



Video Multiprocessing Gateway (VMG)

Release 3.1.3

VMG Element Manager User Guide

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VMG Element Manager User Guide document history

Part Number	Software Release	Release Date	Changes
250-0175-01 Rev A	3.1.3	11/17/12	<ul style="list-style-type: none">• Updates compliant with VMG-14+ hardware modifications, and minor screen display modifications.• Decimal mark updates for TS bitrate entries and Dolby advanced decode parameters.
250-0165-01 Rev A	3.1.2	8/31/12	<ul style="list-style-type: none">• EBP function now available for Global Transcode configuration.• NOTE: Release 3.1.2 does not support VPMs.
250-0161-01 Rev A	3.1.1	7/20/12	<ul style="list-style-type: none">• MBR Grooming: updated resolution options.• Software upgrade enhancements.• Global quality of service controls for transcoding.• New displays: hardware, software, driver information in chassis view.• New audio worksheet in Bulk Configuration Tool.• NOTE: Release 3.1.1 does not support VPMs.
250-0153-01 Rev A	3.1.0	5/11/12	<ul style="list-style-type: none">• New SNMP traps (including service-impacting).• 2-audio 2-data, and 4-audio 4-data configurations.• Support for E-AC-3.• New ES Performance Monitoring.• Redundant Output Option for VTX, AVTX, PIP, and VTRv transport streams.• NOTE: Release 3.1.0 does not support VPMs.
250-0148-01 Rev A	3.0.3	2/27/11	<ul style="list-style-type: none">• New SDT pass-through for MBR transport streams.• GigE Addressing: One-IP and Three-IP modes.
250-0141-01 Rev A	3.0.1	11/30/11	<ul style="list-style-type: none">• Reset grooming output.• Regroom output.• 32-character support for outbound TS name and MBR group name, input and output TSs, input and audio profile IDs.

VMG Element Manager User Guide document history (Continued)

Part Number	Software Release	Release Date	Changes
250-0131-01 Rev A	3.0.0	10/15/11	<ul style="list-style-type: none"> AC-3 Transcoder. AMP enhancement: audio pass-through, transcoding updates. MBR bitrate updates Async data bitrate for AVTX+PIP, VTX+PIP, AVTX, and VTX. Small resolution support (control for closed captioning). Virtual MAC removed; new physical IP address fields for GigE port configurations.
250-0130-01 Rev A	2.5.2	09/16/11	<ul style="list-style-type: none"> Additional resolutions for SD MBR transport streams. Information about IP address configuration for management interface.
250-0112-01 Rev A	2.5.1	08/19/11	<ul style="list-style-type: none"> New MBR-TS grooming settings, HD and SD. Audio Codec tables inserted. Terminology: from MBR-PIP, to transcoded+PIP. New Bulk Configuration option from Configuration menu.
250-0102-01 Rev A	2.5.0	07/11/11	<ul style="list-style-type: none"> VMG-8 Support Enhanced audio transcoding Audio transcoding support for non-MBR TSs AMP upgrade through GUI
250-0071-01 Rev A	2.2.1	10/18/2010	<ul style="list-style-type: none"> GUI enhancements: removed <i>PIP Required</i> option from SD and HD in new program creation.
250-0044-01 Rev E	2.2.0	09/24/2010	<ul style="list-style-type: none"> Added video ES bitrate hunting feature HD horizontal resolution enhancements On-the-fly output TS modification support PIP Support MCTF support
250-0095-01 Rev A	2.4.0	04/21/11	<ul style="list-style-type: none"> Added MBR transport streams with audio transcoding Output port mirroring support AFD support Inter-chassis IDR support
250-0044-01 Rev B	1.1.1	04/15/2009	Production Release
250-0044-01 Rev D	2.1.0	03/10/2010	<ul style="list-style-type: none"> Rebranded product name Initialization procedure enhancement Upgrade enhancements Input and Output PID management enhancements NPM fast failover reduction Bypass transrater enhancements PIP support MMC support DVB SI support Program redundancy functionality SNMP support Transcoding functionality and support
250-0071-01 Rev B	2.2.2	02/02/2011	<ul style="list-style-type: none"> User-defined video scaling in HD to SD down-conversion. SCTE 20 support. Removed IDR from H.264 PIP streams. Support for full resolution transcoding with no IDR. Added MBR-PIP transport streams.

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Introduction

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

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

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

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

Document Organization

The chapters in this document are arranged to provide the reader with a logical progression of the tasks involved in configuration and usage of the VMG.

This guide is organized as follows:

- [Chapter 1, *Introduction*](#) – (this chapter) describes the contents and conventions used in the VMG Software User Guide.
- [Chapter 2, *Overview*](#) – provides information about the features and capabilities of the VMG.
- [Chapter 3, *VMG Element Manager*](#) – provides an overview of the Java-based *VMG Element Manager*.
- [Chapter 4, *System Configuration*](#) – describes VMG setup and configuration.
- [Chapter 5, *Bulk Configuration*](#) – contains information about how to access and use the Bulk Configuration Tool from the *VMG Element Manager*.
- [Chapter 6, *System Maintenance*](#) – describes VMG system maintenance.
- [Chapter 7, *System Alarms and Events*](#) – discusses the methods used to monitor the health of the VMG.
- [Chapter 8, *Video Processing Overview*](#) – describes interfaces, transport streams, programs and grooming, transrating, transcoding, and program redundancy.
- [Chapter 9, *Input Transport Streams*](#) – describes input transport stream configuration and management.
- [Chapter 10, *Single Video Transport Streams*](#) – describes standard output transport stream configuration and management.

- [Chapter 11, *Transcoded+PIP Transport Streams*](#) – describes transcoded+PIP output transport stream configuration and management.
- [Chapter 12, *MBR Transport Streams*](#) – describes MBR output transport stream configuration and management.
- [Chapter 13, *Advanced Grooming Applications*](#) – describes program redundancy and elementary stream management/PID management.
- [Chapter 14, *Module Redundancy*](#) – provides details of the Network Processor Module (NPM), Video Processor Module (VPM), and Transcoding Module (TCM) software related redundancy features.
- [Chapter 15, *Digital Program Insertion \(DPI\) and Program Substitution*](#) – describes the VMG's digital program insertion features.
- [Chapter 16, *Monitoring*](#) – describes how to use the VMG performance monitoring tools at the *VMG Element Manager*.
- [Chapter 17, *Troubleshooting*](#) – describes VMG troubleshooting procedures and Customer Support contact information.
- [Appendix A, *Configuration Reference*](#) – provides lists of bitrates and resolutions, to reference for configuration purposes.
- [Appendix B, *VMG Alarms and Events*](#) – provides a list of VMG alarms and events, their categories, and severity levels.
- The glossary and index are available, for quick reference.

Document Audience

This guide is intended for system administrators and operators who are responsible for configuration and maintenance of the VMG and for processing network broadcasts. Users of this guide should be familiar with general video and networking terminology, and should be accustomed to basic network software configuration.

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





Related Documentation

- *Video Multiprocessing Gateway, Element Manager User Guide.*
- *Video Multiprocessing Gateway, VMG-6: Hardware Setup Guide.*
- *Video Multiprocessing Gateway, VMG-8: Hardware Setup Guide.*
- *Video Multiprocessing Gateway, VMG-14: Hardware Setup Guide.*
- *Video Multiprocessing Gateway, VMG-14+ Hardware Setup Guide.*
- *Video Multiprocessing Gateway Software Upgrade Guide.*
- *Video Multiprocessing Gateway Software Release Notes.*

Document Conventions

Table 1 provides an easy way to recognize information of particular importance in this manual.

Table 1. Document Conventions

When you see:	It means:
	Note: This points out information that may not be part of the text but provide tips and other helpful advice.
	Caution: This provides an alert to an action that 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.
	Warning! This shows that failure to take the necessary precautions or to follow guidelines could cause harm to equipment and personnel.
	Navigation tip: follow the path alongside the pointer to navigate to a specific option.
Clicking any blue link takes you to the item to which the link refers.	

Graphics

In some cases the images shown in this manual may differ slightly from what appears on screen and 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) 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 H.264 video processing, including advanced ad insertion and transcoding solutions. The VMG platform enables video service operators to deploy the next generation of video services.

In This Chapter:

- “VMG Architecture,” next.
- “High-Availability and Redundancy” on page 7.
- “Software Features and Capabilities” on page 7.

Figure 1. RGB Video Multiprocessing Gateway Systems



VMG Architecture

RGB's VMG architecture combines the VMG hardware and *Element Manager* software described in this section.

Hardware Architecture

The RGB Video Multiprocessing Gateway product line delivers advanced video and audio processing solutions on a modular carrier-class platform that is designed to scale to the telco and cable service provider video processing and ad insertion requirements. The VMG product line consists of the VMG-14, VMG-8, and VMG-6 products that offer cable and telco operators more flexibility in deploying the next generation of video processing applications in terms of size and density requirements. The three platforms have identical system functionality by virtue of running the same software and sharing the same hardware modules: Network Processing Modules (NPM), Video Processing Modules (VPM), Transcoding Modules (TCM), and Application Media Processors (AMP). The key differences between the three platforms are as follows:

- The VMG-14 can accommodate up to twelve application slots for AMPs, VPMs, and/or TCMs.
- The VMG-8 can accommodate up to six application slots.
- The VMG-6 can accommodate up to four application slots.

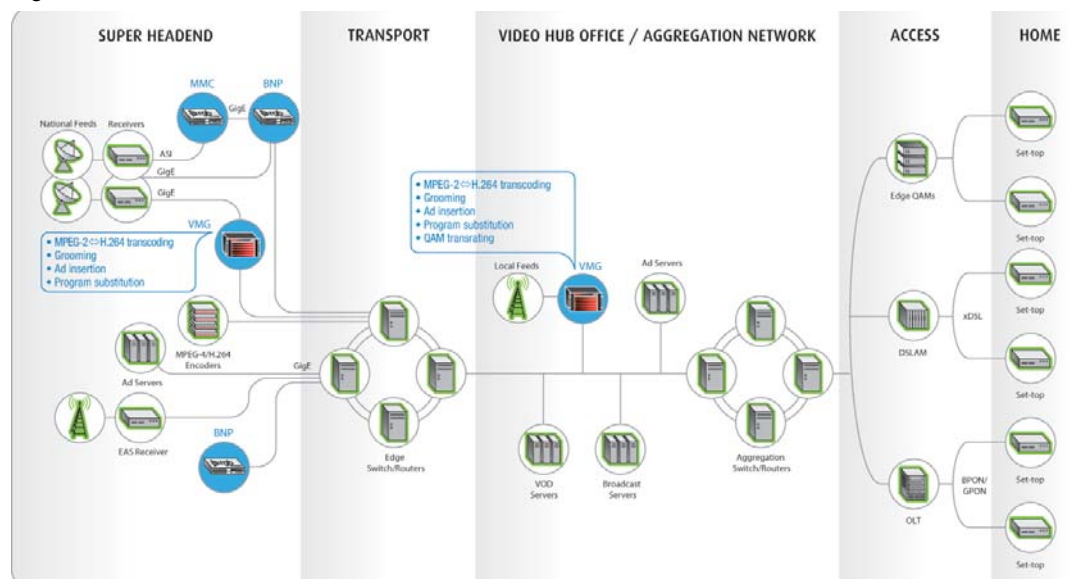


Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information.*

For more information on the VMG hardware platform, please refer to “[Related Documentation](#)” on page 2.

Additionally, 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 video processing environments where density requirements vary. [Figure 2](#) shows how the VMG fits within the network architecture.

Figure 2. Centralized and Distributed Network Architecture



Software Architecture

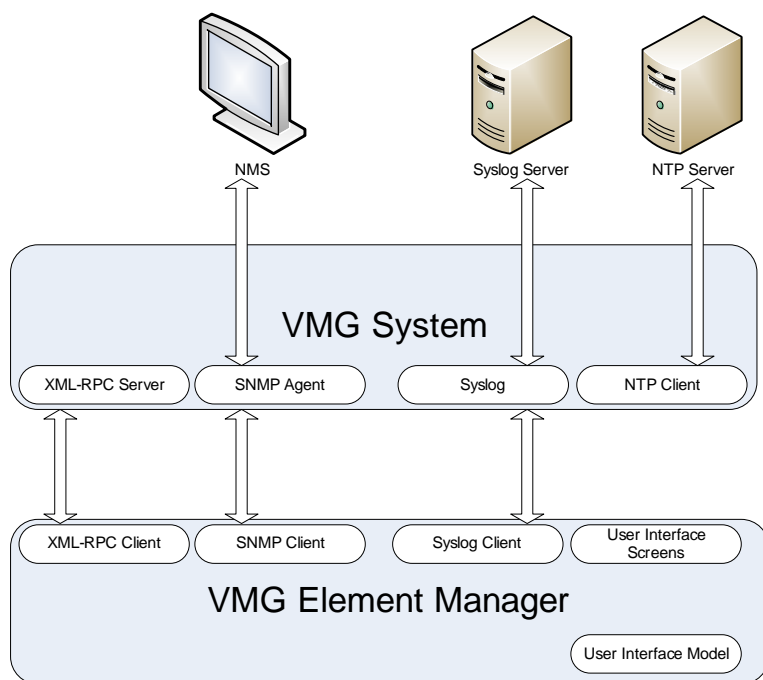
The *VMG Element Manager* is a Java Web Start-based user interface that supports Microsoft Windows™, Unix, and Apple™ operating systems. The *VMG Element Manager* communicates with the VMG using the XML-RPC protocol and provides automatic chassis status updates, such as the current chassis view, and chassis alarms and events. Multiple *VMG Element Manager* user interfaces are supported for managing a single VMG.

The *VMG Element Manager* user interface is divided into three layers:

- XML-RPC Client: handles communication with the XML-RPC server running on the VMG.
- User Interface Model: defines the Application Programming Interface (API) used to access the VMG data objects and configuration logic.
- User Interface Screens (or Widgets): provides the windows that are displayed to operators using the *VMG Element Manager* GUI.

Figure 3 shows the *VMG Element Manager* interface architecture model.

Figure 3. VMG Element Manager Interface Architecture Model



High-Availability and Redundancy

High availability and redundancy refer to the duplication of critical components within a system in order to prevent downtime in the event a primary component fails.

The VMG redundancy implementation guarantees high availability of services provided by the VMG platform. It is designed with the goal of a high availability of carrier-class service through both hardware and software implementations, including chassis redundancy, NPM and AMP 1:1 redundancy, and N+M redundancy for the VPM and TCM cards. Refer to [Chapter 14, “Module Redundancy”](#) for more information.

Software Features and Capabilities

Key VMG system software features and capabilities are listed in [Table 2](#).

Table 2. System Software Features and Capabilities

General	MPEG-2 and H.264 video program distribution through MPEG-2TS / UDP / IP / GigE, or through MPEG-2TS / RTP / UDP / IP / GigE with or without Pro-MPEG COP3r2 FEC coding.
Input/Output	<ul style="list-style-type: none"> • MPEG-2 input and output transport stream (TS) unicast and multicast. • DVB SI input and output transport stream support. • Support for: <ul style="list-style-type: none"> - H.264 SD / HD or MPEG-2 SD / HD video programs. - Mixed Mode: Multiple programs types (MPEG-2 or H.264) to be carried by one output transport stream. - Up to eight GigE interfaces and one of two 10 GigE interfaces per NPM. - Mirroring all output on one GigE interface (port) to another GigE interface.
Stream Processing	<ul style="list-style-type: none"> • Support for input transport stream network de-jittering. • Program grooming with different combinations of input programs. • MPEG-2: TS statistical multiplexing for MPEG-2 and H.264 video content, and video program digital ad insertion based on SCTE 30 and SCTE 35. • H.264: Video program digital ad insertion with constraints per SCTE 128 and DVS714r3. Picture in Picture (PIP) support, including program substitution and DPI. • Input and Output PID management. • Bandwidth utilization monitoring and analysis. • PSI generation, PSIP and DVB-SI data parsing, re-construction, and pass-through. • FEC decoding and encoding on input and output streams.

Table 2. System Software Features and Capabilities (Continued)

Video Processing	<ul style="list-style-type: none"> • MPEG-2 video stream transrating with manageable video quality and best bandwidth efficiency. • Support on each VPM for: <ul style="list-style-type: none"> - Grooming and statistical multiplexing for SD or HD video program streams (MPEG-2 and H.264). - Simultaneous transrating for MPEG-2 SD or HD video program streams. - Simultaneous digital program insertion (DPI) splicing for SD or HD video program streams (MPEG-2 and H.264). • Support on each TCM for: <ul style="list-style-type: none"> - Transcoding of input programs from MPEG-2 to output of H.264 Single Program Transport Stream (SPTS). - Transcoding of input programs from H.264 to output of MPEG-2 Single Program Transport Stream (SPTS). - CBR rate conversion of MPEG-2 to MPEG-2 and H.264 to H.264 output TSs. • Input and output support for: <ul style="list-style-type: none"> - MPEG-2 single program transport streams (SPTSs) and multiprogram transport streams (MPTSs). - Constant bitrate (CBR) or variable bitrate (VBR) of MPEG-2 and H.264 video streams. • Support for Active Format Description (AFD)-based aspect ratio conversion and forwarding. • Support for high density transcoding: SD to SD and SD to PIP.
Audio Processing	Audio transcoding support for the following codecs: HE-AACv1, HE-AACv2, AAC-LC, MPEG-1 LII, MPEG-2 LII, AC-3, and E-AC-3 (Dolby Digital Plus).
Control Interface	<ul style="list-style-type: none"> • Web browser-based GUI for system configuration, control, and management. Also, FTP-based software upgrade via the GUI, and database backup and FTP-based restore via the GUI. • Support for: <ul style="list-style-type: none"> - Drag-and-drop grooming using the VMG Element Manager. - Remote Authentication Dial In User Service (RADIUS) and Terminal Access - License keys for all VMG features, with options to add licenses. - SNMP v2: MIBs available for download from the VMG Element Manager home page. • Controller Access Control System Plus (TACACS+) for administrative access control. • Management of local accounts and interaction with one or more AAA servers. • Multi-tiers of password protection within the VMG Element Manager interface for different user access levels.
Redundancy	<ul style="list-style-type: none"> • Design for high availability of carrier-class service, service level and card redundancy. • Support for four (in the VMG-6), six (in the VMG-8), or 12 (in the VMG-14) application modules (TCM, VPM, AMP) with in-chassis module redundancy support. • Up to two Network Processor Modules (NPMs) configured in 1:1 redundancy for video over IP network routing, switching, and filtering. • Up to two Application Media Processors (AMPs), each mated to an NPM and configured in 1:1 redundancy, for audio transcoding. • Support for both input-level program redundancy. • Support for output GigE interface redundancy.

Multi-Bitrate Video and Audio Transcoding for Adaptive Streaming Applications

Adaptive streaming and “over the top” video delivery technologies now represent a key option available to video service providers to leverage IP networks to the home and to make content available on PC and mobile devices such as Apple's iPad.

The VMG represents a key component in an adaptive streaming architecture in that it allows for real-time audio transcoding (through the AMP module) and video transcoding (through the TCM module). The TCM allows a multi-profile transcode operation where an HD or SD input received over MPTS or SPTS can be configured to an H.264 output complying with PC/mobile device video requirements. Requirements include the definition of a “group” of output profiles, all of which are synchronized with aligned IDR frames.

VMG input and output protocol format is typically MPEG-2 transport stream, and the output is typically received by a downstream “fragmenter” device, such as RGB's AMS Packager, for protocol conversion and possible encryption for secure content to be made available to the appropriate receiving device.

Key VMG features for multi-bitrate transcoding

- Video transcoding from HD or SD inputs and up to 48 H.264 all-progressive outputs per TCM module with varying resolutions and encoding parameters.
- Audio transcoding from MPEG-1 LII, MPEG-2 LII, AAC-LC, HE-AACv1, HE-AACv2, or Dolby AC-3 or E-AC-3 (Dolby Digital Plus), to MPEG-1 LII, MPEG-2 LII, AAC-LC, HE-AACv1, HE-AACv2, or Dolby AC-3 or E-AC-3 (Dolby Digital Plus).

MPEG-2 and H.264 Grooming and PSIP

Grooming refers to the process of grouping specific programs and services into different levels for end-users (e.g., creating customized channel lineups based on the available input programs). Grooming must be done to prevent potential conflicts with any current packet identifiers (PIDs) and Program and System Information Protocol (PSIP) data. PSIP data is comprised of a set of descriptive tables, associated with digital television (DTV) transport streams, that provide program guide information about the broadcasters services and programming. The VMG preserves incoming PSIP data and only reads the information to check for conflicts. If conflicts are found, the user is alerted.

VMG Grooming and PSIP features

- Allows selection of any GigE input SPTS or MPTS program to combine with one or more programs from any other input to create an MPTS multiplex on any output port.
- Supports Main and High profile H.264 encoded video for grooming, statistical multiplexing, and DPI.
- Allows drag-and-drop grooming through the *VMG Element Manager*.
- Dynamic service grooming supported, with scheduling of start time, end time, and day of the week.
- Synchronization of input and output program names.
- PSIP based on the ATSC A/65 standard supported.

Refer to [Chapter 10, “Single Video Transport Streams”](#) and [Chapter 11, “Transcoded+PIP Transport Streams”](#) for more information.

MPEG-2 and H.264 Multiplexing

Multiplexing is used to combine multiple data sources such as video, audio, and data, into a single source. This is normally done to transmit multiple video programs over a single bandwidth-limited carrier medium, such as fiber or coax, to end-users. Multiplexing several variable bitrate streams together into a fixed sized transport stream bandwidth is called statistical multiplexing and helps to increase the overall efficiency of a multi-channel digital transmission.

VMG multiplexing features

- Support for transport stream-level multiplexing CBR or VBR programs from SPTS and MPTS input transport streams to an MPTS output stream.
- Support for de-multiplexing multiple MPTSs into smaller SPTSs or MPTSs.
- PID re-mapping/PID-aliasing to prevent PID conflicts in the MPEG-2 output transport stream.
- Allows program stream creation with up to thirty-two PIDs: only one can be video, the rest a mix of audio and data.
- MPEG-2 transport stream timing accuracy: PCR correction with tolerance within $\pm 500\text{ns}$.
- Generation and insertion of new PSI tables (PAT and PMT).
- PSI insertion repetition rate is MPEG-2 system specification compliant: the VPM default is 67ms and not programmable.



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

Refer to [Chapter 8, “Video Processing Overview”](#) through [Chapter 13, “Advanced Grooming Applications”](#) for more information.

MPEG-2 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. This includes converting variable bitrate (VBR) to constant bitrate streams (CBR), as well as transrating the streams. The use of transrating removes the need for additional decoders and encoders in order to change the bitrate of a video stream.

This function is processed by the VPM to provide VTR services.



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

VMG Transrating features

- Supports processing of any MPEG-2 SPTS or MPTS inputs over IP (Unicast/Multicast).
- Supports NTSC and PAL video formats:
 - Supports MP@ML and MP@HL MPEG-2 profiles.
 - SD resolutions: 720x480/576, 704x480/576, 544x480/576, 528x480/576, 352x480/576.
 - HD resolutions: 1080i1920, 1080i1440, 1080i1280, 720p1280.
 - Frame rates: 23.976 or 24Hz, 25 or 29.97 or 30Hz, 50 or 59.94 or 60Hz.
 - Aspect ratios: 4:3 and 16:9.

- 3:2 reverse pull down.
- Dynamic bitrate conversion and adaptation of MPEG-2 video streams:
 - CBR to VBR.
 - VBR rate clamped output.
 - VBR to VBR.
- Provides multiple QoS setting levels for each output program that is to be rate shaped:
 - Rate shaping QoS levels range from -8 to +8 with step sizes of 1.
 - +8 is for minimum relative rate reduction.
 - -8 is for maximum relative rate reduction.
- Configuration of transrating output video bitrates through GUI.
- Ability to disable transrating on any output program through GUI.
- VPM required.



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

Refer to [Chapter 10, “Single Video Transport Streams”](#) for more information.

Transcoding

The VMG’s high capacity transcoding capabilities enable operators to deliver MPEG-2 or MPEG-4/H.264 SD or HD content from various sources to suit the type of “last mile” distribution network to the home, targeting broadcast-quality delivery to set top boxes or integrated digital tuner TV’s. Typical applications include transcoding H.264 signals into MPEG-2 for existing MPEG-2 set top boxes, or transcoding MPEG-2 feeds into H.264 for IPTV or next-generation QAM delivery networks. IPTV applications also require a picture in picture (PIP) version of the full resolution (SD or HD) video stream. That stream is typically used for electronic program guides, multi-screen mosaic, and related set top box applications. The VMG is capable of generating a PIP stream alongside a full screen transcode, compliant with such popular middleware systems as Microsoft’s Mediaroom.

This function is processed by the TCM to provide PIP, VTX, and VTX+PIP services.

TCM transcoding features

- Transcoding of MPEG-2 to H.264 SPTS, in HD or SD.
- Transcoding of H.264 to MPEG-2 SPTS, in HD or SD.
- Transcoding of MPEG-2 to MPEG-2, in HD or SD.
- Transcoding of H.264 to H.264, in HD or SD.
- Integrated HD to SD downconversion.
- H.264 PIP generation, with SD or HD inputs in either MPEG-2 or H.264 formats.
- TCM required.

Refer to [Chapter 10, “Single Video Transport Streams”](#) and [Chapter 11, “Transcoded+PIP Transport Streams”](#) for more information.

MPEG-2 and H.264 Digital Program Insertion (DPI)

Digital program insertion (DPI) is the digital splicing of one digital program into one or more other digital programs. DPI is used to seamlessly insert digital content, such as locally specific programs and advertisements, into national or regional programs before they are delivered to end-viewers. This generally involves MPEG-2 or H.264 video stream splicing to accomplish the substitution, and is based on SCTE 30 and SCTE 35 standards for communication, with an ad server and reading cue messages embedded in the transport stream.



Note: *For correct DPI splicing and ad insertion, the VMG must be configured to use an NTP server that is accurate to ± 15 ms.*

VMG DPI features

- H.264 ad insertion based on an MPEG-2 transport stream.
- Support for multiple ad zones per VMG.
- Support for both SD and HD formats for H.264 DPI.
- Supports splicing that is seamless:
 - Follows DVS714 for video network feeds and video ad streams.
 - Follows SCTE 128 for video systems and transport constraints.
- Supports back-to-back ads.
- Supports SCTE 30 to SCTE 35 mapping.
- Cue forwarding enable/disable.
- Support network and ad stream language matching.
- Support for MPEG-1 LII, AC-3, AAC audio formats and meta data.
- Complies with SCTE 30 and SCTE 35 standards for communication with ad servers and ad insertion.
- Simultaneous ad insertions for SD or HD programs.
- Supports rate shaping for SD or HD channels for MPEG-2 video streams only.
- Support for SCTE 30 keep-alive and priority messages.

Refer to [Chapter 15, “Digital Program Insertion \(DPI\) and Program Substitution”](#) for more information.

MPEG-2 and H.264 Program Substitution

Program substitution is a form of digital program insertion (DPI) that offers the ability to switch from one program to another program based on a schedule instead of between a program and an advertisement based on cue tones. Long format content, which is typically 30 to 60 minute programming segments, differs from short format content which is used for regional spot advertisements. Program substitution is particularly important for some operators in meeting national programming content rules which often limit the amount of international programming that is allowed. This generally involves MPEG-2 or H.264 video stream splicing to accomplish the substitution, and is based on the SCTE 30 standard for communication, with a scheduling server.

VMG Program Substitution features

- Similar to DPI except involves long form MPEG-2 and H.264 content instead of short form video streams.
- Program Substitution based on the scheduled information via SCTE 30 on a schedule or on demand basis.
- Integrates with third party scheduling system based on SCTE 30 messaging.
- Integration with an external Program Substitution scheduling server for schedule based program substitution.
- VPM required.



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

Refer to [Chapter 15, “Digital Program Insertion \(DPI\) and Program Substitution”](#) for more information.

Forward Error Correction (FEC) Coding

Due to video’s inherent low tolerance for transmission errors, delivering high quality IPTV video services over IP transport networks to digital set-top box decoders can be challenging, the access portion of the transport network being the main source for transmission related errors. These errors result in packet loss and perceptible degradation of video quality such as macro blocking, artifacts, and frame freezes from decoder under flows, the results even less desirable when viewing video in High Definition, where anything less than pristine quality is unacceptable from a subscriber perspective.

The VMG provides a simple, standards-based solution to video degradation seen as a result of transmission error packet loss. By implementing Real Time Protocol (RTP) in conjunction with Pro-MPEG CoP#3 FEC, the VMG can recover from packet errors on processed incoming broadcast video streams as well as supporting packet recovery to downstream devices.

FEC coding features and parameters

- Supports FEC generation and error correction on RTP encapsulated video packets.
 - Decodes and corrects FEC packets on input transport streams.
 - Generates FEC packets on output streams.
- Based on the Pro-MPEG CoP#3 standard.
- Supports RTP packet recovery on detection of packet loss on input video streams.
 - Uses two dimensional computed checksum received from the low bit rate channel.
 - Addition of four net filters and four UDP ports assigned for each FEC-enabled input transport stream.
- Supports RTP encapsulated video delivery in output video streams.
 - Generates two dimensional checksum on a set of RTP packets and sent over a separate out of band low bit rate UDP connection.
 - Addition of three netfilters and four UDP ports assigned for each FEC-encoded output transport stream.
 - Matrix dimension where L = width and range is between 1 and 20.
 - Matrix dimension where D = height and range is between 4 and 20.

- L x D is less than or equal to 100.
- VPM required.



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

Refer to [Chapter 9, “Input Transport Streams”](#) and [Chapter 10, “Single Video Transport Streams”](#) for more information.

Program Redundancy

The VMG supports input-level program redundancy. At the detection of a missing program, the VMG automatically switches to a redundant or backup program.

In a program redundancy configuration, a switch to backup occurs when:

- Missing MPTS/SPTS streams are identified by checking the PAT.
- Missing program streams are identified by checking the PMT.

You can assign a backup program for every input program, and any input program can be assigned to back up a running primary program. The backup program can be another program on the same GigE port or it can be on a different GigE port in the same chassis.

Program redundancy also supports programs using DPI; the DPI program will default to the primary program when a backup is triggered.

Refer to [Chapter 13, “Advanced Grooming Applications”](#) for more information.

Port Mirroring

The VMG supports replicating (mirroring) all traffic sent out on one odd-numbered GigE port (the source port) to the next higher even-numbered GigE port (the mirrored-to port). The port mirroring functionality can serve one of two purposes:

- Capturing traffic sent out on a port for analysis by mirroring the traffic to another port.
- Support for downstream device redundancy where the outputs from a VMG are replicated across two different paths, thus allowing for greater network resiliency in the event that a downstream device goes out of service.

The source port can carry both input and output traffic; however, only the output traffic is mirrored. The output transport streams can be sent to a different IP address (for redundant output) on the mirrored-to port.

Software Serviceability

Software serviceability refers to the ability to perform software maintenance, such as upgrades, on the VMG with the least amount of hassle and down time.

VMG software serviceability features

- Remote upgrade of software using FTP.
- Support for graceful shutdown of VMG.
- Full IP interface support on management IP address.

Refer to [Chapter 6, “System Maintenance”](#) for more information.

Database Backup and Restore

The *VMG Element Manager* provides the ability to backup all configurations stored in the VMG database and the ability to restore a backup up configuration to a current system.

Backup / Restore functionality includes:

- Remote HTTP backup using the *VMG Element Manager*.
- Remote restore of current system configuration using FTP.
- Forward configuration database compatibility for software upgrade.

Refer to [Chapter 6, “System Maintenance”](#) for more information.

Monitoring and Management

The VMG provides multiple monitoring and management tools accessible through the *VMG Element Manager*. The features listed below encompass security, asset management, system configuration, system management, system monitoring, and system diagnostics. Alarms and events allow operators to monitor the health of the VMG system and to be notified when their assistance is required. Alarms monitor and notify operators when any hardware, software, MPEG stream anomalies, or defects are caused by the VMG. Events are used to log issues that occur within the VMG system, and may be used to provide historical event information. Operator assistance may or may not be necessary depending on the severity of the alarm or event.

VMG monitoring and management features

- RADIUS and TACACS+ support for user authentication and access control.
- Three login profile levels for user accounts: Administrator, Operator, and User.
- Embedded GUI application for configuration and management supported via XML/RPC over HTTP.
- Allows setting International Time Zones through the *VMG Element Manager*.
- Display of audio language code during grooming.
- Basic event reporting using the *VMG Element Manager*.
- Popup window display for accessing configuration or activity details.
- Display of input and output bandwidth for each service.
- Display of input and output error statistics for each groomed elementary stream.
- Support for International variations of Daylight Savings Time (DST).
- Initialization of system software upgrade from the *VMG Element Manager*.
- Platform asset management information: software version, hardware serial numbers, and card characteristics and capabilities.
- Monitoring of port link faults and bitrate via the *VMG Element Manager*.
- Four severity levels for generated alarms: Critical, Major, Minor, and Info.
- Maintains a log for alarm triggered events.
- User sortable event log.
- Uses standard Syslog for logging service and system events.
- Full management capability via SNMP.

Refer to [Chapter 4, “System Configuration”](#) and [Chapter 7, “System Alarms and Events”](#) for more information.

Licensing

Licensing is used to enable certain-value added aspects of the VMG. The VMG supports the licensing options listed and described in [“License Management” on page 99](#).

VMG Element Manager

This chapter provides information about the *VMG Element Manager* which is used to configure and monitor the VMG system.

In This Chapter:

- “VMG Element Manager Overview,” next.
- “Obtaining Java Runtime Environment” on page 18.
- “Launching the VMG Element Manager” on page 18.
- “VMG Element Manager GUI” on page 22.
- “Chassis Tab” on page 25.
- “Grooming tab” on page 35.
- “Monitor tab” on page 35.
- “Alarms & Events tab” on page 35.
- “VMG Element Manager Software Version” on page 35.
- “Quick Keys” on page 36
- “Clearing the Java Web Start Cache” on page 37.

VMG Element Manager Overview

The *VMG Element Manager* is a Java-based GUI available using a standard web browser. This easy-to-use interface offers a variety of features that simplify the setup and operation of the VMG. These features include:

- An embedded GUI application for configuration and management via XML/RPC over HTTP.
- Program level drag-and-drop grooming.
- PID Management.
- Input program redundancy.
- Output port mirroring.
- Simultaneous bitrate analysis of input and output transport streams and programs.
- Viewing of alarm and event logs.
- Module redundancy configurations.
- Full configuration of system functions and Gigabit Ethernet ports.

About the VMG IP Address

There are two types of IP addresses employed by the VMG: **physical** (used by each NPM installed in the VMG) and **virtual** (used by the system as a whole, also referred to as the Management Interface).

The active NPM's physical IP address must be used to access the VMG until a virtual IP address has been configured.

To find out how to perform initial VMG configuration, refer to the VMG-6, VMG-8, or VMG-14 Hardware Setup Guide. Once the virtual IP address is configured on the VMG, this address will be used for subsequent access to the VMG (the management interface).

Obtaining Java Runtime Environment

The *VMG Element Manager* requires that the PC on which it is running have Java™ Runtime Environment (JRE) v1.6 or higher. If your PC does not have the correct JRE installed, it is available free from the RGB Customer Portal (see below).

Obtaining JRE from the RGB Customer Portal

To obtain installation instructions and the latest version of JRE that is compatible with the *VMG Element Manager*, [log in to RGB's Customer Portal](#) and search for *Download Java Runtime Environment*.

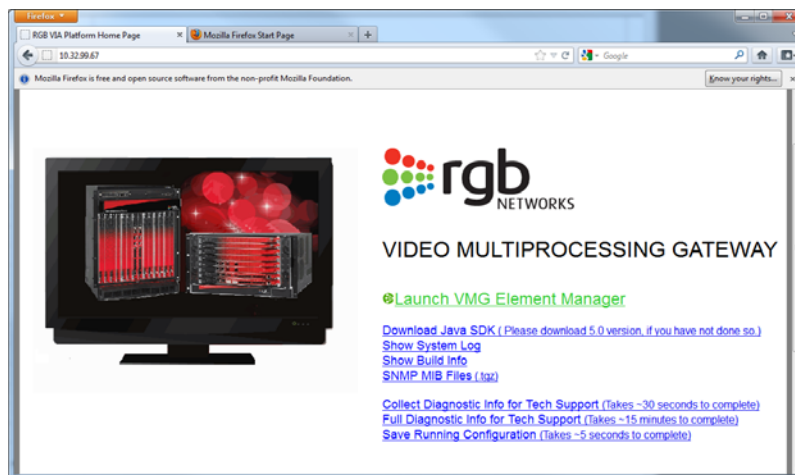
Launching the VMG Element Manager

The *VMG Element Manager* is pre-installed on the VMG at the factory. This section describes how to set up a session with the VMG and the *VMG Element Manager*, then log in to the *VMG Element Manager* for management of the VMG.

Accessing the VMG Element Manager

1. Open a web browser from the management workstation and enter the IP address of the VMG in the browser's address field to display the *VMG Element Manager* home page (Figure 4).

Figure 4. VMG Home Page



The *VMG Element Manager* home page allows you to launch the GUI and also contains options you can use for troubleshooting, MIB access, database backup, and configuration backup.

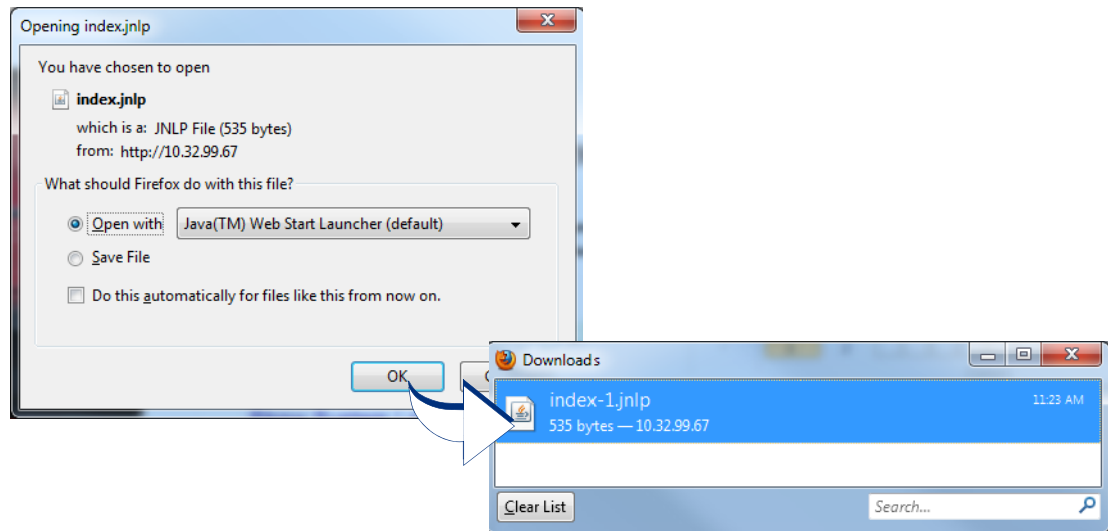
2. At the *VMG Element Manager* home page, click **Launch VMG Element Manager**.

The system now queries for action to take with the **index.jnlp** file (Figure 5).

3. At the **Opening index.jnlp** screen, use the **Open with** option and click **OK** to download the application.

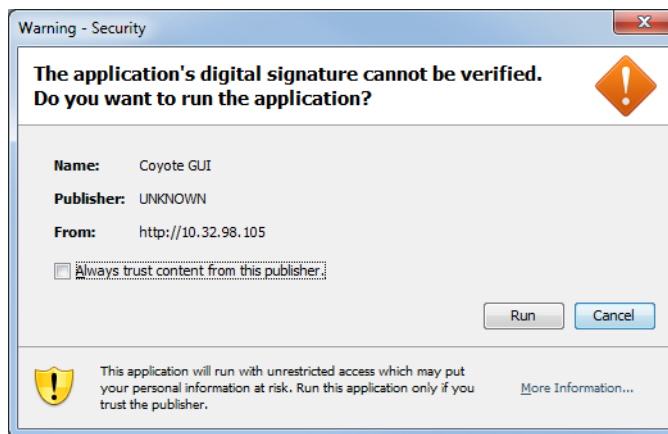
The Java WebStart screen now reports download activity (if the Web Start cache does not already contain the correct version).

Figure 5. Open index.jnlp and download



4. At the Java **Warning Security** screen (Figure 6), click **Run** to start the *VMG Element Manager*.

Figure 6. Java warning



Logging in to the VMG Element Manager

As dependent on the type of login required—as either local login, or login via AAA server—you can either type or enter the user ID and password (Figure 7) after launching the VMG Element Manager.

1. At the **IP Address or Host Name:** field, enter the **IP address** of the VMG to manage, or use that already provided in this field.

Note: If required, you can change the VMG target to be managed, by specifying the VMG IP address or Host Name during log in. When doing this, you can avoid inconsistent VMG behavior if you ensure that the VMGs are running the same software versions.
For example, if you launch Element Manager with (VMG) 10.32.96.215 at the web browser, then change the IP address to (VMG) 192.168.1.12 at the Log In dialog, these VMGs must be running identical software versions.

Figure 7. VMG Element Manager login
Local log in

AAA server log in

Note: Prior to initial configuration of the VMG, the default IP address of the NPM is set to 10.1.1.1 with a subnet mask of 255.255.255.0. However, prior to launching the VMG Element Manager, the IP address should have already been changed to an appropriate address for your specific network. For detailed information on initial configuration of the VMG, please see the VMG-6, VMG-8, or VMG-14 Hardware Setup Guides.

2. At the **User:** field, select the user account from the drop-down list, or type the user name if using a AAA server for authentication.
3. At the **Password:** field, type the password (Table 3)

Table 3. VMG Element Manager Default Login Reference

User	Password
Administrator	Admin
Operator	Operator
User	User

Note: Passwords are case sensitive.
To change a local user account password, refer to “Local Tab” on page 56.
To change an AAA server password, refer to the AAA server documentation.

4. Click **Log in**.

The VMG *Element Manager* opens to reveal the graphical representation of the VMG chassis and current slot assignments, a tabular display of associated system information, and various status indicators (Figure 8).

Figure 8. VMG *Element Manager* Chassis tab (VMG-14)

The screenshot displays the VMG Element Manager interface for VMG-14. The main window shows a graphical representation of the chassis with 14 slots. Slots 1-4 are labeled 'NPM', slots 5-8 are 'AMP', and slots 9-14 are 'TCM'. The status of each slot is indicated by a color-coded bar (red for 'BLANK', green for 'Active'). The right-hand pane shows the 'System Information' table.

Property	Value
Management IP	
IP Address	0.0.0.0
MAC Address	00:11:07:00:07:6a
Subnet Mask	0.0.0.0
Gateway	0.0.0.0
Chassis	
System Type	17 ...
System Time	11/5/2012 13:42:2
System Up Time	2 days 23:47:10
Active Software Version	3.1.3.55684
Loaded Software Version	3.1.3.55684
Reset Reason	0
Alarm LED	
Chassis FRU	
Fan 1	Not Present
Fan 2	Present
AC Power 1	Present ...
AC Power 2	Present ...
AC Power 3	Present ...
AC Power 4	Present ...
System Controller 1	Present ...
System Controller 2	Present ...
NPM Resource	
Slot 1(NPM)	Active
Slot 2(NPM)	N/A
Redundancy State	Not Redundant
AMP Redundancy	
Slot 3(AMP)	Active
Slot 4(AMP)	N/A
Redundancy State	Not Redundant

At the bottom of the window, a status bar shows 'Connected 10.32.98.189' and a 'Trace logs: Syslog' button.

Additionally, management and control options are provided in the *Element Manager* menu, tab pages, and pop up menus throughout the *Element Manager* GUI, as described in “VMG Element Manager GUI” on page 22.

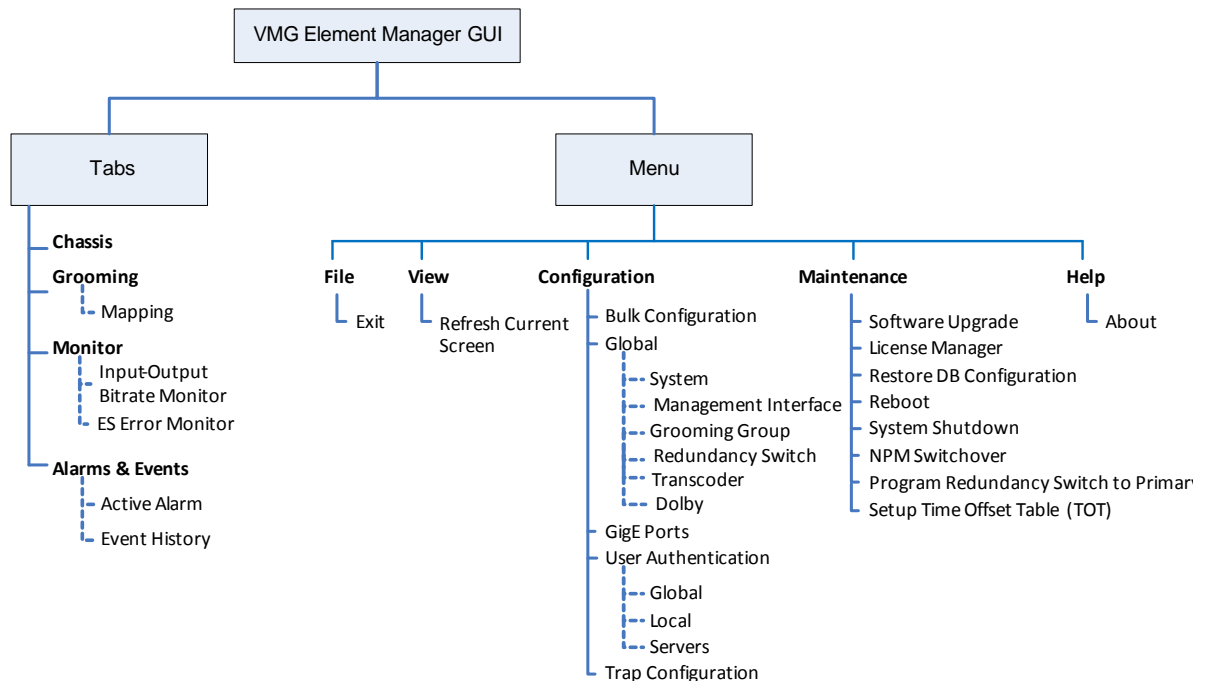
VMG Element Manager GUI

The VMG *Element Manager* provides a convenient, intuitive method for management of a VMG. In addition to numerous tools built into the interface for configuration of services, status of the VMG system is always evident via various reporting functions.

The VMG *Element Manager* GUI hierarchy consists of two main branches: tabs and menus (Figure 9). The menus and tabs reside in the GUI screen with various other functions, as described in the following topics:

- “VMG Element Manager Window” on page 23.
- “VMG Element Manager Menu” on page 23.
- “VMG Element Manager Tabs” on page 24.
- “VMG Element Manager Toolbar Icons” on page 24.
- “VMG Element Manager Status Bar” on page 25.
- “Chassis Tab” on page 25.
- “Grooming tab” on page 35.
- “Monitor tab” on page 35.
- “Alarms & Events tab” on page 35.

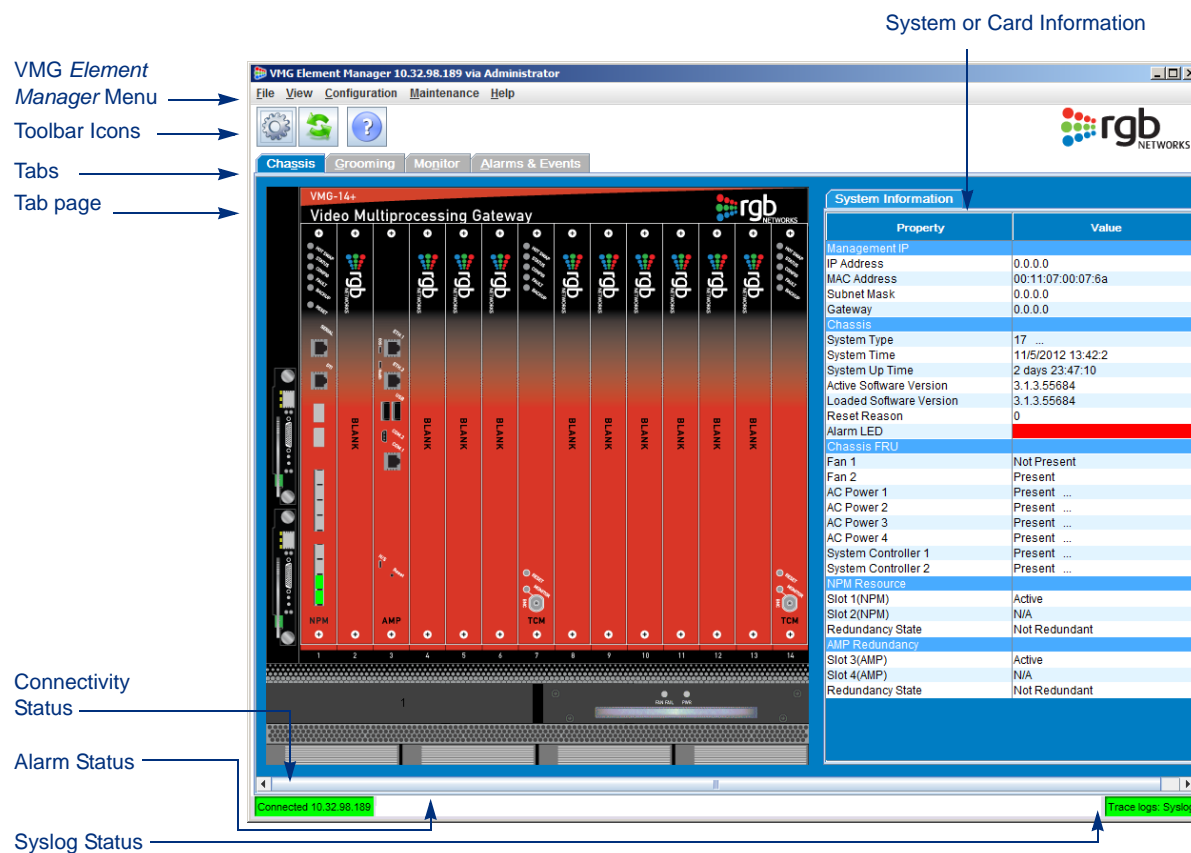
Figure 9. Hierarchy of VMG *Element Manager* Menus and Tabs



VMG Element Manager Window

The *VMG Element Manager* provides the GUI components shown in Figure 10. The menus, icons, tabs, and colors built into the GUI assist in locating the configuration functions and determining status of the VMG.

Figure 10. VMG Element Manager window components



Note that the identity of the VMG and the currently logged in user is always in view at the top bar of the window. Status of the connection between the VMG and the *VMG Element Manager* is always on display at the bottom bar, alongside the overall status of the VMG system.

VMG Element Manager Menu

Use the *VMG Element Manager* menu to perform configuration and maintenance tasks (Table 4).

Table 4. VMG Element Manager Menus

Menu	Use
File	Exit the <i>VMG Element Manager</i> .
View	Refresh the currently active window.
Configuration	Configure global options, Gigabit Ethernet ports, and user authentication. Access bulk configuration components.

Table 4. VMG *Element Manager* Menus (Continued)

Menu	Use
Maintenance	Upgrade software, manage licenses, restore database information, reboot the system, shutdown the system, and perform NPM redundancy switching.
Help	Display the <i>Element Manager</i> About dialog.

VMG *Element Manager* Tabs

Use the VMG *Element Manager* tabs to perform monitoring and grooming (Table 5).




Table 5. VMG *Element Manager* Window Tabs

Tab	Use
Chassis	Provides a quick overview of the VMG system state. Clicking a card or port provides specific information for that item. Clicking any other part of the VMG displays system information about the VMG.
Grooming	Create and map programming.
Monitor	Monitor bitrates in real-time.
Alarms & Events	View alarms and events.

VMG *Element Manager* Toolbar Icons

Use the VMG *Element Manager* toolbar icons (Table 6) for quick access to commonly used functions.

Table 6. VMG *Element Manager* Toolbar Icons

Icon	Name	Use
	Global Configuration	Opens the global configuration dialog. Equivalent to Configuration -> Global . (See also “ Global Configuration ” on page 41).
	Refresh Current Window	Refreshes the current view. Equivalent to View -> Refresh .
	About	Opens the VMG About dialog. Equivalent to Help -> About .

VMG Element Manager Status Bar

The status bar at the bottom of the *VMG Element Manager* always remains in view to report status information about the VMG. Color coding (Table 6) indicates the current, highest-level severity of the situation reported for connectivity, events, or the syslog portion of the bar.





Connectivity

Status of connectivity to the VMG is reported at the left portion of the status bar, where you can view the currently connected IP address of the VMG, and current status of connectivity between the VMG and the *VMG Element Manager* as either green (good) or red (error).

Events

Status of most critical event reported by the VMG is displayed as a text string and color code (Table 7) in the middle section of the status bar. Refer to [Appendix B, VMG Alarms and Events, on page 314](#) for information about messages you may see in the status bar.



Table 7. VMG Element Manager System Status

Color		Meaning
Green		Informational alert or event.
Yellow		Minor alert or event may require operator action.
Pink		Major alert or event requires operator action.
Red		Critical error has occurred and operator intervention is needed.

Syslog

Status of trace logging from the VMG is reported at the right portion of the status bar. Current status is color-coded as either green or red (Table 8).

Table 8. VMG Element Manager Syslog Status

Color		Meaning
Green		The trace logs reported to syslog are enabled at normal logging levels.
Red		The trace logs reported to syslog are enabled at increased logging levels, and may result in VMG performance issues.

Chassis Tab

The *VMG Element Manager* automatically detects the chassis hardware and provides a graphical display of the product components, current status, and general system information (Figure 8).

Except for setting the administrative state of a card, information on the **Chassis** tab screen is displayed for informational purposes only.

- When moving the cursor over a port on the screen, the name of the port is displayed, indicating that details about that port are viewable.

- Clicking with the left mouse button displays the information about the selected Gigabit Ethernet port.
- All active ports appear green on the screen.

Chassis Tab Menus

At the Chassis tab page, you can access popup menu options from the components displayed in the VMG chassis. These menus allow access to module details, administrative settings, and reset functions.



Right-click on a component in the **Chassis** tab page to view applicable options ([Table 9](#)) from the popup menu.

Table 9. VMG Chassis Popup Menus

Component	Options
Chassis	View System Information (see also “ VMG System Information ” on page 27).
NPM	View System Information, View Slot Properties, Configure GigE Ports.
AMP	View System Information, View Slot Properties.
TCM	View System Information, View Slot Properties, Set Card Admin State, Reset Card (see also “ Card Information ” on page 31).
VPM	
GigE port	View System Information, View Slot Properties, Configure Gige Ports (see also “ Port Information ” on page 33).

VMG System Information

To access the comprehensive VMG chassis **System Information** table, make sure the **Chassis** tab (Figure 11) is in view:


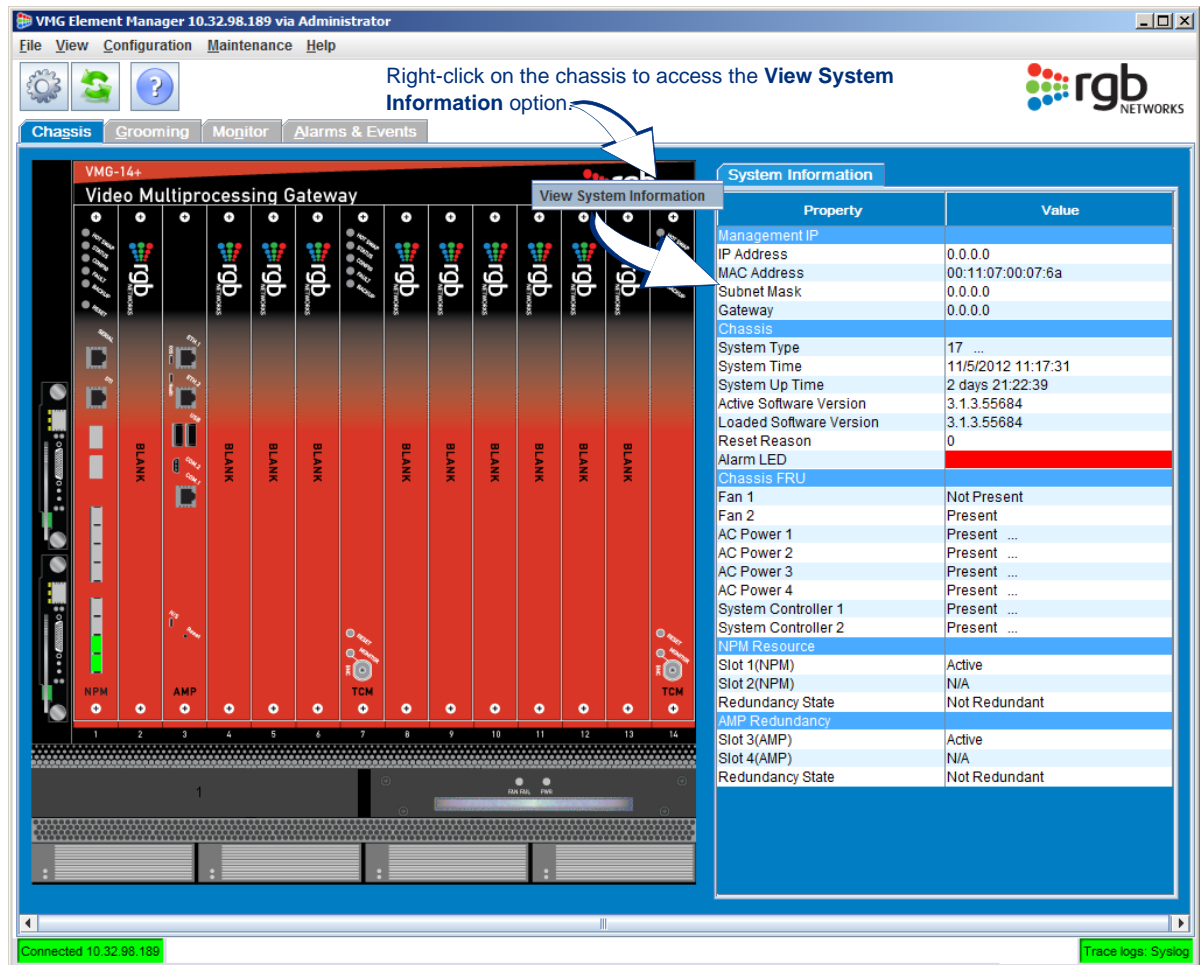
 If the **System Information** panel is not already in view, right-click anywhere on the chassis and select **View System Information** from the popup menu.

Figure 11. VMG *Element Manager*—Accessing System Information



The chassis system information is displayed in the table alongside the chassis graphic, and described in the following topics:

- “Management IP,” next.
- “Chassis” on page 28.
- “Chassis FRU” on page 28.
- “NPM Redundancy” on page 29.
- “VPM Redundancy” on page 29.
- “TCM Redundancy” on page 30.
- “AMP Redundancy” on page 30.

Management IP

The Management IP information for the managed VMG consists of properties listed in (Table 10).

Table 10. Chassis Tab - System Information - Management IP

Property	Value
IP Address	Virtual IP address of the system. <ul style="list-style-type: none"> If this hasn't been configured in the <i>Global Configuration -> Management Interface</i> tab, this field will be empty.
MAC Address	MAC address of the system.
Subnet Mask	Subnet mask of the system. <ul style="list-style-type: none"> If this hasn't been configured in the <i>Global Configuration -> Management Interface</i> tab, this field will be: empty.
Gateway	The IP address of the gateway. <ul style="list-style-type: none"> If this hasn't been configured in the <i>Global Configuration -> Management Interface</i> tab, this field will be: 0.0.0.0

Chassis

The chassis information for the managed VMG consists of properties listed in (Table 11).

Table 11. Chassis Tab - System Information - Chassis

Property	Value
System Type	The chassis type (e.g., 14-slot). Note: Double click the ellipses (...) to retrieve the serial number of the chassis.
System Time	The current system time.
System Up Time	Amount of time that the chassis has been powered on.
Active Software Version	Version of the software currently running on the system.
Loaded Software Version	Specifies the latest downloaded version of the software currently residing on the system disk. This version will become the active version at the next system reboot.
Reset Reason	The reason for the last system reset. Used for troubleshooting purposes when reporting to customer support.
Alarm LED	Displays the color of the highest alarm currently active in the system.

Chassis FRU

The chassis FRUs for the managed VMG consists of properties listed in (Table 12).

Table 12. Chassis Tab - System Information - Chassis FRU

Property	Value
Fan <i>n</i>	Indicates if fan is present in the system.
Power <i>n</i>	Indicates if power module is present in the system.
System Controller <i>n</i>	Indicates if system controller is present in the system.
SAP	Indicates if shelf alarm panel is present in the system. SAP is displayed only for VMG-6 and VMG-14 systems; not applicable for VMG-8.

NPM Redundancy

Current NPM redundancy configuration and state information for the managed VMG consists of properties listed in (Table 13).

Table 13. Chassis Tab - System Information - NPM Redundancy

Property	Value
Slot <i>n</i> (NPM)	Shows if there is an NPM installed in slot 7 or 8 of the VMG-14 chassis or slot 1 or 2 of the VMG-6 or VMG-8 chassis, and its current redundancy state. <ul style="list-style-type: none"> • If one NPM, choices are: <i>Not Redundant</i> or <i>N/A</i> (empty slot). • If two NPMs, choices are: <i>Active</i>, <i>Standby</i>, or <i>Disabled</i>.
Redundancy State	Shows Redundancy state: <ul style="list-style-type: none"> • If one NPM, or the standby NPM has failed, value is: <i>Not Redundant</i>. • If two NPMs are fully operational, choices are: <i>Fully Redundant</i> or <i>Not Redundant</i>.

See also Chapter 14, “Module Redundancy,” for more information about NPM redundancy.

VPM Redundancy



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information.*

Current VPM redundancy configuration and state information for the managed VMG consists of properties listed in (Table 14):

Table 14. Chassis Tab - System Information - VPM Redundancy

Property	Value
Grooming Group 1	Provides color coded and text redundancy status information on available bandwidth for all cards in grooming group 1 (the 8x1 GigE ports). Color codes are: <ul style="list-style-type: none"> • Green: Less than 70% capacity utilized. • Yellow: Greater than 70% capacity utilized. • Orange: Greater than 90% capacity utilized. • Red: Card is at 100% capacity; no more streams will be allocated to this card. Hover over a color block to view percent of utilization.
Grooming Group 2	Provides color coded and text redundancy status information on available bandwidth for all cards in grooming group 2 (either 10 GigE1 or 10 GigE2). Color codes are: <ul style="list-style-type: none"> • Green – Less than 70% capacity utilized. • Yellow – Greater than 70% capacity utilized. • Orange – Greater than 90% capacity utilized. • Red – Greater than 100% capacity utilized; some output TSs are currently unassigned. Hover over a color block to view percent of utilization.

See also Chapter 14, “Module Redundancy,” for more information about VPM redundancy.

TCM Redundancy

Current TCM redundancy configuration and state information for the managed VMG consists of properties listed in (Table 15)

Table 15. Chassis Tab - System Information

Property	Value
Grooming Group 1	<p>Provides color coded and text redundancy status information on available bandwidth for all cards in grooming group 1 (the 8x1 GigE ports). Color codes are:</p> <ul style="list-style-type: none"> • Green: Less than 70% capacity utilized. • Yellow: Greater than 70% capacity utilized. • Orange: Greater than 90% capacity utilized. • Red: Card is at 100% capacity; no more streams will be allocated to this card. <p>Hover over a color block to view percent of utilization.</p>
Grooming Group 2	<p>Provides color coded and text redundancy status information on available bandwidth for all cards in grooming group 2 (either 10 GigE1 or 10 GigE2). Color codes are:</p> <ul style="list-style-type: none"> • Green – Less than 70% capacity utilized. • Yellow – Greater than 70% capacity utilized. • Orange – Greater than 90% capacity utilized. • Red – Greater than 100% capacity utilized; some output TSs are currently unassigned. <p>Hover over a color block to view percent of utilization.</p>

See also Chapter 14, “Module Redundancy,” for more information about TCM redundancy.

AMP Redundancy

Current AMP redundancy configuration and state information for the managed VMG consists of properties listed in (Table 16)

Table 16. Chassis Tab - System Information - AMP Redundancy

Property	Value
Slot <i>n</i> (AMP)	<p>Shows if there is an AMP installed in slot 6 or 9 of the VMG-14 chassis or slot 3 or 4 of the VMG-6 or VMG-8 chassis, and its current redundancy state.</p> <ul style="list-style-type: none"> • Choices are: <i>Active</i>, <i>Standby</i>, <i>Disabled</i>, or <i>N/A</i> (empty slot).
Redundancy State	<p>Shows Redundancy state:</p> <ul style="list-style-type: none"> • If one AMP, or the standby AMP has failed, value is: <i>Not Redundant</i>. • If two AMPs are fully operational, choices are: <i>Fully Redundant</i> or <i>Not Redundant</i>.

See also Chapter 14, “Module Redundancy,” for more information about AMP redundancy.

Card Information

To access information about a specific module in the VMG chassis, bring up the **Card Information** tab:



Hover over the card in the display, and right-click to present the popup menu -> select **View Slot Properties** to present the **Card Information** tab (Figure 12 and Table 17). The following example demonstrates the **Card Information** tab presented when invoking the popup from the AMP in slot 3.

Figure 12. VMG Element Manager—Accessing Slot Information

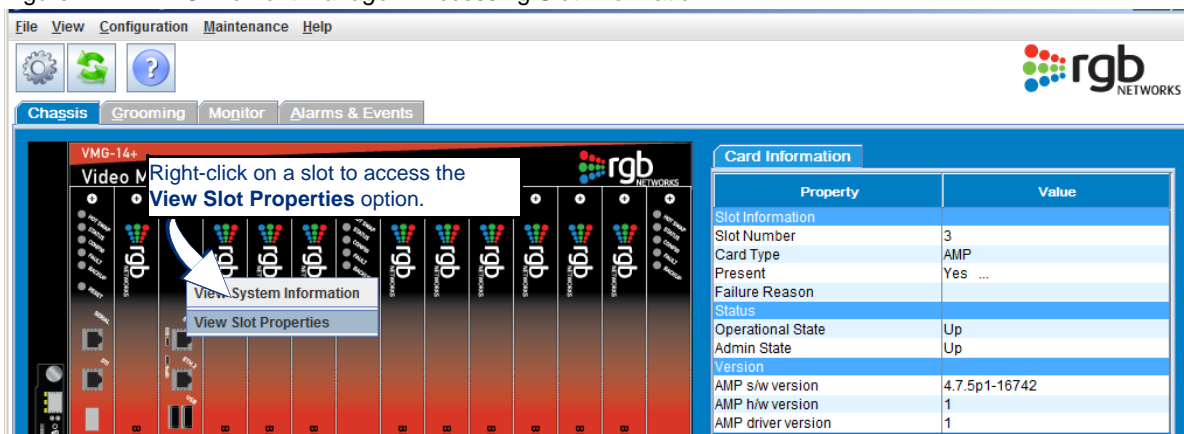


Table 17. Chassis Tab - Card Information

Section	Field	Description
Slot Information	Slot Number	The VMG slot location where the selected card is installed.
	Card Type	The card type (NPM, AMP, VPM, or TCM) or <i>Blank</i> if no card present.
	Present	Indicates if a card is present in the slot. Yes or No. Note: See also “ Additional Information (...) ” on page 33.
	Failure Reason	The reason for card failure, if a failure has occurred. Used for troubleshooting purposes when reporting to customer support.
Status	Operational State	Up or Down. Specifies if the card is functioning (Up) or not (Down).
	Admin State	Up or Down. Indicates the administrative state of the card.
Version	For NPM	Software version, hardware version, and driver version.
	For AMP	Software version, hardware version, and driver version.
	For TCM	Hardware version, and driver version.
	For VPM	Hardware version, and driver version.

Table 17. Chassis Tab - Card Information (Continued)

Section	Field	Description
LEDs (NPM only)	Fault LED	Displays the current color/state of the Fault LED for the selected card: <ul style="list-style-type: none"> • White - Card operation state is down. • Gray - Card operation admin state is down. • Green – Normal operation. • Red – A fault has occurred.
	Backup LED	Displays the current color/state of the Backup LED for the selected card: <ul style="list-style-type: none"> • White - Card operation state is down. • Gray - Card operation admin state is down. • Green – Card is currently active (in operation). • Red – Card is currently in standby mode.
Redundancy (VPM & TCM only)	Redundancy Status (Grooming Group1)	Indicates the color-coded redundancy capability of the grooming group for selected card. Color codes are: <ul style="list-style-type: none"> • Green – Grooming group is available for redundancy failover. • Red – Grooming group is not available for redundancy failover.
	Redundancy Status (Grooming Group2)	Indicates the color-coded redundancy capability of the grooming group for selected card. Color codes are: <ul style="list-style-type: none"> • Green – Grooming group is available for redundancy failover. • Red – Grooming group is not available for redundancy failover.

Port Information

To access information about a specific NPM GigE port, go to the **Port Information** tab (Table 17):



Hover over the GigE port of an NPM in the graphic -> right-click and select **View Port Properties** from the popup menu.

Table 18. Chassis Tab - Port Information

Section	Field	Description
Port	Slot Number	The VMG slot location of the NPM card where the selected port is located.
	Port Number	The selected GigE port number on the NPM card. The port numbers are as follows: <ul style="list-style-type: none"> • GigE 1 to GigE 8 – The 1 GigE interfaces. • 10 GigE 1 – The 10 GigE 1 interface. • 10 GigE 2 – The 10 GigE 2 interface.
	Port	The name of the selected Gigabit Ethernet port.
	IP Address	IP address assigned to the port.
	MAC Address	MAC address of the port.
	Subnet Mask	Subnet mask of the port.
	Gateway	The IP address of the gateway.
Status	Admin State	Up or Down. Indicates the administrative state of the port.
	Operational State	Up or Down. Specifies if the port is functioning (Up) or not (Down).

Additional Information (...)

At the **System Information** tab screen, you can obtain additional information from any topic listed alongside an ellipsis. This tab screen provides the option to view tabular details about System Type, the fans, the system controller, and SAP in a dialog associated with your selection. For any selection, the dialog presents the manufacturer name, part name, part number, manufacturer date, hardware revision number, and serial number.



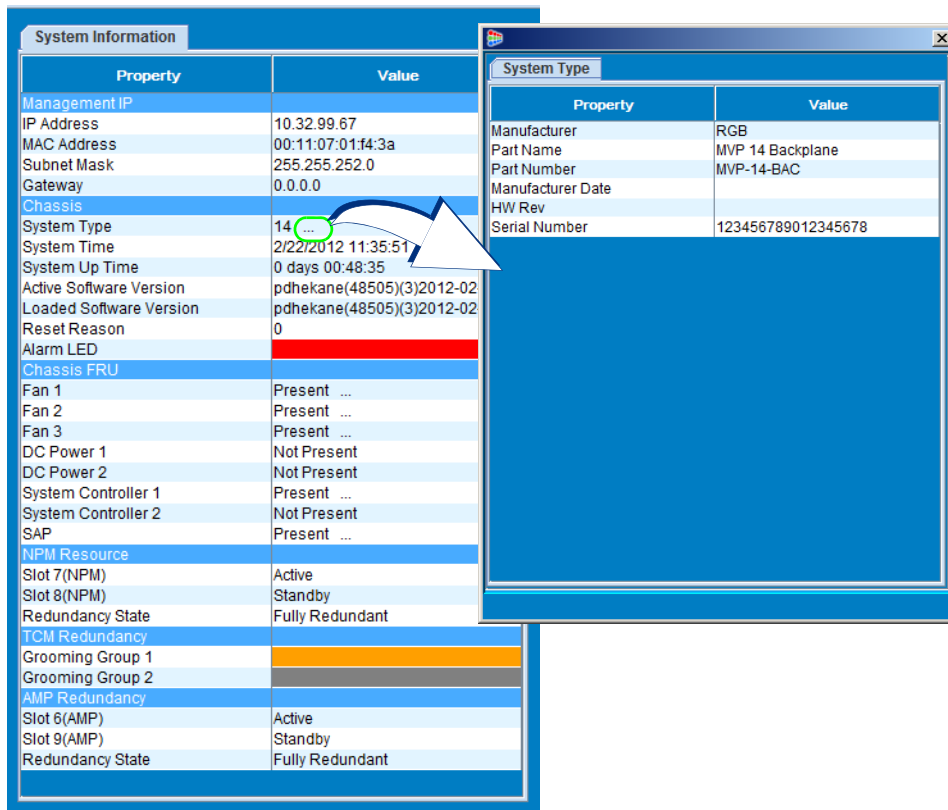
At the ellipsis (...) use one of the following methods to present the detail dialog:

- Double-click to go directly to the detail dialog (Figure 13).

or

- Right-click and select **Detail** from the popup menu.

Figure 13. Chassis tab - Additional Information (...)



The screenshot displays the 'System Information' window with the 'Chassis' tab selected. The 'System Type' property is highlighted with a green circle and a callout box. The callout box shows a detailed view of the 'System Type' property, including its manufacturer, part name, part number, manufacturer date, hardware revision, and serial number.

Property	Value
Management IP	
IP Address	10.32.99.67
MAC Address	00:11:07:01:f4:3a
Subnet Mask	255.255.252.0
Gateway	0.0.0.0
Chassis	
System Type	14 ...
System Time	2/22/2012 11:35:51
System Up Time	0 days 00:48:35
Active Software Version	pdhekane(48505)(3)2012-02
Loaded Software Version	pdhekane(48505)(3)2012-02
Reset Reason	0
Alarm LED	
Chassis FRU	
Fan 1	Present ...
Fan 2	Present ...
Fan 3	Present ...
DC Power 1	Not Present
DC Power 2	Not Present
System Controller 1	Present ...
System Controller 2	Not Present
SAP	Present ...
NPM Resource	
Slot 7(NPM)	Active
Slot 8(NPM)	Standby
Redundancy State	Fully Redundant
TCM Redundancy	
Grooming Group 1	
Grooming Group 2	
AMP Redundancy	
Slot 6(AMP)	Active
Slot 9(AMP)	Standby
Redundancy State	Fully Redundant

Property	Value
Manufacturer	RGB
Part Name	MVP 14 Backplane
Part Number	MVP-14-BAC
Manufacturer Date	
HW Rev	
Serial Number	123456789012345678

Grooming tab

The **Grooming** tab page provides access to tools for managing transport streams and programs and is described in the following sections:

- Chapter 8, “Video Processing Overview”
- Chapter 10, “Single Video Transport Streams”
- Chapter 11, “Transcoded+PIP Transport Streams”

Monitor tab

The **Monitor** tab allows real-time bitrate monitoring and display of error statistics on input-output audio and video elementary streams. Refer to Chapter 16, “Monitoring” for more information.

Alarms & Events tab

The **Alarms & Events** tab provides information about the current state of the system and is viewable at any time. Refer to Chapter 7, “System Alarms and Events” for more information.

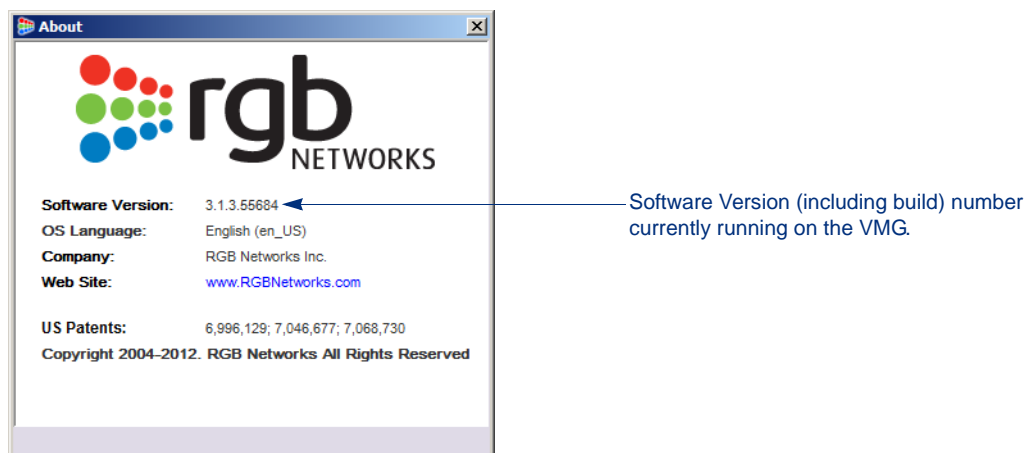
VMG Element Manager Software Version

To view the current version of the *VMG Element Manager*, go to the RGB Networks **About** dialog (Figure 14):



From *VMG Element Manager* main menu -> **Help** -> **About**.

Figure 14. VMG Element Manager About Dialog



Quick Keys

The VMG *Element Manager* contains numerous shortcuts you can use to navigate quickly from the main menu, and to adjust views.

Table 19. VMG *Element Manager* Quick Keys

Primary Key(s)	Key Combinations and Actions
Esc	Close all dialog windows at once.
Tab	In dialogs, navigate to next editable field.
Alt f	Display the File option from the VMG <i>Element Manager</i> main menu. <ul style="list-style-type: none"> Alt f, Alt e = Log off the current user session and dismiss the VMG <i>Element Manager</i> screen.
Alt v	Display the View options from the VMG <i>Element Manager</i> main menu. <ul style="list-style-type: none"> Alt v, Alt r = Refresh the current view of the VMG <i>Element Manager</i> screen.
Alt c	Display the Configuration options from the VMG <i>Element Manager</i> main menu. <ul style="list-style-type: none"> Alt c, Alt b = Go to the Bulk Configuration dialog. Alt c, Alt g = Go to the Global Configuration tab panel. Alt c, Alt p = Go to the Configure GigE Ports screen. Alt c, Alt u = Go to the User Authentication tab panel. Alt c, Alt t = Go to the Trap Configuration dialog.
Alt m	Display the Maintenance options from the VMG <i>Element Manager</i> main menu. <ul style="list-style-type: none"> Alt m, Alt u = Go to the Upgrade Software dialog. Alt m, Alt l = Go to the License Manager dialog. Alt m, Alt d = Go to the Restore DB Configuration dialog. Alt m, Alt r = Go to the Reboot dialog. Alt m, Alt s = Go to the System Shutdown confirmation query. Alt m, Alt n = Go to the NPM Switchover confirmation query. Alt m, Alt p = Go to the Regroom confirmation query. Alt m, Alt t = Go to the Set Up Time Offset Table (TOT) dialog.
Alt h	Display the Help option from the VMG <i>Element Manager</i> main menu. <ul style="list-style-type: none"> Alt h, Alt a = Go to the VMG <i>Element Manager</i> About dialog.

Clearing the Java Web Start Cache

If you need to downgrade your *VMG Element Manager* software, be sure to clear the Java web start cache, as described in this section.

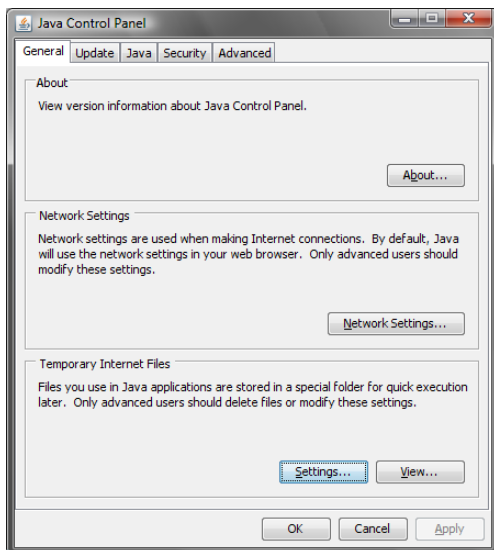
Go to the **Java Control Panel** to get started:



From Windows -> **Control Panel**, double-click on the **Java** icon,
or

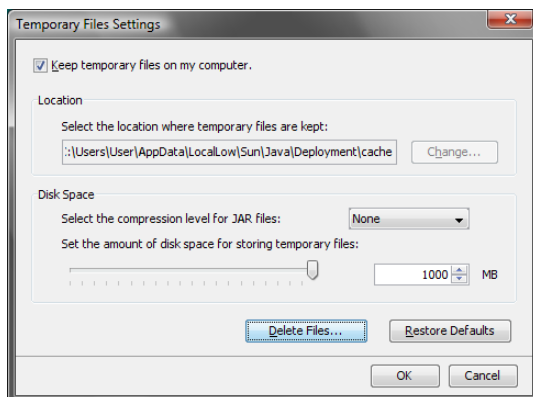
Select **Start -> Control Panel -> Java** to present the **Java Control Panel** (Figure 15).

Figure 15. Java Control Panel screen



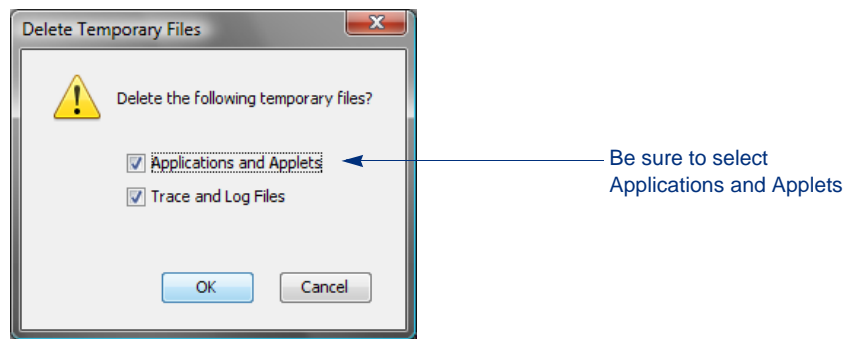
5. Click the **Settings...** button in the *Temporary Internet Files* section. The **Temporary Files Settings** screen (Figure 16) is now presented.

Figure 16. Temporary Files Settings screen



6. Click the **Delete Files...** button. The **Delete Temporary Files** confirmation screen (Figure 17) is now presented.

Figure 17. Delete Temporary Files screen



7. Ensure that the *Applications and Applets* option is selected, and click the **OK** button to clear the cache.

System Configuration

This chapter describes the tools that are available from the configuration menu of the *VMG Element Manager*. Configuration of global settings, user authentication, and Gigabit Ethernet ports can be performed here.



Note: *Release 2.5.1 introduced the new Bulk Configuration function from the VMG Element Manager main menu. Currently, only MBR-TS configuration is supported via use of the bulk configuration tools.*

In This Chapter:

- “Bulk Configuration,” next.
- “Global Configuration” on page 41.
- “User Authentication Configuration” on page 53.
- “SNMP Traps and Trap Configuration” on page 60.
- “Gigabit Ethernet Port Configuration” on page 63.

Bulk Configuration

The bulk configuration function allows the Element Manager Administrator to set up a complete set of MBR-TS parameters into a convenient spreadsheet format. Following entry of the settings, the spreadsheet can be applied to a VMG to either replace or append the current MBR-TS configuration. You can also use the **Bulk Configuration** screen to clear the current MBR-TS configuration on the VMG.



Note: *The Bulk Configuration function is available only to users logged on to the VMG Element Manager as Administrator. This function is not available at Operator or User privilege levels.*

To get started with the bulk configuration tools, the administrator must access the **Bulk Configuration** screen to get the spreadsheet components:.



From the *VMG Element Manager*, select **Configuration** -> **Bulk Configuration** to present the **Bulk Configuration** screen (Figure 18 and Table 20).

See Chapter 5, *Bulk Configuration* on Page 72 to find out how to use the VMG Bulk Configuration Tools.

Figure 18. Bulk Configuration screen

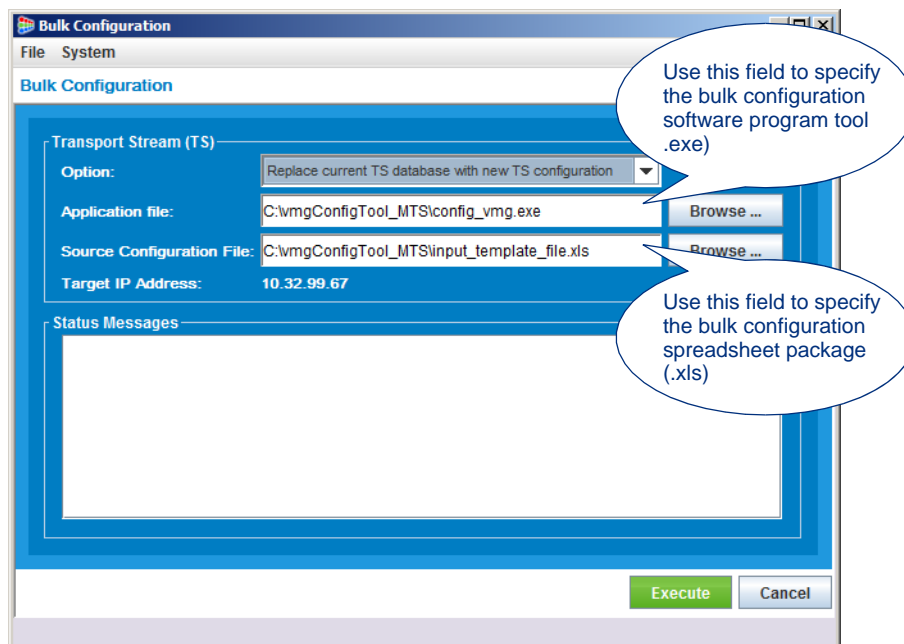


Table 20. VMG-8 components

Field	Description
File	Provides graceful exit from the <i>Bulk Configuration</i> screen.
System	Provides the Download Bulk Configuration Software option.
Option	<p>Drop-down selector to select one of the following options:</p> <p>Note: <i>In the current release, bulk configuration applies only to MBR.</i></p> <ul style="list-style-type: none"> • Replace current TS database with new TS configuration The bulk configuration tool clears all transport streams and configures the transport stream based on the configuration file read from the VMG-8. The system needs to be out of service when using this option. • Append new configuration to existing TS database The bulk configuration appends the transport streams based on the bulk configuration file. The system can remain in service when using this option. • Clear the TS database The bulk configuration clears all current transport streams. The system needs to be out of service when using this option. • Save current TS database to new Configuration File Retains the existing configuration file under a new configuration file name.
Application File	<p>The location of the application file.</p> <p>Default path: c:\vmgConfigTool_MTS\config_vmg.exe</p>
Source Configuration File	The location of the Excel (.xls) configuration source file. Refer to the <i>VMG Bulk Configuration Tool Administrator's Guide</i> for complete details about the configuration files (spreadsheets).
Target IP Address	IP address of the VMG on which the bulk configuration will be deployed.

Table 20. VMG-8 components (Continued)

Field	Description
Status Messages	Status message display area, which populates with INFO and/or ERROR messages after you press the Execute button. Messages continue to display until completion of the configuration at the VMG.
Execute	Use the settings in this screen to begin sending the spreadsheet configuration to the VMG system. Prior to upload, the system will query for Administrator password.

Global Configuration

Use the **Global Configuration** screen to view and configure settings that are applicable to the VMG chassis.



From the *VMG Element Manager*, select **Configuration -> Global** or

Click the **Global Configuration** icon at the *VMG Element Manager* toolbar to present the **Global Configuration** screen.

The tab pages available in the **Global Configuration** screen are described in the following sections:

- “System Tab,” next.
- “Management Interface Tab” on page 44.
- “Grooming Group tab” on page 46.
- “Redundancy Switch Tab” on page 49.
- “Transcoder Tab” on page 50.
- “Dolby Tab” on page 51.

System Tab

Use the **System** tab to set and configure network timing protocol (NTP) servers, system time, and syslog settings.



From the *VMG Element Manager* main menu, select **Configuration -> Global -> System** to present the **System Tab** (Figure 19 and Table 21).

Figure 19. Global Configuration - System tab

Global Configuration

System Management Interface Grooming Group Redundancy Switch Transcoder Dolby

NTP:

Address 1: Status: Inactive

Address 2: Status: Inactive

Address 3: Status: Inactive

Address 4: Status: Inactive

Address 5: Status: Inactive

System Time:

Time Zone: GMT-11 Midway Island Time (Samoa)

Time: 06/27/12 17:54:25 SST

Syslog Server:

IP Address: 10.32.99.181

Port: 514

System Event:

Max Count (50...10000): 500

Apply Cancel

Table 21. Global Configuration - System Settings

Category/ Section	Field	Description	Default
NTP	NTP Address 1 ... NTP Address 5	Type the IP address(es) of the NTP server(s) to use for time synchronization. Up to five NTP servers can be specified.	Blank
	Status	View current status of NTP server, as either Active or Inactive.	Read-only
System Time	Time Zone	Drop-down selector, to define the local time zone relative to UTC (GMT) time.	From NTP
	System Time	Drop-down panel, to define the system time (see also Figure 21).	From NTP
Syslog Server	Syslog IP Address	Type the IP address of the syslog server.	Blank
	Syslog Port	Type the port number to be used at the syslog server.	514
System Event	Max Count (50...10000)	Type the maximum number of events, in the range 50-10,000, to be displayed in the <i>Element Manager > Alarms & Events > Event History</i> screen.	500

About NTP

NTP provides the mechanisms to synchronize and coordinate time distribution over a computer network using a reference clock. NTP uses a hierarchical configuration of synchronized time servers, in a distributed subnet, to deliver reference time to requesting clients using local routing algorithms. NTP is used to provide accurate timestamps for system log messages and program splicing.



Note: *NTP server connectivity must be tested to ensure proper system time synchronization and system operation.*

When configuring NTP, up to five systems on the network can be specified as authoritative time sources/servers. It is important to select reliable and reachable local NTP servers in order to maintain clock accuracy and synchronization.

An NTP server is required for splicing when performing digital program insertion (DPI). If not using NTP, the **Time Zone** (Figure 19) and **System Time** (Figure 21) fields must be manually set, using the drop down options from the **System** tab page.

Figure 20. System Time Zone Configuration

The screenshot shows the 'Global Configuration' window with the 'System' tab selected. The 'NTP' section contains five rows for 'Address 1' through 'Address 5', each with an input field and a 'Status' field currently set to 'Inactive'. Below this is the 'System Time' section, which includes a 'Time Zone' dropdown menu, a 'Time' dropdown menu, a 'Syslog Server' input field, an 'IP Address' input field, and a 'Port' input field set to '514'. The 'Time Zone' dropdown is open, showing a list of time zones including GMT-11 Midway Island Time (Samoa), GMT-10 Hawaii Time, GMT-09 Alaska Time, GMT-08 Pacific Time (US & Canada), GMT-08 Pacific Time (Tijuana, Baja California), GMT-07 Mountain Time (US & Canada), GMT-07 Mountain Time (Chihuahua, La Paz, Mazatlan), and GMT-07 Mountain Time (Phoenix & Sonora). A callout bubble points to the 'Time Zone' dropdown with the text 'Select a time zone from the drop-down selector.' At the bottom of the window are 'Apply' and 'Cancel' buttons.

Figure 21. System Time Configuration

Global Configuration

System Management Interface Grooming Group Redundancy Switch Transcoder Dolby

NTP:

Address 1: Status: Inactive

Address 2: Inactive

Address 3: Inactive

Address 4: Inactive

Address 5: Inactive

Select month, year, and day, or click **Today** to set the current date.

Island Time (Samoa)

Time: 5:54:25 SST

Select values to set system hour, minute, second; AM or PM.

Hour Min Sec

5 54 25 PM

Syslog Server: Sun Mon Tue Wed Thu Fri Sat

IP Address: 1 2

Port: 3 4 5 6 7 8 9

System Event: 10 11 12 13 14 15 16

Max Count (5): 17 18 19 20 21 22 23

24 25 26 27 28 29 30

Today OK Cancel

Apply Cancel

About VMG Syslogs

The VMG generates system log messages (syslog messages) that record alarms and events occurring in the system. Each syslog message contains a time stamp of when the event occurred, a description of the event, and the severity of the event. Refer to [Chapter 7, “System Alarms and Events”](#) and [Appendix B, “VMG Alarms and Events”](#) for more information on alarms and events.



Note: The syslog also contains debug messages intended for internal RGB use that are not documented in this user guide.

Management Interface Tab

The VMG chassis allows for two separately addressed NPMs to be installed to provide network connection redundancy. Configuring a virtual IP address for the VMG system means that IP connectivity to the VMG remains unchanged regardless of which NPM is active.

When configuring the VMG for the first time, the physical IP address of the NPM must first be set through Telnet access or GUI to the VMG or serial console access (see Chapter 4, “*Initial Configuration*,” of the *VMG Hardware Setup Guide* for more information). Once the physical IP addresses have been set for both NPMs (the active NPM and the backup NPM if you are configuring NPM redundancy for your system), you can then point your browser to the physical IP address configured for the active NPM in order to configure the VMG’s Virtual IP address.

Use the **Management Interface** tab to configure a single global Virtual IP address for the VMG system and to edit the physical IP address of the active NPM card.



From the *VMG Element Manager* main menu, select **Configuration -> Global -> Management Interface** to present the **Management Interface** tab (Figure 22 and Table 22).

Figure 22. Global Configuration - Management Interface tab

The screenshot displays the 'Global Configuration' window with the 'Management Interface' tab selected. The window contains the following fields and values:

- MAC Address:** 00:11:07:00:fd:0a
- Virtual IP Address:**
 - IP Address:** 10.32.99.67
 - Subnet Mask:** 255.255.252.0
- Gateway for Active NPM Physical and Virtual:**
 - Gateway:** (empty field)
- Active NPM Physical IP Address:**
 - IP Address:** 10.32.98.103
 - Subnet Mask:** 255.255.252.0

At the bottom right, there are 'Apply' and 'Cancel' buttons.

Table 22. Global Configuration - Management Interface Settings

Section	Field	Description	Default
	Mac Address	View the MAC address of the active NPM.	Read-only
Virtual IP Address	IP Address	Type the virtual IP address of the VMG that the installed NPM(s) will use for management traffic.	Blank
	Subnet Mask	Type the subnet mask of the VMG's virtual IP address.	Blank
Gateway for Active NPM Physical and Virtual	Gateway	Type the IP address of the default router for the system.	Blank
Active NPM Physical IP Address	IP Address	View the physical IP address of the active NPM card.	Auto-populated based on config
	Subnet Mask	View the subnet mask of the active NPM card.	Auto-populated based on config

Management IP Address Configuration Guidelines

The following guidelines must be considered when configuring or editing the **Virtual IP Address** or the **NPM Physical IP Address** sections.



Note: The 10.0.1x and 10.0.2x subnets are reserved for VMG internal use only and cannot be used for the management interface.

- To edit the **Active NPM Physical IP Address** section, there can be no **Virtual IP Address** information configured. If a virtual IP Address has already been configured, you will need to delete the address, apply the changes, and re-login to the *VMG Element Manager* before being able to modify the **Active NPM Physical Address** section.
- When changes to either the **Virtual IP Address** or **Subnet Mask** have been applied, the *VMG Element Manager* will close and you will have to re-login using the new IP configuration.
- When changes to either the **Active NPM Physical IP Address** or **Subnet Mask** have been applied, the *VMG Element Manager* will close and you will have to re-login using the new IP configuration.
- The **Active NPM Physical Address** and **Subnet Mask** fields cannot be blank.
- The **Virtual IP Address** configuration cannot be changed at the same time as the **Active NPM Physical IP Address** configuration, and vice versa.

Grooming Group tab

Use the **Grooming Group** tab to enable GigE grooming groups, which is necessary to retain connectivity with certain ad servers after an NPM switchover.

You can enable or disable one of the grouping categories displayed in the **Grooming Group** tab page, using the following considerations:

- The VMG must be rebooted whenever a group is enabled or disabled.
 - Only one group may be selected: the groups cannot be enabled / disabled at once.
- See also “[Configuration Guidelines for Grooming Groups](#)” on page 47 for additional information.



Note: *You must set up and enable all desired grooming groups before configuring and grooming any program. Disabling of the 10 GigE 1 or 10 GigE 2 grooming group will remove all grooming for the port.*



From the *VMG Element Manager* main menu, select **Configuration -> Global -> Grooming Group** to present the **Grooming Group** tab ([Figure 23](#) and [Table 23](#)).

Figure 23. Global Configuration - Grooming Group tab.

Table 23. Global Configuration - Grooming Group Settings

Field	Description	Default
Grooming Group Enable	Enable (check) or disable (un-check) one of the following groups: <ul style="list-style-type: none"> • 8X1 1GigE • 10GigE 1 • 10GigE 2 	8X1 1GigE = checked 10GigE 1 = un-checked 10GigE 2 = un-checked

Configuration Guidelines for Grooming Groups

The VMG recognizes three groupings for the NPM Gigabit Ethernet ports (Figure 24), which can be combined as shown in Table 24:



Note: For conceptual purposes only, the groupings are identified in this section as Group A, Group B, and Group C.

- Group A — the eight 1GigE ports (labeled SFP 01 to SFP 08)
- Group B — the 10GigE 1 port (labeled XFP2)
- Group C — the 10GigE 2 port (labeled XFP1)

Your groupings will be displayed at the highest level of the trees contained within the input and output columns of the **Grooming** tab page. Groups displayed in the **Grooming** tab page are ready for service configurations.

Figure 24. NPM Port Grouping

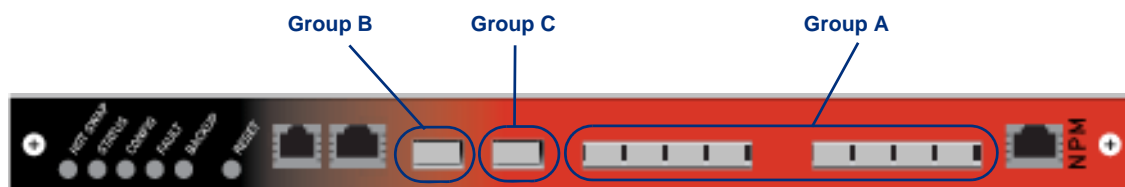


Table 24. Valid Grooming Group Combinations

Enabled Grooming Groups	Validity
Group A + Group B	Valid
Group A + Group C	Valid
Group A alone	Valid
Group B alone	Valid
Group C alone	Valid
Group A + B + C	Invalid
Group B + C	Invalid

Video processing considerations. The NPM provides video processing capabilities based on the groups configured. Video processing for grooming input and output transport streams cannot span across the two groups. For example, an input transport stream from Group A must be associated with an output transport stream in Group A; it cannot use an output transport stream in Group B or Group C.

General considerations about grooming groups.

