



Doc. No. 78-4671-02

Installing 56K 12-Port Modem Modules in Cisco AS5300 Universal Access Servers

Product Numbers: AS53-12-M-56K=

This document describes how to install 56K 12-port modem modules in Cisco AS5300 universal access servers, and includes the following sections:

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- FCC Class B Compliance, page 23
- Cisco Connection Online, page 24

Use this document with the *Regulatory Compliance and Safety Information* publication that shipped with the Cisco AS5300.

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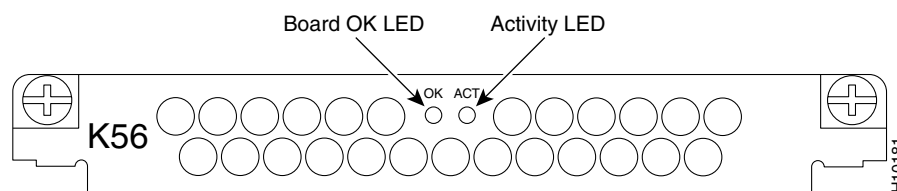
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Product Overview

The 56K 12-port modem module (Figure 1) uses Rockwell's K56Flex technology. The modem can send data at up to 56 kbps and receive data at up to 33.6 kbps. However, the actual speed that you can achieve with the modem depends on the condition of your local telephone network.

Note Actual speeds vary depending on line conditions. Due to FCC limitations, speeds in the U.S. are less than 56 kbps.

Figure 1 56K 12-Port Modem Module



Prerequisites

The following prerequisites apply to the 56K 12-port modem module:

- K56Flex-compatible modems must be present at both ends of a digital connection in a digital network. If not, 56-kbps throughput cannot be achieved. The speed will fall back to 33.6 kbps.
- Only one analog loop can be in the end-to-end communications path.
- You cannot have any A-law to μ -law conversions, which exist at some international gateways.
- Cisco IOS Release 11.2 (9)XA, 11.2 (10)P, or higher.

Safety Recommendations

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Keep tools away from walk areas where you or others could fall over them.
- Do not wear loose clothing that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.

Safety Warnings

Safety warnings appear throughout this publication in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each safety warning.



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* -kirjasesta (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 *Regulatory Compliance and Safety Information* (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 *Regulatory Compliance and Safety Information* (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 *Regulatory Compliance and Safety Information* (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 *Regulatory Compliance and Safety Information* (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 *Regulatory Compliance and Safety Information* (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 *Regulatory Compliance and Safety Information* (Información sobre seguridad y conformidad con las disposiciones reglamentarias) que se acompaña con este dispositivo.

Warning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador. Se förklaringar av de varningar som förekommer i denna publikation i dokumentet *Regulatory Compliance and Safety Information* (Efterrättelse av föreskrifter och säkerhetsinformation), vilket medföljer denna anordning.

Safety with Electricity



Warning Read the installation instructions before you connect the system to its power source.



Warning Ultimate disposal of this product should be handled according to all national laws and regulations.



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



Warning To ensure your safety and the safety of others, be sure the power is OFF and the power cord is unplugged before working on the router.



Warning Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.

Follow these guidelines when working on equipment powered by electricity:

- Locate the emergency power-OFF switch in the room in which you are working. Then, if an electrical accident occurs, you can quickly shut the power OFF.
- Disconnect all power before doing the following:
 - Installing or removing a chassis
 - Working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit. Always check.
- Look carefully for possible hazards in your work area, such as moist floors, ungrounded power extension cables, and missing safety grounds.

- If an electrical accident occurs, proceed as follows:
 - Use caution; do not become a victim yourself.
 - Turn OFF power to the system.
 - If possible, send another person to get medical aid. Otherwise, determine the condition of the victim and then call for help.
 - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing cards. Ensure that the chassis is electrically connected to earth ground. Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to safely channel unwanted ESD voltages to ground. To properly guard against ESD damage and shocks, the wrist strap and cord must operate effectively. If no wrist strap is available, ground yourself by touching the metal part of the chassis.



Caution For safety, periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohm (Mohm).

Installation Overview

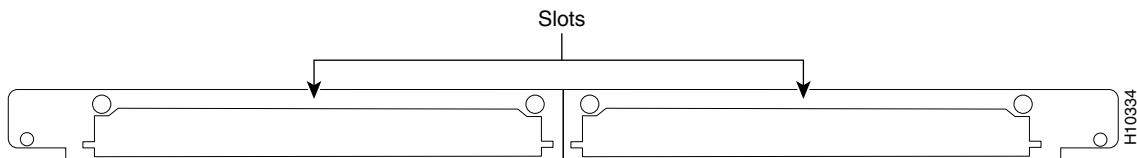
The use of 56K modems introduces a new step for installing and configuring modem software. To use 56K modems, you must first install the modem code file into the Cisco AS5300 system Flash memory. The following steps provide an overview of the installation process:

- 1 Verify that the Cisco AS5300 is running Cisco IOS Release 11.2 (9)XA, 11.2 (10)P, or higher.
- 2 Install the 56K 12-port modem modules, as described in the section “Installing 56K 12-Port Modem Modules.”
- 3 In some circumstances, download new modem code. Depending on your configuration, you can download the modem code from an external file or from the default modem code bundled with Cisco IOS software. These options are explained in “Modem Code.”
- 4 Configure the Cisco AS5300 to support the 56K 12-port modem modules, as described in the section “Configuring 56K 12-Port Modem Modules.”

Installing 56K 12-Port Modem Modules

You must install 56K 12-port modem modules in a Microcom carrier card, which is not included with this kit. The carrier card, shown in Figure 2, is a wide card with two slots in which you can install up to two 56K 12-port modem modules (or other supported port modules). You can install 56K 12-port modem modules with any combination of other supported port modules.

