

# Understand Configuration Register Usage on all Routers

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## Introduction

This document describes how to update the configuration register (`config-register`) to change router behavior.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

### Conventions

Refer to [Cisco Technical Tips Conventions](#) for more information on document conventions.

## Purpose of the Configuration Register

The configuration register can be used to change router behavior in several ways, such as:

- How the router boots (into ROMmon, NetBoot)
- Boot Options (ignore configuration, disable boot messages)
- Console speed (baud rate for a terminal emulation session)

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**Note:** If the baud rate is set different than the default rate, odd characters are seen on CLI. Check the Common Platform Parameters table to set baud rates for different `confreg` values.

---

The configuration register can be set from configuration mode with the **config-register** command. From ROMmon, execute the **confreg** command. Issue the **show version** command to view the current setup of the configuration register:

```
<#root>
```

```
Router#
```

```
show version
```

```
Cisco IOS XE Software, Version 16.10.01a
Cisco IOS Software [Gibraltar], ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.10.1a, RE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Thu 29-Nov-18 03:47 by mcpre
```

```
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documentation or "License Notice" file accompanying the Cisco IOS-XE software,
or the applicable URL provided on the flyer accompanying the Cisco IOS-XE
software.
```

```
ROM: IOS-XE ROMMON
```

```
Router uptime is 2 minutes
Uptime for this control processor is 5 minutes
System returned to ROM by Reload Command
System image file is "bootflash:asr1002x-universalk9.16.10.01a.SPA.bin"
Last reload reason: Reload Command
```

```
This product contains cryptographic features and is subject to United
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to comply with U.S. and local laws, return this product immediately.
```

```
A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wvl/export/crypto/tool/stqrg.html
```

```
If you require further assistance please contact us by sending email to
export@cisco.com.
```

License Type: Smart License is permanent  
License Suite: AdvUCSuiteK9  
Next reload License Suite: AdvUCSuiteK9  
The current throughput level is 10000000 kbps

Smart Licensing Status: UNREGISTERED/EVAL MODE

cisco ASR1002-X (2RU-X) processor (revision 2KP) with 1189381K/6147K bytes of memory.  
Processor board ID FOX1719GE28  
14 Gigabit Ethernet interfaces  
1 Ten Gigabit Ethernet interface  
32768K bytes of non-volatile configuration memory.  
4194304K bytes of physical memory.  
6684671K bytes of eUSB flash at bootflash:.  
0K bytes of WebUI ODM Files at webui:.

Configuration register is 0x2102

The factory-default setup for the configuration register is 0x2102. This indicates that the router must attempt to load a Cisco IOS<sup>®</sup> software image from Flash memory, and load the startup configuration with a console speed of 9600 baud.

## Configuration Register Values and Their Significance

configreg

If you know the value of your configuration register, you can determine its significance. For information on the configuration register, potential issues, and fixes, collect the output of the **show version** command, or the **show tech-support** command, and input into the [Cisco CLI Analyzer](#) tool.

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**Note:** Only registered Cisco users can access internal tools and bug information.

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This table contains some common parameters which are valid on most platforms.

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**Note:** Check the appropriate hardware installation guide to verify that the configuration register can be used before you change the configuration register on your router to one of the values in this table.

---

### Platform Common Parameters

Configuration Register Set At	Router Behavior
0x102	<ul style="list-style-type: none"><li>• Ignores break</li><li>• 9600 console baud rates</li></ul>
0x1202	<ul style="list-style-type: none"><li>• 1200 baud rates</li></ul>

