

RS 38000 Optical Metro Aggregation Router

KEY APPLICATIONS

- Aggregate Ethernet, TDM and ATM traffic from metro networks, and support POS/SDH OC-48c uplinks to the Internet core in a single, carrier-class platform
- Create or hand off MPLS/Ethernet VPNs, Transparent LAN Services, or Virtual Leased Lines, across an MPLS or ATM core
- Create cost-effective CWDM/Ethernet metro backhaul or regional transport networks between access rings, POPs, and data centers

PRODUCT OVERVIEW

The RS 38000 is Riverstone's high density metro aggregation router. It is an established leader among metro-focused high-density routers, combining powerful service creation tools, dynamic bandwidth provisioning, and a connection-oriented data collection architecture. The 38000 can aggregate or deliver these services over a complete range of optical and legacy network interfaces, including current support for GbE, Fast Ethernet, CWDM, POS/SDH OC-48c, ATM OC-3c, Channelized T3/E3 interfaces with scheduled support for 10 GigE, and Packet Ring OC-48c interfaces.

The 38000 is ideally suited to serve as an MPLS Label Edge Router (LER) or Label Switch Router (LSR), and sits at the critical juncture for extending metro VPN services over a nationwide ATM or MPLS backbone. The 38000 is designed to be NEBS compliant and features fully redundant processors, switch fabrics, and power supplies, along with a standards-based implementation of the Virtual Router Redundancy Protocol (VRRP). Overall, the RS 38000 makes the perfect fit for service creation in the most demanding and highest density environments found in today's Metro networks.

CUSTOMER CHALLENGES & RS 38000 SOLUTIONS

Challenge: Ensure interoperability with Internet core routers

Solution: MPLS-implementation certified interoperable with core routers. Full support for standards-based Internet routing protocols, including BGP-4, IS-IS, PIM, and OSPF

Challenge: Enable high-density traffic aggregation across any media type

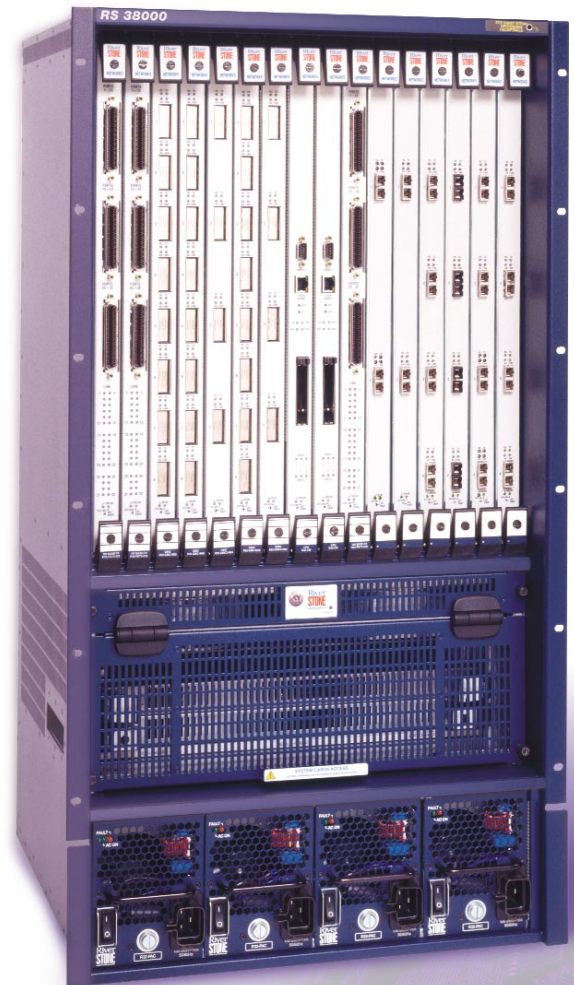
Solution: With GigE, TDM, POS/SDH, and WDM interfaces available now, and 10 GbE, OC-192c, and Packet Ring OC-48 in development, the RS 38000 delivers massive port density and wire-speed routing and switching

Challenge: Achieve maximum network uptime

Solution: Redundant-processor, switch fabric, and processor, combined with standards-based VRRP and self-healing route paths (OSPF multi-path, MLPPP, and Port Trunking) as well as NEBS compliance and multiple levels of redundancy

