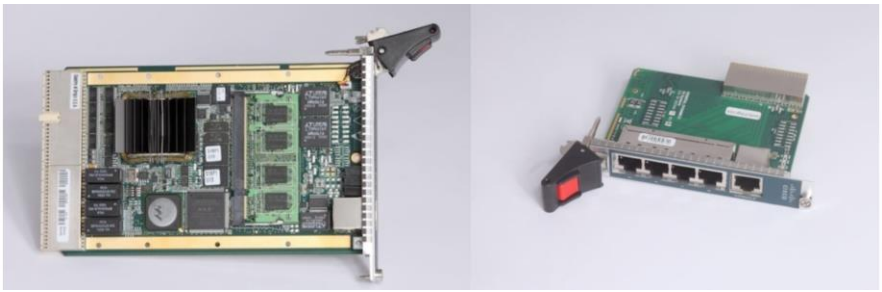
Cisco 5940 Series Embedded Services Routers

The Cisco® 5900 Series Embedded Services Routers (ESRs) are optimized for mobile and embedded networks that require IP routing and services. The flexible, compact form factor of the Cisco 5900 Routers, complemented by Cisco IOS® Software and Cisco Mobile Ready Net capabilities, provide highly secure data, voice, and video communications to stationary and mobile network nodes across wired and wireless links.

The Cisco 5940 ESR is a high-performance, ruggedized router designed for use in harsh environments—offering reliable operation in extreme temperatures and under shock and vibration conditions typical for mobile applications in rugged terrain. With onboard hardware encryption, the Cisco 5940 ESR offloads encryption processing from the router engine to provide highly secure yet scalable video, voice, and data services for mobile and embedded outdoor networks. The router offers high performance, four Gigabit Ethernet interfaces, and a rich Cisco IOS Software feature set, providing investment protection for customers deploying bandwidth-intensive applications in mobile or embedded networks in public safety, transportation, defense, and energy markets.

The Cisco 5940 ESR is a 3U CompactPCI (CPCI) router card that is available in both air- and conduction-cooled models. At only 100 x 160 mm (roughly the size of a 4- x 6-in. photograph), the Cisco 5940 ESR solves critical size, weight, and power challenges. Cisco has an ecosystem of partners and systems integrators that embed Cisco 5900 Series Router Cards into industry-standard, commercially available enclosures and custom enclosures, tailored to the unique environments in which these routers are deployed. An optional rear transition module (RTM) is available for applications requiring access to the I/O connectors through standard RJ-45 connectors. Figures 1 and 2 show the Cisco 5940 ESR models.

Figure 1. Cisco 5940 ESR—Air-Cooled Model with Rear Transition Module



© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

Figure 2. Cisco 5940 ESR—Conduction-Cooled Model



Applications

You can use the Cisco 5940 ESR in a variety of applications, discussed in the following sections.

Mobile Networks

The Cisco 5940 ESR establishes a mobile network in vehicles, extending corporate resources securely to employees in the field within the public safety, transportation, and defense markets. It offers a scalable network platform, establishing a mobile network for first-responder vehicles, armored vehicles, and passenger and freight rail trains.

To ensure transparent connectivity to the roaming vehicle network, Cisco has integrated standards-based Mobile IP software into the Cisco IOS Software running on the Cisco 5940 ESR. Mobile IP allows transparent roaming over multiple wireless networks. For mission-critical mobile communications, you can deploy the Cisco 5940 ESR with the capability to take advantage of the Cisco Mobile Ready Net, with the following features:

- Access to mission-critical information: Transparent access and transfer of voice, data, and video information
- Infrastructure-less networking: Reaching beyond the range of a fixed network
- Self-forming temporary ability: Immediate connection with no preconfiguration of peers required; no need for connectivity to centralized network

Embedded Networks

The Cisco 5940 ESR extends IP networks to outdoor locations when integrated into environmentally hardened cabinets or other outdoor infrastructures, enabling systems integrators to offer custom solutions tailored to meet their customers' needs. Systems integrators also can embed the Cisco 5940 ESR into existing outdoor infrastructures such as border security systems to tie remote networks into a manageable, highly secure IP network. For example, the Cisco 5940 ESR provides a high-performance router for aggregating peripheral devices onto an IP network, including video surveillance cameras and chemical sensors.

On-Demand Network Connectivity

In disaster situations, regular network connectivity is often not available because of damaged network infrastructure or the lack of network capacity. In these situations, the Cisco 5940 ESR provides on-demand network connectivity for homeland-security and emergency-response applications. Government response teams and tactical military teams must have a versatile network platform with the following characteristics:

- High performance in a small form factor
- Portability
- Low power consumption
- Ability to handle harsh environments

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

- Sophisticated networking capabilities such as quality of service (QoS) to ensure the most important data gets through when links are degraded, and security to protect the network and the data transmitted over the network

The Cisco 5940 ESR offers this versatility, based on industry standards that take advantage of the rich ecosystem of complementary systems and products.

