

**SCOPE OF WORK**  
**CONSTRUCT “UPGRADE PUBLIC ADDRESS SYSTEM”**  
**PROJECT #656-18-844**  
**ST CLOUD VA HEALTH CARE SYSTEM**  
**DATE: 8.2.2022**

**A. PART I – GENERAL**

**Base Project:** The Contractor shall furnish all labor, materials, tools and equipment required to completely prepare site for operations, including demolition and removal, and furnish labor and materials and perform work for Upgrade Public Address System as required by drawings, specifications, and the attached Amendment to this Scope Work.

The project involves a campus-wide overhead paging system replacement. The existing paging system head end will be networked with remote amplifiers. Existing remote amplifiers must be relocated to new locations. New remote amplifiers will be installed in additional locations. Existing dual-coil fire alarm speakers will be connected to the new system, and new public address speakers will be installed where indicated in the drawings. After testing and acceptance of the new system is complete, existing overhead paging speakers and system components will be demolished.

Work includes general construction not all inclusive to: demolition, low voltage systems, alterations, architectural, and electrical work. All work completed in accordance with the specifications and contract drawings.

**1. Deducts:**

- None

**2. Work includes, but is not limited to:**

- a. Demolition:
- b. Contractor shall remove from the VA site and dispose of all equipment and materials not scheduled to be reused.
- c. Contract working hours are 8 am to 4:30 pm Monday through Friday, excluding Federal Holidays.
- d. An amendment to the construction drawings is attached to this scope of work. Changes to the drawings are listed in this document.

**B. Period of Performance:**

Contract award*	D
Pre-construction conference	D+10
Notice to Proceed	D+20
Construction completion	D+290

The required substantial completion of this project is 270 calendar days after “Notice to Proceed” (NTP).

**C. Cost Range**

The anticipated cost range for this project is between \$500,000 and \$1,000,000.

**ATTACHMENT:**

- 1. Amendment to the Scope of Work- 60 pages

- E N D - - -

**Department of  
Veterans Affairs**

# Memorandum

**Date:** August 2, 2022

**From:** Contracting Officer's Representative (656/FM-78P)

**Subj:** Project No. 656-18-844, Upgrade Public Address System at the St Cloud VA Health Care System, St Cloud, MN – Amendment to Scope of Work

When the construction drawings included with this solicitation were prepared, the VA was operating an antiquated Dukane public address (PA) system. During design of this project, the Dukane system failed. Under an emergency contract, the VA replaced the existing head end and remote amplifiers. This work occurred after the construction drawings were finalized though. Because of this, the scope of work shall be modified as shown below.

The head end of the PA system has also been relocated from Building 108 to the main data center in Building 4, Room 185. The PA system head end is already connected to, and communicates with the remote amplifiers through the campus engineering fiber optic network.

The system riser diagram and product information for the current PA system is attached to this document.

### **Revisions to Scope of Work:**

1. The PA system head end (now a QSC Q-SYS 510i) shall not be replaced, and will be left in its current location in the main data center as opposed to placing it in Building 4 Room 41 Demark as shown in the construction drawings.
2. When the PA system head end was relocated from Building 108 to Building 4, the existing PA speaker circuits were extended to the new location. All of this cabling is to be demolished.
3. Instead of demolishing the existing remote amplifiers and associated network switches, they may be salvaged and reinstalled. 7 of the 8 remote amplifiers will need to be relocated from their current locations to the new planned locations. Existing cabling between the existing remote amplifiers and the associated network switches shall be demolished.
4. Prior to disconnecting any existing remote amplifier, an amplifier must be installed in the new planned location with all permanent speakers connected and

operational. This is to avoid an outage in PA system coverage during the relocation.

5. The existing remote amplifier in Building 118 is already in its planned location and may be left in place. Provide and install new AC quad receptacle, AC outlet strips, AC power line surge protector and filter, and uninterruptible power supply (UPS) per specification 27 11 00.
6. As the existing PA speaker circuits are disconnected/demolished, existing amplifiers in the PA system head end rack will become unused. The contractor may salvage and reinstall these unused amplifiers in planned remote locations provided there is no lapse in PA system coverage.
7. Existing enclosures for PA system network switches and amplifiers may be salvaged and reinstalled instead of demolished. These salvaged enclosures shall be installed in lieu of the specified enclosures where space constraints will not permit installation of a singular floor or wall mounted cabinet. Coordinate final locations with COR prior to installation.
8. Where salvaged enclosures are installed, the contractor is still responsible for providing and installing an AC quad receptacle, AC outlet strips, AC power line surge protector and filter, and UPS per specification 27 11 00.
9. Omit installation of all new public address administrative phones shown in the construction drawings.
10. Omit installation of all new public address system microphones as shown in the construction drawings.

### **Revisions to Construction Drawings:**

Individual changes to drawings are outlined below.

1. Drawing ED01-00 : Salvage and reinstall existing network switch in lieu of removal.
2. Drawing ED02-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
3. Drawing ED02-00 : Salvage and reinstall existing network switch in lieu of removal.
4. Drawing ED04-00 : Salvage and reinstall existing network switch in lieu of removal.
5. Drawing ED28-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
6. Drawing ED28-00 : Salvage and reinstall existing network switch in lieu of removal.
7. Drawing ED29-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
8. Drawing ED29-00 : Salvage and reinstall existing network switch in lieu of removal.
9. Drawing ED48-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.

10. Drawing ED48-00 : Salvage and reinstall existing network switch in lieu of removal.
11. Drawing ED49-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
12. Drawing ED49-00 : Salvage and reinstall existing network switch in lieu of removal.
13. Drawing ED50-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
14. Drawing ED50-00 : Salvage and reinstall existing network switch in lieu of removal.
15. Drawing ED51-00 : Salvage and reinstall existing PA amplifier and enclosure in lieu of removal.
16. Drawing ED51-00 : Salvage and reinstall existing network switch in lieu of removal.
17. Drawing ED108-01 : PA system head end in Building 108 has already been demolished. Existing PA speaker circuits have been extended from Building 108 to the new PA head end in the Building 4 data center. After the existing PA speaker circuits have been disconnected from the PA head end, the contractor shall demolish these extended circuits between Building 108 and Building 4.
18. ET01-01 : Omit installation of PA system administrative phones.
19. ET02-00 : Salvage and reinstall existing network switch in lieu of removal.
20. ET03-02 : Omit installation of PA system administrative phone.
21. ET04-00 : Omit installation of PA system microphone.
22. ET04-00 : PA system head end is located in the Building 4 main data center, not in Building 4 room 41 demark.
23. ET04-02 : Omit installation of PA system administrative phone.
24. ET28-00 : Omit installation of PA system administrative phone.
25. ET50-02 : Omit installation of PA system administrative phone.
26. ET118-00 : Leave existing PA system components in place. Provide and install new AC quad receptacle, AC outlet strips, AC power line surge protector and filter, and uninterruptible power supply (UPS) per specification 27 11 00.
27. ET.401 : Existing PA system head end is located in the main Building 4 data center and shall not be replaced.
28. ET.402 : Salvage and reinstall existing network switch in lieu of removal.
29. ET.409 : Leave Building 118 existing PA system components in place. Provide and install new AC quad receptacle, AC outlet strips, AC power line surge protector and filter, and uninterruptible power supply (UPS) per specification 27 11 00.
30. ET.501 : Existing PA head end is already connected to the Cisco Unified Call Manager. A new connection is not required.

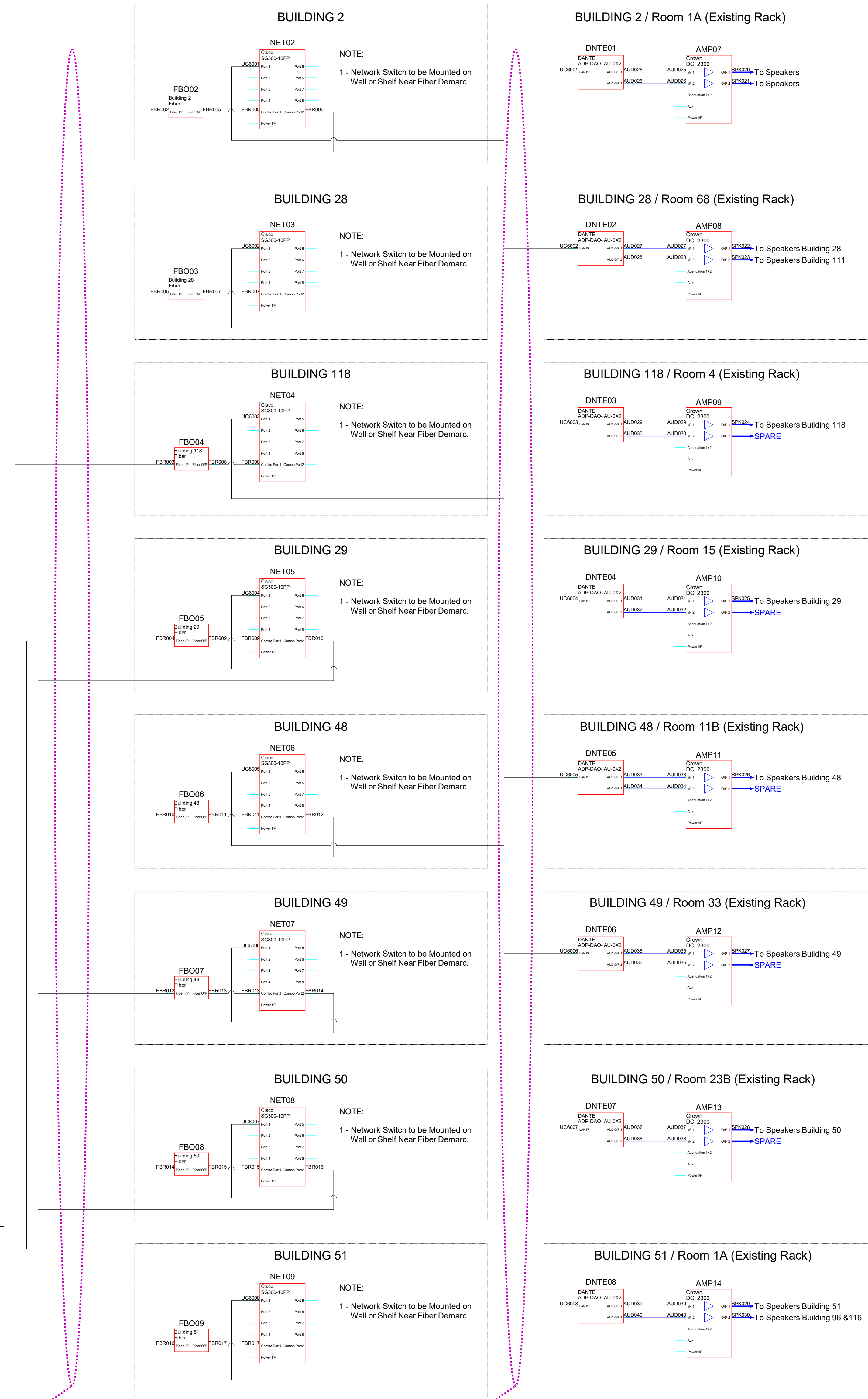
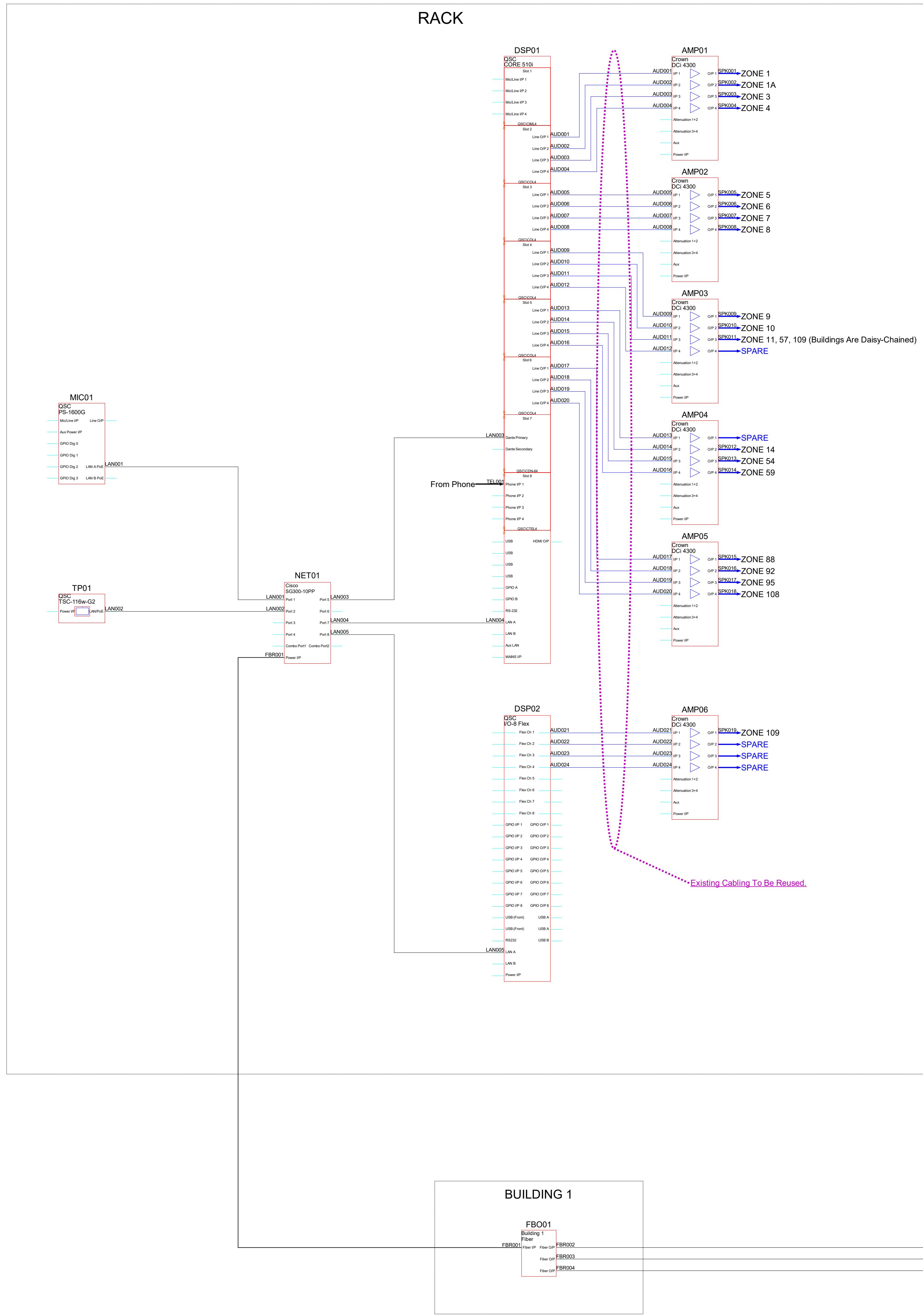
8-2-2022

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Bob Klein, Project COR

Date

Rev	Date	Notes
1	9/18/18	Original
2	9/18/18	Revision 1
3	11/5/18	Revision 2



MA / ERK-4428LRD	
1	MARCO
2	
3	BLANK
4	BLANK
5	BLANK
6	BLANK
7	FIBER I/O
8	BLANK
9	NET01
10	BLANK
11	BLANK
12	DSP02
13	
14	
15	
16	TP01
17	
18	
19	
20	
21	
22	
23	
24	
25	MA / FD-915R-PL
26	AMP01
27	BLANK
28	AMP02
29	BLANK
30	BLANK
31	AMP03
32	BLANK
33	BLANK
34	AMP04
35	BLANK
36	AMP05
37	BLANK
38	AMP06
39	BLANK
40	AMP04
41	BLANK
42	AMP04
43	BLANK
44	BLANK

2 ST CLOUD VA PAGING - RACK DIAGRAM  
AV1.1 NOT TO SCALE

- NOTE:**
- FBOxx are existing fiber termination boxes
  - With exception of NET01, all NETxx network switches are to be wall or shelf mounted at or near FBOxx or in fire closet.
  - Cat6 cable is to be placed in existing cable tray
  - Speaker cabling for buildings 11, 57 and 109 are daisy-chained into 1 homerun to the head end, so they will have to be on 12 zone. The following is a list of where each building's speaker cabling is landed:
    - B108 Head End: 1, 1A, 3, 4, 5, 6, 7, 8, 9, 10, 11/57/109, 14, 54, 57, 88, 92, 95, 108, 109
    - B2 Amp: 2
    - B28 Amp: 28, 111
    - B29 Amp: 29
    - B48 Amp: 48
    - B49 Amp: 49
    - B50 Amp: 50
    - B51 Amp: 51, 96, 116
    - B118 Amp: 118
  - Cable Distances:
    - PA System Head End (Building 108) to Building 1 Fire Alarm Room - 150'
    - PA System Head End (Building 108) to Building 4 Fire Alarm Room - 130'
    - Building 2 Amplifier to Building 2 Fire Alarm Room - 70'
    - Building 28 Amplifier to Building 28 Fire Alarm Room - 110'
    - Building 29 Amplifier to Building 29 Fire Alarm Room - 140'
    - Building 48 Amplifier to Building 48 Fire Alarm Room - 20'
    - Building 49 Amplifier to Building 49 Fire Alarm Room - 70'
    - Building 50 Amplifier to Building 50 Fire Alarm Room - 50'
    - Building 51 Amplifier to Building 51 Fire Alarm Room - 100'
    - Building 118 Amplifier to Building 118 Fire Alarm Room - 10'

Existing Fiber Infrastructure.  
NOTE:  
1) Schematic Subject to Change Once Clarification on Existing (Fire System) Fiber Infrastructure Routing/Loop is Received.

