



# Hot Standby MAC Address

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The Hot Standby MAC Address (HSMA) feature achieves redundancy and fault tolerance and avoids a single point of failure of Cisco Channel Interface Processors (CIPs) or Channel Port Adapters (CPAs). This feature also ensures that multiple devices on the Ethernet can have a common MAC address.

## Feature History for the Hot Standby MAC Address

Release	Modification
Cisco IOS Releases 12.2(16), 12.3(1), and CMCC Ucode Release 28-14	This feature was introduced.

## 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 that appear.

## Contents

- [Prerequisites for Hot Standby MAC Address, page 2](#)
- [Restrictions for Hot Standby MAC Address, page 2](#)
- [Information About Hot Standby MAC Address, page 2](#)
- [How to Configure Hot Standby MAC Address Functionality, page 3](#)
- [Configuration Examples for Hot Standby MAC Address, page 9](#)
- [Additional References, page 11](#)
- [Command Reference, page 13](#)



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## Prerequisites for Hot Standby MAC Address

- Two Cisco CIPs or CPAs must be configured.
- The CIPs or CPAs must have a minimum of 32 MB memory or more available.
- Cisco Mainframe Channel Connection (CMCC) Ucode release 28-14 or later must be used.

## Restrictions for Hot Standby MAC Address

HSMA is used for IBM mainframe application only.

## Information About Hot Standby MAC Address

To configure the Hot Standby MAC Address feature on a CIP or CPA, you should understand the following concepts:

- [Multiple CIPs or CPAs in the Ethernet Environment, page 2](#)
- [Behavior of HSMA Protocol Between Two HSMA Peers, page 2](#)
- [Active Service Access Points on the Adapter, page 3](#)
- [Benefits of Hot Standby MAC Address, page 3](#)

## Multiple CIPs or CPAs in the Ethernet Environment

When you migrate from Token Ring and/or FDDI to Ethernet, you lose the ability to have multiple CIPs and CPAs in the network with duplicate MAC addresses. Under Token Ring and FDDI, the physical medium format provides a means of distinguishing among the common multiple MAC addresses by way of the routing information field (RIF). Ethernet does not provide this RIF in its definition. When you use duplicate MAC addresses in an Ethernet environment, confusion occurs in the switch tables, resulting in link loss.

## Behavior of HSMA Protocol Between Two HSMA Peers

An HSMA environment consists of two control adapters working together as peers. The adapters can be either two CIPs, two CPAs, or one CIP and one CPA. A Cisco CIP or a CPA in an HSMA environment must have a peer to be effective. Peered devices communicate with each other over a Logical Link Control (LLC) session between the two control adapters. Each peer monitors the other and negotiates roles in the event of a race condition. The LLC stack is enhanced to allow HSMA also to control the virtual adapters. When a device negotiates to be a standby device, it disables the virtual adapter on the CIP or CPA. When disabled, the virtual adapter does not transmit any MAC frame with the HSMA MAC adapter's source address. Only the active device utilizes the HSMA MAC adapter address owing to the restriction that Ethernet switches enforce. If both devices advertise the address at the same time, unpredictable results ensue.

A new HSMA protocol facilitates communication between two HSMA peers. The HSMA protocol data is carried over the LLC session between the peers. The exchange of information between the two peers decides which state (active state or inactive state) the two devices are in. When there is a loss of communication, the devices assume that their partner has been taken offline either by a network error or because of a network outage, and the local peer goes into the active state.

## Active Service Access Points on the Adapter

HSMA monitors the state of the local Extended Communications Adapter (XCA) device by checking for active service access points (SAPs) periodically. When there are open SAPs on the adapter, the adapter is considered to be in an XCA active state; otherwise the adapter is considered to be in an XCA inactive state. Therefore, you should never configure an adapter that is used by the HSMA stack to be used by any other feature on the CIP or CPA; such a configuration might cause HSMA to see a false positive. By monitoring the XCA device, host operators force a device change by forcing all the XCA devices on that adapter to become inactive.

## Benefits of Hot Standby MAC Address

- Hot Standby MAC Address allows two virtual MAC addresses to be used on a channel with only one of them in an active state at a time.
- The MAC addresses exchange messages. If one of them stops receiving the other's messages, it starts itself as the active MAC address.
- Two adapters can be set up together to share the same MAC address.
- In an Ethernet environment, one of the adapters will be active at any given time and will process the packets while the other adapter remains in the disabled state.

