ISDN Basic Rate Interface Installation and Commissioning
Nortel Communication Server 1000

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Sourced in Canada

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Chapter 1: New in this release

There have been no updates to the document in Communication Server 1000 Release 7.0.

Other

Revision History

February 2011	Standard 04.02. This document is up-issued to support Communication Server 1000 Release 7.0.
June 2010	Standard 04.01. This document is up-issued to support Communication Server 1000 Release 7.0.
May 2009	Standard 03.01. This document is up-issued to support Communication Server 1000 Release 6.0.
December 2007	Standard 02.05. This document is up-issued to support Communication Server Release 5.5.
June 2007	Standard 01.02. This document is up-issued to remove the Nortel Networks Confidential statement.
May 2007	Standard 01.01. This document is issued to support Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy document, now retired: ISDN Basic Rate Interface: Installation and Commissioning (NN43001-318). No new content is added for Communication Server 1000 Release 5.0. All references to Communication Server 1000 Release 4.5 are applicable to Communication Server 1000 Release 5.0.
August 2005	Standard 3.00. This document is up-issued to support Communication Server 1000 Release 4.5.
September 2004	Standard 2.00. This document is up-issued for Communication Server 1000 Release 4.0.
October 2003	Standard 1.00. This document is a new technical document for Succession 3.0. It was created to support a restructuring of the Documentation Library, which resulted in the merging of multiple legacy technical documentation. This new document

consolidates information previously contained in the following legacy documents, now retired:

- ISDN Basic Rate Interface: Installation (553-3901-200)
- ISDN Basic Rate Interface: Acceptance Testing (553-3901-330)

Chapter 2: How to get help

This chapter explains how to get help for Nortel products and services.

Getting help from the Nortel web site

The best way to get technical support for Nortel products is from the Nortel Technical Support web site:

http://www.nortel.com/support

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. From this site, you can:

- download software, documentation, and product bulletins
- search the Technical Support Web site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting help over the telephone from a Nortel Solutions Center

If you do not find the information you require on the Nortel Technical Support web site, and you have a Nortel support contract, you can also get help over the telephone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following web site to obtain the telephone number for your region:

http://www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

http://www.nortel.com/erc

Getting help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Chapter 3: Introduction

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

Note the following:

- ISDN Basic Rate Interface (BRI) trunking is not available in North America.
- The Basic Rate Signaling Concentrator (BRSC) is not supported on CS 1000M Cabinet.
- The integrated Meridian 1 Packet Handler is not supported on CS 1000M Cabinet.

Subject

This document contains the following information:

- ISDN BRI hardware installation instructions for all systems
- Description of acceptance testing of ISDN BRI services for Large Systems and Small Systems.
  - how to visually inspect ISDN BRI equipment for possible improper installation
  - how to interpret visual indicators on ISDN BRI cards
  - how to test basic ISDN BRI features and verify traffic reporting

Note:
The craftsperson conducts acceptance testing after the equipment is installed and configured. This is done to verify that the system is operating correctly and ISDN BRI functions and features work as specified.

Note on legacy products and releases

This technical document contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 7.0 software. For more information on legacy products and releases, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

http://www.avaya.com

Applicable systems

This document applies to the following systems:

- Communication Server 1000E (CS1000E)
- Communication Server 1000M Single Group (CS 1000M SG)
- Communication Server 1000M Multi Group (CS 1000M MG)
- Meridian 1 PBX 61C
- Meridian 1 PBX 81C

Note:
When upgrading software, memory upgrades may be required on the Signaling Server, the Call Server, or both.

System migration

When particular Meridian 1systems are upgraded to run CS 1000 software and configured to include a Signaling Server, they become CS 1000 systems. Table 1: Meridian 1 systems to CS 1000 systems on page 10 lists each Meridian 1 system that supports an upgrade path to a CS 1000 system.

Table 1: Meridian 1 systems to CS 1000 systems

This Meridian 1 system...	Maps to this CS 1000 system
Meridian 1 PBX 11C Chassis	CS 1000E
Meridian 1 PBX 11C Cabinet	CS 1000E
Meridian 1 PBX 61C	CS 1000M Single Group
Meridian 1 PBX 81C	CS 1000M Multi Group

Intended audience

This document is intended for individuals responsible for the planning, engineering, and administration of the applicable system.

Conventions

Terminology

In this document, the following systems are referred to generically as "system":

- Communication Server 1000E (CS 1000E)
- Communication Server 1000M (CS 1000M)
- Meridian 1

Related information

This section lists information sources that relate to this document.

Technical Documents

The following technical documents are referenced in this document:

- *Features and Services Fundamentals, NN43001-106*
- *Software Input Output Administration, NN43001-611*
- *Software Input Output Reference - Maintenance, NN43001-711*

Online

To access Nortel documentation online, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

http://www.avaya.com

CD-ROM

To obtain Nortel documentation on CD-ROM, contact your Nortel customer representative.

Chapter 4: Preparing for installation

Contents

This section contains information on the following topics:

[Preparing the site](#) on page 13

[Unpacking and inspecting](#) on page 14

[Taking inventory](#) on page 14

Preparing the site

When installing a system, address the following factors.

- environmental
- structural
- electrical

For more information see *Communication Server 1000M and Meridian 1 Large System Planning and Engineering (NN43021-220)*.

After the site is planned, the following items must be completed prior to ISDN BRI installation.

- Wire the building between ISDN BRI terminal locations and the distribution frame. Refer to the "Engineering guidelines" section of *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)* for wiring specifications and guidelines. For the location of the terminals and the distribution frame, use the Building Cable Plan developed according to instructions in the "Planning the site" section in *Communication Server 1000M and Meridian 1 Large System Planning and Engineering (NN43021-220)*.
- Install any Intelligent Peripheral Equipment (IPE) or Network Modules needed to house ISDN BRI cards as determined in "Engineering guidelines" of *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*. Refer to *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* for a description of how to install the modules.

Unpacking and inspecting

ISDN BRI cards and external communication cables are shipped in separate packages. To unpack them, follow the general precautions recommended by computer and telephone equipment manufacturers.

- Remove items that generate static charge from the installation site.
- If the installation site is carpeted, spray it with an antistatic spray.
- Ground yourself before handling any equipment.
- Carefully remove the equipment from its packaging. Do not puncture or tear the containers. Use scissors or a utility knife.
- Inspect the equipment for obvious faults or damage. Report any damaged component to your sales representative and the carrier who delivered the equipment.
- When unpacking the circuit cards, hold them only by their nonconductor edges. Do not touch connector pins or components.
- Keep the circuit cards in their antistatic bags until you are ready to install them.
- Do not stack the plug-in cards on top of each other. This can damage the components and the printed circuits on the cards.

Taking inventory

After unpacking, verify that all the equipment necessary is at the site before installation begins. Check the equipment received against the shipping documents. Note any shortages and report them to your sales representative.

Chapter 5: Installing ISDN BRI hardware

Contents

This section contains information on the following topics:

Installing ISDN BRI hardware for line applications on page 15

Installing ISDN BRI hardware for trunk applications on page 36

- Selecting the card slots on page 37
- Removing the module cover for card installation on page 37
- Installing the MISP on page 37
- Installing the clock reference on the SILC on page 37
- Installing the SILC and the UILC on page 40
- Connecting the system to the Main Distribution Frame (MDF) on page 40
- Cross-connecting the Main Distribution Frame (MDF) on page 40
- Card location forms on page 41

Installing ISDN BRI hardware for line applications

The following lists the procedures for installing ISDN BRI hardware for line applications. The system must already be installed and operating according to the instructions in *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* before performing these procedures.

For a successful installation, perform these procedures in the order listed below:

1. Select the card slots where the ISDN BRI cards will be located.
2. Remove the module cover for card installation.
3. Install the Multi-Purpose ISDN Signaling Processors (MISPs).

4. Install the S/T Interface Linecards (SILCs) and/or U Interface Linecards (UILCs) or Basic Rate Signaling Concentrators (BRSCs).
5. Connect ISDN BRI terminals. This procedure comprises the following:
    - Connect the system to the Main Distribution Frame (MDF).
    - Cross-connect the MDF.
    - Connect ISDN BRI terminals to the DSL.
    - Initialize the ISDN BRI terminals.

Selecting the card slots

To install ISDN BRI cards, perform the following steps:

1. Identify all the slots that can contain the ISDN BRI cards. First identify the modules with unused network and peripheral card slots and then remove the covers from the identified modules. To identify the modules, use the following Print Programs.
    - LD 22 to print the system configuration and identify unused network card slots to install MISPs

      LD 22 REQ: prt TYPE: cfn
    - LD 20 to list unused IPE card slots to install SILCs, UILCs and BRSCs

      LD 20 REQ: prt TYPE: luc TN: l s

    Table 2: ISDN BRI card location on page 16 lists the modules that can house ISDN BRI cards.

    Table 2: ISDN BRI card location

Modules	Supported Systems	SILCs, UILCs, BRSCs	MISPs
NT4N41 Core/Network Module	Large Systems	—	Network slots 0-7
NT8D35 Network Module	81C CPPII	—	Network slots 5-12
NT8D37 IPE Module	All systems	IPE slots 0-15	—
11c cabinet		slot 1–9	slot 1–9
NT414 chassis		slot 1–4	slot 1–4
MG1010		slot 1–10	slot 1–10

2. Locate the card slots in the modules that house ISDN BRI cards. Group all SILCs, UILCs, BRSCs, superloops and the MISP that supports them in the same network group to avoid using junctors for dedicated connections.
3. For the Communication Server 1000E, make sure the MISP is in the same IPMG as the BRI cards.

Note:

The following hardware is referred to generically as Media Gateway:

- Option 11C Mini Chassis (NTDK91) and Expander chassis (NTDK92) - legacy hardware
- Option 11C Cabinet (NTAK11) - legacy hardware
- MG 1000E Chassis (NTDU14)
- Expander chassis (NTDU15) is not supported
- Large System Universal Equipment Module (UEM) with Media Gateway Extended Peripheral Equipment Controller (MG XPEC) card (NTDW20) is not supported

The following rules apply when selecting the card slots:

MISPs

- MISPs are inserted into the Core/Network Module for Large Systems (Multi Group). Refer to the LD 22 printout to identify modules with unused network card slots and to Table 2: ISDN BRI card location on page 16 for the card slots in these modules that can house MISPs.
- An MISP cannot share network loop addresses with a Superloop Network Card in the Large Systems. The MISP requires two network loop addresses and one network card slot.
- An MISP supports a maximum of 8 BRSCs and two line cards.
- An MISP supports a set of 4 SILCs or UILCs when not supporting a BRSC.
- An MISP can support both BRSCs and SILCs or UILCs at the same time. If it serves one BRSC, an MISP can also support three line cards. If it supports two or more BRSCs, an MISP can also support two line cards.

BRSCs

- Install one BRSC for each IPE module.
- With a BRSC configured, an IPE module can support a maximum of 15 line cards. These can be up to eight UILCs combined with any other seven peripheral cards (including SILCs), or up to 15 SILCs.

SILCs/UILCs

- The cards are installed in the Core/Network Module or the IPE Module for all system options. Refer to the LD 20 printout to identify modules with unused peripheral card slots.
- In each module, install a maximum of 15 SILCs, or eight UILCs combined with any other seven peripheral cards (including SILCs). If 15 SILCs are installed, the remaining slots in the module may contain a BRSC, a UILCs, or non-ISDN BRI cards that do not need the - 48 V power supply of the IPE module (this restriction is due to power supply limitations for the module). If eight UILCs are used, you may install any other card which could reside in the IPE module.
- Group all SILCs, UILCs, BRSCs and the MISP that supports them in the same network group to avoid using junctors for dedicated connections. Figures 1 through 3, beginning Figure 1: NT8D35 Network module (Large System) on page 19 show typical module configurations.
- Communication Server 1000E requires that you install the MISP and SILCs in the same Media Gateway.

Note:

Any IP-based calls using BRI must be transcoded using the DSPs available on an mc32s or DSP daughterboard.

Figure 1: NT8D35 Network module (Large System) on page 19 shows the NT8D35 Network module.

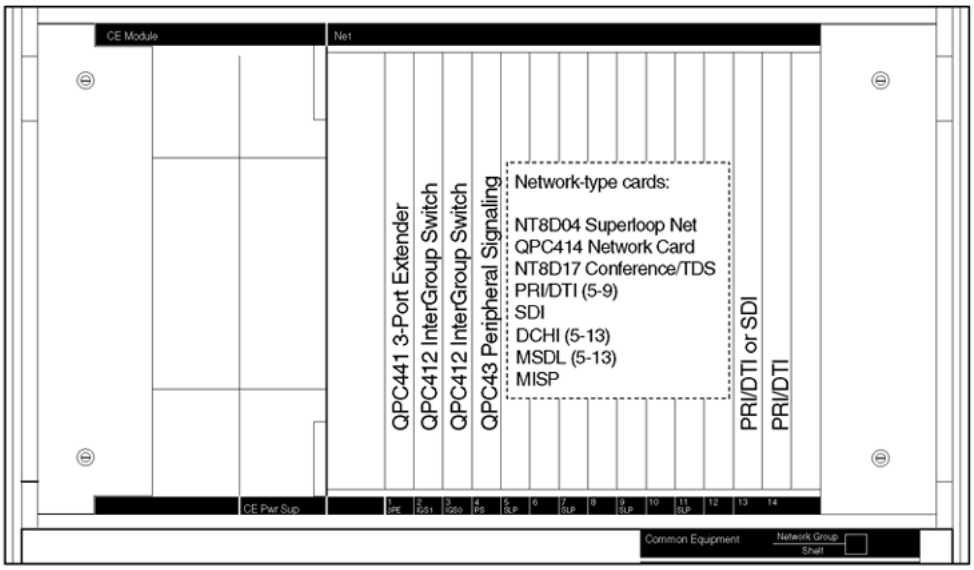


Figure 1: NT8D35 Network module (Large System)

Figure 2: NT8D37 IPE module (Large System) on page 19 shows the NT8D37 IPE module.

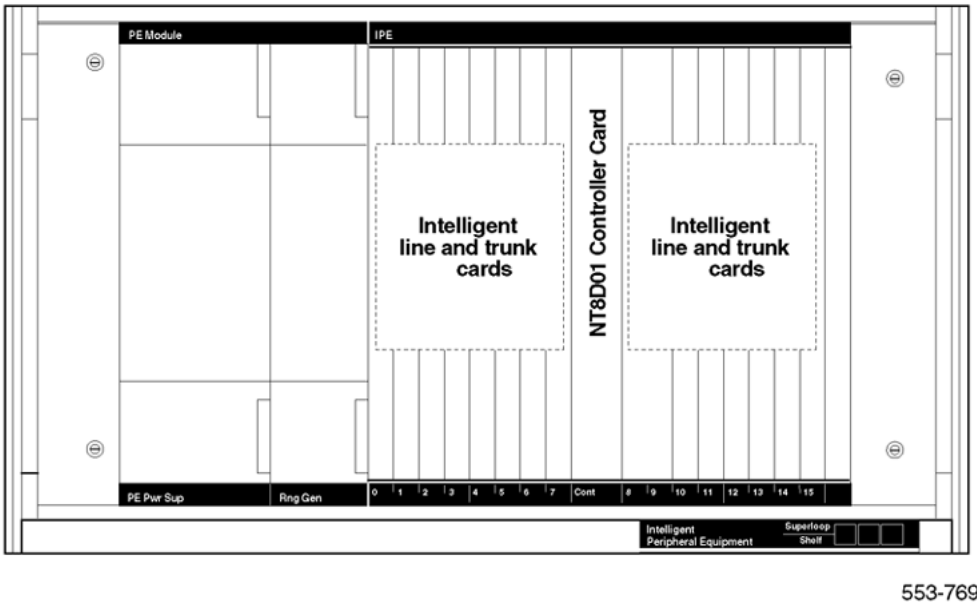


Figure 2: NT8D37 IPE module (Large System)

Figure 3: NT4N41 Core/Network module (Large System) on page 20 shows the NT4N41 Core/Network module.

