



Video Multiprocessing Gateway (VMG)

Release 2.5.2

VMG-8 Hardware Setup Guide

RGB Networks, Inc.
390 West Java Drive
Sunnyvale, CA 94089
Support Tel: 877-RGB-NETW
Fax: (408) 701-2700
www.rgbnetworks.com

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VMG-8 Hardware Setup Guide Document History

Part Number	Software Version	Release Date	Changes
250-0132-01 Rev A	2.5.2	09/16/11	<ul style="list-style-type: none">• IP address for management port: content update.• DC PEM (V DC) update.• New (localized) warning.
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Introduction

The compact Video Multiprocessing Gateway (VMG-8) from RGB Networks is a 7RU chassis that is suitable for lower density video headends and hub sizes while still delivering the industry's highest density digital video solution—per Rack Unit—for grooming, statistical multiplexing, transrating, digital program insertion (DPI), and MPEG-2 / H.264 transcoding. Based on a flexible, scalable and modular platform, the compact VMG-8 expedites deployments of advanced video services and simplifies operation and management, while reducing operational and capital costs.

This *VMG-8 Hardware Setup Guide* describes the VMG-8 system hardware and provides guidelines for physical installation, initial configuration, and basic troubleshooting.

Document Organization

This guide is organized as follows:

- [Chapter 1, *Introduction*](#) – (this chapter) describes the contents and conventions used in the *VMG-8 Hardware Setup Guide*.
- [Chapter 2, *Overview*](#) – provides a detailed description of the VMG-8 features and components.
- [Chapter 3, *Physical Installation*](#) – describes the initial steps and requirements for installing the VMG-8.
- [Chapter 4, *Initial Configuration*](#) – describes the management and console setup.
- [Chapter 5, *Troubleshooting and Maintenance*](#) – provides information about LED indicators and component replacement.
- [Chapter 6, *System Specifications*](#) – includes information about regulatory, environmental, electrical, and mechanical compliances.
- [Appendix A, *Localized Cautions and Warnings*](#) – lists all of this guide's *Caution* and *Warning* statements in French and German.
- [Appendix B, *Conformity*](#) – provides regulatory compliance information for the VMG.
- The glossary and index can be used to quickly reference information.

Document Audience

This guide is intended for system administrators who are responsible for installation and maintenance of the VMG-8 at Telco and Cable Headends. Users of this guide should be familiar with general video and networking terminology and should be accustomed to basic network hardware installation.

Most importantly, the user must be familiar with the basics and principles of broadcast network processing.


Related Documentation

- *Video Multiprocessing Gateway (VMG) Software User Guide, Release 2.*
- *Application Media Processor (AMP) Install Guide for VMG Systems.*

Document Conventions

Table 1 provides an easy way to recognize important information in the text.

Table 1. Document Conventions

When you see:	It means:
	Notes point out information that may not be part of the text but provide tips and other helpful advice.
	<p>Cautions let you know that an action may have undesirable consequences if the instructions are not followed correctly. Cautions also indicate that failure to follow guidelines could cause damage to equipment or loss of data.</p> <p>Les symboles "ATTENTION", représentés par l'icône de gauche, indiquent qu'une action peut avoir des conséquences indésirables si les instructions ne sont pas suivies correctement.</p> <p>Les symboles " ATTENTION " indiquent également que le fait de ne pas suivre les instructions peut causer des dommages à l'équipement ou résulter en une perte de données.</p> <p>Das links abgebildete Symbol Vorsicht weist darauf hin, dass ein Vorgang unerwünschte Konsequenzen haben kann, falls die Anweisungen nicht korrekt befolgt werden.</p> <p>Das Symbol Vorsicht weist außerdem darauf hin, dass Geräte beschädigt oder Daten verloren gehen können, wenn die Anweisungen nicht befolgt werden.</p>
	<p>Warnings indicate that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel.</p> <p>Les symboles "AVERTISSEMENT", représentés par l'icône de gauche, indiquent que le fait de ne pas prendre les précautions nécessaires ou de ne pas suivre les instructions peut endommager l'équipement ou provoquer des blessures.</p> <p>Das links abgebildete Symbol Warnung weist darauf hin, dass Geräte beschädigt oder Personen verletzt werden können, wenn die notwendigen Vorsichtsmaßnahmen nicht eingehalten oder die Anweisungen nicht befolgt werden.</p>
<p>Hyperlinks: Clicking any blue link takes you to the item to which the link refers.</p> <p>Localization: See Appendix A, Localized Cautions and Warnings for the French and German versions of the caution and warning statements in this manual.</p>	

Graphics

In some cases the line art and screen-shots shown in this manual may differ slightly from what appears on the actual product.

All efforts have been made to ensure that the latest images are used. In all cases, the functionality described is current at the time of writing.

Technical Assistance

Use the contact information provided in this section if you need to phone or write to RGB Customer Support for assistance with VMG installation, initial configuration, or other VMG product issues.

Table 2. Contact Information for Product Returns

To Do This...	Use this contact information	
Return product. Request authorization from RGB Networks to return materials	Customer Portal:	http://support.rgbnetworks.com
	Phone From inside USA: From outside USA:	1.877.RGB.NETW (977.742.6389)+1.408.701.2800
	Email	support@rgbnetworks.com
Affix proper address on the return shipment	Company Address	<i>Use address and RMA number, as advised by your RGB Customer Support contact</i>
	RMA Number	

See also the RGB Networks web site at <http://www.rgbnetworks.com/support> for more details.

Overview

The RGB Video Multiprocessing Gateway (VMG) products provide stream routing, switching and video processing for deployment of digital simulcast, digital broadcast and IPTV streaming in advanced digital cable TV and Telco IPTV networks.

The 8-slot Video Multiprocessing Gateway (VMG-8) from RGB Networks (a smaller version of the VMG-14) is designed for high-level carrier-class service availability through the chassis, service-level, and module-level redundancy. It is ideally suited for operations at lower density video headends and hub sizes, to deliver the industry's highest density digital video solution per-rack-unit for grooming, statistical multiplexing, and digital program insertion (DPI), and transcoding.

Figure 1. VMG-8 Chassis



The VMG-8 is fully MPEG-2 and H.264 compliant and interoperable with leading video industry equipment; it shares the same software functionality and application modules (NPMs, AMPs, TCMs, and VPMs) as the larger VMG-14 chassis, but is contained within the smaller 7 RU form factor. The VMG-8 provides advanced standard definition (SD) and high definition (HD) MPEG-2 and MPEG-4/H.264 video processing, which enables telecommunications deployment of next-generation cable and IPTV services.

Built-in software enables management of the VMG system and applications with the VMG *Element Manager*. Once the VMG-8 is up and running, operators can use this Java-based graphical user interface (GUI) from any Web browser.

In This Chapter:

- “Product Features,” in next section.
- “VMG-8 Chassis and Components” on page 12.
- “VMG-8 System Modules” on page 21.

Product Features

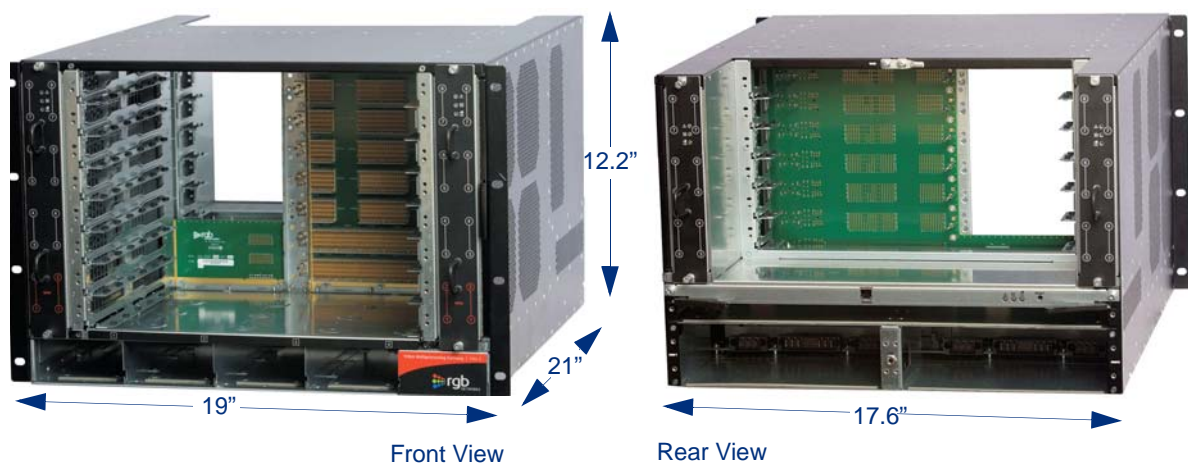
In addition to being software-upgradeable, scalable and reliable, the VMG-8 platform has the following features:

- 1+1 Redundant Shelf Control Managers (SCMs).
- Web-based embedded management.
- Redundancy:
 - Intelligent Platform Management Bus (IPMB) interfaces in a radial configuration.
 - Chassis redundancy, 1:1 NPM (and AMP) redundancy, N+M VPM and TCM redundancy, and service-level redundancy.
 - Redundant Power Entry Modules (PEMs).
- Hot-swappable Video Processor Modules (VPMs), Transcoding Modules (TCMs), Network Processor Modules (NPMs), Application Media Processors (AMPs), and fan trays.
- Mounting flanges for 19" cabinets.
- Chassis size: 7RU.
- 8 front-loading slots: Two dedicated for NPMs.
- Power options: AC or DC.
- Front and rear fans.

VMG-8 Chassis and Components

The VMG-8 utilizes a chassis platform fitted for 7 Rack Units (RU). Both the front and rear of the VMG-8 chassis cage are designed to accommodate the system and application modules. (Figure 2).

Figure 2. Chassis Front and Rear Cage Views



Chassis Front

The chassis cage front provides eight horizontal slots for loading of the application modules. Two of these slots are dedicated for use by Network Processor Modules (NPMs) for 1:1 redundancy configuration; the remaining six slots can be used for Video Processor Modules (VPMs), Transcoding Modules (TCMs), and up to two Application Media Processors (AMPs). Minimally, one NPM must be installed.

The slot numbering scheme for the chassis front is identifiable on the faceplates of the two front fan trays, which reside to the left and right of the chassis. An additional full-size slot houses the chassis air filter alongside the right-side fan tray.

At the base of the cage front is a power bay into which up to four AC Power Supply Units (PSUs) may be inserted. These slots are concealed by a filler panel when not in use.

Rack-mounting flanges are incorporated into the unit at the left and right front edges.

Chassis Rear

The rear chassis cage provides horizontal full-width slots for two Shelf Control Managers (SCMs), two fan trays, and PEM power bay.

The slot numbering scheme for the horizontal slots of the chassis rear is identifiable on the faceplates of the two rear fan trays, which reside at the left and right of the chassis.

At the base of the cage rear is a power bay into which up to two power entry modules (PEMs) may be inserted. For each pair of AC PSUs, one AC PEM is required. Otherwise, two DC PEMs may be housed in the two PEM slots.

Basic Chassis Populations

Slot assignments determine where to load the system modules, SCMs, fan trays, air filter, and (for AC) power supply units.



Note: *The VMG-8 PEMs are installed and serviced only by RGB Networks.*

An AC-powered system differs in appearance from a DC-powered system, as illustrated [Figure 3](#) (fully loaded AC system) and [Figure 4](#) (fully loaded DC system).

Figure 3. VMG-8 Chassis: AC System

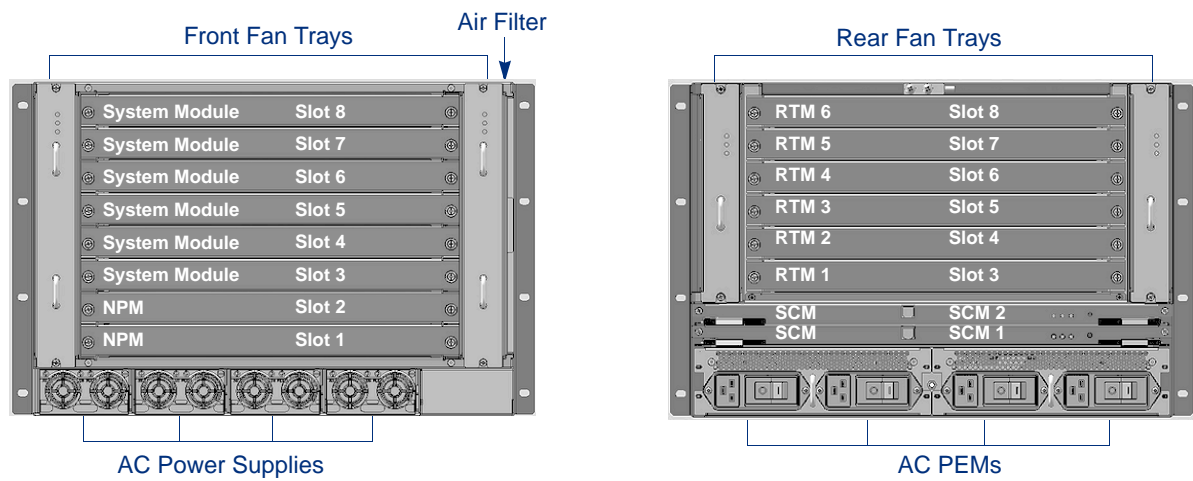
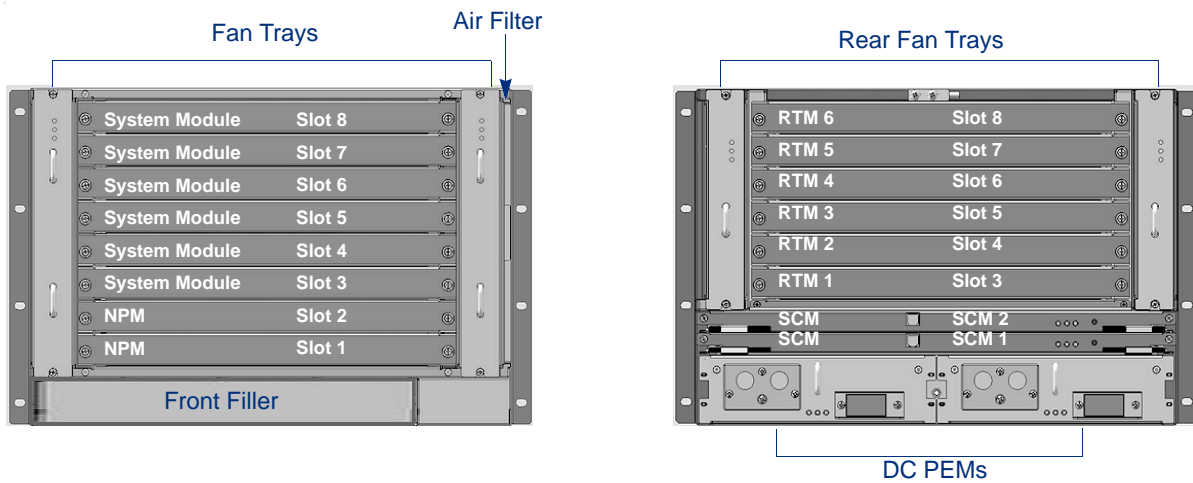


Figure 4. VMG-8 Chassis: DC System



The VMG platform supports the components and modules listed in [Table 3](#).

Table 3. VMG-8 Chassis Modules and Components

Name	Front Panel Label(s) and Marks	Description	System Capacity	Slot Assignments
Shelf Control Manager	SCM	Manage power and cooling, and system interconnectivity via interaction between the SCM and Intelligent Management Controllers (IPMC) over IPMB-0. Enable system management through Ethernet See also “SCM” on page 15	2	Rear, horizontally stacked slots directly above the power bay.
DC Power Entry Modules (Installed and serviced only by RGB Networks)		See also “DC Power” on page 28	2	Rear chassis at power bay
AC Power Entry Modules (Installed and serviced only by RGB Networks)	1 and 2 (left and right)	See also “AC Power” on page 27	2	Rear chassis at power bay
AC Power Supplies	1 - 4 (left-to-right)		4	Front chassis at power bay
Filler Panels <ul style="list-style-type: none"> Front Filler RTM Filler Panels 	Not applicable RTM	See also “The front panel of the DC PEM provides the LEDs listed in Table 14.” on page 30	all empty slots	
Fan Tray <ul style="list-style-type: none"> Rear Fan Trays x 2 Front Fan Trays x 2 	Slot numbering	See also “Fan Tray” on page 16	4	Left and Right chassis edges.
Air Filter	Not applicable	See also “Air Filter Tray” on page 17	1	Right-most chassis edge.

SCM

The VMG-8 SCMs are full-width cards that fit into the dedicated SCM slot located at the rear of the chassis. Two SCMs are required for redundancy. An SCM in either slot can serve as the primary.

The SCM faceplate provides the LEDs and interface illustrated in [Figure 5](#). The LEDs are described in [Table 4](#).

