Release Notes

Selenio™ VMG

Release 1.4.1 P1

Build 74529

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Publication Information

Trademarks

Patents

The products described herein are covered by one or more U.S. and foreign patents pending. The Selenio™ VMG is protected by U.S. Patents. 6,996,129; 7,046,677. Other US and foreign patents pending.

Contact Information

Imagine Communications has office locations around the world. For domestic and international location and contact information see: http://www.imaginecommunications.com/contact-us/

Support Contact Information

For domestic and international support contact information see:

- Support Contacts: http://www.imaginecommunications.com/services/technical-support/

Contents

1.4.1 P1 Build 74529

This document describes the latest software release for Imagine Communications' Selenio Video Multiprocessing Gateway 2 (VMG2), release 1.4.1 P1. It is intended to document the current supported features, capabilities, system interoperability, and known issues for this specific release.

This release supports one platform type and three module types. The supported platform is VMG-14+. The three module types are the Network Processing Module Gen2 (NPM2), the Transcoding Module Gen2 (TCM2), and the Transcoding Module Gen2 Plus (TCM2+).

In This Section:

Upgrade Designation

VMG Gen2 version 1.4.1P1 addresses a discrepancy raised by a customer.

Note: Imported 480x368 resolutions will not be configured correctly since it is not a supported resolution in 1.4.0 Please use 480 x 360 resolution.

As based on criteria that qualify upgrade designations, VMG Gen2 version 1.4.1 P1 is determined to be Optional for customers who have previous versions deployed.

Upgrade Designation Definitions

Upgrade Designation	Definition
Mandatory	A release is given this designation when Imagine has addressed critical product issues that it believes all customers will experience on the currently deployed releases.
Recommended	A release is given this designation when Imagine has addressed product issues that it believes some customers may experience on the currently deployed releases or there are important performance improvements that could benefit customers.
Optional	A release is given this designation when Imagine has addressed product issues that it believes certain customers may experience or that an upgrade provides potential benefits over existing product releases.

VMG Gen2 Overview

Imagine Communications' Selenio Video Multiprocessing Gateway (VMG) product line offers the industry's first high-density, carrier-class platform for the delivery of advanced video services, including high definition (HD) and standard definition (SD) video, as well as lower-resolution H.264 video streams for multi-screen applications. The VMG is an integrated solution specifically designed to address a number of critical applications, including transcoding, and re-coding, in a highly integrated and flexible configuration. The VMG's modular blade architecture provides a flexible platform that scales well in the rapidly-evolving video marketplace.

Additional information on the VMG may be found in the following Imagine Communications documents:

Document Title	Part Number
Selenio VMG Element Manager User Guide G2 1.4.0	250-0349-01 Rev A
Selenio VMG-14+ Hardware Setup Guide	250-0350-01 Rev A

Hardware documents associated with release 1.2.1 are valid for this release as there have been no changes to that hardware since those documents were released, except

Contacting Customer Support

For domestic and international support contact information, see:

- Support Contacts: http://www.imaginecommunications.com/services/technical-support/

Changes in the VMG 1.4.1 P1 Release

New Features and Enhancements

This is no feature or enhancement is this patch release.

Supported Upgrades

This release supports direct upgrade from the following releases:

v1.4.0-73470
V1.4.1-74332

This release does not provide direct upgrade from VMG Gen1 releases or from earlier VMG Gen2 releases. For those releases it is necessary to install the software for this release, apply licenses and global configuration. Then create grooms using the EM GUI or by creating and importing a Bulk Configuration file that can be applied via the Element Manager **Upgrade** window.

Note: *Due to VMG G2 1.3.0 BCT changes to support IPTV, the previous BCT spreadsheet are no longer supported. After an upgrade, operators must export the BCT spreadsheet for the future use.*

Other Changes to Product Specifications

There are no changes to the Product Specifications. Please refer to the specifications in Appendix A: VMG Gen2 Product Specifications, for a complete list of the VMG Gen2 features and functionality.

New Product Constraints

There are no additional product constraints in the VMG Gen2 release 1.4.1 P1

Newly Resolved Issues

Resolved in G2 1.4.1 P1

Removed the obsolete and problematic debug command

ID	Summary
2456	Field VMG2 1.3.1p1 - Debug command triggered NPM2 software crash

New Known Issues and Workarounds

There are no new known issues in VMG Gen2 Release 1.4.1 P1.

External Dependencies

Syslog Server

NOTE: In order for Imagine to provide the best possible customer support, the VMG supports the logging of events to an external syslog server. It is highly recommended that you connect the VMG to an external Syslog server due to the capacity constraints of the VMG's internal local syslog

NTP Server

The VMG requires an external Network Time Protocol (NTP) server to maintain the precise date and time. The precise time is required for accurate Digital Program Insertion and alarm and event messages.

POIS Server

The VMG requires an external Placement Opportunity Information Service (POIS) server to support the Event Signaling And Management (ESAM) functions on the VMG. The POIS server is required to review the Ad Cue events sent from the VMG and notify the VMG of any actions to take regarding those events. It may also notify the VMG to insert Cues for blackout events.

As implementations of POIS servers vary from vendor to vendor and release to release the integration of the VMG with a particular POIS server release should be verified prior to deployment.

