Cisco 4- and 8-Port Gigabit Ethernet Enhanced High-Speed WAN Interface Cards

Product Overview

The 4- and 8-port Cisco® Gigabit Ethernet Enhanced High-Speed WAN interface cards (EHWICs) can reduce your company's total cost of ownership (TCO) by integrating Gigabit Ethernet (GE) switch ports within Cisco 3900, 2900, and 1900 Series Integrated Services Routers (ISRs). These low-density Gigabit Ethernet switches offer small to medium-sized business (SMB) and enterprise branch-office customers a combination of switching and routing integrated into a single device (Figure 1).

Integration of these switches with Cisco IOS® Software allows network administrators to manage a single device using Cisco management tools or the router command-line interface (CLI) for LAN and WAN management needs. This approach reduces network complexity, lowers maintenance contract costs, and lessens staff training needs. It also simplifies software qualification efforts and delivers a consistent user experience at branch offices. Additionally, these low-density Gigabit Ethernet switching modules enable Cisco's industry-leading power initiatives, Cisco EnergyWise, Cisco Enhanced Power over Ethernet (ePoE), and per-port Power over Ethernet (PoE) power monitoring, which enhance the ability of the branch office to scale to higher performance requirements and still meet environmental initiatives for IT teams to operate a power-efficient network.

The 4- and 8-port Gigabit Ethernet EHWICs provide line-rate Layer 2 switching across onboard Gigabit Ethernet ports. The 4-port Gigabit Ethernet EHWIC has four 10/100/1000 switch ports, with options for PoE support on all four ports. The 8-port Gigabit Ethernet EHWIC has eight 10/100/1000 switched Gigabit Ethernet ports, with a PoE support option on all 8 ports.

The new features for the Gigabit Ethernet EHWICs include: 8 quality-of-service (QoS) queues per port, Shaped Deficit Weighted Round Robin (SDWRR), dynamic secure port, intrachassis cascading, up to 20W of PoE per port, and PoE per-port monitoring and policing. Multigigabit Fabric (MGF) is enabled for direct module-to-module communication.

Figure 1. Four- and 8-Port Cisco Gigabit Ethernet EHWICs

Secure Network Connectivity for Data, Voice, and Video

When inserted in a Cisco 1900, 2900, or 3900 Series ISR, the Gigabit Ethernet EHWICs provide a fully integrated, secure networking and converged IP communications solution. From a single platform with an integrated switch, you can connect IP phones, wireless access points, and IP-based video cameras to your network and power them using the IEEE 802.3af or Cisco ePoE. With the optional integration of Cisco Unified Communications Manager Express, the router can also provide call processing for the phones. As users attempt network access, the Gigabit Ethernet EHWIC can use IEEE 802.1x to validate the credentials of the end device and place the users in the appropriate VLAN or Cisco TrustSec™ group. As the end-user data leaves the LAN, the router can then encrypt the traffic and place it on a multitude of VPNs, securing the communications among branch offices and central sites.

Features and Benefits

The Cisco Gigabit Ethernet EHWICs provide increased performance levels, enhanced per-port security, ease of configuration, and, with intermodule cascading capabilities, they allow for additional ports expandability over time.

Table 1 lists some important business benefits of deploying an integrated switching solution.

Table 1. Cisco Gigabit Ethernet EHWICs Business Benefits

Customer Needs	How Addressed by Cisco EHWICs
Total Cost of Ownership	
• Scaled network infrastructure across multiple sites • Decreased costs of operating multiple devices at the branch office • Optimized IT resources	• An integrated switch solution lowers operating costs, simplifies troubleshooting, and enables businesses to scale. • One vendor also means one support center, eliminating blaming among vendors, thereby reducing troubleshooting time. • Cisco SMARTnet® support covers both ISRs and Cisco EtherSwitch devices.
Ease of Management	
• Reduced network complexity and simplified branch-office router management • Single administration and configuration of LAN and WAN policies	• Integrated switches allow simplified configuration and management. • CiscoWorks LAN Management Solution (LMS), Remote Monitoring (RMON1 and RMON2), and standards-based MIBs support provides configuration as well as detailed reporting and troubleshooting capabilities. • Simple Network Management Protocol Versions 1, 2, and 3 (SNMPv1, v2, and v3) offer comprehensive in-band management, and a CLI management console provides detailed out-of-band management. • The management interface uses standard SNMP or Secure Sockets Layer (SSL) to integrate Cisco and third-party management systems.
Green IT	
• Cisco EnergyWise technology • Single power supply for Cisco EtherSwitch device and router	• Cisco EnergyWise technology enables Cisco EtherSwitch devices to automatically reduce off-peak use of PoE. • These switches provide two to eight times lower power consumption than standalone switches. • Because no additional rack space or power supply is needed, there is less to rack, stack, and cool.