NOTE:  
1) Category 6 Cable - UTP (See NOTE 3).

1 ST CLOUD VA PAGING - BLOCK DIAGRAM  
AV1.1 NOT TO SCALE

Gateway  
Subnet  
IP Address  
PART

**Title :**  
ST CLOUD VA  
- PAGING  
**Address :**  
4801 Veterans Drive  
St. Cloud MN 56303

**Client :**  
Department of Veterans Affairs

Sheet Number  
**AV1.1**





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### St. Cloud VA Paging Submittals

Qty	Manufacturer Part #	Description
1	30237-8	ECO™ (Plenum) CAT6 Cable
1	N318-01M	Duplex Multimode 62.5/125 Fiber Patch Cable
1	ERK-4428LRD	Middle Atlantic - 44 Space Standalone Equipment Rack - 28" Depth - Solid Sides - Top/Bottom Vents - Without Rear Door - Black
1	LVFD-44	Middle Atlantic - Large Vented Front Door - for 44 Space Rack - Black
1	ERK-VRD-44	Middle Atlantic - 44 Space Vented Rear Door for ERK Series Rack - Top and Bottom Venting - Black
1	ERK-4FT-285CFM	Middle Atlantic - Integrated Fan Top with Guards for ERK Series Rack - Three Installed 4" Fans
1	PDT-2X820	Middle Atlantic - 16-Outlet Vertical Rack Power Strip - Two 20 Amp Circuits with 8 Outlets Each - Hardwired for Junction Box Termination
3	PD-915R-PL	Middle Atlantic - 9-Outlet Rackmount Power Distribution Unit - Single 15 Amp Circuit - Spike Protected - with Pilot Light
1	LACE-44-1SP	Middle Atlantic - 44 Space Lace Strips - 1" Width - with Tie Saddles - Pack of 6
1	LACE-44-OWP	Middle Atlantic - 44 Space Lace Strips - 77" H x 4.75" W - with Tie Posts - Pack of 6
1	LBP-1.5	Middle Atlantic - Lacing Bars with 1.5" Offset - 10 Pack
1	CORE 510I CTO	QSC - Q-SYS Series Integrated Core DSP - Eight I/O Card Slots - 256 x 256 Networked Audio Channels - Dual Redundant Media LAN Ports - One Auxiliary LAN Port - 16 Configurable GPIO - 64 AEC Processors - 2RU - CTO
1	SL-QUD-510-P	QSC - Q-SYS UCI Deployment Software License for Core 510 - Perpetual License
1	SL-QSE-510-P	QSC - Q-SYS Scripting Engine Software License for Core 510 - Perpetual License
1	I/O-8 FLEX	QSC - Q-SYS I/O Peripheral - Provides 8 individual, software-switchable Q-SYS Flex Channels (Mic/Line IP with +48v or Line Level OP). 8x8 GPIO, 1x RS232 and Audio-to-USB Bridging via USB Device Port. Single cable deployments using PoE+ with an Auxiliary D



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2	TSC-116W-G2-BK	QSC - Q-SYS 11.6" PoE Touch Screen Controller for In-Wall Mounting - Includes 1 LAN Port and Aux Power input - Black
1	PS-1600G	QSC - Q-SYS 16-Button Wall Mounted Page Station - Command Keypad - with Gooseneck Microphone
1	CIML4	QSC - Q-SYS I/O Card - Four channels of Microphone / Line-level Analog Audio Input with 48V Phantom Power
5	COL4	QSC - Q-SYS I/O Card - Four Channels of Balanced Line-level Analog Output
1	CDN64	QSC - Q-SYS I/O Card - Dante Bridge Card - 64 x 64
1	CTEL4	QSC - Q-SYS I/O Card - Analog Telephony Card (POTS) - Provides Four RJ-11 interfaces to connect Q-SYS Core to Analog Telephony Environments
1	SG350-10P-K9-NA	Cisco - SG350-10P 10-Port Gigabit PoE+ Managed Switch - 8 x 10/100/1000 (PoE+) + 2 x combo Gigabit SFP - Layer 3 Supported - Desktop Chassis - 62 Watt PoE Power Budget
1	MGBSX1	Cisco - SFP mini-GBIC Transceiver Module - Gigbit Ethernet to 1000Base-SX Fiber - LC Connector
24	ADP-DAO-AU-0X2	Audinate - Dante AVIO Two Channel Analog Output Adapter
9	SG350-10P-K9-NA	Cisco - SG350-10P 10-Port Gigabit PoE+ Managed Switch - 8 x 10/100/1000 (PoE+) + 2 x combo Gigabit SFP - Layer 3 Supported - Desktop Chassis - 62 Watt PoE Power Budget
18	MGBSX1	Cisco - SFP mini-GBIC Transceiver Module - Gigbit Ethernet to 1000Base-SX Fiber - LC Connector
24	DCI2300	Crown - DriveCore Install Series - Audio Amplifier - 2 Channel - 300 Watts - 70V - 2U





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## Duplex Multimode 62.5/125 Fiber Patch Cable (LC/ST), 1M (3-ft.)

MODEL NUMBER: N318-01M



### Highlights

- Premium 62.5/125 duplex (zipcord) fiber patch cable
- Ideal for LAN applications
- Glass fiber composition

### System Requirements

- Any fiber optic hardware or NIC card requiring multimode duplex cable with ST/LC connectors

### Package Includes

- 1 meter duplex MMF LC/ST 62.5/125 fiber cable

### Description

Tripp Lite's 1-meter multimode duplex fiber optic ST/LC patch cable is manufactured from 62.5/125 zipcord fiber. The cable has LC to ST connectors, a PVC jacket and is FDDI and OFNR rated. Duplex multimode fiber is most commonly used in LAN applications.

### Features

- Manufactured from 62.5/125 duplex (zipcord) fiber
- PVC jacket
- Length: 1-meter/Connectors: 2 ST/LC connectors on each end
- Insertion loss testing performed on every connector (0.2db typical) and provided with cable
- Beveled edge on ends of glass makes insertion of plug a breeze
- Fiber made from glass (not a polymer)
- Duplex multimode fiber is most commonly used in LAN applications where links are 10 feet or less
- Fiber optic distributed data interface (FDDI) rated
- OFNR (riser rated)

## Specifications

OVERVIEW	
Fiber Type	62.5/125 - OM1
Cable Type	Multimode
INPUT	
Cable Length (ft.)	3



**Tripp Lite**  
1111 W. 35th Street  
Chicago, IL 60609 USA  
Telephone: 773.869.1234  
www.tripplite.com

Cable Length (m)	1
<b>PHYSICAL</b>	
Color	Orange
<b>COMMUNICATIONS</b>	
Network Speed	1Gbps
<b>CONNECTIONS</b>	
Connector A	LC DUPLEX (MALE)
Connector B	ST DUPLEX (MALE)
Connector C	LC DUPLEX (MALE)
Connector D	ST DUPLEX (MALE)
Number of Connectors	4
<b>CERTIFICATIONS</b>	
Certifications	ROHS
<b>WARRANTY</b>	
Product Warranty Period (Worldwide)	Lifetime limited warranty

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## Product Highlights

- RoHS compliant
- Tested from 1 to 555 MHz
- UL Verified Category 6
- No internal pair separator
- Small outside diameter permits more cables per conduit than typical Category 6 cable
- Standard Reelex package made with 100% post consumer materials.

## Packaging

- 1,000 foot (305m) reels
- 1,000 foot (305m) Reelex (featuring reverse sequential numbering)
- 1,000 foot (305m) Reel-in-a-Box

## Applications

- Including:
  - 10G BASE-T 10 Gigabit Ethernet (limited distance)
  - 1000 BASE-T Gigabit Ethernet
  - 1000 Mbps ATM
  - 622 Mbps ATM
  - 100 BASE-T Ethernet
  - Broadband Video
  - POE
  - POE+



Standard Reelex box shown above.

## ECO™ (Plenum)

(cUL)us Listed Type CMP, CSA Type FT6)

HITACHI PART NO.	NO. OF PAIRS	CALCULATED CABLE O.D. in.	mm	CABLE WEIGHT lbs/1000ft	kg/305m
30237-8	4	.19	4.87	26.0	11.8

## ECO™ (Riser)

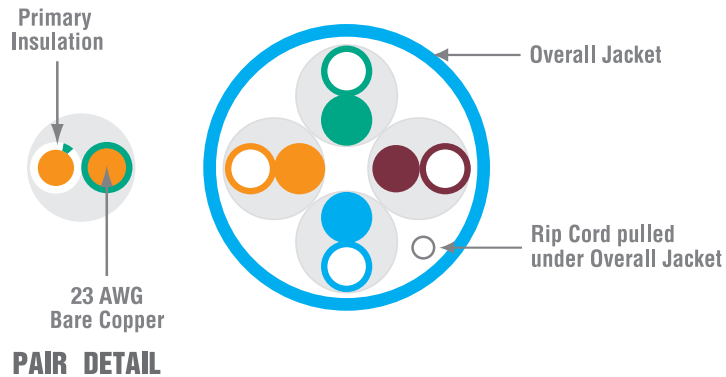
(cUL)us Listed Type CMR, CSA Type FT4)

HITACHI PART NO.	NO. OF PAIRS	CALCULATED CABLE O.D. in.	mm	CABLE WEIGHT lbs/1000ft	kg/305m
30238-8	4	.21	5.48	23.12	10.5

To build a complete HCM part number, visit page 100.

*Note: ECO Riser will be available August, 2011*

## Features



DIELECTRIC MATERIALS	RISER	PLENUM
Primary Insulation	Polyolefin High Performance	FEP
Overall Jacket	Flame-retardant thermoplastic	Low-smoke, flame-retardant thermoplastic
Star Filler	Flame-retardant thermoplastic	Plenum-rated polymer

HCM reserves the right to revise any specifications.

# Category 6 <sup>UTP</sup>

UTP Copper

## Electrical Characteristics

Input Impedance	100 ± 15Ω (1.0 to 100 MHz) 100 ± 15Ω (100 to 250 MHz)
Maximum resistance unbalance	5%
Maximum capacitance unbalance	330 pF/100 meters
Maximum delay skew	45 ns/100 meters
Nominal velocity of propagation (NVP)	riser, 68% plenum, 70%



## Transmission Specifications

TIA/EIA 568-C.2 Category 6 Verified

ISO/IEC 11801, 2nd ed. Class E Compliant

Freq. (MHz)	Ins Loss		NEXT		PSNEXT		ACR		PSACR		ACRF		PSACRF		Return Loss	
	Std.	Max	Std.	Min	Std.	Min	Std.	Min	Std.	Min	Std.	Min	Std.	Min	Std.	Min
1	2.0	2.0	74.3	74.3	72.3	72.3	72.3	72.3	70.3	70.3	67.8	67.8	64.8	64.8	20.0	20.0
4	3.8	3.8	65.3	65.3	63.3	63.3	61.5	61.5	59.5	59.5	55.8	55.8	52.8	52.8	23.0	23.0
8	5.3	5.3	60.8	60.8	58.8	58.8	55.5	55.5	53.5	53.5	49.7	49.7	46.7	46.7	24.5	24.5
10	6.0	6.0	59.3	59.3	57.3	57.3	53.3	53.3	51.3	51.3	47.8	47.8	44.8	44.8	25.0	25.0
16	7.6	7.6	56.2	56.2	54.2	54.2	48.6	48.6	46.6	46.6	43.7	43.7	40.7	40.7	25.0	25.0
31.25	10.7	10.7	51.9	51.9	49.9	49.9	41.2	41.2	39.2	39.2	37.9	37.9	34.9	34.9	23.6	23.6
62.5	15.4	15.4	47.4	47.4	45.4	45.4	32.0	32.0	30.0	30.0	31.9	31.9	28.9	28.9	21.5	21.5
100	19.8	19.8	44.3	44.3	42.3	42.3	24.5	24.5	22.5	22.5	27.8	27.8	24.8	24.8	20.1	20.1
200	29.0	29.0	39.8	39.8	37.8	37.8	10.8	10.8	8.8	8.8	21.8	21.8	18.8	18.8	18.0	18.0
250	32.8	32.8	38.3	38.3	36.3	36.3	5.5	5.5	3.5	3.5	19.8	19.8	16.8	16.8	17.3	17.3
300*	-	36.4	-	37.1	-	35.1	-	-	-	-	18.3	-	15.3	-	16.8	-
350*	-	39.8	-	36.1	-	34.1	-	-	-	-	16.9	-	13.9	-	16.3	-
400*	-	43.0	-	35.3	-	33.3	-	-	-	-	15.8	-	12.8	-	15.9	-
500*	-	48.9	-	33.8	-	31.8	-	-	-	-	13.8	-	10.8	-	15.2	-
555*	-	52.0	-	33.1	-	31.1	-	-	-	-	12.9	-	9.9	-	14.9	-

\*Frequencies beyond the TIA and ISO requirements are for information only. All values are dB/100m



## ERK SERIES RACK, 44 RU, 28"D, W/O REAR DOOR

ERK-4428LRD |

### FEATURES & BENEFITS

An economical standalone rack with solid sides, the ERK series can also be ganged to create partitioned multi-bay installations for thermal management control, future growth or other purposes. Seismic certified to protect your components.



- Fully welded construction for strength
- Enclosure sides include top and bottom venting
- Convenient lacing points and slotted rail brackets for cable management
- Standard front adjustable 10-32 threaded rackrail with numbered spaces

### SPECIFICATIONS

#### GENERAL INFO

UL Standards Tested: UL2416

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

ASCE: 7-10

RoHS: Yes

Greenguard: Yes

UL Listing No: E173107

#### DIMENSIONS

Usable Depth: 26.47

Usable Height: 77.125

Depth (US): 28

Height (US): 81.125

Width (US): 22



Rack Units: 44

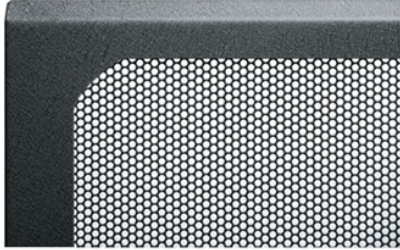
## TECHNICAL INFORMATION

Rackrail Type: 10-32  
Static Load Capacity: 10000  
UL Load Capacity: 2500  
Material: Steel  
Mounting: Horizontal  
Seismic Rating: Yes

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## VENTED FRONT DOOR, 44 RU RACKS, 64% OPEN

LVFD-44 |



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### FEATURES & BENEFITS

Offered in 64% open area perf configurations. Beveled corners provide a stylish modern appearance while hinging either left or right. Black textured powder coat finish. Includes keylock.



- Vented front door with 64% open area
- Can be installed to hinge right or left
- Black textured powder coat finish

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### SPECIFICATIONS

#### GENERAL INFO

Closure Method: Lock  
Finish: Black

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 1.385  
Height (US): 77.873  
Width (US): 20.037  
Rack Units: 44

#### TECHNICAL INFORMATION

Material: Steel

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## VENTED REAR DOOR, 44 RU ERK RACKS

ERK-VRD-44 |



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### FEATURES & BENEFITS



- Rear door with top and bottom venting
- Fits ERK Series enclosures only
- Black textured powder coat finish

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### SPECIFICATIONS

#### GENERAL INFO

Closure Method: Lock / Latch

Finish: Black

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes

Greenguard: Yes

#### DIMENSIONS

Depth (US): 1.2218

Height (US): 76.06

Width (US): 19.439

Rack Units: 44

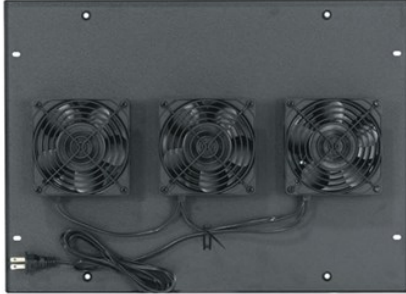
#### TECHNICAL INFORMATION

Material: Steel

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## FAN TOP, 285 CFM, ERK SERIES

ERK-4FT-285CFM |



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### FEATURES & BENEFITS

Save time with Integrated Fan Tops! Ships assembled. Integrated fan tops include 4-1/2" fans, fan guards.



