Dual T1/PRI

Network Application Card
Product Reference

Part No. 1.024.1367-01
Version Number 3.1

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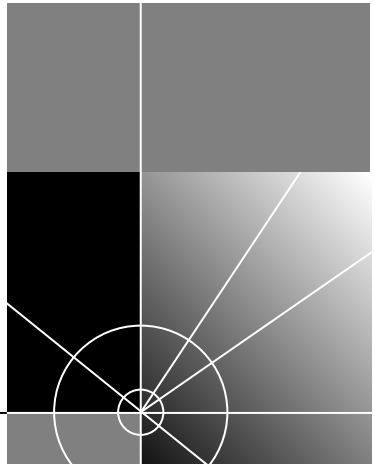

http://www.3com.com/

Part No. 1.024.1367-01

3Com Corporation
5400 Bayfront Plaza
Santa Clara, California
95052-8145

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ABOUT THIS REFERENCE

About This Reference provides an overview of this reference, tells where to look for specific information and how to contact 3Com, and lists document conventions.

This reference describes how to configure the Dual T1/PRI via its user interface (UI) console.

This reference is intended for a network engineer or a network technician. It is assumed that the user of this documentation will possess a working knowledge of LAN and WAN technologies.

If the information in the release notes shipped with your product differs from the information in this reference, follow the instructions in the release notes.

Finding Specific Information in This Reference

This table shows the location of specific information in this reference.

If you are looking for	Turn to
A List of Supported Features	Chapter 1
Configuration Information	Chapter 2
Maintenance Information	Chapter 3
Status Displays	Chapter 4

Conventions

This table lists conventions used throughout this reference.

Icon	Notice Type	Description
	Information note	Information that contains important features or instructions.
	Caution	Information to alert you to potential damage to a program, system, or device.
	Warning	Information to alert you to potential personal injury or fatality. May also alert you to potential electrical hazard.
	ESD	Information to alert you to take proper grounding precautions before handling a product.

Contacting 3Com

Call the appropriate number listed below for technical support.

- If you are calling from the United States or Canada

  Dial 1.800.231.8770

- If you are calling from Europe, Middle East, or Africa

  Dial +353.1.823.7700 (+ represents your international carrier code and 353 represents the Ireland country code, where 3Com International Customer Services is located)

- If you are calling from all other locations

  Dial (your international carrier code) 847.797.6600

Refer to the Total Control Hub Documentation CD-ROM for more information regarding product warranty.

For information about Customer Service, including support, training, code releases and updates, contracts, and documentation, visit our website at ***http://totalservice.usr.com***

1 OVERVIEW

This chapter contains an overview of supported features and instructions for accessing the Dual T1/PRI Network Application Card (NAC) through the user interface (UI) console.

Supported Features

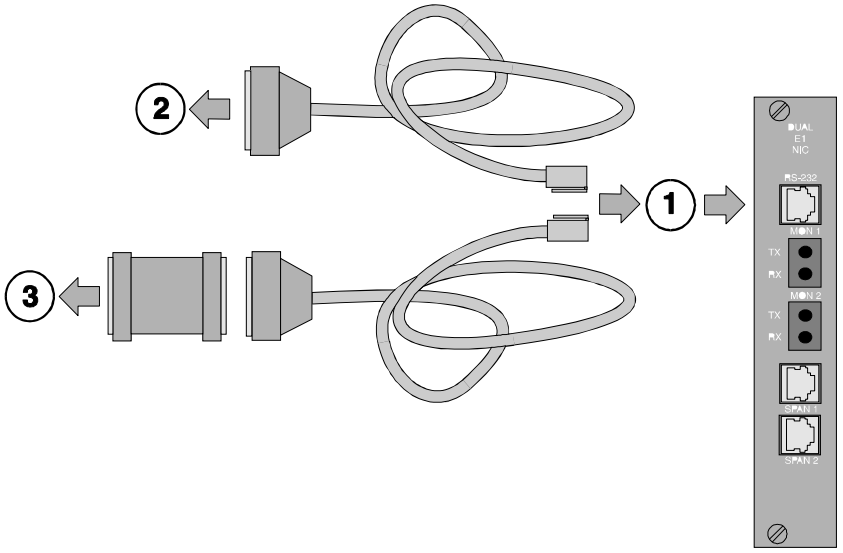
These features are supported in this release:

- RFC-1406 (Definitions of Managed Objects for the DS1 and E1 Interface Types) Error Counters—UAS, CCS, and SEFS
- Increased Number of Modem Pools—from 4 to 12

Accessing the User Interface

To access the Dual T1/PRI NAC's UI console, connect the following cables to the corresponding Network Interface Card (NIC) RS-232 port.

This port's baud rate is defined by DIP switch settings on the Dual T1/PRI NAC. Refer to the NAC's Getting Started Guide for more information.



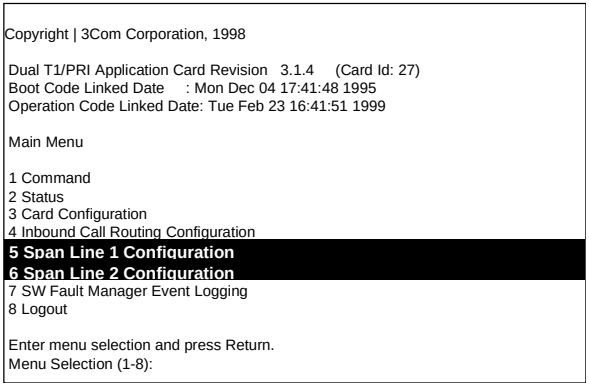
Callout #	Description
1	RJ-45 connector to NIC's RS-232 port
2	DB-25 male connector to modem for remote operations
3	DB-25 female-to-female null modem adapter to PC or terminal

2 DUAL T1/PRI CONFIGURATION

This chapter provides configuration information for span lines 1 and 2, inbound call routing, software fault event logging, and the card.