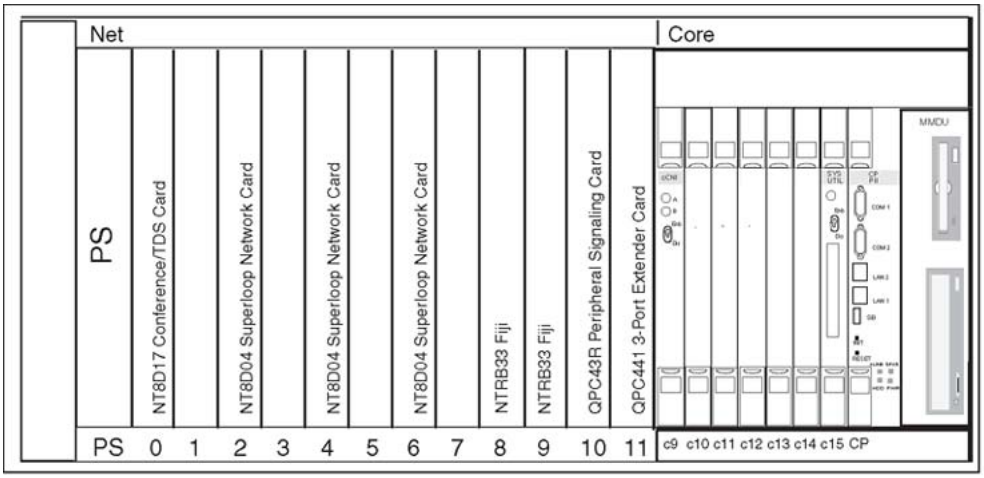


Figure 3: NT4N41 Core/Network module (Large System)

Remove the module cover for card installation

To remove the covers from the modules with unused card slots, follow the procedure below. Refer to Figure 4: Module cover locking latches on page 21.

1. Use a flat-blade screwdriver to unlock the left latch on the front of the cover by turning the screw 1/4 turn clockwise.
2. Use a flat-blade screwdriver to unlock the right latch on the front of the cover by turning the screw 1/4 turn counterclockwise.
3. While holding the cover so it does not fall off, slide the latches toward the center of the cover.
4. Pull the cover toward you and lift it away from the module.
5. Place the cover in a safe place away from the working area to avoid damaging it.
6. Repeat steps 1 through 5 for each cover requiring removal.

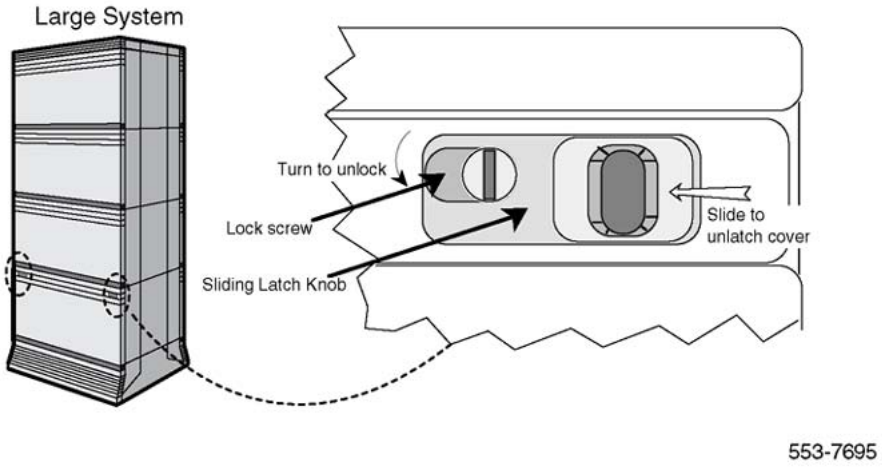


Figure 4: Module cover locking latches

Installing the MISP

Once covers have been removed and card slot locations selected for ISDN BRI cards, install the MISP cards.

1. Hold the MISP by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift the tabs out and away from the card.
2. Insert the MISP into the selected card slot of the module so it engages the card guides in the module.
3. Slide the MISP into the module until it engages the backplane connector.
4. Push the MISP firmly into the connector using the locking devices as levers by pushing them toward the card's front panel.
5. Push the tabs firmly against the front panel of the card so they latch to the front lip in the module and to the post on the card.
6. Observe the red LED on the MISP faceplate.
    - If the red LED lights and stays lit continuously without flashing three times, the card is defective. Remove the MISP, choose a new MISP, and repeat the installation procedure.
    - If the red LED lights, flashes three times, and turns off, the MISP is operating correctly and is configured and enabled. Go to step 7.
    - If it lights, flashes three times, and stays lit continuously, the MISP is operating correctly but is not configured and enabled. Go to step 7.
7. Repeat steps 1 through 6 for each MISP requiring installation.

Removing the MISP

Perform the following steps to remove the MISP.

1. Hold the MISP by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift the tabs out and away from the card.
2. Carefully remove the MISP from its card slot, and slowly slide the card from the module.

Installing the BRSC, SILC, and UILC

After MISPs are installed, install SILCs, UILCs, and BRSCs, as required. As the cards are installed, keep a list of the card type (BRSC, SILC or UILC), the module number, and the number of the card slot containing the card. Use the Core/Network Module card location form or the IPE Module card location form at the end of this chapter to document this information.

1. Hold the card by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift them away from the card.
2. Insert the BRSC, SILC, or UILC into the selected card slot of the module so it engages the card guides in the module.
3. Slide the BRSC, SILC, or UILC into the module until it engages the backplane connector.
4. Push the card firmly into the connector using the locking devices as levers by pushing them toward the card's front panel.
5. Push the tabs firmly against the front panel of the card so they latch to the front lip in the module and to the post on the card.
6. Observe the red LED located on the faceplate.
    - If the red LED turns on and stays lit continuously, the card is defective. Remove the card, choose a new card, and repeat the installation procedure.
    - If it flashes three times and then turns off, the card is operating correctly. Go to step 7.
    - If the red LED flashes three times and then stays lit continuously, the card is operating correctly but is not configured. Go to step 7.
7. On the CE or IPE Module card location form, fill in the card type and the module number next to the slot number of the installed card.
8. Repeat steps 1 through 7 for each card requiring installation.

Remove the BRSC, SILC, and UILC

Perform the following steps to remove the BRSC, SILC, and the UILC.

1. Hold the card by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift them away from the card.
2. Carefully disengage the BRSC, SILC, or UILC from the backplane connector, and slowly slide the card from the module.

Connecting ISDN BRI terminals to the system

To connect the ISDN BRI terminals to the system, perform the following steps.

1. Connect the system to the MDF.
2. Cross-connect the MDF.
3. Connect the ISDN BRI terminals to the Digital Subscriber Line (DSL).

Figure 5: Connect the ISDN BRI terminals to the Large System on page 23 shows a typical DSL with ISDN BRI terminals connected to it using modular cables.

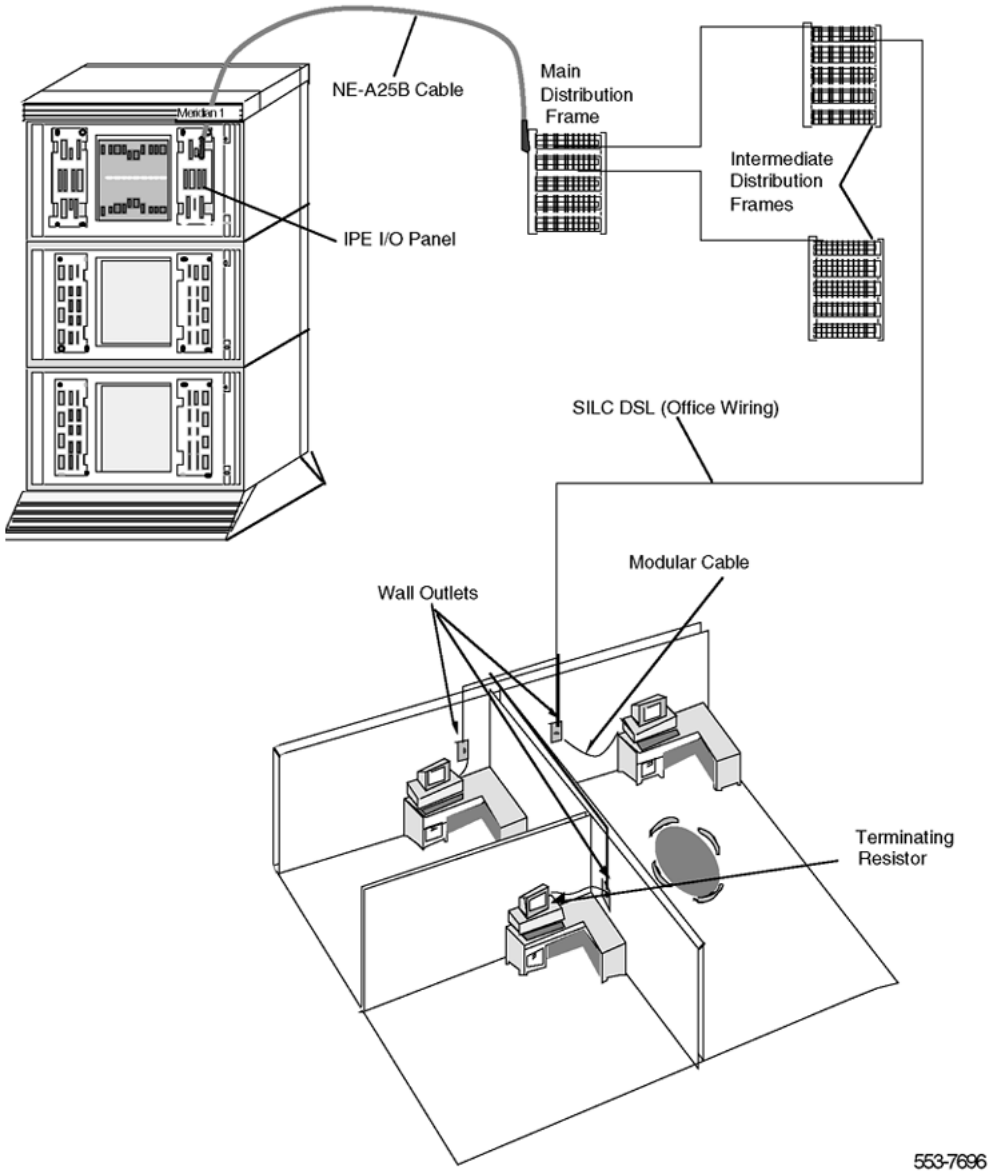


Figure 5: Connect the ISDN BRI terminals to the Large System

Connect the modules to the MDF

Modules connect to the MDF using NE-A25B cables with 50-pin D-type male connectors on each end. One end of the cable plugs into the Input/Output (I/O) panel at the rear of the module, and the other end plugs into the MDF.

Connect the modules to the MDF

1. Determine the number of NE-A25B cables needed to connect one module to the MDF.
2. Label each end of the cable specifying the module number, the connector name (A, B, C), and the card type (SILC or UILC).
3. Plug one end of a cable into the appropriate connector on the I/O panel at the rear of the module. Plug the other end of the cable into the corresponding connector on the MDF.
4. Properly identify cables on the MDF. For example, plug the cable into connector A on the I/O panel and into the connector labeled A on the MDF, if an SILC or UILC is installed in slot 0 of an IPE module.
5. Repeat steps 2 through 4 for all cables in that module.
6. Repeat steps 1 through 5 for all modules containing SILCs and/or UILCs.
7. Lay all the cables neatly and fasten them with cable ties.
8. Label the MDF, as necessary, using Table 3: SILC port designations at the MDF: NT8D37 IPE module (16-cable configuration) on page 26 through Table 6: NT8D37 IPE module SILC and UILC pair-terminations for connectors B, F, L, S (12-cable configuration) on page 31 beginning on Table 3: SILC port designations at the MDF: NT8D37 IPE module (16-cable configuration) on page 26.

Figure 6: Connect the system to the MDF on page 25 shows the cable connection between the system and the MDF.

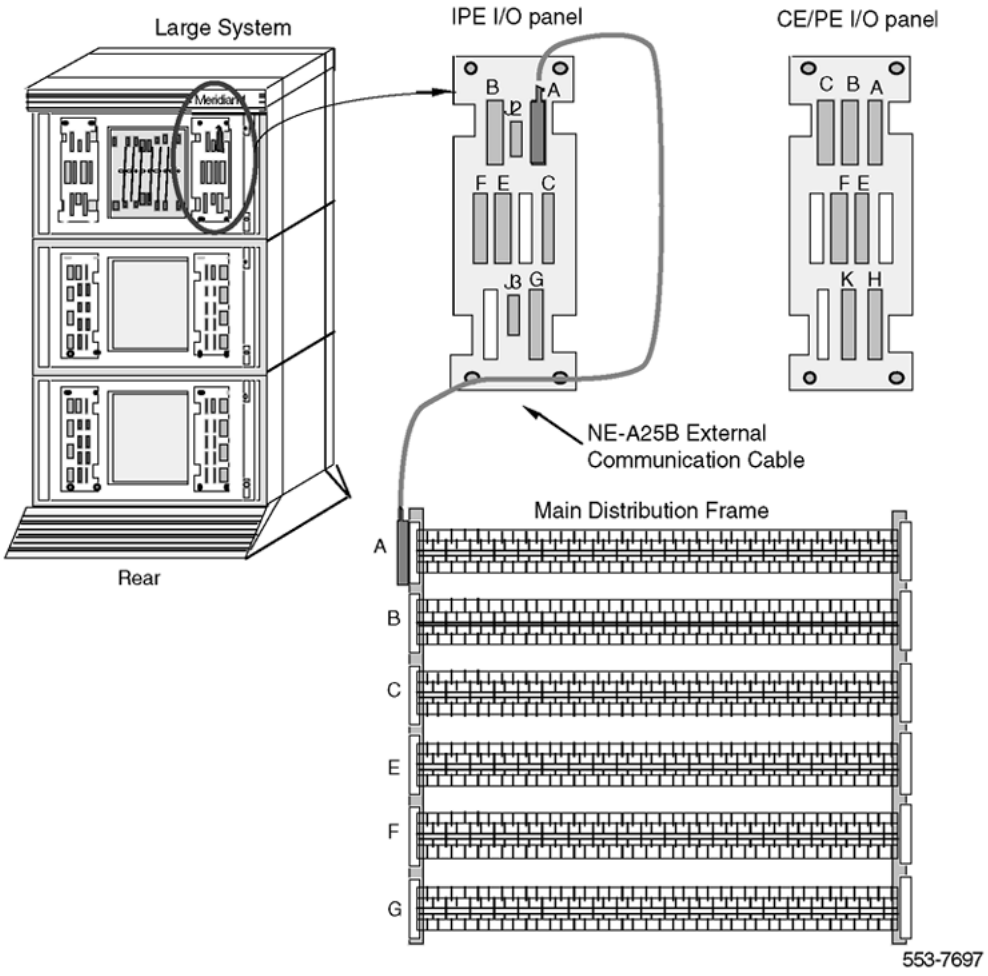


Figure 6: Connect the system to the MDF

SILC/UILC port designations at the MDF

Table 3: SILC port designations at the MDF: NT8D37 IPE module (16-cable configuration) on page 26 and Table 4: UILC port designation labels at the MDF: NT8D37 IPE module (16-cable configuration) on page 27 provide SILC/UILC port designations at the MDF for the NT8D37 IPE. Table 3: SILC port designations at the MDF: NT8D37 IPE module (16-cable configuration) on page 26 shows the SILC port designation labels for the IPE module. The UILC port designation labels for the IPE and CE modules are shown in Table 4: UILC port designation labels at the MDF: NT8D37 IPE module (16-cable configuration) on page 27.