Cisco EnergyWise Technology

Cisco EnergyWise technology is an innovative architecture added to the Cisco 1900, 2900, and 3900 Series ISRs to promote companywide sustainability by reducing energy consumption across an entire network infrastructure. This technology extends the network as a platform for the power control plane for gathering, managing, and reducing power consumption of all devices, resulting in companywide optimized power delivery and reduced energy costs.

Cisco EnergyWise technology encompasses a highly intelligent network-based approach to communicate messages that measure and control energy usage between network devices and endpoints. The network discovers Cisco EnergyWise manageable devices, monitors their power consumption, and takes action based on business rules to optimize power consumption. The technology uses a domain-naming system to query and summarize information from large sets of devices, making it simpler than traditional network management capabilities. The management interface of this technology using SNMP or SSL allows facilities and network management applications to communicate with endpoints and each other using the network as a unifying fabric.

Enhanced Power over Ethernet

Although PoE has been employed for more than a decade, the technology is still evolving. New and innovative applications continue to raise expectations for power requirements. The Cisco EHWICs take advantage of the increased power capabilities of the Cisco 1900, 2900, and 3900 Series routers. Table 9 provides information about total PoE power output per platform. Depending on the ISR series model, the available PoE power ranges from 80 to 1014 watts. The Cisco Enhanced EHWICs support not only IEEE 802.1af (15.4 watts) but also Cisco ePoE (20 watts).

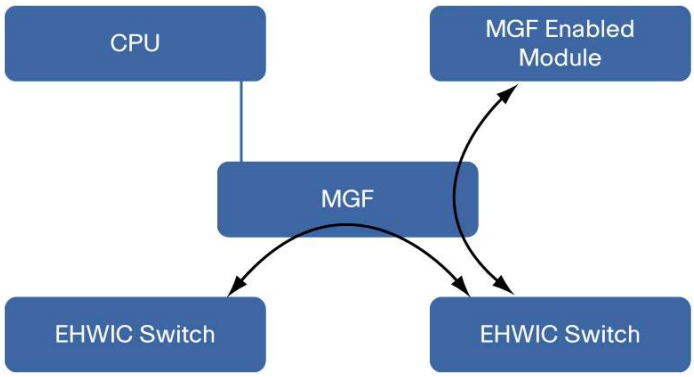
Additional PoE features include:

- Per-port power consumption control allows you to specify a maximum power setting on an individual port.
- Per-port PoE power sensing measures the actual power being drawn, enabling more intelligent control of powered devices.
- The Cisco PoE MIBs provide proactive visibility into power usage and allow you to set different power-level thresholds.
- Cisco Discovery Protocol Version 2 allows the Cisco EHWICs to negotiate a more granular power setting than IEEE classification provides when connecting to a Cisco powered device such as IP phones or access points.

Multigigabit Fabric

The EHWIC switch has a gigabit connection to the MGF and transparently integrates into the system. Connecting over the MGF enables the EHWIC switch to directly communicate with other MGF-enabled modules in the system without involving CPU. Layer 2 switching of packets is thus either internal to each EHWIC switch or goes through the MGF when multiple MGF-enabled modules are in the system. The router CPU is not involved in this operation (Figure 2).