Figure 5. Shelf Control Manager Front Panel

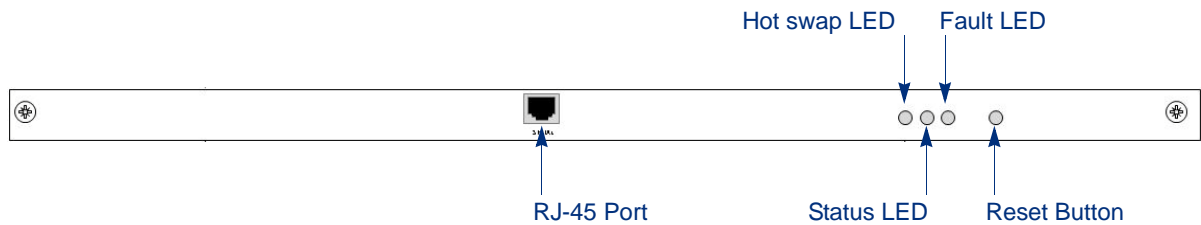


Table 4. Shelf Control Manager LED Descriptions

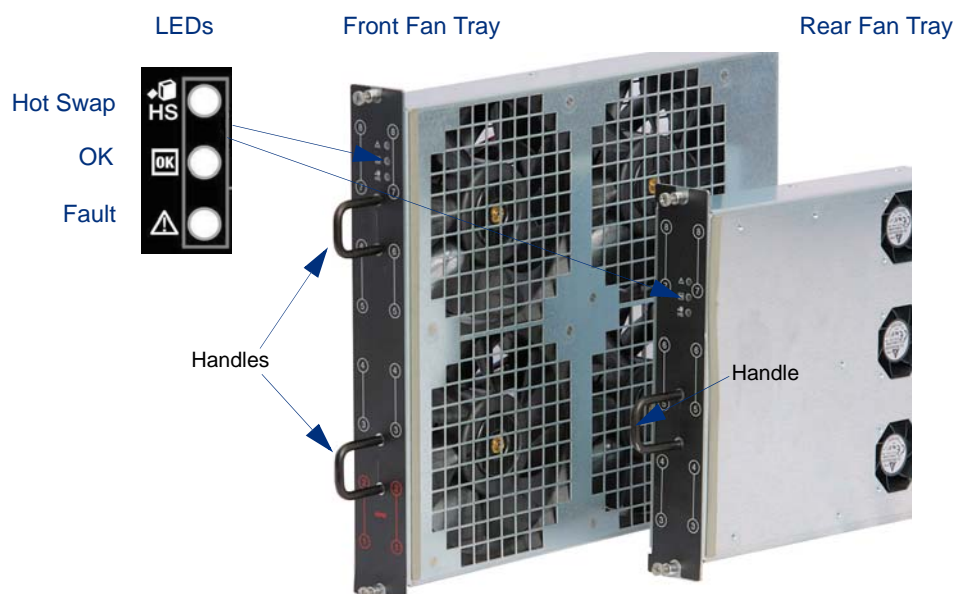
LED Name	Color/Condition	Description
Fault	Green	Temperature normal: not exceeding thresholds. This LED illuminates upon system power-up.
	Red	Temperature exceeds thresholds.
Status	Solid Green	Active. This LED illuminates upon system power- up.
	Blinking Green	Standby.
	Red	Failure.
Hot Swap	Off	SCM is not ready to be removed or disconnected from the chassis.
	Blue	SCM is ready to be removed or disconnected from the chassis.

The Shelf Control Manager replacement procedure is covered in Chapter 5 on page 57.

Fan Tray

The VMG-8 chassis contains four fan trays. Two front fan trays fit into the chassis front; two rear fan trays fit into the chassis rear. Each front fan tray contains four fans; each rear fan tray contains three fans.

Figure 6. Fan Trays



The fan trays are designed to continuously operate and provide sufficient cooling and are monitored by the SCMs. In the event of a failure—such as a fan problem or removal of both SCMs—the fans will continue to run at full speed.

Fan Tray LEDs

The following table describes the LED sequence of the fan trays in the VMG-8 chassis:

Table 5. Fan Tray LEDs

Color	Description	Status	Condition
Green	In-Service LED	Off	No Power to the Fan Tray.
		Solid Green	Normal Operation.
Red	Alarm LED	Solid Red	Attention Status (error condition).
Blue	Hot Swap LED	Off	In use.
		Solid Blue	Fan tray not initialized by SCM.

The fan tray replacement procedure is provided in [Chapter 5 on page 56](#).

Air Filter Tray

The VMG-8 chassis uses a front replaceable air filter tray ([Figure 7](#)). During operations, the system detects the presence of the air filter, and the air filter must be in place at all times. The tray inserts vertically into the chassis front, at the air filter slot alongside the chassis right panel.

Figure 7. VMG-8 Air Filter



Air filter maintenance and replacement information is provided in [Chapter 5 on page 58](#).

NPM

The NPM (Table 6 and Figure) provides the interfaces, indicators, and functions described in the following sections:

- “NPM Interfaces” on page 18.
- “NPM LEDs” on page 19.
- “NPM Management and Serial Ports” on page 19.
- “NPM Functional Block Diagram” on page 20.

Figure 8. NPM Front Panel

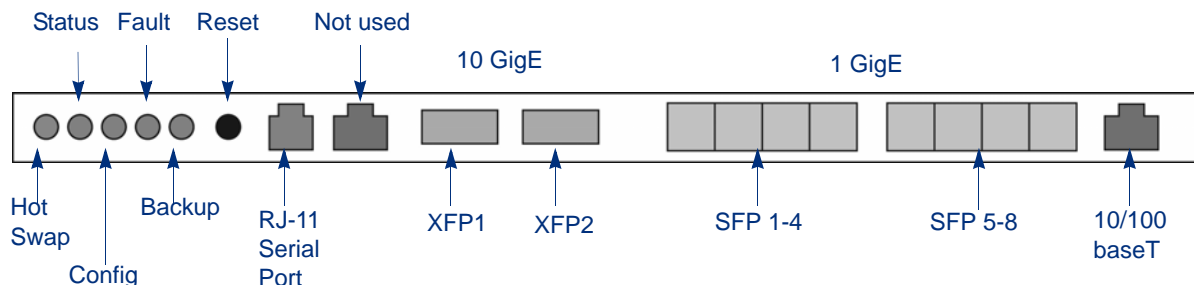


Table 6. NPM Module Overview

Name	Front Panel Label	Description	System Capacity	Slot Assignments
Network Processor Module	NPM	Purpose: receive and transmit MPEG-2 and H.264 transport streams carried in an SPTS and/or MPTS, encapsulated with UDP / IP or RTP / UDP / IP over GigE or 10GigE. System management functions. Supports 1:1 module redundancy.	Up to two <i>At least one is required.</i>	1, 2

NPM Interfaces

- Eight bi-directional GigE ports:
 - Each GigE port supports small form factor pluggable (SFP) (16mm H x 42mm D) optical modules with a data rate of 1.0625Gbps according to IEEE-802.3z.
 - Each GigE port supports either single mode or multimode SFP optical modules (the NPM supports both types simultaneously), and operates on frequencies compliant with the optical channel plan defined in ITU G.692, 100 GHz channel plan appendix IV.
 - The NPM supports SFP modules with wavelengths of SX 850nm for short distances up to 65 meters, LX 1310nm for medium distances up to 10 kilometers, or LX 1550nm for long distances up to 70 kilometers.
 - The GigE port also supports SFP copper modules of full duplex 1000BaseT Ethernet with copper interfaces that are compliant with IEEE-802.3ab. The copper SFP module supports distances up to 100 meters.
- Two 10GigE ports.
 - Each 10GigE port supports pluggable 10 Gigabit small form factor pluggable (XFP) (23.5mm H x 67mm D) optical modules that are IEEE-802.3ae compliant with data rates of

10.3125Gbps. The NPM supports XFP modules with wavelengths of 850nm for distances from 26 meters to 300 meters, depending on the grade of fiber, and 1310nm for distances up to 10 kilometers.

- Each 10GigE port receives input as MPEG-2 SPTS and MPTS with unicast or multicast, de-jitters up to 100ms of network jittering and routes the video or data streams to the appropriate application module (VPM, TCM, AMP).
- The 10GigE ports can handle either constant bit rate (CBR) or variable bit rate (VBR) MPEG-2 as well as H.264 digital video streams in both SD and HD format, then deliver the processed video content over MPEG-2TS / UDP / IP / GigE or MPEG-2TS / RTP / UDP / IP / GigE unicast or multicast IP transport.
- One Fast Ethernet (10/100BaseT) Management port for management and control, including SCTE 30 messages.
- One RJ-11 serial console interface for management access and event logging.
- Reset button.

NPM LEDs

The NPM faceplate provides the LEDs listed in [Table 7](#).

Table 7. NPM Front Panel LED Description

LED Name	Color/Condition	Description
Hot Swap	Blue	NPM is ready for hot-swap.
	Flashing Blue	Transition between the hot-swap <i>not-ready</i> state to <i>ready</i> state, or from <i>ready</i> state to hot-swap <i>not-ready</i> state.
	Off	NPM is not ready for hot-swap.
Status	Red	Chassis interface is in fault state.
	Green	NPM payload powered and out of reset.
Config	Red	FPGA configuration in progress.
	Green	FPGA configuration is done.
Fault	Red	Fault.
	Green	In normal operation.
Backup	Red	Standby.
	Green	In operation.



Note: For a list of SFP and XFP modules approved for use with the NPM, please refer to the VMG release notes and/or RGB Customer Portal.

NPM Management and Serial Ports

The NPM provides one 10/100BaseT Ethernet interface with an RJ-45 connector, compliant with IEEE-802.3ab. A serial console port with an RJ-11 connector is also provided.

Serial Console Configuration

- 19200 baud
- No parity

- 8 data bits
- 1 stop bit
- no flow control

Serial Port Pinouts

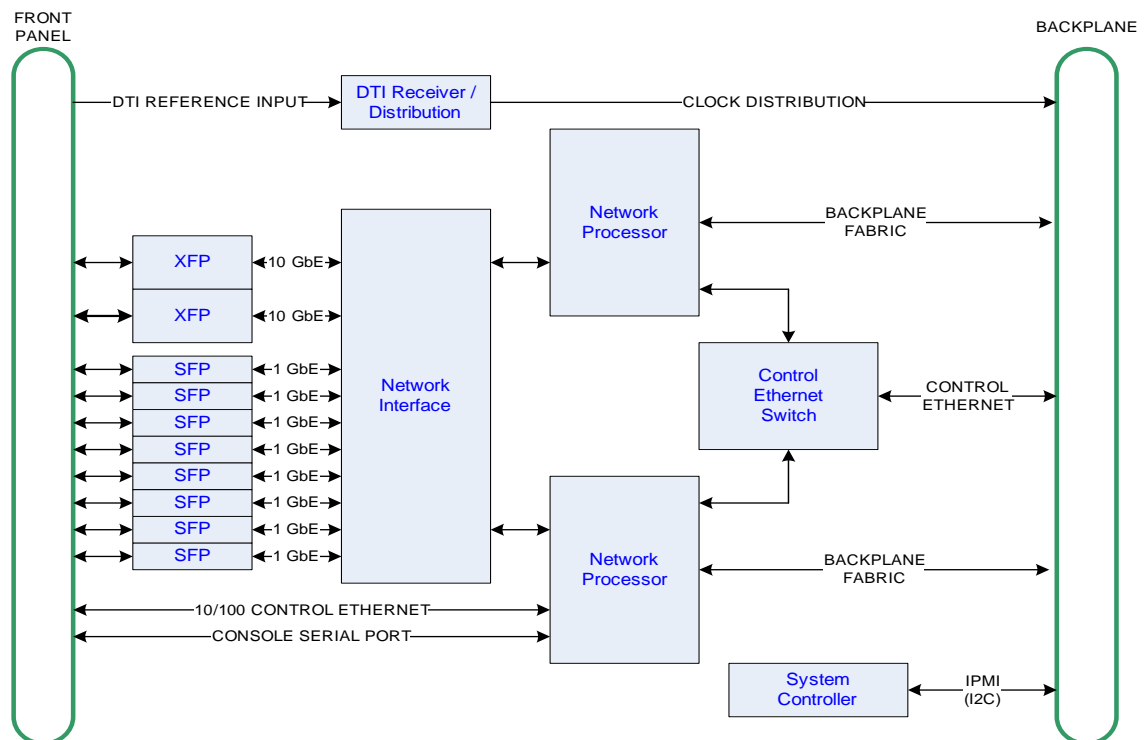
Table 8. NPM Serial Reference

Pin Number	Name
1	No Connect
2	TXD
3	RXD
4	No Connect
5	GND
6	No Connect

NPM Functional Block Diagram

Functional components built into the NPM circuit board are illustrated in [Figure 9](#).

Figure 9. NPM Functional Block



VMG-8 System Modules

The VMG-8 platform supports the suite of processing modules listed in [Table 9](#). These modules are inserted into the front of the chassis cage for connection to the chassis backplane. During operations, the installed modules provide high speed routing and inter-module communication paths.



Note: All VMG-8 modules are hot swappable. System indicators are provided to ensure safe card swaps (see also [“Hot Swap Indicators” on page 54](#)).

Table 9. VMG-8 System Modules

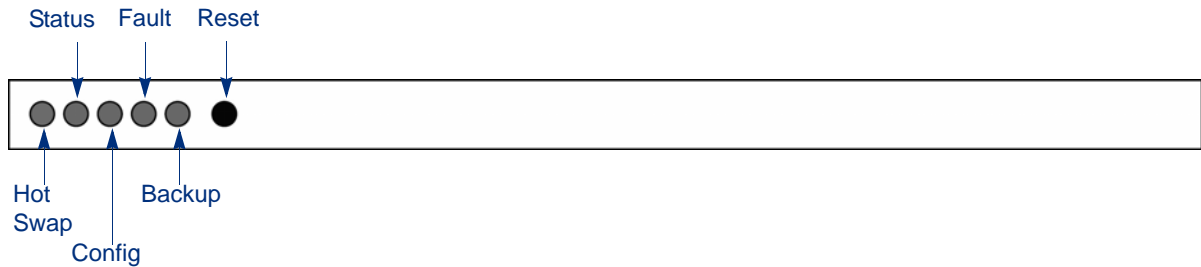
Name	Front Panel Label	Description	System Capacity	Slot Assignments
Application Media Processor	AMP	Purpose: Audio transcoding. Pairs with an NPM by connecting its Ethernet ports to ports 7 and 8 on the NPM. See also “AMP” on page 25 .	Up to two	3 (to pair with NPM in slot 1) 4 (to pair with NPM in slot 2)
Video Processor Module	VPM	Purpose: Video and data traffic, and control messages. Statistical multiplexing for SD programs and HD programs, and concurrent transrating. Digital ad insertion for CBR or VBR H.264 video and MPEG-2 video program streams. See also “VPM” on page 22 .	Up to six	3, 4, 5, 6, 7, 8
Transcoding Module	TCM	Purpose: Video transcoding. NPM interfacing through the VMG chassis backplane, via the high speed bus fabric for the video and data traffic, and control messages. Transcoding functions: MPEG-2 to H.264 SPTS, H.264 to MPEG-2 SPTS, or MPEG-2 to MPEG-2 SPTS. Video resolution handling, up to HD resolutions. High capacity; up to 48 HD streams through a single device. See also “TCM” on page 23 .	Up to six	3, 4, 5, 6, 7, 8

VPM

The VPM (Figure 10) provides the indicators and functions described in the following sections:

- “VPM LEDs” on page 22.
- “VPM Functional Block Diagram” on page 22.

Figure 10. VPM Front Panel



VPM LEDs

The VPM faceplate provides the LEDs list in Table 10.

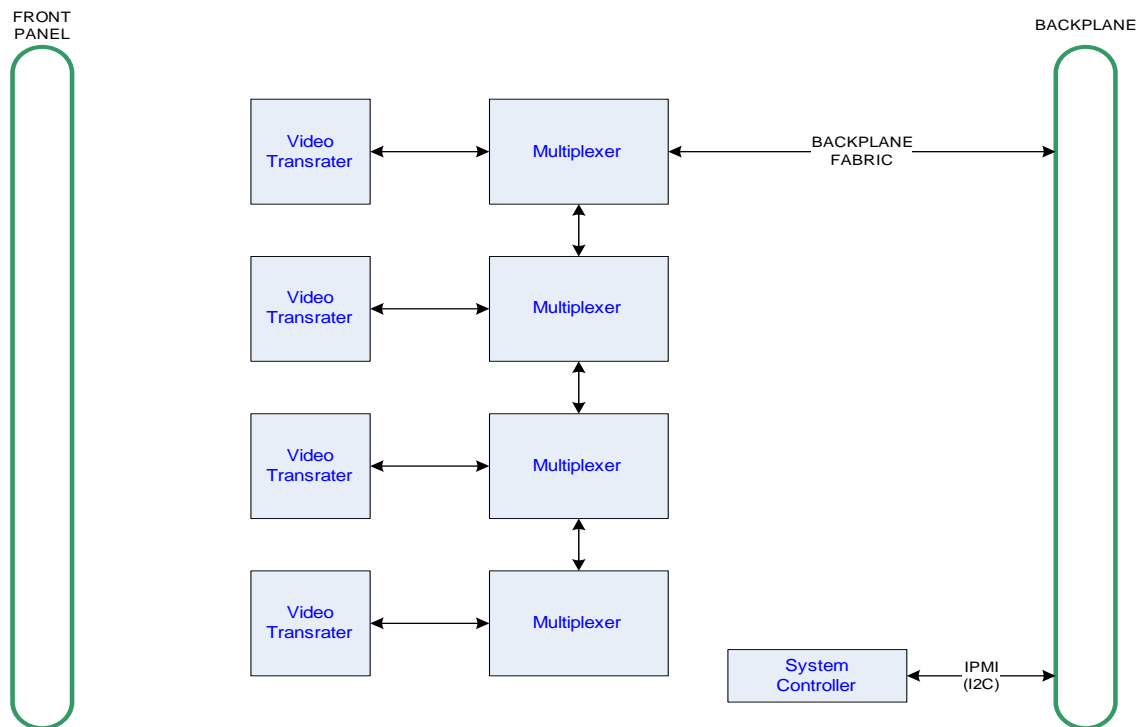
Table 10. VPM Front Panel LEDs

LED Name	Color/Condition	Description
Hot Swap	Blue	VPM is ready for hot-swap.
	Flashing Blue	VPM is making transition from hot-swap <i>not ready</i> to <i>ready</i> state, or from <i>ready</i> state to hot-swap <i>not-ready</i> state.
	Off	VPM is not ready for hot-swap.
Status	Red	Chassis interface fault.
	Green	Payload up.
Config	Red	FPGA configuration in progress.
	Green	FPGA configuration completed.
	Orange	FPGA failure: reverting to factory defaults.
Fault	Red	Fault.
	Green	Normal operation.
Backup	Red	Standby.
	Green	In operation.