- Pre-assembled fan top with three 4-1/2" fans
- Fits WMRK, ERK (35 space and higher), ERK-KD (all heights), SCRK racks
- Steel construction with black finish

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### SPECIFICATIONS

#### GENERAL INFO

Finish: Black  
Component Type: active

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes

#### DIMENSIONS

CFM: 285  
Depth (US): 1.5  
Height (US): 14.38  
Width (US): 19.75

#### TECHNICAL INFORMATION

Material: Steel

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## POWER STRIP, 16 OUTLET, 20A, HARDWIRED

PDT-2X820 |



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### FEATURES & BENEFITS



- Compact design takes up minimal space inside racks
- Unique design allows for isolated ground configurability
- Fast, easy mounting with reusable, space-saving clips
- Includes surge protection
- J-box termination

---

### SPECIFICATIONS

#### GENERAL INFO

Cable Type: Hard-wired  
Finish: Black Anodized  
UL Standards Tested: 5  
Termination: J-Box

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 2.1  
Height (US): 60  
Width (US): 2.58

#### TECHNICAL INFORMATION

Amps: 20  
Material: Aluminum

Mounting: Vertical  
Number Of Circuits: 2  
Number Of Outlets: 16



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## RACKMOUNT POWER, 9 OUTLET, 15A, BASIC SURGE

PD-915R-PL |



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### FEATURES & BENEFITS



- Rear distribution outlets with one front convenience outlet
- Includes surge and spike protection, as well as EMI filtering
- Occupies one rackspace
- 9 foot cord, with front status pilot light

---

### SPECIFICATIONS

#### GENERAL INFO

Cable Type: Corded  
Finish: Black Powder Coat  
UL Standards Tested: 1419, 60950-1 & 60065  
Termination: 5-15P  
Surge Protected: Basic

#### ASSEMBLY/INSTALLATION INFORMATION

Mounting Points: 2

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 9.33  
Height (US): 1.75  
Width (US): 19  
Rack Units: 1

## CORD INFORMATION

Cord Length US: 9

## TECHNICAL INFORMATION

Amps: 15

Material: Steel

Mounting: Horizontal

Volts: 120

Number Of Circuits: 1

Number Of Outlets: 9



## LACE STRIP, 44 RU, ACCEPTS TIE SADDLES, 6 PC.

LACE-44-1P |

### FEATURES & BENEFITS

Perforated steel lacer strips mount vertically to rackrail brackets and provide many locations for securing cable bundles.



- Steel construction
- Space-saving 1" width
- Tapped for installing tie saddles
- Accepts mounting of PD Slim and PDT Series power strips
- Easily trimmed to shorter length if desired
- Sold in packs of 6 pieces

### SPECIFICATIONS

#### GENERAL INFO

Finish: Black Powder Coat  
Quantity: 6  
Component Type: vertical inside

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 0.125  
Height (US): 77  
Width (US): 1  
Rack Units: 44

## TECHNICAL INFORMATION

Material: Steel



LACE STRIP, 44 RU, 4.75"W, W/TIE POSTS,  
6 PC.

LACE-44-OWP |

### FEATURES & BENEFITS

Perforated steel lacer strips mount vertically to rackrail brackets and provide many locations for securing cable bundles.



- Steel construction
- High capacity 4-3/4" width
- Equipped with mixed slip-on posts, cage nut holes, and round holes
- Accepts mounting of PD Slim and PDT Series power strips
- Sold in packs of 6 pieces

### SPECIFICATIONS

#### GENERAL INFO

Finish: Black Powder Coat  
Quantity: 6  
Component Type: vertical inside

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 0.125  
Height (US): 77  
Width (US): 4.75  
Rack Units: 44

#### TECHNICAL INFORMATION

Material: Steel



---

## LACE BAR, 1.5" OFFSET, ROUND, 10 PC.

LBP-1.5 |



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### FEATURES & BENEFITS

Use the LBP-1.5 & LBP-1R4 when lacing small bundles or individual cables off the rear of equipment, patch panels and other components to relieve cable stress from the connections. Choose the appropriate offset based on the distance from the rear of equipment to the rackrail. 1/4" diameter rod with flattened ends.



- Economical horizontal cable lacing and support
- Round rod style with angled 1.5" offset
- All lacer bars sold in packs of 10 pieces

---

### SPECIFICATIONS

#### GENERAL INFO

Finish: Black Powder Coat  
Quantity: 10  
Component Type: Horizontal  
Style: 1.5" offset round rod

#### ASSEMBLY/INSTALLATION INFORMATION

Mounting Points: 2

#### LISTING AGENCIES/THIRD PARTY CERTIFICATIONS

RoHS: Yes  
Greenguard: Yes

#### DIMENSIONS

Depth (US): 1.5  
Height (US): 0.4  
Width (US): 19

## TECHNICAL INFORMATION

Material: Steel



## Q-SYS Core 510i

### Features

- Q-SYS Core processing in a flexible chassis featuring 8 onboard I/O card slots
- Install any combination of Q-SYS I/O cards for maximum flexibility
- Audio, video and control processing on a dedicated Linux™ realtime OS
- Software configurable as either a Core 510i processor, or an I/O-510i expander
- Built using standard computer industry hardware and IT industry networking protocols
- Control and integrate external devices using TCP/IP, RS232 and GPIO
- Design with powerful and intuitive Q-SYS Designer Software application
- Seamlessly integrates with Q-SYS AV-to-USB bridging peripherals
- Provides simple integration with QSC amplifiers and loudspeakers
- Multiple levels of system redundancy

## Q-SYS Core 510i Integrated Core Processor and I/O Expander



### Introduction

The Q-SYS™ Core 510i processor is an audio, video and control processing system that leverages Intel™ CPUs and motherboards as well as a dedicated, Linux™ realtime operating system developed by QSC to provide class-leading capabilities for AV systems of any scale.

The Q-SYS Core 510i processor offers the most flexible audio I/O of any Core in the Q-SYS catalog, perfect for applications that require a diversity of analog, digital and networked audio connectivity. It features eight onboard I/O card slots that can be populated with any combination of Q-SYS Type-II I/O cards allowing diverse connectivity options. The Core 510i processor also offers two modes of operation whereby it can be deployed as a Q-SYS Core Processor with full processing capabilities, or configured as an I/O expander when configured via software as an I/O-510i.

### Applications – Q-SYS Core mode

When deployed as a Q-SYS Core, the Core 510i processor provides an abundance of raw processing power for all audio, video and control requirements including integration with the new Q-SYS AV-to-USB Bridging solution. Onboard acoustic echo cancellation (AEC) processing coupled with high channel capacity networked audio provide the ability to manage multiple small to mid-sized conference spaces or a single large space.

### Applications – I/O Frame mode

When configured via software as an I/O-510i, the device offers the ability to add up to 128 x 128 audio channels in to the Q-SYS system for processing on a separate Q-SYS Core. It can accommodate any combination of Q-SYS Type-II I/O cards.

This is particularly useful when integrating large numbers of networked audio channels from Dante™, CobraNet™ or AVB™ devices and subsystems in to the Q-SYS Platform.

### Network

The Q-SYS Platform utilizes IEEE networking standards and solutions for audio, control and video distribution over a standard Ethernet / IP network. Q-LAN provides deterministic system latencies with analog input to analog output guaranteed at 3.167ms. The Q-SYS Platform uses Q-LAN for audio, video and control connectivity with all Q-SYS peripherals. Additionally, the Q-SYS Core supports VoIP, SIP, LDAP, AES67, TCP/IP and HTTP Web Sockets among many other standard IT networking solutions.

### Scalable Redundancy

While QSC is dedicated to building the most reliable products, some applications call for additional assurance. Any element on the Q-SYS Platform – Cores, networks, I/O-Frames and even amplifiers may be deployed in a redundant configuration. The system designer has the choice of making one or all system elements redundant.

### Peripherals

The capabilities of the Q-SYS Platform are further enhanced by the ever growing suite of Q-SYS peripheral devices, all of which are compatible with all Q-SYS Core processors, including the Q-SYS Core 510i. The catalog of Q-SYS networked peripheral devices include amplifiers, touch screen controllers, paging stations, I/O channel expanders, PTZ-IP cameras for the conference room and AV-to-USB Bridging devices.

# Q-SYS Core 510i Integrated Processor

Description	System processor and control engine with integrated I/O (or I/O expander when configured via software as I/O-510i)
Configuration Modes	"Q-SYS Core" - centralized processor and control engine for a Q-SYS system "I/O-510i configuration suited to integrating high channel-count networked I/O cards (Dante, CobraNet, AVB)" - peripheral to an additional Q-SYS Core processor on the system
Supported Peripherals (when configured as a Q-SYS Core Processor.)	I/O-8 Flex Channel Expander, I/O-USB Bridge, PTZ-IP Camera series, I/O Frame, I/O-Frame 8s, I/O-22, I/O-11 Series, Page Station Series, TSC Series touch screens
Software Requirements	Q-SYS Designer 6.x.x

## Channel Capacity

Network Channel Capacity	256 x 256 (in Q-SYS Core mode) / 128 x 128 (in I/O Frame mode)
Local Audio I/O Capacity	8 audio I/O card slots - accommodates up to 128x128 total onboard I/O channels
AEC Channel Capacity	64 at 200ms tail length (available when configured as a Q-SYS Core Processor only)
Multitrack Player Capacity	16 tracks, expandable to 128 tracks (available when configured as a Q-SYS Core Processor only)
Media Drive Capacity	Approximately 6GB on the default drive (when configured as a Q-SYS Core Processor only, upgrade options are available)

## Configure to Order Inputs/Outputs Options

Audio I/O Cards	COL4: Line output card (4 channels) CODP4: DataPort card (4 channels) CIML4: Mic/line input card (4 channels) CIML4-HP: High Performance mic/Line input card (4 channels) CAES4: AES3 digital I/O card (4x4 channels) CIAES16: AES3 digital input card (16 channels) CCN32: CobraNet network bridge card (up to 32x32 channels) CAN32: AVB network bridge card (up to 32 channels) CDN64: Dante network bridge card (up to 64x64 channels)
Media Drives (in Q-SYS Core Mode)	M2-MD-S: 128GB M2-MD-M: 256GB M2-MD-L: 512GB
Multitrack Players (MTP): (in Q-SYS Core Mode)	MTP-32: 32 tracks MTP-64: 64 tracks MTP-128: 128 tracks

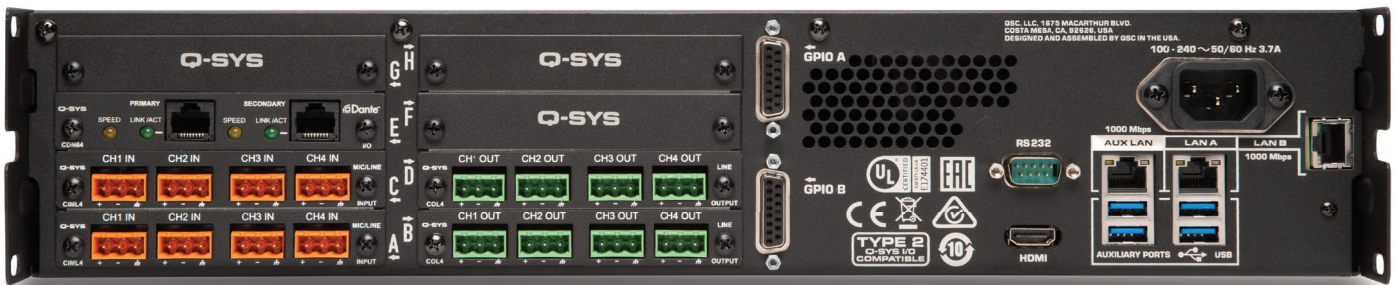
## Controls and Indicators

Front Panel Controls	"NEXT" OLED page forward capacitive touch button "ID" device identification capacitive touch button "Clear Network Settings" - invoked when "NEXT" and "ID" are pressed simultaneously
Front Panel Connectors	AUX USB: USB Host x2 (Type A connectors)
Front Panel Indicators	Blue "POWER" LED 304x96 monochrome OLED display
Rear Panel Connectors	RS232: Male 9-pin D shell connector (DE-9) Video out: HDMI AUX USB: USB Host x4 (Type A connectors) AUX Network: RJ45 10/100/1000 Mbps GPIO: Female 15-pin D shell connector x2 (DA-15) Media Network LAN A: RJ45 1000 Mbps (QLAN, AES67, VoIP, WAN, Media Streaming, etc) Media Network LAN B: RJ45 1000 Mbps (QLAN, AES67, VoIP, WAN, Media Streaming, etc) AC Mains Power: IEC connector
Rear Panel Indicators	"Link", "Speed" and "Activity" LEDs on all LAN ports

# Q-SYS Core 510i Integrated Processor

## Miscellaneous

Line Voltage	100 VAC - 240 VAC 50-60 Hz
Current Draw	3.7A Max @100 VAC (actual current draw depends on configuration options such as I/O cards and/or Media Drive, DSP loading and network loading)
Operating Temperature Range	0°C - 50°C
Storage Temperature	-20°C to +70°C
BTU/Hour	600 (power conversion estimate under typical load)
Humidity	5% to 85%
Regulatory	FCC 47 CFR Part 15 Class A, IC ICES-003, CE (EN55032, EN55035), EU RoHS directive 2011/65/EU, WEEE directive 2012/19/EU, China RoHS directive GB/T26572, EAC, RCM, UL, C-UL, EFUP 10, Expected Product Life Cycle 20 years
Product Dimensions	3.5" x 19" x 15" (89mm x 483mm x 381mm)
Shipping Carton Dimensions	23.5" x 20" x 6.5" (597mm x 508mm x 165mm)
Shipping Weight	23 lbs. minimum (installation of I/O cards increases shipping weight)
Included Accessories	6' UL/CSA/IEC line cord, safety instructions, regulatory statement, I/O connectors (included when purchasing I/O cards with Euro style terminal blocks)



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# Q-SYS Designer Software



Q-SYS Designer Software is the most powerful yet simple advanced DSP software on the market today. This software enables the user to create designs for the Q-SYS Integrated System Platform. The system design environment was created specifically to be intuitive and easy to use. It is laid out without clutter or complicated multi-level menus. As a result, the software allows system integrators to focus their energy on building the audio system, rather than laboring over a complex software learning curve.

- **One Software for all System Sizes:** Q-SYS Designer Software is a single application for use with every Q-SYS Core category for projects of any size.
- **Emulation Mode:** Build the majority of your system without hardware.
- **Third-party peripheral support:** Q-SYS allows for control of external devices through available LUA scripting.
- **User Control Interfaces:** Design custom buttons, import graphics, and build user controls for touchscreen controllers.

**Note:** Before upgrading, be sure to create backup copies of your Q-SYS design files for the current version and older versions. Also, make backup files for all media you have on the Core. To avoid overwriting your backup copies, be sure you do not open the backup copies with the newly installed version of Q-SYS Designer Software.

## Q-SYS UCI Editor

Even more drag-and-drop options for user control interface (UCI) creation, including new color picker, font options and layer options. New Button Style options, including custom graphic images for on/off/pressed states

## Q-SYS Scripting Engine

Q-SYS offers a full-featured AV control platform, powered by its robust software-based scripting engine, including **third party control plugins** and a **new visual coding tool** that allows for easy drag-and-drop control scripts composition within Q-SYS Designer Software.



**Q-SYS I/O-8 Flex  
Channel Expander**



**Q-SYS I/O-8 Flex  
Channel Expander**

**Features**

- Networked I/O expander peripheral
- 8 software definable flex channels (mic/line input w/ phantom power, or line level output)
- Audio-to-USB Bridging for audio integration with soft codec applications
- Control connectivity via GPIO and RS232
- Microphone fault detection
- Dual redundant networking with PoE+ support
- Class-leading mounting accessories included for various mounting configurations



**Introduction**

The Q-SYS™ I/O-8 Flex Channel Expander adds a multitude of expansion capabilities to the Q-SYS Platform in a compact, PoE+ capable networked peripheral that can be remotely located wherever the I/O is required. The I/O-8 Flex Channel Expander features 8 channels of “flex channels” (a QSC exclusive technology), which allows each channel to be configured via software as either a Mic/Line input with phantom power, or a Line Level output. Additionally, the I/O-8 Flex Channel Expander offers Audio-to-USB Bridging for integration with soft-codec applications running on any host PC as well as control connectivity via GPIO and RS232.

**Applications – Meeting Rooms and Conference Spaces**

When deployed under the table, the I/O-8 Flex Channel Expander provides a single network cable solution with sufficient analog I/O to accommodate up to eight phantom powered microphones around the table. In addition to that, the onboard GPIO can be used to provide Push-to-Talk or Push-to-Mute functionality as well as microphone LED status. For situations where laptop PC's are being used for soft-codec conferencing using applications such as Skype for Business™, GoToMeeting™, etc., the onboard USB Device port can be used to provide USB-to-Audio Bridging direct to the PC via driverless USB connectivity.

**Applications – Rack mount I/O Expander**

For those situations where unexpected inputs and outputs are required late in the design phase, the I/O-8 Flex Channel Expander is a perfect solution. The eight flex channels can be reconfigured via software at design or run-time to behave as either a fully balanced mic/line input

offering phantom power or as a line level output. Single channel granularity allows the user to configure any combination of inputs / outputs from 8 x 0 through to 0 x 8. Additionally, when used as mic/line Inputs, the eight flex channels offer microphone fault detection. The onboard RS232 port allows any serial control device to be interfaced with Q-SYS for complete control and monitoring integration.