Figure 2 Microcom Carrier Card



Required Tools

You will need the following tools:

- ESD-preventive wrist strap
- Medium-size flat-blade screwdriver (1/4 in. [0.625 cm])

Installation

To install the 56K 12-port modem module, refer to Figure 3 and take these steps:

Step 1 Attach an ESD-preventive wrist strap.

Step 2 Power OFF the access server.



Caution The modem modules are not hot-swappable (that is, you cannot remove or install them when the access server power is ON). Be sure to power OFF the access server before installing or removing modem modules. *Failure to do so can damage the access server.*

Step 3 Remove all interface cables from the back panel of the access server.

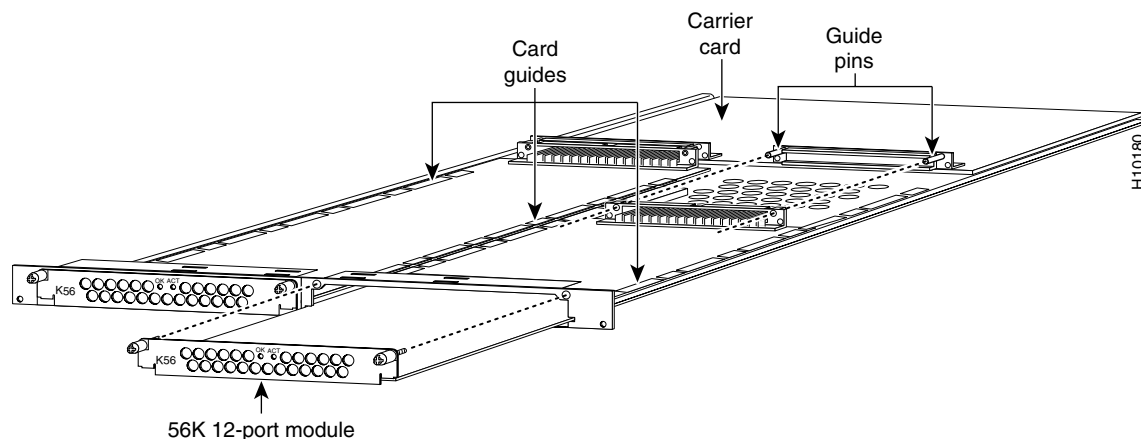
Step 4 Remove the blank cover or modem module installed in the carrier card.

Note If the carrier card is already installed in the access server, you can install 56K 12-port modem modules in the card without removing the carrier card from the access server chassis.

Step 5 Remove the 56K 12-port modem module from the ESD-preventive shipping material.

Step 6 Slide the 56K 12-port modem module into the carrier card slot until it is seated completely.

Step 7 Tighten the two captive screws on the 56K 12-port modem module to secure it to the carrier card.

Figure 3 56K 12-Port Modem Module Installation (Carrier Card Shown)

If you have questions or need assistance, refer to the section “Cisco Connection Online” at the end of this document. Otherwise, proceed to the section, “Configuring 56K 12-Port Modem Modules.”

Modem Code

The 12-port module uses the following modem code images in a single-file format:

- Modem controller firmware, which resides in modem Flash memory
- DSP software, which resides in modem RAM

Modem code also resides on the access server: one version is bundled with Cisco IOS software, and another version can exist in system Flash memory. This modem code residing in the access server is a single file comprised of the modem firmware image combined with the DSP software image.

After power on, Cisco IOS software uses its bundled modem code file or the existing modem code file in system Flash memory to automatically update the DSP software and modem firmware on a given modem.

When you install a new 12-port module, Cisco IOS software examines the following versions of modem code:

- Cisco IOS bundled modem code
- Firmware in modem Flash memory
- Any mapped modem code file in system Flash memory

Then, Cisco IOS software ensures that the system uses matching DSP software and modem firmware—which may include overriding the current firmware on the modem. In some circumstances you may decide to manually update the modem code after the automatic download process completes.

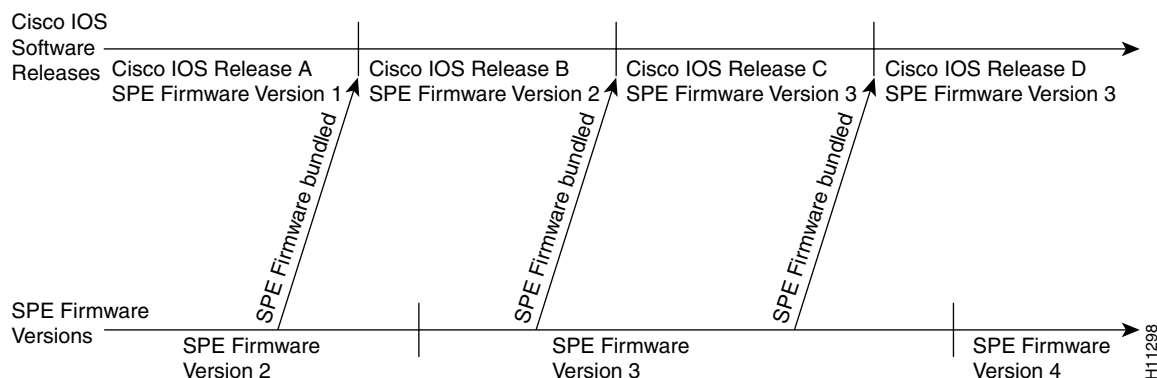
Deciding on an Update Strategy

Because of the possibility of multiple versions of modem code and the way Cisco IOS software process these versions, Cisco suggests that you decide between the following two strategies:

- Always allow Cisco IOS software to use the bundled modem code
- Always control the version of modem code used by the modules, independent of Cisco IOS selections

To help with the decision, Figure 4 shows a hypothetical release process. We recommend that you use the modem code bundled with Cisco IOS software because it is the easier strategy and enables you to take advantage of new modem code whenever you upgrade your Cisco IOS software. You can also control the modem code by reverting to previous versions by using the **copy** command as discussed later.