APPENDIX A

Product Specification

VMG product capabilities are specified in the following sections of this appendix:

Input / Output Interfaces—NPM2

Gigabit Ethernet

- 1-Gigabit Ethernet, 8xSFP ports (copper or fiber).
- 10-Gigabit Ethernet, 8xSFP+ports

Fast Ethernet

- 1 10/100 BaseT control and management interface, RJ-45 connector

Inputs

Compression Formats

- MPEG-2 up to Main Profile at High Level
- H.264 up to High Profile at Level 4.1

Transport Level

- Multi Program Transport Stream (MPTS)
- Single Program Transport Stream (SPTS)

Resolutions and Frame Rates

- 480i60 (30 or 29.97fps) (Vertical: 480; Horizontal: 720, 704, 544, 528, 352)
- 720p60 (60 or 59.94fps)
- 1080i60 (30 or 29.97fps)
- 576i50 (Vertical: 576; Horizontal: 720, 25fps)
- 720p50 (50fps)
- 1080i50 (25fps)

Bitrates

- Up to 50Mbs MPEG2 or H.265 with a maximum of 1 reference frame

PCRs

Common and external PCRs are supported for transcoding.

Outputs

Compression Formats

- IPTV and MBR formats
- H.264 High Profile up to Level 4.1
- H.264 Main Profile up to Level 4.1
- H.264 Baseline Profile up to Level 4.1

Transport Stream Level

Single Program Transport Stream (SPTS)

Video Bit Rates—TCM

- MPEG-2 HD: 4– 15 Mbps
- MPEG-2 SD: 1 – 5 Mbps
- H.264 HD: 2 – 15 Mbps
- H.264 SD: 0.5 – 5 Mbps
- H.264 PIP: 0.05 – 1 Mbps
- H.264 MBR-TS: 0.05 – 9Mbps

MBR Output - TCM

- 24Mbs TS with 20Mbs Video ES
- Up to 3 A6 can be used in a single MBR Group
- Up to 9 profiles IDR and EBP aligned in a single MBR group

Output Resolution and Frame Rates—TCM

VTX or AVTX Transcoding HD to HD

- Horizontal resolution: Full, 1920, 1440, 1280, 960
- Vertical resolution: follow-input, force 720p, or force 1080i
- Frame rate: follow-input

VTX or AVTX Transcoding HD to SD

- Horizontal resolution: D1, VGA, 3/4D1, 2/3D1, 1/2D1
- Vertical resolution:
  - 25 or 50 fps input: 576
  - 29.97 or 59.94 fps input: 480
- Frame rate: follow-input

VTX or AVTX Transcoding SD to SD

- Horizontal resolution: D1, VGA, 3/4D1, 2/3D1, 1/2D1
- Vertical resolution: follow-input
- Frame rate: follow-input

PIP (Picture-in-Picture): VTX+PIP, AVTX+PIP, or PIP Transcoding

- H: 1/2D1 x V: 1/2D1
- 192x192
- 128x96
- 96x96

MBR Transcoding

All outputs are progressive at 29.97/25 frames per second unless otherwise noted. The list of possible output resolutions is color-coded according to the following schemes:

- With HD or SD inputs;

- Green: 1920x1080, 1280x720p60/50.
- Yellow: 1280x720, 1024x576, 960x720, 960x540, 640x720.
- Blue: 864x486, 848x480, 768x432, 720x576, 720x540, 720x480, 640x480.
- Red: 640x360, 624x352, 576x432, 512x288, 480x360, 480x320, 480x272, 448x336, 416x240, 400x360, 400x224, 352x288, 352x240, 320x240, 320x180, 320x176, 256x192, 192x192, 128x96, 96x96.
- Pink (Custom): Any user-defined resolution ranging from 96x96 to 1920x1088. The resolution should be an even number (Consume one Transcode Unit as Green resolutions).
-

- The following are allowed combinations for four output profile TS grooms per Transcode Unit:
  - 1 green
  - 1 yellow + 1 blue + 2 red
  - 1 yellow + 3 red
  - 2 blue + 2 red
  - 1 blue + 3 red
  - 4 red
- Up to Nine profiles (three Transcode units) are supported in one MBR.

Video Processing

Processing Density

- Up to 72 SD input programs per TCM2+ may be transcoded to SD or PIP outputs
- Up to 36 SD input programs per TCM2 may be transcoded to SD or PIP outputs
- Up to 24 SD or HD inputs per TCM2+ and 48 outputs in transcode + PIP mode
- Up to 12 SD or HD inputs per TCM2 and 24 outputs in transcode + PIP mode
- Up to 24 HD inputs per TCM2+ when transcoding HD-HD, HD-SD or HD-PIP
- Up to 12 HD inputs per TCM2 when transcoding HD-HD, HD-SD or HD-PIP
- Up to 24 SD or HD input programs per TCM2+ and 96 outputs in MBR mode
- Up to 12 SD or HD input programs per TCM2 and 48 outputs in MBR mode
- Up to 12 TCM2 or TCM2+ per VMG-14+ chassis

Transcode Modes

- MPEG-2 input to MPEG-2 or H.264 output
- H.264 input to MPEG-2 or H.264 output
- MBR outputs are transcoded to H.264 outputs regardless of input.