Configuring Span Lines 1 and 2

Configure span lines 1 and 2 by selecting options 5 and 6 from the user interface (UI) console's main menu.



The UI console menu options for configuring both spans are identical. Selecting options 5 or 6 from the main menu produces this screen for that span:

```
Span Line 1 Configuration        Current Setting
 1  Framing Mode                   ESF
 2  Line Coding                   B8ZS
 3  Remote Loopback                Ignore
 4  Jitter Attenuation             Transmitter
 5  Transmit Line Build Out        0.0 fN
 6  Switch Type (Boot time)        Config=5ESS(AT&T)Act.=5ESS (AT&T)
 7  Idle Byte Sent to TELCO          FE Hex
 8  DSO to Modem Slot/Chan Mapping
 9  Signaling Channel Config (Boot time)  Config=D-channel Act.=D-channel
10  Interface ID                   0
11  Span Level Call Type Blocking      No Call Blocked
12  Span Level Cause Codes
13  DS0 Level Call Type Blocking
14  DS0 Level Service State
15  Short Haul NIC Line Length       Not Applicable
16  Use ALERTING Response          NO
(NOTE: Changing configuration parameters may affect calls in progress.)

 Enter menu selection and press Return or press Esc to exit.
 Menu Selection (1-16):
```

Menu Option 1 Configuring the span line's framing mode

The framing mode selects the T1 format.

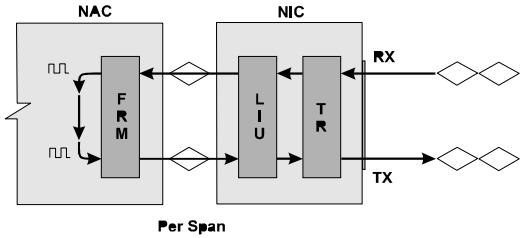
Menu Option 2 Configuring the span line's line coding

Line coding dictates how the data stream is encoded on the span line.

Menu Option 3 Responding to a span line remote (framer) loopback

Performing a framer loopback is one method of performing enhanced trouble clearing. The NAC is put in a "waiting" state for the Telco's loopback (loop-up/loop-down) signal if configured to respond. Various network nodes can be put into loopback in order to isolate "trouble spots" in the network.

This diagram represents this process.



◇ Encoded HDB3 Signal

⎍ Bit Stream

FRM Framer Circuitry

LIU Line Interface Unit

TR Transformer

Configure the NAC framer to respond or ignore the loop-up/loop-down pattern from the Telco.

Menu Option 4 Configuring the span line's jitter attenuation

Jitter attenuation on the span line enhances the network interface card (NIC) tolerance to jitter. The NIC's hardware provides a 193-bit frame buffer to compensate for low frequency jitter on the network.

This option allows you to attenuate jitter on the receiving (from switch to you) and the transmitting (from you to switch) sides. It defaults to the attenuate jitter on the transmitting side.

If you are using the Dual Channelized T1 (386) NAC with a Short Haul (DSX-1) NIC, jitter attenuation is only allowed on the receiving side.

Menu Option 5 Configuring the span line's transmit line build out

The span line's transmit line build out is a configurable output attenuation that can be set to satisfy T1 circuit requirements.

There are four attenuation values to choose from:

- 0.0 dB (default)
- 7.5 dB
- 15.0 dB
- 22.5 dB

Menu Option 6 Configuring for the Telco's switch type

In order to receive or place calls to the Telco on the span line, configure the NAC to work with the type of switch the Telco is using.

The following switch types are supported:

- 4ESS (AT&T)
- 5ESS (AT&T)
- DMS 100 (Northern Telecom)
- INS-1500 (NTT)
- NI2

Menu option 6 displays a *configured* and an *actual* value. The configured value represents any configuration changes made, and the actual value represents the switch type the card is currently configured for.

Configuration changes will not take effect until card is rebooted.

Once you reboot, the configured and actual values remain the same until additional changes are made.

Menu Option 7 Configuring the span line's idle bit pattern

The span line's idle bit pattern is an 8-bit pattern placed on any channel not carrying a call.

This pattern is usually dictated by the Telco and is configured at the NIC by entering a 2-digit hexadecimal number at the prompt. The default is FE Hex.

Menu Option 8 Mapping the span line's DS0s to chassis modems

The Total Control chassis contains 17 NAC slots. Two typical chassis configurations are:

- Configuration 1
  - Slot 1: T1/PRI Card
  - Slots 2–16: Quad Modem or Quad I-modem Cards
  - Slot 17: Network Management Card
- Configuration 2
  - Slot 1: T1/PRI Card
  - Slots 2–15: Quad Modem/Quad I-modem Cards
  - Slot 16: NETServer or NETServer PRI Card
  - Slot 17: Network Management Card

Each of the slots populated by a Quad Modem Card contains four modem channels numbered sequentially 1–4 from top to bottom.

This option allows you to map span line time slots to these modem channels.

Use the following syntax when configuring this option:

DS0#:sl#/ch#

Where:

DS0# = DS0 number (1–23)

sl# = Chassis modem slot number (1–16)

ch# = Chassis modem channel number (1–4)

When a modem is moved to a DS0, the DS0 it was associated with prior to the move becomes unmapped.

Menu Option 9 Configuring the span line's signaling channel

If using non-facility associated signaling (NFAS), configure a B- or D-channel for signaling purposes.

Menu Option 10 Configuring the span line's interface ID

If using NFAS, configure the interface ID specified by the Telco with this option.

The default is 0 for non-NFAS.

Menu Option 11 Configuring span level call-type blocking

Span level call-type blocking allows specific types of calls to be rejected when placed on the span.