0x2101	<ul style="list-style-type: none"> <li>• Boots into bootstrap</li> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 9600 console baud rates</li> </ul>
0x2102	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 9600 console baud rate default value for most platforms</li> </ul>
0x2120	<ul style="list-style-type: none"> <li>• Boots into ROMmon</li> <li>• 19200 console speed</li> </ul>
0x2122	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 19200 console baud rates</li> </ul>
0x2124	<ul style="list-style-type: none"> <li>• NetBoot</li> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 19200 console speed</li> </ul>
0x2142	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 9600 console baud rates</li> <li>• Ignores the contents of Non-Volatile RAM (NVRAM) (ignores configuration)</li> </ul>
0x2902	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 4800 console baud rates</li> </ul>
0x2922	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 38400 console baud rates</li> </ul>
0x3122	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 57600 console baud rates</li> </ul>
0x3902	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 2400 console baud rates</li> </ul>

0x3922	<ul style="list-style-type: none"> <li>• Ignores break</li> <li>• Boots into ROM if initial boot fails</li> <li>• 115200 console baud rates</li> </ul>
--------	--

**Note:** Also remember that configuration register 0x2142 is used for [Password Recovery](#) procedures as it can ignore the contents of NVRAM.

If the value you have for the configuration register is not in the table, then determine which bits are set in order to compute the value:

### Bit Order Values

Bit Number	Hex	Significance
00-03	0x0000-0x000F	Boots Field Parameters: <ul style="list-style-type: none"> <li>• 0x0000 - Stays at the system bootstrap prompt.</li> <li>• 0x0001 - Boots the first system image in onboard Flash memory (EPROM).</li> <li>• 0x0002-0x000F- Specifies a default netboot filename. Enables boot system commands that override the default netboot filename.</li> </ul>
06	0x0040	<ul style="list-style-type: none"> <li>• Ignore NVRAM contents.</li> </ul>
07	0x0080	<ul style="list-style-type: none"> <li>• Disable boot messages.</li> </ul>
08	0x0100	<ul style="list-style-type: none"> <li>• Break disabled.</li> </ul>
09	0x0200	<ul style="list-style-type: none"> <li>• Causes the system to select the secondary bootstrap. This is typically not used (set to 0).</li> </ul>
10	0x0400	<ul style="list-style-type: none"> <li>• IP broadcast with all zeros.</li> </ul>
5,11,12	0x0020, 0x0800, 0x1000	<ul style="list-style-type: none"> <li>• Console line speed</li> </ul>
13	0x2000	<ul style="list-style-type: none"> <li>• Boots default ROM software if network boot fails</li> </ul>

14	0x4000	<ul style="list-style-type: none"> <li>• IP broadcasts do not have net numbers</li> </ul>
15	0x8000	<ul style="list-style-type: none"> <li>• Enables diagnostic messages</li> <li>• Ignores NVRAM contents</li> </ul>

## Troubleshoot Configuration Register Issues

An inappropriately set configuration register can cause many problems, such as:

- The configuration file is ignored.
- There is no output or garbage output from the console.
- Boot into ROMmon.

Change the configuration register to an appropriate parameter, such as the factory default 0x2102, in order to solve these problems.

### Troubleshoot the Unknown Configuration Register Value

If the configuration register value is not known, try to establish a Telnet or console session with the router. You can then check the show version output to determine the value of the configuration register:

```
<#root>
```

```
Router#
```

```
show version
```

```
Cisco IOS XE Software, Version 16.10.01a
Cisco IOS Software [Gibraltar], ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.10.1a, RE
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Thu 29-Nov-18 03:47 by mcpre
```

```
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software.
```

```
ROM: IOS-XE ROMMON
```

```
Router uptime is 1 minute
Uptime for this control processor is 4 minutes
System returned to ROM by Reload Command
System image file is "bootflash:asr1002x-universalk9.16.10.01a.SPA.bin"
Last reload reason: Reload Command
```

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License Type: Smart License is permanent  
License Level: adventerprise  
Next reload license Level: adventerprise  
The current throughput level is 10000000 kbps

Smart Licensing Status: UNREGISTERED/EVAL MODE

cisco ASR1002-X (2RU-X) processor (revision 2KP) with 1189381K/6147K bytes of memory.  
Processor board ID FOX1719GE28  
14 Gigabit Ethernet interfaces  
1 Ten Gigabit Ethernet interface  
32768K bytes of non-volatile configuration memory.  
4194304K bytes of physical memory.  
6684671K bytes of eUSB flash at bootflash:.  
0K bytes of WebUI ODM Files at webui:.