Video Processing

- Motion adaptive deinterlacing for MBR outputs
- Programmable GOP structure
- Adaptive GOP based on scenes [for IPTV only]
- All intra prediction modes
- ¼ pixel interpolation
- Multiple reference frames
- P and B pictures
- Block sizes: 16 x 16, 8 x 8, 16 x 8, 8 x 16
- Coding: CABAC entropy coding

WSS (line 23) Suppression

- Mask top 1/2/3 Visible VBI lines.

Rate Control

- CBR or VBR input
- Capped VBR output

Video Picture Control

- 4:3 or 16:9 output
- Active Format Descriptor (AFD) support for active video control (IPTV mode)
- Dynamic 'follow input' aspect ratio in (MBR mode)

Audio Processing

Input Audio Codecs

- MPEG-1 LII
- MPEG-2 LII
- AAC-LC
- HE-AACv1
- HE-AACv2
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)

Output Audio Codecs

- Pass-through of any input
- MPEG-1 LII
- MPEG-2 LII
- AAC-LC
- HE-AACv1
- HE-AACv2
- Dolby Digital (AC-3)
- Dolby Digital Plus (E-AC-3)

Audio Transcoding Capacity Per Output

Up to 24 audio elementary streams per program (subject to total audio transcoding capacity per TCM2 or TCM2+ as listed in "Transcoding Capacity per TCM2 or TCM2+" on page 14).

Transcoded Output Data Rate

6 – 512 kbps depending on codec and sample rate

Transcoded Output Sampling Rates

8, 11.0, 12, 16, 22.1, 24, 32, 44.1, 48 kHz depending on output codec

Transcoded Audio Gain Control

-12 dB to +12 dB, increments of 1dB

Transcoded Audio Channels

Mono (1.0), Mono (1.0 - One channel selected from dual Mono), Stereo (2.0), Surround (5.1), dependent on codec type.

Transcoding Capacity per TCM2 or TCM2+

Audio Processing per TCM2/TCM2+			
Output CODEC	**Output Channels**	**With E-AC3 Inputs**	**Without E-AC3 Inputs**
AAC-LC AAC-LC	1 or 2 5.1	50 37	83 53
HE-AACv1 HE-AACv1	1 or 2 5.1	34 26	52 32
HE-AACv2	2	55	97
MPEG1/2 L2	1 or 2	57	137
AC-3 AC-3	1 or 2 5.1	45 42	66 61
E-AC3 E-AC3	1 or 2 5.1	24 19	30 22

Ancillary Data Processing

Close Captioned Input

- SCTE-21 on MPEG-2 (including CEA-608 and CEA-708)
- SCTE-128 on H.264

Closed Captioned Output

- SCTE-128 on H.264
- EIA-708 pass-through

SCTE-35 Support

- Selectable PID pass-through
- SCTE-35 Cues will create a Cue induced IDR at the splice point specified in MBR outputs
- ESAM processing (issues with POIS server may delay Cue)

Other Ancillary Data Processing Support

- SCTE-27 subtitles
- EBP in adaptation field. Support for both Implicit and Explicit audio EBP.
- NAL-HRD setting
- ISO 639 Language Descriptor add/modify
- Data PID pass-through (e.g. EBIF)

Control and Management

Module Redundancy

- All modules hot swappable
- 1:1 NPM2 redundancy (1-IP active-standby or 2-IP/3-IP hot-hot modes)
  - Link failure NPM2 switchover
  - Mirrored GigE/10-GigE outputs, including different S, G IP addresses (including different UDP port).
- N+1 TCM2+module redundancy

Management

- Embedded Web-based UI using XML/RPC protocols
- Java-based application
- Multi-user access control
- AAA (Radius, TACACS+)

Management Interface IP Address

- User configurable Management Interface IP address.

Bulk Configuration (BCT)

Excel-based tool for all transcode modes.

Program/Service Redundancy

- Backup program pre-defined and used in case of loss of primary input.[1]
- SSM redundancy (up to four SSM sources may be selected.).
- Program redundancy and SSM redundancy can be triggered by encrypted input.
- Slate: On loss of input, display a black screen or stop the output.

System

IP Networking

IP/UDP, IGMPv3 (including Source IP filtering

Device Latency

- <4 sec

Multiplexing and Table Processing

- SPTS, multicast
- PAT and PMT generation
- PID filtering and re-mapping
- SDT table generation

1. As defined by input PAT/PMT tables presence or encryption if enabled.

- Generation and pass-through of ATSC PSIP tables (incl. A/65)
- DVB-SI table regeneration

Electrical—VMG Input Power

VMG-14+ DC

- DC: -48 VDC nominal (-41 to -60 VDC range)
- 70 Amps per power feed (total 4 feeds)
- Overcurrent protection: 70 Amp circuit breaker on PEM
- Power consumption: 6000 Watts maximum – fully loaded

VMG-14+ AC

- AC: 220 VAC nominal (180 to 264 VAC range)
- 11 Amps per power feed (total 4 feeds)
- Overcurrent protection: 15 Amp fuses on PEM
- Power consumption: 6000 Watts maximum – fully loaded

Mechanical

Dimensions

VMG-14+ DC

- 13 rack units
- 22.75” H X 19.00” W X 21.00” D
- (578.0 H x 482.6 W x 533.4 D mm)