Configure the call-type blocking feature for one of these:

- All calls (analog and digital) blocked
- Analog calls blocked
- Digital calls blocked
- No calls blocked

Any changes made will take affect on the next call.

Menu Option 12 Configuring span level cause codes

When calls are rejected at the span level, configure a cause code to be transmitted to the Telco.

The following types of cause codes are supported:

Cause Code Type	Default Cause Code Value	Description
A	58	All calls blocked
B	58	Analog calls blocked
C	58	Digital calls blocked
D	58	No modems available
E	58	No gateway available

Use the following syntax when configuring this option:

CCT:CCV

Where:

CCT = Cause code type

CCV = Cause code value (0–127)

Pressing **R** at the prompt resets all codes to the default value of 58.

Configuration changes will take place immediately.

Menu Option 13 Configuring the DS0 level call-type blocking

DS0 level call-type blocking allows specific types of incoming calls to be rejected when placed on the channel or DS0.

Configure the call-type blocking feature for:

- All calls (analog and digital) blocked
- Analog calls blocked
- Digital calls blocked
- No calls blocked

Any changes made will take effect on the next call.

Use the following syntax when configuring this option:

BCT:DS0# (to configure a single DS0)

BCT:DS0#,DS0#,DS#-DS#,... (to configure multiple DS0s or a range of DS0s)

Where:

BCT = blocked call type (A for analog calls, N for none, D for digital, B for both analog and digital.)

DS0# = DS0 number, 1–23 (24 is reserved as the D-channel)

The blocked call-type column has two subheadings: configured and current.

As changes are made to this screen, the configured and current column are updated to reflect the new configuration.

If DS0 call-type blocking commands were issued to the T1/PRI through Total Control Manager software or some other MIB browser, the current column displays the call-type being blocked by the command.

Menu Option 14 Configuring the DS0 level service state

This option allows you to remove or restore a DS0 from/to service. The ability to selectively route calls on specific B-channels are useful for debugging.

Use the following syntax when configuring this option:

DSS: DS0# (for single DS0)

DSS: DS0#, DS0#, DS0#-DS0#,... (for multiple DS0s)

Where:

DSS = DS0 service state (I for In-Service, O for Out-of-Service)

DS0# = DS0 number, 1–23 (24 is reserved as the D-channel)

Menu Option 15 Configuring the Short Haul NIC line length

If you are using a Short Haul NIC in conjunction with the T1/PRI card, it provides a more reliable signal over shorter span line distances. The NIC provides a DSX-1 interface bypassing the need for a CSU.

Configure the Short Haul NIC to handle the following cable lengths:

- 0 – 133 ft.
- 134 – 266 ft.
- 267 – 399 ft.
- 400 – 533 ft.
- 534 – 655 ft.

If there is no Short Haul NIC installed behind the T1/PRI NAC, the main menu's current setting for this option is not applicable.

Menu Option 16 Allowing for ALERTING message in response to SETUP request

When the T1/PRI NAC receives a SETUP request from the TELCO, it typically responds with a CALL_PROCEEDING and CONNECT message. Allowing an ALERTING message replaces the CALL_PROCEEDING message.

Use the ALERTING response message to increase the time-out length (from the Telco's perspective) and allow the network side more time to answer a call.

The ALERTING message is in accordance with the Q.931 standard.

Any changes made will take effect immediately.

Configuring Inbound Call Routing

Configure inbound call routing by selecting option 4 from the UI console's main menu.

```
Copyright | 3Com Corporation, 1998

Dual T1/PRI Application Card Revision   3.1.4     (Card Id: 27)
Boot Code Linked Date     : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999


Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Pressing option 4 at the main menu prompt produces this screen:

```
Inbound Call Routing Configuration
                                    Current
1 Default ISDN-GW Slot:   16
2 Allow Analog Modem Calls:       Disabled
3 Inbound Phone Number Routing Configuration
4 Inbound Phone Number Routing Configuration Status (Entries 1-24)
5 Inbound Phone Number Routing Configuration Status (Entries24-48)
6 Reserved Pool to Inbound Phone Number Assignment
7 Modem/ I-Modem to Reserved Pool Assignment
8 ISDN-GWC to Reserved Pool Assignment
9 Allow ISDN-GWC
Enter menu selection and press Return or press Esc to exit.
```

Menu Option 1 Selecting a Gateway to process digital calls

Digital calls handled by the T1/PRI are passed along to an ISDN-GW (ISDN-Gateway (NETServer PRI)) in the Total Control chassis to be processed. The T1/PRI must be configured as to the location (chassis slot number) of the ISDN-GW it is to communicate with.

The ISDN-GW is located in slots 1–16 of the Total Control chassis. If no Gateway is installed, enter **N** at the prompt.

Menu Option 2 Allowing modem analog calls

Enabling this option allows the chassis to accept incoming analog modem calls and route them appropriately.

Menu Option 3 — Configuring inbound call routing

Configure inbound phone numbers assigned to a span line for a specific call type, analog or digital, for routing purposes.

In order to route analog calls, the card must be configured to accept analog in menu option 2.

Use the following syntax to assign a call type to an inbound phone number:

PHIDX#:ph=PH#,ct=x

Where:

PHIDX# = phone number index (1–48)

ph = keyword for specifying the phone number

PH# = numeric phone number (up to 18 numeric characters including (), -, #, and *)

ct = keyword for call type (A for analog, D for digital)

To remove call routing assignments, use this syntax:

PHIDX#:rmv (for removing a phone number; set the call type for this index to digital (default))

PHIDX#:ph=rmv (for removing a phone number from the specified index)

Where:

PHIDX# = phone number index (1–48)

rmv = keyword for removing a phone number from its corresponding phone number index

ph = keyword for specifying the phone number

Menu Options 4 and 5 — Checking the inbound call routing configuration status

The T1/PRI allows for 48 phone number indices to be configured for both span lines. View the configuration status of phone number indices 1–24 using menu option 4 and indices 25–48 using option 5.

The # column represents the phone number index, the phone number column displays the inbound phone number assigned to the specific index, and the CT column displays what call type the specific index is configured for, analog or digital.

Menu Option 6 Mapping inbound phone numbers to reserved pools

The Dual T1/PRI provides 12 pool IDs. These pools allow for greater flexibility in terms of the number of services that can be offered to callers.

In order for this option to function properly, the modem routing method (configured through the card configuration menu's option 6) can not be configured for fixed assignment.

For every pool ID, two options need to be configured:

- Inbound Phone Number

  Assigns a phone number to the ID.

- Pool Type

  Configures the Pool for what types of calls will be handled (analog, digital, or both analog and digital).

Use the following syntax to assign an inbound phone number to a pool ID:

ID:P#

Where:

ID = pool Id

P# = inbound phone number

This facility allows more than one DNIS to map to a single DNIS pool. Now, two wild cards are allowed in DNIS:

- "*" for zero and more digits
- "x(X)" for one digit

Wild cards are present only at the end of the DNIS. "*" and "x(X)" can not co-exist in a single DNIS. There can be more than one "x(X). Even with wild cards, a given DNIS can map to one and only one DNIS pool, if there is a match in DNIS. There should be at least one digit (0–9) before entering any wild card.

Use the following syntax to assign a pool type to a pool ID:

ID:PT

Where:

ID = pool ID

PT = pool type (analog, digital, both, none, or clear (clears pool type and inbound phone #))

CAUTION: *Changing pool types will trigger an automatic update to device-to-pool mappings that may result in data loss.*

Menu Option 7 Mapping chassis modem channels to reserved pools

Once the pool IDs are configured, they must be mapped to modem channels. This option allows you to do this.

Use the following syntax to assign a pool ID to a modem channel:

ID:MID (for single assignments)

ID:MID-MID (for multiple assignments)

Where:

ID = pool ID (or N (none))

MID = modem channel ID (1–64), as displayed on the screen

Menu Option 8 Mapping digital reserved pools to chassis Gateways

Once the digital Pool IDs are configured, they must be mapped to chassis gateways. This option allows you to do this.

Use the following syntax to assign a pool ID to a chassis gateway:

ID:G# (for single assignments)

ID:G#-G#,G# (for multiple assignments)

Where:

ID = pool ID (or N (none))

G# = chassis slot (index) where gateway is installed

Menu Option 9 Allowing ISDN-GWC termination

This is the maximum number of digital (such as Terminal Adapter v.110, v.120) calls terminated directly by the ISDN gateway. All other digital calls are terminated by the Quad (I-modem). Maximum performance is generally obtained by disturbing the digital calls to the Quad (I-modem). Thus, this parameter should be selected to be zero for T1/PRI.

Configuring the Card

Configure Dual T1/PRI NAC chassis options by selecting option 3 from the UI console's main menu.

```
3Com (c) 1995, 1996, 1997, 1998

Dual T1/PRI Application Card Revision  3.1.4    (Card Id: 27)
Boot Code Linked Date     : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999

Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Pressing option 3 at the main menu prompt produces this screen:

```
Card Configuration                  Current Setting

1 Save current Configuration to NVRAM
2 Restore NVRAM Configuration
3 Restore Default Configuration
4 Timing Source Priority Assignment          Span-1=1 Span-2=2
5 Chassis Slot Device Configuration
6 Modem Routing Method                       Next Available
7 Configure Local Console Password
8 Change DS0 state on Quad Modem NAC action  Disabled
9 Companding Code Configuration

(NOTE: Changing configuration parameters may affect calls in progress.)

Enter menu selection and press Return or press Esc to exit.
```

Menu Option 1 Saving configuration changes to NVRAM

This option allows you to save your settings to NVRAM. If power to the NAC is lost or the card is rebooted, any changes made to the UI console and saved to NVRAM will be restored.

Menu Option 2 Restoring configuration from NVRAM

This option allows you to return the NAC to configuration settings stored in NVRAM.

Menu Option 3 Restoring the default configuration

After saving configuration changes to NVRAM, you may decide at a later date that changes need to be made. An easy way to implement this new configuration is to return the NAC to the default configuration and start fresh.

Menu Option 4 Assigning timing source priority

Each span line provides a timing source for the synchronization of data transfer. This option allows you to set the priority of each span's timing source.

The source with the highest priority is the primary timing source for the span lines. The span with the lowest priority acts as a secondary timing source should the primary be lost.

Menu Option 5 Configuring chassis slot devices

This allows the user to configure NACs in slots 1–16 of the Total Control chassis. Only the following types of cards are configurable:

- Quad Modem Card
- Quad I-Modem Card
- NETServer PRI Card (ISDN-GW)

Use the following syntax to assign a device to a chassis slot:

dev:s# (for single assignments)

dev:s#,s#,s#,... (for multiple assignments)

Where:

dev = device type (**q** for Quad Modems, **i** for Quad I-Modems, **g** for ISDN gateways, or **n** for none)

s# = chassis slot number (1–16)

The configurations made with this option are subject to verification by chassis awareness. For example, if a modem is configured that is not present in the chassis, the configuration request is automatically rejected with no error message displayed.

Menu Option 6 Configuring the modem routing method

Route incoming calls from the span to modem channels in one of three ways:

- Next Available (Round Robin)

  Routes calls to the very next modem channel available.

- First Available (Return to Lead)

  Routes calls to the lowest numbered modem channel that is first available.

