Cisco VG350, VG224, VG204XM, and VG202XM Stand-Alone Analog Voice Gateways

The Cisco® VG350, VG224, VG204XM, and VG202XM Analog Voice Gateways allow you to use your IP telephony solution with traditional analog devices while taking advantage of the productivity afforded by IP infrastructure.

Cisco Unified Communications enables organizations to collaborate more effectively - helping them streamline business processes, reach the right resource the first time, and improve productivity and profitability (Figures 1 through 4). Cisco offers an end-to-end unified communications and collaboration solution that includes network infrastructure, security, unified call control, endpoints, network management, and a lifecycle services approach. In addition, it offers flexible deployment models, outsourced management options, end-user and partner financing packages, and integration with third-party communications applications.

Figure 1. Cisco VG350 Analog Voice Gateway

Figure 2. Cisco VG224 Analog Voice Gateway

Figure 3. Cisco VG204XM Analog Voice Gateway

Figure 4. Cisco VG202XM Analog Voice Gateway

The Cisco VG350, VG224, VG204XM, and VG202XM are part Cisco IOS® software-based VG series stand-alone analog voice gateways. The Cisco VG350 is a high-density 160-port gateway, the Cisco VG224 is a 24-port gateway, and the Cisco VG204XM and VG202XM are low-density 4- and 2-port gateways, respectively. These gateways connect analog phones, fax machines, modems, and speakerphones to an enterprise voice system based on Cisco Unified Communications Manager (Unified CM). Having these devices tightly integrated with the IP-based phone system is advantageous for increased manageability, scalability, and cost-effectiveness (refer to Figure 5 later in this document). Commercial businesses can also use these gateways with Cisco Unified Communications Manager Express to effectively augment an integrated-services-router (ISR) environment. Both topology environments support business needs ranging from high to low concentrations of analog voice ports for modem calls, fax calls, and analog supplementary services.

The Cisco VG350, VG224, VG204XM, and VG202XM offer Cisco IOS Software manageability on analog phone lines so that you can use them as extensions to your Cisco or 3rd party IP call control solution. The Cisco VG350 and VG224 offer 19-inch rack-mount chassis, and the Cisco VG204XM and VG202XM offer desktop form-factor chasses with a fanless design.

Features and Benefits

- Cisco IOS Software-based hardware: The hardware includes uniform Cisco command-line interface (CLI) and Simple Network Management Protocol Version 3 (SNMPv3) support for ease of gateway configuration and operation.
- Robust voice quality: Cisco experience in providing toll-quality packet-voice service helps ensure that the Cisco VG350, VG224, VG204XM, and VG202XM provide the clear, robust voice quality end users have come to expect from telephony services.
- Investment protection: You can continue to use your existing analog phones, fax machines, and modems while taking advantage of IP telephony. Basic analog phone connectivity is needed when the infrastructure (wiring) or application does not support or require IP phones. The Cisco VG350 and VG224 offer ideal platforms to support centralized analog phone-line deployments, and the Cisco VG204XM and VG202XM are ideal platforms to support sparsely concentrated, distributed analog phone deployments. Thus you can deploy IP telephony without having to purchase IP phones for all users and you can continue using existing devices. You can also use the Cisco VG350 and VG224 in a Cisco Unified Communications Manager Express environment and migrate to a Cisco Unified Communications Manager deployment with 100-percent investment protection.
- High availability: With these gateways you will experience less voice downtime due to WAN link failure. The Cisco VG350, VG224, VG204XM, and VG202XM have built-in Media Gateway Control Protocol (MGCP) failover to an H.323 connection to a Survivable Remote Site Telephony (SRST) router. This failover maintains voice service for analog endpoints if the WAN link fails or you lose connectivity to the Cisco Unified Communications Manager, Cisco Business Edition or Cisco Hosted Collabortion Solution.

