



Video Multiprocessing Gateway (VMG) Release 2.5.2

VMG-6 Hardware Setup Guide

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VMG-6 Hardware Setup Guide Document History

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250-0103-01 rev A	2.5	07/08/2011	Content removal: reference to Ethernet cabling for initial IP config via telnet is no longer relevant.
250-0049-01 rev A	1.0	06/15/2009	Production Release
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Introduction

The compact Video Multiprocessing Gateway (VMG-6) from RGB Networks is a smaller chassis (5RU) version of the larger VMG-14 (13RU) chassis, suitable for lower density video headends and hub sizes while still delivering the industry's highest density digital video solution per Rack Unit for grooming, statistical multiplexing, transrating, digital program insertion (DPI), and MPEG-2 / H.264 transcoding. Based on a flexible, scalable and modular platform, the compact VMG-6 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 5 RU chassis can simultaneously perform digital ad insertion, program substitution, switching, grooming, and real time transcoding.

The VMG-6 is fully MPEG-2 and H.264 compliant and interoperable with leading video industry equipment; it shares the same software functionality and application modules (NPMs, AMPs, TCMs, and VPMs) as the larger VMG-14 chassis.

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-6 Hardware Setup Guide*.
- [Chapter 2, "Overview,"](#) provides a detailed description of the VMG-6 features and components.
- [Chapter 3, "Physical Installation,"](#) describes the initial steps and requirements for installing the VMG-6.
- [Chapter 4, "Initial Configuration,"](#)describes the management and console setup.
- [Chapter 5, "Troubleshooting and Maintenance,"](#)provides information about LED indicators and component replacement.
- [Chapter 6, "System Specifications,"](#)includes information about regulatory, environmental, electrical, and mechanical compliances.
- [Appendix A, *Localized Cautions and Warnings*](#) – lists all of this guide's *Caution* and *Warning* statements in French and German.
- [Appendix , *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-6 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 compact 6-slot Video Multiprocessing Gateway (VMG-6) from RGB Networks is a smaller chassis (5RU) version of the larger VMG-14 (13RU) chassis that is suitable for relatively lower density video headends and hub sizes, delivering the industry's highest density digital video solution per Rack Unit for grooming, statistical multiplexing, and digital program insertion (DPI), and transcoding. The VMG-6 provides advanced standard definition (SD) and high definition (HD) MPEG-2 and MPEG-4/H.264 video processing, sharing the same software functionality and application modules (NPMs, AMPs, VPMs, and TCMs) as the full-sized VMG-14 chassis while using a smaller form factor. The compact VMG-6 enables telecommunications operators to deploy the next generation of cable and IPTV services that will help accelerate digital TV profitability while saving valuable rack space.

This chapter provides an overview of the VMG-6.

In This Chapter:

- “Product Features,” next.
- “VMG Architecture” on page 12.
- “VMG Functionality” on page 13.
- “VMG Redundancy” on page 17.
- “VMG Components” on page 18.

Figure 1. VMG-6 Chassis



Product Features

In addition to being software-upgradeable, scalable and reliable, the VMG-6 platform has the following features:

- Two dedicated Shelf Managers.
- One Shelf Alarm and Display Panel in between the two Shelf Managers.
- Web-based embedded management.
- Redundant Intelligent Platform Management Bus interfaces in a radial configuration.
- Dual redundant Power Entry Modules (PEM) – each PEM provides a power 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 provides alarm status LEDs and fan tray alarm LEDs.

Features exclusive to the VMG-6:

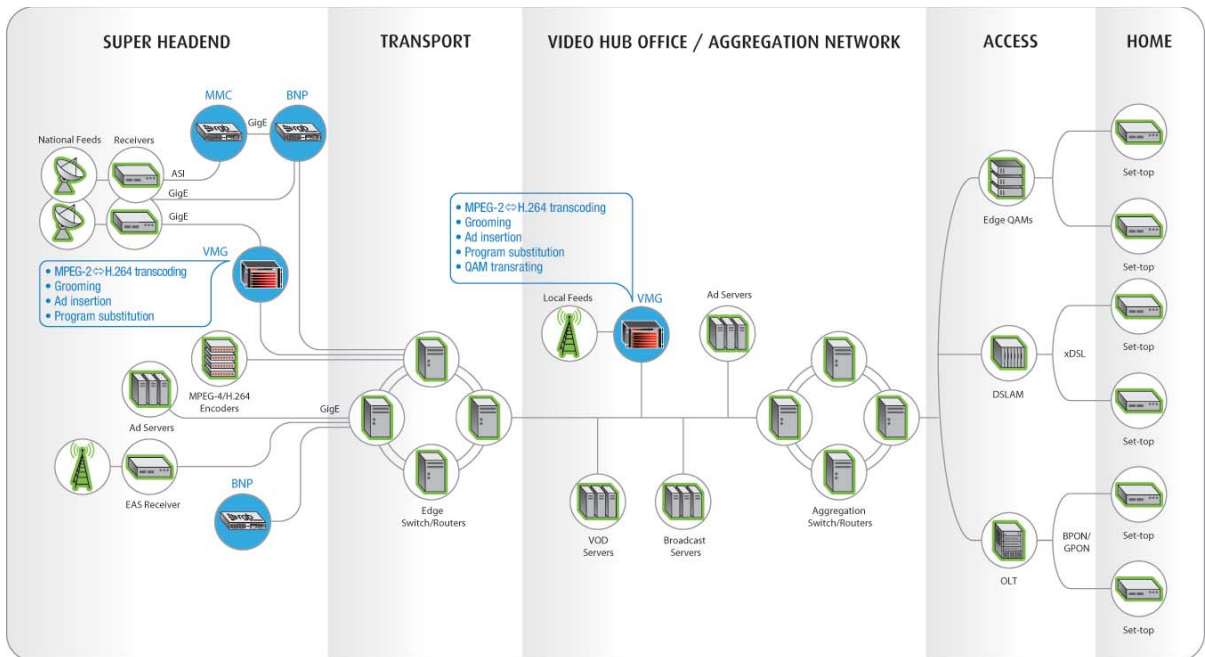
- 5RU chassis
 - 6 slots
 - Up to 4 VPM or TCM cards, as ordered.
 - Up to 2 NPM cards (8 x 1 Gigabit Ethernet, 2 x 10 Gigabit Ethernet).
 - Up to 2 AMP cards, as ordered.

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 video 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-6 accepts:

- Two NPMs (in slots 1 and 2)
- Up to two AMPs (in slots 3 and 4)
- Up to four VPMs or TCMs (in slots 3 through 6)

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:

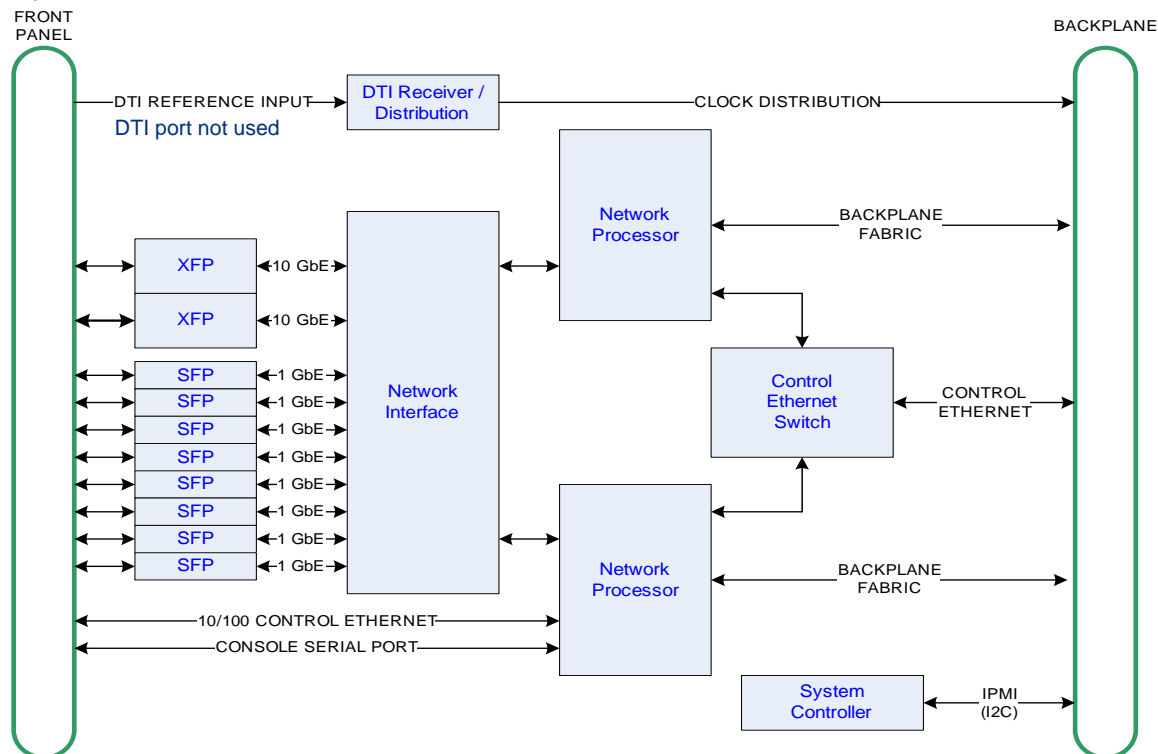
- Aggregation and distribution point for all MPEG-2 and H.264 video content or data traffic.
- Video and data stream filtering, switching and routing.
- System management functions.
- Hot-swappable.
- Supports 1:1 module redundancy.