- Fixed Assignment (Fixed by TS)

  Each T1/PRI channel is permanently assigned to a modem channel. The channels are assigned using option 8, DS0 to modem slot/chan mapping screen in the span line 1 and 2 configuration windows.

Menu Option 7 Configuring the UI console password

Configure the UI console to be password protected with this option.

In order for this option to function, set DIP switch 4 to the ON position. See the Dual T1/PRI NAC's Getting Started Guide for more details.

You will be prompted to enter the current password. The factory default password is **intotalcontrol**. You will then be prompted to enter a new password.

The password option is case sensitive.

Menu Option 8 Enabling automatic DS0 state change

Enabling this feature under fixed modem routing causes the NAC to notify the Telco that DS0s associated with modems that are no longer in service are out of service. Once the modems are available again, the DS0s assigned to those modems are placed back in service.

This option works only under the fixed modem routing method.

Menu Option 9 Companding Code Configuration

Companding is the process of compressing a signal's amplitude for transmission and then expanding it back to its original form at the receiving end. It is used to reduce the signal-to-noise ratio on the line.

This option allows you to configure the NAC for one of these companding modes:

- A-law

  Companding standard used outside of North America.

- u-law

  Companding standard used in Japan and North America.

- Modem's Country Code

  Default code set on chassis modems establishing what country it is to be used in.

Configuring Software Fault Event Logging

```
3Com (c) 1995, 1996, 1997, 1998

Dual T1/PRI Application Card Revision   3.1.4     (Card Id: 27)
Boot Code Linked Date     : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999

Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Fault manager Event Logging is not supported in this release.

3 DUAL T1/PRI MAINTENANCE

This chapter contains information about performing Dual T1/PRI commands and logging out of the user interface (UI) console.

Dual T1/PRI Commands

Issue commands to the Dual T1/PRI by selecting option 1 from the UI console's main menu.

```
3Com (c) 1995, 1996, 1997, 1998

Dual T1/PRI Application Card Revision  3.1.4    (Card Id: 27)
Boot Code Linked Date    : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999

Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Selecting option 1 from the main menu produces this screen:

```
Command
 1 Reset to Highest Priority Timing Source
 2 Reset PRI NAC
 3 Enter/Exit span-to-span pass-thru loopback mode
 4 Force Receiver Reframe on Span Line 1
 5 Disconnect Call on Span Line 1 B-CHANNEL(s)
 6 Force Receiver Reframe on Span Line 2
 7 Disconnect Call on Span Line 2 B-CHANNEL(s)
 8 Force TDM-Bus Mastership on Card
 9 Enter/Exit LoopBack Command on Span Line 1
10 Enter/Exit LoopBack Command on Span Line 2
11 Turn off Red Alarm LED on Span Lines
12 Connect/Disconnect B-Channel on Span Line 1
13 Connect/Disconnect B-Channel on Span Line 2
14 Change individual DS0 Service States on Span Line 1
15 Change individual DS0 Service States on Span Line 2
16 Change DS0 Service States for entire Span Line 1
17 Change DS0 Service States for entire Span Line 2

Enter menu selection and press Return or press Esc to exit.
```

Many of the Command Menu options have corresponding configurable parameters in other menus of the UI console. Issuing commands will not affect the configured parameters except at the time of initial execution.

Menu Option 1 Resetting the highest priority timing source

This action causes re-arbitration of the clock to the highest priority source available.

Menu Option 2 Resetting the PRI NAC

Issuing this command reboots the NAC.

Any configuration changes that are not saved to NVRAM will be lost when the NAC reboots.

Menu Option 3 Enter/Exit span-to-span pass-thru loopback mode

This option allows for a span-to-span loopback, where all of the DS0s on span 1 are connected to all of the DS0s on span 2 through the time slot interchanger (TSI). This command will drop calls.

This option is useful for testing purposes.

There will not be a prompt to authorize dropping calls if initiated from the command line interface (CLI).

Menu Options 4 and 6

Forcing receiver reframe on the span lines

Issuing command options 4 or 6 forces the T1 framer to reframe or re-synchronize incoming data on span line 1 or 2.

Use these options if error conditions occur. Observe error conditions through span line 1 and 2 Alarm/Event status screens.

Menu Options 5 and 7

Disconnecting calls on specific span line B-channels

Options 5 and 7 allow you to disconnect calls on specific B-channels, or time slots, on span lines 1 and 2. Enter the number of the channel or channels you wish to disconnect calls on at the command prompt. Valid channels are 1–23. Channel 24 is reserved as a D-channel.

Attempting to disconnect a call on channel 24 will produce an ERROR message and reject the entire command even if other valid channels were entered.

Use the following syntax when configuring this option:

BC# (for a single channel)

BC#,BC#,BC#,... (for single, non-sequential channels)

BC#-BC# (for a range of channels)

Where:

BC# = B-Channel number (1–23)

Menu Option 8

Forcing the NAC to master the TDM bus

This feature is not supported.

Menu Options 9 and 10

Entering and exiting locally initiated loopbacks on the span lines

Issue loopback tests to verify that the span's framer circuitry is functioning properly and to test Telco links. Menu options 9 and 10 control loopback tests for span lines 1 and 2. Initiate or terminate loopback tests from these prompts.

This command turns the local interface into a "mirror" facing back toward the network.

Menu Option 11

Disabling red ALARM LEDs

The span line ALARM LEDs on the NAC's front panel remain lit for the duration of an alarm condition. In cases where the alarm condition is recognized and it is determined that the cause for this alarm is accounted for, disable the LED with this option.

An example of such a condition would be when only one span is being used. Since there is no span line physically attached to the NIC's span 2 port at the time the NAC is installed, the ALARM LED for span 2 goes red. You may wish to disable the LED because this is a normal operating condition.

