THE 2:8 DOCSIS AND EURODOCSIS 2.0 CMTS MODULES



The modules are deployed in Motorola's Broadband Services Router 64000 (BSR 64000), a fully redundant Cable Modem Termination System (CMTS)/intelligent edge router that allows broadband operators to rapidly introduce differentiated services for both corporate and residential subscribers. It also offers the robust routing, flexibility, and scalability required to support the emerging generation of revenue-generating services, such as Voice over IP (VoIP), multimedia services, and Virtual Private Networks (VPNs).

Operators can efficiently migrate to DOCSIS or EuroDOCSIS 2.0 while simultaneously increasing the performance of the existing base of DOCSIS 1.0 and 1.1 cable modems. With the 2: 8 DOCSIS and EuroDOCSIS 2.0 CMTS Modules, cable operators can implement Advanced Spectrum Management to deliver higher throughput beyond the DOCSIS standards so they can generate increased revenues, extend the life of installed modems, and costeffectively provide advanced services to broadband subscribers.



MOTOROLA intelligence everywhere"

High-Density Aggregation, Support for DOCSIS 2.0, and Advanced Spectrum Management

HIGHLIGHTED FEATURES

- Compatible with DOCSIS and EuroDOCSIS 1.0, 1.1, and 2.0 specifications
- Support for both ATDMA and SCDMA
- Advanced Spectrum Management with advanced ingress noise cancellation and extensions that deliver improved throughput and performance beyond DOCSIS specifications
- Includes next-generation Broadcom chipset for proven interoperability
- Supports both Layer 3 and Layer 4 routing
- Post equalization allows operators to increase the throughout of DOCSIS and EuroDOCSIS 1.0 cable modems by allowing them to operate in 16 QAM mode virtually anywhere it is possible to operate in QPSK
- Supports up to 256 QAM upstream
- Highly dense solution with 2 downstream ports and 8 upstream ports per-module
- Includes a ninth reciever for RF spectrum monitoring and analysis

HIGHLY DENSE MODULES

Each module occupies a single slot in the BSR 64000 and offers two downstream and eight upstream ports with an onboard, tunable upconverter. They are hot swappable and the module is available in a configuration that supports DOCSIS 2.0 and one that supports EuroDOCSIS 2.0. The 2:8 DOCSIS and EuroDOCSIS Modules support packet classification at Layers 3 and 4 and support per-flow classification of DOCSIS traffic.

Broadband operators can deploy up to 12 modules in a single BSR 64000 chassis, or they can optionally assign a DOCSIS 2.0 or EuroDOCSIS 2.0 redundancy module to provide backup for up to 11 DOCSIS 2.0 or EuroDOCSIS 2.0 Modules. The redundancy modules are equipped with the extra memory required to maintain all configuration information for all the active modules in the BSR 64000 chassis.

In the rare event of a failure in an active DOCSIS 2.0 or EuroDOCSIS 2.0 Module, the redundancy module will take over in milliseconds without noticably interrupting an active voice call or data session. In this configuration, operators can support up to 22 downstream and 88 upstream ports in a single platform with one module reserved to provide backup for the 11 live modules. Operators benefit from 1:N RF redundancy switching, and each module has a front active resource module and passive rear I/O for streamlined serviceability and maintenance.

MAXIMUM CONFIGURATION FLEXIBILITY

Broadband operators with existing BSR 64000 platforms installed can optionally deploy 2:8 DOCSIS and EuroDOCSIS 2.0 CMTS Modules in the same chassis with existing Motorola 1:4 and 1:8 DOCSIS and EuroDOCSIS Modules to extend the life of investments in infrastructure while offering new services and higher performance to selected subscribers.

Operators maintain maximum configuration flexibility, and can configure 2:8 DOCSIS 2.0 or EuroDOCSIS 2.0 Modules to optimize the use of existing infrastructure. They can be configured in any combination of downstream and upstream flows depending on how the operator wants to utilize Mac domains and existing fiber nodes.

For example, a module can be configured as a 1:8 configuration or can support two separate 2:4 configurations. In another scenario, an operator that wants to deliver high-bandwidth services to a few business customers may assign a 1:3 or 1:4 configuration to these users while utilizing the remaining ports for additional residential and corporate traffic.

