



Non-Facility Associated Signaling (NFAS)

This chapter describes the Non-Facility Associated Signaling (NFAS) option available for system ISDN call processing. The following topics are discussed:

- Overview of NFAS capabilities
- NFAS system administration screens—NFAS Group Summary and NFAS Configuration
- Additional general NFAS system administration support
- Implementation strategies and considerations

The functions and screens described in this chapter can only be used when the NFAS option is installed on the system. Installation instructions for the NFAS option are discussed in the “ISDN PRI and ISDN NFAS Installation” section on page 1-3.

NFAS Overview

Standard T1 ISDN PRI consists of 24 channels—where a single signaling channel (D-channel) controls the remaining 23 bearer channels (B-channels) on the interface. In system terms, this means ports 1 through 23 on the ICC ISDN span (B-channels) are controlled by port 24 (D-channel). The NFAS option extends D-channel control to B-channels not resident on the same interface. This allows a single D-channel to control up to 20 interfaces (a maximum of 479 B-channels, or a maximum of 478 with one B-channel as a backup).

The NFAS option does not support all ICC ISDN span types. Table 5-1 lists the ICC ISDN span types and indicates their level of NFAS support.

Table 5-1 NFAS Support for ICC ISDN Span Types

Span Type	NFAS Support?
ICC-T1 PRI/4ESS	Yes
ICC-T1 PRI/5ESS	Yes
ICC-T1 PRI/NI-2	Yes
ICC-T1 PRI/NTI	Yes
ICC-T1 PRI/NTT	No
ICC-E1 PRI/NET5	No
ICC-E1 PRI/TS014	No
ICC-E1 PRI/QSIG	No

The following features are supported for NFAS operation:

- 23B+D ICC ISDN spans—ICC ISDN spans can be defined in the system database as 23B+D spans containing the primary D-channel or backup D-channel (optional) for the NFAS group. The B-channels support 64 KB clear channel interfaces.
- ICC T1 voice channels—ICC T1 channels can be configured as NFAS B-channels within an NFAS group. These ICC T1 channels can interface to 56 KB channels suitable for voice traffic only. ICC T1 spans used as ICC T1/NFAS trunk spans support all configurations available in the ICC ISDN Span Configuration system administration utility.
- Optional D-channel backup—The D-channel on an ICC ISDN span can be designated as a backup to assume control in the event of a primary D-channel failure or network/manual switchover. Switchovers between primary and backup D-channels are performed automatically by the system in response to network events or commands, and can also be initiated manually by the system administrator.

A single system can simultaneously support both standard 23B+D ICC ISDN spans and the NFAS operation.

NFAS Channel Grouping

ICC ISDN spans and ICC T1 spans are assigned to NFAS groups using the system administration functions. Two screens are provided for NFAS configuration—the NFAS Group Summary screen and the NFAS Configuration screen. Each NFAS group consists of an interface containing the primary D-channel and up to 19 additional interfaces (supporting a maximum of 479 B-channels). Up to 37 NFAS groups can be configured, each with a separate primary D-channel. An optional backup D-channel can also be configured for each group (supporting a maximum of 478 B-channels, with one B-channel as a backup).

Instructions for using the NFAS administration screens are provided in the “NFAS System Administration” section on page 5-3.

D-Channel Redundancy

Users have the option of designating a backup D-channel (usually called the D2 channel) for each NFAS group. This allows one D-channel to be active (controlling the NFAS group) while another standby D-channel is available should a D-channel switchover occur. The following conditions can cause a D-channel switchover:

- The primary D-channel data link fails due to circumstances outside the system (the ICC ISDN span line is physically severed, the far-end connected equipment stops transmitting on the D-channel, etc.).
- The ICC ISDN span containing the primary D-channel is deleted from the system database.
- Loss of carrier or out of frame (OOF) event.
- Manual switchover initiated by the system administrator.

