MultiFlow™ 5000

Multilayer Switch Family

Unique WAN and OC-48 Connectivity
Empowers a Single Solution That Handles Tomorrow's
LAN, MAN, WAN, and SAN Requirements

MultiFlow 5000

MultiFlow 5024

Anritsu's MultiFlow 5000 heralds a new era in high-speed LAN/MAN/WAN/SAN convergence based on Layer 2/3/4 switching.

- Three traffic priority levels assure proper delivery of voice, video, and SAN traffic
- Unique OC-48 native Ethernet capability provides 2.5 Gbps LAN/MAN Ethernet backbone extension
- Unique ATM OC-3 and V.35/X.21 WAN interfaces
- Full redundancy of all components for maximum reliability
- Full wire-speed IP, IPX, and AppleTalk packet-by-packet routing based on Anritsu ASIC technology
- Full wire-speed Layer 2/3/4 switching
- Full wire-speed Layer 2 and Layer 3 load balancing
- Complete IP Multicast routing support
- Full wire-speed Layer 2/3/4 filtering

The *MultiFlow 5000* family is easy implement and support across a broad range of applications because all units share the same architecture, features, and wire-speed performance.

MultiFlow 5128

- 12-slot chassis with redundant AC or DC power supplies and fans
  - 8 slots for network interface modules
  - 4 slots for primary and redundant management and switching modules
- 24 Mpps forwarding capability
- Supports up to 128 Fast Ethernet or 48 Gigabit Ethernet ports
- LAN/MAN interface modules support 1 OC-48, 6 1000BASE-SX/LX/LH/T, 16 10/100BASE-TX, or 8 100BASE-FX ports per slot
- WAN interface modules support 1 ATM OC-3 or 4 V.35/X.21 ports per slot

MultiFlow 5048

MultiFlow 5128

MultiFlow 5064

- 8-slot chassis with redundant AC power supplies and fans
    - 4 slots for network interface modules
    - 4 slots for primary and redundant management and switching modules
- 12 Mpps forwarding capability
- Supports up to 64 Fast Ethernet or 24 Gigabit Ethernet ports
- LAN/MAN interface modules support 1 OC-48, 6 1000BASE-SX/LX/LH/T, 16 10/100BASE-TX, or 8 100BASE-FX ports per slot
- WAN interface modules support 1 ATM OC-3 or 4 V.35/X.21 ports per slot

MultiFlow 5048 and MultiFlow 5024

- Standalone units with built-in AC power supply, fans, CPU, and multilayer switching
- 11 Mpps (5048) and 6.6 Mpps (5024) forwarding capability
- Fixed configuration of 2 Gigabit Ethernet (1000BASE-SX or -LX) ports
- Fixed configuration of 32 Fast Ethernet (10/100BASE-TX) ports on MultiFlow 5048 and 24 ports on MultiFlow 5024
- 2 expansion slots (MultiFlow 5048 only) support 1 1000BASE-SX/LX, 2 1000BASE-T, 8 10/100BASE-TX, 4 100BASE-FX, 1 ATM OC-3, or 2 V.35/X.21 additional ports per slot

MultiFlow 5064

Unique Multilayer Switch Capabilities For Tomorrow's Networks

Non-Blocking Architecture

The MultiFlow 5000 switches traffic at full wire speed on all ports simultaneously, up to 3 Mpps per slot in chassis products and 1.5 Mpps per slot in the MultiFlow 5048.

Full Wire-Speed Routing

Using custom Anritsu ASIC technology, full packet-by-packet routing is provided at wire speed for IPv4 (RIPv1/v2, OSPFv2), IPX, and AppleTalk traffic. The full suite of IP multicast protocols is supported: IGMPv2, PIM-DM, and DVMRP. PIM-SM support is planned.

Full Wire-Speed Filtering

Layer 3 and Layer 4 filtering criteria can include the protocol type, the source and destination addresses, the source and destination ports, the input or output direction, and the virtual router interface. Adding filters does not change the wire-speed performance.

Traffic Priorities

Three internal priority levels ensure that data, voice, and multimedia traffic are all handled properly at full wire speed. Weighted priority scheduling dynamically adjusts bandwidth allocated to each priority class based on the current traffic to reduce jitter and provide consistent response times to all users. Priority is handled properly at both Layers 2 and 3 via IEEE 802.1p support on all Ethernet and OC-48 ports, and via IETF DiffServ support for IP traffic on all ports.