  The Cisco VG350 is built on the Cisco Integrated Services Routers Generation 2 (ISR G2) platform powered by high-performance multicore processors. In this platform, you can achieve power redundancy by installing an optional integrated redundant power supply (RPS), which helps decrease network downtime and protects the network from power-supply failures. The Cisco VG224 offers high availability during power failure using an external 12-VDC UPS for battery backup.
- Reduced barrier to entry: These analog phone gateways provide a low-cost alternative for low-end analog phones and allow you to take advantage of IP telephony with a lower overall IP telephony investment.

Figure 5. Cisco Voice Gateway Integration with Cisco Unified Communications Manager

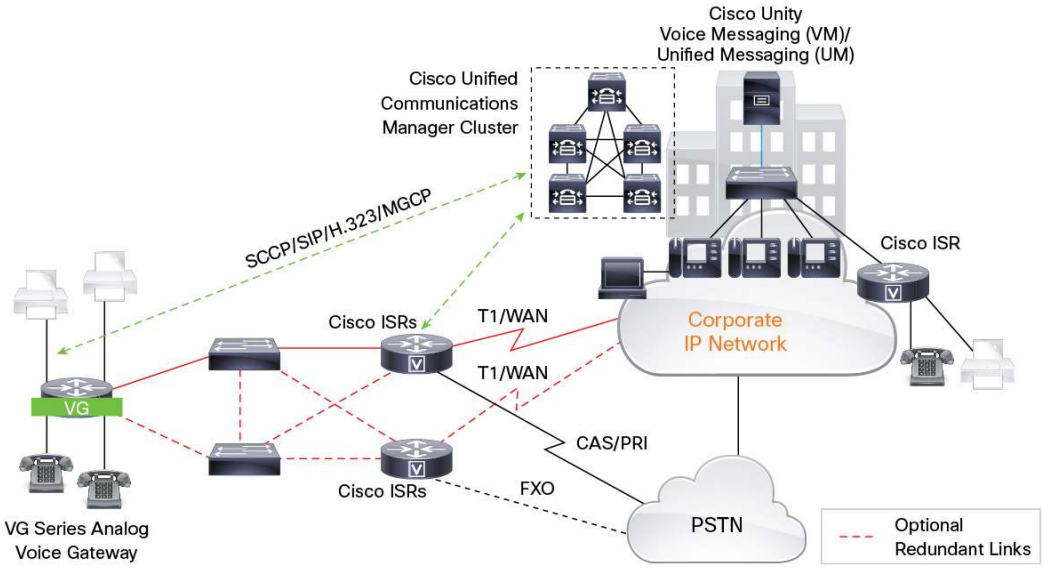
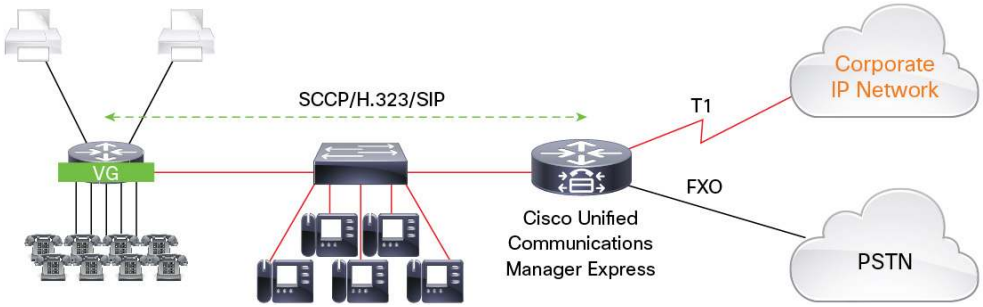


Figure 6. Cisco Voice Gateway Integration with Cisco Unified Communications Manager Express



Analog Phone Connectivity

The Cisco VG350, VG224, VG204XM, and VG202XM are ideal for analog phone deployments ranging from centralized to sparsely concentrated or distributed topologies. These analog voice gateways provide a high level of availability at locations with MGCP fallback, with ease of manageability using Cisco IOS Software monitoring features. They offer many supplementary analog calling features depending on the call control and signaling type used. Refer to Table 1 for the supplementary analog calling features available.

