Video Media Rack Manager page opens ([Figure 27](#)) it will display all the installed modules and their status, the status of the power supplies and the temperature. All reporting items are read-only.

Figure 27. Main Video Media Rack Manager Web Page



You may assign a new IP address to the unit in the **System IP Address** field. To assign a new IP address, first write down the new address you will be using then type the new number in the field. Verify the address is correct, then press **Enter**.

This will bring up the message shown in [Figure 28](#). You will need to power cycle the unit to apply the new IP address.

Figure 28. IP Address Change Message



Clicking on a TX or RX module on the main monitoring web page will bring up a status web page similar to [Figure 29 on page 39](#) for the TX module and [Figure 30 on page 39](#) for the RX module.

The module type and status is reported in the upper left corner. The slot number of the module is reported at the top of the page.

The following read-only status information for each module is reported as applicable for the module type:

- Slot location
- Serial Number
- Part Number
- Revision Number
- Manufacturing Date
- Data Rate
- Part Temperature
- Laser Bias Current
- Transmit Optical Power
- Received Optical Power
- TX Fault Indicator
- Cable Detect Indicator
- Loss of Signal
- Reclocker Lock (VMC modules only)

Figure 29. TX Status Web Page

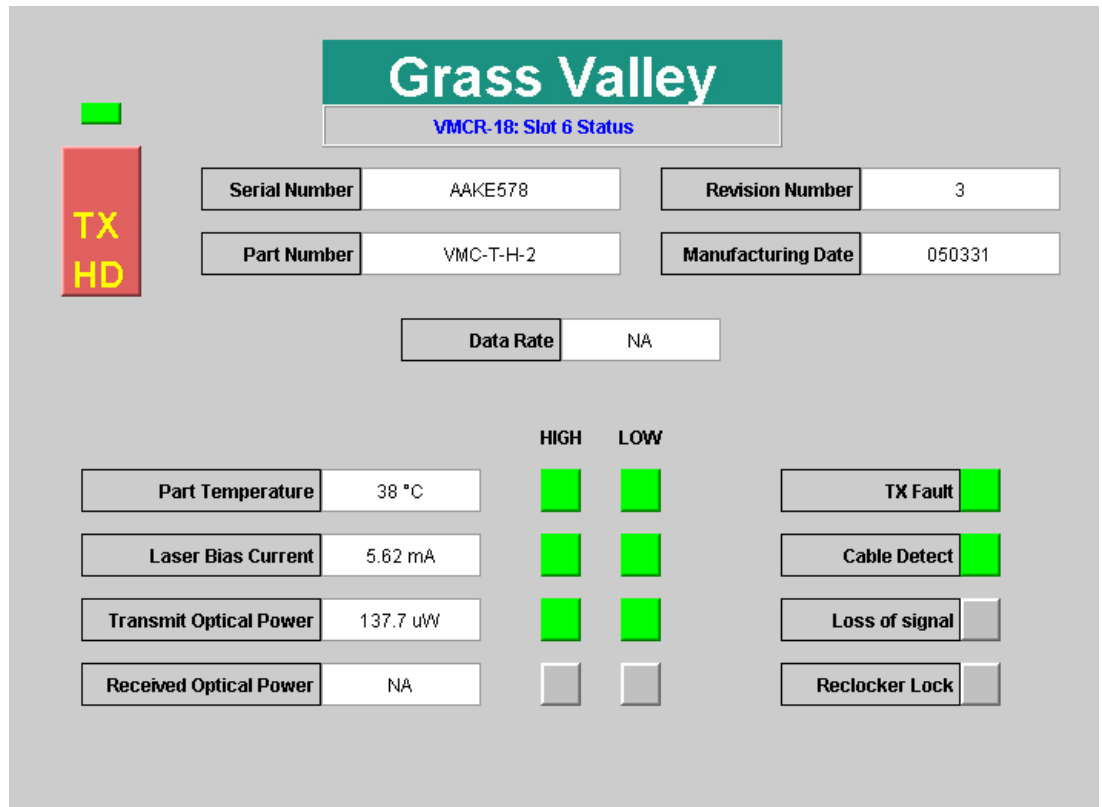
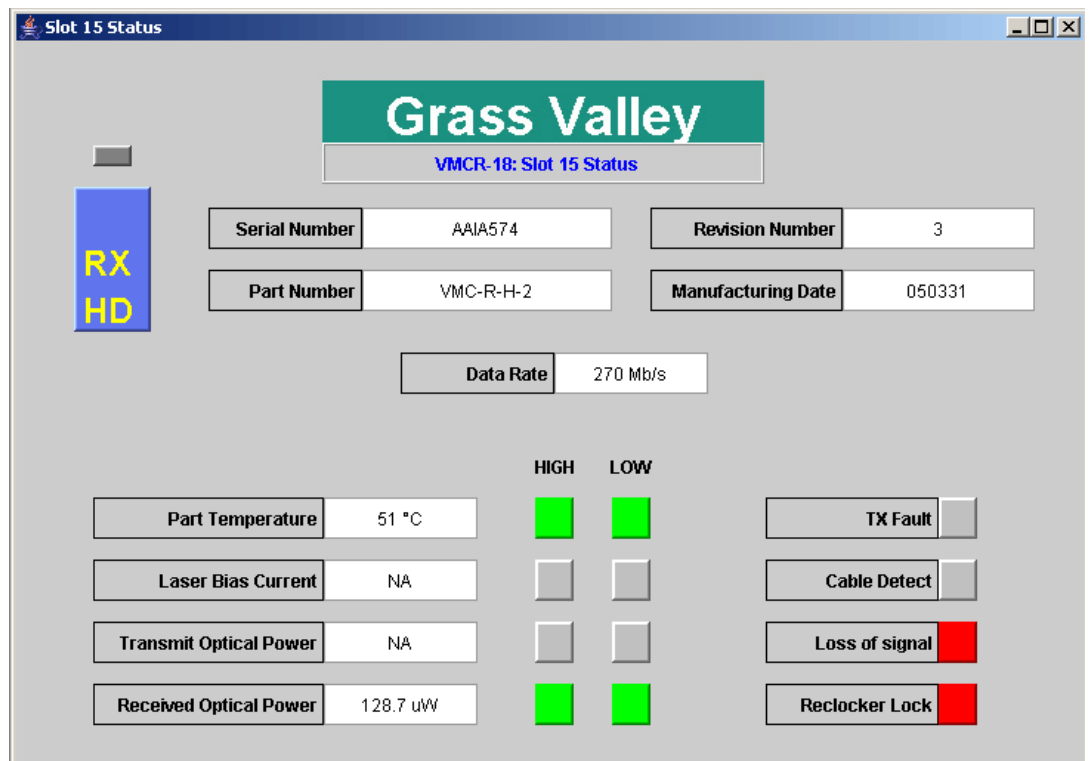
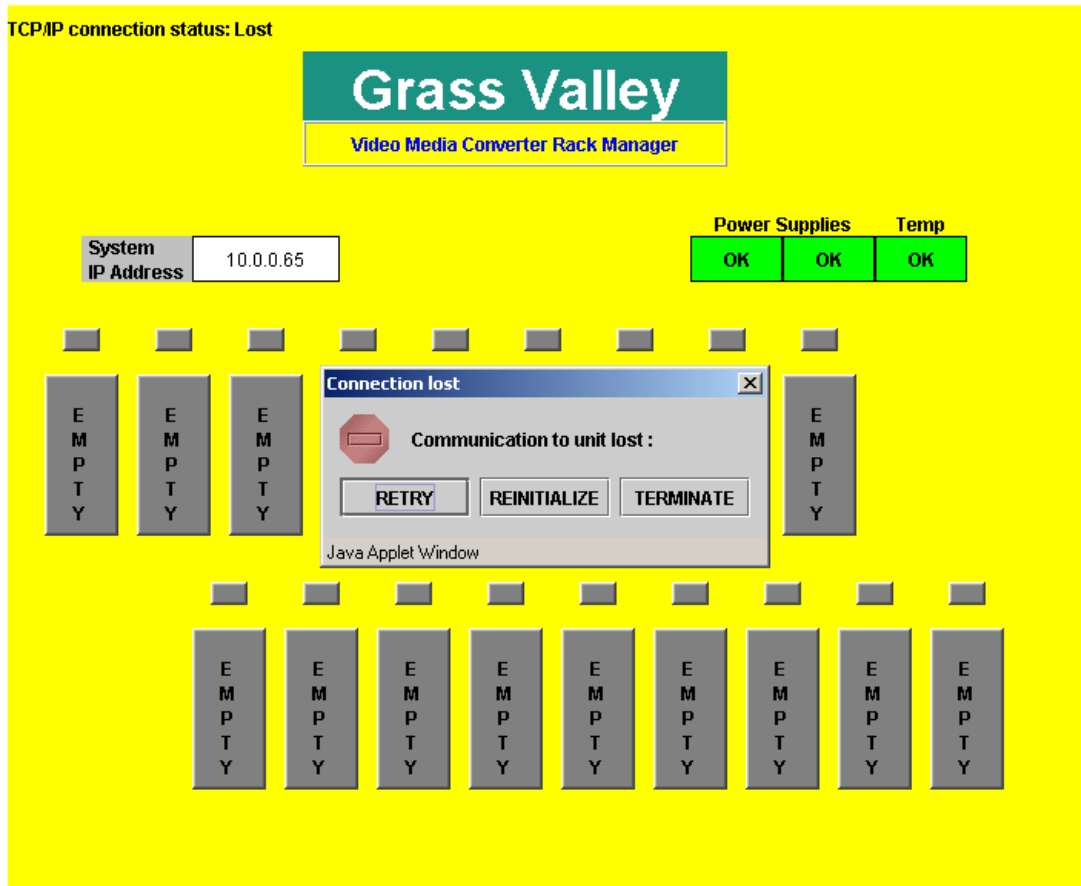


