



# ONcore SwitchModule Series – Switching Solutions

*High-Function Switching Solutions for the ONcore Integrated System*



SwitchModule family

## Introduction

The 3Com® ONcore Integrated System provides a scalable solution for enterprise networks migrating from today's LANs, to switched LANs and ATM. The SwitchModule series offers the highest level of scalability, flexibility, and functionality in the 3Com suite of LAN Switching

solutions for the ONcore® Integrated System. Based on the 3Com Multiprotocol Integrated Switch Controller (ISC) 4000 ASIC, the SwitchModule series supports high-performance Ethernet and FDDI LAN switching, with future LAN-to-ATM migration.

## Key Benefits

■ **Scalable Bandwidth** — Supports the ever growing requirements for today's bandwidth intensive applications. Each SwitchModule delivers 650,000 packets per second of throughput, allowing smooth and incremental increases in aggregate network bandwidth to support new applications with the simple addition of SwitchModules.

■ **High-Function Backbone Features** — Supports the high-function demands of Backbone LAN switching applications. The SwitchModule series provides capabilities that include hardware-based frame and protocol filtering, support for 32,000 MAC addresses, and the ability to prioritize traffic through the switch.

■ **Virtual Networking Support** — Simplifies the configuration and management of the network. The SwitchModule series supports ASIC-based Virtual Networking, to ensure maximum flexibil-

ity and performance while reducing network operating costs.

■ **Complete Fault Tolerance** — Provides nonstop operation for mission critical high-performance networks. With no single point of failure, the ONcore Integrated System, with the SwitchModule series, provides industry-leading reliability for maximum network availability.

■ **Comprehensive System Management** — Provides a single point of network control and management. Along with Transcend® graphical management, the SwitchModule series provides Roving Analysis Port, integrated RMON, and more, for proactive, distributed management of switched network infrastructures. Additionally, each SwitchModule supports the advanced architecture of the ONcore Integrated System for power, inventory, and distributed management.





## ONcore SwitchModule Series Overview

### Scalable Bandwidth

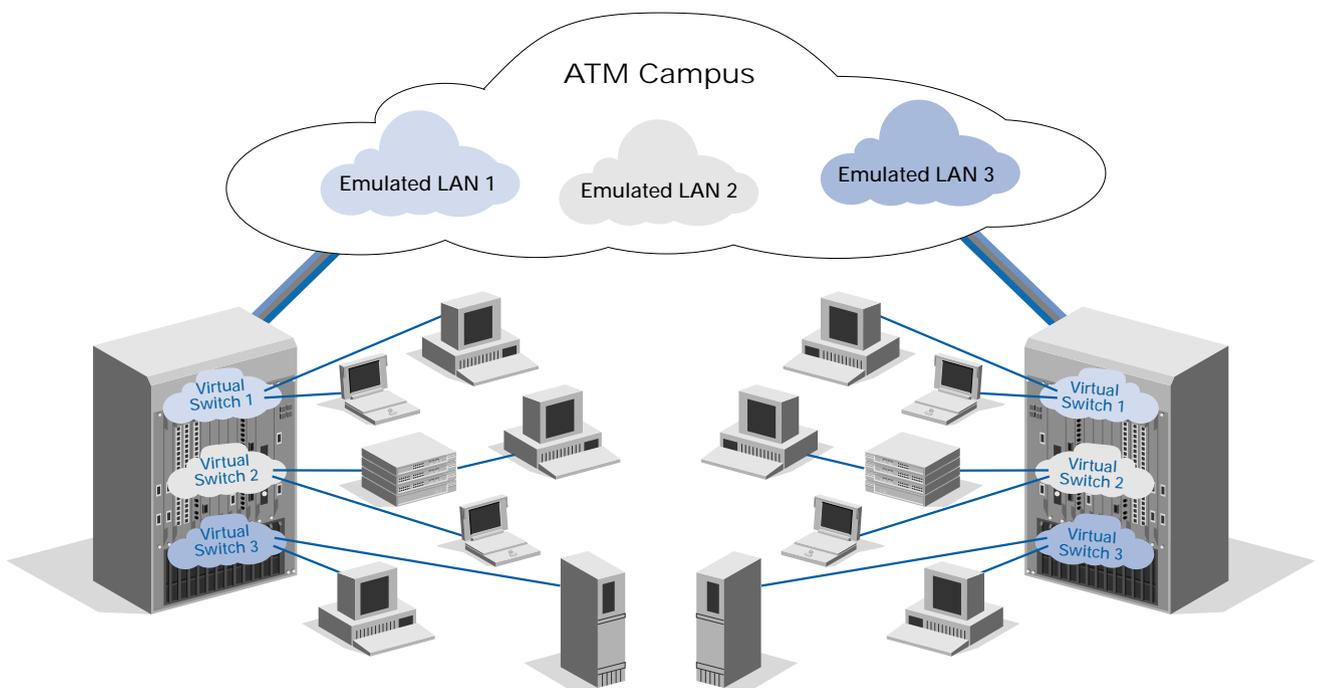
Network expansion and growing bandwidth requirements are easily managed with the SwitchModule series. Each SwitchModule in the series uses its own ISC 4000 Switching ASIC to ensure maximum bandwidth scalability. Simply add ONcore SwitchModules as your network and bandwidth needs grow. For example, the ONcore 17-slot hub supports as many as 204 ports of switched Ethernet or 34 switched DAS FDDI ports to meet high-performance backbone requirements. The ISC 4000 has been optimized

