Meridian 1

Circuit Card Installation and Testing

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January 2002

Standard 18.00. This document is up-issued to support Meridian 1 Release 25.40 systems. This document is up-issued to include Call Processor Pentium (CP PII) and Fiber Network Fabric (FNF) for Option 81C.

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Standard, release 8.00. This document is reissued to include technical information on Meridian 1 Option 61C and corrections specified in the Product Bulletin 93062 Rev. 1. Changes to technical content are noted by revision bars in the margins.

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Standard, release 3.00. Updated to include the NT6D42 Ringing Generator, QPC442 Tone Detector option settings and a correction to the QPC441 3-Port Extender.

July 1990

Standard, release 2.00.

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Standard, release 1.00.

Contents

About this document

This document applies to Meridian 1 Internet Enabled systems.

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

Who should use this document

This document is intended for individuals responsible for maintaining Meridian 1 Internet Enabled systems.

How this document is organized

This document provides the following:

- a list of compatible slots for circuit cards used in Options 51C, 61C, and 81C

- a general procedure for initially installing a circuit card

- acceptance tests for circuit cards that provide service functions, network control, and line and trunk connections

- option settings for the PBX circuit cards currently supported by Nortel Networks.

  Note: For information on equipment used with system Option 11, see the appropriate documentation for that product.

- sample option settings for system configurations with NT8D22 System Monitors

For detailed procedures for removing a specific circuit card and installing a replacement, see *Hardware Replacement* (553-3001-520).

For option settings on telephones, attendant consoles, or add-on modules, see the appropriate document for that equipment.

For a description of all administration programs and maintenance programs, see the *Administration* (553-3001-311). For information about system messages, see the *System Messages Guide* (553-3001-411).

Circuit card installation

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

• *Administration* (553-3001-311)

Card slots—System Options 51C, 61C and 81C

The following table in this chapter identifies card slot compatibility in the following modules:

• NT5D21 Core/Network Module
  required for Options 51C, and 61C

• NT4N476 Core/Network Module
  required for Option 81C

• NT6D60 Core/Network Module
  required for the Option 81 only

- NT8D35 Network Module
  required for Options 81C, optional for Option 61C

- NT8D37 Intelligent Peripheral Equipment (IPE) Module
  required for Option 81C

Circuit Card Installation

Table 1
System Options 51C, 61C, and 81C card slots (Part 1 of 4)

Component	Options 51C, 61C, and 81C
A0786611 Call Processor Pentium II® card	81C Core/Net: "CP"
A0810486 Call Processor Pentium II	81C Core/Net: "CP"
NT1P61 Fiber Superloop Network card	Core/Net: 0–7
NT1P62 Fiber Peripheral Controller card	IPE: "Contr"
NT1R52 Remote Carrier Interface	IPE: "Contr"
NT1R20 Off-Premise Station	IPE: any slot but "Contr"
NT4D18 Hybrid Bus Terminator	Core/Net: between 11 and 12
NT4D19 and NT423 Hybrid Bus Terminator	Core/Net: between 0 and 1
NT4D20 and NT422 Hybrid Bus Terminator	Core/Net: between 1 and 2
NT4N43 Multi-Medium DIsk Unit	81C Core/Net:
NT4N64 Call Processor Pentium II card	81C Core/Net: "CP"
NT4N65 cPCI® Core to Network Interface card	81C Core/Net: c9–c12
NT4N66 cPCI Core to Network Interface Transition card	81C Core/Net cPCI Core backplane: 9–12
NT4N67 System Utility card	81C Core/Net: c15
NT4N68 System Utility Transition card	81C Core/Net cPCI Core backplane:
NT5D11 and NT5D14 Line side T1 Line Card	IPE: any slot but "Contr"
NT5D12AA Dual DTI/PRI Card	Core/Net: 0–7
NT5D61 Input/Output Disk Unit with CD-ROM (IODU/C)	51C/61C Core/Net: 17, 18 and 19
NT5K02 Analog Line Card	IPE: any slot but "Contr"
NT5K07 Universal Trunk Card	IPE: any slot but "Contr"
NT5K09 Quad Density Digitone Receiver	EEPE Slot 2 of section A or B at rear of module
NT5K10 Dual Loop Buffer	EEPE
NT5K17 Direct Dial Inward Trunk Card	IPE: any slot but "Contr"

Table 1
System Options 51C, 61C, and 81C card slots (Part 2 of 4)

Component	Options 51C, 61C, and 81C
NT5K18 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K19 E&M Trunk Card	IPE: any slot but "Contr"
NT5K35 D-channel Handler Interface	Core/Net: 0-7 Net: 5-12
NT5K36 Direct Inward/Direct Outward Dial Trunk Card	IPE: any slot but "Contr"
NT5K70 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K71 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K72 E&M Trunk Card	IPE: any slot but "Contr"
NT5K82 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K83 E&M Trunk Card	IPE: any slot but "Contr"
NT5K84 Direct Inward Dial Trunk Card	IPE: any slot but "Contr"
NT5K90 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K93 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K96 Analog Line Card	IPE: any slot but "Contr"
NT5K99 Central Office Trunk Card	IPE: any slot but "Contr"
NT5K20 Extended Tone Detector	IPE: any slot but "Contr"
NT6D65 Core to Network Interface	51C/61C Core/Net: 12
NT6D66 Call Processor Card	51C/61C Core/Net: 15 and 16
NT6D70 S/T Interface Line Card	IPE: any slot but "Contr"
NT6D71 U Interface Line Card	IPE: any slot but "Contr"
NT6D72 Basic Rate Signal Concentrator Card	IPE: any slot but "Contr"
NT6D73 Multi-purpose ISDN Signaling Processor Card	Core/Net: 0–7
NT6D80 MSDL	Core/Net: 0–7

Table 1
System Options 51C, 61C, and 81C card slots (Part 3 of 4)

Component	Options 51C, 61C, and 81C
NT7D16 Data Access Card	IPE: any slot but "Contr"
NT7R51 Local Carrier Interface	Core/Net: 0–7
NT8D01 Controller Card	IPE: "Contr"
NT8D02 Digital Line Card	IPE: any slot but "Contr"
NT8D04 Superloop Network Card	Core/Net: 0–7 Net: 5-12
NT8D09 Analog Message Waiting Line Card	IPE: any slot but "Contr"
NT8D14 Universal Trunk Card	IPE: any slot but "Contr"
NT8D15 E&M Trunk Card	IPE: any slot but "Contr"
NT8D16 Digitone Receiver Card	IPE: any slot but "Contr"
NT8D17 Conference/TDS Card	Core/Net: 0–7
NT8D41 Dual Port Serial Data Interface Card	Serial Port back of Core/Net module
NT9D19 Call Processor Card	51C/61C Core/Net: 15 and 16
NTAG03 Central Office Trunk Card	IPE: any slot but "Contr"
NTAG04 Central Office/Direct Inward Dial Trunk Card	IPE: any slot but "Contr"
NTAG36 MIRAN	IPE: any slot but "CONTR"
NTBK51 Downloadable D-channel daughterboard	Connects to DDP card
NTCK16 Generic Central Office Trunk Card	IPE: any slot but "Contr"
NTCK43AA Primary Rate Interface Card	Core/Net: 0-7 Net: 5-11, 13-14
NTRB33 FIber Junctor Interface Card	For 81C: Core/Net: 8 and 9, Net module: 2 and 3
NTRE39 Optical Cable Management Card	For 81C: Net module: the slot to the right side of 14, the slot to the left of the 3PE in slot 1
QPC43 Peripheral Signaling Card	Core/Net: 10 Net: 4
QPC71 E&M/DX Trunk Card	IPE: any slot but "CONTR"
QPC414 Network Card	Core/Net: 0–7 Net: 5-12

Table 1
System Options 51C, 61C, and 81C card slots (Part 4 of 4)

Component	Options 51C, 61C, and 81C
QPC441 3-Port Extender Card	Core/Net: 11 Net: 1
QPC471 Clock Controller Card	51C/61C Core/Net: 9 Net: 5 -12 For 81C, use NT8D35 Net slot 13; in QSD39 shelf, use Net slot 2; in QSD40 shelf, use slot 13
QPC513 Enhanced Serial Data Interface Card	Core/Net: 9, 13
QPC578 Integrated Services Digital Line Card	IPE: any slot but "CONTR"
QPC659 Dual Loop Peripheral Buffer Card	IPE: "DLB"
QPC720 Primary Rate Interface Card	Core/Net: 0–7 Net: 5–11, 13–14
QPC775 Clock Controller	51C/61C Core/Net: slot 14. For 81C use NT8D35 Net slot 13; in QSD39 shelf, use Net slot 2; in QSD40 shelf, use slot 13.
QPC789 16-Port 500/2500 Message Waiting Line Card	IPE: any slot but "CONTR"
QPC841 4-Port Serial Data Interface Card	Core/Net: 0-7

Precautions

To avoid personal injury and equipment damage, review the following guidelines before handling Meridian 1 equipment.

> **WARNING**
> Module covers are not hinged; do not let go of the covers. Lift covers away from the module and set them out of your work area.

> **WARNING**
> Circuit cards may contain a lithium battery. There is a danger of explosion if the battery is incorrectly replaced. Do not replace components on any circuit card; you must replace the entire card.
>
> Dispose of circuit cards according to the manufacturer's instructions.

To avoid damage to circuit cards from static discharge, wear a properly connected antistatic wrist strap when you work on Meridian 1 equipment. If a wrist strap is not available, regularly touch one of the bare metal strips in a module to discharge static. Figure 1 on page 15 shows the recommended connection points for the wrist strap and the bare metal strips you should touch.