## How to Configure Hot Standby MAC Address Functionality

This section contains the following procedures:

- [Configuring the Active Adapter, page 3](#) (required)
- [Configuring the HSMA Control Adapter, page 4](#) (required)
- [Tuning HSMA, page 6](#) (optional)

## Configuring the Active Adapter

Use this task to configure the active HSMA adapter.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface channel *slot/port***
4. **csna path device**

5. **lan** *type lan-id*
6. **source-bridge** *source-ring-number bridge-number target-ring-number*
7. **adapter** *adapter-number mac-address* **hsma-partner** *hsma-mac-address*

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>interface channel slot/port</b>  <b>Example:</b> Router(config)# interface channel 1/0	Enters channel interface configuration mode.
Step 4	<b>csna path device</b>  <b>Example:</b> Router(config-if)# csna 0190 09	Configures SNA support on the CMCC channel interface. <ul style="list-style-type: none"> <li>• This command specifies the path and device on a physical channel of the router to communicate with an attached mainframe.</li> </ul>
Step 5	<b>lan type lan-id</b>  <b>Example:</b> Router(config-if)# lan tokenring 20	Configures an internal Token Ring LAN on the CMCC adapter interface and enters internal LAN configuration mode.
Step 6	<b>source-bridge source-ring-number bridge-number target-ring-number</b>  <b>Example:</b> Router(cfg-lan-Token 20)# source-bridge 310 3 100	Configures the interface for source route bridging (SRB).
Step 7	<b>adapter adapter-number mac-address hsma-partner hsma-mac-address</b>  <b>Example:</b> Router(cfg-lan-Token 20)# adapter 20 4062.1515.6014 hsma-partner 4062.5555.0015	Configures the active HSMA adapter. <ul style="list-style-type: none"> <li>• The <b>hsma-partner</b> keyword is used to specify the shared HSMA MAC address.</li> </ul>

## Configuring the HSMA Control Adapter

Use this task to configure the HSMA control adapter.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface channel** *slot/port*
4. **lan** *type lan-id*
5. **source-bridge** *source-ring-number bridge-number target-ring-number*
6. **adapter** *adapter-number mac-address*
7. **hsma enable**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"><li>• Enter your password if prompted.</li></ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>interface channel slot/port</b>  <b>Example:</b> Router(config)# interface channel 1/0	Enters channel interface configuration mode.
Step 4	<b>lan type lan-id</b>  <b>Example:</b> Router(config-if)# lan tokenring 26	Configures an internal Token Ring LAN on the CMCC adapter interface and enters internal LAN configuration mode.
Step 5	<b>source-bridge source-ring-number bridge-number target-ring-number</b>  <b>Example:</b> Router(cfg-lan-Token 20)# source-bridge 319 9 100	Configures the interface for SRB.
Step 6	<b>adapter adapter-number mac-address</b>  <b>Example:</b> Router(cfg-lan-Token 20)# adapter 26 4043.1111.001a	Configures the HSMA control adapter.
Step 7	<b>hsma enable</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# exit	Enables HSMA.

## Tuning HSMA

Use this task to fine-tune the HSMA configuration.

**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **interface channel** *slot/port*
4. **lan** *type lan-id*
5. **adapter** *adapter-number mac-address* [**hsma-partner** *hsma-mac-address*]
6. **hsma dead-interval** *time-interval*
7. **hsma hello-interval** *hello-interval*
8. **hsma preferred**
9. **hsma shutdown**
10. **hsma control-sap** *sap-address*
11. **exit**
12. **shutdown**
13. **no shutdown**

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>interface channel slot/port</b>  <b>Example:</b> Router(config)# interface channel 1/0	Enters channel interface configuration mode.
Step 4	<b>lan type lan-id</b>  <b>Example:</b> Router(config-if)# lan tokenring 26	Configures an internal Token Ring LAN on the CMCC adapter interface and enters internal LAN configuration mode.
Step 5	<b>adapter adapter-number mac-address [hsma-partner hsma-mac-address]</b>  <b>Example:</b> Router(cfg-lan-Token 20)# adapter 26 4043.1111.001a	Configures either the active HSMA controller or the HSMA control adapter.
Step 6	<b>hsma dead-interval time-interval</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# hsma dead-interval 8	(Optional) Configures the time interval during which at least one hello packet must be received from the peer HSMA adapter or else the router declares that neighbor down.
Step 7	<b>hsma hello-interval hello-interval</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# hsma hello-interval 2	(Optional) Configures the time interval between hello messages that pass between the HSMA CIP or CPAs
Step 8	<b>hsma preferred</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# hsma preferred	(Optional) Assigns priority to a peer as the control adapter.
Step 9	<b>hsma shutdown</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# hsma shutdown	(Optional) Stops HSMA on an adapter and hence enables the partner adapter.
Step 10	<b>hsma control-sap sap-address</b>  <b>Example:</b> Router(cfg-lan-Token 20-26)# hsma control-sap e8	(Optional) Overrides the default control SAP for HSMA peer communications. <ul style="list-style-type: none"> <li>Changing the control SAP requires that the CMCC be restarted.</li> </ul>