for Multiprotocol 10/100 environments and delivers 650,000 packets per second of throughput. A dedicated switching engine on each SwitchModule provides scalable performance for full wire-speed forwarding on all ports. With store-and-forward architecture, and dynamic buffering, SwitchModules provide full error checking and the ability to switch large data bursts without packet loss. SwitchModules are interconnected through the ONcore 2 Gbps PacketChannel. The PacketChannel has been completely optimized for multiprotocol environments and supports inter-module communication of FDDI or Ethernet and future ATM migration. With ONcore SwitchModules installed, your networks will not experience bandwidth overload. ONcore SwitchModule-based networks have the scalable capacity to support today's and tomorrow's bandwidth needs.

### High-Function Backbone Features

SwitchModules have a full set of capabilities that provide proactive traffic management, user access, and growth for future network requirements. These capabilities include:

- Support for 32,000 MAC addresses for each SwitchModule.
- User definable MAC address filters, to effectively manage network access and restrict users to specific resources.
- Support for 64 protocol filters per SwitchModule. Each filter enables the network manager to block or forward a particular protocol on user-defined sets of ports on the SwitchModule. All protocol filtering/forwarding is performed by the ISC 4000 ASIC, thus ensuring wire-speed performance even with filtering enabled.



Virtual Networking using ONcore Virtual Switches and ATM.

- Support for traffic prioritization based on protocol type. This allows the network manager to support delay-sensitive protocols by assigning a “high” priority level to protocols within each SwitchModule.

## Virtual Networking Support

ONcore SwitchModules allow the user to form Layer 2-based Virtual Networks, called “Virtual Switches.” Each Virtual Switch is a user-defined grouping of ports across an ONcore hub, regardless of interface type. Virtual Switches allow network managers to effectively segment access and management of their networks. Each Virtual Switch is a complete 802.1d Spanning Tree bridge that supports its own address database, broadcast/multicast containment, and management view. Each ONcore hub can support up to 256 Virtual Switches. Virtual Switches can also be extended beyond the hub, using an ATM Backbone SwitchModule. The ATM Backbone SwitchModule uses ATM Forum-compliant LAN Emulation to allow you to build standards-based Virtual Networks.

## Complete Fault Tolerance and Reliability

Mission-critical enterprise networks require 100% reliability. The SwitchModule series solutions for the ONcore Integrated System are designed with no single point of failure. The ONcore hub architecture provides fault tolerance with:

- Load-sharing power supplies
- Redundant links
- Power management
- Redundant controller modules
- Switched ports
- Network management modules

Automatic switching to the redundant components is provided to ensure the industry’s highest level of network availability.

Distribution of switching capabilities throughout the system provides additional reliability. With an ISC 4000 ASIC and Motorola® 68040 management processor on each SwitchModule, other SwitchModules will continue to operate even if one SwitchModule is disabled. Additionally, the ONcore PacketChannel backplane has been designed for maximum reliability by using a passive bus, female connectors, and no active components. The benefit is the delivery of maximum network availability. Additional fault-tolerant features include:

- Support for Dynamic Side Switching — To eliminate session loss, each SwitchModule dynamically adapts to network changes by detecting when a node is moved to a different port in the system.

- Hot-swappable modules with configuration learning — Each SwitchModule can be hot swapped into or out of an operating ONcore hub. In addition, if an identical replacement module is swapped into the hub, it will learn the previously stored configuration ensuring minimum network disruption.
- Support for the ONcore System comprehensive power management architecture — This allows the network manager to ensure that critical network functions stay operational.

