

Cisco 700 Series Frequently Asked Questions

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Questions

Introduction

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Introduction

This document contains Frequently Asked Questions about the Cisco 700 Series Routers. For more information on this product, please visit the Cisco Documentation home page and search for the Cisco 700 Series Router documentation. In addition, many sample configurations are available in the Sample Configurations for 7XX Products document.

Refer to Cisco Technical Tips Conventions for more information on document conventions.

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Section 1 – Basic Configuration, ISDN, and PPP Troubleshooting

Q. What is the Cisco 700 Series Router?

A. It is a family of routers (derived from routers made by Combinet) that are primarily used for remote ISDN access. Currently, the series consists of models 761, 762, 765, 766, 771, 772, 775, and 776, which can all support IP and IPX routing, transparent bridging, SNMP management, multilevel authentication, multilink PPP, as well as a host of other features. Models and features are continuously enhanced, so check the Cisco product catalog and online documentation for the most current information.

Q. What software does it support, and what naming convention is used?

A. The Cisco 700 Series Routers run their own Cisco software (Cisco IOS–700), which is different than traditional Cisco IOS[®]. The images vary dependent upon the country in which the router is used and upon what feature set is desired:

- ◆ "US" for use in the USA

- ◆ "NET3" for use in Europe
 - ◆ "TR6" for use in Germany
 - ◆ "INS" for use in Japan
 - ◆ "TPH" for use in Australia
 - ◆ "b" for Internet Ready (IP only, four LAN devices, no data compression)
 - ◆ "bx" for Internet Ready X.25 (IP only, four LAN devices, no compression, X.25)
 - ◆ "s" for Small Office Home Office (SOHO) (IP/IPX, four LAN devices, compression), Pre-version 4.1
 - ◆ "r" for Remote Office (IP/IPX, 1500 LAN devices, compression)
 - ◆ "rx" for Remote Office X.25 (IP/IPX, 1500 LAN devices, compression, X.25)
- So an image on CCO named "c760-in.r-TPH.42-1.bin" is a Series 760 router image release 4.21, Remote Office feature set for Australia.

For example, if you enter the **version** command at the ">" prompt, it outputs something like this:

```

guest> version
Software Version c760-in.r.US 4.0(1) - Jan 14 1997 19:00:23
Cisco 766
ISDN Stack Revision US 2.10 (5ESS/DMS/N1-1)

```

In this example, the output shows that this is a Cisco 760 (c760) image for the United States (US), release 4.0(1), and uses the Remote Office ("r") feature set.

Q. How do I "talk" to or configure the Cisco 700 Series Router?

A. You need at least a computer with a serial port and a communications program (like Hyperterminal or Kermit), or, if your router already has a LAN IP address and you have IP connectivity, you can Telnet to it. You can also use some of the configuration graphical user interfaces (GUIs) that Cisco has, such as Clickstart or FastStep. Check CCO for details. Dependent upon your level of comfort with the command line interface (CLI), the quickest way to go can be to configure the router with the serial port and Hyperterminal of a PC.

Q. Where is documentation for the 700 Series Routers?

A. You can access the Cisco 700 documentation online from the Cisco Documentation home page. Search for the Cisco 700 Series Router documentation.

Q. Are there any sample configurations for the Cisco 700 on CCO?

A. Yes. There are many sample configurations at Sample Configurations for 7XX Products.

Q. The Cisco 700 software is not like Cisco IOS! How do I do anything?

A. Here are some basic commands to get you started. For complete command information, refer to the Cisco 700 documentation.

700 Series Command	Similar IOS Command	Meaning
	show version	Shows you the level of code and hardware.

	<p>Example:</p> <pre> guest> version Software Version c760-in.r.US 4.0(1) - Jan 14 1997 19:00:23 Cisco 766 ISDN Stack Revision US 2.10 (5ESS/DMS/N1-1) Copyright (c) 1993-1997 by Cisco Systems, Inc. All rights reserved. Software is used subject to software license agreement contained with this product. By using this product you agree to accept the terms of the software license. Hardware Configuration: POTS Board: Type 0 NT1 Installed </pre>	
upload	show running/write term	Shows you current configuration which includes many additional parameters.
show status	show isdn status	Shows you whether your SPIDs are accepted and active connection is a good connection with accepted SPIDs, one DATA call; and one phone call; looks like this example:
<p>Example:</p> <pre> guest> show stat Status 01/02/1995 00:47:01 Line Status Line Activated Terminal Identifier Assigned SPID Accepted Terminal Identifier Assigned SPID Accepted Port Status Ch: 1 VOICE Call In Progress 4722900 PHONE1 0 Ch: 2 64K Call In Progress 9910246 DATA 2 </pre> <p>When your SPIDs are rejected because the switch thinks your settings are incorrect, you see this:</p> <pre> guest> sh stat Status 01/01/1995 00:28:53 Line Status Line Activated Terminal Identifier Assigned SPID Rejected Terminal Identifier Assigned SPID Rejected ~~~~~ Port Status Ch: 1 Waiting for Call Ch: 2 Waiting for Call </pre> <p>When your BRI line is not even connected to the router or the RJ-11 cable is bad, it</p>		