Figure 30. RX Status Web Page



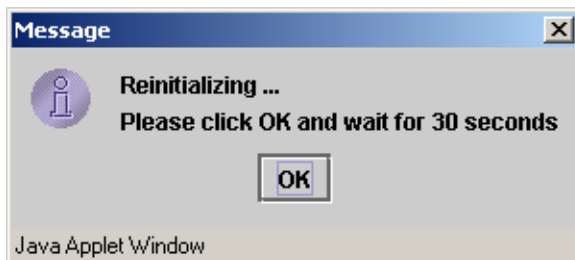
If for some reason communication with the unit is lost over the network, a message similar to the one shown in [Figure 31](#) will appear.

Figure 31. Communication Lost Message



Press the **Reinitialize** button to reconnect to the network. The message shown in [Figure 32](#) will appear. Click **OK** and wait 30 seconds for the unit to reconnect.

Figure 32. Reinitialize Message



Specifications

Device specifications are given in the following tables:

- VMC Transmitters – [Table 3](#)
- VMC Receivers – [Table 4 on page 42](#)
- MVMC Transmitter – [Table 5 on page 43](#)
- MVMC Receiver – [Table 6 on page 44](#)
- MVMC DFB Transmitter – [Table 7 on page 45](#)
- VMCR-18-T and VMCR-18-R Frames – [Table 8 on page 45](#)
- Wall Plug with Mini-XLR – [Table 8 on page 45](#)

Table 3. VMC Transmitter Specifications

Parameter	Value
VMC-T-H-2 and VMC-T-S-2 Transmitters	
Recommended Operating Conditions	
Operating case temperature	- 30 °C (minimum), +70 °C (maximum)
Supply voltage	+4.5 VDC (minimum), +16 VDC (maximum)
Power dissipation	1.0 W
Baud rate	19.4 Mb/s (minimum), 540 Mb/s (maximum) VMC-T-S-2: 19.4 / 143 / 177 / 270 / 360 / 540 Mb/s 19.4 Mb/s (minimum), 1485 Mb/s (maximum) VMC-T-H-2: 19.4 / 143 / 177 / 270 / 360 / 540 / 1485 Mb/s
Electrical	
Input signal	SMPTE 259M/297M/292M
Input impedance	75 ohms ¹
Return loss	15 dB
Propagation delay	1.5 ns
Optical (1310nm FP Singlemode Laser)	
Link distances	
9.0µm core diameter SMF ²	12 km (minimum), 24 km (maximum) BER < 1E-10 @ 360/540/1485 Mb/s
	15 km (minimum), 30 km (maximum) BER < 1E-10 @ 143/177/270 Mb/s
Optical center	1290nm (minimum), 1310nm (typical), 1330nm (maximum)
Optical transmit power	-12 dBm (minimum), -7.5 dBm (maximum) average @ 1310 nm
Extinction ratio	5 dB (minimum), 10 dB (typical) (P1/P0)
Spectral width	4 nm (RMS)
Total jitter	135 ps (measured with color bar test signal @ 1.485 Gb/s)
	740 ps (measured with color bar test signal @ 143/177/270/360/540 Mb/s)
Output rise/fall time	270 ps (20-80%: measured unfiltered @ 1.485 Gb/s)
	0.4 ns (minimum), 1.5 ns (maximum) (20-80%: measured unfiltered @ 143/177/270/360/540 Mb/s)

¹ Equalized for 140m Belden 1694A@1.485 Gb/s and 350 m Belden 1694A@270 Mb/s.