Main Features and Benefits

Table 1 outlines the features and benefits of the Cisco 5940 ESR.

Table 1. Features and Benefits of Cisco 5940 ESR

Feature	Benefit
Cisco Mobile Ready Net	You can deploy the Cisco 5940 in mission-critical mobile communications to provide: • Transparent access of mission-critical voice, video, or data information • Infrastructure-less networking: Reaching beyond the range of a fixed network • Self-forming temporary ability: Immediate connection with no preconfiguration of peers required, eliminating the need for connectivity to a centralized network
Cisco Unified Communications Manager Express (CME) support	This application supports up to 150 phones for remote IP telephony on vehicles or in outdoor locations. It provides primary or backup telephony services for command-and-control communications.
Cisco Wide Area Application Services (WAAS) Express	Cisco WAAS Express extends the Cisco WAAS product portfolio, with a small-footprint, cost-effective solution based on Cisco IOS Software and integrated into the Cisco 5940 Routers to offer bandwidth optimization and application acceleration capabilities. Cisco WAAS Express increases remote user productivity, reduces WAN bandwidth costs, and offers investment protection by interoperating with existing Cisco WAAS infrastructure. Cisco WAAS Express is unique in providing network transparency, improving deployment flexibility with on-demand service enablement, and integrating with native Cisco IOS Software services such as security, NetFlow, and QoS.
Cisco IP Multiplexing	Cisco IP Multiplexing improves bandwidth efficiency over a packets-per-second (pps)-constrained link by using multiplexing schemes to combine multiple small IP packets from a single stream, or multiple streams, into a large packet, and then sending this large packet over the pps-constrained link. Benefits include: • Increased bandwidth efficiency on pps-constrained lines (for example, satellite) • Potential savings in processing load for IP Security (IPsec)-encrypted traffic • Single-box solution: No need for additional piece of equipment • No manipulation of voice stream; codec quality is maintained • Application-agnostic • No need to duplicate dial plans or deal with complex call routing • Ability to multiplex any IP packet, not just voice over IP (VoIP): Other good targets include video and other small User Datagram Protocol (UDP) streams
Cisco IOS Embedded Event Manager (EEM)	Cisco IOS EEM is a distributed and customized approach to event detection and recovery offered directly in a Cisco IOS Software device. It offers the ability to monitor events and take informational, corrective, or any desired EEM action when the monitored events occur or when a threshold is reached.
High-speed interface support	The Cisco 5940 ESR provides four routed, high-speed Gigabit Ethernet interfaces, enabling the router to serve as an aggregation point for on-demand network connectivity in mobile or fixed deployments.
Onboard hardware acceleration	The onboard hardware encryption module offloads packet encryption from the router CPU to increase router performance.
Flexible integration into solutions	• The inclusive and compact design of the Cisco 5940 ESR simplifies integration. Electrical connections are through industry-standard connectors, and they require no additional active components. • Air- and conduction-cooled models are available to satisfy diverse operational environments. • Accelerate time to market by using the Cisco 5940 and its associated RTM in industry-standard enclosures for development or for applications with less-severe size, weight, and power requirements.
Standards-based 3U CPCI	A rich ecosystem of existing complementary products exists to facilitate the development of new systems incorporating the Cisco 5940 ESR.

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

Product Specifications

Tables 2 through 4 list hardware, software, and dimensional specifications for the Cisco 5940 ESR.

Table 2. Hardware Specifications for Cisco 5940 ESR

Cisco 5940 Features	Feature Description
Hardware encryption	Support for the following security protocols: • Onboard hardware encryption processor supporting IPsec • Secure Sockets Layer with transparent LAN services (SSL/TLS) • Secure Real-time Transport Protocol (SRTP) • Triple Digital Encryption Standard (3DES) • Advanced Encryption Standard (AES) • Internet Key Exchange (IKE)
Memory	
DRAM	1 GB
Flash memory	256 MB
Interface Support	
Gigabit Ethernet	Four 10/100/1000 routed Gigabit Ethernet ports supporting autonegotiation
Router console port	One RS-232 console port
Environmental	
Industrial-grade component temperature	–40 to 185°F (–40° to 85°C) component local ambient temperature ranges
Operating temperature	• The conduction-cooled router can withstand extended temperature ranges of –40 to 185ºF (–40 to 85ºC). • The air-cooled router can withstand extended temperature ranges of 0 to 125ºF (–18 to 52ºC). • Temperature ranges for completed solutions depend on hardware configuration variables, including enclosures and third-party components.
Nonoperating temperature	• –60 to 185ºF (–51 to 85ºC) for both the air- and conduction-cooled boards
Altitude (low-pressure operation)	• Up to 15,000 ft (4500m) for both the air- and conduction-cooled boards