- When a grooming group is enabled or disabled, the VMG must be rebooted.
- 10GigE 1 and 10GigE 2 cannot be enabled together at any time.
- Only two grooming groups can exist on the VMG at any time.
- A grooming group cannot be disabled if settings are in place at the **Configure GigE Ports** screen (Figure 40) for any port in that group.
- If only one grooming group is being used on the VMG (e.g., Ports 1-8 in Group A, or only the 10GigE 2 group), consider disabling all *unused* groups to maximize bandwidth allocation for the used groups.



Note: The VMG supports transcoding only on the Group A grooming group.

Redundancy Switch Tab

For operations as a redundant system, up to two NPMs can be installed in the VMG. During operations as a redundant system, one of the NPMs processes requests in active mode, and the other NPM resides in standby mode. If the active NPM encounters a failure condition, the standby NPM automatically ‘switches over’ to become the active NPM. This is the default and recommended behavior and setting.

This setting is controlled at the **Redundancy Switch** tab page (Figure 25), from which NPM redundancy can be further managed by applying one of the predefined link state determinants.



Note: *The Redundancy Switch setting should only be enabled when performing system maintenance, such as for a system upgrades. It is not recommended for use during normal operations because it forces the system into a non-redundant configuration.*

Use the **Redundancy Switch** tab page to modify switchover of the NPMs in the VMG.



From the *VMG Element Manager* main menu, select **Configuration -> Global -> Redundancy Switch** to present the **Redundancy Switch** tab page (Figure 25).

Figure 25. Global Configuration - Redundancy Switch tab

1. At the **Redundancy Switch** tab page, define the NPM switchover behavior:
 - To allow NPM redundancy, click *Enabled*.
 - To inhibit NPM redundancy, click *Disabled*.
 - Select one of the *link state determinant* options for the switchover.
2. Click **Apply** to commit the settings.



Note: *This setting has no effect on a system that deploys only one NPM.*

Transcoder Tab

Use the **Transcoder** tab page to globally adjust quality of video elementary stream output. This is done by enabling or disabling **Smooth Video Bitrate** and/or **Hypothetical Reference Decoding**. The **Transcoder** tab page also provides the option to define global implementation of an Encoder Boundary Point (EBP) for elementary streams.

An EBP refers to metadata (data about data) that is inserted—at segment and/or fragment boundaries—to audio or video elementary streams intended for use in adaptive streaming applications.

- EBPs may be used by downstream equipment, such as packagers (if they support EBP) to assist in the creation of discrete sections of de-codable content from the continuous streams.
- EBPs may also be added at cue-induced boundaries to facilitate the insertion of ads or other alternate content.



From the *VMG Element Manager* main menu, select **Configuration -> Global -> Transcoder** to present the **Transcoder** tab page (Figure 26 and Table 25).

Figure 26. Global Configuration - Transcoder tab

Global Configuration

System Management Interface Grooming Group Redundancy Switch **Transcoder** Dolby

Transcoder Capabilities

Smooth Video Bitrate: ☒ Enabled ☐ Disabled
Enable for Automatic Bitrate Hunting and TS set close to the ES value when grooming to create smooth video bitrates.

HRD Parameter Insertion: ☒ Enabled ☐ Disabled
Enable for the insertion of Hypothetical Reference Decoder parameters in VMG output streams.

Encoder Boundary Point (EBP): ☒ Enabled ☐ Disabled
Enable for the insertion of Encoder Boundary Points in VMG output streams.

Transcoder Parameters

EBP Segment Length:
To enable segment markers, enter the number of fragments (1-30) between segment markers. Otherwise, enter 0 to disable segment markers.

Warning: If any of these options is changed a system reboot will automatically occur when you click Apply, which will interrupt video services.

Apply Cancel

1. At the **Global Configuration Transcoder** tab page, select enable or disable, as required.
2. Click **Apply** to use your settings.



Note: Changes that are applied to the VMG's *Global Transcode* configuration result in automatic reboot of the VMG and interruption to services.

Table 25. Transcode—Transcoder Configuration Options

Field	Description	Default
Smooth Video Bitrate	Enable or disable smoothing on all output video elementary streams. When enabled, neutral packets are inserted into the video layer when the encoder buffer model overflows. The insertion of the zero bytes forces the video output to use up allocated video bandwidth. In most cases, this option will smooth the output. However, if there is a large gap between video ES bitrate and transport stream bitrate, the video output may still be bursty.	Disabled
HDR Parameter Insertion	Enable or disable inclusion of HDR parameters in the video elementary stream.	Disabled
Encoder Boundary Point (EBP)	Enable or disable employment of Encoder Boundary Points in MBR output streams. When enabled: <ul style="list-style-type: none"> An EBP fragment marker will be inserted in every IDR. An EBP fragment and segment marker will be inserted at every cue-induced boundary. 	Disabled
EBP Segment Length	Value, in the range 0 to 30, to define the number of segments allowed between Instantaneous Decoding Refresh (IDR) fragment markers. Click Enabled at Encoder Boundary Point to activate this EBP Segment Length field.	0 (none)

Dolby Tab

Use the **Dolby Advanced Decoder Parameters** tab page to set global AC-3 and E-AC-3(Dolby Digital Plus) decode parameters, which will be applicable to the entire VMG system where input streams are AC-3 or E-AC-3 (Dolby Digital Plus) types. The settings can be modified at any time but will take effect only on new sessions subsequent to your entries in the tab page.



From the *VMG Element Manager* main menu, select **Configuration -> Global -> Dolby** to present the **Dolby Advanced Decoder Parameters** tab page ([Figure 27](#) and [Table 26](#)).



Note: Changes that are applied to the VMG's *Global Dolby* configuration result in automatic reboot of the VMG and interruption to services.

Figure 27. Global Configuration - Dolby

Global Configuration

System Management Interface Grooming Group Redundancy Switch Transcoder **Dolby**

Decoder Capabilities

E-AC-3 (Dolby Digital Plus) decode capability: ☒ Enabled ☐ Disabled

Enable to expand AMP resource allocation for E-AC-3 (Dolby Digital Plus) inputs.

Advanced Decoder Parameters

Compression mode: 0 - Custom mode (no digital dialog normalization)

Dynamic range scale low: 1.0
Used to scale dynamic range control word for low-level signals. (0 to 1.0)

Dynamic range scale high: 1.0
Used to scale dynamic range control word for high-level signals. (0 to 1.0)

Stereo output downmix mode: 0 - Automatically detect stereo mode

Warning: If any of these options is changed a system reboot will automatically occur when you click Apply, which will interrupt video services.

Apply **Cancel**

1. At the **Global Configuration Dolby** tab page, set parameters to control compression, input validations, and stereo output.
2. Click **Apply** to use your settings.
 - Any entry errors detected for dynamic ranges will result in yellow fills at those fields. To continue, you will need to re-enter values—following advice in the guide text beneath the field(s)—and click **Apply** again.
 - Upon successful data entry, an **Information** screen is presented (Figure 28).

Figure 28. Global Configuration - Dolby—Grooming Information

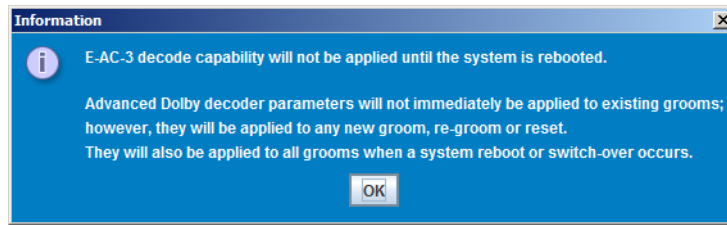


Table 26. Dolby—Capabilities and Advanced Decoder Parameters

Field	Description	Default
E-AC-3 (Dolby Digital Plus) decode capability	Enable (ON) or disable (OFF) E-AC-3 (Dolby Digital Plus) decoding. When enabled, AMP resource allocation for E-AC-3 (Dolby Digital Plus) input is expanded.	OFF
Compression mode	Compression mode to be applied globally, as one of the following: 0 - Custom mode (no digital dialog normalization). 1 - Custom mode (digital dialog normalization). 2 - Line out mode. 3 - RF mode.	0
Dynamic range scale low	Value, in the range 0 to 1.0, to define low range scale by which to validate input. As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry.	1
Dynamic range scale high	Value, in the range 0 to 1.0, to define high range scale by which to validate input. As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also "Dolby Dynamic Range Scale Entry Guidelines" on page 312).	0
Stereo output downmix mode	Stereo output downmix mode to be applied globally, as one of the following: 0 - Automatically detect stereo mode. 1 - 2/0 Dolby Surround compatible (Lt, Rt). 2 - 2/0 Stereo (Lo, Ro).	1 - 2/20

User Authentication Configuration

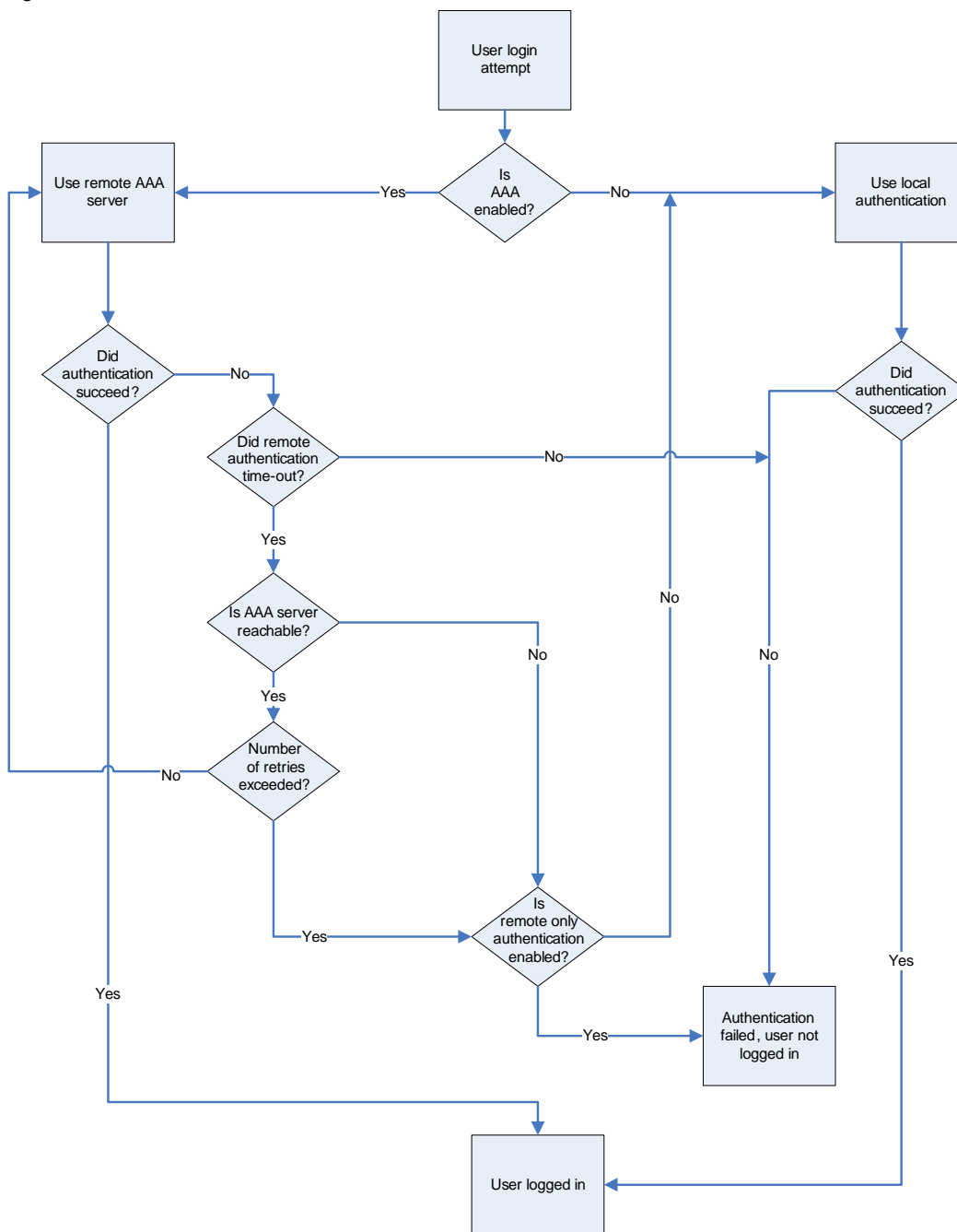
Use the VMG user authentication functions to view and configure settings that control user access to the VMG chassis. The VMG allows both local and remote user authentication. Remote user authentication is performed using an authentication, authorization, and accounting (AAA) server that supports RADIUS or TACACS+.

An AAA server handles requests for access to system resources. It provides a central location for policies to be configured, allowing maintenance of user profiles to be performed once for any number of clients. When a client wants to access a system resource, it must first gain permission from the AAA server.

The VMG provides a local user fallback authentication method enabling users to log in when an AAA server is not available. However, for security and account management reasons, it is recommended to use AAA. All passwords configured for AAA—both remote and local—are encrypted.

The following workflow (Figure 29) describes the behavior of the authentication process when a user attempts to login to the VMG.

Figure 29. VMG User Authentication Workflow



Accessing User Authentication Tools



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication** to present the **User Authentication** screen. The tabs available in the **User Authentication** screen are described in the following sections:

- “Global Tab,” next.
- “Local Tab” on page 56.
- “Servers Tab” on page 57.

Global Tab

Use the **Global** tab to configure global AAA options for the VMG system.



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication -> Global** to present the **Global** (Figure 30 and Table 27).

Figure 30. User Authentication - Global tab.

Disabled

Enabled

Table 27. User Authentication - AAA Global Configuration settings

Field	Description	Default
Enable	Check to enable authentication using a specified AAA server. When checked, configuration fields are displayed in the User Authentication screen. Un-check to use local user authentication.	Un-checked
Number of Retries	Value, in the range 0 to 2, to define the number of times the system will try connecting to a remote server before trying another server in the list.	0
Timeout (Sec)	Value, in the range 1 to 4, to define the amount of time (in seconds) to wait for a response from the remote server.	2

Table 27. User Authentication - AAA Global Configuration settings (Continued)

Field	Description	Default
Protocol	Protocol to be used for server selection, as one of the following: <ul style="list-style-type: none"> • No Preference – No protocol preference. • Radius – Try all RADIUS servers before trying TACACS+ servers. • TACACS+ – Try all TACACS+ servers before trying RADIUS servers. 	Radius
Remote Only	Requires the VMG to use only remote authentication. If enabled and remote authentication fails or a connection to the AAA server is not established, local authentication is not performed and the user is not logged in.	Un-checked

Local Tab

The **User Authentication Local** tab permits the VMG *Element Manager* Administrator to configure local user account passwords, for access to the VMG.



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication -> Local** to present the **Local** tab (Figure 31).

Figure 31. User Authentication - Local tab

Setting the User Role and Password

At the **User Authentication** screen, click **Change Password** to reveal the password configuration fields (Figure 32 and Table 28).

Figure 32. User Authentication - Role and Password Configuration



Note: *Local settings apply only if AAA is disabled, or if the AAA server is unreachable and **Remote Only** in the **Global** tab is not enabled.*

Table 28. User Authentication - Local settings

Field	Description	Default
User	User account name for which to change the password, as either Administrator, Operator, or User.	<i>Administrator</i>
Old Password	The old password for the specified local user account.	Blank
New Password	The new password for the specified local user account. Local passwords are saved as encrypted data in the VMG configuration database.	Blank
Retype New Password	Confirmation of the new password for the specified local user account.	Blank

Local User Accounts

The VMG provides three local user accounts (Table 29) with different levels of access to the VMG system. Each local user account has specific permissions. At the VMG *Element Manager* screens, the features not available to a specific account type are grayed-out and cannot be selected or modified.

Table 29. Local User Accounts

User	Description	Default Password
User	Read-only access account. No changes to the configuration are allowed.	User
Operator	Read and write access are allowed for all configuration operations except changing passwords. This is the normal login user account.	Operator
Administrator	Full access to the VMG system configuration is allowed. This is the only user account that is authorized to change passwords.	Admin

Servers Tab

Use the **Servers** tab to set up and configure the AAA servers to be used by the VMG system.



From the VMG *Element Manager* main menu, select **Configuration -> User Authentication -> Servers** to present the **Servers** tab (Figure 33).

Figure 33. User Authentication - Servers tab

Index	IP	Port	Protocol	Shared Secret	Status	Order
1	10.1.1.1	250	Radius	server_pass	Enabled	1
2	11.1.1.1	200	Radius	test	Disabled	2
3	12.1.1.1	49	Tacacs+	test	Enabled	3

The **Servers** tab lists the currently configured AAA servers that are to be used by the VMG system for user authentication. From here AAA servers can be provisioned, as described in the following sections:

- “Adding or Editing AAA servers,” next.
- “Reordering Server List” on page 59.
- “Deleting Servers” on page 60.

Adding or Editing AAA servers

Use the **Add / Edit AAA Server** screen to add new AAA servers or to edit existing AAA servers. The system allows up to eight AAA servers.



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication -> Servers**, to present the **Servers** tab, then click the **Add** button to present the **Edit AAA Server** screen (Figure 34 and Table 30).

Figure 34. Add/Edit AAA Server

Table 30. User Authentication - Servers - Add/Edit AAA Server settings

Field	Description	Default
IP Address	The IP address of the AAA server.	Blank
Port	Value, in the range 0 - 65536, to define the port to use on the AAA server. Radius uses UDP ports. Tacacs+ uses TCP ports	Radius: 1812
Protocol	The authentication protocol to use when communicating with the AAA server, as either Radius or Tacacs+.	Radius
Shared Secret	Type the password, or passphrase to be used to authenticate with the AAA server.	Blank
Retype Shared Secret	Retype shared secret string, exactly as for previous field.	Blank
Enable	Enable (check) or disable (un-check) associated AAA server. If a server is not enabled, it is not available to be selected by the VMG.	Un-checked

Reordering Server List

Use the **Edit AAA Server Order** screen to modify the sequence to be used by the VMG when searching for AAA servers.



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication -> Servers** to present the **Servers** tab, then click the **Set Order** button to present the **Edit AAA Server Order** screen (Figure 35 and Table 31).

Figure 35. Edit AAA Server Order

Table 31. User Authentication - Servers - Edit AAA Server Order settings

Field	Description
Current Order	Displays the current server order. The default server order is the order in which the AAA servers were added to the list. This field is read-only.
Change Order to	The new server order to use. Separate each number with one space.



Note: The numbers used in these fields refer to the index numbers shown in the first column of the **Configuration -> User Authentication -> Servers** tab of the *VMG Element Manager* menu. See Figure 33 on page 57.

The order in which the system attempts to connect to an AAA server is based on the following conditions:

- The preferred authentication protocol specified in the **Protocol** field of the **User Authentication -> Global** tab.
- The current server order as shown in the **Order** column of the **User Authentication -> Servers** tab.
 - If the preferred authentication protocol is set to **Radius**, all RADIUS servers will be tried first, followed by TACACS+ servers.
 - If set to **TACACS+**, all TACACS+ servers will be tried first, followed by RADIUS servers.
 - If no protocol preference was specified (the default), the servers will be tried based on the current server order.

For example, if four AAA servers have been added to the AAA server list (Table 32) and the specified protocol preference is *Radius*, the order in which the servers are tried is: A, D, B, C.

Table 32. AAA Server List Example

AAA Server	Current Server Order	Protocol
A	1	RADIUS
B	2	TACACS+

Table 32. AAA Server List Example (Continued)

AAA Server	Current Server Order	Protocol
C	3	TACACS+
D	4	RADIUS

Deleting Servers



From the *VMG Element Manager* main menu, select **Configuration -> User Authentication -> Servers** to present the **Servers** tab.

In the Servers tab, select the last AAA server to delete from the list, then click the **Delete** button.

The **Servers** tab will only allow deletion of a server in last-to-first order. For example, if there are four servers in the order of 1, 2, 3, 4, the order in which the servers must be deleted is: 4, 3, 2, 1.



Note: To delete a server whose order is not last, reorder the servers to change the desired deletion to the last number in that order.



Note: The index number is not relevant to the order of server deletion; it is the order in which the servers are configured to prioritize which is relevant to deletion.

SNMP Traps and Trap Configuration

The VMG reports both alarms and events to the *VMG Element Manager*.

- Each event is reported once and logged to the event history.
- Each alarm can be reported twice—once when raised, and once when acknowledged. These occurrences are also reported in the event log.
- Alarms are sent to the designated trap server(s) when they are raised and acknowledged.
- Service impacting error events are sent to the designated trap server(s) when they are reported.

The VMG reports alarms upon detection of various hardware and service-impacting errors. Service-impacting errors may result in alarms associated with problems on the input stream (such as transport stream missing) or problems on the output stream (such as where grooming errors are detected). To reference the full list of alarms and associated criticalities, see [Appendix B, VMG Alarms and Events](#) – beginning on page 314.

Traps and Error Counters

Input errors that are detected on the output elementary stream—DTS jump, PCR error, video underflow, and PCR reset—are reported to the trap server, and associated error counters are recorded on both the output and the input elementary streams.

Traps are cleared when reporting no longer occurs about the error(s). And, if any error is repeated within the 60-second window, no new trap is generated.

Input errors that must be detected by the output video ES—CC error, Decoder error, packet loss, frame loss, packet drop, and TEI error—are the actual accumulated error occurrences detected on the output ES, and cannot be reset.

- The output ES counters are the actual accumulated error occurrences, as detected on the output ES, and cannot be reset.
- The counters on the input ES reveal the number of times that outputs reported each error.

You can set up, generate, and view dynamic reports of error counts by using the VMG Element Manager monitoring tools, as described in “[Viewing Elementary Stream Traffic Details](#)” on page 293.



Note: *It is helpful to use the VMG Element Manager monitoring tools to examine causes of stream alarms, to set up various types of counters for generation of performance statistics. See also Chapter 16, “Monitoring,” beginning on page 291, for more information.*

The VMG Element Manager provides trap configuration tools that you can use to set up SNMPv1 or SNMPv2c trap client destinations. This section describes how to add or remove IP addresses use for VMG trap configurations, in the following topics:

- “[Adding IP Addresses for Trap Configuration](#),” next.
- “[Deleting Trap Servers](#)” on page 62.

Adding IP Addresses for Trap Configuration

You may enter several trap servers for the VMG. Each trap server is defined at the VMG *Element Manager* by an IP address, an SNMP version, and a community string entry.

Use the **Trap Configuration** screen to set trap parameters:



From the VMG *Element Manager* main menu, select **Configuration** -> **Trap Configuration** to present the **Trap Configuration** screen ([Figure 36](#)).

1. In the **Trap Configuration** screen, click **Add** to present the **Configure Trap** dialog ([Figure 36](#) and [Table 33](#)).
2. At the **Configure Trap** dialog, enter an IP address for a VMG, and the SNMP version and password (community string) to be used, then click **Apply**.

Your configuration will now be displayed in the **Trap Configuration** screen ([Figure 37](#)).

Figure 36. Trap Configuration - Add IP Address

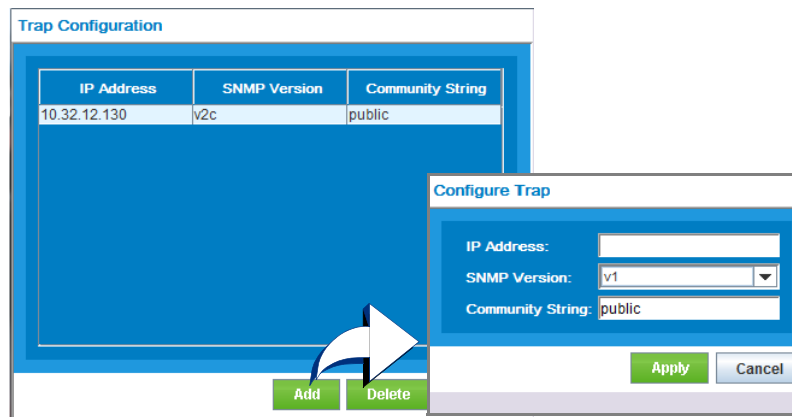
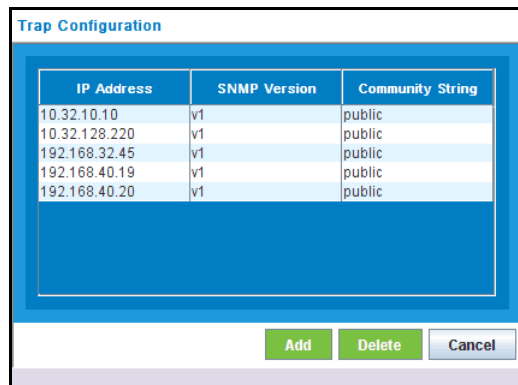


Table 33. Configure Trap Parameters

Field	Description	Default
IP Address	Type the IP address (IPv4) of the trap server, in dotted decimal format.	Blank
SNMP Version	Set SNMP version as either v1, or v2.	v1
Community String	Set the password string to be exchanged (as cleartext) between the VMG and the designated trap server.	public

Figure 37. Trap Configuration screen, displaying designated trap servers.

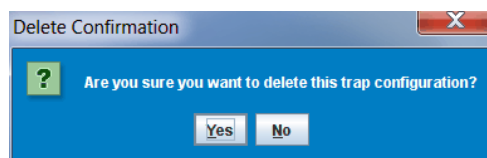


Deleting Trap Servers

Use steps in this section to remove a specified trap server from the **Trap Configuration** screen.

1. In the **Trap Configuration** screen select the trap server to be deleted, then click **Delete**.
2. At the **Delete Confirmation** popup screen (Figure 38), click **Yes**.

Figure 38. Delete IP Confirmation popup



Gigabit Ethernet Port Configuration

Use the **Configure GigE Ports** screen, for either **One-IP** address mode or **Three-IP** address mode, to view and configure settings that control the NPM Gigabit Ethernet ports.



Note: *You can adjust the IP Address mode at any time. The system will prompt for confirmation of an adjustment between the IP address modes, and the change will result in momentary service interruption.*

To enable operations for GigE port pairs, use the **Configure GigE Ports** screen to assign either one address (when using One-IP address mode) or three addresses (when using Three-IP address mode). Using the Three-IP address mode is beneficial if you need to ensure the fastest NPM switchover possible on the VMG.



Note: *Beginning with VMG Release 3.0.3, GigE options for both One-IP and Three-IP address modes are supported. Refer to [Table 34](#) for information about previous releases.*

Table 34. IP Address Options and VMG Releases

VMG Release	GigE Address Modes	
	One-IP	Three-IP
2.5.x (and previous)	Yes	No
3.0.0	No	Yes
3.0.1	No	Yes
3.0.2	No	Yes
3.0.2p1	No	Yes
3.0.3	Yes	Yes
3.1.x	Yes	Yes

Duplication and conflicts with IP addressing are not allowed and the system prevents these errors (during configuration) by issuing an error message upon detection of an attempt to apply faulty address settings. The following rules for assignment of subnets apply to any IP address mode:

- All the virtual and physical IP addresses of a GigE port must be in the same subnet.
For example, virtual IP address of 1.2.3.1, physical IP addresses of 1.2.3.11 and 1.2.3.21 and a subnet mask of 255.255.255.0 ([Figure 40](#)).
- Each GigE port must have a unique subnetwork.
For example, the addresses of GigE 1 might begin with 1.2.3 while the addresses of GigE 2 might begin with 1.2.4 ([Figure 40](#)).
- Each GigE port's subnet must contain at least four IP addresses.
For example, the subnet mask must *not* be 255.255.255.255 or 255.255.255.254.

One-IP Address Mode for GigE Ports

For One-IP address mode, each enabled port pair must be assigned a valid and unique IP address. Ports not enabled need not be assigned addresses.

Each GigE port pairing on redundant NPMs is allocated a single IP address. This address floats with the active redundancy mode of both NPMs, and is assigned (in the **Configure GigE Ports** screen for One-IP address mode) to the GigE port of the active card only. Upon switchover, the VMG tears down this IP address from the previous active NPM GigE port then sets it up on the newly active NPM port.

Use the **Configure GigE Ports** screen, in One-IP address mode, to assign IP addresses to NPM GigE ports.



From the *VMG Element Manager* main menu, select **Configuration -> Gige Ports** to present the **Configure GigE Ports** screen (Figure 40 and Table 35). Ensure that the drop-down selector is set for **One-IP**.

or

From the **Chassis** tab page, right-click on an NPM and select **Configure GigE Ports** from the popup menu.

1. At the **Configure GigE Ports** screen for **One-IP**, set **IP Address** and **Subnet Mask** for GigE ports on the active NPM.
2. Use guidelines from Table 35 to enter other GigE port information for the active NPM.
3. Click **Apply** to save and use your GigE port configuration.

Figure 39. Configure GigE Ports—One-IP

Configure GigE Ports

One-IP

Port	Port Enabled	Link State Redundancy	MAC Address	Name	IP Address	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:00(A)	105.103.11.11	105.103.11.11	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 2
GigE 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:01(A)	105.103.11.11	105.103.12.11	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
GigE 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:11:07:00:fd:02(A)	105.103.11.11	105.103.13.11	255.255.255.0	105.103.13.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 4
GigE 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:03(A)	105.103.11.11	105.103.14.11	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
GigE 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:04(A)	105.103.11.11	105.103.15.11	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 6
GigE 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:05(A)	105.103.11.11	105.103.16.11	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	

☒ AMP Connection

Port	Port Enabled	Link State Redundancy	MAC Address	Name	IP Address	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:06(A)		10.100.2.16	255.255.255.0	10.100.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 8
GigE 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:07(A)		10.100.1.16	255.255.255.0	10.100.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Port	Port Enabled	Link State Redundancy	MAC Address	Name	IP Address	Subnet Mask	Gateway	Strict ARP
10GigE 1	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)					
10GigE 2	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)					

Apply Cancel

Three-IP Address Mode for GigE Ports

For Three-IP address mode, each enabled port pair must be configured with three valid and unique IP addresses: one virtual IP address, and two physical IP addresses:

- **Virtual IP Address**

This address floats with the active mode of the GigE port pair.

- **Physical IP Address** (for the lower-numbered NPM slot).

- VMG-14: slot 7
- VMG-6 or VMG-8: slot 1

This address does not float with the active mode of the GigE port pair.

- **Physical IP Address** (for the high-numbered NPM slot).

- VMG-14: slot 8
- VMG-6 or VMG-8: slot 2

This address does not float with the active mode of the GigE port pair.

Use the **Configure GigE Ports** screen, in Three-IP mode, to assign both virtual and physical network addresses to the NPM's GigE ports.



From the *VMG Element Manager* main menu, select **Configuration -> GigE Ports** to present the **Configure GigE Ports** screen (Figure 40 and Table 35). Ensure that the drop-down selector is set for **Three-IP**.

or

From the **Chassis** tab page, right-click on an NPM and select **Configure GigE Ports** from the popup menu.

Figure 40. Configure GigE Ports—Three-IP

Port	Port Enabled	Link State	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:00(A)	105.103.11.11	105.103.11.11	105.103.11.12	105.103.11.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 2
GigE 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:01(A)	105.103.11.11	105.103.12.11	105.103.12.12	105.103.12.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
GigE 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:11:07:00:fd:02(A)	105.103.11.11	105.103.13.11	105.103.13.12	105.103.13.13	255.255.255.0	105.103.13.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 4
GigE 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:03(A)	105.103.11.11	105.103.14.11	105.103.14.12	105.103.14.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	
GigE 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:04(A)	105.103.11.11	105.103.15.11	105.103.15.12	105.103.15.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 6
GigE 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:05(A)	105.103.11.11	105.103.16.11	105.103.16.12	105.103.16.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	

☒ AMP Connection

Port	Port Enabled	Link State	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:06(A)		10.100.2.16			255.255.255.0	10.100.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	GigE 8
GigE 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:07(A)		10.100.1.16			255.255.255.0	10.100.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Port	Port Enabled	Link State	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Strict ARP
10GigE 1	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)							
10GigE 2	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)							

Apply Cancel

1. At the **Configure GigE Ports** screen for **Three-IP**, set **Virtual IP Address**, **Physical IP Addresses** for both NPM slots, and **Subnet Mask** for the administratively enabled GigE ports on the active NPM.

2. Use guidelines from [Table 35](#) to enter other GigE port information for the active NPM.
3. Click **Apply** to save and use your GigE port configuration.

GigE IP Address Parameters

Use information from [Table 35](#) for entries in the **Configure GigE Ports** screen.

Table 35. Gigabit Ethernet Port Configuration Fields

Field	Description	Default
Mode	Drop-down selector from which to define the IP Addressing mode to be used with the NPM(s), as either One-IP or Three-IP . You can toggle between these modes at any time. The system will prompt for confirmation to proceed with a mode change, and momentary service interruption will occur with the change.	Three-IP
Port	The Gigabit Ethernet port numbers on the NPM. If the port is administratively enabled and operationally Up, the icon is green.	Read-only
Port Enabled	Enable (check) or disable (un-check) a specified GigE port.	Un-checked
Input Link State Redundancy	Click to enable (check) or disable (un-check) input link state based redundancy for the GigE port.	Un-checked
MAC Address	View the physical MAC address of the port. An "(A)" next to the MAC address indicates the NPM's physical MAC is the active MAC for the system.	Read-only
Name	Type and alphanumeric string to define name for the GigE interface. The configured name will be displayed in the Grooming --> Mapping tab page.	Blank
IP Address	For One-IP mode: the valid, unique IP address for the port.	Blank
Virtual IP Address	For Three-IP mode: Type a network address for use as the virtual IP address for the GigE port. Each enabled GigE port must be configured with one virtual IP address, and two physical IP addresses.	Blank
Physical IP Address (slot 1)	for Three-IP mode: Type the IP address of the GigE port associated with the NPM in VMG in the lowest-numbered slot. <ul style="list-style-type: none"> For VMG-6 and VMG-8: Slot 1 in this screen is equivalent to slot 1 at the system. For VMG-14: Slot 1 in this screen is equivalent to slot 7 at the system 	Blank
Physical IP Address (slot 2)	For Three-IP mode: Type the IP address of the GigE port associated with the NPM in VMG in the higher-numbered slot. <ul style="list-style-type: none"> For VMG-6 and VMG-8: Slot 2 in this screen is equivalent to slot 2 at the system. For VMG-14: Slot 2 in this screen is equivalent to slot 8 at the system 	Blank
Subnet Mask	The subnet mask for the interface.	Blank
Gateway	The default router IP address for the port, if applicable.	Blank
Auto Negotiation	Enable (check) or disable (un-check) auto negotiation on the GigE port. This option is applicable only for GigE 1-8. It is not applicable for 10GigE 1 or 10GigE 2.	Un-checked

Table 35. Gigabit Ethernet Port Configuration Fields (Continued)

Field	Description	Default
Strict ARP	Specifies whether or not an ARP response will be sent if the IP address in the request matches the IP address of the GigE port on which the request is received. Values are: <ul style="list-style-type: none"> • Checked (enabled) – an ARP response will only be sent if ARP request IP matches the GigE port IP. (recommended) • Un-checked (disabled) – an ARP response will be sent to any ARP request on any GigE port. Note: To set Strict ARP, an IP address must first be configured for the GigE port.	Checked
Mirror Output To	Check this box to mirror the port's output to the designated port. See also “Output Port Mirroring” on page 67 for details.	Un-checked
AMP Connection	Check this box to connect ports 7 and 8 to the paired AMP card. This connection is necessary to use MBR transport streams. See also “AMP Connection” on page 69 for details.	Un-checked

Output Port Mirroring

The VMG supports replication (mirroring) of all traffic sent out on one GigE port (the source port) to another GigE port (the mirrored-to port). The port mirroring functionality can serve one of two purposes:

- Capture traffic sent out on a port for analysis, by mirroring the traffic to another port.
- Support for downstream device redundancy where the outputs from a VMG are replicated across two different paths, thus allowing for greater network resiliency in the event that a downstream device goes out of service.

The source port can carry both input and output traffic; however, only the output traffic is mirrored. Port mirroring can only be configured between the following port pairs:

- GigE 1 output can be mirrored to GigE 2.
- GigE 3 output can be mirrored to GigE 4.
- GigE 5 output can be mirrored to GigE 6.
- GigE 7 output can be mirrored to GigE 8 (unless the [AMP Connection](#) is enabled).

Configuring Output Port Mirroring

Use the **Configure GigE Ports** screen to set parameters for the output interfaces subject to port mirroring.



From the *VMG Element Manager* main menu, select **Configuration -> GigE Ports** to present the **Configure GigE Ports** screen ([Figure 41](#)).

1. Click the checkbox for the port you want to mirror output traffic to. The example in [Figure 41](#) demonstrates mirroring of output from *GigE 5* to *GigE 6*.

Figure 41. Configure GigE Ports - Output Port Mirroring

The screenshot shows the 'Configure GigE Ports' window with a 'Three-IP' dropdown. It contains three tables for port configuration. The first table lists ports GigE 1 through GigE 6. The second table lists ports GigE 7 and GigE 8. The third table lists ports 10GigE 1 and 10GigE 2. A red circle highlights the row for GigE 6 in the first table, where the 'Mirror Output To' column is set to 'GigE 6'.

Port	Port Enabled	Link State Redundancy	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:00(A)	105.103.11.11	105.103.11.11	105.103.11.12	105.103.11.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 2
GigE 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:01(A)	105.103.11.11	105.103.12.11	105.103.12.12	105.103.12.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 4
GigE 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:11:07:00:fd:02(A)	105.103.11.11	105.103.13.11	105.103.13.12	105.103.13.13	255.255.255.0	105.103.13.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 4
GigE 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:03(A)	105.103.11.11	105.103.14.11	105.103.14.12	105.103.14.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 4
GigE 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:04(A)	105.103.11.11	105.103.15.11	105.103.15.12	105.103.15.13	255.255.255.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GigE 6
GigE 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:05(A)	105.103.11.11	105.103.16.11	105.103.16.12	105.103.16.13	255.255.255.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 6

Port	Port Enabled	Link State Redundancy	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:06(A)		10.100.2.16			255.255.255.0	10.100.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 8
GigE 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:07(A)		10.100.1.16			255.255.255.0	10.100.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 8

Port	Port Enabled	Link State Redundancy	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Strict ARP
10GigE 1	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)							<input type="checkbox"/>
10GigE 2	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)							<input type="checkbox"/>

Buttons: Apply, Cancel

- Click **Apply** to dismiss the screen and use your settings.

Note: The Element Manager checks whether there are any input or output Transport Streams configured on the mirrored-to port. If there are, an error message appears directing you to first delete all transport streams from the mirrored-to port.

- Verify your settings.

Go to the **Grooming** tab **Mapping** page (Figure 42). The *Output mirrored to n* message should be displayed alongside the source port.

Note: You will not be able to configure any input or output transport streams on the mirrored-to port.

Figure 42. Grooming - Output Port Mirroring

The screenshot shows the 'Grooming - Mapping' page with 'Inputs' and 'Outputs' sections. The 'Inputs' section lists ports GigE 1 through GigE 9. A red circle highlights the entry 'GigE 5 [Output mirrored to 6]'. The 'Outputs' section lists ports GigE 1 through GigE 9. The status bar at the bottom shows 'Connected 10.32.128.175'.

AMP Connection

To support audio transcoding, ports 7 and 8 are used to interconnect the NPM with its paired AMP for transporting data between them.

- In the VMG-14, the NPM in slot 7 pairs with the AMP in slot 6, and the NPM in slot 8 pairs with the AMP in slot 9.
- In the VMG-6 and VMG-8, the NPM in slot 1 pairs with the AMP in slot 3, and the NPM in slot 2 pairs with the AMP in slot 4.)

To interconnect an NPM to its paired AMP, you must first physically connect the NPM to the AMP. See any of the following documents for details: *VMG-14 Hardware Setup Guide*, *VMG-8 Hardware Setup Guide*, or *VMG-6 Hardware Setup Guide*, or the *Application Media Processor (AMP) Installation Guide for VMG Systems*.

Following physical setup, you must then configure the AMP connection at the *VMG Element Manager* as described in this section.

Configuring the AMP Connection

Use the **Configure GigE Ports** screen to set AMP connectivity for specific interfaces.



Note: *If you have Port Mirroring or any transport streams configured on ports 7 and 8, you must first disable Port Mirroring and/or delete these transport streams.*



From the *VMG Element Manager* main menu, select **Configuration -> GigE Ports** to present the **Configure GigE Ports** screen (Figure 43).

1. Enable (check) the *AMP Connection* field, located above ports 7 and 8 (Figure 43).

Clicking AMP Connection results in display of a popup warning advising that the following events occur when enabling AMP connectivity:

- Port mirroring is disabled.
- IP address, subnet mask, and gateway are reset to the AMP factory defaults.
- Input and output transport streams cannot be configured at GigE 7 and GigE 8.

Figure 43. Configure GigE Ports - AMP Connection

The screenshot shows the 'Configure GigE Ports' window with the 'AMP Connection' checkbox selected. The table below lists the configuration for GigE ports 1 through 8.

Port	Port Enabled	Link State Redundancy	MAC Address	Name	Virtual IP Address	Physical IP Address (slot 7)	Physical IP Address (slot 8)	Subnet Mask	Gateway	Auto Negotiation	Strict ARP	Mirror Output To
GigE 1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:00(A)	105.103.11.11	105.103.11.11	105.103.11.12	105.103.11.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 2
GigE 2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:01(A)	105.103.11.11	105.103.12.11	105.103.12.12	105.103.12.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 4
GigE 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	00:11:07:00:fd:02(A)	105.103.11.11	105.103.13.11	105.103.13.12	105.103.13.13	255.255.255.0	105.103.13.1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 4
GigE 4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:03(A)	105.103.11.11	105.103.14.11	105.103.14.12	105.103.14.13	255.255.255.0		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 6
GigE 5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:04(A)	105.103.11.11	105.103.15.11	105.103.15.12	105.103.15.13	255.255.255.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> GigE 6
GigE 6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:05(A)	105.103.11.11	105.103.16.11	105.103.16.12	105.103.16.13	255.255.255.0		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
AMP Connection												
GigE 7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:06(A)		10.100.2.16			255.255.255.0	10.100.2.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> GigE 8
GigE 8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:07(A)		10.100.1.16			255.255.255.0	10.100.1.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10GigE 1	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)								<input type="checkbox"/> Strict ARP	
10GigE 2	<input type="checkbox"/>	<input type="checkbox"/>	00:11:07:00:fd:08(A)								<input type="checkbox"/> Strict ARP	

Buttons: Apply, Cancel

2. Click **Apply** to dismiss this screen and use your settings.
3. Verify your settings.

Look at the **Grooming > Mapping** tab: GigE 7 and GigE 8 should now displayed as having an **AMP Connection** (Figure 44).



Note: You will not be able to configure transport streams on these ports while the AMP connection is enabled.

Figure 44. Grooming - AMP Connection

The screenshot shows the 'Grooming > Mapping' tab with the 'Mapping' sub-tab selected. The table below lists the configuration for GigE ports 1 through 8.

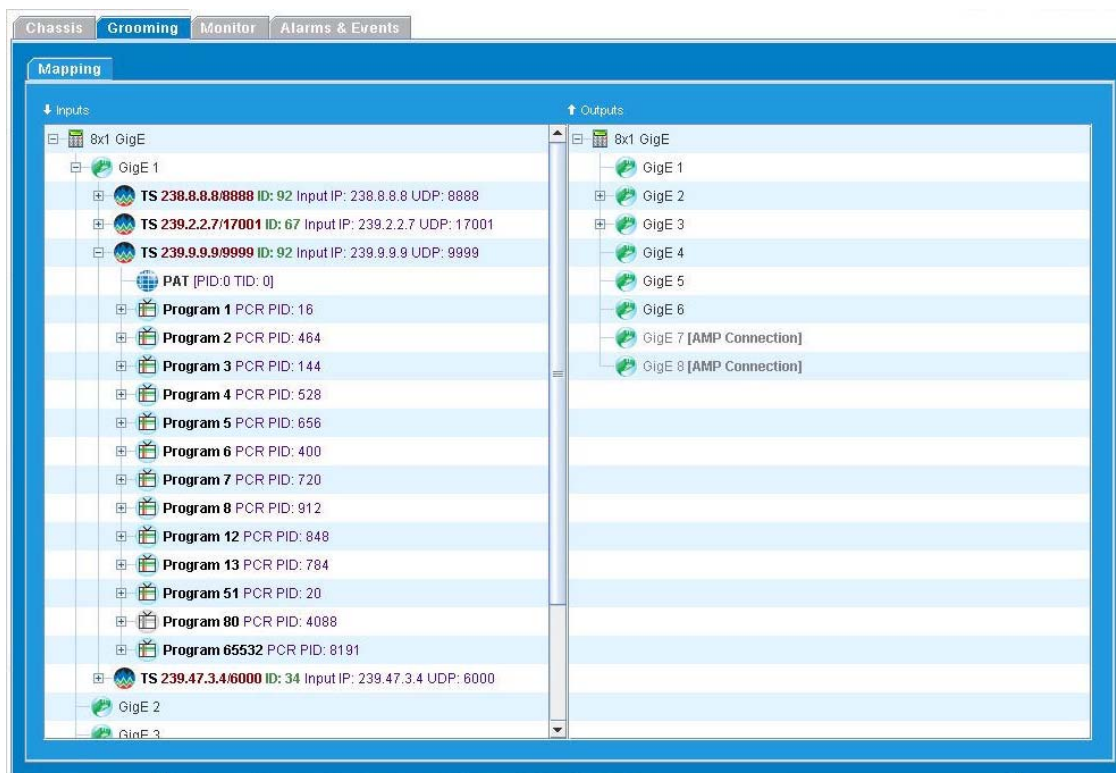
Inputs	Outputs
8x1 GigE	8x1 GigE
GigE 1	GigE 1
GigE 2	GigE 2
GigE 3	GigE 3
GigE 4	GigE 4
GigE 5	GigE 5
GigE 6	GigE 6
GigE 7 [AMP Connection]	GigE 7 [AMP Connection]
GigE 8 [AMP Connection]	GigE 8 [AMP Connection]

Grooming—Mapping Subtab View

In the **GigE Ports** menu, all GigE ports are displayed. However only the ports whose interfaces have been configured in the **GigE Ports** menu and whose grooming group have been enabled in the **Grooming Group** tab will be displayed in the *VMG Element Manager* **Grooming -> Mapping** page.

Figure 45 demonstrates display of all configured GigE ports in the **Grooming -> Mapping** subtab.

Figure 45. Configured GigE Ports in Grooming -> Mapping Subtab



Bulk Configuration

This chapter describes how to access and use the VMG **Bulk Configuration** tool.



Note: *Release 2.5.1 introduced the new Bulk Configuration function from the VMG Element Manager main menu. Currently, only MBR-TS configuration is supported via use of the bulk configuration tools.*



Note: *A bulk configuration is not a replacement for configurations you perform by using the various functions throughout the VMG Element Manager GUI. It is a software package accessible from the VMG Element Manager Configuration menu that allows you to configure MBR transport stream data from a set of .xls files on your PC, for upload to the VMG's MBR database.*



Note: *You must be logged in to the VMG Element Manager as Administrator to use the Bulk Configuration function.*

In This Chapter:

- “About Bulk Configuration,” next.
- “Bulk Configuration Tools” on page 73.
- “Bulk Configuration Spreadsheets” on page 74.
- “Downloading VMG Bulk Configuration Files” on page 84.
- “Using the Bulk Configuration Spreadsheets” on page 88.
- “Applying Spreadsheet Data to the VMG” on page 89.
- “Handling Errors” on page 90.

About Bulk Configuration

The goal of bulk configuration is to simplify the configuration of MBR groups in large systems. These MBR groups can be provisioned for one to eight transport streams each, to provide various combinations of resolution parameters and MBR group IDs. An added bonus is that each worksheet provides a human-readable record of the overall configuration.

You can access blank worksheet templates from the *Bulk Configuration Tool* and start building as many MBR.xls files as you may require for your various operations. The .xls file consists of four bulk configuration worksheets that are pre-populated with rows and columns for organization of the following entries:

- *Tests*—for program grooming configuration.
- *MBRs*—for MBR stream configuration.
- *Program Redundancy*—for program stream backup configuration.
- *Audio Language*—for language descriptor settings.

The VMG is unaffected until you return to the *Bulk Configuration Tool* to select a deployment option. Configurations defined by the worksheet format become the MBR TS database when loaded to a VMG if the selected option either replaces or appends the existing VMG's MBR configuration database. Other options from the *Bulk Configuration Tool* allow you to either clear the VMG's MBR database, or save the VMG MBR database to an .xls file on your PC

Bulk Configuration Tools

Use the **Bulk Configuration** screen to obtain the bulk configuration's spreadsheet (.xls) templates from the VMG, and to apply your configured spreadsheets to the VMG.



From the *VMG Element Manager*, select **Configuration** -> **Bulk Configuration** to present the **Bulk Configuration** screen (Figure 46 and Table 36).

Note: When first launched, the *Bulk Configuration* screen displays the names of files in the *Application File* field and the *Source Configuration File* field. The files displayed in these fields are not available until you complete the tasks described in “*Downloading VMG Bulk Configuration Files*” on page 84.

Figure 46. Bulk Configuration screen

This field specifies the bulk configuration software program tool (.exe).

This field specifies the bulk configuration spreadsheet package. (.xls).

Table 36. VMG-8 components

Field	Description
File	Provides graceful exit from the <i>Bulk Configuration</i> screen.
System	Provides the Download Bulk Configuration Software option.

Table 36. VMG-8 components (Continued)

Field	Description
Option	<p>Drop-down selector that contains the following options:</p> <ul style="list-style-type: none"> • Replace current TS database with new TS configuration The bulk configuration tool clears all transport streams and configures the transport stream based on the configuration file read from the VMG-8. The system needs to be out of service when using this option. • Append new configuration to existing TS database The bulk configuration appends the transport streams based on the bulk configuration file. The system can remain in service when using this option. • Clear the TS database The bulk configuration clears all current transport streams. The system needs to be out of service when using this option. • Save current TS database to new Configuration File Retains the existing configuration file under a new configuration file name.
Application File	<p>The location of the application file.</p> <p>Default path: <code>c:\vmgConfigTool_MTS\config_vmg.exe</code></p>
Source Configuration File	The location of the Excel (.xls) configuration source file. Refer to the <i>VMG Bulk Configuration Tool Administrator's Guide</i> for complete details about the configuration files (spreadsheets).
Target IP Address	IP address of the VMG on which the bulk configuration will be deployed.
Status Messages	Status message display area, which populates with INFO and/or ERROR messages after you press the Execute button. Messages continue to display until completion of the configuration at the VMG.
Execute	Use the settings in this screen to begin sending the spreadsheet configuration to the VMG system. Prior to upload, the system will query for Administrator password.

Bulk Configuration Spreadsheets

The bulk configuration spreadsheets are the .xls files you edit prior to applying the consolidated configurations onto a VMG system. Your entries to the worksheets create various transport streams, each containing combinations of grooming and network settings that you can deploy from a single point of presence.

The spreadsheet package is organized as described in the following topics:

- “Tests Tab” on page 75.
- “MBRs Tab” on page 78.
- “Audio Language Tab” on page 81.
- “Program Redundancy Tab” on page 82.
- “README Tab” on page 84.



Note: *RGB Networks advises that you do not modify or rename the names of the tabs in your worksheets, nor the names of the column heads in the worksheets.*

Tests Tab

The **Tests** tab (Figure 47 and Figure 48) contains columns in which to enter or select values to define program grooming for the transport streams associated with the .xls file. You use this sheet to set program names, networking parameters for input and output, and quality parameters for audio and video. You can also define which rows are to be included/excluded from configuration runs.

The configuration reference for the **Tests** tab is provided in Table 37 on page 76.

Figure 47. Worksheet—Tests Tab (columns A to M)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Skip Test (t: skip)	Testcase	mbR Group ID	MultiTS ID (AS Group ID)	Input Port	Input IP (Multicast-Unicast)	Input Source IP	UDP Port	Input TS Name	Input program #	Input resolution class	Output Port	Output IP (Multicast-Unicast)
2	skip_test	tc	mbR_group_id	mts_id	input_port	input_multicast_ip	input_source_ip	input_multicast_port	input_ts_name	input_program_number	input_resolution_class	output_port	output_multicast_ip
3	1	1	mbR1	1	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.11
4	1	1	mbR1	1	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.12
5	1	1	mbR1	1	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.13
6	1	1	mbR1	1	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.14
7	1	1	mbR1	2	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.15
8	1	1	mbR1	2	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.16
9	1	1	mbR1	2	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.17
10	1	1	mbR1	2	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.18
11	1	2	mbR2	3	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.19
12	1	1	mbR2	3	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.10
13	1	1	mbR2	3	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.11
14	1	1	mbR2	3	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.12
15	1	1	mbR2	4	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.13
16	1	1	mbR2	4	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.14
17	1	1	mbR2	4	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.15
18	1	1	mbR2	4	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.16
19	1	3	mbR3	5	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.17
20	1	1	mbR3	5	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.18
21	1	1	mbR3	5	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.19
22	1	1	mbR3	5	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.20
23	1	1	mbR3	6	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.21
24	1	1	mbR3	6	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.22
25	1	1	mbR3	6	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.23
26	1	1	mbR3	6	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.24
27	1	4	mbR4	7	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.25
28	1	1	mbR4	7	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.26
29	1	1	mbR4	7	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.27
30	1	1	mbR4	7	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.28
31	1	1	mbR4	8	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.29
32	1	1	mbR4	8	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.30
33	1	1	mbR4	8	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.31
34	1	1	mbR4	8	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.32
35	1	5	mbR5	9	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.33
36	1	1	mbR5	9	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.34
37	1	1	mbR5	9	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.35
38	1	1	mbR5	9	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.36
39	1	1	mbR5	10	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.37
40	1	1	mbR5	10	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.38
41	1	1	mbR5	10	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.39
42	1	1	mbR5	10	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.40
43	1	6	mbR6	11	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.41
44	1	1	mbR6	11	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.42
45	1	1	mbR6	11	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.43
46	1	1	mbR6	11	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.44
47	1	1	mbR6	12	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.45
48	1	1	mbR6	12	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.46
49	1	1	mbR6	12	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.47
50	1	1	mbR6	12	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.48
51	1	7	mbR7	13	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.49
52	1	1	mbR7	13	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.50
53	1	1	mbR7	13	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.51
54	1	1	mbR7	13	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.52
55	1	1	mbR7	14	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.53
56	1	1	mbR7	14	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.54
57	1	1	mbR7	14	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.55
58	1	1	mbR7	14	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.56
59	1	8	mbR8	15	4	239.47.3.4		6000	IntS1	7	HD	6	230.1.57

Table 37. Tests Page Worksheet (Columns A to M)

Column		Description
A	skip_test	Value, as either 0 or 1, to indicate whether or not to skip testing that uses data on this row. 0: do the test 1: skip the test.
B	testcase	Test Case: value to define a number for the test.
C	mbr_group_id	Alphanumeric string to define a unique MBR group ID, which is the name of the video/audio file to be applied to an MBR program map. You can either enter an MBR Group ID, or use the existing one.
D	MultiTS ID	unique group ID for the MBR TS group.
E	input_port	Source GigE interface for use by the program.
F	input_mcast_ip	Multicast IP address, in dotted decimal format, for input stream. Address range: 224.0.0.1 - 239.255.255.255.
G	input_source_ip	Source IP address, in dotted decimal format.
H	input_mcast_port	(optional) Value, in the range 1-65535, to define the port on which the incoming stream is to be transported.
I	input_ts_name	Name of the input transport stream.
J	input_program_number	Value to set program number.
K	input_resolution_class	Type of horizontal x vertical resolution to use for SD or HD programming. For the complete list of resolution values, see "Configuration Reference" on page 306 .
L	output_port	Destination GigE interface for use by the transport stream.
M	output_mcast_ip	Multicast IP address, in dotted decimal format, for output stream. Address range: 224.0.0.1 - 239.255.255.255.

Figure 48. Worksheet—Tests Tab (columns N to AA)

N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA
UDP Port	Redundant output IP	TS Name	Program number	Program name	TS Bandwidth (Mbps)	Video Bit Rate (Mbps)	Resolution	Aspect Ratio	Video Profile	PMT PID	Video PID	Audio ESs (number:PID, or number)	Data ESs (number:PID, or number)
output_mcast_port	redundant_output_ip	output_ts_name	output_program_number	output_program_name	output_ts_bw	video_bitrate	video_resolution	aspect_ratio	video_profile	pmt_pid	video_pid	audio_pids	data_pids
1001	230.2.2	DutTS1	1	Prog1	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1002		DutTS1	1	Prog2	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1003		DutTS1	1	Prog3	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1004		DutTS1	1	Prog4	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1005		DutTS1	1	Prog5	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1006		DutTS1	1	Prog6	1.3	0.75	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1007		DutTS1	1	Prog7	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1008		DutTS1	1	Prog8	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1009		DutTS2	1	Prog9	3.7	3	1280x720	16:9	High	100	101	1:102	1:104, 2:105
1010		DutTS2	1	Prog10	1.8	1.25	768x432	16:9	High	100	101	1:102	1:104, 2:105
1011		DutTS2	1	Prog11	1.5	1	840x480	16:9	High	100	101	1:102	1:104, 2:105
1012		DutTS2	1	Prog12	0.6	0.15	624x352	16:9	High	100	101	1:102	1:104, 2:105
1013		DutTS2	1	Prog13	2.1	1.5	960x720	16:9	High	100	101	1:102	1:104, 2:105
1014		DutTS2	1	Prog14	1.3	0.75	848x480	16:9	High	100	101	1:102	1:104, 2:105
1015		DutTS2	1	Prog15	1	0.5	480x368	16:9	High	100	101	1:102	1:104, 2:105
1016		DutTS2	1	Prog16	0.9	0.35	480x320	16:9	High	100	101	1:102	1:104, 2:105
1017		DutTS3	1	Prog17	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1018		DutTS3	1	Prog18	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1019		DutTS3	1	Prog19	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1020		DutTS3	1	Prog20	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1021		DutTS3	1	Prog21	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1022		DutTS3	1	Prog22	1.3	0.75	848x480	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1023		DutTS3	1	Prog23	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1024		DutTS3	1	Prog24	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1025		DutTS4	1	Prog25	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1026		DutTS4	1	Prog26	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1027		DutTS4	1	Prog27	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1028		DutTS4	1	Prog28	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1029		DutTS4	1	Prog29	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1030		DutTS4	1	Prog30	1.3	0.75	848x480	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1031		DutTS4	1	Prog31	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1032		DutTS4	1	Prog32	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1033		DutTS5	1	Prog33	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1034		DutTS5	1	Prog34	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1035		DutTS5	1	Prog35	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1036		DutTS5	1	Prog36	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1037		DutTS5	1	Prog37	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1038		DutTS5	1	Prog38	1.3	0.75	848x480	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1039		DutTS5	1	Prog39	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1040		DutTS5	1	Prog40	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1041		DutTS6	1	Prog41	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1042		DutTS6	1	Prog42	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1043		DutTS6	1	Prog43	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1044		DutTS6	1	Prog44	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1045		DutTS6	1	Prog45	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1046		DutTS6	1	Prog46	1.3	0.75	848x480	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1047		DutTS6	1	Prog47	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1048		DutTS6	1	Prog48	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1049		DutTS7	1	Prog49	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1050		DutTS7	1	Prog50	1.8	1.25	864x486	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1051		DutTS7	1	Prog51	1.5	1	640x360	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1052		DutTS7	1	Prog52	0.6	0.15	624x352	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1053		DutTS7	1	Prog53	2.1	1.5	960x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1054		DutTS7	1	Prog54	1.3	0.75	848x480	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1055		DutTS8	1	Prog55	1	0.5	480x368	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1056		DutTS8	1	Prog56	0.9	0.35	480x320	16:9	High	100	101	1:102, 2:103	1:104, 2:105
1057		DutTS8	1	Prog57	3.7	3	1280x720	16:9	High	100	101	1:102, 2:103	1:104, 2:105

Table 38. Test Page Worksheet (Columns N to AA)

Column	Description
N	output_mcast_port
O	redundant_output_ip
P	output_ts_name
Q	output_program_number
R	output_program_name
S	output_ts_bandwidth

Table 38. Test Page Worksheet (Columns N to AA) (Continued)

Column	Description
T	video_bitrate Value, in Mbps, to define maximum video bitrate allowable. The video bitrate is applied to video on the elementary stream. This value cannot exceed that defined for TS bandwidth.
U	video_resolution Values to set type of horizontal (H) resolution as high (yellow), medium (blue), or low (red) for each transcoded program. Use the drop-down selector to set resolution, in accordance with the following scheme: For the complete list of resolution values, see “Configuration Reference” on page 306 . Default: 640x360
V	aspect_ratio Entry to specify the ratio of the program width to the height, as either <i>automatic</i> , 4:3, or 16:9.
W	video_profile Video capability, as either high, main, or baseline. High = Typically for HD TV applications. Allows 8x8 transform size. Main = Typically for SD TC broadcasts that use DVB-standard MPEG-4 formats. Baseline = typically for low-cost applications, such as video conferencing and mobile usages.
X	pmt_pid ID of the program map table (PMT), as a value in the range 48-8175. Default: 100.
Y	video_pid Video PID. Default: 101.
Z	audio_pids List of Audio PIDs, using format “Audio_ES_num:PID” and comma separator. For example: <ul style="list-style-type: none"> 1:102, 2:103 (Map to 1st Audio and configure PID Map to 2nd Audio and configure PID). or 1:102 (Map to 1st Audio ES Stream).
AA	data_pids List of Data PIDs using format “Data_ES_num:PID” and comma separator. For example: <ul style="list-style-type: none"> 1:104, 2:105 (Map to 1st Data and configure PID Map to 2nd Data and configure PID). or 1:104 (Map to 1st Data ES Stream).

MBRs Tab

Use the **MBRs** tab ([Figure 49](#)) to enter your multi-bitrate transport stream settings. An MBR (multi-bitrate) transport stream enables transcoding of a single input stream (HD or SD in either MPEG-2 or H.264 format) into (max) four H.264 SPTSs per grooming operation. All programs groomed to MBR TSs are transcoded to H.264 video.

The configuration reference for the **MBRs** tab is provided in [Table 39 on page 79](#).



Note: See also [“Configuration Reference” on page 306](#), for supported sampling and bit rates for channels.

Figure 49. Worksheet—MBRs Tab

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
1	MBR Group Name	Forward SCTE35 Cue	GOP M	GOP N	IDR Interval	Audio Codec	Audio Sampling Rate (kHz)	Audio Channels	Audio Bitrate	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput	Audio Bitrate Throughput
2	mb_group_id	forward_cue	gop_m	gop_n	idr_interval	audio_codec	audio_sampling_rate	audio_channels	audio_bitrate	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput	audio_bitrate_throughput
3	mb1	yes	4	32	160	AC3	48	Stereo	224	0	NONE														
4	mb2	yes	4	32	160	AC3	48	5.1 Surround	224	0	AC3	150	On												
5	mb3	yes	4	32	160	AC3	48	5.1 Surround	224	0	NONE	OFF													
6	mb4	yes	4	32	160	HE AAC	48	Stereo	96	0	NONE														
7	mb5	yes	4	32	160	MPEG1 L2	48	Mono	96	0	NONE														
8	mb6	yes	4	32	160	AC3	48	Stereo	96	0	NONE														
9	mb7	yes	4	32	160	AC3	48	Stereo	96	0	NONE														
10	mb8	yes	4	32	160	AC3	48	Stereo	96	0	NONE														

Table 39. MBRs Page Worksheet Columns

Column	Description
A mbr_group_id	Unique system-generated ID for the MBR group.
B forward_cue	Forward SCTE35 cue: Entry, as either Yes or No, to indicate whether or not to enable forwarding of SCTE 35 information on input streams.
C gop_m	Value to define the spacing of the P frames in the output. The higher the value, the lower the data rate: <ul style="list-style-type: none"> For H.264 HD or SD: Default: 4. Acceptable Values: 1, 2, or 4.
D gop_n	Value to define the number of frames in each GOP. The higher the value, the lower the data rate. <ul style="list-style-type: none"> For MBRTS H.264 HD or SD: Acceptable Values: 32, 60, or optimized.
E idr_interval	Value to specify the interval between instantaneous decoder refresh (IDR) frames, or number of frames between random access points. Default: 160 frames. Acceptable Values: 32, 64, 96, 128, 160, 192, 224, 256, 288, 320.
F audio_codec	Specify method to be used for decoding audio. Default: AAC-LC Acceptable Values: HE-AAC, HE-AACv2, AAC-LC, MPEG1L2, MPEG2LC, AC-3, and E-AC-3 (Dolby Digital Plus).
G audio_sampling_rate	Value to define the number of audio samples per second. Higher values equal better sound quality. Default: 48 kHz. Acceptable values: 8 kHz, 11.03 kHz, 12 kHz, 16, kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, 48 kHz.
H audio_channels	Type of channel to be used for the audio stream. Default: stereo Acceptable Values: mono, stereo, or 5.1 surround.
I audio_bitrate)	Define bitrate for all audio streams within the MBR transport stream. Audio bit rate filters on the basis of the combined audio codec, channel, and sample rate settings. For acceptable values (kbps): refer to tables provided in “Configuration Reference” on page 306 .

Table 39. MBRs Page Worksheet Columns (Continued)

Column	Description
J	<p>audio_gain</p> <p>Value to set the gain on an audio stream level. <i>Audio Gain</i> is applied to all audio streams within the MBR TS. If the input program has two or more audio PIDs, all audio outputs will have the same gain.</p> <p>Default: 0 (no gain)</p> <p>Acceptable Values: -24 dB to +24 dB</p>
K	<p>audio_pass_through</p> <p>Enable or disable AC-3 input audio passthrough.</p> <ul style="list-style-type: none"> None: disable audio passthrough. AC-3: enable audio passthrough. <p>Default: None</p>
L	<p>audio_start_pid</p> <p>Set value to define the starting PID value. The PID will be validated within all elementary streams.</p> <p>Default: blank</p>
M	<p>dd_LFE</p> <p>For 5.1 surround configuration only: enable (On) or disable (Off) 3/2 mode.</p> <p>Off = non 3/2 mode.</p> <p>On = 3/2 mode.</p>
N	<p>dd_bitstream</p> <p>Value to set one of the following options for the bitstream mode (AC-3 or E-AC-3 (Dolby Digital Plus) only):</p> <ul style="list-style-type: none"> 0 - main audio service: complete main (CM) 1 - main audio service: music and effects (ME) 2 - associated audio service: visually impaired (VI) 3 - associated audio service: hearing impaired (HI) 4 - associated audio service: dialogue (D) 5 - associated audio service: commentary (C) 6 - associated audio service: emergency (E) 7 - associated audio service: voice over (VO)
O	<p>dd_dialog_norm</p> <p>Set value to define dialog normalization, in the range 0 dB (passthrough) and -1 dB (loudest) to -31 dB (least loud).</p>
P	<p>dd_DRC_line</p> <p>Value to set one of the following options for the DRC line mode profile (AC-3 or E-AC-3 (Dolby Digital Plus) only):</p> <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression
Q	<p>dd_DRC_RF</p> <p>Value to set one of the following options for the DRC RF mode profile (AC-3 or E-AC-3 (Dolby Digital Plus) only):</p> <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression
R	<p>dd_DRC_line2</p> <p>See description for column P (above).</p>
S	<p>dd_DRC_RF2</p> <p>See description for column Q (above).</p>

Table 39. MBRs Page Worksheet Columns (Continued)

Column	Description
T	dd_surr_shift Enable (On) or disable (Off) 90-degree phase shift to surround channels. Default: Off
U	dd_surr_atten Enable (On) or disable (Off) 3dB attenuation to surround channels. Default: Off
V	input_table_processing Set type of table processing to apply to the input stream, as either DVB, ATSC, or SDT.
W	output_sdt Enable (yes) or disable (no) SDT passthrough or generate on the MBR transport stream.
X	sdt_options Select pass-through or generate.
Y	sdt_service_name Type an alphanumeric string, up to 64 characters, to identify the SDT service for the transport stream.

Audio Language Tab

Figure 50. Worksheet—Audio Language Tab

	A	B	C	D	E	F	G	H	I
1	skip_test (1: skip)	Input Port	Mcast IP	Input Source IP	UDP Port	Input TS Name	Input program #	Audio PID	Audio Language Code
2	skip_test	input_port	input_mcast_ip	input_source_ip	input_mcast_port	input_ts_name	input_program_number	audio_pid	audio_lang_code
3	0	4	239.47.3.4		6000	InTS1	10	245	fre
4	0	4	239.47.3.4		6000	InTS1	10	142	jpn
5	1	4	239.47.3.4		6000	InTS1	7	133	rus

Table 40. Audio Language Worksheet Columns

Column	Description
A	skip_test Value, as either 0 or 1, to indicate whether or not to skip testing that uses data on this row. 0: do the test 1: skip the test
B	input_port Source GigE interface.
C	input_mcast_ip Multicast IP address, in dotted decimal format, for input stream. • Address range: 224.0.0.1 - 239.255.255.255.
D	input_source_ip Source IP address, in dotted decimal format.
E	input_mcast_port (optional) Value, in the range 1-65535, to define the port on which the incoming stream is to be transported.
F	input_ts_name Name of the input transport stream.
G	input_program_number Value to set program number.

Table 40. Audio Language Worksheet Columns (Continued)

Column		Description
H	audio_pid	List of Audio PIDs, using format "Audio_ES_num:PID" and comma separator. For example: <ul style="list-style-type: none"> 1:102, 2:103 (Map to 1st Audio and configure PID Map to 2nd Audio and configure PID). or 1:102 (Map to 1st Audio ES Stream).
I	audio_lang_code	String to set a language descriptor. See also "Language Descriptor Settings" on page 313 .

Program Redundancy Tab

The VMG supports input-level program redundancy. At the detection of a missing program, the VMG automatically switches to a redundant or backup program.

In a program redundancy configuration, a switch to backup results when either of the following events occur:

- Missing MPTS/SPTS streams are identified by checking the PAT.
- Missing program streams are identified by checking the PMT.

You can assign a backup program for every input program, and any input program can be assigned to back up a running primary program. The backup program can be another program on the same GigE port or it can be on a different GigE port in the same chassis.

For bulk configuration, use the **Program Redundancy** tab ([Figure 51](#)) to apply settings for backup of streams. The configuration reference for the Program Redundancy tab is provided in [Table 41 on page 83](#).

Figure 51. Worksheet—Program Redundancy Tab

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Skip Test (1: skip)	Input Port	Mcast IP	Input Source IP	UDP Port	Input TS Name	Input Table Processing	Input program #	Backup Input Port	Backup Mcast IP	Backup Input Source IP	Backup UDP Port	Backup Input TS Name	Backup Input Table Processing	Backup Input program #	Recovery Method
2	skip_test	input_port	input_mcast_ip	input_source_ip	input_mcast_port	input_ts_name	input_table_processing	input_program_number	bkp_input_port	bkp_input_mcast_ip	bkp_input_source_ip	bkp_input_mcast_port	bkp_input_ts_name	bkp_input_table_processing	bkp_input_program_number	recovery_mode
3	1	1	225.100.100.1		5001	MI1	DVB	1	2	225.100.100.2		5002	bkp_MI1	DVB	1	Automatic
4	1	1	226.100.100.1		6001	MI2	DVB	1	2	226.100.100.2		6002	bkp_MI2	DVB	1	Automatic

Table 41. Program Redundancy Page Worksheet Columns

Column	Description
A	skip_test Value, as either 0 or 1, to indicate whether or not to skip testing that uses data on this row. 0: do the test. 1: skip the test.
B	Input_port Value, in the range 1-8, to specify the GigE input port number to be used. Recommended value: 1
C	input_mcast_ip Input multicast IP address, in dotted decimal format. Address range: 224.0.0.1 - 239.255.255.255.
D	Input_source_ip Optional cell in which to specify the IP address of the source where the port receives data. This value is used only for multicast (IGMPv3) transport streams. Address range: 0.0.0.0 - 239.255.255.254.
E	input_mcast_port Value, in the range 0-65535, to define the UDP port on which the incoming stream is to be transported.
F	Input_ts_name Alphanumeric string to define the name of the primary input transport stream.
G	Input_table_processing Type of table processing to apply to the input stream, as either ATSC, DVB, or SDT.
H	input_program_number Value to define the primary program number.
I	bkp_input_port Value, in the range 1-8, to specify the GigE backup input port number to be used. Recommended value: 1
J	bkp_input_mcast_port Input multicast IP address for backup use, in dotted decimal format. Multicast address range: 224.0.0.1 - 239.255.255.255.
K	bkp_input_source_ip Input IP address, for backup use, in dotted decimal format.
L	bkp_input_mcast_port Value, in the range 0-65535, to define the UDP port on which the incoming stream is to be transported.
M	bkp_input_ts_name Alphanumeric string to define the name of the backup input transport stream.
N	bkp_input_table_processing Type of backup table processing to apply to the input stream, as either ATSC, DVB, or SDT.

Table 41. Program Redundancy Page Worksheet Columns

Column		Description
O	bkp_input_program_number	Value to define the backup program number.
P	recovery_mode	Define method of recovery from backup program to primary program, as either automatic or manual. 0: automatic Enable automatic fail-over option from primary to backup program and recovery operation from backup to primary, as based on PAT/PMT detection. 1: manual Enable automatic fail-over operation from primary to backup program, as based on manual selection.

README Tab

The **README** tab contains tips and encoding values for use when configuring your worksheets. Information from this page is not read by the system during bulk configuration deployment.

Downloading VMG Bulk Configuration Files

The bulk configuration files reside on the VMG as a tar package—*vmgConfigTool*—that you access via the VMG Element Manager's **Bulk Configuration** window, for placement on your computer's hard drive. This section describes how to get started with bulk configuration, in the following topics:

- “Accessing the Bulk Configuration Template Files”
- “Understanding Bulk Configuration File Types”
- “Managing VMG Bulk Configuration Template Files”

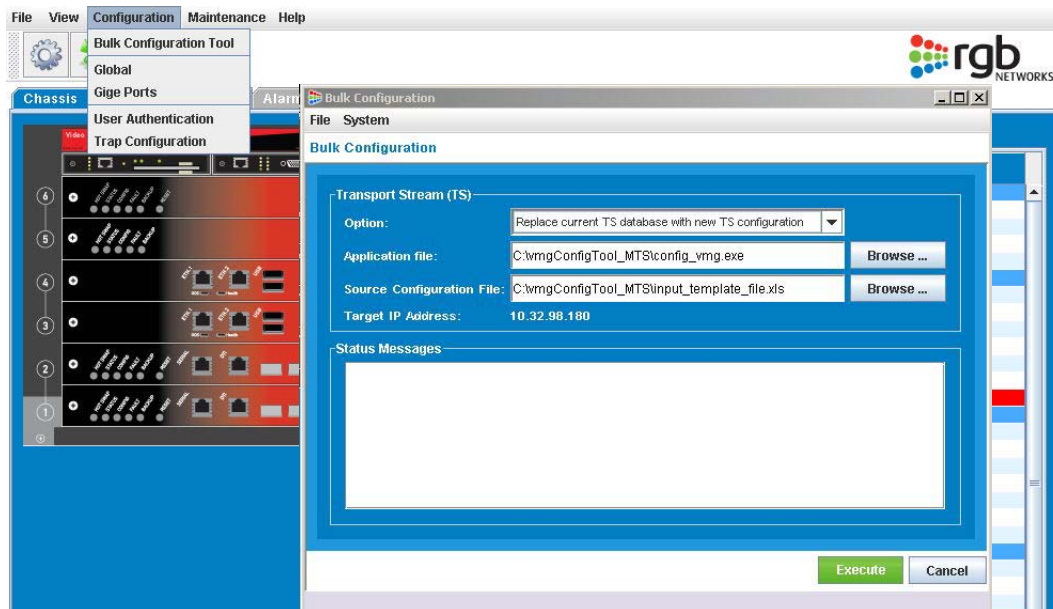
Before you can access any bulk configuration tools, you must be logged in to the management interface as an Administrator user.

1. Access the **VMG Bulk Configuration** window:



From the *VMG Element Manager* main menu, select **Configuration -> Bulk Configuration Tool** to present the **Bulk Configuration** screen (Figure 52).

Figure 52. Launching the Bulk Configuration window.

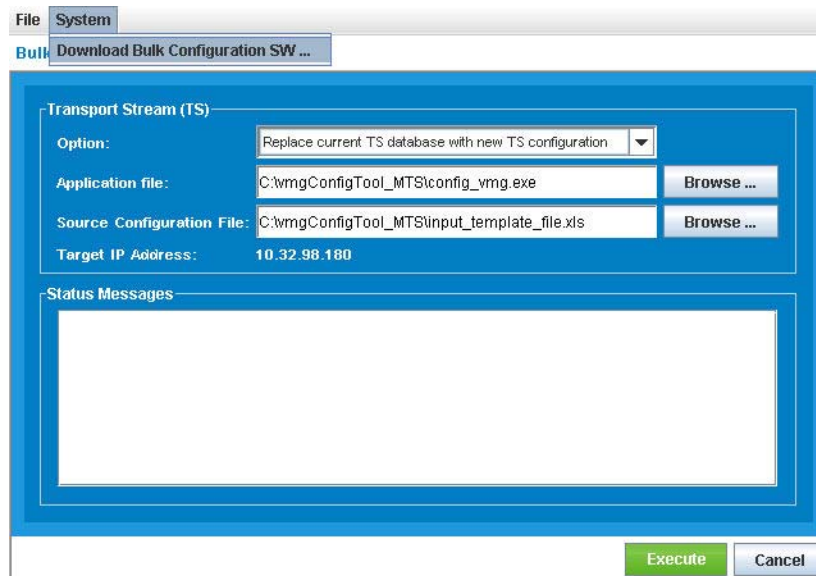


Accessing the Bulk Configuration Template Files

To get started, the bulk configuration files must be downloaded from the VMG to your computer to enable use of the transport stream settings, and to load the software (.exe file) necessary to perform the bulk configuration tasks from the *VMG Element Manager*.

1. With the **VMG Bulk Configuration** window in view, choose **System -> Download Bulk Configuration SW...**(Figure 53).

Figure 53. Bulk Configuration System Software Download command

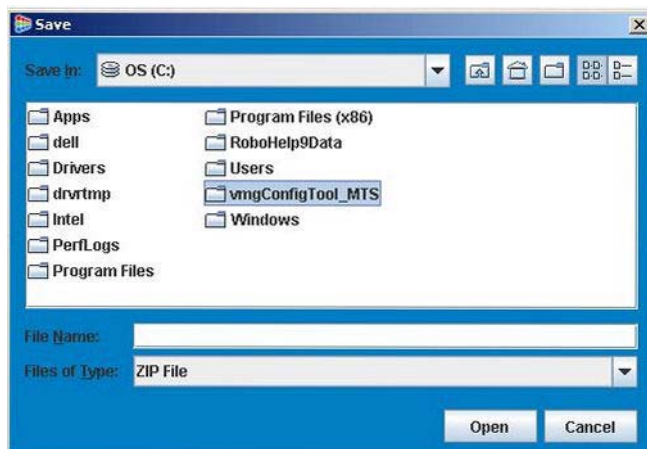


The **Save** window (Figure 54) is now presented.

2. At the **Save** window, perform the following tasks:
 - a. Click to highlight the **c:** directory. This will enable installation into *c:\vmgConfigTool_MTS*.

- b. Check to ensure that the **Files of Type** field contains **vmgConfigTool.zip**.
- c. Click **Save** and wait for the transfer process to complete.

Figure 54. Pulling the VMG Bulk Configuration zip file into your workspace.

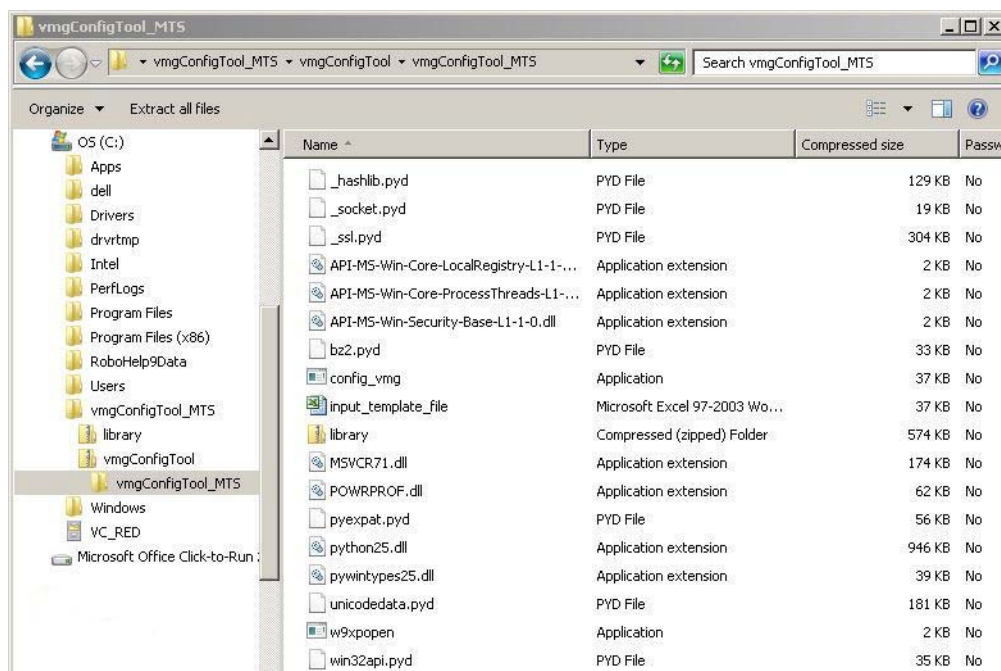


3. Go to the zip file that is now located on your hard drive and extract the files. Note that the **vmgConfigTool_MTS** folder consists of the file types similar to those shown in Figure 55.



Note: Due to Windows security, you cannot download the zip file to C drive. Therefore, you need to set up a subfolder on C for use with your Bulk Configuration source files.

Figure 55. Locating VMG Bulk Configuration Files on your PC



Understanding Bulk Configuration File Types

Files inclusive of the **vmgConfig Tool** directory are contained in the **Library** and the **vmgConfig Tool** folders. Within these folders are the various file types listed in the [Table 42](#).

Table 42. vmgConfigTool directory files

File type	Description
.xls	The input template file that contains sample settings for transport stream bulk configuration. Use this file as your template to create additional bulk configurations for the VMG associated with the current login.
library	The library file for the config tool.
.pyd	Various Python dynamic module files.
.dll	The Python application DLL file.



Note: The .xls file (labelled **input_template_file**) is the file you will use as the initial template for your bulk configurations.

Managing VMG Bulk Configuration Template Files

RGB recommends that you do not modify the **input_template_file** supplied with your **vmgConfigTool** software. To get started, open **input_template_file.xls**, and save the file as a different name.



Note: RGB recommends that you do not modify the original **input_template_file** supplied with your **vmgConfigTool** software.

You can save your worksheets to any folder or directory on your computer, as long as you are able to locate them with the browser from the VMG Bulk Configuration screen.

Handling Template Updates

With upcoming new VMG databases, the newer .xls file templates are likely to contain additional columns. To reuse existing worksheet data, in a new template, use the following steps:

1. Rename and save the new .xls file template.
2. Cut data from columns in the existing (older) worksheet and paste it into the identically named columns at the new worksheet.
3. In your new worksheets, and at the new empty columns, type in value required for your services.
4. Save the .xls file.

Using the Bulk Configuration Spreadsheets



Caution: Before beginning any configurations, ensure that the macros are enabled in your Excel workspace. If you see *Security Warning Macros have been disabled*, click **Options...** and change the setting to enable the Macros.

1. Configure MBRs

In your .xls files, bring the **MBRs** tab into view and set all parameters across the row for the MBR name. You can set up new MBR name(s), or use those already provided.

You can set up as many as 54 video/audio MBR groups for programs groomed to MBR TSs, with up to eight profiles (outputs) each.

For information about the MBRs settings, refer to [Table 39, “MBRs Page Worksheet Columns,”](#) on [page 79](#). This name will also be used in the **Tests** tab, as the **MBR_Group_ID**.

2. Configure Tests

At the **Tests** tab, set the MBR name into the **MBR_Group_ID** column, using one to eight rows, and enter or select settings across the worksheet row, for each MBR group row. Use reference information provided in [Table 37, “Tests Page Worksheet \(Columns A to M\),”](#) on [page 76](#) to tailor your entries.

3. Configure Program Redundancy

At the **Program Redundancy** tab, set parameters for the input source and the backup source.

4. Check the Configuration



Caution: Check your entries against the following list to ensure minimal errors during the upcoming configuration run:

- All output program name entries are unique.
- All referenced mbr group_id(s) in the **Tests** sheet are also defined in the **MBRs** sheet
- Resolution combination per MTS (Multi TS) is valid.
- Value to define the output video ES bit rate is less than that defined for the output TS bit rate.
- The TS bandwidth column contains a value in the range 0.1 to 5 Mbps.
- No more than four TSs are associated with each MTS group ID.
- Excluded audios are done for all streams per MBR.
- Audio transcoding values are valid for codec, sampling rate, channel and bitrate.
- Input Resolution Class setting is identical for all streams within the same MBR.
- Selected output video resolution is valid for the selected input resolution class.

Note: *The number of audios in the Excel sheet drives the maximum of supported/needed audios. Up to two are allowed, but where two columns only are provided in the Excel sheet, the Bulk Configuration tool makes sure to honor that number instead.*

5. Save the Configuration

This .xls file should now be ready for use by the **Bulk Configuration** tool.

After completing your entries to a bulk configuration .xls files, return to the **Bulk Configuration** window to upload your configuration to the VMG.

Applying Spreadsheet Data to the VMG

Use steps in this section to apply settings from a spreadsheet package to the VMG.

1. Save the Current Running VMG Configuration

Before attempting to load any configuration to the VMG, use the **Save Running Configuration** (Figure 56) option at the *VMG Element Manager* splash screen to back up the database currently running on the VMG.

Figure 56. Save Running Configuration



2. Log in to VMG Element Manager and go to the Bulk Configuration screen.



From the *VMG Element Manager* main menu, select **Configuration -> Bulk Configuration Tool** to present the **Bulk Configuration** screen (Figure 52).

3. At the drop-down **Option** field, select the type of configuration to be used (refer to **Option** in Table 36 on page 73).
4. At the **Application file** field, browse to select the *vmgConfigTool* to be used for this upload.
5. At the **Source Configuration File** field, browse to select the .xls file to be uploaded for this bulk configuration.
6. Double check to ensure that the target IP address matches that of the VMG for which this configuration is to be applied.

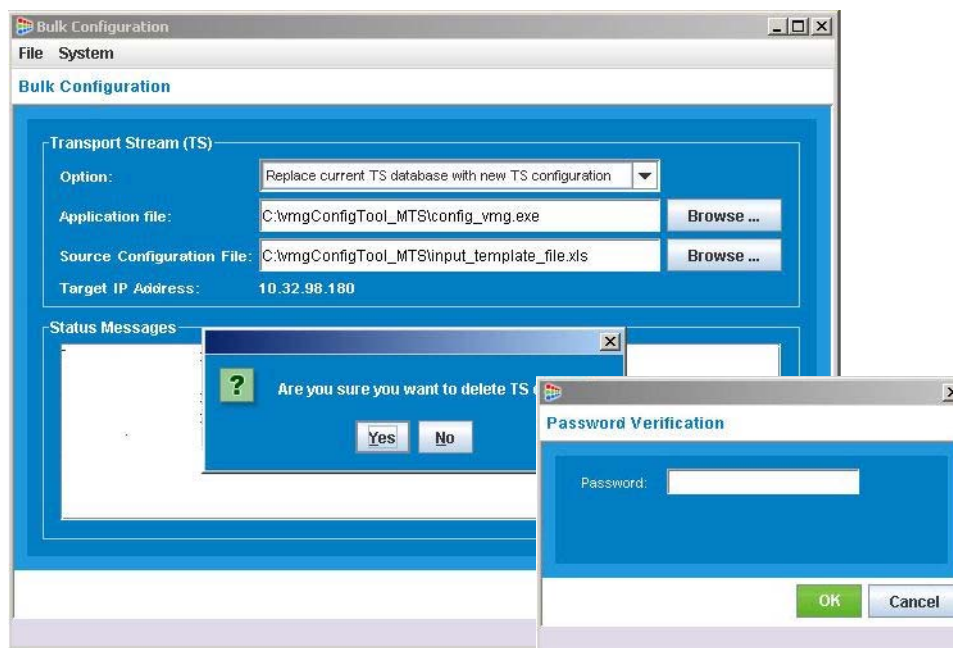
7. Click **Execute** to run the configuration.

As dependent on which option you have selected, the system may query for confirmation of the selected action.

In all cases, the system presents the **Password Verification** dialog box (Figure 57) prior to processing the .xls file configuration for the VMG.

Use your *VMG Element Manager* password, then click **OK** to proceed.

Figure 57. System queries prior to upload



8. Monitor the status messages now displayed in the **Bulk Configuration** window. Status messages are reported as either INFO or ERROR.

Handling Errors

Errors read from the input .xls file are reported in the **Status Messages** field of the **Bulk Configuration** window. If the Excel file passes the initial sanity check, the combinations delivered to the VMG are valid and the configuration should run smoothly on the VMG. Conversely, if problems are detected with input stream configurations, these will be reported as errors in the **Bulk Configuration** window, and will require repair prior to another attempt at upload to the VMG.



Note: *Un checked configurations and/or issues that may require repair, which can result in errors, are listed in “4. Check the Configuration” on page 88.*

In the **Status Messages** field, each error message contains the cause of the error notification. Use this information as your guide if you need to return to the .xls files to correct any entries.

System Maintenance

This chapter describes the VMG maintenance functions that are available from the VMG *Element Manager* home page and the System Maintenance menu.

In This Chapter:

- “Database Backup and Restoration,” next.
- “Software Upgrade” on page 94.
- “License Management” on page 99.
- “System Reboot” on page 103.
- “System Shutdown” on page 105.
- “NPM Redundancy Switch” on page 106.
- “Program Redundancy Switch to Primary” on page 106.
- “Time Offset Table (TOT)” on page 107.

Database Backup and Restoration

The VMG provides the ability to back up its running configuration to a local workstation via HTTP and restore the database to a VMG via FTP. This feature is useful when there is a wide deployment of VMGs sharing identical configurations or when you need to re-apply a saved configuration to the same VMG in the event of a system failure or database wipe.



Note: *To facilitate storage and retrieval of the VMG running configuration, be sure to assign an FTP server that is accessible by the VMG.*

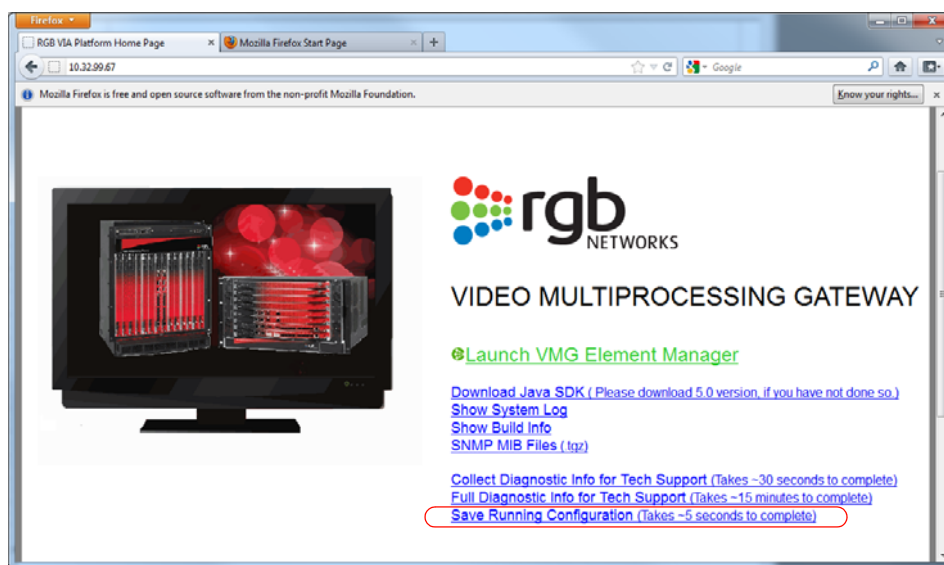
Database Backup / Save Running Configuration

RGB Networks recommends that the VMG running configuration be saved at least once per week to ensure the most up to date database in the event of a system failure.

To save the running configuration:

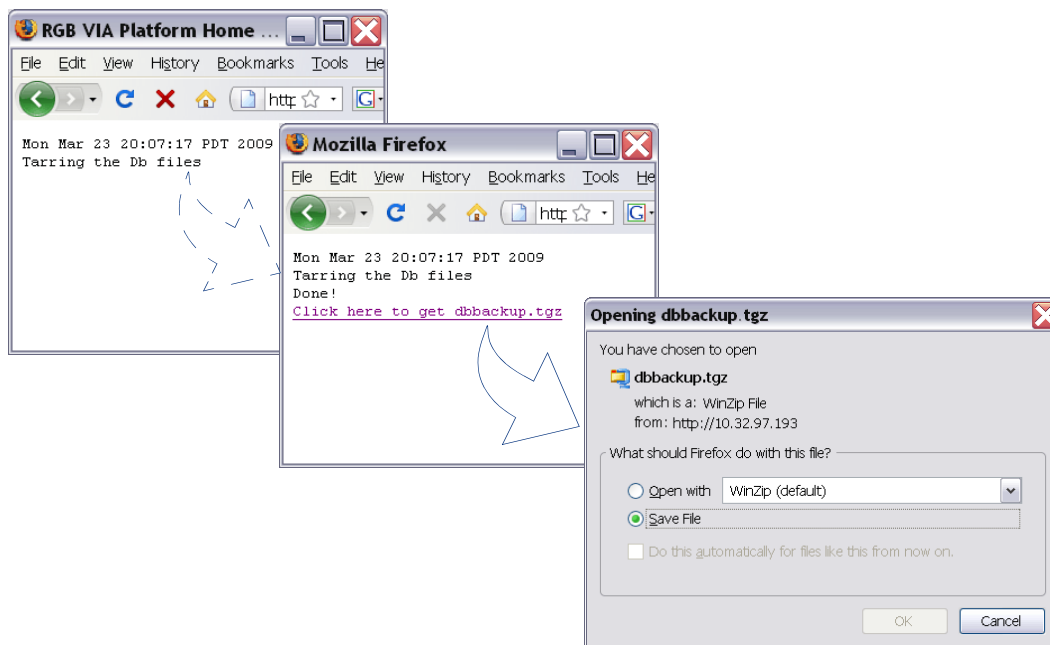
1. Click the **Save Running Configuration** link at the VMG *Element Manager* home page (Figure 58).

Figure 58. VMG Home Page - Save Running Configuration Option



2. Wait for completion of the database tar process. Notifications similar to those shown in Figure 59, will display when files are compressed into binary format, and when the tarred database is completed. You can save the tarred files when you see the **Click here to get dbbackup.tgz** link.

Figure 59. Tar the Running Config and Save Locally



3. Click on the **Click here to get dbbackup.tgz** link to present the **Opening dbbackup.tgz** screen.
4. Click **Save File** and **OK** to save the backup config file to the local workstation.



Note: Note that the screen may not be identical to that shown in Figure 59, as dependent on the browser in use.

Database Restoration

When restoring the database to the same VMG from which the database was saved, or restoring a database to a different VMG, the following guidelines must be considered:

- The configuration database is not valid for an earlier version of software from which it was saved.
- A configuration database from one chassis type (VMG-6, VMG-8, or VMG-14) is not valid for a different chassis type.
- When restoring a configuration database to a different VMG from which it was originally saved, new licenses will need to be installed on the restored VMG. Contact RGB Customer Support for more information.

To restore a database to a VMG:

1. Make sure the backed up configuration file resides on an FTP server accessible by the VMG.
2. Use the **Restore DB Configuration** screen to log into the FTP server and retrieve a specified file:



From the *VMG Element Manager* main menu, select **Maintenance -> Restore DB Configuration** to present the **Restore DB Configuration** screen (Figure 60 and Table 43).

Figure 60. Restore DB Configuration

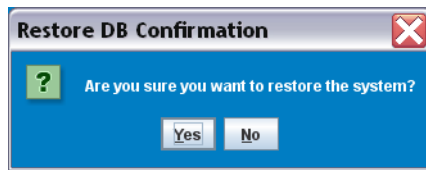
Table 43. Restore DB Configuration Fields

Field	Description	Default
Host IP Address	Type the IP address of the host server where the configuration database resides. this address must be associated with an FTP server, and it must be accessible to the VMG.	Blank
Protocol	Set FTP protocol for retrieval of the configuration database. Currently, FTP is the only protocol option.	FTP
User Name	Type the login user name for the FTP server.	Blank
Password	Type the login password for the FTP server.	Blank
Restore license file	Restore (check) or do not restore (un-check) the license file with the database retrieval.	Checked
Directory and File Name	Type the absolute path where the configuration database is located on the FTP server. <ul style="list-style-type: none"> • Example: /ftproot/dbbackup.tgz 	Blank

3. Click **Restore**.

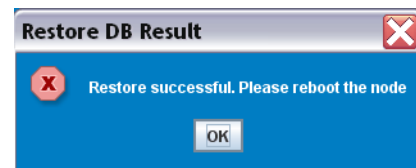
4. At the **Restore DB Confirmation** query (Figure 61), click **Yes** to confirm the restoration, or **No** to abort the operation.

Figure 61. Restore DB Confirmation



5. If **Yes**, watch for the successful restoration message (Figure 62), and click **OK** to dismiss the popup screen.

Figure 62. Restore DB Result.



6. Reboot the VMG to enable activation of the restored database. Refer to “[System Reboot](#)” on page 103

Software Upgrade

Use the VMG *Element Manager* software upgrade function to install the most current VMG software onto the VMG system and the AMP modules. Two software packages are provided with each new VMG release, which are tailored for use specifically with the VMG system modules, or the AMP modules:

- **sw.tar**
This software package contains the software for the NPM, TCM, and VPM and is to be used whenever you are upgrading the system to the most current VGM release.
- **AmpBuild.xxxx.rgb**
This software package contains the software for the AMP and is to be used only if AMPs are installed in the VMG. Where applicable, this upgrade should be performed after successful reboot of the VMG following a sw.tar upgrade.

Note: *Refer also to the Video Multiprocessing Gateway Software Upgrade Guide for detailed upgrade procedures. This guide, which is provided with all new VMG releases, provides instructions for handling upgrades and downgrades over multiple VMG releases.*

This section contains information about VMG software upgrades, in the following topics:

- “[Upgrade Sequences](#),” next.
- “[Upgrade Steps](#)” on page 95
- “[The Software Upgrade Processes](#)” on page 97.

Upgrade Sequences

To upgrade to the current software release, the VMG must already be loaded with VMG software release 3.0.3. If the VMG is using a very early release, accomplishment of the 3.0.3 release requirement will require additional steps (Figure 44).