Figure 4 Release Timeline for Cisco IOS Software and Modem Code



Modem Code Scenarios

Table 1 provides some typical scenarios that occur when you add or replace a 12-port module. Table 2 provides scenarios that occur when you upgrade Cisco IOS software or modem code.

Table 1 Modem Code Scenarios—Hardware Installation

Scenario	Update Process
You replace an existing 56K 12-port module with a module that contains newer modem code. ¹	Option 1—No action needed.
Option 1—Accept the version of modem code selected by Cisco IOS software.	Option 2—Copy the desired version of the modem code file to system Flash memory, then copy that file to the integrated modems on the 12-port module. See “Using the Modem Code from an External File,” page 12.
Option 2—Upgrade modem code to a different version.	
You replace a V.34 12-port module with a 56K 12-port module. ²	Option 1—No action needed.
Option 1—Accept the version of modem code selected by Cisco IOS software (this is the bundled version).	Option 2—Copy the desired version of modem code file to system Flash memory, then copy that file to the integrated modems on the 12-port module. See “Using the Modem Code from an External File,” page 12.
Option 2—Upgrade the modem code to a different version.	

1. Because Cisco IOS software maps modem code (either the bundled Cisco IOS version or a system Flash memory version) to a given slot/port and not the physical modem, Cisco IOS software will automatically load the modem code mapped to the previous module. For more information, see the description of *mapping* in Table 4 on page 11.

2. Cisco IOS software recognizes that the modem code (which is mapped to the previous module) as invalid, so it uses the bundled version.

Table 2 Modem Code Scenarios—Cisco IOS Software or Modem Code Upgrades

No.	Scenario	Update Process
1	You update Cisco IOS software, and you decide to use the version of modem code selected by Cisco IOS software.	<ul style="list-style-type: none"> Update Cisco IOS software. No further action needed—Cisco IOS software automatically downloads either its bundled version or a mapped version from system Flash memory.¹
2	You update Cisco IOS software, and you decide <i>not</i> to use the modem code selected by Cisco IOS software.	<ul style="list-style-type: none"> Update Cisco IOS software. Copy the desired version of modem code file to system Flash memory, then copy that file to the integrated modems on the 12-port module. See “Using the Modem Code from an External File,” page 12.
3	The modems are running a version of modem code from system Flash memory that is different than the version bundled with Cisco IOS software. You decide to revert to the bundled version.	<ul style="list-style-type: none"> Use the Cisco IOS command copy system:ucode/filename modem command (or, for Cisco IOS releases earlier than 11.3AA or 12.0, the copy ios-bundled modem command). To view a list of microcode filenames, use the dir system:ucode command. See “Using the Modem Code Bundled with Cisco IOS Software,” page 17.
4	Cisco releases new modem code, which is a later version than the version currently running on the modems. You decide to use Cisco’s newest modem code. ²	<ul style="list-style-type: none"> Copy the desired version of modem code file to system Flash memory, then copy that file to the integrated modems on the 12-port module. See “Using the Modem Code from an External File,” page 12.

1. In part, Cisco IOS software bases this decision on the last **copy** command issued. For more details about *mapping*, see Table 4 on page 11.

2. Cisco ships new modem code on a disk packed with the 12-port module.

Figure 5 shows a location on the release timeline where updates might take place, and Table 3 explains the resulting versions of Cisco IOS software and modem code.