## Comprehensive System Management

3Com offers the Transcend Suite of management applications for configuration, management, and monitoring of 3Com networking products. Available for both the Windows® and UNIX® environments, Transcend supports the HP OpenView®, SunConnect®, SunNet Manager™, and IBM NetView® management platforms. Along with the Transcend graphical management capabilities, SwitchModules offer the following capabilities:

- Distributed RMON MIB and interface statistics support — Each SwitchModule contains a complete RMON agent that provides all nine groups on any single port. Additionally, comprehensive interface statistics are collected in real-time on every port to provide a detailed view of the network’s operation. Transcend software fully supports the configuration and mon-

## 10BASE-T Solutions

3Com offers both a high-density, dual-slot SwitchModule (24 Ports) and a moderate density, single-slot SwitchModule (12 ports) to connect 10BASE-T networks and end stations. Using RJ-45 connectors, both SwitchModules support 10 Mbps bandwidth per port and provide STP and UTP connectivity.

## 10BASE-FB/FL Solutions

3Com offers both a high-density, dual-slot SwitchModule (20 ports) and a moderate density, single-slot SwitchModule (10 ports) to connect 10BASE-FB or 10BASE-FL networks and end stations. With support for cabling distances of up to 4 km, each port also automatically configures to either 10BASE-FL or 10BASE-FB. Both SwitchModules support 10 Mbps of bandwidth per port, utilizing multimode fiber and ST connectors.

## FDDI Solutions

3Com offers three solutions for connecting to FDDI backbones and servers.

- To build collapsed FDDI backbones, 3Com offers the single-slot 2-port DAS/SAS FDDI SwitchModule.
- To connect to copper Ethernet nodes or networks, 3Com offers a SwitchModule that supports 12 10BASE-T ports and a single DAS/SAS FDDI port.
- To connect to fiber Ethernet nodes, 3Com offers a SwitchModule that supports 10 autosensing 10BASE-FB/FL ports and a single DAS/SAS FDDI port.

For FDDI connectivity, each DAS/SAS port uses MIC connectors and supports connection to an optical bypass.



Left to Right: 24-Port 10BASE-T SwitchModule, 12-Port 10BASE-T SwitchModule.



Left to Right: 10-Port 10BASE-F and DAS FDDI SwitchModule, 12-Port 10BASE-T and DAS FDDI SwitchModule, 2-Port DAS FDDI SwitchModule.



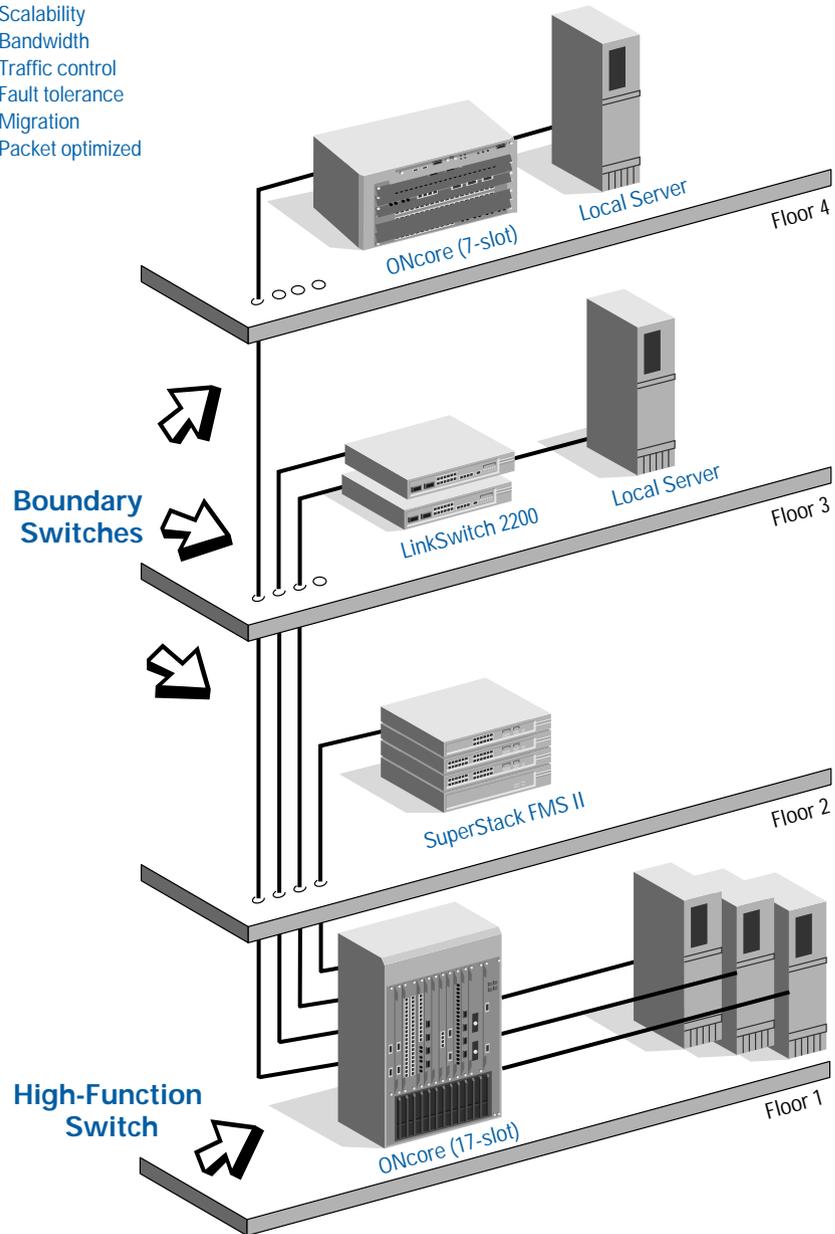
Left to Right: 20-Port 10BASE-F SwitchModule, 10-Port 10BASE-F SwitchModule.

