



Video Multiprocessing Gateway (VMG)

Release 2.5.2

VMG-14 Hardware Setup Guide

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VMG-14 Hardware Setup Guide

Document Part Number: 250-0134-01, Rev A

Printed 9/15/2011

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VMG-14 Hardware Setup Guide Document History

Part Number	Software Version	Release Date	Changes
250-0134-01 rev A	2.5.2	09/16/2011	IP address for management port: content update.
250-0102-01 rev A	2.5	07/08/2011	Content removal: reference to Ethernet cabling for initial IP config via telnet is no longer relevant.
250-0043-01 rev C	1.1	06/15/2009	Additional UL changes
250-0093-01 rev A	2.4	04/15/2011	<ul style="list-style-type: none">Document part number change.Added AMP hardware and functionality
250-0043-01 rev B	1.0	04/15/2009	Production Release
250-0043-01 rev D	2.1	03/10/2010	<ul style="list-style-type: none">Added telnet tcon for Initial Configuration functionality.Added TCM hardware and functionality.

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Introduction

The Video Multiprocessing Gateway (VMG-14) from RGB Networks delivers the industry's highest density digital video solution for grooming, statistical multiplexing, transrating, digital program insertion (DPI), and MPEG-2 / H.264 transcoding. Based on a flexible, scalable and modular platform, the VMG-14 expedites deployments of advanced video services and simplifies operation and management, while reducing operational and capital costs.

Receiving input through its Gigabit Ethernet (GigE) interface, this advanced product can simultaneously support standard definition (SD) and high definition (HD) program services. This one 13 RU chassis can simultaneously perform digital ad insertion, program substitution, switching, grooming, and real time transcoding.

The VMG-14 is fully MPEG-2 and H.264 compliant and interoperable with leading video industry equipment.

The Video Multiprocessing Gateway from RGB makes configuration and control more intuitive and simple by providing the *Element Manager*, an easy-to-use Java-based graphical user interface (GUI) that can be accessed through a standard Web browser.

Document Organization

This guide is organized as follows:

- [Chapter 1, *Introduction*](#) – (this chapter) describes the contents and conventions used in the *VMG Hardware Setup Guide*.
- [Chapter 2, *Overview*](#) – provides a detailed description of the VMG features and components.
- [Chapter 3, *Physical Installation*](#) – describes the initial steps and requirements for installing the VMG.
- [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.
- [Information to Users](#) – 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 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.

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>

Clicking any [blue](#) link takes you to the item to which the link refers.

For a list of all Caution and Warning statements in French and German, refer to [Appendix A, "Localized Cautions and Warnings"](#).

Graphics

In some cases the line art and screenshots 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.

Overview

The Video Multiprocessing Gateway (VMG-14) from RGB Networks is the industry's first high density, carrier-class platform that delivers advanced standard definition (SD) and high definition (HD) MPEG-2 and MPEG-4/H.264 video processing, including advanced ad insertion and transcoding solutions. The VMG platform enables telecommunications operators to deploy the next generation of cable and IPTV services that will help accelerate digital TV profitability.

This chapter provides an overview of the VMG-14.

In This Chapter:

- “Product Features,” next.
- “VMG Architecture” on page 13.
- “VMG Functionality” on page 14.
- “VMG Redundancy” on page 18.
- “VMG Components” on page 19.

Figure 1. VMG-14 Chassis



Product Features

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

- Two dedicated Shelf Managers.
- One Shelf Alarm Panel - front accessible.
- One Shelf Alarm Display - front accessible.
- Web-based embedded management.
- Redundant Intelligent Platform Management Bus interfaces in a radial configuration.
- Dual redundant Power Entry Modules (PEM) - each PEM provides connection of 4 power domains.
- Hot-swappable Video Processor Modules (VPMs), Transcoding Modules (TCMs), Network Processor Modules (NPMs), Application Media Processors (AMPs), and fan trays.
- Front-pluggable shelf alarm display providing alarm status LEDs and fan tray alarm LEDs.
- Mounting flanges for 19" cabinets.

Features exclusive to the VMG-14:

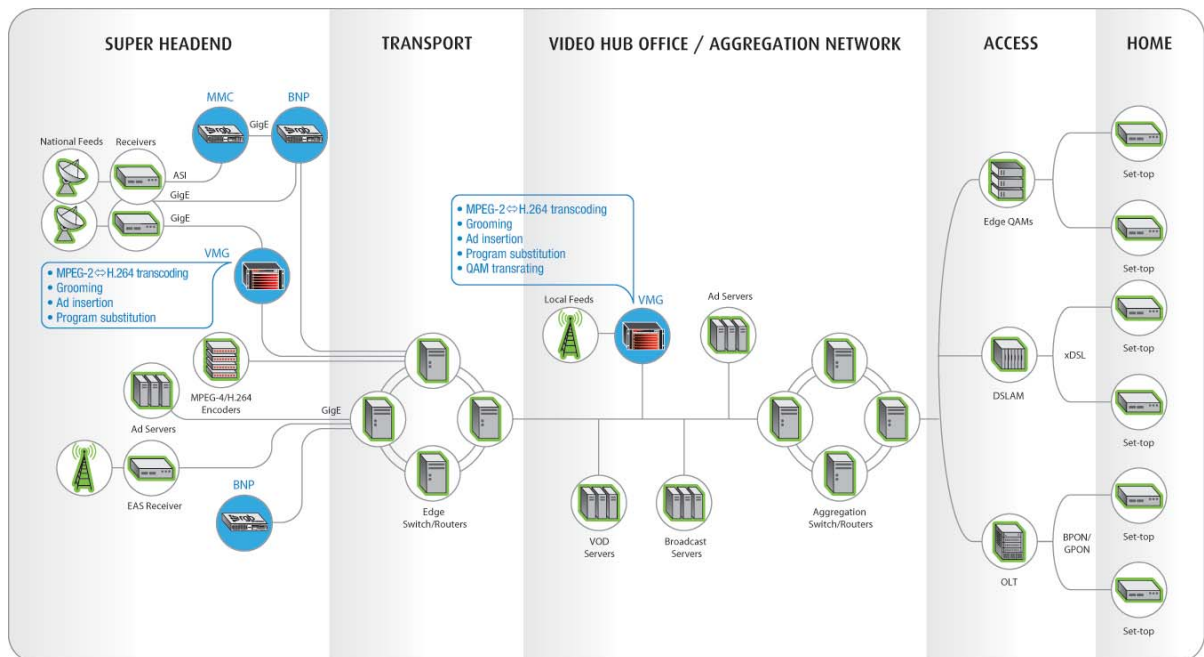
- 13RU chassis
 - 14 slots.
 - Up to 12 VPM or TCM cards, as ordered.
 - Up to 2 NPM cards (8 x 1 Gigabit Ethernet, 2 x 10 Gigabit Ethernet).
 - Up to 2 AMP cards, as ordered.

VMG Architecture

The simplified architecture of the VMG provides full processing scalability designed to grow with your environment. Just as the high density of the VMG is an ideal solution in a centralized environment, its scalability also offers an equally compelling solution for distributed DPI environments where density requirements vary.

Figure 2 shows how the VMG fits within the network architecture.

Figure 2. Centralized and Distributed Network Architecture



VMG Functionality

The VMG platform provides a suite of processing modules inserted into the backplane of the chassis. These modules provide high speed routing and inter-module communication paths. The chassis supports NPMs for video stream aggregation and switching; VPMs for advanced video processing, TCMs for transcoding, and AMPs for audio transcoding (see the *VMG Software Guide* for more information).

The VMG provides stream routing, switching and video processing as required for applications of digital simulcast, digital broadcast and IPTV streaming in advanced digital cable TV, and Telco IPTV networks.

Each VMG-14 accepts:

- Two NPMs (in slots 7 and 8)
- Up to two AMPs (in slots 6 and 9)
- Up to twelve VPMs or TCMs (in slots 1-6 and 9-12)

The VMG platform provides key features and functionality, including:

- Two dedicated Shelf Managers.
- MPEG-2 and H.264 video stream distribution through MPEG-2 TS / UDP / IP / GigE(10GigE) or MPEG-2TS / RTP / UDP / IP/ GigE(10GigE).
- MPEG-2 Transport Stream statistical multiplexing for MPEG-2 and H.264 video content.
- MPEG-2 video stream transrating with manageable video quality and best bandwidth efficiency.

- MPEG-2 video and H.264 video program digital ad insertion based on SCTE 30, DVS 683 and SCTE 35 standards.
- Channel substitution for H.264 video based programs and MPEG-2 video based programs.
- Transcoding of programs between MPEG-2 and H.264 codecs, any to any.
- FEC decoding and coding on input and output TSs on the VPM module.
- Designed for a high level of carrier-class service availability through the chassis, service-level and module-level redundancy.
- Bandwidth utilization monitoring and analysis.
- Web browser-based *Element Manager*, a GUI management for system configuration and control.

Network Processor Module Functionality

The NPM has the following functions:

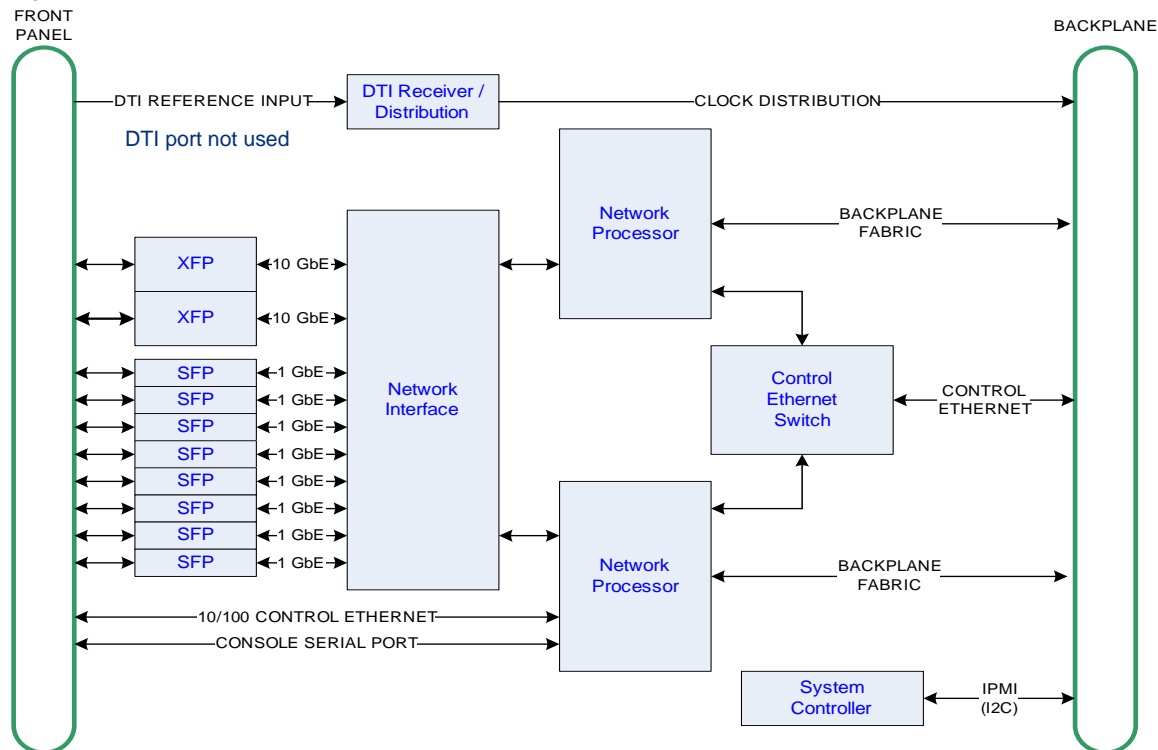
- Aggregation and distribution point for all MPEG-2 and H.264 video content or data traffic.
- Video and data stream filtering, switching and routing.
- System management functions.
- Hot-swappable.
- Supports 1:1 module redundancy.

Each NPM consists of the following:

- Eight GigE ports and two 10GigE ports.
 - Each 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 ports can handle either constant bitrate (CBR) or variable bitrate (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 Management port for management and control, including SCTE 30 messages.
- One RJ-11 serial interface for management access and event logging.

Figure 3 shows the NPM functional block.

Figure 3. NPM Functional Block



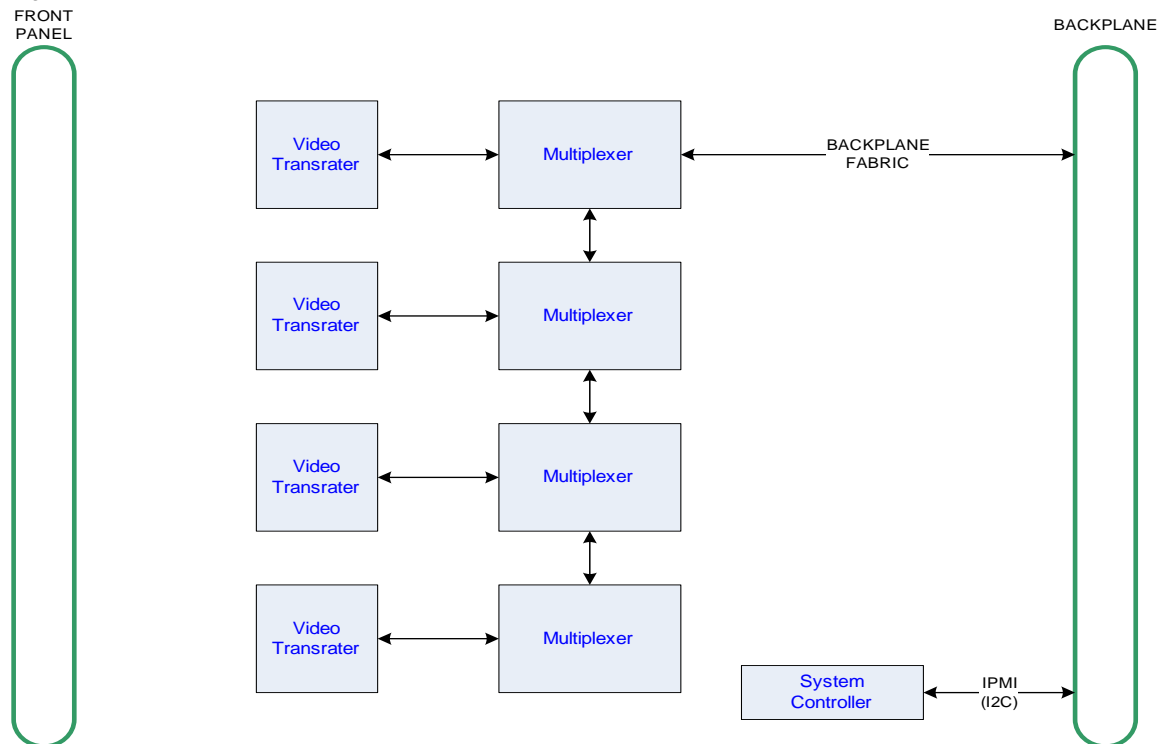
Video Processor Module Functionality

The VPM has the following functions:

- Interfacing with the NPM through the VMG chassis backplane, using the high speed bus fabric for the video and data traffic as well as control messages.
- Statistically multiplexing SD programs and HD programs while performing concurrent transrating.
- Digital ad insertion for CBR or VBR H.264 video and MPEG-2 video program streams.
- Hot-swappable module replacement.

Figure 4 shows the VPM functional block.

