

SUPERVISORY RESOURCE MODULE 4



Highlights

Primary control interface to all BSR 64000 modules in the chassis, communicating via high-speed Ethernet links

Executes all routing protocols supported by the BSR 64000 and provides forwarding information to all modules in the BSR 64000 chassis

Contains the 16x16 64 Gbps switch fabric that provides the datapath connectivity between modules across the midplane

Supports Layer 3 routing as well as wire-speed packet classification and forwarding

Supports standards-based protocols, enabling rapid integration with existing infrastructure

Full-featured routing with support for intra-domain, inter-domain, and multicast routing protocols, including IPv4, IPv6, OSPF v2, BGP4, RIP v1/v2, IGMP, VRRP, PIM-SM, PIM-SSM

Compatible with DOCSIS 1x, 2.0, and 3.0

Supports IPv6 and channel bonding as well as other DOCSIS 3.0 capabilities

Managed via SNMP v1/v3, standard DOCSIS and IETF MIBs, and by a command line interface

Supports BITS clock

Enables lower operational costs via hitless software upgrades

Providing next-generation control, switching, and route processing for the BSR 64000 CMTS/edge router

The Supervisory Resource Module Release 4 (SRM4) is an integrated control, switching, and route processing module for the carrier-class BSR 64000 CMTS/edge router. The SRM4 provides the high performance, advanced routing, and scalability needed for cable operators to deploy new high-speed Internet, voice, and video service packages to mid- and high-tier customers.

The SRM4 integrates three distinct subsystems providing control, switching, and route processing to enable advanced routing, high-speed traffic forwarding, and inter-module control for the proven and highly scalable BSR 64000 system.

Cable operators need carrier-class implementations of major routing protocols so they can efficiently deploy new services and integrate diverse technologies across their networks. The SRM4 enables full-featured routing on the BSR 64000 with support for intra-domain, inter-domain, and multicast

routing protocols including IPv4, OSPF v2, BGP4, RIP v1/v2, IGMP, VRRP, PIM-SM, PIM-SSM, and IPv6. With the SRM4, support for these major IP routing protocols allows cable operators to easily integrate new services onto existing network environments.

The BSR 64000 architecture uses the SRM4 to perform centralized routing table calculations and distribution of forwarding and control information to the High-Speed Interface (HSIM) and 2:8 DOCSIS®/EuroDOCSIS modules to optimize system performance and simplify configuration and management. Using this centralized approach, the SRM4 performance can be optimized and simplified by having all other BSR 64000 modules connect to the primary and secondary SRMs via redundant control buses. This allows the flow of control and management information from the SRM to the other modules.

**SRM4**

Supervisory Resource Module 4

Redundant Configuration

The two central slots in the BSR 64000 chassis are reserved for the primary and secondary SRM modules to enable 1:1 redundancy. Redundant control buses connect all BSR 64000 modules to the primary and secondary SRM4 modules and enable the flow of control and management information. Full SRM redundancy requires both a primary SRM4 and standby SRM4 module to be populated in the BSR 64000.

DOCSIS 3.0 Channel Bonding

The SRM4 will support all DOCSIS 3.0 functions, including a full DOCSIS 3.0 implementation of channel bonding, giving cable operators the ability to combine multiple physical channels into a single virtual channel. The result is a significant increase in throughput to cable modems, enabling the delivery of high-speed bandwidth services to subscribers. The BSR 64000 delivers the increased bandwidth by sending packets on multiple channels at the same time. The SRM4 supports DOCSIS 3.0 channel bonding, allowing cable operators to enable high-speed residential and commercial data services at ultra-broadband speeds of over 145 Mbps to a single DOCSIS cable modem and over 200 Mbps to a single EuroDOCSIS cable modem. Channel Bonding dramatically increases the downstream data rate, allowing for a significant increase in downstream capacity and offering cable operators a cost-effective solution to compete with next-generation DSL and fiber-based telco services.

MPLS and Policy-Based Routing

Support for MPLS allows cable operators to deploy the BSR 64000 as an MPLS Label Edge Router (LER) as an MPLS Label Switch Router (LSR) to provide high-speed Layer 2 transport across the network. MPLS traffic flow can be routed at wire-speed so cable operators can deploy additional revenue-generating services.

VPNs and VLANs

The SRM4 supports private Virtual Private Networks (VPNs) for traffic management and security via Layer 3 MPLS VPNs or 802.1q/p Virtual LANs (VLANs).

Carrier-Class Voice

The SRM4 supports carrier-class voice services, and also provides support for the PacketCable™ and PacketCable Multimedia (PCMM) architectures to allow cable operators to offer a variety of bandwidth-on-demand services, including QoS IP-based revenue-generating services such as VoIP, online gaming, and multimedia services.

High-Performance Architecture

In order to segment and protect traffic flows, the BSR 64000 chassis supports the transport of subscriber data packets and control traffic on two separate high-performance buses. The SRM4 contains the high-speed switch fabric, allowing wire-speed transport of data packets throughout the BSR 64000. The SRM4 includes a 100Base-T switch for management and control of communication to each card in the chassis.

