

## ATM Uplink with Enhanced Gigabit Ethernet Module *for the Catalyst 8540 Platform*

THE CATALYST 8540<sup>®</sup> ATM UPLINK WITH ENHANCED GIGABIT ETHERNET MODULE ARE IDEAL FOR SUPPORTING HIGH-SPEED ATM BACKBONE APPLICATIONS THAT REQUIRE NON-BLOCKING, WIRE-SPEED PERFORMANCE. THIS INTERFACE MODULE HAS ONE ATM UPLINK PORT AND ONE ENHANCED GIGABIT ETHERNET PORT. THE ATM UPLINK WITH ENHANCED GIGABIT ETHERNET MODULE IS SUPPORTED BY THE CATALYST 8540 PLATFORM, A HIGH-END MULTISERVICE SWITCH THAT ALLOWS CUSTOMERS TO HAVE INTEGRATED LAYER 3 AND ATM SWITCHING IN ONE HIGH-PERFORMANCE PLATFORM.



### Feature Support

The following features and capabilities are supported in the ATM Uplink with Enhanced Gigabit Ethernet Module.

| Feature                    | Description  |
|----------------------------|--|
| Wire-speed Routing         | Wire-speed routing on both ATM uplink and Gigabit Ethernet port                                    |
| Built-in ACL               | Access Control List support on both ATM uplink and Gigabit Ethernet ports                          |
| Large Routing Table        | Up to 256K routing table entries   |
| QoS Capabilities           | Module developed with enhanced on-board processor to provide quality of service (QoS) capabilities |
| Integrated Layer 3 and ATM | Layer 3 traffic can be seamlessly passed between Gigabit Ethernet and ATM uplink                   |
| Speed                      | Two versions: OC-12c/STM-4; OC-3c/STM-1  |
| Optics                     | Single Mode Fiber Intermediate Reach and Multimode Fiber versions                                  |
| Cisco IOS <sup>®</sup>     | Feature rich software for advanced networking applications   |

### Layer 3 Feature Summary

- Cisco Express Forwarding (CEF) for wire-speed forwarding for IP, IPX, and IP Multicast
- IP equal cost path load balancing (six paths)
- Multicast forwarding with up to 12,000 (S,G)
- Up to 256K routing entries
- Access Control List support:
  - Standard/Extended IP access lists (1-99;1301-1999/100-199;2000-2699) in hardware; both inbound and outbound
  - Standard IPX access lists (800-899) without source node; both inbound and outbound
  - Named access lists
  - Cisco IOS ACLs for control-plane traffic
- Multiprotocol Routing:
  - OSPF
  - EIGRP
  - BGPv4
  - RIP v1 and v2

- Maximum transfer unit (MTU): ATM uplink(9188 bytes); Gigabit Ethernet (1500 bytes)
- Internet Group Management Protocol (IGMP) and Cisco Group Management Protocol (CGMP) server
- Hot Standby Router Protocol (HSRP) for Gigabit Ethernet
- Cisco Discovery Protocol (CDP)
- Remote Monitoring (RMON)

#### ATM Layer Support for Layer 3

- PVCs, SVCs
- UNI 3.0, UNI 3.1
- ILMI 3.1
- RFC 1483:
  - Logical Link Control (LLC/SNAP) and VC MUX encapsulations
  - Routing (IP, IP MCast, IPX)
  - Bridging
  - PVC and SVC support
- 13-bit virtual circuit number with up to 8K active VCs
- 4096 simultaneous SARs
- AAL 5
- F4 and F5 flows of OAM cells
- Traffic Management - wrt - VBR, UBR, and CBR
- Traffic Shaping (Link speed \* 1/N, where N is an integer)

#### SONET/SDH Layer

- Standards-compliant SONET/SDH interface
- Alarm processing
  - Loss of Signal (LOS), Loss of Frame (LOF), Line Alarm Indicator Signal (LAIS), Path Alarm Indicator Signal (PAIS), Loss of Pointer (LOP), Path Unequipped (UNEQ-P), Payload Mismatch (PLM-P), and Trace Identifier Mismatch (TIM-P)
  - Line Remote Defect Indicator (LRDI), Path Remote Defect Indicator (PRDI), Signal Failure (SF), Signal Degrade (SD), Line Remote Error Indicator (Line FEBE), Path Remote Error Indicator (Path FEBE)

