



Preface

This preface describes the objectives and organization of this document and explains how to find additional information on related products and services. This preface contains the following sections:

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Objectives

This document contains instructions and procedures for installing and configuring the Integrated Services Adapter (ISA) in Cisco 7200 series routers and the Integrated Services Module (ISM) in Cisco 7100 series routers. Also contained in this document are basic configuration steps and examples of router commands and displays.

The ISA is a single-width service adapter and the ISM is a single-width service module. Each provides high-performance, hardware-assisted tunneling and encryption services suitable for virtual private network (VPN) remote access, site-to-site intranet, and extranet applications. The ISA and the ISM offload IP Security Protocol (IPSec) and Microsoft Point to Point Encryption (MPPE) processing from the main processor of the Cisco 7200 series or Cisco 7100 series router, thus freeing router resources for other tasks.

Although both the ISA and the ISM provide the same functionality, they are physically unique cards designed for different router platforms, with their own part numbers:

- SM-ISM(=)—Cisco 7100 series routers
- SA-ISA(=)—Cisco 7200 series routers



Note

The information provided in this document applies to both the ISA and the ISM unless specifically stated otherwise.

**Note**

To ensure compliance with U.S. export laws and regulations, and to prevent problems later on, see the [“Compliance with U.S. Export Laws and Regulations Regarding Encryption”](#) section on page 2-6 for specific and important information.

Audience

To use this publication, you should be familiar not only with Cisco router hardware and cabling but also with electronic circuitry and wiring practices. You should also have experience as an electronic or electromechanical technician.

Installation Warning

**Warning**

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

Waarschuwing

Deze apparatuur mag alleen worden geïnstalleerd, vervangen of hersteld door bevoegd geschoold personeel.

Varoitus

Tämän laitteen saa asentaa, vaihtaa tai huoltaa ainoastaan koulutettu ja laitteen tunteva henkilökunta.

Attention

Il est vivement recommandé de confier l'installation, le remplacement et la maintenance de ces équipements à des personnels qualifiés et expérimentés.

Warnung

Das Installieren, Ersetzen oder Bedienen dieser Ausrüstung sollte nur geschultem, qualifiziertem Personal gestattet werden.

Figyelem!

A berendezést csak szakképzett személyek helyezhetik üzembe, cserélhetik és tarthatják karban.

Avvertenza

Questo apparato può essere installato, sostituito o mantenuto unicamente da un personale competente.

Advarsel

Bare opplært og kvalifisert personell skal foreta installasjoner, utskiftninger eller service på dette utstyret.

Aviso

Apenas pessoal treinado e qualificado deve ser autorizado a instalar, substituir ou fazer a revisão deste equipamento.

¡Advertencia!

Solamente el personal calificado debe instalar, reemplazar o utilizar este equipo.

Varning!

Endast utbildad och kvalificerad personal bör få tillåtelse att installera, byta ut eller reparera denna utrustning.

Предупреждение Установку, замену и обслуживание этого оборудования может осуществлять только специально обученный квалифицированный персонал.

警告 只有经过培训且具有资格的人员才能进行此设备的安装、更换和维修。

警告 この装置の設置、交換、保守は、訓練を受けた相応の資格のある人が行ってください。

Document Organization

This document contains the following chapters:

Section	Title	Description
Chapter 1	Overview	Describes the ISA and the ISM and their LED displays.
Chapter 2	Preparing for Installation	Describes safety considerations, tools required, and procedures you should perform before the actual installation.
Chapter 3	Removing and Installing the ISA and the ISM	Describes the procedures for installing and removing the ISA and the ISM in the supported platforms.
Chapter 4	Configuring the ISA and ISM	Provides instructions for configuring your port adapter on the supported platforms.

Document Conventions

Command descriptions use the following conventions:

boldface font	Commands and keywords are in boldface .
<i>italic font</i>	Arguments for which you supply values are in <i>italics</i> .
[]	Elements in square brackets are optional.
{ x y z }	Alternative keywords are grouped in braces and separated by vertical bars.
[x y z]	Optional alternative keywords are grouped in brackets and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string, or the string will include the quotation marks.

Screen examples use the following conventions:

screen font	Terminal sessions and information the system displays are in <i>screen font</i> .
boldface screen font	Information you must enter is in boldface screen font .
<i>italic screen font</i>	Arguments for which you supply values are in <i>italic screen font</i> .
^	The symbol ^ represents the key labeled Control —for example, the key combination ^D in a screen display means hold down the Control key while you press the D key.
< >	Nonprinting characters, such as passwords, are in angle brackets.
[]	Default responses to system prompts are in square brackets.
!, #	An exclamation point (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Notes, cautionary statements, and safety warnings use these conventions:



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.



Caution

Means *reader be careful*. You are capable of doing something that might result in equipment damage or loss of data.



Warning

This warning symbol means *danger*. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information* document that accompanied this device.

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document *Regulatory Compliance and Safety Information* (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.

Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista. Tässä julkaisussa esiintyvien varoitusten käännökset löydät laitteen mukana olevasta *Regulatory Compliance and Safety Information* -kirjastesta (määräysten noudattaminen ja tietoa turvallisuudesta).

