RGB'S VMG

RGB's Second Generation Video Multiprocessing Gateway

The world's first scalable, carrier-class IP video platform for Multiscreen Delivery

VMG GEN2 BENEFITS INCLUDE:

- High stream processing and capacity: 1000+ streams per chassis
- The highest density, allowing for pay-as-you-grow scalability, without compromising on pristine video quality
- High-availability, carrier-class platform with multi-level redundancy and unmatched reliability
- FPGAs, ASICs and Intel processors ensure best-in-class implementation
- Multi-processor architecture offers future-proofing for new applications, while achieving the greatest density/cost benefits for proven functions
- Ultra-dense platform conserves rack space and reduces power requirements

RGB's second generation model of its award-winning VMG product line builds on the unique, field-proven capabilities of the first-generation VMG platform. The VMG Gen2 is the heart of RGB's 'Multiscreen 2.0' live streaming solution, which allows operators to expand and streamline their TV Everywhere services. The VMG Gen2 sets new levels for stream processing density and capacity with the ability to transcode over a thousand output video streams in a single chassis while still delivering the highest video quality.

RGB's carrier-class VMG Gen2 is the ideal platform for operators seeking to accelerate the growth and profitability of their video services in the most cost-effective manner. With the VMG Gen2, telecom, cable and other service providers can concurrently deliver MPEG-2 and H.264 digital broadcast or on-demand video services targeting a wide variety of consumer video devices from a single device.

The flexibility of the VMG Gen2 allows it to be used for the implementation of a variety of applications critical to the success of today's video service providers. In the core of the network (or super headend), centralized functions are performed in the areas of transcoding, grooming and ESAM support for national/regional ad insertion and program substitution. Edge-level deployment allows for local content transcoding, grooming and ESAM support for local/zoned ad insertion and program substitution.

VMG GEN2: THE CARRIER-CLASS VIDEO PLATFORM

In order to ensure uninterrupted service delivery, the VMG Gen2 delivers very high levels of reliability. It has been designed from the outset to meet the highest levels of redundancy via a multi-level redundancy architecture. Exceptional reliability and fault-tolerance are enabled by the VMG's carrier-class chassis design, which incorporates extensive fail-over capabilities, comprehensive hardware and software component redundancy, as well as program and service level redundancy in case of program service failure, to ensure the highest levels of availability.

The 13-rack unit VMG-14+ DC chassis has 14 module slots, two of which are dedicated to the Network Processing Module 2 (NPM2) and the remainder available for Transcoding Module 2 (TCM2) and the Trancoding Module 2 Plus (TCM2+). The NPM2 performs chassis control functions, external Gigabit and 10-Gigabit Ethernet interfacing via SFP and SFP+ modules, as well internal backplane switching and routing of streams. The NPM2, through its virtual IP and MAC address features, can be configured for 1:1 redundancy. The VMG Gen2 internal backplane switching allows automatic TCM2 and TCM2+ module redundancy where input and output streams to a given operational module are reconfigured to a standby module in the chassis with video services back up in a matter of seconds. The same architecture with identical NPM2, TCM2 and TCM2+ module capacity is also available in a 14 RU VMG-14+ AC chassis which has integrated redundant AC supplies.