If a backup D-channel is defined for the group, all stable calls are maintained when control is passed to the standby D-channel. The standby D-channel transitions from the standby (STBY) state to the in service (IS) state, while the active D-channel transitions from IS to the maintenance busy (MB) state and then to the out of service (OOS) state.

**Note**

To ensure D-channel redundancy, the ISDN interfaces must be provisioned identically at both the system and the network ends. The ICC ISDN span containing the primary D-channel must be connected to the primary (D1) line, while the ICC ISDN span containing the backup D-channel must be connected to the backup (D2) line for the initial contacts and channel switchovers to occur properly.

When a D-channel switchover occurs, a 40-second system timer (T321) is started. If the standby D-channel transitions to IS before the timer expires, all stable calls are maintained and the timer is cancelled. During the switchover, calls that are not stable are cleared by the system. The system then sends an ISDN Port Change of State (\$EA) report to the host for each call cleared. If the timer expires (switchover occurred but was not successful), all calls are cleared. The system generates a System Card Status (\$D9) report for each interface span in the group.

Manual D-channel switchovers are also possible. You can use a command field on the NFAS Configuration screen to force the standby D-channel to assume control of the NFAS group selected. A manual switchover has the same effect on ISDN calls in progress as an automatic switchover.

Refer to Appendix A, “Valid Information Elements for I FLD and D FLD Action Tokens,” for descriptions of D-channel state processing on the primary and backup D-channels during channel initialization and switchovers. The NFAS option follows network requirements for backup D-channel service as discussed in Annex F of the *AT&T Integrated Services Digital Network (ISDN) Primary Rate Interface Specification* (TR 41449) and Appendix F of the *ISDN Primary Rate User-Network Interface Specification* (NIS A211-1). Refer to these publications for more information on switchover timing and D-channel state transitions.

NFAS System Administration

NFAS is defined and configured for your system through the use of two system administration screens—the NFAS Group Summary screen and the NFAS Configuration screen.

NFAS Group Summary Screen

The NFAS Group Summary screen allows you to perform the following functions:

- View a listing of NFAS groups and the number of B-channels in each group.
- Name an NFAS group.
- Access the NFAS Configuration screen.

Up to 37 NFAS groups can be configured for the system from this screen.

To access the NFAS Group Summary screen (see Figure 5-1) from the Database Administration menu, type **L** and press **Enter**. The cursor is located in the first Name field.

Figure 5-1 NFAS Group Summary Screen

N F A S G R O U P S U M M A R Y											
No.	Name	Count	Dsp	No.	Name	Count	Dsp	No.	Name	Count	Dsp
1	_____	-	-	14	_____	-	-	27	_____	-	-
2	_____	-	-	15	_____	-	-	28	_____	-	-
3	_____	-	-	16	_____	-	-	29	_____	-	-
4	_____	-	-	17	_____	-	-	30	_____	-	-
5	_____	-	-	18	_____	-	-	31	_____	-	-
6	_____	-	-	19	_____	-	-	32	_____	-	-
7	_____	-	-	20	_____	-	-	33	_____	-	-
8	_____	-	-	21	_____	-	-	34	_____	-	-
9	_____	-	-	22	_____	-	-	35	_____	-	-
10	_____	-	-	23	_____	-	-	36	_____	-	-
11	_____	-	-	24	_____	-	-	37	_____	-	-
12	_____	-	-	25	_____	-	-				
13	_____	-	-	26	_____	-	-				

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The NFAS Group Summary screen consists of one screen. Press **Tab** and **<** to move between Name fields. Press **Next Field** and **Prev Field** to move between the Name and Dsp fields. Press **Print Screen** to obtain a hard copy of any screen.

NFAS Group Summary Screen Field Definitions

The NFAS Group Summary screen has the following fields:

No.—*Display only*. Indicates the number of the NFAS group. Possible values for this field range between 1 and 37.

Name—*Data entry via main keyboard*. Optional entry that determines the name of the NFAS group. This field accepts up to eight alphanumeric characters, either upper- and/or lowercase.