VPM Functional Block Diagram

Functional components built into the VPM are illustrated in Figure 11.

Figure 11. VPM Functional Block

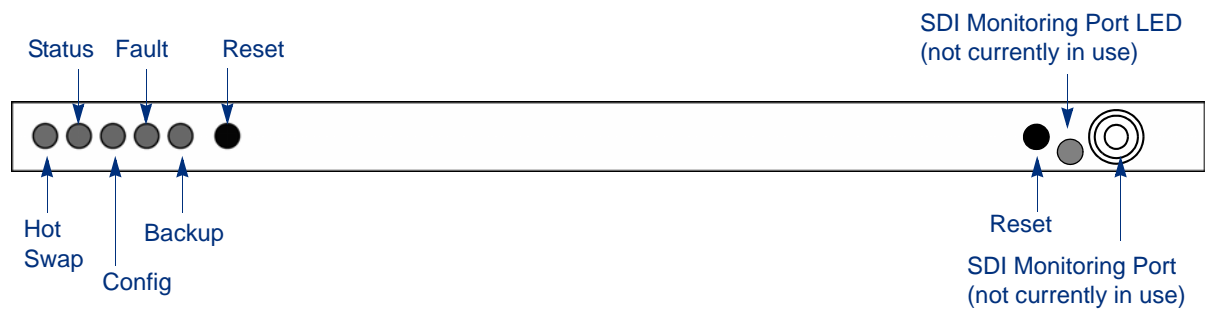


TCM

The TCM (Figure 12) provides the indicators and functions described in the following sections:

- “TCM LEDs” on page 24.
- “TCM Functional Block Diagram” on page 24.

Figure 12. TCM Module Front Panel



TCM LEDs

The TCM faceplate provides the LEDs listed in [Table 11](#).

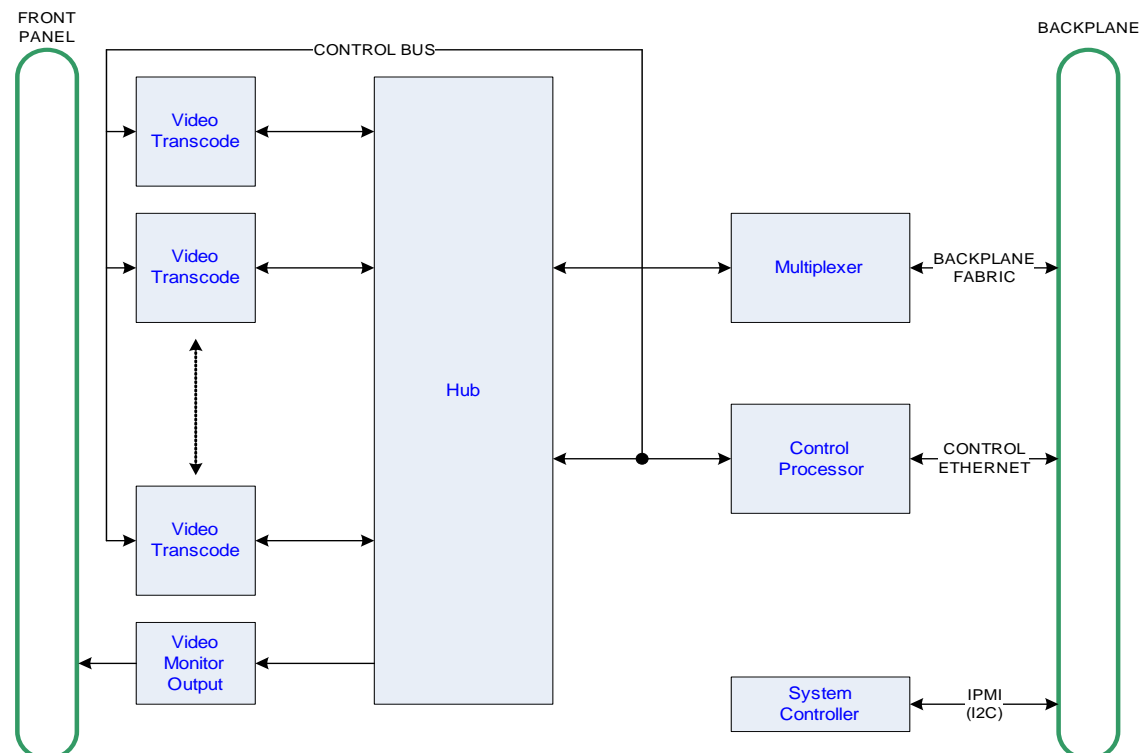
Table 11. TCM Front Panel LEDs

LED Name	Color/Condition	Description
Hot Swap	Blue	TCM is ready for hot-swap.
	Flashing Blue	TCM is making transition from hot-swap <i>not-ready</i> to <i>ready</i> state, or from <i>ready</i> state to hot-swap <i>not-ready</i> state.
	Off	TCM is not ready for hot-swap.
Status	Red	Chassis interface fault.
	Green	Payload up.
Config	Red	FPGA configuration in progress.
	Green	FPGA configuration completed.
Fault	Red	Fault.
	Green	Normal operation.
Backup	Red	Standby.
	Green	In operation.
SDI Monitoring Port LED	n/a	This LED is currently not used.

TCM Functional Block Diagram

Functional components built into the TCM circuit board are illustrated in [Figure 13](#).

Figure 13. TCM Functional Block

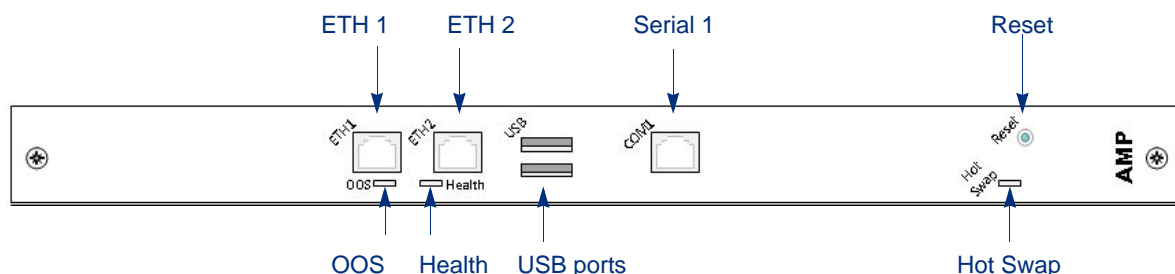


AMP

The AMP (Figure 14) provides the interface, indicators and functions described in the following sections:

- “AMP Interfaces” on page 25.
- “AMP LEDs” on page 25.

Figure 14. AMP Module Front Panel.



For AMP usage in the VMG-8, one AMP module is always paired with an NPM, using the following rules:

- The AMP in slot 3 must be paired with the NPM in slot 1.
- The AMP in slot 4 must be paired with the NPM in slot 2.

Note: If you are using AMP Cards, you must install the same number of AMP cards as NPM cards. Two NPMs and one AMP or one NPM and two AMPs are not supported.

Note: If you are not using AMP Cards, you do not need AMP modules and can install TCM and VPM modules in slots 3 and 4 instead. If you previously used AMP modules and are now using TCM and/or VPM modules in those slots instead, you must power cycle the VMG in order for those modules to come up.

AMP Interfaces

The AMP module interfaces with the NPM module via direct connectivity between the ETH ports of the AMP to the SFP GigE ports on the NPM. Each AMP must be paired to an NPM, using guidelines provided in “AMP-to-NPM Cabling” on page 42.

AMP LEDs

Table 12 describes the AMP front panel LEDs.

Table 12. AMP Front Panel LEDs

LED Name	Color/Condition	Description
OOS (Out of Service)	Red	System out of service.
	Off	System normal.

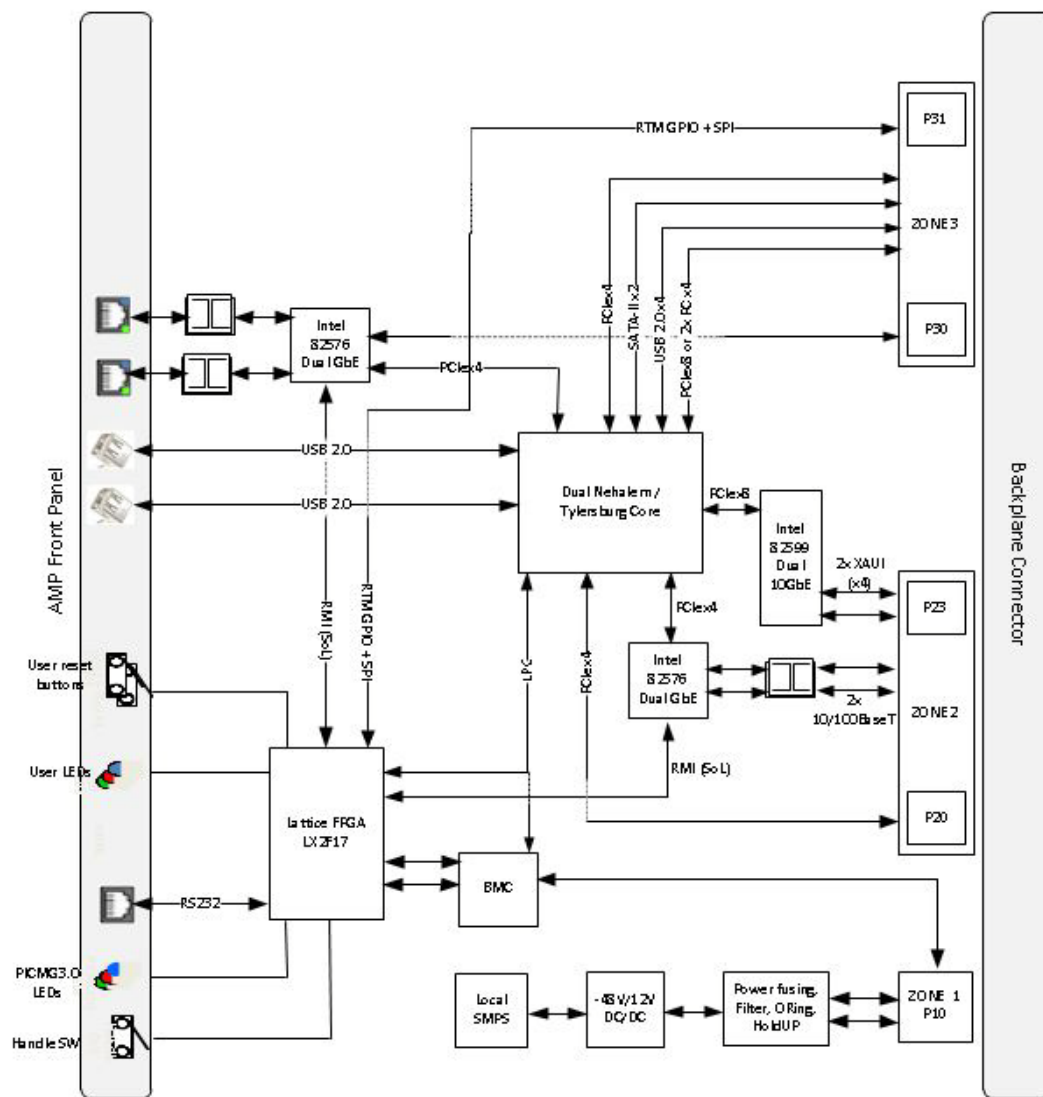
Table 12. AMP Front Panel LEDs (Continued)

LED Name	Color/Condition	Description
Health	Solid green	AMP firmware is active, payload enabled.
	Flashing green	AMP firmware is active, payload disabled.
	Off	AMP firmware is inactive.
Hot Swap	Solid blue	AMP board is inactive and ready to be swapped.
	Flashing blue	AMP board is activating/deactivating and unsafe to swap.
	Off	AMP board is active and unsafe to swap.

AMP Functional Block Diagram

Functional components built into the AMP circuit board are illustrated in [Figure 15](#).

Figure 15. AMP Functional Block Diagram



System Power

Power options supported for VMG-8 are described in the following topics:

- “AC Power” on page 27.
- “DC Power” on page 28.



Note: *The VMG-8 PEMs are installed and serviced only by RGB Networks.*

AC Power

An AC power system consists of one or two AC PEMs and up to four AC power supplies. Each PEM provides AC power for up to two AC power supplies. The AC PEM does not have status indicators or control features, and does not communicate with the SCM. However, all communications with the AC power system occur between the AC power supplies and the SCM. The SCM monitors each power supply for presence and operational status.

Overall input specifications per AC power supply are 100-240V, 12-7A, 47-63Hz.

2000W System

A 2000W system is capable of supporting up to 200 watts of power to each system module slot, the necessary power for the fan trays and system management:

- 1000W per AC power supply x two per AC PEM.
- 100-180 VAC, 47-63 Hz.
- 12A.
- Requires 120 VAC line cords, and outlet circuit per AC PSU:
 - Supply end: NEMA 5-15P.
 - Equipment end: IEC-60320-C13.
 - 15A/125 V.

2400W System

a 2400W system is capable of supporting up to 300 watts of power to four system module slots, and 200 watts to the remaining four system module slots, and the necessary power for the fan trays and system management:

- 1200W per AC power supply x two per AC PEM.
- 180-265 VAC, 47-63 Hz.
- 10A.
- Requires 240VAC line cords, outlet, circuit per AC PSU.
 - Supply end: NEMA 6-15P.
 - Equipment end: IEC-60320-C13.
 - 15A/250V.

AC Power Components

AC power components (Figure 16) fit into the front and rear power bays of the VMG-8 chassis:

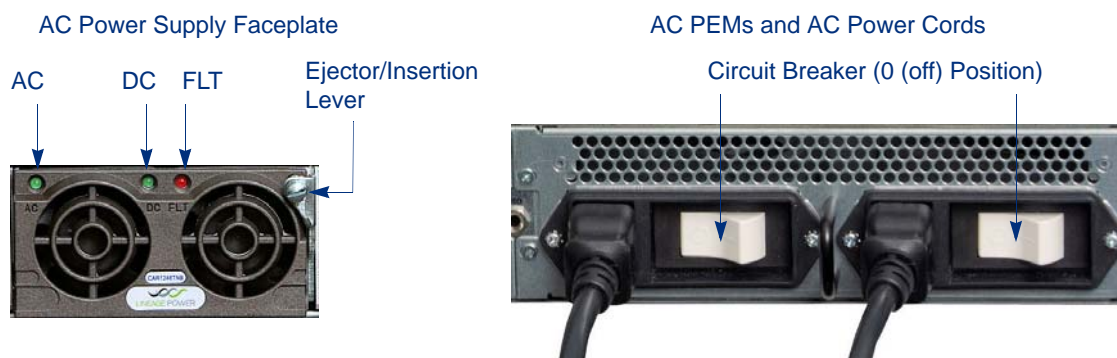
- The front power bay provides for installation of the AC power supply units.
- The rear power bay provides for installation of the AC PEMs.

AC power supply units cannot function without an AC PEM. One AC PEM is required for each pair of AC power supplies. AC power supplies cannot use the DC PEM.



Note: Use only the AC power cord(s) provided with your VMG-8 system.

Figure 16. AC Power Equipment



AC Power Supply LEDs

The front panel of the AC power supply unit provides the LEDs listed in Table 13:

Table 13. AS Power Supply LEDs

LED Color	Condition	Description
Green	OK	Both the AC and the DC LEDs will be illuminated if no faults are detected.
Red	Fault	Only the FLT LED is illuminated in the event of a fault.

DC Power

The VMG-8 can be powered using a regular telecommunications power supply of -48 nominal VDC with a VDC return. The specified voltage range is from -41 VDC to -60 VDC. The VMG-8 supports redundant power supplies; each power supply should be independently powered by a dedicated source.



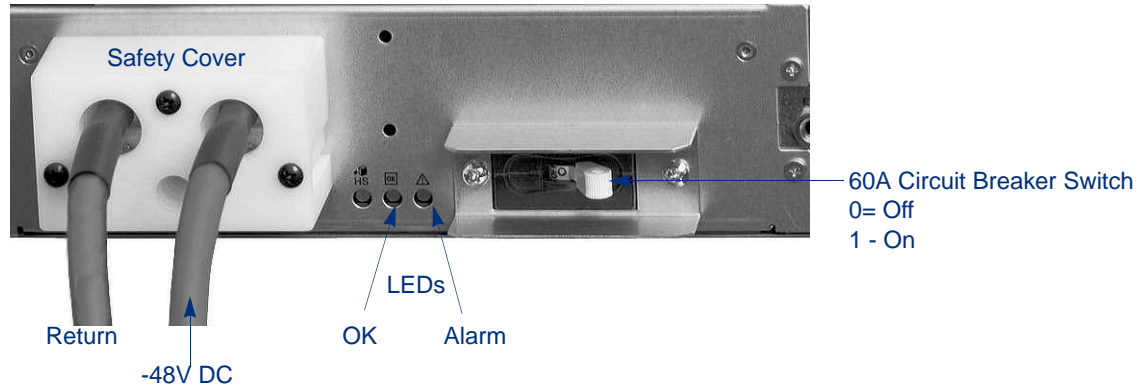
Caution: Although there are circuit breakers in the power entry circuit of the VMG-8, the power lines must be protected on the rack level with an appropriately sized breaker. In addition, an appropriately sized breaker must be provided in the building installation for over current/short circuit backup protection.

The power distribution within the shelf originates from each PEM and powers all the modules, Shelf Control Managers, and fan trays. For maximum fault tolerance, the two PEMs should be independently powered by a separate Feed A and Feed B.

