

# Features and Specifications of the Catalyst Token Ring Switches

---

Cisco offers two options in second-generation Token Ring switching: the Catalyst 3900 Token Ring switch and the Catalyst 5000 Token Ring module. This chapter provides a brief overview of each switch and a list of the features and specifications of each switch.

## Catalyst 3900 Overview

The Catalyst 3900 is a Token Ring switch ideally suited for desktop connectivity. The Catalyst 3900 comes standard with 20 fixed ports and an expansion slot that can accommodate two expansion modules. It also offers an optional Stack Port module that enables up to eight units to be stacked together using the Catalyst Matrix switch.

The Catalyst 3900 offers the following options for expanding beyond the base 20 ports:

- **Port expansion modules**

The expansion slot can accommodate two port expansion modules (four-port copper or fiber), allowing you to add up to eight additional Token Ring ports to each switch.
- **High-speed uplinks**

The expansion slot can accommodate two high-speed uplinks (Token Ring ISL or ATM) for high-speed connectivity between switches and to servers.
- **Stack port module**

The stack port module allows you to connect 2 switches in a back-to-back configuration (for a maximum of 56 Token Ring ports) or up to 8 switches via 140-Mbps FDX links to the Catalyst Matrix switch (for a maximum of 224 ports and an aggregate switching capacity of more than 3 Gbps).
- **TokenChannels**

The TokenChannel feature allows you to group up to 8 ports as one logical port for a high-speed connection of up to 256 Mbps between switches.

An ASIC design results in low-latency, wire-speed switching of unicast, multicast, and broadcast frames at either HDX or FDX speeds, regardless of whether they are source-route bridged, source-route transparently bridged, or source-route switched. Adaptive cut-through mode switching optimizes performance while providing protection from network errors by automatically switching to store-and-forward mode when errors reach a user-defined threshold.

The Catalyst 3900 switch provides a wide range of connectivity options for maximum flexibility. Connecting an MAU, server, or end station is easy because the Catalyst 3900 enables direct station attachment as well as RI/RO connections to scale ring segment size. Each port supports DTR, the IEEE standard that defines direct station attachment at 4, 16, or 32 Mbps. Furthermore, ports 19 and 20 and any of the ports of the fiber expansion module support RI/RO.

The shielded RJ-45 ports support both 150-ohm shielded twisted-pair (STP) and 100-ohm unshielded twisted-pair (UTP). There is no need for external media filters; nor is there a requirement for baluns to do impedance matching for different cable types.

Table 2-1 lists the Catalyst 3900 features and specifications.

**Table 2-1 Catalyst 3900 Features and Specifications**

Performance	Latency: Less than 45 microseconds for all frame sizes
	Throughput: Media speed on all interfaces
Buffers and addressing	Buffers: 1 MB of DRAM per group of 4 ports
	Addressing: 10,000 addresses per system, local cache of up to 6500 addresses per group of 4 ports
System interfaces	20 shielded Token Ring ports for 150-ohm STP or 100-ohm UTP connectivity
	Expansion slot accommodating up to two expansion modules
	Expansion modules include a four-port fiber module, a four-port copper module, a two-port ISL uplink, and an ATM OC-3 uplink
	One rear stack port for an optional stack port module providing a 140-Mbps FDX link between back-to-back switches or between the Catalyst 3900 and the Catalyst Matrix switch for configurations requiring up to 8 units in a stack
	9-pin EIA/TIA-232 interface for local console or modem connectivity
Switching features	SRB, SRT, and source-route switching
	Adaptive cut-through mode switching
	Automatic 4/16/32-Mbps speed adaptation
	Automatic shared and dedicated adaptation
	Two priority queues for multimedia traffic
	TokenChannel switch interconnect
	MAC address, DSAP, and SNAP type filters
	ARE reduction
	Explorer rate protection
IEEE and IBM Spanning Tree Protocols	

