

# Password Recovery Procedure for the Cisco 2000, 2500, 3000, 4000, AccessPro, 7000 (RP), AGS, IGS, and STS-10x

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## Introduction

This document describes how to recover the **enable password** and the **enable secret** passwords. These passwords protect access to privileged EXEC and configuration modes. The **enable password** password can be recovered, but the **enable secret** password is encrypted and must be replaced with a new password. Use the procedure described in this document in order to replace the **enable secret** password.

The **enable password** or the **enable-secret password** is stored in the startup configuration file in the nonvolatile RAM (NVRAM). The password recovery procedure requires that you boot the router and ignore the startup configuration file in the NVRAM. In order to boot the router and ignore the startup configuration file, set the 6th bit in the configuration register. The router boots with the default configuration and all the interfaces in "shutdown" state.

Since the default configuration does not have a password, anyone can enter enable mode on the router. In order to return the router to the original configuration, the startup configuration file can be copied into the router memory. If you are already in the enable mode, you can either view or change the **enable password**, but you can only change the **enable secret password** because it is always encrypted in the **show** commands. This document describes this procedure.

**Note:** Password recovery procedures cannot be performed through a Telnet connection.

## Prerequisites

### Requirements

Before you use the information in this document, see Standard Break Key Sequence Combinations During Password Recovery. In addition, you must be aware of concepts related to the Cisco IOS<sup>®</sup> Software such as, ROM monitor (ROMmon), bootflash, and the configuration register values.

## Components Used

The information in this document is based on these software and hardware versions:

- Cisco 2000 Series Routers
- Cisco 2500 Series Routers
- Cisco 3000 Series Routers
- Cisco 4000 Series Routers
- Cisco AccessPro
- Cisco 7000 Route Processor (RP)
- Cisco AGS+ Routers
- Cisco IGS Router Series
- Cisco STS-10x Access Servers

## Related Products

Refer to Password Recovery Procedures for information on how to recover passwords for related products.

## Conventions

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

## Step-by-Step Procedure

Complete these steps in order to recover a lost or forgotten password:

1. Attach a terminal or PC with terminal emulation to the console port of the router.

Use these terminal settings:

- ◆ 9600 baud rate
- ◆ No parity
- ◆ 8 data bits
- ◆ 1 stop bit
- ◆ No flow control

The required console cable specifications are described in the Cabling Guide for Console and AUX Ports (Cisco 1000 Series, 2500 Series, and AS5100).

2. If you can access the router, type **show version** at the prompt, and record the configuration register setting. See Example of Password Recovery Procedure in order to view the output of a **show version** command.

**Note:** The configuration register is usually set to 0x2102 or 0x102. If you can no longer access the router (because of a lost login or TACACS password), you can safely assume that your configuration register is set to 0x2102.

3. Use the power switch in order to turn off the router, and then turn the router back on.
4. Press **Break** on the terminal keyboard within 60 seconds of power up in order to put the router into ROMmon.

If the break sequence does not work, refer to Standard Break Key Sequence Combinations During Password Recovery for other key combinations.

5. At the prompt, type **o**, press **ENTER**, and record the current value of the configuration register (usually 0x2102 or 0x102).

>o

*!--- Shows the configuration register option settings.*

```
Configuration register = 0x2102 at last boot
Bit#    Configuration register option settings:
15      Diagnostic mode disabled
```

*!--- Output suppressed.*

6. Type **o/r 0x2142**, and press **ENTER** at the > prompt in order to boot from Flash and bypass the configuration file.
7. Type **i** at the > prompt, and press **ENTER**.

The router reboots, but ignores the saved configuration.

8. Type **no** after each setup question, or press **CTRL + C** in order to skip the initial setup procedure.
9. Type **enable** at the Router> prompt.

Once the Router# prompt appears, you are in enable mode.

10. Type **configure memory** or **copy startup-config running-config** in order to copy the NVRAM into memory.

**Important:** Do *not* type **copy running-config startup-config** or **write memory**. These commands erase your startup configuration.

11. Type **write terminal** or **show running-config**.

The **show running-config** and **write terminal** commands show the configuration of the router. In this configuration, the **shutdown** command appears under each interface, which means all interfaces are currently shutdown. Also, the passwords display either encrypted or unencrypted.

12. Type **configure terminal**, and make the changes.

The `hostname(config)#` prompt appears.

13. Type **enable secret <password>** in order to change the **enable secret password**.
14. Issue the **no shutdown** command on every interface that is used. If you issue a **show ip interface brief** command after you exit configuration mode, every interface that you want to use displays *up up*.
15. Type **config-register 0x2102** (or use the value you recorded in step 4).