A single DC PEM is capable of supplying a maximum 2400W at low voltage. A 2400W system is capable of supporting up to 300 watts of power to four system module slots, 200 watts to the remaining four system module slots, and the necessary power for the fan trays and system management.

Up to two pluggable DC PEMs can be installed into the rear power bay of the VMG-8 chassis. Each PEM provides power terminals for one 60A power feed. Each power feed consists of a -48V DC cable and its corresponding return cable and is protected by a 60A circuit breaker switch (Figure 17).

Figure 17. DC PEM and Cables

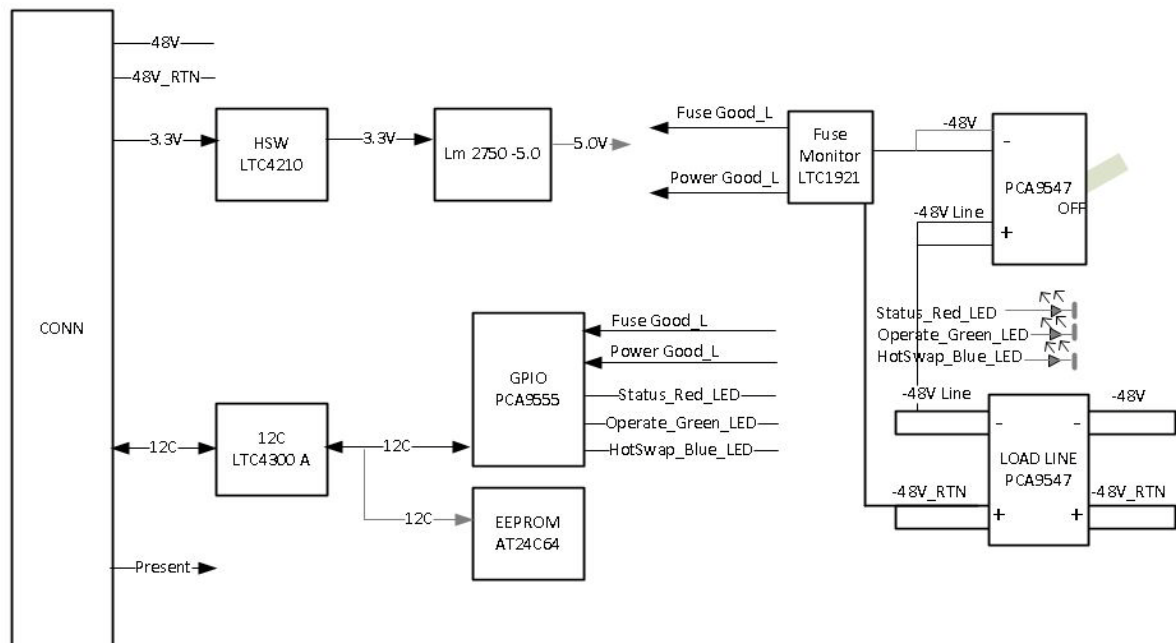


See also “Connect DC Cables” on page 38 for DC cabling procedures. Troubleshooting information is provided in Chapter 5, “DC Power Entry Module.”

DC PEM Block Diagram

Figure 18 is a block diagram of the DC PEM.

Figure 18. PEM Block Diagram



DC PEM LEDs

The front panel of the DC PEM provides the LEDs listed in [Table 14](#).

Table 14. DC PEM LEDs

LED Color	Condition	Description
Green	Service state	Off - No power to the PEM.
		Solid - Normal operation: DC power is good.
Red	Alarm state	Solid red = Error condition.
		Solid Amber = -48 VDC supply voltage not connected to PEM, or fan failure on PEM.

Filler Panels

To maintain proper airflow through the chassis, all empty slots must be shielded by a filler panel. Specific panels are designed for use with front and rear of the VMG-8, as described in this section.

Front Filler Panel

The front filler panel for the VMG-8 is a FRU intended for use on any empty slot at the front of the chassis. The system ships with front filler panels as appropriate for your order. See also “[FRU Part Numbers](#)” on [page 58](#) for ordering information.

Rear Transition Module

The Rear Transition Module (RTM) filler panels cover each of the numbered slots at the rear of the chassis. Each is a blank cover that is one slot wide with screws at the left and right. The system ships with these installed. RGB Networks recommends that these always remain in place.

Chassis Support Shelf

The VMG-8 chassis support shelf ([Figure 19](#)) is designed to provide additional support at the rear of the rack-mounted chassis. Installation of the shelf is optional.

Figure 19. VMG-8 Chassis Support Shelf



Physical Installation

This chapter provides the necessary information for installing the VMG-8 into a rack and applying power. Please read this entire chapter before beginning the installation procedure. Successful completion of this installation readies the system for the initial configuration described in [Chapter 4](#), “Initial Configuration.”

In This Chapter:

- “Site Preparation,” in next section.
- “Electrostatic Discharge (ESD) Prevention” on page 33.
- “Unpacking and Inspection” on page 34.
- “Installation Instructions” on page 35.

Site Preparation

RGB Networks recommends that the VMG operations site be prepared as described in the following topics:

- “Tools and Equipment,” in next section.
- “Site Equipment” on page 31.
- “Personnel” on page 32.
- “Site Space Requirements” on page 32.
- “Rack Requirements” on page 32.
- “Power Connectivity” on page 33.

Tools and Equipment

The installation guidelines in this manual use the following tools, which you should provide at your installation site.

- 3/8” box wrench, socket wrench, or nut driver to attach cables to the DC PEM.
- 5/16” screwdriver and suitable screws to rack mount the chassis.
- Cable ties and cable clamps to secure power cords and signal cables.
- An anti-static pad or treatment if installing on vinyl composite tile, linoleum, or carpet.

Site Equipment

The installation guidelines in this manual require the following equipment at the operations site:

- An equipment rack: EIA compliant 19”:
 - The rack must be accessible from the front and rear for installation.
 - Ensure that any stabilizers that came with the equipment rack have been installed before mounting the chassis in the rack.
 - See also “[Rack Requirements](#)” on page 32.

- For DC power:
 - Dedicated primary branch circuit protection for each line feed supplied to the chassis.
 - It is recommended to use appropriately-sized circuit breakers that conform to local codes.
 - See also “[Power Connectivity](#)” on page 33.
- For AC power: Dedicated outlet at wall in close proximity to the installation rack. See also “[AC Power](#)” on page 27.
- An ESD protection strap for use when installing or removing modules.
- A PC or workstation running terminal emulation software (such as Microsoft HyperTerminal). This will be used to communicate with the NPM management port during initial configuration.
- Slotted screwdriver.
- An Ethernet cable long enough to connect the VMG-8 to the management workstation.

Personnel

Minimally, two people are required for lifting the VMG-8 chassis, and for positioning and securing the chassis to the operations rack.

Site Space Requirements

This equipment is intended for use only in a Restricted Access Location. The VMG-8 relies on the building installation’s safety measures for protection against short-circuit, over-current, and earth (grounding) fault. Precaution must be taken to ensure these protective devices are in place prior to installation, and that they are properly rated to protect the system.

- Keep tools and chassis components off the floor and away from foot traffic.
- Clear the area of possible hazards, such as wet floors, ungrounded power cables, and missing safety grounds.
- Keep the area around the chassis free from dust and foreign conductive material.



Note: For complete environmental requirements, see “[Environmental Specifications](#)” on page 65.

Rack Requirements

1. Elevated Operating Ambient – If installed in a closed or multi-rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
2. Reduced Air Flow – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Air flow on the VMG-8 is from right (ingress from the air filter) to left (from the front of the chassis).
3. Mechanical Loading – Mounting of the equipment in the rack should be in such a way as to ensure an even mechanical load in the equipment rack.
4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. When connecting equipment to a supply circuit, proper consideration should be taken to avoid overloading the supply circuits.

5. **Reliable Earthing** – Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).



Note: *If installing the VMG-8 into a rack that is already partially populated, 7RU of space is required.*

Power Connectivity

Power cables and cord for use with your VMG-8 are described in this section.

DC-Power Cables

To ensure the safe and continued operation of the system, use specifications for chassis ground cabling (Table 15) and power cabling (Table 16).

Table 15. DC Ground Connection Specifications

Parameter	Specification
Wire size	8 AWG.
Terminal	Use the cable shelf ground terminal provided on the rear of the chassis (Figure 22).



Note: *Use only a UL listed crimp connector.*

Table 16. DC Power Connection Specifications

Parameter	Specification
Wire size	4 AWG, maximum length 3.0 m. Terminal connections must use only UL listed ring terminals, such as the Panduit PM6-6R-L ring terminal.

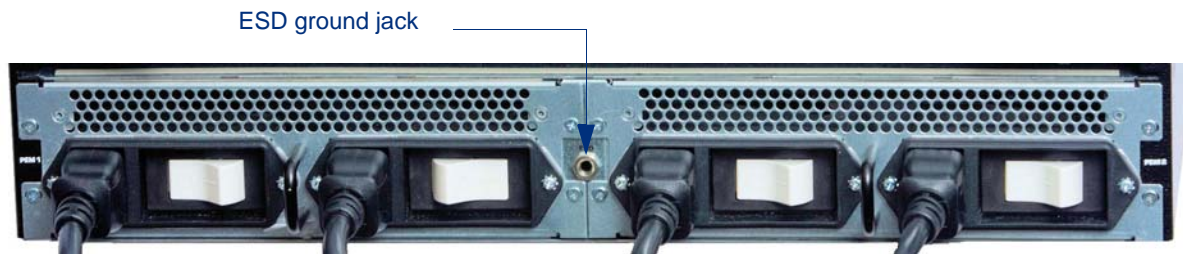
AC-Power Cord

International AC power cords will be supplied (or recommended) as needed to ensure that AC power connectivity is compliant with power requirements for your operations site.

Electrostatic Discharge (ESD) Prevention

To prevent ESD damage during installation or removal of VMG-8 modules, wear an ESD ground strap, and connect it to the ESD terminal at the rear of the chassis (Figure 20).

Figure 20. Location of ESD Jack



Unpacking and Inspection

Begin inspection as soon as your VMG-8 shipment arrives. If you see damage (such as punctures, damp spots, or crushed corners) anywhere on the shipping carton, do not proceed with the unpacking instruction in this chapter. Immediately notify the transfer company about the damage, and record the damage on the bill of lading.

Store the VMG-8 in its original packaging until it is needed for installation.

Once you begin to unpack, do not discard any of the packing materials until you have completed the unpacking procedures and verified the integrity of your VMG-8 shipment. You may need to reuse the materials if returning the product to RGB Networks.



Caution: When opening the shipping carton, use caution to avoid damaging the VMG-8.



Caution: Do NOT use module handles to lift the VMG system. The handles provided on the fan trays, PEMs, or cable trays cannot support the weight of the chassis.

Inspect Contents

The VMG-8 arrives as a fully populated system (in compliance with your order), which includes the following components:

- System modules, as ordered.
- Power Supply Modules (PEMs): either AC or DC:
 - For DC: Up to two Power Entry Modules (PEMs).
 - For AC: Up to four power supply units and up to two AC PEMs.
- Two front fan trays, and two rear fan trays.
- Up to two Shelf Control Managers (SCMs).
- Six Rear Transition Module (RTM) Filler Panels.
- One serial cable with serial connector.
- One chassis support shelf.
- Packaging.

Verify Receipt

After removing the shipping contents from the carton, compare the contents of the shipping container against the packaging list to ensure you have received all components required for your installation of the VMG-8.

- If any components are missing, contact your RGB Networks representative.
- If you need assistance, use the contact information provided in [“Technical Assistance” on page 10](#).

Installation Instructions

Installation of a new VMG system typically encompasses the tasks described in the following topics:

- “Use ESD Protection,” in next section
- “Prepare the Chassis” on page 36
- “Install the Chassis at the Operations Rack” on page 37
- “Prepare the Power Supply (For DC)” on page 37
- “Prepare the Power Supply (for AC)” on page 39
- “Load the Application Modules” on page 40
- “Connect Console Cable” on page 44
- “Double-Check the Physical Installation” on page 44
- “Power Up and Verify” on page 44

Use ESD Protection

Ground yourself by attaching the jack from the ESD wrist strap to the ESD connector located at the rear of the VMG chassis.



Warning! *Danger of electrostatic discharge. Static electricity can harm delicate components inside the VMG-8. An ESD wrist strap must be worn before unpacking or exchanging any part or electric component.*

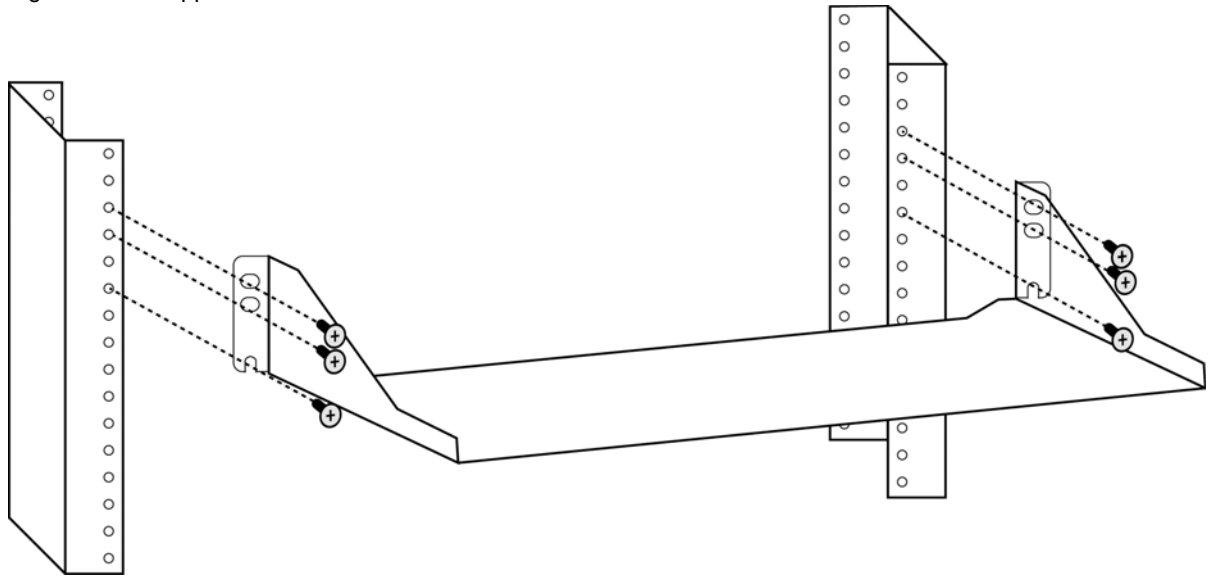
Prepare the Rack

If you elect to use the chassis support shelf ([Figure 21](#)), it must be installed before you begin working with the chassis.

1. From the back side of the rack, partially insert a screw at the bottom of the Rack Unit (RU) where the tray will sit, and repeat for the other side of the rack.
2. Set the U-shaped hole of the support shelf over the screws and continue inserting the four remaining screws. When installed correctly, the bottom screw will be at the bottom of one RU and the top screw will be at the bottom of the next RU up.

After all six screws are tightened, the support shelf is ready to accept the weight of the chassis.

Figure 21. Support Shelf



Prepare the Chassis

To reduce the weight of the chassis prior to lifting it into the rack, remove the installed application modules from the front slots of the chassis:

- Use ESD precautions: prepare an antistatic surface on which to temporarily place the modules.
- Unlock and extract the system modules (see “[Handling VMG Modules-New System](#),” in next section) from the chassis front.

Note: Do not attempt to remove the PEMs from the rear of the chassis.

- Set each module aside on the static-proof surface or in a static-proof bag.

Handling VMG Modules-New System

This section provides basic guidelines for removing and inserting modules for a new system.

Note: For instructions about how to remove a module from a live system, see “[Hot Swap Indicators](#)” on page 54 and “[Handling Application Modules-Live System](#)” on page 55.

Removal

1. Unscrew the two thumb screws at both sides of the module faceplate.
2. While holding both ejector handles on the module, simultaneously open each until fully extended.
3. Continue holding the ejector handles and guide the module out and away from the chassis.
4. Place the module on an antistatic surface.

Insertion

1. Ensure that both ejectors are in open position.
2. Grasp both open ejectors of the module, carefully align the edge of the card with the slot in the chassis, and gently slide the card into its slot.

3. Guide the module until you feel it press against the chassis backplane.
4. Push each ejector handle to closed position. This will lock the module into the rail.
5. Tighten the two thumb screws at both sides of the module faceplate.

Install the Chassis at the Operations Rack

From the front of the rack, guide the emptied chassis into the rack space until the chassis flanges flush against the rack, and the mounting holes are aligned.

- One person should hold the chassis from the front.
- The other person should work from the chassis rear to guide the chassis onto to the chassis shelf.



Caution: *Do NOT use module handles to lift the VMG system. The handles provided on the fan trays, PEMs, or cable trays cannot support the weight of the chassis.*

Using eight (8) chassis rack mount screws, secure the chassis into the rack, tightening each screw incrementally until all four are evenly snug-tight.

Prepare the Power Supply (For DC)

Use information in the following sections to set up the DC power supply for the VMG-8.

- “Electrical Warnings,” next.
- “Ground the Chassis” on page 38.
- “Connect DC Cables” on page 38.