Figure 4. VPM Functional Block



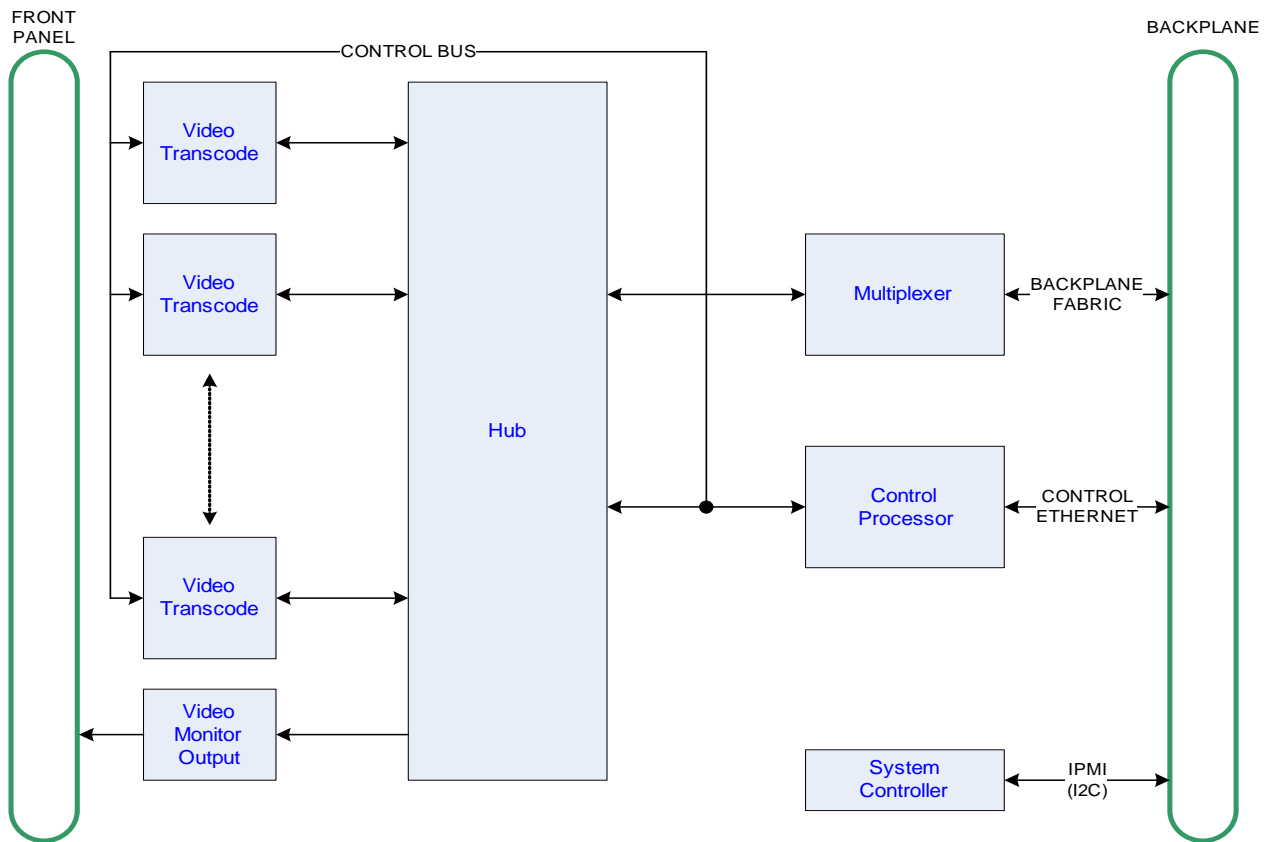
Transcoding Module Functionality

The TCM has the following features:

- Interfacing with the NPM through the VMG chassis backplane, using the high speed bus fabric for the video and data traffic as well as control messages.
- Flexibility in 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, with up to 144 HD streams through a single device.
- Hot-swappable module replacement.

Figure 5 shows the TCM functional block.

Figure 5. TCM Functional Block



Application Media Processor Functionality

The AMP has the following features:

- Pairs with an NPM by connecting its Ethernet ports to ports 7 and 8 on the NPM.
- Provides audio transcoding.
- Hot-swappable module replacement.

VMG Redundancy

The VMG redundancy implementation guarantees high availability of services provided by the VMG platform. It is designed with the goal of a high carrier-class service availability through both hardware and software implementation, which includes chassis redundancy, 1:1 NPM (and AMP) redundancy, N+M VPM and TCM redundancy, and service-level redundancy.

The active or standby status and failure or health status of a module in the VMG will be shown through its backup LED and fault LED on the front panel, respectively, and also shown through the *Element Manager*, the VMG's GUI.

Chassis Level

The VMG chassis provides redundancy for a high availability of services. These include:

- Dual redundant PEMs.
- Three hot-swappable fan trays.
- Dual dedicated Shelf Managers (temperature monitoring, fan and power control).
- Redundant Intelligent Platform Management Bus (IPMB) A and B interfaces through Inter-Integrated Circuit (I²C) buses in the backplane.
- Dual Star Fabric interface and base interface.
- Dual hot-swappable NPMs.
- Fourteen node slots for hot-swappable modules (two for NPMs, up to twelve for VPMs and/or TCMs).

VMG Components

Chassis

The VMG-14 utilizes a chassis platform with 13 Rack Units (RU) height and fourteen slots (13U/14-slot). Two slots in the chassis are used for Network Processor Modules (NPM) in 1:1 redundancy configuration; the remaining twelve slots can be used for Video Processor Modules (VPM), Transcoding Modules (TCM), Application Media Processors (AMPs), and other future release modules. The VMG-14 chassis has dual Power Entry Modules (PEM) and two Shelf Managers (SM).

Figure 6 shows a front view of the chassis without the module cards installed.

Figure 6. Front View of the Chassis

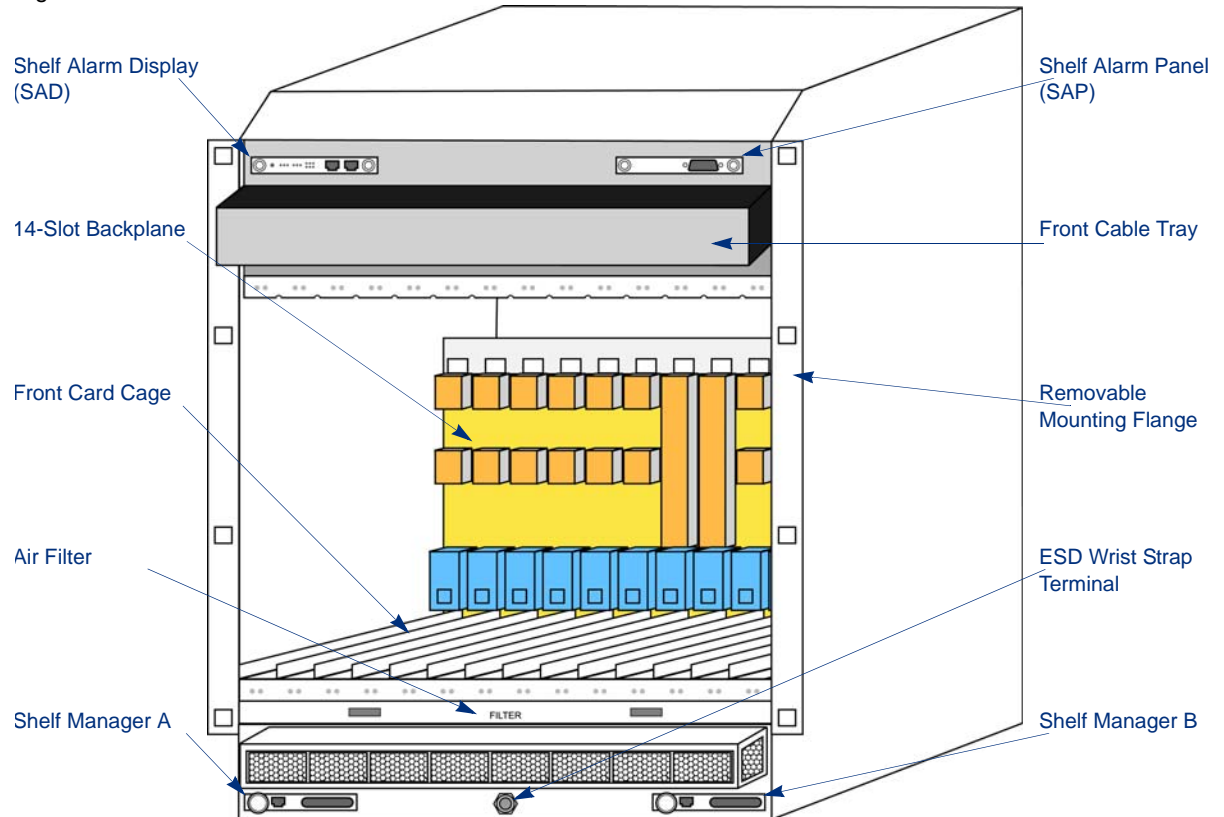
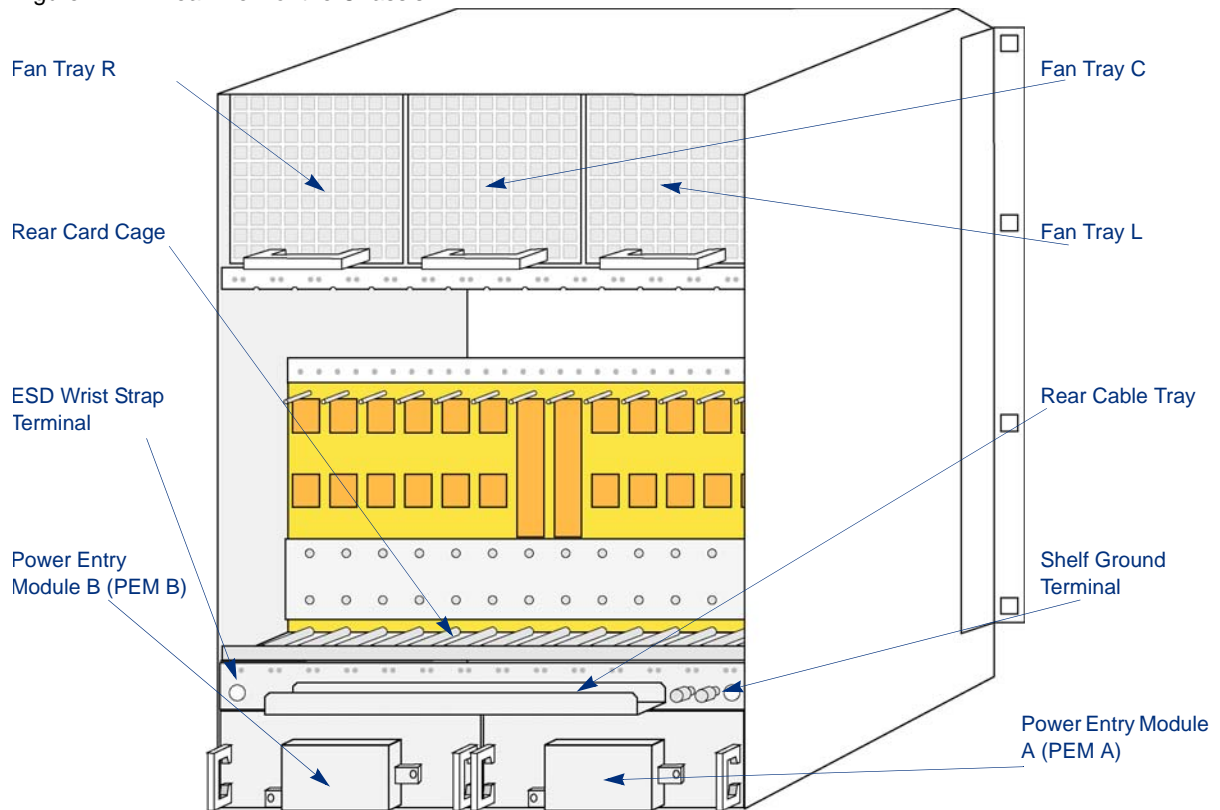


Figure 7 shows a rear view of the chassis.

Figure 7. Rear View of the Chassis



Power Entry Module



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.



Caution: Although there are fuses in the power entry circuit of the VMG, the power lines must be protected on the rack level with 30A breakers.



Note: The VMG can be powered using a regular telecommunications power supply of -48 nominal VDC with a VDC return. The specified voltage range is from -41VDC to -60 VDC. The VMG supports redundant power supplies but the two supplies should be independently powered.

Two pluggable redundant PEMs are located at the left and right side of the back of the VMG chassis. Each PEM provides power terminals for four 20A power feeds. Each power feed consists of a -48VDC cable and its corresponding return cable and is protected by a 30A Listed fuse. Each of the four power feeds supplies power to a separate part of the backplane. This topology is used for safety reasons so that the maximum current per fuse is less than 30A.

The power filtering consists of filtered power terminals and a discrete line-filter for each power input.

The input voltage range for the VMG-14 is from -41VDC to -60VDC.

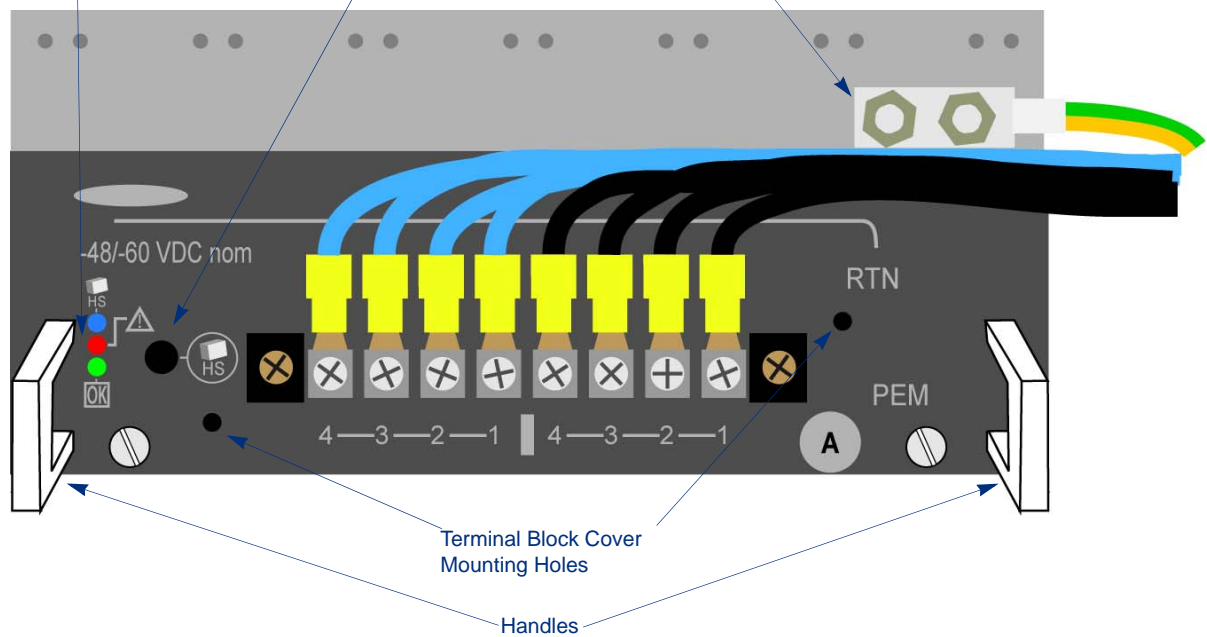
To indicate the presence of the PEM, a PEM presence signal is grounded by the PEM.

A blue (Hot Swap) LED and Hot Swap push button provide hot-swap functionality. A red (power failure) and a green (OK) LED provide status indication.

PEM Components

Figure 8 shows the PEM components.

Figure 8. PEM Components (with Terminal Block Cover Removed)
 Hot Swap LED
 PEM Alarm LED
 PEM OK LED



Note: The PEM replacement procedure is covered in [Chapter 5 on page 67](#).

Table 2 describes the PEM input terminals.

Table 2. PEM Input Power Terminal/VMG

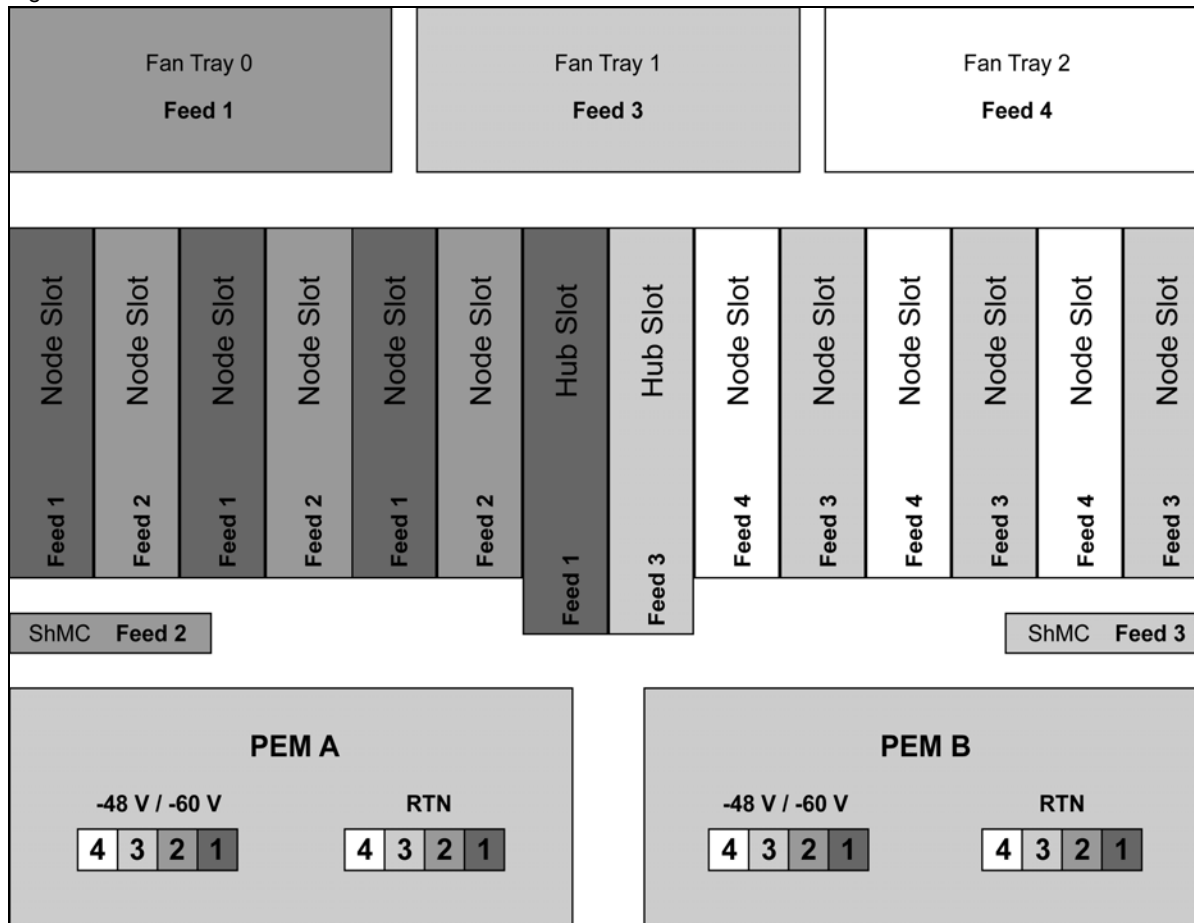
Terminal -48 VDC#	Designation	Terminal RTN#	Designation
1	Power Input Feed 1	1	Return Voltage Feed 1
2	Power Input Feed 2	2	Return Voltage Feed 2
3	Power Input Feed 3	3	Return Voltage Feed 3
4	Power Input Feed 4	4	Return Voltage Feed 4

Note: Power is required for all 4 voltage feeds.