² Assumes minimum transmitter output power of -12 dBm with minimum extinction rate of 9 dB over 9/125µm. Single Mode Fiber (SMF) at 143/177/270/360/540/1485 Mb/s. The minimum link distances are based on worst case receiver sensitivity (VMC-R-X-2 simplex receiver VMC) with color bar test signal. The minimum link distances will be reduced with SDI test matrix.

Table 4. VMC Receiver Specifications

Parameter	Value
VMC-R-H-2 and VMC-R-S-2 Receivers	
Recommended Operating Conditions	
Operating case temperature	- 30 ° C (minimum), +70 ° C (maximum)
Supply voltage	+4.5 VDC (minimum), +16 VDC (maximum)
Power dissipation	1.8 W
Baud rate	19.4 Mb/s (minimum), 540 Mb/s (maximum) VMC-R-S-2: 19.4 /143/177/270/360/540 Mb/s
	19.4 Mb/s (minimum), 1485 Mb/s (maximum) VMC-R-H-2: 19.4/143/177/270/360/540/1485 Mb/s
Electrical	
Output voltage level	SMPTE 259M/297M/292M, mV p-p
Output impedance	75 ohms
Reclocked output rates	143, 177 ¹ , 270, 360, and 540 Mb/s (VMC-R-S-2)
	143, 177 ¹ , 270, 360, 540 Mb/s, 1485.5 and 1485 Mb/s (VMC-R-H-2)
Jitter	135 ps (measured with color bar test signal @ 1.485 Gb/s)
	740 ps (measured with color bar test signal @ 143/177/270/360/540 Mb/s)
Return loss	15 dB
Propagation delay	40 ns (reclocker off)
	50 ns (reclocker on)
Optical (1310nm Singlemode Receiver)	
Link distances	
9.0µm core diameter SMF ²	12 km (minimum), 24 km (maximum) BER < 1E-10 @ 360/540/1485 Mb/s
	15 km (minimum), 30 km (maximum) BER < 1E-10 @ 143/177/270 Mb/s
Optical input wavelength	1270nm (minimum), 1610nm (maximum)
Optical input power	- 20 dBm (minimum), -1 (maximum) (VMC-R-H-2 ³)
	- 25 dBm (minimum), -1 (maximum) (VMC-R-S-2 ⁴)
Optical return loss	29 dB

¹ The VMC-R-X-2 is factory set to reclock at 270 Mb/s to accommodate DVB/ASI and will not reclock at 177 Mb/s. When operating at 177 Mb/s, the receiver may generate bit errors.

² Assumes minimum transmitter output power of -12 dBm with minimum extinction rate of 9 dB (VMC-T-X-2) over 9/125µm. Single Mode Fiber (SMF) at 140/177/270/360/540/1485 Mb/s. The minimum link distances are based on worst case receiver sensitivity (VMC-R-X-2 simplex receiver VMC) with color bar test signal. The minimum link distances will be reduced with SDI test matrix.

³ Minimum receiver input power is defined for line BER < 1 x 10⁻¹⁰ running PRBS 2²³ - 1 at 1.485 Gb/s.

⁴ Minimum receiver input power is defined for line BER < 1 x 10⁻¹⁰ running PRBS 2²³ - 1 at 143/177/270/360/540 Mb/s.

Table 5. MVMC Transmitter Specifications

Parameter	Value
MVMC-T-H-2 Transmitter	
Recommended Operating Conditions	
Operating case temperature	0 ° C (minimum), +70 ° C (maximum)
Supply voltage	+4.5 VDC (minimum), +7 VDC (maximum)
Power dissipation	1.75 W
Baud rate	19.4 Mb/s (minimum), 1485 Mb/s (maximum) 19.4 /143/177/270/360/540/1485 Mb/s
Electrical	
Input signal	SMPTE 292M/259M/297M/305M/310M, mV p-p
Input impedance	75 ohms ¹
Return loss	15 dB
Propagation delay	1.5 ns
Optical (1310nm FP Singlemode Laser)	
Optical center	1290nm (minimum), 1310nm (typical), 1330nm (maximum)
Optical transmit power	- 9 dBm (minimum), - 3 dBm (maximum) average @ 1310 nm
Extinction ratio	9 dB (P1/P0)
Spectral width	4 nm (RMS)
Total jitter	120 ps (typical), 135 ps (maximum) (measured with color bar test signal @ 1.485 Gb/s) 740 ps (measured with color bar test signal @ 143/177/270/360 Mb/s)
Output rise time	80 ps (typical), 120 ps (maximum) (20-80%: measured unfiltered @ 143/177/270/360/1485 Mb/s)
Output fall time	240 ps (typical), 270 ps (maximum) (20-80%: measured unfiltered @ 143/177/270/360/1485 Mb/s)