Figure 2. Direct Module-to-Module Connection Without Involving CPU

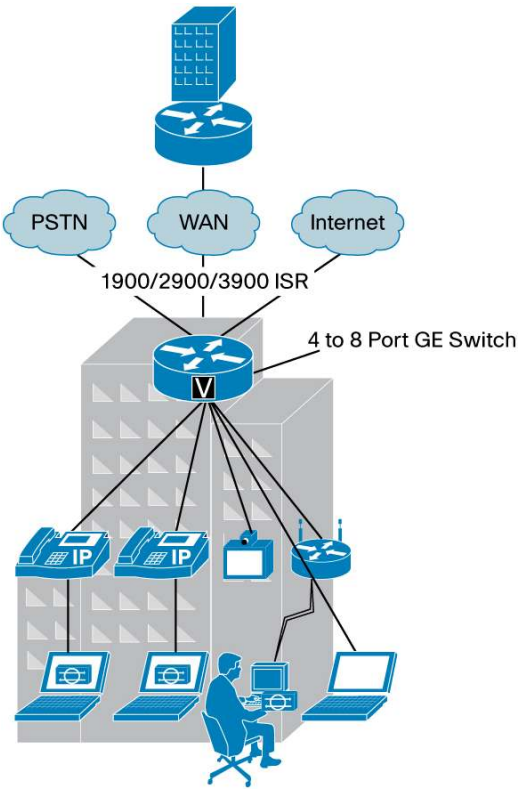


Applications

Small and Medium-Sized Branch Offices

The Cisco Gigabit Ethernet EHWICs in a small to medium-sized enterprise branch-office data deployment scenario provide the flexibility of integrated routing and switching functions in one device. This scenario allows the deployment of high-speed connections between individual network resources such as client desktops, servers, IP phones, wireless access points, and video devices from a single device and at the same time allows for WAN connectivity at Layer 3 through the router (Figure 3).

Figure 3. Typical Data, Voice, Video, and Wireless Access Points Converged Deployment for a SMB



When deployed in a unified communications environment, the 4- or 8-port Cisco Gigabit Ethernet EHWICs transparently interoperate with analog or digital time-division multiplexing (TDM) voice gateway modules and Cisco Unified Communications Manager Express IP Telephony, Cisco Survivable Remote Site Telephony (SRST), or Cisco Unified Border Element solutions.

The Cisco Gigabit Ethernet EHWIC with the optional PoE provides IP phone power and phone discovery for IP phones. In addition, the Cisco Gigabit Ethernet EHWIC supports separate VLAN configuration for IP phones. The auxiliary VLAN feature allows network administrators to segment phones into separate logical networks, even though the data and voice infrastructures are physically the same. The phone discovery feature allows the 4- and 8-port Cisco Gigabit Ethernet EHWICs to automatically detect the presence of an IP phone and supply power to it.

Features and Benefits

Table 2 provides an overview of the architecture, features, and benefits of the 4- and 8-port Cisco Gigabit Ethernet EHWICs, Table 3 lists other features of the new EHWICs, and Table 4 lists the maximum number of VLANs supported per platform.

Table 2. Architecture, Features, and Benefits of 4- and 8-Port Cisco Gigabit Ethernet EHWICs

Feature	Benefit
4 or 8 10/100/1000BASE-TX ports	• The switches offer line-rate forwarding for Layer 2 traffic on each port.
Autosensing, autonegotiation, and Automatic Media-Dependant Interface Crossed Over (Auto-MDIX)	• Autosensing allows the switch to detect the speed of the attached device and automatically configure the port for 10-,100-, or 1000-Mbps operation. • Autonegotiation allows the switch to automatically select half- or full-duplex transmission mode to optimize bandwidth on all the ports of the EHWIC. • Auto-MDIX allows the switch to automatically detect cable type (straight-through vs. crossover) between an attached device and the switch port.
Integrated switching	• Integrated switching provides fewer points of management for remote and small branch offices.