**Table 2-1 Catalyst 3900 Features and Specifications (Continued)**

Standard MIBs supported	<p>Management Information Base (MIB) for network management of TCP/IP-based internets:</p> <ul style="list-style-type: none"> <li>• MIB-II (RFC 1213)</li> <li>• Definitions of Managed Objects for Bridges (RFC 1493)</li> <li>• Evolution of Interfaces Group of MIB-II (RFC 1573)</li> <li>• Token Ring Extensions to the Managed Objects for Source Routing Bridges (RFC 1525)</li> <li>• IEEE 802.5 Token Ring MIB (RFC 1748)</li> <li>• RMON (RFC 1757)</li> <li>• Statistics, History, Alarm, and Event groups</li> <li>• RMON Token Ring Extensions (RFC 1513) <ul style="list-style-type: none"> <li>— Token Ring extensions for Statistics, History, Alarm, and Event groups</li> <li>— Ring Station Order Group</li> <li>— Ring Station Control Table</li> </ul> </li> <li>• IEEE 802.5 DTR Concentrator MIB</li> <li>• IEEE 802.5 DTR MAC MIB</li> </ul>
Private MIBs supported	<p>Catalyst 3900 Enterprise MIB</p> <p>Cisco VLAN Trunking Protocol MIB v2</p> <p>Cisco Discovery Protocol MIB</p>
Monitoring support	<p>CWSI graphical user interface (GUI) management</p> <ul style="list-style-type: none"> <li>• CiscoView with Threshold Manager</li> <li>• VlanDirector</li> <li>• TrafficDirector</li> </ul> <p>SPAN</p> <p>TFTP and BOOTP</p> <p>Menu-driven interface (via console port or telnet)</p> <p>Password-level security</p>
Physical Specifications	<p>Dimensions (H x W x D): 3.4 in. x 17.4 in. x 15.3 in. (8.6 cm x 44.2 cm x 38.7 cm)</p> <p>Weight: 16-18 lb (6-6.7 kg), depending on configuration</p> <p>Mounting: 19-in. (48.26 cm) 2U rack compatible</p>
Power Requirements	<p>Power: 90-264 VAC autosensing (single supply)</p> <p>Frequency: 47-63 Hz</p> <p>AC current rating: 1.5A at 115V; 0.75A at 230V</p> <p>Thermal dissipation: 150W maximum; 512 BTUs/hr</p>
Environmental Conditions	<p>Operating temperature: 50 to 104°F (10 to 40°C)</p> <p>Nonoperating temperature: -13 to 158°F (-25 to 70°C)</p> <p>Operating humidity: 8 to 80% (noncondensing)</p> <p>Nonoperating humidity: 8 to 90% at 45°C</p> <p>Storage altitude: 40,000 ft</p>

**Table 2-1 Catalyst 3900 Features and Specifications (Continued)**

Electromagnetic emissions certifications	FCC Class A/B-UTP
	CE Declaration of Conformity to the EMC Directive-Class B with Unshielded or Shielded Cables
	VCCI Class II (B) Certification (for Japan)
	AS/NRZ 3548 (1992 Class A/B Certification for Australia)
	ICES-003 Class A/B (for Canada)
Safety certifications	UL 1950, third Edition without D3 deviations
	CUL to CAN/CSA 22.2 Number 950
	CE mark to the Low Voltage Directive (EN60 950, 1992 Amendments 1 and 2)
	Certified Body (CB) report to IEC 950, third Edition

## Catalyst 5000 Series Token Ring Module Overview

The Catalyst 5000 Series Token Ring module is a switching module that can be used with any of the Catalyst 5000 series switches. The Token Ring module is available in fiber or copper. The copper Token Ring module provides 16 RJ-45 ports. The fiber Token Ring module provides 16 ST-type ports. On all Catalyst 5000 series switches interface slot 1 is reserved for the supervisor engine module. The maximum number of Token Ring ports varies depending on the model of Catalyst 5000 switch as follows:

- Catalyst 5002 contains 2 slots, allowing a maximum configuration of 16 Token Ring ports.
- Catalyst 5000 contains 5 slots, allowing a maximum configuration of 64 Token Ring ports.
- Catalyst 5500 contains 13 slots, however, slot 13 is reserved for the ATM Switch Processor (ASP) module. Therefore, the maximum configuration of Token Ring ports is 176.