Count—*Display only*. Indicates the number of B-channels currently in this NFAS group. The number is updated when changes are made to the group via the NFAS Configuration screens. The value for this field can be a number between 0 and 479 (or between 0 and 478 with a backup D-channel span).

Dsp—*Data entry via main keyboard, access to another screen(s)*. Display group—provides access to the NFAS Configuration screens. Any character on the main keyboard is valid for entry. Refer to the “Changing NFAS Group Summary Screen Field Parameters” section on page 5-4 for instructions on using this field.

Changing NFAS Group Summary Screen Field Parameters

You can change the **Name** field for each group by using the NFAS Group Summary screen. To change this field, complete the following steps:

-
- Step 1** Access the NFAS Group Summary screen. The cursor is located in the Name field of the first group.
 - Step 2** Type the **Name** information, then press **Next Field**. The cursor moves to the Dsp field.

- Step 3** To assign a name to another NFAS group, press **Next Field** and repeat Step 2. Use **Tab** and < to move between Name fields.
- Step 4** When all changes have been made, press **Enter**. The following message is displayed:
- ```
Press ENTER To Update Group Names
```
- Step 5** Press **Enter**. The following message is displayed, and the database is automatically updated.
- ```
NFAS Group Name(s) Updated
```
- Step 6** To display or edit an NFAS group configuration, use the **Next Field** and **Prev Field** keys to position the cursor in the Dsp field corresponding to that group, type any character and press **Enter** (the NFAS Configuration screen is described in the “NFAS Configuration Screen” section on page 5-5). If no further NFAS group changes are to be made, press **Exit** or **Prev Menu** to return to the Database Administration menu.
- To leave the NFAS Group Summary screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.
-

Accessing Other Menus and Screens from the NFAS Group Summary Screen

You can access the following screens from the NFAS Group Summary Screen:

- Main menu—Press the **Main Menu** key.
- Database Administration menu—Press the **Prev Menu** key.

To access the NFAS Configuration screen, complete the following steps:

-
- Step 1** Use the **Prev Field**, **Next Field**, **Tab** or < key to position the cursor in the Dsp field corresponding to the NFAS group you want to edit or display.
- Step 2** Type any character and press **Enter**.
-

NFAS Configuration Screen

Use the NFAS Configuration screen to create NFAS groups. An NFAS group consists of one or two ICC ISDN spans—the primary span and the backup span. The D-channel on the active span, primary or backup, receives the call control messages for the entire NFAS group. All other interfaces in the NFAS group are ICC T1 spans. Each group consists of the following components:

- A group name and number.
- The rack, level, slot (RLS) address of the primary D-channel.
- The RLS address of the backup D-channel (optional).
- The RLS address of each primary ICC ISDN span and/or backup ICC ISDN span, and all ICC T1 spans assigned to the group.

NFAS Group Configuration Rules

The following configuration rules apply to NFAS groups:

- In order to be added to an NFAS group, ICC ISDN span(s) and ICC T1 spans must have been added to the database (via the Card Maintenance screen) and configured (via the ICC ISDN Span Configuration screen or the ICC Programmable Trunk Configuration screen).
- ICC ISDN spans and ICC T1 spans must be out of service (OOS) when added to an NFAS group.
- Spans containing the primary and backup (if defined) D-channels must be added to the NFAS group.
- Up to 20 spans can be assigned to an NFAS group, including the spans containing the primary and backup D-channels.
- Each span can reside in only one NFAS group.

The NFAS Configuration screen is shown in Figure 5-2. The cursor is located in the Primary D-channel RLS field.