itoring of RMON and interface information, to provide a comprehensive view of network activity from a single point of control.

- **Integrated Inventory Management** — Each SwitchModule contains integrated inventory information that can be accessed with a simple command or a click of a mouse button. The information provides, at a glance, revision levels of the hardware and software, memory installed, and user entered notes.
- **Roving Analysis Port** for real-time nonintrusive monitoring — Traffic on any port can be “mirrored” to any other port in the system or to the RMON Agent contained within any SwitchModule.
- **Full in-band and out-of-band management** through the ONcore Distributed Management Module (DMM) — The DMM provides a central point of control for managing all of the modules installed in an ONcore hub. The DMM supports in-band management using SNMP or TELNET, and out-of-band management using SLIP for TELNET and SNMP and direct asynchronous terminals.

#### Key Attributes of High-Function Switches

- Scalability
- Bandwidth
- Traffic control
- Fault tolerance
- Migration
- Packet optimized



Transcend Networking delivers scalability, performance, and simplicity with Boundary Switches and High-Function Switches. When populated with the SwitchModule Series, the ONcore hub can serve as a High-Function Switch for backbone networks.



# Specifications

## ONcore SwitchModule Series — Switching Solutions

**3Com Corporation**  
 P.O. Box 58145  
 5400 Bayfront Plaza  
 Santa Clara, CA 95052-8145  
 Phone: 800-NET-3Com  
 or 408-764-5000  
 Fax: 408-764-5001  
 World Wide Web:  
<http://www.3com.com>

**3Com ANZA**  
 ANZA East: 61 2 9937 5000  
 ANZA West: 61 3 9653 9515

**3Com Asia Limited**  
 Beijing, China: 86 10 8492 568  
 Shanghai, China: 86 21 6374 0220  
 Ext. 6115  
 Hong Kong: 852 2501 1111  
 Indonesia: 62 21 523 9181  
 Korea: 82 2 319 4711  
 Malaysia: 60 3 732 7910  
 Singapore: 65 538 9368  
 Taiwan: 886 2 377 5850  
 Thailand: 662 231 8151

**3Com Benelux B.V.**  
 Belgium: 32 725 02 02  
 Netherlands: 31 30 6029700

**3Com Canada**  
 Calgary: 403 265 3266  
 Montreal: 514 874 8008  
 Ottawa: 613 566 7055  
 Toronto: 416 498 3266  
 Vancouver: 604 434 3266

**3Com European HQ**  
 44 1628 897000

**3Com France**  
 33 1 69 86 68 00

**3Com GmbH**  
 Czech and Slovak Republics:  
 42 2 21845 800  
 Berlin, Germany: 49 30 3498790  
 Munich, Germany: 49 89 627320  
 Poland: 48 22 6451351  
 Switzerland: 41 31 996 14 14

**3Com Ireland**  
 353 1 820 7077

**3Com Japan**  
 81 3 3345 7251

**3Com Latin America**  
 U.S. Headquarters: 408-764-6075  
 Argentina: 54 1 815 7164  
 Brazil: 55 11 546 0869  
 Chile: 56 2 633 9242  
 Mexico: 52 5 520 7841  
 3Com Northern Latin America  
 Miami, Florida: 305-261-3266  
 Colombia: 57 1 618 4585  
 Peru: 51 1 422 9971  
 Venezuela: 58 2 953 8122

**3Com Mediterraneo**  
 Milan, Italy: 39 2 253011  
 Rome, Italy: 39 6 5917756  
 Spain: 34 1 3831700

**3Com Middle East**  
 971 4 349049

**3Com Nordic AB**  
 Denmark: 45 39 27 85 00  
 Finland: 358 0 435 420 67  
 Norway: 47 22 18 40 03  
 Sweden: 46 8 632 91 00