Table 1. Analog Supplementary Features Available on Analog Voice Gateways

Feature	Skinny Client Control Protocol (SCCP) Features with Cisco Unified Communications Manager	SCCP Features with Cisco Unified Communications Manager Express	Session Initiation Protocol (SIP) Features with Cisco Unified Communications Manager
Basic call	X	X	X
Call forward all	X	X	
Call forward busy	X	X	
Call forward cancel	X	X	
Call forward no answer	X	X	
Call hold or resume	X	X	X

Feature	Skinny Client Control Protocol (SCCP) Features with Cisco Unified Communications Manager	SCCP Features with Cisco Unified Communications Manager Express	Session Initiation Protocol (SIP) Features with Cisco Unified Communications Manager
Call pickup group	X	X	
Call pickup local	X	X	
Call transfer blind	X	X	
Call transfer consultative	X	X	X
Call waiting	X	X	X
Caller ID	X	X	X
Caller ID on call waiting	X	X	X
Malicious caller ID	X		
Conference call	Up to 3 parties	Up to 3 parties	Up to 3 parties
Ad hoc conference call	Up to 3 parties	Up to 3 parties	
Meet-Me conference call	X	X	
Directed call park		X	
Directed call pickup		X	
Directed call pickup of ringing extension		X	
Redial	X	X	
Speed dial	X	X	
Call toggle	X	X	X
Music on hold	X		
Shared-line support*	X		
Shared line privacy	X		
Precedence and preemption	X		
Call back on busy	X		
DC voltage Visual Message Waiting Indicator) VMWI	X (only for foreign exchange station [FXS] on VG224)		

*Simultaneous ringing, hold, and resume across analog and IP phone

The Cisco VG350, VG224, VG204XM, and VG202XM support feature access codes (FACs) in conjunction with Cisco Unified Communications Manager and Cisco Unified Communications Manager Express. Refer to documentation for these applications for details.

Fax and Modem Connectivity

The Cisco VG350, VG224, VG204XM, and VG202XM support fax machines and modems. When using fax machines, they support Cisco Fax Relay, T.38 fax relay, and fax pass-through. Cisco and T.38 fax relay technologies allow transfer of faxes across the network with high reliability using less bandwidth than a voice call. All modems can be connected to the Cisco VG350, VG224, VG204XM, and VG202XM and are transferred over the network using modem pass-through.

Protocols Supported

The voice gateways support the following protocols:

- SCCP
- H.323v4
- MGCP
- SIP
- Real-Time Transport Protocol (RTP)
- Secure Real-Time Transport Protocol (SRTP)
- Trivial File Transfer Protocol (TFTP)
- HTTP server
- Simple Network Management Protocol (SNMP)
- Telnet
- Dynamic Host Configuration Protocol (DHCP)
- Domain Name System (DNS)
- Cisco Unified Communications Manager or Cisco Unified Communications Manager Express redundancy support using Hot Standby Router Protocol (HSRP)
- Call survivability - MGCP failover to an H.323 connection to the SRST router
- Cisco Fax Relay, T.38 fax relay, and modem pass-through
- Coder/decoder (codec) support, G.711, and G.729a
- RADIUS and TACACS+ for Telnet and authorization

Technical Specifications

Table 2 lists technical specifications of the gateways.

