



DBM

RGB Dynamic Bandwidth Manager

RGB's ultra high density Dynamic Bandwidth Manager (DBM) is the industry's only low-latency, real-time video processing solution for interactive, personalized architectures such as video-on-demand (VOD) and switched digital video (SDV). Based on RGB's Video Intelligence Architecture™ (VIA), the DBM enables cable operators to deliver 50% more programming on their existing network without costly network re-architecture and upgrades. The flexible, scalable and modular one rack unit platform offers high density VOD and SDV bandwidth optimization, enables quick 'trick play' functions and works transparently with existing servers, resource managers, modulators and set-top boxes.

High-Density, Real-Time VOD and SDV Bandwidth Optimization

- Provides up to 50% improvement in bandwidth efficiency for video-on-demand and switched digital video applications.
- Real-time processing eliminates the need for costly and operationally complex pre-processing, media staging and integration.
- Low-latency video processing delivers full 'trick-play' agility.
- Supports DVB and ATSC standards.
- Offers seamless integration with VOD servers, session resource managers and edge QAMs for plug-and-play deployment.
- Integrated bulk encryption support simplifies the VOD architecture.¹

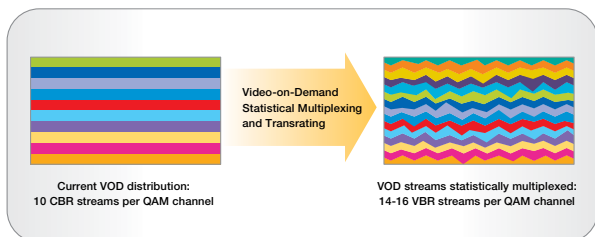
As operators continue to roll out new services such as video-on-demand (VOD), on-demand high definition (HD) television and channel-bonded high-speed Internet services, they are challenged to find enough bandwidth to support these services. The bandwidth limitations of the current networks will continue to be an obstacle to offering more advanced services as demand for digital on-demand services is expected to climb dramatically over the next several years.

Until now, operators did not have a solution that could help with the bandwidth limitations of on-demand, personalized environments, such as VOD and SDV, without network re-segmentation. The current generation of video processing equipment suffers from very high per-program cost and offers low program densities. Additionally, high video processing delay with these products makes them unsuitable for delay-sensitive architectures such as VOD and SDV, where fast trick play interactive functions are expected.

RGB's DBM is the first real-time video processing product specifically designed to address these limitations – it offers extremely high density video processing at an order of magnitude lower cost than existing solutions while maintaining extremely low delay.

Real-Time Video-on-Demand (VOD) Bandwidth Savings

The DBM has been designed to seamlessly integrate with current VOD architectures. In typical VOD deployments, cable operators deliver 10 constant bit rate (CBR), standard definition (SD) VOD programs per 6 MHz 256-QAM channel (typically 14 programs in an 8 MHz 256-QAM channel).



With the addition of the RGB DBM, operators can take advantage of bandwidth savings of 50% or more by statistically multiplexing approximately 15 programs within a single MPTS transport, while still maintaining optimum picture quality. This additional bandwidth can be used to introduce or increase the number of on-demand high definition (HD) VOD programs offered, or can be used for other bandwidth-hungry applications such as high-speed Internet.

Because it statistically multiplexes the VOD programs in real time, the DBM is exceptionally easy to deploy. Real-time processing eliminates the need for complex pre-processing of each VOD program and avoids the need for increased storage capacity and complicated integration with VOD servers. It also maintains extremely low latency, assuring fast response for trick play functions.

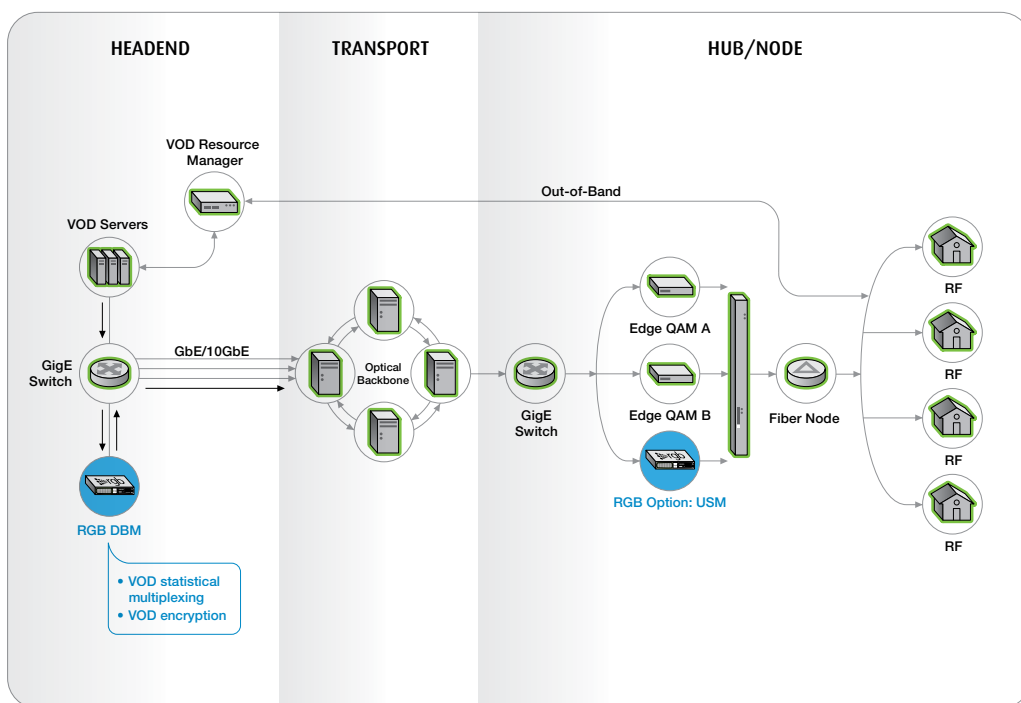
In the VOD environment, the DBM receives the typical 3.75 Mbps CBR standard definition or 15 Mbps CBR high definition VOD programs and statistically multiplexes these SPTSs into MPTS or variable bit rate SPTS outputs. The outputs are delivered to standard edge QAM modulators via Gigabit Ethernet and mapped to specific QAM channels as configured through the VOD resource manager.

