

## Cisco Voice Switch Service Module

The Cisco® Voice Switch Service Module (VXSM) is a high-density voice module for the Cisco MGX® 8880 Media Gateway and Cisco MGX 8000 Series Multiservice Switches. The Cisco VXSM offers high availability, scalable and robust voice features for wireless, wireline, and cable applications.

### Product Overview

The Cisco VXSM is a high-density voice service module with time-division multiplexing (TDM) interfaces ranging from T1/E1 to channelized OC-3/STM-1 (refer to Figure 1). It provides service providers with carrier-class capabilities for high capacity and reliability for voice-over-IP (VoIP) services. The Cisco VXSM scales to 8064 DS0s per module and is fully redundant to maintain active calls upon switchover.

The Cisco VXSM architecture combines a high-performance voice services engine with onboard digital signal processors to provide advanced voice processing and features that allow quick development and deployment of VoIP services. The Cisco VXSM offers carrier-grade voice quality with a full suite of voice, modem, and fax features. The Cisco VXSM, together with a softswitch, provides maximum deployment flexibility for various packet voice networks based on the Media Gateway Control Protocol (MGCP), PacketCable™ Trunking Gateway Control Protocol (TGCP), H.248, H.323, and Session Initiation Protocol (SIP).

The innovative Cisco VXSM architecture provides investment protection with its ability to easily add new functions and services through software upgrades.

**Figure 1.** Cisco VXSM (Front and Back Cards)



## Features and Benefits

Table 1 Describes features and benefits, Table 2 provides an overview of the features, and Table 3 provides specifications of the Cisco VXSM.

**Table 1.** Features and Benefits of Cisco VXSM

Feature	Benefit
High density	<ul style="list-style-type: none"> <li>• Scales up to 8064 VoIP DS0s per service module</li> <li>• Lowers capital expenditures (CapEx) and operating expenses (OpEx) by maximizing density per platform</li> <li>• Allows 40,320 VoIP DS0s per chassis and 120,960 VoIP DS0s per rack, with echo cancellation</li> </ul>
TDM interfaces	<ul style="list-style-type: none"> <li>• Offers scalable optical interfaces; available with 2- or 4-port OC-3/STM-1 interfaces per service module</li> <li>• Provides scalable electrical interfaces; up to 6 port T3 and 48 port T1/E1 interfaces per service module</li> </ul>
High availability	<ul style="list-style-type: none"> <li>• Helps ensure carrier-class reliability by providing active call preservation</li> </ul>
Integrated nonblocking architecture	<ul style="list-style-type: none"> <li>• Lowers entry, scaling, and operations cost by integrating TDM, network processing, and digital-signal-processor (DSP) technology onto a single module</li> </ul>

**Table 2.** Overview of Cisco VXSM Features

Features	Description
Call control	<ul style="list-style-type: none"> <li>• H.248 (over UDP, TCP, and SCTP)</li> <li>• MGCP (over UDP)</li> <li>• TGCP (over UDP)</li> <li>• H.323, SIP (enabled via a softswitch proxy)</li> </ul>
Signaling interfaces	<ul style="list-style-type: none"> <li>• Inter-Machine Trunk (IMT)</li> <li>• Signaling ISDN Primary Rate Interface (PRI) over RUDDP and IUA</li> <li>• Signaling System 7 (SS7) over M3UA</li> <li>• DPNSS/DASS over DUA</li> <li>• Channel Associated Signaling (CAS) for E911(FGD, CAMA) and BLV/OI</li> </ul>
Voice compression	<ul style="list-style-type: none"> <li>• G.711, G.723.1, G.726, G.729a/b, Clear Channel</li> </ul>
Voice features	<ul style="list-style-type: none"> <li>• G.165, G.168-2000 integrated, nonblocking echo cancellation; programmable up to 128 ms</li> <li>• Transparent transcoding between a-law and <math>\mu</math>-law encoding</li> <li>• Voice Activity Detection, Silence Suppression, and Comfort Noise Generation</li> <li>• Fixed and Adaptive Jitter Buffering</li> <li>• Tone detection and regeneration including dial tone, busy, ring back, and congestion with local country variants; programmable tones</li> <li>• Dual Tone Multi Frequency (DTMF) relay (RFC 2833)</li> <li>• Voice Quality Monitoring (RTCP-XR/H.248.30)</li> </ul>
Modem and Fax	<ul style="list-style-type: none"> <li>• Fax and modem pass-through</li> <li>• T.38 Fax Relay (Call Agent and Media Gateway controlled)</li> <li>• TTY/TDD</li> </ul>
IP	<ul style="list-style-type: none"> <li>• Real-time Transport Protocol (RTP) (RFC 1889), DTMF Relay (RFC 2833), Differentiated Services (DiffServ) aware, MPLS</li> </ul>
ATM	<ul style="list-style-type: none"> <li>• Standards-based ATM Adaptation Layer 2 (AAL2) and ATM Adaptation Layer 5</li> </ul>
Announcements	<ul style="list-style-type: none"> <li>• Onboard announcement storage and playout</li> </ul>
Lawful intercept	<ul style="list-style-type: none"> <li>• Legal intercept framework enabling carriers to meet local legal intercept requirements (e.g. Communications Assistance for Law Enforcement Act [CALEA])</li> <li>• Support for call content</li> <li>• Bearer encryption</li> </ul>
Packet Cable	<ul style="list-style-type: none"> <li>• PacketCable 1.1 Compliance</li> <li>• PacketCable bearer encryption</li> <li>• IPSec signaling encryption</li> </ul>