Table 44. Release Sequences for Software Upgrades

Release Currently Running on the VMG	Number of Steps to Perform SW Upgrade	Requirement
Pre 2.5.1	More than 2	Upgrade to 3.0.3
2.5.1	2	
2.5.2	2	
2.5.3	2	
3.0.x	2	
3.0.3 (GA)	1	
3.1.x	1	

Refer to the *Video Multiprocessing Gateway Software Upgrade Guide* for detailed upgrade procedures.

Upgrade Steps

Use steps in this section to upgrade the VMG or an AMP module to the latest software:

1. Contact RGB to acquire/download the upgrade package.
2. Store the sw.tar file and/or the AmpBuild_XXXXX.rgb file on an FTP server accessible by the VMG.
3. Use the **Upgrade Software** screen to load new software.



From the *VMG Element Manager* main menu, select **Maintenance -> Software Upgrade** (Figure 63 and Table 45).

4. Click **Upgrade**.
5. At the upgrade confirmation query, click **Yes** to confirm and proceed with the upgrade, or click **No** to abort the upgrade operation.
 - If **Yes**, the software upgrade procedure now begins by performing a validation check for image corruption and compatibility with the VMG system.
 - When the new image has been downloaded to the applicable module, the **Upgrade Status** field will return a value of **Completed**.
6. After a system software upgrade completes, reboot the VMG to enable activation of the new software.

Note that it is not necessary to reboot the system following an AMP upgrade.

To perform a reboot, you can either check the **Reboot chassis after successful software upgrade** option from the **Upgrade Software** screen. See also “[System Reboot](#)” on page 103 for more details about the *VMG Element Manager* **Reboot** tools.

Figure 63. Upgrade Software

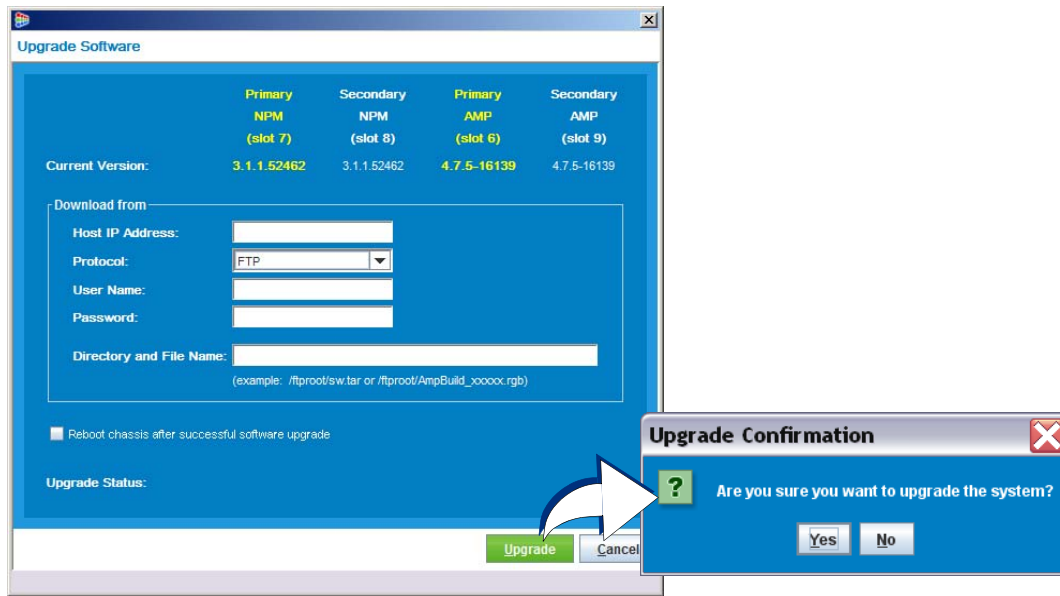


Table 45. Software Upgrade Fields

Field	Description	Default
Current Version	Current version of software installed.	Read-only
Host IP Address	Type the IP address of the host server where the configuration database resides. this address must be associated with an FTP server, and it must be accessible to the VMG.	Blank
Protocol	Set FTP protocol for retrieval of the configuration database.	FTP
User Name	Type the login user name for the FTP server.	Blank
Password	Type the login password for the FTP server.	Blank
Directory and File Name	Type the absolute path where the configuration database is located on the FTP server. Following are examples of path entries that refer to VMG and AMP locations. <ul style="list-style-type: none"> • VMG image: /ftproot/sw.tar • AMP one-file image: AmpBuild_4.7.5-15164.noarch.rgb • AMP two-file image: AmpBuild_4.7.5-15188.noarch.001.rgb 	Blank
Upgrade Status	View the current status of the software upgrade process once started: <ul style="list-style-type: none"> • In Progress – The upgrade procedure is currently being performed. • Completed – The upgrade procedure completed successfully. • Failed – The upgrade procedure encountered an error. 	Read-only
Reboot chassis after successful software upgrade	Either reboot the chassis (check) or do not reboot the chassis (un-check) after the software has been upgraded. Note that before the new software can take effect, the VMG requires a reboot. See also “ System Reboot ” on page 103 for additional information.	Un-checked

The Software Upgrade Processes

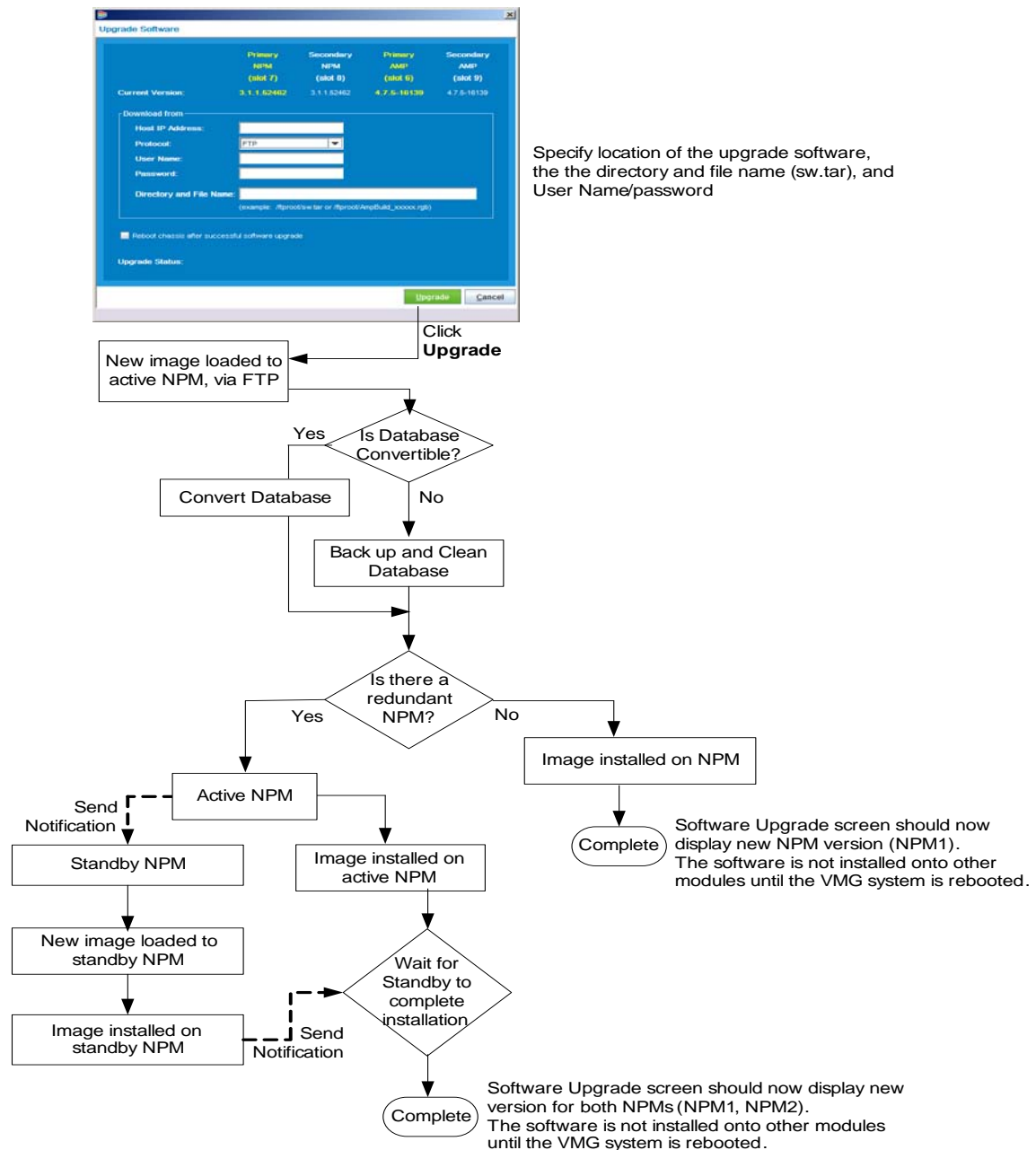
The VMG performs many tasks during software upgrade sessions. This section illustrates the overall process as well as the processes for NPM and AMP upgrades, in the following topics:.

- “VMG System Upgrade Process” on page 97.
- “AMP Upgrade Process” on page 98.

VMG System Upgrade Process

Issuing an upgrade instruction to the VMG results in system processes shown in [Figure 64](#).

Figure 64. VMG Upgrade Process



AMP Upgrade Process

AMP Upgrade Process

	Primary	Secondary	Primary	Secondary
NPM	NPM	NPM	AMP	AMP
(slot 7)	(slot 8 - Active)	(slot 6)	(slot 9 - Active)	
Current Version:	3.0.4.54152	3.0.4.54152	4.7.5.16401	4.7.5.16401

Download from:

Host IP Address:

Protocol:

User Name:

Password:

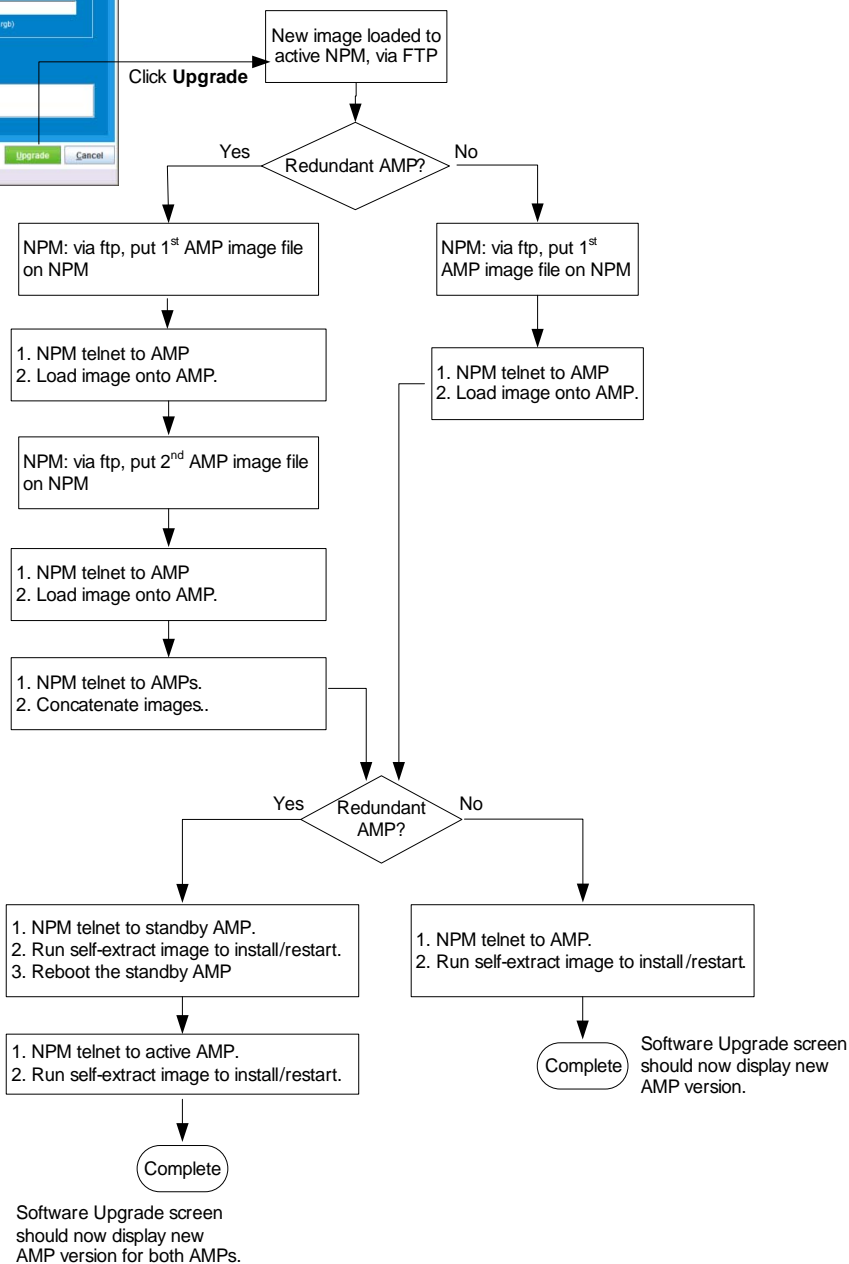
Directory and File Name:

(example: //prodswr1ar or //prodswr1ar/ftp/ampBuild_xxxx.rgb)

☐ Reboot chassis after successful software upgrade

Upgrade Status:

Specify location of the upgrade software, the directory and file name (AmpBuild.xxxx.rgb), and User Name/password



License Management

VMG License Key management is described in the following topics:

- “VMG License Types,” next.
- “License Configuration” on page 101.
- “Acquiring License Keys” on page 102.
- “Entering License Keys” on page 103.

VMG License Types

The VMG supports the license types listed and described in [Table 46](#). Each license is issued on a per chassis basis, and will only work with the corresponding device. Bandwidth allocation for bandwidth-based licenses corresponds to the bitrate configured for the transport stream.



Note: *This note applies to the Transrating License, DPI License, and Program Substitution License listed in the following table: The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information.*

Table 46. VMG License Types

License Type	Description
Base License Key	Allows configuration of non-video related features, such as the chassis and interfaces. Enables grooming and multiplexing functions.
Transrating License (Bandwidth Based) Key	In combination with the Base license, allows creation and configuration of MPEG-2, ATSC, SCTE, or DVB transports with SPTS transrating and MPTS transrating/statistical multiplexing. This is a bandwidth-based license; creation of an output transport stream will be rejected if the bandwidth needed is not available. This license does not allow DPI functionality. Requires VPM.
DPI License (Bandwidth Based) Key	In combination with the Base license, allows creation of DPI supported output transport streams for MPEG-2 and H.264 in addition to SPTS transrating and MPTS transrating/statistical multiplexing. This a bandwidth based license; creation of an output transport stream will be rejected if the DPI bandwidth needed is not available. All programs associated with this output transport stream will be DPI capable. Requires VPM.
DPI License (Number Based) Key	In combination with the Base license, allows creation of DPI-supported output programs within an output transport stream as long as program-level DPI is enabled on the TS. Output programs not supporting DPI can also be created within the same output transport stream. For this license type, the creation of an output program supporting DPI will be rejected if the <i>number</i> of DPI sessions purchased has been exhausted. Requires VPM.

Table 46. VMG License Types (Continued)

License Type	Description
Program Substitution License (Number Based) Key	<p>In combination with the Base license, allows creation of program substitution supported MPEG-2 or MPEG-4 output programs. Output programs not supporting Program Substitution can also be created within the same output transport stream. A DPI bandwidth or number based license is not required for output programs employing Program Substitution. For this license type, the creation of an output program supporting Program Substitution will be rejected if the <i>number</i> of channel substituted sessions purchased has been exhausted.</p> <p>Requires VPM</p>
MPEG-2 SD Transcoding License (Number Based) Key	<p>In combination with the Base License, allows creation of SD MPEG-2 output programs through the Transcoding Module (TCM) when “Transcoding” is enabled in output transport streams. Input format can be either MPEG-2 or H.264, and must be of a supported SD or HD resolution. Transcoded output transport streams must be configured as SPTS.</p> <p>Requires TCM.</p>
MPEG-2 HD Transcoding License (Number Based) Key	<p>In combination with the Base License, allows creation of HD MPEG-2 output programs through the Transcoding Module (TCM) when “Transcoding” is enabled in output transport streams. Input format can be either MPEG-2 or H.264, and must be of a supported HD resolution. SPTS only is supported in Transcoded output transport streams.</p> <p>Requires TCM.</p>
H264 SD Transcoding License (Number Based) Key	<p>In combination with the Base License, allows creation of SD H.264 output programs through the Transcoding Module (TCM) when “Transcoding” is enabled in SPTS. Input format must be MPEG-2 or H.264 and of a supported SD or HD resolution. This license is also used to enable PIP or multi-bitrate stream outputs.</p> <p>Requires TCM.</p>
H264 HD Transcoding License (Number Based) Key	<p>In combination with the Base License, allows creation of HD H.264 output programs through the Transcoding Module (TCM) when “Transcoding” is enabled in SPTS. Input format must be MPEG-2 or H.264 and of a supported HD resolution.</p> <p>Requires TCM.</p>

License Configuration

Use the **License Manager** screen to establish licensing information for the VMG.



From the *VMG Element Manager* main menu, select **Maintenance -> License Manager** to present the **License Manager** screen (Figure 65 and Table 47).



Note: *Display of decimal marks in the **License Manager** screen—as either comma or period separators—is dependent on standards for your locale.*

Figure 65. License Manager.

	Purchased	Used	Available	Enabled	Status
Base License:	N/A	N/A	N/A	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Transrating Bandwidth License (Mbps):	0.0	0.0	0.0	N/A	<input checked="" type="checkbox"/>
DPI Bandwidth License (Mbps):	0.0	0.0	0.0	N/A	<input checked="" type="checkbox"/>
DPI Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>
Program Substitution Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>
MPEG2 SD Transcoding Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>
MPEG2 HD Transcoding Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>
H264 SD Transcoding Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>
H264 HD Transcoding Number License:	0	0	0	N/A	<input checked="" type="checkbox"/>

Table 47. License Manager Fields

Field	Description
Serial Number	Displays the serial number of the VMG
Base License Key Transrating License (Bandwidth Based) Key DPI License (Bandwidth Based) Key DPI License (Number Based) Key Program Substitution License (Number Based) Key MPEG-2 SD Transcoding License (Number Based) Key MPEG-2 HD Transcoding License (Number Based) Key H264 SD Transcoding License (Number Based) Key H264 HD Transcoding License (Number Based) Key	These fields display the currently installed license keys, if installed.

Table 47. License Manager Fields (Continued)

Field	Description
Base License	Indicates if the base license entered is valid and currently enabled.
Transrating Bandwidth License (Mbps) DPI Bandwidth License (Mbps) DPI Number License Program Substitution Number License MPEG-2 SD Transcoding Number License MPEG-2 HD Transcoding Number License H264 SD Transcoding Number License H264 HD Transcoding Number License	<p>These fields display the respective number of purchased, used, and available licenses for each type:</p> <ul style="list-style-type: none"> • <i>Purchased</i> – The total number of licenses or bandwidth purchased. • <i>Used</i> – The number of purchased licenses or bandwidth currently in use. • <i>Available</i> – The number of purchased licenses or bandwidth currently available for use. • <i>Enabled</i> – Applies to Base License only. A Base License can only be enabled or disabled. No number or bandwidth licensing is associated with it. • <i>Status</i> – Indicates if the particular license is valid. Examples of an invalid license are: <ul style="list-style-type: none"> - Invalid serial number information due to erroneous configuration from one VMG to another. - Licensing capacity is less than allowable configuration for the VMG. - Missing or corrupt license file due to system malfunction. - When the <i>Status</i> field is un-checked, contact RGB Customer Support for additional assistance.
New License Key Type	<p>The type of new license corresponding to the license key being entered in the <i>New License Key</i> field. Options are:</p> <p>Base, Transrating Bandwidth, DPI Bandwidth, DPI Number, Program Substitution, MPEG-2 SD, MPEG-2 HD, H264 SD, and H264 HD.</p>
New License Key	The new license key to install.

Acquiring License Keys

To acquire the appropriate license keys, contact RGB Networks and submit the following information:

- The VMG chassis serial number.
- The type(s) of license(s) desired.



Note: The VMG chassis serial number is located at the top of the **License Manager** screen.

Entering License Keys

Use the **License Manager** screen to set license keys:



From the *VMG Element Manager* main menu, select **Maintenance** -> **License Manager**.

1. Select the appropriate license type from the **New License Key Type** drop down list.
2. Enter the corresponding license key in the **New License Key** field.



Note: To avoid key entry errors due to typos, copy the key from the email in which the key was provided, then paste it into the **New License Key** field.

3. Click the **Apply New License** button to apply the license key.
4. Repeat steps 1- 3 for each additional license to be installed.

System Reboot



Caution: Performing a system reboot will interrupt all video services.

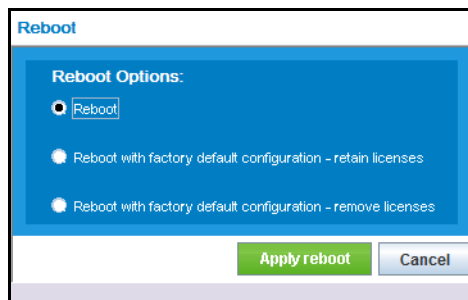
To reboot a VMG from *Element Manager*, use the **Reboot** screen:



From the *Element Manger*, select **Maintenance** -> **Reboot** to present the **Reboot** screen (Figure 66)

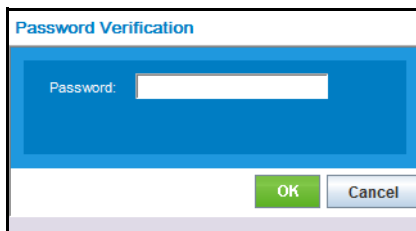
1. At the **Reboot** screen, click to select the appropriate reboot condition and click **Apply reboot** to confirm.

Figure 66. Reboot Options popup screen



2. At the **Password Verification** screen (Figure 67) enter the Administrative password and click **OK**.

Figure 67. Password verification popup screen

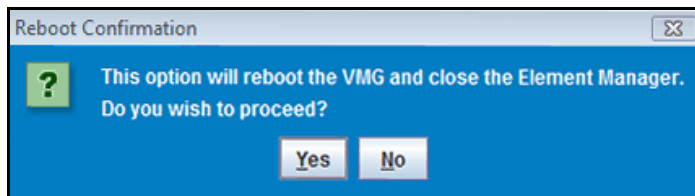


3. Depending upon which **Reboot** option was selected in the **Reboot** options popup screen, one of the following confirmation queries (Figure 68) is presented:

Figure 68.Reboot Options

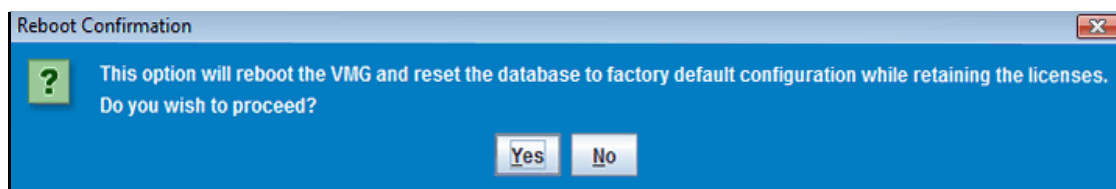
Reboot

- Preserve the current configuration.
 - Preserve all licenses.
-



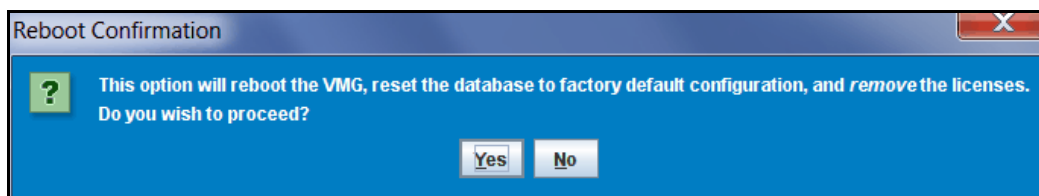
Reboot with factory default configuration-retain licenses

- Reset the database to its factory default setting.
 - Preserve licensing.
-



Reboot with factory default configuration-remove licenses

- Reset the database to its factory default settings.
 - Remove all licenses.
-



4. To apply the selected reboot, click **OK** on the confirmation query.

System Shutdown

If power must be removed from the VMG chassis, as when moving the VMG chassis to a different rack, perform a system shutdown.

Use the **System Shutdown** screen to issue a system shutdown instruction to the VMG.

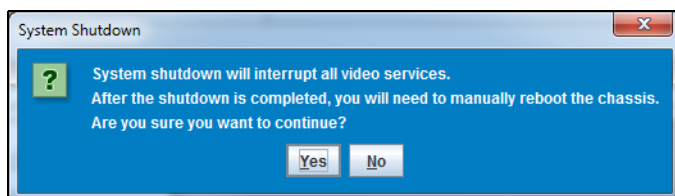


Caution: *Performing a system shutdown interrupts all video services and powers down the chassis. After the system is shut down, the VMG chassis must be manually powered on using the facility power switch.*



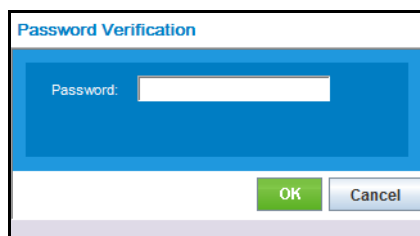
From the *Element Manger*, select **Maintenance -> System Shutdown** to present the **System Shutdown** screen (Figure 69)

Figure 69. System Shutdown Confirmation



1. At the **System Shutdown** screen, click **Yes**.
2. At the **Password Verification** screen (Figure 70), enter your password and click **OK**.

Figure 70. Password Verification



NPM Redundancy Switch

In addition to the VMG initiating an NPM redundancy switch when certain failover conditions are met, the redundancy condition can be manually switched over by using the **NPM Redundancy Switch**. Activating the redundancy switch causes the standby NPM to become active and the currently active NPM to switch to standby after the system is rebooted.



Caution: *If you have AMP cards installed and configured, performing an NPM redundancy switch will cause a switchover to the standby AMP card as well.*



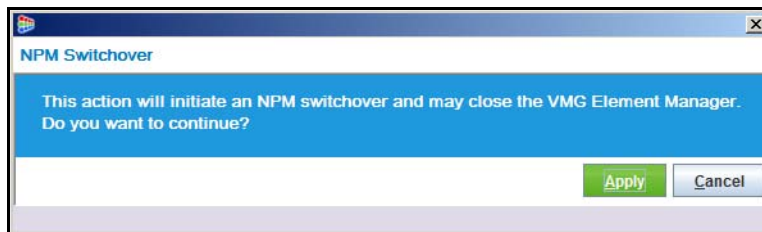
Note: *The NPM Switchover feature only applies if two NP\Ms are installed in the VMG chassis, the system is fully redundant, and the standby NPM has been online for at least three minutes. If the standby NPM has not been online for at least three minutes, the VMG Element Manager will not allow manual switchover.*

Use the **NPM Switchover** screen to manually perform an NPM redundancy switch.



From the *Element Manger*, select **Maintenance** -> **NPM Switchover** to present the **NPM Switchover** screen (Figure 71).

Figure 71. NPM Switchover Confirmation



Either click **Apply** to proceed with the system switchover, or click **Cancel** to abort the switchover.

Program Redundancy Switch to Primary

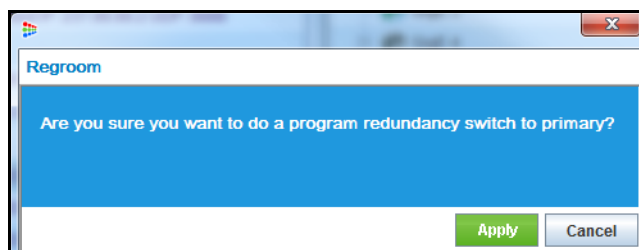
This operation requires that program redundancy be configured prior to attempting the switchover. See also “[Program Redundancy](#)” on page 253 for more information. Use the **Regroom** screen to implement a program switchover.



From the *Element Manger*, select **Maintenance** -> **Program Redundancy Switch to Primary** to present the **Regroom** screen (Figure 72).

Either click **Apply** to proceed with the program redundancy switchover, or click **Cancel** to abort this switchover.

Figure 72. Regroom



Time Offset Table (TOT)

The TOT conveys additional information about summer and winter time periods and gives the local time offset with respect to UTC for different countries or regions. If the TOT is locally generated, user interaction is required to define the country or region in which the receiver is operated.

The VMG supports the required DVB tables, including TOT.

Use the **Setup Time Offset Table (TOT)** screen to set parameters for TOT.



From the *VMG Element Manager main menu*, select **Maintenance -> Setup Time Offset Table (TOT)** to present the **Setup Time Offset table (TOT)** screen (Figure 73 and Table 48).

Figure 73. Setup Time Offset Table (TOT)

Start Time and End Time fields are displayed after you select a value in the DST Offset field.

Table 48. Tot Time Offset Settings

Field	Description	Default
Country Code	The three character country code.	USA
Region ID	The region identifier, with range 0 to 60. If there is only one time zone in the country, this value is zero. Otherwise, the timezones are numbered from 1 (most easterly) up to 60, (the most westerly).	0
DST Offset	The Daylight Savings Time (DST) offset: (range is -2:00, -1:30, -1:00, -0:30, 0, +0:30, +1:00, +1:30, +2:00). The value is 0: when DST is not applicable; otherwise the offset to be applied to current time when DST is in effect. For instance, in the US, the local time offset when DST is not in effect is -8, and when DST is in effect, it is -7. So, the DST offset is +1. polarity is 1 as time is behind UTC.	00:00
The following fields will only be displayed if the DST offset is set to anything but 00:00.		
Start Time: Day	Indicates what day DST takes effect in the current year. Choices are: 1st, 2nd, 3rd or Last Sunday.	1st Sunday
End Time: Day	Indicates what day DST ends in the current year. Choices are: 1st, 2nd, 3rd or Last Sunday.	1st Sunday
Start Time: Month	Indicates the month DST takes effect in the current year. Choices are: January - December	Jan
End Time: Month	Indicates the month DST ends in the current year. Choices are: January - December.	Jan

Table 48. Tot Time Offset Settings (Continued)

Field	Description	Default
Start Time: Hour	Indicates the hour (military time) DST takes effect in the current year. Choices are: 0-23.	0
End Time: Hour	Indicates the hour (military time) DST ends in the current year. Choices are: 0-23.	0
Start Time: Minute	Indicates the minute DST takes effect in the current year. Choices are 0-59.	0
End Time: Minute	Indicates the minute DST ends in the current year. Choices are: 0-59.	0

System Alarms and Events

This chapter describes the use of the *VMG Element Manager* to monitor system health. The **Alarms & Events** tab on the *VMG Element Manager* screen provides system information and health status.

To view the complete list of VMG Alarms and Events, refer to [Appendix B, “VMG Alarms and Events”](#) on page 314.

In This Chapter:

- “Active Alarm,” next.
- “Event History” on page 111.

Active Alarm

For each alarm generated from the VMG, the time raised, acknowledged status, severity, category, type, and description are displayed in the **Active Alarm tab page**. The information on this screen can be sorted by clicking on the column headings. Clicking on the **Apply** button will retrieve the most recent alarms, if any.

Use the **Active Alarm** tab page to view the currently active alarms reported by the VMG ([Figure 74](#) and [Table 49](#)).

 At the *VMG Element Manager*, click **Alarms & Events**, then click **Active Alarm**.

Figure 74. Active Alarm Tab Page

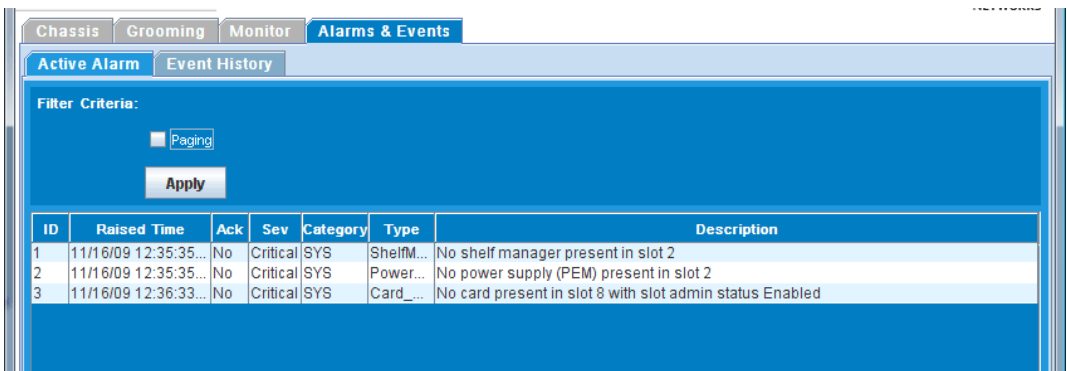


Table 49. Active Alarm Tab Page

Field	Description
ID	The identification number of the alarm.
Raised Time	The time the alarm occurred.

Table 49. Active Alarm Tab Page

Field	Description
Ack	Shows if the alarm has been acknowledged or not. Until an alarm is acknowledged, the central telco alarm/bell will be active.
Severity	The severity of the alarm. One of Critical, Major, Minor, or Info.
Category	The general category for the alarm. See Appendix B, "VMG Alarms and Events" for details.
Type	The type of alarm that occurred.
Description	A description of the alarm.

Once an alarm has been triggered, it must be acknowledged to activate the alarm cutoff.

Acknowledging Alarms

Current status of alarm acknowledgement is reported in the **Ack** column of the **Alarm** tab page as either *Yes* (acknowledged) or *No* (not acknowledged).

Acknowledged alarms remain in the **Active Alarm** list until cleared. Once an alarm condition is resolved, the alarm is removed from the active list. For example, when a port is not functioning ("operationally down") an alarm is added to the list. Later, after the port becomes operationally up, the alarm is cleared and removed from the list.

Use the **Active Alarm** tab page to acknowledge alarms:

1. Ensure that the alarm to be acknowledged has not already been acknowledged. The Ack column should report No.
2. Click on the alarm in the **Active Alarm** list to highlight your selection.
3. Right-click and choose **Ack Alarm** from the popup menu.

Note that the *Ack* column for the selected alarm row now reports Yes, and acknowledgement of an alarm is recorded in the Event History.

Paging - Alarms

The paging option allows you to move quickly through the alarm displays, on a pagination basis. When enabled, you can choose to view the previous or next page of alarm reports, or jump to the first or last pages.

Use the **Active Alarm** tab page to enable or disable the paging function for the displayed alarms.

- Enable (check) or disable (un-check) **Paging** in the **Filter Criteria** section of the **Active Alarm** screen.
 - If paging is selected, four buttons are displayed for navigating the alarm log: **First**, **Previous**, **Next**, and **Last** ([Figure 75](#)).
 - If paging is disabled, the **First**, **Previous**, **Next**, and **Last**.buttons are hidden from view.

Figure 75. Active Alarms List with Paging Enabled

ID	Raised Time	Ack	Sev	Category	Type	Description
1	11/16/09 12:35:35...	No	Critical	SYS	ShelfM...	No shelf manager present in slot 2
2	11/16/09 12:35:35...	No	Critical	SYS	Power...	No power supply (PEM) present in slot 2
3	11/16/09 12:36:33...	No	Critical	SYS	Card_...	No card present in slot 8 with slot admin status Enabled

Event History

An entry is added to the event history table each time an event occurs. Some events result in alarms being raised or cleared. Acking an alarm adds an entry to the list. This provides a history of alarms on the system. For each event, the time stamp, severity, category, type, and description are displayed on the Event History tab page.

- The information on this screen can be sorted by clicking on the column headings.
- Clicking the **Apply** button will retrieve the latest events, if any.

Use the **Event History** tab page to view the current events reported by the VMG.



At the *VMG Element Manager*, click **Alarms & Events**, then click **Event History** (Figure 76 and Table 50).

Figure 76. Event History

ID	Time Stamp	Sev	Category	Type	Description
1	11/16/09 12:35:33 ...	Info	SYS	NPM_A...	NPM card in slot 7 is now active
2	11/16/09 12:35:35 ...	Info	SYS	ShelfMg...	Shelf manager present in slot 1
3	11/16/09 12:35:35 ...	Critical	SYS	ShelfMg...	No shelf manager present in slot 2
4	11/16/09 12:35:35 ...	Info	ALARM	Raise	Alarm ID=1, raised due to event ID=3
5	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 1
6	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 2
7	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 3
8	11/16/09 12:35:35 ...	Info	SYS	PowerS...	Power supply (PEM) present in slot 1
9	11/16/09 12:35:35 ...	Critical	SYS	PowerS...	No power supply (PEM) present in slot 2
10	11/16/09 12:35:35 ...	Info	ALARM	Raise	Alarm ID=2, raised due to event ID=9
11	11/16/09 12:35:38 ...	Info	SYS	Card_P...	Card present in main slot 9
12	11/16/09 12:36:33 ...	Critical	SYS	Card_N...	No card present in slot 8 with slot admin status Enabled
13	11/16/09 12:36:33 ...	Info	ALARM	Raise	Alarm ID=3, raised due to event ID=12
14	11/16/09 12:38:22 ...	Info	SYS	CFG C...	Config change: Card in main slot 9 admin enabled

Table 50. Alarms & Events - Event History Settings

Field	Description
ID	The identification number of the event.
Time Stamp	The time the event occurred.

Table 50. Alarms & Events - Event History Settings (Continued)

Field	Description
Severity	The severity of the event: Critical, Major, Minor, or Info.
Category	The general category for the event. See Appendix B, “VMG Alarms and Events” for details.
Type	The type of event that occurred.
Description	A description of the event.

Paging - Events

The paging option allows you to move quickly through the event log, on a pagination basis. When enabled, you can choose to view the previous or next page of event logs, or jump to the first or last pages.

Use the **Event History** tab page to enable or disable the paging function for the displayed events.

- Enable (check) or disable (un-check) **Paging** in the **Filter Criteria** section of the **Event History** screen.
 - If paging is selected, four buttons are displayed for navigating the alarm log: **First**, **Previous**, **Next**, and **Last** ([Figure 77](#)).
 - If paging is disabled, the **First**, **Previous**, **Next**, and **Last**.buttons are hidden from view.

Figure 77. Event History with Paging Enabled

ID	Time Stamp	Sev	Category	Type	Description
1	11/16/09 12:35:33 ...	Info	SYS	NPM_A...	NPM card in slot 7 is now active
2	11/16/09 12:35:35 ...	Info	SYS	ShelfMg...	Shelf manager present in slot 1
3	11/16/09 12:35:35 ...	Critical	SYS	ShelfMg...	No shelf manager present in slot 2
4	11/16/09 12:35:35 ...	Info	ALARM	Raise	Alarm ID=1, raised due to event ID=3
5	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 1
6	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 2
7	11/16/09 12:35:35 ...	Info	SYS	Fan_Pr...	Fan (or fan tray) present in slot 3
8	11/16/09 12:35:35 ...	Info	SYS	PowerS...	Power supply (PEM) present in slot 1
9	11/16/09 12:35:35 ...	Critical	SYS	PowerS...	No power supply (PEM) present in slot 2
10	11/16/09 12:35:35 ...	Info	ALARM	Raise	Alarm ID=2, raised due to event ID=9
11	11/16/09 12:35:38 ...	Info	SYS	Card_P...	Card present in main slot 9
12	11/16/09 12:36:33 ...	Critical	SYS	Card_N...	No card present in slot 8 with slot admin status Enabled
13	11/16/09 12:36:33 ...	Info	ALARM	Raise	Alarm ID=3, raised due to event ID=12
14	11/16/09 12:38:22 ...	Info	SYS	CFG_C...	Config change: Card in main slot 9 admin enabled
15	11/16/09 12:38:58 ...	Info	SYS	Card_O...	Card in main slot 9 is operationally up
16	11/16/09 12:40:24 ...	Info	IF_PORT	CFG_P...	Config change: 1Gige port 1 is admin enabled
17	11/16/09 12:40:24 ...	Info	IF_PORT	CFG_P...	Config change: 1Gige port 7 is admin enabled
18	11/16/09 12:40:24 ...	Info	MPEG	CFG_In...	InTS created: Index 1 Port 1 IP 239.9.9.9 UDP 9999
19	11/16/09 12:40:24 ...	Info	MPEG	CFG_O...	OutTS created: Index 1 Port 7 IP 224.5.5.50 UDP 5000
20	11/16/09 12:40:26 ...	Major	MPEG	Input_T...	InTs: Missing Set TS 1 Port 1 IP 239.9.9.9 UDP 9999
21	11/16/09 12:40:26 ...	Info	IF_PORT	Port_O...	1Gige port 1 is operationally up
22	11/16/09 12:40:26 ...	Info	IF_PORT	IF_Oper...	Interface on 1Gige 1 is operationally up
23	11/16/09 12:40:27 ...	Info	IF_PORT	Port_O...	1Gige port 7 is operationally up
24	11/16/09 12:40:27 ...	Info	IF_PORT	IF_Oper...	Interface on 1Gige 7 is operationally up
25	11/16/09 14:08:48 ...	Info	AAA	Login	User Authentication succeed for Administrator
26	11/16/09 14:09:26 ...	Info	AAA	Logout	User Administrator logged out

Video Processing Overview

The VMG provides the capability to transmit and receive MPEG-2 and H.264 video program streams in either single- or multi-program MPEG-2 transport streams encapsulated with UDP / IP or RTP / UDP / IP using the IP transport network. The VMG provides advanced digital video services, such as transcoding, transrating, grooming, and statistical multiplexing, which are essential for video processing.



Note: *System configuration must be completed before performing grooming tasks. Refer to Table 59, “Grooming Task Sequence Reference,” on page 124 and/or Chapter 4, “System Configuration” for more information.*

This chapter introduces how to associate the VMG GigE interfaces to the transport streams and perform grooming operations at the *VMG Element Manager*.

In This Chapter:

- “Interfaces,” next.
- “Transport Streams” on page 115.
- “Programs” on page 118.
- “Table Processing” on page 119.
- “Grooming” on page 120.
- “Program Redundancy” on page 125.
- “Transrating” on page 125.
- “Transcoding” on page 126.
- “Bitrate Monitoring” on page 126.
- “Statistical Multiplexing” on page 127.
- “Forward Error Correction (FEC)” on page 127.

Interfaces

Interfaces refer to the Gigabit Ethernet (GigE) ports of the NPMs installed at the VMG. Each NPM provides eight bidirectional GigE ports that support small form-factor pluggable (SFP) optical or copper modules, and two 10GigE ports that support 10 Gigabit small form-factor pluggable (XFP) optical modules. The NPM also provides one RJ-45 10/100 Ethernet port for configuration and management, one RJ11 serial console port, and one RJ-45 DOCSIS Timing Interface (DTI).



Note: For updates on the latest SFPs and XFPs approved for use with RGB's products, [log in to RGB's Customer Portal and search for either SFP, or XFP](#).

The VMG GigE interfaces comply with the following standards:

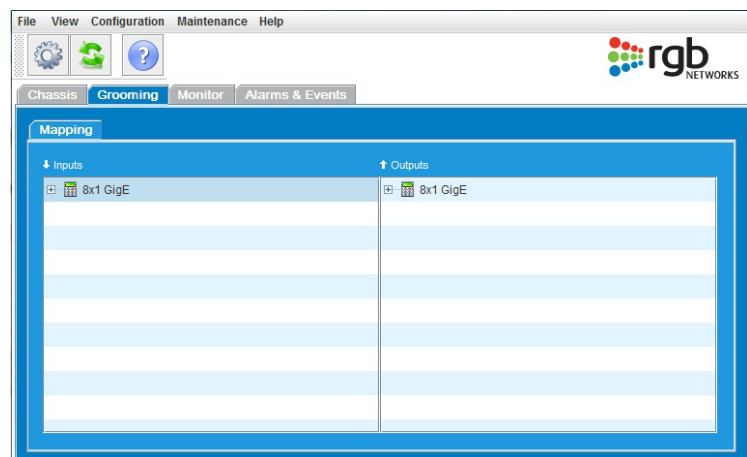
- IEEE 802.3z, IEEE 802.3ab, IEEE 802.3ae.
- ITU-T G.692 - Optical interfaces for multichannel systems with optical amplifiers.
- RFC-768, RFC-791, RFC-792, RFC-793, RFC-826, RFC-1889.

After you configure the GigE interfaces, they are displayed at the **Inputs** and **Outputs** panels of the **Grooming -> Mapping** page as GigE icons ([Figure 78](#)).

Figure 78. GigE Interfaces on the Grooming --> Mapping tab page

GigE interfaces: collapsed view

This view displays the Ethernet grooming groups at the **Inputs** and **Outputs** panels.

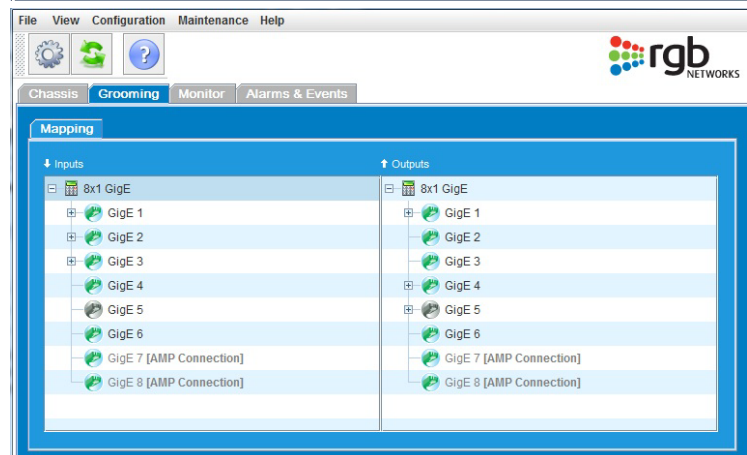


GigE interfaces: expanded view

This view provides the means by which you can manage operations on the individual GigE ports.

However, before you can use a GigE interface, it must first be configured, using the **Configure GigE Ports** screen.

You can view and select options from any GigE interface on the **Grooming Mapping** tab page by right-clicking on the interface and selecting an option from the popup menu (Table 51).



Right-click on an input or output GigE icon to view and select options from the popup menu (Table 51).

Table 51. GigE Menu Options for Input and Output Ports

Input Options	Output Options
Create a Transport Stream	Create MBR Transport Stream
Delete a Transport Stream	Create AVTX + PIP Transport Stream
	Create VTX + PIP Transport Stream
	Create AVTX Transport Stream
	Create VTX Transport Stream
	Create PIP Transport Stream
	Create VTR Transport Stream
	Delete All Transport Streams

Transport Streams

A transport stream consists of a group of programs and the elementary streams (audio, video, data, etc.) associated with each program. The VMG carries MPEG-2 transport streams using UDP / IP (or, optionally, RTP / UDP / IP for real-time content). An MPEG-2 transport stream is split in groups of packets and mapped to the data portion of a UDP frame. The UDP header contains the 16-bit source UDP port number, 16-bit destination UDP port number, and UDP frame length and checksum. The UDP port is used to identify the source and destination applications for the message. In readiness for delivery, the UDP frame is encapsulated in an IP frame, which contains the IP addresses of the source and destination.



Transport stream creation is dependent on the type of licenses installed at the VMG. Refer also to “[License Management](#)” on page 99 for details.

Using the menus from the GigE interfaces on the **Grooming** --> **Mapping** tab page, you create the transport streams for both input and output, as introduced in the following topics:

- “[Input Transport Streams and the VMG](#),” next.
- “[Output Transport Streams and the VMG](#)” on page 116.

Input Transport Streams and the VMG

Input transport streams contain the source content that the VMG uses for video processing tasks. The type of content loaded into an input transport stream is the result of your configuration at the **Create GigE Input Transport Stream** dialog for a specific GigE interface. This configuration allows you to create single or multiple input transport streams, set table processing (for DVB, ATSC, or SDT), and define network parameters.

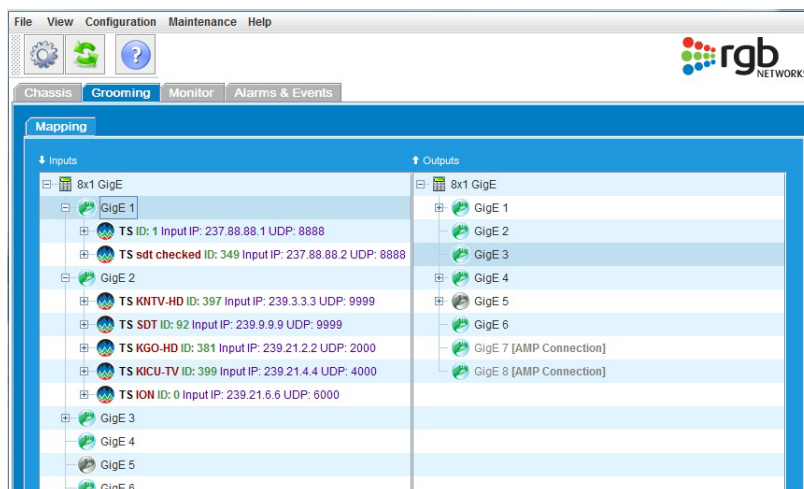
After you set up the input streams, you can:

- View input transport stream content at the **Inputs** panel of the **Grooming Mapping** page (Figure 79), displayed beneath the interface when it is received by the interface.
- Choose programs from the input stream to map with output transport streams.
- Use menu options directly from a TS popup menu (Table 52 on page 118, Inputs column).

Figure 79. Input Transport Streams

Input Transport Streams

This view displays the various transport streams assigned to specific GigE interfaces. Each TS is identified by information as was configured with the **Create GigE Input Transport Stream** dialog.



For details about managing input transport streams, refer to [Chapter 9, “Input Transport Streams”](#).

Output Transport Streams and the VMG

Output transport streams contain the content being sent out from the VMG. For any GigE output interface, you can use the *VMG Element Manager* to create standard, transcoded+PIP, and/or MBR transport streams.

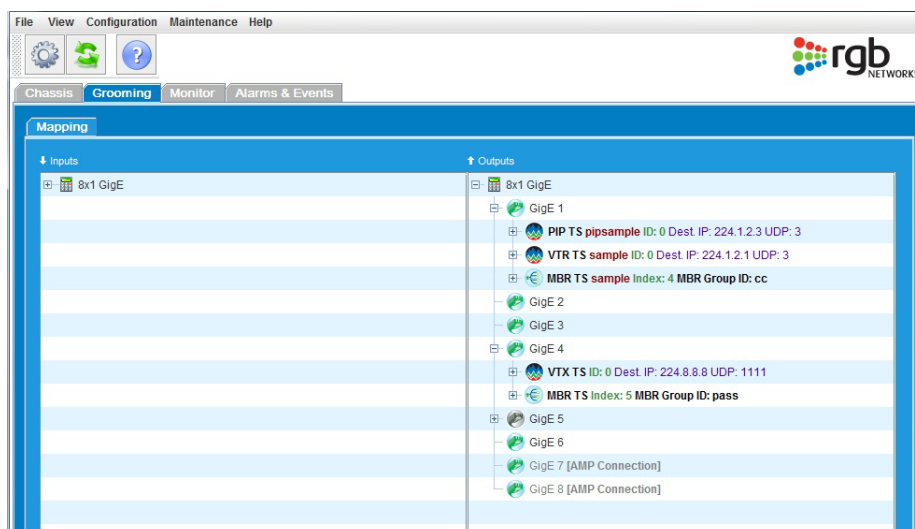
After you set up the output streams, you can:

- View output transport stream content at the **Outputs** panel of the **Grooming Mapping** page ([Figure 80](#)), displayed beneath the interface when you groom to the transport stream.
- Use menu options directly from a output TS popup menu ([Table 52 on page 118](#), Outputs columns) to manage the transport stream as well as the grooming.

Figure 80. Output Transport Streams

Output Transport Streams

These transport streams are associated with specific GigE interfaces as a result of your selection for TS type. Content for each TS is the result of assigning an input program to the output TS.



Standard Output Transport Streams

Standard output transport streams are MPEG-2, ATSC, SCTE, or DVB streams that can contain transcoded or non-transcoded output programs. Single video transport streams are **VTX** (video transcoding), **AVTX** (audio and video transcoding), **PIP** (picture-in-picture), and **VTR** (video transrating).

- Transcoded output programs can contain output video types of MPEG-2 (HD or SD) or H.264 (HD, SD, or PIP).
- Non-transcoded (transrated) streams support both transport stream-level and program-level digital program insertion (DPI).

For information on creating standard output transport streams and associated program grooming, refer to [Chapter 10, “Single Video Transport Streams”](#).

Transcoded+PIP Output Transport Streams

In contrast to standard output transport streams, a Transcoded+PIP transport stream enables transcoding of a single input stream (HD or SD in either MPEG-2 or H.264 format) into two H.264 output streams: a full frame rate, broadcast-resolution main stream and a corresponding PIP stream. All programs groomed to Transcoded+PIP transport streams are transcoded to H.264 video.

Transcoded+PIP TSs use the VMG’s resources more efficiently than standard OTSs and simplify the creation of programming that requires PIP output.

You can create two types of Transcoded+PIP transport streams:

- **AVTX+PIP** for audio transcoding and picture-in-picture.
- **VTX+PIP** for video transcoding and picture-in-picture.

For information on creating Transcoded+PIP transport streams and associated program grooming, refer to [Chapter 11, “Transcoded+PIP Transport Streams”](#).

MBR Output Transport Streams

An **MBR** (multi-bitrate) transport stream enables transcoding of a single input stream (HD or SD in either MPEG-2 or H.264 format) into as many as four H.264 SPTSs per grooming operation. More than four profiles (outputs) can be configured by performing multiple groom operations reference the same group ID. All programs groomed to MBR TSs are transcoded to H.264 video. For each SPTS in an MBR TS, you can independently control the video bitrate, resolution, aspect ratio, profile, and GOP structure for a groomed program.

MBR TSs also perform transcoding on the input audio streams, enabling you to control the number of audio channels, sampling rate, and audio bitrate for the output programs. You can set up as many as 108 video/audio MBR groups for programs groomed to MBR TSs with up to 8 profiles (outputs) each.

For information on creating MBR transport streams and associated program grooming, refer to [Chapter 12, “MBR Transport Streams”](#).

Right-click on an input or output transport stream to view and select options from the popup menu (Table 52).

Table 52. Transport Stream Menu Options for Input and Output

INPUTS	OUTPUTS	
	Standard Transport Stream Options	MBR, and Transcoded + PIP Stream Options
Modify Transport Stream	Modify <TS type> Transport Stream	Modify <TS type> Transport Stream
Delete Transport Stream	Delete <TS type> Transport Stream	Delete <TS type> Transport Stream
Create Ghost Program	Create Program	Modify <TS type> Grooming
	Delete All Programs	Delete <TS type> Grooming
	Display Grooming	Reset <TS type> Grooming
	Bitrate Monitor	View <TS type> Grooming Source
	Reset Grooming	

Programs

Programs processed by the VMG are represented by Program icons at both the input and output sections of the grooming platform.

Input Programs

Input programs are displayed at the *VMG Element Manager* as a result of being received in a particular transport stream via its GigE input interface. An input program consists of a group of individual elementary streams (audio, video, data, etc.), which are compliant with the table processing instructions you define in your configuration for the GigE Input Transport Stream.

Once a program icon is in view at the input panel, you can use options directly from its popup menu (Table 53) Inputs columns) for management of the input program and to add elementary streams.

Output Programs

An output program consists of a group of individual elementary streams (audio, video, data, etc.) intended for transmission from the VMG. You set up and configure the output programs at the **Outputs** section of the grooming platform either by creating a new program directly from an output TS (AVTX, VTX, VTR, PIP), or by dragging an input program to a specific output TS.

Once a program icon is in view at the output panel, you can use options directly from its popup menu (Table 53, Outputs columns) for management of the output program, streams, and grooming.

Right-click on an input or output program icon to view and select options from the popup menu (Table 53).

Table 53. Program Menu Options for Input and Output

Inputs Options	Outputs Options
Modify Program Name	Modify Program
Delete Program	Delete Program

Table 53. Program Menu Options for Input and Output (Continued)

Inputs Options	Outputs Options
Rollback Original Program Name	Manage Elementary Streams
Config Program Redundancy	View Grooming Source
Add Elementary Stream	Modify Grooming

Table Processing

The VMG processes Service Definition Tables (SDTs) on non-DVB input transport streams (on the basis of your configuration for table processing on specific GigE interfaces), and enables generation of SDTs on MBR output transport streams (on the basis of your settings when creating or modifying the output transport streams).

Table processing on an input TS is supported at the VMG for both DVB and non-DVB input. The stream content is managed by means of your configurations for table processing—for specific input transport streams on GigE interfaces—whereby you can opt for no table processing, or choose DVB, ATSC, or SDT (Table 54). More information about this configuration is provided in “[Creating Input Transport Streams](#)” on page 128.

Following your configuration of an input transport stream, the associated table types are displayed in the *VMG Element Manager* grooming platform upon receipt of the incoming traffic. The tables, themselves, cannot be modified.

Table 54. Table Processing—Input Transport Streams

Table Processing Option	Input TS
None	Streams classified as DVB, ATSC, or SDT will be ignored but only basic tables (PAT and PMT) will be processed on the input TS at the GigE interface.
DVB (Digital Video Broadcast)	The GigE interface will classify the input TS as DVB, and will process only DVB tables in conjunction with PAT and PMT from the input transport stream. This setting cannot be combined with any other table processing option.
ATSC (Advanced Television Systems Committee)	The GigE interface will classify the input TS as ATSC, and will process only ATSC tables in conjunction with PAT and PMT from the input transport stream. This setting cannot be combined with any other table processing option.
SDT (Service Descriptor Table)	Allows processing SDT tables on non-DVB input TS. When enabled, input stream types 0x80 are interpreted as SCTE-video; other DVB-SI tables (EIT, NIT, TDT, TOT) cannot be received on the input interface. This setting cannot be combined with any other table processing option.

Grooming

Grooming refers to the process of grouping (mapping) specific input programs and services from multiple sources into different packages, such as customized channel lineups for subscribers. The VMG allows selecting an elementary stream (e.g., video, audio, or data), a single-program transport stream (SPTS), or multi-program transport stream (MPTS) from one input, and grooming it with one or more streams from other inputs to create an MPTS multiplex.



Note: *The VMG must be equipped with appropriate modules to enable service for particular transport streams. See [Table 58](#) for more information.*

You can perform grooming tasks from a single window—the **Grooming--> Mapping** page—on the *VMG Element Manager*, to manage both input and output interfaces, programs, and a variety of transport streams.

Drag-and-drop Grooming

The *VMG Element Manager* GUI provides drag-and-drop grooming capability for programs and elementary streams on an input program, to become part of an output program.

Drag-and-drop grooming can be applied to create new program mappings, or you can replace an existing, already-groomed output transport stream (which is referred to as regrooming). Regrooming recreates the grooming configuration but associates it with a different input (source) program. A basic rule for regrooming is that the input program being used must contain an identical number of streams, stream types, and PMT order as does the targeted output program.

As based on the output transport stream type, the *VMG Element Manager* supports two types of regrooming ([Table 55](#)):

Table 55. Regrooming

Output Transport Streams	Description
VTX, VTX+PIP, PIP, VTR	<p>Regrooming rebuilds the grooming at the selected output TS, with the new input program, using the identical configuration on the output program, output elementary streams.</p> <p>See also “Regrooming—VTX, VTX+PIP, PIP” on page 195.</p> <p>The same implementation is true for VTR, if not program substitution or DPI.</p>
AVTX, AVTX+PIP, MBR	<p>Regrooming rebuilds all grooms for the output transport stream that shared the same audio profile ID, MBR group ID, to use the identical video configuration and audio configuration, and the identical MBR group ID or audio profile ID name.</p> <p>See also “Regrooming—AVTX, AVTX+PIP” on page 220.</p>

Resetting Grooming

The *VMG Element Manager* allows you to reset grooming of output transport streams. This function interrupts service while tearing down the current grooming to rebuild it with the identical configured parameters. For more information about the **Reset Grooming** function, see:

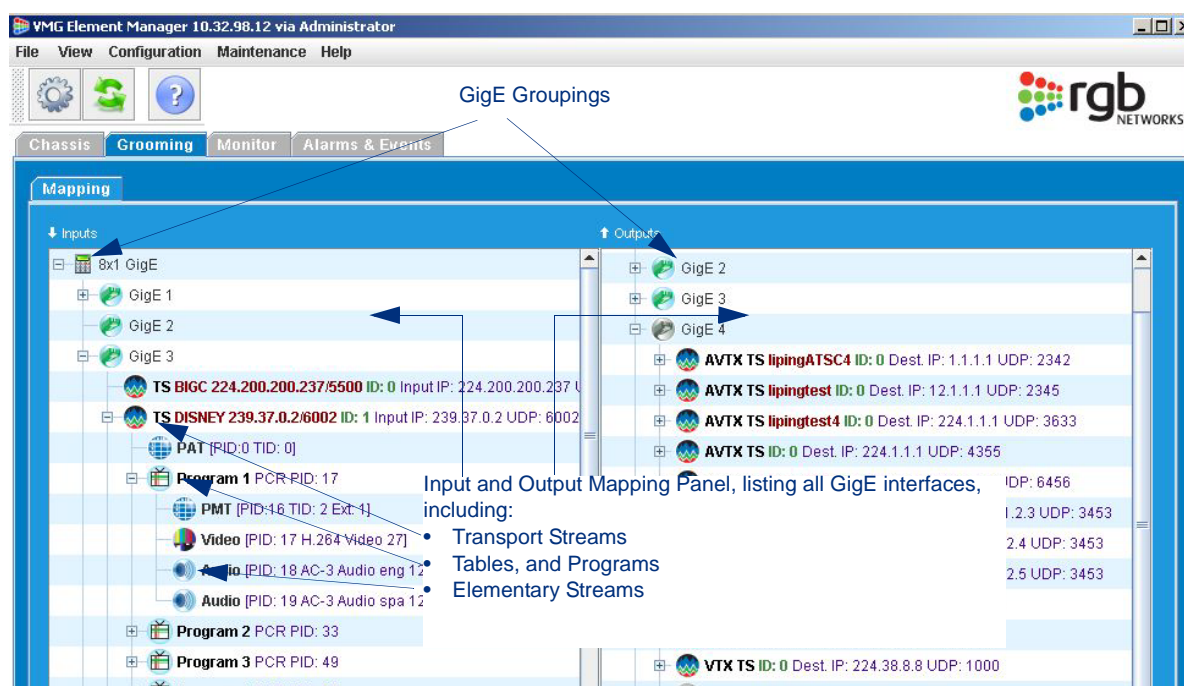
- “Resetting Grooming—AVTX, VTX, PIP” on page 195.
- “Resetting Grooming—AVTX+PIP or VTX+PIP” on page 220.
- “Resetting Grooming—MBR” on page 239.

How to Groom

Use the **Grooming** -> **Mapping** tab page (Figure 81) to view existing transport streams, program names, and elementary streams for each of the input and output interface ports of the VMG.

At the *VMG Element Manager*, click the **Grooming** tab to present the **Mapping** tab page.

Figure 81. Mapping Components



The **Mapping** screen displays all the input and output components currently associated with each GigE interface at the VMG. The components are hierarchically organized (Table 56), and identifiable by icons and labels (Table 57).

Table 56. Mapping Hierarchy for Grooming

Object	Description
GigE group	Displayed at top of the input and output panels. The type of group displayed is the result of your configuration for the GigE grooming group (see “Grooming Group tab” on page 46).
GigE1 through GigE 8	Individual GigE ports, as numbered on the installed NPM. The same GigE port is configured for both input streams and output streams at the Mapping page.

Table 56. Mapping Hierarchy for Grooming (Continued)

Object	Description
TS	<p>Transport stream.</p> <ul style="list-style-type: none"> Input TS: After you create these, they will contain source content: a set of programs and PSIP/SI tables and programs, which are displayed under their associated transport stream. To find out how to create an input TS, see “Creating Input Transport Streams” on page 128. Output TS: After you create these, they will contain the content to be delivered from the VMG. Each output TS is associated with a specific transcoding and/or transrating method. To find out how to create an output TS, see the section appropriate for the type of stream: <ul style="list-style-type: none"> - “Creating Output Transport Streams” on page 139 - “Creating Transcoded+PIP Transport Streams” on page 201. - “Creating MBR Transport Streams” on page 226.
Programs and Tables	<ul style="list-style-type: none"> Each program consists of audio, video, and PSIP/SI information.
Elementary Streams	<ul style="list-style-type: none"> Elementary streams appear under the program.

You can also use the **Display Grooming** option from a populated input program, to view and refresh program information in the **Current Program Mapping** screen.

Grooming Icons

All configured interface ports are displayed in the **Mapping** tab page, which contains the inputs in the left panel, and the outputs in the right panel. If a port is enabled and functioning, it is displayed with a green icon. Each component type listed in the **Mapping** tab page is identifiable by its icon ([Table 57](#)) as well as its logical name. Icon colors provide a quick method of determining status of the GigE ports, certain transport streams, and the programs.

Table 57. Grooming -> Mapping Icons












Icon	Description
	<p>1 GigE or 10 GigE Interface.</p> <p>To start drilling down into the contents, either double-click on the icon or click the + box alongside the label.</p>
	<p>1 GigE or 10 GigE Port. Status is indicated as follows:</p> <ul style="list-style-type: none"> Green and blue = port is administratively up. Black and white = port is enabled but not administratively up.
	Input or Standard Output Transport Stream.
	<p>Transcoded+PIP or MBR Transport Stream. Status is indicated as follows:</p> <ul style="list-style-type: none"> Blue and dark blue = video processing is active. Black and white = video processing is not active.
	<p>Input or Output Program. Status is indicated as follows:</p> <ul style="list-style-type: none"> Red, green, and blue = video processing is active. Black and white = video processing is inactive.
	Output Program that is DPI-enabled.

Table 57. Grooming -> Mapping Icons (Continued)

Icon	Description
	Output Program that is Program Substituted.
	Error detected in program, such as a mismatch between the configurations and the actual stream type, video codec, or resolution. To view the reason for the program error, hover over this icon to prompt for the information popup.
	PAT, PMT, or CUE presence.
	Video channel presence.
	Audio channel presence.

Basic Grooming Requirements and Workflow

The VMG Element Manager contains numerous tools that you can use to set up a wide variety of stream configurations. The VMG can support various configurations if the correct VMG modules are installed at the system ([Table 58](#)).

Table 58. VMG Equipment and Streams

Output Streams	Description	VMG Equipment Requirement	TS Type—Options
VTR	Single video TS: Video Transrating	VPM, NPM	MPEG-2, ATSC, SCTE, DVB
PIP	Single video TS: Picture in Picture	TCM, NPM	MPEG-2, ATSC, SCTE, DVB
VTX+PIP	Transcoded+PIP TS: Video Transcode with PIP	TCM, NPM	MPEG-2, DVB
VTX	Single video TS: Video Transcode	TCM, NPM	MPEG-2, ATSC, SCTE, DVB
MBR	MBR TS: Video and Audio Transcoding	TCM, AMP, NPM	MPEG-2
AVTX	Single video TS: Video and Audio Transcoding	TCM, AMP, NPM	MPEG-2, ATSC, SCTE, DVB
AVTX+PIP	Transcoded+PIP TS: Video and Audio Transcoding with PIP	TCM, AMP, NPM	MPEG-2



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

Typical Task Sequence

The typical task sequence, for grooming input programs to output transport streams consists of steps listed in [Table 59](#).

Table 59. Grooming Task Sequence Reference

Steps and Options	VMG Element Manager Access	Location in Manual
1. Configure GigE interfaces	Main Menu, Configuration --> GigE Ports --> Configure GigE Ports screen.	"Gigabit Ethernet Port Configuration" on page 63.
2. Create Input Transport Stream	Grooming tab --> Mapping page, Inputs panel -> right click on GigE interface, select Create Transport Stream --> Create GigE Input Transport Stream screen.	"Creating Input Transport Streams" on page 128.
3. Create Output Transport Stream	Grooming tab --> Mapping page, Outputs panel --> right click on GigE interface, select Create <type> Transport Stream screen.	<ul style="list-style-type: none"> • "Creating Output Transport Streams" on page 139. • "Creating MPEG-2 Transcoded+PIP Transport Streams" on page 201. • "Creating DVB Transcoded+PIP Transport Streams" on page 206.
4. Map Input Program to Output Transport Stream.	Grooming tab --> Mapping page, Inputs panel -> click-select a Program from an Input Transport Stream --> drag it to the Outputs panel and into a <type> TS --> <type> Program Mapping screen.	<ul style="list-style-type: none"> • VTR: "Grooming Non-Transcoded Programs" on page 171. • PIP: "Grooming Transcoded Programs" on page 175. • VTX+PIP: "Grooming to VTX+PIP" on page 210. • VTX: "Grooming Transcoded Programs" on page 175. • MBR: "Grooming a Program to an MBR TS" on page 230. • AVTX: "Grooming Transcoded Programs" on page 175. • AVTX+PIP: "Grooming to AVTX+PIP" on page 209.

Typical Maintenance Tasks

Typical grooming maintenance tasks are listed in [Table 60](#).

Table 60. Grooming Management Tasks

Steps and Options	VMG Element Manager Access	Location in Manual
1. Manage Output TS (options: Modify , Delete , Reset , Integrate)	Grooming tab --> Mapping page, Outputs panel --> right-click a Program for popup menu.	<ul style="list-style-type: none"> • “Managing Standard Output Streams and Programs” on page 184. • “Managing Transcoded+PIP Transport Streams and Programs” on page 217. • “Managing MBR Transport Streams and Programs” on page 238.
2. Manage Output Programs (options: Modify , Delete , Manage ESs , View Grooming Source , Display Grooming)	Grooming tab --> Mapping page, Outputs panel --> right-click Program for popup menu.	<ul style="list-style-type: none"> • “Managing MBR Transport Streams and Programs” on page 238.
3. Manage Input Programs (options: Modify , Delete , Rollback , Config Redundancy , Add ES)	Grooming tab --> Mapping page, Inputs panel	<ul style="list-style-type: none"> • “Modifying and Deleting Input Transport Streams and Programs” on page 133. • Table 65, “Grooming - Input Program /Ghost Program Popup Menu,” on page 134.

Program Redundancy

The VMG supports per-input program redundancy. Program level standby is configurable using the *VMG Element Manager*. The VMG allows you to designate any input service from the same grooming group as a “standby program” with the exception of the same service. The VMG automatically returns to the primary program from the standby program when the primary program recovers from the interruption if auto-revert was initially selected; otherwise manual intervention is required for the switch back to the primary input.

The health of the standby program will be checked before failover, and the VMG will not perform the switch if the standby is degraded.

When a grooming session is created (via static configuration or SCTE 30 message) it will inherit the program redundancy configuration from the corresponding input program.

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. This includes converting variable bitrate (VBR) streams to constant bitrate (CBR) streams (also known as “clamping”) as well as reducing VBR streams’ bitrate. The VMG supports MPEG-2 standard-definition (SD) and high-definition (HD) transrating.

The Bypass Transrating option in the VMG enables an operator to completely bypass the VMG transrating engine. This is desired when the incoming video programs into the VMG are already transrated and the operator doesn’t wish to make any further changes to the video bitrate or video quality, while taking advantage of other VMG features such as Ad Insertion, Program Substitution, etc.

Transcoding

Transcoding is the direct compressed stream-to-compressed stream conversion of one type of video or audio stream into another in order to increase bandwidth capacity for video delivery of programs, or to enable a new generation of consumer decoding devices. Historically, transcoding was achieved using stand-alone decoders that brought the signal down to the SDI un-compressed format, followed by a stand-alone real-time encoder. That architecture suffered from network complexity and high capital costs. With the TCM, the VMG can provide the following video transcoding features:

- Transcoding of MPEG-2 to H.264, in HD, SD, PIP, or multi-bitrate streams.
- Transcoding of H.264 to MPEG-2, in HD or SD.
- Transcoding of MPEG-2 to MPEG-2, in HD or SD.
- Transcoding of H.264 to H.264, in HD, SD, PIP, or multi-bitrate streams.
- Downconversion from HD to SD in any transcoding combination and aspect ratio.
- Flexibility in configuring video bit rate (in CBR).
- Ability to configure a variety of horizontal resolutions.
- Ability to configure Group of Picture (GOP) structure.
- Support for various pre-processing filters including MCTF noise reduction and Telecine.
- Closed captioning support.

With the AMP module, the VMG can provide the following audio transcoding features:

- Audio transcoding from MPEG-1 LII, MPEG-2 LII, AAC-LC, HE-AACv1, HE-AACv2, or Dolby AC-3, to MPEG-1 LII, MPEG-2 LII, AAC-LC, HE-AACv1, HE-AACv2, or Dolby AC-3.
- Mono, stereo, or 5.1 channel sources can be converted to mono or stereo during transcoding to MPEG-1 LII or MPEG-2 LII.
- Mono or 5.1 channel sources will be converted to stereo during transcoding to HE-AACv2.
- Mono, stereo, or 5.1 channel sources can be converted to mono, stereo, or 5.1 channel during transcoding to AAC-LC or HE-AACv1.
- Up to 300 stereo pairs can be transcoded by an AMP module.

Bitrate Monitoring

The *VMG Element Manager* provides real-time bitrate monitoring and display for both input and output streams.

- Input bitrate monitoring is performed through sampling of the inputs, and monitoring of transport streams and ports.
- Output bitrate monitoring provides output program bitrates as a percentage of total output bandwidth, which you can display as follows.
 - For single-video streams, you can access the bitrate monitor screen by clicking directly on an output —VTR, AVTX, PIP, VTR, or VTX.
 - For multi-video streams, the bitrate monitor is accessible by clicking on a TS listed beneath the transport type—VTX+PIP, MBR, or AVTX+PIP.

See [Chapter 16, Monitoring](#) on Page 291 for more information about the *VMG Element Manager* monitoring tools.

Statistical Multiplexing

Multiplexing is used to combine multiple data sources, such as video, audio, and data into, a single source. This is normally done to transmit multiple video programs over a single bandwidth-limited carrier medium, such as fiber or coax, to end-users. Multiplexing several variable bitrate streams together into a fixed sized transport stream bandwidth is called statistical multiplexing and helps to increase the overall efficiency of a multi-channel digital transmission.

Forward Error Correction (FEC)

Forward Error Correction is a means of error control for video transmission in which redundant data, or error correction code, is added to the transmission. This allows for error detection and correction on incoming transport streams and ensures consistent delivery of high quality video on output transport streams. The VMG provides a simple, standards-based solution to video degradation seen as a result of transmission error packet loss. By using the Pro-MPEG CoP#3 standard, FEC generation and error correction is applied on RTP encapsulated video packets, thus enabling the VMG to provide high density video processing—including transrating, statistical multiplexing, and advertisement insertion—at the highest levels of video quality, which the subscriber has come to expect from IPTV services.

The VMG performs error correction and detection on RTP encapsulated input video streams and generates FEC packets using the Pro-MPEG CoP#3 standard on output video streams.

For more information about VMG and FEC, see:

- “Forward Error Correction (FEC) Coding” on page 13.
- “Creating FEC-based Input Transport Streams” on page 130.
- FEC field descriptions in Table 61, “Create Input Transport Stream Fields,” on page 129 and Table 68, “Create Output Transport Stream - Parameters for AVTX, VTX, VTR, and PIP,” on page 145.

Input Transport Streams

This chapter provides an overview about use of the *VMG Element Manager* to perform video processing, using settings you provide for input transport streams.



Note: *System configuration must be completed before performing grooming tasks. Refer to Chapter 4, “System Configuration” for more information.*



Note: *The VMG supports program redundancy and elementary stream/PID management. If you plan to implement any of these advanced applications, please review associated sections in Chapter 13, “Advanced Grooming Applications” before attempting the input transport stream tasks described in this chapter.*

In This Chapter:

- “Creating Input Transport Streams,” next.
- “Creating Ghost Programs” on page 132.
- “Modifying and Deleting Input Transport Streams and Programs” on page 133.
- “Configuring Program Languages” on page 136.

Creating Input Transport Streams

Use the **Create GigE Input Transport Stream** screen (Figure 82 and Table 61) to set parameters for specific input transport streams. You can also use this screen to access parameters for setup of multiple transport streams (see also “Creating Multiple Transport Streams” on page 130).

The following steps insert a new transport stream (and table processing specification) into the **Inputs** panel, beneath a selected GigE interface.



From the **Inputs** panel of the *VMG Element Manager* **Grooming** -> **Mapping** tab page, right-click on the input GigE interface -> select **Create Transport Stream**.

1. At the **GigE Input Transport Stream** screen, use guidelines from Table 61 to set parameters for the GigE input transport stream.
2. Click **Apply**.
3. Check the **Mapping** page display to ensure that the transport stream name is displayed under its GigE at the Input panel.

Figure 82. Create Input Transport Stream

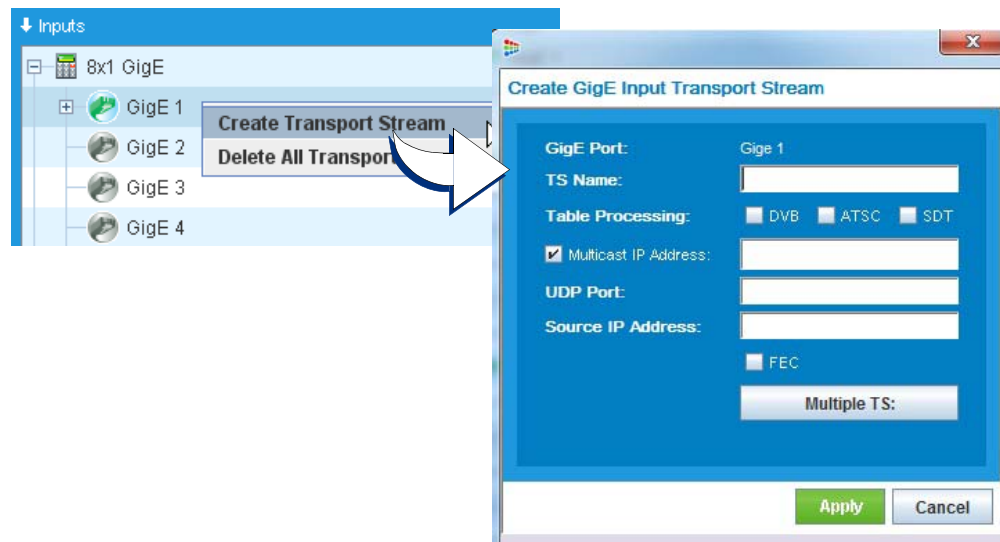


Table 61. Create Input Transport Stream Fields

Field	Description	Default
GigE Port	View the selected port on which the input transport stream will be created.	Read-only
TS Name	Type an alphanumeric string to set a name for the input transport stream. Maximum length = 32 characters.	Blank
Table Processing	Enable (check) or disable (un-check) a specific table processing method for input transport streams on the GigE interface: <ul style="list-style-type: none"> <i>DVB</i>: check to process SI tables, in addition to PAT and PMT. <i>ATSC</i>: check to process PSIP tables, in addition to PAT and PMT. <i>SDT</i>: check to process SDT, in addition to PAT and PMT. Only one option can be selected. If no option is checked, only PAT and PMT streams will be processed on the interface.	Un-checked
Multicast IP Address	Enable (check) or disable (un-check) multicasting on this interface. <ul style="list-style-type: none"> If enabled, type a valid multicast address (in the range 224.0.0.0 through 239.255.255.255) to define the address carrying the service. If disabled, type a valid unicast address. For each multicast input transport stream defined, the VMG issues an Internet Group Management Protocol (IGMP) join to the IP address specified in its configuration. A multicast group must be successfully joined before video can be routed to the interface.	Multicast: Blank Unicast: <i>Defaults to IP Address of GigE port</i>
Source IP	<i>(Optional, and only for multicast IGMPv3 streams)</i> Type the IP address of the source where the port receives data.	Blank
UDP Port	The UDP port on which the input stream transports.	Blank

Table 61. Create Input Transport Stream Fields (Continued)

Field	Description	Default
FEC	<p>Enable (check) or disable (un-check) FEC decoding on the input transport stream.</p> <p>When enabled, an additional four UDP ports will be used when the stream is created, totalling five UDP ports per FEC enabled stream.</p> <p>Refer also to “Creating FEC-based Input Transport Streams” on page 130 for more information.</p>	Un-checked
Multiple TS	<p>Access the Select Multiple IP and UDP screen to set parameters for multiple transport streams.</p> <p>Refer also to “Creating Multiple Transport Streams” on page 130 for more information.</p>	See Table 62 on page 131

Creating FEC-based Input Transport Streams

The following guidelines should be considered when creating FEC-based input transport streams:

- Each FEC-based input transport stream will use an additional four (4) UDP ports, totalling five (5) UDP ports per FEC enabled stream. For example, if creating an FEC input transport stream with a multicast IP address of 239.1.1.1, which uses UDP port number 500, port numbers 500-504 will be used for the FEC based stream.
- For the reason mentioned above, creating multiple transport streams using incrementing UDPs for an FEC-based stream is not allowed.

Creating Multiple Transport Streams

You can create both input and output multiple transport streams. To create an input stream, use steps in this section.

- At the **Create Gige Input Transport Stream** screen, enter the TS name, IP address, and UDP port number. Click **Multiple TS** to display the **Multiple IP and UDP** screen ([Figure 83](#)).
- At the **Multiple IP and UDP** screen, select one of the incremental options, enter values to define the multiple and excluded UDP ports, then click **Apply**.

Figure 83. Select Multiple IP and UDP

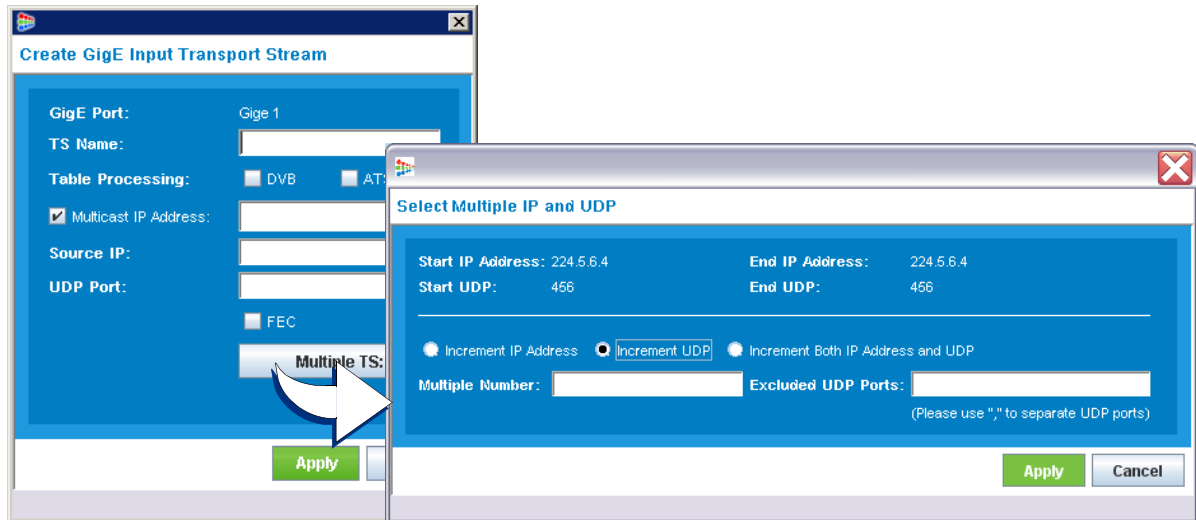


Table 62. Create Multiple Transport Streams (IP and UDP)

Field	Description	Default
Start IP Address	View the starting IP address. This field is read-only.	Based on IP address from stream creation dialog
End IP Address	View the ending IP address. This field is read-only and is updated to reflect the value entered in the <i>Multiple Number</i> and <i>Multiple TS Type</i> fields.	Incremented by the Multiple Number if applicable.
Start UDP	View the starting UDP port. This field is read-only.	Based on UDP port number from stream creation dialog.
End UDP	View the ending UDP port. This field is read-only and is updated to reflect the value entered in the <i>Multiple Number</i> and <i>Multiple TS Type</i> fields.	Incremented by the Multiple Number if applicable.
Multiple TS Type	Set sequential increment method, as one of the following: <ul style="list-style-type: none"> Increment IP Address – Increment only the IP addresses. Increment UDP – Increment only the UDP ports. Increment Both IP Address and UDP – Increment both the IP addresses and UDP ports.^a 	Increment IP Address
Multiple Number	Type a value to define the number of transport streams to create (number of increments).	Blank
Excluded UDP Ports	Type values to define the UDP ports to be excluded from the sequential increments. This field is available only when <i>Increment UDP</i> is selected for the increment type. Use comma delimiters to separate port numbers in your entry.	Hidden

a. When *Increment Both IP Address and UDP* option is selected, the *Excluded UDP Ports* option is not available.

Creating Ghost Programs

Ghost programs are used to add one or more unreferenced packet identifiers (PIDs) to an input transport stream. Unreferenced PIDs are input elementary streams that are not referenced by PAT/PMT tables. Such streams are not detected by the VMG system and require manual configuration for input routing. This manual operation is referred to as “ghost program” configuration.

Use the **Create Ghost Program** screen to set identifiers for a ghost program.



From the **Inputs** panel of the *VMG Element Manager Grooming* -> **Mapping** subtab, right-click the transport stream -> **Create Ghost Program** -> **Create Ghost Program** screen (Figure 84 and Table 63)).

1. Set program name and number.
2. Click **Apply** to dismiss the screen and commit your settings.
3. Check the **Input** panel of the **Mapping** tab (Figure 85) page to ensure your ghost program is listed.

Figure 84. Create Ghost Program.

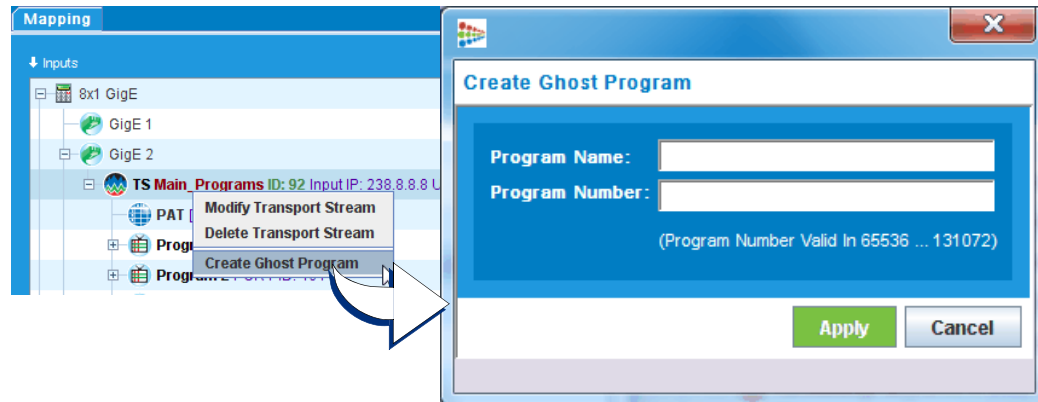
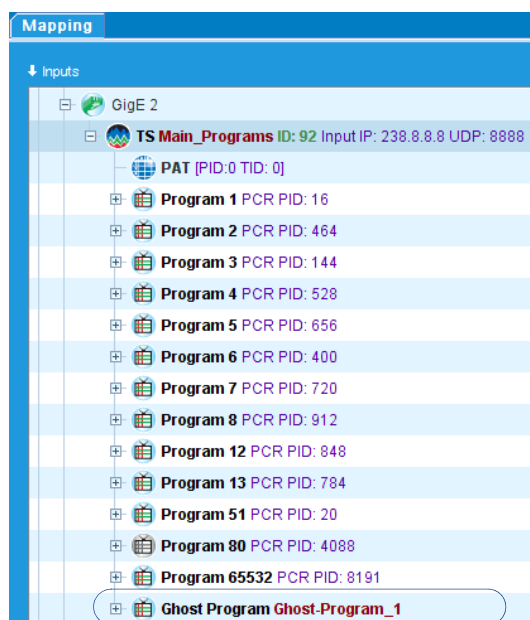


Table 63. Create Ghost Program Fields

Field	Description	Default
Program Name	Type alphanumeric string to set name of the ghost program. Maximum length = 32 characters.	Blank
Program Number	Type numeric string, in the range 65535 to 131072, to set number of the ghost program.	Blank

Figure 85. Ghost Program Input Stream on Mapping Page



Note: To use the ghost program to add an unreferenced PID as an elementary stream, refer to “Adding an Unreferenced PID as an Elementary Stream” on page 262.

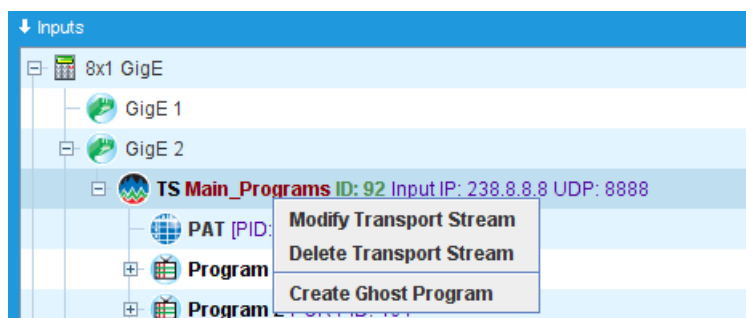
Modifying and Deleting Input Transport Streams and Programs

Use the **Grooming** tab of the *VMG Element Manager* screen to modify a transport stream (Figure 86) or program configuration (Figure 87).



Right-click the input transport stream or program, and select an option from the popup menu.

Figure 86. Transport Stream - Menu Options



The options available from the popup menu differ depending on the item selected. For example, if an item can be deleted, the **Delete** option becomes available.

- Table 64 describes options from the **Inputs** transport stream popup menu.
- Table 65 describes options from the **Inputs** program popup menu.

Table 64. Grooming - Inputs Transport Stream Popup Menu

Menu Item	Description
Modify Transport Stream	Access the transport stream modification screen.
Delete Transport Stream	Remove a selected transport stream.
Create Ghost Program	Access the Create Ghost Program screen.

Figure 87. Input Program Menus

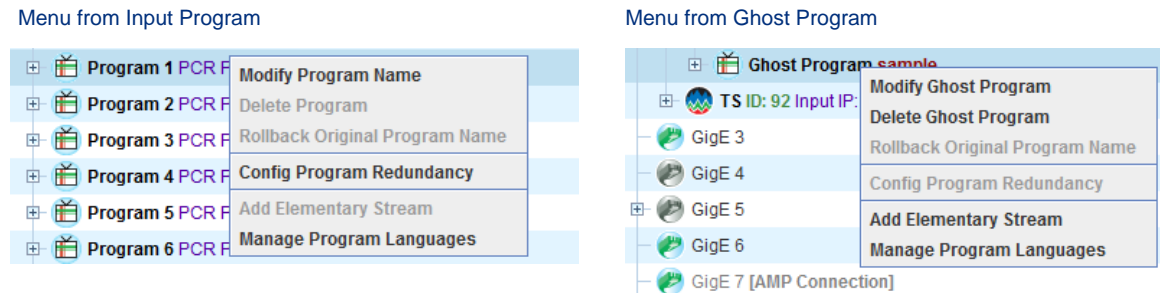


Table 65. Grooming - Input Program /Ghost Program Popup Menu

Menu Item	Description
Modify Program / Ghost Program Name	Go to the <i>Modify Input Program</i> dialog for an input program.
Delete Program / Delete Ghost Program	Applicable for Ghost Program Only: Deletes the ghost program.
Rollback Original Program Name	When selectable, allows you to return to the original name of the input program as received on the input port.
Config Program Redundancy	Applicable for Non-Ghost Programs Only: Opens the <i>Input Program Redundancy Configuration</i> screen.
Add Elementary Stream	Applicable for Ghost Program only: Opens the <i>Add Elementary Stream</i> screen.
Manage Program Languages	Go to the Audio Stream Languages dialog, if any ES in the program is set for a language. If ES language has not been modified, an Info dialog states that no language modifications were found.

Modify Input Program

Use the **Modify Input Program** (Figure 88) screen to change the name of the selected input program.

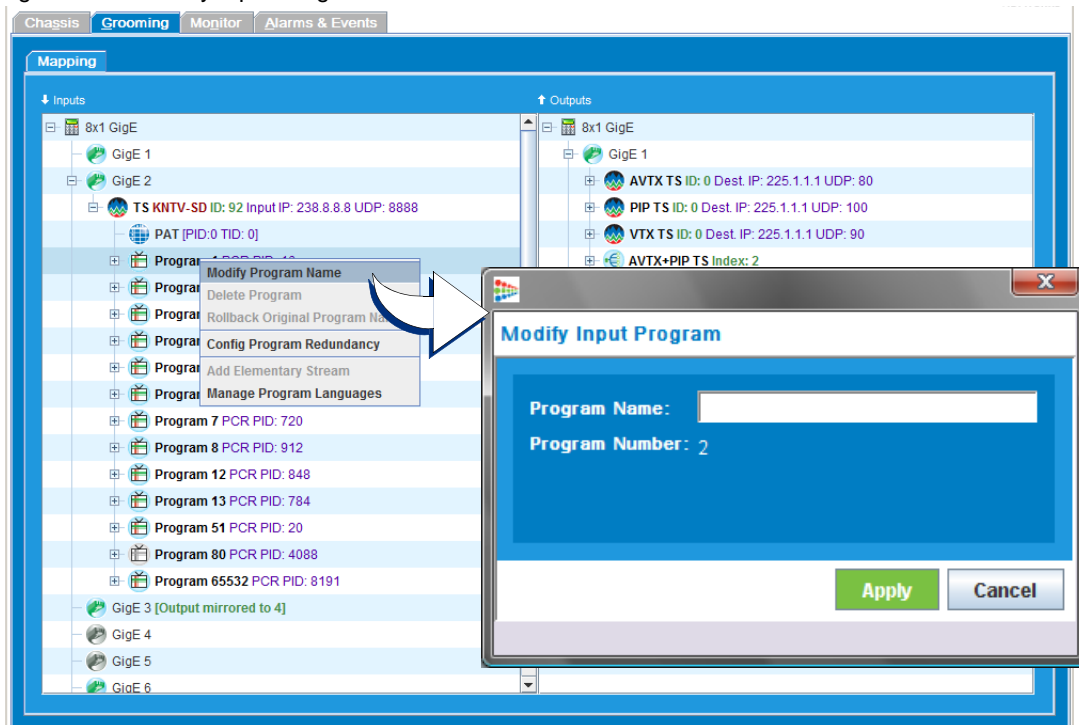


Note: To find out how to modify output program parameters, see “*Modify Output Program*” on page 197.



From the input panel of the **Grooming Mapping** tab page -> right-click on a program, then select **Modify Program Name** from the popup menu.

Figure 88. Modify Input Program



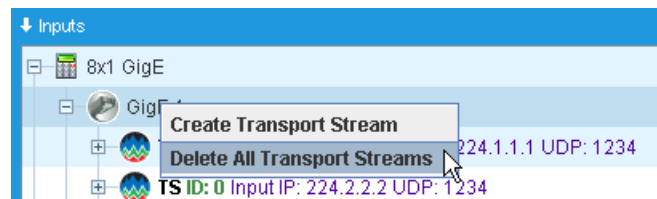
1. At the **Program Name:** field, type an alphanumeric string (maximum 32 characters) to set a name for the selected program.
2. Click **Apply**.
3. Check the input panel to ensure that the program name is now displayed alongside the program number.

Delete All Input Transport Streams

Use steps in this section to delete all input transport streams configured on an interface:

1. From the **Inputs** panel, right click the interface and select the **Delete All Transport Streams** option from the popup menu (Figure 89).

Figure 89. Menu - Delete All Transport Streams



2. Select **Yes** when prompted by the **Delete Confirmation** screen.

Delete Single Input Transport Stream



Note: *If an input transport stream contains programs that are groomed to output transport streams, you cannot delete the input stream until you first delete all of the groomed programs.*

To delete a single transport stream and all its associated programs from an interface:

1. From the **Inputs** panel of the **Grooming** -> **Mapping** screen, right-click the desired transport stream and select the **Delete Transport Stream** option from the popup menu (as shown in [Figure 86](#)).
2. Select **Yes** when prompted by the **Delete Confirmation** screen.

Delete Ghost Program



Note: *Input programs learned through configuring an input transport stream cannot be deleted.*

To delete a single ghost program in an input transport stream:

1. Right-click the ghost program and select the **Delete Ghost Program** option from the popup menu (as shown in [Figure 87](#)).
2. Select **Yes** when prompted by the **Delete Confirmation** screen.

Configuring Program Languages

The VMG *Element Manager* provides language control tools you can use to perform the following tasks:

- Modify the original language (english) for audio elementary stream(s) associated with an input Program.
- Reset the original language, either from the ES level or from the program level.
- View all languages currently configured to run within a program.

Modifying Language Descriptors

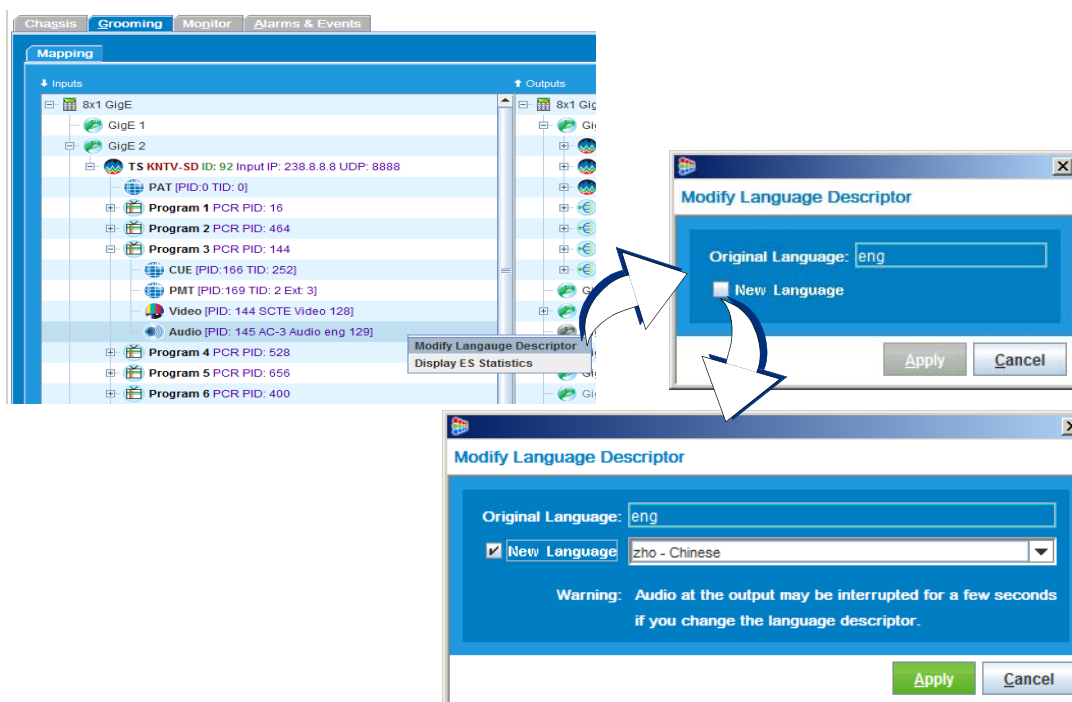
The VMG provides ISO 639-compliant configuration for language coding on individual input audio elementary streams.