	Command or Action	Purpose
Step 11	<code>exit</code>  <b>Example:</b> <code>Router(config-if)# exit</code>	Returns to channel interface configuration mode.
Step 12	<code>shutdown</code>  <b>Example:</b> <code>Router(config-if)# shutdown</code>	Shuts down the channel interface, prior to restarting it with the <b>no shutdown</b> command. <ul style="list-style-type: none"> <li>Restarting the CMCC is only necessary for the <b>hsma control-sap</b> command to take effect.</li> </ul>
Step 13	<code>no shutdown</code>  <b>Example:</b> <code>Router(config-if)# no shutdown</code>	Restarts the channel interface. <ul style="list-style-type: none"> <li>Restarting the CMCC is only necessary for the <b>hsma control-sap</b> command to take effect.</li> </ul>

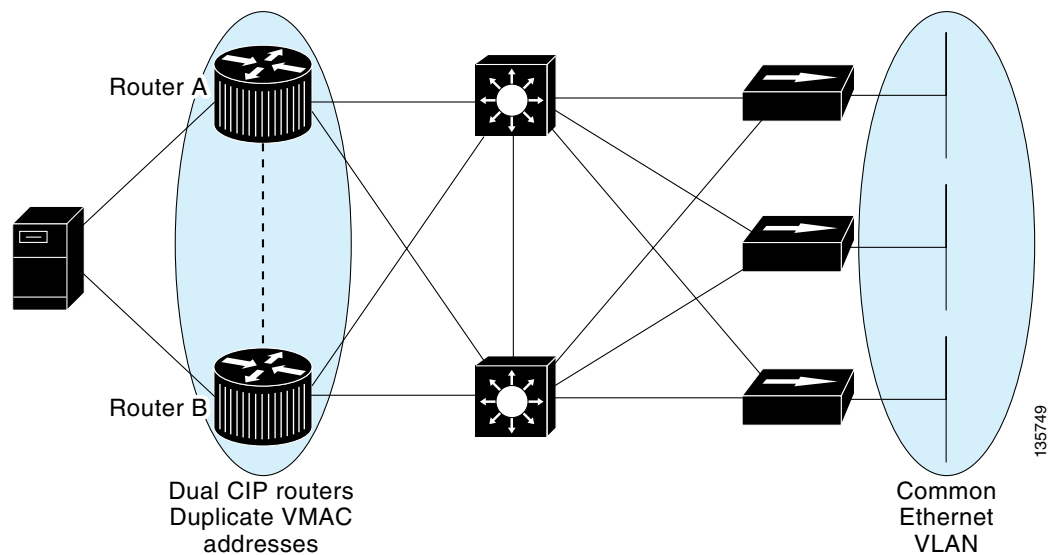
## Configuration Examples for Hot Standby MAC Address

This section provides the following configuration examples:

- [HSMA on Router A: Example, page 10](#)
- [HSMA on Router B: Example, page 10](#)

Figure 1 shows the HSMA network topology.

**Figure 1** HSMA Network Topology



## HSMA on Router A: Example

The following example configures HSMA on Router A to work with the HSMA configuration on Router B. To see the corresponding configuration on Router B, see the section [“HSMA on Router B: Example.”](#)

```
source-bridge ring-group 100
source-bridge transparent 100 1 1 1
!
interface GigabitEthernet 1/0/0
    bridge-group 1
!
interface Channel 2/0
    csna 0150 00
!
interface Channel11/0
    csna 0190 09
    lan TokenRing 20
    source-bridge 310 3 100
! This is the active adapter.
    adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
    lan TokenRing 26
    source-bridge 319 9 100
    adapter 26 4043.1111.001a
! This is the HSMA control adapter.
    hsma enable
!
bridge 1 protocol ieee
```