VMG-14+ AC

- 14 rack units
- 24.50” H X 19.00” W X 21.00” D
- (622.3 H x 482.6 W x 533.4 D mm)

Weights (Assembled)

- VMG-14+-DC: 103.7 lbs. (47.1 kg)
- VMG-14+-AC: 111.6 lbs. (50.7 kg)

Cooling (Air Flow Direction)

- VMG-14+-DC: Front (bottom) to rear (top)
- VMG-14+-AC: Front (bottom) to rear (top)

Compliance

Safety

- IEC 60950-1:2005 (2nd Edition); Am 1:2009
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011

Electro Magnetic

- Subpart B of Part 15 of FCC Rules for Class A digital devices
- Industry Canada Interference Causing Equipment Standard ICES-003, “Information Technology Equipment (ITE) – Limits and methods of measurement”, Issue 5, dated August 2012 (Class A)
- VCCI Regulations For Voluntary Control Measures of radio interference generated by

Information Technology Equipment, dated April 2013 (Class A)

- EN 55022:2010, "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- CISPR 22:2008 "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- AS/NZS CISPR 22:2009: "Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement" (Class A)
- EN 55024:2010 "Information technology equipment – Immunity characteristics, Limits and method of measurement."
- CISPR 24:2010 "Information technology equipment – Immunity characteristics, Limits and method of measurement."
- EN 61000-3-2:2006 +A1:2009 +A2:2009 – AC Current Harmonics
- EN 61000-3-3:2008 – AC Voltage Fluctuations

Environmental

Storage Temperature

-40º C to 70º C (-40º to 158º F)

Operating Temperature

0º to 45º C (32º to 113º F)

Ambient Temperature (Transient Operation)

0º to 55º C (32º to 131º F)

Humidity

- 5% to 85%, non-condensing;
- Transient operation: +5% to +90%, non-condensing

Product Constraints

The following product constraints are applicable in VMG release 1.3.0.

System Constraints

- All the output TSs that belong to the same Channel must be on the same GigE port.
- Input SCTE-35 Cue messages are ignored if the PTS value contained in those messages is close to the PCR rollover value. The following equation specifies the error condition: |(SCTE_35_PTS – PCR_RolloverValue)| <= 2*IDR_interval + 4*Frame_Duration at 29.97fps (or 25fps).
- 10.0.1.x and 10.0.2.x subnets are reserved for internal VMG usage and must not be used for the Management Interface or on other Ethernet ports.
- The VMG does not support non-standard input resolutions such as 480p30, or non-standard frame rates.
- H.264 inputs must have 1 PES every AU and must have the sequence parameter set fully contained within a single TS packet.
- MPEG inputs must either have one PES per every AU, or one PES per GOP.
- The VMG does not support inputs with changing video codec formats (ex: MPEG2 <-> H.264), changing video resolutions (ex: HD <-> SD).
- If audio outputs are assigned specific PID values the VMG will reserve those output audio PIDs even if the input audio is temporarily missing, if the language descriptor changes or the audio stream type changes.
- The insertion of Hypothetical Reference Decoder (HRD) parameters into the video elementary streams of H.264 MBR outputs is intended for use by downstream packagers to automatically determine the bitrates of each of the profiles. It is not intended for other uses as some non-bitrate parameters may be inaccurate.

Transcoding Constraints

H.264 output with GOP value M = 8 is supported with fixed N = 32 and IDR interval = 96, and is applicable to SD and 720p HD inputs only. M = 8 is not supported for 1080i HD inputs. If it is not known whether an HD input is 720p or 1080i do not use M = 8. Imagine has determined that setting M = 8 often degrades the video quality of SD video compared with M = 4. Due to the above constraints and degradation of video quality setting M = 8 is not recommended.

ESAM Functionality

The VMG Gen2 release 1.2.1 implements the following ESAM functionality of CableLabs “Real-time Event Signaling and Management API”.

General Functionality

- Configurable acquisitionPointIdentity and URL of the Signal Processing System (POIS)
- Translate SCTE-35 Splice Insert to Time Signal with Segmentation Descriptor for signaling Ad breaks or Placement Opportunities (PO)
- SCTE-35 Time signal PTS adjustment
- Stream conditioning - SCTE-35 Cue based IDR insertion in the Splice Out point (start of Ad break or PO) and one or more Splice In point
- HTTP 1.1 POST interface to POIS
- ESAM based conditioned MBR output steams are SCTE-172 compliant
- Two levels of ESAM control: Enable/Disable globally (per chassis) and per MBR group
- Input Program Redundancy (Stream Failover): after switch to BKP program the ESAM Cue processing follows new input program
- NPM Redundancy: All user configured ESAM parameters are propagated automatically from active NPM to standby NPM. In case of NPM switchover, ESAM will resume after standby NPM becomes active

Signal Processing for In-Bank Ad Insertion

- Generate Signal ProcessingEvent Messages
- Converts PTS splice time to UTC (UTCPoint);
- Sends all SCTE 35 Splice Inserts and Time Signals to the Signal Processing System (POIS)
- Provides options to control Cue forwarding in case of timeout (“Drop Cue” or “Forward Cue”)
- Supports SCTE-35 Cue with Splice_Immediate flag. For splice_immediate signals, the UTCPoint will be set to cue arrival time plus 4 seconds
- Supports adjustable Cue lead time interval