Use the **Modify Language Descriptor** dialog ([Figure 90](#) and [Table 66](#)) to view the current language, and/or to select the language to be associated with a specified audio elementary stream.



At the VMG *Element Manager*, **Grooming** tab -> **Mapping** tab page, **Inputs** column -> right-click on an Audio ES, and select **Modify Language Descriptor** from the popup menu.

Figure 90. Modify Language Descriptor



Note: The current implementation of the Language Descriptor function only allows you to add a descriptor to an input stream. If the input stream already carries a descriptor, it cannot be removed.

1. With the **Modify Language Descriptor** dialog in view, click to check the **New Language** box. The dialog immediately expands to provide the drop-down selector, and presents an audio-interrupt warning.
2. Use the drop-down selector to define the language to be used on the elementary stream, then click **Apply** to commit the setting..

Table 66. Modify Language Descriptor

Menu Item	Description
Original Language	Three-letter country code that identifies the language descriptor originally provided in the VMG <i>Element Manager</i> software.
New Language	Click to check-mark and reveal the entry field for New Language. Languages you can choose are listed in Table 137 on page 313 .

The setting will remain until it is either reset at the **Modify Language Descriptor** dialog or removed at the program level (as described in “[Managing Program Languages](#)” on page 138).

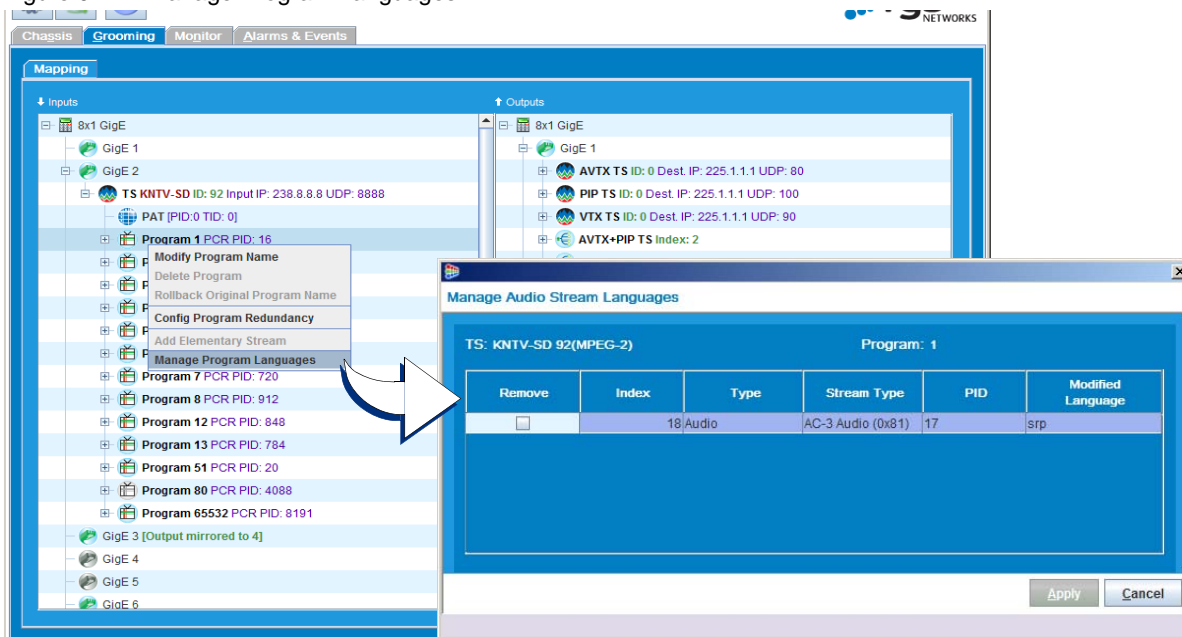
Managing Program Languages

All language descriptors modified for a program can be viewed or removed by means of the **Manage Audio Stream Languages** dialog (Figure 91).



At the *VMG Element Manager*, **Grooming** tab -> **Mapping** tab page, **Inputs** column -> right-click on a Program, and select **Manage Program Languages** from the popup menu.

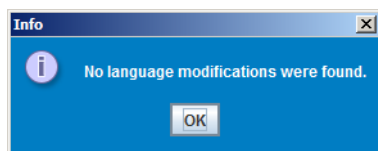
Figure 91. Manage Program Languages



Configuration Prerequisite for Language Management

If a language has not been set for an audio ES within the selected program, an error message is presented (Figure 92).

Figure 92. Language—Not Configured



Refer to “[Modifying Language Descriptors](#)” on page 136 to configure language associations for input audio elementary streams.

Removing a Language Descriptor at the Program Level

1. Go to the **Manage Audio Stream Languages** dialog for a specific program.

1. At the dialog, click one or more check boxes at the **Remove** column.

There are no other editable fields in this dialog.

2. Click the **Apply** button.

All applicable audio elementary streams are returned to the Original Language setting(s).

Single Video Transport Streams

This chapter describes the use of the *VMG Element Manager* **Grooming** -> **Mapping** tab page to manage the creation and grooming of standard single bitrate transport streams—AVTX, VTX, PIP, and VTR.



Note: *System configuration must be completed before performing grooming tasks. Refer to [Chapter 4, “System Configuration”](#) for more information.*



Note: *The VMG supports program redundancy and elementary stream/PID management. If you plan to implement any of these advanced applications, please familiarize yourself with their respective sections in [Chapter 13, “Advanced Grooming Applications”](#) before performing the procedures in this chapter.*

In This Chapter:

- “Creating Output Transport Streams,” next.
- “Output Programs and Grooming” on page 157.
- “Managing Standard Output Streams and Programs” on page 184.

Creating Output Transport Streams

The VMG supports four types of single bitrate output streams: MPEG-2 and SCTE; ATSC and DVB, for which the VMG supports PSIP/SI table generation.

- Processes for creating either an MPEG-2 or SCTE output stream are identical.
See “[Creating Single Video Output Transport Streams](#)” on page 140.
- Processes for creating ATSC and DVB output streams and for generating PSIP tables are similar.
See “[Creating ATSC and DVB Output Transport Streams](#)” on page 151.

Creating Single Video Output Transport Streams

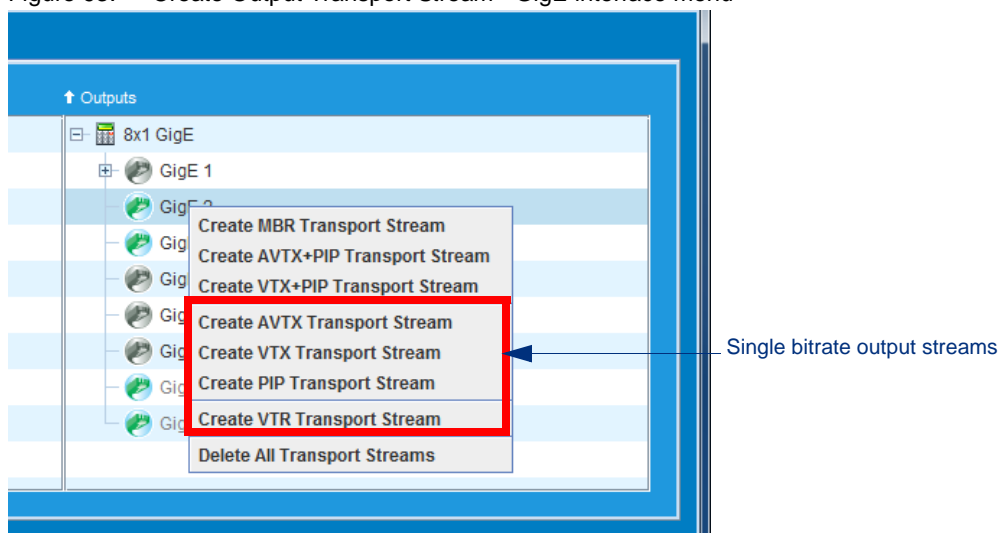
Use steps in this section to create an MPEG-2 or SCTE output transport stream.

1. Access the output transport stream menu:



From the **Outputs** panel of the **Grooming -> Mapping ->** tab page, right-click on a GigE interface and select a single video option—AVTX, VTX, PIP, or VTR—from the popup menu (Figure 93).

Figure 93. Create Output Transport Stream - GigE interface menu



2. Set parameters into the **Create Output Transport Stream** screen associated with your selection (Table 67).

Table 67. Options for Creation of MPEG-2 and SCTE Output Transport Streams

Menu Selection	Description
Create AVTX Transport Stream	Access the Create Output AVTX Transport Stream screen (Figure 94) to set parameters for a standard output transport stream that enables both audio and video transcoding. See also “ Create Output AVTX Transport Stream ” on page 141.
Create VTX Transport Stream	Access the Create VTX Transport Stream screen (Figure 95) to set parameters for standard output transport stream that enables video transcoding only. See also “ Create Output VTX Transport Stream ” on page 142.
Create PIP Transport Stream	Access the Create PIP Transport Stream screen (Figure 96) to set parameters for standard transcoded PIP program output transport stream. See also “ Create Output PIP Transport Stream ” on page 143.
Create VTR Transport Stream	Access the Create VTR Transport Stream screen (Figure 97) to set parameters for non-transcoding transrating output transport stream. See also “ Create Output VTR Transport Stream ” on page 144.

Video transcoding parameters for use with these screens are described in [Table 68 on page 145](#), and [Table 69 on page 148](#).

Create Output AVTX Transport Stream

Use the **Create Output AVTX Transport Stream** dialog (Figure 94) to set parameters for an AVTX TS at a selected GigE output port.



Grooming -> Mapping -> Outputs -> right-click on a **GigE** interface -> select **Create AVTX Transport Stream** from the popup menu.

Figure 94. Create Output AVTX Transport Stream - configuration

Create Output AVTX Transport Stream

Port: GigE 1 ☒ Transcoding: AVTX (Audio + Video) ☐ TS DPI ☐ Program DPI ☒ SPTS

TS Name: TS Bitrate (Mbps): 5

☒ Multicast IP: Async Data Bitrate(Mbps): 0

UDP Port: Auto / Video Bitrate(Mbps): 3

Subnet Mask: ☐ Pick TS ID

ARP: Network PID: 8175

MAC Address: TS Type: MPEG-2

☐ RTP ☐ FEC

Redundant Output:

Transcoding can be enabled on a SPTS output transport stream only
TS DPI, Program DPI and FEC are not supported with Transcoding

Video Transcoding

Input Resolution Class: SD Video Type: MPEG2 Video Standard: NTSC

Output Resolution Class: SD Video Type: MPEG2

NOTE:
For **HD Input Resolution**, the **Video Type** and **Video Standard** fields are not displayed in this screen.

1. At the **Create Output AVTX Transport Stream** dialog, enter information to define the AVTX TS. Use guidelines from [Table 68](#) for your entries.
2. Click **Apply Configuration** to save and use the configuration.

The new AVTX TS is now displayed at the **Outputs** panel of the **Mapping** tab page.

This transport stream is now ready to accept program setup and/or mapping.

Create Output VTX Transport Stream

Use the **Create Output VTX Transport Stream** dialog (Figure 95) to set parameters for a VTX TS at a selected GigE output port.



Grooming -> Mapping -> Outputs -> right-click on a **GigE** interface -> select **Create VTX Transport Stream** from the popup menu.

Figure 95. Create Output VTX Transport Stream - configuration

NOTE:
For HD Input
Resolution, the Video
Type and Video
Standard fields are not
displayed in this screen.

1. At the **Create Output VTX Transport Stream** dialog, enter information to define the VTX TS. Use guidelines from [Table 68](#) for your entries.
2. Click **Apply Configuration** to save and use the configuration.
The new VTX TS is now displayed at the **Outputs** panel of the **Mapping** tab page.
This transport stream is now ready to accept program setup and/or mapping.

Create Output PIP Transport Stream

Use the **Create Output PIP Transport Stream** dialog (Figure 96) to set parameters for an PIP TS at a selected GigE output port.



Grooming -> Mapping -> Outputs -> right-click on a **GigE** interface -> select **Create PIP Transport Stream** from the popup menu.

Figure 96. Create Output PIP Transport Stream - configuration

NOTE:
For **HD Input Resolution**, the **Video Type** and **Video Standard** fields are not displayed in this screen.

1. At the **Create Output PIP Transport Stream** dialog, enter information to define the PIP TS. Use guidelines from [Table 68](#) for your entries.
2. Click **Apply Configuration** to save and use the configuration.

The new PIP TS is now displayed at the **Outputs** panel of the **Mapping** tab page.

This transport stream is now ready to accept program setup and/or mapping.

Create Output VTR Transport Stream

Use the **Create Output VTR Transport Stream** dialog (Figure 97) to set parameters for an VTR TS at a selected GigE output port.



Grooming -> Mapping -> Outputs -> right-click on a **GigE** interface -> select **Create VTR Transport Stream** from the popup menu.

Figure 97. Create Output VTR Transport Stream - configuration

Create Output VTR Transport Stream

Port: GigE 1 ☐ Transcoding

TS Name:

☒ Multicast IP: ☐ TS DPI ☐ Program DPI ☒ SPTS

UDP Port: TS Bitrate (Mbps): 38.0

Subnet Mask:

ARP:

MAC Address:

☐ RTP ☐ FEC ☐ Pick TS ID

Redundant Output: Network PID: 8175

TS Type: MPEG-2

Transcoding can be enabled on a SPTS output transport stream only
TS DPI, Program DPI and FEC are not supported with Transcoding

1. At the **Create Output VTR Transport Stream** dialog, enter information to define the VTR TS. Use guidelines from [Table 68](#) for your entries.
 2. Click **Apply Configuration** to save and use the configuration.
- The new VTR TS is now displayed at the **Outputs** panel of the **Mapping** tab page.
This transport stream is now ready to accept program setup and/or mapping.

Parameters listed and described in [Table 68](#) are provided in the **Create Outputs Stream** screens for configuration of single-video transcoded and non-transcoded streams.

Table 68. Create Output Transport Stream - Parameters for AVTX, VTX, VTR, and PIP

Field	Description	Default
Port	Displays the selected port on which the output transport stream is being created.	Read-only
Transcoding	<p>Note that a valid MPEG-2 or H264 SD or HD license is required to enable transcoding. The following transcoding transport streams are available:</p> <ul style="list-style-type: none"> • AVTX (Audio + Video) • VTX (Video) • PIP (Video) <p>When displayed as checked, transport-level transcoding is enabled for an SPTS program in the TS.</p> <p>This field is un-checked for VTR transport streams.</p>	Read-only
TS Name	<p>(Optional) Alphanumeric string to set name for the output transport stream.</p> <p>Maximum length = 32 characters.</p>	Blank
TS DPI	<p>For VTR Transport Streams only: Enables transport level DPI for the output transport stream. All programs within this output transport stream will be DPI capable.</p> <p>A bandwidth based DPI license, and available bandwidth, are required.</p>	Un-checked
Program DPI	<p>For VTR Transport Streams only: Enables program level DPI for the output transport stream. Only output programs created with DPI enabled will be DPI capable.</p> <p>A number-based DPI license, and available DPI sessions, are required.</p>	Un-checked
SPTS	<p>Check if the output is a single program transport stream (SPTS).</p> <p>If you are creating a transcoding (AVTX, VTX, PIP) transport stream, SPTS is checked and read-only</p>	Checked
Multicast IP	<p>Set stream as either multicast (check) or unicast (un-check).</p> <ul style="list-style-type: none"> • For multicast, type a valid multicast IP address. 	Checked (multicast)
Unicast IP	<ul style="list-style-type: none"> • For unicast, type a unicast IP address, and provide subnet mask and ARP settings. 	
Bitrate (Mbps)	<p>Value to set bitrate of the output stream.</p> <p>As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).</p> <p>See “Bitrate Configuration Reference” on page 310 for guidelines.</p>	AVTX= 20 VTX = 20 PIP = 1.2 VTR = 38

Table 68. Create Output Transport Stream - Parameters for AVTX, VTX, VTR, and PIP (Continued)

Field	Description	Default
Async Data Bitrate (Mbps)	<p>For AVTX, VTX, and PIP transport streams, value in Mbps to set maximum bitrate for asynchronous data in this stream.</p> <p>The async data bitrate cannot exceed the TS bitrate.</p> <p>As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).</p> <p>See “Bitrate Configuration Reference” on page 310 for guidelines.</p>	PIP: 0 (no maximum limit; equivalent to the transport stream bitrate)
Automatic Video Bitrate (In Mbps)	<p>Enable (check) or (disable) auto video bitrate assignment.</p> <ul style="list-style-type: none"> If enabled (checked) the system assigns the video bitrate, with the latency marked by a <i>“Perfecting video”</i> message until the bitrate is assigned. If disabled (un-checked) enter a value to define video bitrate (See “Bitrate Configuration Reference” on page 310, for acceptable values). <p>As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).</p>	AVTX=15.0 VTX=15.0 PIP = 0.3
UDP Port	Identifier of the UDP port to use for transmitting data.	Blank
Pick TS ID	<p>Enables the system to choose a unique number for identification of the output transport stream.</p> <p>When checked, the entry field is displayed. Enter a value, in decimal format, in the range 0 to 65535.</p> <p>Display of this field is demonstrated in Figure 98, “Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS,” on page 148.</p>	Un-checked When checked: 0
Subnet Mask	<p>For unicast configuration only—set the subnet mask of the output transport stream.</p> <p>Display of this field is demonstrated in Figure 98, “Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS,” on page 148.</p>	255.255.255.0
Network PID	Value, in the range 16 to 8175, to define the program ID of transport stream packets that contain the network information table.	8175 When creating a DVB output transport stream, this field defaults to 16 and is read only.
ARP	<p>For unicast configuration only—Enable (check) or disable (un-check) ARP for this stream:</p> <ul style="list-style-type: none"> If creating a unicast transport stream on GigE’s 1-8, check this box if ARP is to be used for broadcasting the VMG MAC address. If creating a unicast transport stream on 10GigE 1 or 10GigE 2, un-check this box and enter the MAC address Display of this field is demonstrated in Figure 98, “Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS,” on page 148 	enable (checked)

Table 68. Create Output Transport Stream - Parameters for AVTX, VTX, VTR, and PIP (Continued)

Field	Description	Default
TS Type	For AVTX, VTX, or PIP, select type of output transport stream to create, as either MPEG-2, ATSC, SCTE, or DVB. This setting is not applicable to VTR transport streams. For TS types <i>ATSC</i> or <i>DVB</i> , refer to “Creating ATSC and DVB Output Transport Streams” on page 151 for additional configuration parameters.	MPEG-2
MAC Address	Where ARP is not enabled, type the physical MAC address of the active NPM. Display of this field is demonstrated in Figure 98, “Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS,” on page 148	Hidden if ARP enabled. When ARP is unchecked: 00:00:00:00:00:00
Multiple TS	Click to access the Select Multiple IP and UDP screen, to create multiple transport streams. Refer to “Creating Multiple Transport Streams” on page 130 for more information.	
RTP	Enable (check) or disable (un-check) Real Time Protocol (RTP) on the output transport stream.	Un-checked
FEC	For transrating transport streams only: Enable (check) or disable (un-check) Forward Error Correction (FEC) on the output transport stream. Checking the FEC option reveals the following fields in which to set the height and width of the FEC matrix: D: value to define FEC height, in the range 4 to 20. L: value to define FEC width, in the range 1 to 20 When checked, an additional four UDP ports will be used when the stream is created, to total five UDP ports per FEC-enabled stream. Display of REC port configuration fields is demonstrated in Figure 98, “Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS,” on page 148 . Additional guidelines for FEC configuration are provided in “Creating FEC-based Output Transport Streams” on page 151 .	Un-checked D = 4 L = 1
Redundant Output Button	Access the Set Redundant IP Address dialog to set a multicast or unicast IP address for supplemental port mirroring. See also “Redundant Output” on page 149 .	n/a
Advanced Setting Button	For VTR transport stream only: Access advanced settings for the selected transport stream. See also “Advanced Transport Stream Setting” on page 150 .	n/a

Parameters listed and described in Table 69 are provided in the **Create Outputs Stream** screens for configuration of single-video transcoded and non-transcoded streams.

Table 69. Video Transcoding Parameters - Standard Output Streams

Field	Description	Default
Input Resolution Class	Select HD or SD. <ul style="list-style-type: none"> For SD, additional fields are displayed in which to set video type (as either MPEG-2 or H264) and video standard (as either NTSC or PAL). HD does not require video type and video standard settings. 	<ul style="list-style-type: none"> AVTX and VTX: HD input, HD output, and MPEG-2 video PIP: HD input, PIP output, and H264 video VTR (not applicable)
Output Resolution Class	Select HD or SD. <ul style="list-style-type: none"> For SD: set video type as either MPEG-2 or H264. For HD: set video type as either MPEG-2 or H264. 	

Unicast Addressing for Output Transport Streams

If the output transport stream configuration dialog is set to disable (un-check) multicast, the unicast IP address field is then revealed to enable entry of the IP address to be associated with this stream. Correspondingly, the subnet mask, ARP and MAC address fields are also revealed (Figure 98).

Figure 98. Subnet Mask, ARP, Mac Address, FEC, and TS ID fields for output TS

Redundant Output

The redundant output function supplements the port mirroring established via GigE port configuration, and allows you to configure secondary DIP and DMAC (if DIP is unicast) for a specific output transport stream. This allows the DIP of the redundant output transport stream to differ from the source.

With the **Set Redundant IP Address** dialog for either unicast or multicast, you can set up the secondary DIP for use with a specific output transport stream.

- **Multicast:** the DMAC is well-known and derived directly from the DIP. Therefore, when an output ts is enabled (assigned to a TCM or VPM on the VMG), its network settings are enacted without additional dependencies.
- **Unicast.** In this case, wait is necessary during ARP resolution for both primary (if primary is unicast) and secondary DIPs before the network settings can be enacted.

If ARP for the secondary DIP is not resolved, the primary output transport stream will not be transmitted (even if ARP for the primary DIP is resolved), and vice versa.

You can statically configure both the primary and secondary DMAC addresses (if unicast) to avoid ARP dependencies during programming of the output transport stream.



Create <type> Transport Stream--> set Multicast or Unicast IP address --> click **Redundant Output button --> **Set Redundant IP Address** dialog.**

Figure 99. Set Redundant IP Address—Multicast

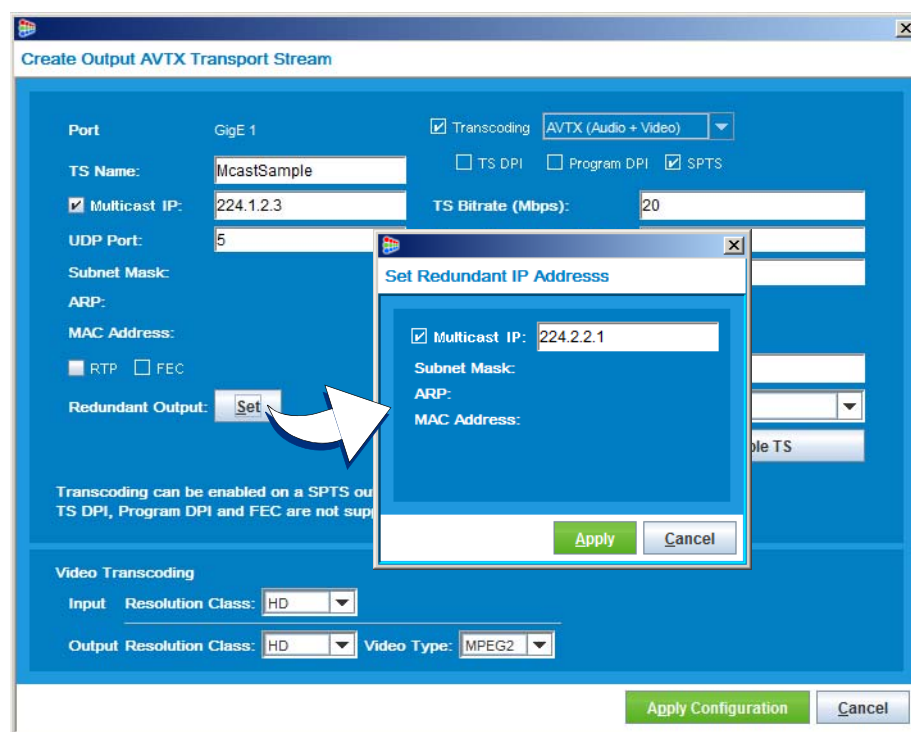
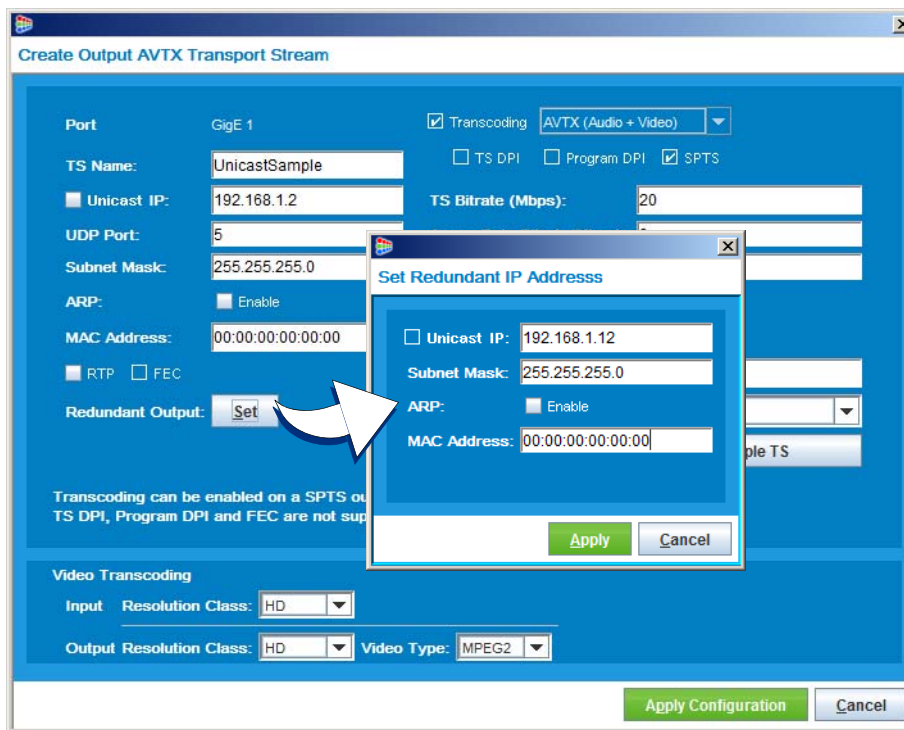


Figure 100. Set Redundant IP Address—Unicast



Advanced Transport Stream Setting

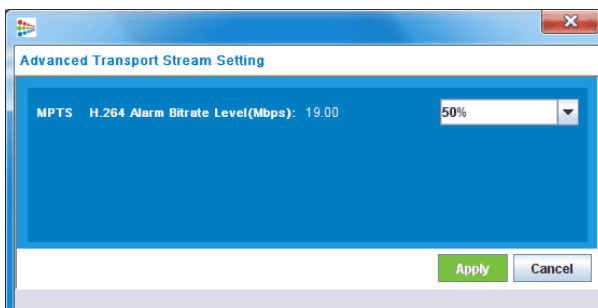
This option applies only to VTR transport streams, and provides access to configuration of the MPTS H.264 alarm bitrate level. This setting can assist in maintaining video quality for MPEG-2 video content in the presence of other content, such as H.264, which bypasses the VMG's transrater. If the H.264 program bandwidth exceeds the configured percentage, an alarm is generated.

Use the **Advanced Transport Stream Setting** dialog (Figure 101 and Table 70) to set the H.264 Alarm Bitrate.



Grooming -> Mapping -> Outputs -> right-click GigE interface -> select Create Output VTR -> Create Output VTR Transport Stream screen (un-check the SPTS option) --> click Advanced Setting button -> Advanced Transport Stream Setting dialog.

Figure 101. Advanced Transport Stream Setting - MPTS



1. At the **Advanced Transport Stream Setting** dialog, select a value to define a percentage of transport stream bandwidth.

2. Click **Apply** to dismiss this dialog and to return to the **Output Transport Stream** dialog.
3. At the **Output Transport Stream** dialog, click **Apply Configuration** to save and use this setting.

Table 70. Advanced Transport Stream Setting

Field	Description	Default
MPTS H.264 Alarm Bitrate Level (Mbps): 19.00	Value to define percentage of aggregated transport stream bandwidth allowable before generating alarm, as one of the following: 0%, 25%, 50%, 75%, 100%	50%

Creating FEC-based Output Transport Streams

The following guidelines should be considered when creating FEC-based output transport streams:

- Because FEC coding is used on top of the RTP, when the FEC field is checked, RTP must also be checked.
- The valid height (D) range of the FEC matrix is from 4 to 20.
- The valid width (L) range of the FEC matrix is from 1 to 20.
- Each FEC-based output transport stream will use an additional four (4) UDP ports, totalling five (5) UDP ports per FEC enabled stream.

For example, if creating an FEC output transport stream with a multicast IP address of 239.1.1.1, which uses UDP port number 500, port numbers 500-504 will be used for the FEC-based stream.

- For the reason mentioned above, creating multiple transport streams using incrementing UDPs for an FEC-based stream is not allowed.

Creating ATSC and DVB Output Transport Streams

PSIP (Program and System Information Protocol) is a collection of tables operating within the terrestrial broadcast Transport Stream (TS) of every digital (and sometimes analog) television. PSIP settings are configured as part of the transport stream. PSIP tables are defined as part of the ATSC standards. DVB defines Service Information (SI) tables to achieve similar functions.

These tables contain system information and program data:

- System information allows navigation and access of the channels within the DTV transport stream.
- Program data provides necessary information for efficient browsing and event selection.
- Some PSIP tables contain the information to locate digital streams.



Note: *If you are not sure of the PSIP guidelines, there are many good references on the Internet, including the ATSC Recommended Practice: Program and System Information Protocol Implementation Guidelines for Broadcasters at <http://www.atsc.org/standards/>.*

For DVB reference, see DVB-SI reference, see http://www.home.agilent.com/upload/cmc_upload/All/6C06MPEGPAPER1.pdf

Creating ATSC Output Transport Streams

Use steps in this section to create a new ATSC output transport stream.

1. From the **Outputs** panel of the **Grooming** -> **Mapping** tab page, right-click the output port on which to create the stream and select one of the following options from the popup menu (Figure 93):

- **Create AVTX Transport Stream**
- **Create VTX Transport Stream**
- **Create PIP Transport Stream**
- **Create VTR Transport Stream**

The **Create Transport Stream** configuration dialog associated with your selection is now displayed.

2. At the output stream configuration dialog, in the **TS Type** field, select **ATSC**.

The lower portion of the screen expands to reveal the ATSC configuration fields shown in Figure 102.

Figure 102. Create ATSC Output Transport Stream

Transcoding can be enabled on a SPTS output transport stream only
TS DPI, Program DPI and FEC are not supported with Transcoding

PSIP table fields (see Table 71).

3. Use guidelines from Table 71 to define ATSC parameters for the output transport stream.
4. Click **Apply Configuration** to save and use these settings.

Table 71. Create ATSC Output Transport Stream Fields

Field	Description	Default
EIT PID EIT [0-3]	Event Information Table packet identifier (PID) numbers. These can be manually set, overriding the PID in the Master Guide Table (MGT). <ul style="list-style-type: none"> Valid range is from 48 to 8175 EIT 1 - 3 automatically increments by 1, as based on the base value entered in EIT 0. 	Blank
EIT Interval EIT [0-3]	Event Information Table intervals. These can be manually set, overriding the intervals in the Master Guide Table (MGT). EIT 0: Valid range from 10 to 500 EIT 1: Valid range from 1000 to 3000 EIT 2: Valid range from 30000 to 60000 EIT 3: Valid range from 30000 to 60000	EIT 0: 500 EIT 1: 3000 EIT 2: 60000 EIT 3: 60000
MGT Interval	The Master Guide Table intervals. The MGT is the highest table in the ATSC transport stream table hierarchy. It contains the PIDs of other tables so receivers can locate them. Valid range is from 10 to 150	150
CVCT Interval	Cable Virtual Channel Table intervals. The CVCT provides information about channels, such as channel name, navigation identifier, and stream components. Valid range is from 10 to 400	400
STT Source	System Time Table source. The STT serves as a reference for time-of-day functions. Used for setting daylight-savings time indicators on the consumer's set-top box, and synchronizing the concept of "now" between the set-top box and the broadcaster. <ul style="list-style-type: none"> Click the Select STT button to select a source. If a groomed input transport stream is using an STT, valid options will appear in this menu. There must be a valid STT source to be ATSC compliant. 	Blank
RRT Source	Rating Region Table source. The RRT transmits the program rating information. <ul style="list-style-type: none"> Click the Select RRT button to select a source. If a groomed input transport stream is using an RRT, valid options will appear in this menu. There must be a valid RRT source to be ATSC compliant. 	Blank
Modulation Mode	Valid modes are: Analog, SCTE 64 QAM, SCTE 256 QAM, ATSC 8 VSB, and ATSC 16 VSB.	SCTE 256 QAM

Creating DVB Output Transport Streams

Use steps in this section to create a new DVB output transport stream.

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the output port on which to create the stream, and select one of the following options from the popup menu (Figure 93):
 - **Create AVTX Transport Stream**
 - **Create VTX Transport Stream**
 - **Create PIP Transport Stream**
 - **Create VTR Transport Stream**
2. At the output stream configuration dialog, in the **TS Type** field, select **DVB**.

The lower portion of the screen expands to reveal the fields shown in Figure 103.

Figure 103. Create DVB Output Transport Stream

The screenshot shows the 'Create Output AVTX Transport Stream' dialog box. The 'TS Type' dropdown is set to 'DVB'. A red box highlights the 'DVB-SI table fields' section, which includes the following fields and controls:

- Network ID:** 160
- Original Network ID:** 160
- Modulation Mode:** SC256 QAM
- NIT Source:** Select NIT
- TDT/TOT Source:** Select TDT/TOT
- SDT Source:** LocalSDT
- EIT Source:** Groomed Input

A red arrow points from the text 'DVB-SI table fields (See Table 72)' to the red box.

3. Use guidelines from Table 72 to define DVB parameters for the output transport stream.
4. Click **Apply Configuration** to save and use these settings.

Table 72. Create DVB-SI Output Transport Stream Fields

Field	Description	Default
Network ID	Value, in the range 0 to 65535, to set Network ID of the current transport stream.	160

Table 72. Create DVB-SI Output Transport Stream Fields (Continued)

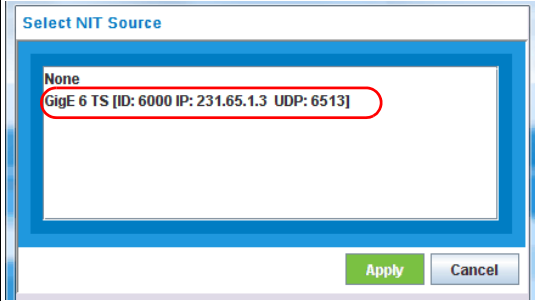
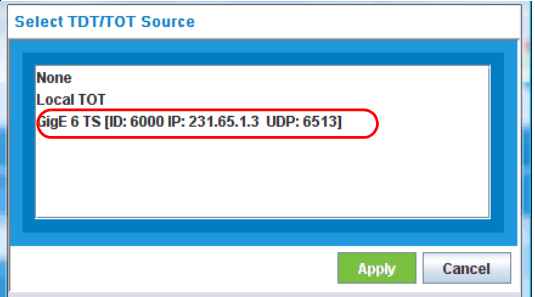
Field	Description	Default
Modulation Mode	Modulation mode to be used for the TS, as either <i>SCTE 64 QAM</i> or <i>SCTE 256 QAM</i> .	SCTE 256 QAM
Original Network ID	Value, in the range 0 to 65535, to set the Network ID from which this stream has originated.	160
NIT Source	<p>Specifies whether or not a DVB network information table is to be included in the output TS. To place a value for NIT Source, click Select NIT, then select an option from the Select NIT Source dialog:</p> <ul style="list-style-type: none"> <i>None</i> - No NIT will be generated on the output TS <i>[Input GigE TS ID]</i> - Specified source NIT will be included in the output TS. <p>NOTE: If a NIT is to be included in the output TS, a valid DVB stream must be feeding the input, and DVB table processing must be enabled on the input TS. Refer also to <i>Table Processing in Table 69 on page 148</i>.</p>  <p>Example of NIT Source selection that includes the input TS (GigE 6 TS), which is a DVB stream for which DVB table processing has been enabled.</p>	Blank
TDT/TOT Source	<p>Specifies whether or not DVB time and date, and time offset tables will be generated for the output TS. To place a value for TDT/TOT Source, click Select TDT/TOT, then select a value from the Select TDT/TOT Source dialog:</p> <ul style="list-style-type: none"> <i>None</i> - No DVB time tables will be generated on the output TS. <i>Local TOT</i> - The output TS will use the locally configured TOT. <i>[Input GigE TS ID]</i> - Specified source TDT/TOT will be included in the output TS. <p>NOTE: If a TDT/TOT is to be included in the output TS, a valid DVB stream must be feeding the input, and DVB table processing must be enabled on the input TS. Refer also to <i>Table Processing in Table 69 on page 148</i>.</p>  <p>Example of TDT/TOT Source selection that includes the input TS (GigE 6 TS), which is a DVB stream for which DVB table processing has been enabled.</p>	Blank

Table 72. Create DVB-SI Output Transport Stream Fields (Continued)

Field	Description	Default
SDT Source	<p>Specifies whether or not a service description table will be generated for this transport stream, as one of the following:</p> <ul style="list-style-type: none"> • <i>N/A</i> - No SDT will be generated for this output TS • <i>LocalSDT</i> - Local SDT will be generated for this output TS. <p>NOTE: if an SDT is to be included in the output TS, a valid DVB stream must be feeding the input, and DVB table processing must be enabled on the input TS. Refer also to Table Processing in Table 61, "Create Input Transport Stream Fields," on page 129.</p>	LocalSDT
EIT Source	<p>Specifies how an Event Information Table (EIT) is generated by the VMG, as one of the following:</p> <ul style="list-style-type: none"> • <i>Groomed Input</i> is selected, an Event Information Table (EIT) is generated based on that which is received from the groomed input program of the DVB TS. • <i>N/A</i> - No EIT will be generated for this output TS. 	Groomed Input

Output Programs and Grooming

The VMG supports program-level grooming. The *VMG Element Manager* provides two methods you can use to create new output programs in standard output transport streams, as described in the following topics:

- “Manual Program Creation,” next.
- “Using Drag-and-Drop to Create Output Programs” on page 170.

The manual program creation method walks you through the Output Program creation process, whereas drag-and-drop program creation automatically sets up an output program on the transport stream to which the program was dragged.



Note: The target output transport stream must already exist before performing program level grooming. Refer to “Creating Single Video Output Transport Streams” on page 140 and “Creating ATSC Output Transport Streams” on page 152 for more information.



Note: Output program creation depends on the type of licenses installed. Refer to “License Management” on page 99 for details.

Manual Program Creation

This section contains guidelines for the following manual configurations:

- “Manual configuration for non-transcoded program,” next.
- “Manual setup for transcoded program” on page 159

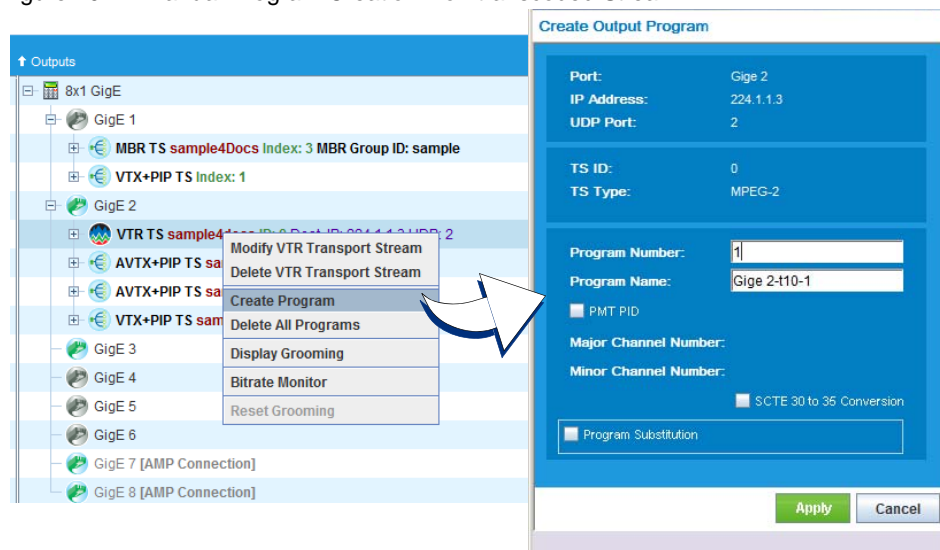
Manual configuration for non-transcoded program

Use the **Create Output Program** screen for manual setup of a non-transcoded program.



From the **Outputs** panel of the **Grooming -> Mapping** tab page -> right-click a non-transcoded transport stream -> select **Create Program** from the popup menu -> **Create Output Program** dialog (Figure 104).

Figure 104. Manual Program Creation-Non transcoded Stream



1. At the **Create Output Program** dialog, use guidelines from [Table 73](#) to define the output program.
2. Click **Apply** to save and use your settings.

After creating the program, an existing input program can be dragged and dropped over it, which will open the **Configure Program Mapping** dialog (see example in [Figure 110 on page 171](#)).

For more information, see “[Managing Standard Output Streams and Programs](#)” on page 184.

Table 73. Grooming - Create Output Program Fields - Non-transcoded

Field	Description	Default
Port	View the GigE or 10 GigE interface on which the program is being created.	Read-only
IP Address	The destination IP address of the transport stream.	Read-only
UDP Port	UDP port the program uses, based on UDP port of the transport stream.	Read-only
TS ID	The program's transport stream id (name), based on TS ID of the transport stream.	Read-only
TS Type	Type of transport stream, based on TS type specified in the creation of the transport stream.	Read-only
Program Number	Number assigned to the program. Valid range is from 1 to 131072	1
Program Name	Type alphanumeric string to set program name. Maximum length = 32 characters. Default format: GigE #-t[unique id]-[Program Number]	e.g: GigE 7-t47221504-1
PMT PID	ID of the program map table (PMT). Check this box to input a valid range from 48-8175.	Un-checked
Major Channel Number	Operator-defined channel number that groups all channels to be identified to a particular broadcast corporation. When the program's TS Type is set to ATSC, the value in this field may be set from 1 to 999.	Read-only
Minor Channel Number	Operator-defined channel number that identifies a particular channel within the Major Channel Number group. When the program's TS Type is set to ATSC, the value in this field may be set from 0 to 999.	Read-only
Program DPI	Enable or disable DPI for the output program. <ul style="list-style-type: none"> • This field is displayed only if the output transport stream was enabled for <i>Program-level</i> DPI. • A number-based DPI license, and available DPI sessions are required. • Each program with program-level DPI enabled will use one license from the available license pool. To “free up” a program DPI license, un-check this box. • This box must be un-checked to enable program deletion. 	Un-checked
SCTE 30 to 35 Conversion	Used to enable SCTE 30 to SCTE 35 conversion.	Un-checked

Table 73. Grooming - Create Output Program Fields (Continued) - Non-transcoded

Field	Description	Default
Program Substitution	<p>Enable or disable program substitution for the output program.</p> <ul style="list-style-type: none"> A number-based Program Substitution license, and available Program Substitution sessions are required. Each program with <i>Program Substitution</i> enabled will use one license from the available license pool. To “free up” a program substitution license, un-check this box. When this box is checked, the Program DPI box may not be checked at the same time. This box must be un-checked before program deletion. When this box is checked, the <i>Disable PMT update during program substitution</i> option becomes visible. <p>NOTE: DPI is not supported on a channel substituted program.</p>	Un-checked
Disable PMT update during program substitution	<p>When checked, this option will maintain the same PMT table version after a substitution event as long as elementary stream structures match. This avoids possible set top box re-tuning and disruptions.</p> <ul style="list-style-type: none"> This field is only displayed when the <i>Program Substitution</i> box is checked; otherwise, this box is hidden. 	Hidden

Manual setup for transcoded program

Use the **Create Transcoding Output Program** dialog to manually establish a transcoded program type. This setup is available for VTX or PIP transport streams: it does not apply to AVTX transport streams.



Transcoded programs do not support DPI, Program Substitution, SCTE 30 to 35 conversion, or transrating. The fields associated with these options are not visible when creating or grooming transcoded programs.



From the **Outputs** panel of the **Grooming** -> **Mapping** tab page, right-click the VTX or PIP transport stream and select **Create Program** from the popup menu -> **Create Transcoding Output Program** dialog.

The entry fields provided in the **Create Transcoding Output Program** screen will be pertinent to the type of video transcoding already configured for the output GigE port, as one of the following:

- MPEG-2 HD Encoded Video—Transcoded Output Program Configuration (see page 160).
- MPEG-2 SD Encoded Video—Transcoded Output Program Configuration (see page 161).
- HD Encoded H.264 Video—Transcoded Output Program Configuration (see page 162)
- SD Encoded H.264 Video—Transcoded Output Program Configuration (see page 163).
- PIP Encoded H.264 Video—Transcoded Output Program Configuration (see page 164).

MPEG-2 HD Encoded Video—Transcoded Output Program Configuration

For this setup, you should first check to ensure that the VTX TS is configured for MPEG-2 HD encoded video.

1. At the **Create or Modify Output Transport Stream** dialog, ensure that the **Video Transcoding** section contains the following entries:

Video Transcoding

Input Resolution Class:

Output Resolution Class: Video Type:

2. Use the **Create Transcoded Output Program** screen from an output VTX TS (Figure 105) to set parameters for an HD Encoded MPEG-2 video program.

Figure 105. Create Transcoding Output Program - MPEG-2, HD Encoding

VTX TS [Gige 3-t2-2] Dest ID: 227.7.7.7 UDP: 7777

- Modify VTX Transport Stream
- Delete VTX Transport Stream
- Create Program
- Delete All Programs
- Display Grooming
- Display Monitor

For VTX TS

Create Transcoding Output Program

Associated TS Parameters

Port: Gige 3
IP Address: 227.7.7.7
UDP Port: 7777
TS ID: 0
TS Type: MPEG-2
TS Bitrate(Mbps): 20.0

PMT/PSIP Parameters

Program Number: 2
Program Name: Gige 3-t2-2
☐ PMT PID
Major Channel Number:
Minor Channel Number:

Video

Video Type: MPEG2
Encoding Template: HD
Automatic/Video Bitrate: ☐ 15.0
GOP Structure:
GOP M: 3
GOP N: 15

Pre-Processing Filters Enable:

☐ MCTF noise reduction ☐ Telecine
Resolution: H: Full Res
AFD Output: ☐ Disable
Aspect Ratio: Automatic
Closed Captioning: SCTE 21
Closed Caption Type: CEA 608

Apply Cancel

3. At the **Create Transcoding Output Program** dialog, use guidelines from the following tables to define this output program:
 - “Create Transcoding Output Program—Associated TS Parameters” on page 165.
 - “Create Transcoding Output Program—PMT/PSIP Parameters” on page 165.
 - “Create Transcoding Output Program—Video Parameters” on page 166.
4. Click **Apply** to save and use these settings.

MPEG-2 SD Encoded Video—Transcoded Output Program Configuration

For this setup, you should first check to ensure that the VTX TS is configured for MPEG-2 SD encoded video.

1. At the **Create or Modify Output Transport Stream** dialog, ensure that the **Video Transcoding** section contains the following entries:



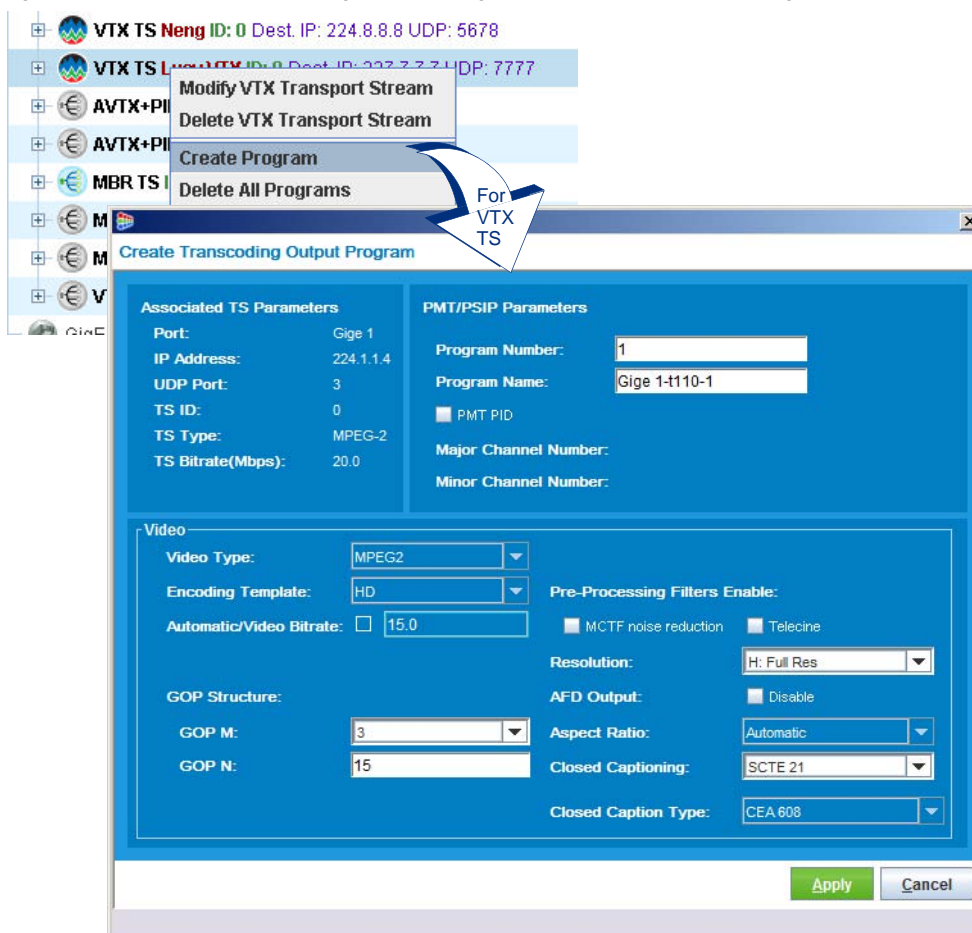
Video Transcoding

Input Resolution Class: HD

Output Resolution Class: SD Video Type: MPEG2

2. Use the **Create Transcoded Output Program** screen from an output VTX TS (Figure 106) to set parameters for an SD Encoded MPEG-2 video program.

Figure 106. Create Transcoding Output Program - MPEG-2, SD Encoding



VTX TS Neng ID: 0 Dest. IP: 224.8.8.8 UDP: 5678

VTX TS L... VTX ID: 0 Dest. IP: 224.7.7.7 UDP: 7777

Modify VTX Transport Stream

Delete VTX Transport Stream

Create Program

Delete All Programs

For VTX TS

Create Transcoding Output Program

Associated TS Parameters

Port: Gige 1

IP Address: 224.1.1.4

UDP Port: 3

TS ID: 0

TS Type: MPEG-2

TS Bitrate(Mbps): 20.0

PMT/PSIP Parameters

Program Number: 1

Program Name: Gige 1-t110-1

☐ PMT PID

Major Channel Number:

Minor Channel Number:

Video

Video Type: MPEG2

Encoding Template: HD

Automatic/Video Bitrate: ☐ 15.0

GOP Structure:

GOP M: 3

GOP N: 15

Pre-Processing Filters Enable:

☐ MCTF noise reduction ☐ Telecine

Resolution: H: Full Res

AFD Output: ☐ Disable

Aspect Ratio: Automatic

Closed Captioning: SCTE 21

Closed Caption Type: CEA 608

Apply Cancel

3. At the **Create Transcoding Output Program** dialog, use guidelines from the following tables to define this output program:
 - “Create Transcoding Output Program—Associated TS Parameters” on page 165.
 - “Create Transcoding Output Program—PMT/PSIP Parameters” on page 165.
 - “Create Transcoding Output Program—Video Parameters” on page 166.
4. Click **Apply** to save and use these settings.

HD Encoded H.264 Video—Transcoded Output Program Configuration

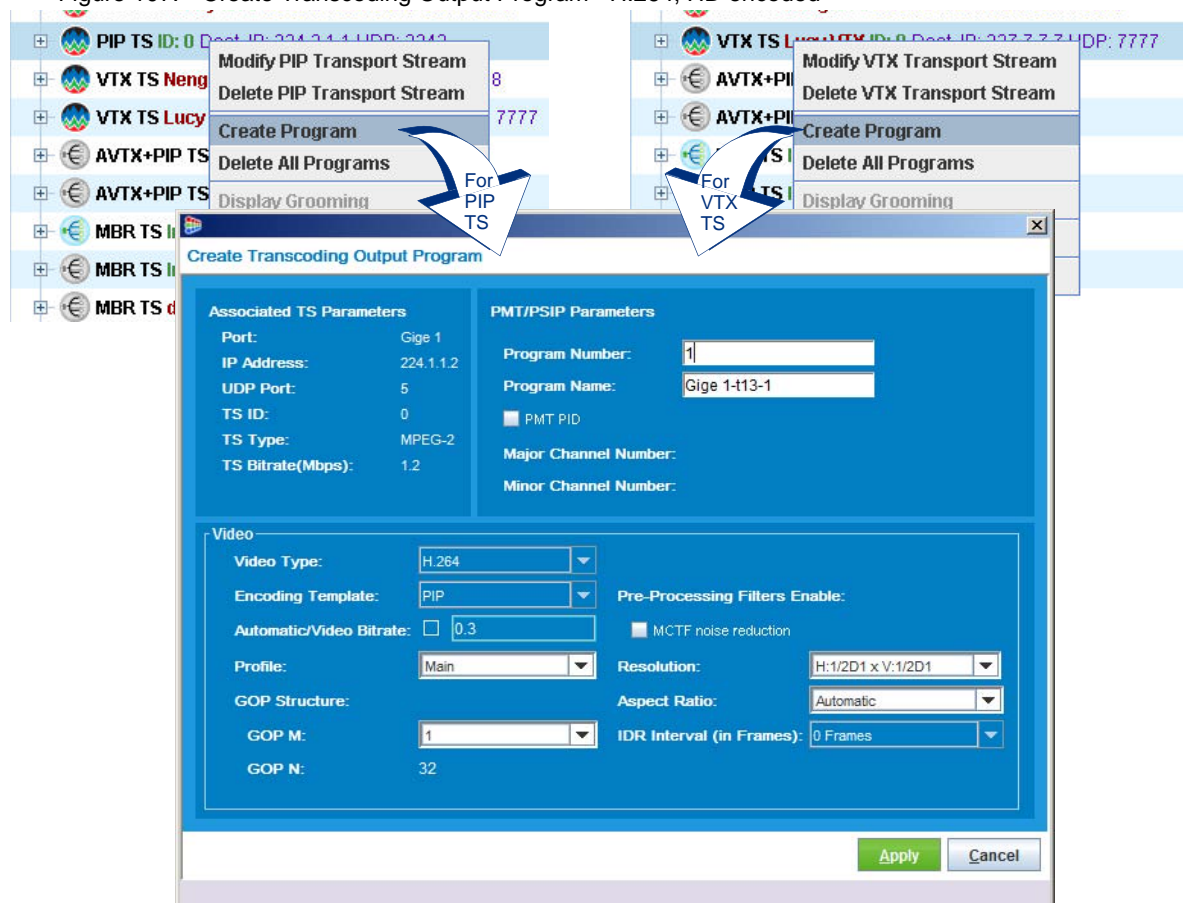
For this setup, you should first check to ensure that the PIP or VTX TS is configured for H.264 HD encoded video.

1. At the **Create or Modify Output Transport Stream** dialog (for VTX or PIP), ensure that the **Video Transcoding** section contains the following entries:



2. Use the **Create Transcoded Output Program** screen (Figure 107) to set parameters for an HD Encoded H.264 video program.

Figure 107. Create Transcoding Output Program - H.264, HD encoded



3. At the **Create Transcoded Output Program** dialog, use guidelines from the following tables to define this output program:
 - “Create Transcoding Output Program—Associated TS Parameters” on page 165.
 - “Create Transcoding Output Program—PMT/PSIP Parameters” on page 165.
 - “Create Transcoding Output Program—Video Parameters” on page 166.
4. Click **Apply** to save and use these settings.

SD Encoded H.264 Video—Transcoded Output Program Configuration

For this setup, you should first check to ensure that the PIP or VTX TS is configured for H.264 SD encoded video.

1. At the **Create or Modify Output Transport Stream** dialog (for VTX or PIP), ensure that the **Video Transcoding** section contains the following entries:

Video Transcoding

Input Resolution Class: SD Video Type: H264 Video Standard: NTSC

Output Resolution Class: SD Video Type: H264

2. Use the **Create Transcoded Output Program** screen from an output PIP or VTX TS (Figure 108) to set parameters for an SD Encoded H.264 video program.

Figure 108. Create Transcoding Output Program - H.264, SD encoded

Figure 108 shows the 'Create Transcoding Output Program' dialog box, which is used to configure parameters for an SD Encoded H.264 video program. The dialog is divided into three main sections:

- Associated TS Parameters:**
 - Port: Gige 1
 - IP Address: 224.1.1.2
 - UDP Port: 5
 - TS ID: 0
 - TS Type: MPEG-2
 - TS Bitrate(Mbps): 5.0
- PMT/PSIP Parameters:**
 - Program Number: 1
 - Program Name: Gige 1-t13-1
 - ☐ PMT PID
 - Major Channel Number:
 - Minor Channel Number:
- Video:**
 - Video Type: MPEG2
 - Encoding Template: SD
 - Automatic/Video Bitrate: ☐ 4.0
 - Pre-Processing Filters Enable:
 - ☐ MCTF noise reduction
 - ☐ Telecine
 - Resolution: H: Full D-1
 - Aspect Ratio: Automatic
 - Closed Captioning: SCTE 21
 - Closed Caption Type: CEA 608
 - GOP Structure:
 - GOP M: 3
 - GOP N: 15

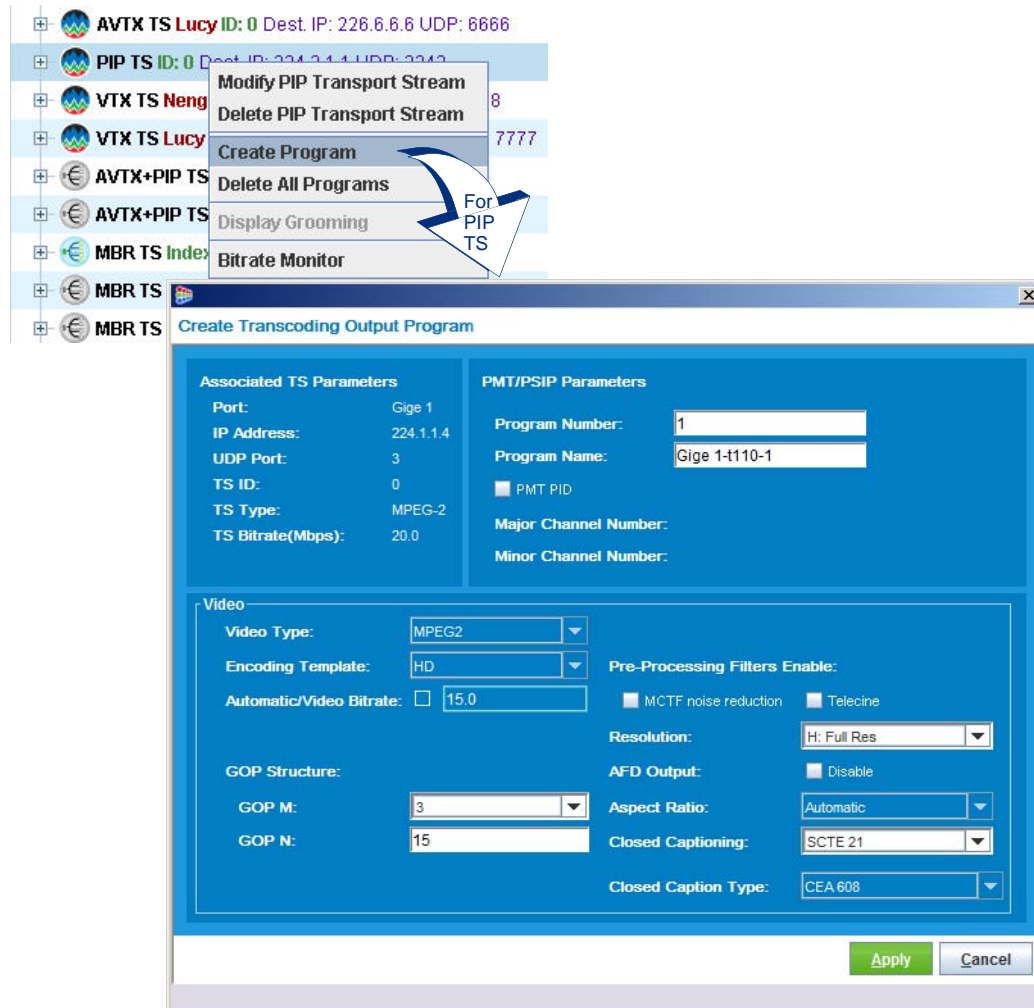
The dialog also includes 'Apply' and 'Cancel' buttons at the bottom right.

3. At the **Create Transcoded Output Program** dialog, use guidelines from the following tables to define this output program:
 - “Create Transcoding Output Program—Associated TS Parameters” on page 165.
 - “Create Transcoding Output Program—PMT/PSIP Parameters” on page 165.
 - “Create Transcoding Output Program—Video Parameters” on page 166.
4. Click **Apply** to save and use these settings.

PIP Encoded H.264 Video—Transcoded Output Program Configuration

Use the **Create Transcoded Output Program** screen (Figure 109) to set parameters for a PIP Encoded H.264 video program.

Figure 109. Create Transcoding Output Program - H.264, PIP encoded



1. At the **Create Transcoded Output Program** dialog, use guidelines from the following tables to define this output program:
 - “Create Transcoding Output Program—Associated TS Parameters” on page 165.
 - “Create Transcoding Output Program—PMT/PSIP Parameters” on page 165.
 - “Create Transcoding Output Program—Video Parameters” on page 166.
2. Click **Apply** to save and use these settings.

Create Transcoding Output Program—Associated TS Parameters

The parameters listed and described in [Table 74](#) are provided in the **Create Transcoding Program** dialog.

Table 74. Create Transcoding Output Program Fields—Associated TS Parameters

Field	Description	Default
Port	The GigE or 10 GigE interface on which the program is being created.	Read-only
IP Address	The destination IP address of the transport stream.	Read-only
UDP Port	UDP port the program uses, based on UDP port of the transport stream.	Read-only
TS ID	The program's transport stream id (name), based on TS ID of the transport stream.	Read-only
TS Type	Type of transport stream, based on TS type specified in the creation of the transport stream.	Read-only
TS Bitrate(Mbps)	Bitrate for the transport stream, based on TS bitrate specified in the creation of the transport stream.	Read-only

Create Transcoding Output Program—PMT/PSIP Parameters

The parameters listed and described in [Table 75](#) are provided in the **Create Transcoding Program** dialog.

Table 75. Create Transcoding Output Program Fields—PMT/PSIP Parameters

Field	Description	Default
Program Number	Number assigned to the program. Valid range is from 1 to 131072	1
Program Name	Type an alphanumeric string to set program name. Maximum length = 32 characters. Default format: GigE #-t[unique id]-[Program Number]	e.g: GigE 7- t47221504-1
PMT PID	ID of the program map table (PMT). Check this box to input a valid range from 48-8175.	Un-checked
Major Channel Number	Operator-defined channel number. Used to group all channels that are to be identified to a particular broadcast corporation. When the program's TS Type is set to ATSC, the value in this field may be set from 1 to 999.	Read-only
Minor Channel Number	Operator-defined channel number. Used to identify a particular channel within the Major Channel Number group. When the program's TS Type is set to ATSC, the value in this field may be set from 0 to 999.	Read-only

Create Transcoding Output Program—Video Parameters

The parameters listed and described in [Table 74](#) are provided in the **Create Transcoding Program** dialog.

Table 76. Create Transcoding Output Program Fields—Video Parameters

Field	Description	Default
Video Type	Specifies the type of video the program is to be transcoded to. The available options are <i>MPEG-2</i> and <i>H.264</i> for VTX transport streams and <i>H.264</i> only for PIP transport streams.	MPEG-2
Encoding Template	Choose between HD (high definition), SD (standard definition), or PIP (picture in picture). If HD, SD, or PIP is selected, the Video Bit Rate defaults and range will change as described below. <i>PIP</i> is only available if creating a program for a PIP transport stream.	HD PIP
Automatic Video Bitrate (In Mbps)	Allows automatic bitrate assignment, to maximize bitrate available for video streams within the range configured in the output transport stream. If this box is checked, the system assigns the video bitrate, with the latency marked by a “ <i>Perfecting video</i> ” message until the bitrate is assigned. Leaving this box un-checked will allow manual video bitrate entry according to supported values for Video Type parameters MPEG-2 HD, MPEG-2 SD, H.264 HD, H.264 SD, and PIP. Refer to “ Bitrate Configuration Reference ” on page 310 for ranges and default values.	Un-checked
Profile (Video Type = H.264 only)	Select either high, main, or baseline to set the video standard to be used. Refer to “ Video Profile Configuration Reference ” on page 313 for guidelines. Note: <i>Profile</i> is available only when <i>Video Type</i> is set to <i>H.264</i> . <i>High</i> is not available for PIP transport streams.	For HD or SD: <i>High</i> For PIP: <i>Main</i>
GOP Structure	Specifies how the Group of Pictures (GOP) structure is determined, as either GOPM or GOPN. GOP M —Specifies the spacing of the P frames in the output. The higher the value, the lower the data rate. <ul style="list-style-type: none"> MPEG-2 HD or SD, select 1, 2, or 3. For H.264 HD or SC, select 1, 2, 3, 4, or 8. <ul style="list-style-type: none"> Note that GOP M 8 is not available if input is 1080i HD. For H.264 PIP, select 1 or 4. GOP N — Specifies the number of frames in each GOP. The higher the value, the lower the data rate. <ul style="list-style-type: none"> MPEG-2 HD or SD, set value between 1 and 60 and a multiple of the GOP M value, else the nearest lower multiple is used. H.264 HD or SC, set value between 1 and 240 and a multiple of the GOP M value. When the GOP M value is set to 4 or 8, the GOP N value is set to 32 and is read-only. H.264 PIP, the value is set to 32 and read-only 	3 4 4 15 32

Table 76. Create Transcoding Output Program Fields—Video Parameters (Continued)

Field	Description	Default
Pre-Processing Filters Enable	<p>One, both, or none of the following pre-processing filters may be selected:</p> <p><i>MCTF noise reduction</i> — when checked, enables motion compensated temporal filtering (MCTF).</p> <p><i>Telecine</i>—when checked, indicates whether the source program was telecine (television / cinema) processed. The telecine process converts a source feed at 24 frames per second (typically a film) to a feed at 30 frames per second. When telecine has occurred, indicating its occurrence when creating a transcoded output program allows for more efficient processing.</p> <p>Note: <i>Telecine is only available when the Video Type is set to MPEG-2.</i></p>	Un-checked
Resolution	<p>Specifies the type of Horizontal (H) resolution to use for the transcoded program.</p> <ul style="list-style-type: none"> For HD transcoded programs, the following options are available: <i>Full Res, 1920, 1440, 1280, 960</i> For SD programs, the following options are available: <i>Full D-1, VGA, 3/4 D-1, 2/3 D-1, or 1/2 D-1</i> For PIP programs, the following horizontal and vertical options are available: H:1/2D1 X V:1/2D1 (352 x 240 for NTSC; 352 x 288 for PAL) 192 X 192, 128 X 96, 96 X 96 	<p>HD: H: Full Res</p> <p>H: Full D-1</p> <p>192 x 192</p>
AFD Output	<p>By default, Active Format Descriptions on the input streams are forwarded in the output streams. Check the box to disable the forwarding of AFDs.</p> <p>The <i>AFD Output</i> parameter does not appear when the Encoding Template is set to PIP.</p> <p>For information on AFD, refer to “Active Format Description (AFD)” on page 168.</p>	Un-checked
Active Format (Hidden unless SD selected)	<p>Specifies the type of output for HD content transcoded to SD, as one of the following options:</p> <ul style="list-style-type: none"> <i>Force 16:9 letterbox</i> — an AFD code of 10 is included in the output (16:9 Image: Letterbox in 4:3 frame, Full Frame in 16:9 frame). <i>Force 4:3 centercut</i> — an AFD code of 9 is included in the output (4:3 Image: Full Frame in 4:3 frame, Pillarbox in 16:9 frame). <i>Use AFD; 16:9 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 16:9 Letterbox. <i>Use AFD; 4:3 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 4:3 Centercut. <p>The <i>Active Format</i> field only appears when the Encoding Template is set to SD.</p>	Force 16:9 letterbox

Table 76. Create Transcoding Output Program Fields—Video Parameters (Continued)

Field	Description	Default
Aspect Ratio	<p>Specifies the ratio of the program's width to the height.</p> <ul style="list-style-type: none"> For an HD program, the field is read-only and set to <i>Automatic</i>. For an SD program, choose from one of the following options: <i>Automatic</i>, 4:3, 16:9. For a PIP program, choose from one of the following options: <i>Automatic</i>, 4:3, 16:9. 	<p>HD and SD: Automatic</p> <p>PIP: 4:3</p>
Closed Captioning	<p>Specifies the format used for encoding closed captioning on an MPEG-2 transcoded program. The options are:</p> <ul style="list-style-type: none"> SCTE 21 SCTE 20 and SCTE 21 <p>When selecting SCTE 20 and SCTE 21, be sure to reserve sufficient bandwidth for both closed captioning streams. <i>Automatic Video Bitrate Assignment</i> accounts for the additional bandwidth needed for SCTE 20.</p> <p>The VMG discards user data format as per SCTE 20 in the input. It re-formats user data for the input as per SCTE21 to SCTE, and as per SCTE 20 when requested.</p> <p>The <i>Closed Captioning</i> field only appears when the Video Type is set to <i>MPEG-2</i>.</p>	SCTE 21
IDR Interval (in Frames)	<p>Specifies the interval between instantaneous decoder refresh (IDR) frames.</p> <ul style="list-style-type: none"> For GOP M—1-3 with HD or SD encoding, the IDR interval can be input by the user and must be a multiple of the GOP N value. Enter 0 if no IDR frames are to be inserted. For GOP M—4, the IDR interval can be set to 96 (the default) or 0 (no IDR). For GOP M—8, the IDR interval is set to 96 and is read-only. If PIP is selected for the Encoding Template, no IDR frames are inserted and the field does not display. <p>The <i>IDR Interval</i> field only appears when the Video Type is set to <i>H.264</i>.</p>	96

Active Format Description (AFD)

MPEG-2 standards define a 4:3 aspect ratio for SD content, 16:9 for HD content. When transcoding from HD content to SD size, in general, we must fit 16:9 HD frames inside a 4:3 frame. This can be accomplished using two different approaches: 16:9 letter box, where the full 16:9 frame is visible with black bars at the top and the bottom of the 4:3 screen, and 4:3 center cut, where the right and left portions of the 16:9 frame are cut off and the remainder fills the 4:3 frame.

To aid HD to SD down-scaling, incoming MPEG-2 or H264 video can contain active format description (AFD) code that describes the active video region inside the 16:9 display frame. The down-scaling process then uses this code to downscale only the active region to the SD display region, thus maximizing the displayed video area inside the 4:3 display.

With the VMG, you can choose whether to forward the incoming AFD in transcoded output streams. You can also determine how to process incoming AFDs:

- Follow the AFD while selecting either 16:9 letterbox or 4:3 centercut as fallback if no AFD is present
OR
- Ignore any AFD and force the output to either 16:9 letterbox or 4:3 centercut

Table 77 describes how the VMG processes incoming video depending on the incoming AFD and the GUI option you select.

Table 77. VMG Handling of AFD Codes Depending on GUI Selection

AFD code in input HD video in decimal (binary)	Aspect ratio of the “area of interest” in input HD video	Output Based on Active Format GUI Selection			
		Force 16:9 letterbox	Force 4:3 centercut	Use AFD; 16:9 fallback	Use AFD; 4:3 fallback
0 (0000)	Reserved	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered
1 (0001)	Reserved: treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered
2 (0010)	Full screen box 16:9 (top)	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered
3 (0011)	Pillar box 14:9 (top)	16:9 letterbox vertically centered	4:3 centercut	14:9 letterbox vertically centered	14:9 letterbox vertically centered
4 (0100)	Box > 16:9 (center). Treat as full screen.	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered
5 (0101)	Reserved: treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	Anamorphic	16:9 letterbox vertically centered
6 (0110)	Reserved: treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	Anamorphic	16:9 letterbox vertically centered
7 (0111)	Reserved: treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	Anamorphic	16:9 letterbox vertically centered
8 (1000)	Active format is the same as the coded frame. Full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered
9 (1001)	Pillar box 4:3 center cut	16:9 letterbox vertically centered (postage stamp)	4:3 centercut	Full frame 4:3 image	Full frame 4:3 image
10 (1010)	Full screen 16:9 (center)	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	16:9 letterbox vertically centered

Table 77. VMG Handling of AFD Codes Depending on GUI Selection (Continued)

AFD code in input HD video in decimal (binary)	Aspect ratio of the “area of interest” in input HD video	Output Based on Active Format GUI Selection			
		Force 16:9 letterbox	Force 4:3 centercut	Use AFD; 16:9 fallback	Use AFD; 4:3 fallback
11 (1011)	Pillar box 14:9 (center)	16:9 letterbox vertically centered	4:3 centercut	14:9 pillar box	14:9 pillar box
12 (1100)	Reserved: treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	Anamorphic	Anamorphic
13 (1101)	Pillar box 4:3 center cut (with shoot and protect 14:9 center)	16:9 letterbox vertically centered (postage stamp)	4:3 centercut	Full frame 4:3 image	Full frame 4:3 image
14 (1110)	Full screen 16:9 (with shoot and protect 14:9 center)	16:9 letterbox vertically centered	4:3 centercut	Full screen 16:9 (14)	Full screen 16:9 (14)
15 (1111)	Full screen 16:9 (with shoot and protect 4:3 center)	16:9 letterbox vertically centered	4:3 centercut	Full frame 4:3 image	Full frame 4:3 image
No AFD	Treat as full screen 16:9	16:9 letterbox vertically centered	4:3 centercut	16:9 letterbox vertically centered	4:3 centercut

Using Drag-and-Drop to Create Output Programs

The *VMG Element Manager* supports drag-and-drop grooming at the program level and transport stream level. Drag-and-drop grooming is performed on the **Grooming -> Mapping** tab page of the *VMG Element Manager* screen.

Program grooming performs different tasks depending on whether there are any existing programs currently associated with the output transport stream (Table 78).

Table 78. Drag-and-Drop Results

When you drag:	The grooming behavior:
Program to Transport Stream	The program is created in the Transport Stream; the <i>Configure Program Mapping</i> screen appears, allowing you to modify the program mapping information.
Program to non-transcoded Program	Deletes the existing program and replaces it with the dragged program.
Program to the TS carrying the transcoded Program	Regrooms the program to the new program.

Grooming Non-Transcoded Programs

Use the **Configure Program Mapping** dialog (Figure 110) to set grooming parameters for a selected program in a non-transcoded transport stream.



From the **Inputs** panel of the **Grooming --> Mapping** tab page--> drag input program to **Outputs** panel --> non-transcoded VTR stream --> **Configure Program Mapping** screen (Figure 110).

Figure 110. Configure VTR Program Mapping

Configure VTR Program Mapping

Grooming

Source

Port: Gige 1
 IP:UDP / TS ID: 239.9.9.9:9999 / 92
 Program Number: 1
 Program Name: Gige 4-t10-1

Destination

Port: Gige 4
 IP:UDP / TS ID: 230.8.8.8:1111 / 0
 Program Number: 1
 Program Name: Gige 4-t10-1
 TS Bitrate(Mbps): 38.0
 TS Type: MPEG-2

Component PIDs

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	16			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	17			Enter PID

Quality of Service

Service Level: 0
 Max Video Bitrate(Mbps):

☐ Synchronize input and output program names
☐ Forward SCTE 35 Cue
☐ PMT PID
☐ SCTE 30 to 35 Conversion
☐ Program Substitution
☐ Disable PMT update during program substitution

Apply Configuration Cancel

TS-level DPI Program (top); Program-level DPI Program (bottom)

Configure VTR Program Mapping

Grooming

Source

Port: Gige 1
 IP:UDP / TS ID: 239.9.9.9:9999 / 92
 Program Number: 1
 Program Name: Gige 4-t10-1

Destination

Port: Gige 4
 IP:UDP / TS ID: 230.8.8.8:2222 / 0
 Program Number: 1
 Program Name: Gige 4-t10-1
 TS Bitrate(Mbps): 38.0
 TS Type: MPEG-2

Component PIDs

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	16			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	17			Enter PID

Quality of Service

Service Level: 0
 Max Video Bitrate(Mbps):

☐ Synchronize input and output program names
☐ Forward SCTE 35 Cue
☐ PMT PID
☐ SCTE 30 to 35 Conversion
☐ Program DPI
☐ Program Substitution
☐ Disable PMT update during program substitution

Apply Configuration Cancel

- At the **Configure VTR Program Mapping** dialog, use guidelines from the following tables:
 - Table 79, “Grooming—Configure VTR Program Mapping Fields—Source,” on page 172.
 - Table 80, “Grooming—Configure VTR Program Mapping Fields—Destination,” on page 172.
 - Table 81, “Grooming - Configure VTR Program Mapping Fields—Component PIDs,” on page 173.
 - Table 82, “Grooming - Configure VTR Program Mapping Fields—Quality of Service,” on page 174.

2. Click **Apply Configuration** to save and use the settings. After clicking the **Apply Configuration** button the input program is copied to the output transport stream, replacing any existing programs if their schedules conflict.

Configure VTR Program Mapping—Source

The parameters listed in Figure 79 are provided in the **Configure VTR Program Mapping** dialog (Figure 110).

Table 79. Grooming—Configure VTR Program Mapping Fields—Source

Field	Description	Default
Port	The input program's source GigE or 10 GigE interface.	Read-only
TS ID	The input program's transport stream id (name).	Read-only
Program Number	Program number assigned to the input program.	Read-only
Program Name	Program name assigned to the input program.	Read-only

Configure VTR Program Mapping—Destination

The parameters listed in Figure 80 are provided in the **Configure VTR Program Mapping** dialog (Figure 110).

Table 80. Grooming—Configure VTR Program Mapping Fields—Destination

Field	Description	Default
Port	The output program's destination GigE interface port.	Read-only
TS ID	The program's transport stream id (name), based on TS ID of the transport stream.	Read-only
Program Number	Number, in the range 1 to 131072, assigned to the output program.	Number of the GigE port
Program Name	Type an alphanumeric string to set the program name. Maximum length = 32 characters. Default format: GigE #-t[unique id]-[Program Number]	e.g: GigE 7-t47221504-1
TS Bitrate(Mbps)	Displays the bitrate defined for the transport stream.	Read-only
TS Type	Displays the transport stream type, as either MPEG-2, ATSC, DVB, & SCTE	Read-only
Major Channel Number (appears only when <i>TS Type</i> is set to ATSC)	Operator-defined channel number, for grouping of all channels to be identified to a particular broadcast corporation. When the program's TS Type is set to ATSC, the value in this field may be set from 1 to 999.	Blank
Minor Channel Number (appears only when <i>TS Type</i> is set to ATSC)	Operator-defined channel number that identifies a particular channel within the Major Channel Number group. When the program's TS Type is set to ATSC, the value in this field may be set from 0 to 999.	Blank

Configure VTR Program Mapping—Component PIDs

The parameters listed in Figure 81 are provided in the **Configure VTR Program Mapping** dialog (Figure 110).

Table 81. Grooming - Configure VTR Program Mapping Fields—Component PIDs

Field	Description	Default
Input Type	Displays the input program types and associated PIDs. To allow stream grooming, un-check the desired input PID Types.	Checked
PID	Displays the PID of the associated Input Type.	Read-only
Output Type	Displays the output program types if a referenced or unreferenced PID has been defined. Click this field or click <i>Enter PID</i> under Action to create a referenced or unreferenced PID.	Blank
PID	Displays the output program type's PID if one has been defined as described above. Click this field to open the same screen as described above for defining a PID.	Blank
Stay Unreferenced (Field displays only if the input program is a Ghost Program)	<p>If the input program is a <i>Ghost Program</i>, the <i>Stay Unreferenced</i> option displays in this section.</p> <ul style="list-style-type: none"> • Checked = no PAT / PMT generation. Use this option if the PIDs in this stream are to remain unreferenced in PSI tables. See also “Adding an Unreferenced PID as an Elementary Stream” on page 262 for more information. • Un-checked = the program will become referenced. 	Checked
Synchronize input and output program names	Enable (check) or disable (un-check) synchronization of the output program names to the input program names.	Un-checked
Forward SCTE 35 Cue	Enable (check) or disable (un-check) forwarding of SCTE 35 information at input streams.	Un-checked
PMT PID	ID of the program map table (PMT). Check to input a valid range from 48-8175.	Un-checked
SCTE 30 to 35 Conversion	Enable (check) or disable (un-check) SCTE 30 to SCTE 35 conversion at output streams.	Un-checked
Program DPI (Field displays only if the output transport stream was enabled for <i>Program level DPI</i>)	<p>Enable or disable DPI for the output program.</p> <ul style="list-style-type: none"> • Un-check = Each program with program-level DPI enabled will use one license from the available license pool. To “free up” a program DPI license, un-check this box. • Checked = to delete the program, this box must be un-checked. <p>NOTE: A number-based DPI license, and available DPI sessions are required.</p>	Un-checked

Table 81. Grooming - Configure VTR Program Mapping Fields—Component PIDs (Continued)

Field	Description	Default
Program Substitution	<p>Enable or disable program substitution for the output program. A number-based Program Substitution license, and available Program Substitution sessions are required.</p> <p>NOTE: DPI is not supported on a channel-substituted program.</p> <p>Un-check = Each program with <i>Program Substitution</i> enabled will use one license from the available license pool.</p> <p>To “free up” a program substitution license, un-check this box.</p> <p>Checked =</p> <ul style="list-style-type: none"> • When this box is checked, the Program DPI box may not be checked at the same time. • When this box is checked, the <i>Disable PMT update during program substitution</i> option becomes visible. • To delete the program, this box must be un-checked. 	Un-checked
Disable PMT update during program substitution	<p>When checked, this option will maintain the same PMT table version after a substitution event as long as elementary stream structures match. This avoids possible set top box re-tuning and disruptions.</p> <p>This field is only displayed when the <i>Program Substitution</i> box is checked; otherwise, this box is hidden.</p>	Hidden

Configure VTR Program Mapping—Quality of Service

The parameters listed in Figure 82 are provided in the **Configure VTR Program Mapping** dialog (Figure 110).

Table 82. Grooming - Configure VTR Program Mapping Fields—Quality of Service

Field	Description	Default
Service Level	<p>Select bit rate adaptation techniques to be applied to MPEG-2 encoded streams to enhance bandwidth efficiency as one of the following:</p> <ul style="list-style-type: none"> • Any integer from -8 to +8 • 0 for average or mid-scale quality • Bypass Transrater • Handle as Data • No Rate-shaping <p>See also Table 83, “Service Level Configuration Details,” on page 175.</p>	0
Max Video Bitrate (Mbps)	Value to define maximum bitrate (in Mbps) for this program. Choosing a specific max rate will bypass automatic transrating based on priorities.	Blank



Note: Statistical multiplexing with rate shaping: With an MPTS, the instantaneous transrating factor for each video stream is determined by ensuring that no overflow or underflow occurs at the receiver when the video programs contained in that MPTS are sent at the transport stream bitrate.

QoS Settings for Program Mapping

This section contains information about the quality of service selections (Table 83) for service level configuration, which are provided in the **VTR Program Mapping** screen. This **Service Level** field allows the assignment of transrating priorities and conditions for each program.

Table 83. Service Level Configuration Details

QoS Service Level Configuration	Video Processing	Can DPI be performed?	Effect on Video Output Bandwidth
Transrating Service Level Values	Video elementary stream (ES) is processed through the transrater. <ul style="list-style-type: none"> • -8: highest transrating, lowest quality. • +8: lowest transrating, highest quality. 	YES DPI sessions carry same QOS settings as network.	Transrated output video ES requires less bandwidth than input video ES.
No Rate-shaping	Video ES processing is limited through the transrater with null packet removal. <ul style="list-style-type: none"> • Video quantization level is unchanged 	YES DPI sessions carry same QOS settings as network.	Output video ES bandwidth will vary depending on level of ES null packet removal.
Bypass Transrater	Video ES is not processed through the transrater. <ul style="list-style-type: none"> • Video can be displayed. 	YES DPI sessions carry same QOS settings as network.	Output video ES uses the same bandwidth as input video ES. <ul style="list-style-type: none"> • Cannot use more than the bandwidth of output TS.
Handle As Data	Video ES is not processed through the transrater. <ul style="list-style-type: none"> • Video cannot be displayed. 	NO	Output data ES is treated as data and will therefore use the same bandwidth as input video ES. <ul style="list-style-type: none"> • Cannot use more than the bandwidth of output TS. • Total bandwidth should not exceed 4Mbps per TS.

Grooming Transcoded Programs

Use the **Configuration Program Mapping** dialog for AVTX, VTX, or PIP to set grooming parameters for a transcoded program (see also “Click Apply Configuration to save the settings. The new program is now displayed in the Outputs panel, in the expanded PIP TS view.” on page 178).



Select and drag an input program to the transcode-enabled output transport stream under which to create the output program, to present the **Configure Program Mapping** dialog for the TS type:

- “Configure AVTX Program Mapping” on page 176.
- “Configure VTX Program Mapping” on page 177.
- “Configure PIP Program Mapping” on page 178.

Configure AVTX Program Mapping

Use the **Configure AVTX Program Mapping** screen (Figure 111) to set grooming parameters for a specific AVTX transport stream.

Figure 111. Configure AVTX Program Mapping—Grooming Parameters

Configure AVTX Program Mapping

Grooming

Source

Port: Gige 2
IP-UDP / TS ID: 238.8.8.8:8888 / 92
Program Number: 1
Program Name:
Resolution Class: HD

Destination

Port: Gige 1
IP-UDP / TS ID: 224.2.2.1:3 / 0
Program Number: 1
Program Name: Gige 1-118-1
TS Bitrate(Mbps): 20
TS Type: MPEG-2

Component PIDs

Pass-Through: NONE
Max Audio: 1
Max Data: 0

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	16			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	17			Enter PID

☐ Synchronize input and output program names
☐ Forward SCTE 35 Cue

Video

Video Type: MPEG2
Encoding Template: HD
Automatic/Video Bitrate: ☐ 15

Pre-Processing Filters Enable:

☐ MCTF noise reduction ☐ Telecine

Resolution: H: Full Res
AFD Output: ☐ Disable
Aspect Ratio: Automatic
Closed Captioning: SCTE 21
Closed Caption Type: CEA 608

Audio

☐ Audio Profile: dedd
Audio Codec: AAC LC
Sampling Rate: 44.1 kHz
Channels: stereo
Audio Bitrate: 320 kbps
Audio Gain: no Gain

Advanced...

Enabled only if a Dolby Codec is selected.

Apply Configuration Cancel

- At the **Configure AVTX Program Mapping** screen, use guidelines from the following tables to define the grooming parameters for this AVTX stream.
 - “Configure AVTX/VTX/PIP Program Mapping—Source” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Destination” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Component PIDs” on page 180.
 - “Configure AVTX/VTX/PIP Program Mapping—Video” on page 180.
 - “Configure AVYX/VTX/PIP Program Mapping—Audio” on page 183.
- Click **Apply Configuration** to save the settings. The new program is now displayed in the **Outputs** panel, in the expanded AVTX TS view.

Configure VTX Program Mapping

Use the **Configure AVTX Program Mapping** screen (Figure 112) to set grooming parameters for a specific VTX transport stream.

Figure 112. Configure VTX Program Mapping—grooming parameters

The screenshot shows the 'Configure VTX Program Mapping' window with the 'Grooming' tab selected. The window is divided into several sections:

- Source:** Port: Gige 2, IP:UDP / TS ID: 239.21.1.1:1000 / 379, Program Number: 1, Program Name: test, Resolution Class: HD.
- Destination:** Port: Gige 1, IP:UDP / TS ID: 224.2.2.2:3 / 0, Program Number: 1, Program Name: Gige 1-19-1, TS Bitrate(Mbps): 20, TS Type: MPEG-2.
- Component PIDs:** Max Audio: 2, Max Data: 2. A table lists input types and their PIDs:

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> MPEG-2 Video	49			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng(fr..	52			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio spa	53			Enter PID
<input checked="" type="checkbox"/> Data	272			Enter PID
<input checked="" type="checkbox"/> Data	273			Enter PID
- Options:**
 - ☐ Synchronize input and output program names
 - ☐ PMT PID:
 - ☐ Forward SCTE 35 Cue
- Video:**
 - Video Type: MPEG2
 - Encoding Template: HD
 - Automatic/Video Bitrate: ☐ 15
 - Pre-Processing Filters Enable:
 - ☐ MCTF noise reduction
 - ☐ Telecine
 - Resolution: H: Full Res
 - AFD Output: ☐ Disable
 - Aspect Ratio: Automatic
 - Closed Captioning: SCTE 21
 - Closed Caption Type: CEA 608
 - GOP Structure:
 - GOP M: 3
 - GOP N: 15

At the bottom right, there are 'Apply Configuration' and 'Cancel' buttons.

- At the **Configure VTX Program Mapping** screen, use guidelines from the following tables to define the grooming parameters for this VTX stream.
 - “Configure AVTX/VTX/PIP Program Mapping—Source” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Destination” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Component PIDs” on page 180.
 - “Configure AVTX/VTX/PIP Program Mapping—Video” on page 180.
 - “Configure AVYX/VTX/PIP Program Mapping—Audio” on page 183.
- Click **Apply Configuration** to save the settings. The new program is now displayed in the **Outputs** panel, in the expanded VTX TS view.

Configure PIP Program Mapping

Use the **Configure PIP Program Mapping** screen (Figure 113) to set grooming parameters for a specific PIP transport stream.

Figure 113. Configure PIP Program Mapping—grooming parameters

Configure PIP Program Mapping

Grooming

Source

Port: Gige 1
 IP:UDP / TS ID: 239.9.9.9999 / 92
 Program Number: 1
 Program Name:
 Resolution Class: HD

Destination

Port: Gige 4
 IP:UDP / TS ID: 224.8.8.8:10100 / 0
 Program Number: 1
 Program Name: Gige 4-17-1
 TS Bitrate(Mbps): 1.2
 TS Type: MPEG-2

Component PIDs

	Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/>	SCTE Video	16			Enter PID
<input type="checkbox"/>	AC-3 Audio eng	17			Enter PID

☐ Synchronize input and output program names ☐ PMT PID:
☐ Forward SCTE 35 Cue

Video

Video Type: H.264
 Encoding Template: PIP
 Automatic/Video Bitrate: ☐ 0.3
 Profile: Main
 GOP Structure:
 GOP M: 1
 GOP N: 0

Pre-Processing Filters Enable:

☐ MCTF noise reduction

Resolution: H.1/2D1 x V.1/2D1
 Aspect Ratio: Automatic
 IDR Interval (in Frames): 0 Frames

Apply Configuration **Cancel**

- At the **Configure PIP Program Mapping** screen, use guidelines from the following tables to define the grooming parameters for this VTX stream.
 - “Configure AVTX/VTX/PIP Program Mapping—Source” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Destination” on page 179.
 - “Configure AVTX/VTX/PIP Program Mapping—Component PIDs” on page 180.
 - “Configure AVTX/VTX/PIP Program Mapping—Video” on page 180.
 - “Configure AVYX/VTX/PIP Program Mapping—Audio” on page 183.
- Click **Apply Configuration** to save the settings. The new program is now displayed in the **Outputs** panel, in the expanded PIP TS view.

Configure AVTX/VTX/PIP Program Mapping—Source

The source parameters listed and described in Figure 84 are provided in the **Configure Program Mapping** dialog for AVTX, VTX, or PIP.

Table 84. Grooming - Create Configure AVTX/VTX/PIP Program Mapping Fields—Source

Field	Description	Default
Port	The input program's source GigE or 10 GigE interface.	Read-only
IP:UDP / TS ID	The input program's transport IP address, UDP port, and stream id (name).	Read-only
Program Number	Program number assigned to the input program.	Read-only
Program Name	Program name assigned to the input program.	Read-only

Configure AVTX/VTX/PIP Program Mapping—Destination

The destination parameters listed and described in Table 85 are provided in the **Configure Program Mapping** dialog for AVTX, VTX, or PIP.

Table 85. Grooming - Create Configure AVTX/VTX/PIP Program Mapping Fields—Destination

Field	Description	Default
Port	The output program's destination GigE interface port.	Read-only
IP:UDP / TS ID	The program's transport stream IP address and UDP port and id (name), based on TS ID of the transport stream.	Read-only
Program Number	Value, in the range 1-131072, assigned to the output program.	Number of the GigE port
Program Name	Alphanumeric string to set name assigned to the program. Maximum length = 32 characters. Example: GigE 7- t47221504-1	Default format: GigE #-t[unique id]-[Program Number]
TS Bitrate (Mbps)	The maximum bitrate for the TS	Read-only
TS Type	Displays the transport stream type as either <i>MPEG-2</i> , <i>ATSC</i> , <i>DVB</i> , or <i>SCTE</i>	Read-only
Major Channel Number (appears only when <i>TS Type</i> is set to ATSC)	Operator-defined channel number. Used to group all channels that are to be identified to a particular broadcast corporation. <ul style="list-style-type: none"> When the program's <i>TS Type</i> is set to ATSC, the value in this field may be set from 1 to 999. 	Blank
Minor Channel Number (appears only when <i>TS Type</i> is set to ATSC)	Operator-defined channel number. Used to identify a particular channel within the Major Channel Number group. <ul style="list-style-type: none"> When the program's <i>TS Type</i> is set to ATSC, the value in this field may be set from 0 to 999. 	Blank

Configure AVTX/VTX/PIP Program Mapping—Component PIDs

The component PIDs parameters listed and described in [Table 86](#) are provided in the **Configure Program Mapping** dialog for AVTX, VTX, or PIP.

Table 86. Grooming - Create Configure AVTX/VTX/PIP Program Mapping Fields—Component PIDs

Field	Description	Default
Input Type	Displays the input program types and associated PIDs. To allow stream grooming, un-check the desired input PID Types.	Checked
PID	Displays the Input Type's associated PID.	Read-only
Output Type	Displays the output program types if a referenced or unreferenced PID has been defined. If blank, click in this field or click <i>Enter PID</i> under <i>Action</i> to create a referenced or unreferenced PID.	Blank
PID	Displays the output program type's PID (if defined as described above). If blank, click in this field or click <i>Enter PID</i> under <i>Action</i> to create a referenced or unreferenced PID.	Blank
Pass-through	Specify whether to disallow passthrough (None), or enable AC-3 or E-AC-3 (Dolby Digital Plus) passthrough on this output transport stream.	None
Max Audio	Set value to define the maximum allowable audio elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	See "Bitrate Configuration Reference" on page 310 for comparative values.
Max Data	Set value to define the maximum allowable data elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	

Configure AVTX/VTX/PIP Program Mapping—Video

The video parameters listed and described in [Table 87](#) are provided in the **Configure Program Mapping** dialog for AVTX, VTX, or PIP.