Figure 1
Static discharge points
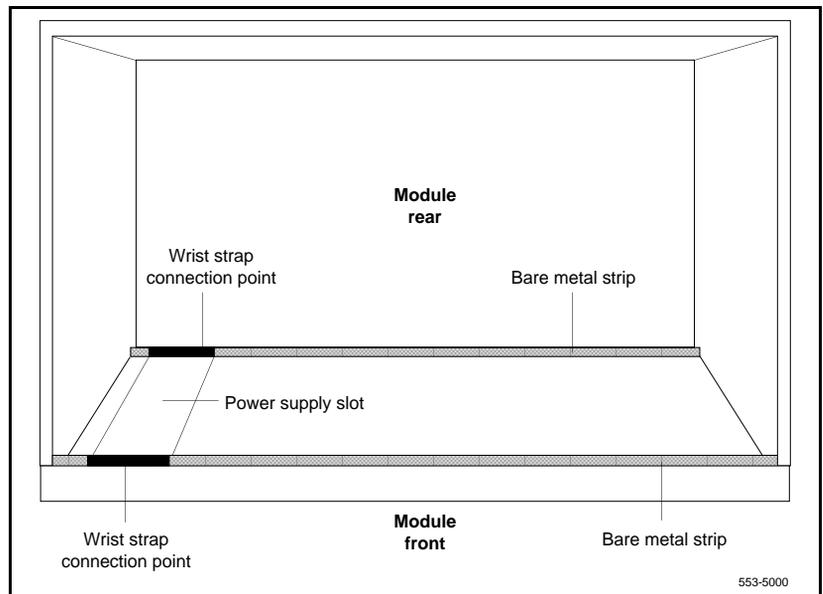
Handle circuit cards as follows:

- Unpack or handle cards away from electric motors, transformers, or similar machinery.

- Handle cards by the edges only. Do not touch the contacts or components.

- Set cards on a protective antistatic bag. If an antistatic bag is not available, hand-hold the card, or set it in a card cage unseated from the connectors.

- Store cards in protective packing. Do not stack cards on top of each other unless they are packaged.

- Keep cards installed in the system as much as possible to avoid dirty contacts and unnecessary wear.

- Store cards in a cool, dry, dust-free area.

During repair and maintenance procedures do the following:

- Turn off the circuit breaker or switch for a module power supply before the power supply is removed or inserted.

- In AC-powered systems, capacitors in the power supply must discharge. Wait five full minutes between turning off the circuit breaker and removing the power supply from the module.

- Software disable cards, if applicable, before they are removed or inserted.

- Hardware disable cards, whenever there is an enable/disable switch, before they are removed or inserted.

- Return defective or heavily contaminated cards to a repair center. Do not try to repair or clean them.

Installing a circuit card

This procedure provides detailed installation instructions for Meridian 1 circuit cards.

⚠	**DANGER** To avoid personal injury and equipment damage, read all of the guidelines in "Circuit Card Installation" on page 11 before you begin installation and follow all guidelines throughout the procedure.

Procedure 1
Installation

1   Open the protective carton and remove the circuit card from the antistatic bag. Return the antistatic bag to the carton and store it for future use.

2   Inspect the card components, faceplate, locking devices, and connectors for damage. If damaged, tag the card with a description of the problem and package it for return to a repair center.

3   Refer to the work order to determine the module and slot location for the card.

4   If there is an enable/disable (Enb/Dis) switch on the faceplate, set it to Dis.

5   If there are option switches or jumpers on the card, set them according to the work order (see "Option settings" on page 31).

⚠	**CAUTION** **System Failure** Incorrectly set switches on common equipment circuit cards may cause a system failure.

6   Squeeze the ends of the locking devices on the card and pull the tabs away from the latch posts and faceplate (see Figure 2 on page 18).

7   Insert the card into the card aligning guides in the card cage. Gently push the card into the slot until you feel resistance. The tip of the locking device must be behind the edge of the card cage (see Figure 2 on page 18).

Figure 2
Installing the circuit card in the card cage
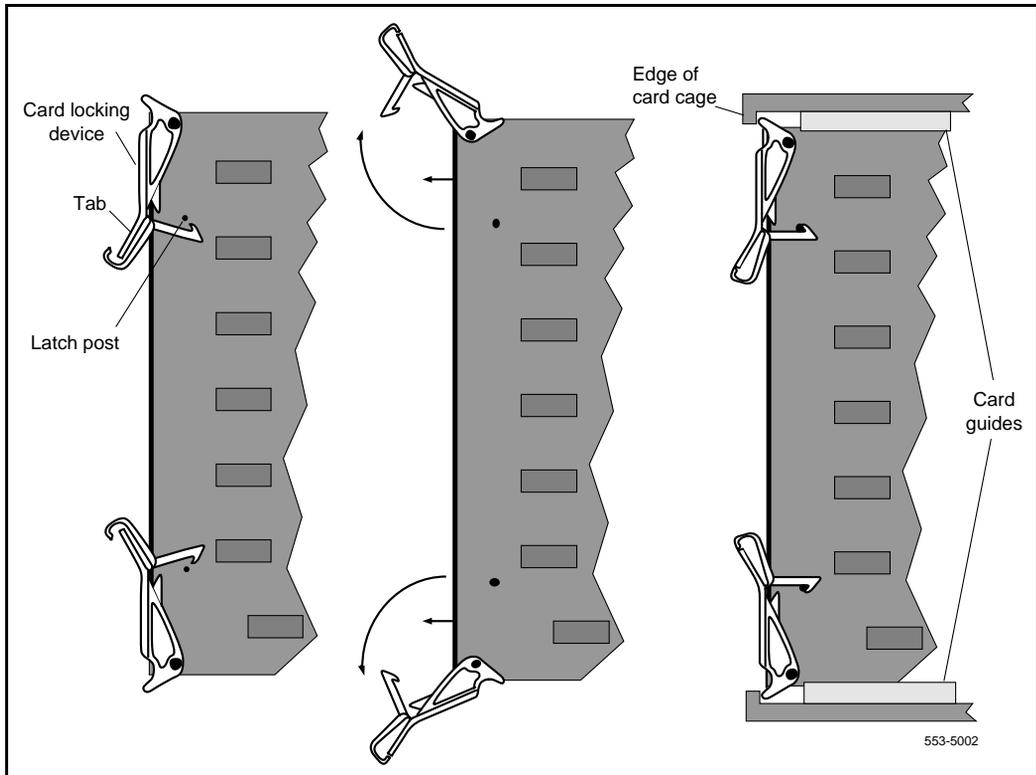
8   Lock the card into position by simultaneously pushing the ends of the locking devices against the faceplate.

Note: When IPE cards are installed, the red LED on the faceplate remains lit for two to five seconds as a self-test runs. If the self-test completes successfully, the LED flashes three times and remains lit until the card is configured and enabled in software, then the LED goes out. If the LED does not follow the pattern described or operates in any other manner (such as continually flashing or remaining weakly lit), replace the card.

9   If there is an enable/disable switch, set it to Enb.

   Note: Do not enable the switch on an NT8D04 Superloop Network
   Card or QPC414 Network Card until network loop cables are installed.

10   If you are adding a voice, conference, or tone and digit loop, press the
   manual initialize (Man Int) button on the NT5D03 or the NT5D10 Call
   Processor (CP) if the card is associated with the active CP:

   Note: An initialization causes a momentary interruption in call
   processing.

11   If you are installing the card in a working system, refer to the work order
   and the *Administration* (553-3001-311) to add the required office data
   to the system memory.

12   Go to the appropriate test procedure in "Acceptance tests" on page 21.

Acceptance tests

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *Telephone and Attendant Console: Installation* (553-3001-215)

- *Administration* (553-3001-311)

- *Maintenance* (553-3001-511)

Test procedures for most circuit cards require that internal and external cabling be installed. See the appropriate installation document for your system and *Telephone and Attendant Console: Installation* (553-3001-215) for cabling procedures.

Procedure 2
Conference cards

Use this procedure to test a conference card or to test the conference function of an NT8D17 Conference/TDS Card.

1   Log into the system:
        LOGI (password)

2   Request the status of a loop on the conference card:
        LD 38
        STAT loop

        Conference status is formatted as follows:

        CNFC n DSBL n BUSY
        "n" represents the number of conference groups disabled and busy

        CHAN n DSBL n BUSY
        "n" represents the number of channels disabled and busy

        UNEQ
        card is not equipped in the system

        DSBL
        card is disabled in software

3   If the conference card loop is disabled, enable it.

For an NT8D17 Conference/TDS Card, enter:
ENLX loop
(the conference loop is the odd loop of the conference/TDS loop pair)

Note: The conference/TDS card is not enabled automatically when it is inserted. You must enable the card with the command ENLX. (This command is used in LD 34 and LD 46 to address even loops and in LD 38 to address odd loops.) Enabling the loops with the command ENLL does not enable the hardware for the card.

For other than an NT8D17 Conference/TDS Card, enter:
ENLL loop
(the conference loop must be an even loop for cards other than the NT8D17)

If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

4   Test the conference loop for channel, group, and switching faults:
CNFC loop

If the conference loop passes the tests, the output is **OK**.

If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

5   Prepare the system for a manual conference call on a specified loop:
CNFC MAN loop c"c" is the manual conference group (1-15)

A manual conference test is performed by stepping through conference channels and groups, listening for noise that indicates a faulty card.

The manual conference test can be performed through a system terminal or BCS maintenance telephone. If commands are entered from a maintenance telephone, this telephone automatically becomes part of the manual conference call.

Only one manual conference call is allowed at one time. A manual conference consists of only two telephones, where one telephone acts as a signal source while the other acts as a listening monitor.

After you enter the CNFC command, any two telephones (one may already be the maintenance telephone) dialing the special service prefix code (SPRE) and the digits 93 will enter the manual conference call. The prime directory number (PDN) indicator, if equipped, will light on each telephone.

Going on-hook takes the telephone out of the manual conference call, and the test must be restarted.

See LD 38 in the *Administration* (553-3001-311) for more detailed information on using this command.

6   Test various channels and conference groups audibly with the command
CNFC STEP

When stepping through channels and groups, a clicking followed by silence is normal. Any distortion or other noises indicates a faulty card.

Once the CNFC STEP command has been entered, entering **C** on the system terminal or maintenance telephone steps through the conference channels. Entering **G** steps through the conference groups. There are 15 channels per group and 15 groups per conference card.

Entering an asterisk (*) and END stops the test.