Menu Options 12 and 13

Connect/disconnect B-channel on span lines 1 and 2

This option allows you to connect and/or disconnect the B-channel on span lines 1 and 2.

Menu Options 14 and 15

Changing individual DS0 service states

This option allows you to place an individual DS0 in or out of service (locally). This is useful for troubleshooting or testing.

Use the following syntax when configuring this option:

SS:DS0# (for a single channel)

SS:DS0#,DS0#,... (for single, non-sequential channels)

SS:DS0#-DS0# (for a range of channels)

Where:

SS = service state (**I** for in-service, **O** for local out of service)

DS0# = DS0 number (1–23)

Menu Options 16 and 17

Changing span line service state

This option allows you to place the entire span line (1 and/or 2) in or out of service (locally). This is useful for troubleshooting or testing.

Logging Out of the UI Console

Exit the Dual T1/PRI UI console by selecting option 8, the logout command, from the console's main menu.

```
3Com (c) 1995, 1996, 1997, 1998

Dual T1/PRI Application Card Revision   3.1.4     (Card Id: 27)
Boot Code Linked Date     : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999

Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Use this option in conjunction with the UI console's password protection feature in the card configuration option of the main menu.

4 DUAL T1/PRI STATUS DISPLAYS

This chapter contains information about Dual T1/PRI status displays.

Dual T1/PRI Status Displays

Access the Dual T1/PRI NAC status display options by selecting option 2 from the user interface (UI) console's main menu.

```
3Com (c) 1995, 1996, 1997, 1998

Dual T1/PRI Application Card Revision  3.1.4    (Card Id: 27)
Boot Code Linked Date    : Mon Dec 04 17:41:48 1995
Operation Code Linked Date: Tue Feb 23 16:41:51 1999

Main Menu

1 Command
2 Status
3 Card Configuration
4 Inbound Call Routing Configuration
5 Span Line 1 Configuration
6 Span Line 2 Configuration
7 SW Fault Manager Event Logging
8 Logout

Enter menu selection and press Return.
Menu Selection (1-8):
```

Selecting option 2 from the main menu produces this screen:

```
Status

1 Power-up Self-test Status
2 Card Status
3 Chassis Slot Device Configuration Status
4 Quad B-channel/Modem Device Status
5 ISDN-gateway Device Status
6 Span Line 1 DS0 Status
7 Span Line 1 Alarm/Event Status
8 Span Line 2 DS0 Status
9 Span Line 2 Alarm/Event Status