PEM Power Feeds

The backplane is divided into four power domains, as shown in [Figure 9](#). Each of the PEM's four redundant power feeds supply power to a separate part of the backplane.

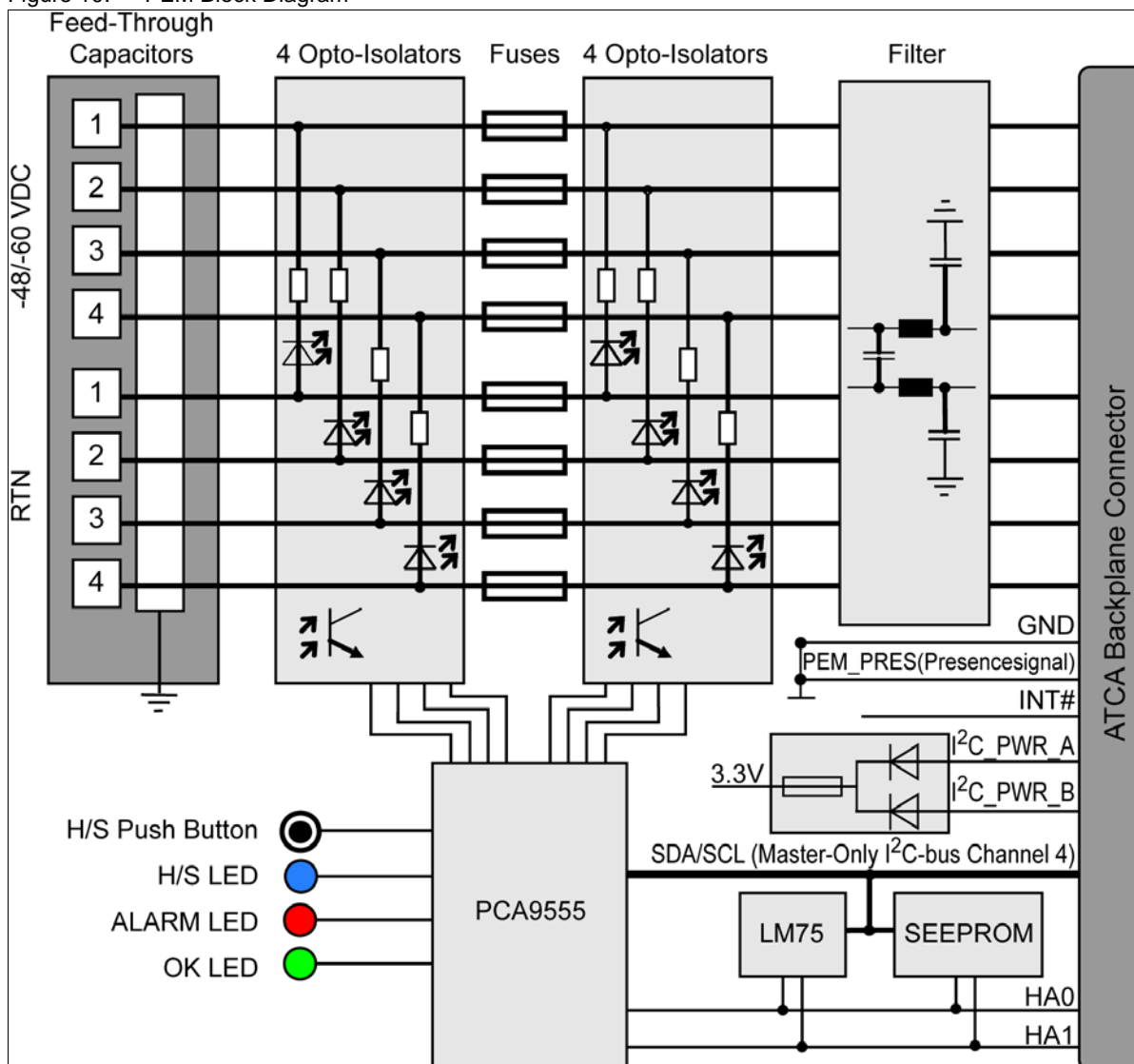
Figure 9. Power Distribution of the Four Power Feeds within the VMG



PEM Block Diagram

Figure 10 shows a block diagram of the PEM.

Figure 10. PEM Block Diagram



PEM I²C-bus Addresses

Geographical address pins (HA0, HA1) on the PEM backplane connector determine the I²C addresses of the devices. As described in [Table 3](#), the I²C devices on the PEMs are connected to channel 4 of the Master-Only I²C-bus of the Shelf Managers.

Table 3. PEM I²C-bus AddressesVMG

PEM Location	SEEPROM	LM75	PCA9555
PEM A (Right, view from rear)	0xa8/54	0x98/4c	0x48/24
PEM B (Left, view from rear)	0xaa/55	0x9a/4d	0x4a/25

PEM I/O Device

The PEM I/O device (PCA9555):

- Controls the status of the LEDs.
- Reads the status of the Hot Swap push button.
- Reads the status of the -48VDC inputs.

Table 4 describes the PEM pin assignments.

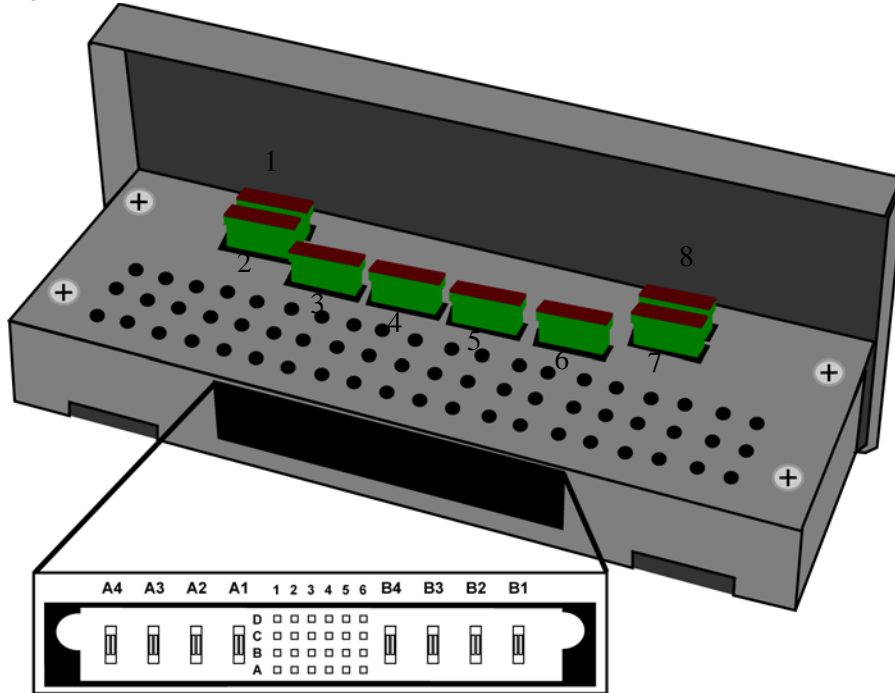
Table 4. PEM PCA9555 Pin AssignmentVMG

PCA9555 I/O pin	Function	State
0.0	Power Input 2 at Backplane connector present.	-48V present = 0 -48V present = 1 (3.3V)
0.1	Power Input 2 after the fuse present.	-48V present = 0 -48V present = 1 (3.3V)
0.2	Power Input 1 at Backplane connector present.	-48V present = 0 -48V present = 1 (3.3V)
0.3	Power Input 1 after the fuse present.	-48V present = 0 -48V present = 1 (3.3V)
0.4	N/C	Pulled High
0.5	N/C	Pulled High
0.6	Power Input 4 at Backplane connector present.	-48V present = 0 -48V present = 1 (3.3V)
0.7	Power Input 4 after the fuse present.	-48V present = 0 -48V present = 1 (3.3V)
1.0	Power Input 3 at Backplane connector present.	-48V present = 0 -48V present = 1 (3.3V)
1.1	Power Input 3 after the fuse present.	-48V present = 0 -48V present = 1 (3.3V)
1.2	N/C	Pulled High
1.3	Green LED	1 = on
1.4	Hot Swap push-button switch	1 = not pushed 0 = pushed
1.5	Red LED	1 = on
1.6	N/C	Pulled High
1.7	Blue LED	1 = on

PEM Connectors

Figure 11 shows the PEM backplane connectors and fuses.

Figure 11. PEM Backplane Connector



Note: The PEM fuse replacement procedure is covered in [Chapter 5](#) on page 68.

[Table 5](#) describes the PEM fuses.

Table 5. PEM Fuse TypesVMG

Number	Fuse type
1	30A Fuse VRTN_1 (F101)
2	30A Fuse -48 V_1 (F102)
3	30A Fuse VRTN_2 (F201)
4	30A Fuse VRTN_3 (F301)
5	30A Fuse -48 V_2 (F202)
6	30A Fuse -48 V_3 (F302)
7	30A Fuse VRTN_4 (F401)
8	30A Fuse -48 V_4 (F402)
9	PEM Backplane connector

[Table 6](#) describes the PEM power contacts.

Table 6. PEM Backplane Connector Power ContactsVMG

A4	A3	A2	A1	B1	B2	B3	B4
-48V_1	VRTN_1	-48V_2	VRTN_2	-48V_3	VRTN_3	-48V_4	VRTN_4

Table 7 describes the PEM signal contacts.

Table 7. PEM Backplane Connector Signal ContactsVMG

Pin#	1	2	3	4	5	6
D		INT#	PEM_PRES			
C		HA0	HA1			
B		SCL_CH4	GND			
A		SDA_Ch4	I ² C_PWR_A	I ² C_PWR_B		

Specification for the Power Connection Cables

Required wire size:

- Diameter 6mm resp. AWG10
- Maximum length 3.0m

Required terminals:

- Use ring terminals for screw M4 or UNC 8-32
- Maximum outside diameter is 9.3mm

Fan Tray

The VMG chassis contains three interchangeable fan trays. The fan trays are plugged-in at the upper rear side of the chassis and can be removed by lifting the retention lever.

Each fan tray contains three radial fans for cooling the front boards and the Rear Transition Module (RTM) section of the VMG. The cooling of the RTM section is provided by guiding air through cutouts in the backplane.

The fan speeds are monitored by tachometer signals sent from the fan trays to the shelf manager. The shelf manager regulates the fan speed with DC voltage.

As shown in [Figure 12](#), the display module of the fan tray provides:

- A blue Hot Swap LED
- A red fan tray alarm LED
- A green fan tray OK LED
- A Hot Swap push button

Figure 12. Fan tray, Front View

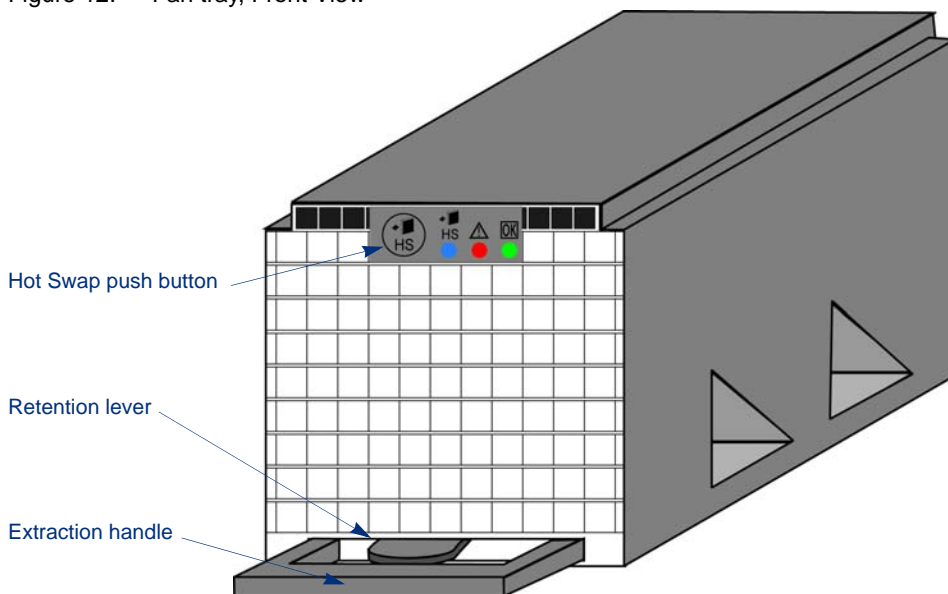
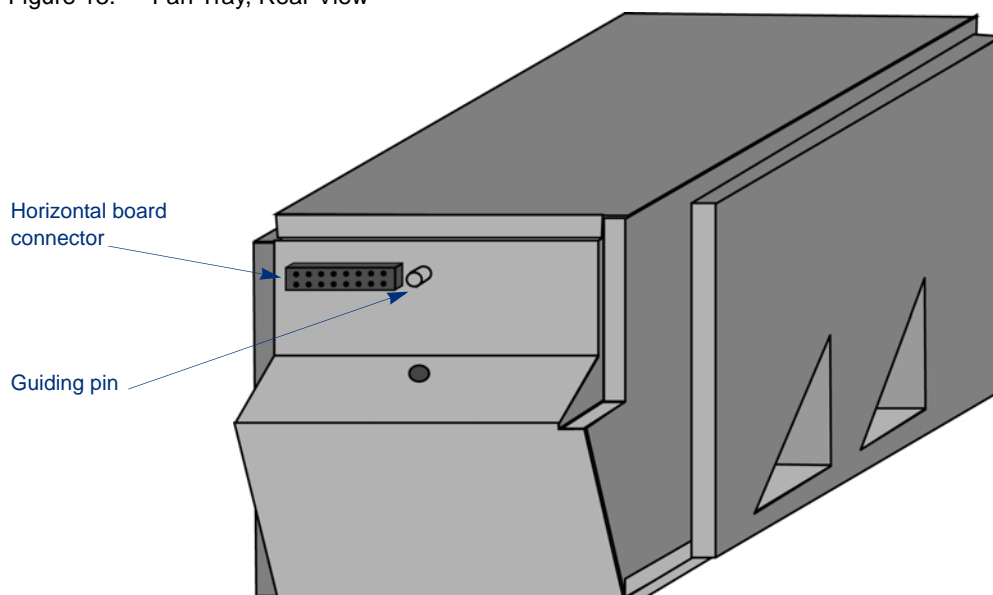


Figure 13. Fan Tray, Rear View



Note: The fan tray replacement procedure is covered in [Chapter 5 on page 68](#).

Application Modules

NPM Overview

The NPM provides the input and output for the 10/100BaseT, GigE or 10GigE interfaces to the IP transport network for video traffic, data traffic, and management control messages. There are eight GigE interfaces, two 10GigE interfaces, one 10/100BaseT Ethernet interface, one RJ-11 based serial console interface and one RJ-45 DOCSIS Timing Interface (DTI). There are five LEDs for the

following indications: hot-swap ready, chassis status, FPGA configuration status, fault and backup indication, and one reset button, all accessible from the NPM front panel.

NPM Front Panel Description

Figure 14 shows the front panel of the Network Processor Module.