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



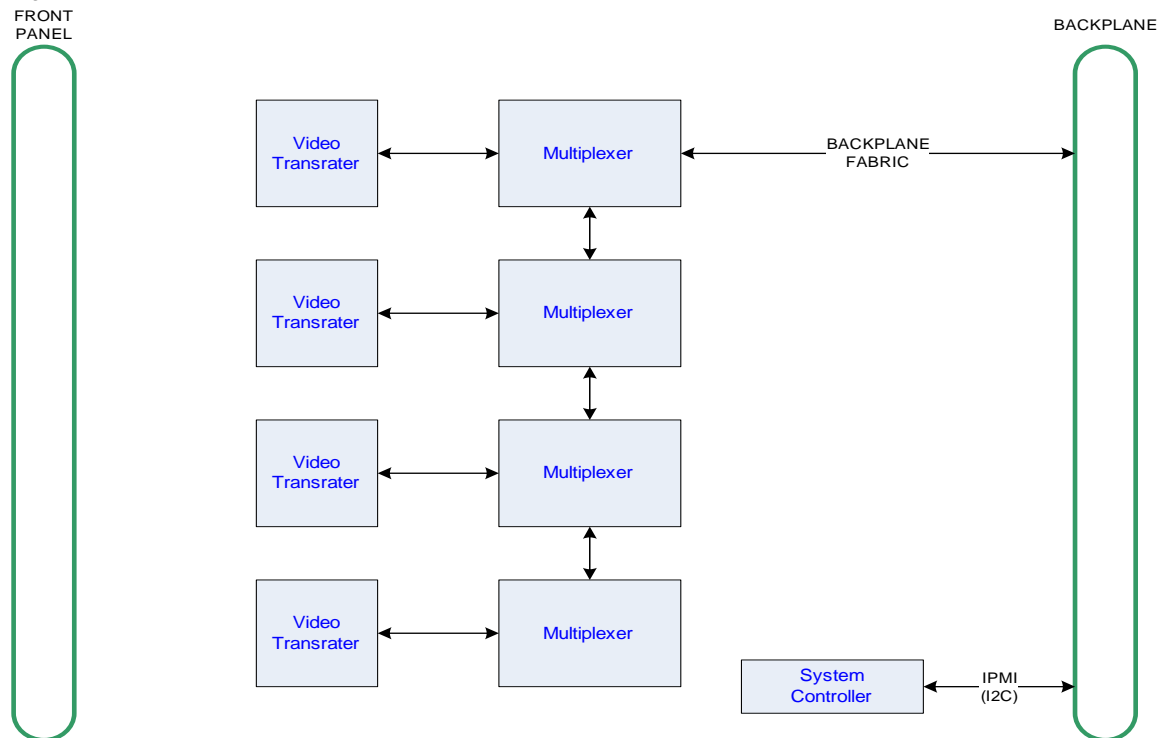
Video Processor Module Functionality

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



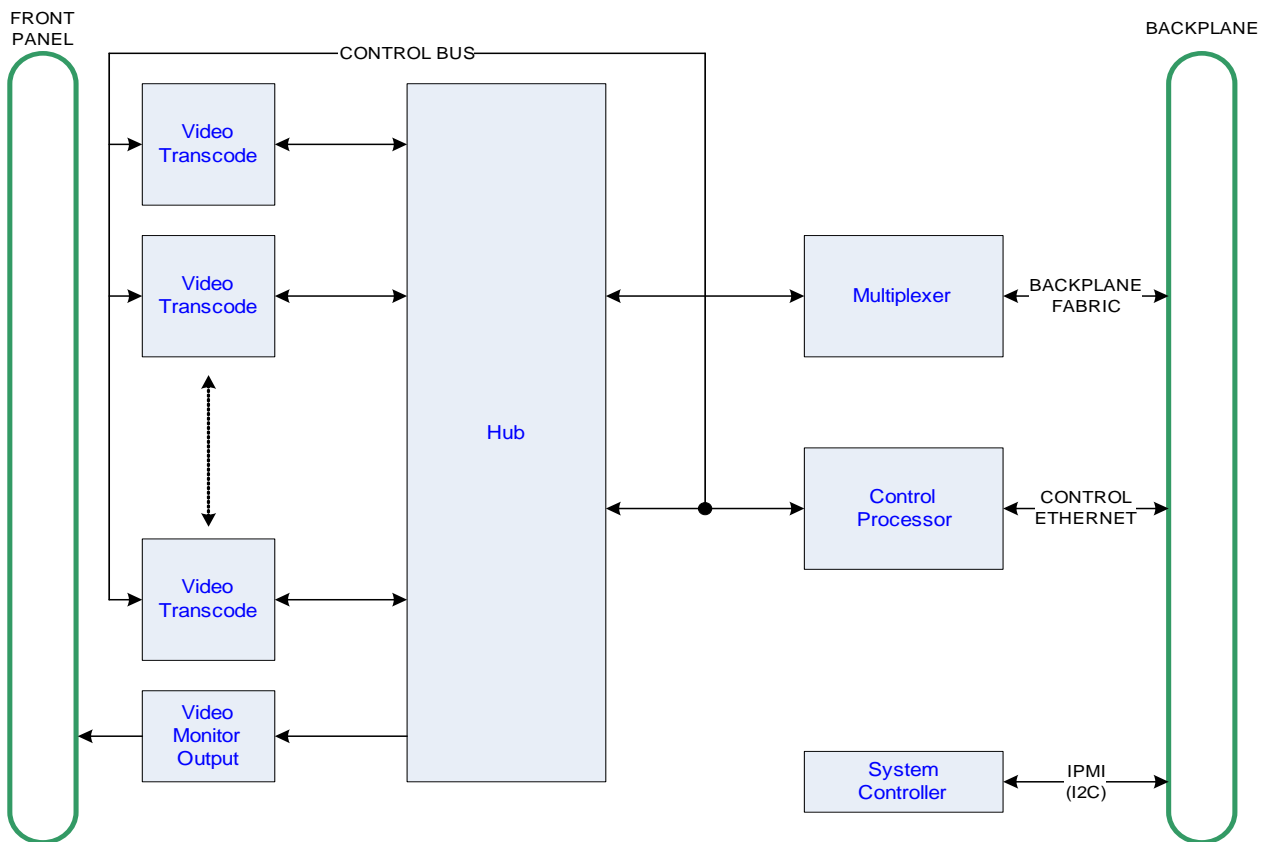
Transcoding Module Functionality

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 48 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-6 chassis provides redundancy for a high availability of services. These include:

- Dual redundant PEMs.
- Two 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.
- Six node slots for hot-swappable modules (two for NPMs, up to four for VPMs or TCMs).

VMG Components

Chassis

The VMG-6 utilizes a chassis platform with 5 Rack Units (RU) height and 6 slots (5RU/6-slot). The two bottom slots in the chassis are used for Network Processor Modules (NPMs) in 1:1 redundancy configuration; the remaining four slots can be used for Video Processor Modules (VPMs), Transcoding Modules (TCMs), Application Media Processors (AMPs), and other future release modules. The VMG-6 chassis has dual Power Entry Modules (PEMs) and two Shelf Managers (SMs).

[Figure 6](#) shows a front view of the chassis without the module cards installed.

Figure 6. Front View of the Chassis

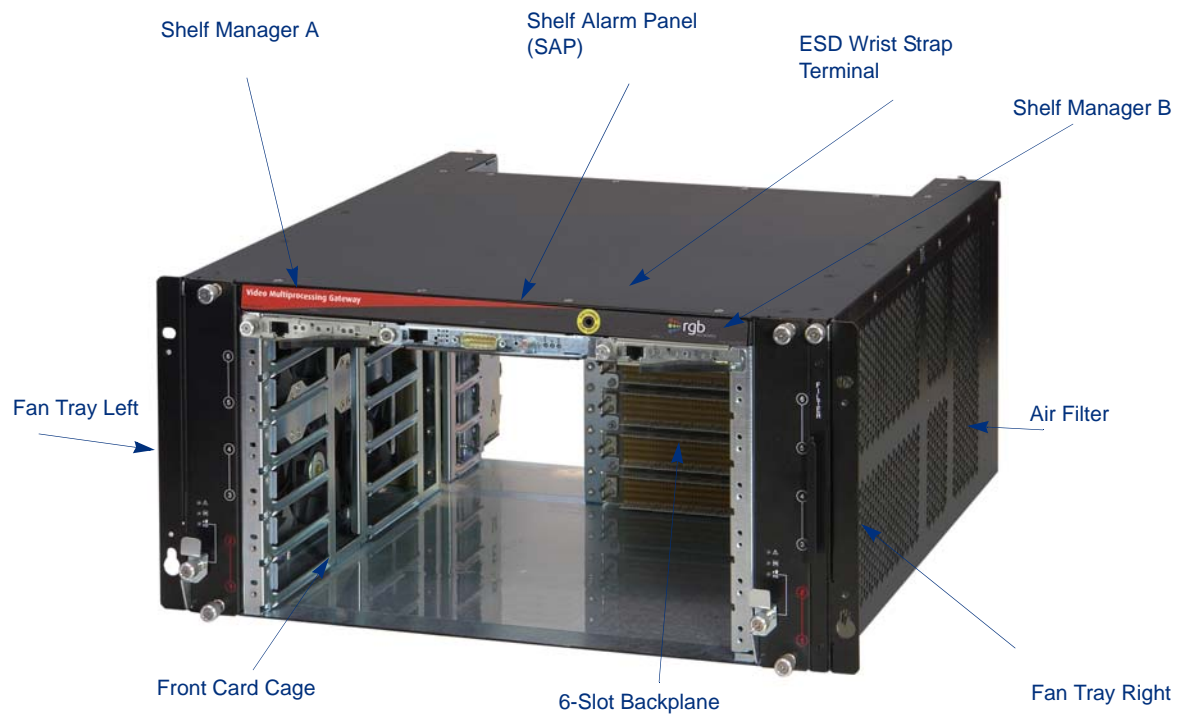


Figure 7 shows a rear view of the chassis.

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 circuit breakers in the power entry circuit of the VMG-6, the power lines must be protected on the rack level with 40A breakers. In addition, a 50A Listed circuit breaker must be provided in the building installation for overcurrent/short circuit backup protection.



Note: The VMG-6 can be powered using a regular telecommunications power supply of -48 nominal VDC with a VDC return. The specified voltage range is from -41 VDC to -60 VDC. The VMG-6 supports redundant power supplies but the two supplies should be independently powered.

Two pluggable redundant PEMs are located on the left and right side of the back of the VMG-6 chassis. Each PEM provides power terminals for one 40A power feed. Each power feed consists of a -48VDC cable and its corresponding return cable and is protected by a 40A circuit breaker switch.

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

A single PEM is capable of supplying 200 watts of power to each blade slot, 15 watts for each Rear Transition Module (RTM) slot (currently not used for VMG applications), and the necessary power for the Fan Trays and system management.

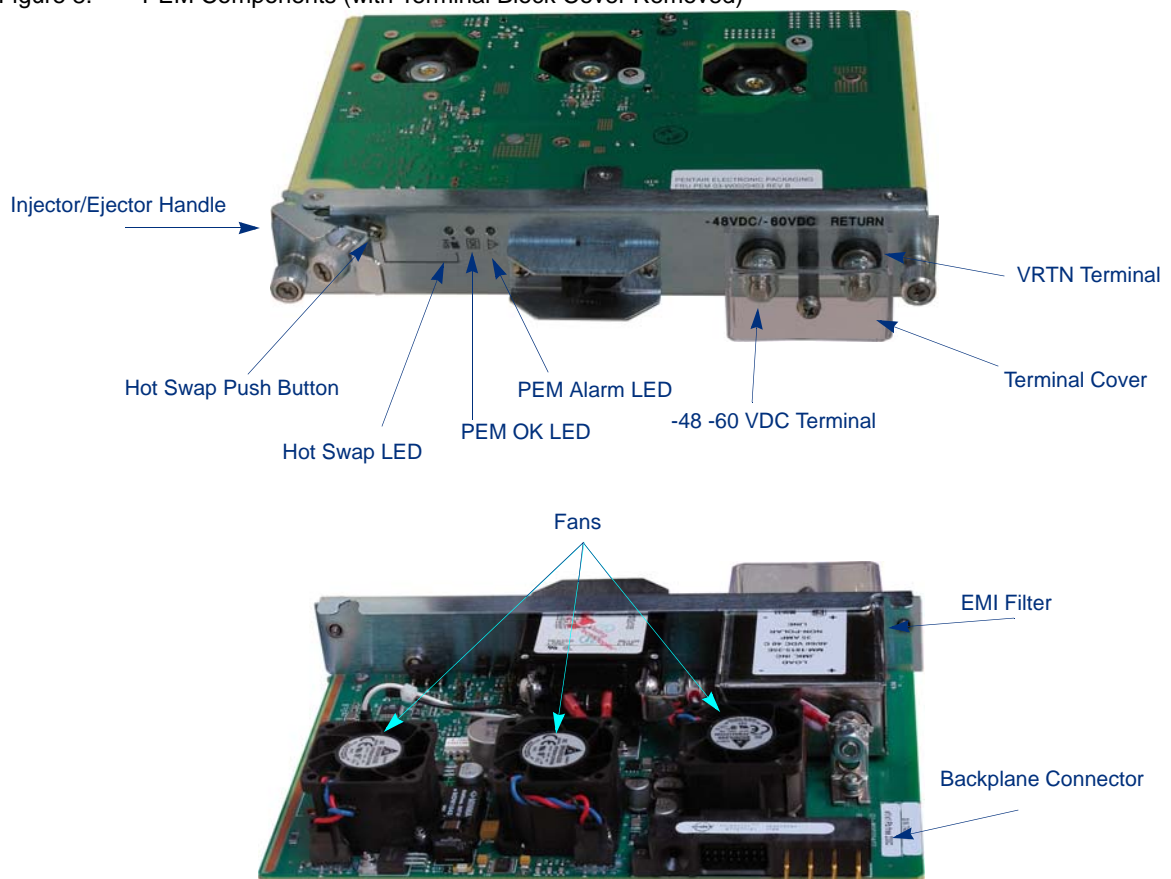
If two PEMs are in service, each PEM is hot-swappable *after* the PEM circuit breaker has been shut off.

The input voltage range for the VMG-6 is from -41 VDC to -60 VDC; the nominal input voltage is -48VDC.

PEM Components

Figure 8 shows the PEM components.