Table 87. Grooming - Create Configure AVTX/VTX/PIP Program Mapping Fields—Video

Field	Description	Default
Video Type	Specifies the type of video the program is to be transcoded to, as either <i>MPEG-2</i> and <i>H.264</i> .	MPEG-2
Encoding Template	Choose between HD (high definition), SD (standard definition), or PIP (picture in picture). If selecting HD, SD, or PIP the Video Bit Rate defaults and range will change as described below.	HD for AVTX and VTX TS PIP for PIP TS

Table 87. Grooming - Create Configure ATVX/VTX/PIP Program Mapping Fields—Video (Continued)

Field	Description	Default
Automatic Video Bitrate Assignment <i>(In Mbps)</i>	<p>This feature allows automatic bitrate assignment in order to maximize the bitrate available for video streams within the range configured by the user in the output transport stream. Automatic bitrate assignment also takes into account other (non-video) elementary streams in the output TS.</p> <ul style="list-style-type: none"> • Checked = the system assigns the video bitrate, with the latency marked by a <i>“Perfecting video”</i> message until the bitrate is assigned. • Un-checked = A low manual video bitrate entry according to the supported values for Video Type parameters MPEG-2 HD, MPEG-2 SD, H.264 HD, H.264 SD, and PIP. As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310). <p>Refer to “Bitrate Configuration Reference” on page 310 for ranges and default values.</p>	Un-checked
Profile <i>(Video Type = H.264 only)</i>	<p>Select either high, main, or baseline to set the video standard to be used. Refer to “Video Profile Configuration Reference” on page 313 for guidelines.</p> <p>Note: <i>Profile is only available when Video Type is set to H.264. High is not available for PIP transport streams.</i></p>	Main
GOP Structure	<p>Specifies how the Group of Pictures (GOP) structure is determined. When the GOP M value is set to 4 or 8, the GOP N value is set to 32 and is read-only.</p> <p><i>GOP M</i>—Specifies the spacing of the P frames in the output. The higher the value, the lower the data rate.</p> <ul style="list-style-type: none"> • MPEG-2 HD or SD, select 1, 2, or 3. Default=3 • H.264 HD or SD, select 1, 2, 3, 4, or 8. Default = 4 <ul style="list-style-type: none"> - Note that GOP M 8 is not available if input is 1080i HD. • H.264 PIP, select 1 or 4. Default = 4 <p><i>GOP N</i>— Specifies the number of frames in each GOP. The higher the value, the lower the data rate.</p> <ul style="list-style-type: none"> • MPEG-2 HD or SD, set value between 1 and 60 and a multiple of the GOP M value, else the nearest lower multiple is used. Default = 15 • H.264 HD or SD, set value between 1 and 240 and a multiple of the GOP M value. Default = 32 • H.264 PIP, the value is set to 32 and read-only 	<p>For MPEG-2 HD or SD: GOP M: 3 GOP N: 15</p> <p>For H.264 HD, SD or PIP: GOP M: 4 GOP N: 32</p>

Table 87. Grooming - Create Configure ATVX/VTX/PIP Program Mapping Fields—Video (Continued)

Field	Description	Default
Pre-Processing Filters Enable	<p>One, both, or none of the following pre-processing filters may be selected:</p> <p><i>MCTF noise reduction</i> — when checked, enables motion compensated temporal filtering (MCTF).</p> <p><i>Telecine</i>--when checked, indicates whether the source program was telecine (television / cinema) processed. The telecine process converts a source feed at 24 frames per second (typically a film) to a feed at 30 frames per second. When telecine has occurred, indicating its occurrence when creating a transcoded output program allows for more efficient processing.</p> <p>Note: Telecine is only available when the Video Type is set to MPEG-2.</p>	Un-checked
Resolution	<p>Specifies the type of Horizontal (H) resolution to use for the transcoded program.</p> <ul style="list-style-type: none"> For HD transcoded programs, the following options are available: <i>Full Res, 1920, 1440, 1280, 960</i> For SD programs, the following options are available: <i>Full D-1, VGA, 3/4 D-1, 2/3 D-1, or 1/2 D-1</i> For PIP programs, the following horizontal and vertical options are available: <i>H:1/2D1 X V:1/2D1</i> (352 x 240 for NTSC; 352 x 288 for PAL) <i>192 X 192, 128 X 96, 96 X 96</i> 	<p>HD: H: Full Res</p> <p>SD: H: Full D-1</p> <p>PIP: 192 X 192</p>
AFD Output	<p>By default, Active Format Descriptions on the input streams are forwarded in the output streams. Check the box to disable the forwarding of AFDs.</p> <p>The <i>AFD Output</i> parameter does not appear when the Encoding Template is set to PIP.</p> <p>For information on AFD, refer to “Active Format Description (AFD)” on page 168.</p>	Un-checked
Active Format (Hidden unless SD selected)	<p>Specifies the type of output for HD content transcoded to SD, as one of the following options:</p> <ul style="list-style-type: none"> <i>Force 16:9 letterbox</i> — an AFD code of 10 is included in the output (16:9 Image: Letterbox in 4:3 frame, Full Frame in 16:9 frame). <i>Force 4:3 centercut</i> — an AFD code of 9 is included in the output (4:3 Image: Full Frame in 4:3 frame, Pillarbox in 16:9 frame). <i>Use AFD; 16:9 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 16:9 Letterbox. <i>Use AFD; 4:3 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 4:3 Centercut. <p>The <i>Active Format</i> field only appears when the Encoding Template is set to SD.</p>	Force 16:9 letterbox

Table 87. Grooming - Create Configure ATVX/VTX/PIP Program Mapping Fields—Video (Continued)

Field	Description	Default
Aspect Ratio	<p>Specifies the ratio of the program's width to the height.</p> <ul style="list-style-type: none"> For an HD program, the field is read-only and set to <i>Automatic</i>. For an SD program, choose from one of the following options: <i>Automatic</i>, 4:3, 16:9. For a PIP program, choose from one of the following options: <i>Automatic</i>, 4:3, 16:9. 	<p>HD and SD: Automatic</p> <p>PIP: 4:3</p>
Closed Captioning	<p>Specifies the format used for encoding closed captioning on an MPEG-2 transcoded program. The options are:</p> <ul style="list-style-type: none"> SCTE 21 SCTE 20 and SCTE 21 <p>When SCTE 20 and SCTE 21 is selected, be sure to reserve sufficient bandwidth for both closed captioning streams. <i>Automatic Video Bitrate Assignment</i> accounts for the additional bandwidth needed for SCTE 20.</p> <p>The VMG discards user data format as per SCTE 20 in the input. It re-formats user data for the input as per SCTE21 to SCTE, and as per SCTE 20 when requested.</p> <p>The <i>Closed Captioning</i> field only appears when the Video Type is set to <i>MPEG-2</i>.</p>	SCTE 21
IDR Interval (in Frames)	<p>Specifies the interval between instantaneous decoder refresh (IDR) frames.</p> <ul style="list-style-type: none"> For GOP M=1-3 with HD or SD encoding, the IDR interval can be input by the user and must be a multiple of the GOP N value. Enter 0 if no IDR frames are to be inserted. For GOP M=4, the IDR interval can be set to 96 (the default) or 0 (no IDR). For GOP M=8, the IDR interval is set to 96 and is read-only. If PIP is selected for the Encoding Template, no IDR frames are inserted and the field does not display. <p>The <i>IDR Interval</i> field only appears when the Video Type is set to <i>H.264</i>.</p>	96

Configure AVYX/VTX/PIP Program Mapping—Audio

Table 88. Grooming - Create Configure ATVX/VTX/PIP Program Mapping Fields—Audio

Field	Description	Default
Audio Profile	<p>You can define audio profiles that you can quickly apply to a Program Mapping.</p> <p>If this option is checked, enter a name to create a new audio profile and then define the audio parameters below. If the option is unchecked, you can select from a list of existing audio profiles and the audio parameters will be automatically filled in and un-editable.</p>	Blank
Audio Codec	<p>Defines the codec for the output audio, as one of the following options: HE-AAC, HE-AACv2, AAC-LC, MPEG-1 LII, MPEG-2 LII, AC-3, E-AC-3 (Dolby Digital Plus).</p> <p>Note: this audio codec setting is not applicable for VTX.</p>	AAC LC

Table 88. Grooming - Create Configure ATVX/VTX/PIP Program Mapping Fields—Audio (Continued)

Field	Description	Default
Sampling Rate	Value, in kHz, to set the number of audio samples per second. The higher the number, the better the sound quality. Choose one of the following options: 8 kHz, 11.03 kHz, 12 kHz, 16 kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, 48 kHz	44.1 kHz
Channels	Defines the number of output channels per audio stream, using one of the following options: mono, stereo, 5.1 surround	stereo
Audio Bitrate	Defines the bitrate for all audio streams within the MBR TS. The selectable values depend on your selection of <i>Audio Codec</i> , <i>Sampling Rate</i> , and <i>Channels</i> .	128 kbps
Audio Gain	Defines the gain on an audio stream level. <i>Audio Gain</i> is applied to all audio streams within the MBR TS. If the input program has two or more audio PIDs, all audio outputs will have the same gain. <ul style="list-style-type: none"> <i>Audio Gain</i> ranges from -24 dB to +24 dB and is selectable in 1 dB increments. Note: <i>And Audio Gain of 0 means no gain.</i>	no Gain
Advanced Button	Allows access to Dolby Configuration dialogs, as appropriate for the Audio Codec specified in the Audio Codec field.	<ul style="list-style-type: none"> Disabled for non-Dolby audio Codec. Enabled for Dolby audio Codec.



Note: *Transcoded programs do not support DPI, Program Substitution, SCTE 30 to 35 conversion, or transrating. The fields associated with these options are not visible or editable when creating or grooming transcoded programs.*

Managing Standard Output Streams and Programs

You can view, change parameters, or delete output streams and programs from the Grooming Mapping tab page, as described in the following sections:

- “Displaying or Modifying Grooming Details,” next.
- “Modifying, Deleting, and Regrooming Output Transport Streams and Programs” on page 189

Displaying or Modifying Grooming Details

- For non-transcoded transport streams and programs, use the **Current Program Mapping** screen to view grooming details.
- For transcoded transport streams, go to the individual programs to modify and view grooming details.

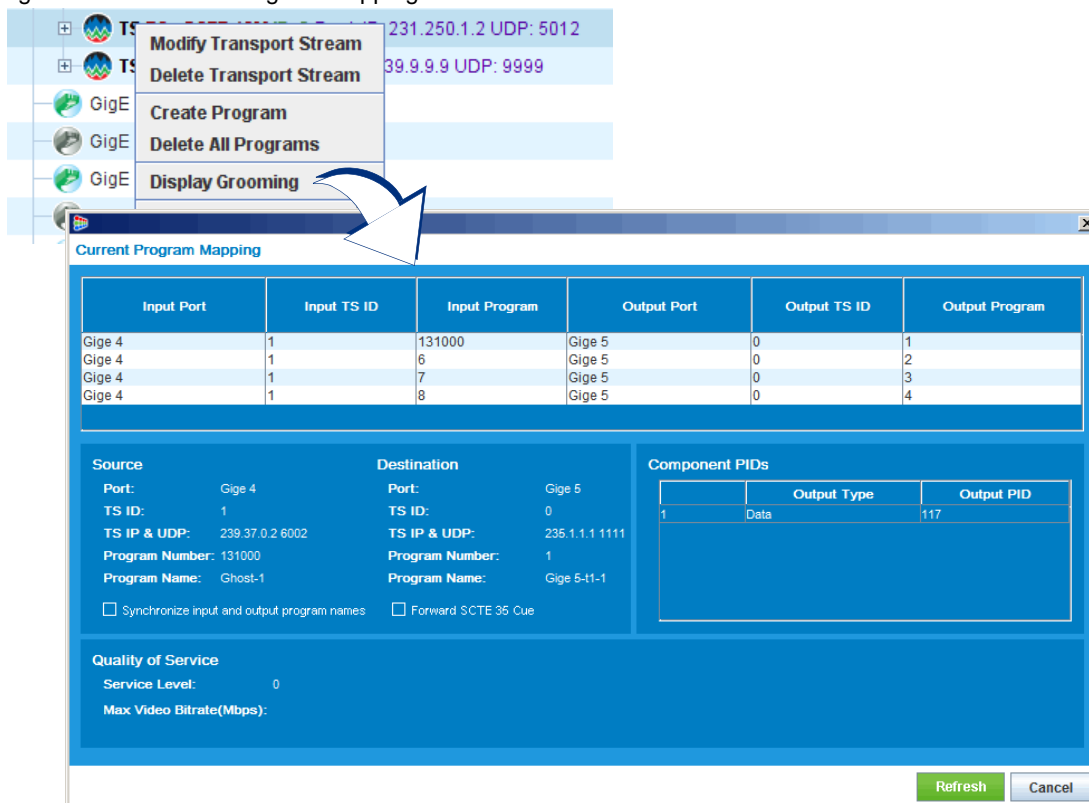
Display Grooming for all Programs in a Non-Transcoded TS

Use the **Current Program Mapping** screen to view grooming details for a VTR transport stream.



From the **Outputs** panel of the **Grooming -> Mapping** screen, right-click at the transport stream and select **Display Grooming** from the popup menu --> **Current Program Mapping** screen (Figure 114).

Figure 114. Current Program Mapping—non-transcoded TS



The upper portion of the **Current Program Mapping** screen contains the table of grooming sessions for the selected transport stream (Table 89).

Table 89. Grooming - Current Program Mapping - Top Portion

Field	Description	Default
Input Port	The input program's GigE or 10 GigE interface.	Read-only
Input TS ID	The input program's transport stream ID.	Read-only
Input Program	Program number assigned to the input program.	Read-only
Output Port	The output program's transport GigE or 10 GigE interface port.	Read-only
Output TS ID	The output program's transport stream ID.	Read-only
Output Program	Program number assigned to the output program.	Read-only

Information contained in the lower section of the Current Program Mapping screen is derived from configuration described in “Grooming Non-Transcoded Programs” on page 171.

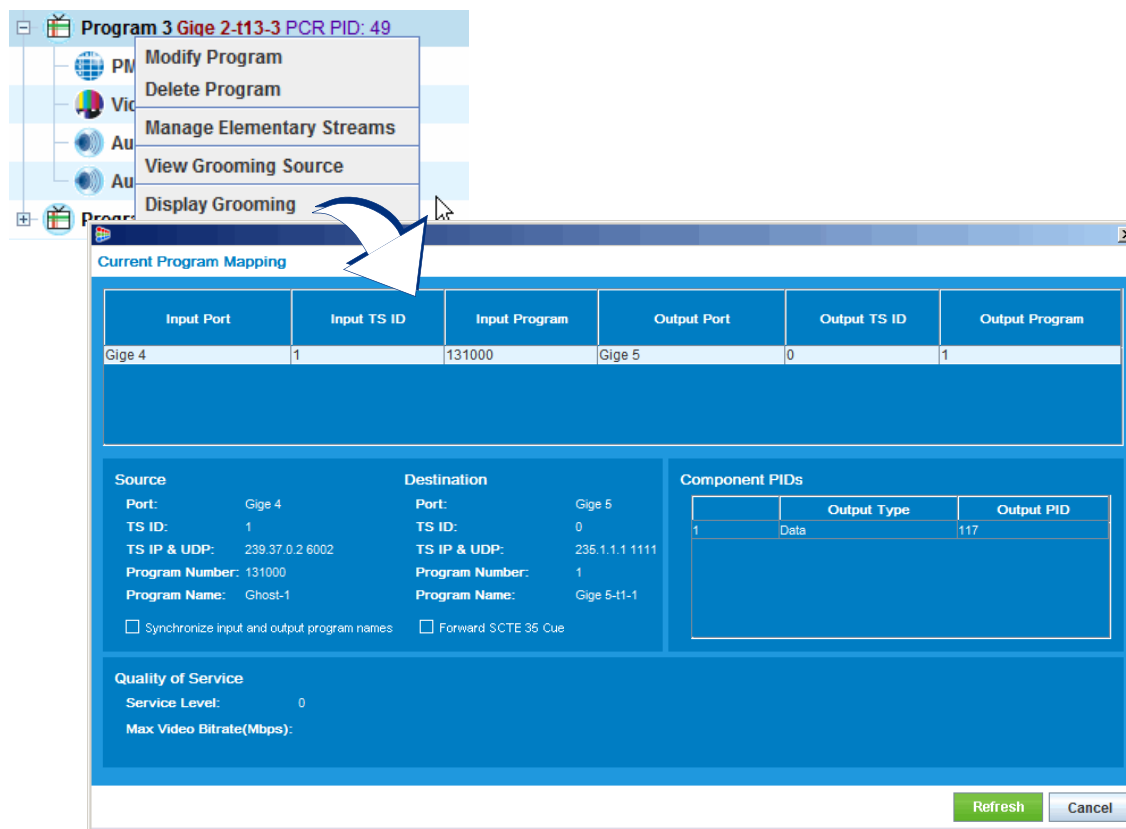
Display Grooming for a Single Program in a Non-Transcoded TS

To view grooming details for a single program in a non-transcoded transport stream, access the **Current Program Mapping** screen:



From the **Outputs** panel of the **Grooming -> Mapping** screen, right-click on a program in a transport stream -> select **Display Grooming** -> **Current Program Mapping** screen (Figure 115).

Figure 115. Current Program Mapping—Single Program—Non-transcoded Stream



Modify Grooming for a Transcoded Program

To modify grooming details for a transcoded program, use the **Modify Program Mapping** screen.



From the **Outputs** panel of the **Grooming -> Mapping** screen, right-click a transcoded program and select **Modify Grooming** from the popup menu (Figure 116 and Table 90).

Figure 116. Modify Program Mapping—Program in Transcoded Stream

The screenshot shows the **Modify Program Mapping** window with the **Grooming** tab selected. A context menu is open over the **Program 1 Gige 4-t9-1 PCR PID: 656** entry in the **Outputs** panel, with **Modify Grooming** highlighted. The main window contains the following sections:

- Source:**
 - Port: Gige 2
 - IP-UDP / TS ID: 238.8.8.8:8888 / 92
 - Program Number: 8
 - Program Name:
 - Actual Resolution: H: 528 X V: 480
 - Resolution Class: HD
- Destination:**
 - Port: Gige 1
 - IP-UDP / TS ID: 225.1.1.1:90 / 0
 - Program Number: 1
 - Program Name: Gige 1-t10-1
 - TS Bitrate(Mbps): 12
 - TS Type: MPEG-2
 - Major Channel: Minor Channel:
- Component PIDs:**
 - Max Audio: 1
 - Max Data: 0

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	912	Video	912	Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	913	Audio	913	Enter PID
- General Settings:**
 - ☐ Synchronize input and output program names
 - ☒ PMT PID: 937
 - ☐ Forward SCTE 35 Cue
- Video:**
 - Video Type: H.264
 - Encoding Template: HD
 - Automatic/Video Bitrate: ☐ 8
 - Actual Video Bitrate: 8
 - Profile: Main
 - GOP Structure:
 - GOP M: 2
 - GOP N: 36
 - Pre-Processing Filters Enable:
 - ☐ MCTF noise reduction
 - Resolution: H: Full Res
 - Actual Resolution: H: 704 x V: 480
 - AFD Output: ☐ Disable
 - Aspect Ratio: Automatic
 - IDR Interval (in Frames): 108
 - Closed Caption Type: CEA 608

At the bottom right, there are **Apply configuration** and **Cancel** buttons.

1. At the **Modify Program Mapping** screen, apply changes, as necessary. Guidelines are provided in Table 90.
2. Click the green **Apply Configuration** button to save your changes.



Note: Once you have made valid changes, the Apply Configuration button becomes green, indicating you can save those changes.

Table 90. Transcoded Grooming - Modify Program Mapping screen parameters

Section	Field(s)	Description	Default
Source	Port, TS ID, Program Number, Program Name,	For a description of these fields, see “Configure AVTX/VTX/PIP Program Mapping—Source” on page 179.	Read-only
	Actual Resolution	Displays the resolution of the source input program before transcoding has occurred.	Read-only
Destination	Port, TS ID, Program Number, Program Name. TS Bitrate(Mbps) TS Type Major Channel Minor Channel	For a description of these fields, see “Configure AVTX/VTX/PIP Program Mapping—Destination” on page 179.	Read-only except for <i>Program Name</i>
Component PIDs	Input Type Input PID Output Type, Output PID.	For a description of these fields, see “Configure AVTX/VTX/PIP Program Mapping—Component PIDs” on page 180.	Editable
	Synchronize input and output program names, Forward SCTE 35 Cue. PMT PID	For a description of these fields, see “Configure AVTX/VTX/PIP Program Mapping—Component PIDs” on page 180.	Editable
Quality of Service	Service Level	For transcoded programs, transrating options are not available. This field will be displayed as read-only.	Bypass Transrater
	Max Video Bitrate (Mbps)	For transcoded programs, transrating options are not available.	Blank

Table 90. Transcoded Grooming - Modify Program Mapping screen parameters (Continued)

Section	Field(s)	Description	Default
Video	Video Type Encoding Template Automatic Video Bitrate Profile GOP Structure: GOP M GOP N Pre-Processing Filters Enable. Resolution Actual Resolution AFD Output Active Format Aspect Ratio Closed Captioning, IDR Interval	For a description of these fields, see “Configure AVTX/VTX/PIP Program Mapping—Video” on page 180.	Editable
	Actual Video Bitrate	Displays the actual video bitrate of the transcoded output program.	Read-only
	Actual Resolution	Displays the resolution at which the system has transcoded the MPEG-2 program.	Read-only
Audio (if AVTX TS)	Audio Profile Audio Codec Sampling Rate Channels Audio Bitrate Audio Gain	For a description of these fields, see “Configure AVYX/VTX/PIP Program Mapping—Audio” on page 183.	Editable

Modifying, Deleting, and Regrooming Output Transport Streams and Programs

Use the menu provided from an individual output transport stream or program to select the Modify, Delete, and Regroom function appropriate for the stream.



Grooming -> Mapping tab page, **Outputs** panel -> right-click the output transport stream to present its popup menu.

Options available from an output transport stream menu—for VTR, AVTX, VTX, and PIP—are identical. Certain options are dependent on the current setup of the transport stream ([Table 91](#)).

Table 91. Output Transport Stream—Popup Menu

Menu Option	Description
Modify Transport Stream	Presents the transport stream modification dialog specifically for the selected transport stream type. Note that to modify the name of a non-transcoding program, neither DPI (if applicable) nor Program Substitution can be enabled. If either of these options is enabled, un-check the relevant box, apply the changes, then proceed with modifying the name.
Delete Transport Stream	Deletes the selected transport stream. This option always presents a confirmation dialog prior to deleting the TS.

Table 91. Output Transport Stream—Popup Menu

Menu Option	Description
Create Program	For PIP and VTX transport streams, this option presents the Create Transcoding Output Program dialog. For VTR, this option presents the non-transcode Create Output Program dialog.
Delete All Programs	Remove all programs associated with the selected transport stream. This option always presents a confirmation dialog prior to deleting the programs currently under the transport stream.
Display Grooming	Go to the <i>Current Program Mapping</i> dialog to view current grooming session and other information about the VTR program mapping. This option is provided only for VTR transport streams, and is disabled for transcoded streams.
Bitrate Monitor	Go to the <i>Monitor</i> tab page of the <i>VMG Element Manger</i> screen.
Reset Grooming	Reset grooming for transcoded transport streams. This option is not available for VTR transport streams. The system always issues a confirmation query prior to performing the reset.

Menus and Modification dialogs for standard output streams are described in the following topics:

- “Non-transcoded Output Transport Stream—VTR,” next.
- “Transcoded Output Transport Stream—PIP” on page 192.
- “Transcoded Output Transport Stream—AVTX” on page 193.
- “Transcoded Output Transport Stream—VTX” on page 194

Non-transcoded Output Transport Stream—VTR

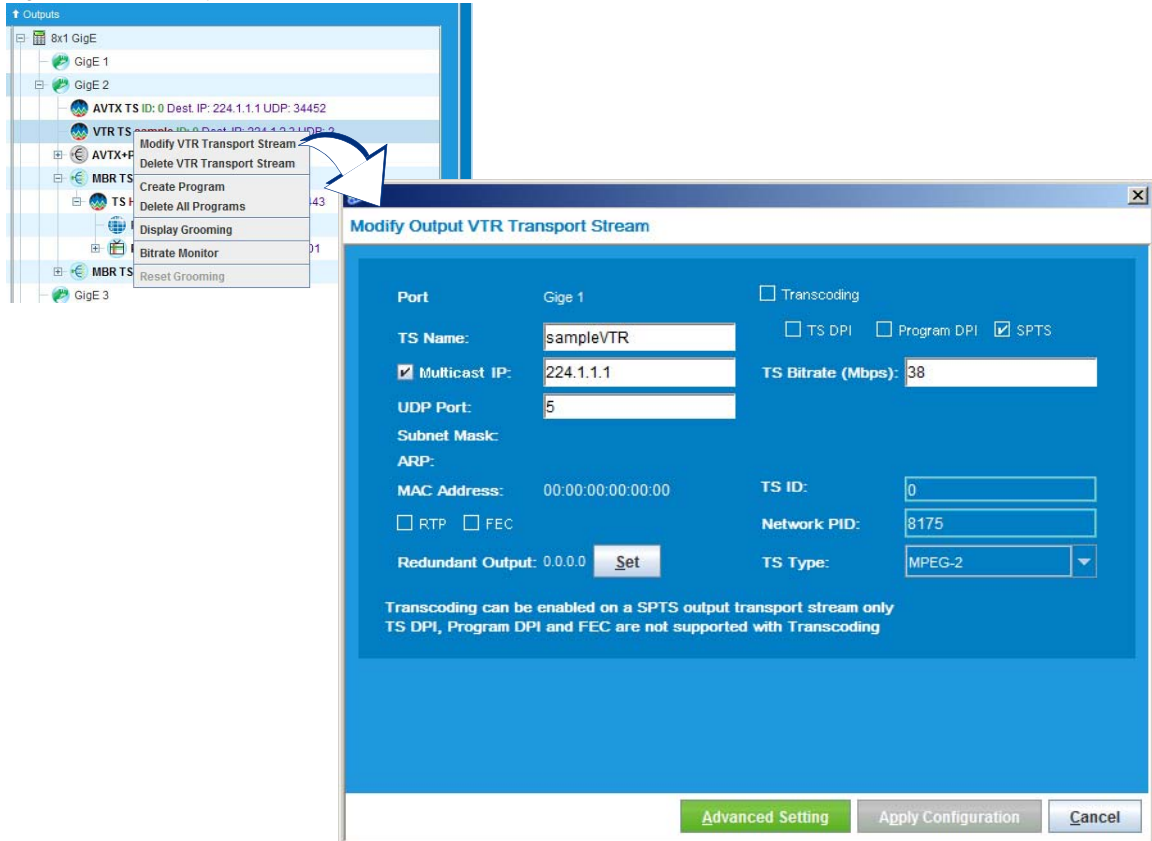
To access management options for a VTR transport stream, use the VTR popup menu:



Grooming -> Mapping tab page, **Outputs** panel -> right-click the non-transcoded (VTR) output transport stream and select an option from the popup menu.

Use the **Modify Output VTR Transport Stream** dialog (Figure 117) to change parameters for a specific VTR transport stream.

Figure 117. Modify Output Transport Stream - VTR



1. At the **Modify Output VTR Transport Stream** dialog, edit any or all of the following fields: *TS Name*, *Multicast IP*, *UDP port*, and/or *TS bitrate*.



Caution: *Modification of any setting (other than the TS name) can result in service interruption.*

2. Click the green **Apply Configuration** button to update and save these settings.

Transcoded Output Transport Stream—PIP

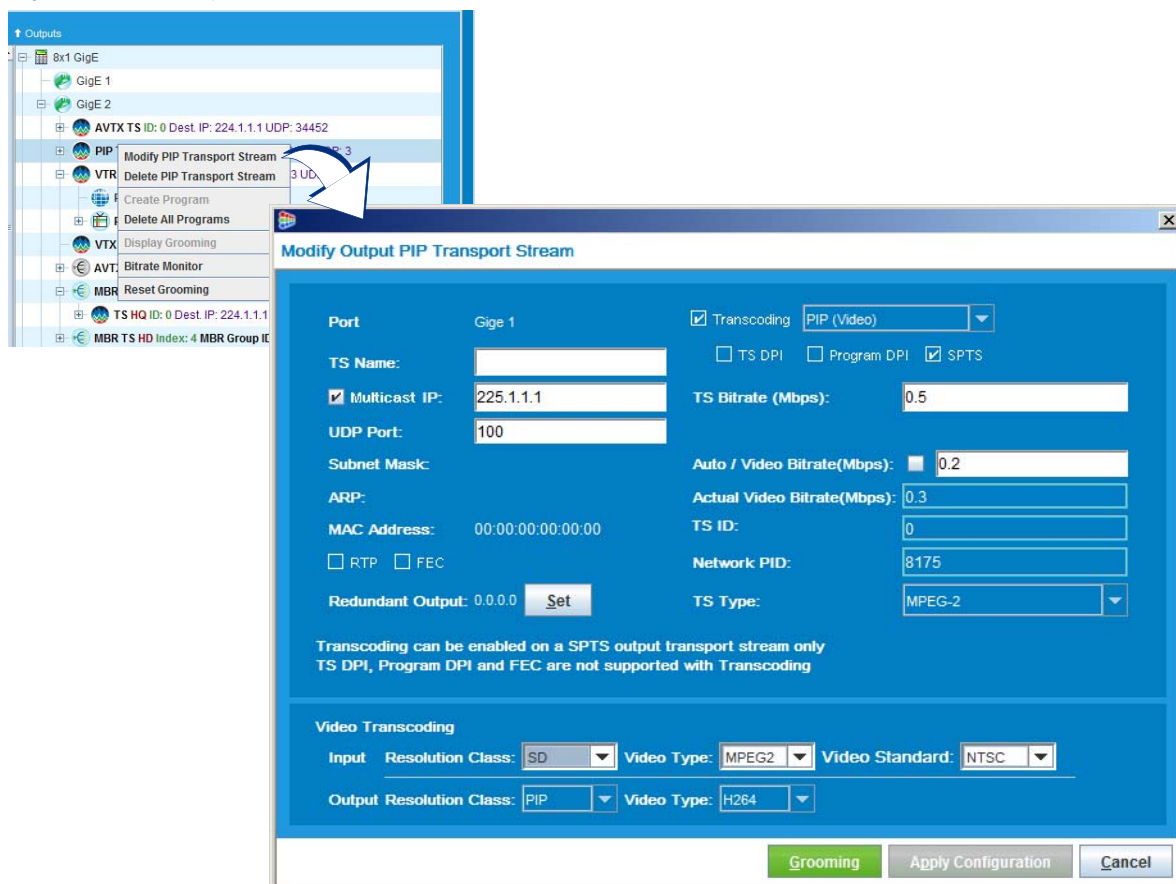
To access management options for a PIP transport stream, use the PIP popup menu:



Grooming -> Mapping tab page, **Outputs** panel -> right-click on a PIP transcoded output transport stream and select an option from the popup menu.

To modify current parameters for this stream type, go to the **Modify Output PIP Transport Stream** dialog (Figure 118).

Figure 118. Modify Output Transport Stream - PIP



1. At the **Modify Output PIP Transport Stream** dialog, edit any or all of the following fields: *TS Name*, *Multicast IP*, *UDP port*, *TS bitrate*, and/or *Input Video Transcoding Input* settings.



Caution: *Modification of any setting (other than the TS name) can result in service interruption.*

2. Click the green **Apply Configuration** button to update and save these settings.

Transcoded Output Transport Stream—AVTX

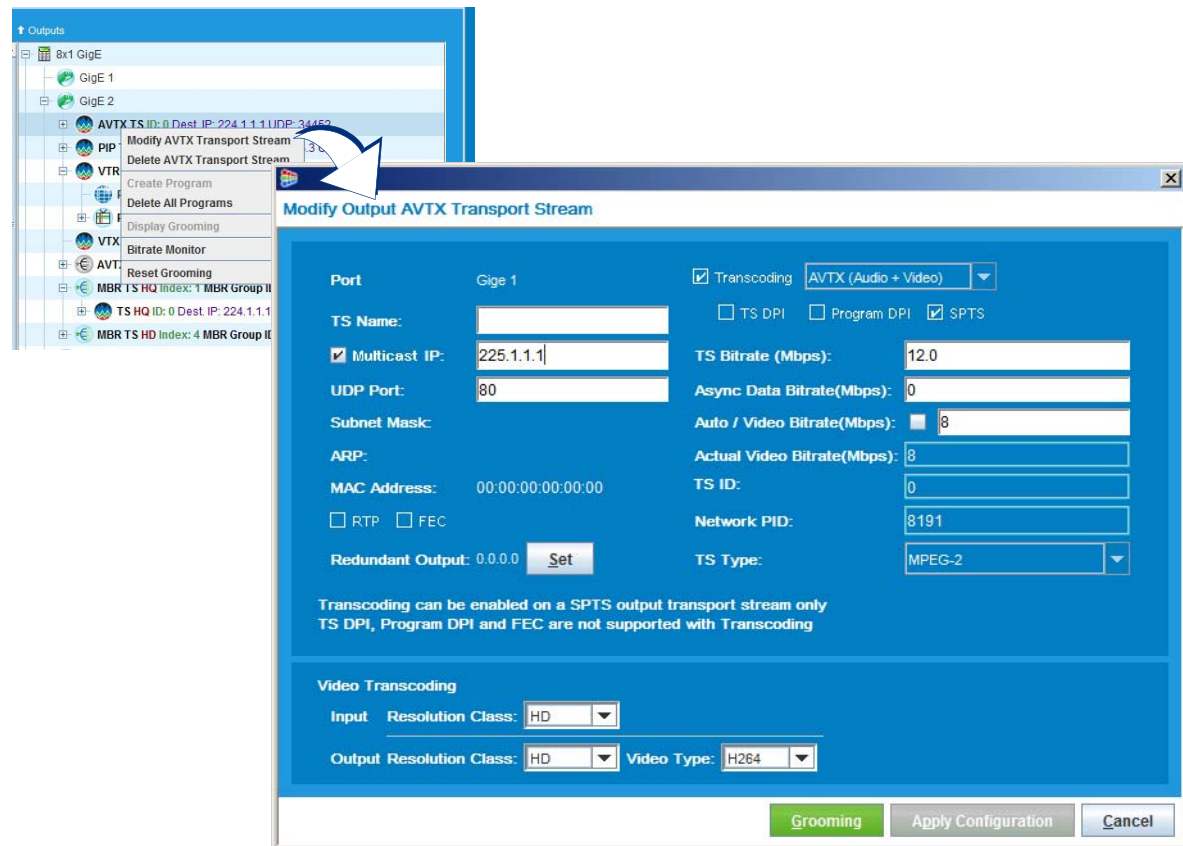
To access management options for an AVTX transport stream, use the AVTX popup menu:



Grooming -> Mapping tab page, **Outputs** panel -> right-click on an AVTX transcoded output transport stream and select an option from the popup menu.

To modify current parameters for this stream type, go to the **Modify Output AVTX Transport Stream** dialog (Figure 119).

Figure 119. Modify Output Transport Stream - AVTX



1. At the **Modify Output AVTX Transport Stream** dialog, edit any or all of the following fields: *TS Name*, *Multicast IP*, *UDP Port*, *TS bitrate*, *Async Data Bitrate*, *Auto/Video bitrate*, and/or the *Video Transcoding* settings.



Caution: *Modification of any setting (other than the TS name) can result in service interruption.*

2. Click the green **Apply Configuration** button to update and save these settings.

Transcoded Output Transport Stream—VTX

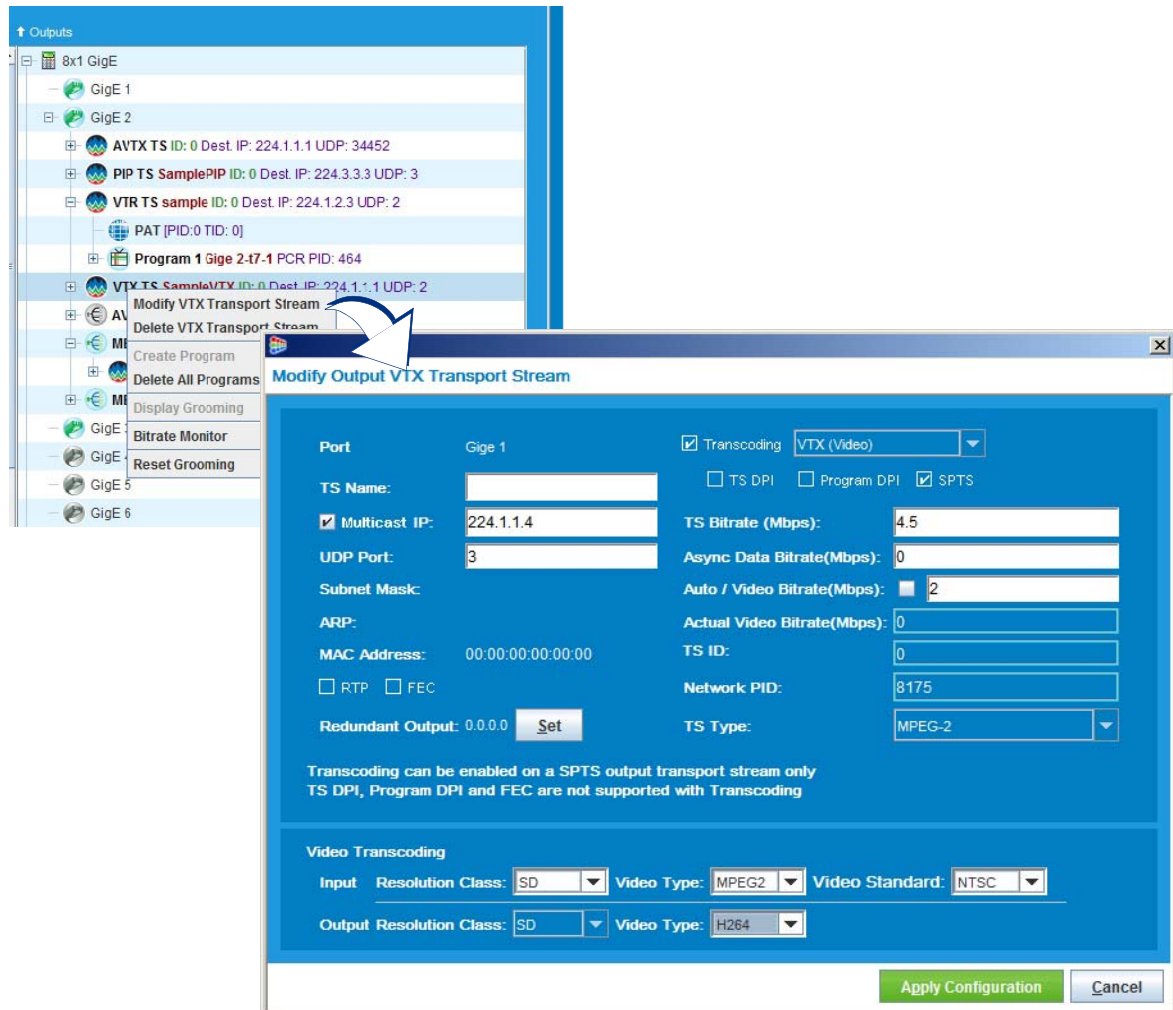
To access management options for a VTX transport stream, use the VTX popup menu:



Grooming -> Mapping tab page, **Outputs** panel -> right-click on an VTX transcoded output transport stream and select an option from the popup menu.

To modify current parameters for this stream type, go to the **Modify Output VTX Transport Stream** dialog (Figure 120).

Figure 120. Modify Output Transport Stream - VTX - No Audio Transcoding



1. At the **Modify Output VTX Transport Stream** dialog, edit any or all of the following fields: *TS Name*, *Multicast IP*, *UDP Port*, *TS bitrate*, *Async Data Bitrate*, *Auto/Video bitrate*, and/or the *Video Transcoding* settings.



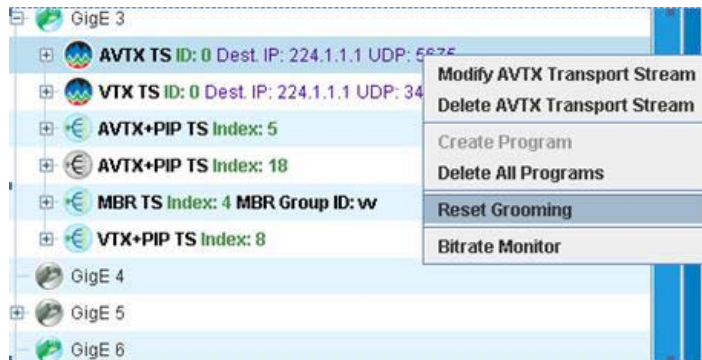
Caution: *Modification of any setting (other than the TS name) can result in service interruption.*

2. Click the green **Apply Configuration** button to update and save these settings.

Resetting Grooming—AVTX, VTX, PIP

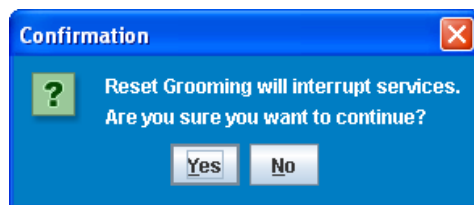
Use the **Reset Grooming** option (Figure 121) on an output transport stream currently in service to tear down a current configuration and rebuild the transport stream with the identical configuration.

Figure 121. Reset Grooming—AVTX, VTX, PIP



Note: Because this option interrupts service during the tear down and rebuild process, the system queries for confirmation to proceed with the reset (Figure 122).

Figure 122. Reset Groom Confirmation—AVTX, VTX, PIP



Regrooming—VTX, VTX+PIP, PIP

Regrooming is the process of changing the program mapping configuration by performing a drag-and-drop grooming operation a second time, replacing all existing program information in the destination with the new program information.



*Regrooming is not allowed if **Program Substitution** or **DPI** is enabled. To regroom a channel substituted or DPI-enabled program, modify the program to disable Program Substitution or DPI, proceed with regrooming, then modify the program again to re-enable Program Substitution or DPI.*

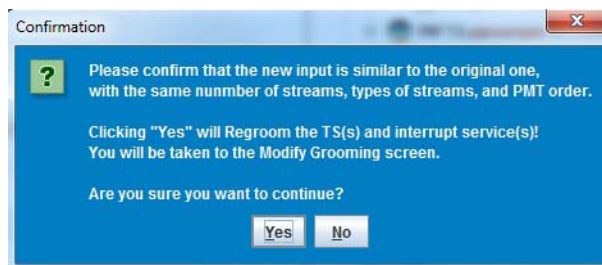
Regrooming occurs as a result of dragging an input program to an output transport stream that has already been groomed. This action rebuilds the grooming at the selected output TS, with the new input program, using the identical configuration on the output program and output elementary streams.



Caution: The new input program must be similar to the current input program that it will replace: it must contain the identical number of streams, stream types, and PMT order.

Prior to dynamically grooming the targeted output transport stream, the *VMG Element Manager* queries for confirmation of the configuration, to ensure that the input configuration matches that of the output configuration. The **Confirmation** dialog (Figure 123) also reminds you that regrooming interrupts service.

Figure 123. Regroom Confirmation—VTX, VTX+PIP, PIP



Upon completion of the regrooming process, you can view the results in a **Modify Program Mapping** screen for a particular transport stream type.

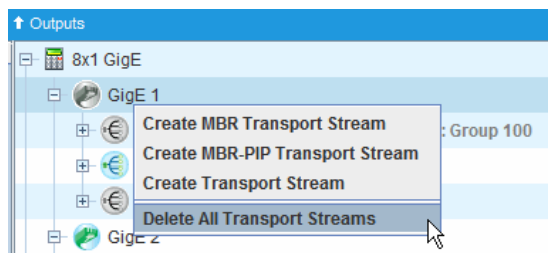
Deleting All Output Transport Streams

To delete all output transport streams in a port:



From the **Outputs** panel of the **Grooming** -> **Mapping** screen, right-click the desired port and select the **Delete All Transport Streams** option from the popup menu (Figure 124).

Figure 124. Delete All Output Transport Streams



Select **Yes** when prompted by the **Delete Confirmation** screen.

Deleting a Single Transport Stream

To delete a single transport stream and all its associated programs in a port:



Right click on the transport stream and select the **Delete Transport Stream** option from the popup menu.

Select **Yes** when prompted by the **Delete Confirmation** screen.

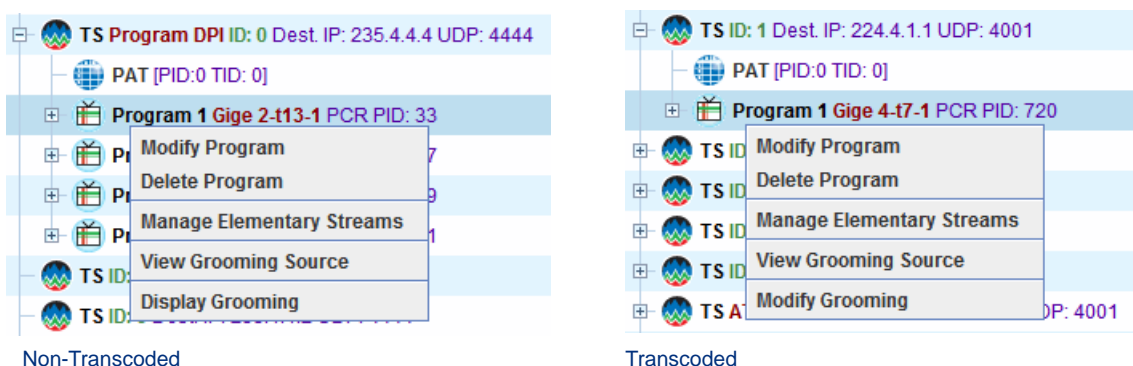
Deleting All Programs in a Transport Streams

To delete all programs in a transport stream (this will delete all corresponding grooming sessions as well):



Right click on the transport stream and select the **Delete All Programs** option from the popup menu. Select **Yes** when prompted by the **Delete Confirmation** screen.

Figure 125. Output Program Popup Menus—Non-Transcoded and Transcoded



Modify Output Program

The **Modify Output Program** and **Modify Transcoding Output Program** screens (Figure 126 and Figure 127) allow a name change for the selected program.



Note: To find out how to modify input program parameters, see “*Modify Input Program*” on page 134.

Figure 126. Modify Output Program Screen—Non-Transcoded

Modify Output Program

Port: Gige 2
IP Address: 235.4.4.4
UDP Port: 4444

TS ID: 0
TS Type: MPEG-2

Program Number: 1
Program Name: Gige 2-t13-1

☐ PMT PID: 8192

Major Channel Number:
Minor Channel Number:

☐ Program DPI ☐ SCTE 30 to 35 Conversion

☒ Program Substitution

☐ Disable PMT update during program substitution

Apply Cancel

Figure 127. Modify Output Program Screen—Transcoded

Associated TS Parameters		PMT/PSIP Parameters	
Port:	Gige 4	Program Number:	1
IP Address:	224.4.1.2	Program Name:	Gige 4-t9-1
UDP Port:	4001	<input type="checkbox"/> PMT PID	681
TS ID:	1	Major Channel Number:	
TS Type:	MPEG-2	Minor Channel Number:	
TS Bitrate(Mbps):	38.0		

Video	
Video Type	H.264
Encoding Template:	HD
Automatic Video Bitrate:	<input type="checkbox"/> 8.0
Profile:	Main
GOP Structure:	
GOP M:	4
GOP N:	32
Pre-Processing Filters Enable:	<input type="checkbox"/> MCTF noise reduction
Resolution:	H: Full Res
AFD Output:	<input type="checkbox"/> Disable
Aspect Ratio:	Automatic
IDR Interval (in Frames):	96

Deleting Programs

This function deletes a single program in a transport stream and all corresponding grooming sessions for the selected TS.



Right click on the program to be removed, and select the **Delete Program** option from the popup menu.

Select **Yes** when prompted by the **Delete Confirmation** screen.

The deleted program should no longer be visible beneath the TS at the Mapping tab page.

Deleting Grooming Sessions

Use the **Current Program Mapping** dialog to select and remove a grooming session for a TS.



At the **Outputs** panel of the **Mapping** screen, right-click the program containing the grooming session to be deleted --> select **Display Grooming** from the popup menu --> **Current Program Mapping** dialog (Figure 128).

1. At the **Current Program Mapping** dialog, click on the grey row that identifies the grooming session you want to delete, then right-click and select **Delete** from the popup menu.

The selected row is now removed from the table in this dialog.

2. Click **Refresh**.

Figure 128. Delete Grooming Session

Current Program Mapping

Input Port	Input TS ID	Input Program	Output Port	Output TS ID	Output Program
Gige 1	92	2	Gige 2	0	1

Delete

Source

Port: Gige 1

TS ID: 92

TS IP & UDP: 238.8.8.8 8888

Program Number: 2

Program Name: ABC

☐ Synchronize input and output program names

Destination

Port: Gige 2

TS ID: 0

TS IP & UDP: 224.1.2.3 3

Program Number: 1

Program Name: Gige 2-t8-1

☐ Forward SCTE 35 Cue

Component PIDs

	Output Type	Output PID
1	MPEG-2 Video	464
2	AC-3 Audio eng	465

Quality of Service

Service Level: 0

Max Video Bitrate(Mbps):

Refresh Cancel

Viewing Grooming Source

Selecting this option from the program context menu highlights the source input program associated with the selected program (Figure 129).

Figure 129. View Grooming Source

Chassis Grooming Monitor Alarms & Events

Mapping

Inputs

- GigE 1
- GigE 2
- GigE 3
- GigE 4
- TS 238.8.8.8/8888 ID: 0 Input IP: 238.8.8.8 UDP: 8888
- TS ID: 1 Input IP: 239.37.0.2 UDP: 6002
- PAT [PID:0 TID: 0]
- Program 1 Bio PCR PID: 17
- Program 2 ESPN PCR PID: 33
- Program 3 PCR PID: 49
- Program 5 PCR PID: 81
- Program 6 PCR PID: 97
- Program 7 PCR PID: 113
- Program 8 PCR PID: 129
- Program 80 PCR PID: 4088

Outputs

- 8x1 GigE
- GigE 1
- GigE 2
- TS ID: 0 Dest. IP: 224.1.1.1 UDP: 9999
- TS ID: 0 Dest. IP: 235.1.1.2 UDP: 4444
- MBR-PIP TS MPEG-2 Full-Res Index: 4
- MBR-PIP TS DVB Full-Res Index: 6

Program Grooming Source Selected

IP: 236.6.6.6 UDP: 2333

Stream DPI ID: 0 Dest. IP: 235.4.4.4 UDP: 4444

PID: 0 TID: 0

Program 1 Gige 2-t13-1 PCR PID: 33

Program 2 Gige 2-t13-2 PCR PID: 37

Program 3 Gige 2-t13-3 PCR PID: 49

Program 4 Gige 2-t13-4 PCR PID: 81

Display Grooming

Use the **Current Program Mapping** dialog, which displays the currently configured grooming sessions for the selected non-transcoded program. See “Displaying or Modifying Grooming Details” on page 184.

Transcoded+PIP Transport Streams

This chapter describes the use of the *VMG Element Manager* to manage the creation and grooming of transcoded+PIP transport streams.



The **Grooming -> Mapping** tab provides program and transport stream (TS) information.



Note: *System configuration must be completed before performing grooming tasks. Refer to Chapter 4, “System Configuration” for more information.*



Note: *The VMG supports input-level program redundancy for transcoded+PIP transport streams. If you plan to implement program redundancy, please familiarize yourself with “Program Redundancy” on page 253 before performing the procedures in this chapter.*

In This Chapter:

- “Overview,” next.
- “Creating Transcoded+PIP Transport Streams” on page 201.
- “Transcoded+PIP TS Program Grooming” on page 208.
- “Managing Transcoded+PIP Transport Streams and Programs” on page 217.
- “Bitrate Monitoring” on page 223.

Overview

In contrast to standard output transport streams, a transcoded+PIP transport stream transcodes a single input stream into two output streams:

- A full frame rate, broadcast-resolution main stream, either HD or SD.
- A corresponding PIP stream, defined as a video-only SPTS program consisting of a lower-resolution H.264 Baseline Profile stream.

Transcoded+PIP transport streams use the VMG’s resources more efficiently than standard output transport streams and also simplify the creation of programming that provides PIP services. Transcoded+PIP transport streams are single-program transport streams (SPTSs) in which the broadcast-resolution and the PIP video start at the same time and share the same input time base. You can create two types of Transcoded+PIP transport streams:

- **AVTX+PIP**—enables the transcoding of both audio and video
- **VTX+PIP**—enables the transcoding of video

All programs groomed to Transcoded+PIP transport streams are transcoded to H.264 video.

Table 92 (below) highlights the differences between Transcoded+PIP Transport Streams and Standard Output Transport Streams.

Table 92. Differences between Standard Output TS and Transcoded+PIP TS

Feature	Standard Output TS	Transcoded+PIP TS
Transcoding	Both transcoding and non-transcoding supported	Transcoding only
Transcoding output	MPEG-2 or H.264 HD, SD, or PIP stand-alone streams	H.264 only HD or SD (PIP included automatically)
TS Types	MPEG-2, SCTE, ATSC, DVB	MPEG-2, DVB
SPTS/MPTS	Both SPTS and MPTS	SPTS only
Digital Program Insertion	TS level and Program level	No DPI support
Program Creation	Manual and Drag-and-Drop Grooming	Drag-and-Drop Grooming only

Creating Transcoded+PIP Transport Streams

The VMG supports two Transcoded+PIP TS types: MPEG-2 and DVB, for which the VMG supports SI table generation. Steps are provided in the following topics:

- “Creating MPEG-2 Transcoded+PIP Transport Streams,” next.
- “Creating DVB Transcoded+PIP Transport Streams” on page 206.

Color Indicators for Transcoded+PIP TS

In the **Outputs** panel, the Transcoded+PIP TS icon is gray when video processing is not active. When you groom a program to the Transcoded+PIP TS the icon become green to indicate that the TS is active. The two SPTSs appear within the Transcoded+PIP TS—one that is broadcast resolution and the other PIP resolution. The Transcoded+PIP TS automatically takes on the name of the **Main** stream.

In Transcoded+PIP TS-related screens, purple background shading identifies fields that cannot be edited. Fields that have white or light blue shading can be edited by first double-clicking on them.

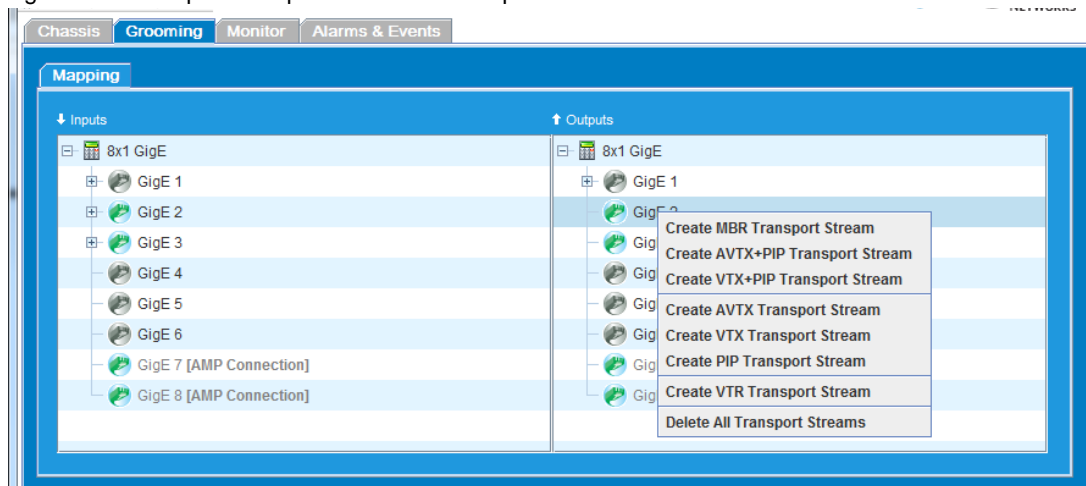
Creating MPEG-2 Transcoded+PIP Transport Streams

Go to the GigE interface on which to create a new MPEG-2 Transcoded+PIP transport stream:



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click on the output GigE interface on which to create the stream to present the popup menu (Figure 130).

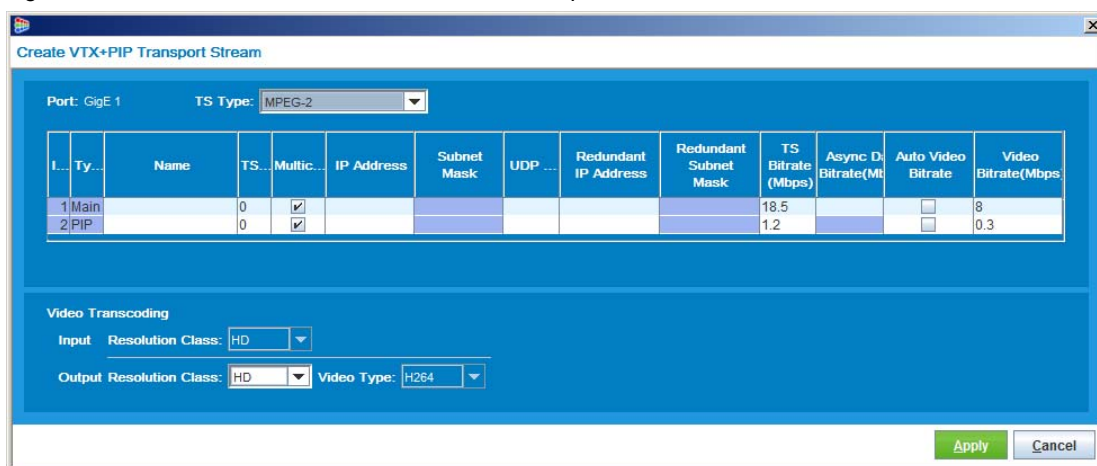
Figure 130. Output Transport Stream Menu Options



1. At the popup menu, select one of the following options:
 - **Create AVTX+PIP Transport Stream** (to transcode both audio and video)
 - **Create VTX+PIP Transport Stream** (to transcode video only)

The **Create Transcoded+PIP Transport Stream** screen is now displayed (Figure 131), as associated with your selection.

Figure 131. Create MPEG-2 Transcoded+PIP Transport Stream screen



2. Verify **TS Type** is set to **MPEG-2**.
3. Set the parameters for both the **Main** (broadcast-resolution) and **PIP** transport streams (Table 93), then click **Apply** to complete this operation.

Table 93. Create MPEG-2 Transcoded+PIP Transport Stream

Field	Description	Default
Port	Displays the selected port on which the Transcoded+PIP output transport stream is being created.	Read-only
TS Type	Select a type of Transcoded+PIP output transport stream to create, as either <i>MPEG-2</i> or <i>DVB</i> .	MPEG-2
Index	The row entry within the Transcoded+PIP TS creation dialog.	Read-only
Type	The type of video stream, either <i>Main</i> (full resolution) or <i>PIP</i> .	Read-only
Name	(Optional) Type alphanumeric string to set name of the output transport stream. Note: <i>The name you give to the Main stream will also become the name of the Transcoded+PIP TS.</i>	Blank
TS ID	(Optional) The TS ID enables the system to choose a unique number for identification of the output transport stream. Valid range is from 0 to 65535 in decimal format.	Blank
Multicast	Enable (check) or disable (un-check) multicast for the output transport stream. If enabled, the <i>IP Address</i> must be a valid multicast IP address.	Checked
IP Address	The IP address to which the output stream is routed. <ul style="list-style-type: none"> If <i>Multicast</i> is checked, this must be a valid multicast IP address. Valid range is from 224.0.0.1 to 239.255.255.255. If <i>Multicast</i> is un-checked, this must be a valid unicast IP address. Valid range is from 0.0.0.1 to 223.255.255.255. Do not assign 10.0.0.1x or 10.0.0.2x to the VMG management interface face or Ethernet port because these are reserved for internal VMG usage. 	Blank
Subnet Mask	If <i>Multicast</i> is un-checked, this field is available for input.	When Multicast is un-checked: 255.255.255.0
UDP Port	Type a value, in the range 1 - 65535, to specify the UDP port to use for transmitting data.	Blank
Redundant IP Address	The alternate IP address to which the output stream can be routed. The redundant IP option can be used if port mirroring is enabled on the output port. <ul style="list-style-type: none"> If <i>Multicast</i> is checked, this must be a valid multicast IP address. Valid range is from 224.0.0.1 to 239.255.255.255. If <i>Multicast</i> is un-checked, this must be a valid unicast IP address. Valid range is from 0.0.0.1 to 223.255.255.255. Do not assign 10.0.0.1x or 10.0.0.2x to the VMG management interface face or Ethernet port because these are reserved for internal VMG usage. 	Blank
Redundant Subnet Mask	If <i>Multicast</i> is un-checked, this field is available for input.	When Multicast is un-checked: 255.255.255.0

Table 93. Create MPEG-2 Transcoded+PIP Transport Stream (Continued)

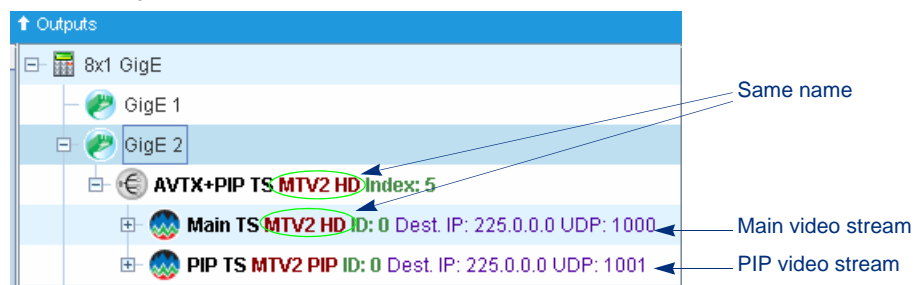
Field	Description	Default
TS Bitrate (Mbps)	<p>The bitrate of the output stream.</p> <ul style="list-style-type: none"> For the Main transport stream, the valid range is 0.1 to 38.8 Mbps. For the PIP transport stream, the valid range is 0.1 to 1.0 Mbps. <p>As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).</p>	<p>Main: 18.5</p> <p>PIP: 1.2</p>
Async Data Bitrate (Mbps)	<p>Applicable to the main configuration, value in Mbps to set maximum bitrate for asynchronous data in this stream.</p> <p>Async data bitrate cannot exceed the TS bitrate.</p> <p>As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).</p>	Blank (no maximum limit; equivalent to transport stream bitrate)
Automatic Video Bitrate (In Mbps)	<p>Enable (check) or (disable) auto video bitrate assignment.</p> <ul style="list-style-type: none"> If enabled the system assigns the video bitrate, with the latency marked by a <i>“Perfecting video”</i> message until the bitrate is assigned. If disabled, use a video bitrate entry according to supported values Video Type parameters H.264 HD, H.264 SD, or H.264 PIP. Refer to Table , “Bitrate Configuration Reference,” on page 310 for ranges and default values. 	Un-checked
Video Bitrate	Value, in Mbps, to set maximum video bitrate for the main and the PIP in this stream.	<p>Main: 8.0</p> <p>PIP: 0.3</p>

Table 94. Video Transcoding Parameters - Transcoded+PIP Streams

Field	Description	Default
Input Resolution Class	<p>Select HD or SD.</p> <ul style="list-style-type: none"> For SD, set video type (as either MPEG-2 or H264) and video standard (as either NTSC or PAL). HD does not require video type and video standard settings. 	<ul style="list-style-type: none"> AVTX and VTX: HD input, HD output, and MPEG-2 video PIP: HD input, PIP output, and H264 video VTR (not applicable)
Output Resolution Class	<p>Select HD or SD.</p> <ul style="list-style-type: none"> For SD: set video type as either MPEG-2 or H264. For HD: set video type as either MPEG-2 or H264. 	

The new Transcoded+PIP TS is now displayed on the **Grooming** -> **Mapping** tab page (as demonstrated in [Figure 132](#)).

Figure 132. Ungroomed MPEG-2 Transcoded+PIP transport stream



Creating DVB Transcoded+PIP Transport Streams

Go to the GigE interface on which to create a new DVB Transcoded+PIP transport stream:



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the output GigE inter-face on which to create the stream (see [Figure 130 on page 202](#)) to present the popup menu.

- At the popup menu, select one of the following:
 - Create AVTX+PIP Transport Stream** (to transcode both audio and video)
 - Create VTX+PIP Transport Stream** (to transcode video only)

The **Create Transcoded+PIP Transport Stream** screen is now displayed, as associated with your selection ([Figure 131 on page 202](#)).

- Set **TS Type** to DVB, to present the TS-specific fields in the screen ([Figure 133](#)).

Figure 133. Create DVB Transcoded+PIP Transport Stream

Create AVTX+PIP Transport Stream

Port: GigE 2 TS Type: DVB

Index	Type	Name	TS ID	Multicast	IP Address	Subnet Mask	UDP Port	TS Bitrate (Mbps)	Async Data Bitrate(Mbps)	Auto Video Bitrate	Video Bitrate(Mbps)
1	Main		0	<input checked="" type="checkbox"/>				18.5		<input type="checkbox"/>	2
2	PIP		0	<input checked="" type="checkbox"/>				1.2		<input type="checkbox"/>	0.3

Video Transcoding

Input Resolution Class: HD

Output Resolution Class: SD Video Type: H264

Network ID: 160 Modulation Mode: SCTE 256 QAM

Original Network ID: 160

NIT Source:

TDT/TOT Source:

SDT Source: LocalSDT EIT Source: Groomed Input

See Table 95, "Create DVB-SI Output Transport Stream," on page 206, for description of these fields.

- Set parameters for both the Main (full-resolution) and PIP transport streams as well as the DVB-specific parameters ([Table 95](#)), then click **Apply** to complete this operation. (See also [Table 93 on page 203](#) for details about other fields in this screen.).

The new Transcoded+PIP TS displays on the **Outputs** panel of the **Grooming -> Mapping** tab page ([Figure 134](#)).

Table 95. Create DVB-SI Output Transport Stream

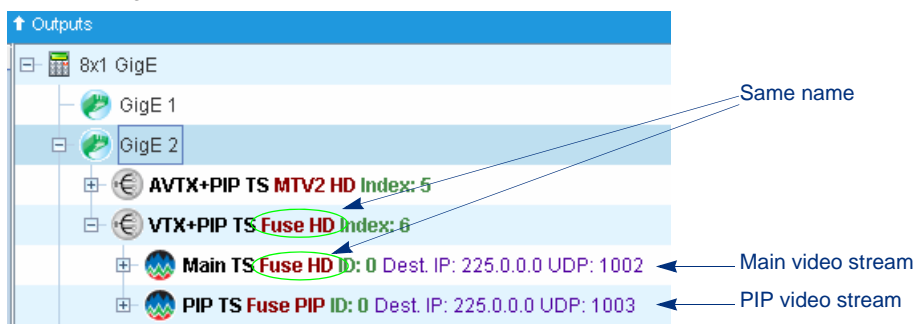
Field	Description	Default
Network ID	Input the Network ID of the current transport stream. Valid range is from 0 to 65535.	160
Modulation Mode	Use the pull-down menu to select the modulation mode used for the TS. Choice between <i>SCTE 64 QAM</i> and <i>SCTE 256 QAM</i> .	SCTE 256 QAM
Original Network ID	Input the Network ID from which this stream has originated. Valid range is from 0 to 65535.	160

Table 95. Create DVB-SI Output Transport Stream

Field	Description	Default
NIT Source ^a	Specifies whether or not a DVB network information table is to be included in the output TS. Click the <i>Select NIT</i> button to select a source. Choices are: <i>None</i> - No NIT will be generated on the output TS <i>[Input GigE TS ID]</i> - Specified source NIT will be included in the output TS.	Blank
TDT/TOT Source ^b	Specifies whether or not DVB time and date, and time offset tables will be generated for the output TS. Click the <i>Select TDT/TOT</i> button to select a source. Choices are: <i>None</i> - No DVB time tables will be generated on the output TS. <i>Local TOT</i> - The output TS will use the locally configured TOT as described in “Configured GigE Ports in Grooming -> Mapping Subtab” on page 71. <i>[Input GigE TS ID]</i> - Specified source TDT/TOT will be included in the output TS.	Blank
SDT Source ^c	Specifies whether or not a service description table will be generated for this transport stream. Choose an option from the pulldown menu: <i>N/A</i> - No SDT will be generated for this output TS <i>LocalSDT</i> - Local SDT will be generated for this output TS.	LocalSDT
EIT Source	Specifies how an Event Information Table (EIT) is generated by the VMG. Choices are: <i>Groomed Input</i> is selected, an Event Information Table (EIT) is generated based on that which is received from the groomed input program of the DVB TS. <i>N/A</i> - No EIT will be generated for this output TS.	Groomed Input

- If a NIT is to be included in the output TS, a valid DVB stream must be feeding the input and DVB table processing must be enabled on the input TS ([Click here](#) for more information on enabling DVB table processing).
- If a TDT/TOT is to be included in the output TS, a valid DVB stream must be feeding the input, and DVB table processing must be enabled on the input TS ([Click here](#) for more information on enabling DVB table processing).
- If an SDT is to be included in the output TS, a valid DVB stream must be feeding the input, and DVB table processing must be enabled on the input TS ([Click here](#) for more information on enabling DVB table processing).

Figure 134. Ungroomed DVB Transcoded+PIP transport stream



Transcoded+PIP TS Program Grooming

Unlike standard OTS creation in which a program can be created both manually and through drag-and-drop grooming, Transcoded+PIP programs are created through drag-and-drop grooming only. When dragging an input program to an Transcoded+PIP TS, the VMG automatically creates one output program on each of the main and PIP transport streams, for a maximum of two programs on the Transcoded+PIP TS.

- Note:** *The target Transcoded+PIP TS must already exist before performing program level grooming. Refer to “Creating MPEG-2 Transcoded+PIP Transport Streams” on page 201 and “Creating DVB Transcoded+PIP Transport Streams” on page 206 for more information.*
- Note:** *Output program creation depends on the type of licenses installed. Refer to “License Management” on page 99 for details.*

To groom a program to a Transcoded+PIP TS

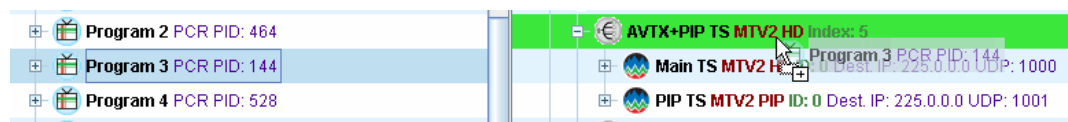
To perform program grooming for transcoded+PIP transport streams, you can apply drag-and-drop grooming in the **Grooming -> Mapping** tab page.

1. Set up the transport stream type, in the output panel of the grooming tab page.



After setting up an **AVTX+PIP TS** or **VTX+PIP TS** in the output panel, drag a program from the input panel to the new output stream. (Figure 135).

Figure 135. Transcoded+PIP TS Program Grooming - Drag and Drop



The program mapping screen associated with AVTX+PIP or VTX+PIP will now display, as shown in the following topics:

- “Grooming to AVTX+PIP” on page 209.
- “Grooming to VTX+PIP” on page 210.

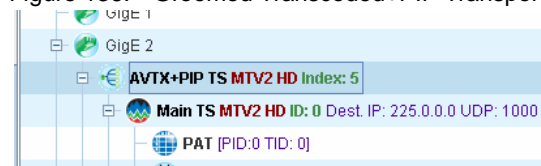
Guidelines for setting parameters are provided in “Program Mapping Parameters for VTX+PIP or AVTX+PIP” on page 211.



2. Complete your entries in the configuration screen, then click **Apply**.

The groomed program is now displayed in the Transcoded+PIP TS on the **Grooming -> Mapping** tab page (similar to the example shown in Figure 136).

Figure 136. Groomed Transcoded+PIP Transport Stream



Colorization of the Transcoded+PIP TS icon indicates that the stream is actively processing video. In addition to modifying the Transcoded+PIP TS, you can now modify the grooming parameters (“Modify Transcoded+PIP Grooming” on page 219) and view its grooming source (“View Transcoded+PIP Grooming Source” on page 222).

Grooming to AVTX+PIP

If you groom to an AVTX+PIP TS, the **Create AVTX+PIP Program Mapping** screen for an HD encoded H.264 video program is displayed (Figure 137).

Figure 137. Create AVTX+PIP Program Mapping

Create AVTX+PIP Program Mapping

Source
 Port: Gige 2 Program Name: Resolution Class: HD
 TS ID: 92 Program Number: 1

Destination
 Port: Gige 1

Output Program(s)

TS Index	TS Name	IP Address: UDP Port	TS Bitrate (Mbps)	Prog Number	Prog Name
15	Sample4Pubs	224.1.1.2:3	18.5	1	Gige 1-t15-1
18	Sample4Pubs	224.1.1.1:3	1.2	1	Gige 1-t18-1

Video and Audio Parameters

Main
 Video Type / Encoding Template: H.264 / HD
 Profile: High
 Auto / Video Bitrate: ☐ 8
 Resolution: H: Full Res
 AFD Output: ☐ Disable
 Aspect Ratio: Automatic
 GOP M / N: 4 / 32
 IDR Interval (in Frames): 96 Frames
 Closed Caption Type: CEA 608
 SCTE 35 Cue: ☒ Forward
 Pre-Processing Filters: ☐ MCTF noise reduction
☒ Audio Profile: sample
 Audio Codec: E-AC3
 Sampling Rate: 48 kHz
 Channels: stereo
 Audio Bitrate: 192 kbps
 Audio Gain: no Gain
 Advanced...

PIP
 H.264 / PIP
 Main
☐ 0.3
 192 x 192
 4:3
 4 / 32
 0 Frames

Main Components
 Pass-Through: NONE
 Max Audio: 1 Max Data: 0

Groom	Input Type	Input PID	TS Index 15 PID	TS Index 15 Lang
<input checked="" type="checkbox"/>	PMT	41	100	N/A
<input checked="" type="checkbox"/>	SCTE Video	16	101	N/A
<input checked="" type="checkbox"/>	AC-3 Audio eng	17	102	English (eng)

PIP Components

Groom	Input Type	Input PID	TS Index 18 PID
<input checked="" type="checkbox"/>	PMT	41	100
<input checked="" type="checkbox"/>	SCTE Video	16	101

Enabled only if a Dolby Codec is selected.

Apply Cancel

Configuration guidelines AVTX_PIP program mapping are provided in “Program Mapping Parameters for VTX+PIP or AVTX+PIP” on page 211.

Grooming to VTX+PIP

If you groom to a VTX+PIP TS, the **Create VTX+PIP Program Mapping** menu for an HD encoded H.264 video program is displayed (Figure 138).

Figure 138. Create VTX+PIP Program Mapping

Create VTX+PIP Program Mapping

Source
 Port: Gige 2 Program Name: Resolution Class: HD
 TS ID: 92 Program Number: 2

Destination
 Port: Gige 1

Video Parameters

Main		PIP
Video Type / Encoding Template:	H264 / SD	H.264 / PIP
Profile:	High	Main
Auto / Video Bitrate:	<input type="checkbox"/> 2	<input type="checkbox"/> 0.3
Resolution:	H: Full D-1	192 x 192
AFD Output:	<input type="checkbox"/> Disable	
Active Format:	Force 16:9 letterbox	
Aspect Ratio:	Automatic	4:3
GOP M / N:	4 / 32	4 / 32
IDR Interval (in Frames):	96 Frames	0 Frames
Closed Caption Type:	CEA 608	
SCTE 35 Cue:	<input checked="" type="checkbox"/> Forward	
Pre-Processing Filters:	<input type="checkbox"/> MCTF noise reduction	

Output Program(s)

TS Index	TS Name	IP Address: UDP Port	TS Bitrate (Mbps)	Prog Number	Prog Name
15	sample4pubs	224.1.1.1:4	18.5	1	Gige 1-t15-1
18	sample4pubs	224.2.2.2:4	1.2	1	Gige 1-t18-1

Main Components
 Max Audio: 1 Max Data: 0

Groom	Input Type	Input PID	TS Index 15 PID	TS Index 15 Lang
<input checked="" type="checkbox"/>	PMT	489	100	N/A
<input checked="" type="checkbox"/>	SCTE Video	464	101	N/A
<input checked="" type="checkbox"/>	AC-3 Audio eng	465	102	English (eng)

PIP Components

Groom	Input Type	Input PID	TS Index 18 PID
<input checked="" type="checkbox"/>	PMT	489	100
<input checked="" type="checkbox"/>	SCTE Video	464	101

Apply Cancel

Configuration guidelines VTX_PIP program mapping are provided in “Program Mapping Parameters for VTX+PIP or AVTX+PIP” on page 211.

Program Mapping Parameters for VTX+PIP or AVTX+PIP

Parameters available in the **Create Transcoded+PIP Programming Mapping** tab page are categorized as follows:

- “Source Parameters,” next.
- “Destination” on page 211
- “Video and Audio Parameters” on page 212
- “Main Components” on page 215
- “PIP Components” on page 216



Note: *Transcoded+PIP programs do not support DPI, Program Substitution, SCTE 30 to 35 conversion, or transrating.*

Source Parameters

The source parameters listed and described in [Table 96](#) are available from the **Create Transcoded+PIP Programming Mapping** tab page.

Table 96. Grooming —Source Parameters

Field	Description	Default
Port	The input program's source GigE or 10 GigE interface.	Read-only
TS ID	The input program's transport stream ID.	Read-only
Program Name	Program name assigned to the input program.	Read-only
Program Number	Program number assigned to the input program.	Read-only
Resolution Class	Resolution standard, as either SD or HD, assigned to the input program.	Read-only

Destination

The destination parameters listed and described in [Table 97](#) are available from the **Create Transcoded+PIP Programming Mapping** tab page.

Table 97. Grooming—Destination Parameters

Field	Description	Default
Port	View output program's destination GigE interface port.	Read-only
TS Index	View the unique ID for each transcoded+pip transport stream.	Read-only
TS Name	View program's transport stream name.	Read-only
IP Address: UDP Port	View IP address and port to which the output stream is routed.	Read-only
TS Bitrate	View bitrate of the output stream.	Read-only
Prog Number	Type a value, in the range 1 - 131072, to assign a number to the output program.	1
Prog Name	Alphanumeric string to set program name. • Default format: GigE #-t[unique id]-[Program Number].	For example: GigE 7-t47221504-1

Video and Audio Parameters

The video and audio parameters listed and described in [Table 98](#) are available from the **Create Transcoded+PIP Programming Mapping** tab page.

Table 98. Grooming—Video and Audio Parameters

Field	Description	Default
Video Type	Only H.264 is available as the video type for Transcoded+PIP output transport stream programs.	H.264
Encoding Template	Choose between HD (high definition) or SD (standard definition) <ul style="list-style-type: none"> If HD is selected, the video bitrate defaults and range will change (see the <i>Automatic Video Bitrate (In Mbps)</i> field). If SD is selected, the video bitrate defaults and range will change (see the <i>Automatic Video Bitrate (In Mbps)</i> field). 	HD for Main. Read-only for PIP
Profile	Select either high, main, or baseline to set the video standard to be used. Refer to “Video Profile Configuration Options” on page 313 for guidelines. <i>Note: Profile is available only when Video Type is set to H.264. High is not available for PIP transport streams.</i>	<i>High</i> for the Main stream and <i>Main</i> for the PIP stream
Automatic Video Bitrate (In Mbps)	Enable (check) or (disable) auto video bitrate assignment. <ul style="list-style-type: none"> If enabled the system assigns the video bitrate, with the latency marked by a <i>“Perfecting video”</i> message until the bitrate is assigned. If disabled, use a video bitrate entry compliant with supported Video Type parameters H.264 HD, H.264 SD, or H.264 PIP. As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310). See Table , “Bitrate Configuration Reference,” on page 310 for ranges and default values. 	Un-checked
Resolution	Specifies the type of horizontal (H) resolution to use for the transcoded program. <ul style="list-style-type: none"> For HD transcoded programs, the following options are available: <i>Full Res, 1920, 1440, 1280, 960</i> For SD programs, the following options are available: <i>Full D-1, VGA, 3/4 D-1, 2/3 D-1, or 1/2 D-1</i> For the PIP program, the following horizontal and vertical options are available: <i>H:1/2D1 X V:1/2D1</i> (352 x 240 for NTSC; 352 x 288 for PAL), <i>192 X192, 128 X 96, 96 X 96</i> 	HD: H: Full Res SD: H: Full D-1 PIP: 192 X 192
AFD Output	Disable (check) or enable (un-check) forwarding of Active Format Descriptions in output streams. This option does not apply to the PIP program. For information on AFD, refer to “Active Format Description (AFD)” on page 168 .	Un-checked

Table 98. Grooming—Video and Audio Parameters (Continued)

Field	Description	Default
Active Format (Hidden unless SD selected)	<p>Specifies the type of output for HD content transcoded to SD. The options are:</p> <ul style="list-style-type: none"> • <i>Force 16:9 letterbox</i> — an AFD code of 10 is included in the output (16:9 Image: Letterbox in 4:3 frame, Full Frame in 16:9 frame). • <i>Force 4:3 centercut</i> — an AFD code of 9 is included in the output (4:3 Image: Full Frame in 4:3 frame, Pillarbox in 16:9 frame). • <i>Use AFD; 16:9 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 16:9 Letterbox. • <i>Use AFD; 4:3 fallback</i> — the frame format will be determined by the Active Format Description in the input program. If the AFD is not present, the frame will be forced to 4:3 Centercut. <p>The <i>Active Format</i> field only appears when the <i>Encoding Template</i> is set to <i>SD</i>.</p> <ul style="list-style-type: none"> • This option does not apply to the PIP program. 	Force 16:9 letterbox
Aspect Ratio	<p>Specifies the ratio of the program's width to the height.</p> <ul style="list-style-type: none"> • For an HD program, the field is read-only and set to <i>Automatic</i>. • For an SD program, choose from one of the following options: <i>Automatic, 4:3, 16:9</i> • For the PIP program, choose from one of the following options: <i>Automatic, 4:3, 16:9</i> 	HD and SD: Automatic PIP: 4:3
GOP M	<p>Specifies the spacing of the P frames in the output. The higher the value, the lower the data rate.</p> <ul style="list-style-type: none"> • For the <i>Main</i> program, choose one of the following values: 1, 2, 3, 4, or 8. <ul style="list-style-type: none"> - Note that GOP M 8 is not available if the input is 1080i HD. • For the <i>PIP</i> program, choose one of the following values: 1 or 4 	4
GOP N	<p>Specifies the number of frames in each GOP. The higher the value, the lower the data rate.</p> <ul style="list-style-type: none"> • For the <i>Main</i> program, this value must be between 1 and 240 and a multiple of the <i>GOP M</i> value. <p>When the <i>GOP M</i> value is set to 4 or 8, the <i>GOP N</i> value is set to 32 and is read-only.</p> <ul style="list-style-type: none"> • For the <i>PIP</i> program, this value is set to 32 and read-only. 	32

Table 98. Grooming—Video and Audio Parameters (Continued)

Field	Description	Default
IDR Interval (in Frames)	<p>Specifies the interval between instantaneous decoder refresh (IDR) frames.</p> <ul style="list-style-type: none"> For GOP M=1-3 with HD or SD encoding, the IDR interval can be manually entered and must be a multiple of the GOP N value. Enter 0 if no IDR frames are to be inserted. For GOP M=4, the IDR interval can be set to 96 (the default) or 0 (no IDR). For GOP M=8, the IDR interval is set to 96 and is read-only. For the PIP program, no IDR frames are inserted and this field does not display. 	96
Closed Caption Type	Currently only CEA 608.	CEA 608.
SCTE 35 Cue	<p>Check the <i>Forward</i> box to forward SCTE 35 cues from the input program</p> <ul style="list-style-type: none"> This option does not apply to the PIP program. 	Checked
Pre-Processing Filters	<p><i>MCTF noise reduction</i> — when checked, enables motion compensated temporal filtering (MCTF).</p> <ul style="list-style-type: none"> This option does not apply to the PIP program. 	Un-checked
Audio Profile (AVTX+PIP only)	<p>You can define audio profiles that you can quickly apply to a Program Mapping.</p> <p>If this option is checked, enter a name to create a new audio profile and then define the audio parameters below. If the option is un-checked, you can select from a list of existing audio profiles and the audio parameters will be automatically filled in and un-editable.</p>	Blank
Audio Codec (AVTX+PIP only)	<p>Defines the codec for the output audio. Choose one of the following options:</p> <ul style="list-style-type: none"> <i>HE AAC, HE AAC v2, AAC-LC, MPEG1 L2, MPEG2 L2, AC-3</i> 	AAC LC
Sampling Rate (AVTX+PIP only)	<p>Defines the number of audio samples per second. The higher the number, the better the sound quality. Choose one of the following options:</p> <ul style="list-style-type: none"> <i>8 kHz, 11.03 kHz, 12 kHz, 16 kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, 48 kHz</i> 	48 kHz
Channels (AVTX+PIP only)	Defines the number of output channels per audio stream as either mono, stereo, or 5.1 surround.	stereo
Audio Bitrate (AVTX+PIP only)	Defines the bitrate for all audio streams within the MBR TS. The selectable values depend on your selection of <i>Audio Codec</i> , <i>Sampling Rate</i> , and <i>Channels</i> .	128 kbps

Table 98. Grooming—Video and Audio Parameters (Continued)

Field	Description	Default
Audio Gain (AVTX+PIP only)	Defines the gain on an audio stream level. <i>Audio Gain</i> is applied to all audio streams within the MBR TS. If the input program has two or more audio PIDs, all audio outputs will have the same gain. <ul style="list-style-type: none"> <i>Audio Gain</i> ranges from -24 dB to +24 dB and is selectable in 1 dB increments. Note: <i>And Audio Gain of 0 means no gain.</i>	no Gain
Advanced Button (AVTX+PIP only)	Allows access to Dolby Configuration dialogs, as appropriate for the Audio Codec specified in the Audio Codec field.	<ul style="list-style-type: none"> Disabled for non-Dolby audio Codec. Enabled for Dolby audio Codec.

Main Components

The main components parameters listed and described in [Table 99](#) are available from the **Create Transcoded+PIP Programming Mapping** tab page.

Table 99. Grooming—Main Components Parameters

Field	Description	Default
Pass-through (AVTX+PIP only)	Enable or disable AC-3 audio pass-through for the stream. If enabled, the AC-3 stream will be passed through to the output with your setting for the PID, and transcoded to the output with your settings for audio codec.	None
Start PID (AVTX+PIP only)	This field is displayed in the Program Mapping screen when AC-3 is selected for Pass-through. Type the PID value to be associated with AC-3. Range: 32 - 8175.	Blank
Max Audio	Set value to define the maximum allowable audio elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	See “ Bitrate Configuration Reference ” on page 310 for comparative values.
Max Data	Set value to define the maximum allowable data elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	
Groom	Check this box to include the specified elementary stream in the <i>Main</i> output program.	Checked
Input Type	Displays the input elementary stream types for the input program.	Read-only
Input PID	Displays the <i>Input Type</i> 's associated PID for the input program.	Read-only
TS Index X PID	The <i>X</i> refers to the <i>TS Index</i> for the <i>Main</i> transport stream within this Transcoded+PIP TS. Here you can set the PIDs for the <i>Main</i> transport stream.	Output PID
TS Index X Lang	The <i>X</i> refers to the <i>TS Index</i> for the <i>Main</i> transport stream within this Transcoded+PIP TS. For audio streams, this displays the output language of the elementary stream.	Read-only

PIP Components

The PIP components parameters listed and described in [Table 100](#) are available from the **Create Transcoded+PIP Programming Mapping** tab page.

Table 100. Grooming—PIP Components Parameters

Field	Description	Default
Groom	Indicates that the elementary stream is included in the <i>PIP</i> output program.	Read-only
Input Type	Displays the input elementary stream types for the input program.	Read-only
Input PID	Displays the <i>Input Type</i> 's associated PID for the input program.	Read-only
TS Index X PID	The <i>X</i> refers to the <i>TS Index</i> for the <i>PIP</i> transport stream within this Transcoded+PIP TS. Here you can set the PIDs for the <i>PIP</i> transport stream.	Output PID

About Audio Pass-Through

Pass-through configuration can be applied only to MBR, AVTX+PIP, and AVTX grooming. Only one input audio stream per groom is allowed when the pass-through option is enabled. This will result in output that contains one transcode audio and one pass-through audio. Audio pass-through applies to the entire groom; it cannot be applied to individual audio streams.

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click on a GigE interface and choose **Create Transport Stream** for either MBR, AVTX+PIP, or AVTX to access the **Create Transport Stream** screen for your selection.
2. Provide the following entries in the **Create Transport Stream** screen:
 - Name, TS ID, multicast information, IP Address, UDP, and bitrate.
 - Resolution class = HD.
 - Click **Apply** to put the Transport Stream on the **Outputs** panel.
3. Drag an input stream over to the new output stream. The **Configure Program Mapping** screen for the your selection is now displayed.



Note: At the *Main Components* section of the screen, the *Pass-Through* field defaults to *None*.

4. Select either **AC-3** or **E-AC-3 (Dolby Digital Plus)** from the **Pass-Through** field, and set a value to define the PID at the **Start PID** field.
5. Set any other required parameters in the **Configure Program Mapping** screen, then click **Apply** to complete this grooming operation.

Managing Transcoded+PIP Transport Streams and Programs

Management of Transcoded+PIP transport streams and programs is performed from the **Grooming** tab of the *VMG Element Manager* screen.

Modify a Transcoded+PIP Transport Stream



Caution: *Modifying a Transcoded+PIP TS will disrupt program output from the VMG for a few seconds. The actual duration of the disruption at the set top box end might be several seconds.*

To modify a Transcoded+PIP transport stream:

1. Go to the **Modify AVTX+PIP Transport Stream** screen:



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click a Transcoded+PIP TS, and select **Modify Transcoded+PIP Transport Stream** (Figure 139) to present the **Modify AVTX+PIP Transport Stream** screen (MPEG-2 Figure 139, or DVB Figure 140).

Figure 139. Transcoded+PIP TS

The screenshot shows the 'Modify AVTX+PIP Transport Stream' dialog box. At the top, it displays 'Port: GigE 1' and 'TS Type: MPEG-2'. Below this is a table with the following columns: L..., T..., Name, T..., Multi..., IP Address, Subnet Mask, UDP..., Redundant IP Address, Redundant Subnet Mask, TS Bitrate (Mbps), Async Bitrate (Mbps), Auto Video Bitrate, Video Bitrate (Mbps), and Actual Video Bitrate. The table contains two rows: '1 Ma...' and '2 PIP'. Below the table, there is a 'Video Transcoding' section with 'Input Resolution Class: HD' and 'Output Resolution Class: HD' (both dropdown menus), and 'Video Type: H264' (a dropdown menu). At the bottom right, there are 'Apply' and 'Cancel' buttons.

L...	T...	Name	T...	Multi...	IP Address	Subnet Mask	UDP...	Redundant IP Address	Redundant Subnet Mask	TS Bitrate (Mbps)	Async Bitrate (Mbps)	Auto Video Bitrate	Video Bitrate (Mbps)	Actual Video Bitrate
1	Ma...		0	<input checked="" type="checkbox"/>	225.1.1.1		60	0.0.0.0		18.5		<input type="checkbox"/>	8	
2	PIP		0	<input checked="" type="checkbox"/>	225.1.1.1		61	0.0.0.0		1.2		<input type="checkbox"/>	0.3	

Figure 140. Modify Transcoded+PIP Transport Stream for DVB Transport Stream

Create VTX+PIP Transport Stream

Port: GigE 1 TS Type: DVB

I...	Ty...	Name	TS...	Multic...	IP Address	Subnet Mask	UDP ...	Redundant IP Address	Redundant Subnet Mask	TS Bitrate (Mbps)	Async D: Bitrate(Mb)	Auto Video Bitrate	Video Bitrate(Mbps)
1	Main		0	<input checked="" type="checkbox"/>						18.5		<input type="checkbox"/>	8
2	PIP		0	<input checked="" type="checkbox"/>						1.2		<input type="checkbox"/>	0.3

Video Transcoding

Input Resolution Class: HD

Output Resolution Class: HD Video Type: H264

Network ID: 160 Modulation Mode: SCTE 256 QAM

Original Network ID: 160

NIT Source:

TDT/TOT Source:

SDT Source: LocalSDT EIT Source: Groomed Input

2. At the **Modify AVTX+PIP Transport Stream** screen, enter changes, then click **Apply**.
 - The **Apply** button becomes green when all required fields contain information.
 - The **Grooming** button also becomes green when all required fields contain information. You can then go directly to the **Program Mapping** screen in which to apply grooming parameters for this transport stream.



Note: In the **Modify AVTX+PIP Transport Stream** screen, purple shading indicates parameters that cannot be edited.

For both MPEG-2 and DVB Transcoded+PIP transport streams, the following parameters can be modified (see [Table 93 on page 203](#) for information on these parameters):

- Name
- Multicast
- IP Address
- Subnet Mask (if Multicast is un-selected)
- UDP Port

For DVB Transcoded+PIP transport streams, the following *additional* parameters can be modified (see [Table 95 on page 206](#) for information on these parameters):

- Network ID
- Original Network ID
- NIT Source
- TDT/TOT Source
- SDT Source
- EIT Source

Deleting a Transcoded+PIP Transport Stream

To delete the transport stream:

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the desired Transcoded+PIP TS and select **Delete AVTX+PIP Transport Stream** or **Delete VTX+PIP Transport Stream** from the popup menu (see [Figure 139 on page 217](#)).

You will be asked if you wish to delete the transport stream.

2. Click **Yes**.

Modify Transcoded+PIP Grooming

Access the **Modify ACTV+PIP Program Mapping** screen to modify grooming for an Transcoded+PIP transport stream:



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click on a Transcoded+PIP TS and select **Modify AVTX+PIP Grooming**, or **Modify VTX+PIP Grooming**, from the popup menu (see [Figure 139 on page 217](#)) to present the **Modify Transcoded+PIP Program Mapping** tab page ([Figure 141](#)).

Figure 141. Modify Transcoded+PIP Program Mapping

Source

Port: Gige 2 Program Name: Resolution Class: HD
 TS ID: 92 Program Number: 5 Actual Resolution: H: 528 x V: 480

Destination

Port: Gige 1

Output Program(s)

TS Index	TS Name	IP Address: UDP Port	TS Bitrate (Mbps)	Prog Number	Prog Name
5		225.1.1.1:60	18.5	1	Gige 1-15-1
6		225.1.1.1:61	1.2	1	Gige 1-16-1

Video and Audio Parameters

Main

Video Type / Encoding Template: H264 / HD
 Profile: High
 Auto / Video Bitrate: ☐ 8
 Actual Video Bitrate (Mbps): 8
 Resolution: H: Full Res
 Actual Resolution: H: 704 x V: 480
 AFD Output: ☐ Disable
 Aspect Ratio: Automatic
 GOP M / N: 4 / 32
 IDR Interval (in Frames): 96 Frames
 Closed Caption Type: CEA 608
 SCTE 35 Cue: ☒ Forward
 Pre-Processing Filters: ☐ MCTF noise reduction
☐ Audio Profile: test3
 Audio Codec: MPEG1 L2
 Sampling Rate: 48 kHz
 Channels: stereo
 Audio Bitrate: 192 kbps
 Audio Gain: no Gain

PIP

H.264 / PIP
 Main
 0.3
 0.3
 H: 192 x V: 192
 4:3
 4 / 32
 0 Frames

Main Components

Pass-Through: NONE
 Max Audio: 2 Max Data: 2

Groom	Input Type	Input PID	TS Index 5 PID	TS Index 5 Lang
<input checked="" type="checkbox"/>	PMT	681	100	N/A
<input checked="" type="checkbox"/>	SCTE Video	656	101	N/A
<input checked="" type="checkbox"/>	AC-3 Audio eng(bul)	657	102	Bulgarian (b...)
<input checked="" type="checkbox"/>	AC-3 Audio spa	658	103	Spanish (spa)

PIP Components

Groom	Input Type	Input PID	TS Index 6 PID
<input checked="" type="checkbox"/>	PMT	681	100
<input checked="" type="checkbox"/>	SCTE Video	656	101

Advanced...

Apply Cancel

All parameters that can be set during initial grooming of an Transcoded+PIP program can also be modified. Refer to the following parameter descriptions for guidelines:

- Table 96, “Grooming—Source Parameters,” on page 211.
- Table 97, “Grooming—Destination Parameters,” on page 211.
- Table 98, “Grooming—Video and Audio Parameters,” on page 212.
- Table 99, “Grooming—Main Components Parameters,” on page 215.
- Table 100, “Grooming—PIP Components Parameters,” on page 216.

Resetting Grooming—AVTX+PIP or VTX+PIP

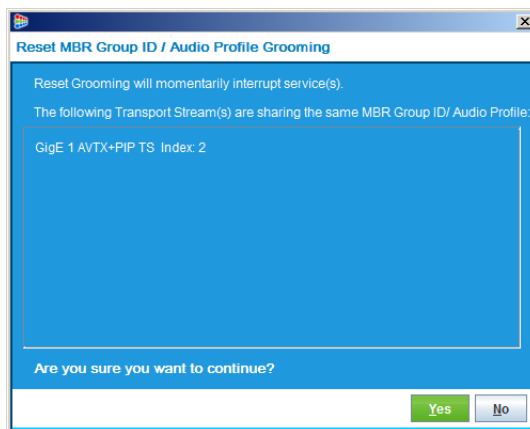
Use the **Reset Grooming** option (Figure 142) on an output transport stream to tear down a current configuration and rebuild the transport stream with an identical configuration.



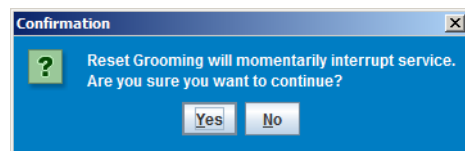
From the **Outputs** panel of the **Grooming** -> **Mapping** tab page, right-click on an AVTX+PIP, VTX+PIP, transport stream for the popup menu -> select **Reset Grooming**.

Figure 142. Reset Grooming—AVTX+PIP. VTX+PIP

Confirmation Query for Reset Grooming at AVTX+PIP TS.



Confirmation Query for Reset Grooming at VTX+PIP TS.



Note: This option interrupts service on service associated with transport streams sharing the same MBR group ID or audio profile. When selected, a confirmation query (Figure 143) will be presented prior to beginning the reset process on the selected transport stream.

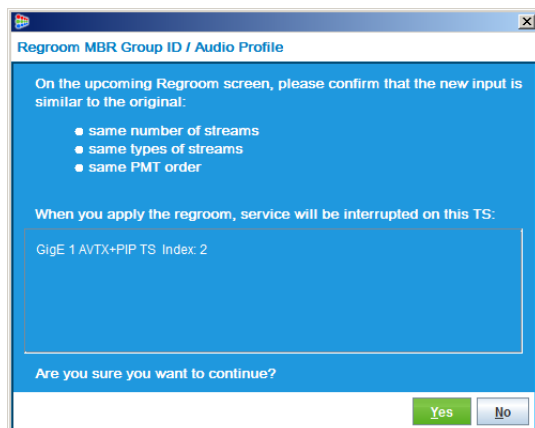
Regrooming—AVTX, AVTX+PIP

Regrooming occurs when you drag an input program to an output transport stream that has already been groomed. This action rebuilds the grooming at the selected output TS, with the new input program, is both configurations are identical—on the output program and the output elementary streams.

Prior to regrooming the targeted output transport stream, the *VMG Element Manager* queries for confirmation of the configuration, to ensure that the input configuration matches that of the output configuration. The **Confirmation** dialog (Figure 143) also reminds you that regrooming interrupts service.

Figure 143. Regroom Confirmation—AVTX+PIP, VTX+PIP

Confirmation Query for Regroom at
AVTX+PIP TS.



Regroom MBR Group ID / Audio Profile

On the upcoming Regroom screen, please confirm that the new input is similar to the original:

- same number of streams
- same types of streams
- same PMT order

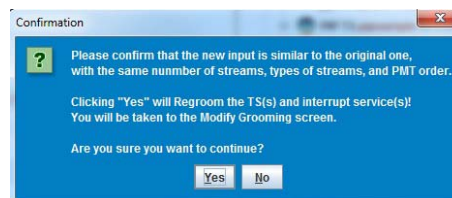
When you apply the regroom, service will be interrupted on this TS:

GigE 1 AVTX+PIP TS Index: 2

Are you sure you want to continue?

Yes No

Confirmation Query for Regroom at
VTX+PIP TS.



Confirmation

Please confirm that the new input is similar to the original one, with the same number of streams, types of streams, and PMT order.