- Performance monitoring
  - Error counts for B1, B2, B3
  - Threshold crossing alerts (TCA) for B1, B2, B3 with configurable threshold
- Synchronization
  - Local (internal) or loop timed (recovered from network)
  - 20 ppm clock accuracy over full operating temperature range
- Local (diagnostic) and line (network) loopback
- Payload mapping
  - $x^{43} + 1$  self-synchronous scrambler

#### Gigabit Ethernet

- Standards-compliant IEEE 802.3z interface
- Gigabit EtherChannel Support
- Modular GBIC Interface Support

#### Layer 2

##### ATM Uplink:

- Transparent Bridging
- Bridging between ATM and Ethernet
- Bridging between ATM and ATM

##### Gigabit Ethernet:

- Transparent Bridging
- VLAN encapsulation: ISL;802.1Q
- IRB

#### Operations and Management

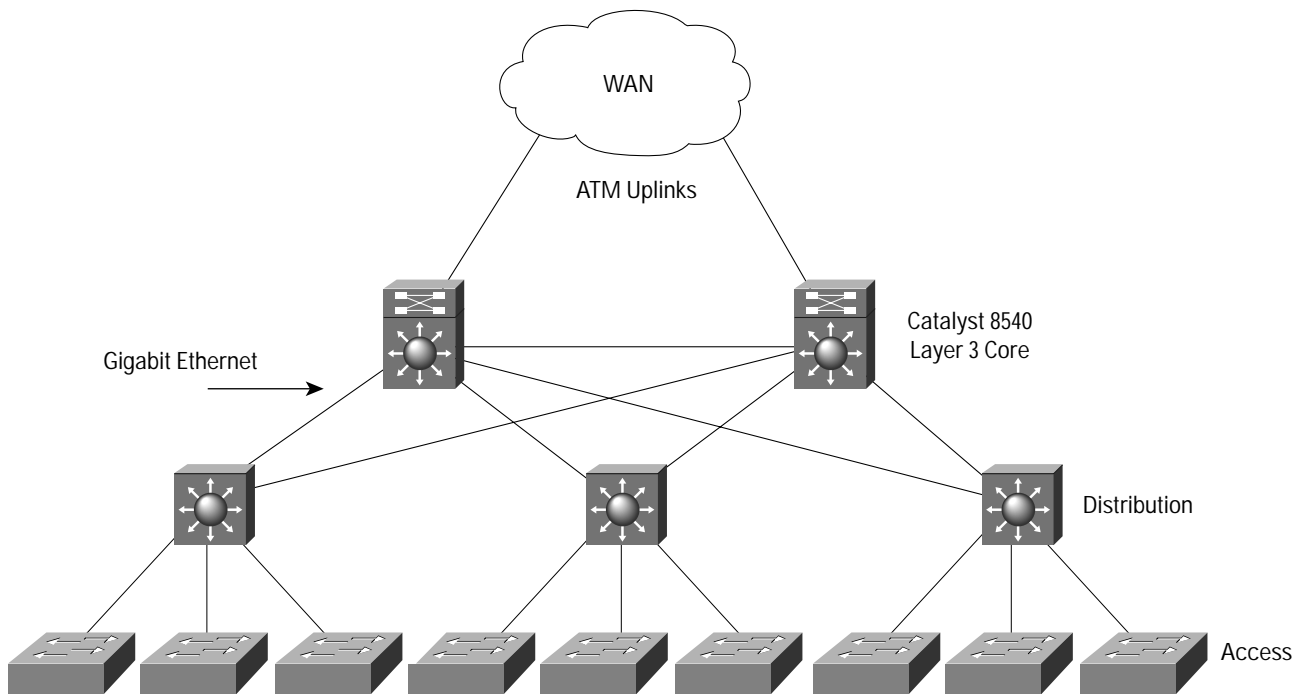
- Online Insertion and Removal (OIR)
- CiscoView
- Simple Network Management Protocol (SNMP)
- IF-MIB (RFC 1213)
- MIB II (RFC 1573)
- RFC 1493 (Bridge MIB)
- Entity MIB (RFC 2037)
- ETHERLIKE-MIB (RFC 1643)
- CISCO-CDP-MIB
- ATM-MIB (RFC 1695)
- SONET MIB (RFC 1595)

### Applications

The ATM Uplink with Enhanced Gigabit Ethernet Module is designed specifically to meet the demanding needs of large-enterprise and service-provider networks.