Table 3: SILC port designations at the MDF: NT8D37 IPE module (16-cable configuration)

A 0	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		A
B 1	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		B
C 2	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		C
D 3	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		D
E 4	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		E
F 5	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		F
G 6	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		G
H 7	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		H
K 8	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		K
L 9	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		L
M 10	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		M
N 11	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		N
R 12	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		R
S 13	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		S
T 14	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		T
U 15	T-T+R+R-0	T-T+R+R-1	T-T+R+R-2	T-T+R+R-3	T-T+R+R-4	T-T+R+R-5	T-T+R+R-6	T-T+R+R7		U
Note 1: For the SILC port designations shown in this table, substitute Tx- Tx+ Rx+ Rx- for every occurrence of T- T+ R+ R-. Note 2: The cable pair designated Tx- Tx+ is the transmit pair. The pair designated Rx+ Rx- is the receive pair. An SILC port supplies 2 watts of power at -48 V (-40 V for international), simplexed over the transmit and receive pairs, where the transmit pair is negative with respect to the receive pair.										

Table 4: UILC port designation labels at the MDF: NT8D37 IPE module (16-cable configuration)

0	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	A
1	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	B
2	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	C
3	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	D
4	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	E
5	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	F
6	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	G
7	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	H
8	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	K
9	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	L
10	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	M
11	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	N
12	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	R
13	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	S
14	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	T
15	TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	U

Note: The cable pair designated TR is a 2B1Q full-duplex U interface.

Cross-connecting the MDF

The MDF cross-connects NE-A25B cables connected to SILC and UILC ports with building wiring connected to ISDN BRI terminals.

Each SILC provides eight four-wire full-duplex ports. These ports are connected to building wiring to form DSLs. These ports are polarity-sensitive. Signal polarity must be maintained along each loop.

Each UILC provides eight two-wire full-duplex ports. These ports are connected to twisted pair building wiring to form DSLs. These DSLs are not polarity-sensitive and, although recommended, it is not necessary to maintain signal polarity along each loop.

Cross-connecting SILC and/or UILC ports to the building wiring

Perform the following steps to cross-connect the SILC and/or UILC ports to the building wiring.

1. Identify the card type (SILC or UILC) for a connector on the MDF. Refer to the IPE or CE module card location form at the end of this chapter, which shows the card type connected to each I/O panel connector.
2. Identify transmit and receive pairs on the top of the labeled distribution strip for the card type and module type you are connecting. To identify SILC or UILC ports and their pin numbers, refer to Table 5: NT8D37 IPE module SILC and UILC pair-terminations for connectors A, E, K, R (12-cable configuration) on page 30 through Table 11: Card location form: NT8D37 IPE module (12-cable configuration) on page 42, which begins on Table 5: NT8D37 IPE module SILC and UILC pair-terminations for connectors A, E, K, R (12-cable configuration) on page 30.

   Note:

   In Table 5: NT8D37 IPE module SILC and UILC pair-terminations for connectors A, E, K, R (12-cable configuration) on page 30 through Table 11: Card location form: NT8D37 IPE module (12-cable configuration) on page 42, the cable pair designated T- T+ is the transmit pair and the pair designated R+ R- is the receive pair of the S/T interface. The cable pair designated T R is the Tx and Rx of the 2B1Q full-duplex U interface.
3. Identify building wires connected to the bottom of the distribution strip. Refer to the Building Cable Plan, which identifies wires between distribution frames and wall outlets. The Building Cable Plan is developed according to instructions in the "Planning the Site" section in Communication Server 1000M and Meridian 1 Large System Planning and Engineering (NN43021-220).
4. Plug in the terminating resistor at the appropriate location in each S/T DSL. See "Engineering Guidelines" in the *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)* for engineering rules and locations of terminating resistors.

Figure 7: Cross-connect the SILC port to the office wiring on page 29 and Figure 8: Cross-connect the UILC port to the office wiring on page 30 illustrate a cross-connection of an SILC port and an UILC port to the building wiring.

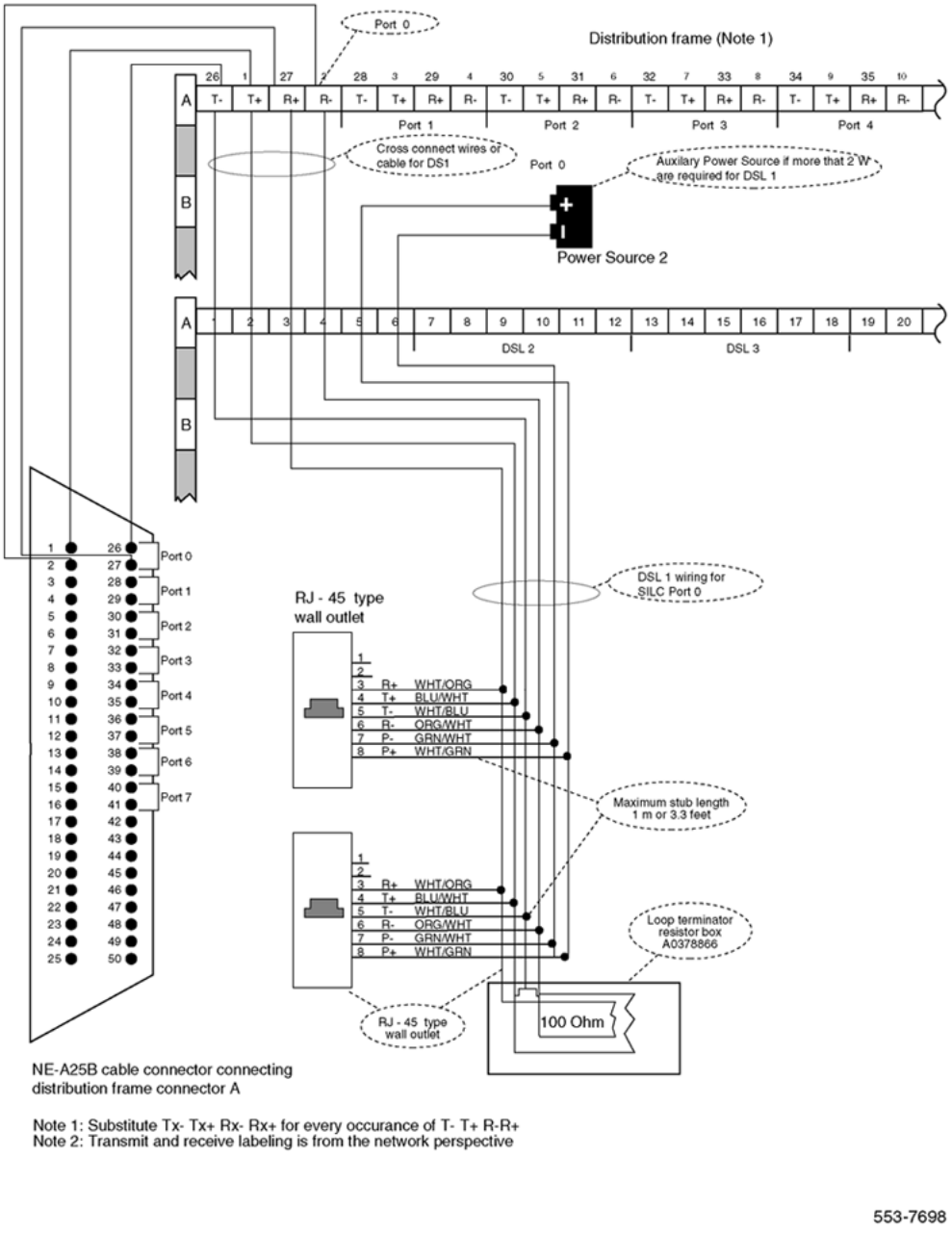


Figure 7: Cross-connect the SILC port to the office wiring

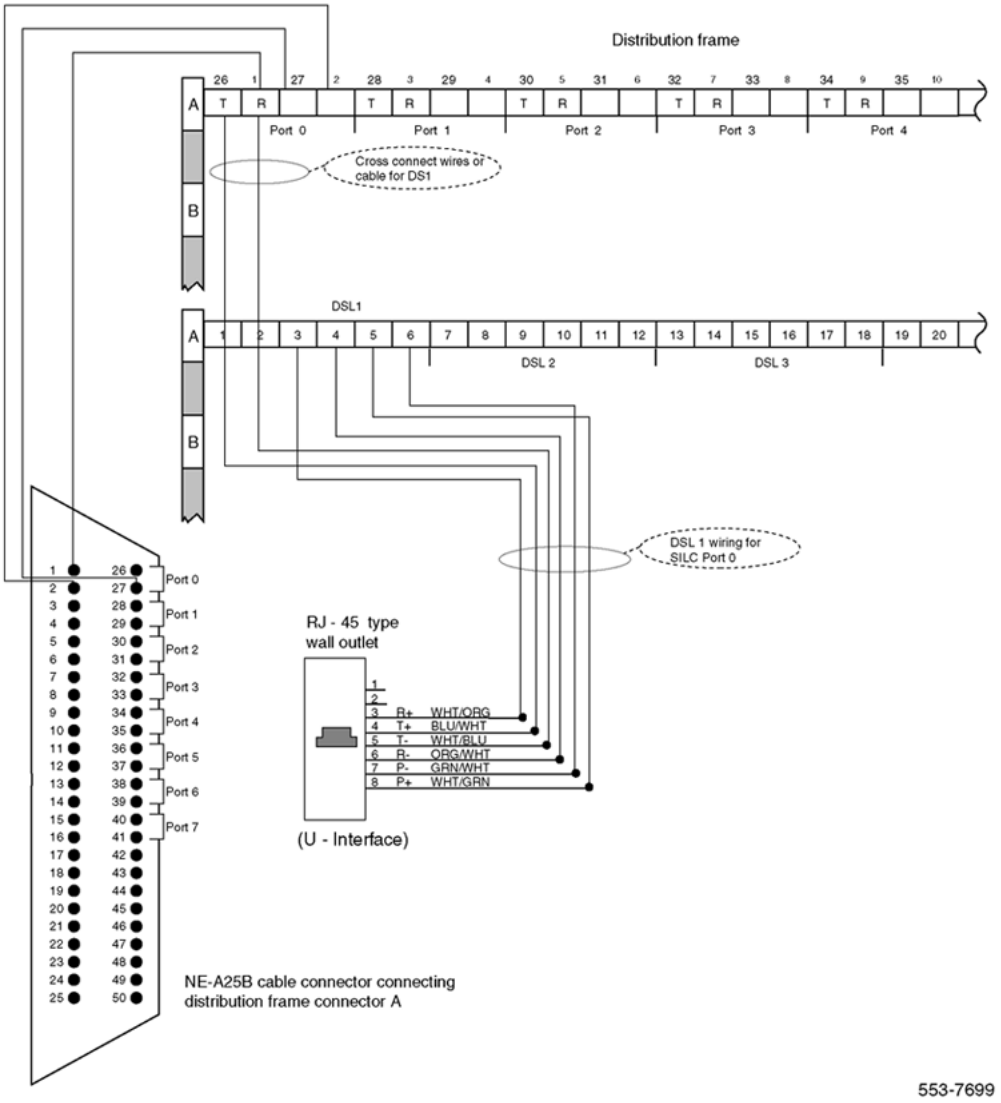


Figure 8: Cross-connect the UILC port to the office wiring

Table 5: NT8D37 IPE module SILC and UILC pair-terminations for connectors A, E, K, R (12-cable configuration) on page 30 shows pair-terminations for connectors.

Table 5: NT8D37 IPE module SILC and UILC pair-terminations for connectors A, E, K, R (12-cable configuration)

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			A	E	K	R	
0Tx - / 0Tx + 0Rx + / 0Rx -	0T / 0R	26 / 1 27 / 2	W-BL / BL-W W-O / O-W	slot 0	slot 4	slot 8	slot 12	0

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			A	E	K	R	
1Tx - / 1Tx + 1Rx + / 1Rx -	1T / 1R	28 / 3 29 / 4	W-G / G-W W-BR / BR-W					1
2Tx - / 2Tx + 2Rx + / 2Rx -	2T / 2R	30 / 5 31 / 6	W-S / S-W R -BL / BL-R					2
3Tx - / 3Tx + 3Rx + / 3Rx -	3T / 3R	32 / 7 33 / 8	Rx-O / O-R R -G / G-R					3
4Tx - / 4Tx + 4Rx + / 4Rx -	4T / 4R	34 / 9 35 / 10	R-BR / BR-R R-S / S-R					4
5Tx - / 5Tx + 5Rx + / 5Rx -	5T / 5R	36 / 11 37 / 12	BK-BL / BL-BK BK-O / O-BK					5
6Tx - / 6Tx + 6Rx + / 6Rx -	6T / 6R	38 / 13 39 / 14	BK-G / G-BK BK-BR / BK-BR					6
7Tx - / 7Tx + 7Rx + / 7Rx -	7T / 7R	40 / 15 41 / 16	BK-S / S-BK Y-BL / BL-Y					7

Table 6: NT8D37 IPE module SILC and UILC pair-terminations for connectors B, F, L, S (12-cable configuration) on page 31 shows pair-terminations for connectors B, F, L, S.

Table 6: NT8D37 IPE module SILC and UILC pair-terminations for connectors B, F, L, S (12-cable configuration)

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			B	F	L	S	
0Tx - / 0Tx + 0Rx + / 0Rx -	0T / 0R	26 / 1 27 / 2	W-BL / BL-W W-O / O-W	slot 1	slot 5	slot 9	slot 13	0
1Tx - / 1Tx + 1Rx + / 1Rx -	1T / 1R	28 / 3 29 / 4	W-G / G-W W-BR / BR-W					1
2Tx - / 2Tx + 2Rx + / 2Rx -	2T / 2R	30 / 5 31 / 6	W-S / S-W R-BL / BL-R					2
3Tx - / 3Tx + 3Rx + / 3Rx -	3T / 3R	32 / 7 33 / 8	R-O / O-R R-G / G-R					3
4Tx - / 4Tx + 4Rx + / 4Rx -	4T / 4R	34 / 9 35 / 10	R-BR / BR-R R-S / S-R					4
5Tx - / 5Tx + 5Rx + / 5Rx -	5T / 5R	36 / 11 37 / 12	BK-BL / BL-BK BK-O / O-BK					5
6Tx - / 6Tx + 6Rx + / 6Rx -	6T / 6R	38 / 13 39 / 14	BK-G / G-BK BK-BR / BK-BR					6

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			B	F	L	S	
7Tx - / 7Tx + 7Rx + / 7Rx -	7T / 7R	40 / 15 41 / 16	BK-S / S-BK Y-BL / BL-Y					7
0Tx - / 0Tx + 0Rx + / 0Rx -	0T / 0R	42 / 17 43 / 18	Y-O / O-Y Y-G / G-Y	slot 2	slot 6	slot 10	slot 14	0
1Tx - / 1Tx + 1Rx + / 1Rx -	1T/ 1R	44 / 19 45 / 20	Y-BR / BR-Y Y-S / S-Y					1
2Tx - / 2Tx + 2Rx + / 2Rx -	2T / 2R	46 / 21 47 / 22	V-BL / BL-V V-O / V-O					2
3Tx - / 3Tx + 3Rx + / 3Rx -	3T / 3R	48 / 23 49 / 24	V-G / G-V V-BR / BR-V					3

Table 7: NT8D37 IPE module SILC and UILC pair-terminations for connectors C, G, M, T (12-cable configuration) on page 32 shows pair-terminations for connectors C, G, M, T.