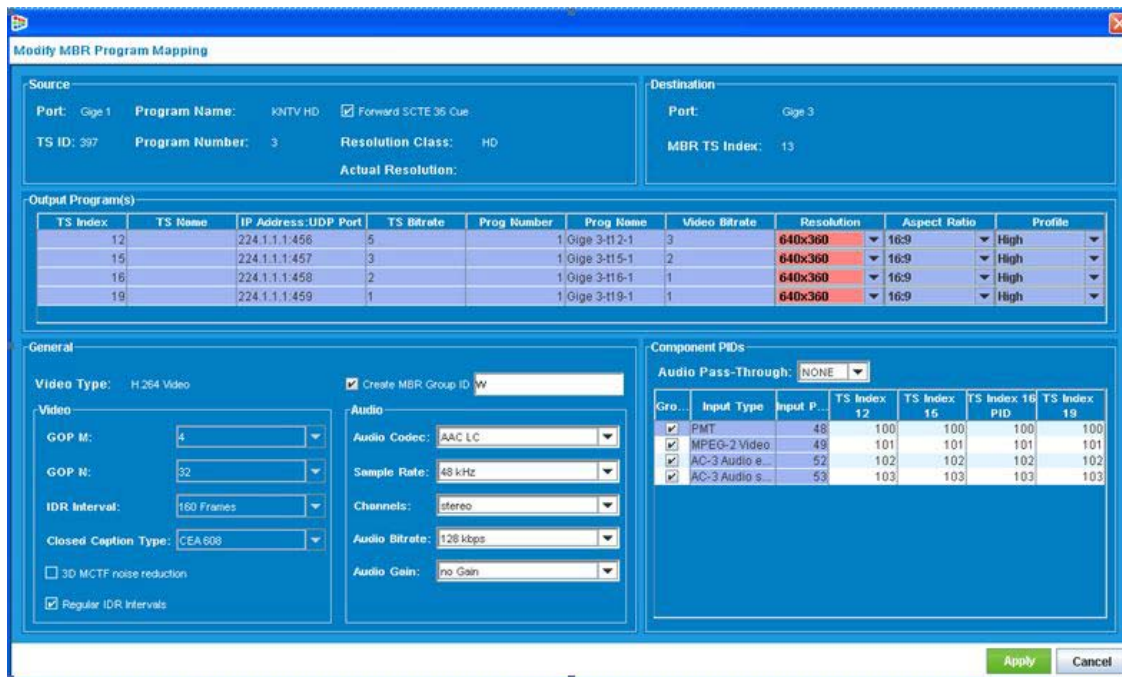
Clicking "Yes" will Regroom the TS(s) and interrupt service(s)! You will be taken to the Modify Grooming screen.

Are you sure you want to continue?

Yes No

Once this grooming session is completed, you can check the **Modify <type> Program Mapping** screen to view data about the incorporated program. Fields associated with the Output ES (in Component PIDs) are editable; all others are read-only, as demonstrated in Figure 144.

Figure 144. Viewing Regrooming Detail



Modify MBR Program Mapping

Source

Port: GigE 1 Program Name: KNTV HD ☒ Forward SCTE 35 Cue

TS ID: 397 Program Number: 3 Resolution Class: HD

Actual Resolution:

Destination

Port: GigE 3

MBR TS Index: 13

Output Program(s)

TS Index	TS Name	IP Address:UDP Port	TS Bitrate	Prog Number	Prog Name	Video Bitrate	Resolution	Aspect Ratio	Profile
12		224.1.1.1:456	5	1	GigE 3-11-2-1	3	640x360	16:9	High
15		224.1.1.1:457	3	1	GigE 3-11-5-1	2	640x360	16:9	High
16		224.1.1.1:458	2	1	GigE 3-11-6-1	1	640x360	16:9	High
19		224.1.1.1:459	1	1	GigE 3-11-9-1	1	640x360	16:9	High

General

Video Type: H.264 Video ☒ Create MBR Group ID W

Video

GOP M: 4

GOP N: 32

IDR Interval: 160 Frames

Closed Caption Type: CEA 608

☐ 3D MCTF noise reduction

☒ Regular IDR Intervals

Audio

Audio Codec: AAC LC

Sample Rate: 48 kHz

Channels: stereo

Audio Bitrate: 128 kbps

Audio Gain: no Gain

Component PIDs

Audio Pass-Through: NONE

Cro.	Input Type	Input P...	TS Index 12	TS Index 16	TS Index 16 PID	TS Index 19
<input checked="" type="checkbox"/>	PMT	48	100	100	100	100
<input checked="" type="checkbox"/>	MPEG-2 Video	49	101	101	101	101
<input checked="" type="checkbox"/>	AC-3 Audio e...	52	102	102	102	102
<input checked="" type="checkbox"/>	AC-3 Audio s...	53	103	103	103	103

Apply Cancel

Deleting Transcoded+PIP Grooming

To delete the grooming:

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the desired Transcoded+PIP TS and select **Delete AVTX+PIP Grooming** or **Delete VTX+PIP Grooming** from the popup menu (see [Figure 139 on page 217](#)).

You will be asked if you wish to delete the grooming.

2. Click **Yes**.

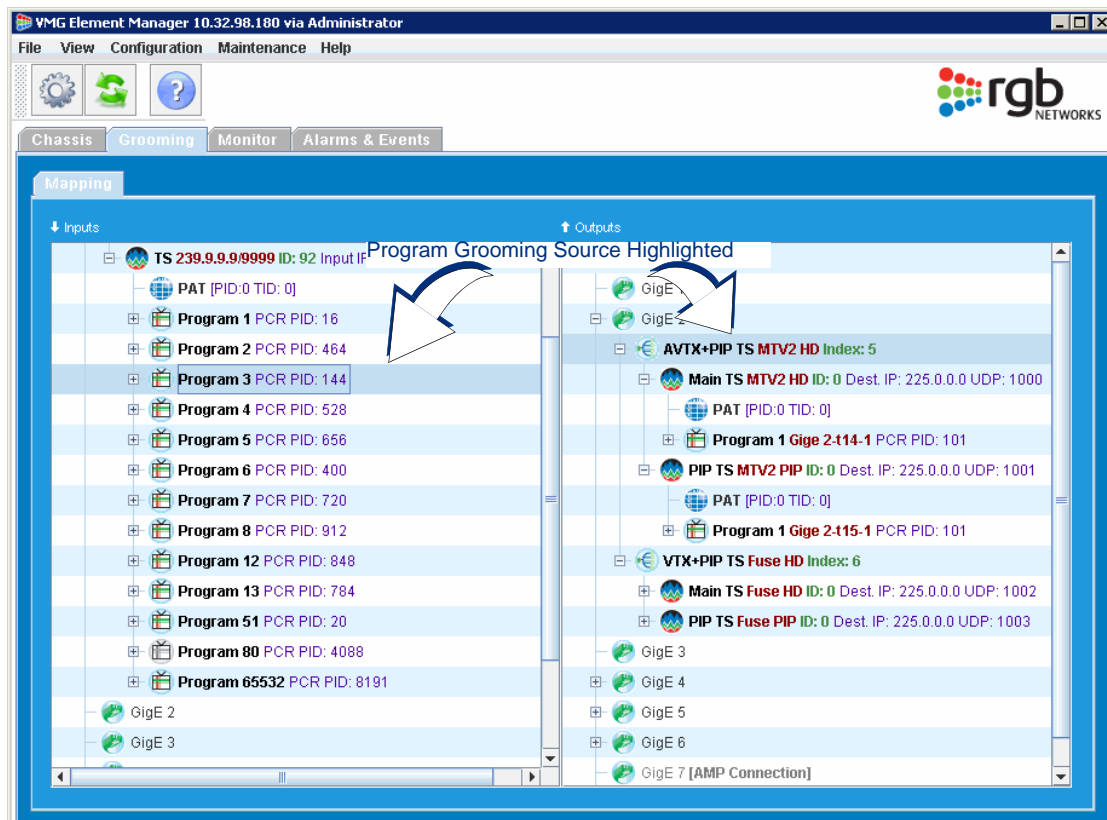
View Transcoded+PIP Grooming Source

To view the grooming source for an Transcoded+PIP program:

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the desired Transcoded+PIP TS carrying the program and select **View AVTX+PIP Grooming Source** or **View VTX+PIP Grooming Source** from the popup menu (see [Figure 139 on page 217](#)).

Selecting this option highlights the source input program associated with the selected Transcoded+PIP program.

Figure 145. View Transcoded+PIP Grooming Source



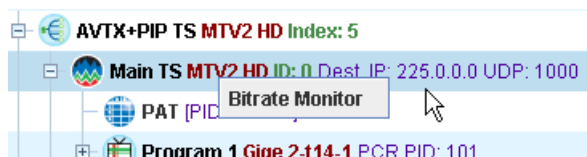
Bitrate Monitoring

Go to the **Input-Output Bitrate Monitor** screen to view the bitrate graph for an Transcoded+PIP program:



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click a transport stream within the Transcoded+PIP TS and select **Bitrate Monitor** from the popup menu (Figure 146) to present the **Input-Output Bitrate Monitor** screen. See Chapter 16, “Monitoring” for additional information.

Figure 146. Transcoded+PIP Bitrate Monitor



Note: The Bitrate Monitor can only display the real-time bitrate for one transport stream and to one VMG Element Manager user at a time. Two transport streams cannot be monitored simultaneously.

MBR Transport Streams

This chapter describes the use of the VMG *Element Manager* to manage the creation and grooming of MBR (multi-bitrate) transport streams. The **Grooming** -> **Mapping** tab provides program and transport stream (TS) information.



Note: *System configuration must be completed before performing grooming tasks. Refer to Chapter 4, “System Configuration” for more information. In addition to the hardware requirements, sufficient H.264 SD licenses must be available.*



Note: *The VMG supports input-level program redundancy for MBR transport streams. If you plan to implement program redundancy, please familiarize yourself with “Program Redundancy” on page 253 before performing the procedures in this chapter.*

Hardware requirements for support of MBR Transport Stream configuration are provided in Table 101.

Table 101. VMG Hardware Requirements for MBR TS Configuration

Hardware	Description
TCM	One or more must be installed and operational.
AMP	One or two must be installed and operational. Each AMP must be physically connected to its NPM pairing, using guidelines from the <i>VMG Hardware Setup Guide</i> for your VMG. The available VMG Hardware Setup Guides are listed in “Related Documentation” on page 2. Each AMP connection must be enabled through the <i>VMG Element Manager</i> . See “AMP Connection” on page 69 for instructions.

Streams associated with MBR configurations can be monitored at the bitrate level. See Chapter 16, *Monitoring* on Page 291 for more information.

In This Chapter:

- “Overview,” next.
- “Creating MBR Transport Streams” on page 226.
- “MBR TS Program Grooming” on page 230.
- “Managing MBR Transport Streams and Programs” on page 238.

Overview

An MBR (multi-bitrate) transport stream enables transcoding of a single input stream (HD or SD in either MPEG-2 or H.264 format) into as many as four H.264 SPTSs per grooming operation. More than four profiles (outputs) can be configured by performing multiple groom operations reference the same group ID. All programs groomed to MBR TSs are transcoded to H.264 video. For each SPTS in

an MBR TS, you can independently control the video bitrate, resolution, aspect ratio, profile, and GOP structure for a groomed program.

MBR TSs also perform transcoding on the input audio streams, enabling you to control the number of audio channels, sampling rate, and audio bitrate for the output programs. You can set up as many as 54 HD or 108 SD video/audio MBR groups for programs groomed to MBR TSs with up to eight profiles (outputs) each. Capacities for redundant and non-redundant VMG systems are listed in [Table 102](#) and [Table 103](#).

Table 102. MBR Transport Stream System Capacities - Redundant System

VMG Model	Input Resolution	Maximum Capacities				
		MBR Groups	MBR Transport Streams	MBR Profiles	Stereo Audio Transcoding streams (AAC-LC)	Qty of Audio Transcodings per MBR Group
VMG-14 ^a	HD/SD	108	108	432	375 mono, or	2
VMG-8 ^b		36	36	144	249 stereo, or	
VMG-6 ^c		12	12	48	132 surround	

- a. System containing nine active TCMs.
- b. System containing three active TCMs.
- c. System containing one active TCM.

Table 103. MBR Transport Stream System Capacities - Non-Redundant System

VMG Model	Input Resolution	Maximum Capacities				
		MBR Groups	MBR Transport Streams	MBR Profiles	Stereo Audio Transcoding streams (AAC-LC)	Qty of Audio Transcodings per MBR Group
VMG-14 ^a	HD/SD	132	132	528	375 mono, or	2
VMG-8 ^b		60	60	240	249 stereo, or	
VMG-6 ^c		36	36	144	132 surround	

- a. System containing 11 active TCMs.
- b. System containing five active TCMs.
- c. System containing three active TCMs.

Transport streams have different characteristics, as based on whether they are MBR streams or standard output streams ([Table 104](#)).

Table 104. Differences between Standard Output TS and MBR TS

Feature	Standard Output TS	MBR TS
Video Transcoding	Both transcoding and non-transcoding supported	Transcoding only
Transcoding output	MPEG-2 or H.264 HD, SD, or PIP stand-alone streams	H.264 only Up to 4 streams of varying resolutions (per groom; more supported per group ID)
TS Types	MPEG-2, SCTE, ATSC, DVB	MPEG-2
SPTS/MPTS	Both SPTS and MPTS	SPTS only

Table 104. Differences between Standard Output TS and MBR TS (Continued)

Feature	Standard Output TS	MBR TS
Digital Program Insertion	TS level and Program level	No DPI support
Program Creation	Manual and Drag-and-Drop Grooming	Drag-and-Drop Grooming only



Note: See also the “[Resolution Configuration Reference](#)” on page 309 for resolutions currently supported for HD or SD programming.

Inter-VMG IDR Alignment

The VMG enables transcoders to create IDR-aligned output profiles suitable for segmenting and adaptive delivery. It also ensures that different transcoders that ingest the same input will have all of their outputs be IDR aligned.

To enable inter-VMG IDR alignment, each VMG must be configured to use identical MBR settings and tuning parameters.

Creating MBR Transport Streams

The VMG supports only one MBR TS type: MPEG-2. You can control the HD output for the MBR transport stream by setting parameters for up to four individual streams, or use the Full HD Output option to consolidate full output into a single MBR transport stream as described in the following topics:

- “[Configuring Individual MBR Transport Streams](#),” next.
- “[Configuring Full HD MBR Transport Stream](#)” on page 227.

Use the **Create MBR Transport Stream** screen ([Figure 147](#) (default) and [Figure 148](#) (Full HD Output), and [Table 105](#)) to set MBR parameters for the stream.



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the output GigE interface and select **Create MBR Transport Stream**.

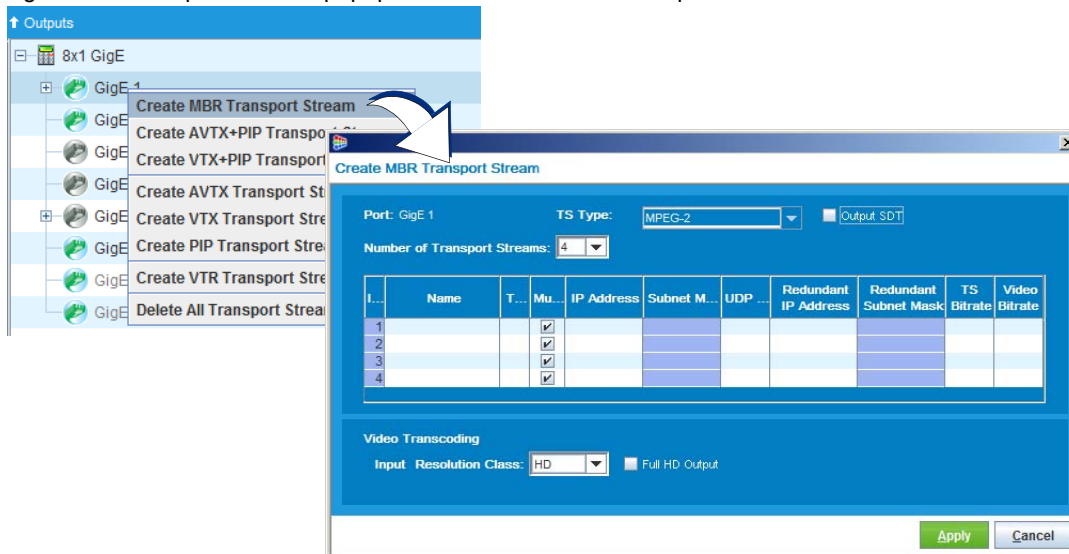


Note: In MBR TS screens, purple background shading identifies fields that cannot be edited. Fields that have white or light blue shading can be edited by first double-clicking on them.

Configuring Individual MBR Transport Streams

1. At the **Create MBR Transport Stream** screen ([Figure 147](#)), select the number of transport streams to be included, and set values for each in the configuration table. See [Table 105](#) for configuration guidelines.
2. Enable or disable output **SDT**, and set **Video Transcoding Input Resolution Class** as either HD or SD.
 - Select *HD* if the video input you intend to process is High Definition.
 - Select *SD* if the video input you intend to process is Standard Definition.

Figure 147. Output interface popup menu - Create MBR Transport Stream - Default



3. Click **Apply**. The new MBR TS is now displayed on the **Grooming -> Mapping** tab page (Figure 149)

Configuring Full HD MBR Transport Stream

Configuration for Full HD MBR enables one profile, only, per MBR transport stream.

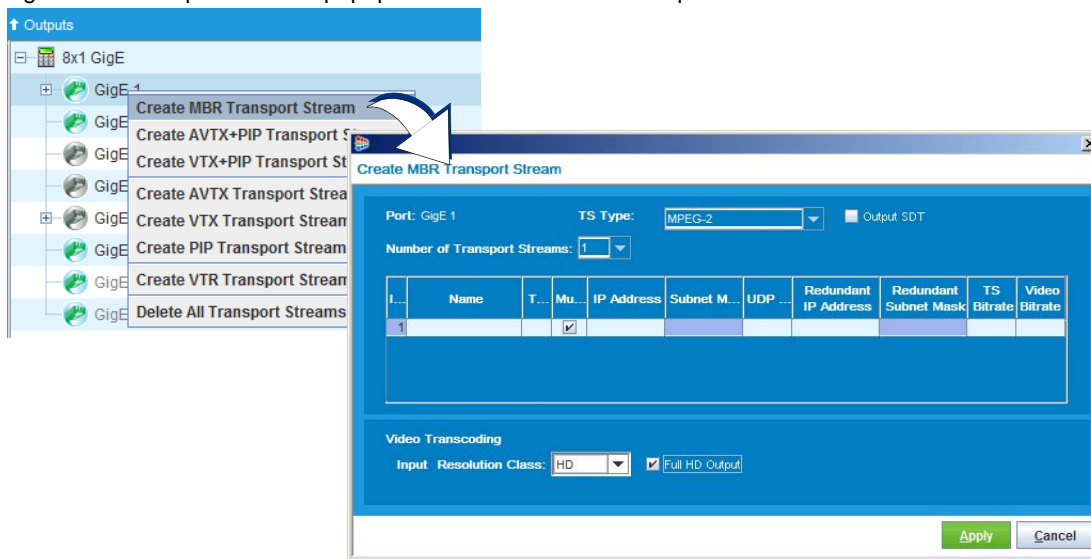
1. At the **Create MBR Transport Stream** screen (Figure 148), click to check-mark the **Full HD Output** checkbox.

The **Number of Transport Streams** available is now displayed as one only, and only one row is provided for entry of the MBR stream parameters. See Table 105 for configuration guidelines.



Note: If you deselect the **Full HD Output** box, you can replace the missing configuration rows by entering a value (maximum four) into **Number of Transport Streams** field.

Figure 148. Output interface popup menu - Create MBR Transport Stream - Default



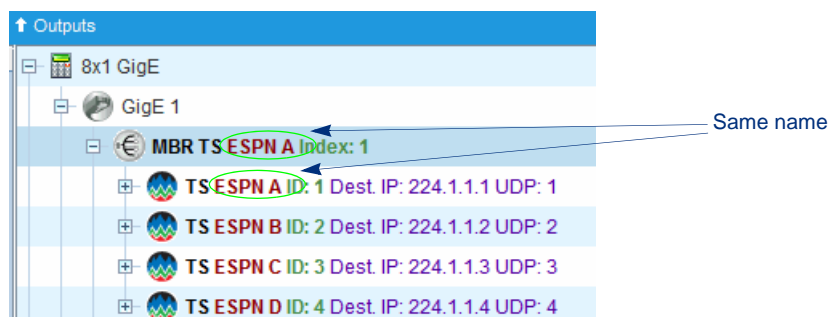
2. Click **Apply**. The new MBR TS is now displayed on the **Grooming -> Mapping** tab page (Figure 149).

Table 105. Create MBR Transport Stream Fields

Field	Description	Default
Port	View the selected port on which the MBR output transport stream is being created.	Read-only
TS Type	View the type of MBR output transport stream being created. Currently, <i>MPEG-2</i> is the only option.	Read-only
Number of Transport Streams	Type a value, in the range 1 - 4, to set the number of single-program transport streams (SPTS) to be contained by the MBR TS. Note: for full HD mode, only 1 TS is allowed.	4
Output SDT	Enable (check) or disable (un-check) SDT passthrough on this MBR transport stream.	Un-checked
Index	View the individual stream number within the MBR TS.	Read-only
Name	(Optional) Type an alphanumeric string—up to 32 characters—to set a name for the output transport stream. Note: <i>The name you give to the first stream will also become the name of the MBR TS.</i>	Blank
TS ID	(Optional) Type a numeric value, in the range 0 - 65535, to set a unique transport identifier.	Blank
Multicast	Enable (check) or disable (un-check) multicast for this output transport stream.	Checked
IP Address	The IP address to which the output stream is routed. <ul style="list-style-type: none"> If <i>Multicast</i> is checked, this must be a valid multicast IP address. Valid range is from 224.0.0.1 to 239.255.255.255. If <i>Multicast</i> is un-checked, this must be a valid unicast IP address. Valid range is from 0.0.0.1 to 223.255.255.255. 	Blank
Subnet Mask	If <i>Multicast</i> is un-checked, this field is available for input.	When Multicast is un-checked: 255.255.255.0
UDP Port	The UDP port to use for transmitting data. Valid range is from 1 to 65535.	Blank
TS Bitrate (Mbps)	Set bitrate of the output stream. The valid range is from 0.1 to 10 Mbps. The sum of all TS bitrates within the MBR group will be constrained to 12 Mbps. As appropriate for your locale, type a comma or a period symbol to designate the decimal point in your entry (see also “Bitrate Entry Guidelines” on page 310).	Blank
Input Resolution Class	Specifies the video input you intend to process, as either <i>HD</i> or <i>SD</i> .	HD
Video bitrate	Value, in Mbps, to define the maximum bitrate for the video bitrate in this transport stream. Range: 0.1 - 8 Mbps. The total for the four video streams is limited to 9 Mbps.	Blank

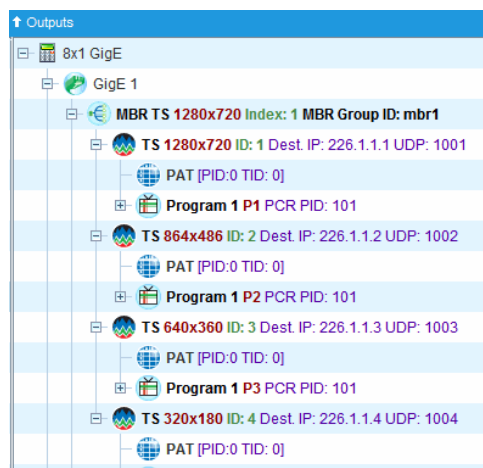
Table 106. Video Transcoding Parameters - MBR Streams

Field	Description	Default
Input Resolution Class	Select HD or SD. <ul style="list-style-type: none"> For SD, set video type (as either MPEG-2 or H264) and video standard (as either NTSC or PAL). HD does not require video type and video standard settings. 	<ul style="list-style-type: none"> AVTX and VTX: HD input, HD output, and MPEG-2 video
Output Resolution Class	Select HD or SD. <ul style="list-style-type: none"> For SD: set video type as either MPEG-2 or H264. For HD: set video type as either MPEG-2 or H264. 	<ul style="list-style-type: none"> PIP: HD input, PIP output, and H264 video VTR (not applicable)
Full HD Output (checkbox)	Check here if the stream is to be treated as an Full-HD MBR. If so, the dialog will provide only one entry row in which to define the Full-HD MBR parameters, and the number of transport streams that can be groomed to the particular session will be limited to one only. An Full-HD MBR transport stream video bitrate is limited to 9 Mbits/sec, and can support up to four audio and four data PIDs. When unchecked, all other sessions (maximum 4) remain unaffected.	<ul style="list-style-type: none"> Unchecked

Figure 149. Example New MPEG-2 MBR transport stream at **Mapping** tab page.

The MBR TS icon is gray unless video processing is active, that is, until you groom a program to the MBR TS. One to four SPTSs appear within the MBR TS. The MBR TS automatically takes on the name of the first SPTS.

Figure 150. Groomed MBR Transport Stream



Colorization of the MBR TS icon (previously gray) indicates that the groomed stream is actively processing video.

- You can modify parameters for the MBR TS (see “[Modifying an MBR Transport Stream](#)” on page 238).
- You can also modify current grooming parameters (“[Modifying MBR Grooming](#)” on page 241) and view its grooming source (“[Viewing MBR Grooming Source](#)” on page 243).
- You can modify the MBR program name (“[Modifying MBR Program](#)” on page 244).

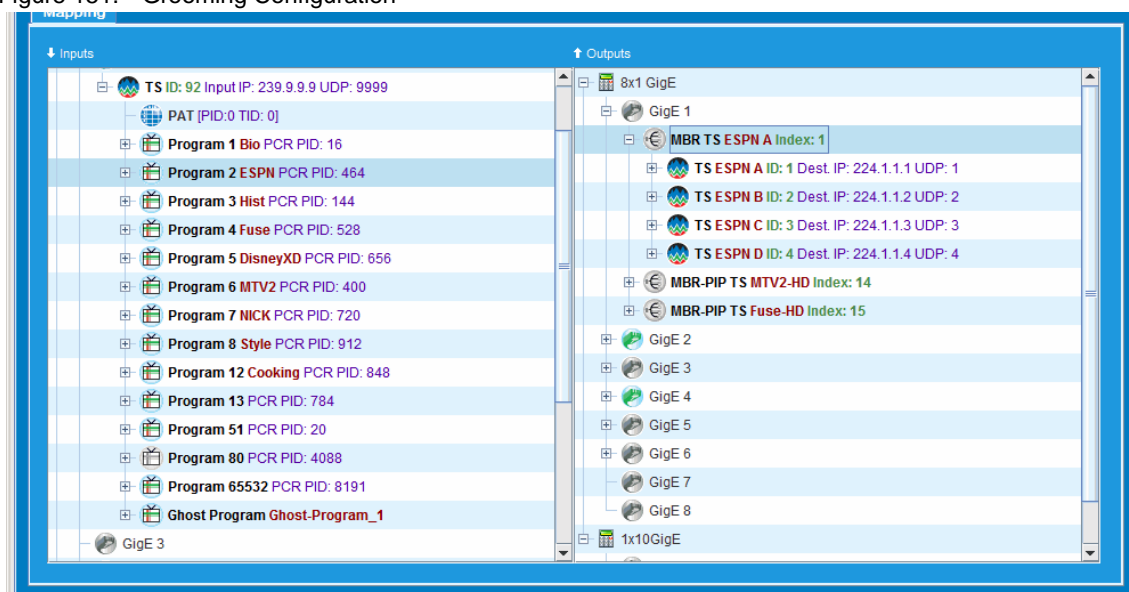
MBR TS Program Grooming

Unlike standard OTS creation in which a program can be created both manually and through drag-and-drop grooming, MBR programs are created through drag-and-drop grooming only. When you drag an input program to an MBR TS, the VMG automatically creates one output program on each of the transport streams, for a maximum of four programs on an MBR TS.

- Note:** The target MBR TS must already exist before performing program level grooming. Refer to “Creating MBR Transport Streams” on page 226 for more information.
- Note:** MBR TS programs require an H264 Transcoding License. Refer to “License Management” on page 99 for details.

Drag-and-drop grooming is performed on the **Grooming -> Mapping** tab page of the *VMG Element Manager* screen (Figure 151).

Figure 151. Grooming Configuration

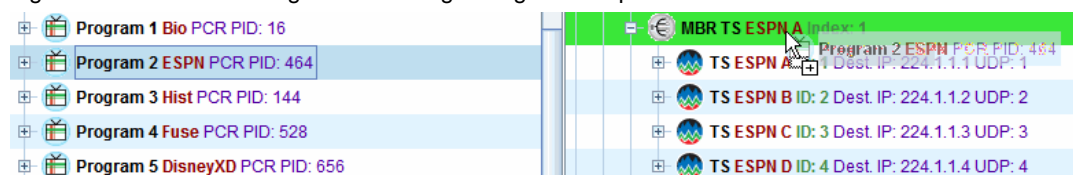


Grooming a Program to an MBR TS

After you associate a selected program to a new MBR transport stream, the **Configure MBR Program Mapping** screen is then presented, which allows you to set the grooming parameters.

1. Set up the MBR transport stream in the **Output** panel of the grooming table page.
2. Drag a program from the **Input** panel to the new to MBR TS at the **Output** panel (Figure 152).

Figure 152. MBR TS Program Grooming - Drag and Drop



The **MBR Program Mapping** screen will now display (Figure 153 and Figure 154).

3. At the **MBR Program Mapping** screen, set parameters, then click **Apply**.

Guidelines applying settings at this screen are provided in “[Program Mapping Parameters for MBR](#)” on page 231.

Clicking **Apply** grooms the new MBR output program, which will now be displayed in the MBR TS on the **Grooming** -> **Mapping** tab page (similar to the example shown in [Figure 150](#)).

4. At the **Outputs** panel, note that the MBR group ID is now appended to the MBR TS information.

Program Mapping Parameters for MBR

The Configure MBR Program Mapping screen complies with the video transcoding setting—as either SD ([Figure 153](#)), HD ([Figure 154](#)), or Full HD Output ([Figure 155](#)—defined during creation, as well as modification, of the MBR output transport stream.

The **Configure MBR Program Mapping** screen contains the sections described in the following tables:

- Table 107, “Grooming - Configure MBR Program Mapping, Source and Destination settings,” on page 234.
- Table 108, “Grooming - Configure MBR Program Mapping, Output Programs settings,” on page 235.
- Table 109, “Grooming - Configure MBR Program Mapping, General settings,” on page 236.
- Table 110, “Grooming - Configure MBR Program Mapping, Audio settings,” on page 237
- Table 111, “Grooming - Configure MBR Program Mapping, Component PID settings,” on page 237.

Configure MBR Program Mapping—SD

Use the **Configure MBR Program Mapping** screen ([Figure 153](#)) to define grooming parameters for a specified MBR program using resolution class SD.

1. At the **Outputs** panel, create or modify an MBR transport stream, and set **Video Transcoding** for **SD**.
2. From the **Inputs** panel of the **Grooming** -> **Mapping** tab page, drag a program to the MBR TS on the **Outputs** panel. The **Configure MBR Program Mapping** screen is now displayed.
3. At the **Configure MBR Program Mapping** screen, set parameters, then click **Apply** to dismiss the screen.
4. At the **Outputs** panel, note that the **MBR group ID** is now appended to the information alongside this MBR TS.)

Figure 153. Configure MBR Program Mapping (SD Resolution Class)

Configure MBR Program Mapping

Source
 Port: Gige 3 ☒ Forward SCTE 35 Cue Resolution Class: SD
 TS ID: 92 Program Number: 1 Program Name:

Destination
 Port: Gige 2 MBR TS Index: 1
 SDT Option: None ☐ Full HD Output
 SDT Service Name:

Output Program(s)

TS Index	TS Name	IP Address:UDP Port	TS Bitrate	Prog Number	Prog Name	Video Bitrate	Resolution	Aspect Ratio	Profile
1		224.3.4.5:123	3	1	Gige 2-11-1	2	480x368	4:3	High
2		224.6.7.8:223	4	1	Gige 2-12-1	3	480x368	4:3	High
3		224.6.7.8:345	3	1	Gige 2-13-1	2	480x368	4:3	High
4		224.3.2.1:321	2	1	Gige 2-14-1	2	480x368	4:3	High

General
 Video Type: H.264 Video ☒ Create MBR Group ID:
Video
 GOP M: 4 GOP N: 32 IDR Interval: 160 Frames
 Closed Caption Type: CEA 608 ☐ 3D MCTF noise reduction ☒ Regular IDR Intervals
Audio
 Audio Codec: AAC LC Sample Rate: 44.1 kHz Channels: stereo
 Audio Bitrate: 128 kbps Audio Gain: no Gain
 Advanced...

Component PIDs
 Audio Pass-Through: NONE
 Max Audio: 1 Max Data: 0

Groom	Input Type	Input PID	TS Index 1 PID	TS Index 2 PID	TS Index 3 PID	TS Index 4 PID
<input checked="" type="checkbox"/>	PMT	41	100	100	100	100
<input checked="" type="checkbox"/>	SCTE Video	16	101	101	101	101
<input checked="" type="checkbox"/>	AC-3 Audio eng	17	102	102	102	102

Apply Cancel

Configure MBR Program Mapping—HD

Use the **Configure MBR Program Mapping** screen (Figure 154) to define grooming parameters for a specified MBR program using resolution class SD.

1. At the **Outputs** panel, create or modify an MBR transport stream, and set **Video Transcoding** for **HD**.
2. From the **Inputs** panel of the **Grooming** -> **Mapping** tab page, drag a program to the MBR TS on the **Outputs** panel. The **Configure MBR Program Mapping** screen is now displayed.
3. At the **Configure MBR Program Mapping** screen, set parameters, then click **Apply** to dismiss the screen.
4. At the **Outputs** panel, note that the **MBR group ID** is now appended to the information alongside this MBR TS.

Figure 154. Configure MBR Program Mapping (HD Resolution Class)

Source

Port: Gige 3 ☒ Forward SCTE 35 Cue Resolution Class: HD

TS ID: 92 Program Number: 1 Program Name:

Destination

Port: Gige 2 MBR TS Index: 1

SDT Option: None ☐ Full HD Output

SDT Service Name:

Output Program(s)

TS Index	TS Name	IP Address:UDP Port	TS Bitrate	Prog Number	Prog Name	Video Bitrate	Resolution	Aspect Ratio	Profile
1		224.3.4.5:123	3	1	Gige 2-11-1	2	640x360	16:9	High
2		224.6.7.8:223	4	1	Gige 2-12-1	3	640x360	16:9	High
3		224.6.7.8:345	3	1	Gige 2-13-1	2	640x360	16:9	High
4		224.3.2.1:321	2	1	Gige 2-14-1	2	640x360	16:9	High

General

Video Type: H.264 Video ☒ Create MBR Group ID

Video

GOP M: 4 GOP N: 32 IDR Interval: 160 Frames Closed Caption Type: CEA 608

☐ 3D MCTF noise reduction ☒ Regular IDR Intervals

Audio

Audio Codec: DolbyPulse LC Sample Rate: 48 kHz Channels: 5.1 surround Audio Bitrate: 512 kbps Audio Gain: no Gain

Component PIDs

Audio Pass-Through: NONE Max Audio: 1 Max Data: 0

Groom	Input Type	Input PID	TS Index 1 PID	TS Index 2 PID	TS Index 3 PID	TS Index 4 PID
<input checked="" type="checkbox"/>	PMT	41	100	100	100	100
<input checked="" type="checkbox"/>	SCTE Video	16	101	101	101	101
<input checked="" type="checkbox"/>	AC-3 Audio eng	17	102	102	102	102

Apply Cancel

Configure MBR Program Mapping—Full HD Output

Use the **Configure MBR Program Mapping** screen (Figure 155) to define grooming parameters for a specified MBR program using resolution class Full HD Output.



Note: Configuration for Full HD MBR enables one profile, only, per MBR transport stream.

1. At the **Outputs** panel, create or modify an MBR transport stream. Set **Video Transcoding** for **HD** and check the **Full HD Output** box.
2. From the **Inputs** panel of the **Grooming** -> **Mapping** tab page, drag a program to the MBR TS on the **Outputs** panel. The **Configure MBR Program Mapping** screen is now displayed.
3. At the **Configure MBR Program Mapping** screen, set parameters, then click **Apply** to dismiss the screen.
4. At the **Outputs** panel, note that the **MBR group ID** is now appended to the information alongside this MBR TS.

Figure 155. Configure MBR Program Mapping (Full HD Output Resolution Class)



Note: MBR programs do not support DPI, Program Substitution, SCTE 30 to 35 conversion, or transrating.

Table 107. Grooming - Configure MBR Program Mapping, Source and Destination settings

Section	Field	Description	Default
Source	Port	The input program's source GigE or 10 GigE interface.	Read-only
	TS ID	The input program's transport stream ID.	Read-only
	Program Name	Program name assigned to the input program.	Read-only
	Program Number	Program number assigned to the input program.	Read-only
	Forward SCTE 35 Cue	Check this box to forward all SCTE 35 Cues from the input program	Checked
	Resolution Class	This field specifies the input resolution class that is going to be detected from transport stream.	Read-only

Table 107. Grooming - Configure MBR Program Mapping, Source and Destination settings (Continued)

Section	Field	Description	Default
Destination	Port	The output program's destination GigE interface.	Read-only
	MBR TS Index	A unique system-generated ID for the MBR TS.	Read-only
	SDT Option	<p>Select Passthrough or Generate.</p> <p>The default setting is dependent on the input setting (as configured with Create Output TS). If Output TS is enabled (checked, at Create Output TS), and:</p> <ul style="list-style-type: none"> If the input TS has SDT, the SDT option will be Passthrough. If the input does not carry SDT, the SDT option setting will be Generate. <p>If SDT is not enabled for output SDT, the SDT option will be <i>None</i> and grayed-out.</p>	See description at left.
	SDT Service Name	<p>Alphanumeric entry, up to 64 characters, to identify the SDT service for this transport stream.</p> <p>Default display is dependent on SDT option:</p> <ul style="list-style-type: none"> If SDT option is Generate, this field is blank. If SDT option is Passthrough, the field displays the SDT service name defined for the corresponding input program. 	See description at left.

Table 108. Grooming - Configure MBR Program Mapping, Output Programs settings

Field	Description	Default
TS Index	A unique ID for each transport stream in the MBR TS	Read-only
TS Name	The name given to each TS when the MBR TS was created.	Read-only
IP Address: UDP Port	The IP address and port to which the output stream is routed.	Read-only
TS Bitrate	The bitrate of the output stream.	Read-only
Prog Number	<p>Number assigned to the output program.</p> <p>Valid range is from 1 to 131072.</p>	1
Prog Name	<p>Name assigned to the program.</p> <ul style="list-style-type: none"> Field is alphanumeric. Default format: GigE #-t [unique id]-[Program Number]. 	For example: GigE 7-t47221504-1
Video Bitrate (In Mbps)	Sets the maximum bitrate for the video stream in each program. The <i>Video Bitrate</i> can range from 0.1 to 8 Mbps but cannot be set higher than the <i>TS Bitrate</i> . The sum of all video bitrates within the MBR group will be constrained to 9 Mbps.	1.5 Mbps
Resolution	<p>Specifies the resolution for each transcoded program. The list of possible resolutions depends on the <i>Resolution Class</i>, for either HD or SD.</p> <p>Values and resolution combinations associated with the resolution classes are provided in "Resolution Configuration Reference" on page 309.</p>	<p>640x360 for HD</p> <p>480x368 for SD</p> <p>1920x1080 for Full HD</p>

Table 108. Grooming - Configure MBR Program Mapping, Output Programs settings (Continued)

Field	Description	Default
Aspect Ratio	Specifies the ratio of the program's width to the height. Choose from one of the following options for each TS: <ul style="list-style-type: none"> Automatic, 4:3, 16:9 	Automatic
Profile	Select either high, main, or baseline to set the video standard to be used. Refer to Table 136, "Video Profile Configuration Options," on page 313 for guidelines. <i>Note: The transcoded programs in a single MBR TS can have a mix of High and Main for the profile. However, you should not mix Baseline with High and Main profiles.</i>	High

Table 109. Grooming - Configure MBR Program Mapping, General settings

Field	Description	Default
Video Type	Only H.264 is available as the video type for MBR output transport stream programs	Read-only
Create MBR Group ID	MBR Groups are video/audio profiles that you can quickly apply to an MBR Program Mapping. If this option is checked, enter a name to create a new MBR Group ID and then define the video and audio parameters below. If the option is unchecked, you can select from a list of existing MBR Groups and the video and audio parameters will be automatically filled in and un-editable.	Checked
GOP M	Specifies the spacing of the P frames in the output. The higher the value, the lower the data rate. Choose from one of the following options: <ul style="list-style-type: none"> 1, 2, or 4. 	4
GOP N	Specifies the number of frames in each GOP. Choose from one of the following options: <ul style="list-style-type: none"> 32 (or 64 in full HD mode) 60 (or 120 in full HD mode) Optimized GOP length. 	32
IDR Interval (in Frames)	Specifies the interval between instantaneous decoder refresh (IDR) frames. Choose one of the following options: <ul style="list-style-type: none"> 32 frames, 64 frames, 96 frames, 128 frames, 160 frames, 192 frames, 224 frames, 256 frames, 288 frames, 320 frames <p>NOTE:</p> <p>If GOP N is set as 60, acceptable settings for IDR Interval are 60, 120, 180, 240, or 300.</p> <p>In full HD mode, settings for IDR intervals are effectively doubled: 64, 128, 192, 256, 320... 640)</p>	160 frames
3D MCTF noise reduction	When checked, enables motion compensated temporal filtering (MCTF).	Read-only
Regular IDR Intervals	Enable (check) or disable IDR frames to occur at regular intervals.	Checked

Table 110. Grooming - Configure MBR Program Mapping, Audio settings

Field	Description	Default
Audio Codec	Defines the codec for the output audio. Choose one of the following options: <ul style="list-style-type: none"> For non-Dolby: HE AAC, HE AAC v2, AAC-LC, MPEG1 L2, MPEG2 L2, AC-3 For Dolby (These options activate the Advanced button) E-AC-3 (Dolby Digital Plus), 	AAC-LC
Sample Rate	Set value, in kHz, to define number of audio samples per second. The higher the number, the better the sound quality. Choose one of the following options: <ul style="list-style-type: none"> 8 kHz, 11.03 kHz, 12 kHz, 16 kHz, 22.05 kHz, 24 kHz, 32 kHz, 44.1 kHz, 48 kHz 	See Table 123, "Audio Bitrates and Sampling Rates," on page 306.
Channels	Defines the number of output channels per audio stream. Choose one of the following options: <ul style="list-style-type: none"> mono, stereo, 5.1 surround 	stereo
Audio Bitrate	Defines the bitrate for all audio streams within the MBR TS. The selectable values depend on your selection of <i>Audio Codec</i> , <i>Sample Rate</i> , and <i>Channels</i> .	See Table 123, "Audio Bitrates and Sampling Rates," on page 306.
Audio Gain	Defines the gain on an audio stream level. <i>Audio Gain</i> is applied to all audio streams within the MBR TS. If the input program has two or more audio PIDs, all audio outputs will have the same gain. <ul style="list-style-type: none"> <i>Audio Gain</i> ranges from -24 dB to +24 dB and is selectable in 1 dB increments. <p>Note: An <i>Audio Gain</i> of 0 means no gain.</p>	no Gain
Advanced Button	This button is enabled only if the currently selected Audio Code is one of the Dolby codec options. When enabled, click to access encoder configuration parameters associated with the resolution and codec settings currently in place at the MBR Program Mapping screen.	See also Chapter 13, "Advanced Audio Encoder Configuration."

Table 111. Grooming - Configure MBR Program Mapping, Component PID settings

Field	Description	Default
Audio Pass-Through	This is selectable only if Create MBR Group ID is checked (in the General section of this screen). Other fields associated with audio pass-through—SCTE Video and/or AC-3 audio eng—are also selectable if pass-through is enabled. Select either None or AC-3.	None

Table 111. Grooming - Configure MBR Program Mapping, Component PID settings (Continued)

Field	Description	Default
Max Audio	Set value to define the maximum allowable audio elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	See "Bitrate Configuration Reference" on page 310 for comparative values.
Max Data	Set value to define the maximum allowable data elementary streams to be handled in the output. Note that this setting affects bitrate allowances on the stream.	
Start PID	This field is displayed in the Program Mapping screen when AC-3 is selected for Pass-through. Type the PID value to be associated with AC-3. Range: 32 - 8175.	
Groom	Check this box to include the corresponding elementary stream in the output program.	Checked
Input Type	Displays the input elementary stream types for the input program. This information is available if an MBR group has been defined or modified.	Read-only
Input PID	Displays the <i>Input Type</i> 's associated PID for the input program.	Read-only
TS Index X PID	The X refers to the <i>TS Index</i> for the SPTS within this MBR TS. Here you can set the output PIDs for each SPTS.	Output PID

Managing MBR Transport Streams and Programs

Use the **Grooming** tab of the *VMG Element Manager* screen for management of MBR transport streams and programs.

Modifying an MBR Transport Stream

Use the **Modify MBR Transport Stream** screen (Figure 156) to change settings for a specific MBR transport stream.

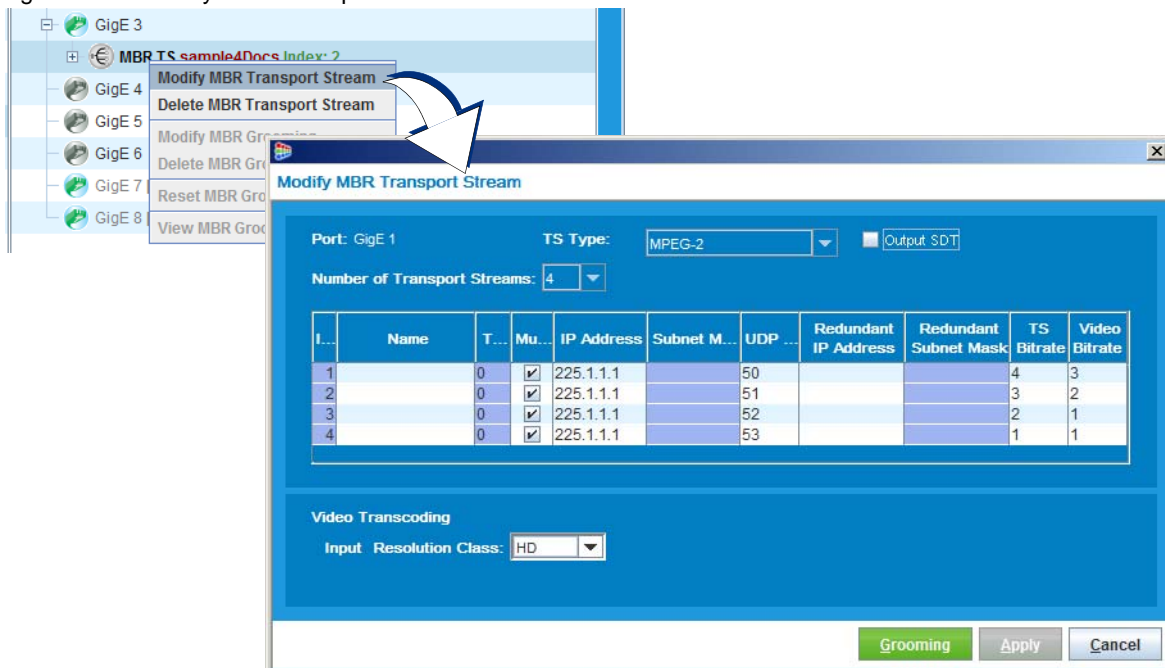


Caution: *Modifying an MBR TS will disrupt program output from the VMG for a few seconds. The actual duration of the disruption at the set top box end might be several seconds.*



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the MBR TS to be modified, and select **Modify MBR Transport Stream** from the popup menu.

Figure 156. Modify MBR Transport Stream

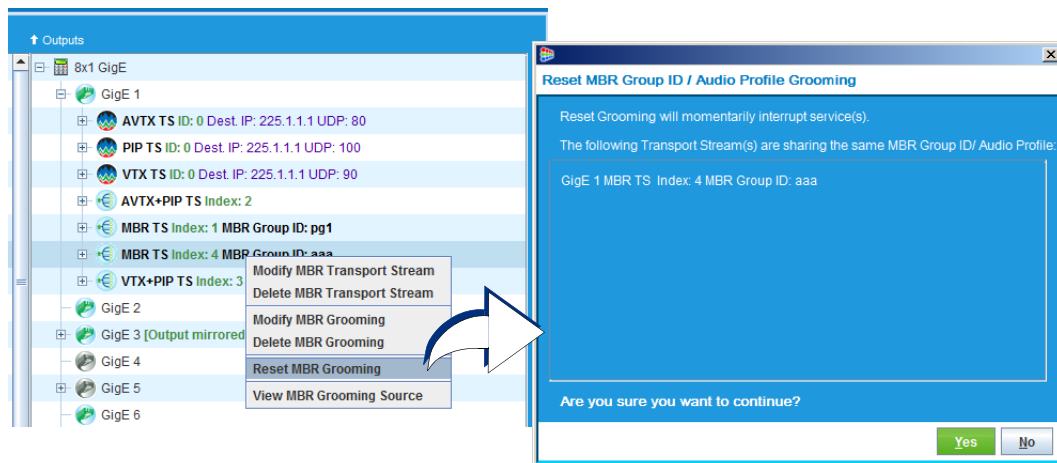


- At the **Modify MBR Transport Stream** screen, enter changes in the editable fields.
For both MBR transport streams, the name, IP address, and UDP port of each SPTS can be modified (see [Table 105](#) on [page 228](#) for information on these parameters).
- Click one of the buttons:
 - If the **Apply** button is green, you can click **Apply** to save and use changes shown in the screen. If the **Apply** button is grey, click **Grooming** to go to the **Modify MBR Program Mapping** screen.
At the **Modify MBR Program Mapping** screen, check and/or modify settings on this screen, then click **Accept** to return to the **Modify MBR Transport Stream** screen (on which the **Apply** button should now be green).
 - Click **Cancel** to abort this MBR modification session.

Resetting Grooming—MBR

Use the **Reset Grooming** option ([Figure 157](#)) on an output transport stream to tear down a current configuration and rebuild the transport stream with the identical configuration.

Figure 157. Reset Grooming—MBR



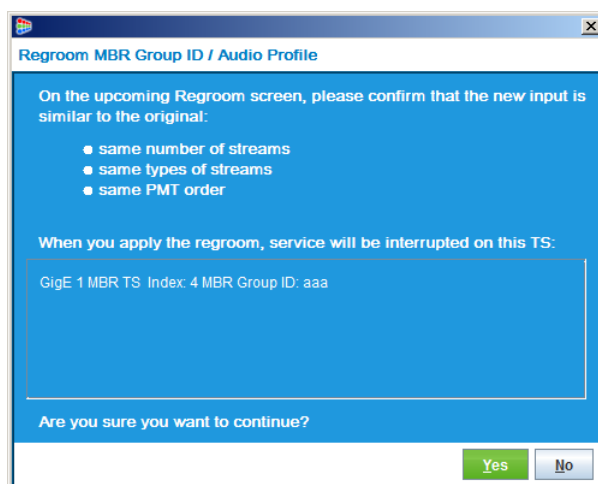
Note: *This option interrupts service during the tear down and rebuild process. When selected, a confirmation query will be presented prior to beginning the reset process on the selected transport stream.*

Regrooming—MBR

To regroom an MBR ts, drag an input program to an MBR output transport stream that has already been groomed. This action rebuilds the MBR grooming at the selected output TS, with the new input program, using the identical configuration on the output program and output elementary streams.

Prior to dynamically grooming the targeted output transport stream, the *VMG Element Manager* queries for confirmation of the configuration, to ensure that the input configuration matches that of the output configuration. The **Confirmation** dialog (Figure 158) also reminds you that regrooming interrupts service.

Figure 158. Reset Groom Confirmation—MBR



Clicking **Yes** results in display of the **MBR Program Mapping** screen, where you can apply and/or verify settings for this transport stream.

- If the MBR group contains more than one MBR transport stream, you will be guided to the MBR Program Mapping screen associated with the first MBR transport stream of the MBR group.
- If you apply changes to the MBR transport stream program mapping, then (as depending on the changes you make) you may also need to make changes to the remaining MBR transport streams in the group.

Upon completion of the regrooming process, you can view the results in a **Modify <TS type> Program Mapping** screen.

Deleting an MBR Transport Stream

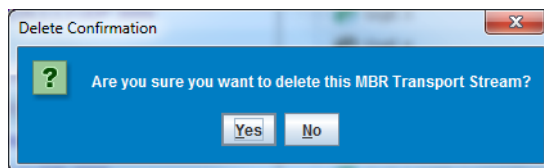
Use the **Delete MBR Transport Stream** function to remove an MBR transport stream from a specified interface.



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click an MBR TS and select **Delete MBR Transport Stream** from the popup menu.

1. At the **Delete Confirmation** dialog (Figure 159), click **Yes**.

Figure 159. Delete MBR Transport Stream



2. At the **Outputs** panel, check to ensure that the deleted MBR TS is no longer displayed.

Modifying MBR Grooming

Use the **Modify MBR Program Mapping** screen (Figure 160) to adjust grooming parameters for a specified MBR program.



From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click an MBR TS and select **Modify MBR Grooming** from the popup menu.

Figure 160. Modify MBR Program Mapping (SDT Enabled)

Source

Port: GigE 1 ☒ Forward SCTE 35 Cue Resolution Class: HD

TS ID: 92 Program Number: 1 Actual Resolution: H: 528 X V: 480

Program Name:

Destination

Port: GigE 2 MBR TS Index: 7

SDT Option: ☐ Full HD Output

SDT Service Name:

Output Program(s)

TS Index	TS Name	IP Address:UDP Port	TS Bitrate	Prog Number	Prog Name	Video Bitrate	Resolution	Aspect Ratio	Profile
3	sample	224.1.1.1:3	3	1	Gige 2-13-1	3	640x360	16:9	High

General

Video Type: H.264 Video ☐ Create MBR Group ID:

Video

GOP M: GOP N: IDR Interval: Closed Caption Type:

☐ 3D MCTF noise reduction ☒ Regular IDR Intervals

Audio

Audio Codec: Sample Rate: Channels: Audio Bitrate: Audio Gain:

Component PIDs

Audio Pass-Through: Max Audio: Max Data:

Groom	Input Type	Input PID	TS Index 3 PID
<input checked="" type="checkbox"/>	PMT	41	100
<input checked="" type="checkbox"/>	SCTE Video	16	101
<input checked="" type="checkbox"/>	AC-3 Audio eng	17	102

Apply Cancel

The configuration fields provided in this screen are identical to those originally configuration for this MBR program mapping.

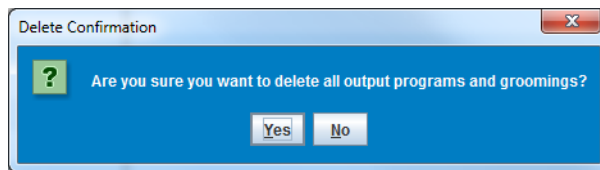
- To change MBR parameters in this screen, use guidelines provided in [Table 107 on page 234](#).
- Values and resolution combinations associated with the resolution classes are provided in “Resolution Configuration Reference” on page 309.

Deleting MBR Grooming

Use the **Delete MBR Grooming** function to remove grooming from a specified MBR TS.

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click the MBR TS and select **Delete MBR Grooming** from the popup menu (see [Figure 156 on page 239](#)).
2. At the **Delete Confirmation** dialog ([Figure 161](#)), click **Yes**.

Figure 161. Delete MBR Grooming

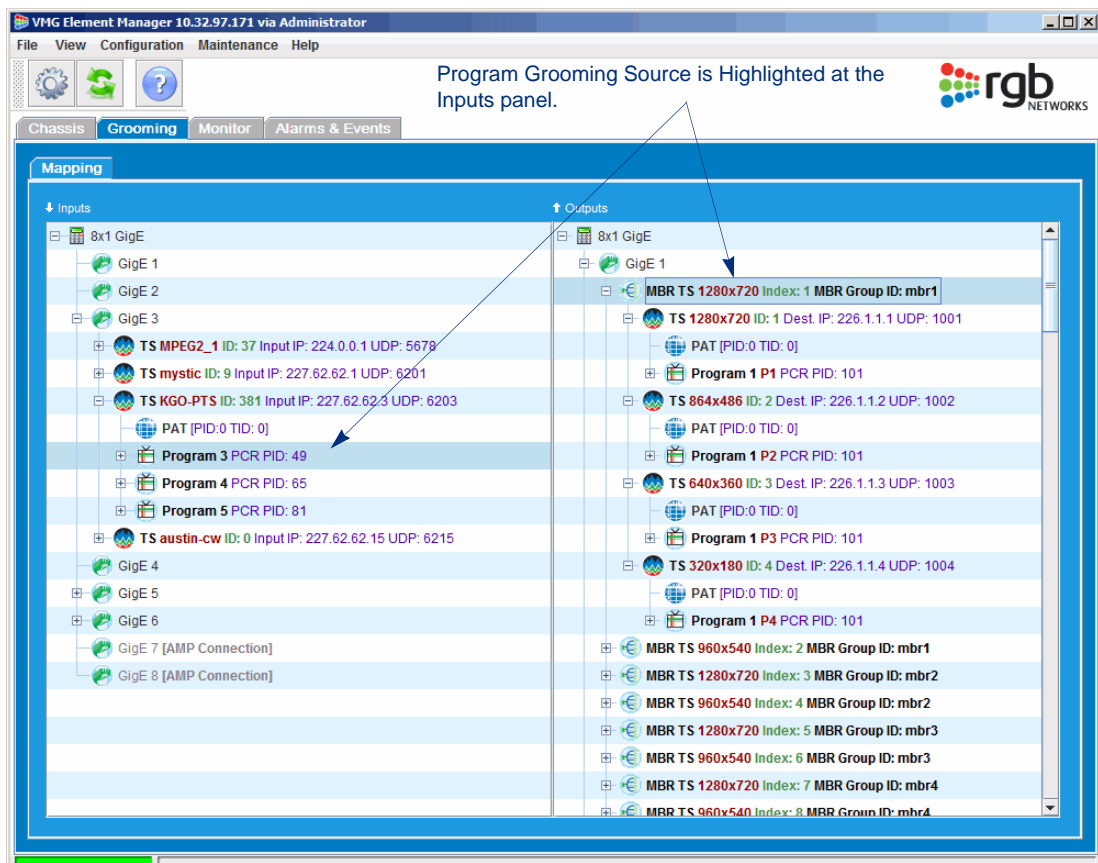


Viewing MBR Grooming Source

To view the grooming source for an MBR program:

1. From the **Outputs** panel of the **Grooming -> Mapping** tab page, right-click an MBR TS carrying the program, and select **View MBR Grooming Source** from the popup menu.
2. Look at the highlighted row now displayed in the **Inputs** column ([Figure 162](#)). This is the source input program associated with the selected MBR TS output.

Figure 162. View MBR Grooming Source

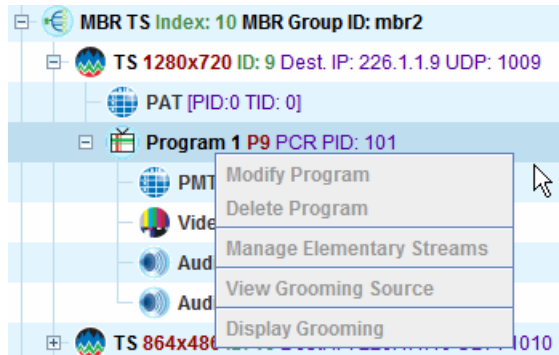


Modifying MBR Program



Note: For MBR programs, **Modify Program**, **Delete Program**, **Manage Elementary Streams**, **View Grooming Source**, and **Display Grooming** menu options are not available. ([Figure 163](#)).

Figure 163. MBR Program Popup Menu



Advanced Grooming Applications

This chapter describes the use of the *VMG Element Manager* to perform advanced grooming applications. The **Grooming** -> **Mapping** tab provides program and transport stream (TS) information.

Additionally, audio codec configuration tools you can use with MBR Program Mapping are also described in this chapter.



Note: *System configuration must be completed before performing grooming tasks. Refer to Chapter 4, “System Configuration” for more information.*

In This Chapter:

- “Advanced Audio Encoder Configuration,” next.
- “Program Redundancy” on page 253.
- “Elementary Stream/PID Management” on page 258.

Advanced Audio Encoder Configuration

Configuration parameters for Dolby Codec are provided from the **MBR Program Mapping** screen, as based on your selection for audio encoding:

- “AC-3 Encode Configuration,” next.
- “E-AC-3 (Dolby Digital Plus) Encode Configuration” on page 249.

AC-3 Encode Configuration

The AC-3 audio encoding configurations for MBR Program Mapping are described in the following topics:

- “AC-3 Channel—5.1 Surround,” next.
- “AC-3 Channel—Mono” on page 247.
- “AC-3 Channel—Stereo” on page 248.

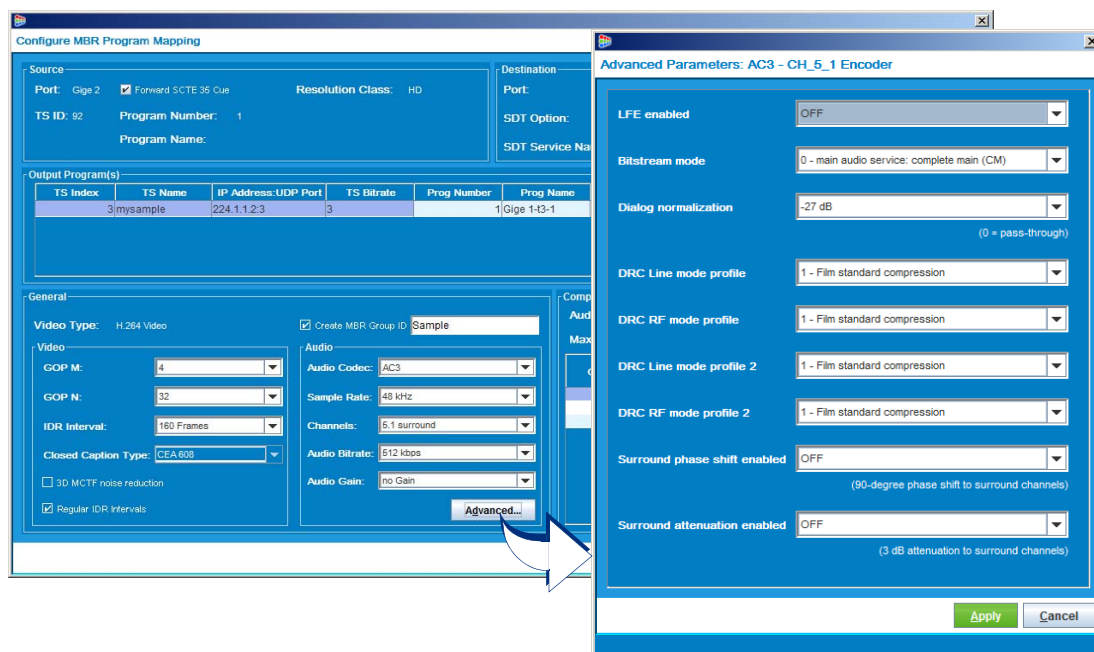
AC-3 Channel—5.1 Surround

To configure an AC-3 audio codec with 5.1 Surround encoding in an MBR program groom, use the **Advanced Parameters: AC-3-CH_5_1 Encode** dialog (Figure 164).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **5.1 Surround** at **Channels** field -> click **Advanced** button.

Figure 164. AC-3 (5.1 Surround Channel) Configuration



See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

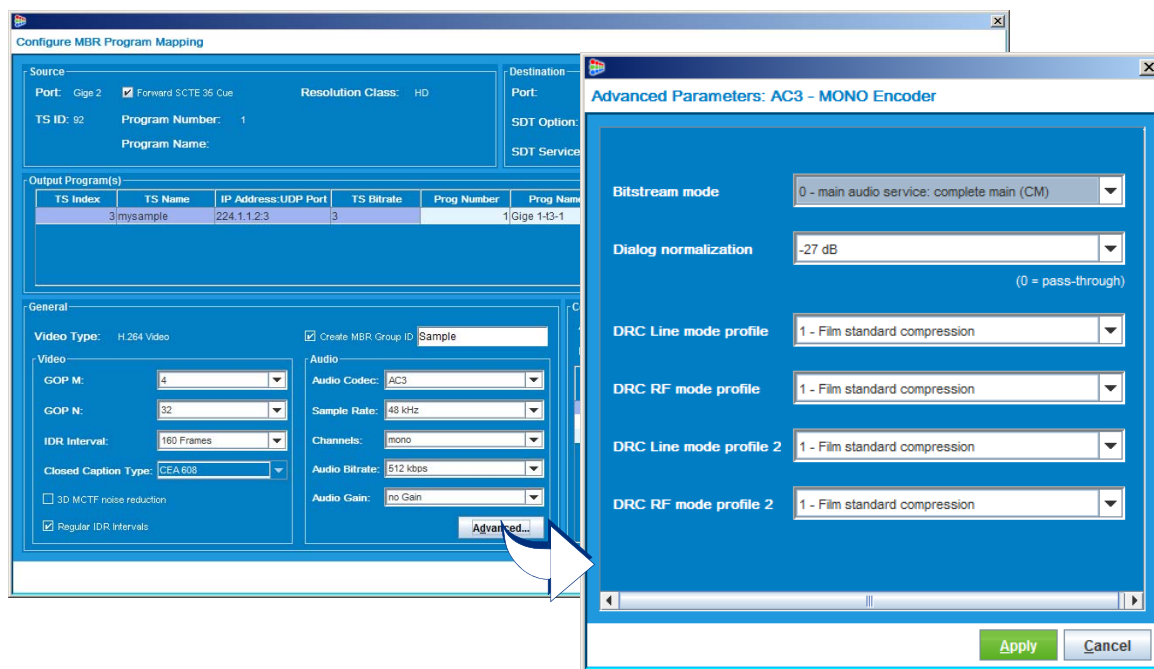
AC-3 Channel—Mono

To configure an AC-3 audio codec with Mono encoding in an MBR program groom, use the **Advanced Parameters: AC-3-MONO Encoder** dialog (Figure 165).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **Mono** at **Channels** field -> click **Advanced** button.

Figure 165. AC-3 (Mono Channel) Configuration



See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

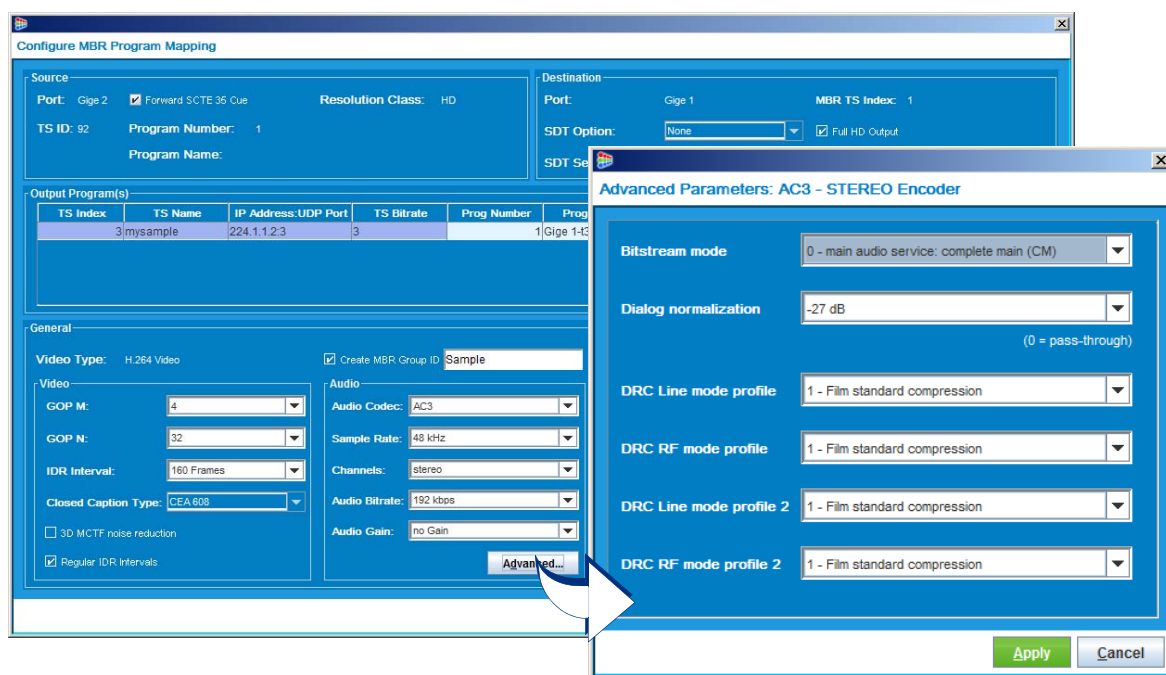
AC-3 Channel—Stereo

To configure an AC-3 audio codec with Stereo encoding in an MBR program groom, use the **Advanced Parameters: AC-3-STEREO Encoder** dialog (Figure 166).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **Stereo** at **Channels** field -> click **Advanced** button.

Figure 166. AC-3 (Stereo Channel) Configuration



See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

E-AC-3 (Dolby Digital Plus) Encode Configuration

The E-AC-3 (Dolby Digital Plus) audio encoding configurations for MBR Program Mapping are described in the following topics:

- “E-AC-3 (Dolby Digital Plus) Channel—5.1 Surround,” next.
- “E-AC-3 (Dolby Digital Plus) Channel—Mono” on page 250.
- “E-AC-3 (Dolby Digital Plus) Channel—Stereo” on page 251.

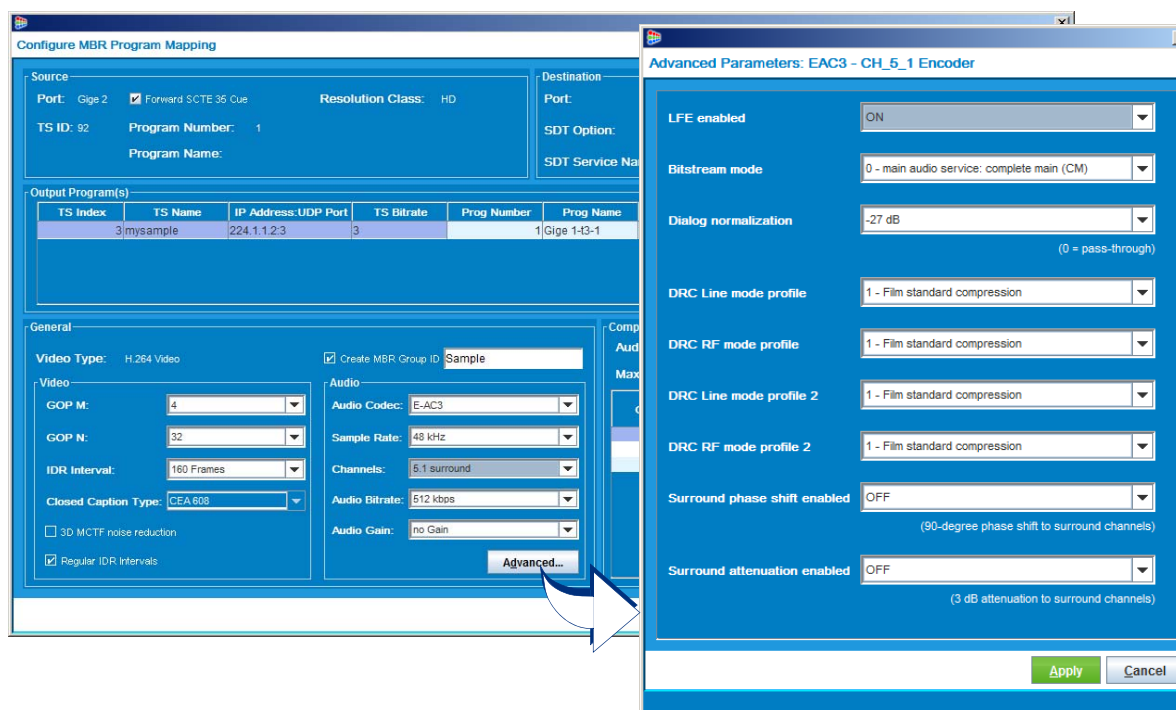
E-AC-3 (Dolby Digital Plus) Channel—5.1 Surround

To configure an E-AC-3 (Dolby Digital Plus) audio codec with 5.1 Surround encoding in an MBR program groom, use the **Advanced Parameters: AC-3-CH_5_1 Encoder** dialog (Figure 167).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **5.1 Surround** at **Channels** field -> click **Advanced** button.

Figure 167. E-AC-3 (Dolby Digital Plus) (5.1 Surround Channel) Configuration



See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

E-AC-3 (Dolby Digital Plus) Channel—Mono

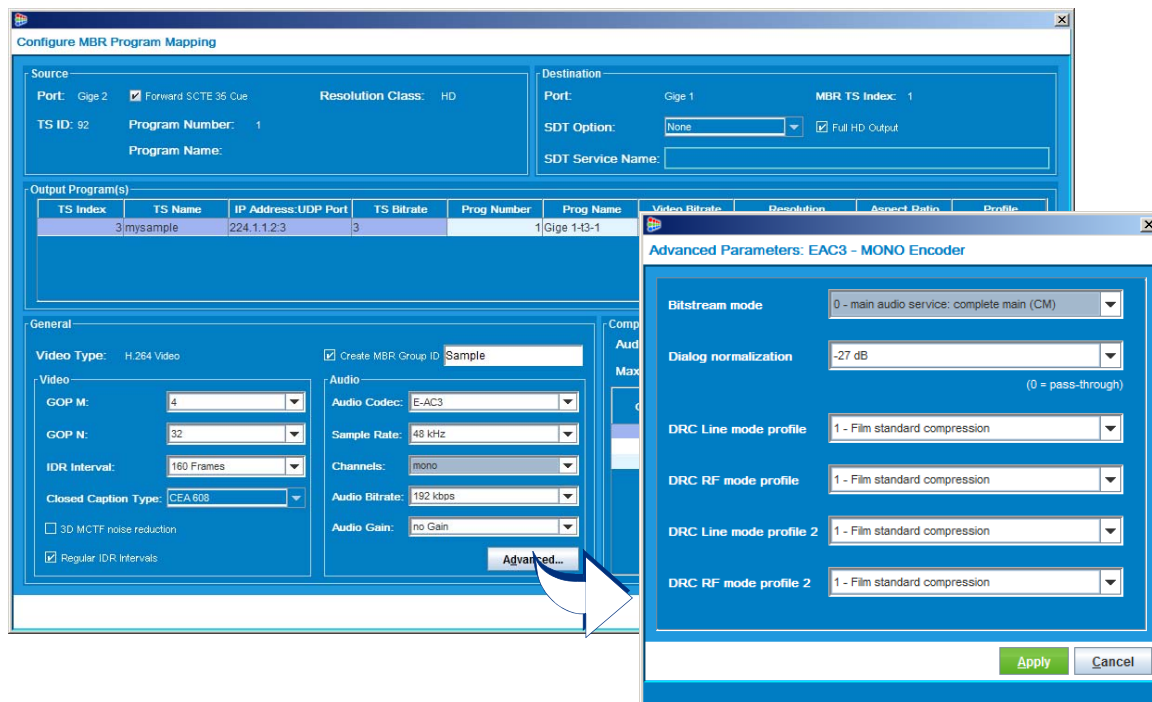
To configure an E-AC-3 (Dolby Digital Plus) audio codec with Mono encoding in an MBR program groom, use the **Advanced Parameters: AC-3-MONO Encoder** dialog (Figure 168).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **Mono** at **Channels** field -> click **Advanced** button.

See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

Figure 168. E-AC-3 (Dolby Digital Plus) (Mono Channel) Configuration



E-AC-3 (Dolby Digital Plus) Channel—Stereo

To configure an E-AC-3 (Dolby Digital Plus) audio codec with Stereo encoding in an MBR program groom, use the **Advanced Parameters: AC-3-STEREO Encoder** dialog (Figure 169).



Drag input program to output MBR transport stream -> at **Configure MBR Program Mapping** screen, select **AC-3** at **Audio Codec** field, and **Stereo** at **Channels** field -> click **Advanced** button.

See Table 112, “Advanced Audio Encoder Settings,” on page 252 for available options and default values.

Figure 169. E-AC-3 (Dolby Digital Plus) (Stereo Channel) Configuration

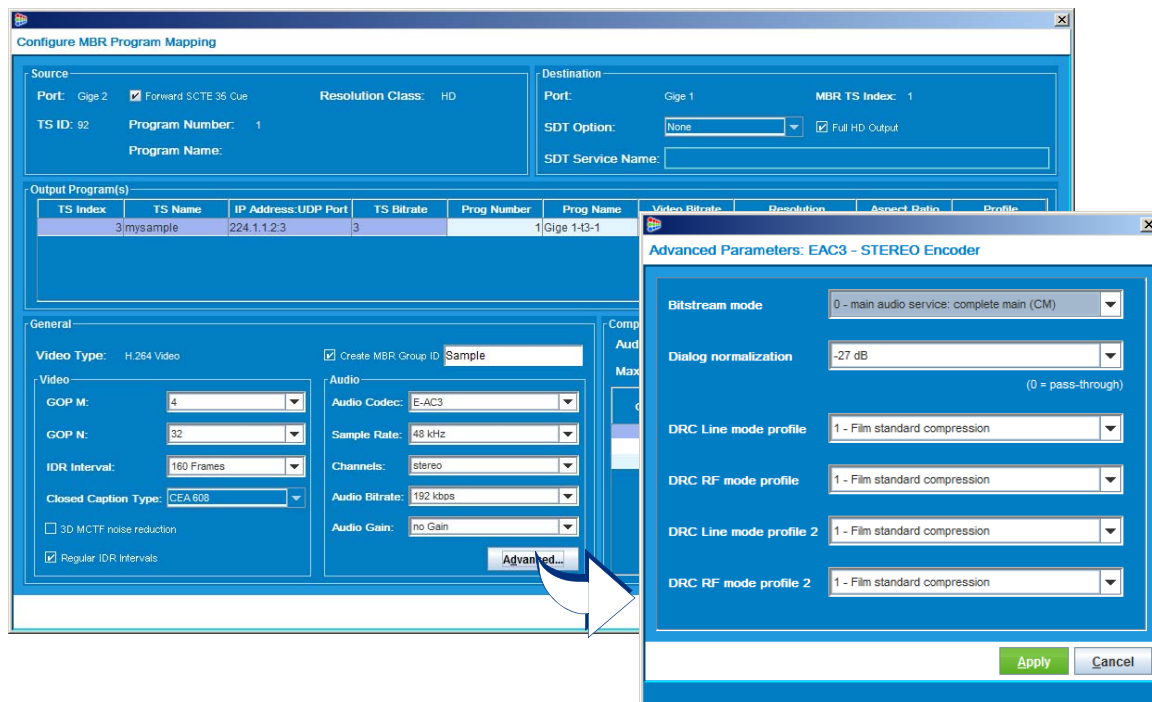


Table 112. Advanced Audio Encoder Settings

Field	Description	Default
Bitstream mode <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable to mono, stereo, and 5.1 surround channels. Select an option: <ul style="list-style-type: none"> 0 - main audio service: complete main (CM) 1 - main audio service: music and effects (ME) 2 - associated audio service: visually impaired (VI) 3 - associated audio service: hearing impaired (HI) 4 - associated audio service: dialogue (D) 5 - associated audio service: commentary (C) 6 - associated audio service: emergency (E) 7 - associated audio service: voice over (VO) 	0
Dialog normalization <ul style="list-style-type: none"> For any audio codec type. 	Applicable to mono, stereo, and 5.1 surround. <ul style="list-style-type: none"> Select a value from the range 0 dB (passthrough) and -1 dB (loudest) to -31 dB (least loud). 	27
DRC Line mode profile <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable to mono, stereo, and 5.1 surround Select an option: <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression 	1
DRC RF mode profile <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable to mono, stereo, and 5.1 surround. Select an option: <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression 	1
DRC Line mode profile 2 <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable to mono, stereo, and 5.1 surround. Select an option: <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression 	1

Table 112. Advanced Audio Encoder Settings

Field	Description	Default
DRC RF mode profile 2 <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable to mono, stereo, and 5.1 surround. Select an option: <ul style="list-style-type: none"> 0 - No compression 1 - Film standard compression 2 - Film light compression 3 - Music standard compression 4 - Music light compression 5 - Speech compression 	1
LFE enabled <ul style="list-style-type: none"> For AC-3 and/or E-AC-3 (Dolby Digital Plus). 	Applicable for 5.1 surround configuration only: <ul style="list-style-type: none"> Select either ON or OFF. Default= <ul style="list-style-type: none"> Off, non 3/2 mode On, 3/2 mode 	Depends on 3/2 mode.
Surround phase shift enabled <ul style="list-style-type: none"> For any audio codec type. 	Applicable for 5.1 surround configuration only, to disable or enable 90-degree phase shift to surround channels. <ul style="list-style-type: none"> Select either ON or OFF. 	OFF
Surround attenuation enabled <ul style="list-style-type: none"> For any audio codec type. 	Applicable for 5.1 surround configuration only, to disable or enable 3 dB attenuation to surround channels. <ul style="list-style-type: none"> Select either ON or OFF. 	OFF

Program Redundancy

The VMG supports per-input program redundancy. In a program redundancy configuration, a switch to backup occurs when:

- Missing MPTS/SPTS streams are identified by checking the PAT.
- Missing program streams are identified by checking the PMT.

The VMG allows you to designate any input service as a “standby program” with the exception of the same service. The VMG returns back to the primary program from the standby program when the primary program recovers from the interruption.

The backup program can be another program on the same GigE port or it can be on a different GigE port in the same chassis, as long as the ports are in the same grooming group.

The health of the standby program will be checked before failover, and the VMG will not perform the switch if the standby is degraded.

Program Redundancy Best Practices and Considerations

The following considerations should be taken into account when configuring input program redundancy.

- Input-level program redundancy can be modified as long as there are no grooming sessions associated with the input program.
- The primary and backup video types must be the same. For example, an H.264 program cannot be used to backup an MPEG-2 program and vice versa.
- Both primary and backup programs must be in the same grooming group. For example, a primary program in the 8x1 GigE grooming group may not use as its backup a program from the 1x10 GigE grooming group.
- NPM switchover has the same effect as a system reboot on program redundancy; if the backup program has been used as an input source for a grooming session, the backup will revert back to primary after an NPM switchover.
- Program redundancy is not applicable for ghost programs. A ghost program cannot be used as a backup program, and a backup program cannot be configured for a ghost program.

Program Redundancy Operation Modes

The VMG supports two Program Redundancy modes (Table 113):

- Automatic recovery from the backup program to the primary program.
- Manual selection when the recovery process should occur.

Table 113. Program Redundancy Modes of Operation

Category	Primary to Backup	Backup to Primary
Automatic Failover to Backup Program / Automatic Recovery to Primary Program	Automatic failover operation is based on detection of a missing PAT/PMT (after approximately 7 seconds).	Automatic recovery operation is based on PAT/PMT detection (after approximately 7 seconds).
Automatic Failover to Backup Program / Manual Recovery to Primary Program	Automatic failover operation is based on detection of a missing PAT/PMT (after approximately 7 seconds).	Manual recovery operation is based on the user selecting when a single program or all programs should be recovered to their respective primary programs.

Configuring Program Redundancy

You can configure program redundancy on a per-input program level basis. Groomed programs using channel substitution will be fully redundant.



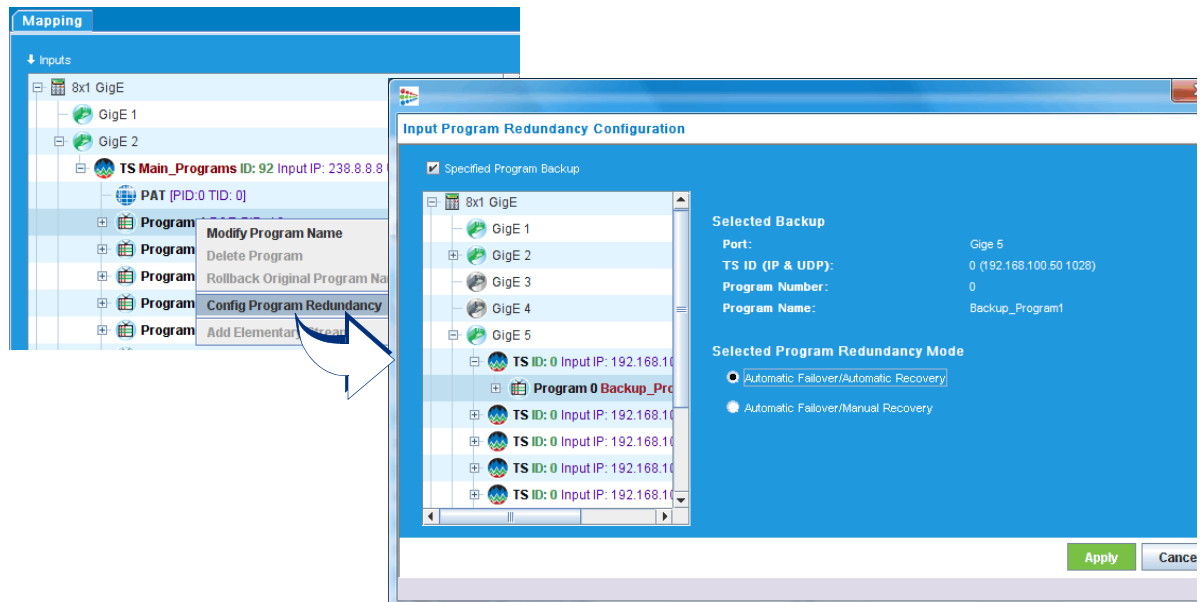
Note: When configuring redundancy at the input level, the selected program must not yet be groomed to an output.

Use the **Input Program Redundancy Configuration** screen (Figure 170) to set define program redundancy settings.



From the **Inputs** panel of the **Grooming -> Mapping** tab page, right-click on the program to back up, and select **Config Program Redundancy** from the popup menu.

Figure 170. Input Program Redundancy Configuration screen



1. At the **Input Program Redundancy Configuration** screen, enable (check) **Specified Program Backup** (at top of screen).
2. Locate and select the program that is to be the backup for the input program.
3. At **Selected Program Redundancy Mode**, click to select either **Automatic Failover / Automatic Recovery** or **Automatic Failover / Manual Recovery**.

Figure 170 shows an example of program redundancy in which the backup is selected as GigE 5, Transport Stream ID 0, Program Number 0, and Program Name of *Backup_Program1*.

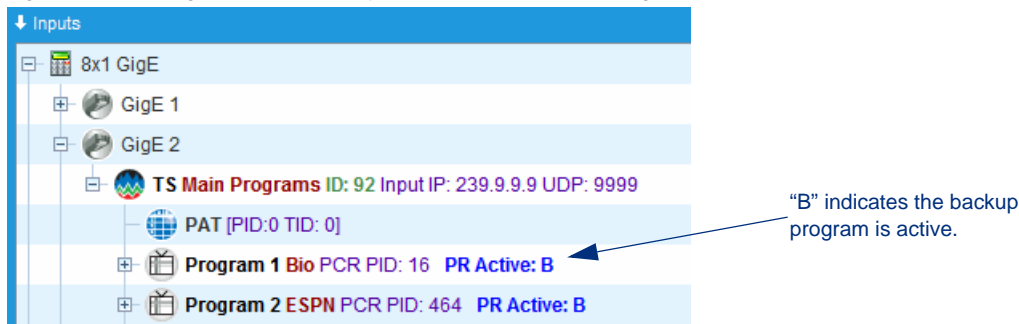
4. Click **Apply** to create the redundancy configuration.

After you configure redundancy for a program, the **Grooming -> Mapping** tab page shows that redundancy has been configured for the program and whether the primary program is active (Figure 171) or the backup program is active (Figure 172).

Figure 171. Program Redundancy Indicator — Primary Programs Active



Figure 172. Program Redundancy Indicator — Backup Programs Active



Modifying Input-level Program Redundancy

Use the following steps to change the program used for backup, or to change the redundancy mode:

1. Repeat the steps from “Configuring Program Redundancy” on page 254, and select a different backup program and/or change the **Selected Program Redundancy Mode**.
2. Click **Apply** at the **Input Program Redundancy Configuration** screen when you have completed your configuration.

Deleting Input-level Program Redundancy

Use the following steps to remove a program redundancy setting:

1. Open the **Input Program Redundancy Configuration** screen.
2. Deselect the **Specified Program Backup** option.
3. Click **Apply**.

Manual Recovery Procedure

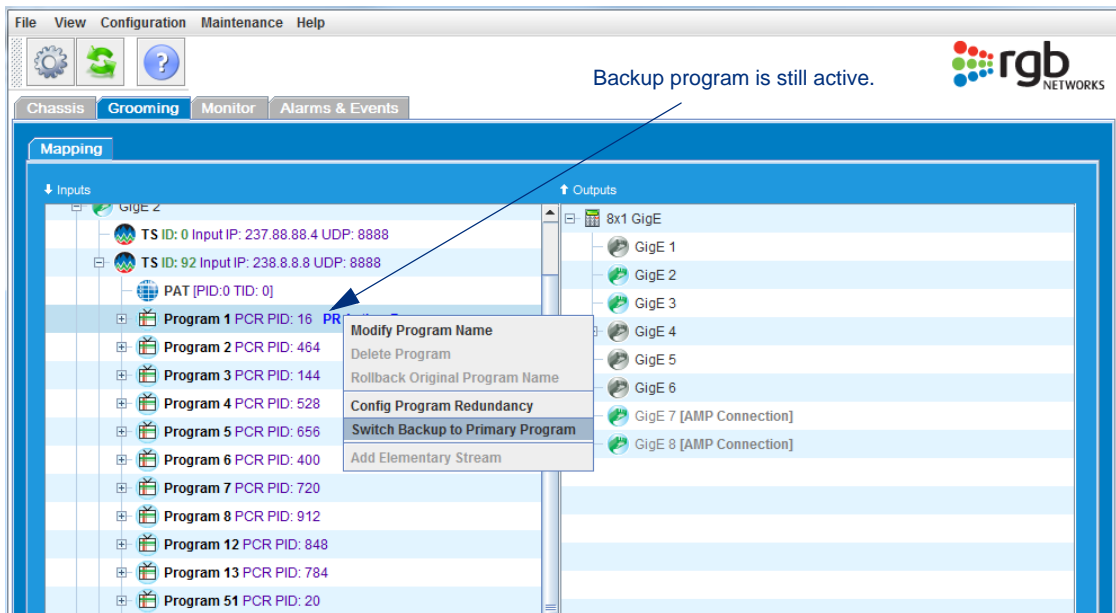
If you configure program redundancy for a program to have manual recovery, you must manually switch from the backup input program to the primary input program after the primary input program is restored.

Recovering Individual Programs

Use the following steps to perform a manual recovery for program redundancy operation on individual programs:

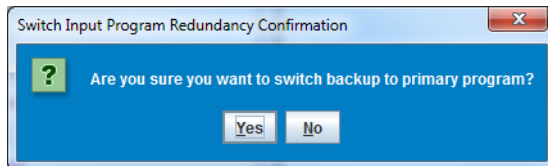
1. From the **Inputs** panel of the **Grooming -> Mapping** tab page, right-click the primary program for which the backup program is still active and select **Switch Backup to Primary Program** from the popup menu (Figure 173).

Figure 173. Program Redundancy - Manual Recovery



2. At the confirmation dialog (Figure 174), click **Yes**.

Figure 174. Switch Input Program Redundancy Confirmation

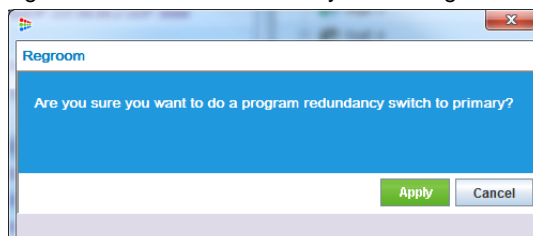


Recovering All Programs

Use the following steps to perform a manual recovery for program redundancy operation on all programs:

1. From the *VMG Element Manager* main menu, select **Maintenance -> Program Redundancy Switch to Primary**.
2. At the **Regroom** confirmation dialog (Figure 175), click **Apply**.

Figure 175. Confirm Recovery of All Programs



Elementary Stream/PID Management

The VMG provides the ability to manage input and output elementary streams for purposes of PID management. You can create new elementary streams, reorder existing streams, create unreferenced PIDs, and perform referenced and unreferenced PID mapping. The following sections provide instructions on elementary stream management.

Creating an Output Elementary Stream

Use the **Manage Element Streams** screen (Figure 176) to add a new elementary stream to a standard output program. The streams displayed in this screen will vary, as associated with the contents for the selected program.



From the **Outputs** panel of the **Grooming** -> **Mapping** tab page, right-click on the program to which you want to add an elementary stream and right, and select **Manage Elementary Streams** from the popup menu.

Figure 176. Manage Elementary Streams

Stream Order	Grooming Status	ES Type	Stream Type	PID	Reserved
1	Yes	Video	MPEG-2 Video 2	35	
2	Yes	Audio	AC-3 Audio eng 129	36	

Buttons: Up, Down, Add ES, Delete ES, Apply, Cancel

1. At the **Manage Elementary Streams** screen, click **Add ES**.

A new elementary stream entry will now display below the last stream.

By default, the new stream is an AC-3 Audio stream. See Figure 177 for an example.



Note: The **ES Type**, **Stream Type**, and **PID** fields in the **Manage Elementary Streams** screen can only be modified when the word “**New**” appears next to the entry in the **Stream Order** column. Once you click **Apply** to save changes, you will not be able to modify any of these parameters for this particular stream without deleting the stream and adding it again.

Figure 177. Manage Elementary Stream - New

TS: 235 Test 0(MPEG-2) Program: 2 scte convert

Stream Order	Grooming Status	ES Type	Stream Type	PID	Reserved
1	Yes	Video	MPEG-2 Video 2	35	
2	Yes	Audio	AC-3 Audio eng 129	36	
3 New	No	Audio	AC-3 Audio 129	37	

Stream Order must display New in order to modify the stream.

Up Down Add ES Delete ES Apply Cancel

2. Modify the **ES Type**, **Stream Type**, and **PID** by clicking or double-clicking on each field under the respective column. (See Table 114 for details.)

For **ES Type**, a drop down box will be displayed with applicable choices:

Figure 178. Elementary Stream Types

TS: 235 Test 0(MPEG-2) Program: 2 scte convert

Stream Order	Grooming Status	ES Type	Stream Type	PID	Reserved
1	Yes	Video	MPEG-2 Video 2	35	
2	Yes	Audio	AC-3 Audio eng 129	36	
3 New	No	Audio Data Video	AC-3 Audio 129	37	

Up Down Add ES Delete ES

For **Stream Type**, depending on the **ES Type**, either a drop down box will appear with applicable choices (Figure 179), or the Audio Selection screen is presented (Figure 180):

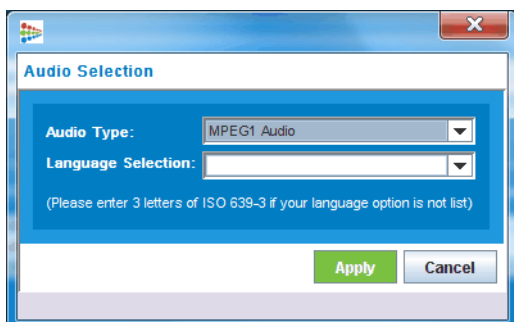
Figure 179. Stream Types

TS: 235 Test 0(MPEG-2) Program: 2 scte convert

Stream Order	Grooming Status	ES Type	Stream Type	PID	Reserved
1	Yes	Video	MPEG-2 Video 2	35	
2	Yes	Audio	AC-3 Audio eng 129	36	
3 New	No	Data	5 6 Teletext 6 SubTitle 7 8	37	

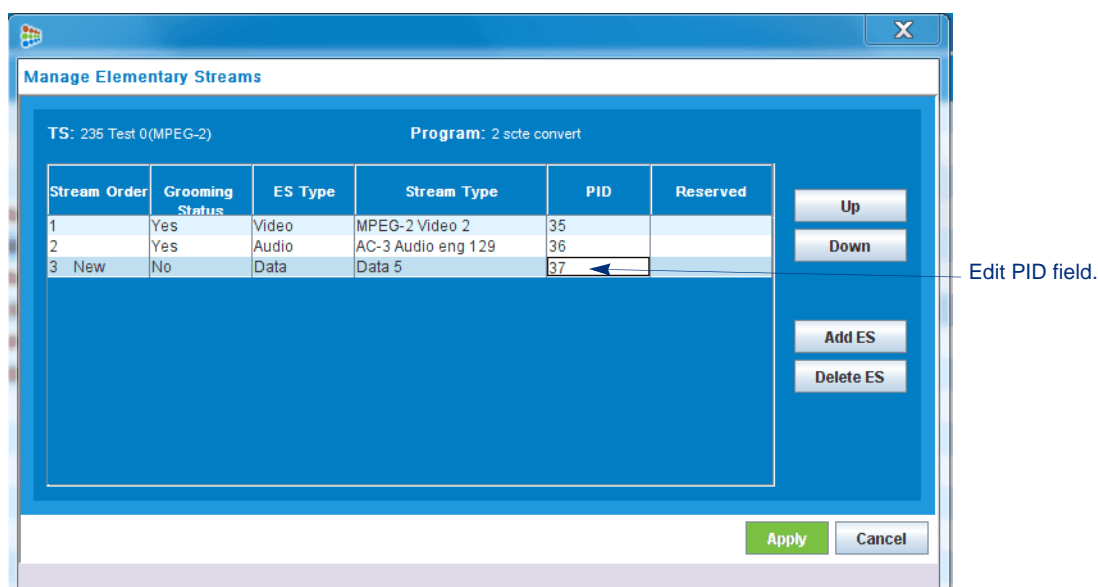
Up Down Add ES Delete ES

Figure 180. Audio Selection Screen for Elementary Streams



For the **PID** column, double-clicking the field will render it editable and you can type in the new PID:

Figure 181. Manage Elementary Stream - PID



3. Click **Apply** when you are done modifying the elementary stream to save all changes. The new stream will be displayed in the **Outputs** panel of the **Grooming** -> **Mapping** tab page.

Table 114 provides a description of the fields from the **Manage Elementary Stream** menu.

Table 114. Manage Elementary Streams menu

Field	Description
Stream Order	Read-only. Displays the order of the stream in the program mapping table (PMT).
Grooming Status	Read-only. Displays whether or not the stream is currently groomed.
ES Type	Read-only if changes have been saved (i.e., <i>Apply</i> has been clicked). If the changes to the stream have not yet been applied, clicking this field will open a drop down menu with the following options from which to choose: Audio, Data, or Video.