Figure 5 Release Timeline for Cisco IOS Software and Modem Code

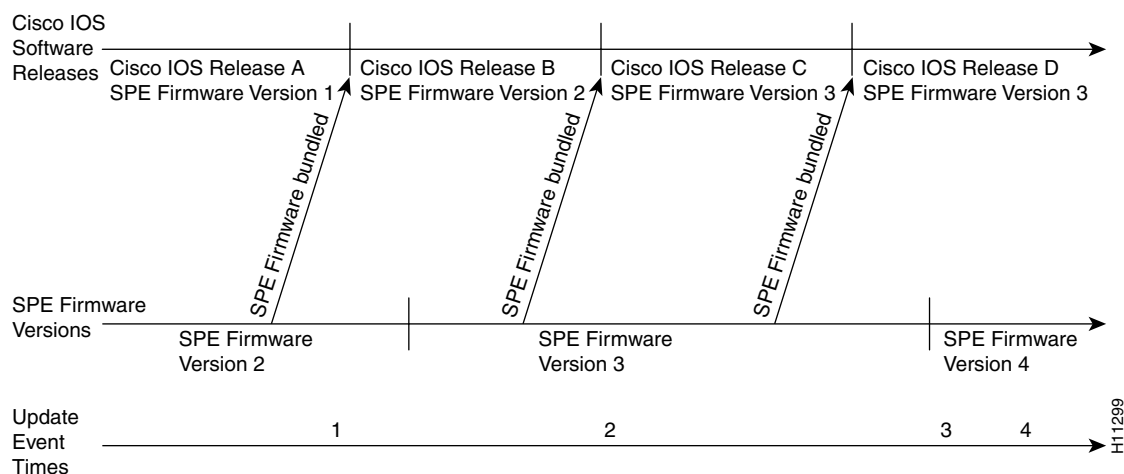


Table 3 Resulting Versions of Cisco IOS Software and Modem Code

Update Event Time	Update Event	Resulting Version of Cisco IOS Software and Modem Code
1	You upgrade Cisco IOS software to Release B. <ul style="list-style-type: none"> If there is no previous copy command (Cisco IOS software uses the bundled version). If invalid mapping (Cisco IOS software uses the bundled version). If last copy command was copy system:/ucode/filename modem (or, for Cisco IOS releases earlier than 11.3AA or 12.0, copy ios-bundled modem) (Cisco IOS software uses the bundled version). If last copy command was copy flash modem and Modem Code Version 1 was specified. 	<ul style="list-style-type: none"> Cisco IOS Release B Modem Mode Version 2 Cisco IOS Release B Modem Mode Version 2 Cisco IOS Release B Modem Mode Version 2 Cisco IOS Release B Modem Mode Version 1
2	You upgrade Cisco IOS software to Release C. (Cisco IOS software uses mapping from last copy command at Time 1). ¹ You enter the copy system:/ucode/filename modem (or, for Cisco IOS releases earlier than 11.3AA or 12.0, copy ios-bundled modem) command.	Cisco IOS Release C Modem Mode Version 1 Cisco IOS Release C Modem Mode Version 3
3	New Modem Code Version 4 is released, you copy the file to system Flash memory, enter copy flash modem and specify Modem Code Version 4.	Cisco IOS Release C Modem Mode Version 4
4	You upgrade Cisco IOS software to Release D. You enter the copy system:/ucode/filename modem (or, for Cisco IOS releases earlier than 11.3AA or 12.0, copy ios-bundled modem) command.	Cisco IOS Release D Modem Mode Version 4 Cisco IOS Release D Modem Mode Version 3

1. This example assumes the last copy command was **copy flash modem**, and Modem Code Version 1 was specified.

Table 4 provides a list of terms and commands and a description of how they are used in the modem code update process.

Table 4 Modem Code Terminology

Term	Description
Modem firmware	Modem controller firmware that resides in modem Flash memory.
DSP software	DSP controller software that resides in modem RAM. Cisco IOS software transfers a version of DSP software to modem RAM on each reboot.
Modem code	<p>Two images:</p> <ul style="list-style-type: none"> • Modem controller firmware • DSP software <p>These images reside separately in the modems and as a single-file version in the access server's system Flash memory.</p> <p>System Flash memory can contain several versions of modem code: a version bundled with Cisco IOS software and multiple versions that resulted from previous copy tftp flash commands.</p>
copy tftp flash mcom-modem-code-x.x.x.bin command	Places a copy of the modem code in system Flash memory.
copy flash modem command	<p>Transfers the copy tftp flash version of modem code to the modems. This command transfers the modem firmware file to modem Flash memory and the DSP software file to modem RAM.</p> <p>Maps the system Flash memory version to the modems.</p>
copy system:/ucode/filename modem command (or, for Cisco IOS releases earlier than 11.3AA or 12.0, copy ios-bundled modem command)	<p>Instructs the modems to use the version of modem code bundled with Cisco IOS software. This command does not affect any existing versions of modem code that reside in system Flash memory.</p> <p>After one such command, future Cisco IOS upgrades will potentially result in the downloading of new Cisco IOS bundled firmware to the modems. (If the new Cisco IOS image contains the same modem code as the old one, no new code will be downloaded to the modems.)</p> <p>Maps the bundled Cisco IOS software version to the modems.</p>
Mapping	The copy commands map a specific version of modem code to a group of modem slots/ports. The copy system:/ucode/filename modem (or, for Cisco IOS releases earlier than 11.3AA or 12.0, copy ios-bundled modem) command maps the slots/ports to the bundled version, and the copy flash modem command maps the slots/ports to a specific modem code file located in system Flash memory. Cisco IOS software uses the mapping to determine which version of modem code should be downloaded to the modems. If Cisco IOS software finds no mapping or invalid mapping, it downloads the bundled version.

Using the Modem Code from an External File

Use the procedures in this section to transfer modem code from Cisco Connection Online (CCO) to the integrated modems on the 12-port module. The procedure consists of the following tasks:

- Download the modem code to a TFTP server
- Copy the modem code from the TFTP server to the modems

Downloading Modem Code to a TFTP Server

You can download the single file (mcom-modem-code-x.x.x.bin) to a TFTP server on your LAN two ways:

- Using an Internet browser
- Using a traditional FTP application

Download Modem Code to a TFTP Server—Method 1, Use an Internet Browser

Log in to Cisco's Software Center at the following URL to download the modem code file. You must log in as a Cisco registered user. (If you are not a registered user, note that Cisco provides modem code on a disk when updates are necessary. This disk is shipped with the 12-port module.)

After downloading to your desktop computer, you must transfer it to a TFTP server on your network using an FTP application.

```
http://www.cisco.com/cgi-bin/tablebuild.pl/56K
```

Alternatively, you can access Cisco at <http://www.cisco.com>, login, and take the following path to the file:

- Service and Support
- Software Center
- Access Products
- Cisco AS5300 Series Software
- Download Microcom 56K Modem Firmware

Download Modem Code to a TFTP Server — Method 2, Use a Traditional FTP Application

Take the following steps to download the modem code file from Cisco's FTP server using an FTP client application. These steps assume that you want to download both the modem firmware and the DSP software.

Note The directory path leading to the 56K images on cco.cisco.com is subject to change without notice. If you cannot access the files using an FTP application, use Download Method 1.