Table 7: NT8D37 IPE module SILC and UILC pair-terminations for connectors C, G, M, T (12-cable configuration)

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			C	G	M	T	
4Tx - / 4Tx + 4Rx + / 4Rx -	4T / 4R	26 / 1 27 / 2	W-BL / BL-W W-O / O-W	slot 2	slot 6	slot 10	slot 14	4
5Tx - / 5Tx + 5Rx + / 5Rx -	5T / 5R	28 / 3 29 / 4	W-G / G-W W-BR / BR-W					5
6Tx - / 6Tx + 6Rx + / 6Rx -	6T / 6R	30 / 5 31 / 6	W-S / S-W R-BL / BL-R					6
7Tx - / 7Tx + 7Rx + / 7Rx -	7T / 7R	32 / 7 33 / 8	R-O / O-R R-G / G-R					7
0Tx - / 0Tx + 0Rx + / 0Rx -	0T / 0R	34 / 9 35 / 10	R-BR / BR-R R-S / S-R	slot 3	slot 7	slot 11	slot 15	0
1Tx - / 1Tx + 1Rx + / 1Rx -	1T / 1R	36 / 11 37 / 12	BK-BL / BL-BK BK-O / O-BK					1
2Tx - / 2Tx + 2Rx + / 2Rx -	2T / 2R	38 / 13 39 / 14	BK-G / G-BK BK-BR / BK-BR					2
3Tx - / 3Tx + 3Rx + / 3Rx -	3T / 3R	40 / 15 41 / 16	BK-S / S-BK Y-BL / BL-Y					3
4Tx - / 4Tx + 4Rx + / 4Rx -	4T / 4R	42 / 17 43 / 18	Y-O / O-Y Y-G / G-Y					4

Port signals		Pairs	Pair color	I/O panel connectors				Card port
SILC	UILC			C	G	M	T	
5Tx - / 5Tx + 5Rx + / 5Rx -	5T / 5R	44 / 19 45 / 20	Y-BR / BR-Y Y-S / S-Y					5
6Tx - / 6Tx + 6Rx + / 6Rx -	6T / 6R	46 / 21 47 / 22	V-BL / BL-V V-O / V-O					6
7Tx - / 7Tx + 7Rx + / 7Rx -	7T / 7R	48 / 23 49 / 24	V-G / G-V V-BR / BR-V					7

Connecting the ISDN BRI terminals to the DSL

ISDN BRI terminals are connected to DSLs using modular cables up to 10 meters (33 feet) long, with RJ-45 plugs on each end. One end of the cable plugs into the terminal, and the other end plugs into the wall outlet.

Note:

All ISDN BRI terminals should comply with CCITT, ANSI, ETSI NET-3, INS NET-64, National ISDN, 1TR6, Numeris VN2, and D70 standards for terminals, and be compatible with the system. For a list of compatible terminals, refer to the *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

Figure 9: Connect the ISDN BRI terminal to the S/T interface on page 35 illustrates a terminal connection to the S/T interface; Figure 10: Connect the ISDN BRI network termination (NT1) to the U interface on page 36 illustrates a network termination (NT1) connection to the U interface.

Connecting the ISDN BRI terminals to the DSL

1. Plug one end of the modular cable into the ISDN BRI interface connector on the terminal and the other end of the modular cable into the wall outlet.
2. For an SILC S/T interface terminal with an optional auxiliary power source, plug the power source into the wall outlet, then plug the cable into the power source's RJ-45 jack. This power source must supply power only to the local ISDN BRI terminal, not back into the DSL through the RJ-45 wall outlet. The power adapter is supplied with the terminal.
3. Program the terminal parameters, such as the Supervisor Position ID (SPID) and Static Terminal Endpoint Identifier (TEI), as required by the type of terminal. For detailed information pertaining to this procedure, refer to the section "Initialize ISDN BRI terminals", found in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
4. Repeat steps 1 and 3 for each terminal to be connected.

Connecting the terminating resistors

DSLs require that a terminating resistor be connected at the end of each loop. See *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)* for engineering rules and locations of terminating resistors. The end of the S/T interface loop has an RJ-45 jack to plug in the telephone cable. Plug the terminating resistor into the RJ-45 jack, and then plug the telephone cable into the terminating resistor.

Note:

For every port there is one loop with only one terminating resistor per loop. Each loop can support a maximum of eight telephones.

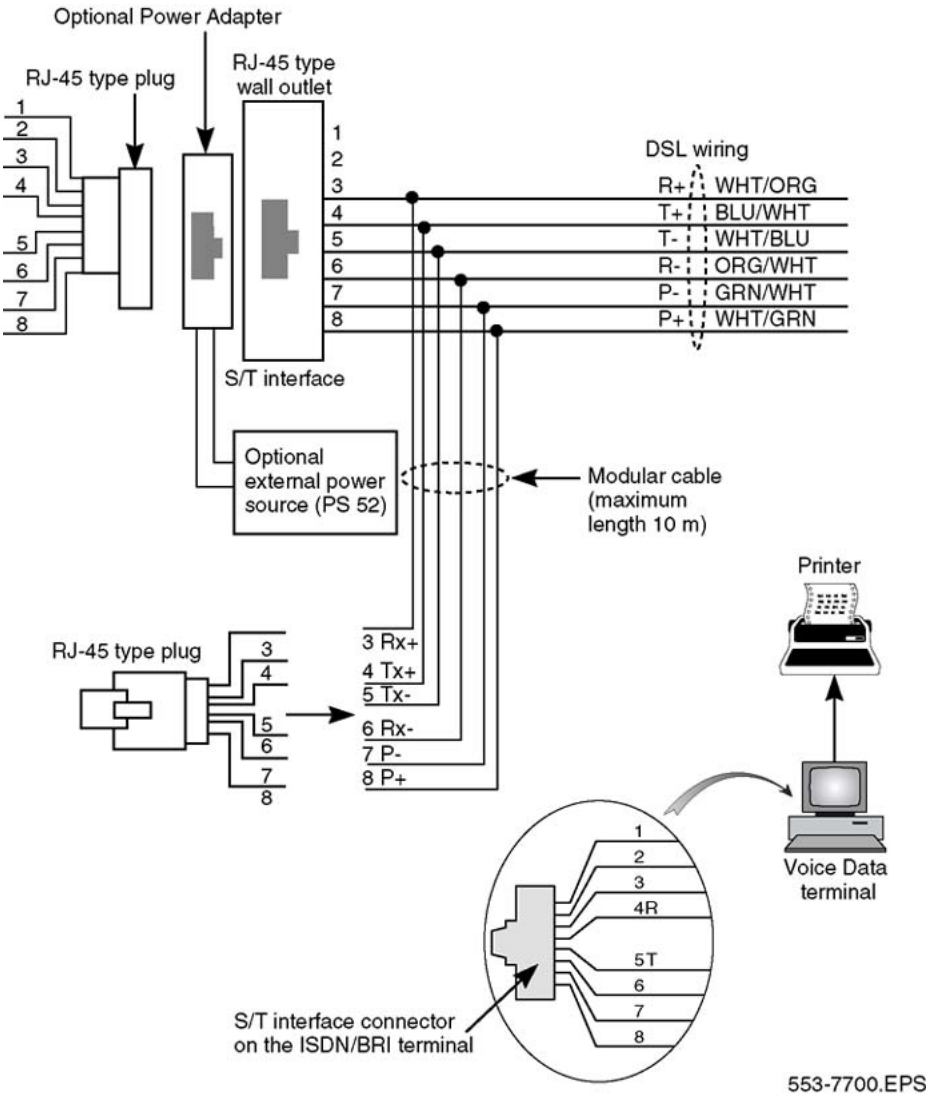


Figure 9: Connect the ISDN BRI terminal to the S/T interface

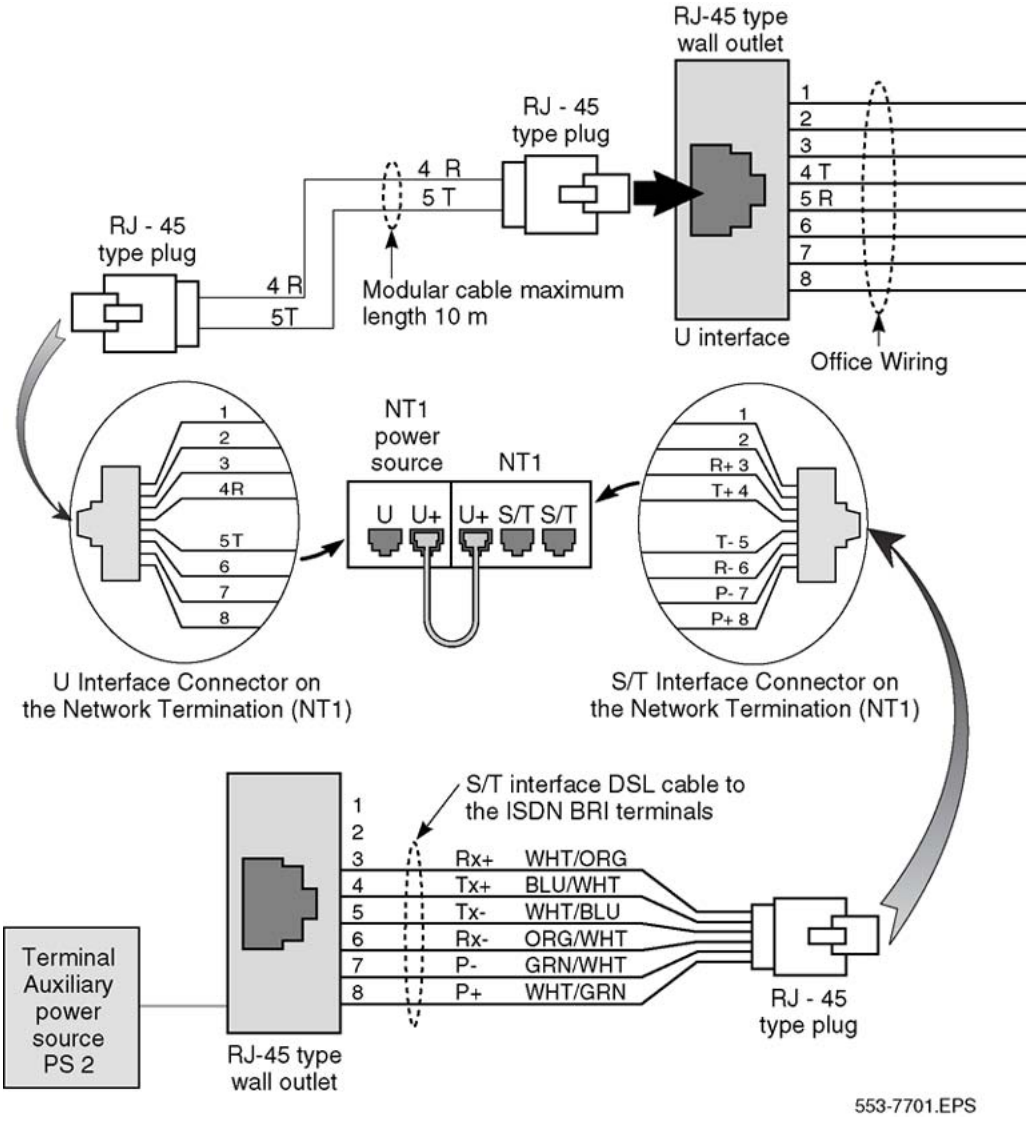


Figure 10: Connect the ISDN BRI network termination (NT1) to the U interface

Installing ISDN BRI hardware for trunk applications

This section explains how to install ISDN BRI hardware to support ISDN BRI trunk applications. The system must already be installed and operating according to the instructions in *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning (NN43021-310)* before performing these procedures.

For a successful installation, perform these procedures in the order listed below:

1. Select the card slots where the ISDN BRI cards will be located.
2. Install the MISP.
3. Install clock referencing on the SILC.
4. Install the SILC and/or UILC.
5. Connect the system to the MDF.
6. Cross-connect the MDF (in Terminal Equipment mode).

Note:
The system, in TIE trunk or CO connectivity, requires a different wiring configuration than for a line application; the transmit and receive pairs should be reversed, as illustrated in Figure 12: Connect the network termination to the U interface and to the S/T interface (in TE mode) on page 41.

Selecting the card slots

Follow the same procedures as described earlier for line applications (refer to Selecting the card slots on page 16).

Removing the module cover for card installation

Follow the same procedures as described earlier for line applications (refer to Remove the module cover for card installation on page 20).

Installing the MISP

Follow the same procedures as described for line applications (refer to Installing the MISP on page 21).

Installing the clock reference on the SILC

The DSL#0 and DSL#1 on an SILC card can be configured as the reference clock source, with DSL#0 being assigned for the primary clock reference and DSL#1 being assigned for the secondary clock reference.

The loop number and location of the primary and secondary clock source is configured in the Digital Data Block LD 73. Refer to the *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

Providing clock referencing on the SILC

Complete the following procedure to provide clock referencing on the SILC.

Providing clock referencing on the SILC

To install the NTRB53 Clock Controller for CS 1000 Release 4.0 refer to NN43001-301

1. Maintain the same polarity on each transmit and receive. Rewire the selected Tx and Rx pairs (applicable to DSL0 and DSL1) to exchange the Tx and Rx pair position. This rewiring is done at the Main Distribution Frame (MDF).
2. Remove the phantom power jumpers (two jumpers per DSL) from the pin headers.
3. Place the SILC in the selected IPE slot.
4. Configure the selected DSL as Terminal Equipment (TE) mode in LD 27.
5. Enable the clock in LD 60 to output the clock references to the IPE back plane pins.
6. Configure the Clock Controller card to accept ISDN BRI clock reference.
7. Check the appropriate messages from the Clock Controller to ensure that it is synchronized to the proper clock reference in LD 60).
8. Connect the ISDN BRI clock reference cables to the Clock Controller, using the procedures which follow.

Connecting clock reference cables

Complete this procedure to connect the ISDN BRI clock reference cables to the Clock Controller. There are three different cables that route clock signals from the IPE back plane to the Clock Controller face plate (as shown in Figure 11: Clock reference cable connection on page 39). Refer to Table 8: ISDN BRI clock reference tables on page 38.

Table 8: ISDN BRI clock reference tables

Code	Length (feet)	Use
NTND70AA	1.5	Connects IPE back plane to IPE I/O panel.
NTND71AA-AD	6.5, 12, 25, 42	Connects IPE I/O to CE I/O panel.
NTND72AA	6.5	Connects CE I/O to Clock Controller face plate.

Note:
Measure the distance between the IPE and CE modules to ensure that you order the correct cable lengths.

Connecting clock reference cables

1. Search for available D-sub 9 connector slots on the I/O panels of the selected IPE and CE I/O modules (if the I/O panel is equipped with D-sub 9 connector slots). If none is available, look for an empty slot used for 25-pair wire connectors (the cables contain two adapter plates to convert a 25-wire slot to two D-sub 9 connector slots).
2. Connect the cables as shown in Figure 11: Clock reference cable connection on page 39; if choosing IPE slots 0, 4, 8, or 12, remove the transmit and receive cable installed on pins 72 - 79 and secure them to a proper place.