**Network and Power**

The Q-SYS Platform utilizes IEEE networking standards and solutions for audio, control and video distribution over a standard Ethernet / IP network. Q-LAN provides deterministic system latencies with analog input to analog output guaranteed at 3.167ms. The Q-SYS Platform uses Q-LAN for audio, video and control connectivity with all Q-SYS peripherals. Additionally, all Q-SYS Cores support VoIP, SIP, LDAP, AES67, TCP/IP and HTTP Web Sockets among many other standard IT and industry protocols. The I/O-8 Flex Channel Expander offers PoE+ capability for single cable applications.

**Redundancy**

The Q-SYS I/O-8 Flex Channel Expander offers dual network ports for redundancy with the ability to send and receive on both ports simultaneously for glitch-free switchover in the event of a network failure.

**Peripherals**

The I/O-8 Flex Channel Expander is a Q-SYS peripheral that can be used as part of a Q-SYS system utilizing any Q-SYS Core processor and all other Q-SYS peripheral types including the new Q-SYS AV-to-USB Bridging Bridging devices. However, the USB device port on the I/O-8 Flex Channel Expander offers audio bridging.



# Q-SYS I/O-8 Flex Channel Expander

## Inputs/Outputs

Audio Flex Channel Capacity	8
Audio Flex Channel Assignments	Each channel can be configured as a mic/line input or as a line output (configured through Q-SYS Designer software)
Rear Panel Indicators	"Link", "Speed" and "Activity" LEDs on all LAN ports

## USB Inputs & Outputs

USB Audio Bridging	Up to 8x8 channels of digital audio in/out via software defineable USB instances advertised to the USB Host operating system
USB B (device port):	
Bit depth	16-bit, 24-bit (configured in Q-SYS Designer software)
USB Channel Capacity	8x8
Sample Rate	48kHz

## Controls and Indicators

Front Panel Controls	"NEXT" OLED page forward capacitive touch button "ID" device identification capacitive touch button "Clear Network Settings" - invoked when "NEXT" and "ID" are pressed simultaneously
Front Panel Connectors	AUX USB: USB Host x2 (Type A connectors)
Front Panel Indicators	Blue POWER LED 304x96 monochrome OLED display
Rear Panel Connectors	Audio I/O Flex Channels: 12-pos blue Euro Block x2 GPIO: 10-pos black Euro Block x2 (GPI = 1x10, GPO = 1x10) RS232: 3-pos black Euro Block AUX USB Host: USB Host x2 (Type A connectors) AUX USB Device: USB Device Port (Type B connector) Media Network LAN A/PoE+ Power In : RJ45 1000 Mbps Media Network LAN B: RJ45 1000 Mbps AUX PWR In: 2-pos green Euro block

## GPIO

General Purpose Inputs	0-24VDC analog input or contact closure
General Purpose Outputs	Open collector, 24VDC at 200mA max, internal pullup to 3.3V
GPIO 12VDC Power Pins	12VDC out at 100mA max

## Miscellaneous

PoE+ Power Input	IEEE 802.3at compliant powered device, PoE+ power supplied through LAN A port
External Power Input	24VDC, 1.2A supplied via the external power input, may be used as the primary power source or as a backup to the PoE+ source
Operating Temperature Range	0C - 50C
Power Consumption	25.5W Maximum
BTU/Hour	70 BTUs (power conversion estimate under typical load)
Humidity	5% to 85% RH
Storage temp	-20C - +85C
Regulatory	FCC 47 CFR Part 15 Class A, IC ICES-003, CE (EN55032, EN55035), EU RoHS directive 2011/65/EU, WEEE directive 2012/19/EU, China RoHS directive GB/T26572, EAC, RCM, UL/cUL/CB, E174401-A18, EFUP: 10 years, Expected Product Life Cycle: 20 years.
Product Dimensions	8.66" x 9.43" x 1.75" (220mm x 240mm x 44mm), 1RU half rack
Shipping Carton Dimensions	20" x 12" x 4" (508mm x 305mm x 102mm)
Shipping Weight	6 lbs.
Included Accessories	Connector kit, rack ears, surface mount kit, safety instructions, regulatory statements, USB cable (Type A to Type B)



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TSC-47w-G2  
TSC-55w-G2  
TSC-80w-G2  
TSC-116w-G2

Q-SYS Platform  
touch screen controller

**Features**

- Capacitive LCD touch surface:  
In-plane switching (IPS) technology
- High resolution displays
- Power over Ethernet: IEEE 802.3af compliance allows for simplified single cable installation
- Universal mounting options: Included accessories for mounting to US standard and European wall and junction boxes
- Complete design freedom: Create custom branded graphical interfaces using Q-SYS UCI Editor within Q-SYS Designer Software



Q-SYS TSC-G2 Series touch screen controllers combine capacitive touch technology with a bright, high resolution full color LCD for state-of-the-art control of a Q-SYS system. Control elements and layout for GUIs on this versatile touch screen controller are completely customizable to provide end users a full range of controls, from complete system control and monitoring, to one-touch deployments of pre-programmed presets.

Designers can create custom user control interfaces (UCI) within Q-SYS Designer Software using the UCI Editor. Drag and drop any control Q-SYS element from a Q-SYS design schematic into UCI Editor and easily deploy your design to the touch screen, without any programming experience.

UCI Editor allows the import of room diagrams, corporate logos or other graphical elements in most major graphic file formats including .png, .jpg, .svf, and .gif. In order to deploy UCI designs onto Q-SYS touch screens, a software license is required for each Q-SYS Core processor.

TSC-G2 Series touch screen controllers are offered in black and designed for easy surface mount installation in a wall, lectern or similar flat surface. Universal mounting accessories are included for standard US and European wall and junction boxes for vertical or horizontal installations.

Table top stand accessories are available for the TSC-80w-G2 and TSC-116w-G2 models.



(shown with optional table top stands available for TSC-80W-G2 and TSC-116W-G2)

# Q-SYS TSC-G2 Series



**TSC-47w-G2**



**TSC-55w-G2**



**TSC-80w-G2**



**TSC-116w-G2**

## Display

Description	Capacitive Touch Surface, In-Plane Switching (IPS) technology, 16M colors.			
Panel Dimensions	3.1" X 5.2" X 1.4" (80 mm X 132 mm X 35 mm)	5.85" X 3.44" X 1.33" (148.5 mm X 87.5 mm X 33.7 mm)	8.8" X 5.8" X 1.4" (223.5 mm X 148.4 mm X 36.3 mm)	12.3" X 7.9" X 1.6" (313.6 mm X 201.5 mm X 39.85 mm)
Viewable screen dimensions (diagonal)	4.7" (119 mm)	5.5" (127 mm)	8.0" (203 mm)	11.6" (295 mm)
Resolution	960x540	1280x720	1280x800	1920x1080
Brightness	400 Nits	400 Nits	400 Nits	350 Nits
Panel Orientation	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal	Vertical / Horizontal

## Power

Power over Ethernet	IEEE PoE 802.3af class 3 via LAN port			
Aux power PSU	+24VDC @ 0.5A (power supply not included)			
Aux power connection type	Locking terminal	Locking terminal	Barrel connection	Barrel connection

## Weight

Product weight (net)	5.10 oz (145 g)	6.31 oz (179 g)	17.64 oz (500 g)	32.1 oz (910 g)
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## Environment

Operating temperature	0°-50° C (32°-122° F)	0°-50° C (32°-122° F)	0°-50° C (32°-122° F)	0°-50° C (32°-122° F)
BTUs	15 typical	17 typical	23 typical	30 typical
Humidity	5-85rh non-condensing	5-85rh non-condensing	5-85rh non-condensing	5-85rh non-condensing

## Enclosure

Rear Panel	LAN, 1000Mbps full-duplex RJ-45	LAN, 1000Mbps full-duplex RJ-45	LAN, 1000Mbps full-duplex RJ-45	LAN, 1000Mbps full-duplex RJ-45
Wall Mount	Yes	Yes	Yes	Yes
Table Top	No	No	Optional table top stand accessory	Optional table top stand accessory

Specs subject to change without notice





## Q-SYS™

Integrated System Platform

**PS-1650G | PS-1600G |**

**PS-800G | PS-400G**

Networked Page Stations  
Gooseneck Models

### Features

- Capacitive touch, programmable keypad and 240 x 64 graphics LCD for flexible customization
- Fully compatible with all Q-Sys systems. Simply connect to a Q-Sys system (with version 2.0 software or later) and all paging functions are available without the need for additional hardware boxes
- Second microphone input and GPIO allow one Page Station to serve two locations
- Dual Ethernet connections support network redundancy
- May use Power over Ethernet (PoE) or local power supply
- Flexible, securely mounted gooseneck microphone (activated by keypad)
- Q-Sys technical support is available **24/7**  
24/7 – worldwide



The Q-Sys Page Stations are network devices for use in transportation, hospitality and other facilities that require live paging to selected zones. Like all Q-Sys system components, functionality of the Page Stations are defined and configured by the system designer using Q-Sys Designer. Once a Q-Sys design file has been created, it is then deployed to a Q-Sys Core Processor over the Q-LAN network. The Page Station works in conjunction with the “Public Address Router”, a suite of Q-Sys software to provide extensive and sophisticated paging functionality.

Q-Sys Page Stations provide two network interfaces (two gigabit Ethernet ports) for connection to the Q-Sys system. This allows the Page Stations to be connected to two switch ports or to be deployed on two separate networks to support a variety of redundant operation modes for mission critical applications.

In addition to audio and data deliveries via Q-LAN, the Page Stations are designed to receive power from the network via PoE (Power over Ethernet) or from an optional +24V DC power supply.

The Page Stations provide a front panel user interface that includes a 16, 8 or 4-button capacitive touch keypad depending on the model selected. The keypad offers visible feedback and audible cues, yet there are no buttons or membranes to wear out. Paging status, operational detail and alerts are also reported via illuminated status indicators and the station’s 240x64 monochrome graphics LCD.

Voice input is provided through a gooseneck dynamic paging microphone. The microphone is securely fastened to the unit, deterring theft or removal.

### Page Station Models

Model	Microphone Type	Assignable Buttons
PS-1650G	Gooseneck	16
PS-1600G	Gooseneck	4
PS-800G	Gooseneck	8
PS-400G	Gooseneck	4

The rear panel of the Page Station offers a variety of auxiliary audio I/O interfaces and GPIO for expanding the capability of the page station. The auxiliary audio inputs can accommodate accessories such as a secondary microphone or other audio source. This feature-set permits a single page station (with an optional second microphone) to serve, for example both the kiosk and the jet-way entrance of an airport boarding area. The page stations include an auxiliary output that can drive an amplifier or powered loudspeaker even if the page station loses connection to the Q-Sys Core. The GPIO interface can be configured to use external events to affect paging operation or to affect external control systems.

The Page Station is designed with a flexible mounting system. The rear of the page station fits into a standard triple-gang U.S. electrical outlet box or it may be mounted directly to a rough cut opening in a wall or podium when an electrical “back box” solution is not required. The electrical box provides system designers with the option of pre-wiring the Page Station cabling prior to mounting the product. Please visit the QSC website for a dimensioned template before beginning installation.

# PS-1650G | PS-1600G | PS-800G | PS-400G | Specifications

## Q-Sys Public Address Functionality

Q-Sys Designer (version 2.0 and higher) includes the Public Address Router, a suite of functions to support public address applications. Most of these functions may be deployed whether or not the Q-Sys system incorporates QSC Page Stations. Alternative interfaces such as touch screen controllers may also be used in conjunction with analog microphones. All of these functions are executed by the Q-Sys Core with no additional hardware "boxes" required.

Local backup paging (requires local amplification & loudspeaker) permits the station to function locally even if the core and network become unavailable.

Virtual Page Station supports the design of custom graphic or physical page station interfaces. It is used in conjunction with a microphone connected to an analog input and can support any number of preset page events or allow the user to create ad-hoc destination Zone Groups, etc.

The Design Administration Interface is provided to allow facility personnel to manage day to day changes to selected system settings without accessing the system design. Functions including security code changes, station / zone assignments and scheduling of pre-recorded messages may be made available to facility staff

A variety of Paging Logic functions are supported including:

- Source to zone routing
- Priority and interruption logic
- Queuing logic
- Page delay
- Preambles (such as chimes)
- Emergency paging priority and over-ride logic

Messaging capability includes the ability to record announcements and trigger playback of pre-recorded announcements. Multi-layer security is provided with pass-code access. A sophisticated Event Scheduler is provided that can be used to schedule pre-recorded announcements or to make changes to system parameters at pre-specified times.

## Preliminary Specifications

Audio Channel Capacity	2 line inputs, 1 line output
Front Panel Controls	Paging Keypad: Capacitive touch keypad
Front Panel Indicators	Talk, Ready, Busy: Bi-color LEDs (red/green) Keypad button activity: Green LEDs LCD: 240 x 64 monochrome graphics display
Rear Panel Connectors	Q-Sys Network LAN A: RJ45 1000 Mbps only Q-Sys Network LAN B: RJ45 1000 Mbps only DC power +24V inlet: 2-pin Euro receptacle Line input: 3-pin Euro receptacle Line output: 3-pin Euro receptacle GPIO: 6-pin Euro receptacle
Line Voltage Requirements	IEEE 802.3af power over Ethernet (PoE) or +24V DC
Dimensions (HWD)	10.37" (26.4 cm) x 8.3" (21.1 cm) x 1.5" (3.8 cm)
Accessories Included	Hardware user manual, software CD, connector ship kit, warranty card.

### Line Input

Dynamic Range	
Unweighted	> 115 dB
A-weighted	> 118 dB
Distortion (20 Hz - 20 kHz, all sensitivities)	
+4 dBu (max)	< 0.009% THD+N
2 dB below clip	< 0.009% THD+N
Crosstalk (20 Hz - 20 kHz)	
Inter-channel (max)	> 75 dB
Inter-channel (typical)	> 90 dB
Intra-channel (max)	> 85 dB
Intra-channel (typical)	> 100 dB
Frequency Response	
20 Hz - 20 kHz (max)	± 0.5 dB
20 Hz - 20 kHz (typical)	± 0.2 dB
Input Impedance	
Balanced (nominal)	10k ohms
Unbalanced (nominal)	10k ohms
Common Mode Rejection	
20 Hz - 20 kHz (max)	> 54 dB
20 Hz - 20 kHz (typical)	> 60 dB
Input Sensitivities	Vrms: 1.5, 3, 9, 18 dBu: 5.7, 11.8, 21.3, 27.3 dBv: 3.5, 9.5, 19.1, 25.1

### Line Output

Dynamic Range	
Unweighted	> 112 dB
A-weighted	> 115 dB
Crosstalk (20 Hz - 20 kHz)	
Inter-channel (max)	> 75 dB
Inter-channel (typical)	> 90 dB
Intra-channel (max)	> 85 dB
Intra-channel (typical)	> 100 dB
Mute	Infinite attenuation



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I/O Cards	Mic/Line Input Card CIML4	High-Performance Mic/Line Input Card CIML4-HP	Line Output Card COL4	DataPort Output Card CODP4
Description	Four channels of microphone/line-level analog audio input with 48V phantom power	Four channels of microphone / line-level analog audio input with 48V phantom power and high performance pre-amplifiers and A/D converters	Four channels of balanced, line-level analog output	Four audio output channels (2 DataPorts) for connection to DataPort equipped QSC amplifiers
Performance				
Dynamic Range Unweighted	> 105 dB	> 112 dB	> 112 dB	> 114 dB
Dynamic Range A-weighted	> 108 dB	> 115 dB	> 115 dB	> 117 dB
Distortion 20 Hz – 20 kHz +4 dBu (nominal input)	< 0.009% THD+N	< 0.004% THD+N	–	–
Distortion 20 Hz – 20 kHz 2 dB below clip (max)	< 0.08% THD+N	< 0.06% THD+N	< 0.004% THD+N	< 0.004% THD+N
Crosstalk 20 Hz – 20 kHz				
Inter-channel (max)	> 100 dB	> 110 dB	> 100 dB	> 95 dB
Inter-channel (typ)	> 110 dB	> 110 dB	> 110 dB	> 100 dB
Intra-channel (max)	> 100 dB	> 110 dB	> 100 dB	> 100 dB
Intra-channel (typ)	> 110 dB	> 110 dB	> 110 dB	> 110 dB
Frequency Response 20 Hz – 20 kHz (max)	± 0.5 dB	± 0.5 dB	± 0.5 dB	± 0.5 dB
Frequency Response 20 Hz – 20 kHz (typ)	± 0.2 dB	± 0.2 dB	± 0.2 dB	± 0.2 dB
Input Impedance				
Balanced (nominal)	10 k ohms	10 k ohms	–	–
Unbalanced (nominal)	10 k ohms	10 k ohms	–	–
Common Mode Rejection 20 Hz – 20 kHz (max)	> 45 dB	> 45 dB	–	–
Common Mode Rejection 20 Hz – 20 kHz (typ)	> 50 dB	> 50 dB	–	–
Max Input Level	0.125, 2.25, 8.70, 17.35 Vrms -16, 10, 21, 27 dBu -18.2, 7.04, 18.8, 24.78 dBv (4 selections)	1.23 to 17.35 Vrms -56 to 27 dBu -58.2 to 24.8 dBv (continuously variable)	–	–
Mute	Infinite attenuation (via digital mute)	Infinite attenuation (via digital mute)	Infinite attenuation (via electro-mechanical relays)	Infinite attenuation (via electro-mechanical relays)
Audio Converters				
Analog to Digital Conversion (ADCs)	24-bit delta-sigma at 48 or 96 kHz sample rate	24-bit delta-sigma at 48 or 96 kHz sample rate	–	–
Digital to Analog Conversion (DACs)	–	–	24-bit delta-sigma at 48 or 96 kHz sample rate	24-bit delta-sigma at 48 or 96 kHz sample rate
Group Delay	< 13 FS (≈ 271 μs) at 48 kHz	< 13 FS (≈ 271 μs) at 48 kHz	< 10 FS (≈ 196 μs) at 48 kHz	< 13 FS (≈ 271 μs) at 48 kHz
Connectors	Four 3-terminal Euro-style detachable terminal blocks	Four 3-terminal Euro-style detachable terminal blocks	Four 3-terminal Euro-style detachable terminal blocks	Two 15-pin HD15 connectors
User-configurable Options (software enabled)				
Phantom Power	+48 V phantom power (meets IEC 1938 [1996] spec)	+48 V phantom power (meets IEC 1938 [1996] spec)	–	–
Output Trim				
Vrms (max)	–	–	8.7 V	–
dBu (max)	–	–	21 dBu	–
dBv (max)	–	–	18.8 dBv	–
Amplifier Standby	–	–	–	Set or clear amplifier in standby mode
Mute	–	–	–	Set or clear individual channel mutes
Enable Meters	–	–	–	Enable data collection of meters for each channel
Audio Output Levels	–	–	–	Adjust individual audio channel levels
Amplifier Model Support	–	–	–	CX, PowerLight™ 3 Series, DCA, and legacy V1 models