¹ Equalized for 140m Belden 1694A@1.485 Gb/s and 350m Belden 1694A@270 Mb/s.

Table 6. MVMC Receiver Specifications

Parameter	Value
MVMC-R-H-2 Receiver	
Recommended Operating Conditions	
Operating case temperature	- 30 ° C (minimum), +70 ° C (maximum)
Supply voltage	+4.5 VDC (minimum), +7 VDC (maximum)
Power dissipation	1.2 W
Baud rate	19.4 Mb/s (minimum), 1485 Mb/s (maximum) MVMC-R-H-2: 19.4/143/177/270/360/540/1485 Mb/s
Electrical	
Output voltage level	SMPTE 259M/297M/292M, mV p-p
Output impedance	75 ohms
Jitter	135 ps (measured with color bar test signal @ 1.485 Gb/s) 740 ps (measured with color bar test signal @ 143/177/270/360/540 Mb/s)
Return loss	15 dB
Propagation delay	40 ns
Optical (1310nm Singlemode Receiver)	
Optical input wavelength	1270nm (minimum), 1610nm (maximum)
Optical input power	- 20 dBm (minimum), -1 (maximum) (VMC-R-H-2 ¹) - 25 dBm (minimum), -1 (maximum) (VMC-R-S-2 ²)
Optical return loss	29 dB

¹ Minimum receiver input power is defined for line BER < 1 x 10⁻¹⁰ running PRBS 2²³ - 1 at 1.485 Gb/s.

² Minimum receiver input power is defined for line BER < 1 x 10⁻¹⁰ running PRBS 2²³ - 1 at 143/177/270/360/540 Mb/s.

Table 7. MVMC DFB Transmitter Specifications

Parameter	Value
MVMC-T-H-3L Transmitter	
Recommended Operating Conditions	
Operating case temperature	0 ° C (minimum), +70 ° C (maximum)
Supply voltage	+4.5 VDC (minimum), +7 VDC (maximum)
Power dissipation	1.75 W
Baud rate	19.4 Mb/s (minimum), 1485 Mb/s (maximum) 19.4 /143/177/270/360/540/1485 Mb/s
Electrical	
Input signal	SMPTE 292M/259M/297M/305M/310M, mV p-p
Input impedance	75 ohms
Return loss	15 dB
Propagation delay	1.5 ns
Optical (1550nm DFB Singlemode Laser)	
Optical center	(+ 25 Degrees C) 1540nm (minimum), 1550nm (typical), 1560nm (maximum) (-30 degrees C) 1480nm (minimum), 1580nm (maximum)
Optical transmit power	+3 dBm (maximum) average @ 1550nm
Extinction ratio	9 dB (P1/P0)
Total jitter	120 ps (typical), 135 ps (maximum) (measured with color bar test signal @ 1.485 Gb/s) 740 ps (measured with color bar test signal @ 143/177/270/360 Mb/s)
Output rise time	80 ps (typical), 120 ps (maximum) (20-80%: measured unfiltered @ 143/177/270/360/1485 Mb/s)
Output fall time	240 ps (typical), 270 ps (maximum) (20-80%: measured unfiltered @ 143/177/270/360/1485 Mb/s)

Table 8. VMCR -18-R and -VMCR-18-T Frame Specifications

Parameter	Value
Recommended Operating Conditions	
Operating ambient temperature	0 ° C (minimum), +55 ° C (maximum) (when fully populated with 18 media converters)
Supply voltage	90-264 VAC
Power dissipation	35 W (typical), 40 W (maximum) (when fully populated with 18 media converters)

Table 9. Wall Plug with Mini-XLR Power Supply Specifications

Parameter	Value
Input voltage	100 V (minimum), 240 V (maximum)
Output voltage (DC)	+5V @ 100mA

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