Feature	Benefit
Intrachassis stacking or cascading	• Grouping EHWIC switch modules together is called cascading. The EHWIC switch modules are capable of cascading on all Cisco Integrated Services Routers Generation 2 (ISR G2) platforms using the internal MGF. • Cascading of multiple EHWIC switches over the MGF allows multiple EHWICs to behave as a single switch. • Layer 2 switching of packets can be internal to each EHWIC switch or they can go through the MGF when multiple EHWIC switch modules in the system are acting as a unified switch. The router CPU is not involved in this operation.
IEEE 802.1P QoS (Traffic Prioritization)	• This feature supports QoS based on the IEEE 802.1P class of service (CoS) and port-based prioritization, allowing the switch to change the CoS settings of tagged packets on a per-port basis. • Each port has eight QoS queues. Strict priority is enforced by default. The routers support SDWRR with configurable weight on each queue
802.1Q Trunking	• This feature provides an industry wide VLAN tagging standard, allowing for trunks also to be set up to third-party devices.
802.1D Spanning Tree Protocol	• This industry-standard link layer network protocol ensures a loop-free topology between Layer 2 devices regardless of vendor. IEEE 802.1D Spanning Tree Protocol is turned on by default.
Voice VLAN (VVLAN)	• VVLANs enable Cisco IP phones to place voice and data in their own separate VLANs. The EHWIC switch port is manually configured as a trunk port to support voice and data VLANs on the same port. The switch then uses Cisco Discovery Protocol to dynamically configure the Cisco IP phones
IEEE 802.1x Authentication	• This client-server-based access control and authentication protocol restricts unauthorized devices from connecting to a LAN through publicly accessible ports.
PoE (option)	• Cisco Gigabit Ethernet technology with the appropriate PoE module and internal power supply can power Cisco IP phones and wireless access points. Support is provided for both IEEE 802.3af and enhanced PoE (ePoE).
IP Multicast management support	• The routers provide Internet Group Management Protocol (IGMP) snooping in hardware for management support.
SNMP management	• SNMP allows management of the MIB through a MIB browser.
Cisco IOS Software CLI	• This feature provides configuration through the Cisco IOS Software CLI and provides a common user interface for all the router functions.
CiscoWorks support	• CiscoWorks network management software enables manageability on a per-port and per-switch basis, providing a common management interface for Cisco routers, switches, and hubs. • SNMPv1, v2, and v3 (noncryptographic) and Telnet interface support delivers comprehensive in-band management, and a CLI management console provides detailed out-of-band management. • Cisco Discovery Protocol Versions 1 and 2 enable a CiscoWorks network management station to automatically discover the switch in a network topology. • Support is provided by the CiscoWorks LAN Management Solution.
Cisco Discovery Protocol Versions 1 and 2	• This protocol enables a CiscoWorks network management station to automatically discover the switch in a network topology.
Cisco VLAN Trunking Protocol (VTP; client, server, and transparent modes)	• Cisco VTP supports dynamic VLAN configuration across Cisco switches.
Cisco Configuration Professional -based configuration and device management	• This feature simplifies initial configuration of a switch through a web-based GUI, eliminating the need for more complex terminal emulation programs and CLI knowledge. • Cisco Discovery Protocol reduces the cost of deployment by helping less-skilled personnel set up switches quickly and simply.
Status-indicator LEDs	• Two LEDs per port provide visual indication of the switch-port status and PoE status.

Table 3. Cisco Gigabit Ethernet EHWIC Features

Feature	EHWIC Switch	New Feature
10/100/1000BASE-TX	✓	✓
IEEE 02.1Q Trunking	✓	
IEEE 802.1D Spanning Tree	✓	
Static and dynamic MAC address learning	✓	
IEEE 802.1x port-based and multiple supplicant	✓	
IEEE 802.3af (15.4W)	✓	
ePoE (20W)		✓
ePoE (20W)	✓	
IEEE 802.1u (guest VLAN)	✓	

Feature	EHWIC Switch	New Feature
IEEE 803.1s Multiple Spanning Tree (MST)	Not supported	
IEEE 803.1w Rapid Spanning Tree Protocol (RSTP)	Not supported	
IGMP Snooping	✓	
Auxiliary VLANS	✓	
Voice VLANS		
Maximum number of VLANs supported (platform dependent)	16-64	✓
Maximum number of VLAN IDs	4095	
SDWRR and fixed scheduling	✓	✓
Eight QoS queues per port	✓	✓
IEEE 802.1p for 802.1q tagged packets	✓	
Port-based priority for untagged packets	✓	
Priority override	✓	
Switched Port Analyzer (SPAN)	✓	
SPAN across multiple EHWICs	✓	✓
Number of Spanning Tree Protocol instances	1 per VLAN (64 maximum)	
Per-port storm control	✓	
Media Access Control (MAC) notification	✓	
Dynamic secure port	✓	✓
Secure port filtering (port security)	✓	
Intrachassis cascading (no external link between EHWIC cards)	✓	✓
Up to 100 secure MAC addresses		✓
Private VLAN edge (protected port)		✓
Protected port (across multiple EHWICs)	✓	✓
Bridge protocol data unit (BPDU) guard	✓	
PortFast	✓	
Jumbo Frames	✓	
VTP (client, server, and transparent modes)	✓	
Per-VLAN Spanning Tree (PVST)	✓	
Cisco EnergyWise technology	✓	
Per-port power monitoring and policing	✓	✓
Hot Standby Router Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), and Gateway Load Balancing Protocol (GLBP) on VLAN interfaces		✓
MGF integration	✓	
CiscoWorks LAN Management Solution (LMS)	✓	
RMON support	✓	
Auto-MDIX	✓	
Cisco EtherChannel technology	Not supported	

