Equipos Ethernet

Area de Ingeniería Telemática
http://www.tlm.unavarra.es

Redes de Banda Ancha
5º Ingeniería de Telecomunicación

Listado

- Repetidor
- Hub 10/100
- Switch no gestionable
- Switch gestionable
- GBIC
- Switch Layer 3

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- **Repetidor**
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Magnum 200X 2-Port Repeaters

Features

- Extends network distances beyond standard limits while maintaining network performance

- Supports all standard Ethernet media types, with repeater units for both mixed-media and homogenous segments

- Ensures data integrity through comprehensive signal quality maintenance, including automatic partitioning and reconnection

- Complies with Ethernet V1.0/2.0 standards; IEEE 802.3 with full repeater functionality

- Durable metal enclosure, internal auto-ranging power supply.

Magnum™ 200X Two-Port Repeaters easily and cost-effectively expand Ethernet networks when Ethernet media distance limits are not sufficient or when different media types need to be connected in a single link.

The Magnum repeater models support all standard Ethernet media types (BNC, AUI, twisted pair, and fiber optic) to allow users to extend network distances. When media type preferences change or when networks lengthen with system growth, the ability to convert media types while ensuring standard signals on both network segments saves time and money. The Magnum 200X series also support all media type combinations.

The full-featured modular media connectors for Magnum 200X repeaters offer media-specific features for application convenience. The BNC module's internal termination switch eliminates the need for a tee connector. The AUI module's slide-lock ensures secure cable connections. The twisted pair module has a shielded port connector and is switchable between a user segment and an

Magnum 200X 2-Port Repeaters

internal auto-ranging power supply.

secure cable connections. The twisted pair module has a shielded port connector and is switchable between a user segment and an up-link segment without special crossover cables. The fiber module supports both the 2.0 Km 10BASE-FL specifications. All modules have diagnostic / status LEDs next to the port connectors.

The Magnum 200X units have an internal auto-ranging power supply. Optional brackets for rack mounting are available. The Magnum Two-Port Repeaters and all other Magnum products are designed and manufactured in the USA and are backed by a three year warranty.

Magnum 200X 2-Port Repeaters

PERFORMANCE:
Data Rate: 10 Mbits / second
Partitioning: Enforced after 32 consecutive collisions
Reconnect: After 512 bits of error-free transmission

NETWORK STANDARDS:
Ethernet V1.0/V2.0, IEEE 802.3;10BASE-T, 10BASE2,
10BASE5,DTE, FOIRL, 10BASE-FL

MAXIMUM STANDARD ETHERNET LENGTHS:
10BASE-FL mm Fiber Optic 2.0 Km
Single-mode Fiber Optic 10.0 Km
DTE (AUI drop cable)50 m10BASE-T (twisted pair)100 m
10BASE2 ThinNet 185 m
10BASE5 ThickNet 500 m

CONNECTORS:
Two Magnum RPM ports
EC-type AC power in rear
RPM-FST: 1 fiber optic multi-mode, ST-type connector.
RPM-FSM: 1 fiber optic single-mode, ST-Type connector

RPM Types are:
RPM-BNC: 1 BNC connector, internal terminal switch
RPM-AUI: 1 AUI (DB-15 fem.) connector; slide-lock
RPM-TP: 1 RJ-45 female twisted pair connector, up-link switch
All RPMs can also be used with other Magnum "X series"
products)

OPERATING ENVIRONMENT:
Ambient Temperature: 32° to 120°F (0° to 50°C)
Storage: -20°C to 60°C
Ambient Relative Humidity: 10% - 95% (non-condensing)

200X PACKAGING:
Designed for rack or shelf mounting
Enclosure: High-strength sheet metal
Dimensions: 5.4 in D x 8.5 in W x 1.75 in H
                (13.7 cm D x 21.6 cm W x 4.45 cm H)
Weight: 2.5 lb. (1.1 Kg)
Cooling Method: Convection
Internal Power Supply
Power Input: 90-260 vac, 47-63 Hz, auto-ranging
Power Connector: IEC recessed male, rear-mounted
Power Consumption: 12 watts max

LED INDICATORS :
PWR: Steady on when power applied
COL: Flashes yellow to indicate a collision has been detected
JAB: Steady on amber indicates jabber (illegal packet length con-
dition
LINK (per port): Steady on green shows the connection (Fiber and
TP only) is made at both ends, segment is ready.
Other LEDs may be on individual ports depending on me-
dia type, see RPM specs.

AGENCY APPROVALS:
UL listed (UL1950), cUL, CE
Meets FCC Part 15, Class A

WARRANTY:
Three years   Made in USA

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NETGEAR's Dual Speed Hubs

10/100 Mbps **Dual Speed Hub**

DS104   DS106   DS108   DS116

N E T G E A R's DS100 Series 10/100 Mbps Dual Speed Stackable Hubs connect PCs to share e-mail, Internet access, printers, and files. Their exceptional adaptability enables you to mix and match 10 and 100 Mbps PCs, servers, and peripherals on the same network with ease and without any configuration required. Every hub in the DS100 family offers multiple capabilities in a very compact and affordable unit, particularly designed for small business use.

ALERT

Auto-sensing dual-speed ports individually sense and adjust to run at 10 or 100 Mbps, allowing you to upgrade your network speed effortlessly.

SELF-RELIANT

Every port automatically operates at the proper speed, while the built-in 10 to 100 Mbps bridge automatically discovers where each user is and filters or forwards traffic accordingly.

NETGEAR's Dual Speed Hubs

EXPLICIT

Network ports with built-in LEDs provide clear and intuitive status for instant feedback on hub connections and of network activity.

MIX & MATCH

All devices on the same network—whether connected at 10 Mbps or 100 Mbps—operate at maximum performance.

NEAT

Compact metal case design gives you an uncluttered desktop and enables wall-mount installation.