Figure 5-2 NFAS Configuration Screen

```

      N F A S   C O N F I G U R A T I O N

Group __ of __                               Group Name: _____

Primary D-channel RLS: _ _ _ _              State: _____
Backup  D-channel RLS: _ _ _ _              State: _____ Cmd: _____

Interface  R L S      Status  D      Interface  R L S      Status  D
  0         _ _ _ _    _ _ _ _  -      10         _ _ _ _    _ _ _ _  -
  1         _ _ _ _    _ _ _ _  -      11         _ _ _ _    _ _ _ _  -
  2         _ _ _ _    _ _ _ _  -      12         _ _ _ _    _ _ _ _  -
  3         _ _ _ _    _ _ _ _  -      13         _ _ _ _    _ _ _ _  -
  4         _ _ _ _    _ _ _ _  -      14         _ _ _ _    _ _ _ _  -
  5         _ _ _ _    _ _ _ _  -      15         _ _ _ _    _ _ _ _  -
  6         _ _ _ _    _ _ _ _  -      16         _ _ _ _    _ _ _ _  -
  7         _ _ _ _    _ _ _ _  -      17         _ _ _ _    _ _ _ _  -
  8         _ _ _ _    _ _ _ _  -      18         _ _ _ _    _ _ _ _  -
  9         _ _ _ _    _ _ _ _  -      19         _ _ _ _    _ _ _ _  -

```

The NFAS Configuration screen consists of a single screen.

Press **Prev Field** and **Next Field** keys to move between fields for an interface, and from the last field for an interface to the first field for the next interface. Press **Tab** and **<** to move between interface R L S fields. Press **Prev Screen** and **Next Screen** to move through the NFAS Group displays. Press **Print Screen** to obtain a hard copy of this screen.

NFAS Configuration Screen Field Definitions

The NFAS Configuration screen contains the following fields:

Group__of__—*Display only*. Indicates the number of the NFAS group currently displayed. Interpret this field as: Group n of 37, where n is a numerical value in the range from 1 to 37.

Group Name—*Display only*. Indicates the name assigned to the currently displayed NFAS group. This field can be changed using the NFAS Group Summary screen, and can contain up to eight alphanumeric characters, upper- and/or lowercase.

Primary D-channel RLS—*Data entry via main keypad*. Indicates the rack, level, slot (RLS) address of the span which contains the D-channel designated as the primary control channel for the currently displayed NFAS group. Refer to the “ISDN Primary Rate Interface Package” section on page 1-1 for span location conventions.



Note

An ICC ISDN span RLS address must be entered in this field for the NFAS group to function. This span must be configured as a 23B+D PRI.

State—*Display only*. This field indicates the current state of the primary D-channel. With the exception of the manual out of service (MOOS) state, the state transitions are controlled by link signaling between the system and the network interface and cannot be set via system administration. Possible values for this field are listed in Table 5-2.

Table 5-2 Primary and Backup D-Channel States

Value	D-Channel State
IS	In service
STBY	Standby
MB	Maintenance busy (transitioning to OOS)
WAIT	Wait (transitioning to IS)
MOOS	Manual out of service
OOS	Out of service

Backup D-channel RLS—*Data entry via main keyboard*. Optional entry that indicates the rack, level, slot (RLS) address of the span which contains the D-channel designated as the backup control channel for the currently displayed NFAS group. Refer to the *Cisco VCO/4K System Administrator's Guide* for span location conventions.

State—*Display only*. This State field indicates the current state of the backup D-channel. Possible values for this for this field are listed in Table 5-2.

Cmd—*Data entry via Select key*. Allows the user to change the state of the backup D-channel using one of three commands, listed in Table 5-3. Use this field to perform a manual switchover between the primary and backup D-channels, and to place the primary or backup D-channel into and out of the manual out of service (MOOS) state.



Note

The command selections available to the user depend upon the current state of the standby D-channel. For example, if the D-channel is currently in MOOS state, the only selection available is ACTIVATE.