	shows up as "Line DeActivated":	
	<pre> user-isdn> show stat Status 01/01/1995 00:36:38 Line Status Line DeActivated ~~~~~ Terminal Identifier Unassigned Not Initialized Terminal Identifier Unassigned Not Initialized Port Status Ch: 1 Waiting for Call Ch: 2 Waiting for Call Interface Connection Link </pre>	
show memstat	show memory	Shows you memory allocation and sizes.
	<p>Example:</p> <pre> test> show mem show mem ID 0: Size: 10 Avail: 8 Max: 8 Used: 1 Addr: 0x000DDBE8 ID 1: Size: 30 Avail: 66 Max: 80 Used: 19 Addr: 0x000DDE22 ID 2: Size: 18 Avail: 35 Max: 35 Used: 0 Addr: 0x000DE5E8 . . . ID 16: Size: 112 Avail: 2 Max: 2 Used: 0 Addr: 0x000F1210 NVStore Used: 1471, Remaining 6721 (Deleted 489 + Unused 6232), Total 8192 RamStore Used: 0, Remaining 10000, Total 10000 RAM Size = 0x180000 ~~~~~ Available memory=515696, Allocs=382, Frees=248 MbufAllocs=0x101, MbufFrees=0x101, MbufFail=0x0 IbufAllocs=0xf8, IbufFrees=0xf8, IbufFails=0x0 MlenMax=0xe0, MlenAvail=0xe0, MlenLow=0xdf, MlenAllocs=0x9, MlenFails=0x0 ZeroMax=0x0, ZeroAvail=0x0, ZeroLow=0x7fff, ZeroAllocs=0x0, ZeroFails=0x0 test> </pre> <p>RAM Size is in HEX, so 0x180000 means 1.5 MB.</p> <p>Note: It is possible that you need to increase memory in order to run the latest release of code. Always read the Release Notes before you download new system code.</p>	
none	write memory	There is no way to write to NVRAM on the 700. When you make a change, it is remembered after a "reboot" or after you turn the unit off.
show ip config all	write term	Displays on which profiles IP has been configured, as well as RIP, MULTICAST, port address

		translation (PAT), and so on.
	<p><i>Example:</i></p> <pre> guest> show ip config all Profile Routing Frame IP Address Netmask RIP TX RX Prop C ----- LAN ON ETH2 198.95.215.254 255.255.255.0 V1 OFF V1 ON 1 cdl-isdn-rt ON IPCP 0.0.0.0 0.0.0.0 V1 OFF V1 ON 1 Profile PAT Multicast Summarization ----- LAN OFF OFF OFF cdl-isdn-rt OFF OFF OFF </pre>	
show ip route	show ip route	Shows you the IP routing table in the router.
	<p><i>Example:</i></p> <pre> guest> show ip route all Profile Type Destination Bits Gateway Prop Cost Source Ag ----- LAN NET 198.95.215.0 24 DIRECT ON 1 DIRECT 0 cdl-isdn-rtp NET 0.0.0.0 0 0.0.0.0 ON 1 STATIC 0 </pre>	
show connection	show dialer 0	Shows you who is connected to your B channels.
	<p><i>Example:</i> Here, we are connected to the test router "cdl-isdn":</p> <pre> guest> show conn Connections 01/01/1995 00:08:27 Start Date & Time # Name # Ethernet 1 01/01/1995 00:00:00 # # 00 00 00 00 00 00 2 01/01/1995 00:00:00 # cdl-isdn # Link: 1 Channel: 1 Phone: 4778998 </pre>	
show users	show dialer interface	Shows profiles and where they are used.
	<p><i>Example:</i></p> <pre> guest> show users User State Connection ----- LAN Active LAN Internal Active INTERNAL Standard Active 1 cdl-isdn-rtp Active 2 </pre>	
	none	Shows parameter settings for demand dialing.

Example:

```
guest> show demand
      Demand Calling Parameters
      Connection Type           Link 1      Link 2
      Threshold                 Auto ON    Auto ON
      Duration                  0 kbs     48 kbs
      Source                    1 sec     1 sec
      Timeout (call tear down) Parameters
      Threshold                 LAN       BOTH
      Duration                  0 kbs     48 kbs
      Source                    OFF       OFF
      Source                    LAN       BOTH
```

show security

write term

Displays security settings.

Example:

```
guest> show security
      System Parameters
      Security
      Access Status             ON
      System Password           NONE
      Remote Configuration      PROTECTED
      Local Configuration       ON
      Logout Timeout            5
      Caller ID Security        OFF
      Caller Id Numbers

      PPP Security
      PPP Authentication IN     CHAP
      PAP Client Password       NONE
      CHAP Client Secret        EXISTS

      Profile Parameters
      Callback ID Security      OFF
      CPP Security
      Client Password           NONE
      Callback                   OFF
      Callback Numbers
      Number of Host Passwords  0
      Host Passwords            User      Password

      PPP Security
      PPP Authentication OUT    CHAP
      PAP Host Password         NONE
      CHAP Host Secret          NONE
      Callback Request          OFF
      Callback Reply            OFF
```

This output has been changed in 4.1 because we have implemented the profile-based username/password feature.

```
guest> show security
      System Parameters
      Security
      Access Status             ON
      System Password           NONE
      Remote Configuration      PROTECTED
      Local Configuration       ON
      Logout Timeout            5
```

		Caller ID Security Caller Id Numbers PPP Security PPP Authentication IN CHAP Profile Parameters PPP Security PPP Authentication OUT NONE Client User Name white PAP Password NONE CHAP Secret NONE Host PAP Password NONE CHAP Secret NONE Callback Request OFF Reply OFF
set default	write erase then reload	Resets router to defaults so you erase all of the config and reboot.