I/O Cards	AES-3 Input/Output Card CAES4	CobraNet Bridge Card CCN32
Description	Four input and four output channels of AES-3 digital audio	Up to 32 input and 32 output channels of CobraNet digital audio
Frequency Response	± 0.2 dB	± 0.2 dB
Mute	Infinite attenuation (via digital mute)	Infinite attenuation (via digital mute)
Group Delay	37 Samples (0.760 ms actual) with Sample Rate Converter enabled	Selectable: 64 Samples (2.687 ms actual) 128 Samples (4.020 ms actual) 256 Samples (6.686 ms actual)
I/O Capacity	4x4	Selectable: 4x4 8x8 16x16 32x32 (in Core only)
Bundle Packing	—	0 to 8 channels
Network Transmitters	—	4
Network Receivers	—	4
Management	—	CobraNet management via SNMP
Connectors	Four 3-terminal Euro-style detachable terminal blocks	Dual RJ-45



Mic/Line Analog Input Card



High-Performance Mic/Line Analog Input Card



Analog Line Output Card



DataPort Output Card



AES-3 Digital Input/Output Card



CobraNet™ Digital Input/Output Card



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I/O Card Spec Sheet 12/21/12



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Integrated System Platform

**CDN64 Dante Bridge Card**

**Features**

Features

- Up to 64x64 Dante network audio channels
- Sample rate conversion to and from other network audio transports such as CobraNet, AVB and Q-Lan
- Integrate Dante-enabled 'front-of-house' input or output sources with the 'back-of-house' or 'facility-wide' Q-Sys integrated platform



Q-Sys™ is a complete integrated system that encompasses everything from the audio input to the output of the loudspeakers; it provides all the routing, processing, control and monitoring, while maintaining the audio quality and reliability QSC has come to be known for.

The CDN64 Dante™ bridge card provides third-party Dante enabled digital audio products and Dante edge networks the ability to connect and interface with Q-Sys™.

**Applications:**

The CDN64 Dante Bridge Card is ideal for use in Performance venues such as theatres, auditoriums, convention centers and houses of worship, as well as a general solution to bridge Dante-enabled sources such as wireless microphones and digital mixers, directly into the Q-Sys eco-system for advanced processing and re-distribution over Q-Lan for larger LAN and WAN IT infrastructures.

**Specifications**

System Hardware	Q-Sys Dante Bridge Card
Description	Dante network audio input and output bridge card
Capacity and Sample Rate Support: *Sample rate conversion to Q-Sys system standard 48 kHz	64x64 channels at 44.1/48 kHz 32x32 channels at 88.2/96 kHz * 16x16 channels at 176.4/192 kHz *
Connectors	Dual RJ45

*As part of QSC's ongoing commitment to product development, specifications are subject to change without notice.*



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# Cisco 350 Series Managed Switches

## Easy-to-Use Managed Switches That Provide the Ideal Combination of Features and Affordability

To stay ahead in a competitive marketplace, businesses need to make every dollar count. That means getting the most value from your technology investments, but it also means making sure that employees have fast, reliable access to the business tools and information they need. Every minute an employee waits for an unresponsive application and every minute your network is down has an effect on your profits. The importance of maintaining a strong and dependable business network only grows as your business adds more employees, applications, and network complexity.

When your business needs advanced security and features but value is still a top consideration, you're ready for the new generation of Cisco® Small Business managed switches: the Cisco 350 Series (Figure 1).

**Figure 1.** Cisco 350 Series Managed Switches



### Cisco 350 Series Switches

The Cisco 350 Series, part of the Cisco Small Business line of network solutions, is a portfolio of affordable managed switches that provides a reliable foundation for your business network. These switches deliver the features you need to improve the availability of your critical business applications, protect your sensitive information, and optimize your network bandwidth to deliver information and applications more effectively. Easy to set up and use, the Cisco 350 Series provides the ideal combination of affordability and capabilities for small businesses and helps you create a more efficient, better-connected workforce.

The Cisco 350 Series is a broad portfolio of fixed-configuration managed Ethernet switches. Models are available with 8 to 48 ports of Fast Ethernet and 10 to 52 ports of Gigabit Ethernet connectivity, providing optimal flexibility to create exactly the right network foundation for your business. However, unlike other small business switching solutions that provide managed network capabilities only in the costliest models, all Cisco 350 Series Switches support the advanced security management capabilities and network features you need to support business-class data, voice, security, and wireless technologies. At the same time, these switches are simple to deploy and configure, allowing you to take advantage of the managed network services your business needs.



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## Business Applications

Whether you need a basic high-performance network to connect employee computers or a solution to deliver data, voice, and video services, the Cisco 350 Series offers a solution to meet your needs. Possible deployment scenarios include:

- **Secure desktop connectivity:** Cisco 350 Series Switches can simply and securely connect employees working in small offices with each other and with all of the servers, printers, and other devices they use. High performance and reliable connectivity help speed file transfers and data processing, improve network uptime, and keep your employees connected and productive.
- **Secure wireless connectivity:** With its advanced security features, Power over Ethernet, Auto Smartports, QoS, VLAN, and access control features, the Cisco 350 Series Switches are the perfect foundation to add business-grade wireless to a business network.
- **Unified communications:** As a managed network solution, the Cisco 350 Series provides the performance and advanced traffic-handling intelligence you need to deliver all communications and data over a single network. Cisco offers a complete portfolio of IP telephony and other unified communications products designed for businesses. Cisco 350 Series Switches have been rigorously tested to help ensure easy integration and full compatibility with these and other products, providing a complete business solution.
- **Highly secure guest connectivity.** Cisco 350 Series Switches let you extend highly secure network connectivity to guests in a variety of settings, such as a hotel, an office waiting room, or any other area open to nonemployee users. Using powerful but easy-to-configure security and traffic segmentation capabilities, you can isolate your vital business traffic from guest services and keep guests' network sessions private from each other.

## Features and Benefits

Cisco 350 Series switches provide the advanced feature set that growing businesses require and that high-bandwidth applications and technologies demand. These switches can improve the availability of your critical applications, protect your business information, and optimize your network bandwidth to more effectively deliver information and support applications. The switches provide the following benefits.

### Ease of Management and Deployment

Cisco 350 Series switches are designed to be easy to use and manage by commercial customers or the partners that serve them. They feature:

- Cisco Smart Network Application (SNA) is an innovative network-level monitoring and management tool embedded in Cisco 100 to 500 Series switches. It can discover network topology, display link status, monitor events, apply configurations, and upgrade software images across multiple switches in the network.
- The FindIT Network Manager and Probe are designed to manage Cisco 100 to 500 Series switches, routers, and wireless access points. The Manager lets you proactively manage the network instead of just reacting to events. FindIT Network Management is the perfect addition to your business network. For more information, visit <https://www.cisco.com/go/findit>.
- The Cisco FindIT Network Discovery Utility works through a simple toolbar on your web browser to discover Cisco devices on the network and display basic device information, inventory, and new firmware updates to aid in the configuration and speed the deployment of Cisco Small Business products. For more information, visit <https://www.cisco.com/go/findit>.

- The USB port on the front panel of the switch enables easy image and configuration transfer for faster deployment or upgrade.
- Simple-to-use graphical interfaces reduce the time required to deploy, troubleshoot, and manage the network and allow you to support sophisticated capabilities without increasing IT head count.
- The switches also support Textview, a full Command-Line Interface (CLI) option for partners that prefer it.
- Using Auto Smartports intelligence, the switch can detect a network device connected to any port and automatically configure the optimal security, Quality of Service (QoS), and availability on that port.
- Cisco Discovery Protocol discovers Cisco devices and allows devices to share critical configuration information, simplifying network setup and integration.
- Support for Simple Network Management Protocol (SNMP) allows you to set up and manage your switches and other Cisco devices remotely from a network management station, improving IT workflow and mass configurations.

### **High Reliability and Resiliency**

In a growing business where availability 24 hours a day, 7 days a week is critical, you need to assure that employees can always access the data and resources they need. The Cisco 350 Series supports dual images, allowing you to perform software upgrades without having to take the network offline or worry about the network going down during the upgrade.

### **Strong Security**

Cisco 350 Series switches provide the advanced security features you need to protect your business data and keep unauthorized users off the network:

- Embedded Secure Sockets Layer (SSL) encryption protects management data traveling to and from the switch.
- Extensive Access Control Lists (ACLs) restrict sensitive portions of the network to keep out unauthorized users and guard against network attacks.
- Guest VLANs let you provide Internet connectivity to nonemployee users while isolating critical business services from guest traffic.
- Support for advanced network security applications such as IEEE 802.1X port security tightly limits access to specific segments of your network. Web-based authentication provides a consistent interface to authenticate all types of host devices and operating systems, without the complexity of deploying IEEE 802.1X clients on each endpoint.
- Advanced defense mechanisms, including dynamic Address Resolution Protocol (ARP) inspection, IP Source Guard, and Dynamic Host Configuration Protocol (DHCP) snooping, detect and block deliberate network attacks. Combinations of these protocols are also referred to as IP-MAC port binding (IPMB).
- IPv6 First Hop Security extends the advanced threat protection to IPv6. This comprehensive security suite includes ND inspection, RA guard, DHCPv6 guard, and neighbor binding integrity check, providing unparalleled protection against a vast range of address spoofing and man-in-the-middle attacks on IPv6 networks.
- Time-based ACLs and port operation restrict access to the network during predesignated times such as business hours.
- Uniform MAC address-based security can be applied automatically to mobile users as they roam between wireless access points.

- Secure Core Technology (SCT) helps ensure that the switch is able to process management traffic in the face of a Denial-of-Service (DoS) attack.
- Private VLAN Edge (PVE) provides Layer 2 isolation between devices on the same VLAN.
- Storm control can be applied to broadcast, multicast, and unknown unicast traffic.
- Protection of management sessions occurs using RADIUS, TACACS+, and local database authentication as well as secure management sessions over SSL, SSH, and SNMPv3.
- DoS attack prevention maximizes network uptime in the presence of an attack.

### **Power over Ethernet**

Cisco 350 Series Switches are available with up to 48 PoE ports. This capability simplifies advanced technology deployments such as IP telephony, wireless, and IP surveillance by allowing you to connect and power network endpoints over a single Ethernet cable. With no need to install separate power supplies for IP phones or wireless access points, you can take advantage of advanced communications technologies more quickly and at a lower cost. Models support 802.3af PoE, 802.3at PoE+, and 60 Watt PoE.

### **Multigigabit Performance**

Network needs are changing quickly. Thanks to evolving wireless standards and the rising number of wireless devices, keeping up with data rates and growing traffic can be a challenge. Your traditional Ethernet infrastructure can support speeds up to 1 Gigabit per second (Gbps), but competing today requires much more capacity. One option is completely replacing your older cabling infrastructure and upgrading your hardware. But wouldn't it be better to increase network speed and traffic capacity in a way that's quick, inexpensive, and efficient?

Cisco's new Multigigabit Ethernet switches offer just that: an easy-to-deploy, budget-friendly solution that allows you to increase network speed and bandwidth using your existing cables. By partnering with other industry leaders to form the NBASE-T Alliance, Cisco uses NBASE-T technology to help you get more out of your existing infrastructure. Save time and money by avoiding upgrades and extending the life of your installed cable plants. And discover the benefits of meeting consumer demand for increased bandwidth and speeds without a large initial investment.

Multigigabit Ethernet technology uses capabilities in your existing cabling infrastructure to meet bandwidth requirements and provide up to five times the performance. The technology enables intermediate data rates of 2.5 and 5 Gbps to ease the jump between traditional rates of 1 Gbps and 10 Gbps. These intermediate rates run on most installed cables and preserve older UTP wiring, which is good for 802.11ac wireless LAN applications.

The technology also supports Power over Ethernet (PoE) forms, including PoE+ and 60W PoE. Cisco Multigigabit Ethernet switches help you avoid having to run multiple cables between switches and access points and let your networks welcome next-generation traffic speeds and data rates.

### **Networkwide Automatic Voice Deployment**

Using a combination of Cisco Discovery Protocol, LLDP-MED, Auto Smartports, and Voice Services Discovery Protocol (or VSDP, a unique Cisco protocol), customers can deploy an end-to-end voice network dynamically. The switches in the network automatically converge around a single voice VLAN and QoS parameters and then propagate them out to the phones on the ports, where they are discovered. For example, automated voice VLAN capabilities let you plug any IP phone (including third-party phones) into your IP telephony network and receive an immediate dial tone. The switch automatically configures the device with the right VLAN and QoS parameters to prioritize voice traffic.

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## **IPv6 Support**

As the IP address scheme evolves to accommodate a growing number of network devices, the Cisco 350 Series can support the transition to the next generation of networking and operating systems such as Windows 8, Vista, and Linux. These switches continue to support previous-generation IPv4, allowing you to evolve to the new IPv6 standard at your own pace and helping ensure that your current network will continue to support your business applications in the future. Cisco 350 Series switches have successfully completed rigorous IPv6 testing and have received the USGv6 and IPv6 Gold certification.

## **Advanced Layer 3 Traffic Management**

The Cisco 350 Series enables a more advanced set of traffic management capabilities to help growing businesses organize their networks more effectively and efficiently. For example, the switches provide static LAN Layer 3 routing, allowing you to segment your network into workgroups and communicate across VLANs without degrading application performance.

With these capabilities, you can boost the efficiency of your network by offloading internal traffic-handling tasks from your router and allowing it to manage primarily external traffic and security.

Additionally, Cisco 350 models provide static Layer 3 routing features. With these capabilities, you can minimize the need to manually configure routing devices and simplify the ongoing operation of the network.

## **Power Efficiency**

The Cisco 350 Series integrates a variety of power-saving features across all models, providing the industry's most extensive energy-efficient switching portfolio. These switches are designed to conserve energy by optimizing power use, which helps protect the environment and reduce your energy costs. They provide an eco-friendly network solution without compromising performance. Cisco 350 Series switches feature:

- Support for the Energy Efficient Ethernet (IEEE 802.3az) standard, which reduces energy consumption by monitoring the amount of traffic on an active link and putting the link into a sleep state during quiet periods
- The latest Application-Specific Integrated Circuits (ASICs)
- Automatic power shutoff on ports when a link is down
- LEDs that can be turned off to save power
- Embedded intelligence to adjust signal strength based on the length of the connecting cable

## **Expansion Ports**

The Cisco 350 Series provides more ports per Gigabit Ethernet switch than traditional switch models, giving you more flexibility to connect and empower your business. Gigabit Ethernet models offer 28 to 52 ports to give you more value, versus the 24-port or 48-port varieties with four shared ports that's common in the market. The Cisco 350 Series also offers mini gigabit interface converter (mini-GBIC) expansion slots that give you the option to add fiber-optic or Gigabit Ethernet uplink connectivity to the switch. With the ability to increase the connectivity range of the switches, you have more flexibility to design your network around your unique business environment and to easily connect switches on different floors or across the business.