Table 3. Software Specifications for Cisco 5940 ESR

Features	Feature Description
Cisco Service Advertisement Framework (SAF)	The Cisco SAF is a dynamic, ready-to-use communications framework for network applications that allows servers and clients to advertise, discover, and select services. Network-based, Cisco SAF distributes information by taking advantage of IP routing technologies. SAF allows our customers greater scalability, availability, and flexibility to deploy and manage applications across the enterprise: • Provides real-time service advertisement, discovery, presence, and selection • Reduces ongoing operational costs by eliminating manual configuration • Reduces services deployment time to realize faster ROI • Improves business continuity, avoiding potentially costly network downtime
Multicast Listener Discovery (MLD) Proxy	MLD Proxy enables a device to learn proxy group membership information and simply forward multicast packets based upon that information.

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

Features	Feature Description
Routing protocols	• Routing Information Protocol (RIP) Versions 1 and 2 • Open Shortest Path First (OSPF) • Enhanced Interior Gateway Routing Protocol (EIGRP)-IP • Border Gateway Protocol (BGP) • Cisco Discovery Protocol • IP Policy Routing • IP Multicast Protocol Independent Multicast (PIM) Versions 1 and 2 • Internet Group Management Protocol (IGMP) Versions 1 and 2 • IP Multicast Load Splitting • Cisco Group Management Protocol (GMP)
VLANs	Up to 32 VLANs supported per router
IPv4	IPv4 support
IPv6	• IPv6 routing and Cisco Express Forwarding switching • IPv6 QoS • IPv6 tunneling support • Cisco IOS Zone-Based Firewall for IPv6 traffic
Encapsulations	• Point-to-Point Protocol (PPP) • PPP over Ethernet (PPPoE) client and server for Fast Ethernet • 802.1q VLAN trunking support • Generic routing encapsulation (GRE)
Radio Aware Routing	• Optimizes IP routing over fixed or temporary radio networks • Factors radio link metrics into route calculations • Immediately recognizes and adapts to changes in network neighbor status • Supports Dynamic Link Exchange Protocol (DLEP) • Supports Router Radio Control Protocol (R2CP) • Supports RFC 5578 (authored by Cisco)
Mobile Ad Hoc Networks	• OSPFv3 enhancements for mobile ad hoc networks
Cisco IP Multiplexing	Improved bandwidth efficiency over pps-constrained links
Mobile IP	Mobile IP and Cisco Mobile Networks in Cisco IOS Software • Home agent and mobile router redundancy • Mobile router preferred interfaces • Mobile router reverse tunneling • Mobile router asymmetric links • Mobile router static and dynamic networks • Static co-located care-of address • Authentication, authorization, and accounting (AAA) server • Cisco Mobile Networks Network Address Translation (NAT) Traversal over Mobile IP • Support for Mobile IP tunnel templates, allowing configuration of IP Multicast and IPsec on Mobile IP tunnels • Mobile IP foreign agent local routing optimization
Next-Generation Encryption	Next-Generation Encryption support in Cisco IOS Software cryptography, including Suite-B-GCM-128, Suite-B-GCM-256, Suite-B-GMAC-128, and Suite-B-GMAC-256 as described in RFC 4869
Authentication	• Route and router authentication • Password Authentication Protocol (PAP) • Challenge Handshake Authentication Protocol (CHAP) • Microsoft CHAP (MS-CHAP) local password • IP basic and extended access lists • Time-based access control lists (ACLs)
Secure connectivity	Secure collaborative communications with Group Encrypted Transport VPN, Dynamic Multipoint VPN (DMVPN), or Enhanced Easy VPN
Integrated threat control	Responding to sophisticated network attacks and threats using Cisco IOS Firewall, Cisco IOS Zone-Based Firewall, Cisco IOS Intrusion Prevention System (IPS), Cisco IOS Content Filtering, and Flexible Packet Matching (FPM)