NETGEAR's Dual Speed Hubs

TECHNICAL SPECIFICATIONS

	DS104	DS106	DS108	DS116
Network Ports	4 RJ-45 ports	6 RJ-45 ports	8 RJ-45 ports	16 RJ-45 ports
Dimensions	W 158 mm (6.2") D 101 mm (4.0") H 27 mm (1.1")	W 235 mm (9.3") D 101 mm (4.0") H 27 mm (1.1")	W 235 mm (9.3") D 101 mm (4.0") H 27 mm (1.01")	W 286 mm (11.3") D 101 mm (4.0") H 27 mm (1.1")
Weight	0.4 kg (.87 lb)	0.58 kg (1.3 lb)	0.74 kg (1.7 lb)	0.9 kg (2.0 lb)
AC Power	10 W	12 W	13 W	18 W

Standards Compliance
IEEE 802.3i 10BASE-T Ethernet
IEEE 802.3u 100BASE-TX Fast Ethernet
Built-in 10-to-100 Mbps bridge
Compatible with all popular network software, including Windows®, NetWare, and Unix

Status LEDs
Unit: power
10 Mbps segment
100 Mbps segment
Per network port: 10 or 100 Mbps operations link, receive data

Power Adapter
12VDC 1.2A (DS104/106/108)
5VDC 5.0A (DS116)
Localized plug for North America, Japan, UK, Europe, Australia

Environmental Specifications
Operating temperature: 0 to 40° C
Operating humidity: 90% maximum relative humidity, noncondensing

Electromagnetic Compliance
CE mark, commercial
FCC Part 15 Class A
EN 55 022 (CISPR 22), Class A
VCCI Class A
C-Tick

Safety Agency Approvals
(power adapter)
UL listed (UL 1950), cUL
TUV licensed (EN 60 950)
T-Mark

Warranty
Hub: 5 years
AC adapter: 2 years

PACKAGE CONTENTS

Dual speed hub
2-piece power switcher and cord
Wall-mount kit
User guide and Warranty card

Listado

- Repetidor
- Hub 10/100

- **Switch no gestionable**

- Switch gestionable

- GBIC

- Switch Layer 3

D-Link Gigabit Smart Switch

16-Port Copper Gigabit Smart Switch

Small Form factor Pluggable

With 2 Combo SFP (Mini GBIC)

The DGS-1216T copper Gigabit Smart Switch presents a cost-effective solution for the small and medium business to implement Gigabit Ethernet packet switching with easy fine-tuning of network performance and security. This switch comes with 16 10/100/1000BASE-T copper Gigabit ports and 2 combo SFP (Mini GBIC) ports for flexible fiber Gigabit connection. Port trunks are provided for server deployment and network backbone attachment, while functions important for bandwidth-intensive applications such as Priority Queues and VLANs are supported to enable you to implement Quality of Service (QoS) and security without having to go through complex network management usually found in other managed switches.

16 Copper Gigabit Ports

16 Gigabit ports provide an inexpensive alternative solution to fiber-optic. Using your existing low-cost Cat. 5 copper twisted-pair wires as the transmission media, these ports allow you to instantly upgrade your servers to Gigabit capability without requiring you to install new, expensive fiber cables. All ports support 10/100/1000Mbps network speed auto-sensing, full/half duplex auto-negotiation and auto MDI/MDIX plug-and-play.

2 Combo SFP Slots for Flexible Fiber Connection

2 combo SFP (Mini GBIC) slots are provided for flexible fiber connection. You can select to install optional transceiver modules in these slots for short, medium or long-distance fiber backbone attachment. Use of the SFP will disable their corresponding built-in 10/100/1000BASE-T connections.

Port Trunks for Aggregated Bandwidths

Ports can be combined together to create multi-link load-sharing aggregated bandwidths to a server or a network backbone. To expand the network, you can also make use of the port trunks to eliminate bottlenecks between the cascaded switches. The switch allows you to combine between 2 and 4 ports per trunk to create multiple port trunks.

VLANs for Enhanced Security & Performance

The switch support VLANs to let you improve security and bandwidth utilization by limiting the broadcast domains and confining intra-group traffic within their segments. To segment up the network, VLAN-supported workstations and servers that are connected to the switch can be grouped into different Virtual LANs (VLANs).

Quality of Service Support

The switch supports Layer 2 802.1p Priority Queue control to prioritize network packets. Classification of users' data priorities can be based on a data packet Priority Queue. This QoS function support allows you to run bandwidth-intensive and delay-sensitive applications and to attach video servers to the switch for video conference.

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D-Link Gigabit Smart Switch

General

Standards
- IEEE 802.3 10BASE-T Ethernet (twisted-pair copper)
- IEEE 802.3u 100BASE-TX Fast Ethernet (twisted-pair copper)
- IEEE 802.3ab 1000BASE-T Gigabit Ethernet (twisted-pair copper)
- IEEE 802.3z Gigabit Ethernet (fiber)
- ANSI/IEEE 802.3 NWay auto-negotiation
- IEEE 802.3x Flow Control

Number of Ports
- 16 10/100/1000BASE-T ports
- 2 combo SFP (Mini GBIC) *

* Use of the SFP will disable their corresponding 10/100/1000BASE-T connections

Mini GBIC (SFP) Support
- IEEE 802.3z 1000BASE-LX (DEM-310GT transceiver)
- IEEE 802.3z 1000BASE-SX (DEM-311GT transceiver)
- IEEE 802.3z 1000BASE-LH (DEM-314GT transceiver)
- IEEE 802.3z 1000BASE-ZX (DEM-315GT transceiver)

Protocol
CSMA/CD

Data Transfer Rates
- Ethernet:
  10Mbps (half duplex)
  20Mbps (full duplex)
- Fast Ethernet:
  100Mbps (half duplex)
  200Mbps (full duplex)
- Gigabit Ethernet:
  2000Mbps (full duplex)

Topology
Star

Network Cables
- UTP Cat. 5, Cat. 5e (100 m max.)
- EIA/TIA-568 100-ohm STP (100 m max.)