Voice Over IP

Link Aggregation

802.3ad standard link aggregation (trunking) combines ports into higher-capacity trunks at full wire speed with fallback capability if any port fails, and assures interoperability with other compatible systems. The MultiFlow 5000 supports 4 trunk groups, with any combination of up to 8 Gigabit or Fast Ethernet ports in each group. Load balancing is automatic across each trunk, and any link failure automatically causes traffic to be handled by the remaining links.

Load Balancing

Capabilities for load balancing at all traffic layers ensure maximum benefits and fault tolerance. At Layer 2, Link Aggregation balances traffic over multiple Gigabit and Fast Ethernet links. At Layer 3, the Equal-Cost Multipath feature balances IP traffic over multiple WAN and LAN links.

Unique OC-48 Interface
(For MultiFlow 5128 and 5064 only)

This unique interface based on Anritsu's ONE™ (Optical Network Extension) technology provides more than twice the bandwidth on a single port than any other multilayer switch. It supports direct full duplex 2.5 Gbps links at full wire speed between MultiFlow 5000 systems over metro or long-haul WDM (Wavelength Division Multiplexing), or up to 80 km over dark fiber. Anritsu's OC-48 is optimized for data and multimedia traffic, avoiding the high cost and 50% bandwidth loss of traditional SONET infrastructures with add-drop multiplexers.

It is superb for IP traffic but not limited to IP — it handles all Ethernet-compatible traffic, routable or not, including VLANs and 802.1p priority based on the latest PPP Bridging Control Protocol (RFC2878). Thus it provides a reliable high-speed way to extend enterprise Ethernet backbone traffic to facilities throughout a metropolitan area.
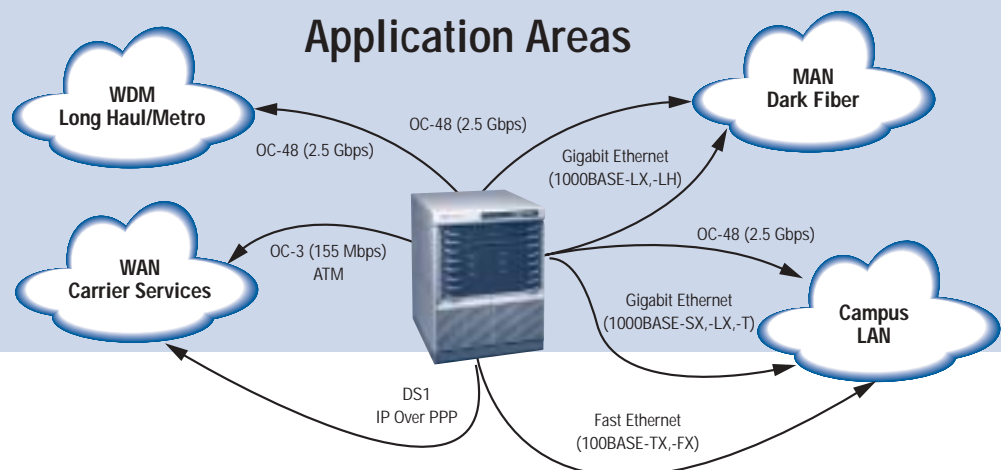
1000BASE-T Interface

MultiFlow 5000 1000BASE-T modules support the IEEE standard (formerly 802.3ab) for Gigabit Ethernet operation over 4 pairs of Category 5 copper cabling, which includes most of the cabling within buildings today. The high port density on these modules is ideal for supporting servers and workgroup switch uplinks.

Unique WAN Interfaces

ATM OC-3 and V.35/X.21 interface modules for the chassis as well as standalone products let network managers avoid the cost of buying and maintaining separate WAN routers for Internet access, for interconnecting buildings or campuses, and for Voice Over IP.

UDP Traffic Capabilities

The MultiFlow 5000 has the unique ability to handle large block size UDP traffic such as video distribution, storage networking, NFS, and streaming media with high throughput, low latency, and low latency variation.

Application Areas

WDM
Long Haul/Metro

MAN
Dark Fiber

OC-48 (2.5 Gbps)

OC-48 (2.5 Gbps)

Gigabit Ethernet
(1000BASE-LX,-LH)

OC-3 (155 Mbps)
ATM

WAN
Carrier Services

OC-48 (2.5 Gbps)

Gigabit Ethernet
(1000BASE-SX,-LX,-T)

Campus
LAN

DS1
IP Over PPP

Fast Ethernet
(100BASE-TX,-FX)

Easy Management and Administration

The MultiFlow 5000 supports SNMPv1/v2 and 4 RMON groups on all ports simultaneously. A powerful internal Web server enables full configuration and management from any Web browser, and network management software is available for HP OpenView. Alternatively, management via a command line interface operates over a network telnet connection and a direct terminal connection with planned remote modem support. For easy network analysis, all operating events can be recorded in a syslog file in any network host. New control firmware can be downloaded over the network or by modem, and is stored in a 20 MB PCMCIA PC-ATA memory card on the Management Module.