The DBM also offers the ability to encrypt the VOD streams in real time, allowing a more simplified and optimized VOD architecture.

Real-Time Switched Digital Video (SDV) Bandwidth Savings

Due to the dynamic nature of a switched digital video architecture, real-time, high density processing can play a very critical role in this environment. In current SDV environments, a staging processor is used to convert broadcast programs to specific capped bit-rate video programs to allow the SDV resource management application the means to manage and allocate the programs to specific

RGB DBM in the Video-on-Demand Environment



QAM channels. Although this conversion simplifies the allocation of the video programs, it also lowers the overall efficiency of the SDV architecture, and can result in lower quality video programs. RGB's DBM offers a plug-and-play solution for SDV allowing the delivery of the video programs in their original and native VBR format, while optimizing the bandwidth and improving the video quality.

Redundancy Architecture Increases Reliability and Service Availability

The DBM features 1:1 chassis redundancy. In this mode, the primary and redundant units share configuration and are automatically kept in sync. The 1:1 chassis redundancy architecture requires identical hardware configuration between primary and redundant units. The redundancy is based on automatic heartbeat checks between the units, assuring fast switch-over in the event of a software or hardware failure.

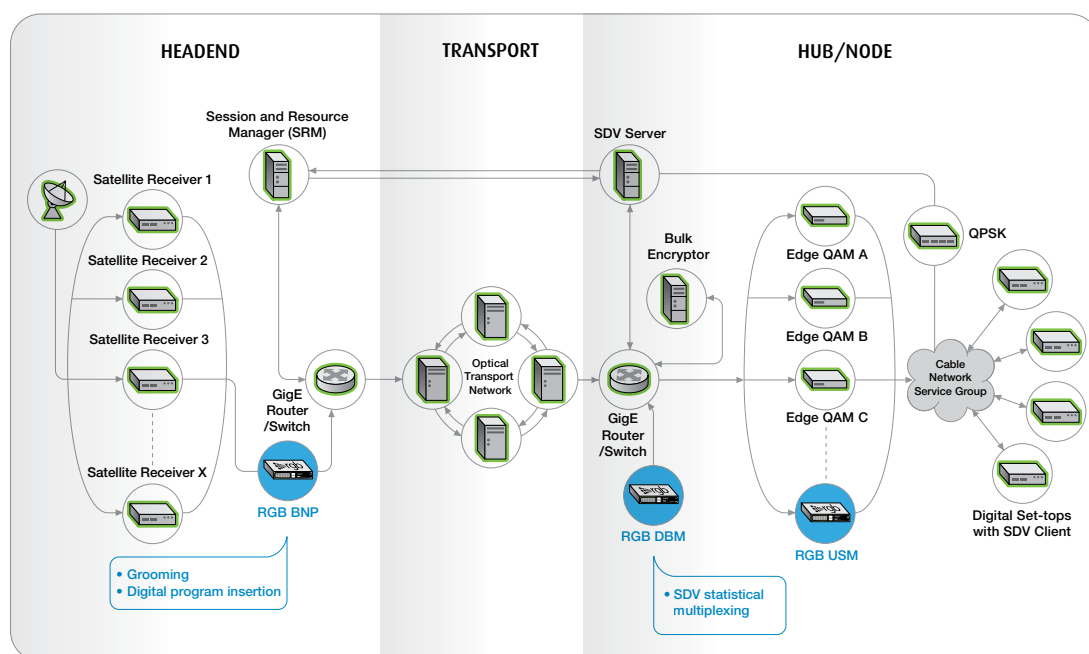
Intuitive Graphical User Interface Simplifies Configuration

The DBM is controlled through a web-based graphical user interface. The easy-to-use interface offers a variety of features that simplify the set-up and operation of the DBM, including simultaneous bit rate analysis, alarms and system logs, and full configurability of the input and output ports. The DBM can also be monitored via SNMP when operational support systems need access to transponder events.