This step causes the router to load the Cisco IOS software from the Flash with the configuration from NVRAM at the next reload.

16. Press **CTRL + Z** in order to leave the configuration mode.

The `hostname#` prompt appears.

17. Type **write memory** or **copy running-config startup-config** in order to commit the changes.
18. Type **Reload** in order to restart the router and force the Cisco IOS software to boot from the Flash.

## Sample Output

This section provides an example of the password recovery procedure. This example uses a Cisco 2500 Series Router. Even if you do not use a Cisco 2500 Series Router, this output provides an example of what you should experience on your product.

```
Router>enable
Password:
Password:
Password:
% Bad secrets
```

Router>**show version**

Cisco Internetwork Operating System Software

IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a)  
RELEASE SOFTWARE (fc3)

Copyright (c) 1986-2004 by cisco Systems, Inc.  
Compiled Fri 28-May-04 19:30 by pwade

Image text-base: 0x0306C4E0, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), RELEASE SOFTWARE  
BOOTFLASH: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c),  
RELEASE SOFTWARE (fc1)Router uptime is 5 minutes  
System returned to ROM by power-on  
System image file is "flash:/c2500-js-l.122-24a.bin"

cisco 2500 (68030) processor (revision D) with 14336K/2048K bytes of memory.

Processor board ID 02315272, with hardware revision 00000000

Bridging software.

X.25 software, Version 3.0.0.

SuperLAT software (copyright 1990 by Meridian Technology Corp).

TN3270 Emulation software.

1 Ethernet/IEEE 802.3 interface(s)

1 Token Ring/IEEE 802.5 interface(s)

2 Serial network interface(s)

32K bytes of non-volatile configuration memory.

16384K bytes of processor board System flash (Read ONLY)

**Configuration register is 0x2102**

*!--- This is the current value of the configuration register.*

Router>

*!--- The router was just power cycled and during bootup a  
!--- break sequence is sent to the router.*

System Bootstrap, Version 11.0(10c), SOFTWARE  
Copyright (c) 1986-1996 by cisco Systems  
2500 processor with 16384 Kbytes of main memory

Abort at 0x10EA83C (PC)

>o

**Configuration register = 0x2102 at last boot**

*!--- You can also issue the o command at the ROMmon prompt  
!--- in order to view the configuration register settings value.*

Bit# Configuration register option settings:  
15 Diagnostic mode disabled  
14 IP broadcasts do not have network numbers  
13 Boot default ROM software if network boot fails

```
12-11 Console speed is 9600 baud
10 IP broadcasts with ones
08 Break disabled
07 OEM disabled
06 Ignore configuration disabled
03-00 Boot file is cisco2-2500 (or 'boot system' command)
```

```
>o/r 0x2142
```

```
!--- Changes the value of config-register to 2142, so that
!--- the router boots and ignores the NVRAM contents.
```

```
>i
```

```
!--- Initializes or resets the router; the
!--- router boots with the default configuration.
```

```
System Bootstrap, Version 11.0(10c), RELEASE SOFTWARE
```

```
Copyright (c) 1986-1996 by cisco Systems
```

```
2500 processor with 8192 Kbytes of main memory
```

```
F3: 13626872+197596+780568 at 0x3000060
```

```
Restricted Rights Legend
```

```
Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
```

```
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
```

```
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
```

```
cisco Systems, Inc.
```

```
170 West Tasman Drive
```

```
San Jose, California 95134-1706
```

```
Cisco Internetwork Operating System Software
```

```
IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a),
```

```
RELEASE SOFTWARE (fc1)
```

```
Copyright (c) 1986-1999 by cisco Systems, Inc.
```

```
Compiled Fri 28-May-04 19:30 by pwade
```

```
Image text-base: 0x0306C4E0, data-base: 0x00001000
```

```
cisco 2500 (68030) processor (revision D) with 14336K/2048K bytes of memory.
```

```
Processor board ID 02315272, with hardware revision 00000000
```

```
Bridging software.
```

```
X.25 software, Version 3.0.0.
```

```
SuperLAT software (copyright 1990 by Meridian Technology Corp).
```

```
TN3270 Emulation software.
```

```
1 Ethernet/IEEE 802.3 interface(s)
```

```
1 Token Ring/IEEE 802.5 interface(s)
```

```
2 Serial network interface(s)
```

```
32K bytes of non-volatile configuration memory.
```

```
16384K bytes of processor board System flash (Read ONLY)
```

```
--- System Configuration Dialog ---
```