Table 2. Technical Specifications

Category	Cisco VG350	Cisco VG224	Cisco VG204XM and VG202XM
System			
Processor	High-performance multicore processors	RISC processor	Power QUICC (power PC-based) processor
Memory (default)	1-GB synchronous dynamic RAM (SDRAM)	256-MB SDRAM	256-MB double data rate 2 (DDR2) RAM
Compact Flash	256 MB	128 MB, one slot Type II	128-MB NAND Flash
Ethernet	Up to three 10/100/1000 Ethernet WAN ports are supported Two of the 10/100/1000 Ethernet WAN ports can support Small Form-Factor Pluggable (SFP)-based connectivity instead of RJ-45 ports, enabling fiber connectivity	Two 10/100BASE-T Ethernet ports	Two 10/100BASE-T Ethernet ports
Console and auxiliary (maximum)	A new, innovative, mini-B USB console port supports management connectivity when traditional serial ports are not available Traditional console and auxiliary ports are also available	Up to 119.2 kbps per port	Up to 115.2 kbps per port

Category	Cisco VG350	Cisco VG224	Cisco VG204XM and VG202XM
Power			
AC input voltage	100- to 240-VAC autoranging	100 to 240 VAC	100 to 240 VAC
AC input current (maximum)	7.1 to 3.0 amps	1 amp	0.5 amp
DC input voltage	-	12V	12V
Frequency	47 to 63 Hz	50 to 60 Hz	50 to 60 Hz
Power dissipation	230 watts (maximum consumption) (power supply rated for 540W capacity)	60W	30W
Redundant power supply	Optional integrated RPS	External 12-VDC UPS	-
Physical			
Width	17.25 in. (438.15 mm)	17.5 in. (444.5 mm)	8.81 in. (223.8 mm)
Height	5.25 in. (133.35 mm)	1.75 in. (44.4 mm) (add 0.17 in. for optional rubber feet)	1.78 in. (45.2 mm) with rubber feet
Depth	18.75 in. (476.25 mm)	13.5 in. (342.9 mm)	8.13 in. (206.5 mm)
Weight (maximum)	48.08 lb	11 lb (4.106 kg)	2.98 lb (1.351 kg)
Mounting	3 rack units (3RU), 19 in.; EIA 23 in.	Rack- and wall-mountable	Desktop- and wall-mountable
Environment			
Operating temperature	32 to 104ºF (0 to 40ºC)	32 to 122ºF (0 to 50ºC)	32 to 104℉ (0 to 40℃)
Nonoperating temperature	-40 to 158ºF (-40 to 70ºC)	-40 to 185ºF (-40 to 85ºC)	-22 to 149℉ (-30 to 65℃)
Operating humidity	5 to 95%	5 to 95% noncondensing	10 to 85% noncondensing
Noise level (maximum)	Sound pressure: 57.6 dB typical, 77.6 dB maximum Sound power: 67.8 dB typical, 84.7 dB maximum	38-dbA @ 3 ft (0.914m)	No fan, 0 db
On- or off-premises	On-premises only, restricted access area, permanent ground required, to be installed and serviced only by trained professionals	On-premises only, restricted access area, permanent ground required, to be installed and serviced only by trained professionals	On-premises only, permanent ground required, to be installed and serviced only by trained professionals
Compatibility			
Cisco IOS Software Release	15.2(4)M or later	12.3(4)T or later	15.3(2)T or later
Cisco Unified Communications Manager version	8.6.2(SU2), 9.0.1, or later	3.3.3 SR2 or later	6.1.3, 7.0.1 or later
Cisco Unified Communications Manager Express version	7.1, 8.0, or later	4.3.2 or later	7.0.1 or later
Tip and Ring Interfaces for Each FXS Port (SLIC)			
Interface type	FXS (on-premises connection only) (RJ-21) (Optional high-speed WAN interface card [HWIC] FXS modules on motherboard have RJ-11 connectors.)	FXS (on-premises connection only)	FXS (on-premises connection only)
Address signaling formats	In-band dual tone multifrequency (DTMF) Out-of-band pulse (8-12 pulses per second [pps])	In-band DTMF Out-of-band pulse (8-12 pps)	In-band DTMF Out-of-band pulse (8-12 pps)
FXS signaling formats	Part numbers SM-D-72FXS and SM-D-48FXS-E support loop-start and ground-start signaling. HWIC slots on motherboard support FXS loop-start, ground-start, and DID signaling.	Loop-start and ground-start signaling	Loop-start and ground-start signaling