Q. There is a lot of information in the "show memstat" output. What does it mean?

A. Sample **show memstat** output is shown with a description for each area.

```
myrouter> sh mem
```

This section of memory is allocated to the ISDN protocol stack, and developers use it to trace any problems that originate from the ISDN stack:

```

ID 0: Size: 10 Avail: 8 Max: 8 Used: 1 Addr: 0x000F1288
ID 1: Size: 30 Avail: 66 Max: 80 Used: 15 Addr: 0x000F1486

ID 2: Size: 18 Avail: 35 Max: 35 Used: 0 Addr: 0x000F1C88
ID 3: Size: 4 Avail: 36 Max: 36 Used: 0 Addr: 0x000F1F30
ID 4: Size: 8 Avail: 220 Max: 220 Used: 1 Addr: 0x000F1FE8
ID 5: Size: 32 Avail: 202 Max: 400 Used: 201 Addr: 0x000F3FB0
ID 6: Size: 268 Avail: 20 Max: 20 Used: 1 Addr: 0x000F5918
ID 7: Size: 20 Avail: 80 Max: 80 Used: 1 Addr: 0x000F6E30
ID 8: Size: 24 Avail: 121 Max: 200 Used: 79 Addr: 0x000F7C00
ID 9: Size: 54 Avail: 35 Max: 50 Used: 17 Addr: 0x000FA114
ID 10: Size: 8 Avail: 1 Max: 2 Used: 1 Addr: 0x00103298
ID 11: Size: 54 Avail: 6 Max: 6 Used: 0 Addr: 0x001032C8
ID 12: Size: 172 Avail: 2 Max: 2 Used: 0 Addr: 0x001040C0
ID 13: Size: 70 Avail: 4 Max: 5 Used: 1 Addr: 0x0010504E
ID 14: Size: 96 Avail: 5 Max: 7 Used: 2 Addr: 0x00105250
ID 15: Size: 112 Avail: 2 Max: 2 Used: 0 Addr: 0x00105458

```

This line is a description of the NVRAM status, which is basically the status of the configuration of the unit:

```
NVStore Used: 1738, Remaining 6454 (Deleted 1036 + Unused 5418), Total 8192
```

This memory section is very rarely used:

```
RamStore Used: 0, Remaining 10000, Total 10000
```

This line displays the amount of DRAM in the unit:

```
RAM Size = 0x180000
```

Developers use this information about the memory heap:

```
Available memory=1360976, Allocs=118, Frees=0 (used 118)
```

The Mbuf memory is used as the transmit and receive buffering areas:

```
MbufAllocs=0x0, MbufFrees=0x0, MbufFail=0x0
```

The Ibufs shown are rarely used:

```
IbufAllocs=0x0, IbufFrees=0x0, IbufFails=0x0
```

Mlen is one kind of Mbuf with a fixed length of 256 bytes. It is used as a transmit and receive buffer. If MlenAvail becomes 0, the router probably cannot receive or transmit any packet. MlenAvail can be 0 immediately after reboot because Mlen has not been initialized yet:

```
MlenMax=0x0, MlenAvail=0x0, MlenLow=0x7fff, MlenAllocs=0x0, MlenFails=0x0
```

The Zero memory areas are additional pointers to Mbufs:

```
ZeroMax=0x0, ZeroAvail=0x0, ZeroLow=0x7fff, ZeroAllocs=0x0, ZeroFails=0x0
```

Q. What is the minimum amount of IP configuration I need to connect to my Internet Service Provider (ISP)?

A. First, have your telco install and test a BRI where you use the 700 Series Router. Next, if you are in the US, you need to know your SPID (Service Profile Identifier Number) for each B channel (or one SPID for a 5ESS switch). If you plan to accept calls and you are connected to a 5ESS, DMS-100, or NI-1, you need to configure **directorynumbers**.

For example, if you connect to a DMS-100 switch and your SPIDs are 91928633330101 and 91928633340101, your **directorynumbers** are 2863333 and 2863334, your system name is "guest", the system name of your ISP is "cdl-isdn-rtp", and you share a PPP/CHAP secret "guest."

Let us also say that your local LAN segment has the IP class C 198.95.216.0 (which your provider advertises), and, for the ISDN connection, your WAN address is 10.10.11.2, and theirs is 10.10.11.1. If your ISP did not give you an IP address for your BRI port, you do not have to set one. Just let it default to 0.0.0.0 if you want to use IP unnumbered.