Table 5-3 *Cmd Field Commands and Resulting Backup D-channel State Changes*

Command	Change in Backup D-Channel State
MOOS	Places the D-channel currently in STBY state into the manual out of service state regardless of its current state. The D-channel remains in MOOS state until you enter an ACTIVATE command.
ACTIVATE	Places the D-channel in out of service (OOS) state. This command allows you to transition D-channels from MOOS to OOS.
SWITCH	Causes a manual D-channel switchover; the standby D-channel becomes in service (IS) and assumes control of the NFAS group. This command is only valid when a backup D-channel is specified for the group. The standby D-channel must be in STBY state for the switchover to take place.

Interface—*Display only*. Specifies the interface number of the ICC ISDN span or the ICC T1 span being added to the NFAS group. Up to 20 interfaces, including those containing the primary and backup D-channels, are listed for each NFAS group. Corresponding R L S, Status, and D fields are listed for each interface. The interface number must correspond to the provisioning of the interfaces at the far-end connection.

R L S—*Data entry via main keyboard*. Indicates the rack, level, slot (RLS) address of the span. Refer to the *Cisco VCO/4K System Administrator's Guide* for the span location conventions.

**Note**

The primary D-channel and optional backup D-channel (if defined) must be entered in the Interface RLS fields for the NFAS group.

Status—*Display only*. Indicates the current status of the ICC ISDN spans and ICC T1 spans. This field can be changed using the Card Maintenance screens. Possible values for this field are listed in Table 5-4.

Table 5-4 *Status Field States and Associated Meanings for ICC ISDN Spans and ICC T1 Spans*

State	ICC ISDN Span Status Meaning	ICC T1 Span Status Meaning
ACTIVE	All signal alarms are clear. B-channels (ports) on this span can be involved in active calls and can be allocated to new calls.	
OOS (out of service)	No B-channels (ports) can be involved in active calls; no ports are allocated to new calls.	
MAINT (maintenance)	D-channel may be disabled and an alarm condition may exist. If the span was placed into maintenance using the Card Maintenance screen, the D-channel is still active. One or more B-channels (ports) on this span may be involved in active calls; no ports are allocated to new calls. The span enters this state automatically upon system reset, when the D-channel releases, or for a signal alarm. When the condition clears, the span transitions back to the active state.	The span may have been placed into maintenance using the Card Maintenance screen. One or more B-channels (ports) on this span may be involved in active calls; no ports are allocated to new calls. The span enters this state automatically upon system reset or for a signal alarm. When the condition clears, the span transitions back to active state.

Table 5-4 Status Field States and Associated Meanings for ICC ISDN Spans and ICC T1 Spans (continued)

State	ICC ISDN Span Status Meaning	ICC T1 Span Status Meaning
DIAG (diagnostic)	D-channel is disabled. No B-channels (ports) on this NFAS group are involved in calls or allocated to new calls. Span is in local loopback and sending all 1s (ones).	No B-channels (ports) on this NFAS group are involved in calls or allocated to new calls. Span is in local loopback and sending all 1s (ones).
REMOTE (remote loopback)	D-channel is disabled. No B-channels (ports) on this NFAS group are involved in calls or allocated to new calls. Span is in local and remote loopback.	—

D—Data entry via main keyboard, access to another screen. Depending on the span type, provides access to the appropriate ICC ISDN Span Configuration screen or the ICC Programmable Trunk Configuration screen. Any character is valid for entry.

Specifying RLS Addresses

To specify the RLS address of an interface in an NFAS group, complete the following steps:

-
- Step 1** Position the cursor in the R field. Type the single-digit rack/cabinet number (either 1 or 2) and press **Next Field**. The cursor moves to the L field.
 - Step 2** Type the single-digit level number (0, 1, or 2) and press **Next Field**. The cursor moves to the S field.
 - Step 3** Type the one- or two-digit slot number (2 through 21).
-

Refer to the *Cisco VCO/4K System Administrator's Guide* for span location conventions.

Adding Interfaces to an NFAS Group

Create an NFAS group by adding interfaces to it and specifying a primary (required) and backup (optional) D-channel. All spans that are to be added to the group must be taken out of service prior to their addition to the group. For other NFAS grouping conventions, refer to the preceding sections.