Full/half Duplex
- Full/half duplex for 10/100Mbps speeds
- Full duplex for Gigabit speed

Media Interface Exchange
Auto MDI/MDIX adjustment for all twisted-pair ports

LED Indicators
- Per port: Link/Act, Speed
- Per device: Power/CPU

Software

VLAN
- Port-based VLAN
- Maximum number of VLAN: 16 per device

Quality of Service (QoS)
- 802.1p Priority Queues
- Maximum number of queues: 2
- Port-based VLAN

Port Trunks
- 2 or 4 ports per trunk
- 2 port trunks per device

Management & Configuration
- Web-based configuration
- Windows-based utility
- Configuration reset through software or hardware (reset button)

D-Link Gigabit Smart Switch

Performance

Transmission Method
Store-and-forward

MAC Address Table
4K entries per device

MAC Address Learning
Automatic update

Packet Filtering/Forwarding Rates (half duplex)
Maximum 1,488,095 pps per port

RAM Buffer
272KB per device

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Cisco Catalyst 2950 (EI)

PRODUCT FEATURES AND BENEFITS

Feature	Benefit
Availability	
Superior Redundancy for Fault Backup	IEEE 802.1D Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance.
	• Support for Cisco Spanning Tree Protocol enhancements such as UplinkFast, BackboneFast, and PortFast technologies helps to ensure quick fail-over recovery, enhancing overall network stability and availability.
	• IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) provides rapid convergence of the spanning tree, independent of spanning-tree timers.
	• Per VLAN Rapid Spanning Tree (PVRST+) allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances.
	• Cisco CrossStack UplinkFast technology extends UplinkFast to a stack to ensure quick fail-over recovery, enhancing network stability and availability.
	• Support for Cisco's optional RPS 675, 675-watt redundant AC power system, which provides a backup power source for one of six switches, for improved fault tolerance and network uptime.
	• Redundant stacking connections provide support for a redundant loopback connection for top and bottom switches in an independent stack backplane cascaded configuration.
	• Provides unidirectional link detection (UDLD) and Aggressive aggressive UDLD for detecting and disabling unidirectional links on fiber-optic interfaces caused by incorrect fiber-optic wiring or port faults.

Cisco Catalyst 2950 (EI)

Integrated Cisco IOS Software Features for Bandwidth Optimization

- Bandwidth aggregation up to 4 Gbps (two ports full duplex) through Gigabit EtherChannel technology and up to 16 Gbps (eight ports full duplex) through Fast EtherChannel technology enhances fault tolerance and offers higher-speed aggregated bandwidth between switches, to routers and individual servers. Port Aggregation Protocol (PAgP) is available to simplify configuration.
- VLAN1 minimization allows VLAN1 to be disabled on any individual VLAN trunk link.
- Per-port broadcast, multicast, and unicast storm control prevent faulty end stations from degrading overall systems performance.
- Per virtual LAN (VLAN) Spanning Tree Plus (PVST+ allows for Layer 2 load sharing on redundant links, to efficiently use the extra capacity inherent in a redundant design.
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP) allows a spanning-tree instance per VLAN, enabling Layer 2 load sharing on redundant links.
- VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices. Dynamic Trunking Protocol (DTP) enables dynamic trunk configuration across all ports in the switch.
- Internet Group Management Protocol version 3 (IGMPv3) snooping provides for fast client joins and leaves of multicast streams, and limits bandwidth-intensive video traffic to only the requestors. Multicast VLAN Registration MVR, IGMP filtering, and fast-join and immediate leave are available as enhancements. The number of IGMP groups can be limited with IGMP throttling. IGMP Snooping time can be adjusted to optimize the performance of multicast data flows
- MVR continuously sends multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs for bandwidth and security reasons.
- Supports additional frame formats: Ethernet II (tagged and untagged) and 802.3 (Subnetwork Access Protocol [SNAP] encapsulated tagged and untagged frames).

Cisco Catalyst 2950 (EI)

Quality of Service (QoS)

Overview	• Cisco Catalyst 2950 Series switches support the aggregate QoS model by enabling classification, policing/metering, and marking functions on a per-port basis at ingress and the queuing/scheduling function at egress. • The switches support configuring QoS ACPs on all ports to ensure proper policing and marking on a per-packet basis using ACPs. Up to four ACPs per switch are supported in configuring either QoS ACPs or security filters. • Auto-QoS greatly simplifies the configuration of QoS in VoIP networks by issuing interface and global switch commands that allow the detection of Cisco IP phones, the classification of traffic, and egress queue configuration.
QoS Classification Support at Ingress	• The switches support QoS classification of incoming packets for QoS flows based on Layer 2, Layer 3, and Layer 4 fields. • The following Layer 2 fields (or a combination) can be used for classifying incoming packets to define QoS flows: source/destination MAC address, or 16-bit Ethertype. • The switches support identification of traffic based on Layer 3 type of service (ToS) field DSCP values. • The following Layer 3 and Layer 4 fields (or a combination) can be used to classify incoming packets to define QoS flows: source/destination IP address, TCP source/destination port number, or UDP source/destination port number.
QoS Metering and Policing at Ingress	• Support for metering and policing of incoming packets restricts incoming traffic flows to a certain rate. • The switches support up to six policers per Fast Ethernet port, and 60 policers on a Gigabit Ethernet port. • The switches offer granularity of traffic flows at 1 Mbps on Fast Ethernet ports, and 8 Mbps on Gigabit Ethernet ports.
QoS Marking at Ingress	• The switches support marking and remarking packets based on the state of policers and meters. • The switches support marking and remarking based on the following mappings: from DiffServ Code Point (DSCP) to 802.1p, and 802.1p to DSCP. • The switches support 14 well-known and widely used DSCP values. • The switches support classifying or reclassifying packets based on default DSCP per port. They also support classification based on DSCP values in the ACL. • The switches support classifying or reclassifying frames based on default 802.1p value per port. • The switches support 802.1p override at ingress.