Features	Description
Management interfaces	<ul style="list-style-type: none"> <li>• Simple Network Management Protocol (SNMP)</li> <li>• Command Line Interface (CLI)</li> <li>• Telnet</li> <li>• Secure Shell (SSH) Protocol</li> <li>• FTP</li> </ul>

**Table 3.** Product Specifications

Features	Description
Chassis compatibility	<ul style="list-style-type: none"> <li>• Cisco MGX 8880 Media Gateway</li> <li>• Cisco MGX 8850 (with PXM-45/C)</li> </ul>
Physical specifications	<p>Front Card</p> <ul style="list-style-type: none"> <li>• Height: 15.65 in. (397.51 mm)</li> <li>• Depth: 15.83 in. (402.08 mm)</li> </ul> <p>Back Card</p> <ul style="list-style-type: none"> <li>• Height: 7 in. (177.8 mm)</li> <li>• Depth: 4.125 in. (104.76 mm)</li> </ul> <p>Environmental</p> <ul style="list-style-type: none"> <li>• -32° to 104°F (0° to 40°C) for normal operation</li> <li>• Operating humidity (noncondensing): 10 to 85 percent</li> </ul>
Power consumption	134W for 48-T1E1, 169W for 6-T3, and 180W for 4-OC3/STM1

Features	Description
Compliance	<p>Safety</p> <ul style="list-style-type: none"> <li>• BellCore NEBS: Level 3</li> <li>• UL 1950, CSA C22.2 No. 950</li> <li>• AS/NZS 3260/ACA Approval</li> <li>• IEC 60825-1, EN60825-1</li> <li>• IEC 825-1</li> <li>• IEC 60950/EN 60950/TUV/CE mark</li> <li>• UL 60950</li> <li>• BABT: Telecom Requirement</li> <li>• ETS 300 047 : Telecom Standard</li> </ul> <p>EMI/ESD</p> <ul style="list-style-type: none"> <li>• 47 CFR Part 15: 2002</li> <li>• CISPR22: 1997</li> <li>• EN55022: 1998</li> <li>• EN61000-3-2: 2000</li> <li>• EN61000-3-3: 1995</li> <li>• EN300386: 2001</li> <li>• VCCI: V-3/2000.04</li> <li>• EN300386: 2001</li> <li>• EN50082-1: 1992</li> <li>• EN50082-1: 1997</li> <li>• EN61000-6-1: 2001</li> <li>• Central Office Equipment (USA only) GR1089: Issue2: Rev1: 1999 and GR1089: Issue 3: October 2002</li> </ul> <p>SONET</p> <ul style="list-style-type: none"> <li>• Bellcore GR-253-Core (GR for SONET transports)</li> <li>• ANSI T1.105 (SONET: Network element timing and synchronization)</li> </ul> <p>SDH</p> <ul style="list-style-type: none"> <li>• G.707</li> <li>• G.957</li> <li>• G.783</li> </ul> <p>T3</p> <ul style="list-style-type: none"> <li>• T1.101, T1.403, T1.404, G.704</li> </ul> <p>T1</p> <ul style="list-style-type: none"> <li>• TIA-968-A 2002 (USA)</li> <li>• CS-03 Issue 8 1996 (Canada)</li> <li>• T1.101 / T1.403</li> </ul> <p>E1</p> <ul style="list-style-type: none"> <li>• RTTE Directive (1999/5/EC) 1999 (CE)</li> <li>• G.703</li> </ul>
Telcordia CLEI	<ul style="list-style-type: none"> <li>• GR-485-CORE – CLEI coding</li> <li>• GR-383-CORE – CLEI code product label</li> <li>• GR-209-CORE – PCN Process</li> </ul>