Flexibility to Support Diverse Routing Requirements

With the SRM4, each operator's network can be viewed in routing terms as an autonomous system or routing domain. Operators implement interior routing protocols within a domain, while exterior routing protocols are used for routing between routing domains. The SRM4 supports interior, exterior, and multicast routing protocols and gives cable operators the ability to classify traffic at the edge of the network for routing within an autonomous domain and for routing to third-party networks. Cable operators benefit from high-availability routing and can efficiently scale their networks in terms of number of routes, interfaces, and peering relationships.

SRM I/O Module

The SRM4 includes an SRM rear I/O module, a passive device that provides the physical interfaces for connectivity into the mid-plane of the BSR 64000. The SRM rear I/O modules include a DB-25 pin connector for connecting with an external alarm panel, two RJ-48 T1/E1 interfaces for BITS clock inputs, a DB-9 RS-232 connector for linking to a console monitor, and an RJ-25 10/100 Ethernet connector for management over the network.

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Specifications

ROUTING, MULTICAST, AND TRAFFIC MANAGEMENT

IPv4 and IPv6; OSPF v2; BGP v4; MPLS; BGP/MPLS-VPNs; RIP v1 and v2; IS-IS; VRRP; IGMP v1, v2, and v3; PIM-SM, PIM-SSM
 Static routes
 DHCP Relay
 Marking, policing, and shaping traffic management
 Two-level class-based scheduling
 SmartFlow™ per-flow queuing
 Longest Queue Pushout (LQP) congestion management
 IPSec tunnels, MD5 authentication, BPI+
 Hardware-based forwarding and flow classification, hardware-based wire-speed QoS, routing policy support

PACKETIZED VOICE SERVICE

Dynamic QoS, COPS, IPSec, cable intercept, lawful intercept

LOGGING AND MONITORING

Syslog, traceroute, ping (IPv4 and IPv6)

SYSTEM MANAGEMENT

Industry-compatible CLI, Telnet
 SSH, TACACS/TACACS+, and RADIUS; SNMP v1, v2, v3
 10/100 Ethernet port

PROCESSORS

FreeScale Semiconductor MPC7410 Host Processor (500 MHz CPU, 166 MHz bus, 2 MB L2 cache)
 FreeScale Semiconductor MPC8260 PowerQuicc II Communications Processor (166 MHz CPU)

MEMORY

512 MB SDRAM System Memory
 512 MB removable Compact Flash Memory Card
 32 MB Packet Memory
 64 MB on-board Flash Memory

POWER

Unit Power 87 W (typical)

SOFTWARE

Minimum Software Revision BSR 64000 Software Release 4.2.0.13 with the SRM4 modules

PHYSICAL

Occupies a single slot in the BSR 64000 chassis
 Hot-swappable with redundancy
 Front Module
 Module LEDs Fail, Status, Alarm
 Fan Status LEDs OK and Fail
 Alarm LEDs Minor, Major, Critical
 Terminal Port DB-9 (male) connector
 Audible alarm cutoff button
 Flash status LED
 CompactFlash card slot
 Rear Module
 External Alarm Interface DB-25 (female) connector
 T1/E1 Bits Clock Interface Input A RJ-48 and input B RJ-48 connectors
 Console Port DB-9 (male) connector
 10/100 Ethernet Interface RJ-45 connector
 Dimensions 15.0 in x 15.0 in x 0.12 in (38.1 cm x 38.1 cm x 0.3 cm)
 Weight 3.5 lb

ENVIRONMENTAL

Operating Temperature 0 °C to 40 °C (32 °F to 104 °F)
 Storage Temperature -20 °C to 60 °C (-4 °F to 140 °F)
 Operating Humidity 10% to 90% non-condensing
 Storage Humidity 5% to 95% non-condensing

REGULATORY COMPLIANCE

Safety
 UL60950-1:2003 1st Ed.
 CSA C22.2 No. 60950-1-03 1st Ed.
 IEC 60950-1:2001, 1st Ed.
 EN 60950-1:2002, 1st Ed.
 2006/95/EC
 Electromagnetic Emissions
 EN 300386 V 1.3.1: 2005, Telecom Centers
 IEC CISPR 22: 2003 Class A
 CFR 47 Part 15, Subpart B, Class A
 VCCI V3: 2005, Class A
 AS/NZS CISPR 22: 2002 Class A
 RRL Notice 2006-67, Class A
 2004/108/EC
 Electromagnetic Immunity
 EN 300386 V 1.3.1: 2005, Telecom Center
 RRL Notice 2005-130
 Environmental
 RoHS
 WEEE
 2005/95/EC
 Physical
 Designed for NEBS GR-63-CORE Level 3 Requirements
 ETS 300 019 Part 1-1 Class 1.1, Part 1-2 Class 2.2, Part 1-3 Class 3.1

Ordering Information

SRM4 Primary Set	517930-002-00
SRM4 Redundant Module	517932-002-00



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