Again, see "LD 38" in the *Maintenance* (553-3001-511) for detailed information on using this command.

7   End the session in LD 38:
****

Procedure 3
Digitone receiver cards

Use this procedure to test a Digitone receiver (DTR) card, a DTR
daughterboard, or the DTR function on the NT8D18 Network/DTR Card.

> *Note:* The DTR daughterboard connected to a QPC659 Dual Loop
> Peripheral Buffer Card cannot be assigned when the peripheral
> equipment (PE) shelf is used in single loop mode.

1   Log into the system:
    LOGI (password)

2   See if the Digitone receiver to be tested is disabled:
    LD 34
    STAT

    The system responds with the terminal number (TN), or numbers, of
    any disabled Digitone receivers.

3   If the Digitone receiver is disabled, enable it:
    ENLR l s c uloop, shelf, card, and unit numbers

4   Test the Digitone receiver:
    DTR l s c uloop, shelf, card, and unit numbers

    If the system response is other than **OK**, see the *Administration*
    (553-3001-311) to analyze the messages.

5   End the session in LD 34:
    ****

Procedure 4
Line cards

Use this procedure to test a line card.

1   Log into the system:
LOGI (password)

2   Perform a network memory test, continuity test, and signaling test on a specific loop and shelf:
LD 30
SHLF l sloop and shelf numbers

If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

3   For a line card on a superloop, perform a signaling test on a specific card or unit:
UNTT l s cloop, shelf, and card numbers

For the NT8D02 Digital Line Card, enter:
UNTT l s c uloop, shelf, card, and unit numbers

If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

4   End the session in LD 30:
****

Procedure 5
Multifrequency sender cards

Use this procedure to test a multifrequency sender (MFS) card or the MFS function of an NT8D17 Conference/TDS Card.

1   Log into the system:
     LOGI (password)

2   Test and enable an MFS loop:
     LD 46
     MFS loop
     (on the NT8D17 Conference/TDS Card, the TDS/MFS loop is the even loop of the conference/TDS loop pair)

     Note: The conference/TDS card is not enabled automatically when it is inserted. You must enable the card with the command ENLX. (This command is used in LD 34 and LD 46 to address even loops and in LD 38 to address odd loops.) Enabling the loops with the command ENLL does not enable the hardware for the card.

     If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

3   Access the system from a maintenance telephone; then enter:
     LD 46

     Give the system approximately 20 seconds to load the program.

     See "Communicating with the Meridian 1" in the *Administration* (553-3001-311) for details on accessing the system from a maintenance telephone.

4   Obtain 10-second bursts of digits 1 to 9, 0, and 11 to 15 (in that order) for all digits on the specified loop:
     TONE loop ALL

     Each burst should sound different. If the bursts do not sound different, replace the card.

5   End the session in LD 46:
     ****

Procedure 6
Multifrequency signaling cards

Use this procedure to test a multifrequency signaling card.

1   Log into the system:
       LOGI (password)

2   Test and enable the specified unit:
       LD 54
       ATST l s c uloop, shelf, card, and unit numbers

       If the system response is other than **OK**, see the *Administration*
       (553-3001-311) to analyze the messages.

3   End the session in LD 54:
       ****

Procedure 7
Network cards

Use this procedure to test a network card.

1   Log into the system:
       LOGI (password)

2   Perform a network memory test, continuity test, and signaling test:
       LD 30
       LOOP loopcan be a specific loop number or ALL

       If ALL is specified, all enabled loops (except attendant console loops)
       and all shelves on each loop are tested.

       If only one loop is being tested and it is disabled, enter **ENLL loop** to
       enable and test a network card associated with the specified loop.
       (This command cannot enable network cards disabled by LD 32.)

       If the system response is other than **OK**, see the *Administration*
       (553-3001-311) to analyze the messages.

3   End the session in LD 30:
       ****

Trunk cards

Use the following procedures to test a trunk card.

Procedure 8
Test procedure using a maintenance telephone

1 Access the system from a maintenance telephone.

See "Communicating with the Meridian 1" in the *Administration* (553-3001-311) for details on accessing the system from a maintenance telephone.

2 Test the trunk unit:
LD 36
TRK l s c u loop, shelf, card, and unit numbers

3 If the maintenance telephone is hooked up to a monitor and the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

Procedure 9
Test procedure using a system terminal

1 Log into the system:
LOGI (password)

2 Enter:
LD 36

3 To test a trunk from a remote test center, seize a central office (CO) monitor trunk:
CALL
   or
CALL l s c u

Seize the automatic number identification (ANI) trunk:
TRK l s c u loop, shelf, card, and unit numbers

When you see the **DN?** prompt, enter the directory number (DN) you want the system to dial.

If the system response is other than **OK**, see the *Administration* (553-3001-311) to analyze the messages.

4 End the session in LD 36:
****

5   Test an automatically identified outward dialing (AIOD) trunk card:
LD 41
AIOD l s cloop, shelf, and card numbers

If the system response is other than **OK**, see the *Administration*
(553-3001-311) to analyze the messages.

6   End the session in LD 41:
****

Procedure 10
Tone and digit switch cards

Use this procedure to test a tone and digit switch (TDS) card or to test the TDS
function of an NT8D17 Conference/TDS Card.

1   Log into the system:
LOGI (password)

2   Obtain a list of terminal numbers (TNs) for disabled TDS cards:
LD 34
STAD

3   If the TDS loop to be tested is disabled, enable it.

For an NT8D17 Conference/TDS Card, enter:
ENLX loop
(the TDS/MFS loop is the even loop of the conference/TDS loop pair)

Note: The conference/TDS card is not enabled automatically when it
is inserted. You must enable the card with the command ENLX. (This
command is used in LD 34 and LD 46 to address even loops and in
LD 38 to address odd loops.) Enabling the loops with the command
ENLL does not enable the hardware for the card.

For other than an NT8D17 Conference/TDS Card, enter:
ENLL loop

4   Test the TDS loop:
TDS loop

If the system response is other than **OK**, see the *Administration*
(553-3001-311) to analyze the messages.

5   End the session in LD 34:
****

6   Using a maintenance telephone, log into the system.

See "Communicating with the Meridian 1" in the *Administration* (553-3001-311) for details on accessing the system using a maintenance telephone.

7   From the maintenance telephone, enter:
LD#34##

To test outpulsers and channels for the TDS loop, see Table 2 on page 31 for a sample of the input commands used with the maintenance telephone. See the *Administration* (553-3001-311) for all tones that can be tested.

8   Exit LD 34 from the maintenance telephone:
****

Table 2
TDS tone tests

Input command	Dial pad equivalent	Description
BSY#loop##	279#loop##	Provides busy tone from TDS loop specified.
C##	2##	Removes any active tone.
DIA#loop##	342#loop##	Provides dial tone from TDS loop specified.
OVF#loop##	683#loop##	Provides overflow tone from TDS loop specified.
RBK#loop##	725#loop##	Provides ringback tone from TDS loop specified.
RNG#loop##	764#loop##	Provides ring tone from TDS loop specified.
****		Exits TDS test program.

Option settings

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *Multi-Purpose Serial Data Link: Description* (553-3001-195)

- *Administration* (553-3001-311)

Circuit card grid

Some circuit cards contain option switches or jumpers, or both, that define specific functions. A switch or jumper can be identified by an alphanumeric coordinate (such as D29) that indicates a location on the card, or by a switch number (such as SW2) printed on the circuit board (see Figure 3 on page 32). Positions on a switch (for example, positions 1, 2, 3, and 4 on SW2) are labeled on the switch block.

On a circuit card

- ON may be indicated by the word "on," the word "up," the word "closed," the number "1," an arrow pointing up, or a solid dot (•).

- OFF may be indicated by the word "down," the word "open," the number "0," or an arrow pointing down.

Throughout this document, if neither ON nor OFF is given (there is a blank space) for a position on a switch, that position may be set to either ON or OFF because it has no function for the option described.

Figure 3
Circuit card grid

553-5491
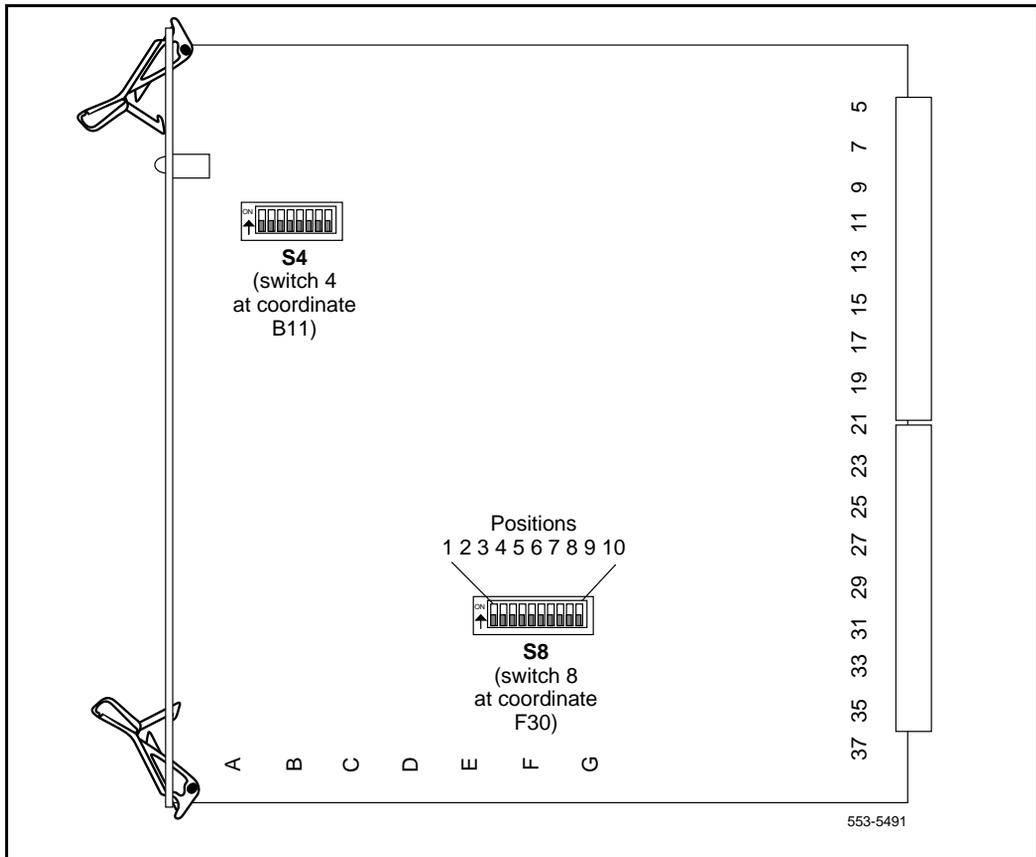
NT1R20 Off-Premise Station card

The following table lists option settings for the NT1R20 Off-Premise Station analog card.