rgb NETWORKS

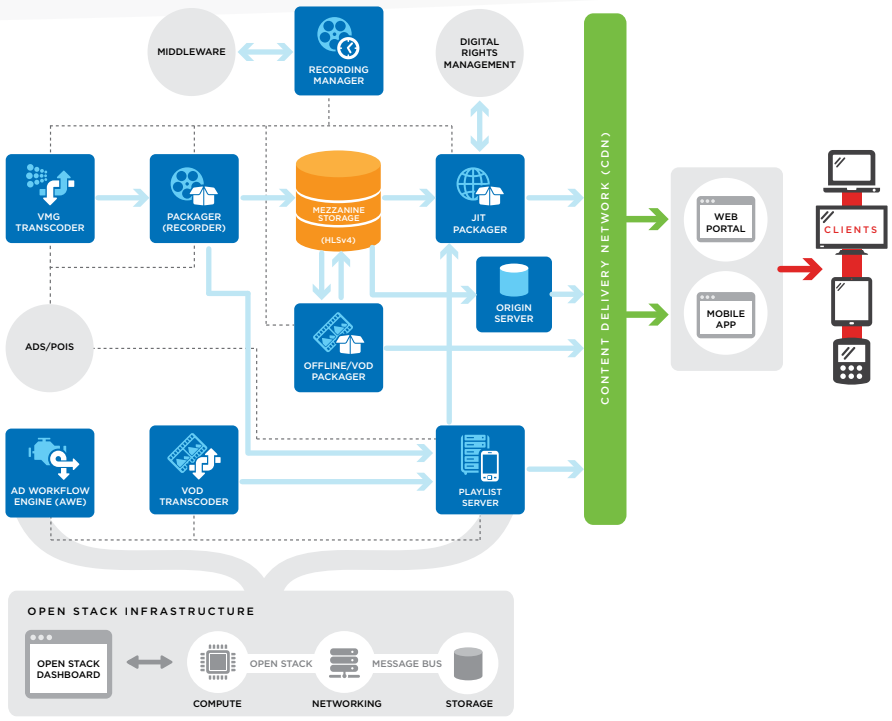
INTUITIVE, FLEXIBLE OPERATIONS WITH VMG GEN2

The VMG Gen2 is monitored and configured through an element manager which provides a powerful user interface allowing complete flexibility of configuration. The VMG Gen2's SNMP and XML/RPC support also allows monitoring through third-party network management systems which may have a plant-wide scope of operations. The easy-to-use interface offers a variety of features that simplify the set-up and operation of the VMG, including program and transport level drag and drop grooming; simultaneous bitrate analysis of input and output transport streams grouped by input/output physical interfaces; alarms and system logs; with extensive diagnostic and troubleshooting capability.

The VMG interface supports multiple tiers of user access and password protection to prevent any unintentional operational issues, and additionally supports Remote Authentication Dial In User Service (RADIUS) and Terminal Access Controller Access Control System Plus (TACACS+) for more granular user authentication and authorization.

The VMG on-board database allows backup and restore operations for quickly recovering to an earlier configuration. The Bulk Configuration Tool (BCT) supports configuration of high-capacity networks from intuitive spreadsheets which reduces entry errors, time-consuming manual data entry and provides a convenient readable summary of saved configurations.

RGB's VMG Enables a Number of Critical Applications



VMG Gen2 Specifications

INPUT / OUTPUT INTERFACES (NPM2)	SPECIFICATION
Gigabit Ethernet	1-Gigabit Ethernet, 8 x SFP ports (copper or fiber); 10-Gigabit Ethernet, 8 x SFP+ ports
Fast Ethernet	1 10/100 BaseT control and management interface, RJ-45 connector
INPUTS	**SPECIFICATION**
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)
PCRs	Common and external PCRs are supported for transcoding
OUTPUTS	**SPECIFICATION**
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 Support user defined resolution for MBR
Transport stream level	Single Program Transport Stream (SPTS)
Video bit rates	**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 – 9 Mbps

VMG Gen2 Specifications (cont.)

(OUTPUTS CONTINUED)

Output resolution and frame rates	**VTX or AVTX transcoding HD to HD:** Horizontal resolution: Full, 1920, 1440, 1280, 960; Vertical resolution: follow-input, or force 108i; 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: VTX+PIP, AVTX+PIP or PIP transcoding to Picture-in-picture (PIP):** H: 1/2D1 x V: 1/2D1; 192x192; 128x96;96x96 **MBR transcoding:** All outputs are p29.97/25 unless otherwise noted. The list of possible output resolutions is color-coded according to the following schemes: Green: 1920x1080, 1280x720p60/50 Yellow: 1280x720, 1024x576, 960x720, 960x540, 640x720 Blue: 864x486, 848x480, 768x432, 720x576, 720x540, 720x480, 640x480 Red: 640x360, 624x352, 576x432, 512x288, 480x368, 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). Only one output profile per Transcode Unit for Full HD Output: 1 green The following are allowed combinations for four output profile TS per Transcode Unit: 1 yellow + 1 blue + 2 red; 1 yellow + 3 red; 2 blue + 2 red; 1 blue + 3 red; 4 red