## HSMA on Router B: Example

The following example configures HSMA on Router B to work with the HSMA configuration on Router A. To see the corresponding configuration on Router A, see the section [“HSMA on Router A: Example.”](#)

```
source-bridge ring-group 100
source-bridge transparent 100 1 1 1
!
interface GigabitEthernet 1/0/0
    bridge-group 1
!
interface Channel 2/0
    csna 0150 00
!
interface Channel13/0
    lan TokenRing 23
    source-bridge 330 3 100
    adapter 9 4043.1313.9009 hsma-partner 4043.1111.001a
    lan TokenRing 31
    source-bridge 339 9 100
    adapter 26 4043.3333.001a
    hsma enable
!
bridge 1 protocol ieee
```

# Additional References

The following sections provide references related to the Hot Standby MAC Address.

## Related Documents

Related Topic	Document Title
Bridging and IBM networking	<a href="#">Cisco IOS Bridging and IBM Networking Configuration Guide, Release 12.3</a>
Bridging and IBM networking	<a href="#">Cisco IOS Bridging and IBM Networking Command Reference, Volume 1 of 2: Bridging, Release 12.3</a>
Bridging and IBM networking	<a href="#">Cisco IOS Bridging and IBM Networking Command Reference, Volume 2 of 2: IBM Networking, Release 12.3</a>
Channel port adapters	<a href="#">PA-4C-E 1-Port High-Performance ESCON Channel Port Adapter Installation and Configuration</a>

## Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	—

## MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

## RFCs

RFC	Title
No new or modified RFCs are supported by this feature, and support for existing RFCs has not been modified by this feature.	—

## Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/public/support/tac/home.shtml">http://www.cisco.com/public/support/tac/home.shtml</a>

# Command Reference

This section documents new and modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.3 command reference publications.

## Modified Commands

- [adapter](#)

## New Commands

- [hsma control-sap](#)
- [hsma dead-interval](#)
- [hsma enable](#)
- [hsma hello-interval](#)
- [hsma preferred](#)
- [hsma shutdown](#)
- [show extended channel hsma](#)

# adapter

To configure internal adapters, use the **adapter** command in internal LAN interface configuration submode. To remove an internal adapter, use the **no** form of this command.

**adapter** *adapter-number* [*mac-address*] [**hsma-partner** *hsma-mac-address*]

**no adapter** *adapter-number* [*mac-address*]

## Syntax Description

<i>adapter-number</i>	Number in the range from 0 to 31 that uniquely identifies the internal adapter (relative adapter number) for all internal LANs of the same type on the Cisco Mainframe Channel Connection (CMCC) adapter. In Cisco Systems Network Architecture (CSNA), this value corresponds to the adaptor number (ADAPNO) parameter defined in the Virtual Telecommunications Access Method (VTAM) Extended Communications Adapter (XCA) Major Node.
<i>mac-address</i>	(Optional) MAC address for this internal adapter. This is a hexadecimal value in the form <i>xxxx.xxxx.xxxx</i> .
<b>hsma-partner</b>	(Optional) Specifies a hot standby MAC address (HSMA) partner.
<i>hsma-mac-address</i>	(Optional) MAC address of the HSMA partner control adapter.

## Defaults

No default behavior or values

## Command Modes

Internal LAN interface configuration

## Command History

Release	Modification
11.0	This command was introduced.
12.3(3)	The <b>hsma-partner</b> keyword and <i>hsma-mac-address</i> argument were added.

## Usage Guidelines

This command is valid only on the virtual channel interface. Internal adapters are used to provide LAN gateway MAC addresses for the following CMCC adapter features: CSNA, Cisco Multipath Channel (CMPC), and TN3270 Server.

Up to 18 internal adapters can be configured on a CMCC adapter. Internal adapters are configured on internal LANs. The only limit to the number of internal adapters that you can configure on a single internal LAN is the limit of up to 18 total internal adapters per CMCC.

When an internal adapter configuration command is removed or an existing internal adapter is modified, the *mac-address* parameter is not required. In internal adapter configuration mode, the router prompt appears as follows:

```
router (cfg-adap-type n-m) #
```

In this syntax, *type* is the internal LAN type, *n* is the LAN ID, and *m* is the adapter number.