Cisco Catalyst 2950 (EI)

QoS Scheduling Support at Egress	• Four queues per egress port are supported in hardware. • The WRR queuing algorithm ensures that low-priority queues are not starved. • Strict-priority queue configuration via Strict Priority Scheduling ensures that time-sensitive applications such as voice always follow an expedited path through the switch fabric.
Sophisticated Traffic Management	• The switch offers the ability to limit data flows based on MAC source/destination address, IP source/destination address, TCP/UDP port numbers, or any combination of these fields. • The switch offers the ability to manage data flows asynchronously upstream and downstream from the end station or on the uplink.

Cisco Catalyst 2950 (EI)

Cisco Network Assistant Software

- Cisco Network Assistant Software is a free, standalone network management application software that simplifies the administration of networks of up to 250 users. . It supports a wide range of Cisco Catalyst intelligent switches from Cisco Catalyst 2950 through Cisco Catalyst 4506. With Cisco Network Assistant, users can manage Cisco Catalyst switches plus launch the device managers of Cisco integrated services routers (ISRs) and Cisco Aironet WLAN access points by simply clicking on its icon in the topology map.
- Cisco Architecture for Voice, Video, and Integrated Data (AVVID) Wizards use just a few user inputs to automatically configure the switch to optimally handle different types of traffic: voice, video, multicast, and/or high-priority data.
- A security wizard is provided to restrict unauthorized access to servers and networks, and to restrict certain applications on the network.
- One-click software upgrades can be performed across multiple switches simultaneously, and configuration cloning enables rapid deployment of networks.
- Cisco Network Assistant Software supports multilayer feature configurations such as ACPs and QoS parameters.
- Cisco Network Assistant Software Guide Mode assists users in the configuration of powerful advanced features by providing step-by-step instructions.
- Cisco Network Assistant Software provides enhanced online help for context-sensitive assistance.
- Easy-to-use GUI provides both a topology map and front-panel view of the switches.
- Multidevice and multiport configuration capabilities allow network administrators to save time by configuring features across multiple switches and ports simultaneously.
- User-personalized interface allows users to modify polling intervals, table views, and other settings within Cisco Network Assistant Software, and to retain these settings the next time they use Cisco Network Assistant.
- Alarm notification provides automated e-mail notification of network errors and alarm thresholds.

Cisco Catalyst 2950 (EI)

Feature	Description
Performance	• 13.6 Gbps switching fabric (Catalyst 2950G-48)
	• 8.8 Gbps switching fabric (Catalyst 2950G-24, 2950G-24-DC, 2950T-24, 2950C-24, 2950G-12)
	• Cisco Catalyst 2950G-48: 13.6 Gbps maximum forwarding bandwidth
	• Cisco Catalyst 2950G-24: 8.8 Gbps maximum forwarding bandwidth
	• Cisco Catalyst 2950G-24-DC: 8.8 Gbps maximum forwarding bandwidth
	• Cisco Catalyst 2950G-12: 6.4 Gbps maximum forwarding bandwidth
	• Cisco Catalyst 2950T-24: 8.8 Gbps maximum forwarding bandwidth
	• Cisco Catalyst 2950C-24: 5.2 Gbps maximum forwarding bandwidth (Forwarding rates based on 64-byte packets.)
	• Cisco Catalyst 2950G-48: 10.1 Mpps wire-speed forwarding rate
	• Cisco Catalyst 2950G-24: 6.6 Mpps wire-speed forwarding rate
	• Cisco Catalyst 2950G-24-DC: 6.6 Mpps wire-speed forwarding rate
	• Cisco Catalyst 2950G-12: 4.8 Mpps wire-speed forwarding rate
	• Cisco Catalyst 2950T-24: 6.6 Mpps wire-speed forwarding rate
	• Cisco Catalyst 2950C-24: 3.9 Mpps wire-speed forwarding rate
	• 8 MB memory architecture shared by all ports
	• Up to 16 MB SDRAM and 8 MB Flash memory
	• Configurable up to 8000 MAC addresses
	• Configurable maximum transmission unit (MTU) of up to 1530 bytes (Cisco Catalyst 2950G switches only)

Cisco Catalyst 2950 (EI)

Standards	
	• IEEE 802.1x support
	• IEEE 802.1w
	• IEEE 802.1s
	• IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports
	• IEEE 802.1D Spanning-Tree Protocol
	• IEEE 802.1p class-of-service (CoS) prioritization
	• IEEE 802.1Q VLAN
	• IEEE 802.3 10BASE-T specification
	• IEEE 802.3u 100BASE-TX specification
	• IEEE 802.3ab 1000BASE-T specification
	• IEEE 802.3ad
	• IEEE 802.3z 1000BASE-X specification
	• 1000BASE-X (GBIC)
	• 1000BASE-T (GBIC)

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Cisco GBIC

CISCO 1000BASE-T GBIC

The Cisco 1000BASE-T GBIC (product number WS-G5483) connects a GBIC port to Category 5 wiring via a standard RJ-45 interface. The maximum Category 5 wiring distance is 328 feet (100 meters). For details, see the *Cisco 1000BASE-T Gigabit Interface Converter Data Sheet*.

CISCO 1000BASE-SX GBIC

The Cisco 1000BASE-SX GBIC (WS-G5484) operates on ordinary multimode fiber (MMF) optic link spans up to 1815 feet (550 m) long.