**3Com South Africa**  
 27 11 807 4397

**3Com UK Ltd.**  
 Edinburgh: 44 1312 208228  
 Manchester: 44 1618 737717  
 Marlow: 44 1628 897000

### General

#### All ONcore SwitchModules

##### Switching Architecture

– Store and Forward

##### Memory Architecture

– System Software Storage: FLASH  
 EEPROM - 2 MB, user-upgradeable to 4 MB

– Packet Memory: 3 MB dynamically shared by ports on each SwitchModule  
 – Data memory for RMON: 2 MB, user upgradeable to 18 MB

##### Virtual LAN Support

– 256 Virtual Switches

##### MAC Addresses per ONcore

##### SwitchModule

– 32,000

##### Protocols Supported

IEEE 802.3; IEEE 802.1d; IEEE 802.1h;  
 FDDI; IP Fragmentation — RFC 1349;  
 SNMP — RFC 1157; TELNET (via DMM) — RFC 854; TFTP — RFC 1350; ARP — RFC 826; SLIP (via DMM) — RFC 1055

##### MIBs Supported

MIB II — RFC 1213; RMON MIB — RFC 1757; Bridge MIB — RFC 1493; Ethernet-like MIB — RFC 1643; FDDI SMT 7.3 MIB — RFC 1512; Interfaces MIB — RFC 1573; 3Com MIB

##### Management Access (via DMM)

##### In-band

SNMP, TELNET (command line interface)

##### Out-of-band

SLIP (SNMP, TELNET) and Direct Asynchronous Terminals

### Front Panel Indicators

PacketChannel Status; Module Status; Per port bicolor Activity/Status LED (except FDDI)

### User-defined Filters

MAC Addresses; Protocol - 64 per SwitchModule

### Environmental

**Operating Temperature:** 0° to 50°C

**Operating Humidity:** 10 to 95% relative humidity (noncondensing)

**Storage Temperature:** -40° to 66°C

**Storage Humidity:** 10 to 95% relative humidity

### Agency Approvals

#### EMI Certifications

FCC Part 15, Class A; ICES003; EN55022 (CISPR22), Class A; EMC Directive 89/336/EEC; VCCI Level 1; EN61000-3

#### Safety Certifications

UL Listed (1950); CSA Certified (CSA22.2 No. 950); TUV GS (EN 60950); IEC950

### Cabling Requirements

**10BASE-T Ports:** 100 Ohm Category 3 or 5 UTP - up to 100 m, 100 Ohm STP - up to 180 m, IBM Type 1 150 Ohm STP - up to 180 m

**10BASE-F Ports:** 50/125, 62.5/125, multi-mode fiber up to 4 km

**FDDI Ports:** 50/125, 62.5/125, 100/140 multimode fiber up to 2 km

### Ordering Information

Single-slot, 12-Port 10BASE-T (RJ-45) SwitchModule 3C96612M-TP

Dual-slot, 24-Port 10BASE-T (RJ-45) SwitchModule 3C96624M-TP

Single-slot, 10-Port 10BASE-F (ST) SwitchModule 3C96610M-F-ST

Dual-slot, 20-Port 10BASE-F (ST) SwitchModule 3C96620M-F-ST

Dual-slot, 12-Port 10BASE-T (RJ-45) and DAS/SAS (MIC) FDDI SwitchModule 3C96614M-FTP

Dual-slot, 10-Port 10BASE-F (ST) and DAS/SAS (MIC) FDDI SwitchModule 3C96612M-FF-ST

Single-slot, 2-Port DAS/SAS (MIC) FDDI SwitchModule 3C96604M-F

To learn more about 3Com products, visit our World Wide Web site at <http://www.3com.com>.

© 3Com Corporation 1996. All rights reserved. 3Com is a publicly owned corporation (NASDAQ:COMS). 3Com, ONcore and Transcend are registered trademarks and LinkSwitch and SuperStack are trademarks of 3Com Corporation. Unless otherwise indicated, 3Com registered trademarks are registered in the United States and may or may not be registered in other countries. HP and OpenView are registered trademarks of Hewlett-Packard Company; IBM and NetView are registered trademarks of International Business Machines Corporation; Windows is a registered trademark of Microsoft Corporation; Motorola is a registered trademark of Motorola, Inc., SunConnect is a registered trademark and SunNet Manager is a trademark of Sun Microsystems, Inc.; UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd. Other brand and product names may be trademarks or registered trademarks of their respective owners. All specifications are subject to change without notice.