Table 3
OPS analog line card configuration

Application	On-premise station (ONS)			Off-premise station (OPS)			
Class of Service (CLS) (Note 1)	ONP			OPX			
Loop resistance (ohms)	0–460			0–2300 (Note 2)			
Jumper strap setting (Note 6)	Both JX.0 and JX.1 off			Both JX.0 and JX.1 off		Both JX.0 and JX.1 on	
Loop loss (dB) (Note 3)	0–1.5	>1.5–2.5	>2.5–3.0	0–1.5	>1.5–2.5	>2.5–4.5	>4.5–15
TIMP (Notes 1, 4)	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms
BIMP (Notes 1, 4)	600 ohms	3COM1	3COM2	600 ohms	3COM1	3COM2	3COM2
Gain treatment (Note 5)	No						Yes

Note 1: Configured in the Single-line Telephone Administration program (LD 10).

Note 2: The maximum signaling range supported by the OPS analog line card is 2300 ohms.

Note 3: Loss of untreated (no gain devices) metallic line facility. Upper loss limits correspond to loop resistance ranges for 26 AWG wire.

Note 4: Default software impedance settings are:

	ONP CLS	**OPX CLS**
TIMP:	600 ohms	600 ohms
BIMP:	600 ohms	3COM2

Note: Gain treatment, such as a voice frequency repeater (VFR) is required to limit the actual OPS loop loss to 4.5 dB, maximum. VFR treatment of metallic loops having untreated loss greater than 15 dB (equivalent to a maximum signaling range of 2300 ohms on 26 AWG wire) is not recommended.

Note: Jumper strap settings JX.0 and JX.1 apply to all eight units; "X" indicates the unit number, 0–7. "Off" indicates that a jumper strap is not installed across both pins on a jumper block. Store unused straps on the OPS analog line card by installing them on a single jumper pin as shown below:

553-5924

NT5D12AA Dual DTI/PRI (DDP) card

Switch setting tables for this card are listed in subsections according to their function. Bold font designates factory (default) settings.

General purpose switches

Use switch set SW9 for Trunk 0; use switch set SW15 for Trunk 1

General purpose switch settings

Switch	Description	SW9/SW15 switch setting
1	Framing Mode	**off - ESF**
		on - SF
2	Yellow Alarm Method	**off - FDL**
		on - Digit2
3	Zero Code Suppression Mode	**off - B8ZS**
		on - AMI
4	Unused	**off**

Trunk interface switches

A switch provides selection of T1 transmission. Use switch SW4 for Trunk 0; use switch SW10 for Trunk 1.

Table 4
Trunk interface transmission mode switch settings

Description	SW4/SW10 switch setting
For future use	off
T1	on

A set of three switches provides selection of dB values. Use SW5, SW6, and SW7 for Trunk 0; use SW11, SW12, and SW13 for Trunk 1.

Table 5
Trunk interface line build out switch settings

Description	Switch setting		
	SW5/SW11	**SW6/SW12**	**SW7/SW13**
0 dB	off	off	off
7.5 dB	on	on	off
15 dB	on	off	on

A set of four DIP switches provides selection among three values for receiver impedance. Use SW8 for Trunk 0; use SW14 for Trunk 1.

Table 6
Trunk interface impedance switch settings

Description	SW8/SW14 switch settings			
75 Ω	off	off	on	off
100 Ω	on	off	off	on
120 Ω	off	off	off	on

Ring ground switches

A set of four DIP switches selects which Ring lines are connected to ground.

Table 7
Ring ground switch settings

Switch	Description	S2 switch setting
1	Trunk 0 Transmit	**off - Ring line is not grounded** on- Ring line is grounded
2	Trunk 0 Receive	**off - Ring line is not grounded** on - Ring line is grounded
3	Trunk 1 Transmit	**off - Ring line is not grounded** on - Ring line is grounded
4	Trunk 1 Receive	**off - Ring line is not grounded** on - Ring line is grounded

DCH mode and address select switches

One switch selects an on-board NTBK51AA D-Channel daughterboard and an external MSDL/DCHI card. Four other switches provide the daughterboard address.

Table 8
DCH mode and address select switch settings

Switch	Description	S3 Switch Setting
1-4	D-Channel daughterboard Address	See the next table.
5-7	For future use	off
8	External DCH or Onboard DDCH	**off - MSDL or DCHI card** on - Onboard DDCH daughterboard

Table 9
NTBK51AA daughterboard address select switch settings

Device Address[1]	Switch Setting			
0[2]	off	off	off	off
1	on	off	off	off
2	off	on	off	off
3	on	on	off	off
4	off	off	on	off
5	on	off	on	off
6	off	on	on	off
7	on	on	on	off
8	off	off	off	on
9	on	off	off	on
10	off	on	off	on
11	on	on	off	on
12	off	off	on	on
13	on	off	on	on
14	off	on	on	on
15	on	on	on	on

Note 1: The maximum number of DCHI, MSDL, and DDCH devices in the system is 16.

The Device Addresses are equivalent to the MSDL DNUM designations. For programming information on the MSDL, refer to NTPs *Multi-Purpose Serial Data Link: Description* (553-3001-195) and *Administration* (553-3001-311) *guide*.

Note 2: Device address 0 is commonly assigned to the System Monitor.

Illustrations of switch locations and settings

Figure 4 on page 38 below displays functional areas for switches on the DDP card.

Figure 4
Switch functions and areas
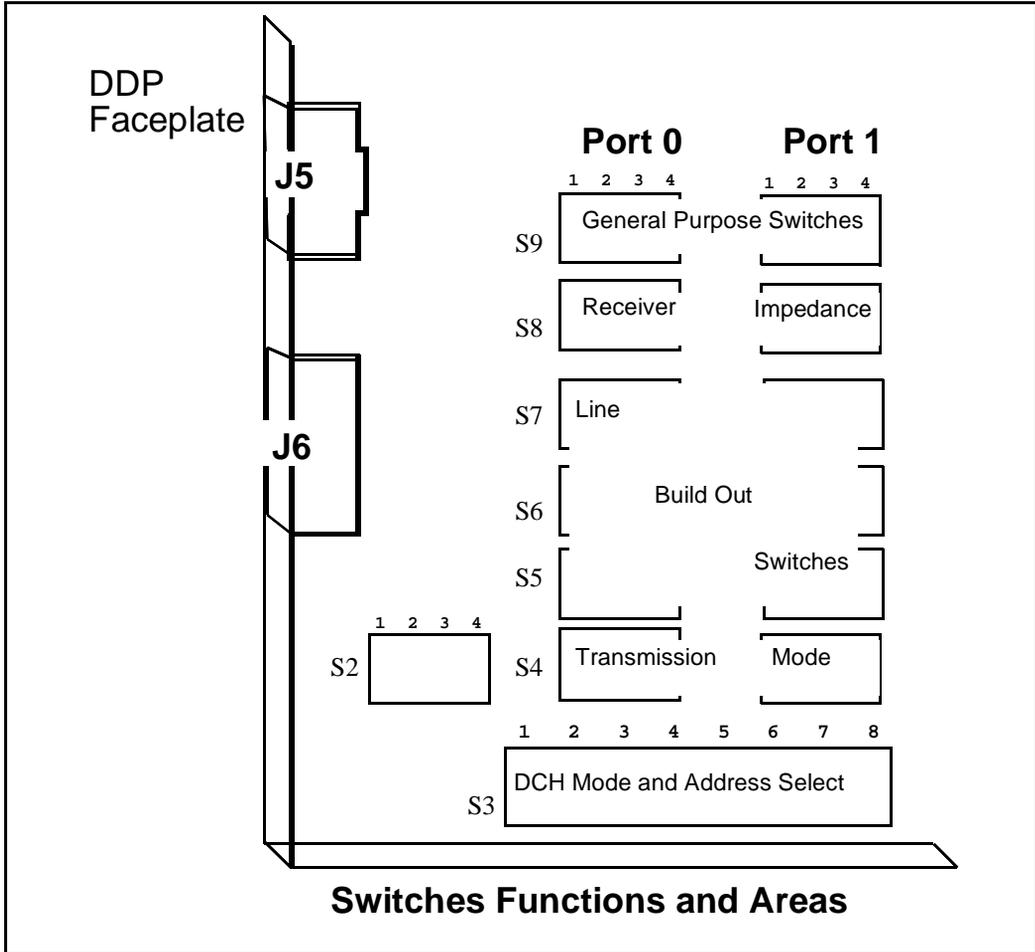
Figure 5 on page 39 displays default settings for switches on the DPP card.