To add an interface or span(s) to an NFAS group, complete the following steps:

-
- Step 1** Display the NFAS Configuration screen for the group to which you want to add interfaces(s) (refer to the “NFAS Configuration Screen” section on page 5-5). The cursor is located in the Primary D-channel RLS field.
 - Step 2** Change or define the primary D-channel interface as follows:
 - If a primary D-channel interface has already been defined and does not need to be changed, press **Tab**. The cursor moves to the Backup D-channel RLS field.
 - To define or change the primary D-channel interface, type the RLS address of the span that contains the primary D-channel and press **Next Field**. The cursor moves to the Backup D-channel RLS field.
 - Step 3** Change or define the backup D-channel as follows:

- If no backup D-channel is being defined, press **Tab**. The cursor moves to the R field for the first interface.
- To define or change the backup D-channel interface, type the RLS address of the span that contains the backup D-channel and press **Next Field**. The cursor moves to the R L S field for the first interface in the group.

- Step 4** Use the **Tab** key to position the cursor in the R L S field for the interface to be added or changed.
- Step 5** Type the RLS address of the interface. Refer to the “Specifying RLS Addresses” section on page 5-9.
- Step 6** Repeat Step 4 and Step 5 for each interface you want to add or change.
- Step 7** Press **Enter**. The database is automatically updated and the cursor moves to the Group field.
- Step 8** Repeat Step 2 through Step 7 for all NFAS groups you want to change.

**Note**

Before leaving the NFAS Group Configuration screen, verify that a primary D-channel span is defined in the Primary D-channel RLS and Interface R L S fields. If a backup D-channel is defined, verify that its RLS address is also entered in both the Backup D-channel RLS and Interface R L S fields.

- Step 9** Press **Exit** to return to the NFAS Group Summary screen.
- To leave the NFAS Configuration screen without making any changes, press **Exit**, **Prev Menu**, or **Main Menu**. No changes are made to the database unless you press **Enter**.
-

Deleting Interfaces from an NFAS Group

To delete one or more interfaces from an NFAS group, follow these steps:

-
- Step 1** Display the NFAS Configuration screen for the group from which you want to delete interfaces (refer to the “NFAS Configuration Screen” section on page 5-5. The cursor is located in the Primary D-channel RLS field.
- Step 2** Use the **Tab** key to position the cursor in the R L S field for the interface to be deleted.
- Step 3** Using the space bar, space over the address of the interface, leaving the fields blank.
- Step 4** Repeat Step 2 and Step 3 for each interface you want to delete.
- Step 5** Press **Enter**. The database is automatically updated and the cursor moves to the Group field.
- Step 6** Repeat Step 2 through Step 5 for all NFAS groups you want to change.
- Step 7** Press **Exit** to return to the NFAS Group Summary screen.
-

Changing D-Channel States

Change the state of the standby D-channel or cause a manual switchover between the D-channels, by completing the following steps:

-
- Step 1** Display the NFAS Configuration screen for the group from which you want to modify the standby D-channel state (refer to the “NFAS Configuration Screen” section on page 5-5). The cursor is located in the Primary D-channel RLS field.
- Step 2** Press the **Tab** key twice to position the cursor in the Cmd field.
- Step 3** Use the **Select** and **Reverse Select** keys to step through the values until the correct command (MOOS, ACTIVATE or SWITCH) is shown.
- Step 4** Press **Enter**. The following message appears:
- ```
Press ENTER To Submit Command
```
- Step 5** Press **Enter** again to submit the command. The display is updated to show the changes to the D-channel state(s), and the following message appears:
- ```
NFAS Configuration Updated
```
- Step 6** Repeat Step 2 through Step 5 for all NFAS groups you want to change.
- Step 7** Press **Exit** to return to the NFAS Group Summary screen.
-

Accessing Other Menus and Screens from the NFAS Configuration Screen

You can access the following screens from the NFAS Configuration screen:

- Main menu—Press the **Main Menu** key.
- Database Administration menu—Press the **Prev Menu** key.