Electrical Warnings



Warning! *High leakage current. Earth connection is essential before connecting supply.*



Warning! *Before working, ensure that the power is removed from the power connection cables. When the system is powered on, do **NOT** touch the power terminals.*



Warning! *Hazardous voltage! Before working, ensure that the power connection cables are disconnected from power. When the system is powered on, do **NOT** touch the power terminals.*



Warning! *The VMG-8 is intended to be grounded. Ensure that the ground terminals are connected to the Protective Earth (PE) of the building.*



Warning! *Avoid electric overload. To avoid electrical hazard, do not make connections to terminals outside the specified voltage range for the VMG-8.*

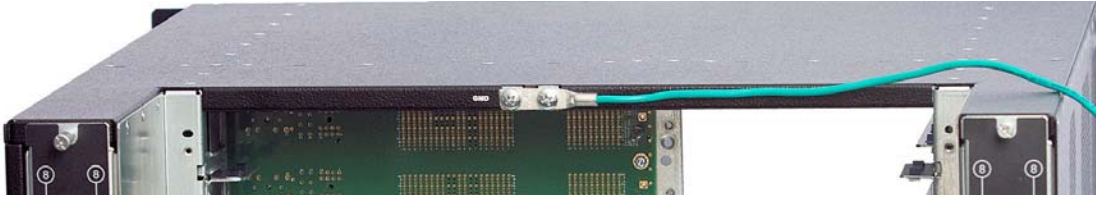


Warning! *Remove jewelry (rings, watches, etc.) before working on equipment that is connected to power lines.*

Ground the Chassis

The VMG-8 provides a shelf ground terminal—labelled **GND**—at the upper edge of the rear chassis. The shelf ground terminal provides two threaded screws (10-32 UNF) with a 15.88 mm (.625 in.) spacing between thread centers to connect a double lug Shelf ground terminal cable.

Figure 22. Shelf Ground Terminal



Use your site guidelines to determine the site grounding point for the chassis.

Connect DC Cables

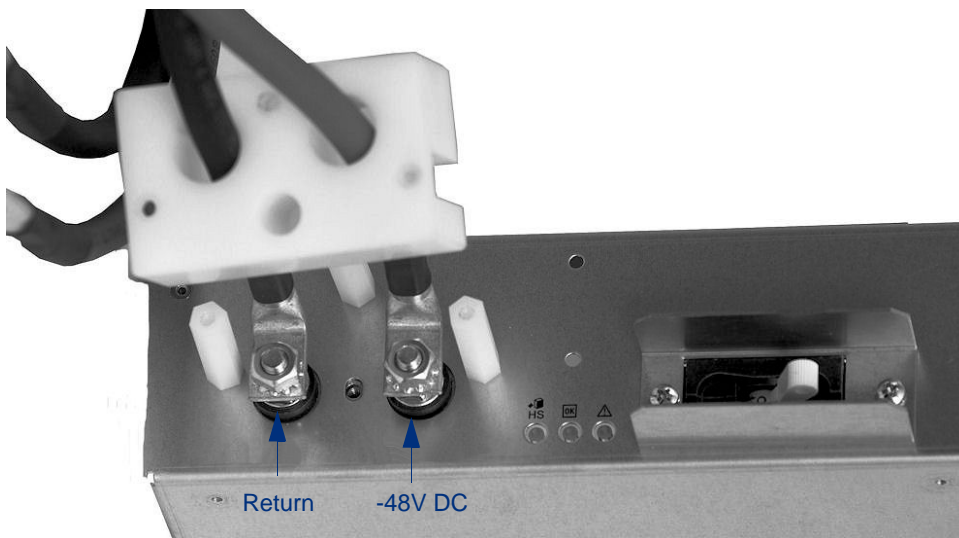
The DC PEM provides two 1/4" studs (1/4 - 20 UNC) for **Return** and for **48V DC**. See “[DC-Power Cables](#)” on [page 33](#) for cable specifications appropriate for use with these studs.



Note: All VMG-8 PEMs are installed and serviced only by RGB Networks.

To prevent accidental shorting, a safety cover fits over the power feeds and studs on each DC PEM. You may opt to ground the **Return** to the chassis ground either at the chassis, the rack, or back at the DC source.

Figure 23. PEM Cable Connections (Safety Cover Removed)



To connect DC cables to the VMG-8 DC PEM:

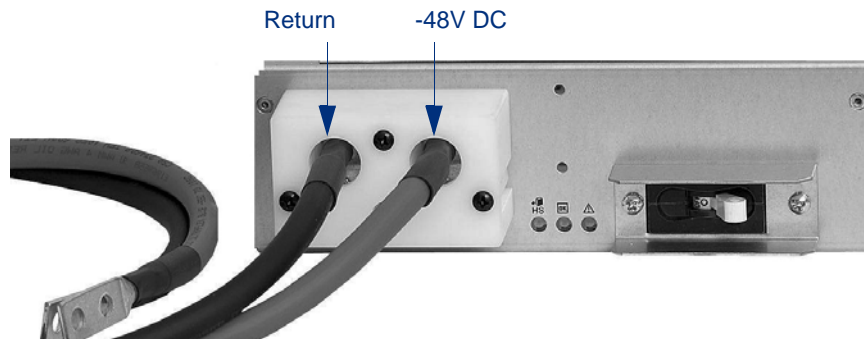
1. Ensure that the power supply is turned off.
2. Remove the PEM safety cover.
3. Slide the cable through the holes on the safety cover.
4. Connect the power cables to the power terminal. Torque the bolts to 6.8N-m (5 foot pounds).



Caution: Verify the correct polarity of the -48V DC and the RTN cables.

5. Affix the cables with cable ties.
6. Re-attach the PEM terminal cover (Figure 24).

Figure 24. PEM Cable Connections (Safety Cover Attached)



Prepare the Power Supply (for AC)

The AC system can contain up to four AC power supply units at the front of the chassis. For a fully loaded AC power supply load, up to two AC PEMs would be installed (by RGB Networks) at the rear of the chassis. AC power supply units cannot function without an AC PEM: one AC PEM is required for each pair of AC power supplies. AC power supplies cannot use the DC PEM.



Note: All VMG-8 PEMs are installed and serviced only by RGB Networks.



Warning! High leakage current. Earth connection is essential before connecting supply.

AC Power Supply Units (PSUs)

Each AC power supply unit must be firmly seated at the chassis-front AC power bay. If you are installing the AC power supply unit for your system, use the following steps to ensure that each is properly inserted:

1. Set the lever on the power supply unit into Open position (Figure 25).

Figure 25. AC Power Supply Unit: Ejector/Insertion Lever

Lever is Open.
It must be in this position
when inserting AC PSU
into the chassis.



Lever is Closed.
It must be in this
position to fully seat the
AC PSU, and during
chassis operations.



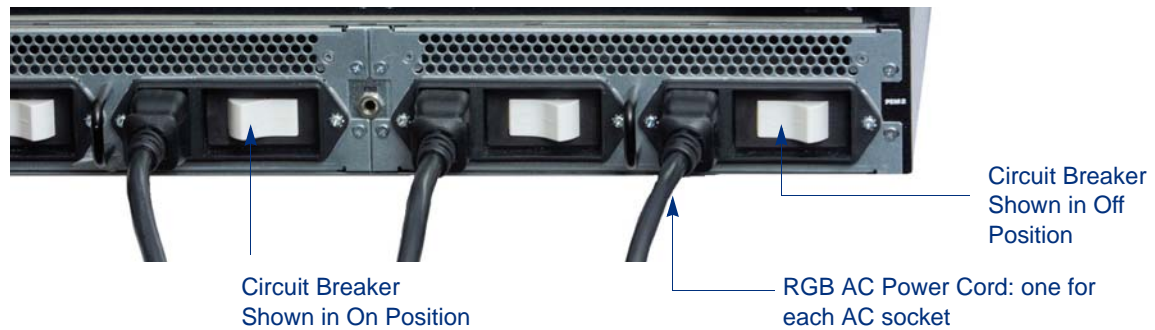
2. Guide the power supply unit into a slot, at the chassis front power bay, until it stops.

3. Set the lever on the power supply unit into Closed position (Figure 25). This will push the power supply unit into fully seated position and lock it in place.

AC Power Entry Modules (PEMs)

One AC PEM is installed at the chassis rear for each pair of AC PSUs. The AC PEM provides dual power cord sockets and circuit breakers (Figure 26).

Figure 26. AC Power Entry Modules



AC Power Cord

Use only the AC power cords provided by RGB Networks. Insert one into each applicable AC PEM socket and plug it into the dedicated wall outlet near the installation rack.

Load the Application Modules

Use the guidelines from “[Handling VMG Modules-New System](#)” on page 36, re-insert the modules into the chassis.



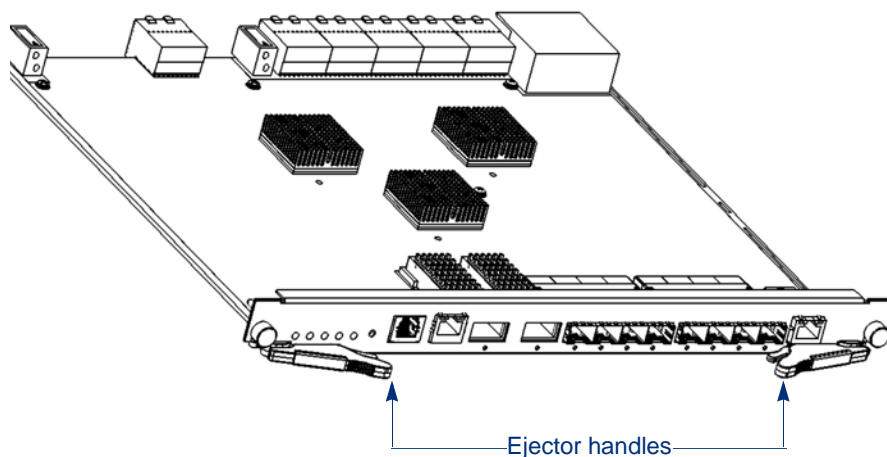
Warning! *At the front of the chassis, any empty card slot must be fitted with a filler panel to maintain proper air flow.
The system ships with rear slots 3 - 8 covered by RTMs. Do not remove these.*

Network Processor Module

Slot Assignment: VMG chassis-front, slot 1 and/or 2

Use the guidelines in “[Handling VMG Modules-New System](#)” on page 36 to place and secure the NPM(s) (Figure 27).

Figure 27. NPM Circuit Board



Application Media Processor

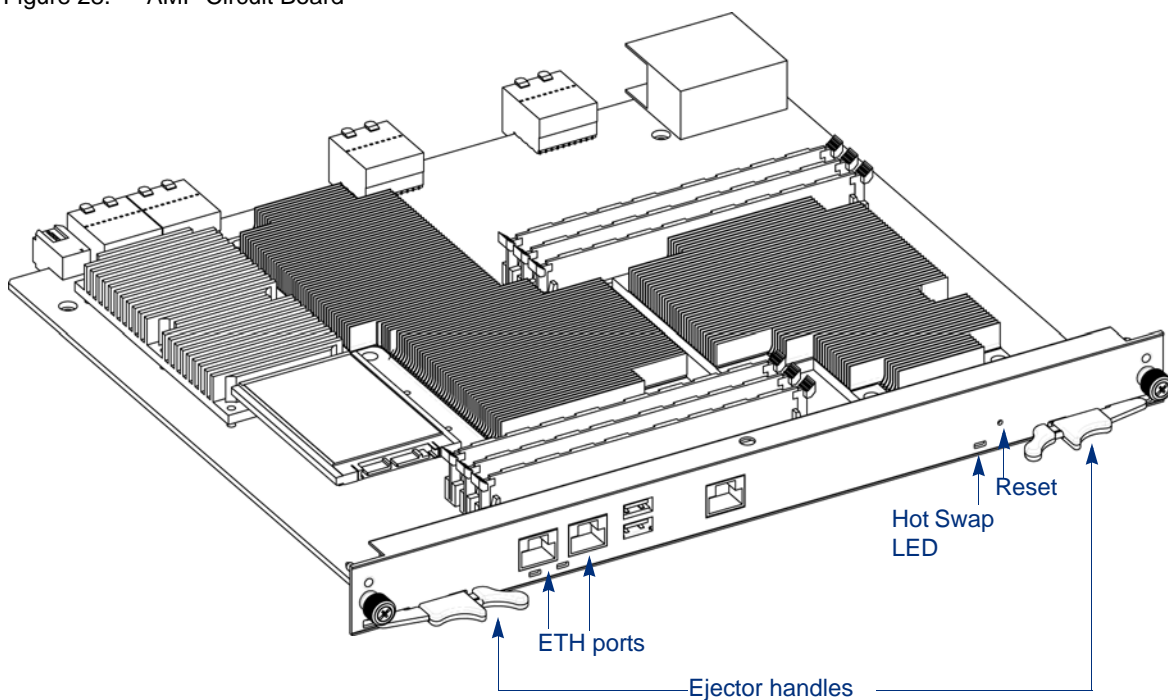
Slot Assignment: VMG chassis-front, slot 3 and/or 4



Note: *The quantity of AMPs installed must equal the quantity of NPMs installed.*

Use the guidelines in “Handling VMG Modules-New System” on page 36 to place and secure the AMP(s) (Figure 28).

Figure 28. AMP Circuit Board



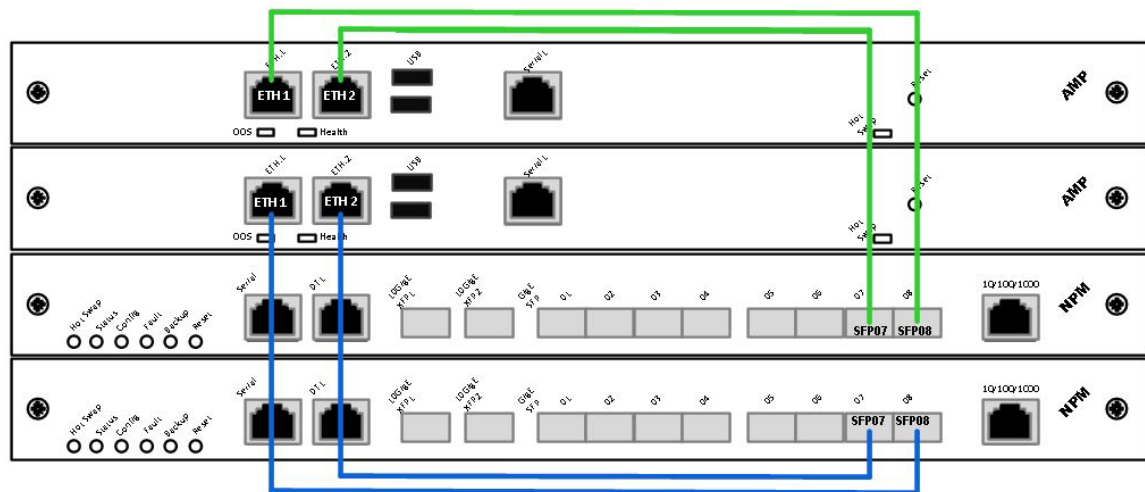
AMP-to-NPM Cabling

Once the AMP card is installed, use the cable Ethernet cable provided by RGB Networks to connect the AMP card to its corresponding NPM card:

- Connect the AMP card in slot 3 to the NPM in slot 1.
- Connect the AMP card in slot 4 to the NPM in slot 2.
- Connect the Ethernet cable to ETH 1 on the AMP and GigE port 8 on the NPM.
- Connect the Ethernet cable to ETH 2 on the AMP and GigE port 7 on the NPM.

Figure 29 shows the front panel connections for a 2 NPM/2 AMP configuration at the VMG-8.

Figure 29. AMP Connections to NPMs



Additional information about AMP setup is available in the *Application Media Processor (AMP) Installation Guide for VMG Systems* (part number 250-0104-01).

Video Processing Module, and Transcoding Module

Slot Assignment: VMG chassis-front, any slot in the range 3 to 8

Use guidelines in “[Handling VMG Modules-New System](#)” on page 36 to place and secure the VPM(s) (Figure 30) or TCM(s) (Figure 31).

Figure 30. VPM Circuit Board

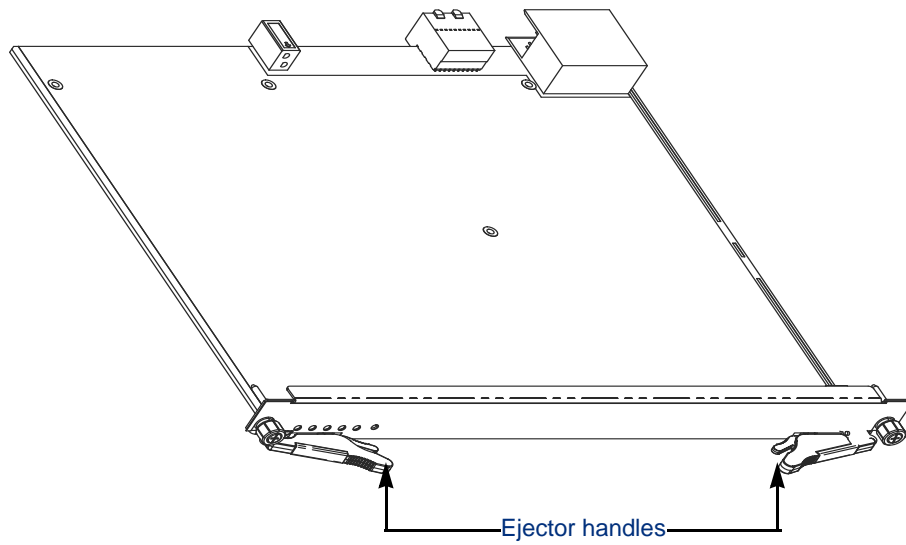
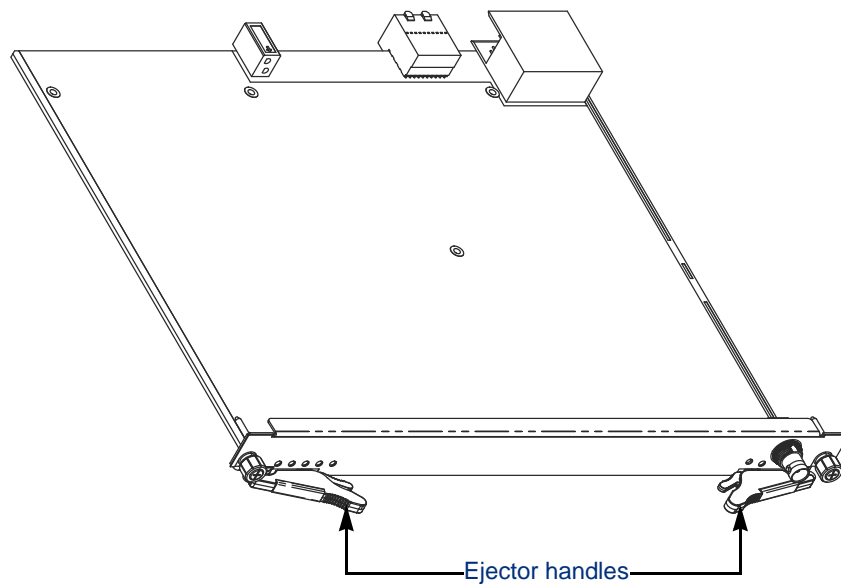


Figure 31. TCM Circuit Board



Double-Check the Physical Installation

- Ensure that all modules are firmly seated.
- Ensure that the thumb screws for all modules are tightly secured.