Figure 5
Switch default settings

Switch Default Setting
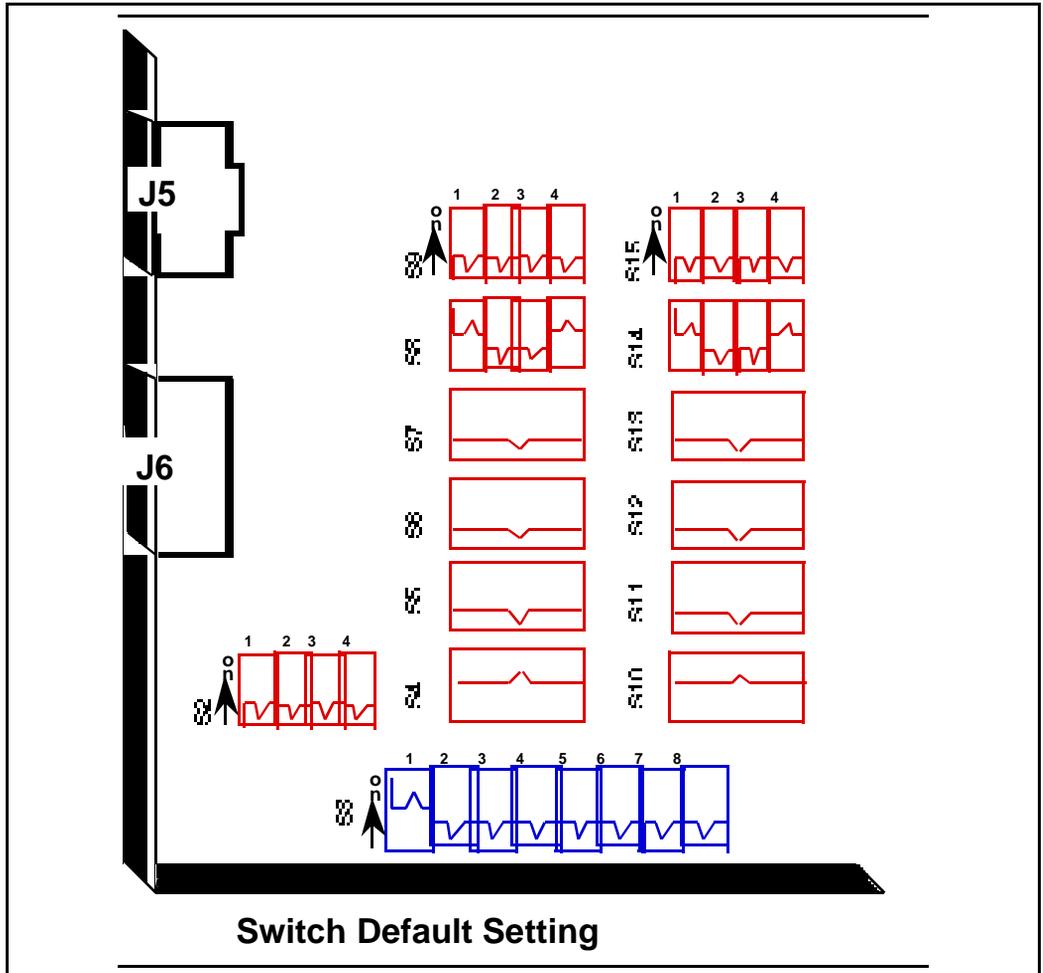
NT6D42 Ringing Generator DC

The next six tables list option settings for the NT6D42 Ringing Generator.

NT6D42 recommended options for North American and British Telecom

Application	Ringing frequency	Ringing voltage	Jumper locations	Ringing output
North America	20 Hz	86 V ac	P5 High voltage message waiting	Low impedance
British Telecom	25 Hz	80 V ac	P4 No high voltage message waiting	Low impedance

NT6D42 jumper locations P4 and P5

High voltage message waiting	Pin location
Disable	Jumper in P4
Enable	Jumper in P5
Note: One jumper must be installed.	

NT6D42 jumper location J7

Ringing output	Jumper location J7
Low impedance (normal)	Connect pins 1 and 2
High impedance (Australia)	Connect pins 2 and 3

NT6D42 SW1

Ringing frequency (Hz)	Position SW1
20	1
25	2
50	3

NT6D42CB SW2

Ringing voltage	Message waiting voltage	SW2			
		1	**2**	**3**	**4**
86 V ac	−120 V dc	off	off	off	off
86 V ac	−150 V dc	off	off	off	on
80 V ac	−120 V dc	on	off	off	off
80 V ac	−150 V dc	on	off	off	on
75 V ac	−120 V dc	off	on	off	off
75 V ac	−150 V dc	off	on	off	on
70 V ac	−120 V dc	off	off	on	off
70 V ac	−150 V dc	off	off	on	on

NT6D42CC SW2

Ringing voltage	Message waiting voltage	SW2			
		1	**2**	**3**	**4**
86 V ac	−100 V dc	off	off	off	off
86 V ac	−150 V dc	off	off	off	on
80 V ac	−100 V dc	on	off	off	off
80 V ac	−150 V dc	on	off	off	on
75 V ac	−100 V dc	off	on	off	off
75 V ac	−150 V dc	off	on	off	on
70 V ac	−100 V dc	off	off	on	off
70 V ac	−150 V dc	off	off	on	on

NT5D2101/NT9D1102 Core/Network Module Backplane

Jumper	Location (between slots)	Core/Network 1	Core/Network 0
JB1	14/15	Jumper plug not installed	Plug installed

Note: Berg jumper is located at the bottom of the primary side of the backplane. (This is inside the card cage assembly.)

NT6D68 Core Module Backplane

Jumper	Location (between slots)	Core 1	Core 0
JB4	9 / 10	Jumper plug not installed	Plug installed
JB3	10 / 11	Plug installed	Plug installed
JB2	11 / 12	Plug installed	Plug installed
JB1	12 / 13	Plug installed	Plug installed

Note: Berg jumpers are located along the bottom of the primary side of the backplane. (This is inside the card cage assembly.)

NT6D80 Multi-purpose Serial Data Link Card

	Port 0—SW4	**Port 0—SW8**
RS-232-D DTE or DCE* RS-422-A DTE (terminal) RS-422-A DCE (modem)	all off all off all on	all off all on all off
	Port 1—SW3	**Port 1—SW7**
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	all off all off all on	all off all on all off
	Port 2—SW2	**Port 2—SW6**
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	all off all off all on	all off all on all off
	Port 3—SW1	**Port 3—SW5**
RS-232-D DTE or DCE* RS-422-A DTE RS-422-A DCE	all off all off all on	all off all on all off
* RS-232-D DTE and DCE modes are software configured. RS-422-A DTE and DEC modes are switch configured.		
Note: The device number for the MSDL card is configured in LD17 at the prompt DNUM. You must also set the device number, using switches S9 and S10, on the MSDL card. S9 designates ones and S10 designates tens. To set the device number as 14, for example, set S10 to 1 and S9 to 4.		

NT8D14 Universal Trunk Card

The next five tables list option settings for the NT8D14 Universal Trunk Card.

NT8D14 vintage AA jumper strap settings

Modes	Location	Jumper strap
Central Office (CO)	J1, J2	off
2-way tie trunk (loop dial repeat)	J1, J2	off
2-way tie trunk (outgoing/incoming dial)	J1, J2	off
Recorded announcement (RAN)	J1, J2	off
Paging trunk	J1, J2	off
Japan CO/DID operation	J1, J2	off
DID operation: loop length > = 2000 ¾	J1, J2	on
DID operation: loop length < 2000 ¾	J1, J2	off
Note 1: off = no strap present.		
Note 2: Locations (J1, J2) apply to all eight units.		

NT8D14 vintages BA/BB jumper strap settings—factory standard

Trunk types	Loop length	Jumper strap settings			
		J1.X	**J2.X**	**J3.X**	**J4.X**
CO/FX/WATS	Zero–1524 m (5000 ft)	Off	Off	1–2	1–2
2-way tie (LDR)					
2-way tie (OAID)					
DID	Zero–600 ohms				
RAN: continuous operation mode	Not applicable: RAN and paging trunks should not leave the building.				
Paging					

Note: Jumper strap settings J1.X, J2.X, J3.X, and J4.X apply to all eight units; "X" indicates the unit number, 0–7. "Off" indicates that no jumper strap is installed on a jumper block. Store unused straps on the universal trunk card by installing them on a single jumper pin as shown below:

Jumper pin

Jumper strap

Jumper block

553-5924
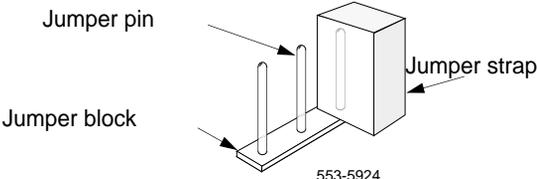
NT8D14 vintages BA/BB jumper strap settings—extended range

Trunk types	Loop length	Jumper strap settings			
		J1.X	**J2.X**	**J3.X**	**J4.X**
CO/FX/WATS	> 1524 m (5000 ft)	Off	Off	1–2	2–3
2-way tie (LDR)					
2-way tie (OAID)					
DID	> 600 ohms	On	On	1–2	2–3
RAN: pulse start or level start modes	Not applicable: RAN trunks should not leave the building.	Off	Off	2–3	1–2

Note: Jumper strap settings J1.X, J2.X, J3.X, and J4.X apply to all eight units; "X" indicates the unit number, 0–7. "Off" indicates that no jumper strap is installed on a jumper block.

NT8D14 vintages BA/BB trunk types—termination impedance and balance network

Trunk types	Terminating impedance (Note 1)	Balance network for loop lengths (Note 2)		
		Zero–915 m (zero–3000 ft)	915–1524 m (3000–5000 ft)	> 1524 m (> 5000 ft)
CO/FX/WATS	600 or 900 ohms	600 ohms	3COM1	3COM2
2-way tie (LDR)	600 or 900 ohms	600 ohms	3COM1	3COM2
2-way tie (OAID)	600 or 900 ohms	600 ohms	3COM1	3COM2
DID (loop < 600 ohms)	600 or 900 ohms	600 ohms	3COM1	3COM2
DID (loop Š 600 ohms)	600 or 900 ohms	600 ohms	N/A	3COM2
RAN: continuous operation mode	600 or 900 ohms	600 or 900 ohms	N/A	N/A
Paging	600 ohms	600 ohms	N/A	N/A

Note 1: The terminating impedance of each trunk unit is software selectable in LD 14 and should match the nominal impedance of the connecting equipment.

Note 2: The balance network of each trunk unit is software selectable between resistive 600 or 900 ohms or 3COM and is jumper selectable between 3COM1 and 3COM2.