To access either the ICC ISDN Span Configuration screen, or the Trunk Card Configuration screen, for a particular interface, complete the following steps:

-
- Step 1** Use the **Prev Field**, **Next Field**, **Tab**, or < key to position the cursor in the Dsp field which corresponds to the interface you want to edit or display.
- Step 2** Type any character and press **Enter**.
-

Additional NFAS System Administration Support

In addition to the NFAS Group Summary screen and NFAS Group Configuration screen, other system administration screens support NFAS. These screens, and their features, are listed below.

NFAS system administration is also supported by system status messages, which are described in the *Cisco VCO/4K System Messages*.

Card Summary Screen

The Card Summary screen identifies ICC ISDN span and ICC T1 spans assigned to NFAS groups in the following ways:

- ICC T1 spans appear as ICC T1/NFAS Trunk type spans.
- ICC ISDN spans containing the primary D-channel appear as ICC T1-PRI/Primary.
- ICC ISDN spans containing the backup D-channel appear as ICC T1-PRI/Backup.

Refer to the *Cisco VCO/4K System Administrator's Guide* for further information on the Card Summary screen.

Card Maintenance Screen

The Card Maintenance screen identifies ICC ISDN span and ICC T1 spans assigned to NFAS groups in the following ways:

- ICC T1 spans appear as ICC T1/NFAS Trunk type spans.
- ICC ISDN spans containing the primary D-channel appear as ICC T1-PRI/Primary.
- ICC ISDN spans containing the backup D-channel appear as ICC T1-PRI/Backup.



Note

If the ICC ISDN span containing the primary D-channel for an NFAS group is deleted using the Card Maintenance screen and no backup D-channel is defined, the configuration for that NFAS group is deleted from the database. The interface spans associated with that group remain listed in the database span table; however, the NFAS group configuration is lost (group name and interface listing is deleted). If a backup D-channel is defined for the group and the ICC ISDN span containing the primary D-channel is deleted, only the primary D-channel setting is removed from the group configuration; all other settings (interfaces and backup D-channel) remain.

Refer to Chapter 2, “System Administration Support,” of this manual and the *Cisco VCO/4K System Administrator's Guide* for more information on ISDN NFAS system administration support.

ICC ISDN Span Configuration Screen

The Type field on the ICC ISDN Span Configuration screen displays ICC ISDN spans containing the primary D-channel as ICC T1-PRI/Primary, while the span containing the backup D-channel is designated as ICC T1-PRI/Backup.

The ICC ISDN Span Configuration screen can be accessed from both the Card Summary screen and the NFAS Group Configuration screen.

Refer to Chapter 2, “System Administration Support,” for further information on the ICC ISDN Span Configuration screen.

ICC Programmable Trunk Configuration Screen

The ICC Programmable Trunk Configuration screen (see Figure 5-3) allows you to configure ICC T1 spans to NFAS groups as ICC T1/NFAS Trunk type spans.

Figure 5-3 ICC Programmable Trunk Configuration Screen

ICC PROGRAMMABLE TRUNK CONFIGURATION							
SPAN LOCATION:		R,L,S 1 1 15-4-1		STATUS:		Out of Service	
CARD TYPE:		ICC T1/NFAS Trunk		SPAN TYPE:		SF CODE: AMI	
TXGAIN: Obd		TXCLK: SCLK		SLIP: 255		ALM: A03 LENG: 0-133	
RXGAIN: Obd		RFCLK: LOOP		OOF: 17			
PORT	TRUNK NAME	GROUP	GROUP NAME	SIG. TYPE	INPULSE RULE	COS	LAW
1				Clear	0	2	Mu
2				Clear	0	2	Mu
3				Clear	0	2	Mu
4				Clear	0	2	Mu
5				Clear	0	2	Mu
6				Clear	0	2	Mu
7				Clear	0	2	Mu
8				Clear	0	2	Mu

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ICC Programmable Trunk Configuration Screen Field Definitions—NFAS Specific

Two fields in the ICC Programmable Trunk Configuration screen are specific to NFAS groups—ALM and SIG. TYPE. These two fields are displayed in the ICC Programmable Trunk Configuration screen only when NFAS groups have been defined. The fields are described in detail below.