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

```
!--- Ctrl+C pressed.
```

```
!
```

```
Press RETURN to get started!
```

```
00:00:08: %LINK-3-UPDOWN: Interface Ethernet0, changed state to up
```

```
00:00:08: %LINK-3-UPDOWN: Interface Serial0, changed state to up
```

```
00:00:08: %LINK-3-UPDOWN: Interface Serial1, changed state to up
```

```
00:00:09: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0,
changed state to up
```

```
00:00:09: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
changed state to up
```

```
00:01:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0,
changed state to up
```

```
00:01:29: %LINK-3-UPDOWN: Interface Ethernet0Translating "Router"...
```

```

    domain server (255.255.255.255), changed state to up
00:01:30: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
    changed state to up
00:01:31: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a),
RELEASE SOFTWARE (fc1)
Copyright (c) 1986-1999 by cisco Systems, Inc.
Compiled Fri 28-May-04 19:30 by pwade
00:01:32: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0,
    changed state to down
00:01:33: %LINK-5-CHANGED: Interface Ethernet0, changed state to

administratively down

00:01:33: %LINK-5-CHANGED: Interface Serial0, changed state to

administratively down
00:01:33: %LINK-5-CHANGED: Interface Serial1, changed state to
administratively down
00:01:33: %LINK-5-CHANGED: Interface TokenRing0, changed state to

administratively down

00:01:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0,
    changed state to down
00:01:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
    changed state to down
00:01:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface TokenRing0,
    changed state to down
Router>enable
Router#copy startup-config running-config
Destination filename [running-config]?

!--- Press ENTER.

1278 bytes copied in 10.448 secs (127 bytes/sec)

```

**Note:** After you copy the configuration file from NVRAM to RAM, based on how the password is last configured, you can either:

- perform a password recovery, if the **enable password** is configured (which is in plain text format)
- or
- perform a password replacement, if the **enable secret password** is configured (which is in encrypted format)

**Note:** In order to check the format in which the password is configured on the router, use the **show running-config** command, and look for **enable password** or **enable secret password** in the configuration.

## Example for Enable Password Recovery

This output from the **show running-config** command shows that **enable password** is configured. You can complete password recovery as shown in this example.

```

Router#show running-config

!--- This command can be used to view the unencrypted password.

Building configuration...

```

```

Current configuration : 431 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
enable password XxXxXx

!--- Here the password is plain clear text. We can either maintain
!--- the same password or replace with a new password for security reasons.

!--- Output Suppressed.

```

## Example for Password Replacement

This output from the **show running-config** command shows that the **enable secret password** is configured. As a result, you can perform password replacement as shown in this example.

```

Router#show running-config
Building configuration...
Current configuration : 835 bytes
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
enable secret 5 $1$Oea234/6Ppi0PZYzAj/vX0

!--- Password replacement has to be done as the password is in encrypted format.

!--- Output suppressed.

Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#enable secret xxxxxxxx
Router(config)#
00:03:39: %SYS-5-CONFIG_I: Configured from console by console

```

When the password recovery or replacement is complete, the next steps are the same, as shown in this example output:

```

Router#show ip interface brief
Interface  IP-Address  OK? Method Status          Protocol
Ethernet0  10.3.4.4    YES TFTP  administratively down down
Serial0    172.16.1.4  YES TFTP  administratively down down
Serial1    192.168.1.4 YES TFTP  administratively down down
TokenRing0 unassigned  YES TFTP  administratively down down

Router(config)#interface ethernet 0
Router(config-if)#no shutdown

```

```

*Mar 1 00:04:12.863: %LINK-3-UPDOWN: Interface Ethernet0,
  changed state to up
*Mar 1 00:04:13.947: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0,
  changed state to up
Router(config-if)#interface serial 0
Router(config-if)#no shutdown
*Mar 1 00:04:18.107: %LINK-3-UPDOWN: Interface Serial0,
  changed state to up
*Mar 1 00:04:19.167: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0,
  changed state to up
Router(config-if)#interface serial 1
Router(config-if)#no shutdown
Router(config-if)#
*Mar 1 00:04:27.055: %LINK-3-UPDOWN: Interface Serial1,
  changed state to up
*Mar 1 00:04:28.071: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
  changed state to up #
Router(config-if)#^Z
Router#
00:02:35: %SYS-5-CONFIG_I: Configured from console by console
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