HSMA is designed to allow redundant CMCC internal adapter MAC addresses in an Ethernet environment. Communication between the HSMA control adapters is used to ensure that only one of the adapters is active at a time.

### Examples

The following example shows how to configure internal adapters 3 and 4 (with their corresponding MAC addresses) on the internal Token Ring LAN number 20, and internal adapter 1 on the internal Token Ring LAN number 10:

```
interface channel 1/2
 lan tokenring 20
  adapter 3 4000.7500.0003
  adapter 4 4000.7500.0004
 lan tokenring 10
  source-bridge 100 1 100
  adapter 1 4000.7500.1111
```

The following example shows how to configure internal adapter 9 to communicate with the HSMA partner at the MAC address 4043.3333.001a:

```
interface Channel1/2
 lan TokenRing 20
  source-bridge 310 3 100
  adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
 lan TokenRing 20
  source-bridge 319 9 100
  adapter 26 4043.1111.001a
  hsma enable
```

### Related Commands

Command	Description
<b>lan</b>	Configures an internal LAN on a CMCC adapter interface and enters the internal LAN configuration mode.
<b>name</b>	Assigns a name to an internal adapter.
<b>show extended channel lan</b>	Displays the internal LANs and adapters configured on a CMCC adapter.
<b>show extended channel llc2</b>	Displays information about the LLC2 sessions running on CMCC adapter interfaces.
<b>show extended channel connection-map llc2</b>	Displays the number of active LLC2 connections for each SAP and the mapping of the internal MAC adapter and the SAP to the resource that activated the SAP.
<b>source-bridge</b>	Configures an interface for SRB.

## hsma control-sap

To override the default control service access point (SAP) for (hot standby MAC address) HSMA peer communications, use the **hsma control-sap** command in control adapter configuration mode. To restore the default SAP for peer communications, use the **no** form of this command.

**hsma control-sap** *sap-address*

**no hsma control-sap** *sap-address*

### Syntax Description

<i>sap-address</i>	SAP address used by the HSMA protocol on the control adapter. This is a hexadecimal value. The allowed range is from 0x4 to 0xFC, and the default is 0xEC.
--------------------	--

### Defaults

The default SAP address, 0xEC, is used.

### Command Modes

Control adapter configuration

### Command History

Release	Modification
12.3(3)	This command was introduced.

### Usage Guidelines

This command allows you to override the default control SAP used for HSMA peer communications. The same value must be configured for both HSMA peers or they will not be able to communicate. This command is valid only on the control adapter.

When the **hsma control-sap** command is changed, it will take effect only after you restart the interface by using the **shutdown** and **no shutdown** commands.

### Examples

The following example configures the SAP address E8 on control adapter 26:

```
interface Channel3/0
  csna 0190 09
  lan TokenRing 23
  source-bridge 330 3 100
  adapter 9 4043.1313.9009 hsma-partner 4043.1111.001a
lan TokenRing 31
  source-bridge 339 9 100
  adapter 26 4043.3333.001a
    hsma enable
    hsma control-sap E8
```

## hsma dead-interval

To configure the time interval during which at least one hello packet must be received from the peer (hot standby MAC address) HSMA adapter or else the router declares that neighbor down, use the **hsma dead-interval** command in peered adapter configuration mode. To restore the default value, use the **no** form of this command.

**hsma dead-interval** *time-interval*

**no hsma dead-interval** *time-interval*

<b>Syntax Description</b>	<i>time-interval</i>	Time interval used by the HSMA protocol between the control and peered HSMA adapters. Range: 3 to 180. Default: 10.
---------------------------	----------------------	---

<b>Defaults</b>	The time interval is set to the default value of 10 seconds.
-----------------	--

<b>Command Modes</b>	Peered adapter configuration
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.3(3)	This command was introduced.

<b>Examples</b>	The following example configures the time interval on adapter 26 to be 8 seconds:
-----------------	---

```
interface Channel1/0
  load-interval 30
  csna 0190 09
  lan TokenRing 20
    source-bridge 310 3 100
    adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
      hsma dead-interval 8
  lan TokenRing 26
    source-bridge 319 9 100
    adapter 26 4043.1111.001a
      hsma enable
```

# hsma enable

To enable (hot standby MAC address) HSMA on an adapter, use the **hsma enable** command in control adapter configuration mode. To disable HSMA, use the **no** form of this command.