NT8D14 vintages BA/BB cable loop resistance and loss

Cable length	Cable loop resistance (ohms)			Cable loop loss (dB) (non-loaded at 1kHz)		
	22 AWG	24 AWG	26 AWG	22 AWG	24 AWG	26 AWG
915 m (3000 ft)	97	155	251	0.9	1.2	1.5
1524 m (5000 ft)	162	260	417	1.6	2.0	2.5
2225 m (7300 ft)	236	378	609	2.3	3.0	3.7
3566 m (11700 ft)	379	607	977	3.7	4.8	6.0
5639 m (18500 ft)	600	960	1544	5.9	7.6	9.4

NT8D15 E&M Trunk Card

Jumper (Note 1)	Mode of operation (Note 2)					
	2-wire trunk		4-wire trunk			
					DX tip & ring pair	
	Type I	Paging	Type I	Type II	M—rcv M—xmt	E—rcv M—xmt
J1.X	off	off	off	off	Pins 1–2	Pins 2–3
J2.X	on	on (Note 3)	on	on	off	off
J3.X	off	off	off	off	(Note 4)	(Note 4)
J4.X	off	off	off	off	Pins 2–3	Pins 1–2
J5.X	off	off	off	off	(Note 4)	(Note 4)
J6.X	off	off	off	off	on	on
J7.X	off	off	off	off	on	on
J8.X	off	off	off	off	on	on
J9.X	Pins 2–3	Pins 2–3	Pins 2–3	Pins 2–3	Pins 1–2	Pins 1–2

Note 1: Jumper strap settings J1.X through J9.X apply to all 4 units; "X" indicates the unit number, 0–3.

Note 2: Off indicates that no jumper strap is installed on a jumper block.

Note 3: Paging trunk mode is not zone selectable.

Note 4: Jumper strap installed in this location only if external loop resistance exceeds 2500 ohms.

Note 5: Dot next to the jumper block indicates pin 1.

NT8D17 Conference/TDS Card

Switch and jumper settings are used to select the companding law and to change the conference attenuation PAD levels. These PAD levels are used if prompt CPAD = 1 in LD97. The J1 connector on the faceplate is reserved for future use.

You can enable or disable a warning tone for conference calls. When the option is enabled, the tone lets callers know they are entering a conference call. The switch for this option is preset to disable the warning tone.

Companding law	Jumper at J3		
μ-law (North America), A-law	connect pins 2 and 3		
Special cases	connect pins 1 and 2		
Attenuation levels	**SW2 (see Note)**		
	1	**2**	**3**
10.2 db	on	on	on
8.5 db	on	off	on
6 db	off	on	on
6 db	off	off	on
4.5 db	on	on	off
3 db	on	off	off
0 db	off	on	off
0 db	off	off	off

Note: Set position 4 to ON to disable the warning tone option. When the warning tone is enabled, select the warning tone level as shown below.

Level	Jumper at J2
24 db	connect pins 1 and 2
30 db	connect pins 2 and 3

NT8D21 Ringing Generator AC

Frequency	Amplitude	Settings		
		P1	**P2**	**P3**
20 Hz	86 V ac	open	open	2–5 8–11
25 Hz	70 V ac	open	1–4 7–10	open
25 Hz	80 V ac	open	3–6 9–12	open
25 Hz	86 V ac	open	2–5 8–11	open
50 Hz	70 V ac	1–4 7–10	open	open
50 Hz	80 V ac	3–6 9–12	open	open

NT8D22 System Monitor

The master system monitor, located in the column with CP 0, must be numbered 0. Slave system monitors are numbered from 1 to 63.

For examples of system monitor option settings in basic configurations, see "Sample settings for NT8D22 System Monitors."

Configure the system monitor in Remote Peripheral Equipment (RPE) columns as slaves. There is no serial connection between RPE columns.

NT8D22 SW1

SW1 function	Position							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Not used Meridian 1 columns only	on off							
Position 1 is OFF (Meridian 1 columns only) Not used Position 1 is ON, master column contains CP:　　　master 　　　　　　　　　　　　　　　　　　　　　　slaves		off off on off						
DC-powered system AC-powered system			on off					
PFTU is activated by this column due to over-temperature PFTU is not activated by this column				on off				
Position 1 is OFF (Meridian 1 columns only) Not used Not used					off on off			
Position 1 is OFF (Meridian 1 columns only) Not used Not used						off on off		
Not used Not used Not used Meridian 1 columns only							on on off off	on off on off

NT8D22 SW2

SW2 indication	Position							
	1	2	3	4	5	6	7	8
Master system monitor Slave system monitor	on off							
Not used All other operation		on off						
For master, indicates total number of slaves			Set 3–8 according to the table titled "NT8D22 settings for total number of slaves—SW2 on master."					
For each slave, indicates the slave address			Set 3–8 according to the table titled "NT8D22 slave address—SW2 on slave."					

NT8D22 SW3

SW3 indication		Position			
		1	2	3	4
CTA	master slave	on off			
CTR	master slave		on off		
FAIL	master slave			on off	
MAJOR	master slave				on off

NT8D22 settings for total number of slaves—SW2 on master

How many slave units	Switch position						How many slave units	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
0	on	on	on	on	on	on	32	off	on	on	on	on	on
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on
31	on	off	off	off	off	off	63	off	off	off	off	off	off

NT8D22 slave address—SW2 on slave

Slave unit address	Position						Slave unit address	Position					
	3	4	5	6	7	8		3	4	5	6	7	8
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on
31	on	off	off	off	off	off	63	off	off	off	off	off	off
32	off	on	on	on	on	on							

NT8D41BA Quad Serial Data Interface Paddle Board

Baud rate

Switches SW13, SW10, SW11, and SW12 determine the baud rate for ports 1, 2, 3, and 4, respectively. See the settings for these switches in the following table.

QSDI paddle board baud rate switch settings

Baud rate	Baud Clock (kHz)	SW13 (port 1), SW10 (port 2), SW11 (port 3), SW12 (port 4)			
		1	2	3	4
150	2.40	on	off	on	on
300	4.80	on	on	off	on
600	9.60	on	off	off	on
1,200	19.20	on	on	on	off
2,400	38.40	on	off	on	off
4,800	76.80	on	on	off	off
9,600	153.60	on	off	off	off
19,200*	307.20	on	on	on	on

* For future use.

Address

Switch SW15 or SW16 and logic on the card always address the four UARTs using a pair of addresses: 0 and 1, 2 and 3 through 14 and 15. The settings for both switches are shown in the following table. To avoid system problems, switches SW15 and SW16 must not be configured identically.

QSDI paddle board address switch settings

SW15	Port 1	Port 2	Switch settings							
SW16	Port 3	Port 4	1*	2+	3	4	5	6	7	8
	0	1	E	X	off	off	off	off	off	off
	2	3	E	X	off	off	off	off	off	on
Device	4	5	E	X	off	off	off	off	on	off
pair	6	7	E	X	off	off	off	off	on	on
addresses	8	9	E	X	off	off	off	on	off	off
	10	11	E	X	off	off	off	on	off	on
	12	13	E	X	off	off	off	on	on	off
	14	15	E	X	off	off	off	on	on	on

* To enable ports 1 and 2, set SW15 position 1 to ON. To enable ports 3 and 4, set SW16 position 1 to ON.
+ For each X, the setting for this switch makes no difference, because it is not used.

DTE/DCE mode

Each serial port can be configured to connect to a terminal (DTE equipment) or a modem (DCE equipment). Instructions for setting the DTE/DCE switches SW2, SW3, SW4, SW5, SW6, SW7, SW8, and SW9 are shown in the following table.

Example: Port 1 is changed from DTE to DCE by reversing every switch position on SW3 and SW2; i.e., switches that were off for DTE are turned on for DCE, and switches that were on for DTE are turned off for DCE.

QSDI paddle board DTE/DCE mode switch settings

Mode	Port 1 — SW 3						Port 1 —SW 2					
	1	2	3	4	5	6	1	2	3	4	5	6
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
	Port 2 — SW 5						Port 2 — SW4					
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
	Port 3 — SW 7						Port 3— SW 6					
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off
	Port 4 — SW 9						Port 4 — SW 8					
DTE (terminal)	on	on	on	off	on	off	off	on	off	on	off	on
DCE (modem)	off	off	off	on	off	on	on	off	on	off	on	off

NT8D72 Primary Rate Interface Card

The NT8D72 Primary Rate Interface card allows the setting of interface impedance by way of DIP switches.

Figure 6
NT8D72 DIP switch settings
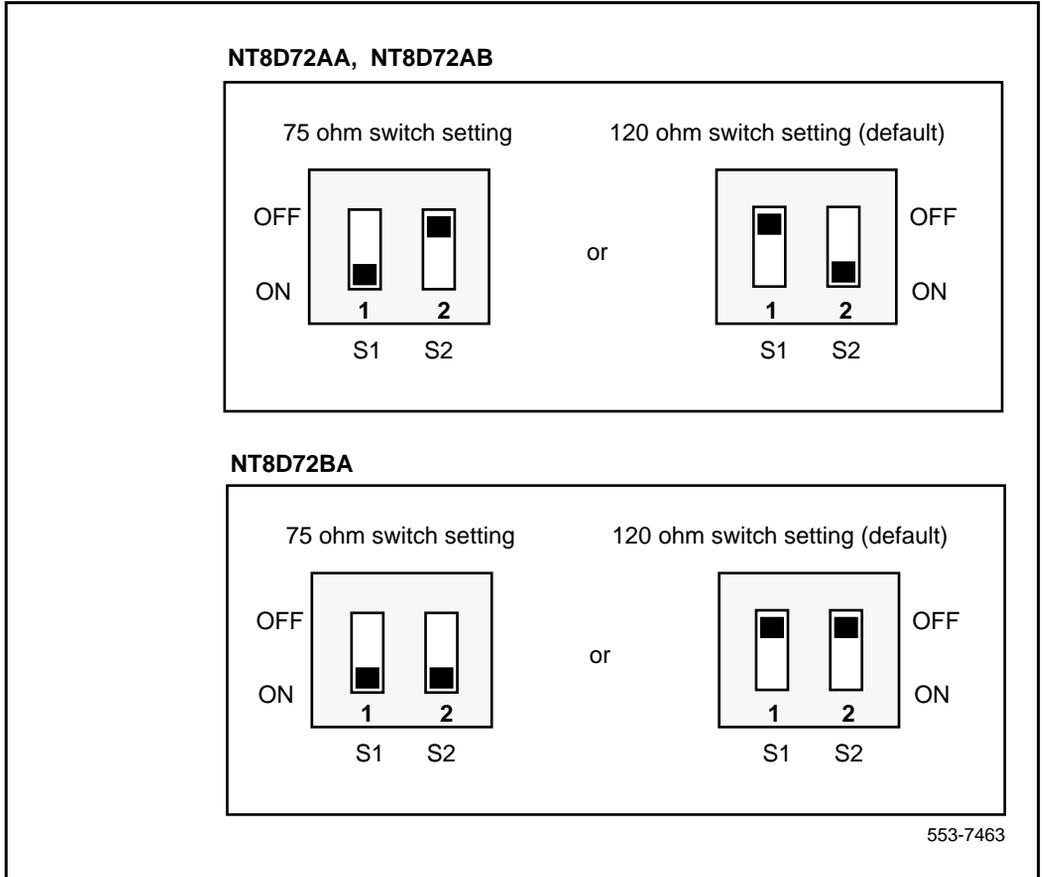
QPC43 Peripheral Signaling Card