Category	Cisco VG350	Cisco VG224	Cisco VG204XM and VG202XM
FXS loop resistance	Up to 600 ohms (including phone or terminal equipment) for short-loop-length port Up to 1400 ohms (including phone and terminal equipment) for long-loop-length port	Up to 600 ohms (including the phone or terminal equipment)	Up to 600 ohms (including the phone or terminal equipment)
Direct inward dialing (DID) loop resistance	Up to 1800 ohms (including terminal equipment)	-	-
On-hook voltage	-44V	-43 V	-43 V
Off-hook loop current	25 mA (maximum) for short-loop-length port 35 mA (maximum) for long-loop-length port	25 mA (maximum)	25 mA (maximum)
Ring tone	Configurable for different country requirements	Configurable for different country requirements	Configurable for different country requirements
Ring voltage	54 Vrms into 5 ringer equivalence numbers (RENs) at zero-loop-length port (balanced) (short-loop-length port) 62 Vrms into 2 RENs at zero-loop-length port (balanced) (long-loop-length port)	50 Vrms into 5 RENs at zero-loop-length port (balanced) if no DC offset	54 Vrms into 5 RENs at zero-loop-length port (balanced) if no DC offset
Ring frequency	20, 25, 30, and 50 Hz	20, 25, 30, and 50 Hz	20, 25, 30, and 50 Hz
Ring waveform	Sine wave if no DC offset	Sine wave if no DC offset 20 and 24 VDC offset trapezoidal	Sine wave up to 35-VDC offset
Ring load	-	5REN with no DC offset 2REN with DC offset	5 RENs with no DC offset 2 RENs with DC offset
REN loading	5 REN per port (short-loop-length port) 2 RENs per port (long-loop-length port) (maximum 40 total RENs loads per each SM-D-72FXS module; maximum 30 total RENs loads per each SM-D-48FXS-E module)	5 RENs per port, 12 RENs per system (maximum)	5 RENs per port, 12 RENs per system (maximum)
RJ-11 FXS port terminating impedance option	600c, 600r, 900c, 900r, complex1, complex2, complex3, complex4, complex5, and complex6	600-ohm complex, 600-ohm real, 900-ohm complex, 900-ohm real, complex1, and complex2	600-ohm complex, 600-ohm real, 900-ohm complex, 900-ohm real, complex1, and complex2
Disconnect supervision	Power denial (calling party control and far-end disconnect)	Power denial (calling party control and far-end disconnect)	Power denial (calling party control and far-end disconnect)
Caller ID	On-hook transmission of frequency-shift-keying (FSK) data	On-hook transmission of FSK data	On-hook transmission of FSK data
FXS loop Length	Short-loop-length port 3000 ft, 26 AWG 5500 ft, and 24 AWG Long-loop-length port 11,000 ft, 26AWG 18,000 ft, and 24 AWG	3000 ft, 26 AWG	3000 ft, 26 AWG
Category cable	Category 3 and Category 5	Category 3 and Category 5	Category 3 and Category 5
Physical connector	RJ-21 and RJ-11	RJ-21	RJ-11
Number of connectors or ports	160 (144 using two SM-D-72FXS modules with RJ-21 connectors and 16 using FXS voice interface card (VIC) modules with RJ-11 connectors)	24 FXS ports	2 FXS ports on VG202XM 4 FXS ports on VG204XM
Mean time between failures (MTBF)	1,390,019 hours	195,671 hours	200,000 hours