We also assume the phone number of the ISP is a local one, and it is 472-0990. For the sake of simplicity, we assume that you default route all your IP traffic to your ISP and do not run any dynamic routing protocol (such as RIP). If you have a PC with Hyperterm or some other program that can control the serial port of your PC, here is the configuration to use, with comments that follow each line (comments are indicated by #, so do not try to type the comments into the router):

```

    # this is our router's name (used for CHAP)
set systemname guest
    # we are talking to a NT DMS-100 ISDN switch
set switch dms
    # the SPIDs (in the US only) given to us by the TELCO
set 1 spid 91928633330101
set 2 spid 91928633340101
    # right after you assign the SPIDs, it is a good idea to check them
    # with a show status command.  If you don't see "SPID accepted",
    # this means that the switch didn't accept your SPIDs;
    # the local directory numbers are needed with DMS, NI1, and 5ESS for acceptin
set 1 directorynumber 2863333
set 2 directorynumber 2863334
    # this ISP (as most do) needs PPP
set encapsulation ppp
    # we will challenge incoming calls and challenge outgoing calls
    # with CHAP (recommended rather than PAP).
set ppp authentication in chap
set ppp authentication out chap
    # this is how we respond when we are CHAP *challenged*
set ppp secret client
guest
guest
    # we will now configure the LAN profile (by changing directory, cd)
cd lan
    # the LAN IP Address
set ip address 198.95.216.253
    # this is our LAN netmask...we can use 1-254 for host addresses in this class
set ip netmask 255.255.255.0
    # we will route IP
set ip routing on
    # we turn off bridging, so IPX and so on will be dropped.
set bridging off
    # brings us back to the system level configuration
cd
    # we create a WAN profile for the ISP.  The name is important for CHAP.
set user cdl-isdn-rtp
    # this is the ISDN number we use to dial the ISP.  We usually call the
    # same number for both B channels
set number 4720990
    # we turn off bridging
set bridging off
    # and turn on routing for IP
set ip routing on
    # set out BRI port IP address; if your provider didn't give
    # you one, don't enter the following two commands, they will
    # default to 0.0.0.0
set ip address 10.10.11.2
    # and netmask
set ip netmask 255.0.0.0
    # set a default route to our ISP's IP address.
set ip route destination 0.0.0.0/0 gateway 10.10.11.1
    # set the CHAP secret we will check when *we* challenge this remote user
set ppp secret host
guest
guest
    # go back to the system level
cd
    # don't forget to activate the profile for this user
set active cdl-isdn-rtp

```

You are now able to ping your ISP, and it looks something like this:

```

guest> ping 10.10.11.1
Start sending: 01/01/1995 01:05:01 L05 0 4720990
Outgoing Call Initiated
guest> 01/01/1995 01:05:02 L08 1 4720990 Call Connected
guest> 01/01/1995 01:05:03 Connection 2 Add Link 1 Channel 1
guest> round trip time is 2110 msec.

guest> ping 10.10.11.1
Start sending: round trip time is 50 msec.

```

Q. My ISP has not set up my account. How can I test my new BRI line now?

A. You can use the config in the previous question to call the test BRI here at Cisco. Simply change the SPIDs and **directorynumbers** (to your own values), and change the number dialed to 19194720990, so you can call our known working BRI and router. Of course, your BRI line needs to be configured so that you are able to make a long distance call.

Q. I cannot ping or connect to anything. What is wrong?

A. It can be a number of things. First, check to make sure your SPIDs are correct with the **show status** command:

```

guest> sh stat
Status 01/01/1995 01:55:54
Line Status
Line DeActivated
Terminal Identifier Unassigned Not Initialized
Terminal Identifier Unassigned Not Initialized
Port Status Interface Connection Link
Ch: 1 Waiting for Call
Ch: 2 Waiting for Call
guest>

```

If you have entered your SPIDs correctly, turn the power off and then on again (or type reboot). If your physical connection and SPIDs are correct, you see this:

```

guest> reboot

BOOT version 2.0(1) 04/16/96 14:48
Copyright (c) 1993-1996. All rights reserved.

POST ..... OK.
Validating FLASH ... OK.
Booting up .....
01/01/1995 00:00:00 Connection 1 Opened
guest> 01/01/1995 00:00:00 L01 0 Started Operation
guest> 01/01/1995 00:00:00 Connection 2 Opened
guest> 01/01/1995 00:00:01 L02 0 Line Activated
guest> 01/01/1995 00:00:01 L18 1 Terminal Identifier Assigned
guest> 01/01/1995 00:00:01 L22 1 91928633330101 Sending SPID
guest> 01/01/1995 00:00:13 L22 1 91928633330101 Sending SPID
guest> 01/01/1995 00:00:13 L23 1 91928633330101 SPID Accepted
guest> 01/01/1995 00:00:13 L22 2 91928633340101 Sending SPID
guest> 01/01/1995 00:00:13 L18 2 Terminal Identifier Assigned
guest> 01/01/1995 00:00:13 L23 2 91928633340101 SPID Accepted

guest> show status

```

```

Status      01/01/1995 00:01:50
Line Status
  Line Activated
  Terminal Identifier Assigned      SPID Accepted
  ~~~~~
  Terminal Identifier Assigned      SPID Accepted
  ~~~~~
Port Status
Ch: 1      Waiting for Call
Ch: 2      Waiting for Call
Interface  Connection Link

```

When your SPIDs are rejected because the switch thinks your settings are incorrect, you see this:

```

guest> sh stat
Status      01/01/1995 00:28:53
Line Status
  Line Activated
  Terminal Identifier Assigned      SPID Rejected
  Terminal Identifier Assigned      SPID Rejected
  ~~~~~
Port Status
Ch: 1      Waiting for Call
Ch: 2      Waiting for Call
Interface  Connection Link

```

If you do not see your SPIDs accepted, do not continue. Call your telco to verify your SPIDs, and, if necessary, have them come out and test the BRI line again.

If your BRI line is not even connected to the router, or the RJ-11 cable is bad, or if the line has not been activated, you see this:

```

user-isdn> show stat
Status      01/01/1995 00:36:38
Line Status
  Line DeActivated
  ~~~~~
  Terminal Identifier Unassigned    Not Initialized
  Terminal Identifier Unassigned    Not Initialized
Port Status
Ch: 1      Waiting for Call
Ch: 2      Waiting for Call
Interface  Connection Link

```

This is usually enough information to solve many telco issues. But if you want to do more ISDN debugging, use the **log message** command (or even **log message verbose**). Use **log none** to turn logging off.