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## Peace of Mind and Investment Protection

Cisco 350 Series switches offer the reliable performance and peace of mind you expect from a Cisco switch. When you invest in the Cisco 350 Series, you gain the benefits of:

- Limited lifetime warranty with Next-Business-Day (NBD) advance replacement (where available; otherwise same day ship).
- A solution that has been rigorously tested to help ensure optimal network uptime to keep employees connected to primary resources and productive.
- A solution designed and tested to easily and fully integrate with other Cisco voice, unified communications, security, and networking products as part of a comprehensive technology platform for your business.
- Complimentary software updates for bug fixes for the warranty term. To download software updates, go to <https://www.cisco.com/cisco/web/download/index.html>.
- Telephone technical support at no charge for the first 12 months following the date of purchase.
- Product warranty terms and other information applicable to Cisco products are available at <https://www.cisco.com/go/warranty>.
- Cisco Small Business products are supported by professionals in Cisco Small Business Support Center locations worldwide who are specifically trained to understand your needs. The Cisco Small Business Support Community, an online forum, enables you to collaborate with your peers and reach Cisco technical experts for support information.

## Cisco Limited Lifetime Hardware Warranty

Cisco 350 Series switches offer a limited lifetime hardware warranty with NBD advance replacement (where available; otherwise same day ship) and a limited lifetime warranty for fans and power supplies.

In addition, Cisco offers software application updates for bug fixes for the warranty term and telephone technical support at no charge for the first 12 months following the date of purchase. To download software updates, go to <https://software.cisco.com/download/navigator.html>.

Product warranty terms and other information applicable to Cisco products are available at <https://www.cisco.com/go/warranty>.

## World-Class Service and Support

Your time is valuable, especially when you have a problem affecting your business. Cisco 350 Series switches are backed by Cisco SMARTnet<sup>®</sup> Total Care<sup>™</sup> which provides affordable peace-of-mind coverage. Delivered by Cisco and backed by your trusted partner, this comprehensive service includes software updates and access to the Cisco Support Center, and it extends technical service to three years.

Cisco SMB products are supported by professionals in the Cisco Support Center, a dedicated resource for small business customers and networks, with locations worldwide that are specifically trained to understand your needs. You also have access to extensive technical and product information through the Cisco Support Community, an online forum that enables you to collaborate with your peers and reach Cisco technical experts for support information.

## Product Specifications

Table 1 gives the product specifications for the Cisco 350 Series Switches.

**Table 1.** Product Specifications

Feature	Description		
<b>Performance</b>			
<b>Switching capacity and forwarding rate</b> All switches are wire speed and nonblocking	<b>Model Name</b>		
	<b>Capacity in Millions of Packets per Second (mpps) (64-byte packets)</b>		
	<b>Switching Capacity in Gigabits per Second (Gbps)</b>		
	SF350-08	1.19	1.6
	SF352-08	4.17	5.6
	SF352-08P	4.17	5.6
	SF352-08MP	4.17	5.6
	SF350-24	9.52	12.8
	SF350-24P	9.52	12.8
	SF350-24MP	9.52	12.8
	SF350-48	13.09	17.6
	SF350-48P	13.09	17.6
	SF350-48MP	13.09	17.6
	SG350-8PD	46.13	62.0
	SG350-10	14.88	20.0
	SG350-10P	14.88	20.0
	SG350-10MP	14.88	20.0
	SG355-10MP	14.88	20.0
	SG350-10SFP	14.88	20.0
	SG350-20	29.76	40.0
SG350-28	41.66	56.0	
SG350-28P	41.66	56.0	
SG350-28MP	41.66	56.0	
SG350-28SFP	41.66	56.0	
SG350-52	77.38	104.0	
SG350-52P	77.38	104.0	
SG350-52MP	77.38	104.0	
<b>USB slot</b>	For file-management purposes		
<b>Layer 2 Switching</b>			
<b>Spanning Tree Protocol</b>	Standard 802.1d Spanning Tree support Fast convergence using 802.1w (Rapid Spanning Tree [RSTP]), enabled by default 8 instances are supported Multiple Spanning Tree instances using 802.1s (MSTP)		
<b>Port grouping</b>	Support for IEEE 802.3ad Link Aggregation Control Protocol (LACP) <ul style="list-style-type: none"> <li>Up to 8 groups</li> <li>Up to 8 ports per group with 16 candidate ports for each (dynamic) 802.3ad link aggregation</li> </ul>		
<b>VLAN</b>	Support for up to 4096 VLANs simultaneously Port-based and 802.1Q tag-based VLANs MAC-based VLAN Management VLAN Private VLAN Edge (PVE), also known as protected ports, with multiple uplinks		

Feature	Description
	<p>Guest VLAN</p> <p>Unauthenticated VLAN</p> <p>Dynamic VLAN assignment via RADIUS server along with 802.1x client authentication</p> <p>CPE VLAN</p>
<b>Voice VLAN</b>	Voice traffic is automatically assigned to a voice-specific VLAN and treated with appropriate levels of QoS Auto voice capabilities deliver networkwide zero-touch deployment of voice endpoints and call control devices
<b>Multicast TV VLAN</b>	Multicast TV VLAN allows the single multicast VLAN to be shared in the network while subscribers remain in separate VLANs (also known as MVR)
<b>Q-in-Q VLAN</b>	VLANs transparently cross a service provider network while isolating traffic among customers
<b>Generic VLAN Registration Protocol (GVRP)/Generic Attribute Registration Protocol (GARP)</b>	Protocols for automatically propagating and configuring VLANs in a bridged domain
<b>Unidirectional Link Detection (UDLD)</b>	UDLD monitors physical connection to detect unidirectional links caused by incorrect wiring or cable/port faults to prevent forwarding loops and blackholing of traffic in switched networks
<b>Dynamic Host Configuration Protocol (DHCP) Relay at Layer 2</b>	Relay of DHCP traffic to DHCP server in different VLAN; works with DHCP Option 82
<b>Internet Group Management Protocol (IGMP) versions 1, 2, and 3 snooping</b>	IGMP limits bandwidth-intensive multicast traffic to only the requesters; supports 1K multicast groups (source-specific multicasting is also supported)
<b>IGMP Querier</b>	IGMP querier is used to support a Layer 2 multicast domain of snooping switches in the absence of a multicast router
<b>Head-Of-Line (HOL) blocking</b>	HOL blocking prevention
<b>Loopback Detection</b>	Loopback detection provides protection against loops by transmitting loop protocol packets out of ports on which loop protection has been enabled. It operates independently of STP
<b>Jumbo frames</b>	Up to 9K (9216) bytes
<b>Layer 3</b>	
<b>IPv4 routing</b>	Wirespeed routing of IPv4 packets Up to 1K static routes and up to 128 IP interfaces
<b>IPv6 routing</b>	Wirespeed routing of IPv6 packets
<b>Classless Interdomain Routing (CIDR)</b>	Support for CIDR
<b>Layer 3 Interface</b>	Configuration of Layer 3 interface on physical port, LAG, VLAN interface, or loopback interface
<b>DHCP relay at Layer 3</b>	Relay of DHCP traffic across IP domains
<b>User Datagram Protocol (UDP) relay</b>	Relay of broadcast information across Layer 3 domains for application discovery or relaying of bootP/DHCP packets
<b>DHCP Server</b>	Switch functions as an IPv4 DHCP server serving IP addresses for multiple DHCP pools/scopes Support for DHCP options
<b>Security</b>	
<b>Secure Shell (SSH) Protocol</b>	SSH is a secure replacement for Telnet traffic. SCP also uses SSH. SSH v1 and v2 are supported
<b>Secure Sockets Layer (SSL)</b>	SSL support: Encrypts all HTTPS traffic, allowing highly secure access to the browser-based management GUI in the switch
<b>IEEE 802.1X (Authenticator role)</b>	802.1X: RADIUS authentication and accounting, MD5 hash; guest VLAN; unauthenticated VLAN, single/multiple host mode and single/multiple sessions Supports time-based 802.1X Dynamic VLAN assignment
<b>Web-based authentication</b>	Web based authentication provides network admission control through web browser to any host devices and operating systems
<b>STP Bridge Protocol Data Unit (BPDU) Guard</b>	A security mechanism to protect the network from invalid configurations. A port enabled for BPDU Guard is shut down if a BPDU message is received on that port
<b>STP Root Guard</b>	This prevents edge devices not in the network administrator's control from becoming Spanning Tree Protocol root nodes

Feature	Description
<b>DHCP snooping</b>	Filters out DHCP messages with unregistered IP addresses and/or from unexpected or untrusted interfaces. This prevents rogue devices from behaving as DHCP Servers
<b>IP Source Guard (IPSG)</b>	When IP Source Guard is enabled at a port, the switch filters out IP packets received from the port if the source IP addresses of the packets have not been statically configured or dynamically learned from DHCP snooping. This prevents IP Address Spoofing
<b>Dynamic ARP Inspection (DAI)</b>	The switch discards ARP packets from a port if there are no static or dynamic IP/MAC bindings or if there is a discrepancy between the source or destination addresses in the ARP packet. This prevents man-in-the-middle attacks
<b>IP/MAC/Port Binding (IPMB)</b>	The preceding features (DHCP Snooping, IP Source Guard, and Dynamic ARP Inspection) work together to prevent DOS attacks in the network, thereby increasing network availability
<b>Secure Core Technology (SCT)</b>	Makes sure that the switch will receive and process management and protocol traffic no matter how much traffic is received
<b>Secure Sensitive Data (SSD)</b>	A mechanism to manage sensitive data (such as passwords, keys, and so on) securely on the switch, populating this data to other devices, and secure autoconfig. Access to view the sensitive data as plaintext or encrypted is provided according to the user-configured access level and the access method of the user
<b>Layer 2 isolation Private VLAN Edge (PVE) with community VLAN</b>	PVE (also known as protected ports) provides Layer 2 isolation between devices in the same VLAN, supports multiple uplinks
<b>Port security</b>	The ability to lock source MAC addresses to ports and limits the number of learned MAC addresses
<b>RADIUS/TACACS+</b>	Supports RADIUS and TACACS authentication. Switch functions as a client
<b>Storm control</b>	Broadcast, multicast, and unknown unicast
<b>RADIUS accounting</b>	The RADIUS accounting functions allow data to be sent at the start and end of services, indicating the amount of resources (such as time, packets, bytes, and so on) used during the session
<b>DoS prevention</b>	Denial-Of-Service (DOS) attack prevention
<b>ACLs</b>	Support for up to 512 rules  Drop or rate limit based on source and destination MAC, VLAN ID or IP address, protocol, port, Differentiated Services Code Point (DSCP)/IP precedence, TCP/UDP source and destination ports, 802.1p priority, Ethernet type, Internet Control Message Protocol (ICMP) packets, IGMP packets, TCP flag, time-based ACLs supported
<b>Quality of Service</b>	
<b>Priority levels</b>	8 hardware queues
<b>Scheduling</b>	Strict priority and Weighted Round-Robin (WRR) Queue assignment based on DSCP and class of service (802.1p/CoS)
<b>Class of service</b>	Port based; 802.1p VLAN priority based; IPv4/v6 IP precedence/Type of Service (ToS)/DSCP based; Differentiated Services (DiffServ); classification and remarking ACLs, trusted QoS
<b>Rate limiting</b>	Ingress policer; egress shaping and rate control; per VLAN, per port, and flow based
<b>Congestion avoidance</b>	A TCP congestion avoidance algorithm is required to minimize and prevent global TCP loss synchronization
<b>Standards</b>	
<b>Standards</b>	IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Fast Ethernet, IEEE 802.3ab 1000BASE-T Gigabit Ethernet, IEEE 802.3ad LACP, IEEE 802.3z Gigabit Ethernet, IEEE 802.3x Flow Control, IEEE 802.1D (STP, GARP, and GVRP), IEEE 802.1Q/p VLAN, IEEE 802.1w RSTP, IEEE 802.1s Multiple STP, IEEE 802.1X Port Access Authentication, IEEE 802.3af, IEEE 802.3at, RFC 768, RFC 783, RFC 791, RFC 792, RFC 793, RFC 813, RFC 879, RFC 896, RFC 826, RFC 854, RFC 855, RFC 856, RFC 858, RFC 894, RFC 919, RFC 922, RFC 920, RFC 950, RFC 1042, RFC 1071, RFC 1123, RFC 1141, RFC 1155, RFC 1157, RFC 1350, RFC 1533, RFC 1541, RFC 1624, RFC 1700, RFC 1867, RFC 2030, RFC 2616, RFC 2131, RFC 2132, RFC 3164, RFC 3411, RFC 3412, RFC 3413, RFC 3414, RFC 3415, RFC 2576, RFC 4330, RFC 1213, RFC 1215, RFC 1286, RFC 1442, RFC 1451, RFC 1493, RFC 1573, RFC 1643, RFC 1757, RFC 1907, RFC 2011, RFC 2012, RFC 2013, RFC 2233, RFC 2618, RFC 2665, RFC 2666, RFC 2674, RFC 2737, RFC 2819, RFC 2863, RFC 1157, RFC 1493, RFC 1215, RFC 3416
<b>IPv6</b>	
<b>IPv6</b>	IPv6 host mode IPv6 over Ethernet Dual IPv6/IPv4 stack IPv6 neighbor and router discovery (ND) IPv6 stateless address autoconfiguration Path Maximum Transmission Unit (MTU) discovery Duplicate Address Detection (DAD)



Feature	Description																																										
	ICMP version 6 IPv6 over IPv4 network with Intrasite Automatic Tunnel Addressing Protocol (ISATAP) support USGv6 and IPv6 Gold Logo certified																																										
<b>IPv6 QoS</b>	Prioritize IPv6 packets in hardware																																										
<b>IPv6 ACL</b>	Drop or rate limit IPv6 packets in hardware																																										
<b>IPv6 First Hop Security</b>	RA guard ND inspection DHCPv6 guard Neighbor binding table (snooping and static entries) Neighbor binding integrity check																																										
<b>Multicast Listener Discovery (MLD v1/2) snooping</b>	Deliver IPv6 multicast packets only to the required receivers																																										
<b>IPv6 applications</b>	Web/SSL, Telnet server/SSH, ping, traceroute, Simple Network Time Protocol (SNTP), Trivial File Transfer Protocol (TFTP), SNMP, RADIUS, syslog, DNS client, Telnet Client, DHCP Client, DHCP Autoconfig, IPv6 DHCP Relay, TACACS																																										
<b>IPv6 RFCs supported</b>	RFC 4443 (which obsoletes RFC2463): ICMP version 6 RFC 4291 (which obsoletes RFC 3513): IPv6 address architecture RFC 4291: IPv6 addressing architecture RFC 2460: IPv6 specification RFC 4861 (which obsoletes RFC 2461): neighbor discovery for IPv6 RFC 4862 (which obsoletes RFC 2462): IPv6 stateless address autoconfiguration RFC 1981: path MTU discovery RFC 4007: IPv6 scoped address architecture RFC 3484: default address selection mechanism RFC 5214 (which obsoletes RFC 4214): ISATAP tunneling RFC 4293: MIB IPv6: textual conventions and general group RFC 3595: textual conventions for IPv6 flow label																																										
<b>Management</b>																																											
<b>Web user interface</b>	Built-in switch configuration utility for easy browser-based device configuration (HTTP/HTTPS). Supports configuration, system dashboard, system maintenance, and monitoring																																										
<b>Smart Network Application</b>	Smart Network Application (SNA) is an innovative network-level monitoring and management tool embedded in Cisco 100 to 500 Series switches. It can discover network topology, display link status, monitor events, apply configurations, and upgrade software images across multiple switches in the network  (Note: Management of your network using Smart Network Application requires the use of either a 350, 350X, or 550X Series switch model as a part of your network)																																										
<b>SNMP</b>	SNMP versions 1, 2c, and 3 with support for traps, and SNMP version 3 User-based Security Model (USM)																																										
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	1215.my SNMPv2- CONF.my SNMPv2-TC.my rfc2674-MIB rfc2575-MIB rfc2573-MIB rfc2233-MIB rfc2013-MIB rfc2012-MIB	rfc2737-MIB rfc2925-MIB rfc3621-MIB rfc4668-MIB rfc4670-MIB trunk-MIB tunnel-MIB udp-MIB
<b>Private MIBs</b>	CISCOB-lldp-MIB CISCOB- brgmulticast-MIB CISCOB- bridgemibobjects-MIB CISCOB-bonjour-MIB CISCOB-dhcpcl-MIB CISCOB-MIB CISCOB-wrandomtaildrop-MIB CISCOB-traceroute-MIB CISCOB-telnet-MIB CISCOB-stormctrl-MIB CISCOB-ssh-MIB CISCOB-socket-MIB CISCOB-sntp-MIB CISCOB-smon-MIB CISCOB-phy-MIB CISCOB-multisessionterminal-MIB CISCOB-mri-MIB CISCOB-jumboframes-MIB CISCOB-gvrp-MIB CISCOB-endofmib-MIB CISCOB-dot1x-MIB CISCOB-deviceparams-MIB CISCOB-cli-MIB CISCOB-cdb-MIB CISCOB-brgmacswitch-MIB CISCOB-3sw2swtables-MIB CISCOB-smartPorts-MIB CISCOB-tbi-MIB CISCOB-macbaseprio-MIB CISCOB-policy-MIB CISCOB-env_mib CISCOB-sensor-MIB CISCOB-aaa-MIB CISCOB-application-MIB CISCOB-bridgesecurity-MIB CISCOB-copy-MIB CISCOB-CpuCounters-MIB CISCOB-Custom1BonjourService-MIB CISCOB-dhcp-MIB CISCOB-dif-MIB CISCOB-dnsc-MIB CISCOB-embweb-MIB CISCOB-fft-MIB CISCOB-file-MIB CISCOB-greeneth-MIB CISCOB-interfaces-MIB CISCOB-interfaces_recovery-MIB	CISCOB-ip-MIB CISCOB-iprouter-MIB CISCOB-ipv6-MIB CISCOB-mnginf-MIB CISCOB-lic-MIB CISCOB-localization-MIB CISCOB-mcmngr-MIB CISCOB-mng-MIB CISCOB-physdescription-MIB CISCOB-Poe-MIB CISCOB-protectedport-MIB CISCOB-rmon-MIB CISCOB-rs232-MIB CISCOB-SecuritySuite-MIB CISCOB-snmp-MIB CISCOB-specialbpdu-MIB CISCOB-banner-MIB CISCOB-syslog-MIB CISCOB-TcpSession-MIB CISCOB-traps-MIB CISCOB-trunk-MIB CISCOB-tuning-MIB CISCOB-tunnel-MIB CISCOB-udp-MIB CISCOB-vlan-MIB CISCOB-ipstdacl-MIB CISCO-SMI-MIB CISCOB-DebugCapabilities-MIB CISCOB-CDP-MIB CISCOB-vlanVoice-MIB CISCOB-EVENTS-MIB CISCOB-sysmng-MIB CISCOB-sct-MIB CISCO-TC-MIB CISCO-VTP-MIB CISCO-CDP-MIB CISCOB-eee-MIB CISCOB-ssl-MIB CISCOB-qosclimib-MIB CISCOB-digitalkeymanage-MIB CISCOB-tbp-MIB CISCOB-MIB CISCOB-secsd-MIB CISCOB-draft-ietf-entmib-sensor-MIB CISCOB-draft-ietf-syslog-device-MIB CISCOB-rfc2925-MIB

