# Implementing FCCS (NEC Fusion)

This chapter describes how to implement Fusion Call-Control Signaling (FCCS), also known as NEC Fusion. FCCS allows a voice network to seamlessly integrate into an IP network, making it possible to add voice-networking capabilities to a LAN or WAN without major network restructuring.

The NEC Fusion Strategic Alliance Program facilitates development of integrated solutions, complementary to both NEC and other technology businesses, that provide telephony solutions for mutual customers.

FCCS, developed under this program, deploys a new transmission signaling protocol that is compatible with IP networks and Cisco routers and switches. It allows individual nodes anywhere within a network to operate as if they were part of a single integrated PBX system. Database storage, share, and access routines allow real-time access from any node to any other, allowing individual nodes to learn about the entire network configuration. This capability allows network-wide feature, functional, operational, and administration transparency.

### Feature History for FCCS

| Release | Modification |
|---|---|
| 12.0(7)T | This command was introduced on the Cisco AS5300. |

### 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.

**Note** For more information about related Cisco IOS voice features, see the following:

- "Overview of ISDN Voice Interfaces" on page 3
- Entire Cisco IOS Voice Configuration Library—including library preface and glossary, other feature documents, and troubleshooting documentation—at http://www.cisco.com/en/US/products/ps6441/prod_configuration_guide09186a0080565f8a.html.

For a list of references cited in this chapter, see the "Additional References" section on page 305.

# Contents



# Prerequisites for Implementing FCCS

- Perform the prerequisites that are listed in the "Prerequisites for Configuring ISDN Voice Interfaces" section on page 3.

# Restrictions for Implementing FCCS

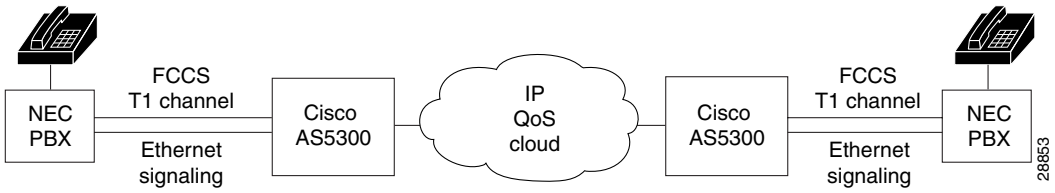
Restrictions are described in the Restrictions for Configuring ISDN Voice Interfaces, page 4.

# Information About FCCS

**Note** General information about ISDN voice interfaces is presented in the "Information About ISDN Voice Interfaces" section on page 4.

If you have an NEC PBX in your network and also run FCCS, you must configure your access servers appropriately for QSIG and then for FCCS (NEC Fusion). Figure 18 shows an example of a Cisco AS5300 QSIG signaling configuration using an NEC PBX.

***Figure 18 QSIG Signaling Configuration with NEC PBX***




# How to Configure FCCS

This section contains the following procedures:

# Configuring VoIP QSIG

To configure VoIP QSIG, perform the following steps.

**Note** You can configure a switch type at either global level or interface level. For example, if you have a QSIG connection on one line and on the PRI port, you can use the **isdn-switch-type** command to configure the ISDN switch type in any of the following combinations:

- At the global level to support QSIGX, PRI 5ess, or another switch type such as VN3
- At the interface level to set a particular interface to support QSIG, to set a particular interface to a PRI setting such as 5ess, or to set one particular interface to a PRI setting and another interface to support QSIG.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **isdn switch-type primary-qsig**
4. **controller**
5. **pri-group**
6. **exit**
7. **interface**
8. **isdn switch-type primary-qsig**
9. **isdn protocol-emulate**
10. **isdn overlap-receiving**
11. **isdn incoming-voice modem**
12. **isdn network-failure-cause**
13. **isdn bchan-number-order**
14. **exit**

## DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br><br>**Example:**<br>`Router> enable` | Enters privileged EXEC mode. Enter your password when prompted. |
| **Step 2** | **configure terminal**<br><br>**Example:**<br>`Router# configure terminal` | Enters global configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 3** | **isdn switch-type primary-qsig**<br><br>**Example:**<br>`Router(config)# isdn switch-type primary-qsig` | (Optional) Globally configures the ISDN switch type to support QSIG signaling.<br><br>**Note** Depending on your configuration, you can configure the ISDN switch type by using this command either in global configuration mode or interface configuration mode (see Step 8).<br><br>If the PBX in your configuration is an NEC PBX and you use Fusion Call Control Signaling (FCCS), see the "Configuring FCCS" section on page 304. |
| **Step 4** | **controller** {**t1** \| **e1**} *controller-number*<br><br>**Example:**<br>`Router(config)# controller t1 3` | Enters controller configuration mode for the specified controller. |
| **Step 5** | **pri-group** [**timeslot** *range*]<br><br>**Example:**<br>`Router(config-controller)# pri-group timeslot 1-23` | Configures the PRI group for either T1 or E1 to carry voice traffic. T1 time slots are 1 to 23. E1 time slots are 1 to 31.<br><br>You can configure the PRI group to include either all available time slots or just a select group. For example, if only time slots 1 to 10 are in the PRI group, specify **timeslot 1-10**. If the PRI group includes all channels available for T1, specify **timeslot 1-23** command. If the PRI group includes all channels available for E1, specify **timeslot 1-31**. |
| **Step 6** | **exit**<br><br>**Example:**<br>`Router(config-controller)# exit` | Exits the current mode. |
| **Step 7** | **interface serial 1:***channel-number*<br><br>**Example:**<br>`Router(config)# interface serial 1:23` | Enters interface configuration mode for the ISDN PRI interface. T1 channel number is 23. E1 channel number is 15. |
| **Step 8** | **isdn switch-type primary-qsig**<br><br>**Example:**<br>`Router(config-if)# isdn switch-type primary-qsig` | (Optional) Configures the ISDN switch type to support QSIG signaling for the specified interface. Use this command if you did not configure the ISDN switch type for QSIG support globally in Step 1.<br><br>The same conditions that apply to this command in global configuration mode also apply to this command in interface configuration mode.<br><br>**Note** For the selected interface, this command in interface configuration mode overrides the same command in global configuration mode. |