Figure 8. PEM Components (with Terminal Block Cover Removed)

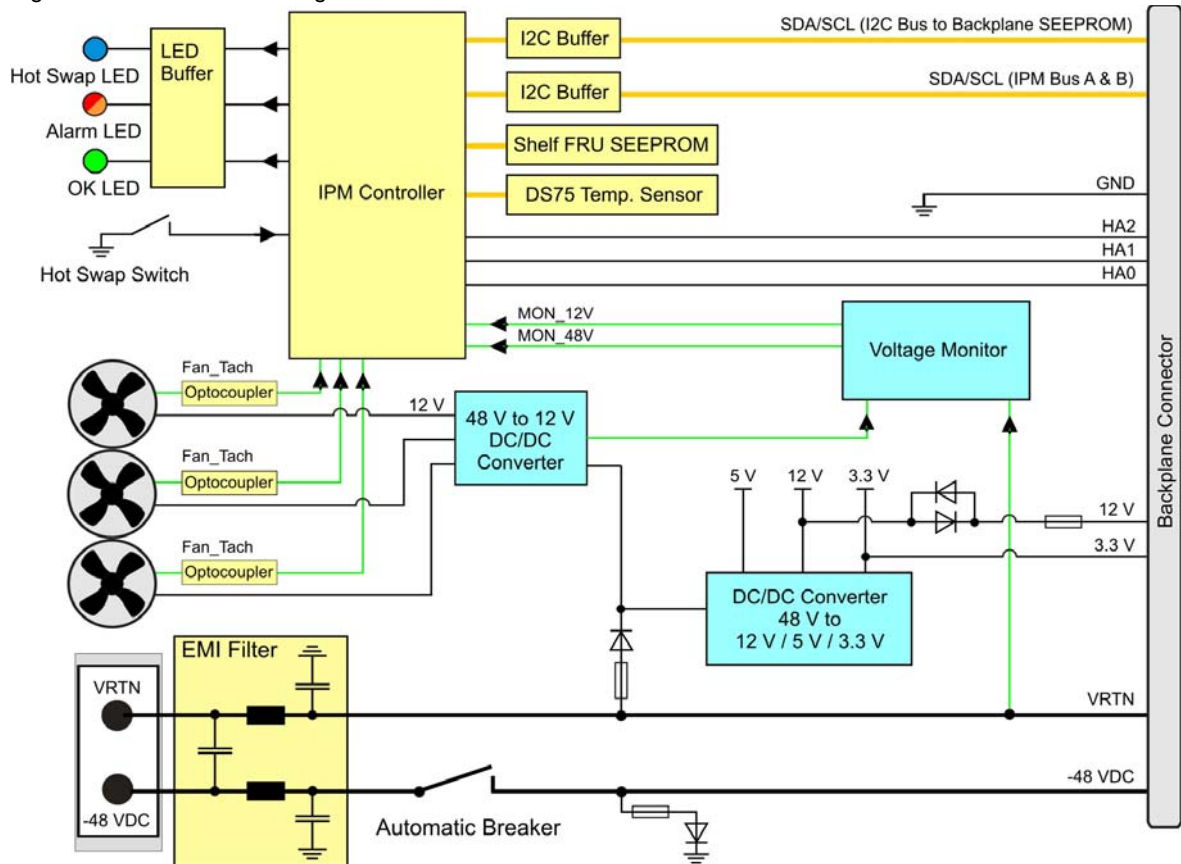


Note: The PEM replacement procedure is covered in *Chapter 5* on page 58.

PEM Block Diagram

Figure 9 shows a block diagram of the PEM.

Figure 9. PEM Block Diagram



PEM IPMB Addresses

Geographical address pins (HA0, HA1, HA 2) on the PEM backplane connector determine the IMPB addresses of the PEM.

Table 2. PEM IPMB Addresses

PEM Location	
PEM A (Right, view from rear)	0 x 66
PEM B (Left, view from rear)	0 x 68

PEM LED Indicators

The front panel includes the following indicators:

- Green LED: “In Service”
- Bicolor Red and Amber LED: “Out of Service/Fan Failure”
- Blue LED: “Hot-Swap”

The PEMs have an Injector/Ejector handle that signals the IPM Controller for hot-swap. Once the user operates the handle, an internal switch is triggered, signaling pending extraction. When it is safe to remove the PEM, the blue Hot-Swap LED illuminates solidly.

Table 3. PEM LEDs

Color	Description	Status	Condition
Green	In-Service LED	Off	No power to the PEM.
		Solid Green	Normal operation.
Red/Amber	Alarm LED	Solid Red	Attention Status (error condition).
		Solid Amber	-48 VDC supply voltage not connected to PEM or Fan failure on PEM.
Blue	Hot Swap LED	Off	In use.
		Long blink	Searching for Shelf Manager.
		Short blink	Preparing for extraction.
		Solid blue	Ready to remove.

Fan Tray

The VMG-6 chassis contains two interchangeable fan trays, one on either side of the chassis. Each fan tray can be removed by pulling the Injector/Ejector handle.

Each fan tray contains six radial fans for cooling the boards in slots one through six of the VMG-6, and are controlled as a group by the Intelligent Platform Management (IPM) Controller in the fan tray.

The fan trays are designed to continuously operate and provide sufficient cooling in the event of a single fan failure, which will increase all other fans in the failed fan tray to full speed.

The fan trays are monitored by the Shelf Manager through two independent bussed IPMP connections, but do not negotiate for power through the Shelf Manager; this ensures that the fans start up immediately upon insertion.

As shown in [Figure 10](#), the display module of the fan tray provides:

- A green fan tray OK LED.
- A red fan tray alarm LED.
- A blue hot-swap LED.
- A hot-swap switch.

Hot Swap Switch

The Hot Swap switch indicates to the Shelf Managers that the fan tray is about to be removed. While its use is optional, it is recommended that all service personnel become used to verifying the illumination of a blue LED on an active component before removing it from the system. Once the switch has been released, the Shelf Manager receives the message of impending extraction and will change the LED from blinking to solid blue, indicating extraction is ready.

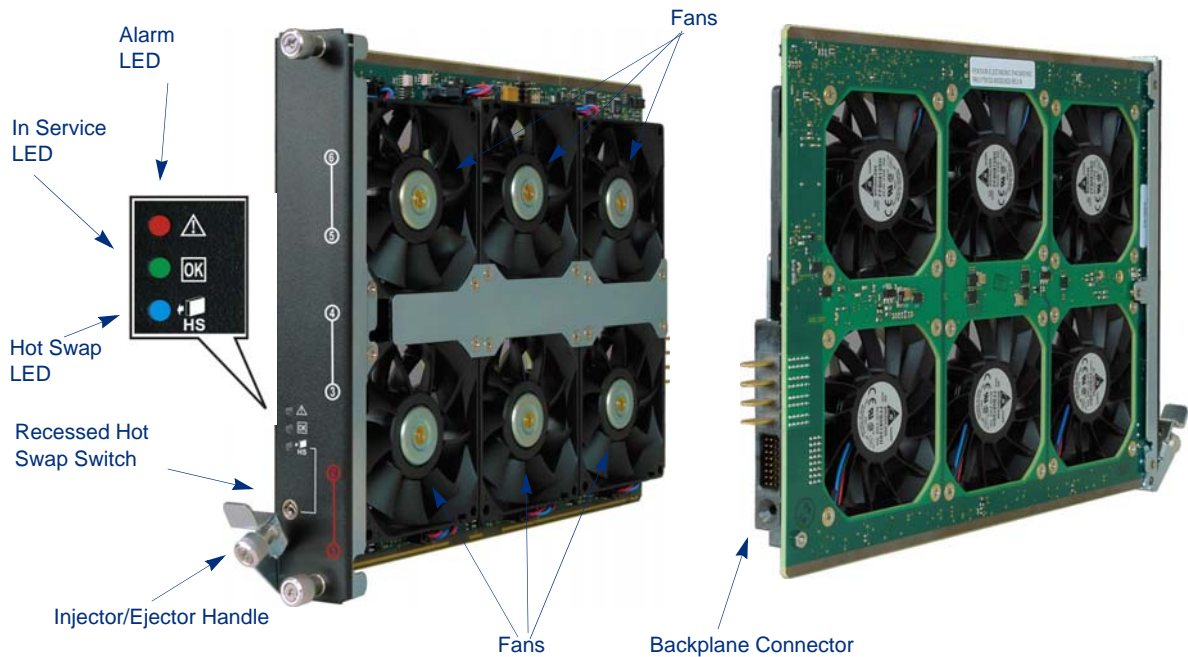
Fan Tray LEDs

The following table describes the LED sequence of the fan trays in the VMG-6 chassis:

Table 4. Fan Tray LEDs

Color	Description	Status	Condition
Green	In-Service LED	Off	No Power to the Fan Tray
		Solid Green	Normal Operation
Red	Alarm LED	Solid Red	Attention Status (error condition)
Blue	Hot Swap LED	Off	In use
		Long blink	Searching for Shelf Manager
		Short blink	Preparing for extraction
		Solid blue	Ready to remove

Figure 10. Fan Tray



Note: The fan tray replacement procedure is covered in *Chapter 5* on page 60.

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. There is one recessed reset button. All interfaces, LEDs, and the reset button are accessible from the NPM front panel.

NPM Front Panel Description

Figure 11 shows the front panel of the Network Processor Module.

Figure 11. NPM Front Panel

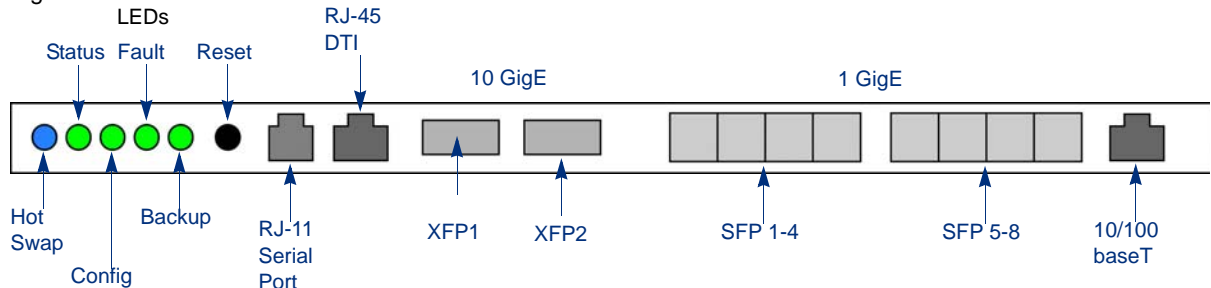


Table 5 describes the NPM front panel LEDs.

Table 5. NPM Front Panel LED Description

LED Name	Color/Condition	Description
Hot Swap	Blue	NPM is ready for hot-swap
	Flashing Blue	Transition between the hot-swap 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 small form factor pluggable (SFP) (16mm H x 42mm D) optical modules with a data rate of 1.0625Gbps according to IEEE-802.3z.

Each GigE port supports either single mode or multimode SFP optical modules (the NPM supports both types simultaneously), and operates on frequencies compliant with the optical channel plan defined in ITU G.692, 100 GHz channel plan appendix IV. The NPM supports SFP modules with wavelengths of SX 850nm for short distances up to 65 meters, LX 1310nm for medium distances up to 10 kilometers, or LX 1550nm for long distances up to 70 kilometers.

The GigE port also supports SFP copper modules of full duplex 1000BaseT Ethernet with copper interfaces that are compliant with IEEE-802.3ab. The copper SFP module supports distances up to 100 meters.

The NPM provides two 10GigE ports that each support pluggable 10 Gigabit small form factor pluggable (XFP) (23.5mm H x 67mm D) optical modules that are IEEE-802.3ae compliant with data rates of 10.3125Gbps. The NPM supports XFP modules with wavelengths of 850nm for distances from 26 meters to 300 meters, depending on the grade of fiber, and 1310nm for distances up to 10 kilometers.