Feature	Description
<b>Remote Monitoring (RMON)</b>	Embedded RMON software agent supports 4 RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis
<b>IPv4 and IPv6 dual stack</b>	Coexistence of both protocol stacks to ease migration
<b>Firmware upgrade</b>	<ul style="list-style-type: none"> <li>• Web browser upgrade (HTTP/HTTPS) and TFTP and upgrade over SCP running over SSH</li> <li>• Upgrade can be initiated through console port as well</li> <li>• Dual images for resilient firmware upgrades</li> </ul>
<b>Port mirroring</b>	Traffic on a port can be mirrored to another port for analysis with a network analyzer or RMON probe. Up to 8 source ports can be mirrored to one destination port. A single session is supported
<b>VLAN mirroring</b>	Traffic from a VLAN can be mirrored to a port for analysis with a network analyzer or RMON probe. Up to 8 source VLANs can be mirrored to one destination port. A single session is supported
<b>DHCP (options 12, 66, 67, 82, 129, and 150)</b>	DHCP options facilitate tighter control from a central point (DHCP server) to obtain IP address, autoconfiguration (with configuration file download), DHCP relay, and hostname
<b>Secure Copy (SCP)</b>	Securely transfer files to and from the switch
<b>Autoconfiguration with Secure Copy (SCP) file download</b>	Enables secure mass deployment with protection of sensitive data
<b>Text-editable config files</b>	Config files can be edited with a text editor and downloaded to another switch, facilitating easier mass deployment
<b>Smartports</b>	Simplified configuration of QoS and security capabilities
<b>Auto Smartports</b>	Applies the intelligence delivered through the Smartport roles and applies it automatically to the port based on the devices discovered over Cisco Discovery Protocol or LLDP-MED. This facilitates zero-touch deployments
<b>Textview CLI</b>	Scriptable command-line interface. A full CLI as well as a menu-based CLI is supported. User privilege levels 1, 7, and 15 are supported for the CLI
<b>Cloud services</b>	Support for Cisco Small Business FindIT Network
<b>Localization</b>	Localization of GUI and documentation into multiple languages
<b>Other management</b>	Traceroute; single IP management; HTTP/HTTPS; SSH; RADIUS; port mirroring; TFTP upgrade; DHCP client; BOOTP; SNMP; Xmodem upgrade; cable diagnostics; ping; syslog; Telnet client (SSH secure support)
<b>Time-based port operation</b>	Link up or down based on user-defined schedule (when the port is administratively up)
<b>Time-based PoE</b>	Capability for power to be on or off based on a user-defined schedule to save energy
<b>Login banner</b>	Configurable multiple banners for web as well as CLI
<b>Power Efficiency</b>	
<b>EEE Compliant (802.3az)</b>	Supports 802.3az on all copper ports (SG350 models)
<b>Energy Detect</b>	Automatically turns power off on Gigabit Ethernet and 10/100 RJ-45 port when detecting link down Active mode is resumed without loss of any packets when the switch detects the link up
<b>Cable length detection</b>	Adjusts the signal strength based on the cable length for Gigabit Ethernet models. Reduces the power consumption for cables shorter than 10m
<b>Disable port LEDs</b>	LEDs can be manually turned off to save on energy
<b>General</b>	
<b>Jumbo frames</b>	Frame sizes up to 9K (9216) bytes supported on 10/100 and Gigabit interfaces
<b>MAC table</b>	Up to 16K (16384) MAC addresses
<b>Discovery</b>	
<b>Bonjour</b>	The switch advertises itself using the Bonjour protocol
<b>Link Layer Discovery Protocol (LLDP) (802.1ab) with LLDP-MED extensions</b>	LLDP allows the switch to advertise its identification, configuration, and capabilities to neighboring devices that store the data in a MIB. LLDP-MED is an enhancement to LLDP that adds the extensions needed for IP phones
<b>Cisco Discovery Protocol</b>	The switch advertises itself using the Cisco Discovery Protocol. It also learns the connected device and its characteristics via Cisco Discovery Protocol

Feature	Description																																																													
<b>Power over Ethernet (PoE)</b>																																																														
<b>802.3af PoE, 802.3at PoE+, and 60W PoE power are delivered over any of the RJ-45 ports within the listed power budgets</b>	Switches support 802.3at PoE+, 802.3af, 60W PoE, and Cisco prestandard (older) PoE. Maximum power of 60W to any 10/100 or Gigabit Ethernet port for PoE+ supported devices and 15.4W for PoE supported devices, until the PoE budget for the switch is reached. The total power available for PoE per switch is as follows:																																																													
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<b>PoE powered device and PoE passthrough</b>	In addition to AC power, compact switch models can work as PoE powered devices and be powered by PoE switches connected to the uplink ports. The switch can also pass through the power to downstream PoE end devices if required																																																													
	Maximum of 60W can be drawn per uplink port if the peer PoE switch supports 60W PoE. When multiple uplink ports are connected to PoE switches, the power drawn from these ports is combined																																																													
	When AC power is connected and functioning properly, it will have priority over the PoE powered device function. The PoE powered device function will then act as a backup power source to the AC power. The PoE powered device function will be the primary power source for the switch if AC power is not connected																																																													
	<table border="1"> <thead> <tr> <th>Model</th> <th>Power Option</th> <th>Available PoE Power (W)</th> <th>Can Switch Be Powered with Uplinks?</th> </tr> </thead> <tbody> <tr> <td rowspan="7">SG350-10P</td> <td>1 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>1 PoE+ uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE+ uplink</td> <td>22W</td> <td>Yes</td> </tr> <tr> <td>1 60W PoE uplink</td> <td>22W</td> <td>Yes</td> </tr> <tr> <td>2 60W PoE uplink</td> <td>50W</td> <td>Yes</td> </tr> <tr> <td>AC power</td> <td>62W</td> <td>Yes</td> </tr> <tr> <td rowspan="7">SG350-10MP</td> <td>1 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>1 PoE+ uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE+ uplink</td> <td>22W</td> <td>Yes</td> </tr> <tr> <td>1 60W PoE uplink</td> <td>22W</td> <td>Yes</td> </tr> <tr> <td>2 60W PoE uplink</td> <td>50W</td> <td>Yes</td> </tr> <tr> <td>AC power</td> <td>128W</td> <td>Yes</td> </tr> <tr> <td rowspan="4">SG355-10P</td> <td>1 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>1 PoE+ uplink</td> <td>0W</td> <td>Yes</td> </tr> <tr> <td>2 PoE+ uplink</td> <td>22W</td> <td>Yes</td> </tr> </tbody> </table>	Model	Power Option	Available PoE Power (W)	Can Switch Be Powered with Uplinks?	SG350-10P	1 PoE uplink	0W	Yes	2 PoE uplink	0W	Yes	1 PoE+ uplink	0W	Yes	2 PoE+ uplink	22W	Yes	1 60W PoE uplink	22W	Yes	2 60W PoE uplink	50W	Yes	AC power	62W	Yes	SG350-10MP	1 PoE uplink	0W	Yes	2 PoE uplink	0W	Yes	1 PoE+ uplink	0W	Yes	2 PoE+ uplink	22W	Yes	1 60W PoE uplink	22W	Yes	2 60W PoE uplink	50W	Yes	AC power	128W	Yes	SG355-10P	1 PoE uplink	0W	Yes	2 PoE uplink	0W	Yes	1 PoE+ uplink	0W	Yes	2 PoE+ uplink	22W	Yes
	Model	Power Option	Available PoE Power (W)	Can Switch Be Powered with Uplinks?																																																										
	SG350-10P	1 PoE uplink	0W	Yes																																																										
		2 PoE uplink	0W	Yes																																																										
		1 PoE+ uplink	0W	Yes																																																										
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		2 60W PoE uplink	50W	Yes																																																										
		AC power	62W	Yes																																																										
	SG350-10MP	1 PoE uplink	0W	Yes																																																										
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	1 PoE+ uplink	0W	Yes																																																											
	2 PoE+ uplink	22W	Yes																																																											

Feature		Description			
		1 60W PoE uplink	22W	Yes	
		2 60W PoE uplink	50W	Yes	
		AC power	62W	Yes	
Model	Green Power (mode)	System Power Consumption	Power Consumption (with PoE)	Heat Dissipation (BTU/hr)	
SF350-08	Energy Detect	110V=5.6W 220V=5.8W	N/A	30.0	
SF352-08	Energy Detect	110V=6.9W 220V=6.9W	N/A	23.5	
SF352-08P	Energy Detect	110V=10.4W 220V=11.2W	110V=78.7W 220V=79.3W	207.4	
SF352-08MP	Energy Detect	110V=10.4W 220V=11.2W	110V=157.2W 220V=156.2W	536.1	
SF350-24	Energy Detect	110V=10.6W 220V=10.9W	110V=240W 220V=230W	43.3	
SF350-24P	Energy Detect	110V=10.6W 220V=10.9W	110V=240W 220V=230W	684.1	
SF350-24MP	Energy Detect	110V=29.2W 220V=28.3W	110V=238W 220V=233W	1333.0	
SF350-48	Energy Detect	110V=23.4W 220V=24.2W	N/A	82.6	
SF350-48P	Energy Detect	110V=50.8W 220V=52.1W	110V=464.3W 220V=453.1W	1584.3	
SF350-48MP	Energy Detect	110V=58.4W 220V=58.5W	110V=866.7W 220V=843.5W	2957.3	
SG350-8PD	EEE, Energy Detect, Short Reach	110V=29.8W 220V=31.3W	110V=167W 220V=165.2W	569.5	
SG350-10	EEE, Energy Detect, Short Reach	110V=9.0W 220V=9.8W	N/A	33.4	
SG350-10P	EEE, Energy Detect, Short Reach	110V=13.0W 220V=13.5W	110V=84.7W 220V=83.5W	289.0	
SG355-10P	EEE, Energy Detect, Short Reach	110V=12.4W 220V=12.6W	110V=83.5W 220V=83.4W	284.8	
SG350-10MP	EEE, Energy Detect, Short Reach	110V=13.2W 220V=13.5W	110V=152.8W 220V=151.6W	521.5	
SG350-10SFP	EEE, Energy Detect, Short Reach	110V=11.1W 220V=11.9W	N/A	40.6	
SG350-20	EEE, Energy Detect, Short Reach	110V=14.5W 220V=15.2W	N/A	51.8	
SG350-28	EEE, Energy Detect, Short Reach	110V=19.7W 220V=19.9W	N/A	67.9	
SG350-28P	EEE, Energy Detect, Short Reach	110V=35.7W 220V=36.9W	110V=263W 220V=255.1W	897.4	
SG350-28MP	EEE, Energy Detect, Short Reach	110V=41.3W 220V=42.1W	110V=261.1W 220V=451.2W	1573.3	
SG350-28SFP	EEE, Energy Detect, Short Reach	110V=32.0W 220V=34.3W	N/A	117.0	

Feature		Description			
	SG350-52	EEE, Energy Detect, Short Reach	110V=40.4W 220V=40.6.8W	N/A	136.4
	SG350-52P	EEE, Energy Detect, Short Reach	110V=62.4W 220V=61.8W	110V=440.0W 220V=431.0W	1429.4
	SG350-52MP	EEE, Energy Detect, Short Reach	110V=72.5W 220V=73.6W	110V=858.0W 220V=833.0W	2674.8
Ports	Model Name	Total System Ports	RJ-45 Ports	Combo Ports (RJ-45 + SFP)	
	SF350-08	8 Fast Ethernet	8 Fast Ethernet		
	SF352-08	8 Fast Ethernet + 2 Gigabit Ethernet	8 Fast Ethernet	2 Gigabit Ethernet combo	
	SF352-08P	8 Fast Ethernet + 2 Gigabit Ethernet	8 Fast Ethernet	2 Gigabit Ethernet combo	
	SF352-08MP	8 Fast Ethernet + 2 Gigabit Ethernet	8 Fast Ethernet	2 Gigabit Ethernet combo	
	SF350-24	24 Fast Ethernet + 4 Gigabit Ethernet	24 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF350-24P	24 Fast Ethernet + 4 Gigabit Ethernet	24 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF350-24MP	24 Fast Ethernet + 4 Gigabit Ethernet	24 Fast Ethernet	2 Gigabit Ethernet combo + 2 SFP	
	SF350-48	48 Fast Ethernet + 4 Gigabit Ethernet	48 Fast Ethernet 2 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet	
	SF350-48P	48 Fast Ethernet + 4 Gigabit Ethernet	48 Fast Ethernet 2 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet	
	SF350-48MP	48 Fast Ethernet + 4 Gigabit Ethernet	48 Fast Ethernet 2 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet	
	SG350-8PD	6 Gigabit Ethernet + 2 2.5G	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG350-10	10 Gigabit Ethernet	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG350-10P	10 Gigabit Ethernet	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG355-10P	10 Gigabit Ethernet	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG350-10MP	10 Gigabit Ethernet	8 Gigabit Ethernet	2 Gigabit Ethernet combo	
	SG350-10SFP	10 Gigabit Ethernet	8 Gigabit SFP Slots	2 Gigabit Ethernet combo	
	SG350-20	20 Gigabit Ethernet	16 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-28	28 Gigabit Ethernet	24 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-28P	28 Gigabit Ethernet	24 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-28MP	28 Gigabit Ethernet	24 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-28SFP	28 Gigabit Ethernet	24 Gigabit SFP slots	2 Gigabit Ethernet combo	
	SG350-52	52 Gigabit Ethernet	48 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-52P	52 Gigabit Ethernet	48 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
	SG350-52MP	52 Gigabit Ethernet	48 Gigabit Ethernet	2 SFP slots, 2 Gigabit Ethernet combo	
Buttons	Reset button				

Feature	Description			
<b>Cabling type</b>	Unshielded Twisted Pair (UTP) Category 5 or better for 10BASE-T/100BASE-TX; UTP Category 5 Ethernet or better for 1000BASE-T			
<b>LEDs</b>	System, Link/Act, PoE, Speed, LED power saving option			
<b>Flash</b>	256 MB			
<b>CPU memory</b>	512 MB			
<b>Packet buffer</b>	All numbers are aggregate across all ports as the buffers are dynamically shared:			
	<b>Model Name</b>	<b>Packet Buffer</b>		
	SF350-08	12 Mb		
	SF352-08	1.5 Mb		
	SF352-08P	1.5 Mb		
	SF352-08MP	1.5 Mb		
	SF350-24	12 Mb		
	SF350-24P	12 Mb		
	SF350-24MP	12 Mb		
	SF350-48	24 Mb		
	SF350-48P	24 Mb		
	SF350-48MP	24 Mb		
	SG350-8PD	12 Mb		
	SG350-10	12 Mb		
	SG350-10P	12 Mb		
	SG355-10P	12 Mb		
	SG350-10SFP	1.5 Mb		
	SG350-20	1.5 Mb		
	SG350-10MP	12 Mb		
	SG350-28	12 Mb		
	SG350-28P	12 Mb		
	SG350-28MP	12 Mb		
	SG350-28SFP	12 Mb		
SG350-52	24 Mb			
SG350-52P	24 Mb			
SG350-52MP	24 Mb			
<b>Supported SFP modules</b>	<b>SKU</b>	<b>Media</b>	<b>Speed</b>	<b>Maximum Distance</b>
	MGBSX1	Multimode fiber	1000 Mbps	350 m
	MGBLH1	Single-mode fiber	1000 Mbps	40 km
	MGBT1	UTP cat 5	1000 Mbps	100 m
<b>Environmental</b>				
<b>Unit dimensions (W x H x D)</b>	<b>Model Name</b>	<b>Unit Dimensions</b>		
	SF350-08	279.4 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)		
	SF352-08	279.4 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)		
	SF352-08P	279.4 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)		
	SF352-08MP	279.4 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)		
	SF350-24	440 x 44 x 202 mm (17.3 x 1.45 x 7.95 in)		
SF350-24P	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)			