| | Command or Action | Purpose |
|---|---|---|
| **Step 9** | **isdn protocol-emulate** {**user** \| **network**}<br><br>**Example:**<br>`Router(config-if)# isdn protocol-emulate {user \| network}` | Configures the ISDN interface to serve as either the primary QSIG slave or the primary QSIG master. Keywords are as follows:<br>• **user**—Slave<br>• **network**—Master<br>If the private integrated services network exchange (PINX) is the primary QSIG master, configure the access server as the primary QSIG slave. If the PINX is the primary QSIG slave, configure it as the primary QSIG master. |
| **Step 10** | **isdn overlap-receiving** [**T302** *value*]<br><br>**Example:**<br>`Router(config-if)# isdn overlap-receiving T302 500` | (Optional) Activates overlap signaling to send to the destination PBX using timer T302. The keyword are argument are as follows:<br>• **T302** *value*—Value of timer T302, in ms. |
| **Step 11** | **isdn incoming-voice modem**<br><br>**Example:**<br>`Router(config-if)# isdn incoming-voice modem` | Routes incoming voice calls to the modem and treats them as analog data. |
| **Step 12** | **isdn network-failure-cause** [*value*]<br><br>**Example:**<br>`Router(config-if)# isdn network-failure-cause 5` | (Optional) Specifies the cause code to pass to the PBX when a call cannot be placed or completed because of internal network failures. The argument is as follows:<br>• *value*—Cause code, from 1 to 127. All cause codes except Normal Call Clearing (16), User Busy (17), No User Responding (18), and No Answer from User (19) are changed to the specified cause code. |
| **Step 13** | **isdn bchan-number-order** {**ascending** \| **descending**}<br><br>**Example:**<br>`Router(config-if)# isdn bchan-number-order ascending` | (Optional) Configures the ISDN PRI interface to make the outgoing call selection in ascending or descending order. Keywords are as follows:<br>• **ascending**—Ascending order.<br>• **descending**—Descending order. This is the default.<br>For descending order, the first call from the access server uses (T1) channel 23 or (E1) channel 31. The second call then uses (T1) channel 22 or (E1) channel 30, and so on, in descending order.<br>For ascending order, if the PRI group starts with 1, the first call uses channel 1, the second call uses channel 2, and so on, in ascending order. If the PRI group starts with a different time slot, the ascending order starts with the lowest time slot. |
| **Step 14** | **exit**<br><br>**Example:**<br>`Router(config-if)# exit` | Exits the current mode. |

# Configuring FCCS

To configure FCCS, perform the following steps.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **controller**
4. **pri-group nec-fusion**
5. **exit**

### DETAILED STEPS

| | Command or Action | Purpose |
|---|---|---|
| **Step 1** | **enable**<br><br>**Example:**<br>`Router> enable` | Enters privileged EXEC mode. Enter your password when prompted. |
| **Step 2** | **configure terminal**<br><br>**Example:**<br>`Router# configure terminal` | Enters global configuration mode. |
| **Step 3** | **controller t1** *controller-number*<br><br>**Example:**<br>`Router(config)# controller t1 5` | Enters controller configuration mode for the specified controller.<br><br>**Note** NEC Fusion does not support fractional T1/E1; all 24 channels must be available or the configuration request fails. |
| **Step 4** | **pri-group nec-fusion** {*pbx-ip-address* \| *pbx-ip-host-name*} **pbx-port** *number*<br><br>**Example:**<br>`Router(config-controller)# pri-group nec-fusion 172.16.0.0 pbx-port 55000` | Configures the controller to communicate with an NEC PBX using NEC Fusion. The argument is as follows:<br><br>• *number*—PBX port number. If the specified value is already in use, the next greater value is used. |
| **Step 5** | **exit**<br><br>**Example:**<br>`Router(config-controller)# exit` | Exits the current mode. |

# Verifying FCCS

To verify FCCS functionality, perform the following step.

### SUMMARY STEPS

1. **show isdn status**

### DETAILED STEPS

**Step 1** **show isdn status**

Use this command to display the status of all ISDN interfaces or a specific ISDN interface.

```
Router# show isdn status

Global ISDN Switchtype = primary-qsig
ISDN Serial1:23 interface
        dsl 0, interface ISDN Switchtype = primary-qsig
         **** Slave side configuration ****
    Layer 1 Status:
        DEACTIVATED
    Layer 2 Status:
        TEI = 0, Ces = 1, SAPI = 0, State = TEI_ASSIGNED
    Layer 3 Status:
        0 Active Layer 3 Call(s)
    Activated dsl 0 CCBs = 0
    The Free Channel Mask: 0x7FFFFF
```

# Additional References

### General ISDN References

- "ISDN Features Roadmap" on page 1—Describes how to access Cisco Feature Navigator; also lists and describes, by Cisco IOS release, ISDN features for that release
- "Overview of ISDN Voice Interfaces" on page 3—Describes relevant underlying technology; lists related documents, standards, MIBs, and RFCs; and describes how to obtain technical assistance
- "Additional References" section on page 64—Lists additional ISDN references