Q. My SPIDs are correct, so why can I not establish a PPP session?

A. If your SPIDs are accepted, you then check to make sure that that PPP/CHAP is configured correctly. You can use **diag ppp on** (and then **diag ppp off**) to make sure that PPP negotiates properly. This is an example of an exchange:

```

01/02/1995 01:06:39 Connection 7 Opened
guest> 01/02/1995 01:06:42 L05 0      9910246  Outgoing Call Initiated
guest> 01/02/1995 01:06:43 L08 1      9910246  Call Connected
guest> ppp: Physical layer up
ppp: lcp: event up
ppp: lcp: FSA st=Initial; ev=Up; ac=nop,nop,nop; nx=Closed
ppp: open event

```

```

ppp: lcp: event open
ppp: lcp: FSA st=Closed; ev=Open; ac=ico,irc,scr; nx=ReqSent
ppp: lcp: ico - initialize configuration
ppp: lcp: irc - init restart counter

***** we are requesting sending the following configuration parameters

ppp: lcp: scr - send conf-req
ppp:      MRU 1522
ppp:      AuthProt CHAP hash MD5
ppp:      MagicNum 000F0364
ppp:      PFC
ppp:      ACFC
ppp:      MRRU 1800
ppp:      ShortSequenceNumber
ppp:      EPD

***** we get acknowledgement for requested parameters

ppp: lcp: recv conf-req
ppp: ack option AuthProt CHAP
ppp: ack option MagicNum 0x48CBB151
ppp: ack optioPD6973K15o C ev=RCR-; ac=scn,nop,nop; nx=ReqSent
ppp: lcp: scn - send conf-nak/rej
ppp: lcp: recv conf-rej
ppp: rej option ShortSeqNum
ppp: lcp: FSA st=ReqSent; ev=RCN; ac=irc,scr,nop; nx=ReqSent
ppp: lcp: irc - init restart counter
ppp: lcp: scr - send conf-req
ppp:      MRU 1522
ppp:      AuthProt CHAP hash MD5
ppp:      MagicNum 000F0364
ppp:      PFC
ppp:      ACFC
ppp:      MRRU 1800
ppp:      EPD
ppp: lcp: recv conf-req
ppp: ack option AuthProt CHAP
ppp: ack option MagicNum 0x48CBB151
ppp: ack option MRRU 1524
ppp: ack option EPD len 11 data 017274702D6973646E
ppp: Adding option MRU to NAK
ppp:      MRU 1522
ppp: Adding option PFC to NAK
ppp:      PFC
ppp: Adding option ACFC to NAK
ppp:      ACFC
ppp: lcp: FSA st=ReqSent; ev=RCR-; ac=scn,nop,nop; nx=ReqSent
ppp: lcp: scn - send conf-nak/rej
ppp: lcp: recv conf-ack
ppp:      MRU 1522
ppp:      AuthProt CHAP hash MD5
ppp:      MagicNum 000F0364
ppp:      PFC
ppp:      ACFC
ppp:      MRRU 1800
ppp:      EPD
ppp: lcp: FSA st=ReqSent; ev=RCA; ac=irc,nop,nop; nx=AckRcvd
ppp: lcp: irc - init restart counter
ppp: lcp: recv conf-req
ppp: ack option AuthProt CHAP
ppp: ack option MagicNum 0x48CBB151
ppp: ack option MRRU 1524
ppp: ack option EPD len 11 data 017274702D6973646E

```

```

ppp: Adding option MRU to NAK
ppp:      MRU 1522
ppp: Adding option PFC to NAK
ppp:      PFC
ppp: Adding option ACFC to NAK
ppp:      ACFC
ppp: lcp: FSA st=AckRcvd; ev=RRC-; ac=scn,nop,nop; nx=AckRcvd
ppp: lcp: scn - send conf-nak/rej
ppp: lcp: rcv conf-req
ppp: ack option AuthProt CHAP
ppp: ack option MagicNum 0x48CBB151
ppp: ack option MRRU 1524
ppp: ack option EPD len 11 data 017274702D6973646E
ppp: lcp: FSA st=AckRcvd; ev=RRC+; ac=sca,tlu,nop; nx=Opened
ppp: lcp: sca - send conf-ack
ppp: lcp: tlu - this layer up

***** we agree on parameters and LCP (lower part of PPP) is up

***** we start CHAP authentication

ppp: chap: authenticator start
ppp: send chal
ppp: chap: authenticatee start
ppp: rcv chal
ppp: chap: send resp
ppp: chap: rcv resp
ppp: send success
ppp: rcv success

***** done with CHAP, we now go on to IPCP (top part of PPP)

ppp: chan 1 conn'd
01/02/1995 01:06:43 Connection 7 Add      Link 1 Channel 1
guest> ppp: bcp: event up
ppp: bcp: FSA st=Initial; ev=Up; ac=nop,nop,nop; nx=Closed
ppp: bcp: event open
ppp: bcp: FSA st=Closed; ev=Open; ac=ico,irc,scr; nx=ReqSent
ppp: bcp: ico - initialize configuration
ppp: bcp: irc - init restart counter
ppp: bcp: scr - send conf-req
ppp:      MacSupport: IEEE 802.3/Ethernet
ppp: ipcp: event up
ppp: ipcp: FSA st=Initial; ev=Up; ac=nop,nop,nop; nx=Closed
ppp: ipcp: event open
ppp: ipcp: FSA st=Closed; ev=Open; ac=ico,irc,scr; nx=ReqSent
ppp: ipcp: ico - initialize configuration
ppp: ipcp: irc - init restart counter
ppp: ipcp: scr - send conf-req
ppp:      Address: 171.68.117.189
ppp: ccp: event up
ppp: ccp: FSA st=Initial; ev=Up; ac=nop,nop,nop; nx=Closed
ppp: ccp: event open
ppp: ccp: FSA st=Closed; ev=Open; ac=ico,irc,scr; nx=ReqSent
ppp: ccp: ico - initialize configuration
ppp: ccp: irc - init restart counter
ppp: ccp: scr - send conf-req
ppp:      CompressionTypeSTACLZS
ppp: Send echo-req
ppp: ipcp: rcv conf-req
ppp: ack option Address: 171.68.116.65
ppp: ipcp: FSA st=ReqSent; ev=RRC+; ac=sca,nop,nop; nx=AckSent
ppp: ipcp: sca - send conf-ack
ppp: ccp: rcv conf-req