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

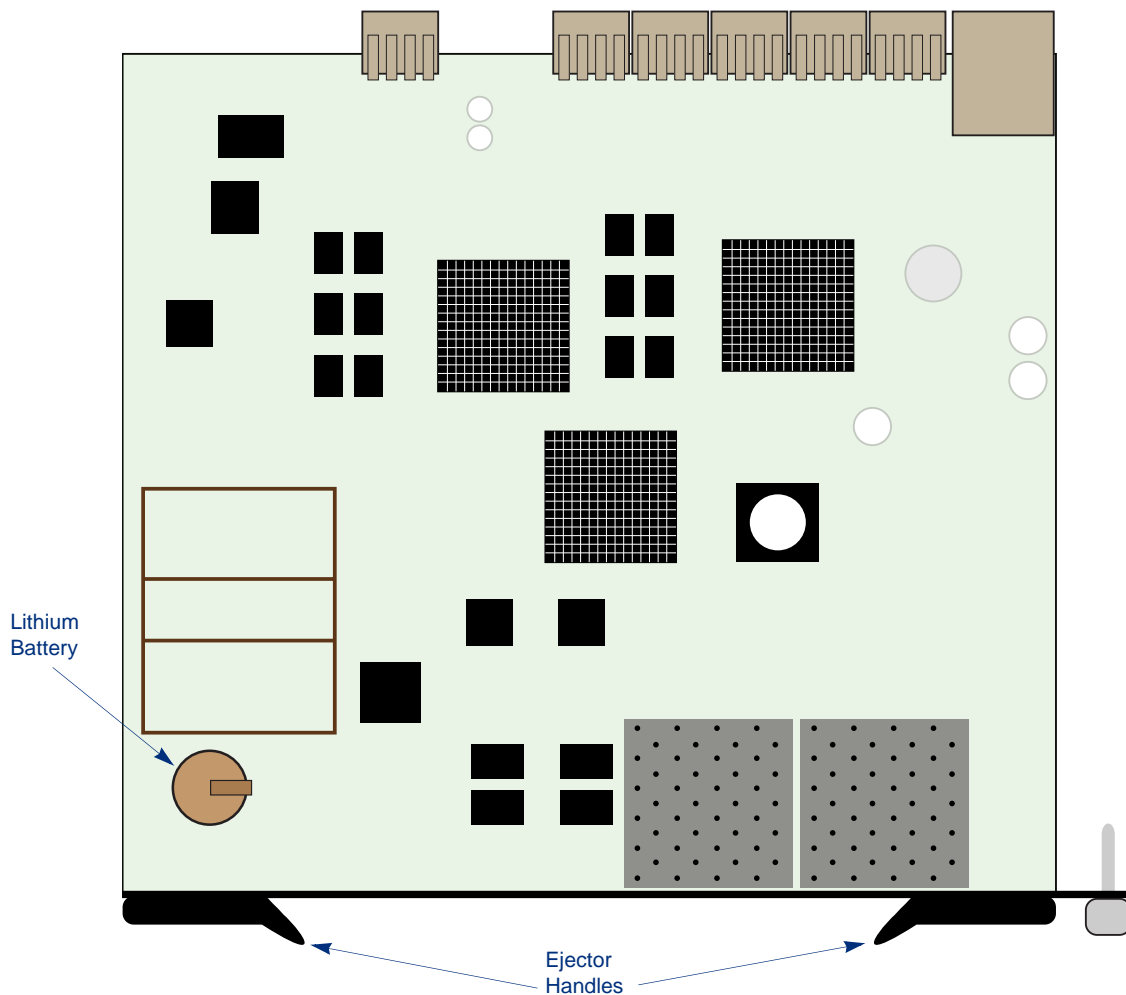
The NPM provides one 10/100BaseT Ethernet interface with an RJ-45 connector, compliant with IEEE-802.3ab. A serial console port with an RJ-11 connector is also provided. The default configuration for the serial console is 19200 baud; No parity; 8 data bits; 1 stop bit.

Table 6. 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 12. 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

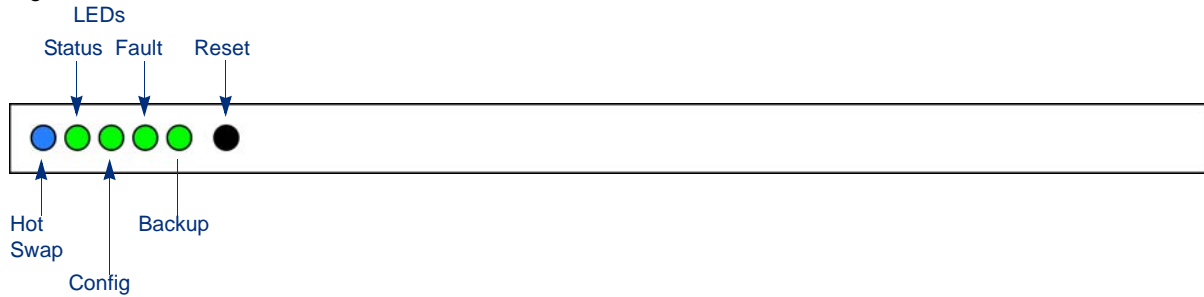
The Video Processing Module (VPM) is a high density, low cost, intelligent, digital video processing module offering flexible H.264 video and MPEG-2 video grooming, statistical multiplexing, MPEG-2 transrating, and digital program insertion (DPI).

The VPM module directly interfaces with the NPM module through the VMG chassis backplane fabric for the 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 VPM module front panel block diagram is shown in [Figure 13](#).

Figure 13. VPM Front Panel



[Table 7](#) describes the VPM front panel LEDs.

Table 7. 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 14](#).

Figure 14. TCM Module Front Panel.

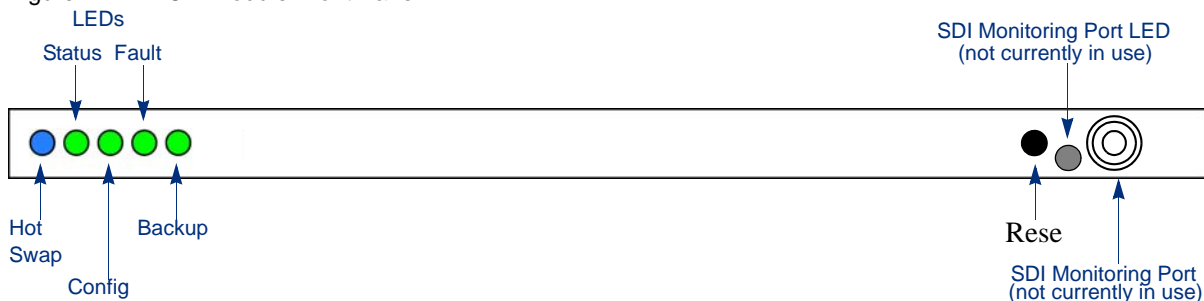


Table 8 describes the TCM front panel LEDs.

Table 8. 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.
Status	Red	Chassis interface fault.
	Green	Payload up.
Config	Red	FPGA configuration in progress.
	Green	FPGA configuration completed.
Fault	Red	Fault.
	Green	Normal Operation.
Backup	Red	Standby.
	Green	In operation.
SDI Monitoring Port LED	n/a	This LED is currently not used

AMP Overview

The Application Media Processor (AMP) provides audio transcoding. The AMP module is always paired with an NPM. In the VMG-6, you can install AMP modules only in slots 3 and 4. An AMP in slot 3 is paired with the NPM in slot 1, and the AMP in slot 4 is paired with the NPM in slot 2.

- 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 3 and 4 instead. If you previously used AMP modules and are now using TCM and/or VPM modules in those slots instead, you must power cycle the VMG in order for those modules to come up.*

The AMP module front panel block diagram is shown in Figure 15.

Figure 15. AMP Module Front Panel.

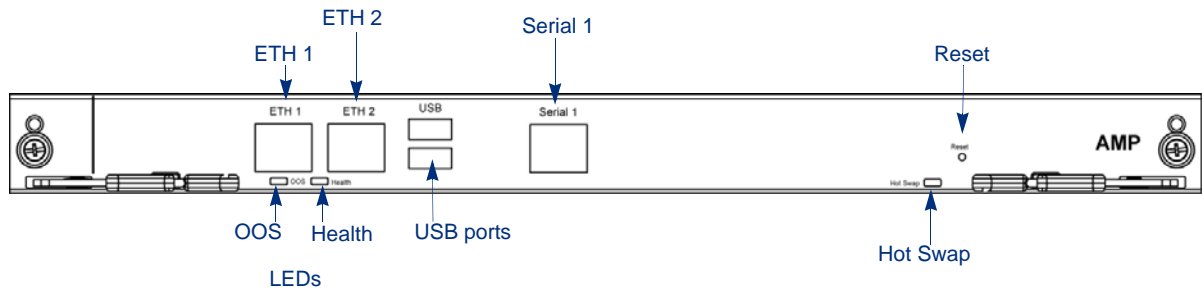


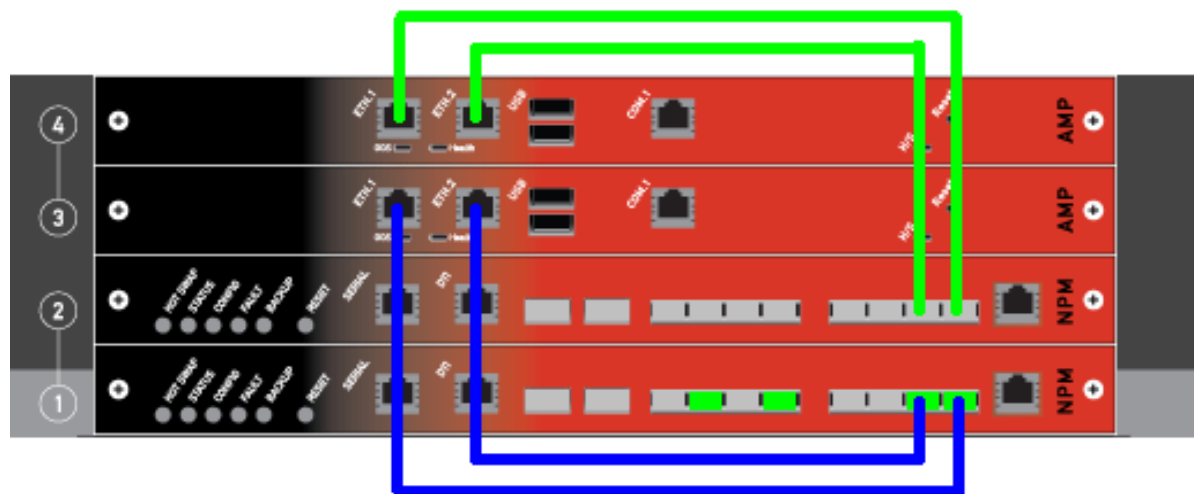
Table 9 describes the AMP front panel LEDs.

Table 9. 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 16 shows the front panel connections for a 2 NPM/2 AMP configuration.

Figure 16. AMP Connections to NPMs



Chassis Modules

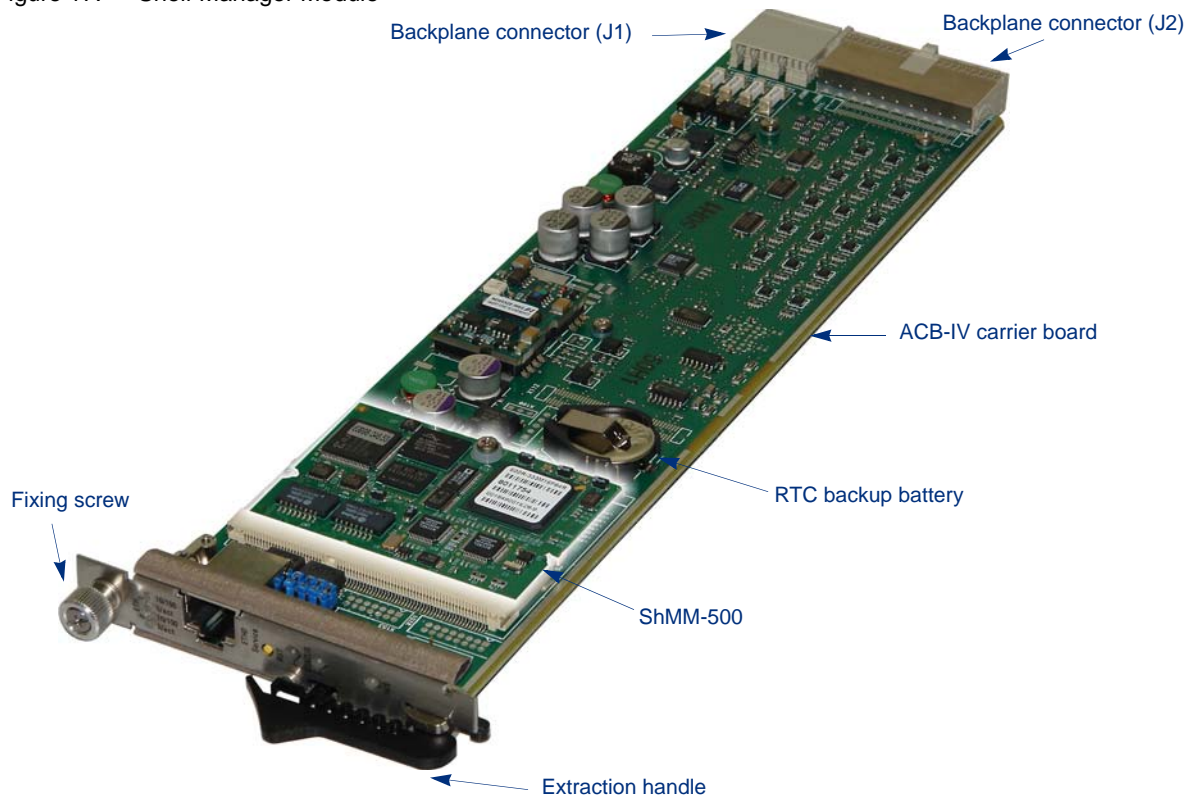
The VMG-6 comes equipped with various chassis modules. There are two Shelf Managers (SM), two Power Entry Modules (PEM), and one Shelf Alarm Panel (SAP). Details of these modules can be found below.