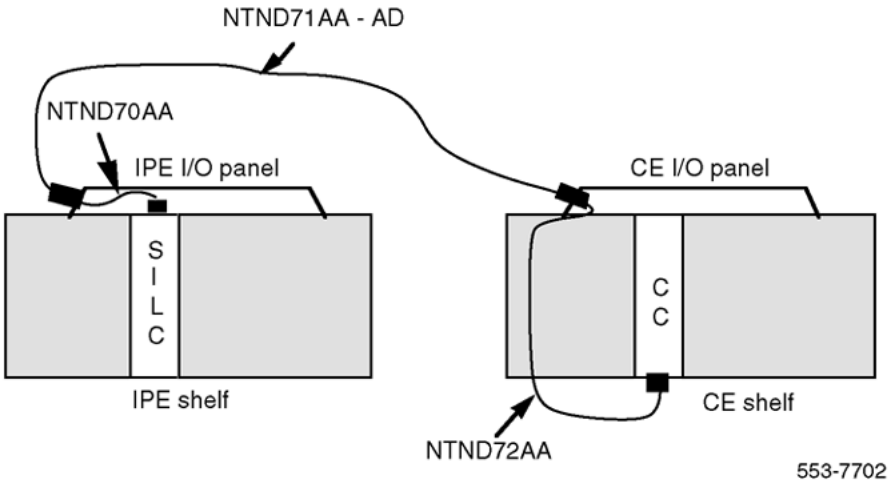


Figure 11: Clock reference cable connection

Clock recovery

The SILC is configured in the slave-slave mode when acting as a trunk interface. This is configured through the Maintenance Signaling Channel (MSC). The microcontroller configures the S/T chips on the SILC as appropriate.

The SILC can recover the network clock from the received data stream using on-chip phase lock loops. The clock frequency that is recovered is 2.56 MHz. The jitter and wander conform to CCITT recommendations.

All of the S/T chips on the SILC could be configured as Terminal Equipment Slaves (TES), but only the clocks recovered from DSL0 and DSL1 are routed to the back plane connector pins. These clocks are provided as differential pairs on back plane pins. See Table 9: Clocks as differential pairs on page 40.

Table 9: Clocks as differential pairs

Differential pairs	Pin #	Row A	Row B
Primary	73	+Ref 0A	- Ref 0A
Primary	74	+Ref 1A	- Ref 1A
Secondary	75	+Ref 0B	- Ref 0B
Secondary	76	+Ref 1B	- Ref 1A

Automatic clock recovery is done upon the expiration of the free run guard timer. Tracking is restored to the primary reference clock, if defined. If the primary reference clock is disabled, tracking is restored to the secondary reference clock, if defined.

Installing the SILC and the UILC

Follow the same procedures as described earlier for line applications (refer to Installing the BRSC, SILC, and UILC on page 22).

Connecting the system to the Main Distribution Frame (MDF)

Follow the same procedures as described earlier for line applications (refer to Connect the modules to the MDF on page 24).

Cross-connecting the Main Distribution Frame (MDF)

The system, in TIE trunk or CO connectivity, requires a different wiring configuration than for a line application; the transmit and receive pairs should be reversed, as illustrated in Figure 12: Connect the network termination to the U interface and to the S/T interface (in TE mode) on page 41.

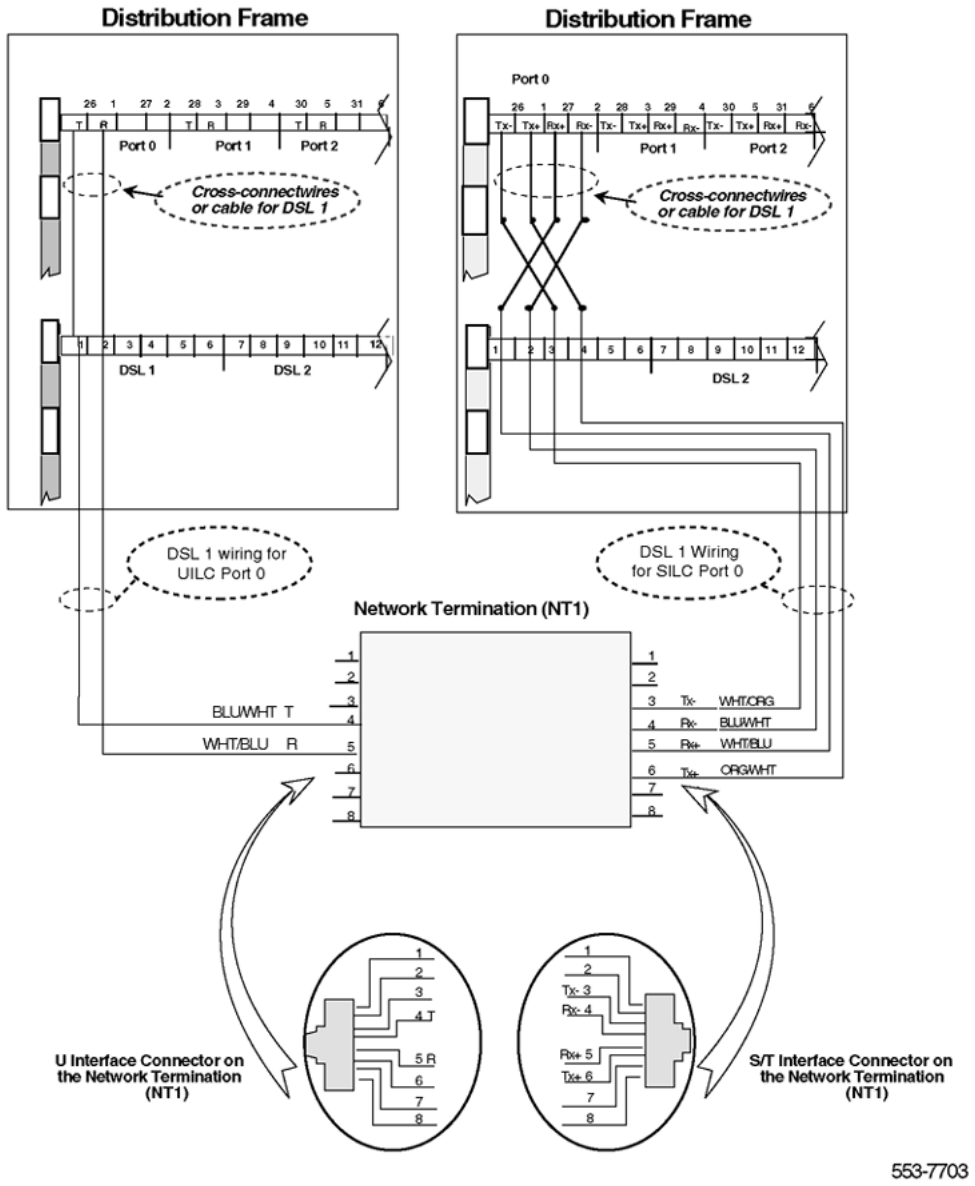


Figure 12: Connect the network termination to the U interface and to the S/T interface (in TE mode)

Card location forms

Use the following card location forms when installing SILC/UILC and BRSC cards.

Table 10: Card location form: NT8D37 IPE module (16-cable configuration)

Card type (SILC/ UILC/BRSC)	IPE Module number	IPE Module slot number	I/O panel connector	SILC/UILC/BRSC ports
		0	A	0–7
		1	B	0–7
		2	C	0–7
		3	D	0–7
		4	E	0–7
		5	F	0–7
		6	G	0–7
		7	H	0–7
		8	K	0–7
		9	L	0–7
		10	M	0–7
		11	N	0–7
		12	R	0–7
		13	S	0–7
		14	T	0–7
		15	U	0–7

Table 11: Card location form: NT8D37 IPE module (12-cable configuration)

Card Type (SILC/ UILC or BRSC)	IPE Module number	IPE module slot number	I/O panel connector	SILC/UILC or BRSC ports
		0	A	0–7
		1	B	0–7
		2	B C	0–3 4–7
		3	C	0–7
		4	E	0–7
		5	F	0–7
		6	F G	0–3 4–7
		7	G	0–7
		8	K	0–7
		9	L	0–7

Card Type (SILC/ UILC or BRSC)	IPE Module number	IPE module slot number	I/O panel connector	SILC/UILC or BRSC ports
		10	L M	0–3 4–7
		11	M	0–7
		12	R	0–7
		13	S	0–7
		14	S T	0–3 4–7

Chapter 6: Preparing the system

Contents

This section contains information on the following topics:

Introduction on page 45

Verifying ISDN BRI operation on page 45

Setting up ISDN BRI test terminals and trunks on page 46

Introduction

This chapter describes how to prepare ISDN BRI equipment for acceptance testing. It explains how to verify that ISDN BRI cards are enabled and functioning correctly and how to correct any problems before starting the test.

Verifying ISDN BRI operation

After ISDN BRI equipment is installed and configured, you can visually inspect ISDN BRI cards to make sure that they are operating correctly by observing their LEDs:

- Check the red Dis LED located on the MISP faceplate. If the Dis LED on an MISP is lit, check that the MISP is disabled or faulty. If it is extinguished, check that the MISP is enabled and operating. To enable the MISP or to correct a problem, refer to *ISDN Basic Rate Interface Maintenance (NN43001-718)*.
- Check the red LED located on the BRSC faceplate. If the red LED is extinguished, check that the BRSC is enabled and operating correctly. If the red LED is lit, check that the BRSC is manually disabled or faulty. To enable a BRSC or to correct a problem, refer to *ISDN Basic Rate Interface Maintenance (NN43001-718)*.
- Check the red LED located on the SILC and UILC faceplates. If the red LED is extinguished, check that the SILC or UILC is enabled and operating correctly. If the red LED is lit, check that the SILC or UILC is manually disabled or faulty. To enable an SILC

or a UILC or to correct a problem, refer to *ISDN Basic Rate Interface Maintenance (NN43001-718)*.

If all indicator LEDs on ISDN BRI equipment are extinguished (with the exception of the CC LED on an MISP), the equipment is functional and you can set up the terminals for this test.

Setting up ISDN BRI test terminals and trunks

Set up ISDN BRI terminals

To conduct acceptance testing for ISDN BRI terminals, you must have a setup that can verify basic ISDN BRI functions and features. Figure 13: ISDN BRI acceptance testing setup for terminals on page 47 shows an example of the ISDN BRI terminal arrangement. You may wish to establish a different test setup, which can be determined by the type of terminals implemented in a specific customer configuration. You may want to setup communication between ISDN BRI and non-ISDN terminals.

Refer to the *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)* for ISDN BRI terminal installation instructions.

Performing acceptance testing

To perform acceptance testing of ISDN BRI terminals:

1. Select three DSLs, two connected to different SILCs and one to a UILC.
2. Equip each SILC DSL with two voice, one circuit-switched data, and one low speed packet data ISDN BRI terminals.

   Note:

   Packet data testing can be conducted only if an external packet handler or an Meridian Packet Handler (MPH) is installed as part of the customer configuration, and is supported by the system (like the external DPN-100 packet handler). If packet handler is not part of the configuration, do not equip the DSLs with packet data terminals and skip all the packet data tests specified in this chapter.
3. Equip the UILC DSL with a network terminator (NT1) and connect the two voice and one circuit-switched data ISDN BRI terminal to the S/T interface on the NT1.
4. Configure the DSLs to support these ISDN BRI terminals and initialize the terminals as described in the "Initialize ISDN BRI terminals" section of the *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

After you have completed the setup to perform acceptance testing, proceed with the tests described in Testing ISDN BRI functions on page 81.

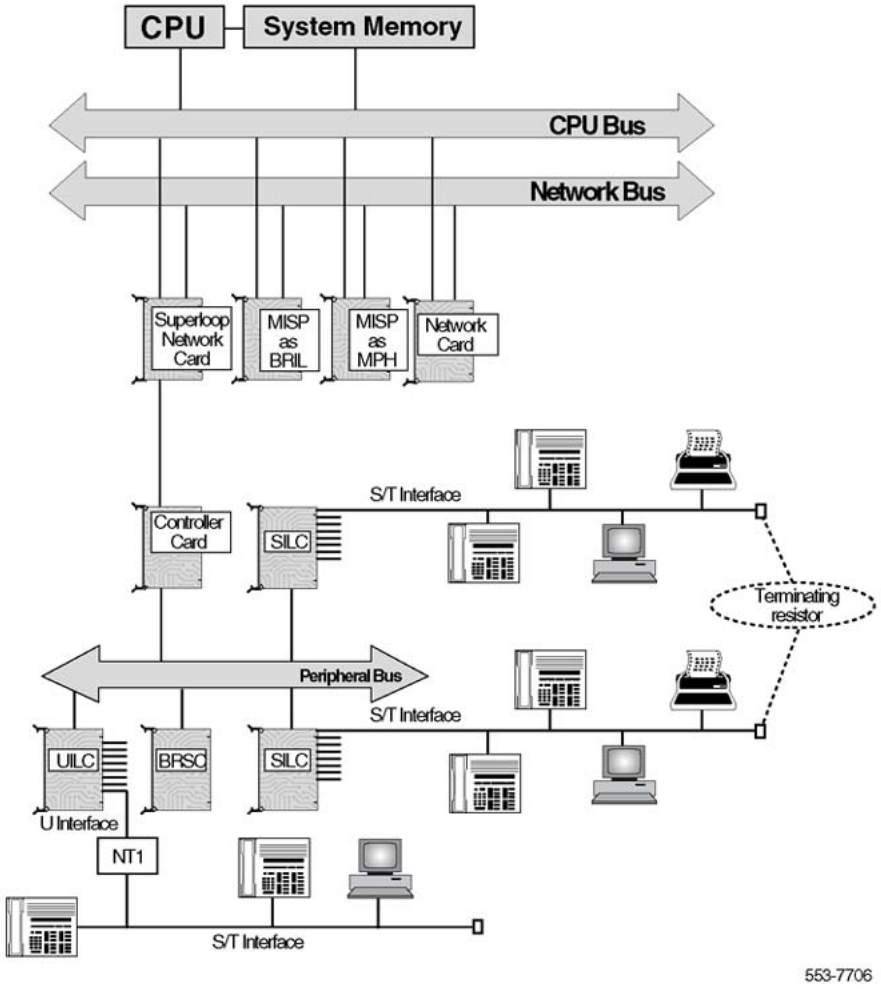


Figure 13: ISDN BRI acceptance testing setup for terminals

Set up ISDN BRI trunking - Local Exchange connectivity

Figure 14: ISDN BRI acceptance testing setup for trunking - Local Exchange connectivity on page 48 illustrates a typical configuration to test ISDN BRI Local Exchange connectivity. The ISDN BRI Local Exchange DSL is connected to a Network Termination (NT1) device, which is physically located on the same premises as the system. The NT1 device connects to the Local Exchange that supports Numeris VN2, 1TR6 or D70 protocol through a U interface. The distance limitation of the NT1 from the Local Exchange depends on the distance supported by the Local Exchange.

To achieve system clock synchronization, configure the system as a slave to the local exchange. Derive the clock source from either the ISDN BRI Local Exchange connection or the other ISDN BRI/PRI/DTI local exchange connections, if available.

After you complete the acceptance testing setup, proceed with the test described in Testing ISDN BRI functions on page 81.