Step 1 Log in to Cisco System's CCO FTP server, which is called cco.cisco.com:

```
terminal> ftp cco.cisco.com
Connected to cio-sys.cisco.com.
220-
220- Cisco Connection Online      |          | Cisco Systems, Inc.
220- Email: cco-team@cisco.com    |||       ||| 170 West Tasman Drive
```

```

220- Phone: +1.800.553.2447 .:|||||:..:|||||:. San Jose, CA 95134
220-
220- NOTE: As of February 1, 1997 ftp.cisco.com will now point to this
220- service. Please be advised. To use the former ftp.cisco.com after
220- February 1, connect to ftpeng.cisco.com
220-
220- You may login with:
220-     + Your CCO username and password, or
220-     + A special access code followed by your e-mail address, or
220-     + "anonymous" followed by your e-mail address for guest access.
220-
220-
220 cio-sys FTP server (CIOESD #103 Sun Dec 15 14:43:43 PST 1996) ready.

```

Step 2 Enter your CCO registered username and password (for example, **harry** and **letmein**):

```

Name (cco.cisco.com:harry): harry
331 Password required for harry.
Password: letmein
230-#####
230-# Welcome to the Cisco Systems CCO FTP server.
230-# This server has a number of restrictions. If you are not familiar with
230-# these, please first get and read the /README or /README.TXT file.
230-# http://www.cisco.com/acs/info/cioesd.html for more info.
230-#####
230-
230- ***** NOTE: As of February 1, 1997, "cco.cisco.com", *****
230- ***** "www.cisco.com" and "ftp.cisco.com" are now all *****
230- ***** logical names for the same machine. *****
230- *****
230- ***** The old "ftp.cisco.com" is an entirely *****
230- ***** different machine, which is now known as *****
230- ***** "ftpeng.cisco.com" or "ftp-eng.cisco.com". *****
230- *****
230- ***** In general, "ftpeng.cisco.com" is used only for *****
230- ***** distribution of Cisco Engineering-controlled *****
230- ***** projects, such as beta programs, early field *****
230- ***** trials, developing standards documents, etc. *****
230- *****
230- ***** Be sure to confirm you have connected to *****
230- ***** the machine you need to interact with. *****
230-
230- If you have any odd problems, try logging in with a minus sign (-)
230- as the first character of your password. This will turn off a feature
230- that may be confusing your ftp client program.
230- Please send any questions, comments, or problem reports about this
230- server to cco-team@cisco.com.
230-
230- NOTE:
230- o To download files from CCO, you must be running a *passive-mode*
230- capable FTP client.
230- o To drop files on this system, you must cd to the /drop directory.
230- o Mirrors of this server can be found at
230-
230- + ftp://www-europe.cisco.com European (Amsterdam)
230- + ftp://www-fr.cisco.com France (Paris)
230- + ftp://www-au.cisco.com Australia (Sydney)
230- + ftp://www-jp.cisco.com Japan (Tokyo)
230- + ftp://www-kr.cisco.com Korea (Seoul)
230-
230-
230- Please read the file README
230- it was last modified on Sat Feb 1 12:49:31 1997 - 163 days ago
230- User harry logged in. Access restrictions apply.

```

```
Remote system type is UNIX.  
Using binary mode to transfer files.
```

Step 3 Specify the directory that holds the Modem Code file, which is `/cisco/access/5300`:

```
ftp> cd /cisco/access/5300  
250- Please read the file README  
250- it was last modified on Tue May 27 10:07:38 1997 - 48 days ago  
250- Please read the file README.txt  
250- it was last modified on Tue May 27 10:07:38 1997 - 48 days ago  
250- CWD command successful.
```

Step 4 View the contents of the directory with the `ls` command:

```
ftp> ls  
227 Entering Passive Mode (192,31,7,130,218,128)  
150 Opening ASCII mode data connection for /bin/ls.  
total 2688  
drwxr-s--T  2 ftpadmin ftpcio      512 Aug 23 18:11 .  
drwxr-sr-t 19 ftpadmin ftpcio      512 Jul 18 10:26 ..  
lrwxrwxrwx  1 root      3          10 Aug  9 1996 README -> README.txt  
-rw-rw-r--  1 root      ftpcio    2304 Nov  8:07 README.txt  
-r--r--r--  1 ftpadmin ftpint 377112 Jul 10 18:08 mcom-modem-code.3.1.30.bin  
-r--r--r--  1 ftpadmin ftpint  635 Jul 10 18:08 mcom-modem-code.3.1.30.readme  
  
226 Transfer complete.
```

Step 5 Specify a binary image transfer:

```
ftp> binary  
200 Type set to I.
```

Step 6 Copy the modem code file from the server to your local environment with the `get` command. The filename is `mcom-modem-code-3.1.30.bin`.

The following example downloads the modem code file:

```
ftp> get mcom-modem-code-3.1.30.bin  
PORT command successful.  
Opening BINARY mode data connection for mcom-modem-code-3.1.30.bin (377112 bytes).  
Transfer complete.  
local: mcom-modem-code-3.1.30.bin  
remote: mcom-modem-code-3.1.30.bin  
385503 bytes received in 3.6 seconds (1e+02 Kbytes/s)
```

Step 7 Quit your terminal session:

```
ftp> quit  
Goodbye.
```

Step 8 Verify that you successfully transferred the modem code file to your local directory:

```
server% ls -al  
total 596  
-r--r--r--  1 377112 Jul 10 18:08 mcom-modem-code-3.1.30.bin  
server% pwd  
/auto/tftpboot
```

Step 9 If you have not already done so, transfer this file to a local TFTP server that your Cisco AS5300 can access.

Note In some cases, Cisco ships modem software on a disk. To use this software, first upload the software to your TFTP server, then download the software to the modem using the method described in the next section “Copying the Modem Code File from a Local TFTP Server to the Modems.”