VIDEO PROCESSING

	SPECIFICATION
Input Video Bitrate	Up to 45 Mbps
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 PIP and MBR outputs are transcoded to H.264 outputs regardless of input
H.264 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
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)
WSS (line 23) Suppression	Mask top 1/2/3 Visible VBI lines for IPTV and MBR
Noise reduction	Motion Compensated Temporal Filter (MCTF) noise reduction (IPTV mode)
Film processing	Telecine (MPEG-2)
Audio Processing	Specification
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)
Transcoding capacity	Up to 24 audio elementary streams per program (subject to total audio transcoding capacity per TCM2 or TCM2+ as shown below)
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), Stereo (2.0), Surround (5.1), depedent on codec type

AUDIO PROCESSING PER TCM2/TCM2+

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

VMG Gen2 Specifications (cont.)

ANCILLARY DATA PROCESSING	SPECIFICATION
	Closed 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)
	EBP in adaptation field
	NAL-HRD setting
	ISO 639 language descriptor add/modify
	Data PID pass-through (e.g. EBIF)
	Slate Support: Black out or no output.

CONTROL, MANAGEMENT	SPECIFICATION
Module redundancy	All modules hot swappable 1:1 NPM2 redundancy (1-IP active-standby or 2-IP/3-IP hot-hot modes). Hot-Hot output redundancy: Redundant output streams are sent from the same transcoding unit via both NPM. User can choose same or different destination (Multicast) IP/port, source IP. - Link failure NPM2 switchover - Mirrored GigE / 10-GigE outputs, including different S,G IP addresses (including different UDP port)
	N+1 TCM2+ module redundancy
Program/service redundancy	Backup program pre-defined and used in case of loss of primary input . SSM redundancy (up to 4 SSM sources may be selected)
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 (RGB Director)	Excel-based tool for for all types of TS: MBR, IPTV (VTX, AVTX), IPTV+PIP (VTX+PIP, AVTX+PIP), and PIP, including presets and channels.

SYSTEM	SPECIFICATION
IP Networking	IP/UDP; IGMPv3 (including Source IP filtering)
Device latency	< 4 sec
Multiplexing & Table Processing	SPTS, multicast; PAT and PMT generation; PID filtering and re-mapping; SDT table generation Generation and pass-through of ATSC PSIP tables (incl. A/65); DVB-SI table regeneration

REGULATORY COMPLIANCE	
Safety	CB 60950-1 With National differences CA, DE, FI, IL, KR,US
	Test Spec IECxxx. ENxxx) 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
	EN 55022:2010, CISPR 22:2008, AS/NZS CISPR 22:2009: EN 55024:2010, CISPR 24:2010, EN 61000-3-2:2006 +A1:2009 +A2:2009, EN 61000-3-3:2008
	ICES-003, "Information Technology Equipment (ITE) – Limits and methods of measurement", Issue 5, dated August 2012 (Class A)

ELECTRICAL/MECHANICAL	VMG-14+-DC:	VMG-14+-AC:
Input Power	-48 VDC nominal (-41 to -60 VDC range) 70 Amps per power feed (total 4 feeds)	220 VAC nominal (180 to 264 VAC range) 11 Amps per power feed (total 4 feeds)
Overcurrent Protection	70 Amp circuit breaker on PEM	15 Amp fuses on PEM
Power Consumption	6000 Watts maximum – fully loaded	6000 Watts maximum – fully loaded
Dimensions	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)	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)
Weight (assembled)	VMG-14+-DC: 103.7 lbs. (47.1 kg)	VMG-14+-AC: 111.6 lbs. (50.7 kg)
Cooling (air flow direction)	Front (bottom) to rear (top)	Front (bottom) to rear (top)

OPERATIONAL ENVIRONMENT	
Storage Temperature	-40° to 70° C (-40° to 158° F)
Operating Temperature	0° to 45° C (32° to 113° F)
Ambient Temperature (transient operation)	+5° to 55° C (41° to 131° F)
Humidity	5% to 85%, non-condensing; Transient operation: +5% to +90%, non-condensing

RGB Networks, Inc.
390 West Java Drive, Sunnyvale, CA 94089
USA
T: +1.408.701.2700 | F: +1.408.701.2710
www.rgbnetworks.com