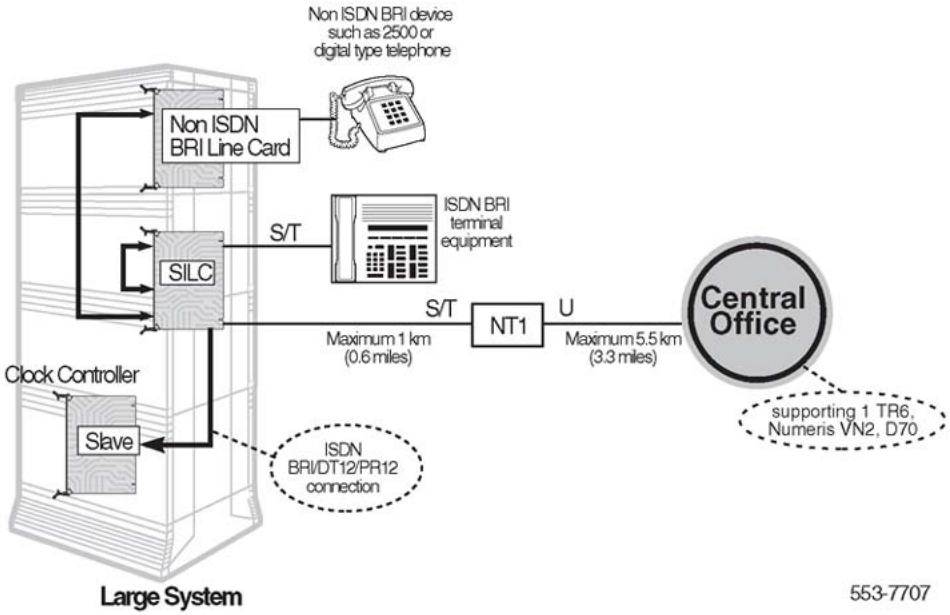


Figure 14: ISDN BRI acceptance testing setup for trunking - Local Exchange connectivity

Set up ISDN BRI trunking - TIE trunk connectivity

Figure 15: ISDN BRI acceptance testing setup for trunking - TIE trunk connectivity on page 49 illustrates one configuration that can be used to test ISDN BRI TIE trunk connectivity. In this configuration, a Meridian Customer Defined Networking (MCDN) TIE trunk connection is implemented by connecting two systems to the ISDN BRI leased line through the local exchange using two SILC cards. The S/T interface is connected to the local exchange using an NT1. There is no distance limitation on this configuration. System clock synchronization can be achieved by having the system slave to the local exchange; the clock source may be derived either from the ISDN BRI local exchange connections or from other ISDN BRI/PRI/DTI local exchange connections, if available.

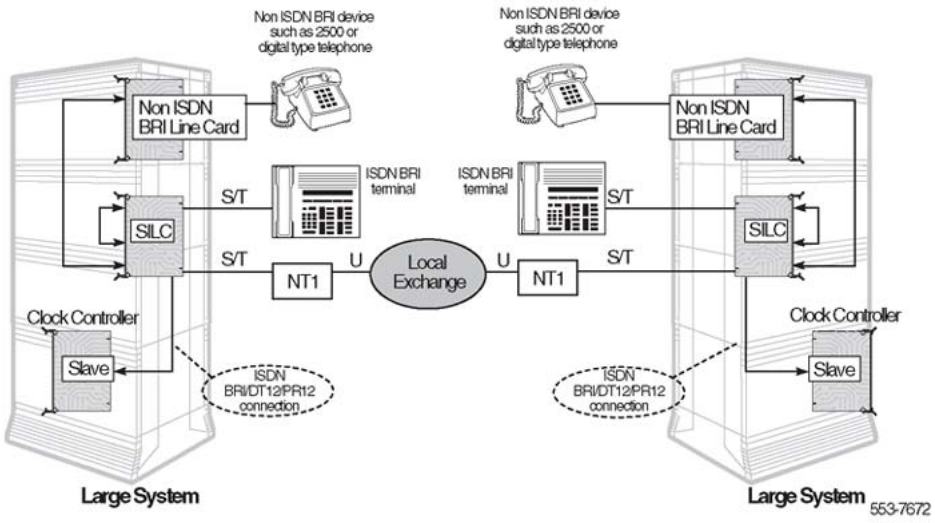


Figure 15: ISDN BRI acceptance testing setup for trunking - TIE trunk connectivity

Chapter 7: Configuring ISDN BRI hardware

Contents

This section contains information on the following topics:

Hardware requirements on page 51

Line and packet data applications on page 51

ISDN BRI trunking on page 53

Configuring ISDN BRI trunking with IP expansion cabinets or Media Gateway systems on page 53

Summary on page 54

Installation procedures on page 56

Hardware requirements

This section contains the hardware requirements for:

- line and packet data applications
- ISDN BRI trunking

Line and packet data applications

Table 12: Hardware requirements for line and packet data applications on page 51 lists the hardware required to configure line and packet data on the system.

Table 12: Hardware requirements for line and packet data applications

Hardware	Product code	Description
MISP circuit card	NTBK22	The MISP card (NTBK22) is specific to Small Systems. It performs Data Link (Layer 2) and

Hardware	Product code	Description
		Network (Layer 3) processing associated with the OSI protocol.
SILC circuit card	NT6D70AA NT6D70BA	-48V North American S/T interface line card -40V International S/T interface line card
UILC circuit card	NT6D71	U interface line card
Terminating resistor	A0378866	Terminating resistor
PRI circuit card (one only)	Required for packet data implementation only.	
	NTRB21	1.5Mb TMDI circuit card with built-in downloadable D-channel
	NTAK09	1.5 Mb DTI/PRI circuit card
	NTAK79	2.0 Mb PRI circuit card
	NTBK50	2.0 Mb PRI circuit card used with the downloadable D-channel application
Packet handler	Required for packet data implementation only.	
	DPN-100	DPN-100 packet handler is required for external packet data implementation only when the system does not process X.25 packets.
ISDN BRI terminals	Required for line applications only.	
	M5317TDX	Proprietary terminal equipped with voice and data transmission options and a hands-free feature; supports B-channel and D-channel packet data.
	M5000TD-1	ISDN Terminal Adapter provides a connection to an analog telephone and supports circuit-switched or packet data; supports B-channel and D-channel packet data.
		Any other terminal deemed compatible by Nortel Networks.
Terminal adapters	Required if connecting non-BRI terminals to the ISDN BRI line interface.	
Network termination	Required for conversion from a U to and S/T interface.	
		ISDN network termination unit (NT1), including NT1 standard power supply. Two cables are provided with the NT1 power supply unit: • 178 mm (7 in.) cable for connection between the power supply and the NT1 unit • captive power cord for connection to an AC power outlet

ISDN BRI trunking

Note:
ISDN BRI trunking is not supported in North America.

Table 13: Hardware requirements for ISDN BRI trunking on page 53 lists the hardware required to configure ISDN BRI trunking.

Table 13: Hardware requirements for ISDN BRI trunking

Hardware	Product code	Description
MISP circuit card	NTBK22	The MISP card (NTBK22) is specific to Small Systems. It performs Data Link (Layer 2) and Network (Layer 3) processing associated with the OSI protocol.
SILC circuit card	NT6D70AA NT6D70BA	-48V North American S/T interface line card -40V International S/T interface line card
UILC circuit card	NT6D71	U interface line card
Clock controller	A clock controller is required in every cabinet or Media Gateway equipped with a digital trunk card.	
	NTAK20AB NTAK20BB	Stratum 3 clock controller daughterboard Stratum 4 clock controller daughterboard
Network termination	Required for conversion from a U to and S/T interface.	
		ISDN network termination unit (NT1), including NT1 standard power supply. Two cables are provided with the NT1 power supply unit: • 178 mm (7 in.) cable for connection between the power supply and the NT1 unit • captive power cord for connection to an AC power outlet

Configuring ISDN BRI trunking with IP expansion cabinets or Media Gateway systems

Configure the MISP card slot number for ISDN BRI trunking in LD 27. Refer to Table 14: Correct responses to LOOP and MISP prompts in LD 27 on page 54 for the correct response to the LOOP prompt.

Configure DSL for ISDN BRI trunking in LD 27. Refer to Table 14: Correct responses to LOOP and MISP prompts in LD 27 on page 54 for the correct response to the MISP prompt.

Table 14: Correct responses to LOOP and MISP prompts in LD 27

		LOOP	MISP
Cabinet Systems	Main	1 – 9	1 – 9
	Expansion 1	11 – 19	11 – 19
	Expansion 2	21 – 29	21 – 29
	Expansion 3	31 – 39	31 – 39
	Expansion 4	41 – 49	41 – 49
Chassis Systems	Media Gateway 1	11 – 14	11 – 14
	Media Gateway 2	21 – 24	21 – 24
	Media Gateway 3	31 – 34	31 – 34
	Media Gateway 4	41 – 44	41 – 44

Installation procedures

Summary

The following is a summary of the procedures to install and configure ISDN BRI hardware. Collectively, the procedures apply to line, packet data, and trunking applications. Individually, some procedures apply only to line, packet data, or trunking.

Before beginning the procedures, ensure the system is installed and operational. Perform the procedures in the order shown.

1. Select the card slots. See Selecting the card slots on page 56.
2. Remove the MISP, if previously installed. See Removing the MISP on page 57.
3. Install the clock controller on the MISP (for trunking applications only). Installing the clock controller on the MISP (for trunking applications) on page 58
4. Install the MISP. See Installing the MISP on page 57.

Note:
A clock controller is only required for ISDN BRI trunk applications. The system supports a single active clock controller (CC). This clock controller can support

both a primary and a secondary reference clock. These reference clock sources are derived from either BRI spans or DSLs (DSL 0 and/or DSL 1).

Note:
A clock controller is required in every cabinet or Media Gateway that contains a digital trunk.

5. Install the SILCs and UILCs. See Installing the SILCs and UILCs on page 58.
6. Remove the SILCS and UILCs, if previously installed. See Removing the SILC and UILC on page 60.
7. Install the PRI hardware. See Installing the PRI hardware on page 60.

Note:
This step is required for packet data implementation only.

8. Connect the ISDN BRI terminals or trunks.
    a. Connect the ISDN BRI terminals for line applications:
        i. Connect system cables to the cross-connect terminal. See Connecting system cables to the cross-connect terminal on page 65.
        ii. Cross-connect the DSLs at the cross-connect terminal. See Cross-connecting the DSLs at the cross-connect terminal on page 69.
        iii. Connect the terminating resistor to the SILC DSL. See Connecting the terminating resistor to the SILC DSL on page 72.
        iv. Connect the ISDN BRI terminals to the DSL. See Connecting the ISDN BRI terminals to the DSL on page 74.
        v. Initialize a Nortel Networks M5317TDX terminal. See Initializing a Nortel Networks M5317TDX terminal on page 77.
    b. Connect the ISDN BRI trunks for trunking applications:
        i. Connect the system cables to the cross-connect terminal. See Connecting the system cables to the cross-connect terminal on page 61.
        ii. Cross-connect the DSLs at the cross-connect terminal. See Cross-connecting DSLs at the cross-connect terminal on page 62.

Installation procedures

Selecting the card slots

Select the appropriate ISDN BRI circuit card slot assignments in the Small System by using Table 15: Small System shelf slot assignments for ISDN BRI cards on page 56.

Table 15: Small System shelf slot assignments for ISDN BRI cards

		ISDN BRI Card			
		MISP (see Note 2)	**SILC is not clock reference**	**SILC is clock reference**	**UILC**
Option 11C Chassis System	Main	1-9	1-9	1-9	1-9
	Expansion 1	11-19	11-19	11-19	11-19
	Expansion 2	21-29	21-29	21-29	21-29
	Expansion 3	31-39	31-39	31-39	31-39
	Expansion 4	41-49	41-49	41-49	41-49
CS 1000M, Option 11C Chassis	Call Server	1-4	1-4	1-4	1-4
	Media Gateway 1	11-14	11-14	11-14	11-14
	Media Gateway 2	21-24	21-24	21-24	21-24
	Media Gateway 3	31-34	31-34	31-34	31-34
	Media Gateway 4	41-44	41-44	41-44	41-44
	Expansion 1	Not applicable	17-20	17-20	17-20
	Expansion 2		27-30	27-30	27-30
	Expansion 3		37-40	37-40	37-40

		ISDN BRI Card			
		MISP (see Note 2)	**SILC is not clock reference**	**SILC is clock reference**	**UILC**
	Expansion 4		47-50	47-50	47-50

Note:
One MISP chassis supports a set of four SILCs or UILCs, or a combination of SILCs and UILCs.

Installing the MISP

1. Remove the cover from the system.

   Important:
   Wear the static discharge bracelet located inside the system before handling circuit cards. Failure to wear the bracelet can damage the circuit cards.
2. Remove the MISP from its shipping package and hold it by its card-locking devices.
3. Insert the MISP into the selected card slot and lock it in place.
4. Observe the behavior of the LED on the faceplate of the MISP to determine its status:
   - The LED lights, flashes three times and then stays lit – the MISP is operating correctly but is not configured and enabled.
   - The LED lights, flashes three times and then turns off – indicates the MISP is operating correctly and is configured and enabled.
   - Any other LED behavior indicates a defective MISP circuit card.

   Note:
   The Flash ROM can become corrupted if loss of power occurs during programming of the Flash ROM. If this occurs, the Flash ROM automatically re-initializes when the MISP is installed and powered up. The automatic re-initialization delays the completion of the self-test, and it takes five minutes for the LED to flash three times.
5. Repeat the steps for each MISP.

Removing the MISP

1. Hold the MISP by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift the tabs out and away from the card.
2. Carefully remove the MISP from its card slot.

Installing the clock controller on the MISP (for trunking applications)

A clock controller is only required for ISDN BRI trunk applications. The system supports a single active clock controller. This clock controller can support a primary and a secondary reference clock. These reference clock sources are derived from BRI spans or DSLs (DSL 0 and/or DSL 1).

A clock controller is required in every cabinet or Media Gateway that contains a digital trunk.

The line cards associated with BRI DSLs used as clock references are installed in the Small System main cabinet or Media Gateway.

Use the following guidelines when installing the clock controller on the MISP:

- If the primary reference clock source comes from a PRI or DTI, then the clock controller is a daughterboard on the DTI/PRI card.
- If the primary reference clock is derived from a BRI DSL, then the CC daughterboard is on the MISP associated with that line card. DSL0 of that line card is used to generate the reference clock.
- To use a DTI/PRI as a secondary clock source reference, the clock controller daughterboard must reside on a DTI, PRI, or MISP. The clock is extracted from the target DTI/PRI span and routed to the clock controller over the back plane.
- To use a BRI DSL as a secondary clock source reference, the clock controller daughterboard must reside on a DTI/PRI or an MISP. The clock is extracted from DSL1 of the source line card and routed over the backplane to the CC.

Installing the SILCs and UILCs

1. Remove the cover from the assigned system.

   Important:
   Wear the static discharge bracelet located inside the cabinet or Media Gateway before handling circuit cards. Failure to wear the bracelet can damage the circuit cards.

2. Remove the SILC or UILC from its shipping package and hold it by its card locking devices.
3. Insert the SILC or UILC into the selected card slot and lock it in place.
4. Use the jumper plugs to configure the line powering options for the SILC. Each port is equipped with its own set of option jumper plugs, enabling individual configurations for each DSL.

   The SILC has three line powering options. These options are configured using the jumpers located near the backplane connector as shown in Figure 16: SILC line power options on page 59.

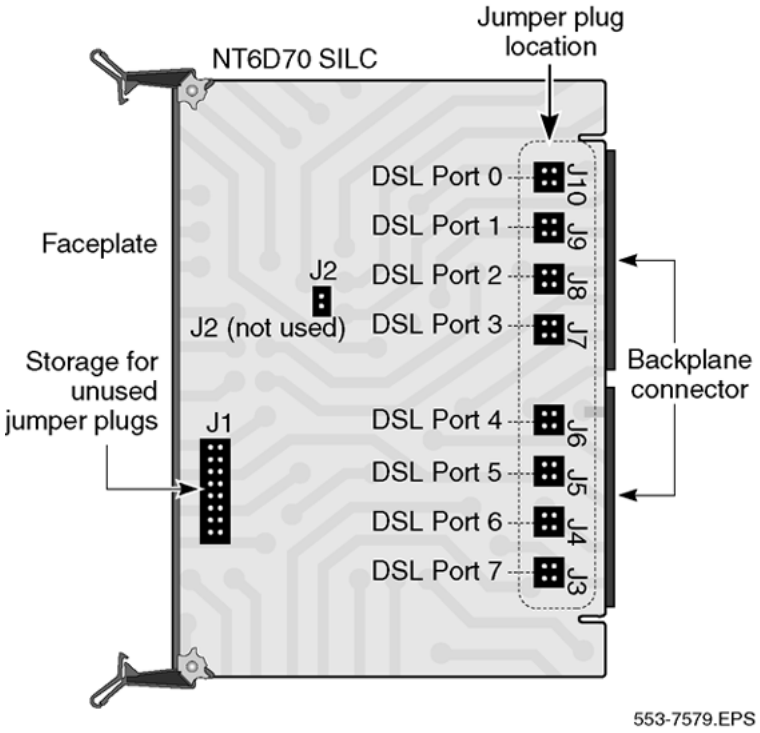


Figure 16: SILC line power options

Store unused jumper plugs on position J1 of the SILC for future use. The following are descriptions of the three options and their jumper settings.