ALM—*Data entry via Select or Rev Select keys.* The ALM field refers to the alarm specification file which determines how the VCO system responds to ICC alarms. The default value is **SYS**, with an additional selectable value of A03, the recommended value for NFAS groups. You must configure the ALM field, which invokes the alarm specification file, to A03 for NFAS groups.

SIG. TYPE—*Data entry via Select or Rev Select, and Enter keys.* The SIG. TYPE field determines the signal type in use for the ICC span. Possible values, and their meanings, are as follows:

- E&M—Default value.
- E&M01—Select for ICC-T1/E&M detection of wink_A/B = 1/0 support.
- E&M02—Select for inverted E&M (China pulse on idle) support.
- Clear—Select for NFAS groups.

After you have selected and entered the first port's signal type, **Clear**, the system software displays the following message at the bottom of your screen:

Enter Y to Propagate port 1 values

Press any key to propagate the **Clear** value to all remaining ports.

Refer to the *Cisco VCO/4K System Administrator's Guide* for further information on the ICC Programmable Trunk Configuration screen.

NFAS Implementation Strategies and Considerations

The following guidelines assist application designers develop ISDN NFAS applications that make the most efficient use of the system. These are guidelines only, and should not preclude other application design approaches. The guidelines are described in the following sections.

General Sequence for Defining NFAS Resources in the System Database

Once NFAS resources (ICC ISDN span and ICC T1 span) are physically inserted in the system equipment frame, use the following steps to add these resources into the system database:

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- Step 1** Add the ICC ISDN span and ICC T1 spans into the database via the Card Maintenance utility; the spans must be left in the out of service (OOS) mode.
 - Step 2** Access the ICC ISDN Span Configuration screen through the Card Summary screen and define the operating parameters for the ICC ISDN span. Refer to the “Card Summary Screen” section on page 5-12.
 - Step 3** Access the ICC Programmable Trunk Configuration screen through the Card Summary screen and define the operating parameters for the ICC T1 spans. The COS must be defined for each T1 port, but the default impulse rule is not required. Refer to the “ICC Programmable Trunk Configuration Screen” section on page 5-13.
 - Step 4** Create an NFAS group using the NFAS Group Summary screen.
 - Step 5** Access the NFAS Group Configuration screen through the NFAS Group Summary screen and add all ICC ISDN span and ICC T1 spans to the interface listing.
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Provisioning Primary and Backup D-Channels

To ensure D-channel redundancy, the PRI interfaces must be provisioned identically at both the system and network end. The ICC ISDN span containing the primary D-channel must be connected to the primary (D1) line, while the ICC ISDN span containing the backup D-channel must be connected to the backup (D2) line for the initial contacts and channel switchovers to occur properly. The interface numbering scheme on the NFAS Group Configuration screen can be used for this purpose.

Backup D-channel Configuration

Users may configure different default impulse rules for the backup D-channel than those set for the primary D-channel. To ensure consistent operation following a switchover, the default impulse rule for the primary and backup D-channels should be the same.

ICC T1 Channel Usage

ICC T1 spans used as NFAS B-channels can interface to 56-KB channels, but actually only support 48-KB transmissions. These channels are suitable for voice traffic only and cannot be used for data. Use ICC ISDN span B-channels for data transmissions.

Host Commands During D-Channel Switchover

During a D-channel switchover, some host commands cannot be processed properly because of the slight delay before the backup D-channel is available. These commands are returned with a network status byte of \$3D to indicate that the D-channel is not available. Disconnect commands from the host, however, are processed and queued, waiting for the switchover to complete. These commands appear to process normally to the host.