CISCO 1000BASE-LX/LH GBIC

The Cisco 1000BASE-LX/LH GBIC (WS-G5486) fully complies with the IEEE 802.3z 1000BASE-LX standard. However, its higher optical quality allows it to reach 6.2 miles (10 kilometers) over single-mode fiber (SMF), compared with the 3.1 miles (5 km) specified in the standard.

CISCO 1000BASE-ZX GBIC

The Cisco 1000BASE-ZX GBIC (WS-G5487) operates on ordinary single-mode fiber optic link spans up to 43.4 miles (70 km) long. Link spans of up to 62 miles (100 km) are possible using premium single-mode fiber or dispersion shifted single-mode fiber. The GBIC provides an optical link budget of 23 dB—the precise link span length will depend on multiple factors such as fiber quality, number of splices, and connectors.

When shorter distances of single-mode fiber are used, it might be necessary to insert an in-line optical attenuator in the link to avoid overloading the receiver:

- A 5-dB or 10-dB inline optical attenuator should be inserted between the fiber-optic cable plant and the receiving port on the Cisco 1000BASE-ZX GBIC at each end of the link whenever the fiber-optic cable span is less than 15.5 miles (25 km).

Cisco GBIC

CONNECTORS AND CABLING

Connectors: Dual SC/PC connector

Note: Only connections with patch cords with PC or UPC connectors are supported. Patch cords with APC connectors are not supported.

Note: Patch cables need to be compliant with GR326.

Table 1 provides cabling specifications for the Cisco GBICs that you install in the Gigabit Ethernet port. Note that all Cisco GBICs have SC-type connectors, and the minimum cable distance for all GBICs listed (multimode fiber [MMF] and single-mode fiber [SMF]) is 6.5 feet (2 m).

Table 1.   Cisco GBIC Port Cabling Specifications

GBIC	Wavelength (nm)	Fiber Type	Core Size (Micron)	Modal Bandwidth (MHz/km)	Cable Distance
Cisco 1000BASE-SX	850	MMF	62.5	160	722 ft (220 m)
			62.5	200	902 ft (275 m)
			50.0	400	1640 ft (500 m)
			50.0	500	1804 ft (550 m)
Cisco 1000BASE-LX/LH	1310	MMF*	62.5	500	1804 ft (550 m)
			50.0	400	1804 ft (550 m)
			50.0	500	1804 ft (550 m)
		SMF	9/10	N/A	6.2 miles (10 km)
Cisco 1000BASE-ZX	1550	SMF	9/10	N/A	43.4 to 62 miles (70 to 100 km)**

*   Mode-conditioning patch cord (CAB-GELX-625 or equivalent) is required.

**   Cisco 1000BASE-ZX GBIC can reach up to 62 miles (100 km) by using dispersion shifted SMF or low-attenuation SMF; the distance depends on fiber quality, number of splices, and connectors.
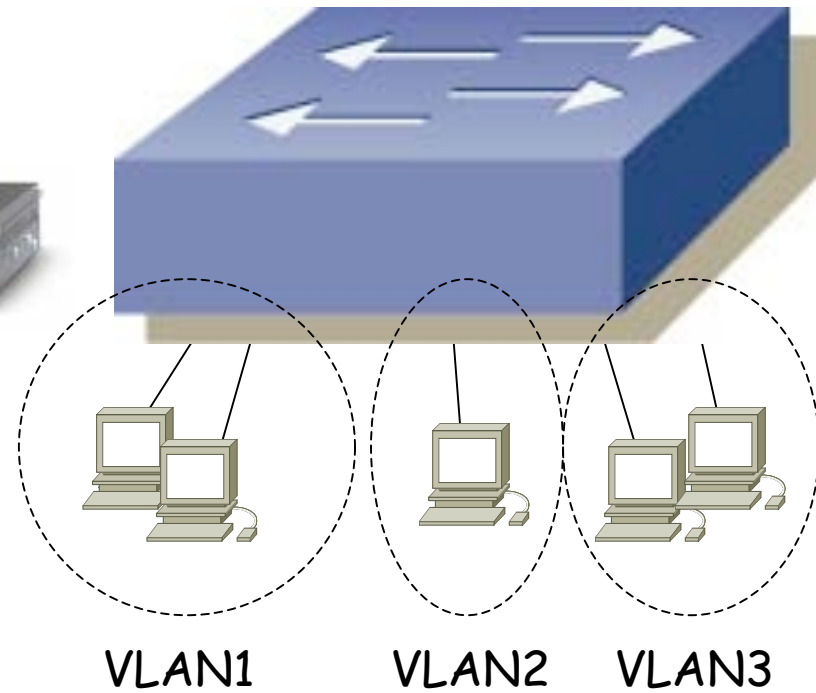
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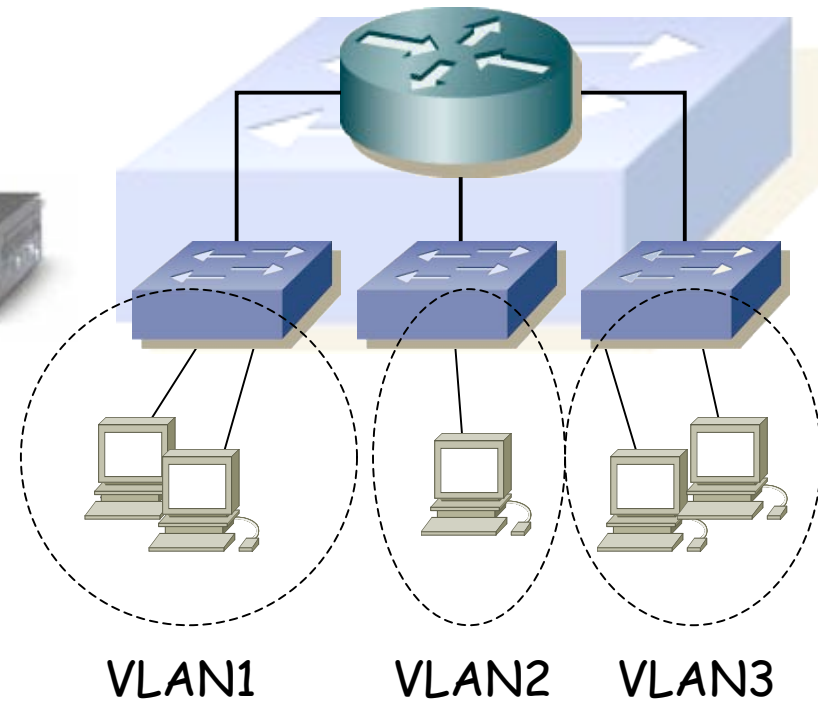- **Switch Layer 3**