Options (minimum vintage N)	Plug location
NT5D21 Core/Network Module NT8D35 Network Module	F13

QPC71 E&M/DX Signaling and Paging Trunk Cards

Application	Unit 0 E35 switch								Unit 1 E5 switch							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
E&M	off	off	off	on	off	off	on	off	off	off	off	on	off	off	on	off
Paging	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off
DX 2-wire (conductor loop < 2.5 K ¾)	on	on	off	off	off	on	off	on	on	on	off	off	off	on	off	on
DX 2-wire (conductor loop > 2.5 K ¾)	on	on	on	on	off	on	off	on	on	on	on	on	off	on	off	on
DX 4-wire (conductor loop < 2.5 K ¾)	off	off	off	off	on	on	off	on	off	off	off	off	on	on	off	on
DX 4-wire (conductor loop > 2.5 K ¾)	off	off	on	on	on	on	off	on	off	off	on	on	on	on	off	on

Note: DX trunks must be balanced correctly. If the loop is <2.5 K ¾, far-end balancing is standard. If the loop is >2.5 K ¾, far end balancing requires standard plus 2.5 K ¾. To connect PBX to PBX, switches should be arranged for loops to be >2.5 K ¾ at one end and <2.5 K ¾ at the other. Apply similar treatment when connecting to Pulse QPJ69 trunks.

QPC414 Network Card

Application	Pin connection J3/S2 and J4/S1
Option A: In-house remote peripheral equipment (RPE), microwave, fiber optics	connect pins 2 and 3 (pin 1 is next to the white dot)
Option B: T-1 facilities (including PRI/DTI),* channel service unit	connect pins 1 and 2 (pin 1 is next to the white dot)

*   To connect 1.5M RPE to T-1 through channel service unit, select option B. For 2M RPE, jumper plugs are not used.

Note 1: Possible jumper locations for vintage B (for different styles/series):
         J3—E11 or H11
         J4—H17 or E7
         S1 and S2—E33

Note 2: Possible jumper locations for vintage A (for different styles/series). These cards do not have the option selection and can only be used in the option A setting:
         J3—H5 or E11
         J4—H17 or E7
         S1 and S2—E33

Note 3: Connectors and loop relations:
         Even loop: J1 faceplate connector, jumper at J4 or S1
         Odd loop: J2 faceplate connector, jumper at J3 or S2

QPC441 3-Port Extender Cards

For Option 51C, 61C and 81C systems, QPC441 vintage F or later must be used in all modules.

Table 10
QPC441 3PE Card installed in the NT5D21 Modules

Jumper Settings: Set Jumper RN27 at E35 to "A".								
Switch Settings								
Module	**D20 switch position**							
NT5D21 (Option 51C)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Core/Network	off	on	on	off	on	on	on	on
NT5D21 (Option 61C)								
Core/Network 0	off	on	on	off	on	on	on	on
Core/Network 1	off	on	on	off	on	on	on	off
NT5D21 (Option 81C)								
Core/Net 0 (Shelf 0)	Group 0	off	on	on	off	on	on	on	on
	Group 1	off	on	on	off	on	on	off	on
	Group 2	off	on	on	off	on	off	on	on
	Group 3	off	on	on	off	on	off	off	on
	Group 4	off	on	on	off	off	on	on	on
	Group 5	off	on	on	off	off	on	off	on
	Group 6	off	on	on	off	off	off	on	on
	Group 7	off	on	on	off	off	off	off	on
Core/Net 1 (Shelf 1)	Group 0	off	on	on	off	on	on	on	off
	Group 1	off	on	on	off	on	on	off	off
	Group 2	off	on	on	off	on	off	on	off
	Group 3	off	on	on	off	on	off	off	off
	Group 4	off	on	on	off	off	on	on	off
	Group 5	off	on	on	off	off	on	off	off
	Group 6	off	on	on	off	off	off	on	off
	Group 7	off	on	on	off	off	off	off	off

Table 11
QPC441 3PE Card installed in the NT8D35 Module

Jumper Settings								
Set Jumper RN27 at E35 to "A".								
Switch Settings								
D20 switch position:		**1**	**2**	**3**	**4**			
81, 81C (Note 1)		off	on	on	on			
Shelf	**Group**	D20 switch position:				**5**	**6**	**7**	**8**
0	0					on	on	on	on
	1					on	on	off	on
	2					on	off	on	on
	3					on	off	off	on
	4					off	on	on	on
	5					off	on	off	on
	6					off	off	on	on
	7					off	off	off	on
1	0					on	on	on	off
	1					on	on	off	off
	2					on	off	on	off
	3					on	off	off	off
	4					off	on	on	off
	5					off	on	off	off
	6					off	off	on	off
	7					off	off	off	off
Note 1: For Option 51C, 61C, and 81C systems, QPC441 vintage F or later must be used in all modules.								

QPC559, QPC560 Loop Signaling Trunk Cards

The next two tables list option settings for loop signaling trunk cards.

QPC559, QPC560 single density

Application	Single density—Unit 0/1 F30/F8 switch					
	1	2	3	4	5	6
Outgoing ANI only:						
loop pulsing	off	off	off	off	off	off
battery and ground pulsing	off	off	off	off	on	off
Other than outgoing ANI	on	off	on	off	on	off
	Jumpers (QPC560) Units 0/1/2/3					
600 ¾ resistive impedance	connect pins 1 and 2					
3-component complex impedance	connect pins 2 and 3					

QPC559, QPC560 double density

Application	Double density—Unit 0/1/2/3 H17/H3/A17/A3 switch					
	1	2	3	4	5	6
Outgoing ANI only:						
loop pulsing	off	off	off	off	off	off
battery and ground pulsing	off	off	off	off	on	off
Other than outgoing ANI	on	off	on	off	on	off
	Jumpers (QPC560) Units 0/1/2/3					
600 ¾ resistive impedance	connect pins 1 and 2					
3-component complex impedance	connect pins 2 and 3					

QPC528 CO/FX/WATS Trunk Cards

The following table list switch and jumper settings for options available.

QPC528 Trunk Cards switch and jumper settings

Switch Settings										
	Switch S1 (location A23)									
Switch position:	1	2	3	4	5	6	7	8		
	on	off	on	off	on	off	on	off		
	Unit 0, Switch S2 (Location E29) Unit 1, Switch S3 (Location E9) Unit 2, Switch S4 (Location A28) Unit 3, Switch S5 (Location A10)									
Switch position:	1	2	3	4	5	6	7	8	9	10
Trunk type:										
Loop start	off	on	off	off	on	off			off	off
Ground start	off	on	on	on	on	off			off	off
Metering:										
Second pair (M, MM) or							off	off		
Third wire, battery on M or							off	on		
Third wire, ground on M							on	off		
Jumper Settings										
	Unit 0 jumper (Location E27) Unit 1 jumper (Location E11) Unit 2 jumper (Location D29) Unit 3 jumper (Location D9)									
Jumper:	**Unit 0 Jumper**		**Unit 1 Jumper**		**Unit 2 Jumper**		**Unit 3 Jumper**			
600 ¾ resistive impedance	Pin 1 to 2		Pin 1 to 2		Pin 1 to 2		Pin 1 to 2			
3-component complex impedance	Pin 2 to 3		Pin 2 to 3		Pin 2 to 3		Pin 2 to 3			

QPC471 Clock Controller Card

The next table lists option settings for the QPC471 Clock Controller Card.

Table 12
QPC471 vintage H

System	SW1				SW2				SW4			
	1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
51C, 61C	on	on	on	on	off	off	off	off	off	on	*	*
81	off	off	off	off	off	off	off	off	off	on	*	*
81C	on	off	off	off	off	off	off	off	**	on	*	*
81C with Fiber Network	on	off	off	off	off	off	off	off	**	on	*	*
					*Cable length between the J3 faceplate connectors:							
					0–4.3 m (0–14 ft)						off	off
					4.6–6.1 m (15–20 ft)						off	on
					6.4–10.1 m (21–33 ft)						on	off
					10.4–15.2 m (34–50 ft)						on	on

*   If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. The maximum total (combined) length is 50 ft. Set the switches on both cards to the same settings.

**   Set to ON for clock controller 0. Set to OFF for clock controller 1.

Note: FNF based-systems the total clock path length is equal to the length of the NTRC49 cable used to connect between the two clock controller cards.