- Normal power on the TX and RX leads. This option is set at the factory and provides normal power (-48V or -40V) on the TX lead and battery return (BRTN) on the RX lead to power the terminal. To implement it, install one jumper plug across the RX and BRTN pins, and one across the PWR and TX pins, as shown in Figure 17: Jumper plug settings for normal power on the TX and RX leads on page 59.

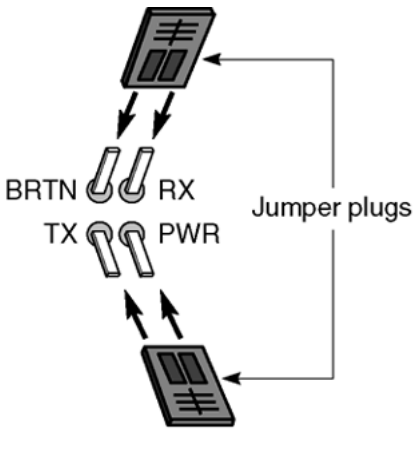


Figure 17: Jumper plug settings for normal power on the TX and RX leads

- Reverse power on the TX and RX leads. This option is used only in Japan and provides power (-48V or -40V) on the RX lead and battery return (BRTN) on the TX lead to power the terminal. To implement it, install one jumper plug across the RX and PWR pins, and one across the BRTN and TX pins as shown in Figure 18: Jumper plug settings for reverse power on the TX and RX leads on page 60.

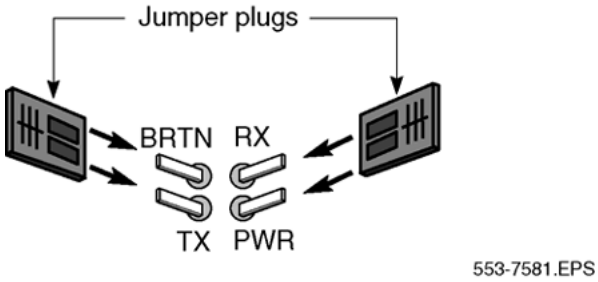


Figure 18: Jumper plug settings for reverse power on the TX and RX leads

- No power on the TX and RX leads. This option applies when the terminal is powered locally with an adapter provided with the terminal. It also applies when a SILC DSL is used for trunking. Remove the jumper plugs and store them on J1 to implement this option.

5. Insert the SILC or UILC into the selected card slot and lock it in place.
6. Observe the behaviors of the LED on the faceplate of the MISP to determine its status:
   - The LED lights, flashes three times, and then remains lit – indicates the card is operating correctly, but is not configured.
   - The LED lights, flashes three times, and then turns off – indicates the card is operating correctly and is configured.
   - Any other LED behavior suggests a defective circuit card.
7. Repeat the steps in this procedure for each SILC or UILC being installed.

Removing the SILC and UILC

1. Hold the card by its card-locking devices. Squeeze the tabs to unlatch the card-locking devices and lift them away from the card.
2. Carefully disengage the SILC or UILC from the backplane connector, and slowly slide the card from the cabinet or Media Gateway.

Installing the PRI hardware

This procedure is only required for packet data implementation.

To install the 1.5 Mb NTRB21 TMDI card or the NTAK09 1.5 Mb PRI circuit card, refer to *ISDN Primary Rate Interface Maintenance (NN43001-717)*.

To install the NTAK79 2.0 Mb PRI circuit card or the NTBK50 2.0 Mb PRI circuit card, refer to *ISDN Primary Rate Interface Installation and Commissioning (NN43001-301)*.

Connecting the ISDN BRI trunks (for trunking applications)

For trunking applications, two procedures are required to connect the ISDN BRI trunks:

1. Connect the system cables to the cross-connect terminal. See Connecting the system cables to the cross-connect terminal on page 61.
2. Cross-connect the DSLs at the cross-connect terminal. See Cross-connecting DSLs at the cross-connect terminal on page 62.

Connecting the system cables to the cross-connect terminal

Each card slot equipped with an SILC or UILC requires one NE-A25B 25-pair connector cable. The cables connect to the connectors at the bottom of the cabinet or at the rear of the Media Gateway. Each connector is assigned to its corresponding card slot (for example, connector J8 is assigned to card slot 8).

1. Remove the connector retaining bar from the connector panel in the lower part of each cabinet or Media Gateway. See Figure 22: Cable connectors in main cabinet on page 67 and Figure 23: Cable connectors in the expansion cabinet on page 67 on Figure 22: Cable connectors in main cabinet on page 67, and Figure 24: Cable connectors in the second expansion cabinet on page 67 on Figure 24: Cable connectors in the second expansion cabinet on page 67.
2. Connect an NE-A25B cable to each connector associated with a card slot containing an SILC or UILC circuit card. See Figure 22: Cable connectors in main cabinet on page 67 and Figure 23: Cable connectors in the expansion cabinet on page 67 on Figure 22: Cable connectors in main cabinet on page 67, and Figure 24: Cable connectors in the second expansion cabinet on page 67 on Figure 24: Cable connectors in the second expansion cabinet on page 67.
3. Tag both ends of each cable with the cabinet or Media Gateway and connector numbers.
4. Route cables down through the opening at the bottom of the cabinet or Media Gateway.
5. Plug in the cables to the connector.
6. Replace the retaining bar after you have connected all cables to the cabinet or Media Gateway.
7. Terminate the 25-pair cables at the cross-connect terminal.
8. Label the cross-connect terminal for each connector.

   Figure 26: SILC port designation label at the cross-connect terminal on page 68 and Figure 27: UILC port designation label at the cross-connect terminal on page 68 on Figure 27: UILC port designation label at the cross-connect terminal on page 68 show the label used with the BIX cross-connecting system.

Cross-connecting DSLs

:Each SILC provides eight four-wire, full-duplex ports. These ports connect to the trunk wiring facilities (typically cabling or wiring from outside the building) to form DSLs. Since the DSLs

are polarity-sensitive, maintain signal polarity along each loop as shown in Figure 19: Cross-connecting an SILC port on page 63 on Figure 19: Cross-connecting an SILC port on page 63.

:Each UILC provides eight two-wire full-duplex ports. These ports connect to twisted pair trunk wiring facilities to form DSLs, as shown in Figure 20: Cross-connecting a UILC port on page 63. The DSLs are not polarity-sensitive and it is not necessary to maintain signal polarity along each loop.

Cross-connecting DSLs at the cross-connect terminal

To cross-connect SILC and/or UILC ports to the trunk wiring facilities:

1. Identify the card type (SILC or UILC) at the cross-connect terminal.
2. Identify transmit and receive pins on the top of the labeled distribution strip for the card type you are connecting.

   Refer to Table 16: SILC and UILC port assignments connectors at cross-connect terminal on page 69 on Table 16: SILC and UILC port assignments connectors at cross-connect terminal on page 69 to identify ports and their pin numbers for a SILC or UILC.
3. Identify the trunk wiring facilities connected at the cross-connect terminal.
4. Cross-connect the pins from the SILC or UILC to the trunk wiring facilities.
5. Repeat this procedure for each DSL.

Note:

For the system DSL in TE mode, reverse the TX and RX pairs as shown in Figure 21: Connecting the ISDN network terminator to the U interface and to the S/T interface (in TE mode) on page 64. Maintain the same polarity on the Tip and Ring pins as for line application. Rewire the selected TX and RX pairs to exchange their TX pairs with RX pair position. This procedure is required since SILC cards are designed for applications in the NT mode.

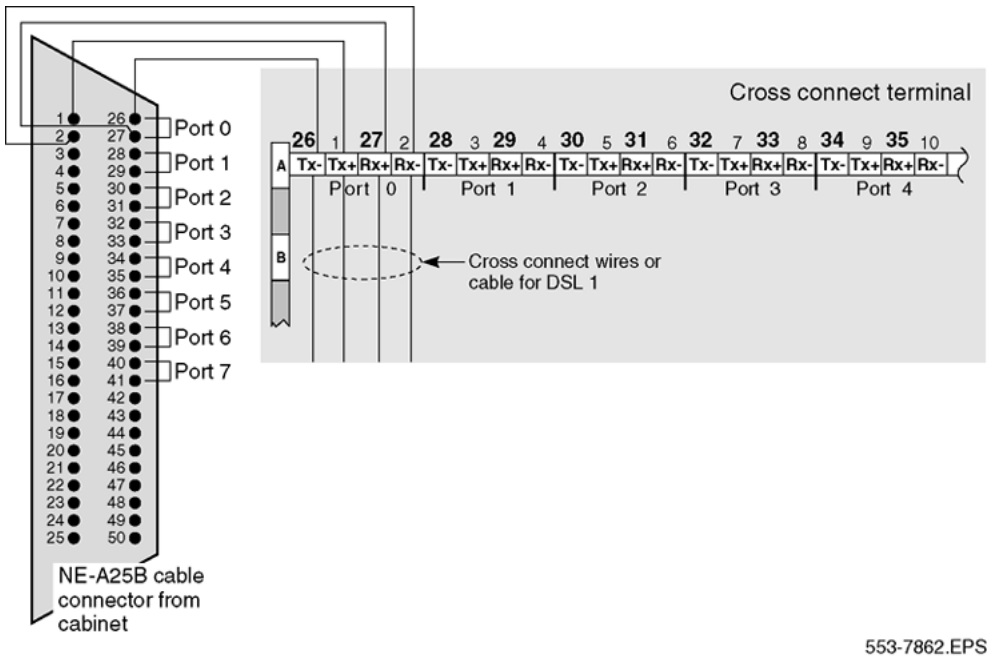


Figure 19: Cross-connecting an SILC port

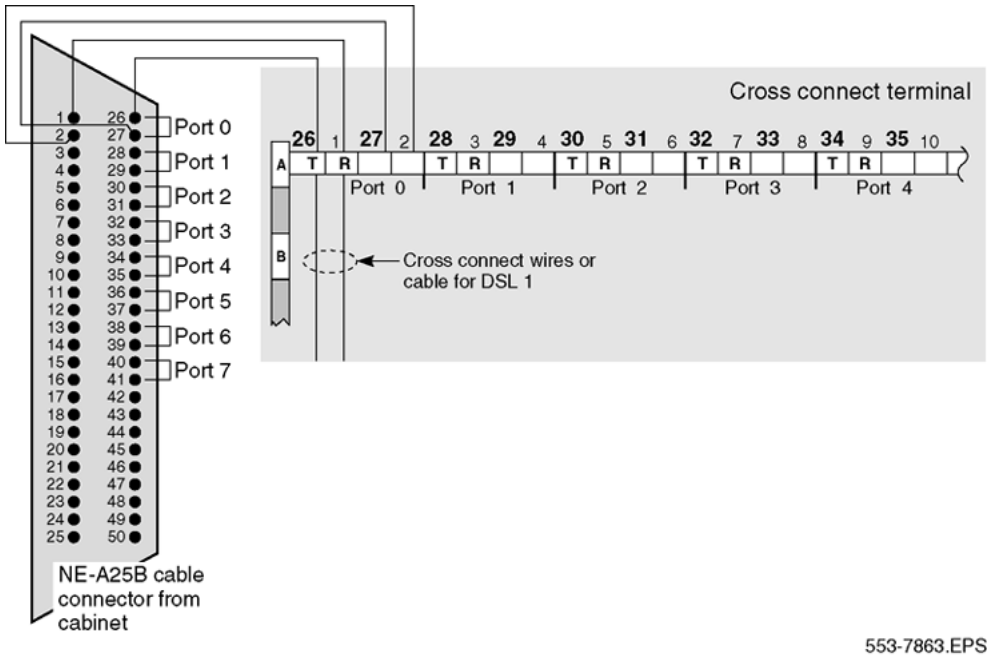


Figure 20: Cross-connecting a UILC port

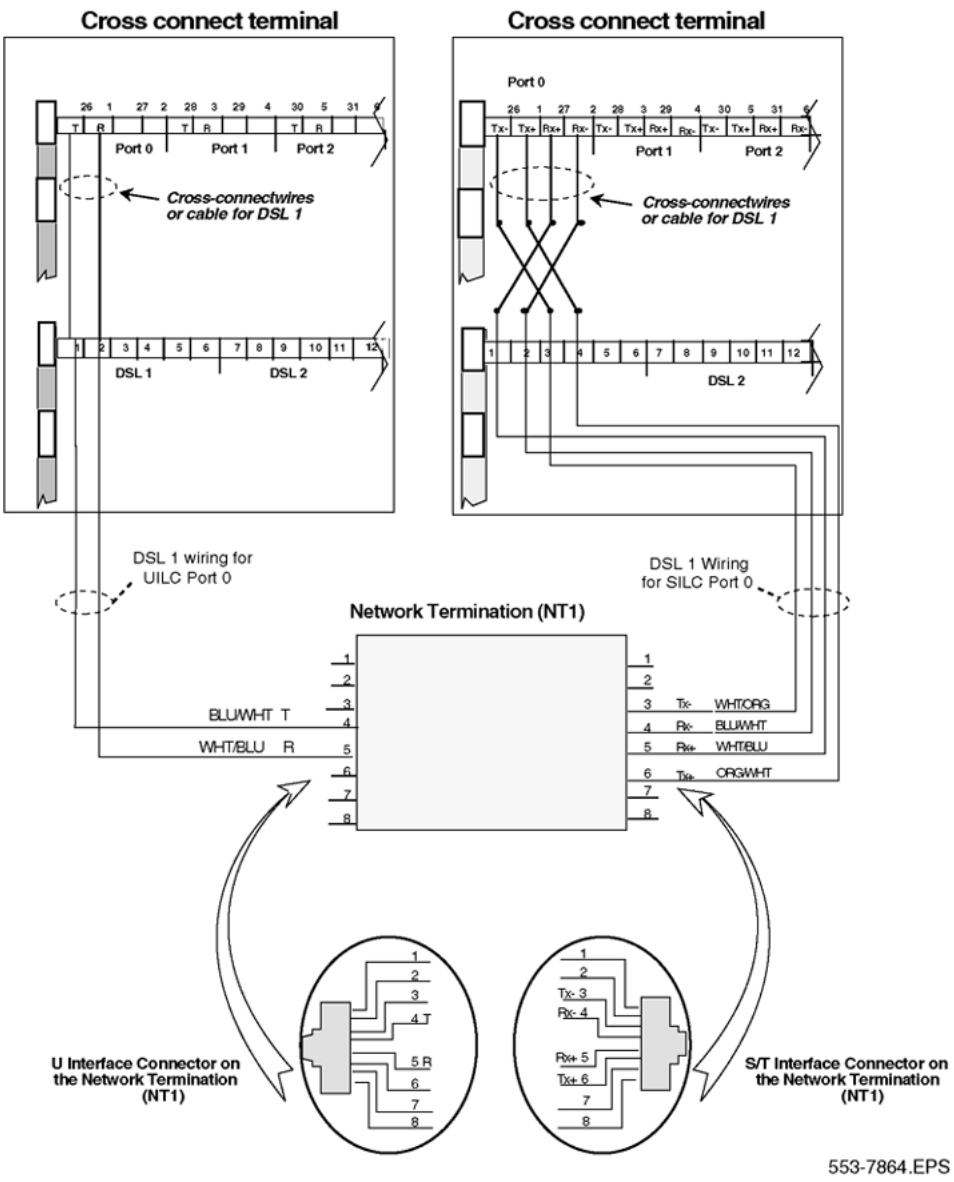


Figure 21: Connecting the ISDN network terminator to the U interface and to the S/T interface (in TE mode)