Table 114. Manage Elementary Streams menu (Continued)

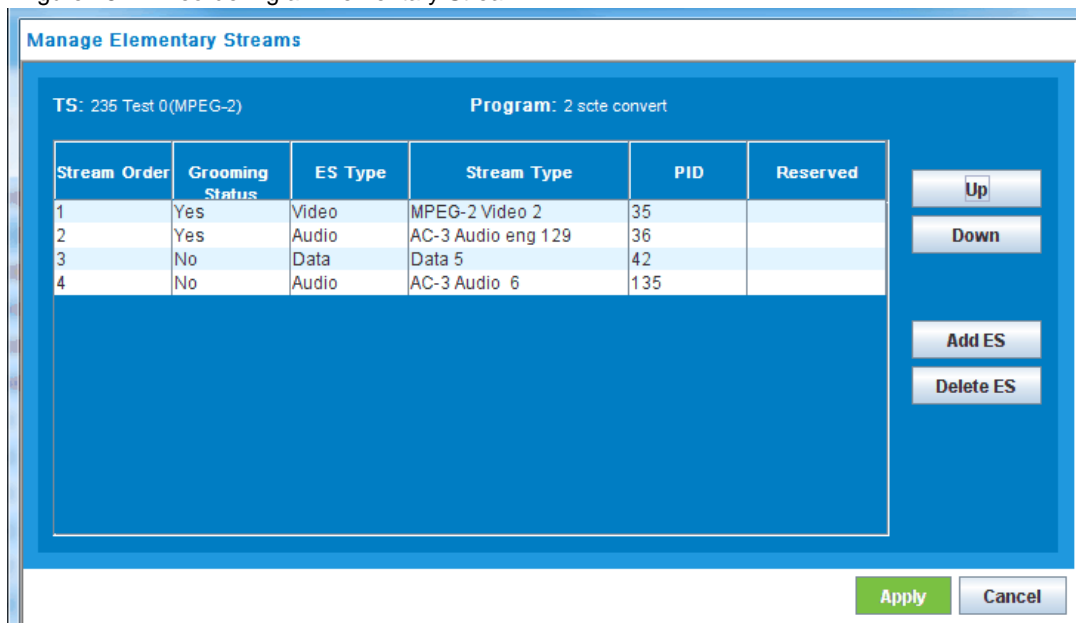
Field	Description
Stream Type	<p>Read-only if changes have been saved (i.e., <i>Apply</i> has been clicked).</p> <p>If the changes to the stream have not yet been applied, and depending on the selection from <i>ES Type</i>, clicking this field will open various options:</p> <ul style="list-style-type: none"> For Audio Stream Type: Set an audio code type and language from the Audio Selection screen. Audio code options are MPEG-1 Audio, MPEG-2 Audio, AC-3 Audio (0x6), AC-3 Audio (0x81), AAC Audio (0x0f), HE-AAC Audio (0x11). Currently supported languages are listed in “Audio input elementary stream language options” on page 313. For Data Stream Type: Set a value from the selection range (5 to 255) with 6 as either <i>Teletext</i> or <i>Subtitle</i>. For Video Stream Type: Select either <i>MPEG2</i>, <i>H.264</i>, or <i>SCTE</i>.
PID	<p>Read-only if changes have been saved (i.e., <i>Apply</i> has been clicked).</p> <p>If the changes to the stream have not yet been applied, double-clicking this field allows you to modify the PID associated with the new elementary stream.</p>
Reserved	<p>Read-only. If the stream is a reserved PID, Yes will appear; if the stream is not a reserved PID, nothing will appear in this column.</p> <ul style="list-style-type: none"> Anytime an elementary stream is manually created as described in “Creating an Output Elementary Stream,” above, the PID will automatically be Reserved. For more information on Reserved PIDs, see “Reserved PIDs” on page 264.

Reordering an Output Elementary Stream

You can reorder an elementary stream to change the order of the stream in the PMT. (If, for example, you wish to change the order a stream is placed in the PMT when sent to the end-user’s STB.)

1. Highlight the stream you want to reorder ([Figure 182](#)).

Figure 182. Reordering an Elementary Stream



2. Click **Up** or **Down** as required to put the stream in its desired place.
3. When you are done, click **Apply**.

Creating an Input Elementary Stream

To create an Input Elementary Stream, you must first create a ghost program within the desired input transport stream. Once the ghost program has been created, the **Add Elementary Stream** option from the popup menu will become selectable. For details on creating ghost programs, refer to “[Creating Ghost Programs](#)” on page 132. For details on creating input elementary streams, follow the steps in the section, “[Adding an Unreferenced PID as an Elementary Stream](#)” on page 262.

Elementary Stream Remapping

You can create a reserved PID or select any specific PID from existing output PIDs, while performing grooming in the **Configure Program Mapping** screen, as an outgoing PID.

You have the flexibility of selecting any PID value for an outgoing PID. When you select from an existing PID then it should be of the same ES Type and language (for audio) as the corresponding Input ES. If there is no exact match then you cannot select that existing output PID.

You cannot create a Reserved PID for Video if there is an existing video PID in the output program on which you are grooming.

Adding an Unreferenced PID as an Elementary Stream

You can add an unreferenced PID to an input transport stream. This allows you to manage unreferenced PID inputs for various applications in the VMG output. Unreferenced PID streams are MPEG-2 elementary streams that are encapsulated in the MPEG-2 SPTS or MPTS whose PIDs are not referenced in any PSI (PAT and PMT) tables. These unreferenced PID streams may be purposely inserted for some special control and applications; they could also result from the stream originator's error.

Unreferenced PIDs can come from the program inputs from GigE or 10xGigE interfaces. In some applications, these unreferenced PIDs need to be routed to the appropriate output ports as pass-through, or with or without the PIDs being remapped. In other cases, these unreferenced PIDs need to be dropped, either because such unreferenced PIDs are not needed or the streams are corrupted.

To add an unreferenced PID as an Elementary Stream:

1. From the **Inputs** panel of the **Grooming** -> **Mapping** subtab, select to ghost program to which you want to add an unreferenced PID.
2. Right-click the Ghost Program, and choose **Add Elementary Stream** ([Figure 183](#)).

Figure 183. Add Elementary Stream popup menu

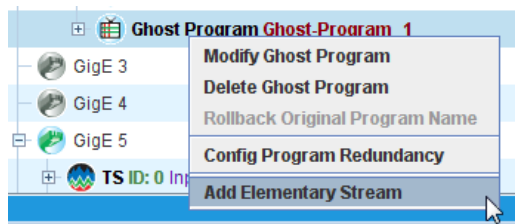
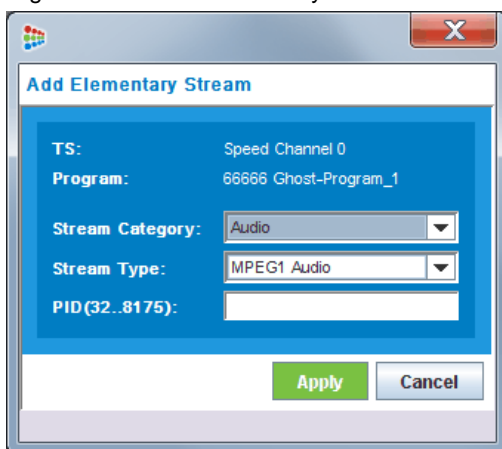


Figure 184. Add Elementary Stream screen



3. From the pull-down menus, select the **Stream Category**, **Stream Type**, and **PID**.

Table 115 describes the options available from the **Inputs** panel of the **Add Elementary Stream** screen:

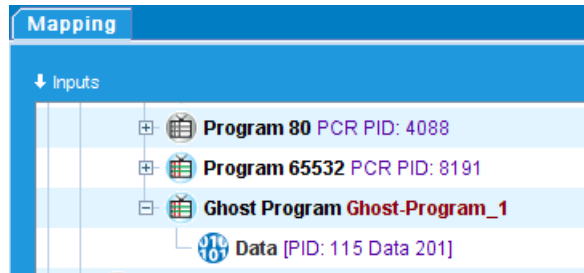
Table 115. Input Add Elementary Stream screen

Field	Description	Default
TS	Name of the selected transport stream	Read-only
Program	Name of the selected program	Read-only
Stream Category	Clicking this field will open a drop down menu with the following options from which to choose: Audio, Data, or Video.	Audio
Stream Type ^a	Depending on the selection from <i>Stream Type</i> , clicking this field will open various options: <ul style="list-style-type: none"> If <i>Stream Type</i> is <i>Audio</i> -- A new screen will open allowing you to choose Audio Type of: <i>MPEG1</i>, <i>MPEG2</i>, <i>AC-3 (0x6)</i> or <i>AC-3 (0x81)</i>, or <i>AAC (0x0f)</i>. If <i>Stream Type</i> is <i>Data</i> -> A drop down box will appear with a type range from 5 to 255. 	MPEG1 Audio
PID (32...8175)	Type a PID value for this ES. Range = 32 - 8175	Blank

a. Stream Type *Video* is not supported when creating an Elementary Stream for a ghost program.

4. Click **Apply**. The new PID appears (Figure 185).

Figure 185. New Unreferenced PID



Reserved PIDs

Reserved PIDs allow you to create PIDs under output programs which will maintain PID values and ES Type and Subtype across reboots and regrooming even when the PID is not groomed. These types of output elementary streams are called reserved PIDs. An example of when it is useful to reserve PIDs would be a set top box expecting to receive a specific PID.

The **Manage Elementary Streams** screen can be used to add the ES and to specify its PID and subtype, as well as the language for the audio ES. The subtype of the reserved video stream will be overwritten by the input Video Subtype but the PID value will be maintained. You can delete any reserved ES if it is not groomed from the **Grooming -> Mapping** screen by right-clicking the ES, and choosing **Delete**.



Note: When specifying PID values from the **Outputs** panel of the **Grooming -> Mapping** screen, the values *must* be unique.

There are two ways to create reserved PIDs: via output elementary stream creation or via grooming.

Reserved PIDs via Output ES Creation

To create a reserved PID via output ES:



Create a new output elementary stream as described in the section, “[Creating an Output Elementary Stream](#)” on page 258.

Ensure that the PID value is unique to the transport stream for the program under which you are creating the new elementary stream.

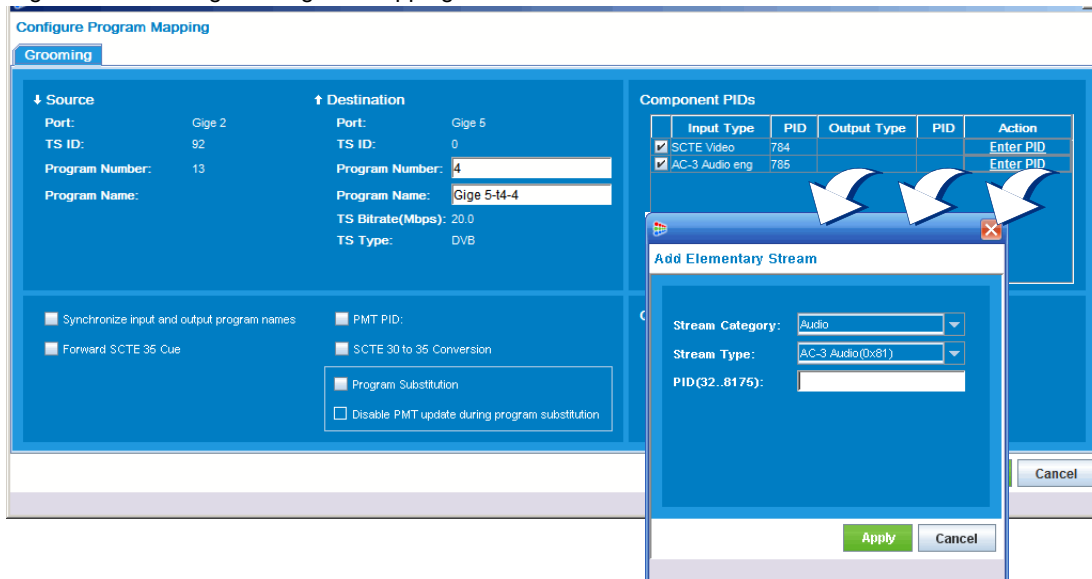
Reserved PIDs via Grooming

To create a reserved PID via grooming:

1. Use the drag-and-drop grooming feature as described in “[Using Drag-and-Drop to Create Output Programs](#)” on page 170 to drag an input program to an output transport stream.

The **Configure Program Mapping** tab page (Figure 195) for the selected stream type is presented.

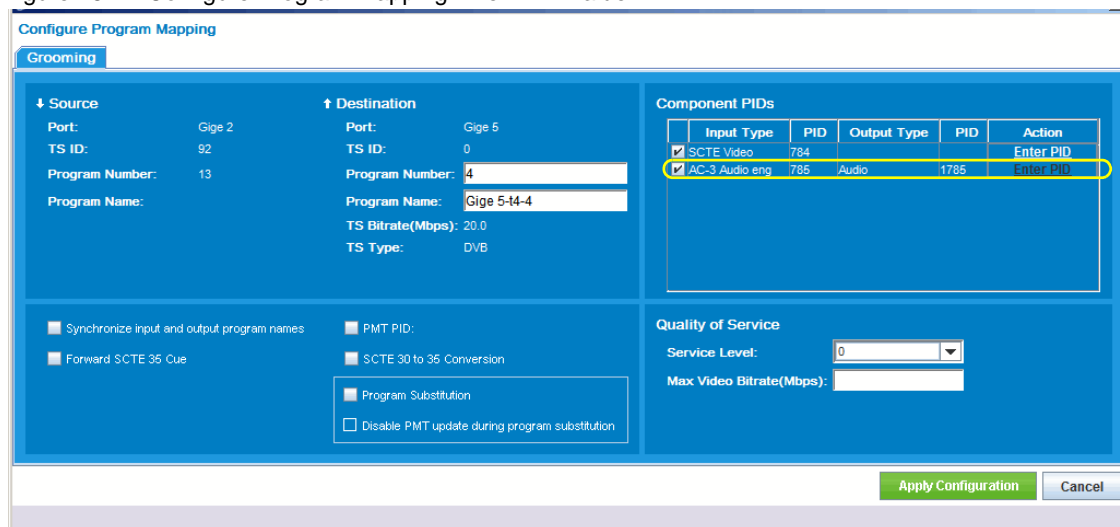
Figure 186. Configure Program Mapping - Reserved PID



2. Bring up the **Add Elementary Stream** dialog by using either of the following actions from the **Component PIDs** section:
 - Go to the **Action** column and click **Enter PID** in the row containing the PID to be changed.
 - or
 - Click in the blank space in the **Output Type** column or the **PID** column.
3. At the Add Elementary Stream dialog, type a PID value from 32 to 8175 that will be reserved for this stream.
4. Click **Apply**.

The new reserved PID is now displayed in the **Component PIDs** portion of the **Configure Program Mapping** tab page (Figure 187).

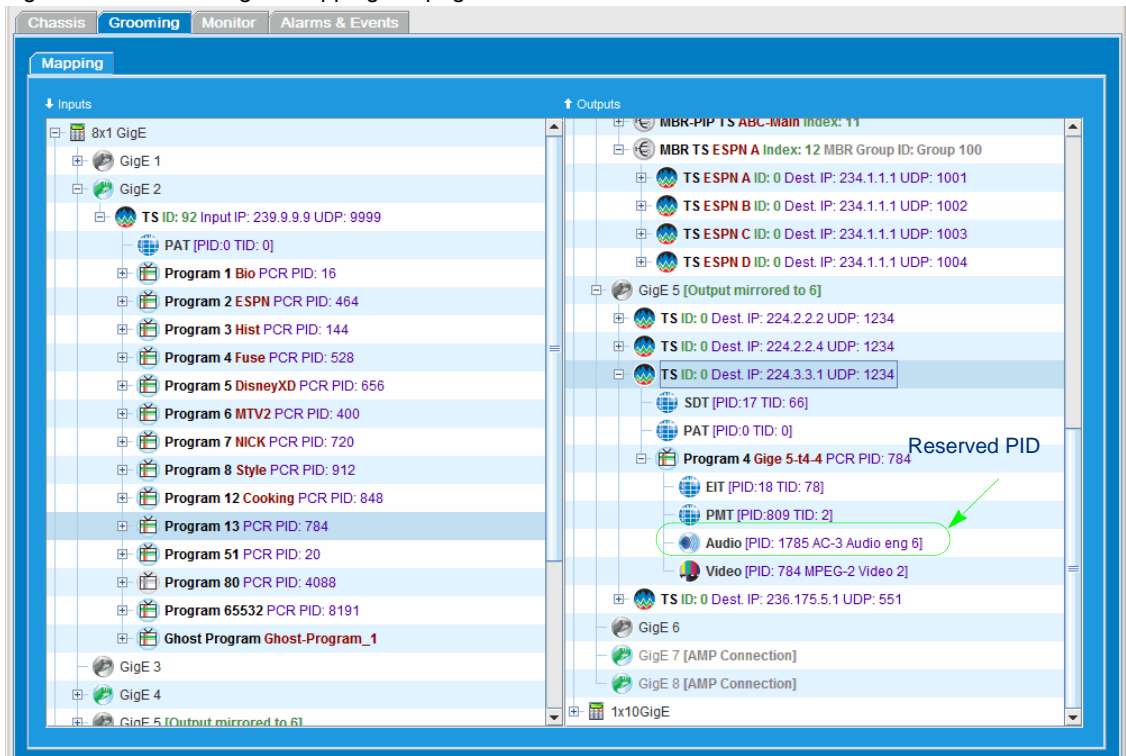
Figure 187. Configure Program Mapping - New PID value



5. Click **Apply Configuration** to groom the new program with reserved PID.

The **Grooming** -> **Mapping** tab page will look similar to that shown in Figure 188.

Figure 188. Grooming -> Mapping tab page- Reserved PID



Elementary Stream Ghost PID Management

Ghost Programs and PIDs are extra input and output streams not referenced in a Program Association Table (PAT). The VMG allows you to manage elementary stream (ES) Ghost PIDs in three ways:

- **Unreferenced PID Pass Through.** The PID output is unreferenced in the Program Mapping Table (PMT) and there is no mapping to any other program or transport stream table. Typical applications are Data PID transport and grooming.
- **Unreferenced PID Mapping.** This has no reference in the PMT, but is mapped as a table entry in the PAT at the transport stream level. This is used in various EPG applications.
- **Referenced PID Mapping.** The PID output is referenced as a PMT entry. A typical application might be to associate electronic program guide (EPG) data with one or more programs.

Unreferenced PIDs streams are those MPEG-2 streams encapsulated in the MPEG-2 SPTS or MPTS but their PIDs are not referenced in any PSI (PAT and PMT) tables. These unreferenced PID streams may be purposely inserted for some special control and applications; they could also result from the stream originator's error.

Unreferenced PIDs can come from the program inputs from GigE or 10GigE interfaces. In some applications, these unreferenced PIDs need to be routed to the appropriate output GigE ports as pass-through without or with PIDs remapping. In other cases, these unreferenced PIDs need to be dropped, either because such unreferenced PIDs are not needed or the streams are corrupted.

The VMG allows you to add and drop the unreferenced PIDs in its inputs from both GigE and 10GigE ports.

The VMG can groom the unreferenced PIDs from the inputs to the appropriate output transport stream (SPTS or MPTS) with or without PID remapping using the GUI configuration for the unreferenced PIDs.

Unreferenced PIDs associated with program inputs are usually known in advance, so they can be configured through the GUI for pass-through or drop. The GUI enables the user-configurable remapping as an output PID for the input unreferenced PID; the output PID can also be referenced in the output TS when necessary through GUI configuration.

User-configured unreferenced PID streams are routed based on grooming and grooming group rules.

The VMG ensures there are no conflicts between unreferenced PIDs and the referenced PIDs in its output MPTS or SPTS. If there are unreferenced PIDs causing conflict in the output MPTS or SPTS, then the groomed unreferenced PID causing the conflict is dropped. This could happen when an unreferenced PID is not allowed to be remapped for output.

Unreferenced PID Pass Through

To add an unreferenced PID:

1. Start by creating a ghost program as described in “Creating Ghost Programs” on page 132. See Figure 189.

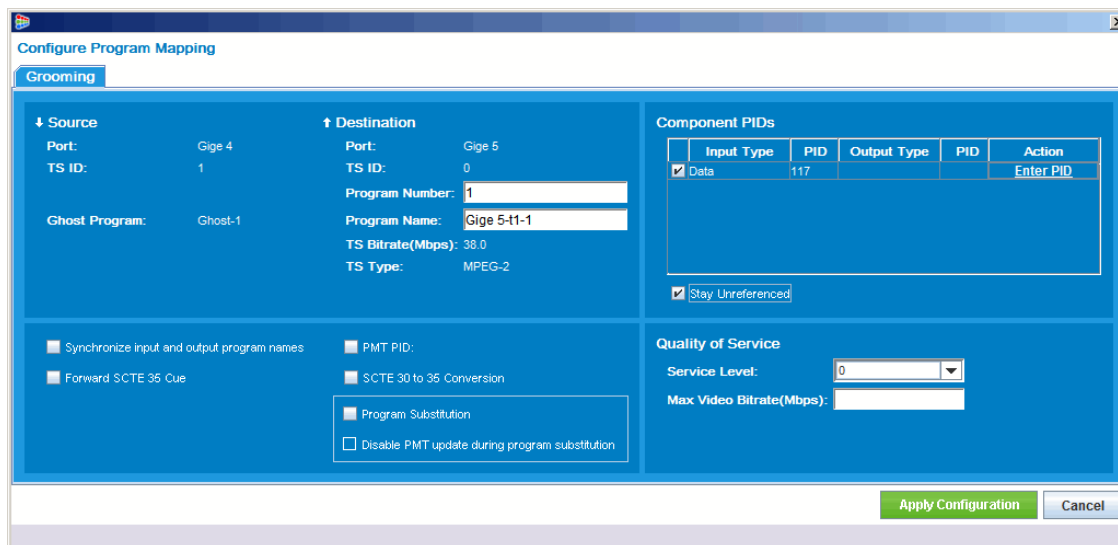
Figure 189. Ghost Programs With Unreferenced PID.



2. Map the unreferenced PID to an output by dragging and dropping the ghost program from the input GigE port to the output transport stream.

The **Configure Mapping** screen appears (Figure 190).

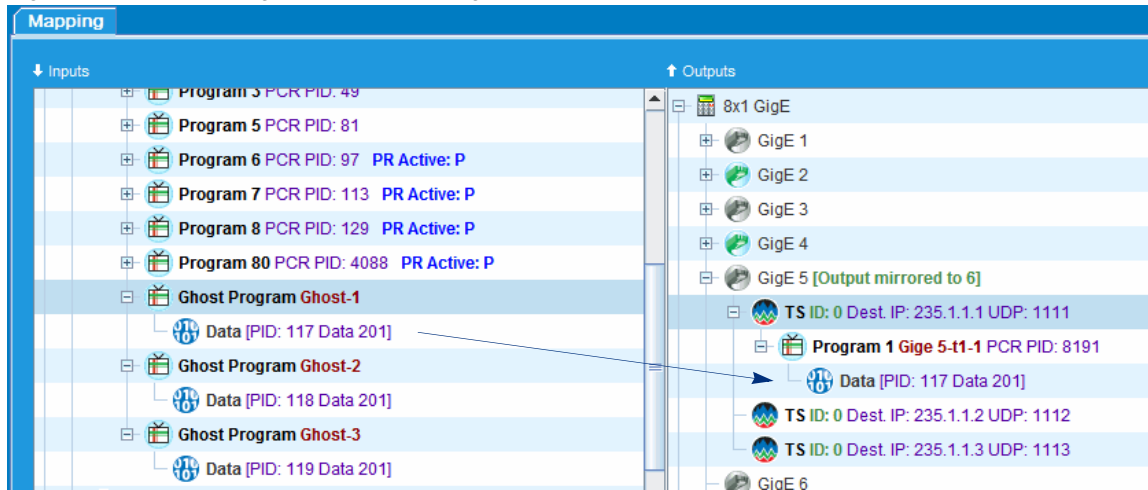
Figure 190. Ghost Program Dragged and Dropped to Output TS



3. Note the PID number of the component PID, in this case 117. You will need this when you want to create a referenced PID mapping.
4. Be sure that the **Stay Unreferenced** box is checked, and click **Apply Configuration**.

The ghost program and its data transport stream with a PID of 117 appears on both the input and output (Figure 191) showing the stream has been passed through.

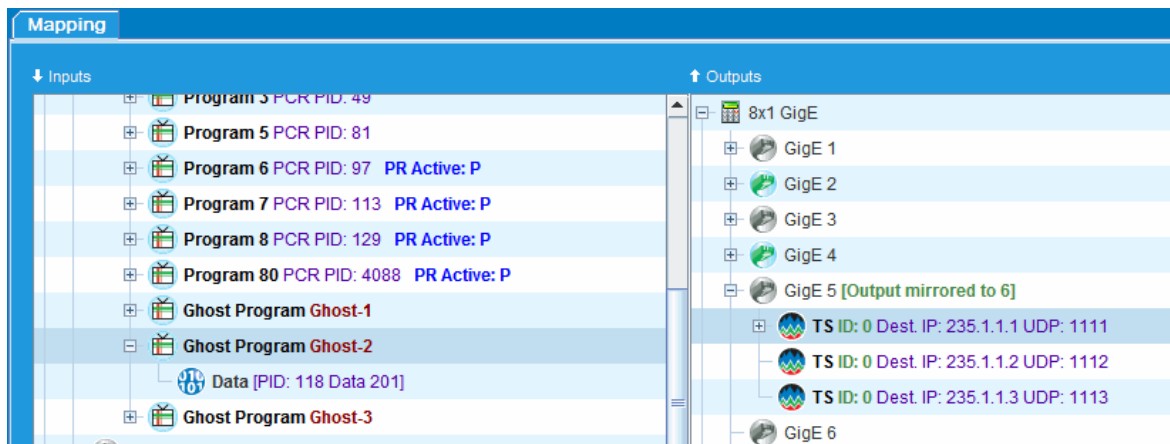
Figure 191. Ghost Program Passed Through



Unreferenced PID Mapping

1. Start with a screen, as shown in Figure 192.

Figure 192. Starting Unreferenced PID Mapping



2. Drag the Ghost Program from the input of Figure 192 and drop it on the transport stream you just created. The **Configure Program Mapping** screen (Figure 193) now appears.

Figure 193. Configure Program Mapping screen - Unreferenced

Configure Program Mapping

Grooming

Source

Port: Gige 4
TS ID: 1
Ghost Program: Ghost-2

Destination

Port: Gige 5
TS ID: 0
Program Number: 1
Program Name: Gige 5-t3-1
TS Bitrate(Mbps): 38.0
TS Type: MPEG-2

Component PIDs

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> Data	118			Enter PID

☒ Stay Unreferenced

☐ Synchronize input and output program names
☐ Forward SCTE 35 Cue
☐ PMT PID:
☐ SCTE 30 to 35 Conversion
☐ Program Substitution
☐ Disable PMT update during program substitution

Quality of Service

Service Level: 0
Max Video Bitrate(Mbps):

Apply Configuration Cancel

3. Be sure that the **Stay Unreferenced** box is *checked*.
4. In the Component PIDs portion of the screen, click the empty space to the right of the row of the stream. The **Add Elementary Stream** screen of Figure 194 appears.

Figure 194. Add Elementary Stream screen

Add Elementary Stream

Stream Category: Data
Stream Type: 201
PID(32..8175):

Apply Cancel

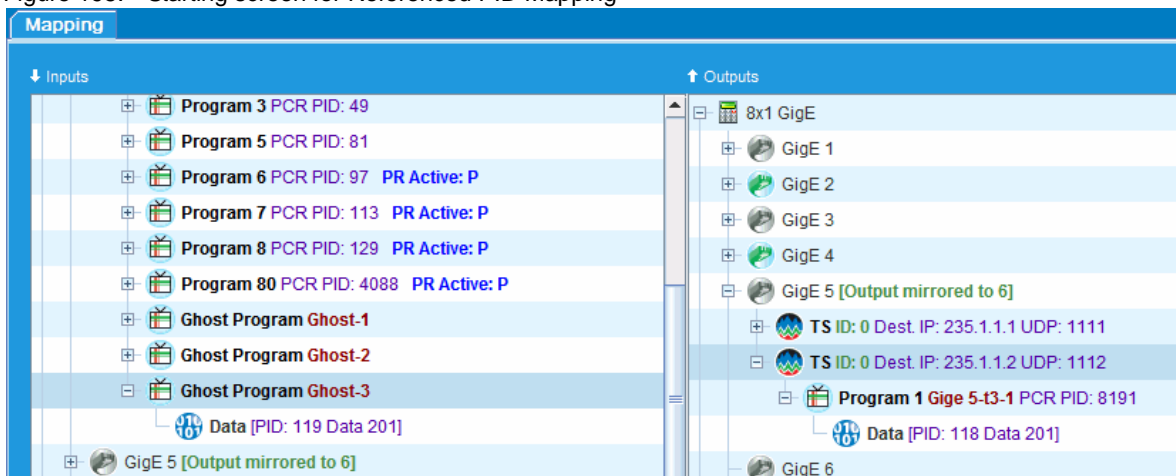
5. Enter the new reserved PID number, (in this case, 118, the same PID number as shown in Figure 193) and click **Apply**.
6. Click **Apply Configuration** in the **Configure Program Mapping** screen. The unreferenced PID is mapped.

Referenced PID Mapping

Input Ghost ES PIDs can be groomed by the VMG and referenced as ES PIDs in a program in the output TS as long as the PID value is unique within the output TS.

Figure 195 shows the starting screen with the unreferenced PID input mapped into a Ghost Program on the input.

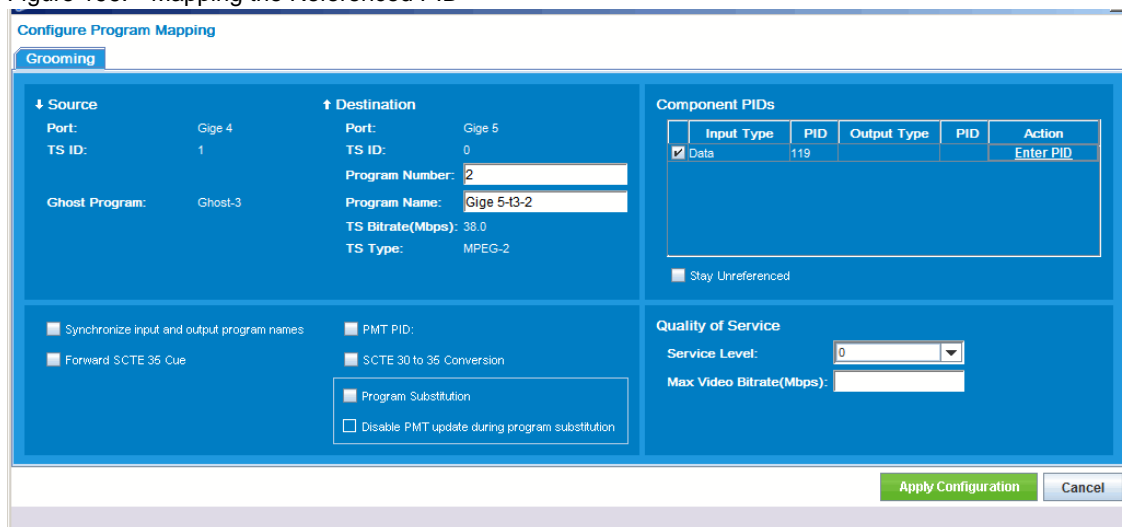
Figure 195. Starting screen for Referenced PID Mapping



To map a referenced PID to a program:

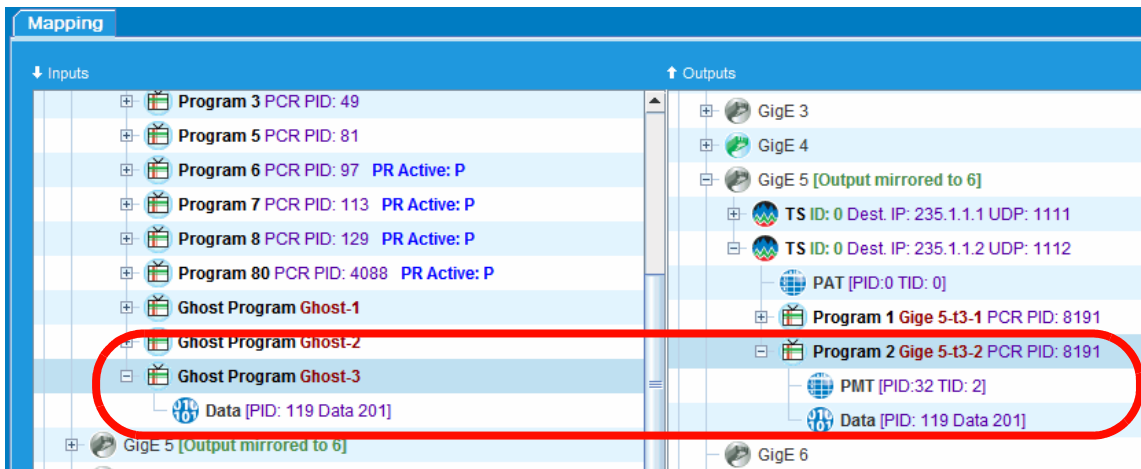
1. Drag the Ghost Program from the input of Figure 195 and drop it on the transport stream. The **Configure Program Mapping** screen (Figure 196) appears.

Figure 196. Mapping the Referenced PID



2. Be sure that the **Stay Unreferenced** box is un-checked.
3. Click **Apply Configuration**. The **Mapping** tab page (Figure) shows the mapped PID in both programs from the input and the output.

Mapped Referenced PID



Module Redundancy

This chapter discusses the redundancy features offered by the VMG Network Processor Module (NPM), Video Processor Module (VPM), and the Transcoding Module (TCM).

In This Chapter:

- “NPM Status and Health,” next.
- “NPM Redundancy” on page 274.
- “VPM and TCM Status and Health” on page 275.
- “VPM and TCM Redundancy” on page 276.
- “AMP Status and Health” on page 278.
- “AMP Redundancy” on page 278.

NPM Status and Health

The LEDs on the front panel of the NPM card indicate its current status and health. This information is also displayed in the chassis view of the *VMG Element Manager*. Refer to “Chassis Tab” on page 25 for details. Table 116 describes the NPM front panel LEDs.

Table 116. NPM Front Panel LED Description

LED Name	Color/Condition	Description
Hot Swap	Blue	NPM is not ready for hot-swap
	Flashing Blue	Transition between the hot-swap not ready state to ready state, and ready state to not ready state.
	Off	NPM is ready for hot-swap
Chassis Status	Red	Chassis interface fault
	Green	NPM payload powered and out of reset
FPGA 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 Redundancy

In order to take advantage of the VMG's redundancy features, two NPMs must be installed and properly configured as well as a virtual IP address assigned to the VMG system. The NPM provides video and data service filtering/switching/routing to and from all other cards in the chassis, and supports 1:1 card redundancy. In this redundancy configuration, one NPM is designated as the primary (active) card and the other NPM as the backup (standby) card. During normal use, the standby NPM is in warm-standby mode and ready to become active if either the active NPM encounters a failure or a user initiates a manual switchover. In warm-standby redundancy mode all traffic flows simultaneously into both NPMs in the chassis; however, only the active NPM is processing the data.

High Availability

During system boot, if two NPMs are available they negotiate their roles within the redundant system. One becomes active and the other goes into standby mode. The criteria used to determine this are:

- Configuration database validity.
- Health of NPM software and hardware.
- The cards' previous active/standby role.
- The cards' physical location within the VMG chassis.

After the active NPM is determined, applications on that card take control of the system and start configuring the hardware based on its persistent configuration data. The active NPM takes control over all network interfaces for video streams, and its physical Ethernet interface becomes active.

The switch between active and standby roles in an NPM redundancy environment is seamless.

The standby NPM continues to keep in sync with the persistent data storage controlled by the active database.

Fast Failover Switch

The NPM Fast Failover switch mechanism allows for seamless transition in the event of a redundancy switch. When a card failure or user initiated switch-over occurs, the standby NPM will detect the failure using a missed heartbeat mechanism. The standby NPM will claim all the MUXs from the failed NPM while the MUX software automatically re-initializes itself and wipes out configuration from the failed NPM.

System Failure

Certain system failure conditions exist that trigger a failover. Some active NPM failure conditions are:

- An unplanned reset of the active NPM.
- Removal of the active NPM:
 - Partial card removal using the ejector handles (allowing the hot-swap procedure to complete).
 - Abrupt card removal (without allowing the hot-swap procedure to complete).



Note: For more information about the NPM ejector handles, refer to Chapter 3, *Physical Installation, Inserting Modules* section, in the VMG Hardware Setup Guide.

User-Initiated

When a user-initiated switch-over occurs, all applications on the active NPM are asked to free their resources. This action triggers checkpoints to sync the persistent configuration from the active database to the standby database. Once the user initiated switch-over is accepted, configuration changes are no longer allowed and are not saved.

After the flushing procedure is complete, the active NPM relinquishes control of the system and reboots, allowing the standby NPM to take control and go into an active state. All video streams, client connections (GUI, etc.), and connections with ad servers will temporarily go down during the transition.

Refer to “[NPM Redundancy Switch](#)” on page 106 for more information on user initiated switch over.

Configuring NPM Redundancy

1. Make sure the same physical setup, including applicable wiring and network connection, exists for both NPM cards.
2. Setup a Virtual IP Address in the *VMG Element Manager Global Configuration -> Management Interface* tab (see “[Management Interface Tab](#)” on page 44 for more information).
3. If using the VMG with an ad server, setup a Virtual MAC Address in the *VMG Element Manager Global Configuration -> Grooming Group* tab (see “[Grooming Group tab](#)” on page 46).

VPM and TCM Status and Health



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

The LEDs on the front panel of the VPM and TCM cards indicate their current status and health. This information is also displayed in the chassis view of the *VMG Element Manager*. Refer to “[Chassis Tab](#)” on page 25 for details. [Table 117](#) describes the VPM and TCM front panel LEDs.

Table 117. VPM/TCM front panel LEDs

LED Name	Color/Condition	Description
Hot Swap	Blue	VPM/TCM is not ready for hot-swap.
	Flashing Blue	VPM/TCM is making transition from hot-swap not ready to ready state, and ready state to not ready state.
	Off	VPM/TCM is 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.

VPM and TCM Redundancy



Note: *The VPM is not supported in Release 3.1.x. Please refer to the associated Release Notes for additional information*

The VMG offers N+M VPM and TCM redundancy, where N is the number of cards in the system and M is the number of redundancy cards available for the following cards and functions:

- VPM:Grooming, statistical multiplexing, transrating, and digital ad insertion.
- TCM:Grooming and transcoding.



Note: *VPM uses load balancing for redundancy, whereas TCM uses first-fill provisioning.*

Unlike N+1 redundancy, N+M redundancy allows an operator to utilize all the VPM or TCM cards in the VMG system for video processing and transcoding, thus sharing the load and the probability of a malfunction equally between the VPMs or TCMs instead of dedicating one or multiple cards operating in standby mode to provide redundancy. This N+M redundancy scheme requires VPM or TCM capacity to be over-provisioned (i.e., you allow for more capacity than is operationally needed to allow a successful failover) so that video streams from a failed VPM card(s) can be redistributed across remaining functional VPM or TCM cards without running out of processing capacity on those modules.



Note: *A VPM card cannot provide redundancy for a TCM card and vice versa.*

Functionality

When the system detects a failed VPM or TCM card, the redundancy algorithm will automatically perform intelligent redistribution of output transport stream video processing across all available sources.

Failover

With N+M redundancy, if one VPM or TCM card fails, video processing resources will be redistributed to any other available VPM or TCM card(s) until the failed card can be replaced. It is not necessary to replace the same card in the same slot. VPM or TCM cards can be easily added with no service interruption, or removed from the system with minimal service interruption.

Failover conditions consist of online insertion and removal of a card or a hardware or software failure.

Oversubscription Indication

Depending on available resources, any number of card failures can be reallocated to any number of available cards. The **Chassis** view of the *VMG Element Manager* displays color-coded and text indications of current bandwidth percentage use in order for the user to better gauge at what point oversubscription may occur, and when additional VPMs might be necessary. [Figure 197](#) shows the **Chassis** view with the VPM redundancy status highlighted at the bottom:

Figure 197. Chassis tab - VPM Redundancy

Property	Value
Management IP	
IP Address	10.32.128.250
MAC Address	00:11:22:33:44:1a
Subnet Mask	255.255.255.0
Gateway	0.0.0.0
Chassis	
System Type	14 ...
System Time	12/31/2009 10:52:14
System Up Time	1 days 21:51:45
Active Software Version	2.2.2.36010
Loaded Software Version	2.2.2.36010
Reset Reason	0
Alarm LED	
Chassis FRU	
Fan 1	Present ...
Fan 2	Present ...
Fan 3	Present ...
Power 1	Present ...
Power 2	Present ...
System Controller 1	Present ...
System Controller 2	Present ...
SAP	Present ...
NPM Redundancy	
Slot 7(NPM)	Active
Slot 8(NPM)	Standby
Redundancy State	Fully Redundant
VPM Redundancy	
Grooming Group 1	<70%
Grooming Group 2	
TCM Redundancy	
Grooming Group 1	
Grooming Group 2	None

For complete descriptions of the VPM Redundancy properties and values, see Table 10, “Chassis Tab - System Information - Management IP,” on page 28 and Table 17, “Chassis Tab - Card Information,” on page 31.

Additionally, if VPM or TCM resource allocation fails, the undistributed (oversubscribed) program’s icon will remain black and white (indicating no video processing is taking place) in the **Outputs** panel of the **Grooming -> Mapping** subtab of the *VMG Element Manager*.

Configuring VPM and TCM Redundancy

VPM and TCM redundancy occurs automatically in the VMG system. No additional configuration is necessary.

AMP Status and Health

The LEDs on the front panel of the AMP card indicates its current status and health. This information is also displayed in the chassis view of the VMG *Element Manager*. Refer to “Chassis Tab” on page 25 for details. Table 118 describes the AMP front panel LEDs.

Table 118. 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

AMP Redundancy

Each AMP module is paired with an NPM module and follows the same failover behavior as the NPM. In the VMG-6 and VMG-8, the AMP in slot 3 is paired with the NPM in slot 1 to form one group, and the AMP in slot 4 is paired with the NPM in slot 2 to form another group. In the VMG-14, the AMP in slot 6 is paired with the NPM in slot 7 to form one group, and the AMP in slot 9 is paired with the NPM in slot 8 to form another group.

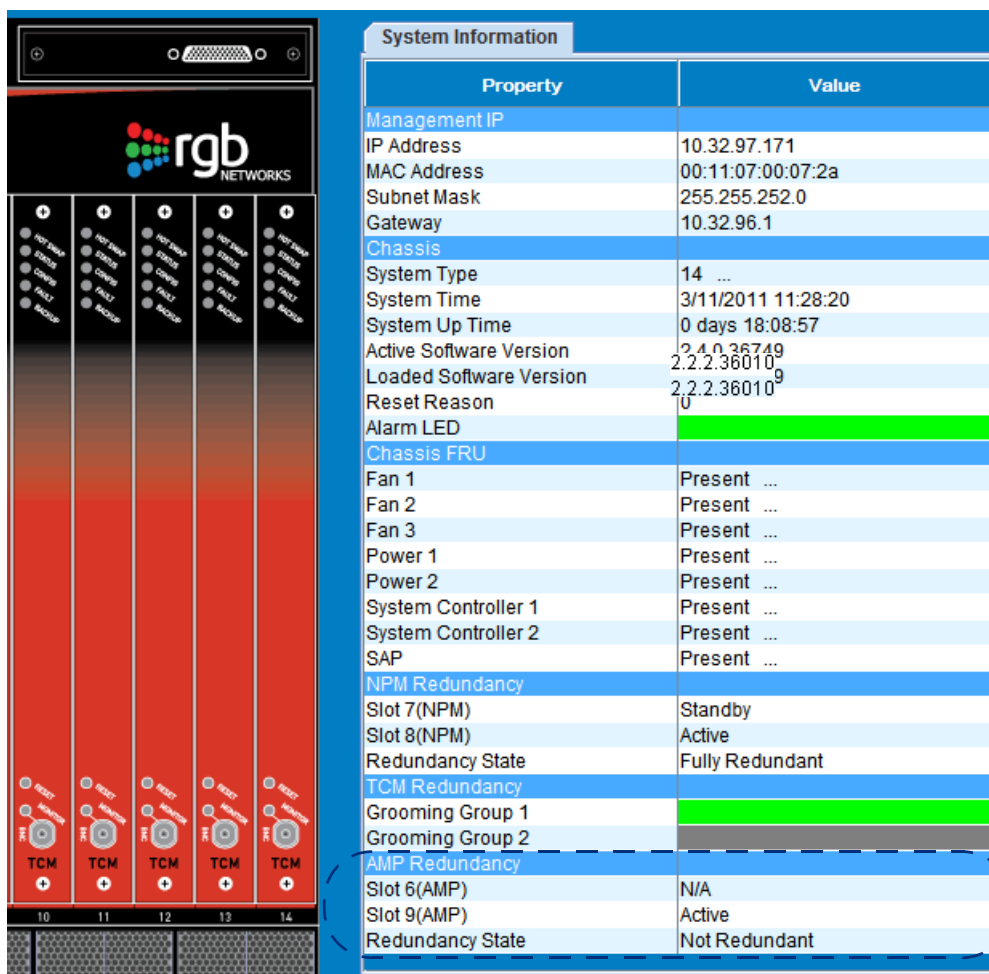
Functionality

Whichever NPM is active, it's paired AMP is active also. In each NPM/AMP group, the NPM is the master. NPM switchover triggers AMP switchover; also, AMP switchover triggers NPM switchover.

Note: *If you have active grooming of programs on standard OTSs and Transcoded+PIP TS, AMP failover will cause video interruption of these programs due to NPM switchover.*

You can trigger NPM/AMP failover through the GUI, but only when both the NPM and AMP are in a fully redundant configuration (that is, two NPMs and two AMPs). However, NPM auto-failover will trigger AMP switchover even if only one AMP is installed. If programs are configured on standard OTSs and Transcoded+PIP TS, video on those programs will be restored after NPM failover. However, MBR TS programs will not be restored if there is no working AMP paired with the new active NPM.

Figure 198. Chassis tab - AMP Redundancy



Property	Value
Management IP	
IP Address	10.32.97.171
MAC Address	00:11:07:00:07:2a
Subnet Mask	255.255.252.0
Gateway	10.32.96.1
Chassis	
System Type	14 ...
System Time	3/11/2011 11:28:20
System Up Time	0 days 18:08:57
Active Software Version	2.4.0.36749
Loaded Software Version	2.2.2.36010
Reset Reason	0
Alarm LED	
Chassis FRU	
Fan 1	Present ...
Fan 2	Present ...
Fan 3	Present ...
Power 1	Present ...
Power 2	Present ...
System Controller 1	Present ...
System Controller 2	Present ...
SAP	Present ...
NPM Redundancy	
Slot 7(NPM)	Standby
Slot 8(NPM)	Active
Redundancy State	Fully Redundant
TCM Redundancy	
Grooming Group 1	
Grooming Group 2	
AMP Redundancy	
Slot 6(AMP)	N/A
Slot 9(AMP)	Active
Redundancy State	Not Redundant

For complete descriptions of the AMP Redundancy properties and values, see Table 10, “Chassis Tab - System Information - Management IP,” on page 28 and Table 17, “Chassis Tab - Card Information,” on page 31.





Configuring AMP Redundancy

AMP redundancy happens automatically in the VMG system. No additional configuration is necessary.

Digital Program Insertion (DPI) and Program Substitution

Digital Program Insertion (DPI) is used for the insertion of ads or other types of television content in the digital domain. DPI commonly involves splicing MPEG-2 or H.264 video streams in order to perform the substitution. The VMG is fully compliant with SCTE 30 and SCTE 35 DPI standards.

Program Substitution is used for the insertion of secondary, long format video content into a primary video stream. Program Substitution commonly involves splicing MPEG-2 or H.264 video streams in order to perform the substitution.

-  **Note:** *An NTP server must be used with the VMG when performing DPI with a schedule referencing an absolute time base to ensure time synchronization. The NTP server must be up and running prior to booting up the VMG.*
-  **Note:** *The VPM is not supported in Release 3.1.0. Please refer to the 3.1.0 Release Notes for additional information.*
-  **Note:** *DPI and Program Substitution capability are dependent on the type of licenses installed. Refer to “License Management” on page 99 for details.*
-  **Note:** *DPI and Program Substitution are not available for transcoded programs, including Transcoded+PIP programs.*

In This Chapter:

- “Digital Program Insertion,” next.
- “Configuring DPI Programs” on page 282.
- “Connecting an Ad Server to the VMG” on page 285.
- “Program Substitution” on page 285.
- “SCTE 30 to SCTE 35 Conversion” on page 288.
- “SCTE 35 Cue Message Forwarding” on page 290.

Digital Program Insertion

The VMG performs DPI splicing by opening a session and inserting digital ads into a primary programming channel or a group of channels. For example, inserting locally-generated advertisements into network distributed programming. The information about when to splice and what to insert are communicated to the VMG using SCTE 30 and SCTE 35 messages.

SCTE 30 splicing messages provide a standardized method for communication between ad servers and splicers, such as the VMG. The VMG performs ad splicing when it receives splicing messages and ads from the ad server.

SCTE 35 cueing messages provide the signaling that allows splicing of transport streams for digital program and ad insertion. These cueing messages provide the VMG with the precise timing information needed to coordinate with the ad server for splicing a primary video feed.

SCTE 35 cue message forwarding and SCTE 30 to SCTE 35 message conversion are configurable through the *VMG Element Manager*.

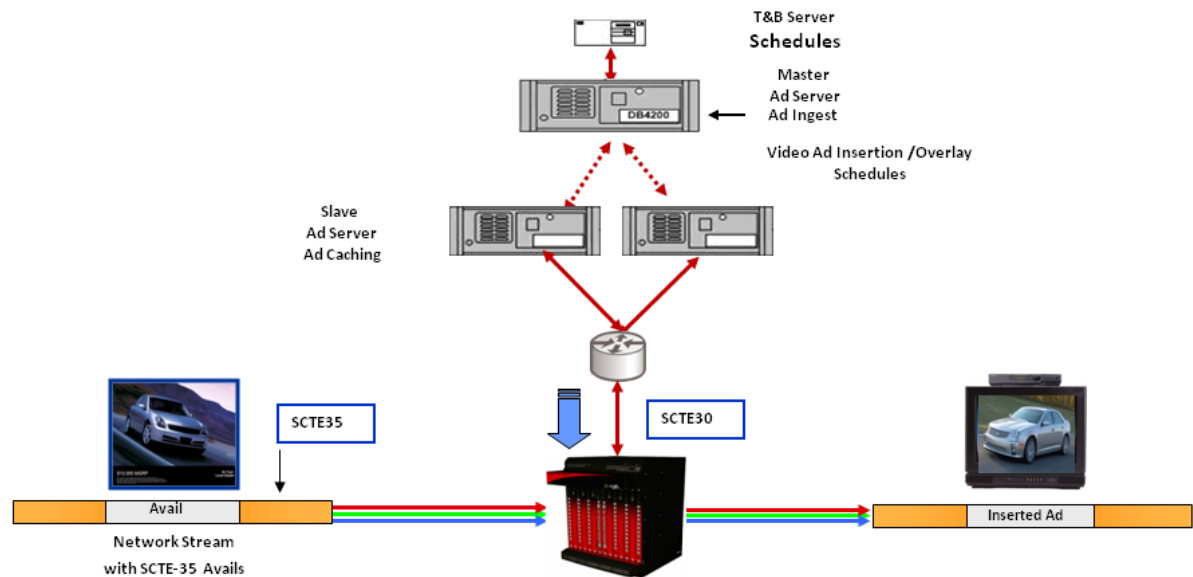
The VMG is capable of real-time splicing of un-encrypted MPEG-2 input streams into another un-encrypted MPEG-2 input stream, or real-time splicing of un-encrypted H.264 input video streams into another un-encrypted H.264 input stream. This can be performed in real-time at any I or P frame in an MPEG-2 stream, or any pre-conditioned IDR frame in an H.264 stream. The VMG also supports simultaneous ad insertions for both SD and HD MPEG-2 and H.264 video programs, as well as insertion of back-to-back ads. Multiple ad zones can also be defined.

Network and ad stream language mapping is supported by the VMG. If the network feed contains both English and Spanish audio, and the ad content also includes both English and Spanish audio, then the English ad content audio is spliced to the English network feed audio stream and the Spanish ad content audio is spliced to the Spanish network feed audio stream. However, if the ad content only contains English audio, then the English ad content audio is spliced to the English feed only.

The VMG is also capable of performing rate-shaping on inserted MPEG-2 video ad channels.

Seamless splicing of H.264 video network feeds with ad streams follow the DVS714r3 and SCTE 128 standards. DVS714r3 covers video coding constraints, and SCTE 128 deals with video system and transport constraints. SCTE 128 describes the transmission of advanced video coding (AVC) coded digital video in MPEG transport streams. [Figure 199](#) shows how the VMG interacts in a DPI environment.

Figure 199. VMG in DPI Environment



Configuring DPI Programs

There are two types of DPI program configurations available: Transport Stream DPI and Program-level DPI.

Transport Stream DPI provides the ability to configure DPI programs on an entire transport stream and requires the use of a Bandwidth-based DPI license. For every DPI-enabled transport stream, the license manager will deduct from available bandwidth based on the amount of DPI bandwidth purchased under the license and total bitrate of the transport stream.

Program-level DPI provides the ability to configure DPI at the program level; in lieu of using a bandwidth-based license, Program-level DPI will deduct one number-based license for every DPI-enabled program.

Configuring DPI Programs - Transport Stream Level

1. Verify a proper DPI Bandwidth-based license exists in the **License Manager** and the appropriate amount of bandwidth is available on the transport stream.
See [“License Management” on page 99](#) for details.
2. From the **Outputs** panel of the *VMG Element Manager Grooming -> Mapping* tab page, right-click the desired GigE or 10GigE interface for which to enable bandwidth-based DPI programming and select **Create Transport Stream** (Figure 96 on page 143).
3. Un-check the **Transcoding** box at the top right of the **Create Output Transport Stream** dialog.
4. Check the **TS DPI** box.
5. Enter other necessary information for the transport stream, such as **Destination IP** and **UDP Port**.
6. Select **Apply Configuration**.

7. Under the transport stream that is now enabled for TS level DPI, create or groom a new program by following the applicable steps in “[Output Programs and Grooming](#)” on page 157.



Note: *When creating DPI-based programs (either on the transport level or the program level) the name assigned to the program must exactly match the name configured on the ad server.*

8. Select **Apply** to create the new program or **Apply Configuration** to groom the new program.

Configuring DPI Programs - Program Level

1. Verify a proper DPI number-based license exists in the **License Manager**. See “[License Management](#)” on page 99 for details.
2. If modifying an existing program: from the **Outputs** panel of the *VMG Element Manager* **Grooming** -> **Mapping** tab page, right-click the desired program under the transport stream for which to enable DPI and select **Modify Program** ([Figure 126](#) on page 197).
or
3. If creating a new program, follow the applicable steps in “[Output Programs and Grooming](#)” on page 157.



Note: *When creating DPI-based programs (either on the transport level or the program level) the name assigned to the program must exactly match the name configured on the ad server.*

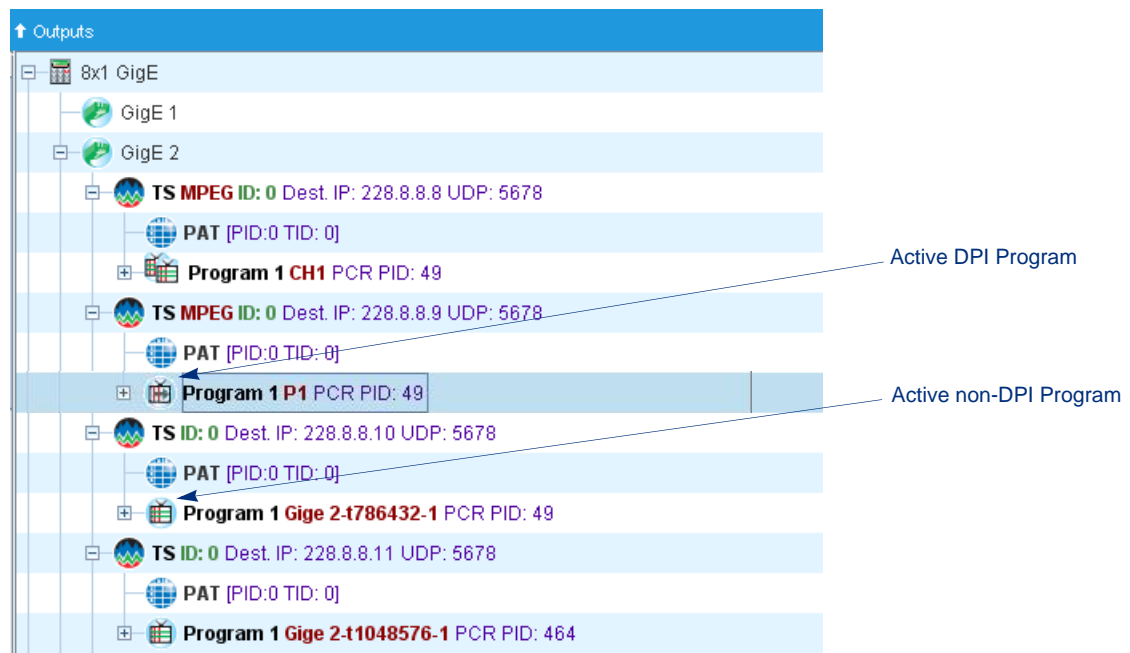
4. Check the **Program DPI** box in the relevant **Create / Modify Output Program** or **Configure Program Mapping** dialog.
5. Select **Apply** or **Apply Configuration**.



Note: *DPI is not supported on a channel substituted program; therefore, **DPI** and **Program Substitution** cannot be checked at the same time when configuring on the program level.*

The *VMG Element Manager* displays DPI-based programs in the **Grooming** -> **Mapping** tab page as a different program icon. When DPI is configured and active on a program, a program icon will be displayed with an arrow inside as seen in [Figure 200](#). (For a complete description of icons available in the **Mapping** tab page, see [Table 57](#) on page 122.)

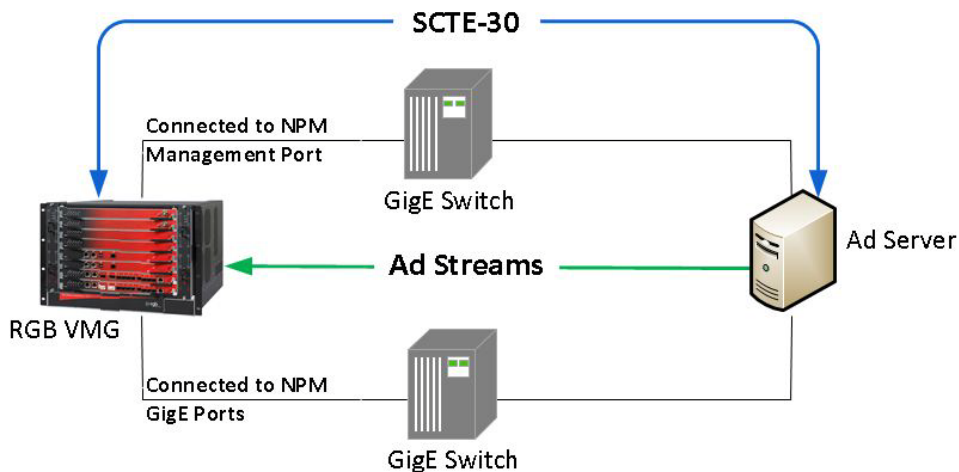
Figure 200. DPI-based Program Icon



Connecting an Ad Server to the VMG

Figure 201 shows how an ad server is connected to the VMG through the management interface only. This is the most general method; however, other connection methods may be possible.

Figure 201. Connecting an Ad Server to the VMG



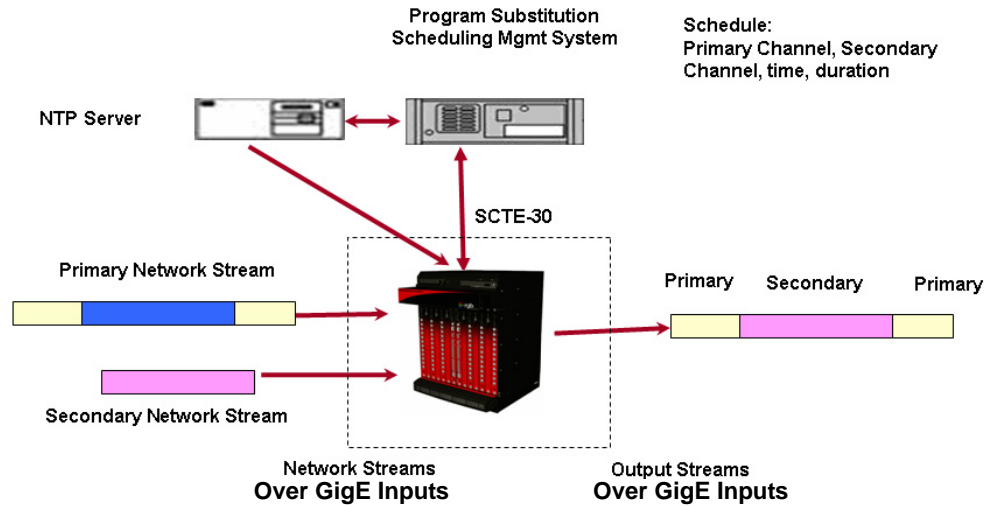
Program Substitution

Program substitution is a form of digital program insertion (DPI) that offers the ability to splice secondary, long-format video content into a primary video stream. Long format content, which is typically 30 to 60 minute programming segments, differs from short format content which is used for regional spot advertisements.

The VMG is capable of real-time splicing of unencrypted MPEG-2 input streams into another unencrypted MPEG-2 input stream, or real-time splicing of unencrypted H.264 input video streams into another unencrypted H.264 input stream for Program Substitution.

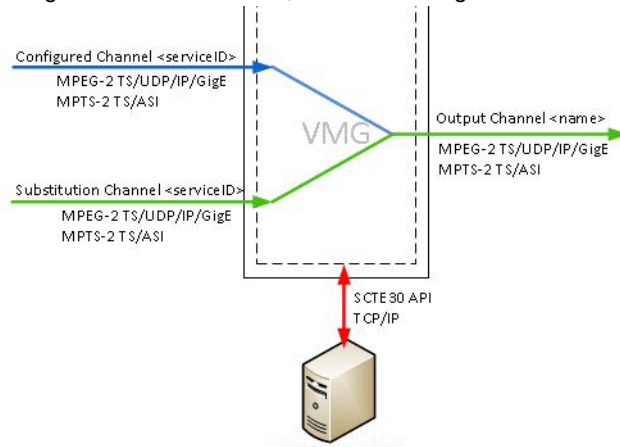
Program substitution is particularly important for some operators in meeting National programming content rules which often limit the amount of International programming that is allowed. For example, a Canadian channel airing a U.S. music video network from 10 a.m. to 6 p.m. may be required to switch to local programming during the prime time evening hours. This capability is equally important for channels that play long-form infomercials or home shopping programs during the early morning hours, but need to switch to their regular programming for the remainder of the day. Figure 202 shows how the VMG interacts in a Program Substitution environment.

Figure 202. VMG in Program Substitution Environment



The implementation for program substitution is similar to that of DPI. Instead of using an ad server to splice an MPEG-2 input video stream into another MPEG-2 input video stream or an H.264 input video stream into another H.264 input video stream, a Program Substitution scheduling server is used as the controller that communicates with the VMG based on the SCTE 30 standard. Figure 203 shows Program Substitution implemented on a VMG system.

Figure 203. Program Substitution Flow, with Scheduling Server



Configuring Program Substitution

1. Verify the proper Program Substitution number-based license exists in the **License Manager**. See [“License Management” on page 99](#) for details.
2. If modifying an existing program: from the **Outputs** panel of the *VMG Element Manager*’s **Grooming -> Mapping** tab page, right-click the desired program under the transport stream for which to enable a channel substituted program and select **Modify Program** ([Figure 126 on page 197](#)).
or
3. If creating a new program, follow the applicable steps in [“Output Programs and Grooming” on page 157](#).

Configuring DPI at the Program Level

1. Verify a proper DPI number-based license exists in the **License Manager**. See “[License Management](#)” on page 99 for details.
2. If modifying an existing program: from the **Outputs** panel of the *VMG Element Manager* **Grooming -> Mapping** tab page, right-click the desired program under the transport stream for which to enable a DPI and select **Modify Program** (Figure 126 on page 197).
or
3. If creating a new program, follow the applicable steps in “[Output Programs and Grooming](#)” on page 157.



Note: When creating channel substituted programs, the name assigned to the program must exactly match the name configured on the program substitution scheduling server.

4. Check the **Program Substitution** box in the relevant **Create / Modify Output Program** or **Configure Program Mapping** screen.

When checked, the **Disable PMT update during program substitution option** becomes visible. This option maintains the same PMT table version after a substitution event, as long as elementary stream structures match. This avoids possible set top box re-tuning and disruptions.

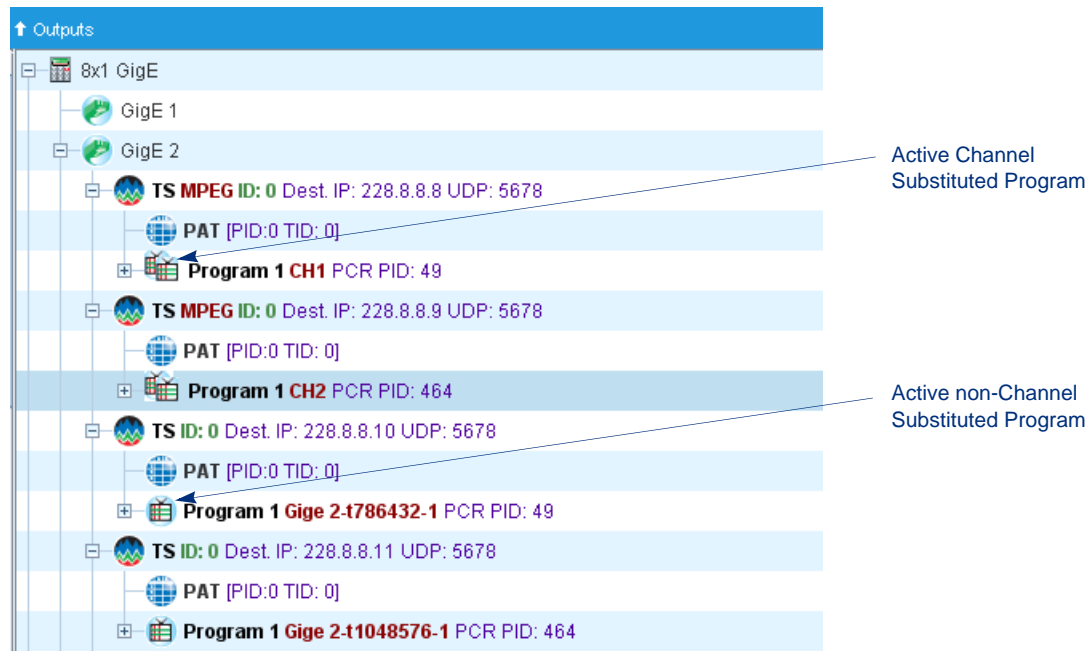
5. Select **Apply** or **Apply Configuration**.



Note: Program Substitution is not supported on a DPI-enabled transport stream or program; therefore, **DPI** and **Program Substitution** cannot be checked at the same time when configuring on the program level, nor can a channel substituted program be created under a DPI-enabled transport stream.

The *VMG Element Manager* displays channel substituted programs in the **Grooming -> Mapping** tab page as a different program icon. When Program Substitution is configured and active on a program, a program icon will be displayed one on top of the other as seen in Figure 200. (For a complete description of icons available in the **Mapping** tab page, see Table 57 on page 122.)

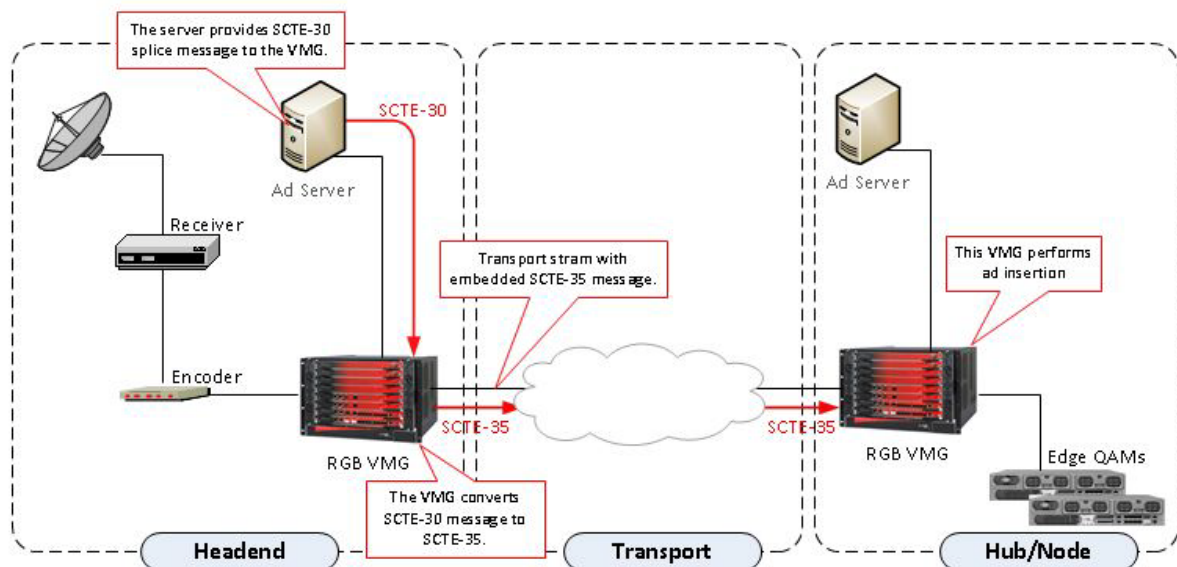
Figure 204. Channel Substituted Program Icon



SCTE 30 to SCTE 35 Conversion

The VMG is capable of receiving SCTE 30 splice messages from an ad server and converting them into SCTE 35 'cue-tone' messages at the program level. This allows DPI to be performed at the regional hub.

Figure 205. SCTE 30 to SCTE 35 Conversion



To enable SCTE conversion:

1. Launch the *VMG Element Manager* and log in as the **Administrator**.
2. Create or modify a new output program as described in “Output Programs and Grooming” on page 157 and “Modifying and Deleting Input Transport Streams and Programs” on page 133.
 - If creating a program manually, the *Create Output Program* dialog opens (Figure 206).
 - If using the drag-and-drop program creation method the *Configure Program Mapping* screen opens (Figure 207).

Figure 206. Enable SCTE 30 to SCTE 35 Conversion (Manual Program Creation)

Figure 207. Enable SCTE 30 to SCTE 35 Conversion (Drag-and-Drop Program Creation)

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	16			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	17			Enter PID

3. Check the **SCTE 30 to 35 Conversion** box, and apply other settings in the screen, as required.

Note: *If enabling SCTE 30 to 35 Conversion, neither DPI nor Program Substitution should be enabled.*

4. Click **Apply Configuration**.

Note: *Once enabled, the transport stream will only perform conversions. No splicing is performed.*

SCTE 35 Cue Message Forwarding

The VMG is capable of forwarding SCTE 35 cue messages on an input program to a groomed output program.

Use the **Configure Program Mapping** screen (Figure 208) to enable SCTE 35 message forwarding:

1. Launch the *VMG Element Manager* and log in as the **Administrator**.
2. Create or modify a new output program as described in “[Using Drag-and-Drop to Create Output Programs](#)” on page 170 (only the drag-and-drop program creation or modification method is available for enabling this field).

Figure 208. Enable SCTE 35 Message Forwarding

Configure VTR Program Mapping

Grooming

Source

Port: Gige 1
 IP:UDP / TS ID: 239.9.9.9:9999 / 92
 Program Number: 1
 Program Name:

Destination

Port: Gige 4
 IP:UDP / TS ID: 230.8.8.8:2222 / 0
 Program Number: 1
 Program Name: Gige 4-t11-1
 TS Bitrate(Mbps): 38.0
 TS Type: MPEG-2

Component PIDs

Input Type	PID	Output Type	PID	Action
<input checked="" type="checkbox"/> SCTE Video	16			Enter PID
<input checked="" type="checkbox"/> AC-3 Audio eng	17			Enter PID

Quality of Service

Service Level: 0
 Max Video Bitrate(Mbps):

☐ Synchronize input and output program names
☒ Forward SCTE 35 Cue
☐ PMT PID:
☐ SCTE 30 to 35 Conversion
☐ Program DPI
☐ Program Substitution
☐ Disable PMT update during program substitution

Apply Configuration **Cancel**

3. Check the **Forward SCTE 35 Cue** box, and apply other settings, as required.

4. Click **Apply Configuration**.

Monitoring

The *VMG Element Manager* provides various methods you can use to view and control displays of error counts on input and output transport streams and elementary streams.

In This Chapter:

- “Bitrate Monitoring—MBR Transport Streams,” next.
- “Monitoring Input-Output Transport Streams” on page 292
- “Viewing Elementary Stream Traffic Details” on page 293
- “Displaying Error Statistics” on page 298.
- “Additional Monitoring Operations” on page 301.

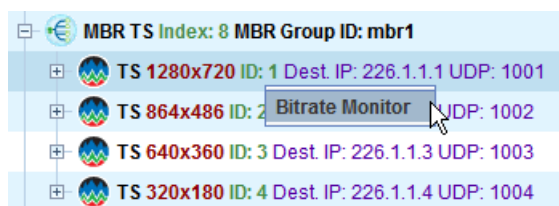
Bitrate Monitoring—MBR Transport Streams

To monitor the bitrate for an MBR program:



From the **Outputs** panel of the **Grooming** -> **Mapping** tab page, right-click on a transport stream within the MBR TS and select **Bitrate Monitor** from the popup menu (Figure 209).

Figure 209. MBR Bitrate Monitor



The *VMG Element Manager* opens the **Input-Output Bitrate Monitor** to display the input and output bitrates for the selected transport stream.



Note: *The Bitrate Monitor can only display the real-time bitrate for one transport stream and to one VMG Element Manager user at a time. Two transport streams cannot be simultaneously monitored.*

Monitoring Input-Output Transport Streams

To view monitoring detail for a transport stream, go to the **Input-Output Bitrate Monitor** tab page (Figure 210).



From the *VMG Element Manager* tabs, click the **Monitor** tab.

or

From the **Outputs** panel of the **Grooming** tab page, right-click a transport stream to monitor, and select **Bitrate Monitor** from the popup menu.

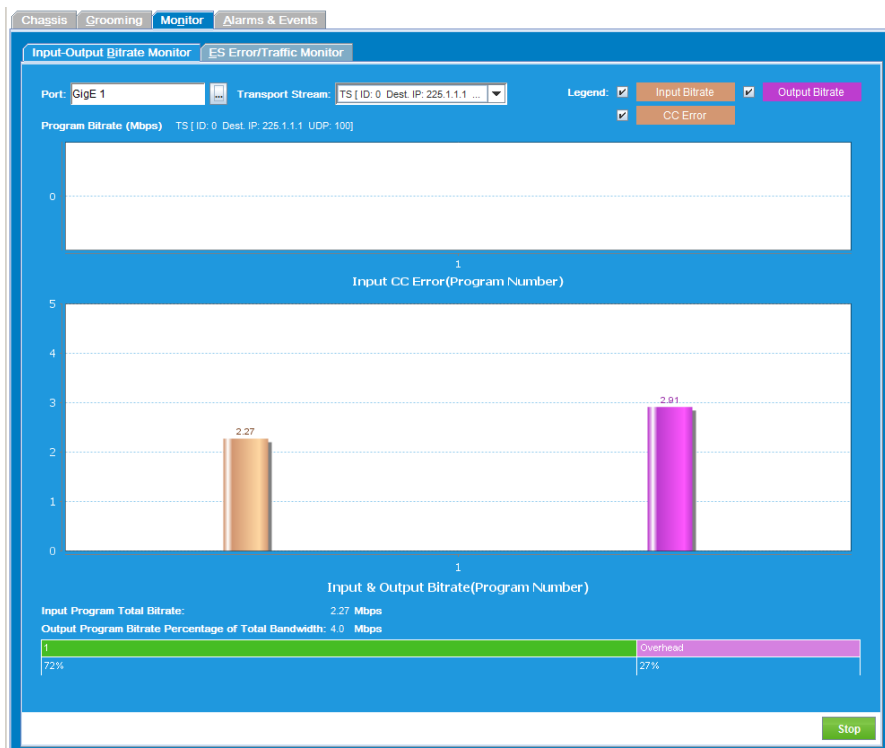
About the Bitrate Monitor Graph



Note: *The Bitrate Monitor can only display the real-time bitrate for one transport stream and to one VMG Element Manager user at a time. Two transport streams cannot be simultaneously monitored.*

To adjust the view on display, use the selectors across the top of the screen to select the port, transport stream, and legend information.

Figure 210. Bitrate Monitor Components



The input and output bitrates are shown in a bar graph by program number in the middle portion of the screen. At the bottom portion of the screen a program's percentage of the total output bitrate is displayed.

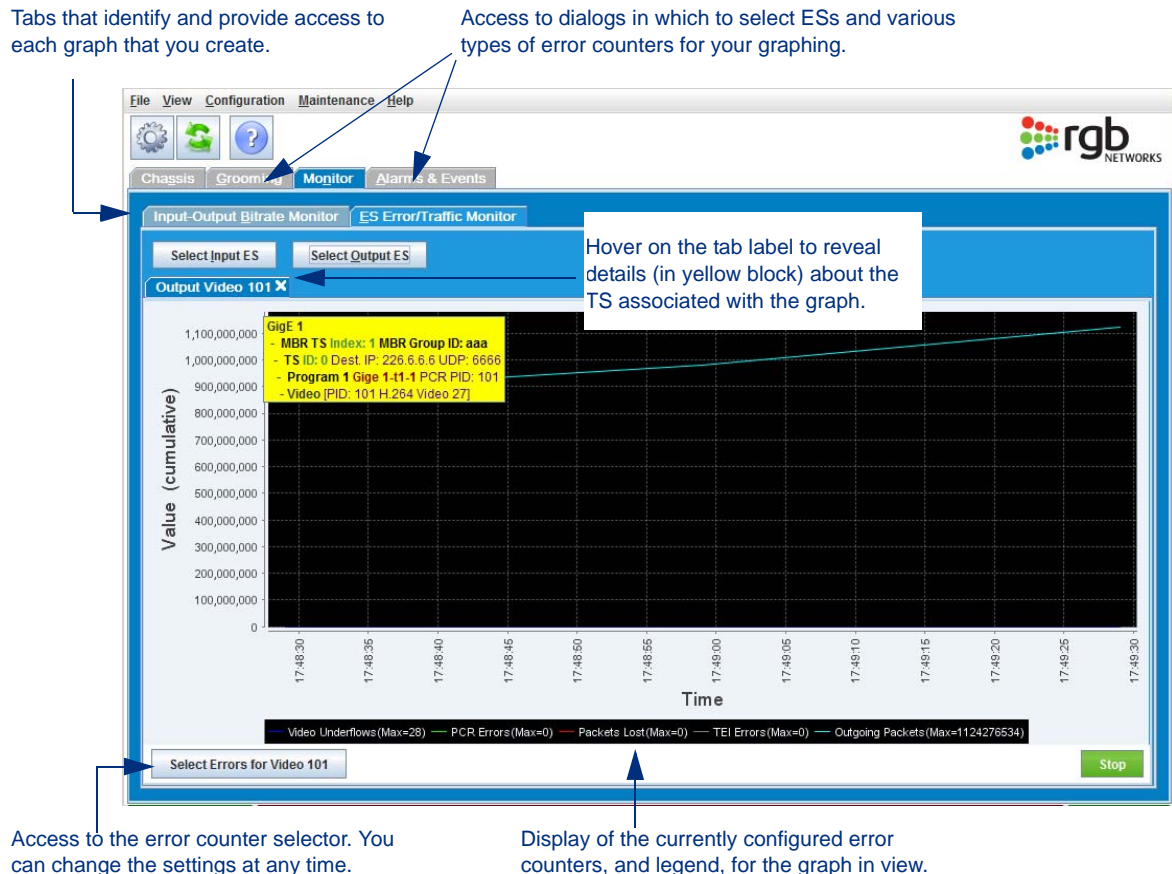
Use the **Start/Stop** button at the lower right of the screen to activate or halt display of the real-time monitoring display.

Viewing Elementary Stream Traffic Details

Use tools in the **Monitor** tab's **ES Error / Traffic Monitor** tab page (Figure 211) to define the individual input or output elementary streams and the monitoring parameters to be displayed as real-time graph, as described in the following topics:

- “Displaying Input ES Performance Graphs” on page 293.
- “Displaying Output ES Performance Graphs” on page 296.

Figure 211. Traffic Monitor Graph Components



Displaying Input ES Performance Graphs

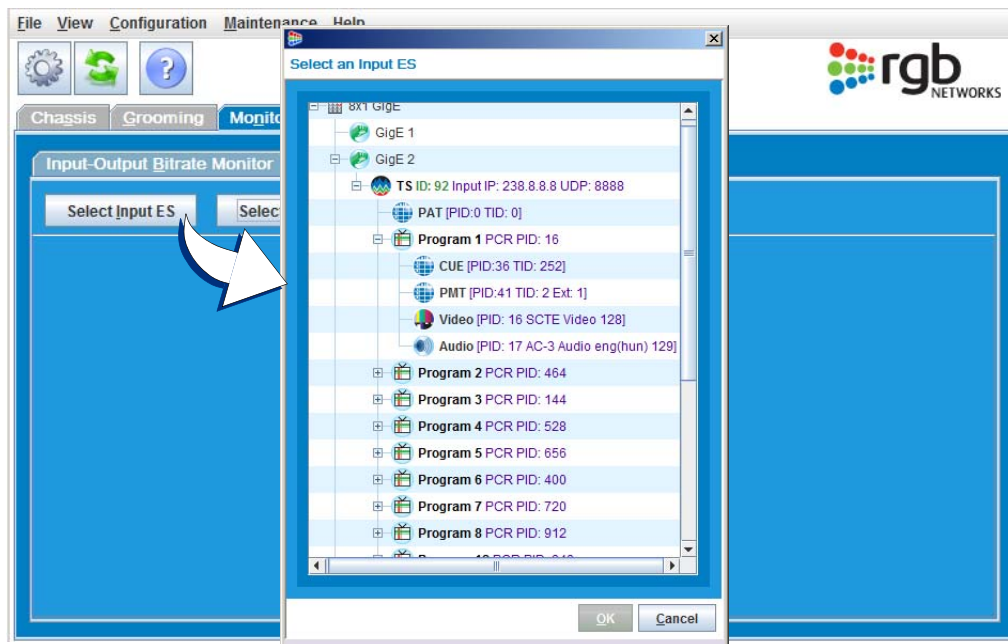
Use the **Select an Input ES** dialog (Figure 212) to select an audio or video input elementary stream and to define the monitoring information to be reported about a selected stream.



Starting at the *VMG Element Manager*, **Monitor** tab -> **ES Error/Traffic Monitor** tab page, click **Select Input ES**.

1. At the **Select Input ES** dialog, click on an audio or video ES. The **OK** button at the bottom of the screen should now be green.
2. Click the **OK** button to access parameters to chart audio ES or video ES performance.

Figure 212. Select an Input ES

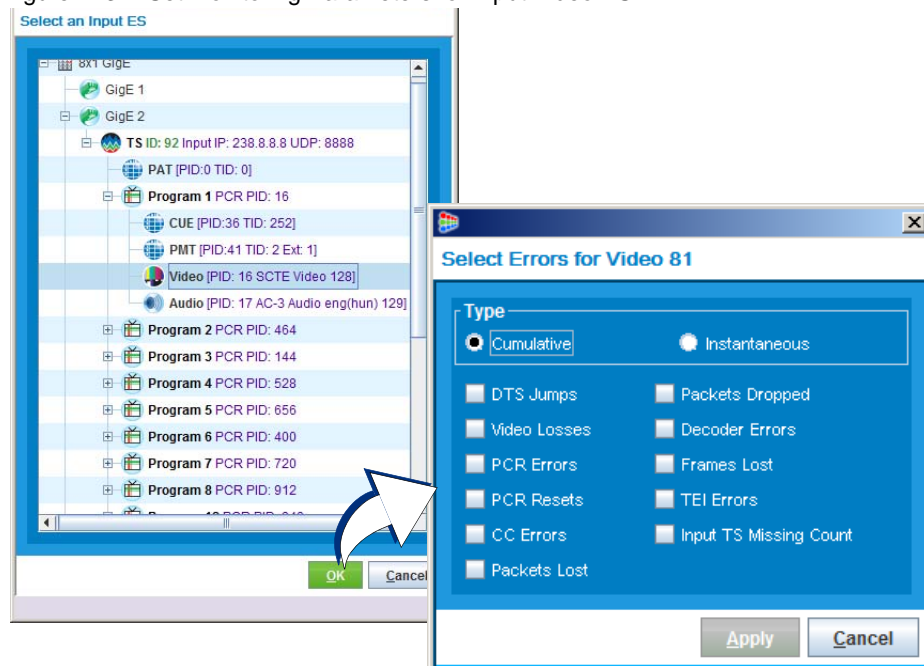


Input Video ES

Use the steps in this section to create a real-time graph that displays performance information about a selected input video ES.

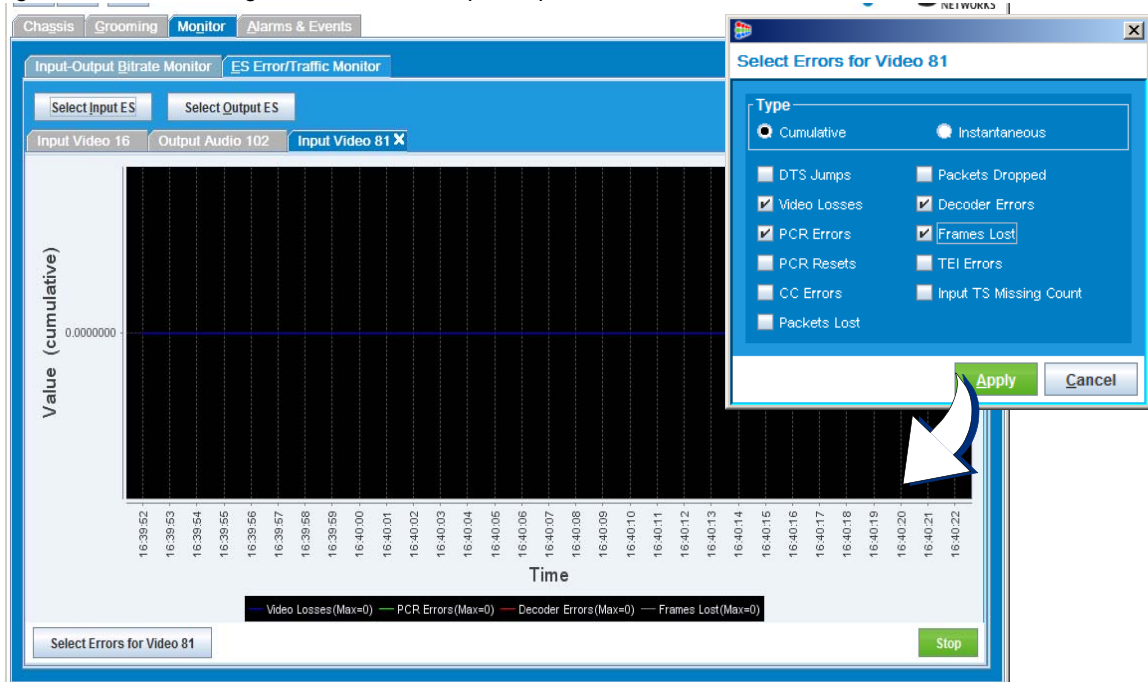
1. At the **Select an Input ES** dialog, select the video ES to be monitored, and click the green **OK** button to present the **Select Errors for Video** dialog (Figure 213).

Figure 213. Set Monitoring Parameters for Input Video ES



- At the **Select Errors for Video** dialog, click to check-mark the video monitoring options to be used, then click **Apply** to present the **Input Video** graph (Figure 214).

Figure 214. Generating a Performance Graph—Input ES Video

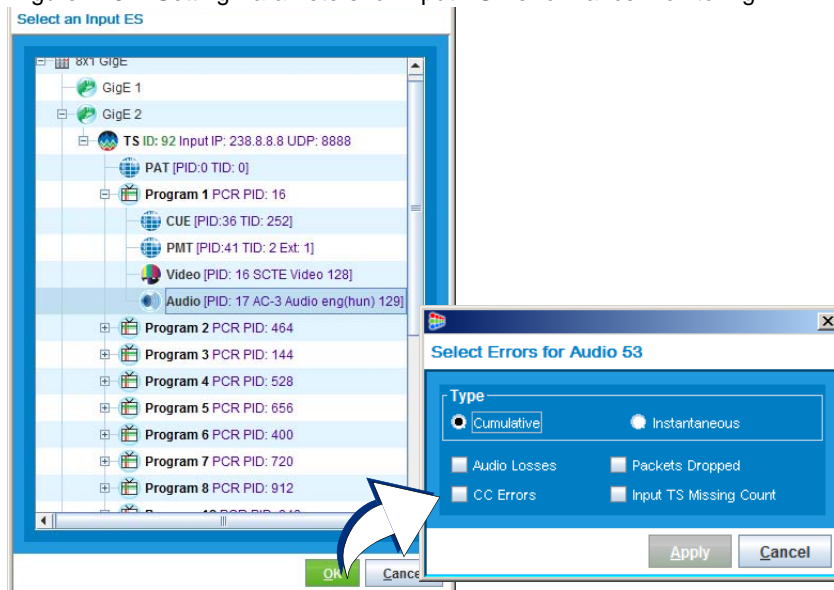


Input Audio ES

Use the steps in this section to create a real-time graph that displays performance information about a selected input audio ES.

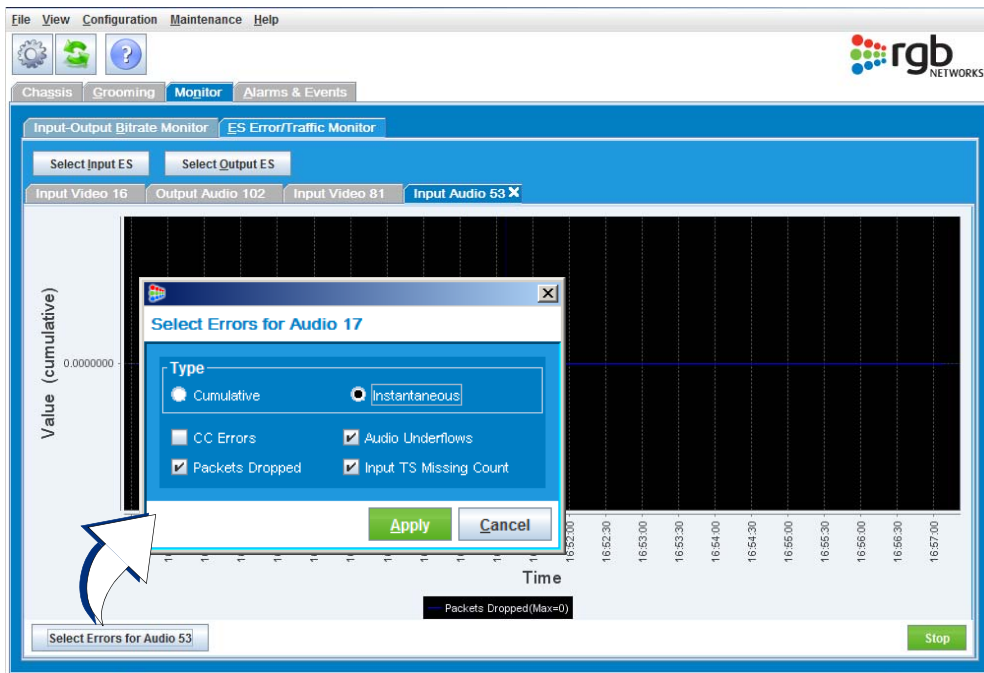
- At the **Select an Input ES** dialog, select the audio ES to be monitored, and click the green **OK** button to present the **Select Errors for Audio** dialog (Figure 215).

Figure 215. Setting Parameters for Input ES Performance Monitoring



- At the **Select Errors for Audio** dialog, click to check-mark the audio monitoring options to be used, then click **Apply** to present the **Input Audio** graph (Figure 216).

Figure 216. Generating a Performance Graph—Input ES Audio



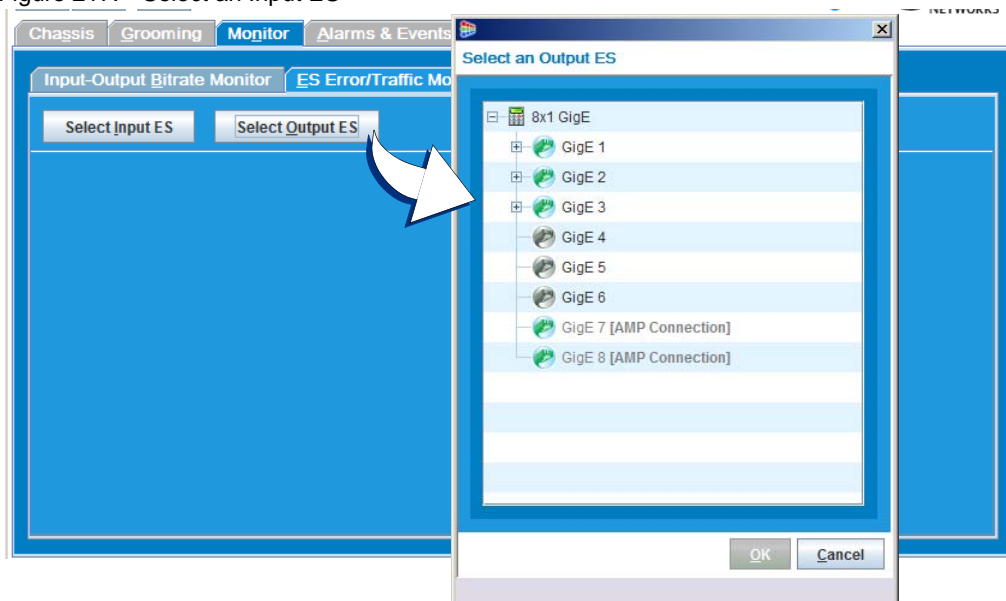
Displaying Output ES Performance Graphs

Use the **Select an Output ES** dialog to select an output elementary stream and to define the monitoring information to be reported about the selected stream.



At the *VMG Element Manager*, **Monitor** tab -> **ES Error/Traffic Monitor** tab page, click **Select Output ES**.

Figure 217. Select an Input ES



Output ES Audio

Use the steps in this section to create a real-time graph that displays performance information about a selected output audio ES.

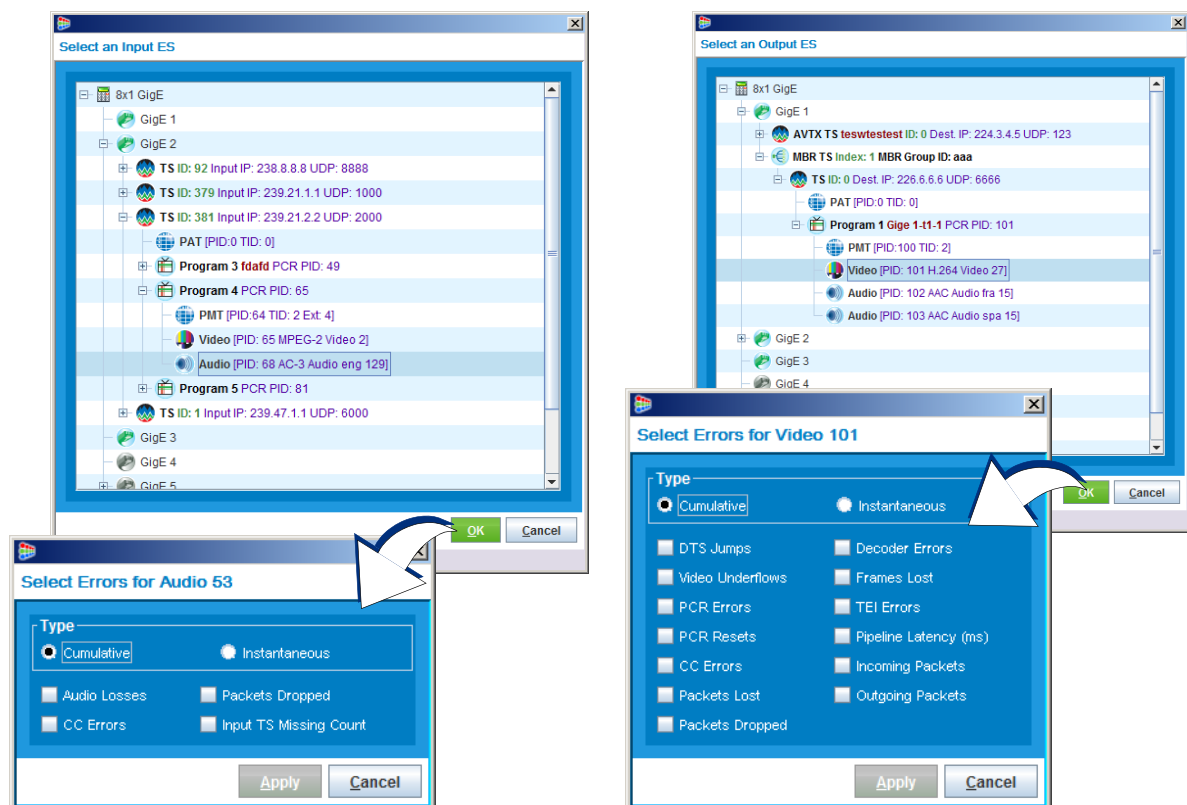
1. At the **Select an Input ES** dialog, expand a program and click the audio ES to be monitored. The **OK** button, at the bottom of the screen, should now be green (Figure 218).
2. Click the green **OK** button to present the **Select Errors for Audio** dialog.
3. At the **Select Errors for Audio** dialog, click to check-mark the monitoring options to be used, then click **Apply**.

