



# Microcode Manager for Multiservice Engine Line Cards on Cisco 12000 Series Routers

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Revised: November 17, 2007, 12.0(32)SY  
Part Number: OL-10363-01 A0

## Feature History

Release	Modification
12.0(32)SY	This feature was enhanced and made available for multiservice engine line cards for Cisco 12000 series routers.

This feature module provides information on how to use the Microcode Manager to select and load the appropriate microcode mode on multiservice engine line cards for Cisco 12000 series routers. Information is provided in the following sections:

- [Feature Overview, page 2](#)
- [Supported Platforms, page 3](#)
- [Supported Standards, MIBs, and RFCs, page 3](#)
- [Prerequisites, page 4](#)
- [Configuration Tasks, page 4](#)
- [Configuration Examples, page 6](#)
- [Glossary, page 9](#)

## Feature Overview

A microcode bundle consists of the bundling together of various microcodes for different ASIC stages and contains a set of features that can be loaded onto a line card by selecting a specific microcode mode.

The Microcode Manager is used to package various microcode bundles into the firmware image so that the user can select a specific feature set by selecting the appropriate microcode mode.

Microcode Manager runs in one of two modes that are selectable by the user:

- **Feature mode**—Increases the packet header buffer area that is copied between ASIC stages. Feature mode supports all features available on the card. When a feature that explicitly requires Feature mode is configured, it must verify that the Microcode Manager is currently running in Feature mode. If the Microcode Manager is not running in Feature mode, a warning message appears or the configuration for that feature is rejected.

To configure the Microcode Manager to run in Feature mode, place the following command in the startup configuration:

**hw-module slot <slotNumber> np mode feature**

- **Turbo mode (default)**—Microcode Manager automatically runs in Turbo mode unless Feature mode is configured in the startup configuration. You can switch to Turbo mode from Feature mode using the no version of the same command in the CLI as follows:

**no hw-module slot <slotNumber> np mode feature**

Turbo mode supports a subset of the available features for the card that is at or close to the line rate. All Turbo mode functionality is available in Feature mode.

When you switch from Feature mode to Turbo mode, you should first disable the features that are not supported in Turbo mode. Mode selection affects both the ingress and egress data paths.

## Benefits

The Microcode Manager provides the following benefits:

- A simple way to manage the complexity of the increasing number of software features supported on multiservice engine line cards.
- Ensures that the correct microcode mode is consistently and reliably loaded (or unloaded), when you enable (or disable) a software feature.

## Restrictions

The following restrictions apply to Microcode Manager:

- In Feature mode, performance degradation in packets per second occurs in all features running on that slot.
- In Turbo mode, the following features are not supported. They are only supported in Feature mode:
  - L2TPv3
  - IPHC
  - MPLS VPNs over IP

## Related Features and Technologies

Microcode bundling.

## Related Documents

*Layer 2 Tunnel Protocol Version 3*

## Supported Platforms

Microcode Manager is supported on all Integrated Services Engine (ISE) and multiservice engine line cards for Cisco 12000 series routers.

### Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions.

## Supported Standards, MIBs, and RFCs

No new standards, MIBs, or RFCs were introduced for this feature in this release.

### Standards

No new standards were introduced for this feature in this release.

### MIBs

No new MIBs were introduced for this feature in this release.

### RFCs

No new RFCs were introduced for this feature in this release.

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

If Cisco MIB Locator does not support the MIB information that you need, you can also obtain a list of supported MIBs and download MIBs from the Cisco MIBs page at:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to [cco-locksmith@cisco.com](mailto:cco-locksmith@cisco.com). An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you. Qualified users can establish an account on Cisco.com by following the directions at:

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

## Prerequisites

To use Cisco IOS Release 12.0(32)SY of Microcode Manager, you must be running Cisco IOS software Release 12.0(32)SY on a multiservice engine line card.

## Configuration Tasks

See the following sections for configuration tasks for the Microcode Manager feature.

- [Configuring Feature Mode, page 4](#)
- [Configuring Turbo Mode, page 4](#)

## Configuring Feature Mode

To configure Feature mode, use the **hw-module slot <slotNumber> np mode feature** command in the Command Line Interface (CLI) or place this command in the startup configuration:

	Command	Purpose
Step 1	Router# <b>config t</b>	Changes to configuration mode.
Step 2	Router(config)# <b>hw-module slot &lt;slotNumber&gt; np mode feature</b>	Selects Feature mode for both ingress and egress data paths on the network processor (np). This mode provides extended features, but causes lower performance.

## Configuring Turbo Mode

Turbo mode is the default mode. The Microcode Manager automatically runs in Turbo mode after startup unless you have configured Feature mode in the startup configuration.

You can switch to Turbo mode while in Feature mode, using the no version of the **hw-module slot <slotNumber> np mode feature** command in the Command Line Interface (CLI) as follows:

	Command	Purpose
Step 1	Router# <b>config t</b>	Enter configuration mode.
Step 2	Router(config)# <b>no hw-module slot &lt;slotNumber&gt; np mode feature</b>	Selects Turbo mode. Turbo mode is the default. This mode provides limited features, but allows for higher performance.

# Verifying and Monitoring Microcode Modes

To monitor and verify microcode modes on the network processor, use the follow **show** commands:

Command	Purpose
Router# Router# <b>show controllers ise [slot number] np mode detail</b> Router#	Shows information for all line card types in a slot, including the microcode mode.
Router# Router# <b>attach &lt;slotNumber&gt;</b> LC-Slot> <b>show controllers tofab wahoo ucode-mgr</b> LC-Slot>	Shows the supported features for the selected microcode mode.
Router# Router# <b>attach &lt;slotNumber&gt;</b> LC-Slot> <b>show controllers frfab wahoo ucode-mgr</b> LC-Slot>	Shows the supported features for the selected microcode mode.