Caution: *Ensure that RGB-supplied filler panels are installed in empty slots. This is necessary to maintain proper airflow and prevent air from escaping out of the front of an open slot.*

Power Up and Verify

1. On a DC System, connect power to the PEMs.
On an AC System, set the circuit breaker of each AC PEM to be used to the ON position.
2. Monitor the boot-up process, which proceeds as follows:
 - All of the LEDs on the SCM, the Fan Trays, the PEMs, the VPMs, the TCMs, and the NPMs illuminate.
 - The fans spin up to full speed.
 - The fans reduce speed to 25%, normal operational speed.
 - The red LEDs on the PEMs and fan trays turn off.
 - All blue Hot-Swap LEDs blink.
 - All blue Hot-Swap LEDs turn off.
 - All Status-OK LEDs should be green.



Note: *The status LED of the active SCM should be solid green.*

Connect Console Cable

This step is necessary for setup of the console from which the initial configuration (as detailed in the next chapter) will be performed.

Required equipment

- Workstation with terminal emulation program (like such as Microsoft Hyperterminal).
- RGB-specific serial cable (included in accessory package).

Procedure

1. Connect the serial cable from your workstation directly to the serial port of the NPM.
2. At the console, open a terminal emulation program with the following parameters:

```
19,200 bits per second
data bits=8
parity=0
stop bits=1
flow control=NONE
```
3. Tap the <ENTER> key several times to receive a prompt.



Note: *If the VMG has just been powered on (or the NPM has been inserted in the chassis), boot messages will be displayed. There are three sets of messages:*

- *The first set comes from startup of the OS kernel and the device drivers.*
 - *The second set consists of internal communications.*
 - *The third set comes from the startup up of video applications.*
4. If or when the boot messages have finished scrolling, the console program will be displayed. Tapping <ENTER> should re-display the TCON console program menu.
 5. Proceed to [“Using TCON \(Temporary Console\) to Set Initial Configuration”](#) on page 47 to set the IP configuration of the VMG.

Initial Configuration

Completion of the initial configuration enables management of the VMG by *Element Manager*, a Web-based GUI for configuration, monitoring and management of the chassis, NPMs, AMPs, TCMs, and VPMs. All configuration, monitoring and management control are XML-RPC based.

This chapter provides information on the initial configuration of the RGB VMG chassis. For additional information about management of the VMG-8, refer to the *VMG Software User Guide*.

In This Chapter:

- “VMG Physical and Virtual IP Addresses,” in next section.
- “Prerequisites” on page 47.
- “Using TCON (Temporary Console) to Set Initial Configuration” on page 47.
- “Using Element Manager to Finalize Initial Configuration” on page 50.

VMG Physical and Virtual IP Addresses

To provide NPM redundancy, there are two types of IP addresses employed by the VMG: physical and virtual. Each NPM installed in the VMG must have a physical address assigned to it during the initial system configuration. See “Using TCON (Temporary Console) to Set Initial Configuration” on page 47.

The VMG Element Manager uses 10.1.1.1 / 255.255.255.0 as the default IP address and subnet mask.

Configuring a virtual IP address for the VMG system means that IP connectivity to the VMG remains unchanged regardless of which NPM is active. Once the virtual IP address is configured on the VMG, this address will be used for subsequent access to the active NPM (the management interface) of the VMG.

Prerequisites

Before beginning, be sure the console is connected to an NPM, as described in [Chapter 3, “Connect Console Cable.”](#)

In a VMG system containing two NPMs, the configuration requires the following network addresses:

- Three IPv4 addresses (all in the same IP subnet).
- The subnet mask (netmask).
- The default router (gateway) address.
- The address of a DNS server (if one is not available, the address 0.0.0.0 may be used).

Initial configuration consists of connecting through the serial port and setting the *physical* IPv4 address, net mask, default router (gateway) address, and DNS server address for each NPM in the VMG. After the IP configuration has been set for the NPMs, a Web browser is used to complete the initial configuration. The browser is used to configure the following:

- The Virtual IP address that the VMG-8 will use for GUI management access.
Note that 10.0.1x and 10.0.2x subnets are reserved for VMG internal use only and cannot be used for the management interface.
- The address of one or more NTP servers.
- The time zone.
- The address of the syslog server (optional).



Note: *Although the syslog server is optional, it is highly recommended!*



Note: *The DNS, NTP and syslog servers are not required to be on the same IP subnet as the VMG. However, it is strongly recommended that the same NTP server be used for the VMG and all of its DPI (Ad) servers.*

Using TCON (Temporary Console) to Set Initial Configuration

The temporary console (TCON) program displays a menu of actions, then prompts for the number identifying the action. Actions that require further input will issue a prompt for the needed values. If the **Enter** key is pressed when prompted for action, the menu will be re-displayed.



Note: *Customer use of TCON and the command line interface (CLI) is supported for initial configuration only as described in this section and “Using TCON (Temporary Console) to Set Initial Configuration” on page 47.*

The TCON Main Menu

The TCON welcome screen is the TCON main menu, which contains five options.

Welcome to the VMG

Choose action:

- 1)Display Mgmt IF configuration
- 2)Configure Mgmt IF IP address, netmask, and gateway
- 3)Check connectivity from Mgmt IF to gateway
- 4)Reboot NPM
- 5)Display build info

Enter number of your choice:

For initial configuration, use options 1, 2, 3, and 5, as demonstrated in the following sections:

- “[Viewing Current Configuration](#),” in the next section.
- “[Setting Network Addresses for the NPM](#)” on page 49.
- “[Verifying Gateway Connectivity](#)” on page 49.
- “[Viewing VMG Build Information](#)” on page 50.

Once the management interface is configured for each NPM, the NPMs can be rebooted (using option 4 of the TCON main menu). You can then use a Web browser to access the *Element Manager* and finish the initial configuration (as described in “[Using Element Manager to Finalize Initial Configuration](#)” on page 50).

Viewing Current Configuration

To view the configuration currently saved to the NPM, select **1** from the TCON main menu. Output similar to the following example will be displayed.

Enter number of your choice: 1

Configuration of Mgmt interface

Configuration Saved in EEPROM

```
MACblock=00:11:07:00:03:50 (used for all interfaces)
MAC=00:11:07:00:03:5a
IP=10.1.1.1
Mask=255.255.255.0
GW=0.0.0.0
DNS=0.0.0.0
```

Configuration presently on system

```
MAC=00:11:07:00:03:5a
IP=10.1.1.1
Mask=255.255.255.0
GW=0.0.0.0
DNS=0.0.0.0
-----
```

Note: A management interface must be configured for each installed NPM at the VMG-8 system.

Setting Network Addresses for the NPM

To set the network addresses for the NPM, select **2** from the TCON main menu. Output similar to the following example will be displayed.

```
Enter number of your choice: 2
```

```
Enter the mgmt interface IP address, netmask, gateway address, and DNS
address
```

```
Format is a single line of 4 dotted quads, for example:
```

```
10.0.0.34      255.255.255.0      10.0.0.1      0.0.0.0
```

```
Hint: use 0.0.0.0 for DNS when none is available
values:
```

At the values: line, enter the single line of four dotted quads for your configuration.

Enter values for each installed NPM in the VMG-8 system.

Verifying Gateway Connectivity

To verify connectivity with the default router (gateway), select **3** from the TCON main menu. Output similar to the following example will be displayed, where connectivity is enabled.

```
Enter number of your choice: 3
```

```
Pinging 10.32.96.1
```

```
-----
PING 10.32.96.1 (10.32.96.1): 56 data bytes
64 bytes from 10.32.96.1: seq=0 ttl=255 time=2.6 ms
--- 10.32.96.1 ping statistics ---
1 packets transmitted, 1 packets received, 0% packet loss
round-trip min/avg/max = 2.6/2.6/2.6 ms
-----
```

```
** Connectivity OK
```

If connectivity is not enabled, a screen similar to the following example will be displayed.

```
Enter number of your choice: 3
```

```
Pinging 10.32.96.1
```

```
-----
PING 10.32.96.1 (10.32.96.1): 56 data bytes
--- 10.32.96.1 ping statistics ---
1 packets transmitted, 0 packets received, 100% packet loss
-----
```

```
** Have a connectivity problem
```

Viewing VMG Build Information

To examine current system build information, select **5** from the TCON main menu. Output similar to the following example will be displayed.

Enter number of your choice: 5

Build info

```
-----
Build at buildbot1, 12/03/08 10:52:39, by builder,
/opt/buildbot/VMG/slaves/1/VMG/build/VMG_sw_dev/host/scripts
Repository UUID: 938d8f3e-7cd8-0310-8ac0-d259df6d3ab9
Revision: 17901
-----
```

Using Element Manager to Finalize Initial Configuration

Using a web browser, enter the physical IP address of the management interface on the active NPM.

Note: *If two NPMs are installed, the active NPM will be the module in Slot 1.*

The URL will be the IP address preceded by 'http://' (e.g., if the IP address is 10.32.97.181 the URL is http://10.32.97.181). If the web browser successfully contacts the VMG, the display will show the following:

Figure 32. VMG Initial Login Page

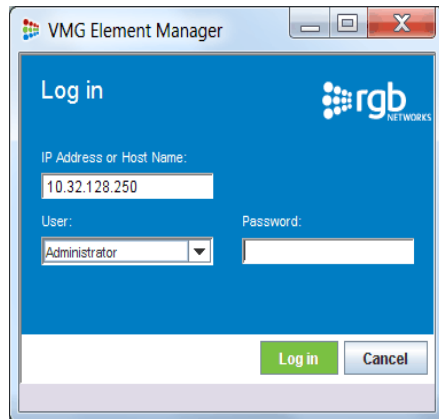


Note: *The system must have a copy of version 5.0 or above of the standard edition Java runtime environment (JRE) installed. If not, click the **Download Java SDK (Please download 5.0 version, if you have not done so.)** link. The browser will redirect to the Sun Systems website where the JRE may be downloaded. For more information on installing the JRE, refer to “The VMG Element Manager,” Chapter 3 in the VMG Software User Guide.*

1. Click the **Launch VMG Element Manager** link.

After clicking through the various Java applet options and accepting the EULA, the *VMG Element Manager* login screen is displayed (Figure 33).

Figure 33. VMG Element Manager Login



2. At the *Log in* screen, make sure the **User** field is set to *Administrator*, then enter *Admin* in the **Password** field.

If using an AAA server account, *type* the AAA login name in the **User** field and the AAA password in the **Password** field).

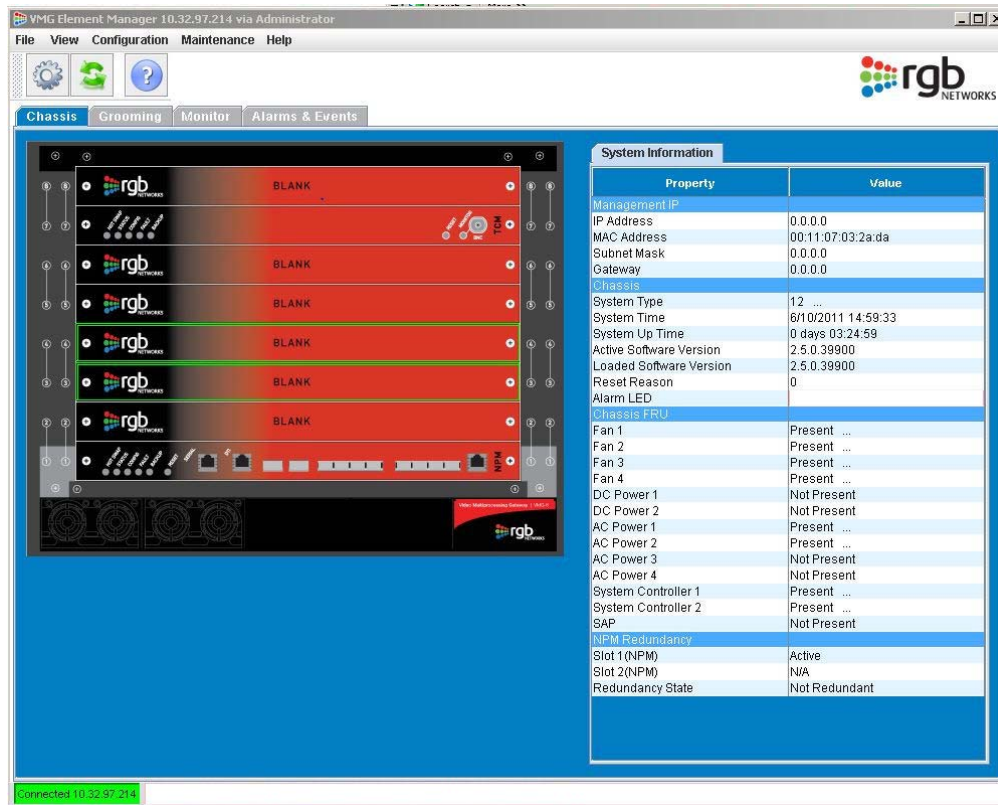
3. Click the **Log in** button to continue.

Upon logging in, the initial view defaults to the **Chassis** tab as seen in Figure 34, which displays a representation of the physical VMG-8 and its populated slots.

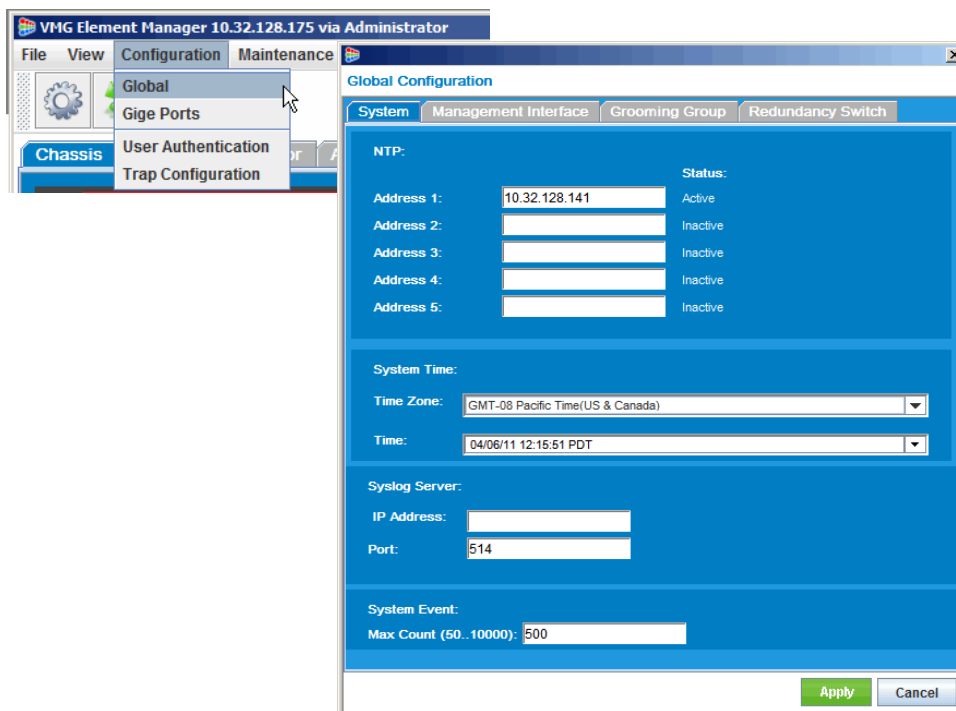
The **System Information** window on the right side of the screen provides details of the system in general.

Right-clicking on a particular card in the chassis opens a pop-up window for viewing additional information or configuration parameters for the card or system.

You can also use drop-down functions available from the Menu Bar located at the upper edge of the Element Manager window.

Figure 34. *Element Manager - Chassis View*

- From the main menu bar, select **Configuration** -> **Global** from the drop down menu to present the Global Configuration window, which default to display of the **System** tab (Figure 35).

Figure 35. *Accessing System Parameters*

5. In the **System** tab, enter the value for at least one NTP server address and the **Time Zone**.
6. Optionally, enter the **Syslog Server IP Address** and **Port** number (the normal UDP port for syslog is 514).
7. Click on the **Management Interface** tab (Figure 36) to set values for the virtual (management) IP address of the system. This IP address will be used for all subsequent access to the VMG-8.

Figure 36. Global Configuration - Management Interface Tab

Global Configuration

System Management Interface Grooming Group Redundancy Switch

Mac Address: 00:11:22:33:44:1a

Virtual IP Address

IP Address: 10.32.128.250

Subnet Mask: 255.255.255.0

Gateway: 10.32.128.1

Active NPM Physical IP Address

IP Address: 10.32.128.251

Subnet Mask: 255.255.255.0

Apply Cancel

8. In the **Virtual IP Address** section, enter the **IP Address**, **Subnet Mask** (netmask), and **Gateway** (default router) address (if used).
9. Click the **Apply** button to commit the values and complete initial configuration.