Cisco Catalyst 3750

- Switches Layer 3

VLAN1   VLAN2   VLAN3

Cisco Catalyst 3750

- Switches Layer 3

VLAN1   VLAN2   VLAN3

Cisco Catalyst 3750

Feature	Benefit
Ease of Use and Deployment	• Autoconfiguration of new stack units eliminates reconfiguration. • Dynamic Host Configuration Protocol (DHCP) autoconfiguration of multiple switches through a boot server eases switch deployment. • Automatic Cisco IOS Software version checking and updating helps ensure that all stack members have the same software version. • Automatic QoS (AutoQoS) simplifies QoS configuration in voice over IP (VoIP) networks by issuing interface and global switch commands to detect Cisco IP phones, classify traffic, and help enable egress queue configuration. • Master configuration management helps ensure that all switches are automatically upgraded when the master switch receives a new software version. • Autosensing on each non-SFP port detects the speed of the attached device and automatically configures the port for 10-, 100-, or 1000-Mbps operation, easing switch deployment in mixed 10, 100, and 1000BASE-T environments. • Autonegotiating on all ports automatically selects half- or full-duplex transmission mode to optimize bandwidth. • Dynamic Trunking Protocol (DTP) facilitates dynamic trunk configuration across all switch ports. • Port Aggregation Protocol (PAgP) automates the creation of Cisco Fast EtherChannel® groups or Gigabit EtherChannel groups to link to another switch, router, or server. • Link Aggregation Control Protocol (LACP) allows the creation of Ethernet channeling with devices that conform to IEEE 802.3ad. This feature is similar to Cisco EtherChannel technology and PAgP. • DHCP Relay allows a DHCP relay agent to broadcast DHCP requests to the network DHCP server. • IEEE 802.3z-compliant 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX, 1000BASE-T, and CWDM physical-interface support through a field-replaceable SFP module provides unprecedented flexibility in switch deployment. • To help ensure that the switch can be quickly connected to the network and can pass traffic with minimal user intervention, there is a default configuration stored in Flash memory. • Automatic media-dependent interface crossover (MDIX) automatically adjusts transmit and receive pairs if an incorrect cable type (cross-over or straight-through) is installed.

Cisco Catalyst 3750

Availability and Scalability	
Superior Redundancy for Fault Backup	• 1:N master redundancy allows each stack member to serve as a master, providing the highest reliability for forwarding. • Cisco CrossStack UplinkFast (CSUF) technology provides increased redundancy and network resiliency through fast spanning-tree convergence (less than 2 seconds) across a switch stack with Cisco StackWise technology. • Cross-Stack EtherChannel provides the ability to configure Cisco EtherChannel technology across different members of the stack for high resiliency. • IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) provides rapid spanning-tree convergence independent of spanning-tree timers and also offers the benefit of distributed processing. • Stacked units behave as a single spanning-tree node. • Per-VLAN Rapid Spanning Tree (PVRST+) allows rapid spanning-tree reconvergence on a per-VLAN spanning-tree basis, without requiring the implementation of spanning-tree instances. • Cisco Hot Standby Router Protocol (HSRP) is supported to create redundant, failsafe routing topologies. • Unidirectional Link Detection Protocol (UDLD) and Aggressive UDLD allow unidirectional links caused by incorrect fiber-optic wiring or port faults to be detected and disabled on fiber-optic interfaces. • Switch-port autorecovery (errdisable) automatically attempts to reactivate a link that is disabled because of a network error. • Cisco RPS 675 Redundant Power System support provides superior power-source redundancy for up to 6 Cisco networking devices, resulting in improved fault tolerance and network uptime. • Equal-cost routing for load balancing and redundancy. • Bandwidth aggregation up to 16 Gbps through 10 Gigabit EtherChannel technology, 8 Gbps through Gigabit
	EtherChannel technology, and up to 800 Mbps through Fast EtherChannel technology enhances fault tolerance and offers higher-speed aggregated bandwidth between switches and to routers and individual servers. • Uplink bandwidth can be easily upgraded by adding a 10 Gigabit Ethernet version to a wiring-closet stack and replacing the 1 Gigabit Ethernet uplinks with 10 Gigabit Ethernet without having to change fiber pairs.

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High-Performance IP Routing	• Cisco Express Forwarding hardware routing architecture delivers extremely high-performance IP routing.
	• Basic IP unicast routing protocols (static, Routing Information Protocol Version 1 [RIPv1], and RIPv2) are supported for small-network routing applications.
	• IPv6 routing support in hardware for maximum performance. The Advanced IP Services License is required.
	• Advanced IP unicast routing protocols (Open Shortest Path First [OSPF], Interior Gateway Routing Protocol [IGRP], Enhanced IGRP [EIGRP], and Border Gateway Protocol Version 4 [BGPv4]) are supported for load balancing and constructing scalable LANs. The IP Services Image is required.
	• Policy-based routing (PBR) allows superior control by facilitating flow redirection regardless of the routing protocol configured. The IP Services Image is required.
	• HSRP provides dynamic load balancing and failover for routed links, up to 32 HSRP links supported per unit or stack.
	• Inter-VLAN IP routing for full Layer 3 routing between 2 or more VLANs.
	• Protocol Independent Multicast (PIM) for IP multicast routing is supported, including PIM sparse mode (PIM-SM), PIM dense mode (PIM-DM), and PIM sparse-dense mode. The IP Services Image is required.
	• Distance Vector Multicast Routing Protocol (DVMRP) tunneling interconnects 2 multicast-enabled networks across nonmulticast networks. The IP Services Image is required.
	• Fallback bridging forwards non-IP traffic between 2 or more VLANs. The IP Services Image is required.
	• Routing is possible across the stack.
	• 128 switch virtual interfaces (SVIs) are recommended. Maximum of 1000 are supported (depending on the number of routes and multicast entries). 468 routed ports are supported per stack.