Mission-Critical Redundancy and Reliability

At Layer 2

802.3ad standard link aggregation (trunking) combines ports into higher-capacity trunks with fallback capability if any port fails. The Advanced Quick Reconfiguration (AQR) Layer 2 link failure recovery mechanism based on high-speed Spanning Tree Protocol (STP) uses redundant Ethernet or OC-48 links to provide fast recovery from link failures. Conventional STP link recovery is also provided.

At Layer 3

VRRP (Virtual Router Redundancy Protocol) provides rapid failover to one or more backup routers. The Equal-Cost Multipath feature allows multiple IP routes over WAN or LAN links that have the same cost factors, distributing traffic equally among all operating links. The Quick Path Change feature provides 1-second recovery from route failures in RIP or OSPF, greatly improving the typical recovery times of 3 minutes or 40 seconds, respectively.

The unique Fast Router Recovery feature greatly enhances reliability by removing a failed IP address from the router table in as fast as 1 second when a Layer 2 link failure is detected, allowing immediate use of an alternate path or server.

Passive Backplane

All chassis system functions are contained in slide-in modules that are easily added or replaced from the front, including fans and power supply units.

Switching and Management Modules

Both chassis systems accept redundant hot-swappable Switching and Management modules.

Hot Swapping

All chassis switching, management, and interface modules support hot swapping. Power supplies and fans can also be hot swapped.
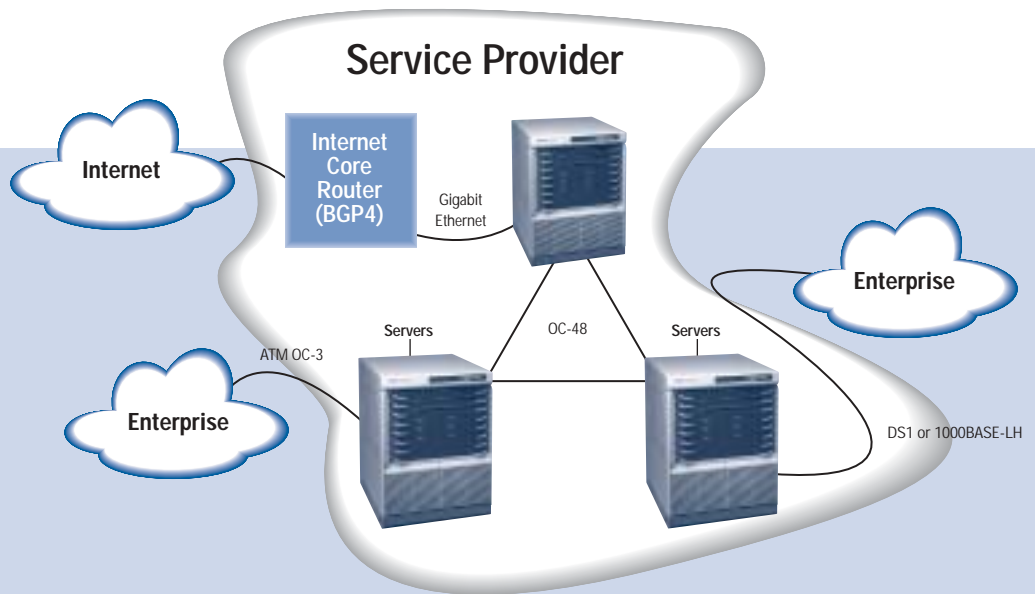
Power Supplies

Each chassis system requires at least two power supply units. An optional third unit provides "N+1" redundancy. An optional fourth unit allows dual supply redundancy. Both AC and DC supplies are available for MultiFlow 5128, but a minimum of three or four units may be required if 6-port Gigabit modules are installed. All installed units are always operating with automatic load balancing, and disabled units can be removed while others are operating.

Fans

Both chassis systems incorporate redundant hot-swappable fans.