Figure 14. NPM Front Panel

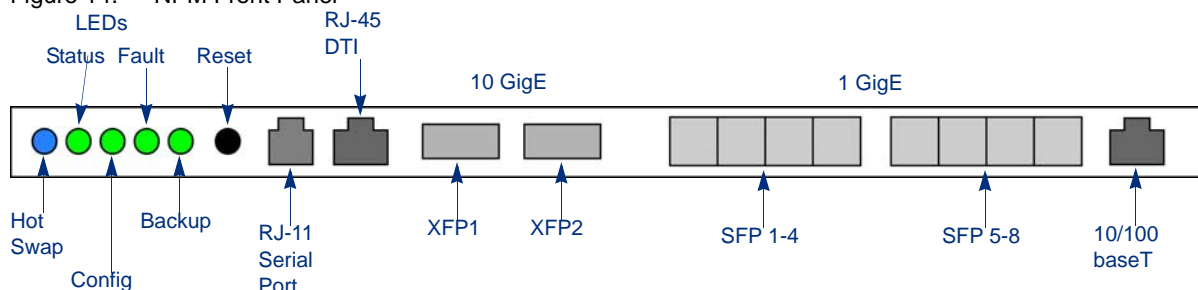


Table 8 describes the NPM front panel LEDs.

Table 8. NPM Front Panel LED DescriptionVMG

LED Name	Color/Condition	Description
Hot Swap	Blue	NPM is ready for hot-swap
	Flashing Blue	Transition between the hot-swap not-ready state to ready state, or from ready state to hot-swap not ready state.
	Off	NPM is not ready for hot-swap
Status	Red	Chassis interface fault.
	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.

NPM Physical Interfaces

The NPM provides the capability to 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.

The NPM module provides eight bi-directional GigE ports. Each port supports SFP (16mm H x 42mm D) pluggable 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 65meters, 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 pluggable 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.

The NPM provides two 10GigE ports that each support 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.



Note: *For a list of SFP and XFP modules approved for use with the NPM, please refer to the release notes.*

Management and Serial Ports

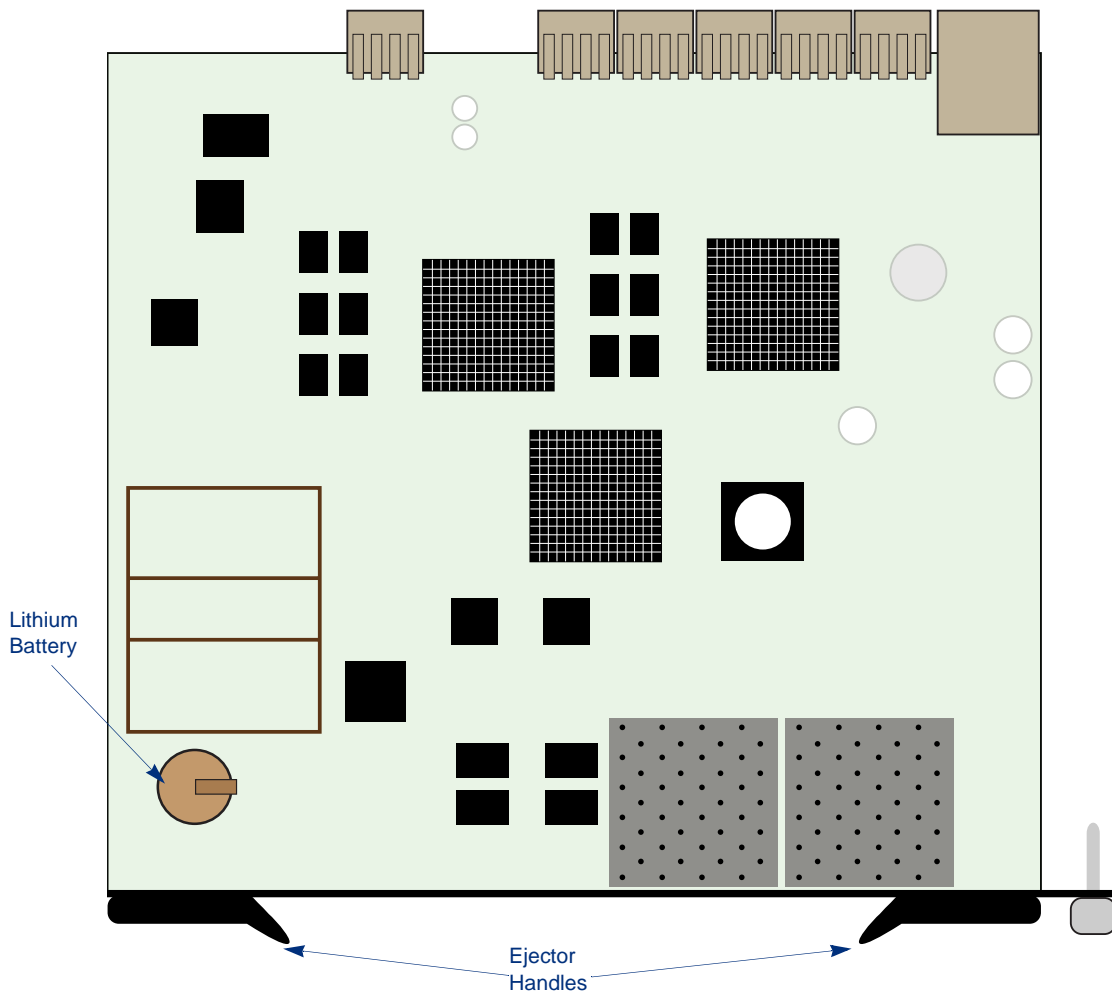
The NPM provides one 10/100BaseT Ethernet interface with an RJ-45 connector, compliant with IEEE-802.3ab. A serial console port with an RJ-11 connector is also provided. The default configuration for the serial console is 19200 baud; No parity; 8 data bits; 1 stop bit.

Table 9. Serial Port Pinout

Pin number	Name
1	No connect
2	TXD
3	RXD
4	No connect
5	GND
6	No connect

One DTI with an RJ-45 connector, compliant with DTI specification CM-SP-DTI-I03-060728, is provided.

Figure 15. Network Processor Module



Warning! *The NPM contains 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.*

VPM Overview

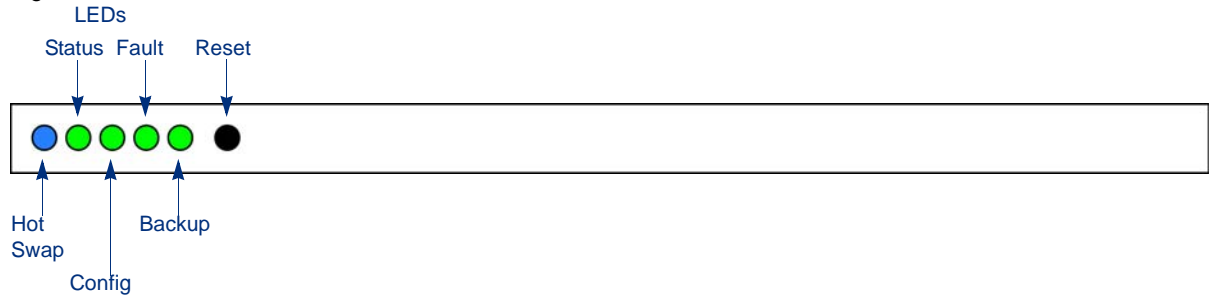
The Video Processing Module (VPM) is a high density, low cost, intelligent, digital video processing module offering flexible H.264 video and MPEG-2 video grooming, statistical multiplexing, MPEG-2 transrating, and digital program insertion (DPI).

The VPM module directly interfaces with the NPM module through the VMG chassis backplane fabric for video and data traffic and control messages through the high speed bus, Fast Ethernet bus, and I²C bus. The VPM can statistically multiplex standard definition (SD) programs and high definition (HD) programs while performing concurrent transrating and digital ad insertion for Constant Bit Rate (CBR) or Variable Bit Rate (VBR) H.264 video and MPEG-2 video program streams.

There are 5 LEDs for the following indications: hot swap ready, chassis status, FPGA configuration status, fault, and backup. There is one recessed reset button. All interfaces, LEDs, and the reset button are accessible from the VPM front panel.

The VMG module front panel block diagram is shown in [Figure 16](#).

Figure 16. VPM Front Panel



[Table 10](#) describes the VPM front panel LEDs.

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 not ready to ready state, or from ready state to hot-swap not ready 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.
Fault	Red	Fault.
	Green	Normal Operation.
Backup	Red	Standby.
	Green	In operation.

TCM Overview

The Transcoding Module (TCM) converts video streams between H.264 and MPEG-2 formats, both in SD and HD resolutions.

The TCM module directly interfaces with the NPM module through the VMG chassis backplane fabric for video and data traffic and control messages through the high speed bus, Fast Ethernet bus, and Control bus. The TCM provides flexibility in transcoding functions, while supporting video resolutions up to HD resolutions.

The TCM module front panel block diagram is shown in [Figure 17](#).

Figure 17. TCM Module Front Panel.



Table 11 describes the TCM front panel LEDs.

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 not ready to ready state, or from ready state to hot-swap not ready state.
	Off	TCM is not ready for hot-swap.
Chassis Status	Red	Chassis interface fault.
	Green	Payload up.
FPGA 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

AMP Overview

The Application Media Processor (AMP) provides audio transcoding. The AMP module is always paired with an NPM. In the VMG-14, you can install AMP modules only in slots 6 and 9. An AMP in slot 6 is paired with the NPM in slot 7, and the AMP in slot 9 is paired with the NPM in slot 8.

- Note:** *If you are using the MBR TS functionality, 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 the MBR TS functionality, you do not need AMP modules and can install TCM and VPM modules in slots 6 and 9 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.*

The AMP module front panel block diagram is shown in Figure 18.

Figure 18. AMP Module Front Panel.

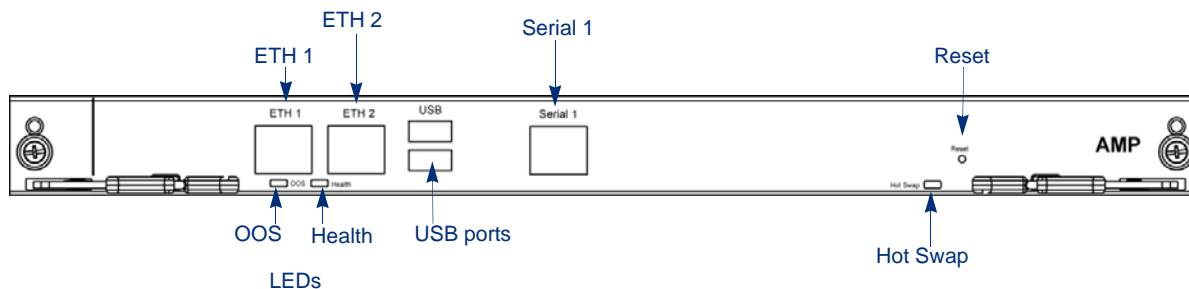


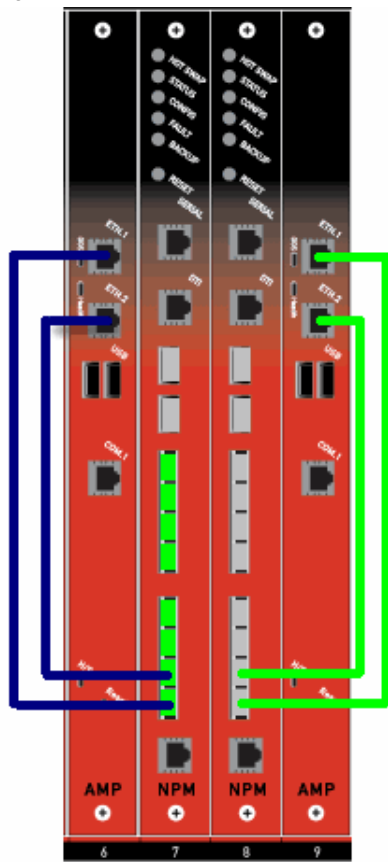
Table 12 describes the AMP front panel LEDs.

Table 12. AMP Front Panel LEDs

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

The AMP module directly interfaces with the NPM module by connecting ETH 1 on the AMP to GigE port 8 on the NPM and ETH 2 on the AMP to GigE port 7 on the NPM. Figure 19 shows the front panel connections for a 2 NPM/2 AMP configuration.

Figure 19. AMP Connections to NPMs

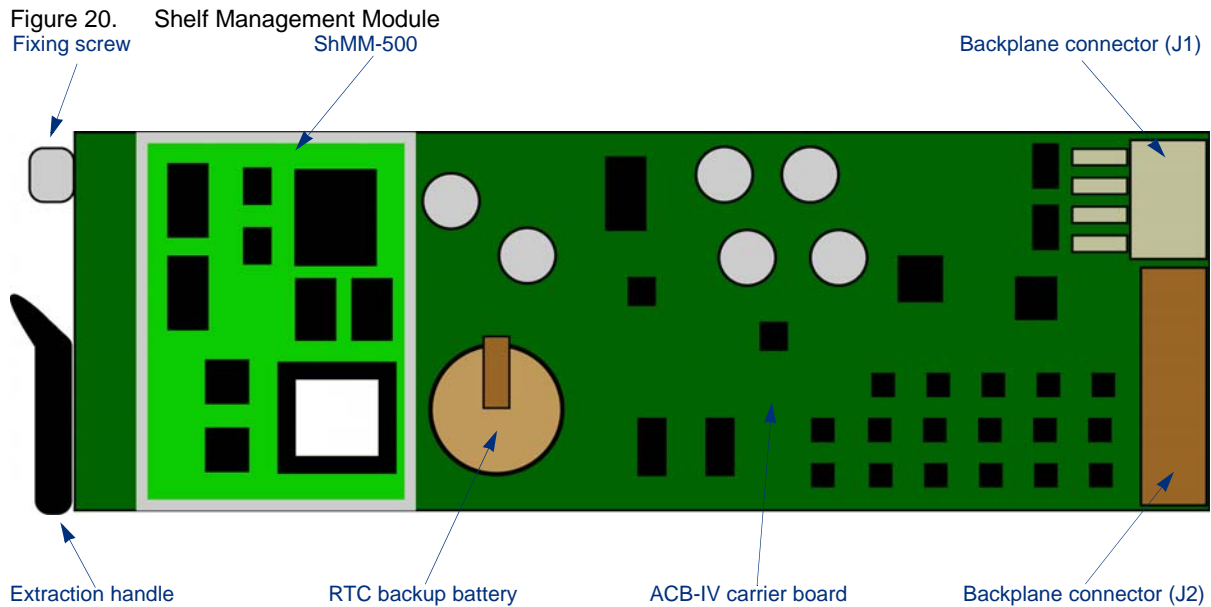


Chassis Modules

The VMG comes equipped with various chassis modules. There are 2 Shelf Managers (SM), 2 Power Entry Modules (PEM), 1 Shelf Alarm Panel (SAP), and 1 Shelf Alarm Display (SAD). Details of these modules can be found below.

Shelf Managers

The VMG-14 SMs fit into the dedicated SM slots located in the front of the chassis below the air intake cover. They use the Shelf Management Mezzanine 500 (ShMM-500), a compact SO-DIMM form-factor module, installed on a carrier board called the ATCA Carrier Board version IV (ACB-IV). [Figure 20](#) shows a complete SM. To maximize availability, 2 SMs are included for redundancy.



The Shelf Managers have two main responsibilities:

1. Manage the power, cooling, and interconnect resources and their usage. Within the chassis, this management primarily takes place through interactions between the SM and the Intelligent Platform Management Controllers (IPMC) over IPMB-0.
2. Enable the overall System Manager to join in the management through the System Manager Interface, which is typically implemented over Ethernet.

Figure 21 shows the SM front panel components and Table 13 gives an explanation of the LEDs.

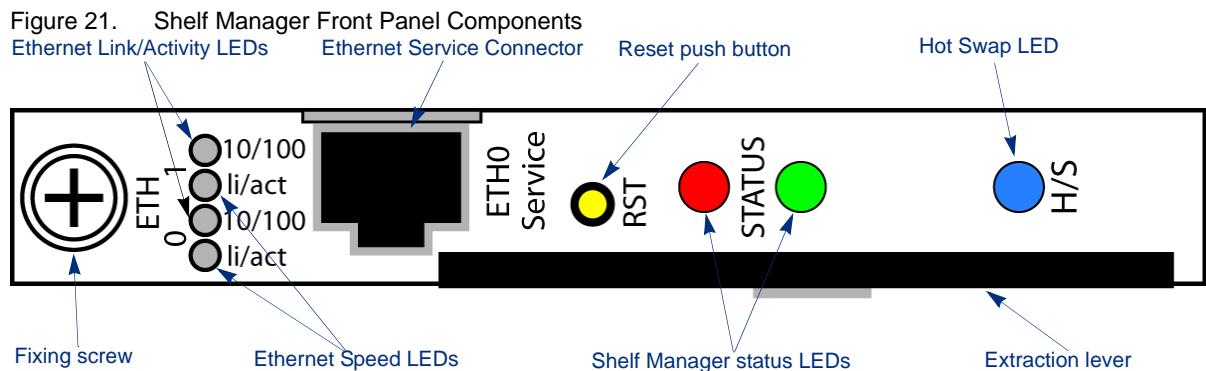


Table 13. Shelf Manager LED Descriptions

LED Name	Color/Condition	Description
ETH 1 Speed (yellow) (10/100)	On	100Mbps
	Off	10Mbps
ETH 1 Link/Activity (green) (li/act)	On	Link
	Off	No link
	Blinking	Activity

Table 13. Shelf Manager LED Descriptions (Continued)

LED Name	Color/Condition	Description
ETH 0 Speed (yellow) (10/100)	On	100Mbps
	Off	10Mbps
ETH 0 Link/Activity (li/act)	On	Link
	Off	No link
	Blinking	Activity
Shelf Manager status (red)	On	Out of service
Shelf Manager status (green)	On	In service, active Shelf Manager
	Blinking	In service, backup Shelf Manager
(H/S) Hot Swap	On	Ready to remove
	Blinking	Hot-swap requested
	Off	Hot-swap not possible



Note: The Shelf Manager replacement procedure is covered in [Chapter 5 on page 69](#).