Signal Processing for Out of Band Blackouts

- Accepts and process Scheduled and Immediate Out-Of-Band (OOB) SignalProcessingNotification from POIS (Alternate Content Manager)
- Supports configurable time window for Immediate OOB Notifications
- For immediate OOB notifications, set the blackout start time to current UTC Time plus 4 seconds to ensure proper conditioning of the video
- Defines correct pts_time for Program Start/End
- Supports Time signal with segmentation descriptor according to SCTE-35 2012

ESAM Integration

As ESAM is an evolving specification the VMG should be tested with any third party POIS server to verify desired interoperability prior to use in a production environment. The VMG and the POIS server must have their time and dates synchronized. It is therefore recommended to use the same NTP server to meet this requirement.

APPENDIX B

New Feature History

In addition to the New Features and Enhancements listed on page 6, the following New Features were added in previous releases.

VMG G2 1.4.1

Clock Recovery Options

VMG2 1.4.1 is built on top of VMG2 1.4.0 to address a specific customer case, referenced internally as

VMGII-2438 (SF# 25902) AVTX Auto Bitrate gives 0.05mbit output.

The customer was having issues transcoding certain upstream DVB multicast inputs delivered from open source DVBlast DVB network streamers. On certain inputs the video delivery rate to VMG2 is bursty with PCR values, well beyond tolerance limits in ISO 13118-1.

In order to address such non-compliant video sources, this release provides an option of a relaxed clock recovery approach from incoming PCR, a settable database parameter in the Program Mapping for VTX (VTX-PIP) and AVTX (AVTX-PIP) transport streams in the form of a drop down menu with three selections. In the Source section, a new "Clock Recovery" category has been created with the following options:

1. **Always lock to source** PCR (default): Value 0
2. **Loose coupling**: Value 1 (Clock recovery algorithm coupling parameters are read from two newly added tuning parameters (TUNE_TCM_EXPPCR_THRESH_FOR_TIMING_RESET, TUNE_TCM_EXPPCR_FILTER_LENGTH)
3. **De-coupled to source**: Value 2 (Coupling parameters read from tuning parameters, and used after an internal modification to TUNE_TCM_EXPPCR_FILTER_LENGTH value).

In a system where these parameters are not present, they will be populated with values as determined to work, derived from testing at the specific customer site: (TUNE_TCM_EXPPCR_THRESH_FOR_TIMING_RESET= 6, TUNE_TCM_EXPPCR_FILTER_LENGTH= 0).

This enhancement will not be made available to MBR, and MBR grooming will always use "Always lock to source PCR" approach.

Upon database upgrade, "Clock recovery field is set to 0 (always lock to source) will be used in all existing grooms.

All existing and new customers are advised to use only "Always lock to source" selection, while the customer raising this specific case will use "Loose Coupling" selection for certain DVBlast sourced inputs as needed. Customers are advised to contact customer support before using options other than "Always lock to source".

VMG G2 1.4.0

Re-branding to Imagine Communications
MBR bandwidth expansion (30Mb/s for total TS and 25Mb/s for total video)
Added new Tuning parameter: TUNE_TCM_H264_REDECODE_CONTROL=1 (default setting). This parameter will tell the decoder to re-decode the input stream when required to address inputs with multiple reference frames, and large motion vectors that were previously causing macro blocking to appear. Setting this parameter to 0 will revert the VMG to previous behavior, which was to never re-decode an input stream.
Added new Tuning parameter TUNE_TCM_VCAP_VIDEO_LINES_REPEAT_ZERO to mask with black lines on top of the screen in “mask top lines” feature. (“mask top lines” feature is available for VTX, AVTX outputs)
Support disabling (“Admin Down”) an empty slot

VMG G2 1.3.1P2

No new features added in this release.

VMG G2 1.3.1P1

No new features added in this release.

VMG G2 1.3.1

50Mbs Input Support

GUI: Add the 50M HD SPTS checkbox in the INPUT TS creation

Mute –Standby in 3-IP Mode

If 3-IP mode is configured, the option to mute the outputs of the standby NPM card is now available. Only the primary/Active NPM card will output multicast in this case.

Increate MAX MBR aggregate bitrate in an MBR group to 24Mbs TS and 20MbsVideo ES

Clone MBR

Ability to select an MBR groom and clone it to help speed up manual provisioning of a service.

DSCP configuration on output multicasts for QOS enablement on the network.

Enhanced processing of incoming SCTE 20 closed caption data to be compatible with legacy set top boxes that do not handle presence of standards compliant marker bits well.

VMG G2 1.3.0

Standby NPM2 card upgrade from active NPM2 card.

When the standby NPM is running a different software, the active NPM will now automatically synchronize the current software to standby NPM, and reboot the standby NPM.

SW upgrade from local file stored on the VMG.

Operators can perform the software upgrade without the FTP server by selecting the software image file (gen2sw.tar) from the local PC, which is running the Element Manager GUI. [1439]

Force output resolution to 720p for IPTV HD outputs

The feature allows the operator to set the output resolution for HD channels to a fixed resolution of 720p while in IPTV mode.