Empowers

Service Provider

Internet

Internet Core Router (BGP4)

Gigabit Ethernet

Enterprise

Servers — OC-48 — Servers

ATM OC-3

DS1 or 1000BASE-LH
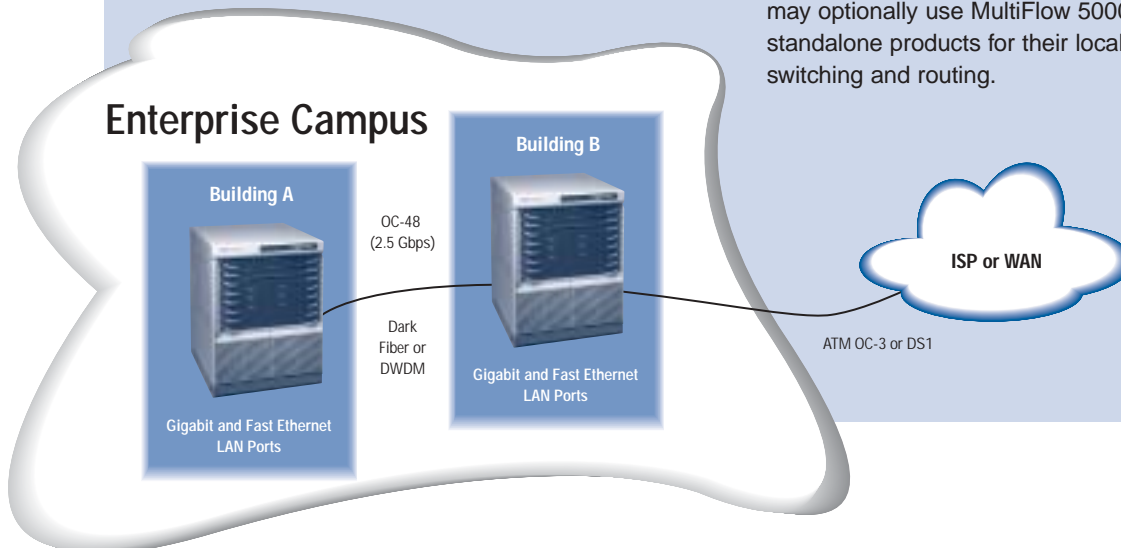
Enterprise

Applications

Application Areas

MultiFlow 5000 multilayer switches are uniquely capable of providing high-speed network connectivity within the campus or local area (LAN), the metropolitan area (MAN), and wide-area (WAN) networks. Wire-speed IP, IPX, and AppleTalk routing is provided within the LAN/MAN, with IP WAN links over ATM OC-3 or V.35/X.21. Unique OC-48 links to the metropolitan area are ideal for transparent LAN services and MAN backbones — they can carry all native Ethernet traffic including VLANs and are not limited to IP or routable traffic. The OC-48 ports interface to WDM systems so users can easily establish 2.5 Gbps backbone network connections between switches over long haul or metro WDM links.

Enterprise Applications

OC-48 links provide a reliable high-speed campus backbone network extension throughout a metropolitan area over dark fiber or WDM links. A ring configuration adds fault tolerance by providing a redundant link with automatic failure recovery. Gigabit and Fast Ethernet interfaces handle campus servers and user PCs, plus links to department switches and SAN gateways. ATM OC-3 or V.35/X.21 interfaces handle ISP and other WAN links.

Service Provider Applications

Service providers use the MultiFlow 5128 to connect metropolitan area hubs in a ring configuration with OC-48 links. Gigabit Ethernet provides a high-speed link to Internet backbone routers in one or more of the facilities. ATM OC-3, 1000BASE-LX/LH, or V.35/X.21 links provide service to enterprise customers whose facilities may optionally use MultiFlow 5000 chassis or standalone products for their local network switching and routing.

Enterprise Campus

Building B

Building A

OC-48 (2.5 Gbps)

Dark Fiber or DWDM

ISP or WAN

ATM OC-3 or DS1

Gigabit and Fast Ethernet LAN Ports

Gigabit and Fast Ethernet LAN Ports

Specifications

Routing
IPv4 (RIPv1/v2, OSPFv2), IPX (RIP/SAP), AppleTalk (RTMP/ZIP/NBP), and IP Multicast (IGMPv2, DVMRP, PIM-DM; PIM-SM planned). Equal-Cost Multipath Routing (RFC2328). Up to 128 virtual router interfaces. Dynamic IP address assignment support via DHCP and BootP Relay Agent protocols.

Priorities/QoS
Three internal traffic priorities. Supports IEEE 802.1p and IETF DiffServ.