As in the Catalyst 3900, an ASIC design results in low-latency, wire-speed switching of unicast, multicast, and broadcast frames at either half- or full-duplex speeds, regardless of whether they are source-route bridged, source-route transparently bridged, or source-route switched.

Like the Catalyst 3900, the Catalyst 5000 Series Token Ring module supports IEEE 802.5r, which defines standards for the direct attachment of end stations to the switch as well as for the transmission of data at half-duplex (4/16 Mbps) and full-duplex (32 Mbps) speeds. The fiber Token Ring module also allows the ports to operate in RI/RO mode.

The shielded RJ-45 ports support both 150-ohm STP and 100-ohm UTP. There is no need for external media filters and there is no requirement for baluns to do impedance matching for different cable types.

Table 2-2 lists the Catalyst 5000 Series Token Ring module features and specifications.

**Table 2-2 Catalyst 5000 Token Ring Module Features and Specifications**

Performance	Throughput: Media speed on all interfaces
System interfaces	16 Token Ring ports for UTP/STP connectivity
	16 Token Ring ports for multimode 62.5-micron fiber connectivity
	Autosense 4/16/32 Mbps on all ports
	Switch ports can function as concentrator or station ports

**Table 2-2 Catalyst 5000 Token Ring Module Features and Specifications (Continued)**

Switching features	SRB, SRT, and source-route switching		
	Automatic 4/16/32-Mbps speed adaptation		
	Automatic shared and dedicated adaptation		
	Two priority queues for multimedia traffic		
	MAC address, DSAP, and SNAP type filters		
	ARE reduction		
	IEEE and IBM Spanning Tree Protocols		
Standard MIBs supported	MIB for network management of TCP/IP-based internets: <ul style="list-style-type: none"> <li>• MIB-II (RFC 1213)</li> <li>• Definitions of Managed Objects for Bridges (RFC 1493)</li> <li>• Evolution of Interfaces Group of MIB-II (RFC 1573)</li> <li>• Token Ring Extensions to the Managed Objects for Source Routing Bridges (RFC 1525)</li> <li>• IEEE 802.5 Token Ring MIB (RFC 1748)</li> <li>• RMON (RFC 1757) Statistics, History, Alarm, and Event groups</li> <li>• RMON Token Ring Extensions (RFC 1513) <ul style="list-style-type: none"> <li>— Token Ring extensions for Statistics, History, Alarm, and Event groups</li> <li>— Ring Station Order Group</li> <li>— Ring Station Control Table</li> </ul> </li> <li>• AToM MIB (RFC 1695)</li> <li>• LEC MIB (ATM Forum LANE v. 1.0)</li> <li>• LECS, LES, BUS MIB</li> </ul>		
	Cisco VLAN Trunking Protocol MIB v2		
	Cisco Discovery Protocol MIB		
	Monitoring support	CWSI GUI management <ul style="list-style-type: none"> <li>• CiscoView with Threshold Manager</li> <li>• VlanDirector</li> <li>• TrafficDirector</li> </ul>	
		TFTP and BOOTP	
		Command line interface (via console port or telnet)	
		Password-level security and Terminal Access Controller Access Control System (TACACS)	
		Physical specifications	Single slot dimensions (H x W x D): 1.17 in. x 14.4 in. x 16.0 in. (2.97 cm x 36.58 cm x 40.64 cm)
			Weight: 3.9 lb (1.45 kg)
	Electromagnetic emissions certifications		FCC 15J Class A
		VCCI CE II	
CE Mark			
EN 55022 Class B			
CISPR 22 Class B			

**Table 2-2 Catalyst 5000 Token Ring Module Features and Specifications (Continued)**

Safety Certifications	UL 1950
	EN 60950
	CSA to C22.2 No. 950
	IEC 950