NOTE: Forced 1080i output resolution is not working correctly, and should therefore not be configured. [1648]

Input PMT update handling enhancements

VMG 1.3.0 has better handling of PMT input updates, which will reduce the instances that require the internal decoder to be reset. This results in a slight, or glitch-free transition on the video output when a PMT update occurs. [1694]

WSS (line 23) suppression for VTX+PIP, AVTX+PIP, and MBR outputs.

Visible VBI on line 23 can now be suppressed in MBR mode. [1738]

Display output TS groomed from input program

This feature allows the operator to see which output transport streams were groomed from an input program. [1625

EBP enhancement

Allows the operator to explicitly specify the audio stream that will have its

bitrate placed in the TS header

Start transcoding with primary input on grooming

When program redundancy is configured, the VMG will join both the primary and backup source. It will begin transcoding the first source that is discovered which is some instances will be the backup source. This feature will wait a period of time for the Primary source to be joined/ discovered before using the backup source

Manual switch to a backup source in Program Redundancy on a per-program basis.

This feature allows the operator to force a groom to use the configured backup source. Automatic failover to backup sources is not affected by this feature. This feature allows for a manual override to the backup source.

SSM Improvements

Release 1.3.0 now provides manual switchover/UI SSM redundancy, pre-joining of all sources, and TCM SSM switchover.

Stagger IGMP join requests on loss of input link

This feature prevents the flooding of IGMP requests to the network if an input link were to go down, then come back up.

License enhancements

Enforce HD license use for full HD MBR profile

Use sub-SD license for MBR PIP resolutions

Previously, full HD MBRs would consume an SD license but not HD licenses. Operators using full HD MBR profiles must ensure they have the correct number of full HD output licenses installed on their VMG to prevent failure of outputs associated with HD profiles.

late input support when input missing.

This feature displays a black screen on loss of input, when enabled. The black slate is a proper video stream and will appear as a normal video stream to downstream devices

BCT support for IPTV TS types.

Bulk configuration is now supported in IPTV mode. Previously, only MBR mode was available for bulk import.

New MBR resolutions

Now enabled are 256x192, 576x432, 720x576 PAL

All MBR resolutions available for HD and SD

Previously, only a subset of resolutions were available to HD inputs

Flexible MBR resolutions support

This feature allows the operator to manually select the resolution to be output. This feature is for lab testing only, as the impact to the capacity for using a custom resolution must be evaluated by Imagine.

0.5 sec GOP support for MBR outputs

Previously, the minimum GOP length for MBR output was 25 and 30. GOP length = 15 is now supported.

CPB/Buffer Drain Rate Modifications

These modifications eliminate STB from playing audio before video.

Active Format Enhancement

MBR: support for 16:9 letter box on 4:3 output, or 4:3 center cut on 16:9 output. [1912]

KDG Secondary Source IP Feature

In Two-IP mode, support is now provided for three IP addresses on outputs that are not in the same subnet. The VIP is only used as source address in the multicast output from both ports. [1923]

ES audio bitrate in PES header

VMG G2 1.2.1

The following changes were made with VMG release 1.2.1, build 68803.

The initial releases of VMG Gen2 support MBR transcoding for NTSC content. This release extends MBR transcoding to PAL content, adds new features and enhancements and fixes numerous issues as described below.The following new features below are introduced in software release VMG Gen1 1.2.1. Please refer to the specifications in Appendix A: VMG Gen2 Product Specifications, for a complete list of the VMG Gen2 features and functionality.

1.SSM Redundancy

In addition to input program redundancy this release supports input redundancy of Source Specific Multicast inputs. Each input program may specify as many as 4 different SSM addresses to use as an input source. The specified input addresses will be used in a round robin fashion, only changing to the next input in the SSM list if the current input is lost.

2. Switchover on Encrypted input

With this release the VMG will detect whether an actively used input is encrypted and switch to the corresponding backup input program if one has been configured.

3. Modify Existing Grooms On-The-Fly

This release supports the ability to modify the settings of existing grooms without having to delete them and then recreate them with the new settings. This makes it much more convenient to modify existing grooms. Although modifying the settings will cause a momentary interruption of services for a few seconds, it is a much shorter interruption than if the groom were manually deleted and then recreated.

VMG G2 1.2.1

Note: *Note: The additional Gen1 functions listed here either did not exist or may have only been partially implemented or tested in previous Gen2 releases.*

a. IPTV transcoding: AVTX+PIP, AVTX, VTX+PIP, VTX, PIP
b. DVB SI support
c. DVB Subtitles/Teletext
d. Support for MBR profiles at less than 100 kbps
e. Line 23 masking (to hide WSS data that may appear as white lines)
f. Correct AFD passthrough for PAL

VMG Gen2 1.2.0

The following new features below are introduced in software release VMG Gen1 1.2.0 for transcoding applications.

1. Flexible Audio Support

This release supports much more flexible audio transcoding. This allows users to optimize the encoding of each audio associated with a video program by encoding differently. For example in previous releases if one audio required AC-3 encoding with 5.1 channels then all of the audio associated with that program would be encoded using AC-3 with 5.1 channels. In this release the primary audio may be encoded using AC-3 with 5.1 channels, the Secondary Audio Program (SAP) may be encoded using AAC- LC in stereo and Audio Description (AD) using MPEG2-L2 in mono.