Table 4. Maximum Number of VLANs Supported per Platform

Platform	Maximum Number of VLANs
Cisco 1900 Series Integrated Services Router	16
Cisco 2901 Integrated Services Router	16
Cisco 2911 Integrated Services Router	32
Cisco 2921, 2951, and 3925 Integrated Services Routers	48
Cisco 3945 Integrated Services Router	64
Cisco 3925E and 3945E Integrated Services Routers	64

Table 5 lists the PoE power-supply options for the Cisco ISR G2 routers.

Table 5. Cisco ISR G2 PoE Power-Supply Product Numbers

Product Number	Description
PWR-1900-POE=	Cisco 1921 POE Power Supply
PWR-1941-POE=	Cisco 1941 POE Power Supply
PWR-2901-POE=	Cisco 2901 POE Power Supply
PWR-2911-POE=	Cisco 2911 POE Power Supply
PWR-2921-51-POE=	Cisco 2921 and 2951 POE Power Supply
PWR-3900-POE=	Cisco 3900 POE Power Supply

Platform Support

Table 6 lists the platforms that support the new 4- and 8-port Cisco Gigabit Ethernet EHWICs.

Table 6. Platform Maximum Support of the 4- and 8-port Cisco Gigabit Ethernet EHWICs

	Cisco 1921	Cisco 1941 and 1941W	Cisco 2901	Cisco 2911	Cisco 2921	Cisco 2951	Cisco 3925	Cisco 3925E	Cisco 3945	Cisco 3945E
Four-port non-PoE	1	2	2	4	4	4	4	3	4	3
Four-port PoE	1	2	2	4	4	4	4	3	4	3
Eight-port non-PoE	1	1	1	2	2	2	2	1	2	1
Eight-port PoE	1	1	1	2	2	2	2	1	2	1
Maximum number of non-PoE ports	8	12	16	16	16	16	16	12	16	12
Maximum number of PoE ports at 15.4W in normal mode	7	7	16	16	16	16	16	12	16	12
Maximum number of ports running at 20W in boost mode	6	6	12	12	12	12	12	10	12	10

Summary and Conclusion

As companies strive to lower the costs of operation and at the same time increase productivity of their workforce by using network applications, higher-speed integrated branch-office solutions are required.

Cisco EtherSwitch 10/100/1000 EHWICs enable a higher level of performance as well as enhanced PoE capabilties over earlier-generation of HWIC-based switches. Other benefits are advanced Layer 2 switching features for both data and IP communications, easy expandability, and simplified branch-office router management.

Specifications

Table 7 gives the technical specifications of the 4- and 8-port Cisco Gigabit Ethernet EHWICs.

Table 7. Specifications of 4- and 8-Port Cisco Gigabit Ethernet EHWICs (EHWIC-4ESG, EHWIC-4ESG-P, EHWIC-D8ESG, and EHWIC-D-8ESG-P)

Parameter	Specification
Form factor	• EHWIC-4ESG: Single-wide EHWIC form factor • EHWIC-D-8ESG: Double-wide EHWIC form factor
Dimensions (H x W x D)	• EHWIC-4ESG and 4ESG-P: 0.8 x 3.1 x 4.8 in. (2.1 x 7.9 x 12.2 cm) • EHWIC-D-8ESG and 8ESG-P: 0.8 x 6.2 x 4.8 in. (2.1 x 18.8 x 12.2 cm)