Shelf Managers

The VMG-6 SMs fit into the dedicated SM slots located on either side of the SAP at the top of the front of the chassis. The primary SM is located on the left, the secondary on the right. The SMs 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 17](#) shows a complete SM. To maximize availability, 2 SMs are included for redundancy.

Figure 17. Shelf Manager Module



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, implemented over Ethernet.

[Figure 18](#) shows the SM front panel components, and [Table 10](#) gives an explanation of the LEDs.

Figure 18. Shelf Manager Front Panel Components

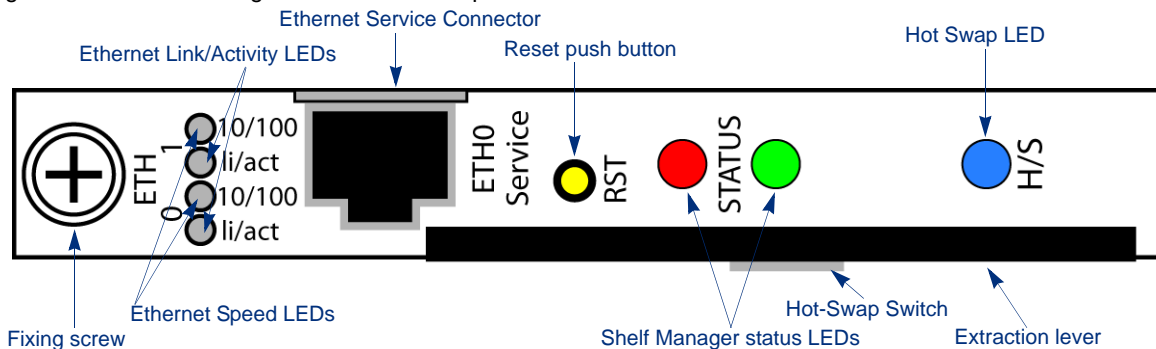


Table 10. Shelf Manager LED Descriptions

LED Name	Color/Condition	Description
ETH 0 -- 10/100	Solid Yellow	Speed at 100Mbps.
	Off	Speed at 10Mbps.
ETH 0 -- li/act	Solid Green	Link is up.
	Off	No link.
	Blinking Green	Activity.
ETH 1 -- 10/100	Solid Yellow	Speed at 100Mbps.
	Off	Speed at 10Mbps.
ETH 1 -- li/act	Solid Green	Link is up.
	Off	No link.
	Blinking Green	Activity.
STATUS (Shelf Manager)	Solid Red	Out of service.
STATUS (Shelf Manager)	Solid Green	In service, active Shelf Manager.
	Blinking Green	In service, backup Shelf Manager.
H/S (Hot Swap)	Solid Blue	Ready to remove.
	Long Blinking Blue	Shelf Manager is activating itself.
	Short Blinking Blue	Deactivation requested.
	Off	Shelf manager not ready for hot-swap.



Note: The Shelf Manager replacement procedure is covered in [Chapter 5 on page 61](#).

Some Shelf Manager I/O functionalities are handled by a separate board called the **Shelf Alarm Panel (SAP)**.

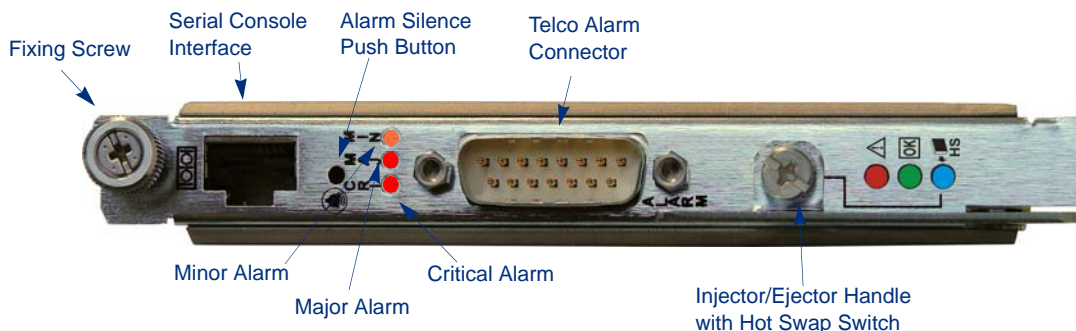
Shelf Alarm Panel

The SAP, as shown in [Figure 19](#), is a user interface located the front top of the chassis. It provides:

- Serial Console Interface of both Shelf Managers (RJ-45);
- The push button;
- Three Telco alarm LEDs;
 - MIN (Minor) - Amber
 - MAJ (Major) - Red

- CRIT (Critical) - Red
- Telco Alarm Connector (DB15-male);
- Status LEDs;
 - Out of Service (red)
 - In Service (green)
 - Hot Swap (blue)

Figure 19. Shelf Alarm Panel



Note: The SAP replacement procedure is covered in [Chapter 5](#) on page 57.

Telco Alarm

The SAP provides a Telco Alarm interface on the DB15-male connector as shown in [Figure 20](#). Three relay outputs are used for remote alarm distribution, reflecting the state of the three alarm LEDs. The relays are capable of carrying 72 VDC or 1 A with a maximum rating of 30 VA. [Table 11](#) describes the Telco Alarm pin assignments and [Table 12](#) describes the Telco alarm LEDs.

Figure 20. Telco Alarm Connector

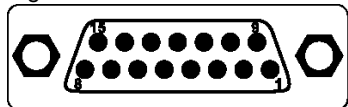


Table 11. Telco Alarm Connector Pinout

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

Table 11. Telco Alarm Connector Pinout (Continued)

Pin number	Name	Description
13	AMACOM	MajorAlarm – COM
14	APRCO	PwrAlarm – NO
15	APRCOM	PwrAlarm – COM
Shield	Chassis-GND	Chassis Ground

There are three Telco Alarm LEDs: Minor (amber), Critical (red), and Major (red). The state for each LED is described below.

Table 12. Telco Alarm LEDs

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

Alarm Silence Push Button

The Alarm Silence push button on the SAP 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.



Note: *The Alarm Silence push button only silences the alarm; it does not reset it. If the silence interval (default 600 s) is exceeded without resolving the alarms, the alarms will be reinitiated.*

Alarm Reset

Two relay inputs at the DB15 connector are used to reset the Minor and Major alarm states.

The reset inputs accept timed pulse inputs for clearing Minor and Major alarm states. Reset is accomplished by asserting a voltage differential from 3.3 VDC to 72 VDC for between 200 ms and 300 ms. The acceptance voltage range is from 0 to 48 VDC continuous (handles up to 60 VDC at a 50% duty cycle). The current drawn by a reset input does not exceed 12 mA.



Note: *There is no hardware reset (reset input) for the Critical Alarm state.*

Air Filter Tray

The VMG-6 chassis provides a front replaceable air filter as shown [Figure 21](#). The air filter presence is detected by a micro switch located on the right side panel. The switch, hosted by PEM B, is accessible after removing PEM B.

Figure 21. Air Filter



i **Note:** The air filter replacement procedure is covered in *Chapter 5* on page 63.

RTM Filler Panel

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

Physical Installation

This chapter provides the necessary information for installing the VMG-6 into a rack. Please read this entire chapter before beginning the installation procedure. For information on configuring the VMG-6, see [Chapter 4, “Initial Configuration”](#).

In This Chapter:

- “Site Preparation,” next.
- “Warnings” on page 38.
- “Unpacking” on page 39.
- “Installation Instructions” on page 39.

Site Preparation

Be sure that you have the required items listed below before you begin installation of the VMG-6. You will need:

- Populated VMG-6 chassis, which includes:
 - One or two Network Processing Modules (NPMs);
 - One or two Application Media Processors (AMPs) (*must be the same number as the number of NPMs*);
 - Up to four Video Processing Modules (VPMs) and/or Transcoding Modules (TCMs) as ordered.
 - Appropriate number of Small Form-Factor Pluggable (SFP) or XFP transceivers;
 - Two Power Entry Modules (PEMs);
 - Two Fan Trays;
 - Two Shelf Managers;
 - One Shelf Alarm Panel (SAP);
 - Air Filter Tray with filter.
- Four chassis rack mount screws.
- VMG-6 AC to DC Distribution Power Supply Kit, if AC power is required. Kit includes:
 - One or two AC power supply chassis, as ordered;
 - Three or four AC power modules, ordered;
 - One to five AC power cords, as ordered;
 - DC connector cables for AC to DC conversion;
 - AC power supply Installation Guide.
- One RGB-specific serial cable for console access (included).
- Slotted screwdriver.

- Double lug shelf ground terminal cable.
- An Ethernet cable long enough to connect the VMG-6 to the management workstation.

Site Space Requirements



Note: For complete environmental requirements, see “*Environmental Specifications*” on page 68.

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).

A 50A Listed circuit breaker shall be provided in the building installation for overcurrent/short circuit backup protection.

The VMG-6 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-6 is from right (ingress from the air filter) to left (from the front of the chassis).
3. Mechanical Loading – Mounting of the equipment in the rack should be in such a way as to ensure an even mechanical load in the equipment rack.
4. Circuit Overloading – Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on 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-6 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-6 into a rack that is already partially populated, 5RU of space is required.*

Cables

To ensure the safe and continued operation of the VMG, proper cabling must be used, as listed in [Table 13](#) and [Table 14](#).

Chassis Ground Cabling

Table 13. Ground Connection Specifications

Parameter	Specification
Wire size	8 AWG
Terminal	Use only UL listed double lug terminals.



Note: *Use only a UL listed Crimp Connector.*

Power Cabling

Table 14. Power Connection Specifications

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

Warnings



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



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-6 chassis, which includes:
 - Processor module cards as ordered;
 - Two Power Entry Modules (PEMs);
 - Two Fan Trays;
 - Two Shelf Managers (SMs);
 - One Shelf Alarm Panel (SAP);
 - Six Rear Transition Module (RTM) Filler Panels;
 - One serial cable with serial connector.
- Packaging.

Installation Instructions

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.

Placement in the Rack

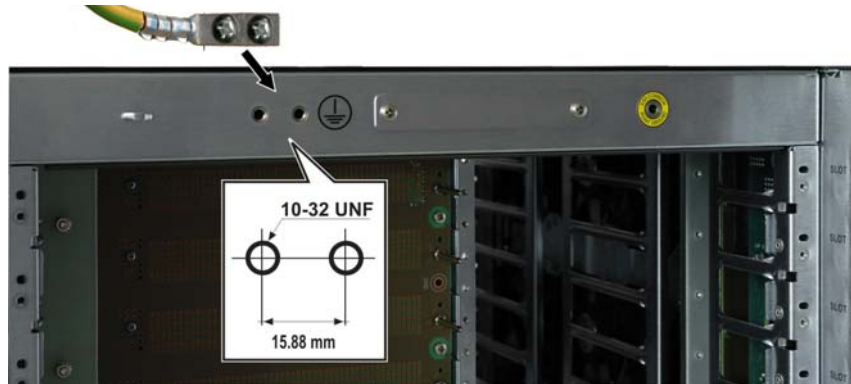
From the front of the rack, insert the empty chassis until the rack brackets of the chassis are flush against the rack. Using four (4) chassis rack mount screws, secure the chassis into the rack, tightening each screw incrementally until all four are evenly snug-tight. The chassis may now be populated. See

Chapter 5, *Troubleshooting and Maintenance on page 57* for more information on inserting cards, fan trays, etc.