Challenge: Rapidly deploy value-added services and bandwidth to establish a time-to-market advantage

Solution: Bandwidth provisioning from 1 kbps to multiple Gbps links on per-port or per-aggregate flow basis. Service provisioning features with independent classifications, prioritization, and queue management on a per-customer basis. LFAP billing ensures irrefutable usage-based billing or network diagnostics



Ordering Information

Part No.	Product Description
R38-CHS	16-slot router chassis, backplane, switch fabric, and fan tray (also requires R38-CM4-256, SYS-OS, R32-PAC, or R32-PDC)
R32-PAC	AC power supply (two minimum configuration, up to four total)
R32-PDC	DC power supply (one, or two for redundancy from same DC source)
R38-CM4-256	Control module (one required, second for redundancy)
R38-FAN	Fan tray assembly (one ships with system, for spare parts)
R38-SWF	Switching Fabric module (one ships with system, optional second for redundancy)
System Software	
SYS-OS	RS router operating system software (PC-card format) required for operation

For complete ordering information, including specific modules, contact your Riverstone representative at (408) 878-6500. You may also visit our Website at www.riverstonenet.com.

Platform Features

Feature-rich Wire-speed Services

- IP routing, unicast, and multicast
- Routing in hardware on each line card
- LSR and LER MPLS support in hardware
- RSVP-TE and LDP-CR traffic engineering support
- Security (ACLs, L2 filters)
- Hardware-based Rate Limiting
- Layer 4 application-flow switching and QoS
- VLANs based on port or protocol
- Network Address Translation (NAT)
- Jumbo Frame support
- Server Load Balancing (LSNAT)

Highly Fault Tolerant

- Redundant CPU, power supplies, and switch fabric
- Hot-swappable media modules
- Standards-based VRRP
- Layer 2 and 3 redundant protocol support

Extensive Management

- Wire-speed full RMON/RMON2
- SNMP manageable
- SSH and Telnet client secured by:
 - RADIUS
 - TACACS+
- RS-232 (out-of-band management)
- Command Line Interface (CLI)

Interfaces

- 10/100 Base-TX
- 1000 Base-SX
- 1000 Base-LX (intermediate and long range)
- 4 GbE Lambda on bi-directional CWDM
- Channelized T3/E3
- ATM DS-3, E-3, OC-3c
- POS/SDH OC-48c
- 10 GbE (standard pending)
- OC-192c (in development)
- Packet Ring OC-48c (in development)

Specifications

Capacity	
Up to 4,096 VLANs	
Up to 250,000 routes	
Up to 20,000 security/access control filters	
Up to 1,600,000 Layer 2 MAC addresses	
Up to 8,000,000 Layer 4 application flows	
Performance	
Up to 170 Gbps non-blocking switching fabric	
Up to 90 million packets-per-second routing throughput	
MTBF (predicted) > 200,000 hours	
Physical	
Dimension:	35" H x 17.25" W x 19" D (88.9 cm x 43.82 cm x 48.26 cm)
Weight:	125 lbs. (56.68 kg)
Environmental Specifications	
Operating temp:	+0° to +40°C (32° to 104°F)
Non-operating temp:	-40° to +70°C (-40° to 158°F)
Operating relative humidity:	10 to 90% (non-condensing)
Non-operating relative humidity:	5 to 95% maximum (non-condensing)
Altitude, operating and non-operating:	10,000 ft (3,000 m) maximum
Shock and vibration:	GR63

Power Requirements

AC power	
Input voltage:	100 - 240 VAC
Input current:	12 A; 6 A
Frequency:	50 to 60 Hz
DC power	
Input voltage:	-48 to -60 VDC
Input current:	50 A
NEBS:	Compliant

Agency Standards and Specifications

Safety:	Certified UL1950, CSA C22.2 No. 950, EN60950, IEC950, and 72/73/EEC
Electromagnetic Compatibility:	Compliant with the requirements of FCC Part 15, CSA C108.8, EN55022, VCCI, EN50082-1, and 89/336/EEC