If you loaded Cisco IOS software from a feature pack CD using Router Software Loader (RSL), note that the CD contains a TFTP server program for PCs using Windows 95. Run the server program from the directory where you installed the RSL program. Remember to set the Root directory to the directory where the AS5300 56K modem code is located. RSL is also available on CCO in the software library in the Access Products section.

Copying the Modem Code File from a Local TFTP Server to the Modems

The procedure for copying the modem code file from your local TFTP server to the access server system Flash memory is a two-step process. First, transfer the code to the access server. Then, transfer the code to the modems.

These two steps are performed only once. After you copy the modem code file into system Flash memory for the first time and map that file to a specific modem using the **copy flash modem** command, you do not have to perform these steps again. Because the DSP software runs from modem RAM, the Cisco IOS software must automatically copy the DSP software to each modem each time the access server power cycles.

Note A list of download failure reasons and recommended actions is provided in Table 5 on page 18.

Step 1 Copy the modem code file from your TFTP server to the access server’s system Flash memory using the **copy tftp flash** command. Cisco IOS software prompts you with a sequence of questions such as name/address of the TFTP server and the filename to be copied. Answer all of the prompts according to your configuration. The following example shows a typical download.

```
5300# copy tftp flash

System flash directory:
File Length Name/status
  1 37712 mcom-modem-code.3.1.30.bin
[4195272 bytes used, 12581944 available, 16777216 total]
Address or name of remote host [255.255.255.255]? modem_server
Source file name? as5300/mcom-modem-code.3.1.30.bin
Destination file name [as5300/mcom-modem-code.3.1.30.bin]?
as5300/mcom-modem-code.3.1.30.bin
Accessing file 'as5300/mcom-modem-code.3.1.30.bin' on modem_server...
Loading as5300/mcom-modem-code.3.1.30.bin from 223.255.254.254 (via Ethernet0): !
[OK]

Erase flash device before writing? [confirm] no
Copy 'as5300/mcom-modem-code.3.1.30.bin' from server
  as 'mcom-modem-code.3.1.30.bin' into Flash WITHOUT erase? [yes/no] yes
Loading as5300/mcom-modem-code.3.1.30.bin from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 282106/557056 bytes]
```

```
Verifying checksum... OK (0xB163)
Flash device copy took 00:00:04 [hh:mm:ss]
```

Step 2 Copy the modem code file to the modems by entering the **copy flash modem** Privileged EXEC command.

```
5300# copy flash modem
Modem Numbers (<slot>/<port> | group <number> | all)? 1/0

System flash directory:
File Length Name/status
  1 5424872 c5200-js-mz
  2 377112 mcom-modem-code-3.1.30.bin
[5801984 bytes used, 10975232 available, 16777216 total]
Name of file to copy? mcom-modem-code-3.1.30.bin
Copy 'mcom-modem-code-3.1.30.bin' from Flash to modems? [yes/no]yes
[OK - 377112/278528 bytes]

5300#
*Mar 1 20:21:55: %MODEM-5-DL_START: Modem (1/0) started firmware download
*Mar 1 20:23:24: %MODEM-5-DL_GOOD: Modem (1/0) completed firmware download:
MNPCClass10K56flexModemRev3.1.30/85
```

Note On the display, notice that the command copies the concatenated modem code file, mcom-modem-code-3.1.30.bin. When the DSP software and modem firmware download is complete, the display reports the modem firmware component, MNPCClass10K56flexModemRev3.1.30/85, was downloaded to the modems.

If you want to verify that the DSP software and modem firmware copied to the modems, use the **show modem version** command. In this example, modems 2/12 through 2/23 are loaded with the modem controller firmware and DSP software:

```
5300# show modem version
```

Mdm	Modem module Number	Firmware Rev	Boot Rev	DSP Rev
2/0	0	2.2(8)	1.0(5)	
2/1	0	2.2(8)	1.0(5)	
2/2	0	2.2(7)	1.0(5)	
2/3	0	2.2(7)	1.0(5)	
2/4	0	2.2(7)	1.0(5)	
2/5	0	2.2(7)	1.0(5)	
2/6	0	2.2(7)	1.0(5)	
2/7	0	2.2(7)	1.0(5)	
2/8	0	2.2(7)	1.0(5)	
2/9	0	2.2(7)	1.0(5)	
2/10	0	2.2(7)	1.0(5)	
2/11	0	2.2(7)	1.0(5)	
2/12	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/13	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/14	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/15	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/16	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/17	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/18	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)
2/19	1	3.1(30)	3.0(4)	1.1(0)/1.1(0)

```

2/20          1      3.1(30)  3.0(4)   1.1(0)/1.1(0)
2/21          1      3.1(30)  3.0(4)   1.1(0)/1.1(0)
2/22          1      3.1(30)  3.0(4)   1.1(0)/1.1(0)
2/23          1      3.1(30)  3.0(4)   1.1(0)/1.1(0)

```

Modem board HW version info:

Slot 2:

Carrier card:

```
hw version= 8, number_of_ports= 24, max_modules= 2, max_oob_ports= 2
```

Modem Module 0:

```
number_of_modems= 12, option_bits= 1,
rev_num= 03.00, vendor_model_number= 01,
vendor_banner= Microcom MNP10 V34 Modem
```

Modem Module 1:

```
number_of_modems= 12, option_bits= 1,
rev_num= 03.00, vendor_model_number= 02,
vendor_banner= Microcom MNP10 K56 Modem
```

Now the modems are equipped with code. The modems are configured to transmit at speeds up to 56 kbps. Each time the access server is power cycled, Cisco IOS software automatically loads the modems with the modem code in system Flash memory. If you erase the modem code file from system Flash memory, the Cisco IOS default modem code (that is, the bundled modem code) will be automatically downloaded to the modem.