**hsma enable**

**no hsma enable**

**Syntax Description** This command has no keywords or arguments.

**Defaults** HSMA is disabled.

**Command Modes** Control adapter configuration

Command History	Release	Modification
	12.3(3)	This command was introduced.

**Usage Guidelines** The **hsma enable** command instructs HSMA to use the adapter it is configured on as the control adapter. The control adapter is the adapter that is used to send and receive hello updates. HSMA is not enabled on the router until a control adapter is specified by the **hsma enable** command. The **no** form of this command is not valid unless all of the HSMA partners have been removed; similarly, the adapter context itself may not be removed unless all of the HSMA partners have been removed.

This command is only valid on the control adapter.

The control adapter can be configured under any LAN Token Ring adapter.

**Examples** The following example enables HSMA on control adapter 26:

```
interface Channel1/0
  lan TokenRing 20
    source-bridge 310 3 100
    adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
  lan TokenRing 26
    source-bridge 319 9 100
    adapter 26 4043.1111.001a
    hsma enable
```

## hsma hello-interval

To configure the time interval between hello messages between the peered (hot standby MAC address) HSMA Cisco Channel Interface Processors (CIPs) or Channel Port Adapters (CPAs), use the **hsma hello-interval** command in peered adapter configuration mode. To restore the default value, use the **no** form of this command.

**hsma hello-interval** *time-interval*

**no hsma hello-interval** *time-interval*

<b>Syntax Description</b>	<i>time-interval</i>	Time interval, in seconds, used by the HSMA protocol between the peered HSMA CIP or CPAs. Range: 1 to 60. Default: 3.
---------------------------	----------------------	---

<b>Defaults</b>	The time interval is set to the default value of 3 seconds.
-----------------	---

<b>Command Modes</b>	Peered adapter configuration
----------------------	------------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.3(3)	This command was introduced.

<b>Usage Guidelines</b>	The <b>hsma hello-interval</b> is the time interval between hello messages that pass between the peered HSMA CIP or CPAs. The control adapter in the enabled mode sends hello messages to the peered adapter after every 2 seconds.
-------------------------	---

<b>Examples</b>	The following example configures the interval between hello messages on adapter 26 to be 2 seconds:
-----------------	---

```
interface Channel1/0
  csna 0190 09
  lan TokenRing 20
  source-bridge 310 3 100
  adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
    hsma hello-interval 2
  lan TokenRing 26
  source-bridge 319 9 100
  adapter 26 4043.1111.001a
    hsma enable
```

# hsma preferred

To assign priority to a peer as a control adapter, use the **hsma preferred** command in peered adapter configuration mode. To allow priority to be set without configuring a peer, use the **no** form of this command.

**hsma preferred**

**no hsma preferred**

---

**Syntax Description** This command has no keywords or arguments.

---

**Defaults** Disabled

---

**Command Modes** Peered adapter configuration

---

Command History	Release	Modification
	12.3(3)	This command was introduced.

---



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**Usage Guidelines** The **hsma preferred** command is used in situations when both HSMA peers are becoming active at the same time or both were active because of an interruption of communication between the control adapters. In such situations, the adapter with the **hsma preferred** command configured becomes the active adapter, and the other adapter is disabled. Sessions that are connected to the disabled adapter will be dropped. If the **hsma preferred** command is not configured on either peer, the control adapter with the higher MAC address is used.

---

**Examples** The following example disables adapter 9 as the HSMA adapter and enables adapter 26 as the active HSMA adapter:

```
interface Channel1/0
  csna 0190 09
  lan TokenRing 20
    source-bridge 310 3 100
    adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
      hsma preferred
      hsma shutdown
  lan TokenRing 26
    source-bridge 319 9 100
    adapter 26 4043.1111.001a
      hsma enable
```

# hsma shutdown

To stop (hot standby MAC address) HSMA on an adapter and hence enable the partner adapter, use the **hsma shutdown** command. To restart the HSMA adapter, use the **no** form of this command.

**hsma shutdown**

**no hsma shutdown**

**Syntax Description** This command has no keywords or arguments.

**Defaults** HSMA is not shut down.

**Command Modes** Peered adapter configuration

Command History	Release	Modification
	12.3(3)	This command was introduced.

**Usage Guidelines** Use the **hsma shutdown** command when you wish to force the other adapter of a pair to become active.