Parameter	Specification	
Weight	• EHWIC-4ESG: 79g (0.17 lb) • EHWIC-4ESG-P: 108g (0.24 lb) • EHWIC-D-8ESG: 149g (0.33 lb) • EHWIC-D-8ESG-P: 196g (0.43 lb)	
Standards		
IEEE protocols	• Gigabit Ethernet: IEEE 802.3 and 10BASE-T • Gigabit Ethernet: IEEE 802.3u, 100BASE-TX, and 1000BASE-TX • IEEE 802.1d Spanning Tree Protocol • IEEE 802.1p CoS for Traffic Prioritization • IEEE 802.1q VLAN • IEEE 802.1x Security • IEEE 802.3x Full Duplex • IEEE 802.3af Power over Gigabit Ethernet Standard	
RFC	RFC 2284, PPP Extensible Authentication Protocol (EAP)	
MIBs	• RFC 1213 • IF MIB • RFC 2037 ENTITY MIB • CISCO-CDP-MIB • CISCO-IMAGE-MIB • CISCO-FLASH-MIB • OLD-CISCO-CHASSIS-MIB • CISCO-VTP-MIB • CISCO-HSRP-MIB • OLD-CISCO-TS-MIB • CISCO-ENTITY-ASSET-MIB • CISCO-ENTITY-FRU-CONTROL-MIB • BRIDGE MIB (RFC 1493)	• CISCO-VLAN-MEMBERSHIP-MIB • CISCO-VLAN-IFINDEX-RELATIONSHIP-MIB • RMON1-MIB • PIM-MIB • CISCO-STP-EXTENSIONS-MIB • OSPF MIB (RFC 1253) • IPMROUTE-MIB • CISCO-MEMORY-POOL-MIB • ETHER-LIKE-MIB (RFC 1643) • CISCO-ENTITY-FRU-CONTROL-MIB.my • CISCO-RTTMON-MIB • CISCO-PROCESS-MIB • CISCO-COPS-CLIENT-MIB
	To obtain lists of supported MIBs by platform and Cisco IOS Software release and to download MIB modules, go to the Cisco MIB website on Cisco.com at: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.	
Manageability	• SNMP and Telnet interface support delivers comprehensive in-band management, and a CLI management console provides detailed out-of-band management. • An embedded RMON software agent supports four RMON groups (history, statistics, alarms, and events) for enhanced traffic management, monitoring, and analysis. • A SPAN port can mirror traffic from one or many ports to another port for monitoring all eight RMON groups with an RMON probe or network analyzer. • Trivial File Transfer Protocol (TFTP) reduces the cost of administering software upgrades by downloading from a centralized location. • Two LEDs per port provide convenient visual indication of the port link and PoE status. • Crash information support enables a switch to generate a crash file for improved troubleshooting. • Show-interface capabilities provide information about the configuration capabilities of any interface.	
Connectors and cabling	• 10BASE-T ports: RJ-45 connectors, two-pair Category 3, 4, or 5 unshielded twisted pair (UTP) cabling • 100BASE-TX ports: RJ-45 connectors; two-pair Category 5 UTP cabling • 1000BASE-TX ports: RJ-45 connectors; two-pair Category 5e and Category 6 UTP cabling	
LED indicators	• Link status LED: One LED per port for indicating link status • PoE LED: One LED per port system for PoE status indication	
Power Requirements		
Internal power supply	Optional PoE system power supply available for all Cisco 2900 and 3900 Series routers	
External redundant power supply: Cisco Redundant Power System 2300 (RPS2300)	Optional for the Cisco 2911 through Cisco 2951 and Cisco 3900 Series routers	
Internal redundant power supply	For the Cisco 3925, 3925E, 3945, and 3945E routers only	
DC power support	• DC system power input available on the Cisco 2911, 2921, 2951, 3925, 3925E, 3945, and 3945E routers • PoE option not available with DC system power input	
Software suppor	Minimum Cisco IOS Software Release 15.1(2)T for Cisco 1900, 2900, and 3900 Series routers: IP Base License of the Universal image	
Environmental		

Parameter	Specification
Operating temperature	32 to 104°F (0 to 40°C)
Operating humidity	10 to 90 percent, non-condensing
Nonoperating temperature	-4 to 149°F (-20 to 65°C)
Operating altitude	15,000 ft (4,570m)
Regulatory compliance, safety, and EMC	When installed in a Cisco 1941, 2900, or 3900 Series router, the Cisco Gigabit Ethernet EHWIC meets the standards (regulatory compliance, safety, and EMC) of the router itself. Refer to the data sheets for the Cisco 1921 and 1941 routers and the Cisco 2900 and 3900 Series routers for more details.

Cisco ISR G2 PoE Modes of Operation

Table 8 describes the modes of operation for the Cisco ISR G2 routers, and Table 9 gives power output of the routers.