```

After you recover or replace the password, you must reset the configuration register value to *0x2102*, which was changed earlier in the procedure to *0x2142* in order to ignore the startup configuration and boot the router. In order to verify the configuration register value, issue the **show version** command.

```

Router#show version
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a)RELEASE SOFTWARE (fc3)
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Fri 28-May-04 19:30 by pwade
Image text-base: 0x0306C4E0, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), RELEASE SOFTWARE
BOOTFLASH: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c),
RELEASE SOFTWARE (fc1)

Router uptime is 5 minutes
System returned to ROM by power-on
System image file is "flash:/c2500-js-l.122-24a.bin"

cisco 2500 (68030) processor (revision D) with 14336K/2048K bytes of memory.
Processor board ID 02315272, with hardware revision 00000000
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
1 Ethernet/IEEE 802.3 interface(s)
1 Token Ring/IEEE 802.5 interface(s)
2 Serial network interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read ONLY)

Configuration register is 0x2142

Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#config-register 0x2102

```

*!--- The config-register is changed back to load the router  
!--- with NVRAM configuration.*

```
Router(config)#^Z
00:03:20: %SYS-5-CONFIG_I: Configured from console by console
```

When you issue the **config-reg 0x2102** command, the new configuration register value is not immediately applied. The new value is applied only after the router is reloaded. The **show version** command shows the current value (0x2142) and the value that will be applied after the next reload (0x2102).

```
Router#show version
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a)RELEASE SOFTWARE (fc3)
Copyright (c) 1986-2004 by cisco Systems, Inc.
Compiled Fri 28-May-04 19:30 by pwade
Image text-base: 0x0306C4E0, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), RELEASE SOFTWARE
BOOTFLASH: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c),
RELEASE SOFTWARE (fc1)

Router uptime is 5 minutes
System returned to ROM by power-on
System image file is "flash:/c2500-js-l.1.122-24a.bin"

cisco 2500 (68030) processor (revision D) with 14336K/2048K bytes of memory.
Processor board ID 02315272, with hardware revision 00000000
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
1 Ethernet/IEEE 802.3 interface(s)
1 Token Ring/IEEE 802.5 interface(s)
2 Serial network interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read ONLY)

Configuration register is 0x2142 (will be 0x2102 at next reload)

Router#
```

After you save the configuration, reload the router, and verify the configuration register value is 0x2102, as shown in this example:

```
Router#write memory
*Mar 1 00:05:09.035: %SYS-5-CONFIG_I: Configured from console by console
Building configuration...
[OK]
Router#
Router#reload
Proceed with reload? [confirm]

!--- Press Enter to continue.

!--- Starts to load the Cisco IOS from Flash
and takes the configuration from the NVRAM.

00:17:36: %SYS-5-RELOAD: Reload requested by console.

System Bootstrap, Version 11.0(10c), SOFTWARE
Copyright (c) 1986-1996 by cisco Systems
2500 processor with 14336 Kbytes of main memory

F3: 15011856+968960+947120 at 0x3000060
```

*!--- Output suppressed.*

Router#**show version**

Cisco Internetwork Operating System Software  
IOS (tm) 2500 Software (C2500-JS-L), Version 12.2(24a)RELEASE SOFTWARE (fc3)  
Copyright (c) 1986-2004 by cisco Systems, Inc.  
Compiled Fri 28-May-04 19:30 by pwade  
Image text-base: 0x0306C4E0, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), RELEASE SOFTWARE  
BOOTFLASH: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c),  
RELEASE SOFTWARE (fc1)

Router uptime is 5 minutes  
System returned to ROM by reload  
System image file is "flash:/c2500-js-l.122-24a.bin"

cisco 2500 (68030) processor (revision D) with 14336K/2048K bytes of memory.  
Processor board ID 02315272, with hardware revision 00000000  
Bridging software.  
X.25 software, Version 3.0.0.  
SuperLAT software (copyright 1990 by Meridian Technology Corp).  
TN3270 Emulation software.  
1 Ethernet/IEEE 802.3 interface(s)  
1 Token Ring/IEEE 802.5 interface(s)  
2 Serial network interface(s)  
32K bytes of non-volatile configuration memory.  
16384K bytes of processor board System flash (Read ONLY)  
Configuration register is **0x2102**

Router#

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## Related Information

- [Password Recovery Procedures](#)
- [Cabling Guide for Console and AUX Ports](#)
- [Standard Break Key Sequence Combinations During Password Recovery](#)
- [Technical Support – Cisco Systems](#)

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