Note: For complete instructions on configuring the VMG-8, refer to the VMG Software User Guide.

Troubleshooting and Maintenance

This chapter provides recommended procedures for maintenance of VMG-8 system components. Troubleshooting advice and RGB Customer Support information is also included in this chapter.

In This Chapter:

- “Hot Swap Indicators,” in next section.
- “Handling Application Modules-Live System” on page 55.
- “DC Power Entry Module” on page 56.
- “Fan Tray” on page 56.
- “Shelf Control Manager” on page 57.
- “Air Filter Tray” on page 57.
- “FRU Reference” on page 58.
- “If You Need Assistance” on page 59.



Warning! *Static electricity can harm delicate components inside the chassis. You must wear an ESD wrist strap before exchanging any part or electrical component. Connect your ESD strap to the ESD jack at the rear of the VMG-8 chassis.*

Hot Swap Indicators

Before removing or servicing modules on a live system, it is important to notice current swap-readiness of the module, as indicated by the Hot Swap LED at the front panel of the module. During operations, the Hot Swap LED remains Off until the ejector levers are opened. After opening the levers, you should wait until the Hot Swap LED becomes solid blue before extracting the module from the system. [Table 17](#) lists the LED information important for hot swaps of the VMG modules.

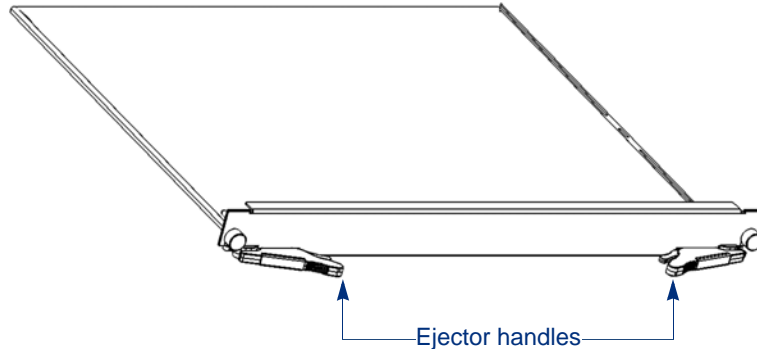
Table 17. Hot Swap LED

State	Description
Off	The shelf manager is not ready to be removed/disconnected from the chassis.
Solid Blue	The shelf manager is ready to be removed/disconnected from the chassis.
Long-blink	The shelf manager is activating.
Short-blink	Deactivation in progress.

Handling Application Modules-Live System

This section describes how to handle the NPM, AMP, VPM, and TCM at VMG system that is up and running. To see instructions for a new (unpopulated and not initialized) system, refer to [“Handling VMG Modules-New System”](#) on page 36.

Figure 37. Application Module (NPM, AMP, VPM, or TCM)



Removing VMG Modules from Live System

1. Unscrew the two thumb screws at either side of the module faceplate.
2. While holding both ejector handles on the module, slowly and simultaneously unlatch them until the Hot Swap (blue) LED begins blinking.
3. Wait until the Hot Swap LED stops blinking and becomes solid blue.
4. Pull the ejector levers outward, and guide the module out and away from the chassis.

Replacing VMG Modules at Live System

1. Extend the ejector levers fully by releasing the locking trigger.
2. Carefully align the edge of the module with the slot in the chassis and gently slide it in.
3. Press the module into the backplane and lock the ejector levers in place, making sure that the retaining hooks are properly engaged.
4. Tighten the thumb screws at both ends of the module faceplate.
5. Check the LEDs to ensure that the module is functioning as expected ([Table 18](#)).

Table 18. VMG-8 Module Troubleshooting

Indication	Recommended Action
Blue hot-swap LED is unlit	Ensure the card is fully seated and the ejector handles are completely locked.
	Verify power is getting to the chassis.
Blue hot-swap LED is on solid	Ensure the ejector handles are completely seated and locked.
	Verify the Shelf Manager is properly installed.

DC Power Entry Module

Under normal operation, the green OK LED on the PEM is lit. This indicates there is supply voltage on all the power feeds and the PEM is operating normally. When the red failure LED is illuminated, there is either a supply voltage missing, a fuse blown, or the PEM is not working.

Note: *The VMG-8 PEMs are installed and serviced only by RGB Networks.*

DC PEM Circuit Breakers

The VMG-8 uses circuit breakers for over-current circuit protection. Flip the switch to the 1 (On) position if the circuit breaker is tripped (see [Figure 2-17 on page 29](#) for component locations).

Fan Tray

VMG chassis fans are not individually serviceable: do not attempt to remove or service a fan within the fan tray. Refer to [Figure 2-6 on page 16](#) for Fan Tray component information. You can remove and replace any of the four fan trays, as described in this section.

Fan Tray Removal

1. Loosen the thumb screws at both ends of the fan tray faceplate.
2. Grasp the handle(s) and slowly guide the fan tray out and away from the chassis.
When pulling the front fan tray, hold and pull both handles simultaneously.

Fan Tray Replacement

1. Guide the fan tray into a fan tray slot at the VMG-8 chassis until it is firmly seated.
2. Tighten the thumb screws at both ends of the fan tray faceplate.
3. At the fan tray LEDs, check to ensure that the OK LED is illuminated.

Shelf Control Manager

For a front panel view of the SCM, see [Figure 2-5 on page 16](#).

SCM Removal

1. Unscrew the thumb screws at the opposite ends of the SCM card.
2. Open the extraction levers slowly and simultaneously until the Hot Swap (blue) LED begins blinking.
3. Wait until the Hot Swap LED stops blinking, and becomes solid blue.
4. Extend the levers completely, continue holding them, and pull the SCM out.

SCM Replacement

1. Extend the ejector levers fully by releasing the locking trigger.
2. Carefully align the edge of the SCM with the slot in the chassis and gently slide it in.
3. Press the module into the backplane and lock the ejector levers in place, making sure that the retaining hooks are properly engaged.
4. Tighten the thumb screws at both ends of the module faceplate.
5. Check the LEDs to ensure that the module is functioning as expected.



Warning! *Some shelf managers can contain a lithium battery. There is a risk of explosion if the battery is replaced with an incorrect type. Dispose of used batteries according to the instructions.*

Air Filter Tray

The air filter tray should be checked periodically to rule out excess dust collection. A dirty air filter can cause overheating of the system. You can extend the life of the air filter by using a cleaning method ([Table 19](#)) every 3-to-6 months.

Table 19. Cleaning an Air Filter

Technique	Description
Vacuum	Gently swipe the surface of the air filter with a vacuum nozzle, taking care not to press the air filter pad out of the frame.
Forced Compressed Air	Point a compressed air nozzle in the opposite direction of the operating air flow (i.e. blow from the exhaust side toward the intake side).

Table 19. Cleaning an Air Filter (Continued)

Technique	Description
Cold Water Rinse	Point standard hose nozzle into the air filter padding and rinse with cold water. Let stand until completely dry and free of moisture prior to returning to service.
Warm, soapy water immersion	For particularly stubborn air-borne dirt, immerse the air filter tray into a solution of warm water and mild detergent. Rinse in clear water. Let stand until completely dry and free of moisture prior to returning to service.

To view the location of the Air Filter, see [Figure 2-7 on page 17](#).

Air Filter Removal

Remove the air filter by grasping the handle on the air filter tray, and sliding it out and away from the air filter slot.

Air Filter Replacement

Air filters should be replaced every three to six months, or more often (as dependent on conditions in the operations site). Carefully align, then insert the new air filter element.

FRU Reference

Field replacement units for the VMG-8 can be ordered, using the component identifiers listed in [Table 20](#).

Table 20. FRU Part Numbers

Components / Spares	Part
VMG-NPM	Network Processing Module
VMG-VPM	Video Processing Module
VMG-TCM	Transcoding Module
VMG-AMP	Application Media Processor
VMG-8-SCM	VMG-8 SCM (this is either Shelf Control Manager or Shelf Control Module)
VMG-8-FAN-TRAY-FRONT	VMG-8 front fan tray
VMG-8-FAN-TRAY-REAR	VMG-8 rear fan tray
VMG-8-AIR-FILTER	VMG-8 Replacement air filter
VMG-8-MODULE-FILLER-PANEL	VMG-8 filler panel for front slots
VMG-8-AC-PSU	VMG-8 power supply unit



Note: AC and DC PEMs are installed and serviced only by RGB Networks.

If You Need Assistance

RGB Networks Technical Response Center

For issues beyond the scope of this manual, contact the RGB Networks Technical Response Center (TRC). RGB's TRC provides 24x7 access to professional services, via phone, email, and web (see also "Technical Assistance" on page 10).

Before contacting RGB Customer Support, gather the following information:

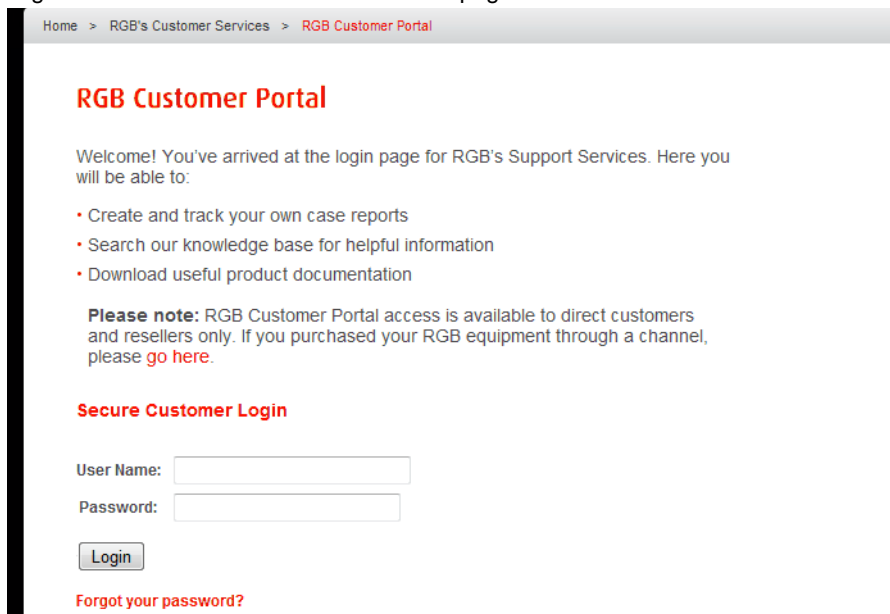
- Chassis model and serial number.
- A clear description of the problem.
- Steps to reproduce the problem, if applicable.

RGB Networks Customer Portal

To search the RGB Customer Portal for a specific document or solution, proceed as follows:

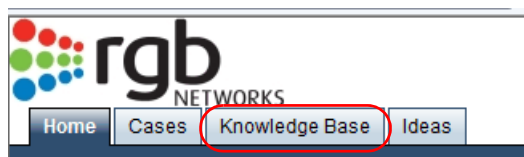
1. Log in to the [RGB Customer Portal](http://support.rgbnetworks.com) site (<http://support.rgbnetworks.com>).

Figure 38. RGB Customer Portal home page

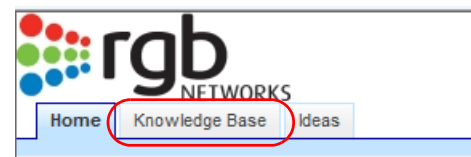


2. From the Customer Portal home page, click on the **Knowledge Base** tab:

Figure 39. Customer Portal home page - Direct and Reseller



Direct Customers - RGB Customer Portal home



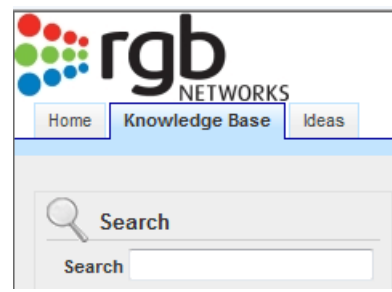
Resellers - RGB Customer Portal home

3. From the **Knowledge Base** home page, enter the desired search term in the **Search** box and tap the [Enter] key:

Figure 40. Knowledge Base search - Direct and Reseller



Direct Customers - Knowledge Base search



Resellers - Knowledge Base search

Event Log Analysis

If asked to do so by customer support, access the system event log. You will be instructed on this procedure by the customer support engineer.

System Specifications

This chapter provides system specifications for the VMG-8.

In This Chapter:

- “Application Modules,” next.
- “Input / Output Interfaces” on page 61.
- “Redundancy” on page 62.
- “Compliance” on page 62.
- “Physical Dimensions” on page 63.
- “Weight Specifications” on page 64.
- “Power Specifications” on page 64.
- “Environmental Specifications” on page 65.

Application Modules

Table 21. Application Modules

Module name	Function
Network Processing Module (NPM)	Runs host software and includes GigE input/output interfaces.
Transcoding Module (TCM)	Provides H.264 / MPEG-2 transcoding of streams.
Video Processing Modules (VPM)	Performs grooming, stat-muxing, DPI, program substitution, and video processing functions.
Application Media Processor (AMP)	Pairs with an NPM to provide audio transcoding.

Input / Output Interfaces

The VMG-8 chassis contains no interface ports. Input/output interfaces described in this section are associated with various modules, as listed in [Table 22](#).

Table 22. Input/Output interfaces

Interface	Type	Applicable Modules
Ethernet	2 x 10GigE, 8 x GigE interfaces - copper or optical	NPM, AMP
Fast Ethernet	1 x 10/100Base-T control and management interface	NPM

Table 22. Input/Output interfaces (Continued)

Interface	Type	Applicable Modules
Serial	1 x RJ-45 serial port	NPM, SCM, AMP
	1x RJ-11 serial port	NPM

Redundancy

Table 23. System and Component-Level Redundancy

Redundancy	Module
Redundancy	<ul style="list-style-type: none"> • All modules are hot-swappable. • 1:1 NPM • 1:1 AMP • N+M VPM • N+M TCM • Service level on one or all output programs. • Power supplies and fans.

Compliance

Table 24. Regulatory Standards Compliance

Category	Standard
Safety	cTUVus 60950-1:2005 2nd Edition CB Certificate
EMC	FCC - Title 47 CFR Part 15, Subpart B Canada - ICES-003, Issue 2, April 1995 CE Mark - EN55022 2006 and EN55024:1998 + A1:2001 + A2:2003

Table 24. Regulatory Standards Compliance (Continued)

Category	Standard
EMI	FCC part 15 Class A Conducted Emissions EN 55022 Class A Radiated Emissions EN 55022 Class A Electromagnetic Compatibility EN50082-1:1992-1997 - Generic Immunity Standard, Part 1: Residential, commercial and light industry. ESD Immunity EN61000-4-2 Level 3, air at 8 kV, contact at 4 kV, Criteria A Radiated RF Field Immunity EN6100-4-3 80-1000 MHz, 3 V/m, Criteria A, Modulation: 1 kHz, 80% AM, 1% step size. Immunity to Electrical Fast Transients EN61000-4-4 Signal Ports: Level 2, 0.5 kV, Criteria A Power Line: Level 2, 1 kV, Criteria A Surge Immunity EN61000-4-5 1.0 kV, 1.2/50-8/20uS, Criteria B, Un-balanced Indoor Cables and shielded cables, Common Mode. Not applicable to Intra-system cables. Not applicable to Unshielded cables that will not operate through CDN. RF Conducted Immunity EN61000-4-6 Power Lines, level 3, 15 MHz-80 MHz, 3 V emf, Criteria A, Modulation 1 kHz, 80% AM, 1% Step size. Signal lines, level 3, 150 kHz-80 MHz, 3 V emf, Criteria A, Modulation: 1 kHz, 80% AM, 1% Step size. Compliant
RoHS	Compliant

Safety

Table 25. Safety Specifications

Parameter	Value
Protected earth test	EN 60950, test current 25 A, resistance <100mOhm

Physical Dimensions

Table 26. Physical Dimensions

Parameter	Value
Height	304 mm (12") 7RU

Table 26. Physical Dimensions (Continued)

Parameter	Value
Width (with flanges)	448.2 mm (19")
Depth (with PEM covers & handles)	533.4 mm (21")

Weight Specifications

Table 27. Weight Specifications

Parameter	Value
VMG-8 weight completely assembled	43.5 Kg (96 lbs)
VMG-8 cage weight, empty	14.3 Kg (31.5 lbs)
SCM Board weight	.57 Kg (1.25 lbs)
DC PEM weight	.59 Kg (1.3 lbs) each
AC PEM weight	.54 Kg (1.2 lbs) each
AC power supply unit weight	1.7 Kg (3.79 lbs) each
Front fan tray weight	2.2 Kg (4.75 lbs) each
Rear fan tray weight	1.0 Kg (2.25 lbs) each
NPM Board weight	1.5 Kg (3.4 lbs)
VPM Board weight	1.3 Kg (3 lbs)
TCM Board weight	1.1 Kg (2.4 lbs)
AMP Board weight	2.5 Kg (5.6 lbs)

Power Specifications

DC Power

Table 28. DC Power Specifications

Parameter	Value
Input Voltage	Two DC inputs each rated: -41 VDC to -60 VDC, 60A
Input Power	<ul style="list-style-type: none"> DC 60A per power feed. 1+1 power feeds.
Power Consumption	2460W maximum - fully loaded.
Overcurrent Protection	60A automatic circuit breaker on DC PEM

AC Power

Table 29. AC Power Input Specifications

Parameter	Value
Input Voltage Range	Four AC inputs each rated: 85-264 VAC ~47-63 Hz, 12.75A - 7.9A
Input Current Max per AC Feed	12.75A @ 100 VAC, 7.9A @ 180 VAC, full load
Inrush Current per AC Feed	40A max. cold start (per ETS 300 132-1 and Bellcore specifications)
AC Power Consumption at Low Line	2550W
AC Power Consumption at High Line	2844W

Table 30. AC Power Supply Module Specifications

Parameter	Value
Input Voltage Range	85-264 VAC, 47-63 Hz
Input Current Maximum	12.75A @ 100 VAC, 7.9A @ 180 VAC, full load
Inrush Current	40A max. cold start (per ETS 300 132-1 and Bellcore specifications)
Power Factor	0.99 typical complies with IEC555, EN60555-2, EN61000-3-2
Output Power	1250W at High Line Operation (230 VAC), Derate to 1000W at Low Line Operation (90 VAC)
Output Voltage Range	-42~ -58 VDC with remote programming (factory set at -54 VDC)
Output Current	23A @ -54 VDC for High Line Operation (230 VAC), reduced to 18.5A at Low Line Operation (90 VAC)

Environmental Specifications

Table 31. Environmental Specifications

Parameter	Value
Storage temperature	-40° to 70° C (-40° to 158° F)
Operating temperature	0° to 45° C (32° to 113° F)
Ambient temperature (transient operation)	+5 ° to +55 °C (41° to 131°F)
Humidity	+5% to +85%, non-condensing
Humidity (transient operation)	+5% to +90%, non-condensing
Altitude	-71 to 3028 m (-200 to 10000 ft)

Localized Cautions and Warnings

This appendix provides French and German translations for the Caution and Warning statements in this manual.