```

```

ppp: rej option Unsupported opt 23 len 6 data 00010201
ppp: ccp: FSA st=ReqSent; ev=RCR-; ac=scn,nop,nop; nx=ReqSent
ppp: ccp: scn - send conf-nak/rej
ppp: send prot-rej: 0x8207
ppp: send prot-rej: 0x8029
ppp: lcp: rcv prot-rej
ppp: Protocol PV 0x8031 rejected
ppp: lcp: FSA st=Opened; ev=RXJ+; ac=nop,nop,nop; nx=Opened
ppp: ipcp: rcv conf-ack
ppp:      Address: 171.68.117.189
ppp: ipcp: FSA st=AckSent; ev=RCA; ac=irc,tlu,nop; nx=Opened
ppp: ipcp: irc - init restart counter
ppp: ipcp: tlu - this layer up

***** IPCP is now up, so we have IP connectivity.

```

Currently, 4.0(x) versions of Cisco IOS-700 "NAK" with PFC, ACFC, and MRU of 1522 three times before it gives up and accepts the request. In later releases, it will no longer NAK with PFC and ACFC, but it still tries to get the remote device to use MRU of 1522 once (such as NAK with MRU=1522 once). This only slows things down a little.

If you see a two-way exchange of data, chances are that, with some PPP debugging from the other end, you can come to an agreement with the "other" router on the correct set of parameters (STAC compression, Multilink PPP, IP address assignment, and so on).

If you do not get a good exchange of PPP data (which means that you send PPP packets and you never receive "rcv" packets back), you can have a physical problem. First, try the connection at 56K instead of the default 64K (use set speed 56 on the WAN profile you test).

If the connections work at 56k but not 64k, you are probably connected over a T1 line that is not configured to handle data calls. You probably get a connection with "robbed bit signaling" T1s, which is fine for voice calls (7 bits/sample), but not for data calls. Make sure that your telco knows you use the line for data calls, or you can try to live with the 56kbps line speeds.

Also, try to call a "known" good BRI and router. If you do not have any problems when you connect (at 56k and 64k), you can be fairly sure that the problem is on the side that you call. Call the administrator at the other end and take a look at the **diag ppp on** or **debug ppp neg** and **debug ppp chap** (for Cisco IOS). Remember to turn **diag ppp off** once you are finished.

Q. Why can I only establish good PPP connections at 56kbps but not 64kbps?

A. If you use **set speed 56** on the WAN profile that you test, if the connections work at 56k but not 64k, you are probably connected over a T1 line that is not configured to handle 64k data calls. You probably get a connection with "robbed bit signaling" T1s, which is fine for voice calls (7 bits/sample), but not for data calls (unless you tell the router to use 56kbps). Make sure that your telco knows you use the line for data calls.

Also, call a "known" good BRI and router. If you do not have any problems when you connect (at 56k and 64k), you can be fairly sure that the problem is on the side you call.

Q. I have forgotten my power-up password. How do I recover it?

A. The "system password" is for remote access protection only, such as log on and Telnet. It can be changed with the **set default** or **set pas sys** commands.

This is different from the power-up password. The power-up password cannot be recovered. You need to load a special image into the router through the console port that erases the configuration and operating system. Then load it all back in again.

1. First, get the program "750erase.hex" or "760erase.hex" from the Technical Support & Documentation – Cisco Systems. Next, choose the appropriate Terminal Emulation Package (Windows95 and Windows3.1x instruction are included).
2. Power Cycle the unit. While it boots up, press the ESC key several times. This puts the unit into a software load. The unit responds with these prompts:

```
Ready to upload new firmware into Flash. Baud (1=19.2K, 2=2400, 3=38.4K, 9=9600)?
```

3. Select the baud rate for the transfer (in this example we use 9600). The unit responds with this prompt:

```
Begin ascii upload at 8n1/9600 baud.
```

4. At this point, start the ASCII file transfer of the image: 750erase.hex for the 750 series, or 760erase.hex for the 760 series. These files are not interchangeable. This file must be treated as a text file to load into the unit through the console port. At 9600, the transfer takes approximately 12 minutes. While the transfer occurs, the LINE LED flashes rapidly. When the transfer is complete, the unit responds with these prompts and then reboots itself:

```
Firmware transfer successful.
Now writing firmware into FLASH, standby ...
Firmware upload complete.
Erase Version of 750/760 firmware? This erases all configured parameters.
ERASING NVRAM...
(reboots itself)
Ready to upload new firmware into Flash.
Baud (1=19.2K, 2=2400, 3=38.4K, 9=9600)?
```