Table 8. Modes of Operation Description

Mode	Description
Normal	One PoE power supply
Redundant	Two PoE internal power supplies (Cisco 3925 and 3945) or one PoE power supply plus an external Cisco RPS 2300 (Cisco 2911, 2921, and 2951), where one is active and one is standby
Boost mode	Two PoE internal power supplies (Cisco 3925 and 3945) or one PoE power supply plus an external Cisco RPS 2300 (Cisco 2900), where both are actively supplying PoE power

Table 9. Integrated Services Routers Power Output

	Cisco 3945E	Cisco 3925E	Cisco 2951	Cisco 2921	Cisco 2911	Cisco 2901	Cisco 1941	Cisco 1921
Normal PoE with single PoE power supply (watts)	520	520	370	280	200	140	110	80
Maximum number of ports running at 15.4W in normal mode	33	33	24	18	12	8	6	5
Maximum number of ports running at 20W in normal mode	16	16	18	16	10	7	5	4
Maximum power with dual PoE supplies in boost mode (watts)	1040	1040	750	750	750	-	-	-
Maximum number of ports running at 15.4W in boost mode	65	65	48	48	48	-	-	-
Maximum number of ports running at 20W in boost mode	50	50	37	37	37	-	-	-

Ordering Information

To place an order, visit the Cisco Ordering Home Page and refer to Table 10.

For more information about the Cisco Integrated Services Routers, visit:

- http://www.cisco.com/go/1900
- http://www.cisco.com/go/2900
- http://www.cisco.com/go/3900

Table 10. Ordering Information for 4- and 8-Port Cisco Gigabit Ethernet EHWICs

Product Number	Product Description

Product Number	Product Description
EHWIC-4ESG	4 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch
EHWIC-4ESG=	4 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch spare
EHWIC-4ESG-P	4 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch with Power over Ethernet
EHWIC-4ESG-P=	4 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch with Power over Ethernet spare
EHWIC-D-8ESG	8 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch
EHWIC-D-8ESG=	8 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch
EHWIC-D-8ESG-P	8 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch
EHWIC-D-8ESG-P=	8 port 10/100/1000 Enhanced High-Speed WAN Interface Gigabit Ethernet switch with Power over Ethernet spare

Cisco IOS Software Support

The Cisco Gigabit Ethernet EHWICs are supported in IP Base and later images. No Cisco IOS Software technology or feature licenses are required. Table 11 provides the minimum Cisco IOS Software requirements.

Table 11. Minimum Cisco IOS Software Release

Integrated Services Router	Minimum Cisco IOS Software Release
Cisco 1921	15.1(2)T: IP Base License of the Universal Image
Cisco 1941 and 1941W	15.1(2)T: IP Base License of the Universal Image
Cisco 2900 Series	15.1(2)T: IP Base License of the Universal Image
Cisco 3900 Series	15.1(2)T: IP Base License of the Universal Image

Service and Support

Leading-edge technology deserves leading-edge support. Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business.

Cisco SMARTnet technical support is available on a one-time or annual contract basis. Support options range from help-desk assistance to proactive, onsite consultation.

All support contracts include:

- Major Cisco IOS Software updates in protocol, security, bandwidth, and feature improvements
- Full access rights to Cisco.com technical libraries for technical assistance, electronic commerce, and product information
- Access to the industry's largest dedicated technical support staff 24 hours a day

For more information about Cisco services, refer to Cisco Technical Support Services or Cisco Advanced Services.

Cisco and Partner Services for the Branch

Services from Cisco and our certified partners can help you transform the branch-office experience and accelerate business innovation and growth in the Borderless Network. We have the depth and breadth of expertise to create a clear, replicable, optimized branch-office footprint across technologies. Planning and design services align technology with business goals and can increase the accuracy, speed, and efficiency of deployment. Technical services help improve operational efficiency, save money, and mitigate risk. Optimization services are designed to continuously improve performance and help your team succeed with new technologies. For more information, visit http://www.cisco.com/go/services.

For More Information

For more information about the Cisco Integrated Services Routers Generation 2, visit http://cisco.com/en/US/prod/routers/networking_solutions_products_genericcontent0900aecd806cab99.html or contact your local Cisco account representative.

For more information about Cisco products, contact:

- United States and Canada: 800 553-NETS (6387)
- Europe: 32 2 778 4242
- Australia: 612 9935 4107
- Other: 408 526-7209
- Web: http://www.cisco.com

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**

Printed in USA C78-612808-05 07/11