VLANs
IEEE 802.1Q tagging interoperates with any compatible system. Up to 1024 port-based VLANs. Dynamic registration via 802.1Q GARP Group VLAN Registration Protocol (GVRP).

Spanning Tree Protocol (STP)
IEEE 802.1d. Supports separate STP topology tables for every VLAN.

Management
Internal Web server with Java operates with Internet Explorer 4.0 or Netscape 4.06 or greater. HP OpenView support for Windows NT/2000. Command line interface via telnet and direct RS-232C terminal interface with modem support planned. SNMP v1/v2 with MIB II, RMON MIB (4 groups), and Enterprise MIB. Syslog event logging. Firmware download via HTTP, TFTP, or X-MODEM.

Regulatory Compliance
Safety UL, CSA; CE Mark and TÜV
EMI FCC Part 15 Class A, VCCI Class A
EMC CE Mark and TÜV

Warranty
1 Year (hardware).

Operating Environment
0 to 40 °C, 20-80% Relative Humidity (no condensation)

Storage Environment
-10 to 60 °C, 10-90% RH

Dimensions, Weight, and Power

MultiFlow 5128
Maximum Current at 100 VAC: 20 A
Maximum Current at -48 VDC: 42 A
Dimensions: 439(W) x 480(D) x 730(H) mm
Weight: 73 Kg

MultiFlow 5064
Maximum Current at 100 VAC: 14 A
Dimensions: 439(W) x 480(D) x 590(H) mm
Weight: 60 Kg

MultiFlow 5048
Maximum Current at 100 VAC: 4.2 A
Dimensions: 425(W) x 491(D) x 130(H) mm
Weight: 18 Kg

MultiFlow 5024
Maximum Current at 100 VAC: 3.1 A
Dimensions: 425(W) x 490(D) x 86(H) mm
Weight: 15 Kg

Operating voltage is 100-240 VAC, 50/60 Hz, or -48 VDC (MulitFlow 5128 only).

Specified chassis product weight includes the maximum number of Switching Modules, Management Modules, Power Units, and 100BASE-TX Modules.

Ordering Information

Chassis Products

Item	Order Number
MultiFlow 5128 Assembly	**DN9840AAC (AC power)**
	DN9840ADC (DC power)

Modular chassis DN9840A with 12 slots (8 slots for interface modules), 1 Switching Module (DN9811L), 1 Management Module (DN9810C), and 2 Power Supply Units (DN9830P or DN9832P). 3 or 4 Power Supply Units may be required if 6-port Gigabit modules (DN9890J or DN9890K) are installed.

5128 Switching Module   **DN9811L**
Optional redundant unit for MultiFlow 5128 chassis.

MultiFlow 5064 Assembly   **DN9820AAC (AC power)**
Modular chassis DN9820A with 8 slots (4 slots for interface modules), 1 Switching Module (DN9811M), 1 Management Module (DN9810C), and 2 Power Supply Units (DN9830P).

5064 Switching Module   **DN9811M**
Optional redundant unit for MultiFlow 5064 chassis.

Management Module   **DN9810C**
Optional redundant unit for either chassis

Optional Router Memory   **Q463-208-2**
Increases DN9810C Management Module capacity from 64 to 128 virtual router interfaces.

AC Power Supply Unit   **DN9830P**
100-240 VAC, 50/60 Hz. Use 1 or 2 optional redundant units for either chassis.

DC Power Supply Unit   **DN9832P**
-48 VDC. Use 1 or 2 optional redundant units for MultiFlow 5128 only.

Chassis Rack Mount Kit   **DN9839A1**
Optional rack-mounting hardware for either chassis.

1000BASE-SX Module   **DN9890G**
Two switched 1000 Mbps full duplex ports. Supports MMF links to 550 m. 2 SC connectors.

1000BASE-LX Module   **DN9890H**
Two switched 1000 Mbps full duplex ports. Supports SMF links to 5 km. 2 SC connectors.

1000BASE-T Module   **DN9890J**
6 1000 Mbps full duplex ports. Supports Cat 5 UTP links to 100 m. 6 RJ-45 connectors.