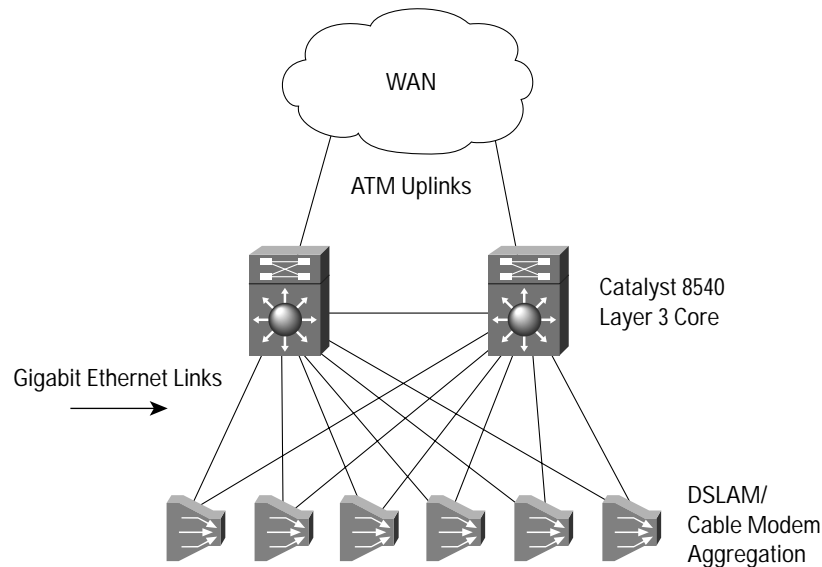
Up to eight of the ATM Uplink with Enhanced Gigabit Ethernet Modules may be placed in a Catalyst 8540 chassis, providing eight ATM uplink ports and eight ports of nonblocking, wire-speed Gigabit Ethernet capacity in the core of an Enterprise network.

Figure 1 Enterprise Core Network



Service providers can use the ATM Uplink with Enhanced Gigabit Ethernet Module to aggregate Gigabit Ethernet traffic before it is sent out over an ATM WAN uplink.

Figure 2 Service Provider Point-of-Presence



## Specifications

### Physical Specification

- Occupies one slot in the Catalyst 8540 platform
- Dimensions (H x W x D): 1.2 x 14.4 x 16.0 in. (3.0 x 36.6 x 40.6 cm)

### Standard Network Protocols

#### ATM uplink:

- Telcordia (Bellcore GR-253 as applicable)
- ITU-T G.957 as applicable
- ITU-T G.707 as applicable

#### Gigabit Ethernet port:

- Ethernet: IEEE 802.3z, IEEE 802.3x, 1000BaseX

### Encapsulation

#### ATM uplink:

- IETF RFC 1483

### Safety Compliance

Catalyst 8540 ATM Uplink with Enhanced Gigabit Ethernet Module, when installed in a system, complies with the following compliance and safety standards:

- UL 1950
- CSA C22.2 No.950
- EN 60825-1
- EN60950
- IEC 950
- IEC 60825-1
- TS 001
- CE marking
- AS/NZS 3260
- 21CFR1040
- Network Equipment Building Systems (NEBS) Level 3

### EMC Compliance

The Catalyst 8540 ATM Uplink with Enhanced Gigabit Ethernet Module, when installed in a system, complies with the following EMI standards:

- FCC Part 15 (CFR 47) Class A
- VCCI Class B
- EN55022 Class B
- CISPR 22 Class B
- CE marking
- AS/NZS 3548 Class B

### Immunity

- IEC-1000-4-2 ESD
- IEC-1000-4-3 Radiated immunity
- IEC-1000-4-4 EFT
- IEC-1000-4-5 Surge
- IEC-1000-4-6 Low frequency common immunity
- IEC-1000-4-11 Voltage dips and sags
- IEC-1000-3-2 Power line harmonics

### ETSI

- ETS-300386-2

### LED Indicators

#### ATM uplink:

- Tx (transmit) activity: active (on), idle (off)
- Rx (receive) activity: active (on), idle (off)
- Alarm activity: active (on), idle (off)
- CD (carrier detect) activity: active (on), idle (off)

#### Gigabit Ethernet:

- OP-DET: optical signal detected (on), no signal (off)
- Full Duplex: full duplex mode (always on)
- RX-SYNC: link synchronized (on)
- Link: link active (on), link idle (off)
- Tx (transmit) activity: active (on), idle (off)
- Rx (receive) activity: active (on), idle (off)