**Configuration register is 0x2142**

If you cannot establish a console session, or if you see only garbage characters, a speed mismatch between the router and the terminal emulation software could be the cause. Try to change the baud rate of your terminal emulation software. Possible rates include 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200. Once you establish a session, you can issue the **show version** command to determine the setup. If the router is in ROMmon mode, you can try to issue the **boot** command to boot the operating system manually.

```
rommon 4 > boot bootflash:asr1002x-universalk9.16.10.01a.SPA.bin
```

For information on the significance of your configuration register set, and potential issues and fixes, collect the output of the **show version** command, or the **show tech-support** command, and input into the [Cisco CLI Analyzer](#) tool.

---

**Note:** Only registered Cisco users can access internal tools and bug information.

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## Troubleshoot the Known Configuration Register Value

If you know the value of your configuration register, review the Configuration Register table to determine the behavior. If you can access the router through Telnet, establish a session with the router. If not, set your

terminal emulation program to the baud rate indicated by the configuration register set to establish a console session, where 9600 baud rate is the default.

## Set the Configuration Register

Review the the Configuration Register table to determine the desired configuration register set (usually 0x2102).

### Set the Configuration Register from Configuration Mode

Issue the **config-register** command to set the configuration register:

```
<#root>
```

```
Router#  
Router#
```

```
configure terminal
```

```
Enter configuration commands, one per line. End with CNTL/Z.  
Router(config)#
```

```
config-register 0x2102
```

```
Router(config)#
```

```
end
```

```
Router#
```

```
show version
```

```
Cisco IOS XE Software, Version 16.10.01a  
Cisco IOS Software [Gibraltar], ASR1000 Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version 16.10.1a, RE  
Technical Support: http://www.cisco.com/techsupport  
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```

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or the applicable URL provided on the flyer accompanying the Cisco IOS-XE  
software.
```

```
ROM: IOS-XE ROMMON
```

```
Router uptime is 6 minutes  
Uptime for this control processor is 9 minutes  
System returned to ROM by Reload Command  
System image file is "bootflash:asr1002x-universalk9.16.10.01a.SPA.bin"  
Last reload reason: Reload Command
```

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License Type: Smart License is permanent  
License Level: adventerprise  
Next reload license Level: adventerprise  
The current throughput level is 10000000 kbps

Smart Licensing Status: UNREGISTERED/EVAL MODE

cisco ASR1002-X (2RU-X) processor (revision 2KP) with 1189381K/6147K bytes of memory.  
Processor board ID FOX1719GE28  
14 Gigabit Ethernet interfaces  
1 Ten Gigabit Ethernet interface  
32768K bytes of non-volatile configuration memory.  
4194304K bytes of physical memory.  
6684671K bytes of eUSB flash at bootflash:.  
0K bytes of WebUI ODM Files at webui:.

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

The new configuration register set becomes active once the router reloads.

```
<#root>
```

```
Router#
```

```
reload
```

```
System configuration has been modified. Save? [yes/no]:
```

```
n
```

```
Proceed with reload? [confirm]
```

## Set the Configuration Register from ROMmon

Set the configuration register with the **confreg** command if the router is in ROMmon mode:

```
<#root>
```

```
rommon 1 >
```

```
confreg 0x2102
```

You must reset or power-cycle for the new configuration register to take effect.

## **Related Information**

- [Why Does My Router Lose Its Configuration During Reboot?](#)
- [Password Recovery Procedures](#)
- [Software Configuration Register](#)
- [Technical Support & Documentation - Cisco Systems](#)