1000BASE-X Module   **DN9890K**
6 GBIC-based 1000 Mbps full duplex ports. Requires GBIC transceiver modules Q483-030-1 (1000BASE-SX, 550 m), Q483-030-2 (1000BASE-LX, 5 km), or Q483-030-3 (1000BASE-LH, 80 km).
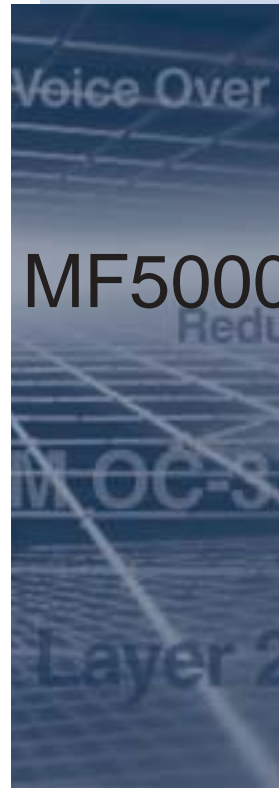
Ordering Information *(continued)*

100BASE-TX Module DN9890B
16 switched 10/100 Mbps ports, full and half duplex, with auto negotiation. 4 status LEDs per port. Supports UTP links to 100 m. 16 RJ-45 connectors.

100BASE-FX Module DN9890F
8 switched 100 Mbps ports, full/half duplex user selectable. Supports MMF links to 2 km. 8 MT-RJ connectors.

OC-48 SONET Module DN9890S1 (short reach)
  DN9890S2 (long reach)
1 switched OC-48 SONET (2.5 Gbps) full duplex port. Supports SMF short reach (to 2 km) or long reach (to 80 km) links and WDM. 1 SC connector. Occupies 2 interface slots.

ATM OC-3 Module DN9890A
1 OC-3 (155 Mbps) port. Supports MMF fiber links to 2 km. IP Over ATM (IPoA) protocol; 2048 PVCs; AAL5; UBR; VC/VP shaping. Compatible with UNI 3.0/3.1/4.0 PVC systems. 1 SC connector.

V.35 Module DN9890V
4 V.35/X.21 ports, each up to 6.1 Mbps or DS2. 4 universal serial connectors. 3 m cables for V.35 (Q483-001) or X.21 (Q483-002) are optional.

Standalone Products

Standalone products include AC power, switching, and management functions in addition to fixed configurations of Gigabit and Fast Ethernet ports. 100BASE-TX ports are switched 10/100 Mbps, full and half duplex, with auto negotiation and RJ-45 connectors. 1000BASE-SX or –LX ports are switched 1000 Mbps full duplex with SC connectors. Interface modules operate in MultiFlow 5048 only.

Item	Order Number
MultiFlow 5048	DN9040A (1000BASE-SX ports)
	DN9040B (1000BASE-LX ports)

Standalone multilayer switch with fixed configuration of 32 100BASE-TX and 2 Gigabit ports. 2 slots for optional interface modules.

MultiFlow 5024 DN9020A (1000BASE-SX ports)
  DN9020B (1000BASE-LX ports)
Standalone multilayer switch with fixed configuration of 24 100BASE-TX and 2 Gigabit ports.

1000BASE-SX Module DN9090G
1 switched 1000 Mbps full duplex port. Supports MMF links to 550 m. 1 SC connector.

1000BASE-LX Module DN9090H
1 switched 1000 Mbps full duplex port. Supports SMF links to 5 km. 1 SC connector.

1000BASE-T Module DN9090J
2 1000 Mbps full duplex ports. Supports Cat 5 UTP links to 100 m. 2 RJ-45 connectors.

100BASE-TX Module DN9090B
8 switched 10/100 Mbps ports, full and half duplex, with auto negotiation. 4 status LEDs per port. Supports UTP links to 100 m. 8 RJ-45 connectors.

100BASE-FX Module DN9090F
4 switched 100 Mbps ports, full/half duplex user selectable. Supports MMF links to 2 km. 4 MT-RJ connectors.

ATM OC-3 Module DN9090A
1 OC-3 (155 Mbps) port. Supports MMF fiber links to 2 km. IP Over ATM (IPoA) protocol; 2048 PVCs; AAL5; UBR; VC/VP shaping. Compatible with UNI 3.0/3.1/4.0 PVC systems. 1 SC connector.

V.35 Module DN9090V
2 V.35/X.21 ports, each up to 6.1 Mbps or DS2. 2 universal serial connectors. 3 m cables for V.35 (Q483-001) or X.21 (Q483-002) are optional.

Optional Software for All Products

Item	Order Number
VRRP	DN9800W4

Support for VRRP (Virtual Router Redundancy Protocol).

AnritsuView DN9900W6
HP OpenView support for Windows NT 4.0 and Windows 2000.

/Anritsu
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