ADVANCED SPECTRUM MANAGEMENT

While eight receivers per-module are available for servicing subscriber traffic, Motorola has uniquely architected a ninth receiver onto each module to enable Advanced Spectrum Management. The DOCSIS and EuroDOCSIS 2.0 CMTS Modules have a ninth receiver that can monitor performance on any one of the upstream ports without impacting throughput. It can non-obtrusively gain access to all of the return nodes connected to one of the receiver ports and perform tests on any available modem on any one of the receiver port's supported nodes.

The BSR 64000 supports both ATDMA and SCDMA and allows DOCSIS 2.0 cable modems to co-exist with DOCSIS 1.X modems. Motorola has leveraged the DOCSIS ATDMA specification and adds value by including advanced noise cancellation techniques that work with all DOCSIS 1.X and 2.0 cable modems to help operators increase throughput.

Cable operators can double the performance of legacy modems while concurrently deploying DOCSIS 2.0 modems that enable new services and increased performance levels. The BSR 64000 noise cancellation capabilities allow operators to optimize performance while operating in DOCSIS 1.X/2.0 mixed mode.

POST EQUALIZATION

Motorola's post-equalization capabilities offer the operator the ability to increase the throughput of DOCSIS 1.0 cable modems by allowing them to operate in 16 QAM mode virtually anywhere that it is possible to operate in QPSK. The BSR 64000 2x8 DOCSIS and EuroDOCSIS 2.0 CMTS Modules perform per-burst equalization that enables the receiver to equalize—and thus correct for—the effects of micro-reflections, amplitude distortion, and group delay distortion.

These impairments have historically been the limiting factors in achieving QAM modulation higher than 4 QAM (QPSK). The combination of post equalization and superior ingress noise cancellation capabilities results in a DOCSIS 1.X system today where 16 QAM, error-free operation is achievable virtually anywhere in the return path. Therefore, operators can effectively double the throughput of their installed base of modems using the Broadcom chipset.

LOAD BALANCING

Operators can balance the upstream and downstream load across 2:8 DOCSIS 2.0 or EuroDOCSIS 2.0 Modules to ensure reliable performance during peak periods. The modules support dynamic switching between ports or modules without interrupting voice calls or data sessions.

FOR MORE INFORMATION

Please visit **broadband.motorola.com/nis** for more information, including white papers on DOCSIS 2.0 and Advanced Spectrum Management as well as solutions briefs and additional product information.

Operators can

monitor

performance on

any one of the

upstream ports

without impacting

throughput



STANDARDS-BASED INTEROPERABILITY

- DOCSIS 1.0 and EuroDOCSIS 1.0 compatible
- DOCSIS 1.1 and EuroDOCSIS 1.1 compatible
- DOCSIS 2.0 and EuroDOCSIS 2.0 compatible
- PacketCable 1.0 compatible
 - DQoS
 - IPsec
 - COPS
- CALEA compatible

FLEXIBLE CONFIGURATIONS

- 2 Downstream Transmitters
- 8 Upstream Receivers
- Available in DOCSIS 2.0 or EuroDOCSIS 2.0 Configurations
- Onboard, Tunable Upconverter
- Hot Swappable
- Deployable with Existing 1:4 and 1:8 DOCSIS CMTS Modules
- Up to 12 Modules-Per-Chassis with N:1 Redundancy

FULL RF SPECTRUM SUPPORT

- Advanced Spectrum Management Functionality
- Downstream DOCSIS Transmitter
- Integrated, Managed Tunable Up Converter for RF Output
- Upstream Modulation QPSK and 16, 32, 64, 128, 256 QAM
- Upstream Per-Channel Bit Rate 0.320 40.96 Mbps

UPSTREAM INPUT FREQUENCY RANGE

- 5 42 MHz DOCSIS
- 5 65 MHz EuroDOCSIS

DOWNSTREAM MODULATION

- 64 QAM
- 256 QAM
- 512 QAM
- 1024 QAM

DOWNSTREAM OUTPUT FREQUENCY RANGE

• 88 - 857 MHz (Channel Center)

OUTPUT FREQUENCY STEP SIZE

• 88 - 857 MHz (Channel Center)

DOWNSTREAM PER-CHANNEL BIT RATE

- 27.00 Mbps (64 QAM DOCSIS)
 - 36.00 Mbps (64 QAM EuroDOCSIS)
- 38.00 Mbps (256 QAM DOCSIS)
- 56.00 Mbps (256 QAM EuroDOCSIS)
- 48.28 Mbps (512 QAM DOCSIS)
- 59.20 Mbps (512 QAM EuroDOCSIS)
- 53.60 Mbps (1024 QAM DOCSIS)
- 65.80 Mbps (1024 QAM EuroDOCSIS)



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