Page number and subject	Statement type	Statement
Page 37 and Page 39	Warning	High leakage current. Earth connection is essential before connecting supply.
	Avertissement	Courant de fuite important. Il est primordial d'opérer une connexion à la terre avant de connecter le matériel.
	Warnung	Hoher Fehlerstrom. Vor dem Anlegen der Stromversorgung unbedingt auf korrekte Erdung achten.



Page number and subject	Statement type	Statement
Page 37, DC Power	Warning	Before working, ensure that the power is removed from the power connection cables. When the system is powered on, do NOT touch the power terminals.
	Avertissement	Avant de travailler, assurez-vous que les câbles d'alimentation sont hors tension. Lorsque le système est allumé, ne touchez PAS les bornes électriques.
	Warnung	Stellen Sie vor Beginn der Arbeiten sicher, dass die Netzkabel stromlos sind. Wenn das System eingeschaltet ist, dürfen die Stromanschlüsse NICHT berührt werden.



Page number and subject	Statement type	Statement
Page 28, DC Power	Caution	Although there are circuit breakers in the power entry circuit of the VMG-8, the power lines must be protected on the rack level with an appropriately sized breaker. In addition, an appropriately sized breaker must be provided in the building installation for over current/ short circuit backup protection.
	Attention	Bien qu'il y ait des disjoncteurs dans le circuit d'entrée d'alimentation du VMG-6, les lignes électriques doivent être protégées au niveau du rack avec des disjoncteurs de taille appropriée. En outre, un autre disjoncteur de taille appropriée doit être prévu dans l'installation du bâtiment pour la protection contre les surtensions/courts-circuits.
	Vorsicht	Der Eingangsschaltkreis des VMG-8 besitzt zwar Leitungsschutzschalter, jedoch müssen die Netzversorgungsleitungen im Rack mit ausreichend dimensionierten Leitungsschutzschaltern abgesichert werden. Für den Überlast- und Kurzschlusschutz muss darüber hinaus in der Gebäudeinstallation ein ausreichend dimensionierter Leitungsschutzschalter installiert werden.



Page number and subject	Statement type	Statement
Page 44, Rack Requirements, Filler Panels	Caution	Ensure that RGB-supplied filler panels are installed in empty slots. This is necessary to maintain proper airflow and prevent air from escaping out of the front of an open slot.
	Attention	Tous les panneaux d'obturation doivent être en place pour maintenir un débit d'air approprié et empêcher l'air de s'échapper par l'avant d'un logement ouvert. Ces panneaux doivent comporter un déflecteur qui s'étend jusqu'au fond de panier.
	Vorsicht	Alle Blindblenden müssen eingebaut werden, um einen ordnungsgemäßen Luftstrom sicherzustellen und zu verhindern, dass Luft durch einen offenen Steckplatz an der Vorderseite entweicht. Die Blindblenden müssen mit einem Luftleitblech bis hin zur Rückwand ausgestattet sein.



Page number and subject	Statement type	Statement
Page 37, DC Power Supply, Electrical Warnings	Warning	Hazardous voltage! Before working, ensure that the power connection cables are disconnected from power. When the system is powered on, do NOT touch the power terminals.
	Avertissement	Tension dangereuse ! Avant de travailler, assurez-vous que les câbles d'alimentation sont débranchés. Lorsque le système est allumé, ne touchez PAS les bornes électriques.
	Warnung	Gefährliche Spannung! Vergewissern Sie sich vor Beginn der Arbeiten, dass die Netzkabel von der Stromversorgung getrennt sind. Wenn das System eingeschaltet ist, dürfen die Stromanschlüsse NICHT berührt werden.



Page number and subject	Statement type	Statement
Page 37, DC Power Supply, Electrical Warnings	Warning	The VMG-8 is intended to be grounded. Ensure that the ground terminals are connected to the Protective Earth (PE) of the building.
	Avertissement	Le VMG doit être mis à la terre. Assurez-vous que les bornes de terre sont connectées à la terre du bâtiment.
	Warnung	Das VMG muss geerdet werden. Vergewissern Sie sich, dass die Erdungsanschlüsse mit dem Schutzleiter des Gebäudes verbunden sind.



Page number and subject	Statement type	Statement
Page 35, DC Power Supply, Electrical Warnings	Warning	Danger of electrostatic discharge. Static electricity can harm delicate components inside the VMG-8. An ESD wrist strap must be worn before unpacking or exchanging any part or electric component.
	Avertissement	Risque de décharge électrostatique. L'électricité statique peut endommager les composants sensibles du VMG. Portez un bracelet antistatique pour déballer ou remplacer toute pièce ou tout composant électrique.
	Warnung	Gefahr der elektrostatischen Entladung. Empfindliche Komponenten innerhalb des VMG können durch statische Elektrizität beschädigt werden. Beim Auspacken und Austauschen von Teilen oder elektrischen Komponenten muss stets ein Erdungsarmband getragen werden.



Page number and subject	Statement type	Statement
Page 37, DC Power Supply, Electrical Warnings	Warning	Avoid electric overload. To avoid electrical hazard, do not make connections to terminals outside the specified voltage range for the VMG-8.
	Avertissement	Évitez une surcharge électrique. Pour éviter les risques liés à l'électricité, n'effectuez aucune connexion à des bornes dont la tension est en dehors de la plage spécifiée pour le VMG.
	Warnung	Vermeiden Sie Überspannungen. Um Gefahren durch Strom auszuschließen, darf keine Spannung außerhalb des für das VMG zulässigen Bereichs an die Anschlüsse angelegt werden.



Page number and subject	Statement type	Statement
Page 37, DC Power Supply, Electrical Warnings	Warning	Remove jewelry (rings, watches, etc.) before working on equipment that is connected to power lines.
	Avertissement	Retirez vos bijoux (bagues, montres, etc.) avant de travailler sur un équipement branché sur l'électricité.
	Warnung	Legen Sie vor Beginn von Arbeiten an Geräten, die an die Stromversorgung angeschlossen sind, jeglichen Schmuck (Ringe, Uhren usw.) ab.



Page number and subject	Statement type	Statement
Page 34, Unpacking and Inspection	Caution	When opening the shipping carton, use caution to avoid damaging the VMG-8.
	Attention	Lors de l'ouverture du carton d'expédition, faites attention à ne pas endommager le VMG.
	Vorsicht	Gehen Sie beim Öffnen des Versandkartons vorsichtig vor, damit das VMG nicht beschädigt wird.



Page number and subject	Statement type	Statement
Page 34, Page 37 Lifting of chassis	Caution	Do NOT use module handles to lift the VMG system. The handles provided on the fan trays, PEMs, or cable trays cannot support the weight of the chassis.
	Attention	N'utilisez PAS les poignées du plateau de ventilation ou du PEM ni les chemins de câbles comme points de levage.
	Vorsicht	Der Lüftereinschub und die PEM-Griffe bzw. die Kabelrinnen dürfen NICHT als Hebepunkte genutzt werden.



Page number and subject	Statement type	Statement
Page 39, DC Cables, Polarity	Caution	Verify the correct polarity of the -48V DC and the RTN cables.
	Attention	Vérifiez la polarité du circuit -48 Vcc et des câbles RTN.
	Vorsicht	Vergewissern Sie sich, dass das -48-V-Gleichstromkabel und das RTN-Kabel richtig gepolt sind.



Page number and subject	Statement type	Statement
Page 40, Filler panel requirements	Warning	At the front of the chassis, any empty card slot must be fitted with a filler panel to maintain proper air flow. The system ships with rear slots 3 - 8 covered by RTMs. Do not remove these.
	Avertissement	Un logement de carte vide doit être couvert avec un panneau d'obturation pour maintenir un débit d'air approprié.
	Warnung	Jeder leere Kartensteckplatz muss mit einer Blindblende versehen werden, um einen ordnungsgemäßen Luftstrom sicherzustellen.



Page number and subject	Statement type	Statement
Page 54 ESD advisory	Warning	Static electricity can harm delicate components inside the chassis. You must wear an ESD wrist strap before exchanging any part or electrical component. Connect your ESD strap to the ESD jack at the rear of the VMG-8 chassis.
	Avertissement	L'électricité statique peut endommager les composants sensibles à l'intérieur du châssis. Vous devez porter un bracelet antistatique avant de remplacer toute pièce ou tout composant électrique.
	Warnung	Empfindliche Komponenten innerhalb des Gehäuses können durch statische Elektrizität beschädigt werden. Beim Austauschen von Teilen oder elektrischen Komponenten muss stets ein Erdungsarmband getragen werden.



Page number and subject	Statement type	Statement
Page 57, Lithium Battery	Warning	Some shelf managers can contain a lithium battery. There is a risk of explosion if the battery is replaced with an incorrect type. Dispose of used batteries according to the instructions.
	Avertissement	Certains shelf managers peuvent contenir une batterie au lithium. Il y a un risque d'explosion si la batterie est remplacée par une autre de type incorrect. Éliminez les batteries usagées conformément aux instructions.
	Warnung	Einige Shelf-Manager können eine Lithiumbatterie enthalten. Wenn diese durch eine Batterie eines unzulässigen Typs ersetzt wird, besteht Explosionsgefahr. Entsorgen Sie Altbatterien entsprechend den geltenden Vorschriften.

Conformity

United States



DECLARATION OF CONFORMITY

Responsible Party Name: RGB Networks, Inc.
Address: 390 West Java Drive
Sunnyvale, CA 94089, U.S.A.
Telephone: (877) 742-6389
Declares that product: Video Multiprocessing Gateway—VMG-8
Complies with Part 15 of the FCC Rules.

This device complies with Part 15 of the FCC Rules. Operations are subject to the following two conditions: (1) This device must not be allowed to cause harmful interference; (2) This device must accept any interference received, including interference that may cause undesired operation.

Modifying the equipment without RGB Networks' authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

For Class A Equipment

Note: *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.*

Canada

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

European Declaration of Conformity

RGB Networks, Inc., declares that the product Video Multiprocessing Gateway (VMG-8) to which this declaration relates is in conformity with the following standards:

- CISPR 22:2005
- EN55022:2006
- EN55024:1998 + A1:2001 + A2:2003
- EN61000-4-2: ESD immunity
- EN61000-4-3: Radiated RF field immunity
- EN61000-4-4: Immunity to electrical fast transients
- EN61000-4-5: Surge immunity
- EN61000-4-6: RF conducted immunity
- cTUVus IEC 60950 2nd Edition CB Certificate

This product follows the provisions of the EMC Directive 2004 / 108 / EC and carries the CE marking accordingly.

Support Tel: 877-RGB-NETW

FAX: (408) 701-2710

Glossary

This glossary describes some of the terminology used in this document.

A

AMP—Application Media Processor

The VMG module that performs audio transcoding.

ANSI—American National Standards Institute

ATSC—Advanced Television Systems Committee

ATSC is working to coordinate television standards among different communications media. ATSC is also developing digital television implementation strategies.

B

Bandwidth

The maximum amount of data that a transmission device is capable of carrying.

C

CBR—Constant Bit Rate

Constant bit rate encoding ensures that the rate at which a codec's output is consumed is constant. Because it is the maximum bitrate that matters, CBR is useful for streaming multimedia content on limited capacity channels. See also VBR.

Codec

A program or device used for compressing/decompressing or encoding/decoding data and signals.

CPU—Central Processing Unit

CVCT—Cable Virtual Channel Table

E

Ethernet

A frame based local area network technology. Specified in the IEEE 802.3 family of standards.

F

FCC—Federal Communications Commission

The agency that regulates communications services, including cable television, that originate in the United States.

FPGA—Field Programmable Gate Array

An array of logic gates that can be hardware-programmed to fulfill user-specified tasks.

FTP—File Transfer Protocol

A network protocol used to transfer data from one computer to another through a network.

G

GigE—Gigabit Ethernet

Technology for transmitting Ethernet frames at data transfer rates of 1 Gigabit (1,000 megabits) per second.

GUI—Graphical User Interface

A type of user interface that allows people to interact with electronic devices.

H

H.264

A block oriented motion-compensation based codec. It is equivalent to the MPEG-4 Part 10 standard.

HD—High Definition

High-resolution digital television combined with Dolby Digital surround sound (AC-3).

Headend

A regional distribution point in a television system.

I

IEEE—Institute of Electrical and Electronics Engineers

An international non-profit professional organization that develops a wide array of standards related to electricity.

IP—Internet Protocol

The network layer for the TCP/IP (Internet Protocol) Suite. It is a connectionless, best-effort packet switching protocol.

IP Address

A numerical identifier used by computers and devices on an IP network.

IPTV—Internet Protocol Television

A system where digital television is delivered to a network infrastructure using Internet Protocol through a broadband connection. Often, IPTV is delivered in conjunction with Video on Demand and other Internet services, such as web access and Voice over IP.

ITU—International Telecommunication Union

An international organization through which governments and the private sector coordinate global telecommunications networks and devices.

J**JRE—Java Runtime Environment**

JRE is made up of the Java virtual machine, the Java platform core classes, and supporting files.

L**LED—Light Emitting Diode**

A semiconductor diode that emits light when current passes through it. LEDs are used as indicators.

M**MPEG—Moving Pictures Experts Group**

A joint standards working group of ISO/IEC that develops video and audio encoding standards.

MPEG-2

A transport, audio, and video standard for compression and storage of broadcast quality television.

MPEG-4

A graphics and video compression algorithm standard based on MPEG-1, MPEG-2, and other related technologies.

MPTS—Multi-Program Transport Stream

A transport stream that contains multiple programs.

N**NPM—Network Processor Module**

The VMG module that performs network related processing.

NTP—Network Time Protocol

A TCP protocol that ensures accurate local time-keeping with reference to radio and atomic clocks, and can synchronize distributed clocks within milliseconds.

P

PEM—Power Entry Module

PSU—Power Supply Unit

R

RADIUS—Remote Authentication Dial In User Service

A networking protocol that provides centralized AAA services.

Redundancy

A method of providing a backup for critical system components to ensure uninterrupted service in the event of a failure. High availability and reliability.

RF—Radio Frequency

Television signals are modulated onto RF signals and are then demodulated by the television tuner.

RTP—Real Time Protocol

RTP provides services such as payload type identification, sequence numbering, time-stamping, and delivery monitoring to real-time applications.

RTM—Rear Transition Module

RU—Rack Unit

A common increment of equipment space height. The height of 1 RU is 1.75 inches.

S

SCTE—Society of Cable Telecommunications Engineers

An organization that develops training for cable television installers and engineers and standards for the cable industry.

SD—Standard Definition

Television systems that have a resolution that meets standards but not considered either enhanced definition or high definition.

SFP—Small Form Factor Pluggable

An optical interface that is used in network switches for Fibre Channel, Gigabit Ethernet and InfiniBand.

SCM—Shelf Control Manager

Manager of the chassis population and infrastructure.

SPTS—Single Program Transport Stream.

A transport stream that contains only one program.

Status Bar

Strip located at the bottom of an application window, which displays system status information.

T

TCM—Transcoding Module

The VMG module that performs transcoding.

TCP—Transmission Control Protocol

A connection oriented transport protocol in the Internet (TCP/IP) protocol suite.

Transcoding

The process of converting one digitally encoded format to another, such as MPEG-2 to H.264 or vice versa.

Transrating

Transrating, or rate shaping, is the process of changing the bitrate of a video stream for the purposes of improving bandwidth and system efficiency.

U

UDP—User Datagram Protocol

A connectionless transport protocol in the TCP/IP (Internet) protocol suite that runs over the IP network protocol. UDP provides a direct way to send information over an IP network. It is used primarily for broadcasting messages over a network.

V

VBR—Variable Bit Rate

VBR streams vary in bandwidth over time.

VIA—Video Intelligence Architecture

An FPGA based modular architecture developed by RGB.

VMG-6—Video Multiprocessing Gateway, 6-slot chassis**VMG-8—Video Multiprocessing Gateway, 8-slot chassis****VMG-14—Video Multiprocessing Gateway, 14-slot chassis****VPM—Video Processor Module**

The VMG card that performs video related processing.

X

XFI

Serial GbE optical interface

XFP—10 Gigabit Small Form Factor Pluggable

10 Gigabit Small Form Factor Pluggable (SFP). The XFP is a pluggable, hot-swappable optical interface for 10 Gigabit SONET/SDH, Fibre Channel, Gigabit Ethernet, and other applications. XFP modules are optical transceivers, typically 1310nm or 1550nm. Optical XFPs include digital diagnostics.

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