Using the Modem Code Bundled with Cisco IOS Software

If you already have a version of modem code in the Flash memory on your access server, and you upgrade to a Cisco IOS release that includes newer modem firmware, only the modems that are mapped to the bundled Cisco IOS version are updated. In order to set the modem firmware mapping to the firmware version bundled with Cisco IOS software, enter the following command:

```
5300# copy system:/ucode/filename modem
```

Note For Cisco IOS releases earlier than 11.3AA or 12.0, use the **copy ios-bundled modem** command.

Note This command does not affect any existing modem code that resides in system Flash memory in case you later want to revert to it. If you decide to delete the code from system Flash memory, remember that *all* files in system Flash memory will be deleted, therefore save and restore any important files (for example, the Cisco IOS software image).

As a result of the **copy system:/ucode/filename modem** (or **copy ios-bundled modem**) command, future Cisco IOS upgrades will potentially result in the mapping of new Cisco IOS bundled firmware to the modems. (If the new Cisco IOS image contains the same modem code as the old one, no new code will be downloaded to the modems.)

Note To determine the version of modem code bundled with your Cisco IOS software, refer to the Cisco IOS release notes shipped with the chassis.

Download Failure Reasons and Recommended Actions

During the modem code download process, you may receive an error message if the download fails.

Table 5 Download Failure Reasons and Recommended Actions

Error Message	Description	Recommended Action
%%ERROR: Modem <slot/port>, Modem Firmware file is not valid for modem type.	The specified modem firmware is not compatible with the target modem. For example, V.34 modems cannot be upgraded with 56K firmware. If you have a bank of non-56K modems in the access server and specify the all option in the copy tftp modem command, this error message will appear and not download 56K firmware where appropriate.	Verify that you are copying 56K modem firmware to 56K modems. Also use the show modem command to verify that you specified the correct slot/port or range.
%%ERROR: Modem <slot/port> currently being downloaded.	The modem code is currently downloading to the 56K modems.	The first download will continue without interruption, and the second download is aborted.
%%ERROR: Modem <slot/port>, download functions not initialized.	The modem code cannot be downloaded to the specified modem.	Use the show modem command to verify that you are downloading to a supported 56K modem.
%%ERROR: Modem <slot/port> is held in reset.	The specified modem is held in reset mode. The DSP software will not download to this modem.	Take the modem out of reset mode, then copy the DSP software again.
%%ERROR: NVRAM write for DSP download filename entry failed.	There is an NVRAM table problem.	Reissue the copy tftp flash command and copy the DSP file again.

Configuring 56K 12-Port Modem Modules

This section describes how to configure the 56K 12-port modem modules.

If you are experienced with Cisco IOS software, refer to the “Configuration Example” section at the end of the following task tables for a working configuration example. Or take the steps described in the following task tables to configure the access server:

- Table 6, Configuring the Asynchronous Group Interface
- Table 7, Configuring the Modems
- Table 8, Configuring the Controller
- Table 9, Configuring the Serial Interfaces

Table 6 Configuring the Asynchronous Group Interface

Step	Command	Purpose
1	5300> enable Password: <password> 5300#	Enter enable mode. Enter the password. You have entered enable mode when the prompt changes to 5300#.
2	5300# config term Enter configuration commands, one per line. End with CNTL/Z. 5300 (config)#	Enter global configuration mode. You have entered global configuration mode when the prompt changes to 5300 (config) #.
3	5300 (config)# interface group-async 1 5300 (config-if)#	Place all asynchronous interfaces in a single group, so that you configure the same parameters quickly on all interfaces at one time.
4	5300 (config-if)# ip unnumbered ethernet 0	To conserve IP addresses, configure the asynchronous interfaces as unnumbered and assign the IP address of the Ethernet interface to them.
5	5300 (config-if)# encapsulation ppp	Enable PPP ¹ to run on the set of interfaces in the group.
6	5300 (config-if)# async mode interactive	Configure interactive mode on the asynchronous interface.
7	5300 (config-if)# ppp authentication chap pap	Enable CHAP ² and PAP ³ authentication on the interface.
8	5300 (config-if)# peer default ip address pool default	Support dial-in PC clients. At the global level, define the pool of addresses
9	5300 (config-if)# group-range 1 48 Building configuration... 5300 (config-if)#	Define the group range of the interface. The number you use with the group-range command depends on the number of asynchronous interfaces you have on your access server. That is, if your access server has 48 asynchronous interfaces, you can specify group-range 1 48 . If 60, specify group-range 1 60 .

1. PPP = Point-to-Point Protocol.

2. CHAP = Challenge Handshake Authentication Protocol.

3. PAP = Password Authentication Protocol.

Table 7 Configuring the Modems

Step	Command	Purpose
1	5300(config-if)# line 1 48 5300(config-line)#	Enter the number of modem lines to configure. If you have 48 modems, enter line 1 48 . If 60, enter line 1 60 . Note: There are 12 modems on each 56K module.
2	5300(config-line)# modem autoconfigure type 56k	Configure the access server modems to use a default configuration string (chat script). A string of modem configuration commands is sent to the modem each time it is reset.
3	5300(config-line)# transport input all	Allow all protocols to be used when connecting to the line.
4	5300(config-line)# autoselect ppp	Enable remote IP users running a PPP application to dial in, bypass the EXEC facility, and connect directly to the network.
5	5300(config-line)# modem inout	Enable both incoming and outgoing calls.
6	5300(config-line)# flowcontrol hardware	Enable hardware flow control.
7	5300(config-line)# exit 5300(config)#	Exit to global configuration mode.