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

Features	Feature Description
Identity management	Intelligently protecting endpoints using technologies such as AAA and public key infrastructure (PKI)
Security protocols	• IPsec • SSL/TLS • 3DES • AES • IKE
Traffic management	• QoS • Generic traffic shaping • Class-based Ethernet matching and mobile access routing (802.1p class of service [CoS]) • Committed access rate • Flow-based Weighted Random Early Detection (WRED) • Class-Based Weighted Fair Queuing (CBWFQ) • Low Latency Queuing (LLQ) • Priority Queuing • Weighted Fair Queuing (WFQ) • Traffic Policing Resource Reservation Protocol (RSVP)
Unified communications	Cisco Unified Communications Manager Express • With support for up to 150 phones
Management services	• Simple Network Management Protocol (SNMP) Versions 2 and 3 • Telnet • Console port • RADIUS • TACACS+ • Cisco Service Assurance Agent • Syslog • Response Time Reporter • Network Time Protocol (NTP) Client • Trivial File Transfer Protocol (TFTP) Client and Server • Dynamic Host Configuration Protocol (DHCP) Client and Server • DHCP Relay • Hot Standby Router Protocol (HSRP)
	• Secure Shell (SSH) Protocol Client and Server Version 2.0
Tool Command Language (Tcl) scripts	Tcl script support
Address conservation	• NAT Many-to-One (Port Address Translation [PAT]) • NAT Many-to-Many (Multi-NAT) • DHCP Client Address Negotiation • Easy IP Phase I

Table 4. Dimensions of Cisco 5940 ESR

Feature	Feature Description
Card dimensions	Router module physical dimensions: • 3U, 4HP CPCI module as per PICMG 2.0 R3.0 RTM physical dimensions: • 3U, 4HP CPCI RTM module as per PICMG 2.0 R3.0

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

Ordering Information

To place an order, visit the Cisco Ordering Home Page and refer to Table 5.

Table 5. Ordering Information for Cisco 5940 ESR

Product Name	Part Number
Cisco 5940 ESR Cards	
Cisco 5940 ESR air-cooled card with 4 Gigabit Ethernet ports and 1 console port. Includes Cisco 5940 Advanced Enterprise Services Cisco IOS Software.	CISCO5940RA-K9
Cisco 5940 ESR conduction-cooled card with 4 Gigabit Ethernet ports and 1 console port. Includes Cisco 5940 Advanced Enterprise Services Cisco IOS Software.	CISCO5940RC-K9
Cisco 5940 Rear Transition Module (RTM) card with 4 Gigabit Ethernet ports and 1 console port.	CISCO5940-RTM
Cisco 5940 RTM Bundles	
Cisco 5940 ESR air-cooled card with RTM and Cisco 5940 Advanced Enterprise Cisco IOS Software image	CISCO5940-A/K9
Cisco 5940 ESR conduction-cooled card with RTM and Cisco 5940 Advanced Enterprise Cisco IOS Software image	CISCO5940-C/K9
Cisco 5940 WAAS Express and Security Bundles	
Cisco 5940 ESR air-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image and WAAS Express license	CISCO5940WSEC-A/K9
Cisco 5940 ESR conduction-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image and WAAS Express license	CISCO5940WSEC-C/K9
Cisco 5940 Quantity Bundles	
Cisco 5940 ESR air-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image–100-499 Units	CISCO5940RA-K9/100
Cisco 5940 ESR air-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image–500+ Units	CISCO5940RA-K9/500
Cisco 5940 ESR conduction-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image–100-499 Units	CISCO5940RC-K9/100
Cisco 5940 ESR conduction-cooled card with Cisco 5940 Advanced Enterprise Cisco IOS Software image–500+ Units	CISCO5940RC-K9/500

To Download the Software

Visit the Cisco Software Center to download Cisco IOS Software. A Cisco.com account is required to access this website. Table 6 lists the Cisco IOS Software images available for the Cisco 5940 ESR.

Table 6. Cisco IOS Software Images for Cisco 5940 ESR

Cisco IOS Software Image Name	Description
c5940-adventerprisek9-mz	Cisco 5940 Advanced Enterprise Cisco IOS Software image

Service and Support

Realize the full business value of your technology investments with smart, personalized services from Cisco and our partners. Backed by deep networking expertise and a broad ecosystem of partners, Cisco Services enable you to successfully plan, build, and run your network as a powerful business platform. Whether you are looking to quickly seize new opportunities to meet rising customer expectations, improve operational efficiency to lower costs, mitigate risk, or accelerate growth, we have a service that can help you.

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

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.

For More Information

For more information about the Cisco 5940 Embedded Services Router, visit http://www.cisco.com/go/5900 or contact your local Cisco account representative.

For more information about Cisco Mobile Ready Net, visit https://www.cisco.com/web/strategy/government/defense_adhocmobility.html or contact your local Cisco account representative.

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.**

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

Printed in USA C78-559978-05 10/12

© 2012 Cisco and/or its affiliates. All rights reserved. This document is Cisco Public.