RGB VIA Product Family

The Dynamic Bandwidth Manager is a member of RGB's groundbreaking VIA product family of intelligent video processors. Based on RGB's flexible Video Intelligence Architecture (VIA), the VIA product family leverages standards-based Gigabit Ethernet and IP data networking technologies to easily integrate with existing infrastructure and dramatically reduce the cost of delivering advanced video services in today's digital video environments. This multi-function platform is programmable and upgradable, making the future-proof VIA product family an intelligent choice to help deliver personalized video services.

RGB DBM in the Switched Digital Video Environment



RGB DBM Specifications

INPUT/OUTPUT INTERFACES	
Gigabit Ethernet	8 x Small Form Factor Pluggable (SFP) interfaces IEEE-802.3z Multi- / Single-mode fiber IEEE-802.3ab 1000Base-T Ethernet copper Protocols – UDP/IP, TCP/IP, ICMP, ARP Four modes supported: Bidirectional autonegotiation, bidirectional, send-only, receive-only
Fast Ethernet	1 x 10/100Base-T Ethernet data port, RJ-45 (IEEE – 802.3u) UDP and TCP/IP Protocols – UDP/IP, TCP/IP, ICMP, IGMP, DHCP, HTTP, FTP, ARP, SNMP
Removable Storage	Compact Flash for software, licenses, configuration files
VIDEO PROCESSING	
Video Processing	MPEG-2 statistical multiplexing, transrating; MPEG-4/H.264 re-multiplexing
Input Video Streams	MPEG-2 or MPEG-4/H.264 SPTS, 188-byte packets Up to 7 MPEG-2 packets per UDP payload, unicast
Input Programs	CBR MPEG-2 or MPEG-4/H.264 SD, HD
Output Video Streams	MPEG-2 transport stream, MPTS and V-MPTS (virtual MPTS, with individual SPTS tables) Up to 64 output muxes, at 40Mbps output data rate each or 48 output muxes at 52Mbps output data rate each Unicast or multicast UDP/IP, 7 MPEG-2 transport stream packets per UDP payload
Output Programs	Up to 960 SD ² or 192 HD ³ programs, or a combination of the two Variable bit rate
MPEG-2 Formats	Main Profile @ Main Level (SD, 4:2:0); Main Profile @ High Level (HD, 4:2:0)
MPEG-4/H.264 Formats	Main Profile @ Level 4.1 (HD); Main Profile @ Level 3 (SD)
Latency	Less than 400 msec, supporting full trick play modes
Video Resolution	SD – 720 x 480, 704 x 480, 544 x 480, 528 x 480, 352 x 480, 720 x 576, 640 x 576 HD – 1080i x 1920, 720p x 1280
Frame Rates	25, 29.97, 50, 59.94 frames per second
AUDIO PROCESSING	
Audio Format	Dolby AC-3 muxing, demuxing, re-stamping
MULTIPLEX PROCESSING	
Routing	UDP port mapping, including the RGB Port Mapping scheme, fully customizable 16-bit port mapping and pre-configured third party port configurations supported by VOD servers
Mux Processing	PID filtering and re-mapping PCR re-stamping and de-jitter, PCR accuracy within 500nsec PAT and PMT generation
Encryption	Motorola Privacy Mode ¹
Network Jitter Tolerance	+/- 100 msec
CONTROL/MANAGEMENT	
Stream Routing	Session-based, via pre-configured port mapping with the VOD server and edge QAM
Element Manager	HTTP JDK 5.0 or higher (includes Java Runtime Environment - JRE - v1.5 or higher)
Remote Management	SNMP v2 Up to eight separate SNMP trap destinations
Access Control	3-tier user levels with unique ID and password
CHASSIS REDUNDANCY	
1:1 redundancy with Layer 3 IP switching and Layer 2 virtual MAC	
ELECTROMAGNETIC	
FCC Part 15, Class A, EN55022, EN55024	
SAFETY	
UL, TUV/GS, cTUVus	
ELECTRICAL/MECHANICAL	
Input Power	AC: 100-264 VAC, 47-63 Hz DC: 48 VDC (range 36-75 VDC)
Power Consumption	450 W maximum (dependant on configuration)
Dimensions	1 rack unit: 1.75" H x 19" W x 23" L (43.6 H x 433 W x 583 L mm)
Weight	30 lbs (13.61 kg)
Cooling	Front to back
OPERATING ENVIRONMENT	
Storage Temperature	-40 to 70° C
Operating Temperature	0 to 40° C
Humidity	5% to 95% (non-condensing)

¹Not available in all geographic regions. Contact RGB for details. ²SD benchmarked at 3.75Mbps per stream. ³HD benchmarked at 15Mbps per stream.



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