Output ES Video

Use the steps in this section to create a real-time graph that displays performance information about a selected output video ES.

1. At the **Select an Input ES** dialog, click the video ES to be monitored. The **OK** button, at the bottom of the screen, should now be green (Figure 218).
2. Click the green **OK** button to present the **Select Errors for Video** dialog.
3. At the **Select Errors for Video** dialog, click to check-mark the monitoring options to be used, then click **Apply**.

Figure 218. Setting Parameters for Output ES Performance Monitoring



Displaying Error Statistics

You can view error statistics reported by the VMG, as described in the following topics:

- “Audio Elementary Stream Statistics,” in next section.
- “Video Elementary Stream Statistics” on page 299.

Audio Elementary Stream Statistics

This section describes how to access statistics for input and output audio elementary streams.

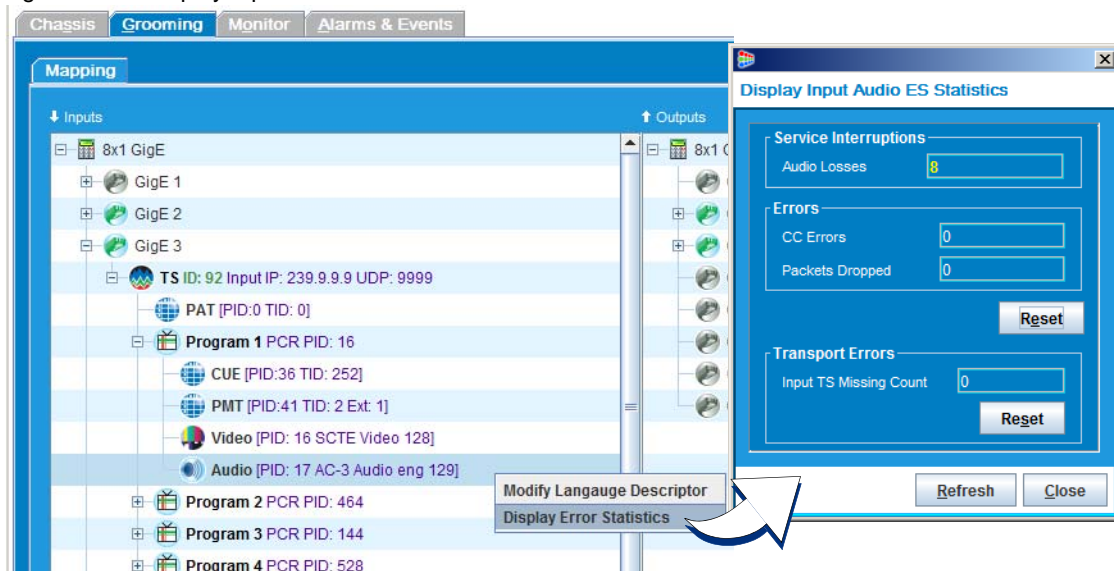
Input Errors

Use the **Display Input Audio ES Error Statistics** dialog (Figure 219) to view the errors reported by the VMG for a selected input audio elementary stream.



At the *VMG Element Manager*, **Grooming** tab -> **Mapping** tab page, **Inputs** column -> right-click on an audio ES, and select **Display Error Statistics** from the popup menu.

Figure 219. Display Input Audio ES Error Statistics



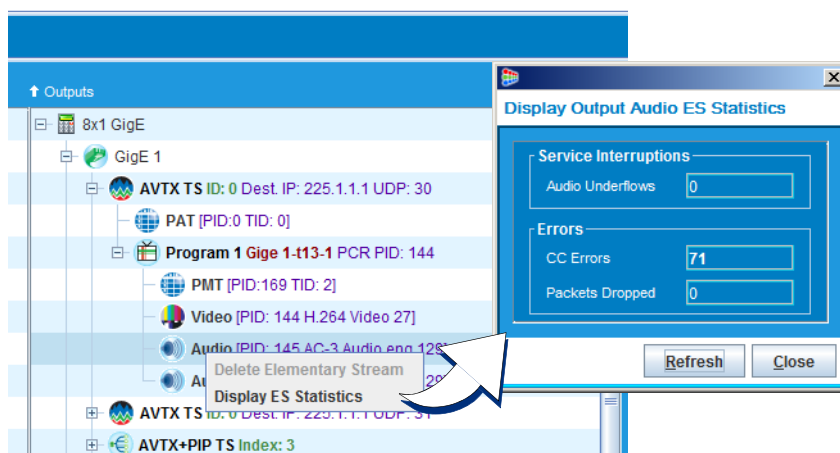
Output Errors

Use the **Display Output Audio ES Statistics** dialog to view the errors reported by the VMG for a selected output audio elementary stream.



At the *VMG Element Manager*, **Grooming** tab -> **Mapping** tab page, **Outputs** column -> right-click on an audio ES, and select **Display ES Statistics** from the popup menu.

Figure 220. Display Output Audio ES Error Statistics



Video Elementary Stream Statistics

This section describes how to access statistics for input and output video elementary streams.

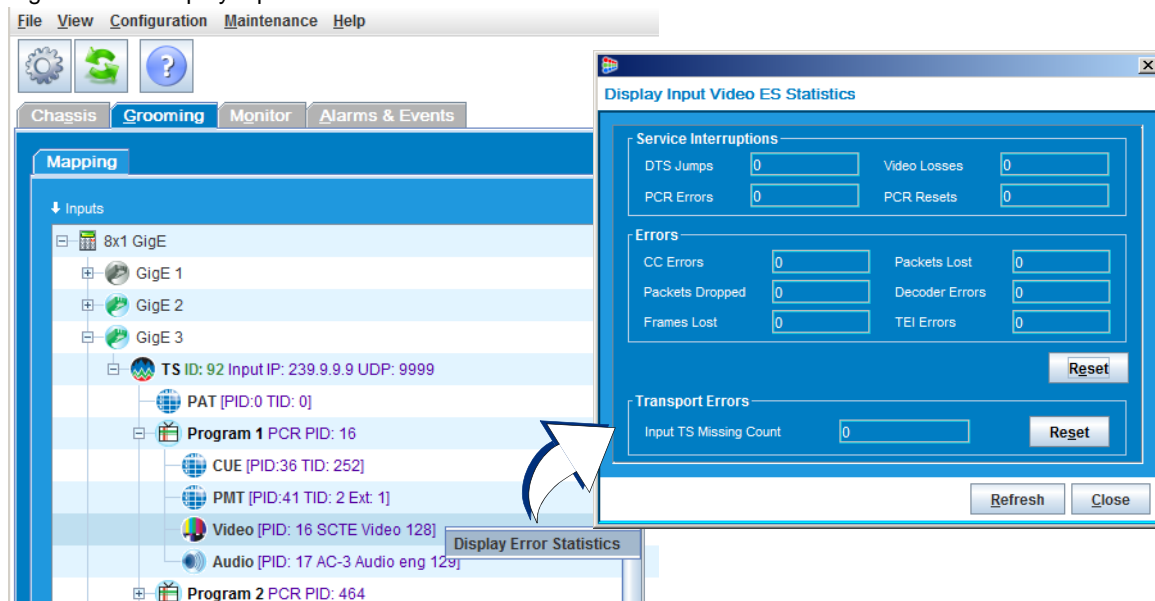
Input Video Statistics

Use the **Display Input Video ES Error Statistics** dialog (Figure 221) to view various types of error counts associated with the selected video elementary stream.



At the *VMG Element Manager*, **Grooming** tab --> **Mapping** tab page, **Inputs** column -> right-click on a video ES, and select **Display Error Statistics** from the popup menu.

Figure 221. Display Input Video ES Error Statistics



Output Video Statistics

Use the Display Output Video ES Statistics dialog (Figure 222) and to view the errors reported by the VMG for a selected output audio elementary stream.



At the *VMG Element Manager*, **Grooming** tab --> **Mapping** tab page, **Outputs** column --> right-click on an audio ES, and select **Display ES Statistics** from the popup menu.

Figure 222. Display Output Video ES Errors

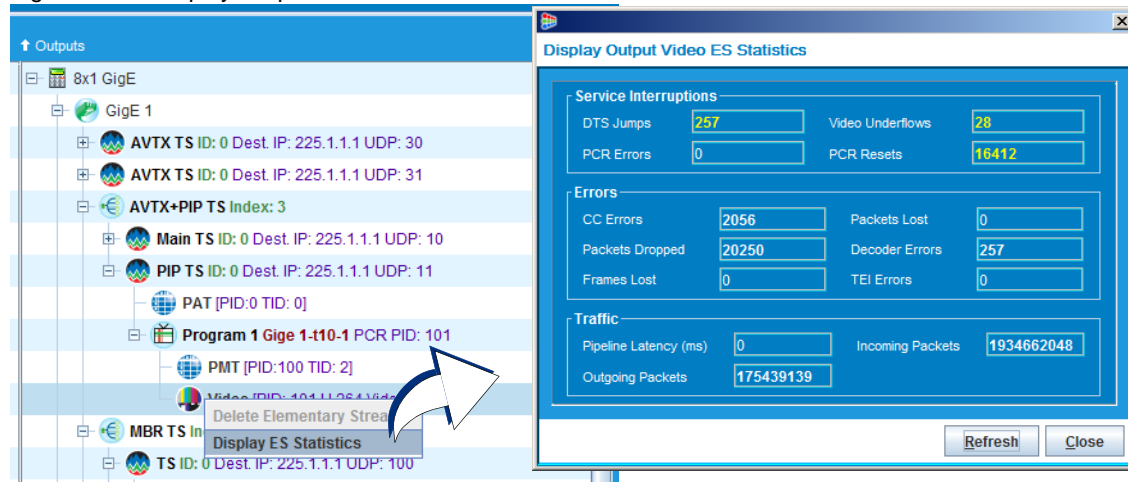


Table 119. Audio Error Counters

Field	Description
Type	<p>This setting controls how the audio errors are to be reported:</p> <p>Select either cumulative or Instantaneous:</p> <ul style="list-style-type: none"> • Cumulative: View number of audio errors, as accumulated since new grooming associated with the transport stream. • Instantaneous: View number of audio errors, as a delta value resultant of the previous poll and the current poll (polling occurs every 30 seconds).
CC Errors	Number of continuity counter errors reported on the audio stream.
Packets Dropped	Number of discarded packet errors reported on the audio stream.
Audio Underflows	Number of underflow errors reported on the audio stream.
Audio Loss	Number of audio loss errors reported on the input audio elementary streams.
Audio Underflow	Number of audio underflow errors reported on the input audio elementary stream.
Input TS Missing Count	Number of occurrences of PAT timeout (for 2 seconds) on an input audio transport stream.

Table 120. Video Error Counters

Field	Description
Type	<p>This setting controls how the video errors are to be reported:</p> <p>Select either cumulative or Instantaneous:</p> <ul style="list-style-type: none"> • Cumulative: View counts of video errors, as accumulated since new grooming associated with the transport stream. • Instantaneous: View number of audio errors, as a delta value resultant of the previous poll and the current poll (polling occurs every 30 seconds).
DTS Jumps	Number of DTS jumps reported on the video stream.
PCR Resets	Number of program clock reference errors reported on the video transport stream.
Video Underflows	Number of video underflow errors reported on the video stream.
Video Loss	Number of Video Loss errors reported on the output video stream.
Decoder Errors	Number of decoder errors reported on the video stream.
CC Errors	Number of continuity counter errors reported on the video stream.
Frames Lost	Number of frames reported as lost on the video stream.
Packets Lost	Number of packets reported as lost on the video stream.
TEI Errors	Number of transport error indicator instances on the video stream.
Packets Dropped	Count of packets dropped from the video elementary stream.
Input TS Missing Count	Count of input transport streams missing.
PCR Errors	Count of program clock errors.

Additional Monitoring Operations

Additional monitoring operations are available directly from a graph in view, via the popup menu (Figure 223 and Table 121).



At the *VMG Element Manager*, **Monitor** tab -> **ES Error/Traffic Monitor** tab page -> graph view, right-click on the graph to present the popup options.

Figure 223. Graph Page Options:

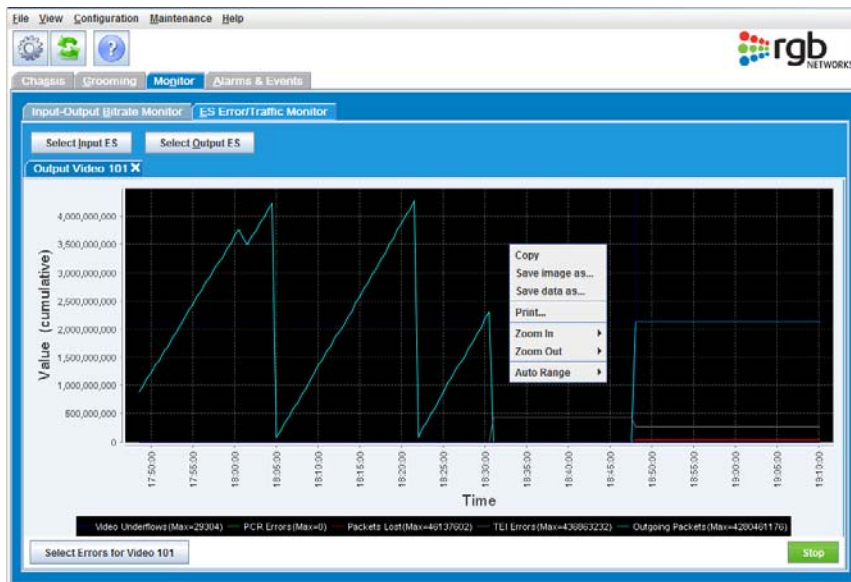


Table 121. Monitoring Page Options

Popup Menu Option	Description
Copy	Make a copy of the image currently in view. You can paste the image into any documentation platform.
Save Image as...	Preserve the image currently in view, as a graphic file in a specified location. This option presents the Save dialog, which allows you to specify the location and name for the (.png) image file.
Save data as...	Preserve details associated with the image currently in view, as a spreadsheet file (.csv) to a specified location. this option presents the Save dialog, which allows you to specify the location and name for the (.csv) file.
Print...	Send the image from your computer to the currently configured default printer, to obtain hardcopy of the graphic on display.
Zoom in...	• Both Axes:
Zoom out...	• Domain Axis:
Auto range...	• Range Axis:

Troubleshooting

If you are experiencing problems with your VMG, please contact RGB Customer Support. Prior to doing so, you should gather as much information as possible about the problem so that you can provide a comprehensive description of the situation to RGB Customer Support.

In This Chapter:

- “LED Indicators,” next.
- “Event Log Analysis” on page 303.
- “Software Upgrade” on page 303.
- “Contacting RGB Customer Support” on page 304.

LED Indicators

The LED indicators on the VMG should be your first line of inquiry if any VMG component is not performing correctly.

The LED indicators are fully described in the *VMG Hardware Setup Guide* that accompanies your VMG-6, VMG-8, or VMG-14 chassis.

Event Log Analysis

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

Software Upgrade

Use the *VMG Element Manager* to upgrade any software image of the VMG.

See “Reboot the VMG to enable activation of the restored database. Refer to “System Reboot” on page 103” on page 94 for details about upgrading software.

See the *Video Processing Gateway Software Upgrade Guide* for upgrade procedures.

Contacting RGB Customer Support



Note: For BNP products or software purchased through other distribution partners, please contact their customer service for product support.

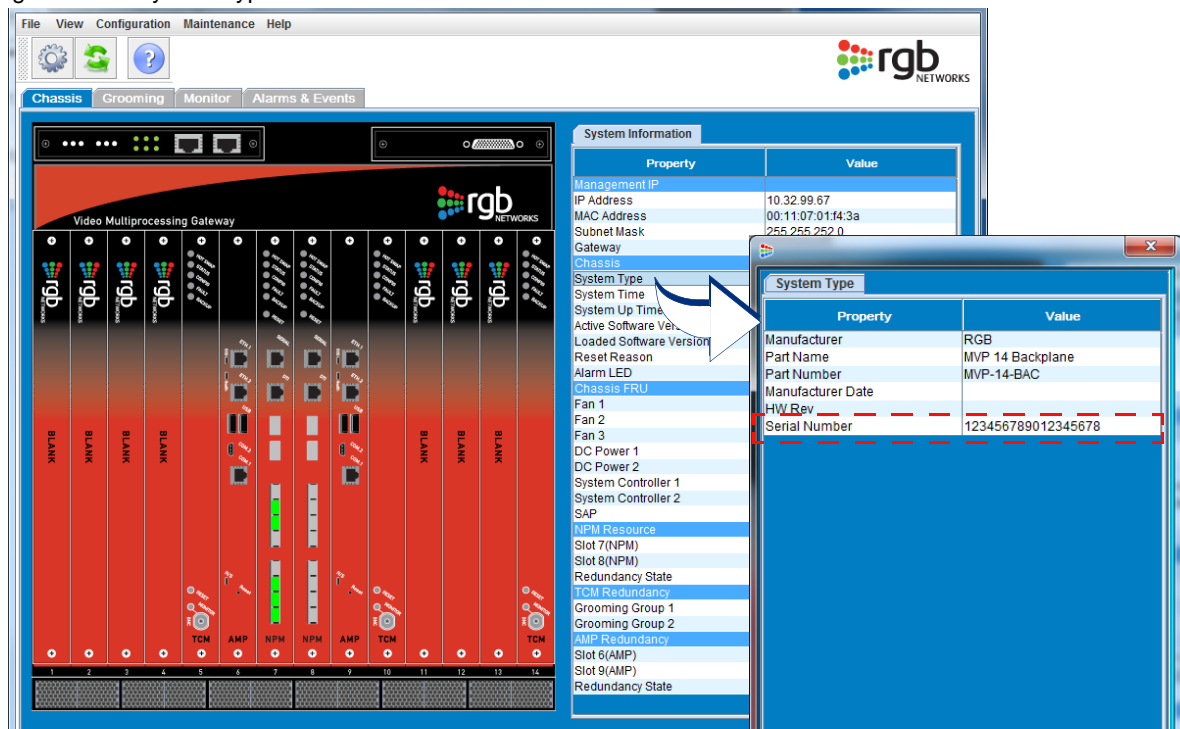
Before you contact Customer Support, have the following information handy:

- A clear description of the problem.
- Steps to reproduce the problem, if applicable.
- Serial number of the VMG, as shown in the **System Type** screen.



From the **Chassis** tab page, **System Information** -> Chassis section; double-click or right-click **System Type** -> **System Type** screen.

Figure 224. System Type screen



Customers who purchased their product directly from RGB Networks, or have purchased extended product support directly from RGB Networks should contact customer support via one of the methods listed in Table 122.

Table 122. Contacting Customer Support

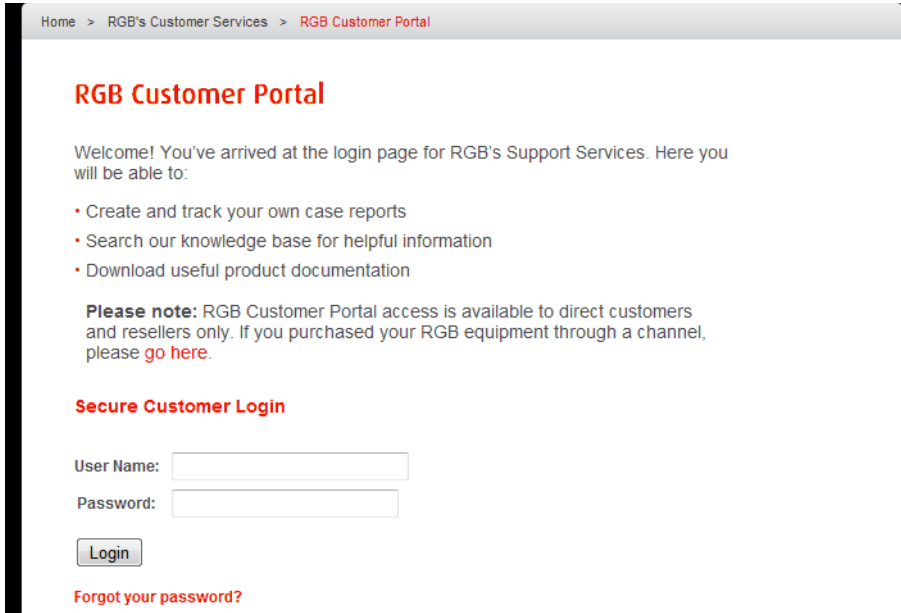
Method	Details
Phone	+1 (877) RGB-NETW (877-742- 6389) or +1 (408) 701-2800
Customer Portal	http://support.rgbnetworks.com
Email	support@rgbnetworks.com

Searching the RGB Customer Portal

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

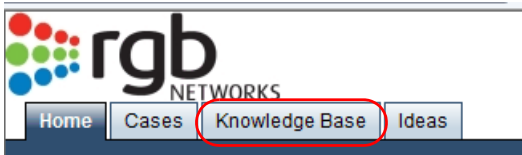
1. Log in to the [RGB Customer Portal](http://support.rgbnetworks.com) site (<http://support.rgbnetworks.com>).

Figure 225. RGB Customer Portal home page

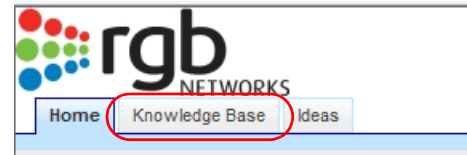


2. From the **RGB Customer Portal** home page, click on the **Knowledge Base** tab:

Figure 226. Customer Portal home page - Direct and Reseller



Direct Customers - RGB Customer Portal home



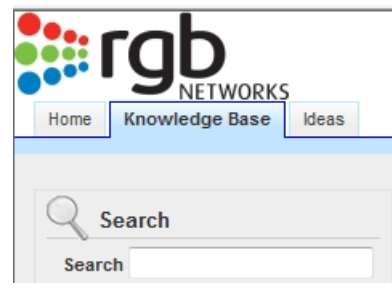
Resellers - RGB Customer Portal home

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

Figure 227. Knowledge Base search - Direct and Reseller



Direct Customers - Knowledge Base search



Resellers - Knowledge Base search

Configuration Reference

This appendix contains tables of supported sampling and bit rates for channels.

In This Appendix:

- “Audio Configuration Reference,”
- “Resolution Configuration Reference” on page 309
- “Locales and Decimal Entries” on page 310.
- “Dolby Dynamic Range Scale Entry Guidelines” on page 313
- “Video Profile Configuration Reference” on page 314.
- “Language Descriptor Settings” on page 314

Audio Configuration Reference

Table 123. Audio Bitrates and Sampling Rates

Audio Codec	Default Sample Rate (kHz)	Default Channels	Default Bitrate (Kbps)
HE-AAC	44.1	Stereo	80
HE-AACv2	44.1	Stereo	40
AAC-LC	44.1	Stereo	128
MPEG-1 LII	48	Stereo	192
MPEG-2 LII	24	Stereo	128
AC-3	48	Stereo	192

Table 124. AAC HE Audio Configuration Reference

Sampling Rate (kHz)	Channel	Bit Rates																			
		10	12	14	16	20	24	28	32	40	48	56	64	80	96	112	128	160	192	224	256
16	mono(1)	x	x	x	x	x	x	x	x	x											
	stereo(2)				x	x	x	x	x	x	x	x									
	surround(6)										x	x	x	x	x	x	x				
22.05	mono(1)	x	x	x	x	x	x	x	x	x	x										
	stereo(2)				x	x	x	x	x	x	x	x	x								
	surround(6)										x	x	x	x	x	x	x	x			
24	mono(1)	x	x	x	x	x	x	x	x	x	x										
	stereo(2)				x	x	x	x	x	x	x	x	x								
	surround(6)										x	x	x	x	x	x	x	x			
32	mono(1)				x	x	x	x	x	x	x	x									
	stereo(2)						x	x	x	x	x	x	x	x							
	surround(6)													x	x	x	x	x	x		

Table 124. AAC HE Audio Configuration Reference (Continued)

Sampling Rate (kHz)	Channel	Bit Rates																			
		10	12	14	16	20	24	28	32	40	48	56	64	80	96	112	128	160	192	224	256
44.1	mono(1)				x	x	x	x	x	x	x	x									
	stereo(2)								x	x	x	x	x	x							
	surround(6)													x	x	x	x	x	x	x	x
48	mono(1)				x	x	x	x	x	x	x	x									
	stereo(2)								x	x	x	x	x	x							
	surround(6)													x	x	x	x	x	x	x	x

Table 125. AAC HEv2 Audio Configuration Reference

Sampling Rate (kHz)	Channel	Bit Rates											
		10	12	14	16	20	24	28	32	40	48	56	64
16	stereo(2)	x	x	x	x	x	x	x	x	x			
22.05	stereo(2)	x	x	x	x	x	x	x	x	x	x		
24	stereo(2)	x	x	x	x	x	x	x	x	x	x		
32	stereo(2)				x	x	x	x	x	x	x	x	
44.1	stereo(2)				x	x	x	x	x	x	x	x	x
48	stereo(2)				x	x	x	x	x	x	x	x	x

Table 126. AAC LC Audio Configuration Reference

Sampling Rate (kHz)	Channel	Bit Rates																										
		6	7	8	10	12	14	16	20	24	28	32	40	48	56	64	80	96	112	128	160	192	224	256	320	384	448	512
8	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x														
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x										
11.03	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x													
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
12	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x													
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
16	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x										
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
	surround(6)										x				x	x	x	x	x	x	x	x						
22.05	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	surround(6)	x													x	x	x	x	x	x	x	x	x	x	x			
24	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x								
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	surround(6)	x													x	x	x	x	x	x	x	x	x	x	x			
32	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
	surround(6)	x																x	x	x	x	x	x	x	x	x		
44.1	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x			
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	surround(6)	x																x	x	x	x	x	x	x	x	x	x	x
48	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x				
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	surround(6)																		x	x	x	x	x	x	x	x	x	x

Table 127. MPEG-1 LII

Sampling Rate (kHz)	Channel	Bit Rates												
		32	48	64	80	96	112	128	160	192	224	256	320	384
32	mono(1)	x	x	x	x	x	x	x	x	x				
	stereo(2)			x		x	x	x	x	x	x	x	x	x
44.1	mono(1)	x	x	x	x	x	x	x	x	x				
	stereo(2)			x		x	x	x	x	x	x	x	x	x
48	mono(1)	x	x	x	x	x	x	x	x	x				
	stereo(2)			x		x	x	x	x	x	x	x	x	x

Table 128. MPEG-2 LII

Sampling Rate (kHz)	Channel	Bit Rates													
		8	16	24	32	40	48	56	64	80	96	112	128	144	160
16	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
22.05	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
24	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Table 129. Encode AC-3

Sampling Rate (kHz)	Channel	56	64	80	96	112	128	160	192	224	256	320	384	448	512
32	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)				x	x	x	x	x	x	x	x	x	x	x
	5.1surround(6)									x	x	x	x	x	x
44.1	mono(10)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)				x	x	x	x	x	x	x	x	x	x	x
	5.1surround(6)									x	x	x	x	x	x
48	mono(1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	stereo(2)				x	x	x	x	x	x	x	x	x	x	x
	5.1surround(6)									x	x	x	x	x	x

Resolution Configuration Reference

The resolutions currently supported for HD, full HD, or SD programming are listed in [Table 130](#) and [Table 131](#).

Table 130. HD Input Resolution Class

Yellow (high)	1280x720, 1024x576, 960x720, 960x540
Blue (medium)	864x486, 848x480, 768x432, 640x480
Red (low)	640x360, 624x352, 512x288, 480x368, 480x320, 480x272, 416x240, 352x240, 320x240, 320x180, 320x176, 192x192, 128x96, 96x96

Table 131. SD Input Resolution Class

Yellow (high)	1024x576
Blue (medium)	768x432, 720x576, 720x480, 640x480
Red (low)	640x360, 624x352, 512x288, 480x368, 480x320, 480x272, 448x336, 416x240, 400x360, 400x224, 352x288, 352x240, 320x240, 320x180, 320x176, 192x192, 128x96, 96x96

Table 132. Full HD Input Resolution Class

Green	1920x1080, 1280x720
--------------	---------------------

Resolutions can be combined as shown in [Table 133](#):

Table 133. Resolution Combinations for SD, HD, and Full HD

HD	SD	Full HD
<ul style="list-style-type: none"> • 1 Yellow + 1 Blue + 2 Red. • 1 Yellow + 3 Red. • 2 Blue + 2 Red. • 1 Blue + 3 Red. • 4 Red. 	<ul style="list-style-type: none"> • 2 Blue + 2 Red. • 1 Blue + 3 Red. • 4 Red. 	<ul style="list-style-type: none"> • 1 green

Locales and Decimal Entries

The VMG Element Manager will accept and display decimal values as commonly displayed for the language (and country) selected as the *Format* in the *Region and Language* menu from the control panel of Windows 7. In addition, either a period or a comma will be accepted during input of fields allowing a fractional value but will be displayed based on the *Format* defined by the selected language (and country).

Table 134. VMG Element Manager screens/values supporting localization

Input	Display	Screens	Effect
x	x	TS bitrate for several Create, Modify, and Configure screens	Rounded to nearest bit per second.
x	x	Video ES bitrate for several Create Modify, and Configure screens.	Rounded to the nearest bit per second.
x	x	Audio sample rates for several Create Modify and Configure screens.	Rounded to nearest bit per second.
x	x	Dynamic range scale low for Dolby global configuration.	Rounded to nearest tenth.
x	x	Dynamic range scale high for Dolby global configuration	Rounded to nearest tenth.
	x	Transrating bandwidth license (Mbps) at License Manager, for purchased, used, and available	Display only.
	x	DPI Bandwidth License (Mbps) at License Manager, for purchased, used, and available	Display only.
	x	Input-Output Bitrate Monitor, and Input Program Total Bitrate and TS Total Bitrate labels on graph bars.	Display only.
	x	Input-Output Bitrate Monitor and Input Program Total Bitrate and TS Total Bitrate labels at bottom of screen.	Display only.

Bitrate Configuration Reference

An automatic bitrate assignment can maximize the bitrate available for video streams within the configured range in the output transport stream. Automatic bitrate assignment also takes into account other (non-video) elementary streams in the output TS.



Note: For VTX+PIP streams, the VTX component is limited by the VTX/H.264 limits, and the PIP component is limited by the PIP/H.264 component.
For AVTX+PIP streams, the AVTX component is limited by the AVTX/H.264 limits, and the PIP component is limited by the PIP/H.264 component.

Guidelines for bitrate entries are provided in the following topics:

- “Bitrate Entry Guidelines,” next.
- “Bitrate Tables” on page 312.

Bitrate Entry Guidelines

The type of decimal mark symbol displayed and/or entered at the VMG *Element Manager*—to express a TS bitrate value—is dependent on the locale settings of the client computer logged in to VMG *Element Manager*. This symbol is either a comma (,) or a period (.) character, and it is used to designate the beginning of the fractional portion of the value entered to define a TS bitrate. For example, in Spain this value is written as 18,5 Mbps.

Figure 228. Sample TS Bitrate Entry—Using Comma Marks

L. Type	Name	TS	Audio	IP Address	Subnet Mask	UDP	Redundant IP Address	Redundant Subnet Mask	TS Bitrate (Mbps)	Audio Bitrate (kb/s)	Audio Video Bitrate	Video Bitrate (Mbps)
1/Main		0	<input checked="" type="checkbox"/>						18,5			0
2/PIP		0	<input checked="" type="checkbox"/>						18,5			1,5

Video Transcoding
 Input Resolution Class: HD
 Output Resolution Class: HD Video Type: H264

The VMG *Element Manager* rounds out and displays your bitrate entries as follows:

- For comma (,) decimal mark entries:
 If your entry extends beyond the 6th place, it is automatically rounded out to the nearest millionth, and the comma mark is displayed in the result. For example, an entry of 0,1234568 will be rounded up to display 0,123457.
 If you enter a period in place of the comma, the period will be converted to a comma and interpreted as a fractional value. For example, an entry of 4.5 will be converted and displayed as 4,5.
 - For period (.) decimal mark entries:
 If your entry extends beyond the 6th place, it is automatically rounded out to the nearest millionth, and the period mark is displayed in the result.
 For example, an entry of 0.1234568 will be rounded up to display 0.123457.
 If you enter a comma in place of the period, the comma will be converted to a period and interpreted as a fractional value. For example, an entry of 4,5 will be converted and displayed as 4.5.
- When the entered values are again displayed on another logged client, any fractional values will be displayed with the decimal mark symbol appropriate to the locale settings of that client computer.

Bitrate Tables

Table 135. AVTX/VTX Transcode Bitrates

Input Resolution Class	Output				
	Resolution Class	Type	Max TS TS Bitrate Range (Mbps)	Max V ES Video ES Bitrate Range (Mbps)	Audios
HD	HD	MPEG2	8 - 20	8 - 15	2
HD	HD	MPEG2	8 - 14	8 - 12	4
HD	SD	MPEG2	1 - 20	1 - 7	2
HD	SD	MPEG2	1 - 14	1 - 7	4
HD	HD	H.264	2 - 18.5	2 - 15	2
HD	HD	H.264	2 - 11	2 - 9	4
HD	SD	H.264	0.5 - 18.5	0.5 - 7	2
HD	SD	H.264	0.5 - 11	0.5 - 7	4
SD	SD	MPEG2	1 - 5	1 - 4	2
SD	SD	H.264	1 - 4.5	1 - 3	2
HD	PIP	H.264	0.1 - 1.2	0.1 - 1.0	0
SD	PIP	H.264	0.1 - 0.5	0.1 - 0.3	0

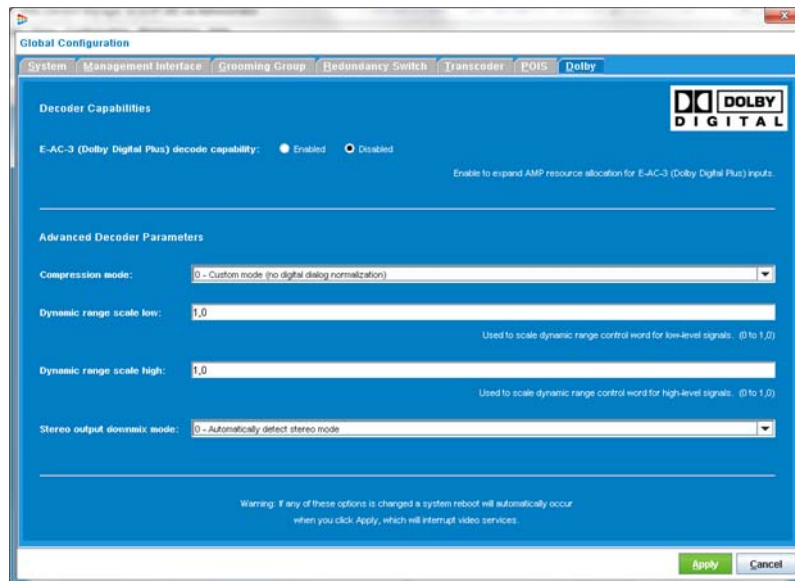
Table 136. MBR Transcode Bitrates

Input Resolution Class	Output					
	Resolution Class	Type	Profiles	Sum of TS	Sum of V ES	Audios
HD	Full HD	H.264	1	13	9	8
HD or SD	Not Full HD	H.264	4	13	9	2
HD or SD	Not Full HD	H.264	2	13	9	4
HD or SD	Not Full HD	H.264	1	13	9	8

Dolby Dynamic Range Scale Entry Guidelines

The type of decimal mark symbol displayed and/or entered at the VMG *Element Manager*—to express a Dolby Dynamic Range value—is dependent on the locale settings of the client computer logged in to VMG *Element Manager*. This symbol is either a comma (,) or a period (.) character, and it is used to designate the beginning of the fractional portion of the value entered to define Dolby Dynamic Range. For example, in Spain this value is written as 18,5 Mbps.

Figure 229. Sample Dolby Dynamic Range Values—Using Comma Marks



The VMG *Element Manager* rounds out and displays your Dynamic Range Scale entries as follows:

- For comma decimal mark entries:
If your entry extends beyond the 1st place, it is automatically rounded out to the nearest tenth, and the comma mark is displayed in the result. For example, an entry of 0,18 will be rounded up to display 0,2.
If you enter a period in place of the comma, the period will be converted to a comma and interpreted as a fractional value. For example, an entry of 0.5 will be converted and displayed as 0,5.
- For period decimal mark entries:
If your entry extends beyond the 1st place, it is automatically rounded out to the nearest tenth, and the period mark is displayed in the result. For example, an entry of 0.18 will be rounded up to display 0.2.
If you enter a comma in place of the period, the comma will be converted to a period and interpreted as a fractional value. For example, an entry of 0,5 will be converted and displayed as 0.5.

Video Profile Configuration Reference

Configuration for video profile applies to grooming with H.264, which sets the video standard to be used for specific classes of applications. Use guidelines in [Table 137](#) when selecting a Profile option.

Table 137. Video Profile Configuration Options

Option	Description
High	For broadcast and disc storage applications, particularly for high-definition television applications. Allows 8x8 transform size. For high-definition video where each video frame is large, the option to encode with a larger coding block allows the encoder to further improve coding efficiency. A high-end encoder can send out different scaling matrices based on the video content, which tends to offer a better subjective visual quality.
Main	For standard definition digital TV broadcasts that use the MPEG-4 formats including broadcasts as defined in the DVB standard. Allows B-slices and interlaced coding mode (MBAFF and PAFF). Also, it allows CABAC for entropy coding. It offers much better coding efficiency over the baseline profile. Therefore, most broadcast video is encoded at least with <i>Main</i> profile.
Baseline	for low-cost applications that require additional data loss robustness. <i>Baseline</i> is normally used in some video conferencing and mobile applications. Offers very basic coding tools. It can only encode progressive video and use I or P slices. Also, it allows CAVLC for entropy coding, a simpler but less efficient than CABAC. Many H.246 decoders running on PCs and mobile devices can only decode H.246 video encoded in the <i>Baseline</i> profile.

Language Descriptor Settings

Use the **Modify Language Descriptor** dialog, from a selected input audio elementary stream to specify one of the following languages ([Figure 138](#)):

Table 138. Audio input elementary stream language options

Language codes and Languages				
ara -Arabic	est -Estonian	isl -Icelandic	nld -dutch	spa -Spanish
bel -Belarusian	fin -Finnish	ita -Italian	nor -Norwegian	sqi -Albanian
bul -Bulgarian	fra -French	jpn -Japanese	pol -Polish	srp -Serbian
cat -Catalan	gle -Irish	kor -Korean	por -Portuguese	swe -Swedish
ces -Czech	heb -Hebrew	lav -Latvian	ron -Romanian	tha -Thai
dan -Danish	hin -Hindi	lit -Lithuanian	rus -Russian	tur -Turkish
deu -German	hrv -Croatian	mkd -Macedonian	slk -Slovak	ukr -Ukranian
ell -Greek	hun -Hungarian	mit -Maltese	slv -Slovenian	zho -Chinese
eng -English	ind -Indonesian	msa -Malay		

VMG Alarms and Events

This appendix is a reference for alarms and events supported by the VMG.

- Alarms are triggered directly by the VMG, and not by external sources.
- Events are triggered by both the VMG and external devices.

In This Appendix:

- “General VMG Alarm and Event Categories,” next.
- “VMG Alarm and Event Model” on page 315.
- “VMG Alarm and Event Severity Levels” on page 315.
- “VMG Hardware Alarms” on page 316.
- “Interface and Port (IF_PORT) Alarms” on page 318.
- Specific alarms and events—per category—as listed in Table 138.

General VMG Alarm and Event Categories

The alarms and events categories used by the VMG are listed in Table 138.

Table 138. VMG General Alarm and Event Categories

Category	Description	Reference
SYS	Alarms and events related to the VMG hardware, NTP service, and system shutdown.	“VMG Hardware Alarms” on page 316 “VMG Hardware Events” on page 319
IF_PORT	Alarms and events related to the VMG ports and interfaces.	“Interface and Port (IF_PORT) Alarms” on page 318 and “Interface and Port (IF_PORT) Events” on page 325
MPEG	Events related to video processing.	“Video Processing (MPEG) Events” on page 327
DPI	Events related to ad insertion.	“Ad Insertion (DPI) Events” on page 340
GRM	Events related to video grooming.	“Grooming (GRM) Events” on page 341
LIC	Events related to licensing for video operations.	“Licensing (LIC) Events” on page 343
CFG	Events related to configuration	“Configuration (CFG) Events” on page 344
ELM	Events related to Event and Alarm management.	“Event/Alarm Manager (ELM) Events” on page 344
AAA	Security events for Authentication, Authorization, and Accounting operations.	“Security (AAA) Events” on page 345
PGSUB	Events related to program substitution.	See also “Program Substitution (PgSub) Events” on page 347

VMG Alarm and Event Model

Alarms represent persistent error conditions due to faults in the VMG. Events are used to signify the start of a fault condition and raise an alarm. After a fault condition is resolved, another event is used to signify the end of the fault condition and clear the alarm. Alarms are cleared only by resolving the fault condition, not by an operator performing an administrative action. An alarm can be acknowledged by an operator allowing them to indicate that an alarm is known. The VMG records the acknowledgement of the alarm and performs no further processing on it.

Alarms and events are identified by area (or category) and type. Some alarms and events also include an instance parameter used to differentiate between identical components in the system. For example, the *Fan_Not_Present* event includes an instance parameter that indicates which fan in the system the alarm or event refers to. Other alarms and events include parameters that are simply used to provide specific information about the alarm or event.

VMG Alarm and Event Severity Levels

Severity levels reported by the VMG, for alarms and events, as listed in [Table 139](#).

Table 139. VMG alarm and event severity levels

Severity	Description
Critical	A severe, service-affecting condition has occurred and immediate corrective action is imperative.
Major	Hardware or software conditions that indicate a serious disruption of service, or the malfunctioning or failure of important hardware or software. Requires immediate attention and response to restore or maintain system functionality.
Minor	For issues that do not have a serious effect on service to customers or are not essential to the operation of the system.
Info	To raise attention to a condition that could possibly be an impending problem, or to notify the customer of an event that improves operation.

VMG Hardware Alarms

CARD_FAILURE

Card in main slot <SlotNum> has failed.

Explanation: The card in the specified slot has failed. No services are available

Severity: CRITICAL

Recommended Action(s): Replace the card in the affected slot.

CARD_NOT_PRESENT

No card in slot <slot#>with slot admin status <AdminStatus>.

Explanation: A card that is administratively enabled is not present.

Severity: CRITICAL

Recommended Action(s): Check that the card is present and working in the specific slot. If not, insert a working card. If the slot is meant to be empty, set the admin status of the slot to Disabled.

CARD_OPER_DOWN

Card in main slot<SlotNum> is operationally down.

Explanation: A card that is administratively enabled is operationally down.

Severity: CRITICAL

Recommended Action(s): (1) Verify the card in the specified slot has cables connected from enabled ports to active devices. (2) Verify that persistent storage (flash) has not been corrupted and it contains valid copies of kernel and application code, and configuration data.

CARD_OVERHEAT

Card in main slot <slot#> Current temp=<CurrentTemp#> exceeded threshold temp <ThresholdTemp#>)

Explanation: Card temperature exceeds the threshold.

Severity: CRITICAL

Recommended Action(s): (1) Check ambient temperature. (2) Check air flow.

CARD_TYPE_MISMATCH

Card in main slot <SlotNum> does not match configured type. Actual type is <Actual CardType>. Configured type is <ConfiguredCardType>.

Explanation: The card in the specified slot does not match the preconfigured card type.

Severity: MAJOR

Recommended Action(s): Either replace the card in the specified slot with the proper card type, or change the configuration of the specified slot to match the currently installed card type.

CFG_OUT_OF_SYNC

The configuration on standby NPM are out of sync.

Explanation: The configuration on standby NPM is out of sync.

Severity: CRITICAL

Recommended Action(s): Check the configuration at both NPMs.

CHASSIS_OVERHEAT

Chassis has overheated. Current temp=<CurrentTemp#> exceeded threshold temp=<Threshold Temp#>

Explanation: VMG chassis temperature exceeds the threshold.

Severity: CRITICAL

Recommended Action(s): (1) Check ambient temperature. (2) Check air flow. (3) Remove unused components.

CHASSIS_TEMP

Cooling state of chassis is <CoolingState>

Explanation: Chassis cooling state is 'cooling state.'

Severity: OTHER

Recommended Action(s): N/A

CHASSIS_TEMP_CRITICAL

Cooling state of chassis is Critical.

Explanation: Alarm status of chassis cooling state is critical.

Severity: CRITICAL

Recommended Action(s): Telnet from active NPM into 10.0.1.15 or 10.0.2.15 (depending on active NPM slot) and execute the command 'clia shelf -v cs' to get list of sensors in critical state.

CHASSIS_TEMP_MAJOR

Cooling state of chassis is Major.

Explanation: Alarm status of chassis cooling state is major.

Severity: MAJOR

Recommended Action(s): Telnet from active NPM into 10.0.1.15 or 10.0.2.15 (depending on active NPM slot) and execute the command 'clia shelf -v cs' to get list of sensor in critical state.

CHASSIS_TEMP_MINOR

Cooling state of chassis is Minor.

Explanation: Alarm status of chassis cooling state is minor.

Severity: MINOR

Recommended Action(s): Telnet from active NPM into 10.0.1.15 or 10.0.2.15 (depending on active NPM slot) and execute the command 'clia shelf -v cs' to get list of sensor in critical state.

FAN_NOT_PRESENT

No fan (or fan tray) present in slot <SlotNum>.

Explanation: The specified slot does not contain a fan or fan tray.

Severity: CRITICAL

Recommended Action(s): Install a fan or fan tray in the specified slot.

POWER_SUPPLY_NOT_PRESENT

No power supply <PEMType> present in slot <slot#>

Explanation: A power supply (power entry module: PEM) is not present.

Severity: CRITICAL

Recommended Action(s): Install a power supply in the specified slot.

POWERSUPPLY_NOT_PRESENT

No power supply (PEM) present in slot <SlotNum>.

Explanation: A power supply (power entry module: PEM) is not present in the specified slot.

Severity: CRITICAL

Recommended Action(s): Install a power entry module in the specified slot.

SHELFMGR_NOT_PRESENT

No shelf manager in slot <SlotNum>.

Explanation: A shelf manager is not present in the specified slot.

Severity: CRITICAL

Recommended Action(s): Install a shelf manager in the specified slot.

SYS_NOT_REDUNDANT

System not redundant.

Explanation: The system does not currently support redundancy.

Severity: CRITICAL

Recommended Action(s): Install two working NPMs in the VMG chassis and ensure they are configured for redundancy.

Interface and Port (IF_PORT) Alarms

CFG_PORT_MIRROR_DISABLE

Config change: <p n="PortType"/> port <p n="PortNum"/> is mirror-to disabled

Explanation: A port mirror is changed to disabled.

Severity: INFO

Recommended Action(s): N/A

CFG_PORT_MIRROR_ENABLE

Config change: <p n="PortType"/> port <p n="PortNum"/> is mirror-to enabled

Explanation: A port mirror is changed to enabled.

Severity: INFO

Recommended Action(s): N/A

PORT_OPER_DOWN

<PortType> port <PortNum> is operationally down with admin status <AdminStatus>

Explanation: A port that is administratively enabled is operationally down.

Severity: MAJOR

Recommended Action(s): Verify the specified port has a cable connected to an active device.

VMG Hardware Events

ACT_CARD_RESET

Action: Card in main slot <SlotNum> reset.

Explanation: The specified card has been reset.

Severity: INFO

Recommended Action(s): N/A

ACT_SET_TIME

Action: current time set to <CurrentTime>.

Explanation: The current time has been reset by a VMG *Element Manager* operator.

Severity: INFO

Recommended Action(s): N/A

ACT_SWO_STARTED

Action: A switchover has started due to <SwitchoverReason>.

Explanation: A switchover has begun.

Severity: MAJOR

Recommended Action(s): N/A

ACT_SYSTEM_REBOOT

Action: System rebooted.

Explanation: The system was rebooted.

Severity: INFO

Recommended Action(s): N/A

ACT_SYSTEM_SHUTDOWN

Action: System shutdown.

Explanation: The system was shut down.

Severity: INFO

Recommended Action(s): N/A

CARD_FAILURE

Card in main slot <SlotNum> has failed.

Explanation: The card in the specified slot has failed. No services are available

Severity: CRITICAL

Recommended Action(s): Replace the card in the specified slot.

CARD_NOT_PRESENT

No card present in slot <SlotNum> with slot admin status <AdminStatus>.

Explanation: An administratively enabled card is not present in the specified slot.

Severity: CRITICAL

Recommended Action(s): Insert a working card in the specified slot. If the slot is meant to be empty, set the admin stats of the slot to disabled.

CARD_OPER_DOWN

Card in main slot <SlotNum> is operationally down.

Explanation: A card is operationally down in the specified slot.

Severity: INFO

Recommended Action(s): N/A

CARD_OPER_UP

Card in main slot <SlotNum> is operationally up.

Explanation: Status of the specified card is operationally up.

Severity: INFO

Recommended Action(s): N/A

CARD_PRESENT

Card present in main slot <SlotNum>.

Explanation: A card is present in the specified slot.

Severity: INFO

Recommended Action(s): N/A

CARD_RESET_DL_DOWN

Action: Card in main slot <SlotNum> reset due to internal (DL) error.

Explanation: The card in the specified slot has been reset, due to an internal (DL) error.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

CARD_RESET_FAILED

Reset of card in main slot <SlotNum> failed.

Explanation: A reset operation on the specified card has failed.

Severity: CRITICAL

Recommended Action(s): Replace the specified card.

CARD_RESET_PPC_LOST

Action: Card in main slot <SlotNum> reset due to loss of PPC heartbeat.

Explanation: The card in the specified slot has been reset, due to loss of PPC heartbeat.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

CARD_RESET_SUCCEEDED

Reset of card in main slot <SlotNum> succeeded.

Explanation: A reset operation on the specified card was successful.

Severity: INFO

Recommended Action(s): N/A

CARD_TYPE_MISMATCH

Card in main slot <SlotNum> does not match configured type.
Actual type is <ActualCardType>. Configured type is
<ConfiguredCard Type>.

Explanation: The card in the specified slot does not match the pre-configured card type.

Severity: MAJOR

Recommended Action(s): Either replace the card in the specified slot with the proper card type, or change the configuration of the specified slot to match the currently installed card type.

CFG_CARD_ADMIN_DISABLED

Config change: Card in main slot <SlotNum> admin disabled.

Explanation: Configuration change: the card in the specified slot was administratively disabled.

Severity: INFO

Recommended Action(s): N/A

CFG_CARD_ADMIN_ENABLED

Config change: Card in main slot <SlotNum> admin enabled.

Explanation: Configuration change: the card in the specified slot was administratively enabled.

Severity: INFO

Recommended Action(s): N/A

CFG_NTP_IPADDR

Config changed: IP address for NTP server.

Explanation: Configuration change: the IP address for an NTP server has been changed.

Severity: INFO

Recommended Action(s): N/A

CFG_SWO_ENABLED

Config change: System switchover is enabled.

Explanation: Configuration change: system switchover is now enabled.

Severity: INFO

Recommended Action(s): N/A

CFG_SWO_INHIBITED

Config change: System switchover is inhibited.

Explanation: Configuration change: system switchover is inhibited.

Severity: INFO

Recommended Action(s): N/A

CFG_Timezone

Config changed: Time zone is now <TimeZone>.

Explanation: Configuration change: the system time zone has been changed.

Severity: INFO

Recommended Action(s): N/A

CHASSIS_TEMP_CRITICAL

Cooling state of chassis is Critical.

Explanation: Status of the chassis temperature is now critical severity.

Severity: CRITICAL

Recommended Action(s): N/A

CHASSIS_TEMP_MAJOR

Cooling state of chassis is Major

Explanation: Status of the chassis temperature is now major severity.

Severity: MAJOR

Recommended Action(s): N/A

CHASSIS_TEMP_MINOR

Cooling state of chassis is Minor

Explanation: Status of the chassis temperature is now minor severity.

Severity: MINOR

Recommended Action(s): N/A

FAN_NOT_PRESENT

No fan (or fan tray) present in slot <SlotNum>.

Explanation: The specified slot does not contain a fan or fan tray.

Severity: CRITICAL

Recommended Action(s): Install a fan or fan tray in the specified slot.

FAN_PRESENT

Fan (or fan tray) present in slot <SlotNum>.

Explanation: A fan or fan tray is present in the specified slot.

Severity: INFO

Recommended Action(s): N/A

NPM_ACTIVE

NPM card in slot <SlotNum> is now active.

Explanation: The NPM in the specified slot is now in active state.

Severity: INFO

Recommended Action(s): N/A

NPM_STANDBY

NPM card in slot <SlotNum> is now standby.

Explanation: The NPM in the specified slot is now in standby state.

Severity: INFO

Recommended Action(s): N/A

POWERSUPPLY_NOT_PRESENT

No power supply (PEM) present in slot <SlotNum>.

Explanation: A power entry module (PEM) is not present in the specified slot.
This event applies only to the VMG-14.

Severity: CRITICAL

Recommended Action(s): Install a PEM in the specified slot of the VMG-14.

POWERSUPPLY_NOT_PRESENT

No power supply <PEMType> present in slot <SlotNum>.

Explanation: Power supply is not present in the VMG.

Severity: CRITICAL

Recommended Action(s): Verify hardware.

POWERSUPPLY_PRESENT

Power supply (PEM) present in slot <SlotNum>.

Explanation: A PEM is present in the specified slot.

Severity: INFO

Recommended Action(s): N/A

SHELFMGR_NOT_PRESENT

No shelf manager present in slot <SlotNum>.

Explanation: A shelf manager is not present in the specified slot.

Severity: CRITICAL

Recommended Action(s): Install a shelf manager in the specified slot.

SHELFMGR_PRESENT

Shelf manager present in slot <SlotNum>.

Explanation: A shelf manager is present in the specified slot.

Severity: INFO

Recommended Action(s): N/A

SWO_FAILED

Switchover failed.

Explanation: The switchover operation failed.

Severity: CRITICAL

Recommended Action(s): Reboot the system.

SWO_SUCCEEDED

Switchover completed successfully and NPM in slot <SlotNum> is active.

Explanation: The switchover operation has succeeded.

Severity: INFO

Recommended Action(s): N/A

SYS_FULLY_REDUNDANT

System is fully redundant.

Explanation: The system is fully redundant: two NPMs are installed and operational. One NPM is active, and the other is in standby mode.

Severity: INFO

Recommended Action(s): N/A

SYS_NOT_REDUNDANT

System not redundant.

Explanation: The system is not currently supporting NPM redundancy, and redundancy was expected.

Severity: CRITICAL

Recommended Action(s): Install two working NPMs in the VMG chassis, and ensure they are configured for redundancy.

Interface and Port (IF_PORT) Events

CFG_DATA_PORT

Config changed: Auto negotiation on <PortType> port <PortNum> changed to <auto_neg>.

Explanation: Configuration change: the auto negotiation settings for the specified port has changed.

Severity: INFO

Recommended Action(s): N/A

CFG_GROOM_GRP

Config changed: Port Group Gige 1-Gige 8 is admin <AdminState1>; Port group 10 Gige 1 is admin <AdminState2>; Port group 10 Gige 2 is admin <AdminState3>.

Explanation: Configuration change: A modification has occurred on the grooming group.

Severity: INFO

Recommended Action(s): N/A

CFG_IF

Configuration changed for interface on <PortType> <IfId>.

Explanation: Configuration change: the configuration of the specified interface has been modified.

Severity: INFO

Recommended Action(s): N/A

CFG_IF_ADD Interface created on <PortType> <IfId>.

Explanation: Configuration change: the specified interface was created.

Severity: INFO

Recommended Action(s): N/A

CFG_IF_DEL Interface deleted on <PortType> <IfId>.

Explanation: Configuration change: the specified interface was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_MGMT_IF

Config change: Mgmt interface to IP address <ipAddr>, net mask <netMask>, and gateway <defGway>.

Explanation: Configuration change: changes were made to the specified management interface.

Severity: INFO

Recommended Action(s): N/A

CFG_PORT_ADMIN_DISABLED

Config change: <PortType> port <PortNum> is admin disabled.

Explanation: Configuration change: the administrative status of the specified port was disabled.

Severity: INFO

Recommended Action(s): N/A

CFG_PORT_ADMIN_ENABLED

Config changed: <PortType> port <PortNum> is admin enabled.

Explanation: Configuration change: the administrative status of the specified port was enabled.

Severity: INFO

Recommended Action(s): N/A

IF_OPER_DOWN

Interface on <PortType> <IfId> is operationally down.

Explanation: The status of the specified interface is operationally down. The status of an interface matches that of the port on which it is configured.

Severity: INFO

Recommended Action(s): change the status of the port on which the specified interface is configured.

IF_OPER_UP

Interface on <PortType> <IfId> is operationally up.

Explanation: The status of the specified interface is operationally up.

Severity: INFO

Recommended Action(s): N/A

PORT_OPER_DOWN

<PortType> port <PortNum> with admin status <AdminStatus> is operationally down.

Explanation: The status of the specified port is operationally down.

Severity: INFO

Recommended Action(s): Verify there is a cable connected from the specified port to an active network device.

PORT_OPER_UP

<PortType> port <PortNum> is operationally up.

Explanation: The status of the specified port is operationally up.

Severity: INFO

Recommended Action(s): N/A

Video Processing (MPEG) Events

CFG_InEs

InEs modified: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum> ES <InEsIdx> Pid <InEsPid>.

Explanation: An input elementary stream was modified.

Severity: INFO

Recommended Action(s): N/A

CFG_InEs_ADD

InEs created: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum>.

Explanation: An input elementary stream was created.

Severity: INFO

Recommended Action(s): N/A

CFG_InEs_DEL

InEs deleted: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum> ES <InEsIdx> Pid <InEsPid>.

Explanation: An input elementary stream was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_InPgm

InPg modified: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum>

Explanation: An input program was modified.

Severity: INFO

Recommended Action(s): N/A

CFG_InPgm_ADD

InPg created: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum>

Explanation: A ghost input program was created.

Severity: INFO

Recommended Action(s): N/A

CFG_INPgm_DEL

InPg deleted: TS <InTsIdx><InTsIp><InTsUdp> PG
<InPgIdx><InPgName><InPgNum>.

Explanation: An input program was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_InTS

InTS modified: Index <InTsIdx> Port <PortNum> IP <IP> UDP <UDP>.

Explanation: An input transport stream was modified.

Severity: INFO

Recommended Action(s): N/A

CFG_InTS_ADD

InTS created: Index <InTsIdx> Port <PortNum> IP <IP> UDP <UDP>.

Explanation: An input transport stream was created.

Severity: INFO

Recommended Action(s): N/A

CFG_InTS_DEL

InTS deleted: Index <InTsIdx> Port<PortNum> IP <IP> UDP <UDP>.

Explanation: An input transport stream was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_OutEs

OutEs modified: TS <OutTsIdx><OutTsIp><OutTsUdp> PG <OutPgIdx><OutPg Name><OutPgNum> ES <OutEsIdx> Pid <OutEsPid>.

Explanation: An output ES was modified.

Severity: INFO

Recommended Action(s): N/A

CFG_OutEs_ADD

OutEs created: TS <OutTsIdx><OutTsIp><OutTsUdp> PG <OutPgIdx><OutPg Name><OutPgNum> ES <OutEsIdx> Pid <OutEsPid>.

Explanation: An output ES was created.

Severity: INFO

Recommended Action(s): N/A

CFG_OutEs_DEL

OutEs deleted: TS <OutTsIdx><OutTsIp><OutTsUdp> PG <PutPgIdx><OutPg Name><OutPgNum> ES <OutEsIdx> Pid <OutEsPid>.

Explanation: An output ES was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_OutPgm

OutPg modified: TS <OutTsIdx> PG <OutPgIdx> Name <Name> Num <Num>.

Explanation: An output program was modified.

Severity: INFO

Recommended Action(s): N/A

CFG_OutPgm_Add

OutPg created: TS <OutTsIdx> PG <OutPgIdx> Name <Name> Num <Num>.

Explanation: An output program was created.

Severity: INFO

Recommended Action(s): N/A

CFG_OutPgm_DEL

OutPg deleted: TS <OutTsIdx> PG <OutPgIdx> Name <Name> Num <Num>.

Explanation: An output program was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_OutTS_ADD

OutTS created: Index <OutTsIdx> Port <PortNum> IP <IP> UDP <UDP>.

Explanation: An output transport stream was created.

Severity: INFO

Recommended Action(s): N/A

CFG_OutTS_DEL

OutTS deleted: Index <OutTsIdx> Port <PortNum> IP <IP> UDP <UDP>.

Explanation: An output transport stream was deleted.

Severity: INFO

Recommended Action(s): N/A

CFG_OutTS_MODIFY

OutTS modified: Index<OutTsIdx> Port<PortNum> IP <IP> UDP <UDP>.

Explanation: An output transport stream was modified.

Severity: INFO

Recommended Action(s): Verify output TS.

In_TS_NIT_Miss_clear

InTs (Gige <port>, <ipAddr>/<udp>) NIT recovered.

Explanation: The DVB Network Information Table was recovered for the input transport stream.

Severity: INFO

Recommended Action(s): N/A

In_TS_NIT_Miss_Set

InTs (Gige <port>, <ipAddr>/<udp>) NIT missing.

Explanation: The DVB Network Information Table timed out for the input transport stream.

Severity: INFO

Recommended Action(s): N/A

In_TS_SDT_Miss_Clear

InTs (Gige <port>, <ipAddr>/<udp>) SDT recovered.

Explanation: DVB Service Description Table recovered for the input transport stream.

Severity: INFO

Recommended Action(s): N/A

In_TS_SDT_Miss_Set

InTS (Gige <port>, <ipAddr><udp>) SDT missing.

Explanation: DVB Service Description Table timed out for the input transport stream.

Severity: INFO

Recommended Action(s): Source issue. Analyze the upstream stream.

Input_Audio_Loss

InTs: Audio underflow TS <InTsIdx> Port <PortNum> IP <IP> UDP <UDP> Pid <APID>.

Explanation: Audio underflow was detected for the specified input. This message identifies when a video elementary stream has detected no bitrate or packets on a defined PID.

This event is report to the trap server.

Severity: MINOR

Recommended Action(s): Verify the TS.

Input_Mismatch

The input <"reason" > <"state" > the configuration of the output_Ts at Port <PortNum"> IP <"IP"> UDP <"UDP">

Explanation: Input video mismatch with the configuration.

Severity: MAJOR

Recommended Action(s): Verify configuration

Input_TS_Missing

InTS: Missing <state> TS <InTsIdx> Port <PortNum> IP <IP> UDP <UDP>.

Explanation: A transport stream was missing for the specified input. This message identifies when a video elementary stream has detected no bitrate or packets on a defined PID.

This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): Verify the TS.

Input_Video_Encrypted

InTS: Video encrypted, no transrating possible slot <Slot> port <Port> IP <IP> UDP <UDP> Prog <PROG>.

Explanation: The input video appears encrypted. Transrating is not possible.

Severity: INFO

Recommended Action(s): Contact RGB Customer Support.

Input_Video_Loss

InTs: Video underflow TS <InTsIdx> Port <PortNum> IP <IP> UDP <UDP> Pid <VPID>.

Explanation: Video underflow was detected for the specified input. This message identifies when a video elementary stream has detected no bitrate or packets on a defined PID.

Severity: MINOR

Recommended Action(s): Verify the TS.

Out_TS_TDT_Miss_Clear

OutTS (Gige <port>, <ipAddr>/<udp>) NIT source recovered.

Explanation: DVB Network Information Table recovered for the output transport stream.

Severity: INFO

Recommended Action(s): N/A

Out_TS_TDT_Miss_Clear

OutTs (Gige <port>, <ipAddr><udp>) TDT source recovered.

Explanation: DVB Time and Date Table source recovered for the output transport stream.

Severity: INFO

Recommended Action(s): N/A

Out_TS_TDT_Miss_Set

OutTs (Gige <port>, <ipAddr>/<udp>) TDT source missing.

Explanation: DVB Time and Date Table source timed out for the output transport stamp.

Severity: INFO

Recommended Action(s): N/A

Out_TS_TOT_Miss_Clear

OutTS (Gige <port>, <ipAddr>/<udp>) TOT source recovered.

Explanation: DVB Time Offset Table source recovered for the output transport stream.

Severity: INFO

Recommended Action(s): N/A

Out_TS_TOT_Miss_Set

OutTS (Gige <port>, <ipAddr><udp>) TOT source missing.

Explanation: DVB Time Offset Table source timed out for the output transport stream.

Severity: INFO

Recommended Action(s): N/A

Out_TS-NIT_Miss_Set

OutTS (Gige <port>, <ipAddr>/<udp>) NIT source missing.

Explanation: DVB Network Information Table timed out for the output transport stream.

Severity: INFO

Recommended Action(s): N/A

Output_IDR_Error

Port (<port#>, OTS<O/P TS IP>, <O/P TS Port>, Prog nos <O/P Prog#>, ES Pid <ES PID>, has IDRjump: <IDR Gap error counter>

Explanation: The packet drop error of the TMUX is over the threshold. The counter is provided.

Severity: MAJOR

Recommended Action(s): N/A

OUTPUT_ES_ERROR

Port (<port#>, OTS<O/P TS IP>, <O/P TS Port>, Prog nos <O/P Prog#>, ES Pid <ES PID>, has Resplce DTSjump:<DTS jump error counter>

Explanation: Reported on the input transport stream because the output ES groomed from this input has DTS jump errors, due to input ES errors.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

Output_ES_ERROR

Port (<port#>, OTS<O/P TS IP>, <O/P TS Port>, Prog nos <O/P Prog#>, ES Pid <ES PID>, has PCRrst:<PCR reset error counter>

Explanation: Reported to signal the Timing module reset (PCR reset) error caused by certain errors in the input program. The counter is provided.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

OUTPUT_RESPLICE

Port (<port#>, OTS<O/P TS IP>, <O/P TS Port>, Prog nos <O/P Prog#>, ES Pid <ES PID>, has Resplce PCR:<PCR error counter>

Explanation: Reported on the input transport stream because the output ES groomed from this input has PCR errors, due to input errors.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

OUTPUT_RESPLICE

Port (<port#>, OTS<O/P TS IP>, <O/P TS Port>, Prog nos <O/P Prog#>, ES Pid <ES PID>, has Resplce UndR:<Underflow error counter>

Explanation: Reported to signal the underflow error of the output program is over the threshold. The counter is provided.

Severity: MAJOR

Recommended Action(s): N/A

Recommended Action(s):

OutTS_oversub_cir

TS <TsIdx> Port <PortNum> IP <IP> <UDP> oversubscription CLEAR.

Explanation: The output transport stream bitrate oversubscription ends.

Severity: MAJOR

Recommended Action(s): Contact RGB Customer Support.

outTS_oversub_set

TS <TsIdx> Port <PortNum> IP <IP> UDP <UDP> oversubscription SET (bitrate is <bitrate> kbps).

Explanation: The output transport stream bitrate exceeds the configured threshold value.

Severity: MAJOR

Recommended Action(s): N/A

PGRED_FAILOVER2BKUP_FAIL

Input Program (Gige<port>, <ipAddr>/<udp>, <pgNum>) failed to switchover to backup

Explanation: The event is generated when primary input program is missing/timed out and the configured backup program is not available.

This event is reported to the trap server.

Severity: INFO

Recommended Action(s): N/A

V6_AUDIO_CC_ERROR

V6 Session:<Session ID>, Output:<Transport name> Audio stream detected <PARM3> MPEG2TS continuity error(s) in last 60 seconds.

Explanation: This event is reported every 60 seconds when continuity errors are detected in the audio stream. This signifies that the input has issues, and the user should ensure the input signal is clean.

Severity: INFO

Recommended Action(s): N/A

V6_AUDIO_DECODE_FAILED

V6 Session:<Session ID>, Output:<Transport name> Audio decode failed for <PARAM3> frame(s) in last 60 seconds

Explanation: The event is reported every 60 seconds when audio frames cannot be decoded. This signifies that the input has issues and the user should ensure that the input signal is clean.

Severity: INFO

Recommended Action(s): N/A

V6_AV_DISCARD_PACKET

V6 Session:<Session ID>, Output:<Transport name> Audio/Video discard <number of packets discarded> packet(s) in last 60 seconds

Explanation: This event is reported every 60 seconds when an extra packet is received unexpectedly. This signifies that the input has a possible extra PID and the user should make sure the input port is not use by other SPTS. This can also happens if the SPTS has a lot of extra PIDs not used for transcoding.

Severity: INFO

Recommended Action(s): N/A

V6_FAIL_DETECT

V6 event Session: <Session ID>, Detection failed.

Explanation: This event occurs when adding a session fails because the session cannot be detected.

Severity: INFO

Recommended Action(s): N/A

V6_FAIL_INPUT_SETUP

V6 event Session: <Session ID>, Input <Input address> cannot be created.

Explanation: This event occurs when adding a session fails because the input stream cannot be created (possible socket creation error).

Severity: INFO

Recommended Action(s): N/A

V6_FAIL_NOT_SUPPORTED

V6 event Session: <Session ID>, The codec or attributes that prevents the session for being added is not supported

Explanation: This event occurs when adding a session fails because the session codec or other attribute is not supported.

Severity: INFO

Recommended Action(s): N/A

V6_FAIL_OTHER

V6 event Session: <Session ID>, <Failure Reason>

Explanation: This event occurs when adding a session fails because of reasons not explicitly defined.

Severity: INFO

Recommended Action(s): N/A

V6_FAIL_OUTPU_SETUP

V6 event Session: <Session ID>, Output: <Output address> cannot be created.

Explanation: This event occurs when adding a session fails because the output stream cannot be created (possible socket creation error).

Severity: INFO

Recommended Action(s): N/A

V6_LONG_TIME_GAP

V6 Session: <Session ID>, Output: <Transport name> Audio decode detected <number of gaps detected> long time gap(s) (>200ms) in last 60 seconds

Explanation: This event is reported every 60 seconds when long time gaps (>200 ms) are detected in the audio stream.

Severity: INFO

Recommended Action(s): N/A

V6_OUTPU_MISMATCH

V6 event Output warning: <warning cause>, Session: <Session_ID> Step: <Step number>, Output: <output file>

Explanation: This event reports a problem in the generation of an output (file output only).

Severity: INFO

Recommended Action(s): N/A

V6_OUTPU_PACKET_ERROR

V6 Session:<Session ID>, Output:<Transport name> Audio/Video unable to output <Number of packets that could not be sent out> packet(s) in last 60 seconds

Explanation: This event is reported every 60 seconds when AV packets can't be decoded. This signifies that the input has issues and the user should make sure the input signal is clean.

Severity: INFO

Recommended Action(s): N/A

V6_OUTQUEUE_10PERCENT

V6 event Queue for session: <Session ID>, Output: <Transport name> has reached 10% full.

Explanation: This event occurs when the input queue to ffmpeg reaches 10% full (3.3 million bytes).

Severity: INFO

Recommended Action(s): N/A

V6_OUTQUEUE_50PERCENT

V6 event Queue for session: <Session ID>, Output: <Transport name> has reached 50% full.

Explanation: This event occurs when the input queue to ffmpeg reaches 50% full (16.5 million bytes).

Severity: MAJOR

Recommended Action(s): N/A

V6_OUTQUEUE_90PERCENT

V6 event Queue for session: <Session ID>, Output: <Transport name> has reached 90% full. Sever progressing delay. User experience degraded. Workload reduction required for proper operation.

Explanation: This event occurs when the input queue to ffmpeg reaches 90% full (29.7 million bytes).

Severity: CRITICAL

Recommended Action(s): N/A

V6_PCR_GREATER_DTS

V6 Session:<Session ID> Output:<Transport name> Audio stream detected <number of errors detected> PCR>DTS error(s) in last 60 seconds

Explanation: The event is reported every 60 seconds when PCR is bigger than DTS. This typical of poorly muxed input streams that suffer disruption or a jump.

Severity: INFO

Recommended Action(s): N/A

V6_RCSTART_NOT_FOUND

V6 event Unable to find /etc/rcstart file... could not startup.

Explanation: This Task Manager event indicates that the /etc/rcstart file was not found (probably due to an installation problem).

Severity: CRITICAL

Recommended Action(s): N/A

V6_SESMGR_STP_COMPLETED

V6 event Completed <workflowName+Step number>, Session: <session ID+Workorder ID>, Output: <output file>, Transcoder: <Transcoder in-use>, Execution time: <execution time>.

Explanation: This event reports the completion of a session step.

Severity: INFO

Recommended Action(s): N/A

V6_SESMGR_STEP_FAILURE

V6 event Failed <WorkflowName+Step number>, Session: <Session ID+WorkOrder ID>, Output: <Output file>, Transcoder: <Transcoder that failed (error: error_code)>.

Explanation: This event reports a session step failure.

Severity: INFO

Recommended Action(s): N/A

V6_SESMGR_STEP_START

V6 event Started <workflowName+Step number>, Session: <session ID>, Work Order: <workorder ID>, Output: <output file>, Transcode: <Transcoder in-use>.

Explanation: This event reports a session step starting.

Severity: INFO

Recommended Action(s): N/A

V6_SESMGR_WO_RESULT

V6 event Completed <workorder ID>, Session:<session ID>, Workflow: <workflow name>, Input: <input file>, Result: <result+ execution time>

Explanation: This event signals the completion (successful or not) of a work order.

Severity: INFO

Recommended Action(s): N/A

V6_SESMGR_WO_START

V6 event Started <workorder ID>, Session: <session ID>, Workflow: <workflow name>, Input: <input file>

Explanation: This event signals the start of a work order.

Severity: INFO

Recommended Action(s): N/A

V6_SHORT_TIME_GAP

V6 Session: <Session ID>, Output:<Transport name> Audio decode detected <number of gaps detected> short time gap(s) (<200ms) in last 60 seconds.

Explanation: This event is reported every 60 seconds when short time gaps (<200ms) are detected in the audio stream.

Severity: INFO

Recommended Action(s): N/A

V6_STREAM_FPS_TOO_LOW

V6 event Session: <Session ID>, Output: <Transport name>, is not transcoding real-time actual fps: <Actual FPS> / target fps: <Target FPS>.

Explanation: This event occurs when the input queue to Mpeg2TsDmx reaches 90% full (29.7 million bytes).

Severity: INFO

Recommended Action(s): N/A

V6_TASK_COMM_FAILURE

V6 event Internal communication problem.

Explanation: This event is reported by any task if it detects problems with inter-task communication.

Severity: CRITICAL

Recommended Action(s): N/A

V6_TASK_FAILED

V6 event The tasks have failed.

Explanation: This Task Manager event indicates that a particular task has failed.

Severity: CRITICAL

Recommended Action(s): N/A

V6_TASK_OUT_OF_MEMORY

V6 event Out of memory, exiting

Explanation: This event is reported by any task that runs out of memory.

Severity: CRITICAL

Recommended Action(s): N/A

V6_TASK_RUNNING

V6 event The task <param1> is running.

Explanation: This Task Manager event indicates that a particular task is now running.

Severity: INFO

Recommended Action(s): N/A

V6_TASK_STARTED

V6 event The task <param1> was requested to start.

Explanation: This Task Manager event indicates that a particular task has started, by request.

Severity: INFO

Recommended Action(s): N/A

V6_TASK_STOPPED

V6 event The task has stopped.

Explanation: This Task Manager event indicates that a particular task has stopped by request.

Severity: INFO

Recommended Action(s): N/A

V6_TASK_STOPPING

V6 event The task <param1> was requested to stop.

Explanation: This Task Manager event indicates that a particular task has been requested to stop but that there is no guarantee that it will stop. This is different from the force-stop request.

Severity: INFO

Recommended Action(s): N/A

V6_TASK_SYS_UP

V6 event All tasks started successfully.

Explanation: This Task Manager event indicates that the system has started successfully.

Severity: INFO

Recommended Action(s): N/A

V6_WRITE_FRAME_FAILED

V6 Session:<Session ID>, Output:<Transport name> Audio/Video unable to write <Number of packets that could not be written> frame(s) in last 60 seconds

Explanation: This event is reported every 60 seconds when AV packets cannot be sent out. This signifies that the input has issues and the user should ensure the input signal is clean.

Severity: INFO

Recommended Action(s): N/A

Video_Loss

Temporary video loss in Ts: <InTsIdx> Port <PortNum> IP <IP> UDP <UPD> Pid<VPID>.

Explanation: Video underflow was detected for the specified input. This even is reported to the trap server.

Severity: MINOR

Recommended Action(s): Verify the TS.

Ad Insertion (DPI) Events

Ad_Service_Acc_Denied

DPI request for program <Name>, which is not DPI enabled.

Explanation: The service name in the DPI request is not DPI-enabled.
SCTE 103.

Severity: MAJOR

Recommended Action(s): Contact RGB Customer Support, and provide the SCTE number.

Ad_Service_Invalid

Invalid or unknown program name <Name>.

Explanation: The service name specified in the DPI request is invalid or not found.
SCTE 102.

Severity: MAJOR

Recommended Action(s): Contact RGB Customer Support and provide the SCTE number.

Ad_Video_underflow

Ad content underflow for program <Name>.

Explanation: Ad content arrived late or not at all for the specified input.
SCTE 110.

Severity: MAJOR

Recommended Action(s): Contact RGB Customer Support, and provide the SCTE number.

Cue_Tone_Invalid

Invalid Cue tone received for program <Name>.

Explanation: The cue tone received is invalid for the specified input.
SCTE 117

Severity: MINOR

Recommended Action(s): Contact RGB Customer Support, and provide the SCTE number.

SCTE30_Msg_Invalid

Invalid SCTE 30 message rcvd for Program <Name>.

Explanation: The SCTE 30 message received is invalid for the specified service.
SCTE 121.

Severity: MINOR

Recommended Action(s): Contact RGB Customer Support, and provide the SCTE number.

Grooming (GRM) Events

PGRED_FAILOVER_TO_BCKUP

Grooming session (Gige <port>, ipAddr>/<udp>, <pgNum>) failed over to backup.

Explanation: A grooming session has failed over to the backup program.
This event is reported to the trap server.

Severity: MAJOR

Recommended Action(s): N/A

CFG_Grm_ADD

Grooming session <GIdx> ITs<InTslp>/IPg<InPgNum>OTs<OutTsIp>/<OutTsUdp>OPg<OutPgNum>/<OutPgName> added.

Explanation: A grooming session was created.

Severity: INFO

Recommended Action(s): N/A

CFG_Grm_DEL

Grooming session <GIdx> OTs <OutTsIp>/<OutTsUdp> OPg <OutPgNum>/<OutPgName> deleted.

Explanation: A grooming session was deleted.

Severity: INFO

Recommended Action(s): N/A

PG_RED_RECOVER_TO_PRIM

Grooming session (Gige< port>, <ipAddr>/<udp>, <pgNum>) recovered to primary.

Explanation: A grooming session has recovered to the primary program.

Severity: INFO

Recommended Action(s): N/A

PGRED_FAILOVR2BKUP_FAIL

Grooming session (Gige <port>. <ipAddr>/ <udp>, <pgNum>) failover to backup failed.

Explanation: A grooming session failover to backup program has failed.
This event is reported to the trap server.

Severity: CRITICAL

Recommended Action(s): N/A

PGRED_FAILOVER_TO_BCKUP

Grooming session (Gige<port>, <ipAddr>/<udp>, <pgNum>) failover to backup failed.

Explanation: A grooming session failover to backup program has failed.

Severity: MAJOR

Recommended Action(s): N/A

PGRED_FAILOVR2BKUP_FAIL

Grooming session (Gige<port>, <ipAddr>/<udp>, <pgNum>) failover to backup failed.

Explanation: A grooming session failover to backup program has failed.

Severity: CRITICAL

Recommended Action(s): N/A

PG_RED_RECOVER_TO_PRIM

Grooming session (Gige<port>), <ipAddr>/<udp>, <pgNum>) recovered to primary.

Explanation: A grooming session recovers to the primary program.

This event is reported to the trap server.

Severity: MINOR

Recommended Action(s): N/A

PGRED_GLB_SWITCH_TO_PRIM

All grooming sessions using back up input source have been switched to primary.

Explanation: The user has manually switched all grooming session, using backup-to-primary.

Severity: INFO

Recommended Action(s): N/A

PGRED_MANSWTCH_TO_BCKUP

Grooming session (Gige <Port>, <ipAddr>/<udp>,<pgNum>) switched to backup.

Explanation: The user has manually switched to a backup program.

Severity: INFO

Recommended Action(s): N/A

PGRED_MANSWTCH_TO_PRIM

Grooming session (Gige <Port>, OTs <ipAddr>/<udp>/<pgNum>) switched to primary.

Explanation: The user has manually switched to primary program.

Severity: INFO

Recommended Action(s): N/A

XCODE_Resolution_CHG

XC Sess ITS(GigE <port>,<ipAddr>,<pgNum> In Res <ires>) OTS (GigE<oport>,<oipSddr>,<opgNum> Out Res<ores>)

Explanation: A resolution change in a transcoding session has occurred.

Severity: INFO

Recommended Action(s): N/A

Licensing (LIC) Events

CFG_LicKey

Config change: LicType "<LICTYPE>" added.

Explanation: A new license key was configured.

Severity: INFO

Recommended Action(s): N/A

Del_LiKey

Config Change: Lic Type <LICTYPE> deleted.

Explanation: An existing license key has been deleted.

Severity: INFO

Recommended Action(s): Verify the TS.

InTS_ADD_Fail

ITS create Failed: <InTsIndex>/<Port Num>/<IP>/<UDP>. No base license present.

Explanation: An input transport stream creation was rejected, due to licensing restrictions.

Severity: INFO

Recommended Action(s): Contact RGB Customer Support.

LiKey_CFG_FAIL

CDEL_LicKeyonfig failed: LicType "<LICTYPE>" configuration failed.

Explanation: Configuration failed for a new license key.

Severity: MINOR

Recommended Action(s): Contact RGB Customer Support.

LiKey_Error

Configuration replay failed: Check licensing.

Explanation: Video configuration not applied. Check licensing.

Severity: MAJOR

Recommended Action(s): Contract RGB Customer Support.

OutPgm_ADD_Fail

OPg OP FailedTS: <OutTsIndex>/<PortNum>/<IP>/<UDP>
<OutPgIndex>/<Num>/<LICTYPE>.

Explanation: An output program creation was rejected, due to licensing restrictions.

Severity: INFO

Recommended Action(s): Contract RGB Customer Support.

OutTS_ADD_Fail

OTS op Failed: <OutTsIndex>/<PortNum>/<IP>/<UDP><LICTYPE>
unavailable.

Explanation: An output transport stream creation was rejected, due to licensing restrictions.

Severity: INFO

Recommended Action(s): Contact RGB Customer Support.

Configuration (CFG) Events

CHASSIS_TYPE_MISMATCH

On system boot, found config DB for chassis type <DB_CHASSIS>, but current chassis is <CURR_CHASSIS>.

Explanation: The configuration database lists a different type of chassis than the one currently in use.

Severity: MAJOR

Recommended Action(s): N/A

Event/Alarm Manager (ELM) Events

CFG_ELM_global

Config changed: global.

Explanation: The configuration of the Event and Alarm Manager has been changed.

Severity: INFO

Recommended Action(s): N/A

CFG_SYSLOG_global

Config changed: global.

Explanation: The configuration of the Syslog server has changed.

Severity: INFO

Recommended Action(s): N/A

CFG_SYSLOG_svr

Config change: syslog server.

Explanation: The configuration of the Syslog server has changed.

Severity: INFO

Recommended Action(s): N/A

Security (AAA) Events

CFG_GLOBAL_MOD

One of more global attributes have been changed.

Explanation: Configuration change: one or more AAA global configuration attributes were changed.

Severity: INFO

Recommended Action(s): N/A

CFG_SERVER_ADD

AAA server <serverIndex> added to the configuration.

Explanation: Configuration change: the specified AAA server was added to the configuration

Severity: INFO

Recommended Action(s): N/A

CFG_SERVER_DEL_AAA

Server <serverIndex> deleted from the configuration.

Explanation: Configuration change: the specified AAA server was deleted from the configuration.

Severity: INFO

Recommended Action(s): N/A

CFG_SERVER_MOD

Configuration of AAA server <serverIndex> modified.

Explanation: Configuration change: the configuration of the specified AAA server was changed.

Severity: INFO

Recommended Action(s): N/A

CFG_USER_ADD

User <userName> added to the configuration.

Explanation: Configuration change: the specified user was added to the configuration.

Severity: INFO

Recommended Action(s): N/A

CFG_USER_DEL

User <userName> deleted from the configuration.

Explanation: Configuration change: the specified user was deleted from the configuration.

Severity: INFO

Recommended Action(s): N/A

CFG_USER_MOD

Configuration of user <userName> modified.

Explanation: Configuration change: the configuration of the specified user was changed.

Severity: INFO

Recommended Action(s): N/A

NO_SERVER_RESPONSE

No response from AAA server <serverIndex> at address <serverIPAddr>: <serverPort>.

Explanation: There was no response received from the specified AAA server on an authentication request.

Severity: MAJOR

Recommended Action(s): (1) Verify AAA server IP address (2) Verify connectivity exists between the VMG and the AAA server.

User_Authen_Failed

or

Login_Failed User login authentication failed for <username>.

Explanation: Login authentication failed for the specified username.

Severity: MINOR

Recommended Action(s): N/A

User_Authen_Succeed

or

Login

User Authentication succeeded for <username>.

Explanation: Login authentication succeeded for the specified username.

Severity: INFO

Recommended Action(s): N/A

User_Logout

or

Logout

User <username> logged out.

Explanation: The specified user has logged out.

Severity: INFO

Recommended Action(s): N/A

Program Substitution (PgSub) Events

PgSub_Fail

O/p Pg Name <OPNAME> program substitution failed. SCTE 30 Err <ERR>.

Explanation: The program substitution failed.

Severity: MAJOR

Recommended Action(s): SCTE code reference needed.

PgSub_NoPMTChange

O/P(TS info), I/P(TS info)

Explanation: A program substitution event occurred with no update to the outgoing PMT table.

Severity: INFO

Recommended Action(s): N/A

PgSub_OK

O/P (<oGePort>, <oTsIp>, <oTsUdp>, <oPgNum>) I/P (iGePort>, <iTsIp>/<iTsUdp>,<iPgNum>).

Explanation: The program was successfully substituted.

Severity: INFO

Recommended Action(s): N/A

PgSub_Service_AccDenied

Program substitution request received for program <Prog>, which is not program substitution enabled.

Explanation: The service name in the PgSub request is not PgSub enabled.

Severity: MAJOR

Recommended Action(s): Contact RGB Customer Support.

PgSub_Service_Invalid

Invalid or unknown program name <Prog> in Program substitution request.

Explanation: The service name in the PgSub request is invalid or not present.

Severity: MAJOR

Recommended Action(s): Create the program name to match the SCTE 30 configured name for the init-request.

Glossary

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

Numeric

3DES—Triple Data Encryption Standard

A mode of DES that encrypts data three times. Three 64-bit keys are used, for an overall key length of 192 bits.

A

AAA—Authentication, Authorization, and Accounting

The services provided by a security protocol. Examples of security protocols are RADIUS and TACACS+.

AC—Access Criteria

ACG—Access Control Generator

AES—Advanced Encryption Standard

AES is a privacy transform for IPSec and Internet Key Exchange, and is replacing the Data Encryption Standard (DES). AES offers a larger key size and a variable key length.

AFD—Active Format Description

AMP—Application Media Processor

The VMG module that performs audio transcoding.

ANSI—American National Standards Institute

API—Application Programming Interface

A set of functions, procedures, methods, classes or protocols that an operating system, library or service provides to support requests made by computer programs.

AR—Analog Regenerator

ARP—Address Resolution Protocol

ARP broadcasts a packet containing the IP address that the sender specifies to all hosts attached to an Ethernet connection. When the target recognizes that the IP address is its own, it sends a response.

ATSC—Advanced Television Systems Committee

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

AVTX—Audio/Video Transcode

A transport stream that enables both audio and video transcoding.

B**Bandwidth**

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

C**CA—Conditional Access**

An encryption/decryption management method by which a broadcaster controls a subscriber's access to services.

CAS—Conditional Access Systems

Systems that ensure broadcast service is accessible only to those entitled to access, usually by scrambling or encrypting the service.

CAT—Conditional Access Table

One of the 4 tables in PSI. The CAT provides conditional access to the transport streams.

CBC—Cipher Block Chaining

A DES mode.

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.

CCA—Circuit Card Assembly**CML**

An optical signaling method.

Codec

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

CPU—Central Processing Unit**CSA—Common Scrambling Algorithm****CVCT—Cable Virtual Channel Table****CW—Control Word**

Part of DVB simulcrypt.

CWG—Control Word Generator

Part of DVB simulcrypt.

D

DAVIC

Digital Audio Visual Council

DCCT—Directed Channel Change Table

One of the 9 tables in the ATCS PSIP. The DCCT instructs the receiver to change channels based on viewer preferences, demographics or geographical location. This table works with a DCCSDT in the set top box.

DCCSCT—Directed Channel Change Selected Code Table

One of the 9 tables in the ATSC PSIP. The DCCSCT allows updating some DCC table information data in receivers equipped to handle updates.

DES—Data Encryption Standard

DES specifies a FIPS approved cryptographic algorithm as required by FIPS 140-1. Encrypting data converts it to an unintelligible form called cipher. The cryptographic security of the data depends on the security provided for the key used to encipher and decipher the data. Data can be recovered from cipher only by using exactly the same key used to encipher it.

DET—Data Event Table

One of the 9 tables in the ATSC PSIP. The DET announces the data portion of a video/audio/data event when the data event does not match the exact duration of an video/audio event.

DHCP—Dynamic Host Configuration Protocol

A protocol used by networked devices on an IP network. DHCP allows these devices to join a network with little to no configuration required.

DHEI—Digital Headend Expansion Interface

DM—Dense Modulator

DOCSIS—Data Over Cable Service Interface Specifications

Now known as CableLabs Certified Cable Modems. DOCSIS specifies modulation schemes and the protocol for exchanging bidirectional signals over cable.

DPI—Digital Program Insertion

The digital splicing of one MPEG program (typically a commercial) into another based on digital cues within the MPEG transport stream.

DSP—Digital Signal Processing

DVB—Digital Video Broadcast

A European set of defined transmission standards for digital broadcasting systems.

DVB SI—DVB Simulcrypt

DWDM—Dense Wavelength Division Multiplexing

A fiber-optic transmission technique using light wavelengths to transmit data parallel-by-bit or serial-by-character.

E

EAS—Emergency Alert System

An operational structure for national and local emergency alerts used by broadcast, cable, and wireless cable.

EBP—Encoder Boundary Point

Data that is inserted into audio or video elementary streams intended for use in adaptive streaming applications.

ECB—Electronic Code Book

A DES mode

ECM—Entitlement Control Messages

ECMG—Entitlement Control Messages Generator

EDS—Extended Data Services

EIA—Electronic Industries Alliance

EIT—Event Information Table

One of the 9 tables in the ATCS PSIP. EITs are associated with a specific virtual channel in the VCT, contain event information, and point to the location of extended text in the ETT.

Elementary Stream

An individual MPEG data stream, such as a video stream, audio stream, or data stream that is encapsulated in a transport stream.

EM—Element Manager

The graphical user interface for the VMG.

EMM—Entitlement Management Message

A packet containing the information necessary to decrypt the picture.

EMMG—Entitlement Management Message Generator

The component of the conditional access headend that delivers entitlements to the multiplexers.

EOD—Everything-On-Demand

ERM—Encrypter Resource Manager

Ethernet

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

ETT—Extended Text Table

One of the 9 tables in the ATCS PSIP. ETTs carry longer text messages than EITs for describing events and virtual channels.

F

FCC—Federal Communications Commission

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

FEC—Forward Error Correction

Also referred to as channel coding, FEC is a technique used for controlling errors in data transmission over unreliable or noisy communication channels

FFT—Fast Fourier Transform**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.

FTTP—Fiber to the Premise**FVOD—Free-Video-On-Demand**

G

GBP /GBP-2

Gigabit Ethernet Processor module.

GigE—Gigabit Ethernet

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

Grooming

The process of creating customized channel lineups.

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.

HFC—Hybrid Fiber/Coax

A distribution system combining fiber and coax cable. An HFC system is used to distribute CATV signals into a neighborhood.

I**ICMP—Internet Control Message Protocol**

A networking protocol.

IEEE—Institute of Electrical and Electronics Engineers

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

IF

A high-rate signal

IFFT—Inverse Fast Fourier Transform**IGMP—Internet Group Management Protocol**

IP hosts use IGMP to register dynamic multicast group membership. Connected routers discover the group members using the same protocol.

IMPB—IP-MAC-Port Binding

A configuration that binds a source IP address with an associated MAC address and port number.

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.

IPMI—Intelligent Platform Management Interface

An open standards specification that defines interfaces which enable system administrators to monitor, manage, diagnose, and recover systems.

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.

IRD—Integrated Receiver Decoder**IRT—Integrated Receiver Transcoder****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

LAN—Local Area Network

A type of computer network that spans a small physical area such as a home, office, or school.

LED—Light Emitting Diode

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

M

MBR TS—Multi-bitrate Transport Stream

An MBR TS enables you to transcode a single input stream into four SPTSs.

MGT—Master Guide Table

One of the 9 tables in the ATCS PSIP. MGT provides program-identification (PID) locations so a receiver can find the other tables, and informs the receiver of changes or table updates.

MIB—Management Information Base

MIB defines the variables needed by the SNMP protocol to monitor and control elements in a network.

MID

Mid-plane.

MOD

Modulator and Up-Converter

MOD

Movies-On-Demand

MPE—Multi-Protocol Encapsulation

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.

MRM—Multiplex Resources Manager

Multiplexing

The process of combining several different signals onto a single communication channel for transmission.

MUX—Multiplexer

A device that combines multiple data sources into a single data stream for transmission. Some MUX's can demultiplexes the single data stream into its composite forms.

N**NEBS—Network Equipment Building System****NIST—National Institute of Standard and Technology****NIT—Network Information Table**

One of the four tables in PSI. The NIT provides information about transport streams and multiplexes.

NMP—Network Management Protocol

A Network Management System

NPM—Network Processor Module

The VMG module that performs network related processing.

NSA—National Security Agency**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.

NTSC—National Television System Committee

Committee that defined the current standard for analog color television in North America, as well as the name for the standard. The format is 525 lines in 4MHx of video bandwidth.

O**OIF**

A standards body

OOB—Out-Of-Band**OTN**

An Optical Transport Network

OTS

Output Transport Stream

P

PAT—Program Association Table

One of the 4 tables in PSI. The PAT lists the programs available in a transport stream.

PCR—Program Clock Reference**PDG—Private Data Generator****PEM—Power Entry Module****PHY**

Physical link layer

PID—Packet Identifier

Part of the transport stream packet header used to identify tables, elementary streams, and programs.

PIP—Picture in Picture**PLL—Phase-Locked Loop**

Part of the clock generator

PMT—Program Map Table

One of the 4 tables in PSI. The PMT contains information about MPEG-2 programs.

POD—Point-Of-Deployment**Program**

A collection of audio, video, tables, and elementary streams carried on a channel.

PSI—Program Specific Information

A collection of four tables as part of an MPEG-2 or MPEG-4 transport stream. These four tables include:

- Conditional Access Table (CAT)
- Network Information Table (NIT)
- Program Association Table (PAT)
- Program Map Table (PMT)

PSIP—Program and System Information Protocol

A collection of nine tables that allow the DTV transport stream to provide information about a station's services and programming. These nine tables include:

- Master Guide Table (MGT)
- System Time Table (STT)
- Virtual Channel Table (VCT)
- Rating Region Table (RRT)
- Event Information Table (EIT)
- Extended Text Table (ETT)
- Data Event Table (DET)
- Directed Channel Change Table (DCCT)
- DCC Selected Code Change Table (DCCSDT)

PSIG—PSI/SI Generator**Q****QAM—Quadrature Amplitude Modulation**

This is the modulation technique used in systems carrying digital video.

QoS—Quality of Service

Guarantees network bandwidth and availability for applications.

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.

RRT—Regional Ratings Table

One of the 9 tables in the ATCS PSIP.

RTP—Real Time Protocol

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

RTC—Real Time Clock**RTM—Rear Transition Module****RU—Rack Unit**

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

S

SCR

DVB CSA scrambler

SCS—Simulcrypt Synchronizer**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.

SDT—Service Description Table

A table ID that indicates the MPEG-2 SI packet type.

SerDes

Serializer/deserializer

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.

SHO—Super Head-end Office

The central distribution point in a television system. Main office.

SMF—Single Mode Fiber

An optical fiber designed to carry only a single ray of light.

SNMP—Simple Network Management Protocol

A protocol used to monitor and control network devices, and to manage configurations, statistics collection, performance, and security.

SPTS—Single Program Transport Stream.

A transport stream that contains only one program.

SRM—System/Session Resource Manager**Status Bar**

Located at the bottom of an application window and displays system status information.

STT—System Time Table

One of the 9 tables in the ATCS PSIP. Allows a broadcaster to present time indicators to the consumer, ensuring that the time is synchronized.

SVOD—Subscription-Video-on-Demand

A Video-on-Demand service offered by subscription, providing viewers with access to select programs from the libraries of featured cable networks.

T**TACACS+—Terminal Access Controller Access-Control System Plus**

A networking protocol that provides centralized AAA services.

TBR—Time Base Recovery**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.

TFTP—Trivial File Transfer Protocol

A simple form of the File Transfer Protocol (FTP). TFTP uses UDP and is often used by servers to boot diskless workstations, X-terminals, and routers.

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.

TS—Transport Stream

One or more multiplexed MPEG-2 or MPEG-4 programs and related data.

TSA—Transfer Switch Adapter

RF redundant switching/routing

TVCT—Terrestrial Virtual Channel Table**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**VBI—Vertical Blanking Interval**

A portion of a television signal that carries non-audio/video data, such as closed-caption text.

VBR—Variable Bit Rate

VBR streams vary in bandwidth over time.

VCT—Virtual Channel Table

One of the 9 tables in the ATCS PSIP. The VCT contains a list of all the channels that are or will be online, along with their channel name and number. This table contains the set of data that enables a receiver to tune and locate the service being broadcast.

VHO—Video Hub Office

The regional distribution point in a television system. Satellite office that receives video from SHO.

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****VOD—Video On Demand**

A system that allow users to watch video content over a network as part of an interactive television system, either by streaming or by download.

VPM—Video Processor Module

The VMG card that performs video related processing.

VSO—Video Serving Office

The local distribution point in a television system. Central office that receives video from VHO.

VTR—Video Transrating

A transport stream that enables only video transrating.

VTX—Video Transcode

A transport stream that enables only video transcoding.

W

WAN—Wide Area Network

A type of computer network that spans a large geographic area such as a state or country.

WM9

Windows Media 9

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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