Feature	Description	
	SF350-24MP	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SF350-48	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SF350-48P	440 x 44 x 350 mm (17.3 x 1.45 x 13.78 in)
	SF350-48MP	440 x 44 x 350 mm (17.3 x 1.45 x 13.78 in)
	SG350-8PD	344.4 x 44 x 252.5 (13.6 x 1.45 x 9.94 in)
	SG350-10	280 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)
	SG350-10P	280 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)
	SG355-10P	440 x 44 x 203 mm (17.3 x 1.45 x 7.99 in)
	SG350-10MP	160 x 30 x 128 mm (6.3 x 1.18 x 5.04 in)
	SG350-10SFP	279.4 x 44 x 170 mm (11.0 x 1.45 x 6.69 in)
	SG350-20	440 x 44 x 203 mm (17.3 x 1.45 x 7.99 in)
	SG350-28	440 x 44 x 202 mm (17.3 x 1.45 x 7.95 in)
	SG350-28P	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SG350-28MP	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SG350-28SFP	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SG350-52	440 x 44 x 257 mm (17.3 x 1.45 x 10.12 in)
	SG350-52P	440 x 44 x 350 mm (17.3 x 1.45 x 13.78 in)
	SG350-52MP	440 x 44 x 350 mm (17.3 x 1.45 x 13.78 in)
<b>Unit weight</b>	<b>Model Name</b>	<b>Unit Weight</b>
	SF350-08	1.18 kg (2.60 lb)
	SF352-08	1.06 kg (2.34 lb)
	SF352-08P	1.16 kg (2.56 lb)
	SF352-08MP	1.16 kg (2.56 lb)
	SF350-24	2.72 kg (6.0 lb)
	SF350-24P	4.08 kg (8.99 lb)
	SF350-24MP	4.12 kg (9.08 lb)
	SF350-48	3.58 kg (7.89 lb)
	SF350-48P	5.59 kg (12.32 lb)
	SF350-48MP	5.61 kg (12.37 lb)
	SG350-8PD	2.5 kg (5.51 lb)
	SG350-10	1.09 kg (2.40 lb)
	SG350-10P	1.19 kg (2.62 lb)
	SG355-10P	2.36 kg (5.20 lb)
	SG350-10MP	1.19 kg (2.62 lb)
	SG350-10SFP	2.08 kg (4.59 lb)
	SG350-20	2.12 kg (4.67 lb)
	SG350-28	2.75 kg (6.06 lb)
	SG350-28P	3.83 kg (8.44 lb)
	SG350-28MP	3.37 kg (7.43 lb)
	SG350-28SFP	2.7 kg (5.95 lb)
	SG350-52	2.75 kg (6.06 lb)
	SG350-52P	3.81 kg (8.40 lb)
	SG350-52MP	3.83 kg (8.44 lb)



Feature	Description																																																																																																
<b>Power</b>	100-240V 50-60 Hz, internal, universal: SF350-24, SF350-24P, SF350-24MP, SF350-48, SF350-48P, SF350-48MP, SG350-20, SG350-28, SG350-28P, SG350-28MP, SG350-28SFP, SG350-52, SG350-52P, SG350-52MP 100-240V 50-60 Hz, 0.5A, external: SF350-08 100-240V 50-60 Hz, 0.7A, external: SF352-08, SG350-8PD 100-240V 50-60 Hz, 0.7A, external: SG350-10 100-240V 50-60 Hz, 1.5A, external: SG350-10P 100-240V 50-60 Hz, internal, universal: SG355-10P 100-240V 50-60 Hz, 2.0A, external: SF352-08P, SF352-08MP, SG350-10MP																																																																																																
<b>Certification</b>	UL (UL 60950), CSA (CSA 22.2), CE mark, FCC Part 15 (CFR 47) Class A																																																																																																
<b>Operating temperature</b>	32° to 113°F (0° to 45°C): SG350-08PD 32° to 122°F (0° to 50°C): SF350-08, SF352-08, SF352-08P, SF352-08MP, SF350-24, SF350-24P, SF350-24MP, SF350-48, SF350-48P, SF350-48MP, SG350-10, SG350-10P, SG355-10P, SG350-10MP, SG350-10SFP, SG350-20, SG350-28, SG350-28P, SG350-28MP, SG350-28SFP, SG350-52, SG350-52P, SG350-52MP																																																																																																
<b>Storage temperature</b>	-4° to 158°F (-20° to 70°C)																																																																																																
<b>Operating humidity</b>	10% to 90%, relative, noncondensing																																																																																																
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<b>Acoustic noise and MTBF</b>	<table border="1"> <thead> <tr> <th>Model Name</th> <th>FAN (Number)</th> <th>Acoustic Noise</th> <th>MTBF @40C (hr)</th> </tr> </thead> <tbody> <tr><td>SF350-08</td><td>Fanless</td><td>N/A</td><td>644,573</td></tr> <tr><td>SF352-08</td><td>Fanless</td><td>N/A</td><td>532,704</td></tr> <tr><td>SF352-08P</td><td>Fanless</td><td>N/A</td><td>530,716</td></tr> <tr><td>SF352-08MP</td><td>Fanless</td><td>N/A</td><td>478,335</td></tr> <tr><td>SF350-24</td><td>Fanless</td><td>N/A</td><td>562,313</td></tr> <tr><td>SF350-24P</td><td>2</td><td>52.2 dB at 40C</td><td>293,029</td></tr> <tr><td>SF350-24MP</td><td>2</td><td>52.2 dB at 40C</td><td>272,127</td></tr> <tr><td>SF350-48</td><td>Fanless</td><td>N/A</td><td>277,653</td></tr> <tr><td>SF350-48P</td><td>3</td><td>53.7 dB at 40C</td><td>182,270</td></tr> <tr><td>SF350-48MP</td><td>4</td><td>49.8 dB at 40C</td><td>191,951</td></tr> <tr><td>SG350-10</td><td>Fanless</td><td>N/A</td><td>308,196</td></tr> <tr><td>SG350-10P</td><td>Fanless</td><td>N/A</td><td>205,647</td></tr> <tr><td>SG355-10P</td><td>Fanless</td><td>N/A</td><td>296,426</td></tr> <tr><td>SG350-10MP</td><td>Fanless</td><td>N/A</td><td>80,093</td></tr> <tr><td>SG350-10SFP</td><td>Fanless</td><td>N/A</td><td>851,827</td></tr> <tr><td>SG350-20</td><td>Fanless</td><td>N/A</td><td>1,400,007</td></tr> <tr><td>SG350-28</td><td>Fanless</td><td>N/A</td><td>367,209</td></tr> <tr><td>SG350-28P</td><td>2</td><td>47.9 dB at 40C</td><td>396,687</td></tr> <tr><td>SG350-28MP</td><td>2</td><td>49.6 dB at 40C</td><td>213,373</td></tr> <tr><td>SG350-28SFP</td><td>1</td><td>43.6 dB at 50C</td><td>101,523</td></tr> <tr><td>SG350-52</td><td>1</td><td>48.0 dB at 40C</td><td>301,297</td></tr> <tr><td>SG350-52P</td><td>3</td><td>54.2 dB at 40C</td><td>195,746</td></tr> <tr><td>SG350-52MP</td><td>4</td><td>51.7 dB at 40C</td><td>163,704</td></tr> </tbody> </table>	Model Name	FAN (Number)	Acoustic Noise	MTBF @40C (hr)	SF350-08	Fanless	N/A	644,573	SF352-08	Fanless	N/A	532,704	SF352-08P	Fanless	N/A	530,716	SF352-08MP	Fanless	N/A	478,335	SF350-24	Fanless	N/A	562,313	SF350-24P	2	52.2 dB at 40C	293,029	SF350-24MP	2	52.2 dB at 40C	272,127	SF350-48	Fanless	N/A	277,653	SF350-48P	3	53.7 dB at 40C	182,270	SF350-48MP	4	49.8 dB at 40C	191,951	SG350-10	Fanless	N/A	308,196	SG350-10P	Fanless	N/A	205,647	SG355-10P	Fanless	N/A	296,426	SG350-10MP	Fanless	N/A	80,093	SG350-10SFP	Fanless	N/A	851,827	SG350-20	Fanless	N/A	1,400,007	SG350-28	Fanless	N/A	367,209	SG350-28P	2	47.9 dB at 40C	396,687	SG350-28MP	2	49.6 dB at 40C	213,373	SG350-28SFP	1	43.6 dB at 50C	101,523	SG350-52	1	48.0 dB at 40C	301,297	SG350-52P	3	54.2 dB at 40C	195,746	SG350-52MP	4	51.7 dB at 40C	163,704
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<b>Warranty</b>	Limited lifetime with next business day advance replacement (where available)																																																																																																

Feature	Description
<b>Package Contents</b>	
<ul style="list-style-type: none"> <li>• Cisco 350 Series Switch</li> <li>• Power Cord (Power Adapter for Desktop SKUs)</li> <li>• Mounting Kit included in all SKUs, including desktop models</li> <li>• Console Cable</li> <li>• Quick Start Guide</li> </ul>	
<b>Minimum Requirements</b>	
<ul style="list-style-type: none"> <li>• Web browser: Mozilla Firefox version 8 or later; Microsoft Internet Explorer version 7 or later, Safari, Chrome</li> <li>• Category 5 Ethernet network cable</li> <li>• TCP/IP, network adapter, and network operating system (such as Microsoft Windows, Linux, or Mac OS X) installed on each computer in the network</li> </ul>	

## Ordering Information

Table 2 provides ordering information for the Cisco 350 Series Switches. Table 3 gives region- and country-specific information, and Table 4 provides MFE and MGE transceiver ordering information.

**Table 2.** Cisco 350 Series Switches Ordering Information

Model Name	Order Product ID Number	Description
<b>Fast Ethernet</b>		
SF350-08	SF350-08-K9-xx	<ul style="list-style-type: none"> <li>• 8 10/100 ports</li> </ul>
SF352-08	SF352-08-K9-xx	<ul style="list-style-type: none"> <li>• 8 10/100 ports</li> <li>• 2 Gigabit copper/SFP combo</li> </ul>
SF352-08P	SF352-08P-K9-xx	<ul style="list-style-type: none"> <li>• 8 10/100 ports with 62W power budget</li> <li>• 2 Gigabit copper/SFP combo</li> </ul>
SF352-08MP	SF352-08MP-K9-xx	<ul style="list-style-type: none"> <li>• 8 10/100 ports with 128W power budget</li> <li>• 2 Gigabit copper/SFP combo</li> </ul>
SF350-24	SF350-24-K9-xx	<ul style="list-style-type: none"> <li>• 24 10/100 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SF350-24P	SF350-24P-K9-xx	<ul style="list-style-type: none"> <li>• 24 10/100 PoE+ ports with 185W power budget</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SF350-24MP	SF350-24MP-K9-xx	<ul style="list-style-type: none"> <li>• 24 10/100 PoE+ ports with 375W power budget</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SF350-48	SF350-48-K9	<ul style="list-style-type: none"> <li>• 48 10/100 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SF350-48P	SF350-48P-K9	<ul style="list-style-type: none"> <li>• 48 10/100 PoE+ ports with 382W power budget</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SF350-48MP	SF350-48MP-K9	<ul style="list-style-type: none"> <li>• 48 10/100 PoE+ ports with 740W power budget</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
<b>Gigabit Ethernet</b>		
SG350-8PD	SG350-8PD-K9	<ul style="list-style-type: none"> <li>• 8 10/100/1000 ports</li> <li>• 2 2.5G ports</li> <li>• 2 combo mini-GBIC ports</li> </ul>
SG350-10	SG350-10-K9	<ul style="list-style-type: none"> <li>• 8 10/100/1000 ports</li> <li>• 2 combo mini-GBIC ports</li> </ul>
SG350-10P	SG350-10P-K9	<ul style="list-style-type: none"> <li>• 8 10/100/1000 PoE ports with 62W power budget</li> <li>• 2 Combo mini-GBIC ports</li> </ul>
SG350-10MP	SG350-10MP-K9	<ul style="list-style-type: none"> <li>• 8 10/100/1000 PoE ports with 128W power budget</li> <li>• 2 Combo mini-GBIC ports</li> </ul>

Model Name	Order Product ID Number	Description
SG355-10P	SG355-10P-K9	<ul style="list-style-type: none"> <li>• 8 10/100/1000 PoE+ ports with 62W power budget</li> <li>• 2 Combo mini-GBIC ports</li> </ul>
SG350-10SFP	SG350-10SFP-K9	<ul style="list-style-type: none"> <li>• 8 SFP Gigabit slots</li> <li>• 2 Gigabit copper/SFP combo</li> </ul>
SG350-20	SG350-20-K9	<ul style="list-style-type: none"> <li>• 16 10/100/1000 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-28	SG350-28-K9	<ul style="list-style-type: none"> <li>• 24 10/100/1000 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-28P	SG350-28P-K9	<ul style="list-style-type: none"> <li>• 24 10/100/1000 ports (24 PoE ports with 195W power budget)</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-28MP	SG350-28MP-K9	<ul style="list-style-type: none"> <li>• 24 10/100/1000 ports (24 PoE+ ports with 382W power budget)</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-28SFP	SG350-28SFP-K9	<ul style="list-style-type: none"> <li>• 24 SFP Gigabit slots</li> <li>• 2 Gigabit copper/SFP combo</li> </ul>
SG350-52	SG350-52-K9-xx	<ul style="list-style-type: none"> <li>• 48 10/100/1000 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-52P	SG350-52P-K9-xx	<ul style="list-style-type: none"> <li>• 48 10/100/1000 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>
SG350-52MP	SG350-52MP-K9-xx	<ul style="list-style-type: none"> <li>• 48 10/100/1000 ports</li> <li>• 2 Gigabit copper/SFP combo + 2 SFP ports</li> </ul>

\* Each combo mini-GBIC port has one 10/100/1000 Ethernet port and one mini-GBIC/SFP Gigabit Ethernet slot, with one port active at a time.

The -xx in the Product Order ID Number is a country-/region-specific suffix. For example, the complete PID of SG350-28P for the United States is SG350-28P-K9-NA. Please refer to Table 2 for the correct suffix to use for your country/region.

**Table 3.** Country/Region Suffix for Product Order ID Number

Suffix	Country/Region
-NA	<ul style="list-style-type: none"> <li>• USA, Canada, Mexico, Colombia, Chile and rest of LATAM</li> </ul>
-BR	<ul style="list-style-type: none"> <li>• Brazil</li> </ul>
-AR	<ul style="list-style-type: none"> <li>• Argentina</li> </ul>
-EU	<ul style="list-style-type: none"> <li>• EU, Russia, Ukraine, Israel, UAE, Turkey, Egypt, South Africa, Indonesia, Philippines, Vietnam, Thailand, India, Korea</li> </ul>
-UK	<ul style="list-style-type: none"> <li>• United Kingdom, Saudi Arabia, Qatar, Kuwait, Singapore, Hong Kong, Malaysia</li> </ul>
-AU	<ul style="list-style-type: none"> <li>• Australia, New Zealand</li> </ul>
-CN	<ul style="list-style-type: none"> <li>• China</li> </ul>
-IN	<ul style="list-style-type: none"> <li>• India</li> </ul>
-JP	<ul style="list-style-type: none"> <li>• Japan</li> </ul>
-KR	<ul style="list-style-type: none"> <li>• Korea</li> </ul>

The products may also be available in a country/region not listed in Table 3. Not all product models are offered in all countries/regions. For India, either -EU or -IN suffix will be used depending on product models. For Korea, either -EU or -KR suffix will be used depending on product models. Please consult with your local Cisco sales representative or Cisco partners for more details.

**Table 4.** MFE and MGE Transceiver Ordering Information

MGE Transceivers	
<b>MGBLH1</b>	1000BASE-LH SFP transceiver, for single-mode fiber, 1310 nm wavelength, support up to 40 km
<b>MGBSX1</b>	1000BASE-SX SFP transceiver, for multimode fiber, 850 nm wavelength, support up to 550 m

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### For More Information

To find out more about the Cisco 350 Series, visit <https://www.cisco.com/go/350switches>.



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