Shelf Ground Connection

The VMG-6 provides a shelf ground terminal at the upper rear side. The shelf ground terminal provides two threads (10-32 UNF) with a 15.88 mm (.625 in.) spacing between thread centers to connect a double lug Shelf ground terminal cable.

Figure 22. Shelf Ground Terminal



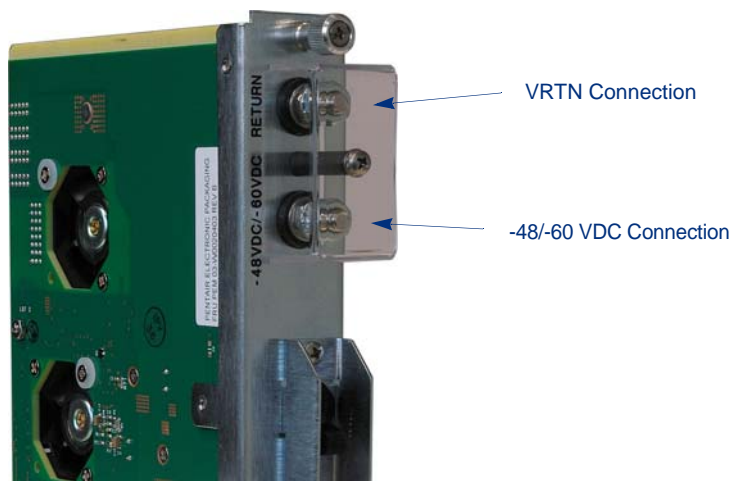
Connecting DC Power

Each power feed to the PEM consists of a -48 VDC cable and its corresponding return cable. The studs used to make power connections are 1/4 inch studs (1/4 - 20 UNC).

To prevent accidental shorting a plastic housing covers the power feeds and returns.

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

Figure 23. PEM Cable Connections



3. Connect the power cables to the power terminal as shown in [Figure 23](#). Torque the bolts to 6.8N-m (5 foot pounds).



Caution: *Verify the correct polarity of the -48 VDC 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.

Inserting VMG Cards

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

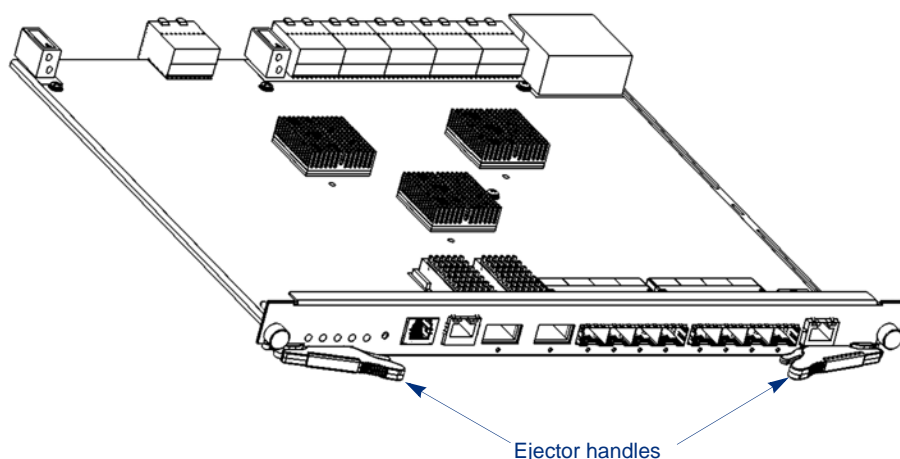
Network Processor Module



Caution: *NPMs can only be installed in slots 1 and 2.*

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 24. Front View of NPM



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

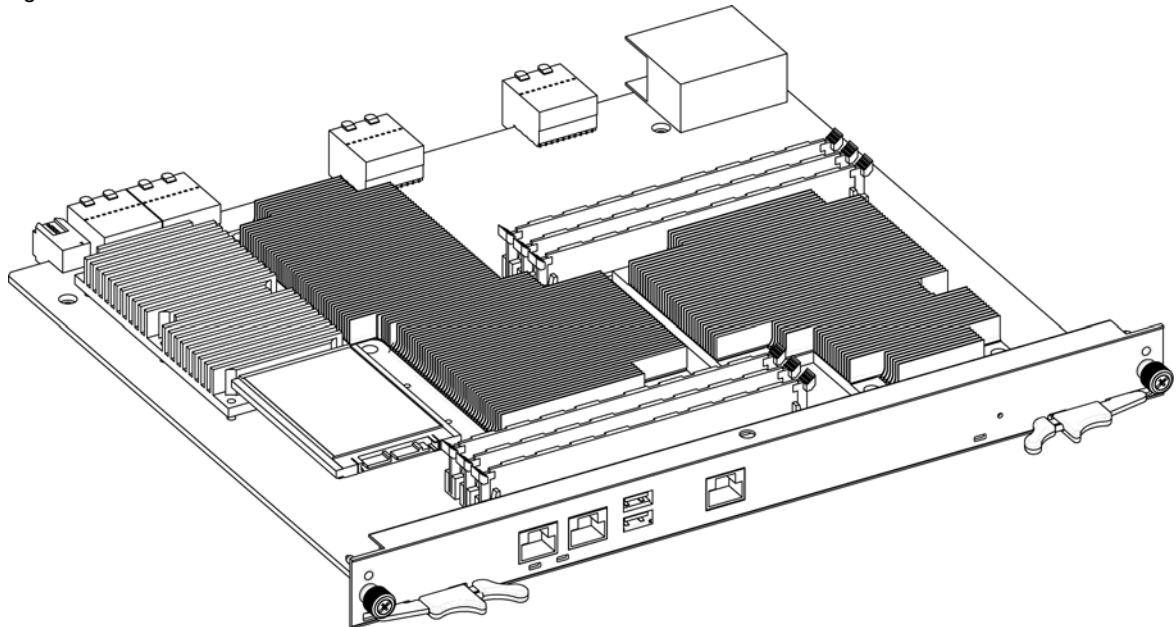
Application Media Processor



Caution: AMPs can only be installed in slots 3 and 4.

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 25. AMP Card



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

- Connect the AMP card in slot 3 to the NPM in slot 1.
- Connect the AMP card in slot 4 to the NPM in slot 2.
- 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 26 shows the front panel connections for a 2 NPM/2 AMP configuration.

Figure 26. AMP Connections to NPMs



Video Processor Module, and Transcoding Module



Caution: VPMs and TCMs can be installed in any slots *except* 1 and 2.

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 AMP, 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 27. VPM Card

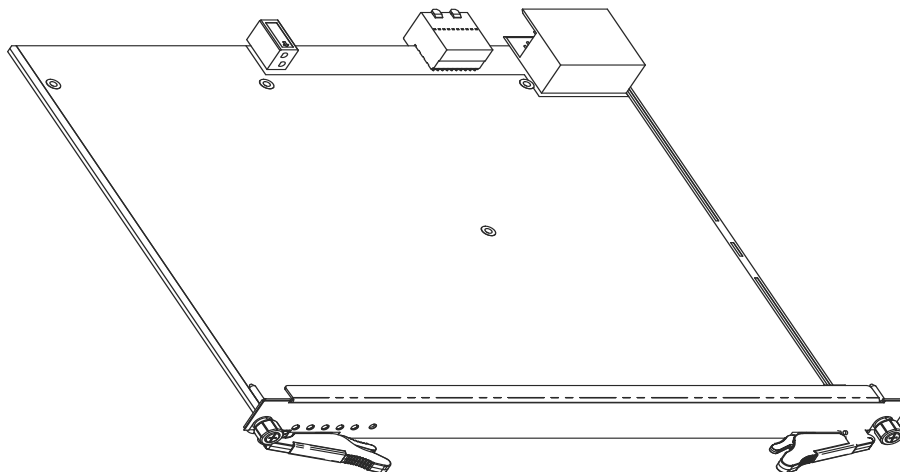
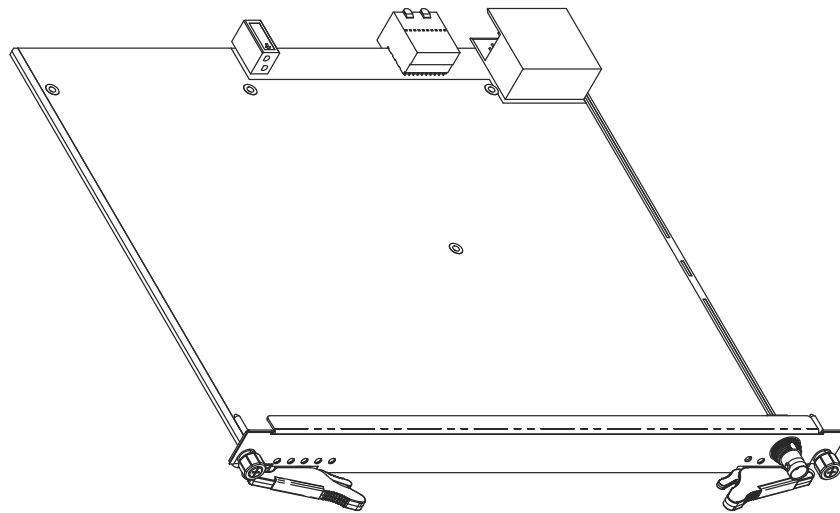


Figure 28. TCM Card



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 that the VMG-6 Model is being sold into U.S. commerce without Class 1 laser transceivers installed in it. UL has been informed of RGB Networks' intent 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 that the manufacturing organization and each purchasing organization of the equipment which intends to incorporate the lasers 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 cables. 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

Connect 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 Panel, the Shelf Manager, the Fan Trays, the PEMs, the VPMs, the TCMs, and the NPMs illuminate.
2. The fans spin up to full speed.
3. The LEDs on the Shelf Alarm Panel with the exception of the Fan Tray status LEDs turn off.
4. The fans reduce speed to 25%, normal operational speed.
5. The red LEDs on the PEMs, Fan Trays, and SAP turn off.
6. All blue Hot-Swap LEDs blink.
7. All blue Hot-Swap LEDs turn off.
8. All Status-OK LEDs should be green.



Note: The status LED of the active Shelf Manager (left side of chassis) should be solid green, the status LED of the backup Shelf Manager (right side) should be blinking.

LED Indicators

Shelf Alarm Panel

Table 15 lists the LED information for the SAP.

Table 15. Shelf Alarm Panel LEDs

LED	Color
Telco Minor alarm	Amber
Telco Major alarm	Red
Telco Critical alarm	Red
SAP Out of Service	Red
SAP In Service	Green
SAP Hot Swap	Blue

Telco Alarm Display

Table 16 lists the LED information for the Telco alarms listed above.

Table 16. Telco Alarm LEDs

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

Fan Tray Display

Table 17 lists the LED information for the fan tray.

Table 17. Fan Tray LEDs

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

Hot Swap Display

Table 18 lists the LED information for the Hot-Swap.

Table 18. Hot Swap LED

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

Initial Configuration

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

This chapter provides information on the initial configuration of the RGB VMG chassis. For additional 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 47.
- “Connecting to the VMG” on page 48.
- “Using the TCON (Temporary Console) Program to Set Initial Configuration” on page 49.
- “Finalizing the Initial Configuration” on page 52.

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 49.