Some Shelf Manager I/O functionalities are handled by two separate boards, the Shelf Alarm Display (SAD) and the Shelf Alarm Panel (SAP).

Shelf Alarm Display (SAD)

The SAD, as shown in [Figure 22](#), is a user interface and is located at the left front top of the chassis. It provides:

- 3 Shelf alarm LEDs
 - MIN (Minor)
 - MAJ (Major)
 - CRIT (Critical)
- 3 Software-defined LEDs (not currently used)
 - USER1
 - USER2
 - USER3
- 3 Fan tray alarm LEDs
 - Left
 - Center
 - Right
- 3 Fan tray OK LEDs
 - Left
 - Center
 - Right
- The alarm silence push button
- 2 serial console interfaces for both Shelf Managers (RJ-45 connectors)

Figure 22. Shelf Alarm Display (SAD)



Note: The SAD replacement procedure is covered in [Chapter 5 on page 70](#).

Shelf Alarm Panel (SAP)

The SAP, as shown in [Figure 23](#), is located at the top right front of the chassis and provides the Telco Alarm connector (DB15-male). The I²C-bus devices on the SAP are connected to the Master-Only I²C-bus of both Shelf Managers. Only the active Shelf Manager has access to the SAP.

Figure 23. Shelf Alarm Panel (SAP)



Note: The SAP replacement procedure is covered in [Chapter 5 on page 70](#).

Telco Alarm

The SAP provides a Telco Alarm interface on the DB15-male connector as shown in [Figure 24](#). Three relay outputs are used for remote alarm distribution, reflecting the state of the three alarm LEDs. The relays are capable of carrying 72VDC or 1A with a maximum rating of 30VA. [Table 14](#) describes the Telco alarm pin assignments and [Table 15](#) describes the Telco alarm LEDs.

Figure 24. Telco Alarm Connector

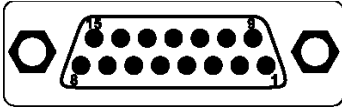


Table 14. Telco Alarm Connector Pinout

Pin number	Name	Description
1	AMIR+	MinorReset+
2	AMIR-	MinorReset-
3	AMAR+	MajorReset+
4	AMAR-	MajorReset-
5	ACNO	CriticalAlarm – NO
6	ACNC	CriticalAlarm – NC
7	ACCOM	CriticalAlarm – COM
8	AMINO	MinorAlarm – NO
9	AMINC	MinorAlarm – NC
10	AMINCOM	MinorAlarm – COM
11	AMANO	MajorAlarm – NO
12	AMANC	MajorAlarm – NC
13	AMACOM	MajorAlarm – COM
14	APRCO	PwrAlarm – NO
15	APRCOM	PwrAlarm – COM
Shield	Chassis-GND	Chassis Ground

Table 15. Telco Alarm LEDs

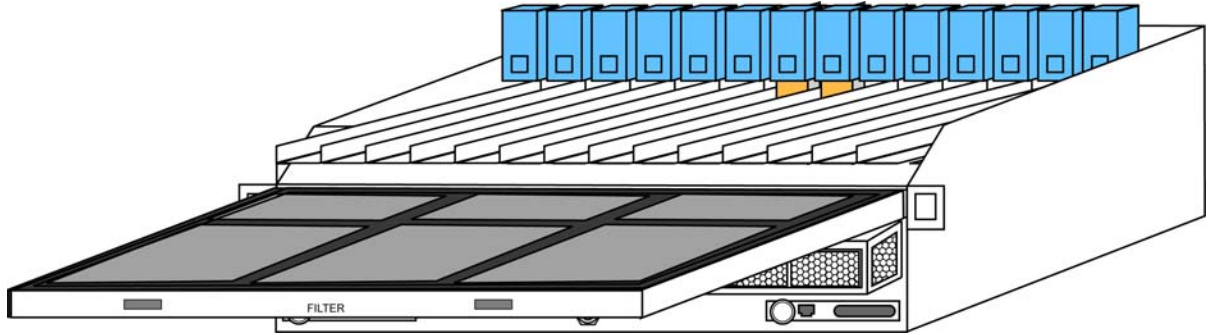
State	Description
Off	No alarm active
On	Alarm active
Flashing	Alarm active, but silenced

The alarm silence push button on the SAD faceplate deactivates the alarm relays. During the time alarm silence is activated, the alarm LEDs flash. Pressing the alarm silence push button a second time reactivates the alarm relays and switches the LEDs to solid.

Air Filter Tray

The VMG chassis provides a front-replaceable air filter as shown in [Figure 25](#). The air filter presence is detected by a Hall effect sensor located on the Chassis Data Module (CDM). The sensor is activated by a magnet at the rear of the air filter's metal frame.

Figure 25. Air filter



Note: The air filter replacement procedure is covered in *Chapter 5* on page 72.

Rear Transition (RTM) Filler Panel

Attached to the rear of the chassis are the RTM Filler Panels. Each is a blank cover that is one slot wide with screws at the top and bottom. These must be in place for every empty slot in order to maintain proper airflow.

Physical Installation

This chapter provides the information necessary to install the VMG-14 into a rack. Please read this entire chapter before beginning installation procedure. For information on configuration of the VMG-14, see [Chapter 4, “Initial Configuration”](#).

In This Chapter:

- “Site Preparation,” next.
- “Warnings” on page 43.
- “Unpacking” on page 44.
- “Installation Instructions” on page 44.

Site Preparation

Be sure that you have the required items listed below before you begin the installation of the VMG. You will need:

- Populated VMG-14 chassis, which includes:
 - One or two Network Processing Modules (NPM);
 - One or two Application Media Processors (AMPs) (*must be the same number as the number of NPMs*);
 - Up to twelve Video Processing Modules (VPM) and/or Transcoding Modules (TCM), as ordered.
 - Two Power Entry Modules (PEM);
 - Three Fan Trays;
 - Two Shelf Managers;
 - One Shelf Alarm Display (SAD);
 - One Shelf Alarm Panel (SAP);
 - Filter Tray with filter;
- Six support shelf rack mount screws.
- One RGB-specific serial cable for console access (included).
- One M4 grounding nut, included.
- VMG-14 AC Power Supply Kit, if AC power is required. Kit includes:
 - Distribution panel (circuit breaker)
 - One or two AC power supply chassis, as ordered;
 - Three to six AC power supply modules, as ordered;
 - Three to six AC power cords, as ordered;

- DC connector cables for AC to DC conversion;
- AC Power Supply Installation Guide.
- Eight chassis rack mount screws.
- Slotted screwdriver.
- One ring lug for grounding.
- An Ethernet cable long enough to connect the VMG to the management workstation.

Site Space Requirements



Note: For complete environmental requirements, see “*Environmental Specifications*” on page 77.

This equipment is only intended for use in a Restricted Access Location.

Choose a site that is dry, clean, well-ventilated and air-conditioned, where the ambient temperature is between 5°C and 45°C (41°F and 113°F).

The VMG relies on the building installation’s safety measures for protection against short-circuit, overcurrent, 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.

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-14 is from front to rear.
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 overcurrent 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).



Caution: *All filler panels must be installed to maintain proper airflow and prevent air from escaping out of the front of an open slot. Filler panels should include an airflow baffle that extends to the backplane.*

The VMG-14 can be installed in 19" equipment racks. The rack must be accessible from the front and rear for installation. Ensure that the rack is constructed to support the weight and dimensions of the chassis.



Note: *If installing the VMG-14 into a rack that is already partially populated, 13RU of space is required.*

Cables

To ensure the safe and continued operation of the VMG, proper cabling must be used, as listed in [Table 16](#) and [Table 17](#).

Ground Cabling

Table 16. Ground Connection Specifications

Parameter	Specification
Wire size	AWG6
Terminal	Use only double lug terminals with 45° angle tongue.

Power Cabling

Table 17. Power Connection Specifications

Parameter	Specification
Wire size	AWG10, maximum length 2.5 to 3.0m.
Terminals	Use ring terminals for screw M4 or UNC 8-32. Maximum outside diameter is 9.3mm.

Warnings



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



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



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



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

Unpacking



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



Caution: *Do NOT use the fan tray and PEM handles or cable trays as lifting points.*

Consider the following when unpacking and storing the VMG:

- Leave the VMG packed until it is needed for installation.
- After unpacking the VMG, save and store the packaging material in case the chassis needs to be returned.
- If the packaging is damaged and possible chassis damage is present, report to the shipper and analyze the damage.

Contents

- Populated VMG-14 chassis, which includes:
 - Processor module cards as ordered;
 - Two Power Entry Modules (PEM);
 - Three Fan Trays;
 - Two Shelf Managers (SM);
 - One Shelf Alarm Display (SAD);
 - One Shelf Alarm Panel (SAP);
 - Fourteen Rear Transition Module (RTM) Filler Panels.
- One serial cable with serial connector.
- Packaging.
- Support shelf.

Installation Instructions

The chassis support shelf comes with the VMG-14 system. Allow clearance around the rack for system maintenance.

Prior to installing the chassis:

- Install any stabilizers that came with the equipment rack before mounting the chassis in the rack.
- Load the rack from the bottom to the top with the heaviest system at the bottom; avoid uneven mechanical loading in the rack.

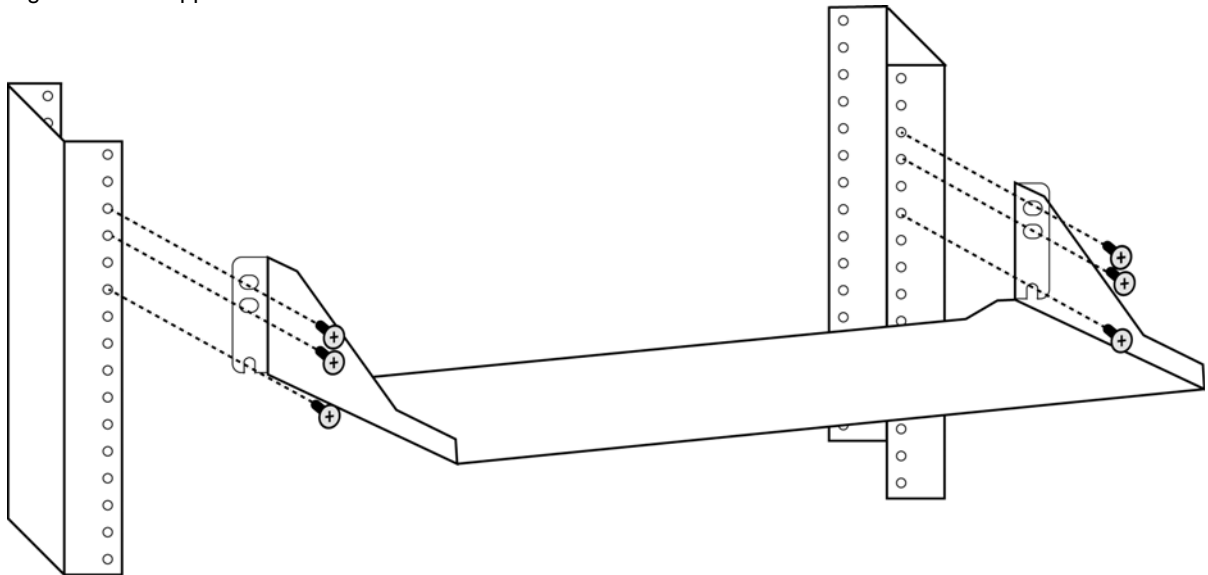


Caution: *Never affix the VMG-14 with only the mounting flange. Due to the weight of the chassis, the rack mounted support shelf must be used.*

Attaching the Support Shelf

The support shelf, as shown in [Figure 26](#), must be installed first. From the back side of the rack, partially insert a screw at the bottom of the Rack Unit (RU) where the tray will sit, repeat for the other side of the rack. Set the U-shaped hole of the support shelf over the screws and continue inserting the 4 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 6 screws are tightened, the support shelf is ready to accept the weight of the chassis.

Figure 26. Support Shelf

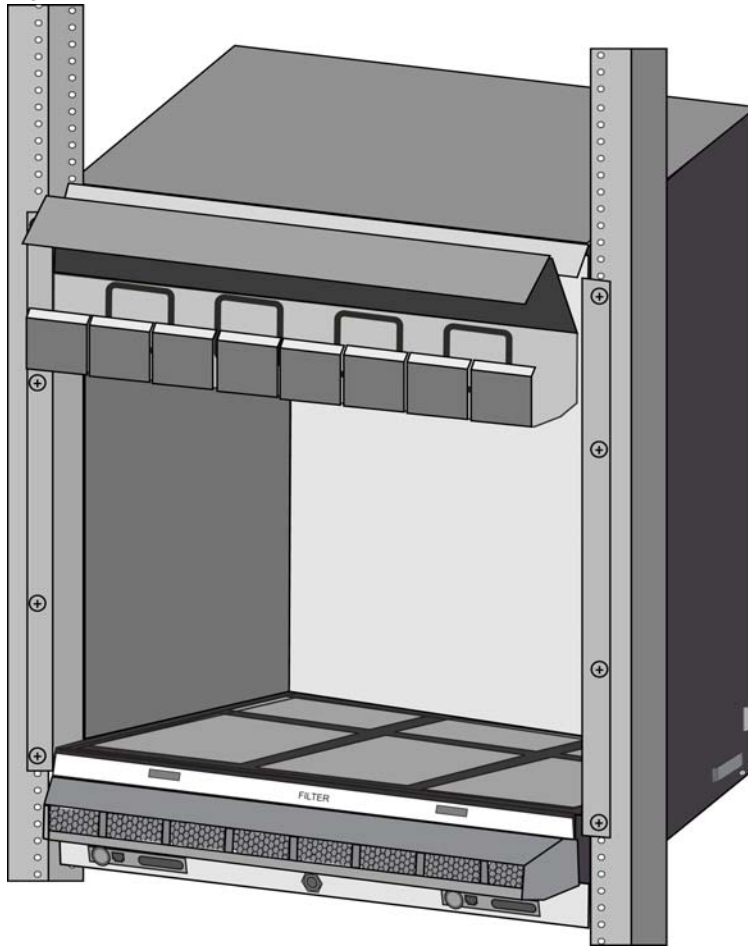


Warning! *Because of the weight of the chassis, two persons must lift and place the VMG-14 on the support shelf. For even greater safety it is advisable to remove the cards and fan trays to make the installation easier.*

Placement in the Rack

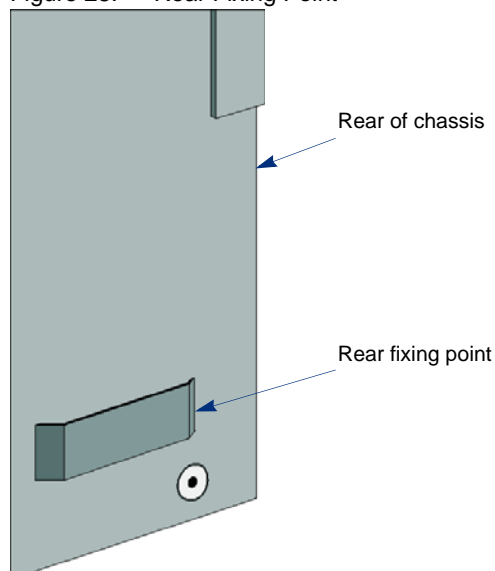
From the front of the rack, begin inserting the chassis, making sure to lift it high enough so that the fixing point for the rear mounting flange (see [Figure 28](#)) clears the support shelf. Set the VMG-14 chassis on the support shelf and slide backwards until the flange meets the front of the rack. At this point the chassis should be fully supported and the eight flange screws can be inserted and tightened with a slotted screwdriver (see [Figure 27](#)). If necessary, the chassis may now be populated. See [Chapter 5, Troubleshooting and Maintenance on page 66](#) for more information on inserting cards, fan trays, etc.

Figure 27. VMG in Rack



Note: For recessed chassis configuration see “*Mounting Flange for Recessed Chassis Configuration*” on page 47.