Enter menu selection and press Return or press Esc to exit.
Menu Selection (1-9):
```

Menu Option 1 Checking power-up self test status

Upon power-up, the T1/PRI software performs various tests to ensure proper operation of the Network Application Card (NAC) hardware. Selecting option 1 from the status menu displays the results for these tests:

- RAM

  This test fills the SRAM of the NAC with a pattern sequence, and then performs a comparison check. The failure level for this test is Critical.

- Flash ROM

  This test performs a CRC check on the Flash ROM. The failure level for this test is Critical.

- Non-maskable Interrupt

  This is a write-to-ROM test that results in a non-maskable interrupt (NMI). Any attempt to write to ROM causes the NMI test code to run. The failure level for this test is Non-critical.

- Watch Dog

  This test verifies the watch-dog circuitry on the NAC functions properly. The failure level for this test is Non-critical.

- Management Bus UART

  This is a simple loopback test to verify that the UART that communicates with the management bus functions properly. The failure level for this test is Non-critical.

- User Interface UART

  This is a simple loopback test to verify that the UART that communicates with the UI port functions properly. The failure level for this test is Non-critical.

- Time/Space Switch

  The NAC's software runs two built-in self-tests of the time space interchange (TSI), as well as a write/read test of the TSI registers. The failure level for this test is Non-critical.

- Framer 1/2

  The T1/PRI software performs various diagnostic exercises to test the framer chips. The failure level for this test is Non-critical.

- Line Interface Unit 1/2

  The power-up code verifies whether or not the NIC is present and then configures the CSU on the NIC to local loopback mode. The failure level for this test is Non-critical.

- Flash ROM 12v Test

  This self-test checks and verifies that the 12v circuitry to the Flash ROM functions properly. The failure level for this test is Non-critical.

- HDLC Channel 1/2

  The code checks the HDLC controller channels 1 and 2. The HDL controller is used for D-channel signaling. The failure level for this test is Non-Critical.

Menu Option 2 Checking the T1/PRI's overall status

This status screen provides status information for:

- Current PRI timing source
- Current packet bus timing source
- What type of NIC is installed behind the NAC
- What chassis slot the NAC is installed in
- How much time elapsed since the NAC was last reset
- How much DRAM is installed on the NAC
- How much Flash ROM is installed on the NAC

Menu Option 3 Checking chassis slot device configurations

Status menu option 3 allows you to verify if you configured the chassis slot assignments correctly in option 5 of the card configuration menu.

The slot # column represents the chassis slot numbers, 1–16.

The device type column indicates the type of NAC installed and assigned in the corresponding chassis slot. It displays one of these:

- NONE

  No NAC is installed and assigned to that particular slot.

- Dual PRI

  A Dual T1/PRI NAC is installed and assigned to that particular slot.

- ISDN-GW

  A NETServer PRI NAC is installed and assigned to that particular slot.

- QBCH-MDM

  A Quad Modem NAC is installed and assigned to that particular slot.

- QBCH-I_MDM

  A Quad I-Modem NAC is installed and assigned to that particular slot.

Menu Option 4 Checking DS0/modem channel status

Status menu option 4 allows you to monitor the status of DS0s/modem channels for both spans. The DS0 to modem channel mappings are configured in option 8 of the span line 1 and 2 configuration menus.

The ID column represents the individual time slots on both spans.

The slot/chan column represents the modem slot/channel mapped to the individual time slots.

The status column displays one of these:

- AVAIL

  The modem is installed and is idle.

- Un-Avail

  There is no modem mapped to the time slot or the modem is not responding.

- In-Use

  The modem is installed and is active.

Menu Option 5 Checking the chassis' ISDN gateway status

Status menu option 5 allows you to check the status of the chassis' ISDN gateway(s) (NETServer PRI(s)).

The ID (slot #) column represents the chassis slot numbers, 1–16

The status column displays one of these:

- AVAIL

  The NETServer PRI is installed in the corresponding chassis slot and is idle.

- Un-Avail

  There is no NETServer PRI installed in the corresponding slot, or it is not responding.

- In-Use

  The NETServer PRI is installed in the corresponding chassis slot and is active.

The number of calls column indicates how many calls the NETServer PRI is handling.

Menu Options 6 and 8

Checking span line 1 and 2's DS0 status

Status menu options 6 and 8 allow you to monitor the individual DS0 status of span lines 1 and 2, respectively.

The status column displays one of these:

- Connected-In

  The time slot is active with a call originated from a remote device through the TELCO.

- Connected-Out

  The time slot is active with a call originated by the chassis.

- Dialing-In

  An incoming call is received and is being processed.

- Dialing-Out

  An outgoing call is being processed.

- Disconn

  The time slot's call is disconnecting.

- IDLE

  The time slot is available and awaiting a call.

- OOS

  The time slot is blocked either at the Telco or locally.

The device type column displays the type of device handling the call. It displays one of these:

- QBCH-MDM

  Quad Modem card.

- QBCH-I_MDM

  Quad I-Modem card.

- ISDN-GW

  NetServer PRI NAC.

The slot/chan column shows what modem slot/channel the individual time slots are mapped to.

Menu Options 7 and 9

Checking span line 1 and 2's alarm/event status

Status menu options 7 and 9 allow you to monitor alarm and event status on span lines 1 and 2.

The status of the following items is displayed on these screens:

- Receiver Gain

  This is a function of line interface unit that indicates the T1 span line signal strength in 7.5 dB increments: 0 dB, 7.5 dB, 15 dB and 22.5 dB (0 dB is a strong signal).

- Errored Seconds

  This indicates out of frame (OOF) conditions, frame slip conditions, or error events for super frame (SF) and extended super frame (ESF) framing formats. For SF, it reports the number of seconds the frame was in either OOF or slip condition. For ESF, it reports error events in seconds.

- Severely Errored Seconds (SES)

  This reports how many seconds were timed during which bit, frame, and CRC error events existed.

- Unavailable Secs

  The DS1 is determined to be unavailable. All other counters will stop. Any layer 1 condition or 10 consecutive SES events will lead to DS1 unavailability. Ten consecutive non-SESs (no alarm condition) will clear the unavailability.

- Bipolar Violations

  This indicates bipolar violations (BPV) in the line format being used. A BPV occurs when two consecutive non-zero elements of the same polarity occur in an alternate mark inversion (AMI) signal.

- Framing Bit Errors

  This indicates an error in the framing bit used to determine frame alignment. The framing bit error count is reported.

- Change in Frame Alignment (CFA)

  This indicates that a receiver has reframed on a new framing pattern, and synchronized at a new frame alignment due to an OOF condition. The status report indicates whether or not a CFA occurred. A counter records the number of times a CFA occurred since the latest counter reset.

- Controlled Slip Secs (Frame Slips)