**Examples** The following example disables adapter 9 as the HSMA adapter and enables adapter 26 as the active HSMA adapter:

```
interface Channel1/0
  csna 0190 09
  lan TokenRing 20
    source-bridge 310 3 100
    adapter 9 4043.1313.9009 hsma-partner 4043.3333.001a
      hsma preferred
      hsma shutdown
  lan TokenRing 26
    source-bridge 319 9 100
    adapter 26 4043.1111.001a
      hsma enable
```

# show extended channel hsma

To display hot standby MAC address (HSMA) information, use the **show access-lists hardware** command in privileged EXEC mode.

**show extended channel *slot:port* hsma**

Syntax Description	slot:	Chassis slot number of the ISE line card and port number on that line card. Refer to the appropriate hardware manual or online help for port numbers on your networking device.
	port	Number of the port on the interface. Refer to the appropriate hardware manual or online help for port numbers on your networking device.

**Defaults** There are no defaults.

**Command Modes** Privileged EXEC

Command History	Release	Modification
	12.3(3)	This command was introduced.

**Examples** The following example shows sample output of the **show extended channel hsma** command:

```
LC-Slot2# show extended channel 1/0 hsma

HSMA information for Channel1/0:
Control adapter:
  LAN Token-26
  Adapter 26
  MAC Address 4043.1111.001a

HSMA peers for this control adapter:
      Hot Standby   HSMA-Partner   Link
LAN   Adapter  Mac Address   Mac Address   State
=====
Token 20 09      4043.1313.9009  4043.3333.001a  UP
Control Sap: EC(configured)(E8 on next restart)
Peer State : Active
Local State: Standby (Preferred)
  Open Stations: 1
  Open SAPs: 1
  XCA Query Interval: 30 seconds.
  Hello Interval : 2 seconds.
  Dead Interval : 8 seconds.
```

[Table 1](#) describes the significant fields shown in the display.

**Table 1** *show extended channel hsma Field Descriptions*

Field	Description
Control Adapter	Information about the control adapter.
LAN Token-26	CMCC virtual lan on which the control adapter is configured.
LAN	The number of the CMCC virtual LAN on which the control adapter is configured.
Adapter-26	The adapter number of the control adapter with MAC address 4043.1111.001a
Hot Standby Mac Address	The HSMA MAC address.
HSMA-Partner Mac Address	The MAC address of the control adapter.
Link state	The status of the LLC connection between the control adapters. Valid values are: <ul style="list-style-type: none"> <li>• UP—The connection is active.</li> <li>• DOWN—The connection is disabled.</li> <li>• Unknown—The router is unable to retrieve the information from the CMCC Control Sap.</li> <li>• OK Peer State— Status of the peer (remote) HSMA adapter</li> </ul>
Control Sap	The address of the control service access point (SAP) for this peer. In this example, EC is the current address of the control SAP, but this has been changed, by using the <b>hsma control-sap</b> command, to E8. Once the interface is restarted, E8 will become the new control SAP address.
Peer State	The current state of the peer (remote) HSMA adapter. Valid values are: <ul style="list-style-type: none"> <li>• UNDEFINED—Mismatched configuration options- an error occurred in retrieving the information from the CMCC.</li> <li>• Active—This adapter is active.</li> <li>• Adapter Starting—The adapter is being started.</li> <li>• Checkpointing—Both adapters are active and beginning negotiations to decide which will remain active.</li> <li>• Negotiating—The peers are negotiating their roles.</li> <li>• Pending Enable—The HSMA adapter is being enabled.</li> <li>• Shutdown—The HSMA adapter has been shutdown.</li> <li>• Standby—The HSMA adapter is not active because the peer is active.</li> <li>• Stopped—HSMA is initializing.</li> <li>• XCA Inactive—The XCA associated with this adapter is not active.</li> <li>• (Preferred)—The <b>hsma preferred</b> command is configured on this adapter.</li> </ul>

**Table 1** *show extended channel hsma Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Local State	Status of the HSMA adapter on this interface (same as for peer).
Open Stations	The number of LLC2 connection stations open on this internal adapter.
Open SAPs	The number of SAPs open on this internal MAC adapter.
XCA Query Interval	The time interval between checks of the status of the XCA that has opened the HSMA adapter.
Hello Interval	The time interval between hello messages between the peered HSMA CIP or CPAs. This is configured by the <b>hsma hello-interval</b> command.
Dead Interval	Time interval during which at least one hello packet must be received from the peer HSMA adapter before the router declares that neighbor down. This is configured by the <b>hsma dead-interval</b> command.

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