5. At this point, reload the latest system software (from Cisco), and repeat step 2.

A. Procedure to perform a text/ASCII transfer with Windows95 Hyperterminal:

1. Choose **Properties** from the File Menu.
2. Choose the **Settings Tab**.
3. Choose the **ASCII Setup** button.
4. Make sure that both **Line Delay** and **Character Delay** are set to zero.
5. Make sure that **Send line ends with line feeds** is selected.
6. Click the **OK** button on both screens.
7. Close Hyperterminal and then restart it.
8. Choose **Send Text File...** from the Transfer menu.
9. Locate the file and highlight it. (If necessary, choose **All Files** for "Files of Type" in order to see your file.)
10. Click the **OK** button.

A. The file then transfers to the unit. There can be no indication that the file transfers except for the LINE LED on the front of the unit. While the transfer occurs, the LINE LED flashes rapidly on the front of the unit.

A. Procedure to perform a text/ASCII transfer with Windows Terminal:

1. Choose **Text Transfers...** from the Settings Menu.
2. Make sure that **Standard Flow Control** is selected.
3. Click the **OK** button.
4. Choose **Send Text File...** from the Transfer Menu.
5. Locate the file and highlight it. (If necessary, choose **All Files** for "Files of Type" in order to see your file.)
6. Make sure that neither "Append LF" nor "Strip LF" is selected.
7. Click the **OK** button.

A. The file then transfers to the unit. The only indication that the file is transferred can be the LINE LED on the front of the unit. While the transfer occurs, the LINE LED flashes rapidly on the front of the unit.

Now, you need to re-configure the router. Be sure to make a note of the password and remember it!

Q. What is the "Internal" profile, and when must I use it?

A. It is difficult to answer this question without the mention of the internal structure of the 700 Series Routers. First, the code has a concept of a "profile," which is simply a set of configuration parameters customized for and associated with a specific device. These are the three permanent profiles:

- ◆ The **LAN profile** is the configuration for how data is passed from the router to the Ethernet LAN connection.
- ◆ The **Standard profile** is used for inbound ISDN connections that do not have their own "User" profile. These are the "unknown" callers.
- ◆ The **Internal profile** determines how data is passed between the Bridge Engine and the Routing (IP/IPX) Engine.

These three profiles comprise the Permanent profiles. Keep in mind that you also make configuration changes at the System level that are independent of the profiles and affect the router as a system (like ISDN switch type) and are only changed at the system level. (This is denoted by the system-level prompt ">", preceded by the router name only.)

This table summarizes how you must configure routing and bridging on the various profiles. It can be summarized in this way: if all your remote users are either routing (IP and/or IPX) or bridging (all other protocols), or both routing and bridging. If you are mathematically inclined, we define the two sets in this way:

```
Let
R = { set of users who are routing (IP and/or IPX) }
B = { set of users who are bridging (all other protocols) }
```

- ◆ If all your users are in R or B or (R and B), you need not configure the Internal profile (let it default).
- ◆ If all your users are in set R, configure routing on the LAN and User profiles (or use the Standard profile if you care to clump them together).
- ◆ If all your users are in set B, configure bridging on the LAN and User profiles (again, you can use the Standard profile if you want to clump them together).
- ◆ If *all* your users are in both set R and set B, configure routing and bridging on the LAN and User profiles.

This is where it gets complicated. If some of your users want to route, and others want to bridge, you need to configure in this way:

- ◆ *Only* bridging on the LAN profile (no routing)
- ◆ Both bridging and routing on the Internal profile
- ◆ Selectively route or bridge on each individual User profile (and, of course, clump the others into the Standard profile)

Generally, you do not configure the Internal Profile unless you have some users who only want to bridge and some users who only want to route, and you wish to accommodate both types of users in the same router.

Stated in another way, look at this table:

When all remote users are...		
Bridging:	Routing:	Comments:
No	No	There is nothing to do, because no one is talking.
No	Yes	Do not configure anything on the Internal Profile. Configure IP and/or IPX routing, and remove bridging on the LAN and User (WAN) profiles. If all your remote users are the same, simply configure the Standard Profile.
Yes	No	Do not configure anything on the Internal Profile. Remove IP and/or IPX routing from the LAN and User (WAN) profiles, and configure bridging on the User (WAN) profiles. If all your remote users are the same, simply configure the Standard Profile.
Yes	Yes	Do not configure anything on the Internal Profile. Configure routing (for IP and IPX) and bridging (for all other protocols) on the LAN and User profiles. If all your remote users are the same, simply configure the Standard Profile.
When some remote users are...		
Bridging:	Routing:	Comments:
No	No	There is nothing to do, because no one is talking.
Yes	Yes	Only configure bridging on the LAN Profile. Configure routing (for IP and/or IPX) and bridging (for all other

		protocols) on the Internal profile. Configure routing or bridging on individual User (WAN) profiles. Configure the Standard profile to how you want unknown users to be handled.
--	--	--

Q. Why can I no longer ping my 700 Series Router from a PC on the same LAN?

A. Access the router from the console and ping the PC. Try to ping other devices. Also, run the **test ether** command from the router for about 30 seconds. Then run **test stop** and **test result**. Capture the output of this last command, then show it to your network administrator and/or call the Cisco TAC. In order to see other **test** commands, such as **wan**, **ether**, and **all**, refer to the Cisco Documentation home page and search for the Cisco 700 Series Router documentation.