  These are caused either by frames deleted due to buffer overflow (BOF) or frames repeated due to buffer underflow (BUF). The status report indicates whether or not a BOF or BUF condition occurred. A counter records the number of times a condition occurred since the latest counter reset.

- Severely Err Framing Secs (SEFS)

  Any second with an OOF or AIS condition is counted as an SEFS.

- Bursty Errored Seconds

  This occurs in ESF format only. It reports CRC error conditions in seconds.

- CRC Errors

  This occurs only in ESF format when a CRC bit is in error. The CRC error count is reported.

- Excessive CRC Error Indication (ECRCEI)

  This is reported in ESF format when 32 of any 33 consecutive CRCs are in error. The status report indicates whether or not this event occurred. A counter records the number of times an event occurred since the latest counter reset.

- Out of Frame (OOF)

  This is a local alarm that indicates a framing pattern for a span is lost and data cannot be extracted properly. This is also referred to as a red alarm. In both SF and ESF formats, OOF occurs when any two of four consecutive frame synchronization bits are in error. The status indicates whether or not OOF conditions are present.

- Loss of Signal (LOS)

  The received signal is missing. This occurs when 175 consecutive 0's are detected on the span line or when the signal is lost for 150 msec or longer. The signal is recovered when the 1's density reaches 12.5% or when four 1's are received within a 32-bit period. The status report indicates the presence of a LOS condition.

- Remote Frame Alarm (RFA)

  This indicates that an OOF condition is occurring at the remote end. The remote end sends a bit pattern indicating a remote problem. This is also referred to as a yellow alarm. The status report indicates whether or not an RFA is present.

- Alarm Indication Signal (AIS)

  This indicates to the other end that a loss of the received signal is occurring (Central Office switch sends the AIS patterns).
  The remote end is alive but there are problems. This is also referred to as a blue alarm. AIS occurs when a stream of 1's is received. The status report indicates the presence of an AIS condition.

- Loop Back

  This indicates whether or not a remotely or locally initiated loopback is in progress from the network.

- Time since clear

  The time in days:hours:minutes:seconds since the counters were reset and the screen was last looked at.

- Failed Seconds

  This indicates the number of seconds in failed state operation. A failed state is defined as 10 consecutive seconds during which severely errored seconds occur.

- D-Channel Operational

  This indicates the state of the ISDN D-channel. Up indicates that the D-channel is active, and Down indicates that the D-channel is not active.

The events in the lower left-hand side of the screen are real time alarms. The events in the lower right-hand side of the screen are debounced alarms and will activate only if the condition persists for more than two seconds.

Press **`Ctrl-R`** to reset any of the counters on this screen.

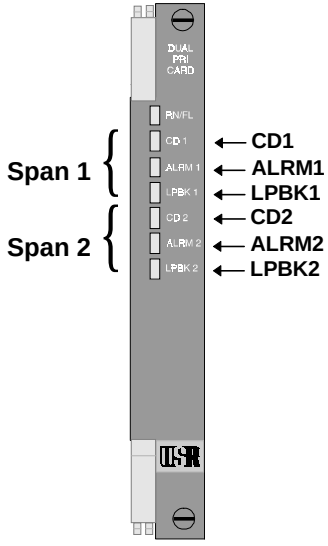
A

TROUBLE CLEARING

This appendix contains Dual T1/PRI Network Application Card (NAC) trouble clearing information.

Using the LEDs

The Dual T1/PRI NAC has six LEDs on the front panel, three per span, that indicate line signal conditions.



LED	Purpose
CD1 & CD2	Carrier Detect indicators for span lines
ALRM1 & ALRM2	Alarm condition indicators for span lines
LPBK1 & LPBK2	Loopback indicators for span lines

CD (1 or 2) LED Color	ALRM (1 or 2) LED Color	LPBK (1 or 2) LED Color	T1 Condition
Green	Off	Off	No Alarm
Green	Red	Off	Remote Frame Alarm (RFA)
Off	Red	Off	Loss of Signal Alarm (LOS)
Red	Red	Off	Out of Frame Alarm (OOF)
Red	Red	Off	Unframed All Ones Alarm (AIS)
Green	Off	Green	Loopback in Progress
Layer 2 (D-channel Status)*			
Any	Any	Off	Signaling Channel Up
Any	Any	Amber	Signaling Channel Down

**If Layer 1 alarms exist, Layer 2 status is not indicated.*

If LEDs indicate an alarm condition, refer to the alarm event status screen for details.

Alarm LEDs will still register during loopback.

About T1/PRI Alarm Levels

Layer 1 alarm conditions are categorized into one of three alarm levels:

Alarm	Severity	Result
Red Alarm	High	Loss of connection and/or data locally
Blue Alarm	High	No data received from Telco; all 1's received by NAC
Yellow Alarm	High	Improper data received at remote end

Correcting Alarm/Error Conditions

Alarm/Error	Level	Trouble Clearing
Remote Frame Alarm (RFA)	Yellow	■ Verify that the NAC is configured properly according to the services provisioned by the Telco. Contact the Telco if necessary. ■ Check the cables—do not use a flat cable. ■ Check break-out boxes. ■ Examine boot-up test results. ■ Examine error counters.
Loss of Signal (LOS)	N/A	■ Verify that the span is plugged into the NIC properly. ■ If the cabling is correct, there is most likely a problem at the Telco. Contact the Telco for service. ■ Check the cables—do not use a flat cable. ■ Check break-out boxes. ■ Examine boot-up test results. ■ Examine error counters.
Out-of-Frame (OOF)	Red	■ Verify that the NAC is configured properly according to the services provisioned by the Telco. ■ If your configuration is correct, there may be a problem with the Telco's equipment. Contact the Telco for service. Check the cables—do not use a flat cable. ■ Check break-out boxes. ■ Examine boot-up test results. ■ Examine error counters. ■ Check framing mode configuration.
Unframed All Ones (AIS)	Blue	■ Indicates a red alarm at the Telco. Contact the Telco for service.
RFA and Continuous CRC (CCRC) Errors	N/A	■ Verify that the NAC is configured properly according to the services provisioned by the Telco.

(continued)

Alarm/Error	Level	Trouble Clearing
Signaling Channel Down	N/A	■ Contact the Telco to see what their side is receiving. If they're showing that the Signaling Channel is up, there is most likely a problem in the receiving pair at your site. ■ If the module is indicating alternating Signaling Channel Up (Loopback LED off) and signaling Channel Down signals, there is most likely a cabling mismatch between the TX and Rx signals.

Using SNMP Traps

The Total Control Enterprise Network Hub provides for the management of the Dual T1/PRI NAC via the Network Management Card (NC) NAC. The NMC manages the Dual T1/PRI and other cards in the chassis using Simple Network Management Protocol (SNMP).

One function of SNMP is to allow for faults, or traps, to be triggered when one of the cards experiences an alarm condition. View the alarm conditions using a standard MIB browser or 3Com's Total Control Manager/SNMP software.

The T1/PRI NAC triggers traps at both the card and span levels.

For a detailed listing and explanation of Dual T1/PRI traps, consult the Total Control Parameter Reference on the Total Control CD-ROM or the Total Control Manager/SNMP online help.

B

TECHNICAL SPECIFICATIONS

Certification

EMI/RFI	■ FCC 15A ■ EN55022 A
Safety	■ UL 1950 ■ C-UL ■ EN 60950 ■ JATE

Regulatory Compliance Statements

United States

FCC Part 15 Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Current Draw

+5.2 vDC @ 2.0 A typical maximum

Typical Maximum refers to the maximum current draw under most typical configurations.

Environment

Shipping and Storage

Temperature:	-25 to 75° C, -13 to 167° F
Relative Humidity:	0 to 100%, Non-condensing

Operating

Temperature:	0 to 40° C, 32 to 104° F
Relative Humidity:	0 to 95%, Non-condensing

Physical Dimensions

	Inches	Centimeters
Length:	5.30	13.46
Width:	0.79	2.00
Height:	6.90	17.53

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3Com Corporation
5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA
95052-8145

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