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| Integrated Cisco IOS Software Features for Bandwidth Optimization | • Per-port broadcast, multicast, and unicast storm control prevents faulty end stations from degrading overall systems performance.
• IEEE 802.1d Spanning Tree Protocol support for redundant backbone connections and loop-free networks simplifies network configuration and improves fault tolerance.
• PVST+ allows for Layer 2 load sharing on redundant links to efficiently use the extra capacity inherent in a redundant design.
• IEEE 802.1s Multiple Spanning Tree Protocol allows a spanning-tree instance per VLAN, for Layer 2 load sharing on redundant links.
• Equal-cost routing facilitates Layer 3 load balancing and redundancy across the stack. The IP Services Image is required.
• Local Proxy Address Resolution Protocol (ARP) works in conjunction with Private VLAN Edge to minimize broadcasts and maximize available bandwidth.
• VLAN1 minimization allows VLAN1 to be disabled on any individual VLAN trunk link.
• VLAN Trunking Protocol (VTP) pruning limits bandwidth consumption on VTP trunks by flooding broadcast traffic only on trunk links required to reach the destination devices.
• Internet Group Management Protocol (IGMP) snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors.
• Multicast VLAN Registration (MVR) continuously sends multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs for bandwidth and security reasons.
• Up to 48 EtherChannel groups are supported per stack. |
| Scalable Stacking | • Cisco StackWise stacking creates a 32 Gbps switch interconnection. Stacking does not require user ports. Up to 9 units can be stacked together for a maximum of 468 10/100 ports, 468 10/100/1000 ports, 108 optical aggregation ports, nine 10 Gigabit Ethernet ports, or any mix thereof. |

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QoS and Control	
Advanced QoS	• Cross-stack QoS allows QoS to be configured across the entire stack. • 802.1p class of service (CoS) and differentiated services code point (DSCP) field classification are provided, using marking and reclassification on a per-packet basis by source and destination IP address, source and destination MAC address, or Layer 4 Transmission Control Protocol/User Datagram Protocol (TCP/UDP) port number. • Cisco control-plane and data-plane QoS ACLs on all ports help ensure proper marking on a per-packet basis. • 4 egress queues per port help enable differentiated management of up to 4 traffic types across the stack. • Shaped Round Robin (SRR) scheduling helps ensure differential prioritization of packet flows by intelligently servicing the ingress queues and egress queues. • Weighted Tail Drop (WTD) provides congestion avoidance at the ingress and egress queues before a disruption occurs. • Strict priority queuing helps ensure that the highest-priority packets are serviced ahead of all other traffic. • There is no performance penalty for highly granular QoS capability.
Granular Rate Limiting	• Cisco committed information rate (CIR) function provides bandwidth in increments as low as 8 Kbps.
	• Rate limiting is provided based on source and destination IP address, source and destination MAC address, Layer 4 TCP/UDP information, or any combination of these fields, using QoS ACLs (IP ACLs or MAC ACLs), class maps, and policy maps. • Asynchronous data flows upstream and downstream from the end station or on the uplink are easily managed using ingress policing and egress shaping. • Up to 64 aggregate or individual policers are available per Fast Ethernet or Gigabit Ethernet port.

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Feature	Benefit
Superior Manageability	• Cisco IOS CLI support provides common user interface and command set with all Cisco routers and Cisco Catalyst desktop switches. • Switching Database Manager templates for access, routing, and VLAN deployment allow the administrator to easily maximize memory allocation to the desired features based on deployment-specific requirements. • VLAN trunks can be created from any port, using either standards-based 802.1Q tagging or the Cisco Inter-Switch Link (ISL) VLAN architecture. • Up to 1005 VLANs per switch or stack and up to 128 Spanning-Tree instances per switch are supported. • 4000 VLAN IDs are supported. • Voice VLAN simplifies telephony installations by keeping voice traffic on a separate VLAN for easier administration and troubleshooting. • Cisco VLAN Trunking Protocol (VTP) supports dynamic VLANs and dynamic trunk configuration across all switches. • Cisco Group Management Protocol server functions allow a switch to serve as the Cisco Group Management Protocol router for client switches. The IP Services Image is required. • IGMP snooping provides fast client joins and leaves of multicast streams and limits bandwidth-intensive video traffic to only the requestors. • Remote Switch Port Analyzer (RSPAN) allows administrators to remotely monitor ports in a Layer 2 switch network from any other switch in the same network. • For enhanced traffic management, monitoring, and analysis, the Embedded Remote Monitoring (RMON) software agent supports 4 RMON groups (history, statistics, alarms, and events). • Layer 2 traceroute eases troubleshooting by identifying the physical path that a packet takes from source to destination. • All 9 RMON groups are supported through a SPAN port, which permits traffic monitoring of a single port, a group of ports, or the entire stack from a single network analyzer or RMON probe. • Domain Name System (DNS) provides IP-address resolution with user-defined device names. • Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location. • Network Timing Protocol (NTP) provides an accurate and consistent timestamp to all intranet switches. • Multifunction LEDs per port for port status; half-duplex and full-duplex mode; and 10BASE-T, 100BASE-TX, and 1000BASE-T indication as well as switch-level status LEDs for system, redundant-power supply, and bandwidth utilization provide a comprehensive and convenient visual management system. • SPAN works across all the ports in a stack.