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


- The Virtual IP address that the VMG 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 49.*

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. There are three sets of messages. 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 49](#) 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 the following prompt will be shown:

```
Enter number of your choice: 1

Configuration of Mgmt interface
-----

Configuration Saved in EEPROM
    MACblock=00:11:07:00:03:50 (used for all interfaces)
    MAC=00:11:07:00:03:5a
    IP=10.1.1.1
    Mask=255.255.255.0
    GW=0.0.0.0
    DNS=0.0.0.0
Configuration presently on system
    MAC=00:11:07:00:03:5a
    IP=10.1.1.1
    Mask=255.255.255.0
    GW=0.0.0.0
    DNS=0.0.0.0
-----
```

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
-----
```

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
```

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

When the management interface is configured for each NPM, the NPMs 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 1.*

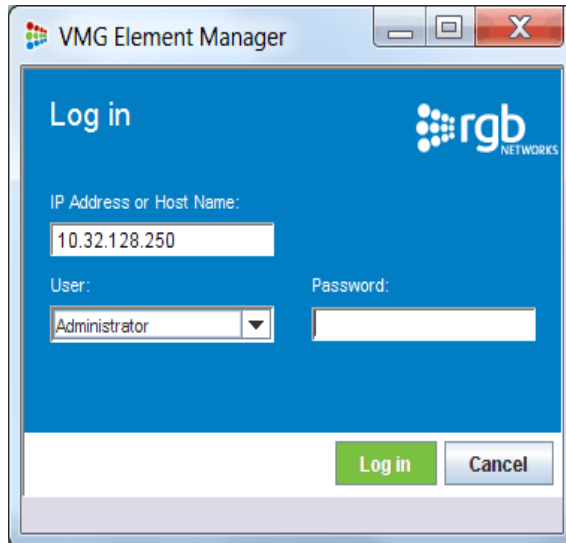
The URL will be the IP address preceded by ‘http://’ (e.g., if the IP address is 10.32.97.181 the URL is `http://10.32.97.181`). If the web browser successfully contacts the VMG, the display will show the following:

Figure 29. VMG Initial Login Page



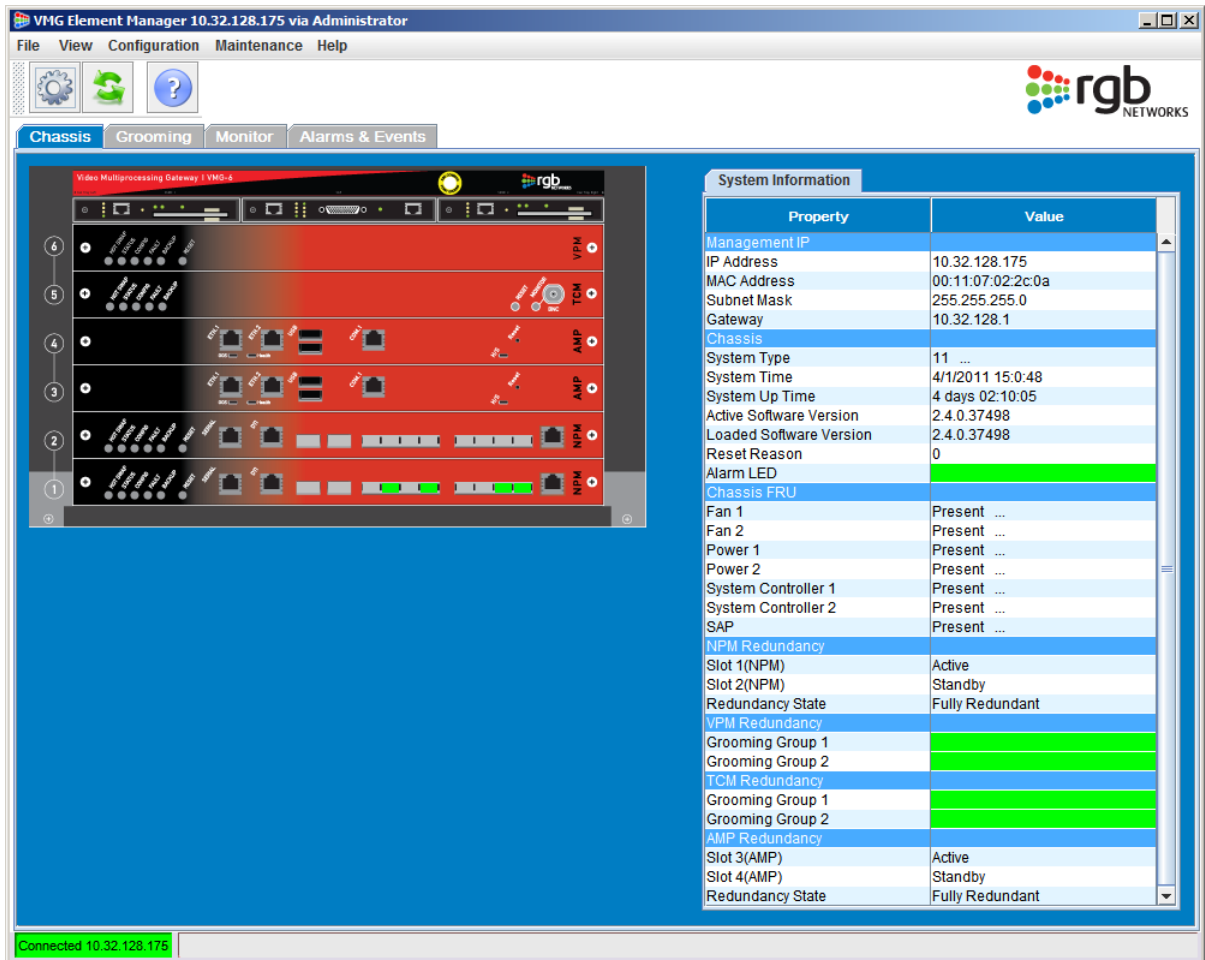
Note: *The system must have a copy of version 5.0 or above of the standard edition Java runtime environment (JRE) installed. If not, click the **Download Java SDK (Please download 5.0 version, if you have not done so.)** link. The browser will redirect to the Sun Systems website where the JRE may be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

1. Click the **Launch VMG Element Manager** link. After clicking through the various Java applet options and accepting the EULA, the login dialog box is shown.

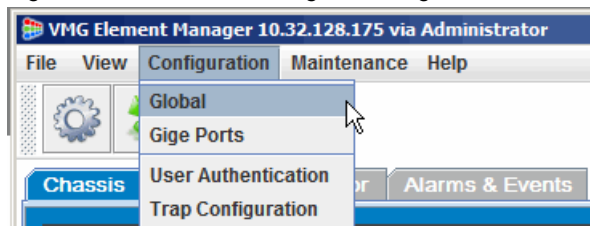
Figure 30. *Element Manager Login*

2. Make sure the User is set to **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 31](#), which displays a representation of the actual VMG-6 and its populated slots. The **System Information** window on the right side of the screen provides details of the system in general. Right-clicking on a particular card in the chassis opens a pop-up window for viewing additional information or configuration parameters for the card or system.

Figure 31. *Element Manager - Chassis View*

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

Figure 32. *Element Manager - Configuration Tab*

The **Global Configuration** window opens (Figure 33).

Figure 33. 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, enter the **Syslog Server IP Address** and **Syslog Server Port** number (the normal UDP port for syslog is 514).
7. Click on the **Management Interface** tab (Figure 34) 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-6.

Figure 34. Global Configuration - Management Interface Tab

Global Configuration

System Management Interface Grooming Group Redundancy Switch

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

Virtual IP Address

IP Address: 10.32.128.250

Subnet Mask: 255.255.255.0

Gateway: 10.32.128.1

Active NPM Physical IP Address

IP Address: 10.32.128.251

Subnet Mask: 255.255.255.0

Apply Cancel

8. 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-6, refer to the VMG Software User Guide.

Troubleshooting and Maintenance

This chapter provides procedures for maintaining and tips for troubleshooting the VMG-6.

In This Chapter:

- “Power Entry Module,” next.
- “Fan Tray” on page 60.
- “Shelf Manager” on page 61.
- “Shelf Alarm Panel (SAP)” on page 61.
- “Application Modules” on page 62.
- “Air Filter Tray” on page 63.
- “FRU Part Numbers” on page 63.
- “Troubleshooting” on page 64.



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



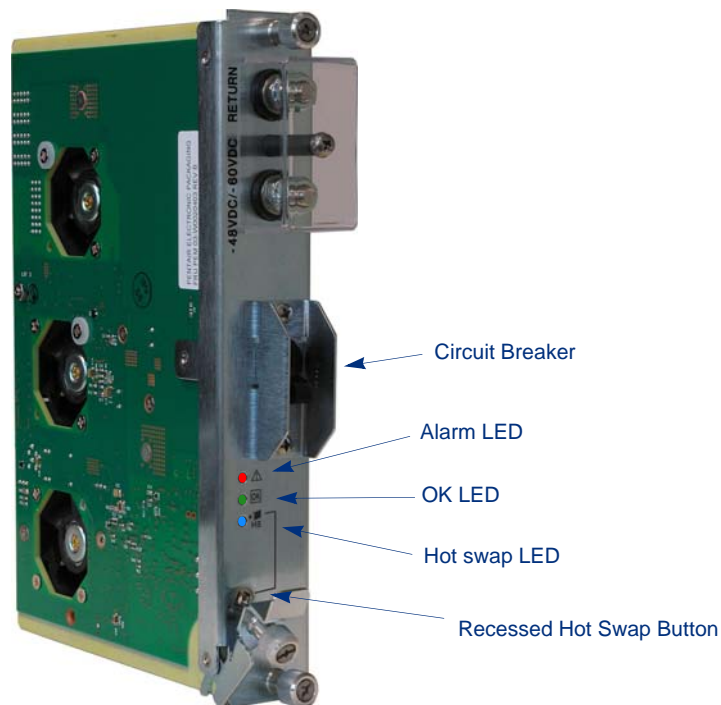
Note: *The front ESD wrist strap terminal is located on the upper front side of the chassis (see Figure 6 on page 19) and the rear ESD wrist strap terminal is located at the upper rear side of the shelf. (see Figure 7 on page 20).*

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 35. PEM View



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. Turn off the PEM circuit breaker.
5. Turn off power to the PEM to be removed.
6. Remove the terminal cover.
7. Disconnect the power cables from the power terminal.
8. Unscrew both PEM fixing screws.
9. 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 will blink until the PEM is fully functional. Until power is provided to the PEM, the red alarm LED remains lit.*

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



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

4. Attach the terminal cover.
5. Power-on the power supply for the PEM.
6. Turn on the PEM circuit breaker.

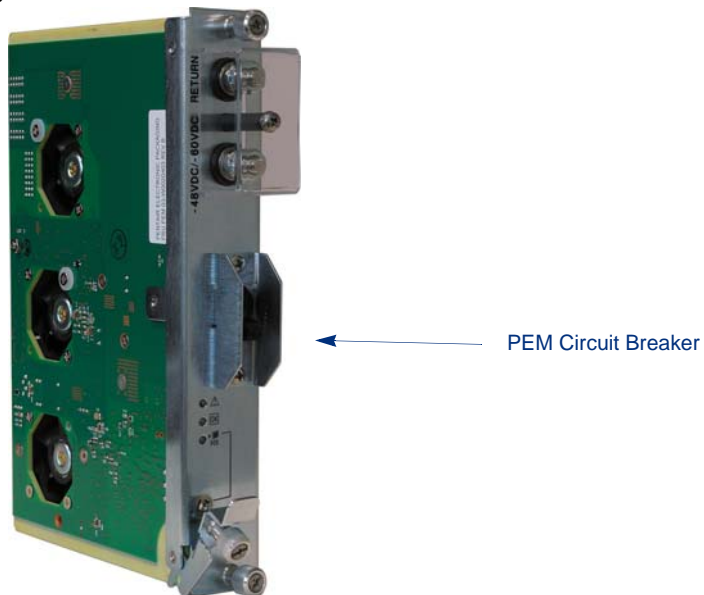


Note: When all power feeds are present, only the green **OK** LED should be lit.