### Cisco VXSM OC-3/STM-1 Interface

Cisco VXSM OC-3/STM-1 back cards use Cisco industry-standard Small Form-Factor Pluggable (SFP) modules. SFPs minimize operations and sparing costs by allowing Cisco VXSM OC-3/STM-1 back cards to be easily adapted to various types of optical interfaces. For example, a Cisco VXSM OC-3/STM-1 back card with Multi-Mode Fiber (MMF) interfaces can be quickly changed to Single-Mode Fiber (SMF) by removing the MMF modules and inserting SMF modules. Table 4 provides information about the Cisco VXSM OC-3/STM-1 back card interfaces.

**Table 4.** Cisco VXSM OC-3/STM-1 Back-Card Interfaces

Feature	MMF	SMF Intermediate Reach (SMF-IR)	SMF Long Reach (SMF-LR)
Port speed	155 Mbps	155 Mbps	155 Mbps
Maximum number of OC-3/STM-1 ports	4	4	4
Port media	MMF	SMF	SMF
Port connector	LC	LC	LC
Optics	LED 1310 nm	Laser 1310 nm	Laser 1310 nm
Tx power level (dBm)	-19 min -14 max	-15 min -8 max	-5 min 0 max
Rx power level (dBm)	-30 min -14 max	-28 min -8 max	-34 min -10 max
Typical reach (km)	2	15	40
Redundancy	1:1	1:1	1:1
Line protection	APS 1+1	APS 1+1	APS 1+1

### Cisco VXSM T3 Interface

The Cisco VXSM T3 interface supports up to 6 ports. The Cisco VXSM T3 back cards may be deployed in pairs; each supporting 3 T3 ports (Table 5).

**Table 5.** Cisco VXSM T3 Back-Card Interfaces

Feature	T3
Port speed	44.736 Mbps
Maximum number of T3 ports per back card	3
Number of back cards per front card	1 or 2
Port media	75-ohm Coax pair
Port connector	3 pair of SMB Coax
Line coding	Binary 8-zero substitution (B8ZS) or alternate mark inversion (AMI)
Line framing	ANSI T1.408 Extended Superframe, Super Frame format line framing
Redundancy	1:1

### Cisco VXSM T1/E1 Interface

The Cisco VXSM T1/E1 interface supports up to 48 T1/E1 ports. The Cisco VXSM T1/E1 back cards may be deployed in pairs; each supporting 24 T1/E1 ports (Table 6).

**Table 6.** Cisco VXSM T1/E1 Back-Card Interfaces

Feature	T1	E1
Port speed	1.544 Mbps	2.048 Mbps
Maximum number of T1/E1 ports per back card	24	24
Number of back cards per front card	1 or 2	1 or 2
Port media	100-ohm twisted pair	120-ohm twisted pair
Port connector	50-pin Amphenol	50-pin Amphenol
Line coding	Binary 8-zero substitution (B8ZS) or alternate mark inversion (AMI)	HDB3 or AMI
Line framing	ANSI T1.408 Extended Superframe, Super Frame format line framing	ITU-T G.704 basic frame, multiframe, cyclic-redundancy-check (CRC) framing
Redundancy	1:1	1:1

## Availability and Ordering

Table 7 provides availability and ordering information for the Cisco VXSM.

**Table 7.** Availability and Ordering Information for Cisco VXSM

Part Number	Product Description
MGX-VXSM-155	Cisco VXSM OC-3/STM-1 Front Card
VXSM-BC-4-155	Cisco VXSM OC-3/STM-1 Back Card
MGX-VXSM-T3	Cisco VXSM T3 Front Card
VXSM-BC-3T3	Cisco VXSM T3 Back Card
MGX-VXSM-T1E1	Cisco VXSM T1/E1 Front Card
MGX-BC-24T1E1	Cisco VXSM T1/E1 Back Card

## For More Information

For more information about Cisco service and support programs and benefits, go to <http://www.cisco.com>.



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