Category	Cisco VG350	Cisco VG224	Cisco VG204XM and VG202XM
Certifications			
Safety	• UL 60950-1 • CAN/CSA C22.2 No. 60950-1 • EN 60950-1 • AS/NZS 60950-1 • IEC 60950-1	• UL 60950 3rd edition • IEC 60950 3rd edition • AS/NZS 3260: 1993 with Amendments 1, 2, 3, and 4 • TS001:1996 with Amendment 1	• UL 60950 • CAN/CSA C22.2 No. 60950 • IEC 60950 • EN 60950-1 • AS/NZS 60950
Immunity	• EN 55024, CISPR 24 • EN50082-1 • EN 61000	• EN55024 and EN50082-1 (including • EN 61000 4-2 electrostatic discharge • EN 61000 4-3 radiated susceptibility • EN 61000 4-4 electrical fast transients • EN 61000 4-5 power and signal line surges • EN 61000 4-6 injected RF swept immunity) post, telephone, and telegraph administration (PTT)	• EN300386 • EN55024/CISPR24 • EN50082-1 • EN61000-6-1
EMC	• 47 CFR, Part 15 • ICES-003 Class A • EN55022 Class A • CISPR22 Class A • AS/NZS 3548 Class A • VCCI V-3 • CNS 13438 • EN 300-386	• 47CFR15 Class A (FCC) • CISPR22 Class A • EN55022 Class A • AS/NZS 3548 Class A (ACA) • ICES003 Class A (Industry Canada) • V-3 Class A (VCCI) • CNS13438 Class A (BSMI)	• FCC Part 15 Class B • ICES-003 Class B • EN55022 Class B • CISPR22 Class B • VCCI Class B • EN 300386 Class B • EN61000-3-3 • EN61000-3-2
TELCOM	• TIA/EIA/IS-968 • CS-03 • ANSI T1.101 • ITU-T G.823, G.824 • IEEE 802.3 • RTTE Directive • Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: http://www.ciscofax.com.	• The Cisco VG224 platform complies with FCC Part 68, CS-03, European Directive 99/5/EC, and other standards. • Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: http://www.ciscofax.com.	• The Cisco VG202XM and VG204XM platforms comply with FCC Part 68, CS-03, European Directive 99/5/EC, and other standards. • Homologation requirements vary by country and interface type. For specific country information, refer to the online approvals data base at: http://www.ciscofax.com.

This equipment complies with all the regulatory requirements for connection to the communications networks of each country in which it is sold.

Ordering Information

To order this product, use the information provided in Table 3.

Table 3. Ordering Information

Product Number	Product Description
VG350-144FXS/K9	Cisco VG350 144 FXS Bundle
VG350-98FXSE/K9	Cisco VG350 96 FXS OPX-Lite Bundle
VG350-72F48E/K9	Cisco VG350 72 FXS & 48 FXS OPX-Lite Bundle
VG350/K9	Cisco VG350 High Density Voice over IP Analog Gateway (A la carte option)
VG224	Cisco VG224 Analog Phone Gateway
VG224-4PACK	4 Pack of VG224 Analog Phone Gateway

Product Number	Product Description
VG204XM	Cisco VG204XM Analog Phone Gateway
VG202XM	Cisco VG202XM Analog Phone Gateway

While this data sheet focuses on Cisco stand-alone analog gateways, the Cisco VG Series of Analog Gateways also provides high-density analog service modules (SM-D-72FXS, SM-D-48FXS-E) that are deployed on Cisco Integrated Services Routers (ISRs). More information can be found on these voice gateways at http://www.cisco.com/go/vg and information on the Cisco ISRs can be found at http://www.cisco.com/go/isr.

Services and Support

Using the Cisco Lifecycle Services approach, Cisco and our partners offer a broad portfolio of end-to-end services. These services are based on proven methodologies for deploying, operating, and optimizing IP communications solutions. Initial planning and design services, for example, can help you meet aggressive deployment schedules and minimize network disruption during implementation. Operate services reduce the risk of communications downtime with expert technical support. Optimize services enhance solution performance for operational excellence. Cisco and our partners offer a system-level service and support approach that can help you create and maintain a resilient, converged network that meets your business needs.

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