### Interfaces

#### ATM Uplink:

- SC

#### Gigabit Ethernet:

- GBIC only

### Optical Power Budget Catalyst 8540 ATM Uplink OC-3c/STM-1 and OC-12c/STM-4 Optics

| Parameter                     | SMF Intermediate Reach | MMF              |
|-------------------------------|------------------------|------------------|
| Line Rate                     | 155Mbps/622 Mbps       | 155Mbps/622 Mbps |
| Connector Type                | SC                     | SC               |
| Launch Power (Max.)           | -8 dBm                 | -14 dBm          |
| Launch Power (Min.)           | -15 dBm                | -20 dBm          |
| Receiver Power (Max.)         | -8 dBm                 | -14 dBm          |
| Receiver Power (Min.)         | -28 dBm                | -26 dBm          |
| Optical Path Power Penalty    | 1 dB                   | 2 dB             |
| Power Budget                  | 13 dB                  | 6 dB             |
| Maximum Distance <sup>1</sup> | 13 km                  | 500 m            |

Note 1: Worst-case scenario considering fiber quality, connectors, patch panel, and splices.

### Maximum Station-to-Station Cabling Distance (Gigabit Ethernet) Using one of the following GBIC types:

- 1000BaseSX: 50-um multimode fiber: up to 550 m
- 1000BaseLX: 62.5-um multimode fiber: up to 550 m
- 1000BaseLX: 50-um multimode fiber: up to 550 m
- 1000BaseLX: 9/10-um single-mode fiber: up to 5 km
- 1000BaseLH: 62.5-um multimode fiber: up to 550 m
- 1000BaseLH: 50-um multimode fiber: up to 550 m
- 1000BaseLH: 9/10-um single-mode fiber: up to 10 km
- 1000BaseZX: 9/10-um single-mode fiber: up to 70 km
- 1000BaseZX: disposition-shifted fiber: up to 100 km

## Ordering Information

### Required Software

| Platform          |                |                           |
|-------------------|----------------|---------------------------|
| Catalyst 8540 MSR | 12.0(10)W5(18) | S854R2-12.0.10W or higher |
| Catalyst 8540 CSR | 12.0(10)W5(18) | S854R3-12.0.10W or higher |

### Product Availability and Part Numbers

| Part Number       | Product Description  | Availability |
|-------------------|--|--------------|
| C85-10C12SGE-64K  | C8540 1-port OC-12c/STM-4 SMF-IR ATM Uplink with 1-port Enhanced Gigabit Ethernet 64K  | Q2CY00       |
| C85-10C12SGE-256K | C8540 1-port OC-12c/STM-4 SMF-IR ATM Uplink with 1-port Enhanced Gigabit Ethernet 256K | Q2CY00       |
| C85-10C12MGE-64K  | C8540 1-port OC-12c/STM-4 MMF ATM Uplink with 1-port Enhanced Gigabit Ethernet 64K     | Q2CY00       |
| C85-10C12MGE-256K | C8540 1-port OC-12c/STM-4 MMF ATM Uplink with 1-port Enhanced Gigabit Ethernet 256K    | Q2CY00       |
| C85-10C3SGE-64K   | C8540 1-port OC-3c/STM-1 SMF-IR ATM Uplink with 1-port Enhanced Gigabit Ethernet 64K   | Q2CY00       |
| C85-10C3MGE-64K   | C8540 1-port OC-3c/STM-1 MMF ATM Uplink with 1-port Enhanced Gigabit Ethernet 64K      | Q2CY00       |

Note: The Enhanced Gigabit Ethernet port on this interface module requires a GBIC (Gigabit Interface Converter). GBICs are sold separately from the ATM Uplink with Enhanced Gigabit Ethernet Module.

### GBIC Part Numbers

| Part Number | Product Description   | Availability |
|-------------|---|--------------|
| WS-G5484    | 1000BaseSX "short-wavelength" GBIC (MMF only)                             | Now          |
| WS-G5486    | 1000BaseLX/LH "long-wavelength/long-haul" GBIC (single mode or multimode) | Now          |
| WS-G5487    | 1000BaseZX "extended-reach" GBIC (single mode)                            | Now          |

Note: The maximum number of 1000BaseZX GBICs in one Catalyst 8540 switch is limited to eight because of EMC compliance regulations.



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