Table 8 Configuring the Controller

Step	Command	Purpose
1	5300(config)# isdn switch-type primary-5ess	Enter your telco's switch type. The following switch types are available: primary-4ess, primary-5ess, primary-dms100, primary-net5, primary-ntt, and primary-ts014.
2	5300(config)# controller t1 0 [or] 5300(config)# controller e1 0 5300(config-controller)#	Enter controller configuration mode to configure your controller port. The controller ports are labeled 0 through 3 on the quad T1/PRI and quad E1/PRI cards.
3	5300(config-controller)# framing esf	Enter your telco's framing type. The following framing types are available: esf, sf, crc4, and nocrc4.
4	5300(config-controller)# linecode b8zs	Enter your telco's line code type. The following line code types are available: ami, b8zs, and hdb3.
5	5300(config-controller)# clock source line primary	Enter the clock source for the line. Configure one line as the primary or most stable clock source line. Configure the other line as the secondary clock source line.

Table 8 Configuring the Controller (Continued)

Step	Command	Purpose
6	5300 (config-controller)# pri-group timeslots 1-24 [or] 5300 (config-controller)# pri-group timeslots 1-31	Configure all channels for ISDN. Enter pri-group timeslots 1-24 for T1. If E1, enter pri-group timeslots 1-31 .
7	5300 (config-controller)# controller t1 1 [or] 5300 (config)# controller e1 0 5300 (config-controller)# framing esf 5300 (config-controller)# linecode b8zs 5300 (config-controller)# clock source line secondary 5300 (config-controller)# pri-group timeslots 1-24 [or] 5300 (config-controller)# pri-group timeslots 1-31	Repeats steps 2 to 6 to configure the second controller. Note that the controller number is 1, instead of 0. And the clock source is secondary, instead of primary.

Table 9 Configuring the Serial Interfaces

Step	Command	Purpose
1	5300 (config-controller)# interface serial0:23 5300 (config-if)#	Enter serial interface configuration mode. After you have configured the controller, a corresponding D channel serial interface is created instantly. Serial interface 0:23 is the D channel for controller 0. You must configure each serial interface to receive incoming and send outgoing modem signaling.
2	5300 (config-if)# ip address 172.16.253.254 255.255.255.0	Assign an IP address and subnet mask to the interface.
3	5300 (config-if)# isdn incoming-voice modem	Configure all incoming voice calls to go to the modems.
4	5300 (config-if)# end 5300# %SYS-5-CONFIG_I: Configured from console by console <Return> 5300#	Return to privileged EXEC mode. When this message appears, press Return to get the 5300# prompt.
5	5300# copy running-config startup-config Building configuration... [OK]	Save the configuration changes to NVRAM.

Configuration Example

The following example shows the output of the **show config** command for a system configured with 56K 12-port modem modules. If you are experienced with Cisco IOS software, you might find this a useful reference for configuration.

```
5300# show config
Using 1888 out of 126968 bytes
!
version 11.2
service timestamps debug uptime
service udp-small-servers
service tcp-small-servers
```

Configuring 56K 12-Port Modem Modules

```
!
hostname 5300
!
enable secret 5 $1$60L4$X2JYOwoDc0.kqa1lo0/w8/
enable password lab
!
username modem password 7 020A0559
username smith-t1 password 7 060A0E23
partition flash 2 8 8
!
no ip domain-lookup
ip host jurai 223.255.254.254
ip host brios 223.255.254.253
isdn switch-type primary-5ess
chat-script dial "" "ATDT\T" TIMEOUT 120 CONNECT \p
!
controller T1 0
    framing esf
    clock source line primary
    linecode b8zs
    pri-group timeslots 1-24
!

controller T1 1
    framing esf
    clock source line secondary
    linecode b8zs
    pri-group timeslots 1-24
!
interface Ethernet0
    ip address 1.18.0.99 255.255.0.0
    hold-queue 512 in
!
interface Serial0
    no ip address
    shutdown
!
interface Serial1
    no ip address
    shutdown
!
interface Serial0:23
    ip address 20.0.0.1 255.0.0.0
    no ip mroute-cache
    encapsulation ppp
    no keepalive
    isdn incoming-voice modem
    dialer idle-timeout 2147483
    dialer map ip 20.0.0.2 name as5300-uuT broadcast 8940166
    dialer load-threshold 50 either
    dialer-group 1
    no fair-queue
    ppp authentication chap
!
interface Serial1:23
    ip address 21.0.0.1 255.0.0.0
    no ip mroute-cache
    encapsulation ppp
    isdn incoming-voice modem
    dialer idle-timeout 2147483
    dialer map ip 21.0.0.2 name as5300-uuT broadcast 4341608
    dialer load-threshold 50 either
    dialer-group 1
```

```

no fair-queue
ppp authentication chap
!
interface Group-Async1
 ip unnumbered Ethernet0
 encapsulation ppp
 async default routing
 async mode interactive
 no peer default ip address
 no fair-queue
 no cdp enable
 ppp authentication chap
 group-range 1 48
!
no ip classless
ip route 223.255.254.254 255.255.255.255 1.18.0.1
snmp-server community public RW
!
line con 0
line 1 48
 exec-timeout 0 0
 autoselect ppp
 modem InOut
 transport input all

line aux 0
line vty 0 4
 password lab
 login
!
end

```

This concludes the procedure for configuring the access server for use with the 56K 12-port modem module. If you have questions or need assistance, refer to the section “Cisco Connection Online” at the end of this document.

FCC Class B Compliance

The equipment described in this document generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco’s installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

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You can access CCO in the following ways:

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- WWW: <http://www-europe.cisco.com>
- WWW: <http://www-china.cisco.com>
- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

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