2. Dual Mono Support

This 1.2.0 release includes a Beta version of Dual Mono support. It is considered Beta as this new feature has been implemented but is still under test. This feature adds support for dual mono audio content where the user is allowed to select which channel of the two mono channels to be used. The options include use of both inputs, channel 1 only or channel 2 only. This will allow users to utilize either channel of a Dual Mono audio as a mono audio source.

3. Two-IP Mode

In Two-IP mode, each pair of the data ports is configured with two IP addresses. Each IP address comes with a subnet mask, and optionally a default gateway IP address. The two IP addresses do not have to be on the same subnet. Each IP address is a physical IP address, meaning that each IP is tied to a specified port in the pair.

This is an additional mode to the One-IP mode, where each pair of the data ports is configured with only one IP address, and the Three-IP mode, each pair of the data ports is configured with three IP addresses: one virtual IP address,

and two physical IP addresses.

4. Additional Gen1 Functions

Note: *The additional Gen1 functions listed here either did not exist or may have only been partially implemented in previous Gen2 releases.*

Ability to mix Baseline, Main and High Profiles in an MBR group

- Support for PAL video including option for 50 frame IDR
- Support for MPEG1 Layer II, MPEG2 LII audio inputs and HE-AACV1, HE-AACV2 audio outputs
- SCTE-20 CC Support
- Delay DVB Teletext to align with video
- Data friendly bit rate hunting
- AAA/Radius Support
- ES Statistics

VMG Gen2 1.1.1.P1

Although VMG Gen2 1.1.1 release resolves a number of issues in the previous release it did not provide any new features.

VMG Gen2 1.1.0

The following new features below are introduced in software release VMG Gen2 1.1.0 for transcoding applications.

1. ESAM Support

This release contains support for Event Signaling And Management (ESAM) functions. In order for this to operate properly please insure that the feature is enabled in the VMG Global Configuration and on desired outputs. The VMG must also be configured to interface to a Placement Opportunity Information Service (POIS) server through the VMG Global Configuration as well. Please refer to the Element Manager User Guide for more details.

2. Element Manager

This release uses an Element Manager (EM) for monitoring and management of the VMG rather than the Director which was used in the previous release. The use of the EM allows for easier transition for VMG Gen1 systems to VMG Gen2

APPENDIX C

Issue Resolved in previous releases

Resolved in G2 1.4.1

ID	Summary
2444	VMG2: FIELD VMG 3.7.0 I VTX H264 HD slow motion / paused effect (A6 microcode changed)

Resolved in G2 1.4.0

ID	Summary
2388	Added new Tuning parameter TUNE_TCM_VCAP_VIDEO_LINES_REPEAT_ZERO to mask with black lines on top of the screen in “mask top lines” feature. (“mask top lines” feature is available for VTX, AVTX outputs)
2378	Interop with SNMP MIBs with iGlass
2375	Blocking on sports channel
2265	Corrected custom resolution field when re-grooming
2270	Corrected behavior when modifying custom resolution to predefined resolution
2397	Corrected discrepancy when EBP explicit audio was configured, EBP is now carried on video and audio segment boundaries as well as video fragment boundaries.

Resolved in G2 1.3.1P2

ID	Summary
4757	Corrected ESAM namespace issue for both in-band and out-of-band CUEs from POIS agent..

Resolved in G2 1.3.1P1

ID	Summary
2402	Correct an issue that was preventing new grooms to be completed.
2401	Correct an issue that was preventing the addition or deletion of existing services.

Resolved in G2 1.3.1

ID	Summary
2385	Cloned MBR throwing "Invalid passthrough start pid" error.
2384	Changing output program number in cloned MBR dialog is not allowed.
2383	Modifying Mirrored IP Address in cloned MBR is not working.
2369	For HTTP url source type, url field caption is not right.
2368	HTTP SW upgrade showing ftp fields.
2367	HTTP DB restore is showing same fields of FTP DB restore. Not showing URL.
2362	Bitrate monitor is not shown at times when launching from output TS right click.
2361	Creating multiple input TS dialog throws 'Invalid number of multiple TSs to create' when entering number of TSs to create.
2354	VMG2 v1.3.1 EM : Primary GigE port DSCP priority is set on mirrored port as well when "Mirror on same IP" is enabled.
2353	After NPM2 SWO, both primary and mirrored outputs use primary output IP:Port, even though they are set differently.
2352	GUI is not checking for redundant UDP port on modify TS.
2303	Gen2 : VMG2 v1.3 EM : All outputs of VMG2 are lost on a running system. Input is present, but output programs show "No Input" error.

Resolved in G2 1.1.1.P1

ID	Summary
25486	Occasionally, more than a single copy of a configured output TS may be produced resulting in an unusable output stream.

Resolved in G2 1.1.1

ID	Summary
24556	Simultaneous configuration of multiple Global Configuration window tab parameters doesn't always work
24605	Changing default gateway causes the following error to occur, "failed to set IP info. Call to setinterfaceCfg timed out"
24624	Cancelling the Password Verification pop up window while configuring the port mirroring closes the GigE Port configuration window. When the user opens the Configure GigE Port configuration window the next time it remembers the last cancelled configuration.
24629	GUI is not closing gracefully when NPM2 cards removed.