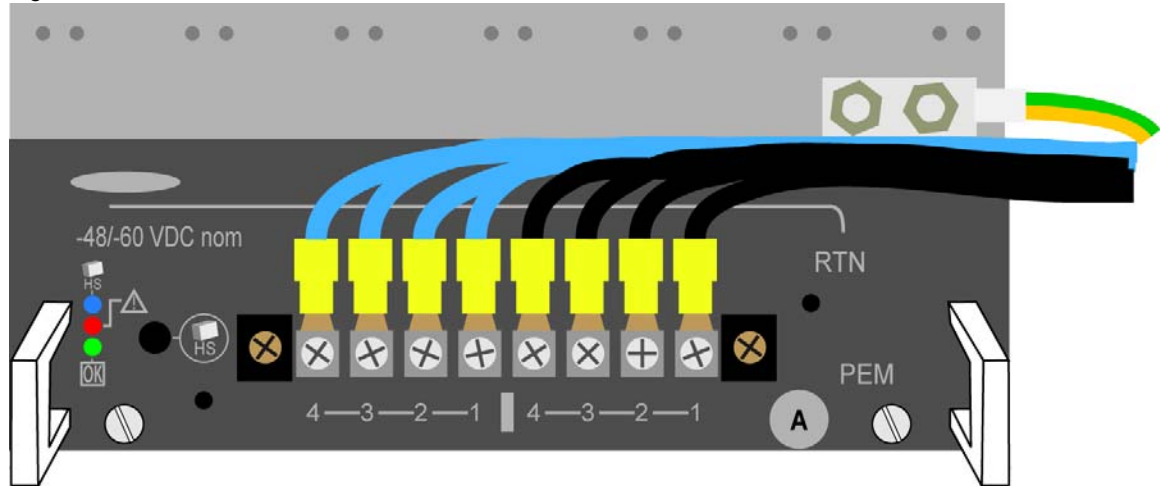
Figure 28. Rear Fixing Point



Connecting DC Power

1. Ensure that the power supply is turned off.
2. Remove the PEM terminal block cover.

Figure 29. PEM Power Cable Connections



3. Connect the power cables to the power terminal as shown in [Figure 29](#). Torque the bolts to 6.8N-m (5 foot pounds).



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

4. Affix the cables with cable ties.
5. Reinstall the terminal cover.

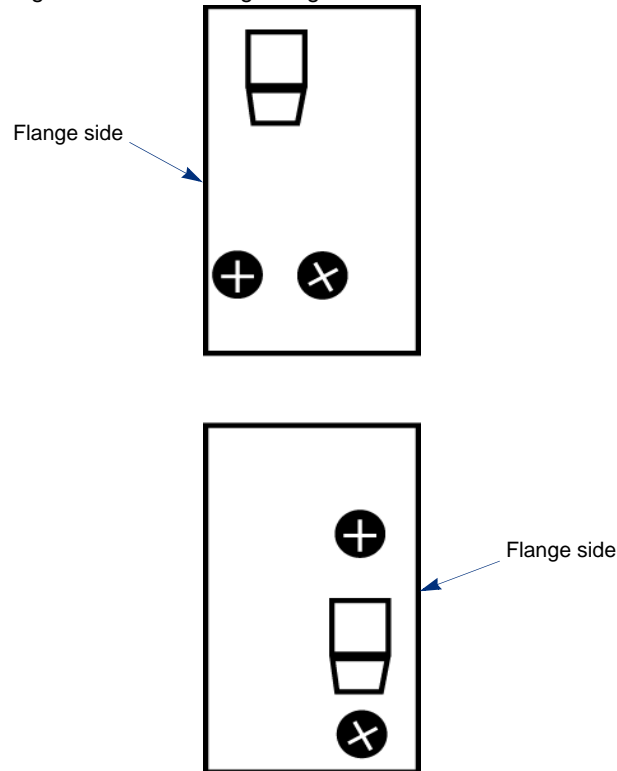
Connecting AC Power

In order to connect the VMG to an AC Power supply, you will need to obtain RGB's AC Power Supply Kit. Please contact your RGB reseller or sales person for details on ordering and installation procedures.

Mounting Flange for Recessed Chassis Configuration

1. Remove the screws (2) from the right side of the chassis at the top of the mounting flange as shown in the top view (default configuration) of [Figure 30](#).
2. Slide the mounting flange downward to disengage.
3. Place the mounting flange in the new position (near the front of the chassis), so that it extends beyond the front of the chassis.
4. Slide the mounting flanges upward to engage.
5. Replace the locking screws as shown in the bottom view of [Figure 30](#).
6. Repeat the procedure for the left side of the chassis.

Figure 30. Mounting Flange Locations



Inserting VMG Cards

Before installing any cards ensure that there is no transport damage and the system is fully operational.

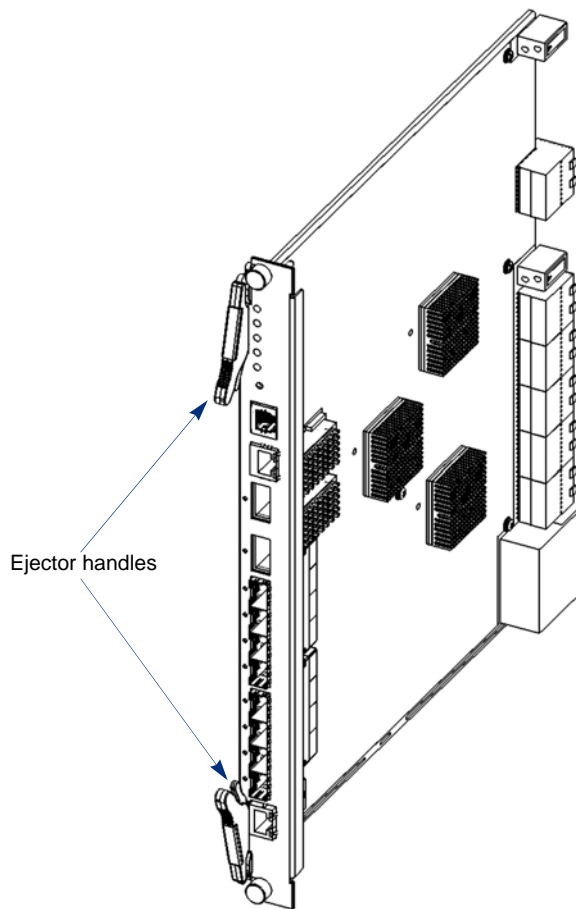
Network Processor Module



Caution: *NPMs can only be installed in slots 7 and 8.*

Before inserting the NPM card, extend the ejector handles fully by releasing the locking trigger. Carefully align the edge of the card with the slot in the chassis and gently slide the card in. Press the NPM card into the backplane and lock the ejector handles in place, making sure that the retaining hooks are properly engaged. The fixing screws can now be tightened with a slotted screwdriver to complete the installation.

Figure 31. Front view of NPM



Warning! Any empty card slots must be fitted with a filler panel to maintain proper air flow.

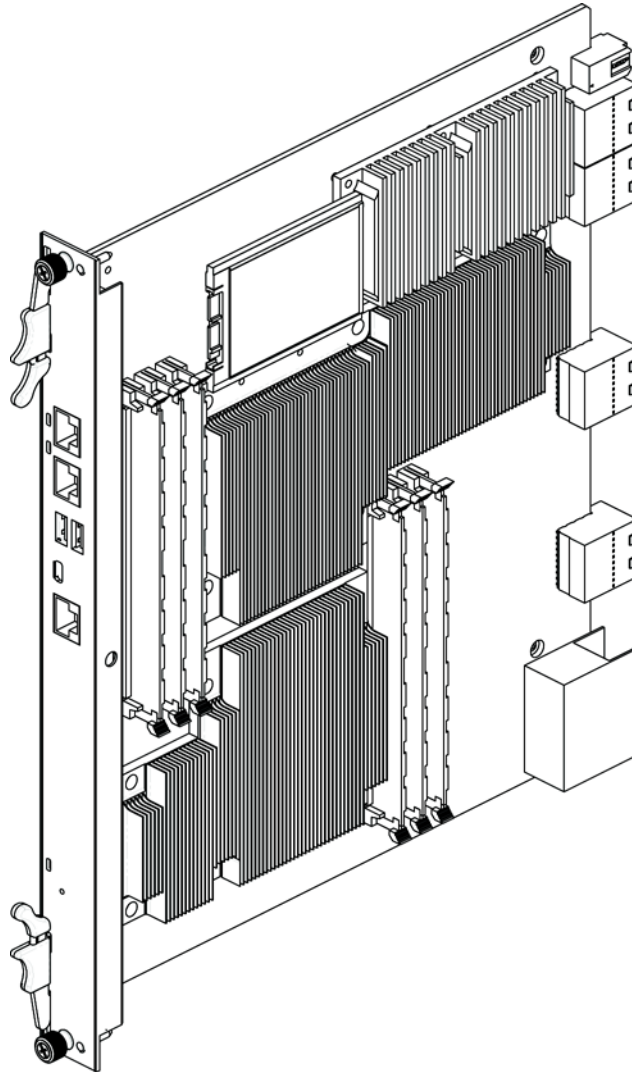
Application Media Processor



Caution: AMPs can only be installed in slots 6 and 9.

Before inserting the AMP card, extend the ejector handles fully by releasing the locking trigger. Carefully align the edge of the card with the slot in the chassis and gently slide the card in. Press the AMP card into the backplane and lock the ejector handles in place, making sure that the retaining hooks are properly engaged. The fixing screws can now be tightened with a slotted screwdriver to complete the installation.

Figure 32. AMP Card

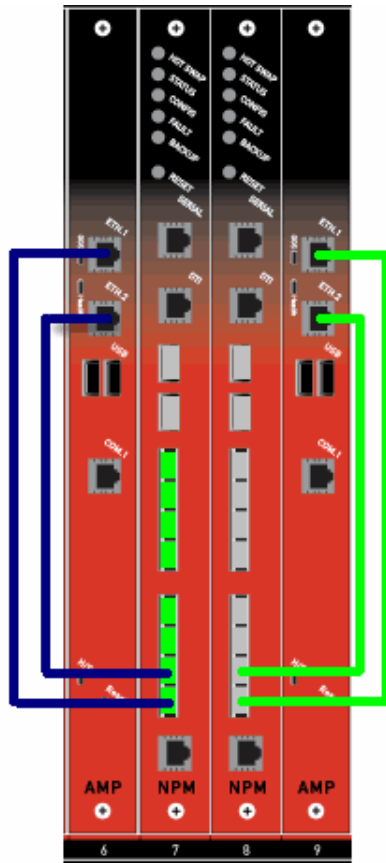


Once the AMP card is installed, use CAT5 Ethernet cable to connect the AMP card to its corresponding NPM card:

- Connect the AMP card in slot 6 to the NPM in slot 7.
- Connect the AMP card in slot 9 to the NPM in slot 8.
- For each AMP card, connect ETH 1 to port 8 on the NPM.
- For each AMP card, connect ETH 2 to port 7 on the NPM.

Figure 33 shows the front panel connections for a 2 NPM/2 AMP configuration.

Figure 33. AMP Connections to NPMs



Video Processor Module and Transcoding Module



Caution: VPMs and TCMs can be installed in any slots *except* 7 and 8.

Before inserting the VPM or TCM card, extend the ejector handles fully by releasing the locking trigger. Carefully align the edge of the card with the slot in the chassis and gently slide the card in. Press the VPM or TCM card into the backplane and lock the ejector handles in place, making sure that the retaining hooks are properly engaged. The fixing screws can now be tightened with a slotted screwdriver to complete the installation.

Figure 34. VPM Card

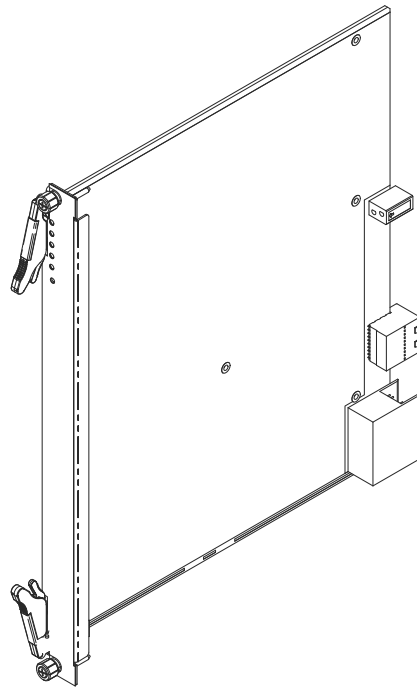
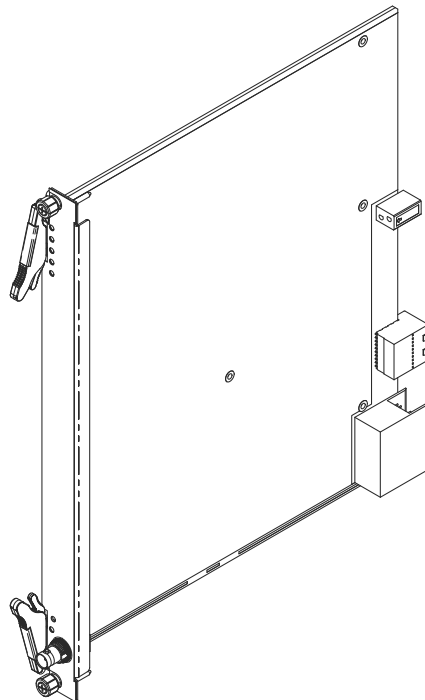


Figure 35. TCM Card



Transceivers

In the appropriate port on the front of the NPM, insert the corresponding transceiver (SFP or XFP) module. With the ejector handle in the upwards or locked position, gently push the module into the port until it is secure (typically there will be a click when the latching mechanism is fully engaged). To remove the module, first remove the cable, then lower the ejector handle, and pull firmly on the ejector

handle. Procedures may vary slightly between manufacturers; refer to the documentation included with the transceiver for specific instructions.

Underwriters Laboratories (UL) has been informed Model VMG-14 is being sold into U.S. commerce without Class 1 laser transceivers being installed in it. UL has been informed that it is the intent of RGB Networks that, in some cases, the purchasing organization of the equipment will install the Class 1 laser transceivers and then use the equipment and not resell the equipment into U.S. commerce. UL notes that per U.S. 21CFR 1040, this practice requires the manufacturing organization and each purchasing organization of the equipment which intends to incorporate the lasers to submit appropriate documentation, including a product report, to the U.S. FDA CDRH before selling the equipment into U.S. commerce. The product report is required to show compliance with U.S. 21CFR, including product and laser radiation classifications for all intended Class 1 laser transceivers. The manufacturing organization and each purchasing organization of the equipment also is responsible for any other reporting and record keeping required by U.S. 21CFR and the FDA CDRH. Through this correspondence, UL is documenting the intent to comply with U.S. CFR 1040 as administered by the U.S. FDA CDRH.



Note: *For a list of SFP and XFP modules approved for use with the NPM, please refer to the release notes.*

Connecting Cables

With the transceiver modules installed, connect the appropriate cable. Lift the lid of the cable tray and slide the cable through the rubber facing. Inside of the tray is a divider; copper cable should be routed in the front and optical cables should be routed in the back of the cable tray.



Note: *To ensure that module cards may be removed easily and expeditiously, cables should be inserted into the cable tray directly above the card they serve.*

Power Up

Apply power to PEM A and PEM B and monitor the boot-up process.

Boot-up process:

1. All of the LEDs on the Shelf Alarm Display, the Shelf Manager, the Fan Trays, the PEMs, the VPMs, TCMs, and the NPMs illuminate.
2. The fans spin up to full speed.
3. The LEDs on the Shelf Alarm Display with the exception of the Fan Tray status LEDs turn off.
4. The fans reduce speed to normal operational speed.
5. The red LEDs on the PEMs, Fan Trays, and SAD turn off.
6. All blue Hot-Swap LEDs blink.
7. All blue Hot-Swap LEDs turn off.
8. All Status-OK LEDs are green.



Note: *The status LED of the active Shelf Manager is solid green, the status LED of the backup Shelf Manager should be blinking.*

LED Indicators

Shelf Alarm Display (SAD)

Table 18 lists the LED information for the SAD.

Table 18. Shelf Alarm Display LEDs

LED	Color
Shelf minor alarm	Yellow
Shelf major alarm	Amber
Shelf critical alarm	Red
User definable 1	Red (not currently used)
User definable 2	Green (not currently used)
User definable 3	Amber (not currently used)
Left fan tray alarm	Red
Center fan tray alarm	Red
Right fan tray alarm	Red
Left fan tray OK	Green
Center fan tray OK	Green
Right fan tray OK	Green

Telco Alarm Display

Table 19 lists the LED information for the Telco alarms.

Table 19. Telco Alarm LEDs

State	Description
Off	No alarm active
On	Alarm active
Flashing	Alarm active, but silenced

Fan Tray Display

Table 20 lists the LED information for the fan tray.

Table 20. Fan Tray LEDs

LED	Color
Hot Swap LED	Blue
Fan tray alarm	Red
Fan tray OK	Green

Hot Swap Display

Table 21 lists information for the Hot-Swap LED.

Table 21. 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 itself.
Short-blink	Deactivation has been requested.