Q. How can I upload a new software image if I cannot use Hyperterm from UNIX?

A. From UNIX, you can use Kermit to upload a new image, as shown:

```
$ kermit
C-Kermit 6.0.192, 6 Sep 96, for Linux
  Copyright (C) 1985, 1996,
  Trustees of Columbia University in the City of New York.
  Default file-transfer mode is TEXT
  Type ? or HELP for help.

C-Kermit@machinex> connect
Connecting to /dev/cua1, speed 9600.
The escape character is Ctrl-\ (ASCII 28, FS)
Type the escape character followed by C to get back,
or followed by ? to see other options.

myrouter>
myrouter> swl
Are you sure? y

BOOT version 2.0(1) 04/16/96 14:48
Copyright (c) 1993-1996. All rights reserved.

Ready to upload new firmware into flash. Select baud rate:

1 - 300 baud
2 - 1200 baud
3 - 2400 baud
4 - 4800 baud
5 - 9600 baud
6 - 19200 baud
7 - 38400 baud
8 - 57600 baud
9 - 115200 baud
```

Begin ascii upload at 8n1/9600 baud.

At this point, you are able to cat the image to your serial port with this command:

```
% cat c760-in.r-US.40-2.bin > /dev/cua1
```

Q. How can I upload a new software image if I cannot use Hyperterm from DOS?

A. Use this syntax:

```
MODE COMx:38400,n,8,1,p  
COPY CON COMx:<return>  
appropriate speed number<return>  
CTRL-Z<return>  
COPY/B IMAGE COMx:
```

The only drawback of this method is that the PC locks completely while it copies the image file to COM-port.

Q. How do I use the "SWL TFTP" command to upload an image and how does it work?

A. When you enter the **software load tftp** command on the Cisco router, it causes it to enter TFTP server mode and wait for client requests.

Note: This is the opposite of Cisco IOS.) The TFTP server mode times out in 15 seconds. If the transfer is successful, the Cisco 700 Router reboots with the new software and the new configuration (if a new configuration file was loaded).

If you enter an IP address after the command, as of 4.1.1 software, the Cisco router enters TFTP client mode, which operates in the same manner as classic Cisco IOS software. The router attempts to download a new version of code from a TFTP server.

On the TFTP client machine, you must use binary file transfer mode to transfer the new software file. The remote file name must be set to "CODE." After the **software load tftp** command is entered, the existent software is erased. If a catastrophic event, such as a power failure, occurs before the transfer of the "CODE" file has completed, the Cisco router must be initialized through the configuration port.

Q. How many WAN (USER) profiles can I have?

A. The maximum number of user profiles allowed depends upon the amount of configurations for each profile since these settings use NVRAM storage. With a typical configuration, such as a routing/bridging profile with one or two static route entries, you can have about 15–17 user-defined profiles. Again, this number is not a set number. The number of profiles that can use PAT is limited to two.

Q. Can I upgrade the 700 Series Router if I am only bridging?

A. Not unless you have console access to the router. For software upgrade, only TFTP is supported, and that requires IP routing. So, if you are in a completely bridged environment, add IP address and IP routing to the Internal Profile, and you are able to TFTP the image to the IP address of the Internal Profile.

Q. Is the 700 Series platform year 2000 compliant?

A. There are no known compliancy issues with the 700 Series because the 700 Series platforms do not have a real-time clock hardware. The date and time are reset every time the box is rebooted, and the code does not rely upon the absolute date/time setting.

Q. Why does the console connection to my 700 lock up?

A. The console session was fixed to use a different buffering scheme to avoid console lock-up. You need to upgrade to at least 4.0(2) to incorporate the fix for this bug (CSCdj06362).

Q. Do I have to use authentication in order connect remote users?

A. Currently, for inbound calls, you can use CLID to accept or deny the ISDN call (as a security measure), but for the router to identify the correct profile, authentication is required.

If inbound authentication is disabled, the 700 still accepts the call, but it uses the STANDARD profile for this connection and allows the connection to be bridged only (which means that only BCP is allowed). In the 4.1 release, the 700 allows routing to be enabled from within the STANDARD profile (which means that IPCP and IPXCP are also allowed). There is a limitation to this: they must use RIP updates to set up the routing table because the 700 provides only limited support for static routes from within the STANDARD profile.

Q. I cannot dial from the UK to the US. What is wrong?

A. The normal international dial code from the UK is 00 (country code). This gives you a voice grade channel. In order to guarantee a true 64 Kbps channel, you need to dial 000 (country code).

Q. Why does my telephone not ring in the UK?

A. Telephony wiring varies from country to country. US telephony equipment only uses two wires for communication. In the UK, a third wire is used in order to generate the ring signal. In the UK, the telco supplies two wires into the premises. The first socket is called the "Master" socket and has circuitry inside to generate the ring on line three.

Because the 700 Series only provides the two lines, the telephone possibly does not ring since, under UK regulations, the equipment manufacturer is allowed to include a certain size of ring circuitry, although this is strictly limited.

In order to deal with the problem, get a US-to-UK (RJ-11, Type 413A) MASTER converter. This generates the ring signal for you.

Go to next section.

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