24630	IP mode configuration change takes effect even if the user cancelled the password verification and didn't reboot the system.
24633	EM GUI shows MBR outputs grayed out (inactive) after switch to BKP Inputs
24652	When an active NPM2 module is removed the GUI still shows two active alarm tab and 2 event tabs
24685	When primary input program is groomed, there is no way for user to know who the backup input program is
24691	When User is “Operator” they are unable to configure the Transcoder Global Configuration
24692	Two different "Input TS Missing" events are reported when the input TS is missing
24695	EM GUI may show incorrect output status of MBR when the input is missing
24710	MBR is grayed-out after switch to BKP program despite output is okay
24712	EM GUI will be closed after NPM2 switchover
24715	Configuration changes in the EM GUI while the system is rebooting may cause the EM GUI to lock up

Resolved in G2 1.1.0

ID	Summary
20045	A log-in to or a log-out from SafeMode do not currently log events to Director's event log.
22819	Director needs a license refresh feature to accurately track license use.
23236	If a large number of channels are quickly deleted, for example using the Bulk Configuration Tool, it may not be possible to create a new input TS.
23357	Safe Mode log-in will be denied with an error indicating that another session is currently active if a previous user did not log-out correctly.
23384	Occasionally the connection between the Director and the VMG fails to establish properly, causing the VMG node to be shown with a grey icon.
23623	MBR outputs based on H.264 inputs do not include closed captioning data.

APPENDIX D

Known Unresolved Issues

The table below contains a list of all unresolved previously known issues and workarounds. Bugs fixed in this release have been removed from this list. Note that the ID numbering system has changed with the VMG Gen2 1.3.0 release. The ID numbers shown below are based on the new numbering system.

ID	Priority	Summary	Workaround
1958	major	Input going from H.264 1080i to 720p, with output set to Force 1080i, results in continual resets of A6 xcoder. Impact: Can cause a periodic glitch in the video output, and logs will display alarm for SLOW TRANSCODING.	Un-check the **Force to 1080i** option via **Modify Grooming**.
1987	major	A change to audio language in PMT update does not have a corresponding change in output audio language. Impact: SPTS output PMT gets updated only when re-grooming occurs and any processing module requires a restart. Processing modules require restart when the input codec types or PID values change, which minimizes interruptions in output. Descriptor changes cause restart.	Reset or restart the sessions, using input with audio language change.
2062	minor	Maximum event and alarm in the global configuration are not synchronized to the standby. The updates do not take effect, and do not persist on the standby NPM.	Perform the same configuration change after the NPM switchover.
2070	minor	The standby NPM2 continues to generate SSM source switching events even though the standby NPM2 has the input. Impact: The events will flush the event list displayed in the Event History tab of the standby NPM. This happens only if the system has configured One-IP mode.	None
2136	major	Error—XCODER_VDSP_ERROR—raised but did not clear after deleting the entire TS Impact: No service impact. However, the alarms cannot be cleared.	None
2146	minor	The output black slate video has 2 to 3 seconds of green frames at the looping point. Impact: VQ issue.	None
2150	minor	Switching from primary video to black video output takes 3 minutes in a fully loaded system. Impact: Occurs only when all transcoding sessions on a single TCM2 card at—100% utilization—switch to black video at the same time.	None

2153	major	An NPM2 switchover with black video output enabled causes TCM2+ in slot 12 power failure. Impact: After switchover, the output contains numerous CC errors.	None
2191	major	Element Manager GUI hung while system is running: black screen display. Impact: The Element Manager GUI is un-usable to operator until it is re-launched.	Open Windows task manager and force-quit Java. Re-launch the Element Manager GUI from the web browser.
2228	minor	Audio language for created and cloned dummy audio elementary stream (AVTX+PIP) groom is not updating automatically after modification. Impact: No service impact but the GUI display is not correct.	The **Output Language** will reflect correct value after you perform one of the following actions: • Click on the cell.
2238	minor	The audio bitrate value is not displaying in the bulk configuration sheet for audio codec Impact: values are not displayed for Audio code=AACLC, Audio sample rate=24 or 32, or Audio channel = Stereo. Values for audio bitrates are not displayed in the BCT even though they are properly displayed in the GUI.	Manually enter the audio bitrate.
2269	minor	Output loss observed during upgrade from Release 1.2.0 to Release 1.3.0.	This feature must be enabled, via the Element Manager GUI, following upgrade to G2 1.3.0.
2276	major	Bulk Configuration Tool fails to report error if PIP contains audio. Impact: The Element Manager GUI displays audio ESs in the grooming tree, only under the +PIP TS.	Right-click on the group and select M**odify Grooming.** Click **Apply** with or without any changes. The audio will then be removed from the +PIP TS.
2279	major	Import from the Bulk Configuration Tool fails during deletion of the TS database. Impact: Some of the configuration on the VMG2 might not be deleted.	Re-run the bulk configuration tool, to delete the configuration.
2280	major	Bulk Configuration Tool import failure: Impact: VMG reports *Failed to create MBR TS. No resource manager available*, or *Session ID Mismatch*.	Reboot/switchover, then re-import the Bulk Configuration Tool.