Standards Supported

IETF Standards Support

RFC No.	Title
RFC 768	UDP
RFC 783	TFTP
RFC 791	IP
RFC 792	ICMP
RFC 793	TCP
RFC 826	ARP
RFC 854	Telnet
RFC 951	BootP
RFC 1058	RIP v1
RFC 1075	DVMRP
RFC 1112	IGMP
RFC 1157	SNMPv1
RFC 1256	ICMP Router Discover Message
RFC 1265	BGP Protocol analysis
RFC 1266	Experience with the BGP Protocol
RFC 1267	BGP-3
RFC 1293	Inverse ARP
RFC 1332	PPP IPCP
RFC 1349	Type of service in the Internet Protocol suite
RFC 1397	BGP Default Route Advertisement
RFC 1483	Multiprotocol encapsulation over AAL5
RFC 1490	Multi-protocol over Frame Relay

RFC 1519	CIDR
RFC 1542	BootP
RFC 1552	PPP IPCP
RFC 1570	PPP LCP extensions
RFC 1583	OSPF v2
RFC 1631	IP NAT
RFC 1638	PPP BCP
RFC 1656	BGP-4 implementation
RFC 1661	PPP
RFC 1662	PPP in HDLC-like framing
RFC 1723	RIP-2
RFC 1771	BGP-4
RFC 1772	Application of BGP in the Internet
RFC 1812	Router requirements
RFC 1966	BGP Route Reflection
RFC 1990	PPP MLP
RFC 1997	BGP communities attribute
RFC 2131	DHCP
RFC 2138	RADIUS
RFC 2139	RADIUS accounting
RFC 2178	OSPF
RFC 2225	Classical IP and ARP over ATM
RFC 2236	IGMP-2
RFC 2338	VRRP
RFC 2362	PIM-SM
RFC 2391	LSNAT

IETF Standards MIB Support

RFC No.	Title
RFC 1471	PPP-LCP-MIB
RFC 1472	PPP-SEC-MIB
RFC 1473	PPP-IP-NCP-MIB
RFC 1474	PPP-BRIDGE-NCP-MIB
RFC 1493	BRIDGE-MIB
RFC 1595	SONET-MIB
RFC 1657	BGP4-MIB
RFC 1695	ATM-MIB
RFC 1724	RIPv2-MIB
RFC 1757	RMON-MIB
RFC 1850	OSPF-MIB
RFC 1907	SNMPv2-MIB
RFC 2011	IP-MIB
RFC 2012	UDP-MIB
RFC 2013	TCM-MIB
RFC 2021	RMON2-MIB
RFC 2096	IP-FORWARD-MIB
RFC 2115	FRAME-RELAY-DTE-MIB
RFC 2233	IF-MIB
RFC 2494	DSO-MIB, DS0BUNDLE-MIB
RFC 2495	DS1-MIB
RFC 2496	DS3-MIB
RFC 2571	SNMP-FRAMEWORK-MIB
RFC 2572	SNMP-MPD-MIB
RFC 2573	SNMP-TARGET-MIB, SNMP-NOTIFICATION-MIB
RFC 2574	SNMP-USER-BASED-SM-MIB
RFC 2575	SNMP-VIEW-BASED-ACM-MIB
RFC 2576	SNMP-COMMUNITY-MIB
RFC 2591	DISMAN-SCHEDULE-MIB
RFC 2618	RADIUS-AUTH-CLIENT-MIB
RFC 2620	RADIUS-ACC-CLIENT-MIB
RFC 2665	ETHER-LIKE-MIB
RFC 2668	MAU-MIB
RFC 2669	DOCS-CABLE-DEVICE-MIB
RFC 2670	DOCS-IF-MIB
RFC 2674	P-Bridge-MIB, Q-Bridge-MIB
RFC 2737	ENTITY-MIB
RFC 2787	VRRP-MIB

Standards and Protocols

IP routing:	RIPv1/v2, OSPF, BGP-4, IS-IS	
Multicast support:	IGMP, DVMRP, PIM-DM, PIM-SM	
QoS:	Application level, RSVP	
IEEE 802.1D	IEEE 802.1p	IEEE 802.1Q
IEEE 802.3	IEEE 802.3ad	IEEE 802.3u
IEEE 802.3x	IEEE 802.3z	



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