Initial Configuration

The VMG platform provides the *Element Manager*, a Web-browser based GUI for configuration, monitoring and management of the chassis, NPMs, AMPs, VPMs, and TCMs. 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 instructions on its use, please refer to the *VMG Software User Guide*.

In This Chapter:

- “VMG Physical and Virtual IP Addresses,” next.
- “Prerequisites” on page 56
- “Connecting to the VMG” on page 57.
- “Using the TCON (Temporary Console) Program to Set Initial Configuration” on page 58.
- “Finalizing the Initial Configuration” on page 61.

VMG Physical and Virtual IP Addresses

In order 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 the TCON (Temporary Console) Program to Set Initial Configuration” on page 58.

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



Note: Please ensure that the fixing screws for all processing card modules are tightly secured.

Required Information

In an VMG system containing two NPMs, the configuration requires:

- 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 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 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.*

Connecting to the VMG

There is one way to connect to the VMG in order to set its initial physical IP address configuration. This method requires a PC running a terminal emulation program and connected to the NPM's serial port via a serial cable (included in accessory kit). This method accesses the VMG's console program (tcon, or temporary console).



Note: *Customer use of TCON and the command line interface (CLI) is supported for initial configuration only as described in this section and “Using the TCON (Temporary Console) Program to Set Initial Configuration” on page 58.*

Serial Cable Connection for Terminal Emulation to the VMG

Required equipment:

1. Workstation with terminal emulation program (like Hyperterminal)
2. RGB-specific serial cable (included in accessory package)

Procedure:

1. Connect the serial cable from your workstation directly to the NPM's serial port.
2. 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 is inserted in the chassis), boot messages will be displayed. The first set comes from the startup of the OS kernel and the device drivers. The second set comes from the setting up of internal communications. The third set comes from the startup up of the video applications.*

4. If or when the boot messages have finished scrolling, the console program will be displayed. Tapping <ENTER> should redisplay the tcon console program menu.
5. Proceed to “Using the TCON (Temporary Console) Program to Set Initial Configuration” on page 58 to set the IP configuration of the VMG.

Using the TCON (Temporary Console) Program 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. Below is a sample of the menu:

```
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:
```

Select choice #1 and following prompt will be shown:

```
Enter number of your choice: 1

Configuration of Mgmt interface
-----Con-
figuration 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
-----
```

The management interface must be configured for each NPM. Select choice #2 and the following prompt will be shown:

```
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:
```

Enter a line with the appropriate values.

To verify connectivity with the default router (gateway), choose #3. The output will look similar to the following:

```
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 there is no connectivity, the output will look similar to the following:

```
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
```

To display information about the build:

```
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
-----
```

The same procedure must be repeated on the second NPM in the VMG system.

When the management interface is configured for each NPM, the VMG system can be rebooted (select choice #4). Use a Web browser to access the *Element Manager* and finish the initial configuration.

Finalizing the 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, this will be the module in Slot 7.*

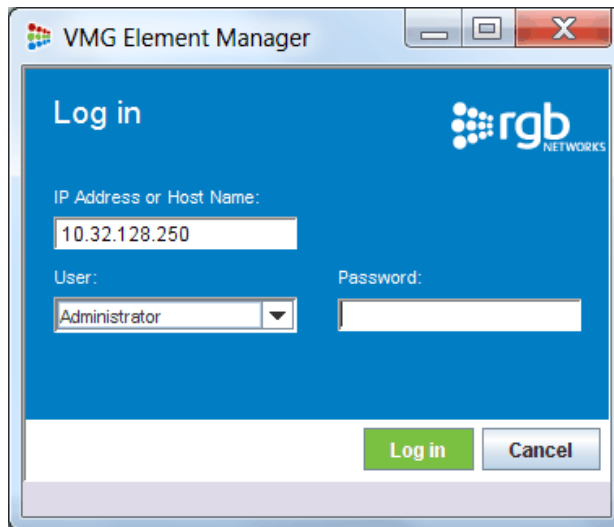
The URL will be the IP address preceded by 'http://' (e.g., if the IP address is 10.32.96.215 the URL is `http://10.32.96.215`). If the web browser successfully contacts the VMG, the display will show the following:

Figure 36. VMG Initial Login Page



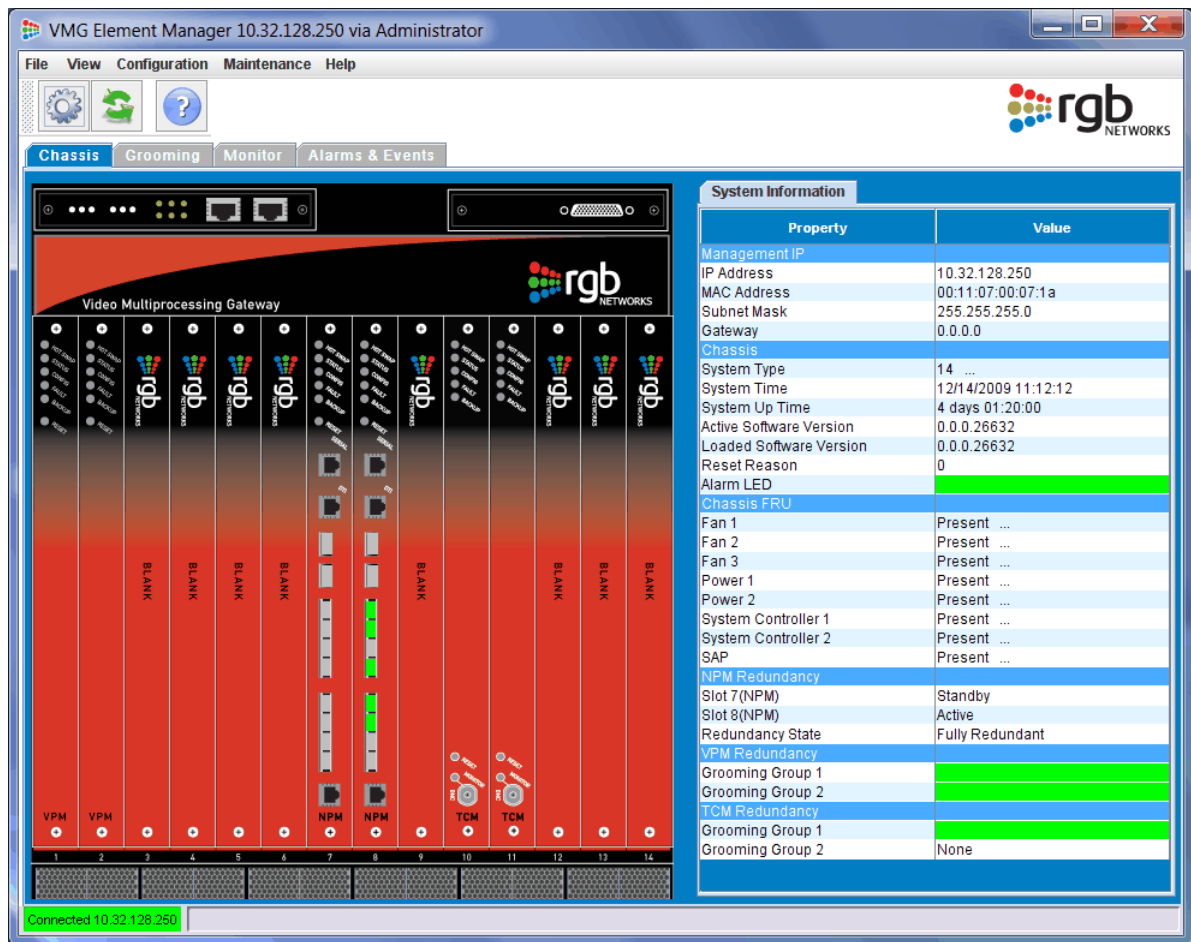
Note: *The system must have a copy of version 5.0 or above of the standard edition Java runtime environment (JRE) installed. If not, click the **Download Java SDK (Please download 5.0 version, if you have not done so.)** link. The browser will redirect to the Sun Systems website where the JRE may be downloaded. For more information on installing the JRE, refer to the “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 login dialog box is shown.

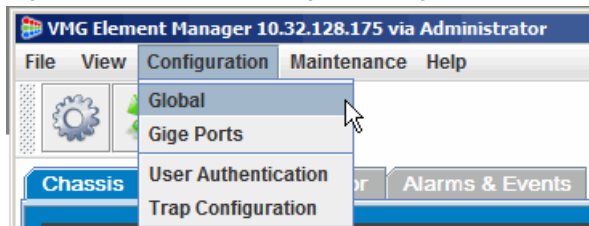
Figure 37. *Element Manager Login*

2. Make sure the user is **Administrator**, then enter **Admin** for the password. (Or, 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 38](#), which displays an actual representation of the VMG-14 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 up a pop-up window for viewing additional information or configuration parameters for the card or system.

Figure 38. *Element Manager - Chassis View*

4. Select **Configuration -> Global** from the drop down menu.

Figure 39. *Element Manager - Configuration Tab*

The **Global Configuration** window opens (Figure 40).

Figure 40. Global Configuration System Tab

Global Configuration

System Management Interface Grooming Group Redundancy Switch

NTP:

Address	Status
Address 1: 10.32.128.141	Active
Address 2:	Inactive
Address 3:	Inactive
Address 4:	Inactive
Address 5:	Inactive

System Time:

Time Zone: GMT-08 Pacific Time(US & Canada)

Time: 04/06/11 12:15:51 PDT

Syslog Server:

IP Address:

Port: 514

System Event:

Max Count (50..10000): 500

Apply Cancel

5. In the **System** tab, enter the value for at least one NTP server address and the **Time Zone**.
6. Optionally, also enter the **Syslog Server IP Address** and **UDP Port Number** (the normal UDP port for syslog is 514).
7. Click on the **Management Interface** tab (Figure 41) 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-14.

Figure 41. Global Configuration Management Interface Tab

The screenshot shows a window titled "Global Configuration" with four tabs: "System", "Management Interface", "Grooming Group", and "Redundancy Switch". The "Management Interface" tab is selected. It displays the following configuration fields:

- 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

At the bottom right of the window are "Apply" and "Cancel" buttons.

8. Enter the **Virtual IP address**, **subnet mask** (netmask), and **gateway** (default router) address (if used).
9. Click the **Apply** button to configure the values and complete the initial configuration.



Note: For complete instructions on configuring the VMG-14, refer to the VMG Software User Guide.

Troubleshooting and Maintenance

This chapter provides procedures for maintaining and tips for troubleshooting the VMG-14.

In This Chapter:

- “Power Entry Module,” next.
- “Fan Tray” on page 68.
- “Shelf Manager” on page 69.
- “Shelf Alarm Display (SAD)/Shelf Alarm Panel (SAP)” on page 70
- “Application Modules” on page 70.
- “Air Filter Tray” on page 72.
- “FRU Part Numbers” on page 72.
- “Troubleshooting” on page 73.



Warning! *Static electricity can harm delicate components inside the chassis. You must wear an ESD wrist strap before exchanging any part or electrical component.*



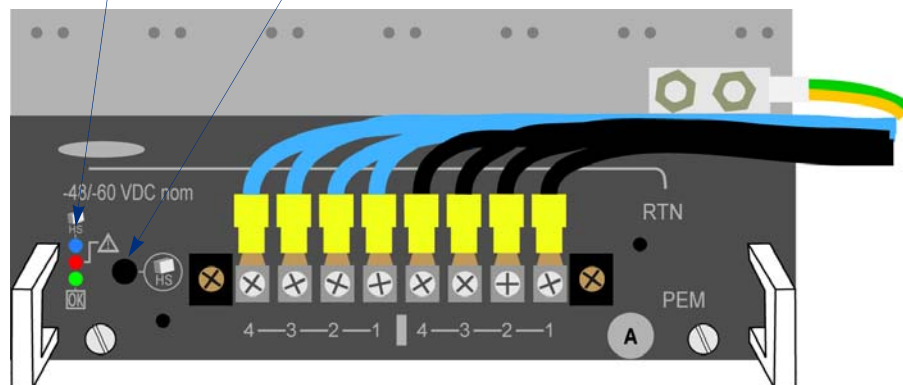
Note: *The front ESD wrist strap terminal is located in the center of the chassis below the air intake cover (see [Figure 6 on page 20](#)) and the rear ESD wrist strap terminal is located above PEM B (see [Figure 7 on page 21](#)).*

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 fully functional.

When the red failure LED lights up, there is either a supply voltage missing, a fuse blown, or the PEM is not working. Before replacing a PEM, check that all power feeds are present at the PEM connector.

Figure 42. PEM View
Hot swap LED Hot Swap Push Button



PEM Removal

1. Ensure that the redundant PEM is fully functional (red alarm LED is off).
2. Press the Hot Swap button until the Hot Swap LED starts blinking.
3. Wait until the Hot Swap LED is solid blue.
4. Cut off the power supply to the PEM that will be removed.
5. Remove the terminal cover.
6. Disconnect the power cables from the power terminal.
7. Unscrew both PEM fixing screws.
8. Pull out the PEM using both handles.

PEM Replacement

1. Insert the PEM into the chassis. The slots must slide into the guides.

Note: The blue Hot Swap LED starts blinking until the PEM is fully functional. Until power is provided to the PEM the red alarm LED is lit.

2. Tighten both screws.
Torque: 0.67N-m (6 in.-lb.)
3. Connect the power cables at the power terminal.
Torque: Bolts 8-32 UNC 6.8N-m (5 foot pounds).

Note: Verify the correct polarity of the -48VDC and the RTN cables.

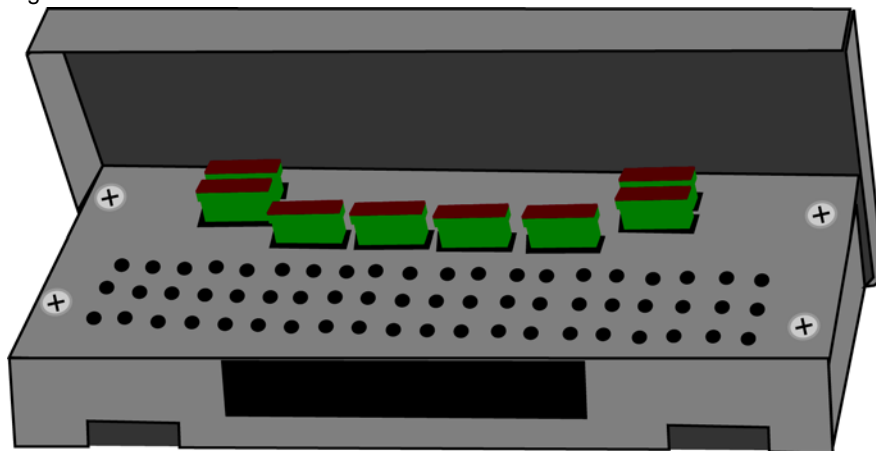
4. Attach the terminal cover.
5. Power-on the power supply for the PEM.

Note: When all power feeds are present, only the green OK LED is lit.

PEM Fuse Replacement

All four power feeds are protected by fuses in the -48 V and VRTN paths, and have a rating of 30A Listed / 80 V.

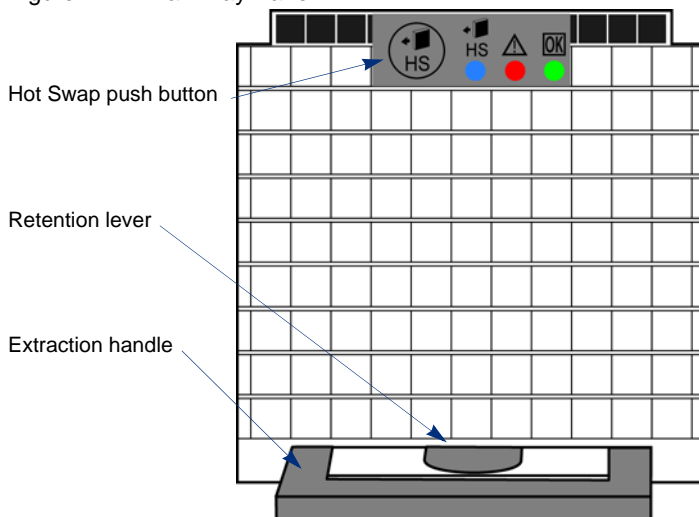
Figure 43. PEM Fuses



1. To replace a fuse, the proper PEM module must first be removed (see, “[PEM Removal](#)” on page 67).
2. With the PEM removed lift the top cover and replace the fuse. Replace the PEM (see, “[PEM Replacement](#)” on page 67).

Fan Tray

Figure 44. Fan Tray Panel



Fan Tray Removal

1. Press the **Hot Swap** button until the Hot Swap LED begins blinking.
2. Wait until the Hot Swap LED is solid blue.



Note: All fans should be completely stopped at this point.

3. Pull out the injector/ejector handle.
4. Pull out the fan tray.

Fan Tray Replacement

1. Insert the fan tray completely into the VMG-14 chassis.



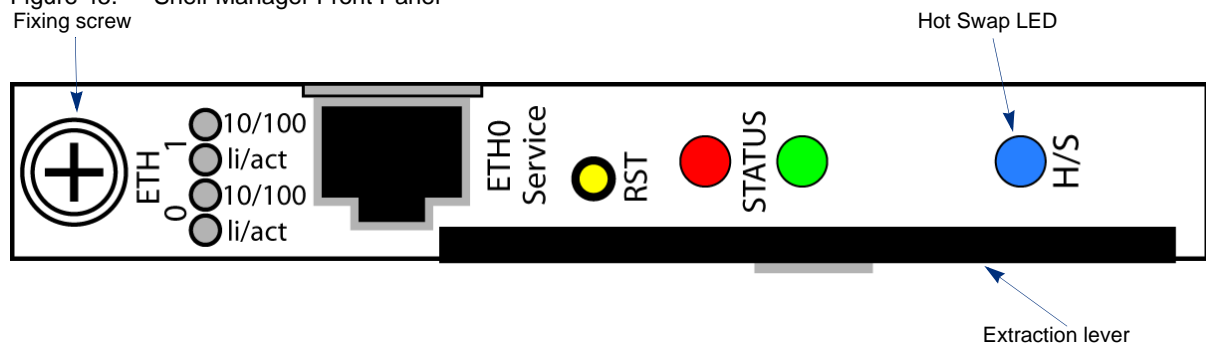
Note: The blue hot-swap LED starts blinking until the fan tray is fully functional. When ready, only the green **OK** LED is lit.

2. When the major Telco alarm on the SAD is lit after replacing the fan tray, clear the alarm through the serial port by entering the command:

```
<clia alarm clear>
```

Shelf Manager

Figure 45. Shelf Manager Front Panel



SM Removal

1. Unscrew the fixing screw.
2. Pull the extraction lever slowly until the Hot Swap (blue) LED begins blinking.
3. After the Hot Swap LED has stopped blinking and is solid blue, extend the lever completely and pull the SM out.

SM Replacement

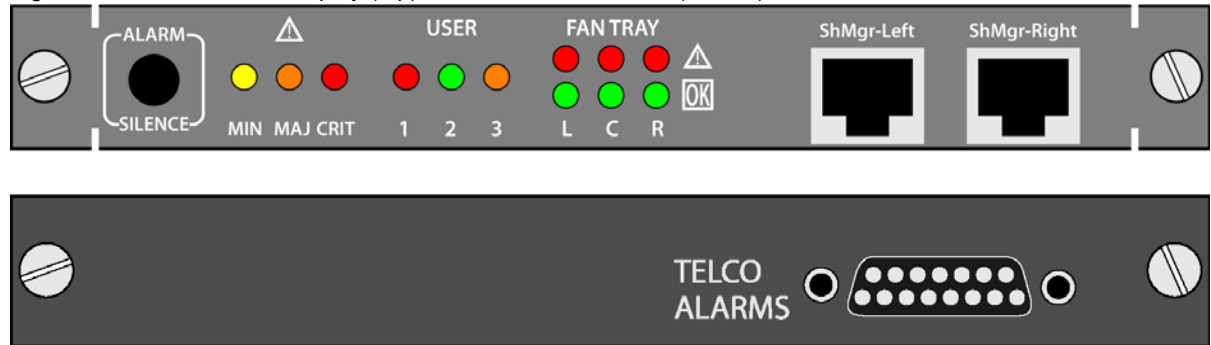
1. With the extraction lever fully extended, insert the SM into the guides and push into the chassis.
2. Close the extraction lever and tighten the fixing screws.
3. The SM will begin booting and after approximately 1 minute the status (green) LED will illuminate, indicating the SM is fully functional.



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.

Shelf Alarm Display (SAD)/Shelf Alarm Panel (SAP)

Figure 46. Shelf Alarm Display (top), and Shelf Alarm Panel (bottom)



SAD/SAP Removal

1. Unscrew both fixing screws.
2. Remove the SAD/SAP by pulling on both of the fixing screws.

SAD/SAP Replacement

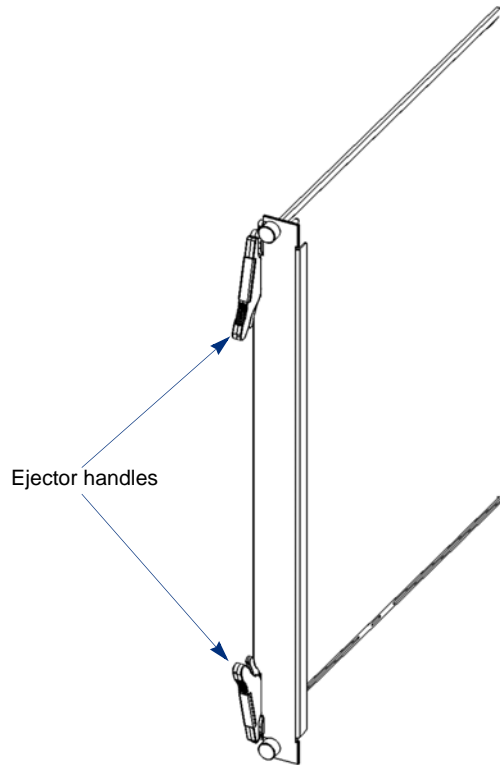
1. Place the guides of the SAD/SAP into the slots of the horizontal board.
2. Fully insert the SAD/SAP.
3. Tighten both fixing screws.
Torque: 0.67N-m (6 in.-lb.).

Application Modules



Note: The following removal and replacement instructions are applicable to all application modules in the VMG: NPM, AMP, VPM, and TCM cards.

Figure 47. Application Module (NPM, AMP, VPM, or TCM)



Removal

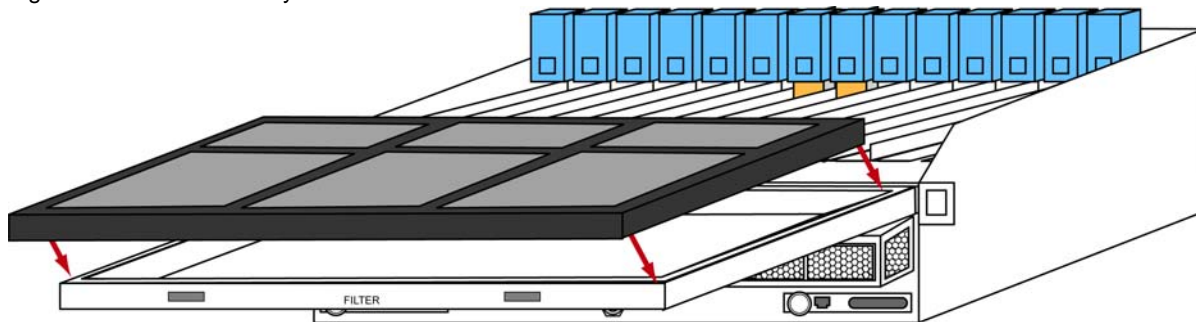
1. Unscrew the two fixing screws at the top and bottom of the module.
2. Hold the ejector handles on the module simultaneously and slowly unlatch them until the Hot Swap (blue) LED begins blinking.
3. After the Hot Swap LED has stopped blinking and is solid blue, pull the latches outward and remove the module.

Replacement

1. Extend the ejector handles fully by releasing the locking trigger.
2. Carefully align the edge of the module with the slot in the chassis and gently slide in.
3. Press the module into the backplane and lock the ejector handles in place, making sure that the retaining hooks are properly engaged.
4. Tighten the fixing screws at the top and bottom of the module.

Air Filter Tray

Figure 48. Air Filter Tray



Removal

1. Extract the filter tray by pulling the handles. No additional screws need be loosened.
2. Remove the old air filter element by lifting.

Replacement

1. Carefully align, then insert the new air filter element.
2. Push the air filter tray into the guide rails at each side of the chassis until the spring mounted ball lock engages.



Note: When installing the air filter tray, the filter element must be in the top position (as it slides into the chassis, the top of the filter will face out).

FRU Part Numbers

Table 22 lists part numbers for the field-replaceable units of the VMG-14 chassis.

Table 22. FRU Numbers

Components / Spares	Part
VMG-NPM	Network Processor Module
VMG-VPM	Video Processor Module
VMG-TCM	Transcoding Module
VMG-AMP	Application Media Processor
VMG-SC	Shelf Manager/Controller Module
VMG-FAN-TRAY	Single Fan Tray
VMG-AIR -FILTER	Replacement Air Filter Element
VMG-SAP	Telco Shelf Alarm Panel Module
VMG-SAD	Telco Shelf Alarm Display Module
VMG-14-FUSE	Fuse 30A / 80V for PEM
VMG-14-MODULE-FILLER PANEL	Filler Panel with airflow baffle for empty module slot

Table 22. FRU Numbers (Continued)

Components / Spares	Part
VMG-14-ACPWRSPPLY-2PEM	AC power supply with 4 x 1000W (3+1) modules, 1RU, additional 1RU DC distribution panel
VMG-14-2ACPWRSPPLY-2PEM	Dual AC power supply chassis with 3 x 1000W modules each (6 total), 2 x 1RU, additional 1RU DC distribution panel

Troubleshooting

Table 23 lists LED indications for troubleshooting the VMG-14 module cards after insertion.

Table 23. VMG-14 Module Card Troubleshooting

Indication	Solution
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.

For details on troubleshooting other statuses, see [“LED Indicators” on page 54](#).

Contacting Technical Support

Before contacting technical support, have the following information handy:

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

Customers who purchased their product directly from **RGB Networks** should contact **877-RGB-NETW** (877-742-6389).

Event Log Analysis

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

System Specifications

This chapter provides the system specifications for the VMG-14.

In This Chapter:

- “Modules,” next.
- “Input / Output Interfaces” on page 74.
- “Redundancy” on page 75.
- “Compliance” on page 75.
- “Safety” on page 76.
- “Physical Dimensions” on page 76.
- “Weight Specifications” on page 77.
- “Power Specifications” on page 77.
- “Environmental Specifications” on page 77.

Modules

Table 24. 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, statmuxing, DPI, program substitution, and video processing functions.
Application Media Processor (AMP)	Pairs with an NPM to provide audio transcoding.

Input / Output Interfaces

Table 25. Input/Output Interfaces

Interface	Type
Ethernet	2 x 10GigE, 8 x GigE interfaces - copper or optical.
Fast Ethernet	1 x 10/100BaseT control and management interface.
Serial	1 x RJ-11 serial port.
DTI	1 x RJ-45 DOCSIS Timing Interface.

Redundancy

Table 26. 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 27. Compliance

Compliance	Standard
Safety	UL / CUL / CB 60950-1, First Edition (Safety of Information Technology Equipment, Including Electrical Business Equipment)
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 27. Compliance (Continued)

Compliance	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
	<ul style="list-style-type: none"> 80-1000 MHz, 3 V/m, Criteria A, Modulation: 1 kHz, 80% AM, 1% step size.
	Immunity to Electrical Fast Transients EN61000-4-4
	<ul style="list-style-type: none"> Signal Ports: Level 2, 0.5 kV, Criteria A Power Line: Level 2, 1 kV, Criteria A
RoHS	Surge Immunity EN61000-4-5
	<ul style="list-style-type: none"> 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

Safety

Table 28. Safety specifications

Parameter	Value
Protected earth test	EN 60950, test current 24A, resistance <100m Ohm

Physical Dimensions

Table 29. Physical dimensions

Parameter	Value
Height	571.6mm (13 RU)
Width	482.6mm
Depth	506.54mm (w/ cable trays)

Weight Specifications

Table 30. Weight Specifications

Parameter	Value
Shipping weight completely assembled with packaging	45Kg
VMG weight (w/o fan tray and PEMs)	19Kg
VMG weight completely assembled	30.6Kg
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	2.54 Kg (5.6 lbs)

Power Specifications

Table 31. Power Specifications

Parameter	Value
Input voltage	-48VDC nominal
Input power	<ul style="list-style-type: none"> DC: -48VDC (range -41 to -60VDC) Amp: 20 per power feed (total 4 + 4 power feeds)
Power consumption	3500W maximum – fully loaded, 4 power feeds
Overcurrent protection	30A Listed fuses on PEM

Environmental Specifications

Table 32. 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

Localized Cautions and Warnings

This appendix provides all of this manual's Caution and Warning statements in French and German.



Page number	Statement type	Statement
Page 21	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	Statement type	Statement
Page 21	Caution	Although there are fuses in the power entry circuit of the VMG, the power lines must be protected on the rack level with 30A breakers.
	Attention	Bien qu'il y ait des fusibles dans le circuit d'entrée d'alimentation du VMG, les lignes électriques doivent être protégées au niveau du rack avec des disjoncteurs 30A.
	Vorsicht	Der Eingangsschaltkreis des VMG besitzt zwar Sicherungen, jedoch müssen die Netzversorgungsleitungen im Rack mit 30-A-Leitungsschutzschaltern abgesichert werden.



Page number	Statement type	Statement
Page 31	Warning	The NPM contains 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	Le NPM contient 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	Das NPM enthält eine Lithiumbatterie. Wenn diese durch eine Batterie eines unzulässigen Typs ersetzt wird, besteht Explosionsgefahr. Entsorgen Sie Altbatterien entsprechend den geltenden Vorschriften.



Page number	Statement type	Statement
Page 43	Caution	All filler panels must be installed to maintain proper airflow and prevent air from escaping out of the front of an open slot. Filler panels should include an airflow baffle that extends to the backplane.
	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	Statement type	Statement
Page 43	Warning	Hazardous voltage! 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	Tension dangereuse ! 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	Gefährliche Spannung! 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	Statement type	Statement
Page 43	Warning	The VMG 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	Statement type	Statement
Page 43	Warning	Danger of electrostatic discharge. Static electricity can harm delicate components inside the VMG. 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	Statement type	Statement
Page 43	Warning	Avoid electric overload. To avoid electrical hazard, do not make connections to terminals outside the specified voltage range for the VMG.
	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	Statement type	Statement
Page 44	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	Statement type	Statement
Page 44	Caution	When opening the shipping carton, use caution to avoid damaging the VMG.
	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	Statement type	Statement
Page 44	Caution	Do NOT use the fan tray and PEM handles or cable trays as lifting points.
	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	Statement type	Statement
Page 45	Caution	Never affix the VMG-14 with only the mounting flange. Due to the weight of the chassis, the rack mounted support shelf must be used.
	Attention	Ne fixez jamais le VMG-14 uniquement avec la bride de montage. En raison du poids du châssis, il y a lieu d'utiliser le support monté en rack.
	Vorsicht	Das VMG-14 darf nie nur mit dem Montageflansch befestigt werden. Aufgrund des Gehäusegewichts muss die am Rack befestigte Stützplatte verwendet werden.



Page number	Statement type	Statement
Page 45	Warning	Because of the weight of the chassis, two persons must lift and place the VMG-14 on the support shelf. For even greater safety it is advisable to remove the cards and fan trays to make the installation easier.
	Avertissement	En raison du poids du châssis, il faut deux personnes pour soulever et poser le VMG-14 sur le support. Pour plus de sécurité encore, il est recommandé de retirer les cartes et les plateaux de ventilation pour faciliter l'installation.
	Warnung	Aufgrund des Gehäusegewichts muss das VMG-14 von zwei Personen angehoben und auf der Stützplatte abgelegt werden. Um den Einbau zu erleichtern und die Sicherheit zu steigern, empfiehlt es sich, die Karten und den Lüftereinschub auszubauen.



Page number	Statement type	Statement
Page 47	Caution	Verify the correct polarity of the -48VDC 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	Statement type	Statement
Page 48	Caution	NPMs can only be installed in slots 7 and 8.
	Attention	Les NPM ne peuvent être installés que dans les logements 7 et 8.
	Vorsicht	NPMs können nur in den Steckplätzen 7 und 8 eingebaut werden.



Page number	Statement type	Statement
Page 49	Warning	Any empty card slots must be fitted with a filler panel to maintain proper air flow.
	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	Statement type	Statement
Page 49	Caution	AMPs can only be installed in slots 6 and 9.
	Attention	Les AMP ne peuvent être installés que dans les logements 6 et 9.
	Vorsicht	AMPs können nur in den Steckplätzen 6 und 9 eingebaut werden.



Page number	Statement type	Statement
Page 51	Caution	VPMS and TCMs can be installed in any slots except 7 and 8.
	Attention	Les VPM et TCM peuvent être installés dans tous les logements hormis 7 et 8.
	Vorsicht	VPMS und TCMs können in allen Steckplätzen mit Ausnahme der Steckplätze 7 und 8 eingebaut werden.



Page number	Statement type	Statement
Page 66	Warning	Static electricity can harm delicate components inside the chassis. You must wear an ESD wrist strap before exchanging any part or electrical component.
	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	Statement type	Statement
Page 69	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.

Information to Users

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-14 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 their 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-14 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
- UL / CUL / CB 60950-1 1950

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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