## Troubleshooting Tips

This section provides information on error messages and debugging commands.

### Error Messages

The follow error messages may be encountered in relation to microcode modes:

Error Message	Description
Mismatch detected between configured features and configured network processor mode in slot x.	The network processor detects a feature mismatch between the selected microcode mode and the configured features on the card.
Cannot change current network processor mode.	Active mode-specific features exist and consequently the microcode mode cannot be changed.
Remove the following features first: <i>list of feature abbreviation names...</i>	Before the microcode mode can be changed, remove the listed features.
<i>"feature abbreviation name"</i> is not supported in current network processor mode.	The feature is not supported in the currently selected microcode mode.
Use <b>hw-module slot &lt;slotNumber&gt; np mode</b> command to change mode.	Use the given command to change the microcode mode.

### Debug Commands

The following debug commands are available for troubleshooting problems with microcode modes.

Command	Purpose
Router# <b>debug eerp ucode-mgr</b>	Activates the router processor microcode manager debugger.
LC-Slot> <b>debug eelc ucode-mgr</b>	Activates the line card microcode manager debugger.

# Configuration Examples

This section provides the following configuration examples:

- [Configuring Feature Mode, page 6](#)
- [Configuring Turbo Mode, page 6](#)
- [Displaying Network Processor Mode, page 6](#)
- [Router Processor Debug Activation, page 7](#)
- [Line Card Debug Activation, page 7](#)

## Configuring Feature Mode

This example shows how to select Feature mode on slot 3 for both the ingress and egress data paths on the network processor (NP).

```
Router# config t
Router(config)# hw-module slot 3 np mode feature
Router(config)#
```

## Configuring Turbo Mode

This example shows how to select Turbo mode on the network processor (NP).

```
Router# config t
Router(config)# no hw-module slot 3 np mode feature
Router(config)#
```

## Displaying Network Processor Mode

This example shows information for all line card types in a slot, including microcode mode.

```
Router# show controllers ise np mode
```

Slot	Card Type	Mode	Default	Features	Supported	Configured
1	OC48-POS-X	turbo	yes	l2tpv3 xconnect IP Header Compression	no	no
2	12000-SIP-601/50	feature	no	l2tpv3 xconnect IP Header Compression	yes	no
4	OC3-16-POS-X	turbo	yes	l2tpv3 xconnect IP Header Compression	no	no

```
Router#
```

This example shows information for slot 2, including microcode mode.

```
Router# show controllers ise 2 np mode
```

Slot	Card Type	Mode	Default	Features	Supported	Configured
2	12000-SIP-601/50	feature	no	l2tpv3 xconnect IP Header Compression	yes	no

```
Router#
```

This example shows specific card information for slot 2, including microcode mode.

```

Router# show controllers ise 2 np mode detail
Slot Card Type           Mode   Default  Features                               Supported  Configured
-----
  2   CH-OC12-4-X          turbo  yes      l2tpv3 xconnect                       no
                                         IP Header Compression                 no
  2   CH-OC48-X           turbo  yes      l2tpv3 xconnect                       no
                                         IP Header Compression                 no
  2   OC48-POS-X          turbo  yes      l2tpv3 xconnect                       no
                                         IP Header Compression                 no
  2   OC12-4-POS-X        turbo  yes      l2tpv3 xconnect                       no
                                         IP Header Compression                 no
  2   OC3-16-POS-X        turbo  yes      l2tpv3 xconnect                       no
Router#

```

This example shows the supported features for the selected microcode mode.

```

Router#
Router# attach 2
Entering Console for 10G ISE Gigabit Ethernet in Slot: 2
Type "exit" to end this session

```

Press RETURN to get started!

```

LC-Slot2> show controllers tofab wahoo ucode-mgr
Ucode Manager ID: 13 Type: feature
10G ISE feature microcode
Supported features
  l2tpv3 xconnect
  IP Header Compression

```

```

LC-Slot2#
LC-Slot2> show controllers frfab wahoo ucode-mgr
Ucode Manager ID: 13 Type: feature
10G ISE feature microcode
Supported features
  l2tpv3 xconnect
  IP Header Compression

```

```

LC-Slot2#

```

## Router Processor Debug Activation

This example shows how to activate debugging for the router.

```

Router# debug eerp ucode-mgr
EE RP Ucode manager debugging is on

```

## Line Card Debug Activation

This example shows how to activate debugging for the line card in slot 2.

```

LC-Slot2># debug eelc ucode-mgr
EE LC Ucode manager debugging is on

```

# Command Reference

No new commands or modifications to commands were introduced for this feature for this release. For information on the commands presented in this document, refer to the Cisco IOS Release 12.0(32)SY command reference publications.

# Glossary

ASIC	application-specific integrated circuit
CLI	command-line interface
frfab	From the fabric. The egress direction on the network processor data path.
ISE	integrated services engine
MSE	multiservice engine
NP	network processor
SIP	SPA interface processor. A platform-specific carrier card that inserts into a router slot like a line card. A SIP can hold 1 or more SPAs in its subslots, depending on the SIP type. The SPA provides the network interface. The SIP provides the connection between the route processor (RP) and the SPA.
SPA	Shared port adapter. A modular, platform-independent port adapter that inserts into a subslot of a compatible SIP carrier card to provide network connectivity and increased interface port density. The SPA provides the interface between the network and the SIP.
tofab	To the fabric. The ingress direction on the network processor data path.
wahoo	The name of the application-specific integrated circuit (ASIC) or network processor (NP).

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