Attention	Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document <i>Regulatory Compliance and Safety Information</i> (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.
Warnung	Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt. Übersetzungen der in dieser Veröffentlichung enthaltenen Warnhinweise finden Sie im Dokument <i>Regulatory Compliance and Safety Information</i> (Informationen zu behördlichen Vorschriften und Sicherheit), das zusammen mit diesem Gerät geliefert wurde.
Avvertenza	Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento <i>Regulatory Compliance and Safety Information</i> (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.
Advarsel	Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker. Hvis du vil se oversettelser av de advarslene som finnes i denne publikasjonen, kan du se i dokumentet <i>Regulatory Compliance and Safety Information</i> (Overholdelse av forskrifter og sikkerhetsinformasjon) som ble levert med denne enheten.
Aviso	Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes. Para ver as traduções dos avisos que constam desta publicação, consulte o documento <i>Regulatory Compliance and Safety Information</i> (Informação de Segurança e Disposições Reguladoras) que acompanha este dispositivo.
¡Advertencia!	Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes. Para ver una traducción de las advertencias que aparecen en esta publicación, consultar el documento titulado <i>Regulatory Compliance and Safety Information</i> (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.

Terms and Acronyms

To fully understand the content of this user guide, you should be familiar with the following terms and acronyms:

- DCE—data communications equipment
- DMA—direct memory access

- DTE—data terminal equipment
- EPROM—erasable programmable read-only memory
- EEPROM—electrically erasable programmable read-only memory
- GB—gigabit
- GBIC—Gigabit Interface Converter
- Gbps—gigabits per second
- MB—megabyte
- Mbps—megabits per second
- NVRAM—nonvolatile random-access memory
- OIR—online insertion and removal
- PCI—Peripheral Component Interconnect
- PXF—Parallel eXpress Forwarding—A secondary processor used to accelerate Cisco IOS services
- RFI—radio frequency interference
- RISC—reduced instruction set computing
- ROM—read-only memory
- SDRAM—synchronous dynamic random-access memory
- SDRAM-fixed—SDRAM of a fixed size or quantity; can be replaced, but not upgraded
- SIMM—single in-line memory module
- SNMP—Simple Network Management Protocol
- SRAM—static random-access memory
- TFTP—Trivial File Transfer Protocol
- VAM—Virtual Private Network (VPN) Acceleration Module (VAM)
- Cache—Memory with fast access and small capacity used to temporarily store recently accessed data; found either incorporated into the processor or near it.
- Primary, secondary, tertiary cache—Hierarchical cache memory storage based on the proximity of the cache to the core of the processor. Primary cache is closest to the processor core and has the fastest access. Secondary cache has slower access than primary cache, but faster access than tertiary cache.
- Instruction and data cache—Instructions to the processor and data on which the instructions work.
- Unified cache—Instruction cache and data cache are combined. For example, a processor may have primary cache with separate instruction and data cache memory, but unified secondary cache.
- Integrated cache—Cache that is built into the processor; sometimes referred to as internal cache. Cache memory that is physically located outside the processor is not integrated, and is sometimes referred to as external cache.

Related Documentation

Your router and the Cisco IOS software running on it contain extensive features and functionality, which are documented in the following resources:

- For configuration information and support, refer to the modular configuration and modular command reference publications in the Cisco IOS software configuration documentation set that corresponds to the software release installed on your Cisco hardware. Access these documents at: <http://www.cisco.com/en/US/products/sw/iosswrel/index.html>.



Note Select Translated documentation is available at <http://www.cisco.com/> by selecting the topic ‘Select a Location / Language’ at the top of the page.

- To determine the minimum Cisco IOS software requirements for your router, Cisco maintains the Software Advisor tool on Cisco.com. This tool does not verify whether modules within a system are compatible, but it does provide the minimum IOS requirements for individual hardware modules or components. Registered Cisco Direct users can access the Software Advisor at: <http://www.cisco.com/cgi-bin/Support/CompNav/Index.pl>.
- Cisco 7100 series routers:
 - [Cisco 7100 Series VPN Router Documentation](#)
 - [Cisco 7100 Series VPN Router Installation and Configuration Guide](#)
 - [Cisco 7100 Series VPN Quick Start Guide](#)
 - [Installing Field-Replaceable Units](#)



Note For specific port and service adapters for the Cisco 7100 series VPN routers, see the [Cisco 7100 Series VPN Router Documentation](#).