QPC525, QPC526, QPC527, QPC777 CO Trunk Card

Application	Switches at E29/E9/A29/A11 Units 0/1/2/3							
	1	2	3	4	5	6	7	8
Zero ohm outpulsing	on	off						off
Standard outpulsing	off	on						off
Ground start			on	on				off
Loop start			off	off				off
Loop start, automatic guard detection			off	on				off
PPM daughterboard not installed					on			off
PPM daughterboard installed					off			off
Battery on M operation						off	on	off
Ground on M operation						on	off	off
Second pair M&MM						off	off	off

Note 1: Note 1: There is no ground start signalling for QPC777 CO trunk cards. Always select loop start signalling for QPC777 CO trunk cards.

Note 2: Note 2: On QPC777 CO trunk cards, the pads are in for short line lengths and the pads are out for long line lengths.

QPC550 Direct Inward Dial Trunk Card

The next five tables give the option settings for the QPC550 DID Trunk Card.

QPC550 vintages A and B—real/complex balance impedance selection

Device location	Device designation	Switch number	Unit number	Impedance type	
				Real	**Complex**
F31	S4.0	1	0	on	off
F24	S4.1	1	1	on	off
F16	S4.2	1	2	on	off
F11	S4.3	1	3	on	off

QPC550 vintage A—600/900 Ohm impedance selection

Device location	Device designation	Unit number	Impedance (ohms)	Switch number							
				1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
G29(a)	S3.0	0	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G29(b)	S3.1	1	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G8(a)	S3.2	2	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on
G8(b)	S3.3	3	600	off	on	on	off	off	on	on	off
			900	on	off	off	on	on	off	off	on

QPC550 vintage A—software/hardware control for 2dB pad

Device location	Device designation	Unit number	Switch number	S/W	2 dB pad control H/W	
					(pad in)	(pad out)
F38	S1	0	1	off	off	on
			2	on	off	off
		1	3	on	off	off
			4	off	off	on
F1	S2	0	1	off	off	on
			2	on	off	off
		1	3	on	off	off
			4	off	off	on

QPC550 vintage B—attenuation level control

Device location	Device designation	Unit number	Switch number								2 dB option
			1	2	3	4	5	6	7	8	
D39	S2.0/1	0	on		on		on		on		on
		1		off		off		off		off	off
D1	S2.2/3	2	on		on		on		on		on
		3		off		off		off		off	off

QPC550 vintage B—software control for 2dB pad

Device location	Device designation	Unit number	Switch number	2 dB pad control H/W	
				(pad in)	(pad out)
F38	S1.0/1	1	1	on	off
			2	off	off
		0	3	off	off
			4	on	off
F1	S1.2/3	3	1	on	off
			2	off	off
		2	3	off	off
			4	on	off

QPC551 Radio Paging Trunk Card

Signal duration on the 18-pair faceplate						S1 (F33)		
		1	**2**	**3**	**4**	**5**	**6**	
Binary value (.1 second)		1	2	4	8	16	32	

Note: This switch determines the length of time a signal stays on the 18-pair data bus. The time is set in binary to the nearest tenth second. For example, to keep data on the bus for 5 seconds, the switch settings total 50 by closing S1.2, S1.5, and S1.6.

Signal duration and pause time							S2 (G33)	
		1	**2**	**3**	**4**	**5**	**6**	**7**
Binary value (.1 second)		1	2	4	8	16	32	64

Note: This switch determines the time data must stay on the 18-pair data bus plus the pause time between the removal of data and the reappearance of subsequent data. The time is set in binary to the nearest tenth second. For example, to keep data on the bus for 5 seconds and have a pause time of 3.2 seconds, the switch settings should total 82 by closing S2.2, S2.5, and S2.7.

Application			S3 (E2) S4 (F2) Unit 0, Unit 1									
	1	**2**	**Address**	**3**	**4**	**5**	**6**	**Address**	**3**	**4**	**5**	**6**
Paging			0	off	off	off	off	8	off	off	off	on
single	on		1	on	off	off	off	9	on	off	off	on
multiple	off		2	off	on	off	off	10	off	on	off	on
			3	on	on	off	off	11	on	on	off	on
Timer*			4	on	off	on	off	12	on	off	on	on
enabled		on	5	on	on	on	off	13	on	off	on	on
disabled		off	6	off	on	on	off	14	off	on	on	on
			7	on	on	on	off	15	on	on	on	on

*   When enabled, this switch prevents a signal from being sent from a paging unit until 5 seconds have elapsed since the beginning of the previous signal on that same unit.

	S5 (E38) Unit 0		S6 (D1) Unit 1	
Impedance termination	1			
Real		on		
Complex		off		

QPC595 Digitone Receiver Cards

	Location	Connection
12 DTMF tones	E9	Center to E3
16 DTMF tones	E9	Center to E2

QPC577, QPC596 Digitone Receiver Daughterboards

16/12 tone options jumper	Jumper at P1
16 tone (4 x 4)	connect pins 1 and 2
12 tone (3 x 4)	connect pins 2 and 3
Note: When a DTR daughterboard is installed, check YES on the faceplate of the QPC659 Dual Loop Peripheral Buffer.	

QPC720 Primary Rate Interface Card

Switch S2 settings	To repeater facility	To cross-connect point
5 on	0–45 m (0–150 ft)	0–30 m (0–100 ft)
2, 4, 6 on	46–135 m (151–450 ft)	31–100 m (101–355 ft)
1, 3, 7 on	136–225 m (451–750 ft)	101–200 m (356–655 ft)
Switch 3 option for DTI with ESF		
SW3-1	on = extended superframe format (ESF) off = superframe format (SF)	
Note 1: All positions on S2 (location B22) are OFF except as shown under the column labeled "Switch S2 settings."		
Note 2: Framing format, line encoding, and method of yellow alarm are selectable for both DTI and PRI in LD17 with the DLOP, LCMT, and YALM prompts. All SW3 switch positions should be OFF.		

QPC775 Clock Controller Card

The next two tables give option settings for the QPC775 Clock Controller card.

QPC775 (before vintage E) switch settings

	SW2				SW3				SW4			
	1	2	3	4	1	2	3	4	1	2	3	4
81C	off	off	off	off	off	off	off	off	on	on	on	on
61C	on	on	on	on	off	off	off	off	on	on	on	on

QPC775 vintage E switch settings

System	SW1				SW2				SW4			
	1	2	3	4	1	2	3	4	1	2	3	4
61C	on	on	on	on	off	off	off	off	off	on	*	*
81C	on	off	off	off	off	off	off	off	**	on	*	*
					*Cable length between the J3 faceplate connectors:							
					0–4.3 m (0–14 ft)						off	off
					4.6–6.1 m (15–20 ft)						off	on
					6.4–10.1 m (21–33 ft)						on	off
					10.4–15.2 m (34–50 ft)						on	on

* If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. The maximum total (combined) length is 50 ft. Set the switches on both cards to the same settings.
** Set to ON for clock controller 0. Set to OFF for clock controller 1.

QPC841 4-Port Serial Data Interface Card

The next four tables list option settings for the QPC841 4-Port SDI Card.

QPC841 port 1 and 2 address selection

Device number		SW14							
Port 1	**Port 2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0	1	off	off	off	off	off	on	on	on
2	3	off	off	off	off	off	on	on	off
4	5	off	off	off	off	off	on	off	on
6	7	off	off	off	off	off	on	off	off
8	9	off	off	off	off	off	off	on	on
10	11	off	off	off	off	off	off	on	off
12	13	off	off	off	off	off	off	off	on
14	15	off	off	off	off	off	off	off	off

Note 1: On SW16, positions 1, 2, 3, and 4 must be OFF.

Note 2: To avoid address conflicts, SW14 and SW15 can never have identical setting.

Note 3: To disable ports 1 and 2, set SW14 position 1 to ON.

QPC841 port 3 and 4 address selection

Device number		SW15							
Port 3	Port 4	1	2	3	4	5	6	7	8
0	1	off	off	off	off	off	on	on	on
2	3	off	off	off	off	off	on	on	off
4	5	off	off	off	off	off	on	off	on
6	7	off	off	off	off	off	on	off	off
8	9	off	off	off	off	off	off	on	on
10	11	off	off	off	off	off	off	on	off
12	13	off	off	off	off	off	off	off	on
14	15	off	off	off	off	off	off	off	off

Note 1: On SW16, positions 1, 2, 3, and 4 must be OFF.

Note 2: To avoid address conflicts, SW14 and SW15 can never have identical setting.

Note 3: To disable ports 3 and 4, set SW15 position 1 to ON.

QPC841 baud rate

Baud rate	Port 1 SW10				Port 2 SW11				Port 3 SW12				Port 4 SW13			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
150	off	off	on	on	off	off	on	on	off	off	on	on	off	off	on	on
300	off	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on
600	off	off	off	on	off	off	off	on	off	off	off	on	off	off	off	on
1200	off	on	on	off	off	on	on	off	off	on	on	off	off	on	on	off
2400	off	off	on	off	off	off	on	off	off	off	on	off	off	off	on	off
4800	off	on	off	off	off	on	off	off	off	on	off	off	off	on	off	off
9600	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off	off

QPC841 DTE or DCE selection

Mode	Port 1—SW8						Port 1—SW9					
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	**6**
DTE (terminal)	on	on	on	on	on	on	off	off	off	off	off	off
DCE (modem)	off	off	off	off	off	off	on	on	on	on	on	on
NT1P61 (Fiber)	on	off	off	on	off	off	on	off	off	off	on	on
	Port 2—SW6						**Port 2—SW7**					
DTE	on	on	on	on	on	on	off	off	off	off	off	off
DCE	off	off	off	off	off	off	on	on	on	on	on	on
NT1P61 (Fiber)	on	off	off	on	off	off	on	off	off	off	on	on
	Port 3—SW4						**Port 3—SW5**					
DTE	on	on	on	on	on	on	off	off	off	off	off	off
DCE	off	off	off	off	off	off	on	on	on	on	on	on
	Port 4—SW2						**Port 4—SW3**					
DTE	on	on	on	on	on	on	off	off	off	off	off	off
DCE	off	off	off	off	off	off	on	on	on	on	on	on

Meridian 1
Circuit Card Installation and Testing

NORTEL NETWORKS™