PEM Circuit Breakers

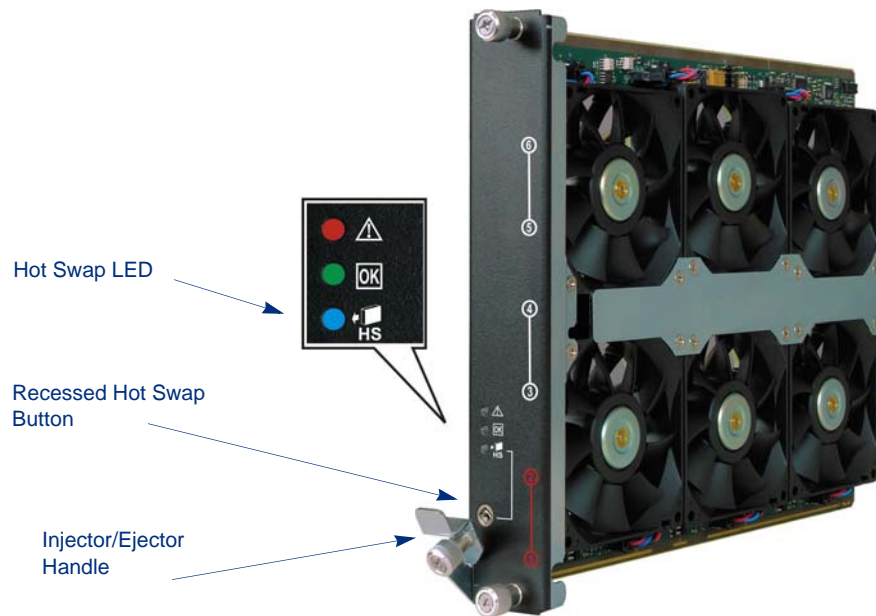
The VMG-6 uses circuit breakers for short circuit protection. Flip the switch if the circuit breaker is tripped.

Figure 36. PEM Circuit Breaker



Fan Tray

Figure 37. Fan Tray Panel



Fan Tray Removal

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

i 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-6 chassis.

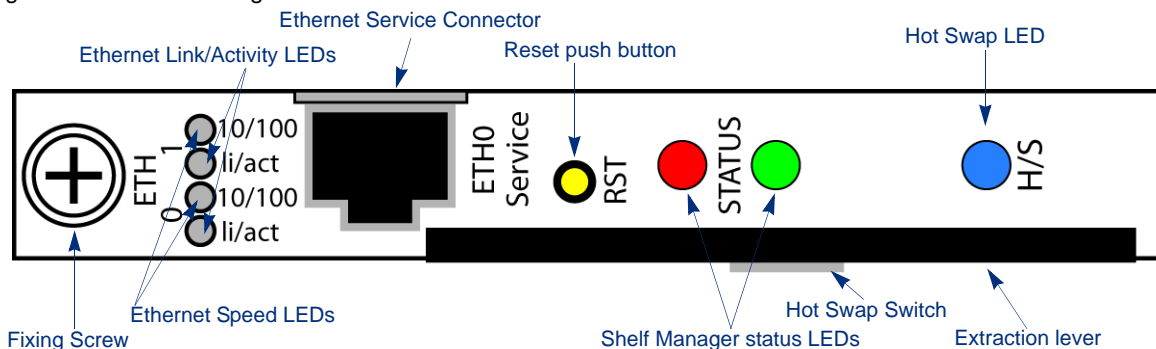
i Note: The blue hot-swap LED starts blinking until the fan tray is fully functional. When ready, only the green **OK** LED should be lit.

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

```
<clia alarm clear>
```

Shelf Manager

Figure 38. 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

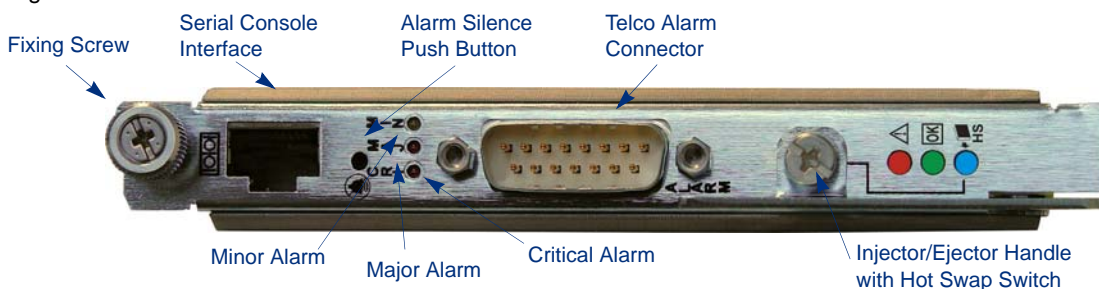
1. With the extraction lever fully extended, insert the SM into the guides and push into the chassis.
2. Close the extraction lever and tighten the fixing screws.
3. The SM will begin booting and, after approximately one minute, the status (green) LED will illuminate, indicating the SM is fully functional.



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 Panel (SAP)

Figure 39. Shelf Alarm Panel



SAP Removal

1. Unscrew the fixing screw.
2. Remove the SAP by pulling on the fixing screw.

SAP Replacement

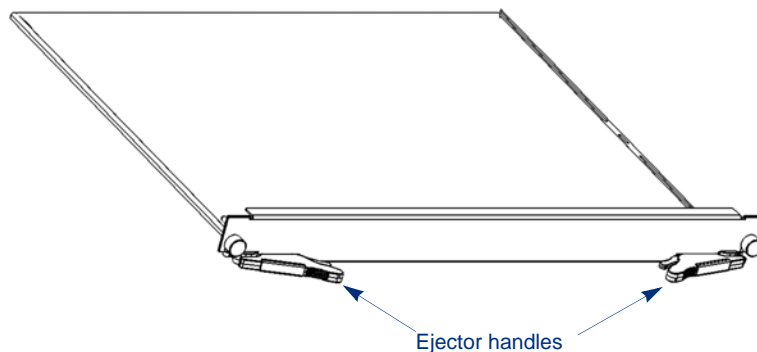
1. Place the guides of the SAP into the slot of the horizontal board.
2. Fully insert the SAP.
3. Tighten the fixing screw.
Torque: 0.67N-m (6 in.-lb.).

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 40. Application Module (NPM, AMP, VPM, or TCM)



Removal

1. Unscrew the two fixing screws at either side 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 either side of the module.

Air Filter Tray

Figure 41. Air Filter Tray



Removal

1. Loosen the locking screw (indicated above).
2. Remove the air filter by sliding it out of the filter tray.

Replacement

1. Carefully align, then insert the new air filter element.
2. When the air filter is fully inserted, tighten the thumbscrew.

FRU Part Numbers

Table 19 lists part numbers for the field replaceable units of the VMG-6 chassis.

Table 19. FRU Part Numbers

Components / Spares	Part
VMG-NPM	Network Processing Module
VMG-VPM	Video Processing Module
VMG-TCM	Transcoding Module
VMG-AMP	Application Media Processor
VMG-6-SMR	VMG-6 Shelf Manager Module
VMG-6-FAN-TRAY	Single Fan Tray

Table 19. FRU Part Numbers (Continued)

Components / Spares	Part
VMG-6-AIR -FILTER	Replacement Air Filter
VMG-6-SAP	VMG-6 Telco Shelf Alarm Panel
VMG-6-PEM	VMG-6 Power Entry Module
VMG-6-MODULE-FILLER PANEL	Filler panel with airflow baffle for empty module slot.VMG
VMG-6-ACPWRSPPLY-2PEM	AC power supply chassis with 3 x 1000W (2+1) modules, 1RU
VMG-6-2ACPWRSPPLY-2PEM	Dual AC power supply chassis with 2 x 1000W modules each (4 total), 2 x 1RU.

Troubleshooting

Table 20 lists LED indications for troubleshooting the VMG-6 module cards after insertion.

Table 20. VMG-6 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 45.

Contacting Technical Support

Before contacting technical support, have the following information ready:

- 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 system specifications for the VMG-6.

In This Chapter:

- “Modules,” next.
- “Input / Output Interfaces” on page 65.
- “Redundancy” on page 66.
- “Compliance” on page 66.
- “Safety” on page 67.
- “Physical Dimensions” on page 67.
- “Weight Specifications” on page 68.
- “Power Specifications” on page 68.
- “Environmental Specifications” on page 68.

Modules

Table 21. 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 22. 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-45 serial port
DTI	1 x RJ-45 DOCSIS Timing Interface

Redundancy

Table 23. Redundancy

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

Compliance

Table 24. 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 24. 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
	<ul style="list-style-type: none"> Power Lines, level 3, .15 MHz-80 MHz, 3 V emf, Criteria A, Modulation 1 kHz, 80% AM, 1% Step size. Signal lines, level 3, 150 kHz-80 MHz, 3 V emf, Criteria A, Modulation: 1 kHz, 80% AM, 1% Step size.
Compliant	

Safety

Table 25. Safety Specifications

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

Physical Dimensions

Table 26. Physical Dimensions

Parameter	Value
Height	221.5 mm (5 RU)
Width	448.2 mm (19")
Depth (with PEM covers & handles)	453.88 mm

Weight Specifications

Table 27. Weight Specifications

Parameter	Value
VMG-6 weight (w/o fan tray and PEMs)	10.5 Kg (23 lbs.)
VMG-6 weight completely assembled	23 Kg (51 lbs.)
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 28. Power Specifications

Parameter	Value
Input Voltage	-41 VDC-60 VDC
Input Power	<ul style="list-style-type: none"> DC 40A per power feed. Amp: 40 per power feed (total 1+1 power feeds).
Power Consumption	1640W maximum - fully loaded.
Overcurrent Protection	40A automatic circuit breaker on PEM

Environmental Specifications

Table 29. 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 20	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 20	Caution	Although there are circuit breakers in the power entry circuit of the VMG-6, the power lines must be protected on the rack level with 40A breakers. In addition, a 50A Listed circuit breaker must be provided in the building installation for overcurrent/short circuit backup protection.
	Attention	Bien qu'il y ait des disjoncteurs dans le circuit d'entrée d'alimentation du VMG-6, les lignes électriques doivent être protégées au niveau du rack avec des disjoncteurs 40A. En outre, un disjoncteur de 50A doit être prévu dans l'installation du bâtiment pour la protection contre les surtensions/courts-circuits.
	Vorsicht	Der Eingangsschaltkreis des VMG-6 besitzt zwar Leitungsschutzschalter, jedoch müssen die Netzversorgungsleitungen im Rack mit 40-A-Leitungsschutzschaltern abgesichert werden. Für den Überlast- und Kurzschlusschutz muss darüber hinaus in der Gebäudeinstallation ein Leitungsschutzschalter mit 50 A Nennstrom installiert werden.



Page number	Statement type	Statement
Page 27	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 37	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 38	Warning	Hazardous voltage! Before working, ensure that the power connection cables are disconnected from power. When the system is powered on, do NOT touch the power terminals.
	Avertissement	Tension dangereuse ! Avant de travailler, assurez-vous que les câbles d'alimentation sont débranchés. Lorsque le système est allumé, ne touchez PAS les bornes électriques.
	Warnung	Gefährliche Spannung! Vergewissern Sie sich vor Beginn der Arbeiten, dass die Netzkabel von der Stromversorgung getrennt sind. Wenn das System eingeschaltet ist, dürfen die Stromanschlüsse NICHT berührt werden.



Page number	Statement type	Statement
Page 38	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 38	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 38	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 39	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 39	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 39	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 Hebeplätze genutzt werden.



Page number	Statement type	Statement
Page 41	Caution	Verify the correct polarity of the -48 VDC 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 41	Caution	NPMs can only be installed in slots 1 and 2.
	Attention	Les NPM ne peuvent être installés que dans les logements 1 et 2.
	Vorsicht	NPMs können nur in den Steckplätzen 1 und 2 eingebaut werden.



Page number	Statement type	Statement
Page 41	Warning	Any empty card slot 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 42	Caution	AMPs can only be installed in slots 3 and 4.
	Attention	Les AMP ne peuvent être installés que dans les logements 3 et 4.
	Vorsicht	APMs können nur in den Steckplätzen 3 und 4 eingebaut werden.



Page number	Statement type	Statement
Page 43	Caution	VPMs and TCMs can be installed in any slots except 1 and 2.
	Attention	Les VPM et TCM peuvent être installés dans tous les logements hormis 1 et 2.
	Vorsicht	VPMs und TCMs können in allen Steckplätzen mit Ausnahme der Steckplätze 1 und 2 eingebaut werden.



Page number	Statement type	Statement
Page 57	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 61	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-6 Complies with Part 15 of the FCC Rules.

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

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

For Class A Equipment

Note: *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.*

Canada

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

Avis de conformité à la réglementation d'Industrie Canada.

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

European Declaration of Conformity

RGB Networks, Inc., declares that the product Video Multiprocessing Gateway (VMG-6) 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

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