- [Cisco 7100 Series VPN Configuration Guide](#)
- Cisco 7100 series VPN router troubleshooting information
- Cisco 7100 Tech Notes
- Cisco 7200 series routers:
 - For port adapter hardware and memory configuration guidelines, refer to the [Cisco 7200 Series Port Adapter Hardware Configuration Guidelines](#).
 - For hardware installation and maintenance information (including the Cisco 7206 as a router shelf in a Cisco AS5800 Universal Access Server), refer to the installation and configuration guide for your Cisco 7200 series router.
- For international agency compliance, safety, and statutory information for WAN interfaces:
 - [Regulatory Compliance and Safety Information for Cisco 7100 Series VPN Routers](#)
 - [Regulatory Compliance and Safety Information for the Cisco 7200 Series Routers](#)
- For IP security and encryption:
 - [Cisco IOS Enterprise VPN Configuration Guide](#)
 - [Cisco IOS Interface Configuration Guide, Release 12.1](#)
 - [Cisco IOS Interface Command Reference, Release 12.1](#)
 - [Cisco IOS Security Configuration Guide, Release 12.2](#)
 - [Cisco IOS Security Command Reference, Release 12.2](#)
 - [Cisco IOS Security Configuration Guide, Release 12.1](#)
 - [Cisco IOS Security Command Reference, Release 12.1](#)

- [Cisco IOS Release 12.0 Security Configuration Guide](#)
- [Cisco IOS Release 12.0 Security Command Reference](#)
- [Cisco IOS Quality of Service Solutions Configuration Guide, Release 12.2](#)
- [Cisco IOS Quality of Service Solutions Configuration Guide, Release 12.1](#)
- [Cisco IOS Release 12.0 Quality of Service Solutions Configuration Guide](#)
- [Cisco IOS Interface Configuration Guide, Release 12.1](#)
- [FIPS 140 Security documents](#)
- [VPN Device Manager documents](#)
- If you are a registered Cisco Direct Customer, you can access the following tools:
 - [Tools, Maintenance, and Troubleshooting Tips for Cisco IOS Software for Cisco IOS Release 12.0](#)
 - [Tools, Maintenance, and Troubleshooting Tips for Cisco IOS Software for Cisco IOS Release 12.1](#)
 - [Tools, Maintenance, and Troubleshooting Tips for Cisco IOS Software for Cisco IOS Release 12.2](#)
 - [Software Advisor](#)
 - [Bug Toolkit](#)
 - [Bug Navigator](#)
 - [Feature Navigator](#)
 - [Output Interpreter](#)
 - [Cisco IOS Error Message Decoder](#)
 - [Cisco Dynamic Configuration Tool](#)
 - [MIB Locator](#)
- Additional tools include:
 - [Tools Index](#)
 - [Cisco IOS Software Selector Tool](#)

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation on the World Wide Web at this URL:

<http://www.cisco.com/univercd/home/home.htm>

You can access the Cisco website at this URL:

<http://www.cisco.com>

International Cisco web sites can be accessed from this URL:

http://www.cisco.com/public/countries_languages.shtml

Documentation CD-ROM

Cisco documentation and additional literature are available in a Cisco Documentation CD-ROM package, which may have shipped with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or through an annual subscription.

Registered Cisco.com users can order the Documentation CD-ROM (product number DOC-CONDOCCD=) through the online Subscription Store:

<http://www.cisco.com/go/subscription>

Ordering Documentation

You can find instructions for ordering documentation at this URL:

http://www.cisco.com/univercd/cc/td/doc/es_inpck/pdi.htm

You can order Cisco documentation in these ways:

- Registered Cisco.com users (Cisco direct customers) can order Cisco product documentation from the Networking Products MarketPlace:

<http://www.cisco.com/en/US/partner/ordering/index.shtml>

- Registered Cisco.com users can order the Documentation CD-ROM (Customer Order Number DOC-CONDOCCD=) through the online Subscription Store:

<http://www.cisco.com/go/subscription>

- Nonregistered Cisco.com users can order documentation through a local account representative by calling Cisco Systems Corporate Headquarters (California, U.S.A.) at 408 526-7208 or, elsewhere in North America, by calling 800 553-NETS (6387).

Documentation Feedback

You can submit comments electronically on Cisco.com. On the Cisco Documentation home page, click **Feedback** at the top of the page.

You can e-mail your comments to bug-doc@cisco.com.

You can submit your comments by mail by using the response card behind the front cover of your document or by writing to the following address:

Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

Obtaining Technical Assistance

Cisco provides Cisco.com, which includes the Cisco Technical Assistance Center (TAC) Website, as a starting point for all technical assistance. Customers and partners can obtain online documentation, troubleshooting tips, and sample configurations from the Cisco TAC website. Cisco.com registered users have complete access to the technical support resources on the Cisco TAC website, including TAC tools and utilities.

Cisco.com

Cisco.com offers a suite of interactive, networked services that let you access Cisco information, networking solutions, services, programs, and resources at any time, from anywhere in the world.

Cisco.com provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

To obtain customized information and service, you can self-register on Cisco.com at this URL:

<http://www.cisco.com>

Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

<http://www.cisco.com/tac>

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

<http://tools.cisco.com/RPF/register/register.do>

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

<http://www.cisco.com/en/US/support/index.html>

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:
http://www.cisco.com/en/US/products/products_catalog_links_launch.html
- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary*, *Internetworking Technology Handbook*, *Internetworking Troubleshooting Guide*, and the *Internetworking Design Guide*. For current Cisco Press titles and other information, go to Cisco Press online at this URL:
<http://www.ciscopress.com>
- *Packet* magazine is the Cisco monthly periodical that provides industry professionals with the latest information about the field of networking. You can access *Packet* magazine at this URL:
http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html
- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:
http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in the design, development, and operation of public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:
http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html
- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:
http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html