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Description	Specification
Performance	• 32 Gbps switching fabric
	• Stack-forwarding rate of 38.7 mpps for 64-byte packets
	• Forwarding rate: 6.5 mpps (Cisco Catalyst 3750-24TS, Catalyst 3750-24FS, and Catalyst 3750-24PS), 13.1 mpps (Catalyst 3750-48TS and Catalyst 3750-48PS), 17.8 mpps (Catalyst 3750G-12S), 35.7 mpps (Catalyst 3750G-24T), 38.7 mpps (Catalyst 3750G-24TS and Catalyst 3750G-24WS), 35.7 mpps (Catalyst 3750G-16TD), 38.7 mpps (Catalyst 3750G-24TS-1U), 38.7 mpps (Catalyst 3750G-24PS), 38.7 mpps (Catalyst 3750G-48TS), 38.7 mpps (Catalyst 3750G-48PS)
	• 128 MB DRAM and 16 MB Flash memory (Cisco Catalyst 3750G-24TS and Catalyst 3750G-24WS, Catalyst 3750G-24T, Catalyst 3750G-12S, Catalyst 3750-24TS, Catalyst 3750-24PS, Catalyst 3750-48TS, Catalyst 3750-48PS, and Catalyst 3750G-16TD)
	• 128 MB DRAM and 32 MB Flash memory (Cisco Catalyst 3750G-24TS-1U and Catalyst 3750G-24WS, Catalyst 3750G-24PS, Catalyst 3750G-48TS, Catalyst 3750G-48PS, Catalyst 3750-24FS)
	• Configurable up to 12,000 MAC addresses (Cisco Catalyst 3750G-24TS and Catalyst 3750G-24WS, Catalyst 3750G-24T, Catalyst 3750G-12S, Catalyst 3750-24TS, Catalyst 3750-24FS, Catalyst 3750-24PS, Catalyst 3750-48TS, Catalyst 3750-48PS, Catalyst 3750-24TS-1U, Catalyst 3750G-24PS, Catalyst 3750G-48TS, Catalyst 3750G-48PS, and Catalyst 3750G-16TD)
	• Configurable up to 20,000 unicast routes (Cisco Catalyst 3750G-12S) and up to 11,000 unicast routes (Catalyst 3750G-24TS and Catalyst 3750G-24WS, Catalyst 3750G-24T, Catalyst 3750-24TS, Catalyst 3750-24FS, Catalyst 3750-24PS, Catalyst 3750-48TS, Catalyst 3750-48PS, Catalyst 3750G-24TS-1U, Catalyst 3750G-24PS, Catalyst 3750G-48TS, Catalyst 3750G-48PS, and Catalyst 3750G-16TD)
	• Configurable up to 1000 IGMP groups and multicast routes (Cisco Catalyst 3750G-24TS and Catalyst 3750G-24WS, Catalyst 3750G-24T, Catalyst 3750G-12S, Catalyst 3750-24TS, Catalyst 3750-24FS, Catalyst 3750-24PS, Catalyst 3750-48TS, Catalyst 3750-48PS, Catalyst 3750G-24TS-1U, Catalyst 3750G-24PS, Catalyst 3750G-48TS, Catalyst 3750G-48PS, and Catalyst 3750G-16TD)
	• Configurable maximum transmission unit (MTU) of up to 9000 bytes, with a maximum Ethernet frame size of 9018 bytes (jumbo frames) for bridging on Gigabit Ethernet ports, and up to 1546 bytes for bridging and routing on Fast Ethernet ports
Connectors and Cabling	• 10BASE-T ports: RJ-45 connectors, 2-pair Category 3 (Cat-3), 4, or 5 unshielded twisted-pair (UTP) cabling
	• 100BASE-TX ports: RJ-45 connectors, 2-pair Cat-5 UTP cabling
	• 100BASE-FX ports: MT-RJ connectors, 50/125 or 62.5/125 micron multimode fiber
	• 1000BASE-T ports: RJ-45 connectors, 2-pair Cat-5 UTP cabling
	• 1000BASE-T SFP-based ports: RJ-45 connectors, 2-pair Cat-5 UTP cabling
	• 1000BASE-SX, -LX/LH, -ZX, and CWDM SFP-based ports: LC fiber connectors (single-mode, or multimode fiber)
	• 10GBASE-ER XENPAK-based port (single-mode)
	• 10GBASE-LR XENPAK-based port (single-mode)
	• 110GBASE-SR XENPAK-based port (single-mode)
	• Cisco StackWise stacking ports: copper-based Cisco StackWise cabling
	• Management console port: RJ-45-to-DB9 cable for PC connections

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Part Number	Description
WS-C3750G-48TS-E	• 48 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGPv4, EIGRP, OSPF, PIM
WS-C3750G-48TS-S	• 48 Ethernet 10/100/1000 ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradable to full dynamic IP routing
WS-C3750G-48PS-E	• 48 Ethernet 10/100/1000 with IEEE 802.3af and Cisco prestandard PoE ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Services Image installed • Full IP routing with BGPv4, EIGRP, OSPF, PIM
WS-C3750G-48PS-S	• 48 Ethernet 10/100/1000 with IEEE 802.3af and Cisco prestandard PoE ports • 4 SFP-based Gigabit Ethernet ports • 32 Gbps, high-speed stacking bus • Innovative stacking technology • 1 RU stackable, multilayer switch • Enterprise-class intelligent services delivered to the network edge • IP Base Image installed • Basic RIP and static routing, upgradable to full dynamic IP routing
WS-C3750-48PS-E	• 48 Ethernet 10/100 ports with IEEE 802.3af and Cisco prestandard PoE