Connecting the ISDN BRI terminals (for line applications)

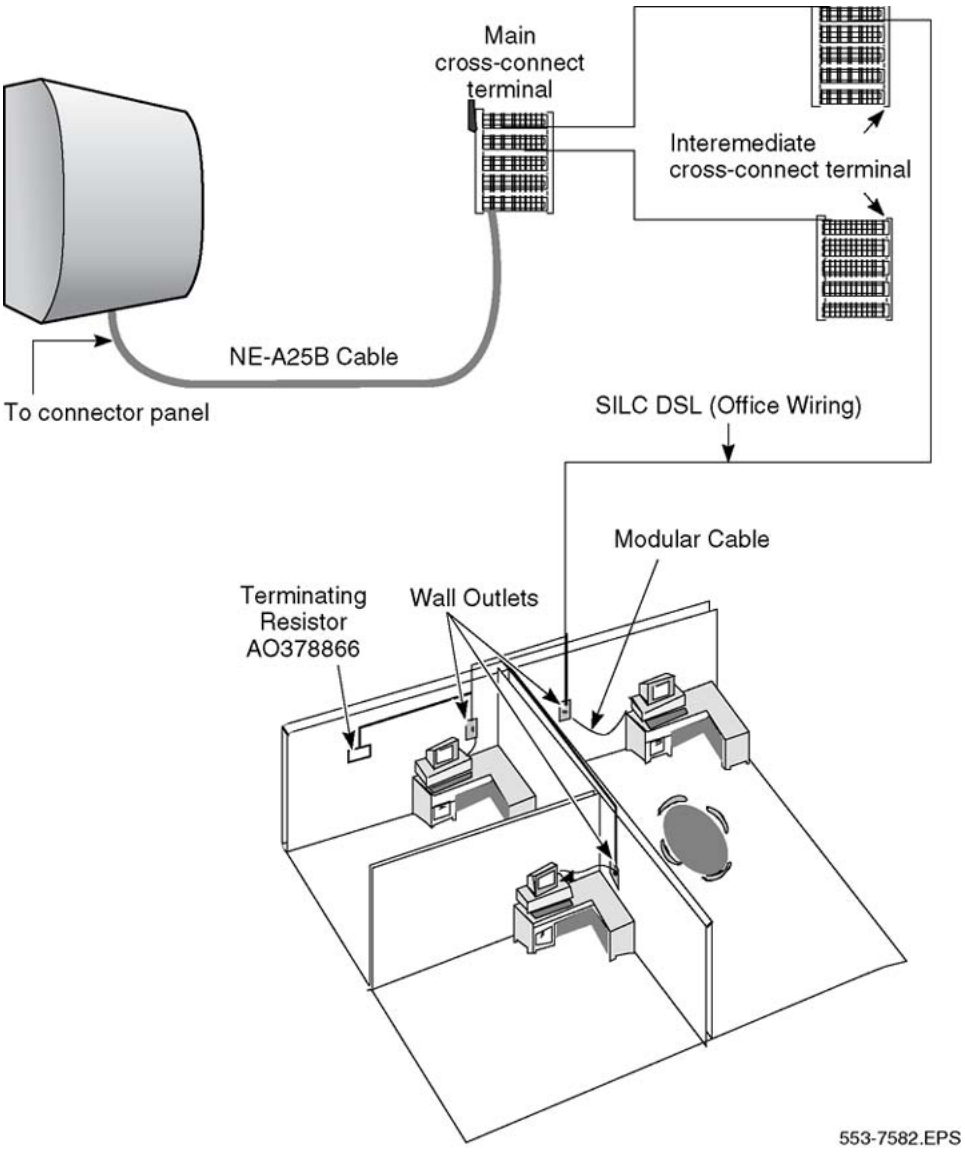
For line applications, five procedures are required to connect ISDN BRI terminals to the system:

1. Connect system cables to the cross-connect terminal. See Connecting system cables to the cross-connect terminal on page 65.
2. Cross-connect the DSLs at the cross-connect terminal. See Cross-connecting the DSLs at the cross-connect terminal on page 69.

3. Connect the terminating resistor to the SILC DSL. See Connecting the terminating resistor to the SILC DSL on page 72.
4. Connect the ISDN BRI terminals to the DSL. See Connecting the ISDN BRI terminals to the DSL on page 74.
5. Initialize the terminals. See Initializing a Nortel Networks M5317TDX terminal on page 77.

Connecting ISDN BRI terminals to the system on page 65 shows a typical DSL and multiple ISDN BRI terminals connected to the system.

Connecting ISDN BRI terminals to the system



Connecting system cables to the cross-connect terminal

Each card slot equipped with a SILC or UILC requires one NE-A25B 25-pair connector cable.

1. Remove the connector retaining bar from the connector panel in the lower part of each cabinet. See Figure 22: Cable connectors in main cabinet on page 67 and Figure 23: Cable connectors in the expansion cabinet on page 67 on Figure 22: Cable connectors in main cabinet on page 67, and Figure 24: Cable connectors in the second expansion cabinet on page 67.
2. Connect an NE-A25B cable to each connector associated with a card slot containing a SILC or UILC circuit card. See Figure 22: Cable connectors in main cabinet on page 67 and Figure 23: Cable connectors in the expansion cabinet on page 67 on Figure 23: Cable connectors in the expansion cabinet on page 67 and Figure 24: Cable connectors in the second expansion cabinet on page 67 and Figure 25: Back of Media Gateway cable connectors on page 68 on Figure 25: Back of Media Gateway cable connectors on page 68.

   Tag both ends of each cable with the cabinet or Media Gateway connector numbers.
3. Connect the cables to the connectors at the bottom of the cabinet or at the rear of the Media Gateway.
4. Replace the retaining bar when you connect all the cables to the system.
5. Terminate the 25-pair cables at the cross-connect terminal.
6. Label the cross-connect terminal for each connector (UILC or SILC).

   Figure 26: SILC port designation label at the cross-connect terminal on page 68 and Figure 27: UILC port designation label at the cross-connect terminal on page 68 on Figure 27: UILC port designation label at the cross-connect terminal on page 68 show the label used with the BIX cross-connecting system.

   Note:
   Use of the BIX cross-connect system is not mandatory. The system supports other cross-connect equipment. Refer to the documentation provided with your cross-connect system for further information.

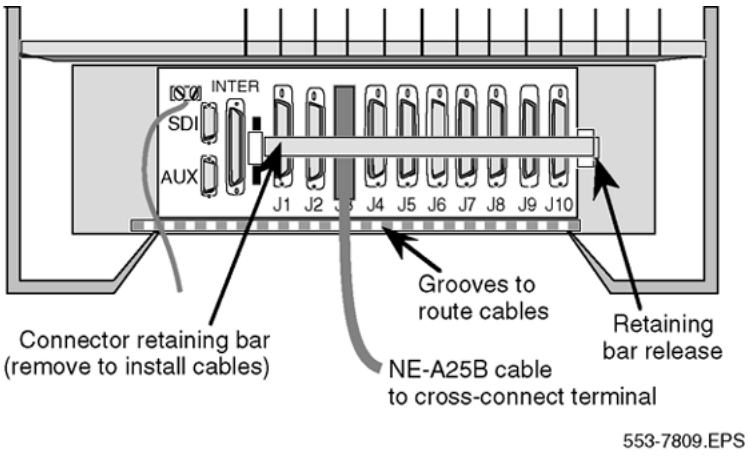


Figure 22: Cable connectors in main cabinet

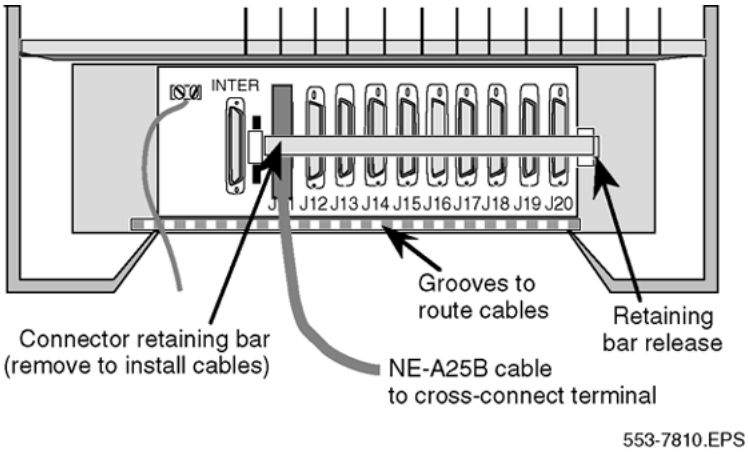


Figure 23: Cable connectors in the expansion cabinet

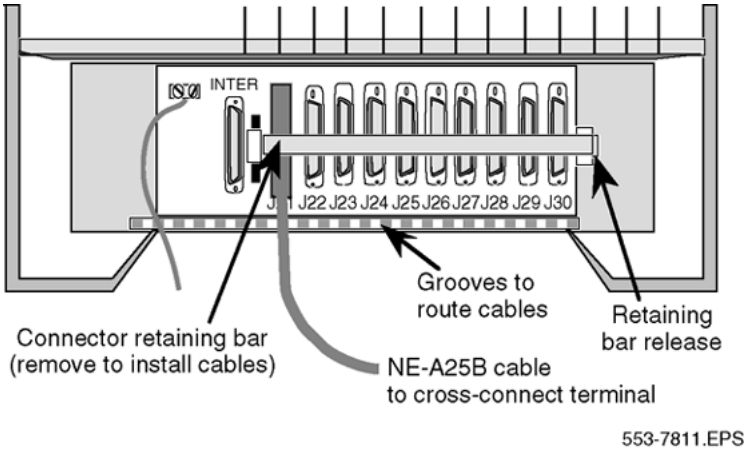


Figure 24: Cable connectors in the second expansion cabinet

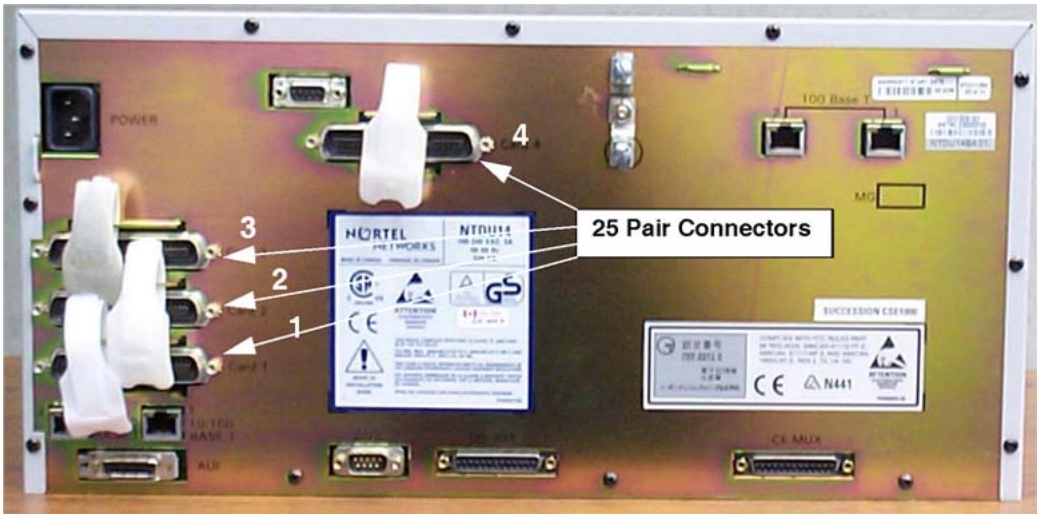


Figure 25: Back of Media Gateway cable connectors

TX- TX+RX+ RX-0	TX-TX+RX+ RX-1	TX-TX+RX+ RX-2	TX-TX+RX+ RX-3	TX-TX+RX+ RX-4	TX-TX+RX+ RX-5	TX-TX+RX+ RX-6	0 7	TX

Figure 26: SILC port designation label at the cross-connect terminal

Note:

The pair designated TX- TX+ is the transmit pair. The pair designated RX- RX+ is the receive pair. A SILC port supplies 2 W of power at -48 V (-40 V for Europe), simplexed over the transmit and receive pairs. The transmit pair is negative with respect to the receive pair.

TR 0		TR 1		TR 2		TR 3		TR 4		TR 5		TR 6		TR 7	0

Figure 27: UILC port designation label at the cross-connect terminal

Note:

The cable pair designated T R is a 2B1Q full-duplex U interface.

Cross-connecting the DSLs

Each SILC provides eight four-wire, full-duplex ports. These ports connect to building wiring facilities to form DSLs. Since the DSLs are polarity-sensitive, maintain signal polarity along each loop as shown in Figure 28: Cross-connecting a SILC port to the office wiring on page 71 on Figure 28: Cross-connecting a SILC port to the office wiring on page 71.

Each UILC provides eight two-wire full-duplex ports. These ports connect to twisted pair building wiring facilities to form DSLs as shown in Figure 29: Cross-connecting a UILC port to the office wiring on page 72 on Figure 29: Cross-connecting a UILC port to the office wiring on page 72. The DSLs are not polarity-sensitive, and it is not necessary to maintain signal polarity along each loop.

Cross-connecting the DSLs at the cross-connect terminal

To cross-connect SILC and/or UILC ports to the building wiring:

1. Identify the card type (SILC or UILC) at the cross-connect terminal.
2. Identify the transmit and receive connections for the SILC and the TIP and RING connections for the UILC from the label of the distribution strip.

   Refer to Table 19: M5317TDX terminal error codes on page 79 to identify ports and their connections for a SILC or UILC.
3. Identify building wires connected at the cross-connect terminal.
4. Cross-connect the pins from the SILC or UILC to the building wiring.
5. Repeat this procedure for each DSL.

Table 16: SILC and UILC port assignments connectors at cross-connect terminal on page 69 identifies SILC and UILC port assignments connectors at the cross-connect terminal.

Table 16: SILC and UILC port assignments connectors at cross-connect terminal

SILC port signals	UILC port signals	Connector pin number and wire color code	Wire color codes	Card ports
0 TX-	0 T	26	W-BL	
0 TX+	0 R	1	BL-W	
0 RX-		27	W-O	Port 0
0 RX+		2	O-W	
1 TX-	1 T	28	W-G	
1 TX+	1 R	3	G-W	
1 RX-		29	W-BR	Port 1
1 RX+		4	BR-W	
2 TX-	2 T	30	W-S	
2 X+	2 R	5	S-W	
2 RX-		31	R-BL	Port 2
2 RX+		6	BL-R	
3 TX-	3 T	32	R-O	
3 TX+	3 R	7	O-R	
3 RX-		33	R-G	Port 3
3 RX+		8	G-R	
4 TX-	4 T	34	R-BR	
4 TX+	4 R	9	BR-R	

SILC port signals	UILC port signals	Connector pin number and wire color code	Wire color codes	Card ports
4 RX-		35	R-S	Port 4
4 RX+		10	S-R	
5 TX-	5 T	36	BK-BL	
5TX+	5 R	11	BL-BK	
5RX-		37	BK-O	Port 5
5RX+		12	O-BK	
6 TX-	6 T	38	BK-G	
6 TX+	6 R	13	G-BK	
6 RX-		39	BK-BR	Port 6
6 RX+		14	BR-BK	
7 TX-	7 T	40	BK-S	
7 TX+	7 R	15	S-BK	
7 RX-		41	Y-BL	Port 7
7 RX+		16	BL-Y	

Note:
The cable pair designated TX- TX+ is the transmit pair and the pair designated RX+ RX- is the receive pair of the S/T interface. The cable pair designated T R is the Tip and Ring of the 2B1Q full-duplex U interface.

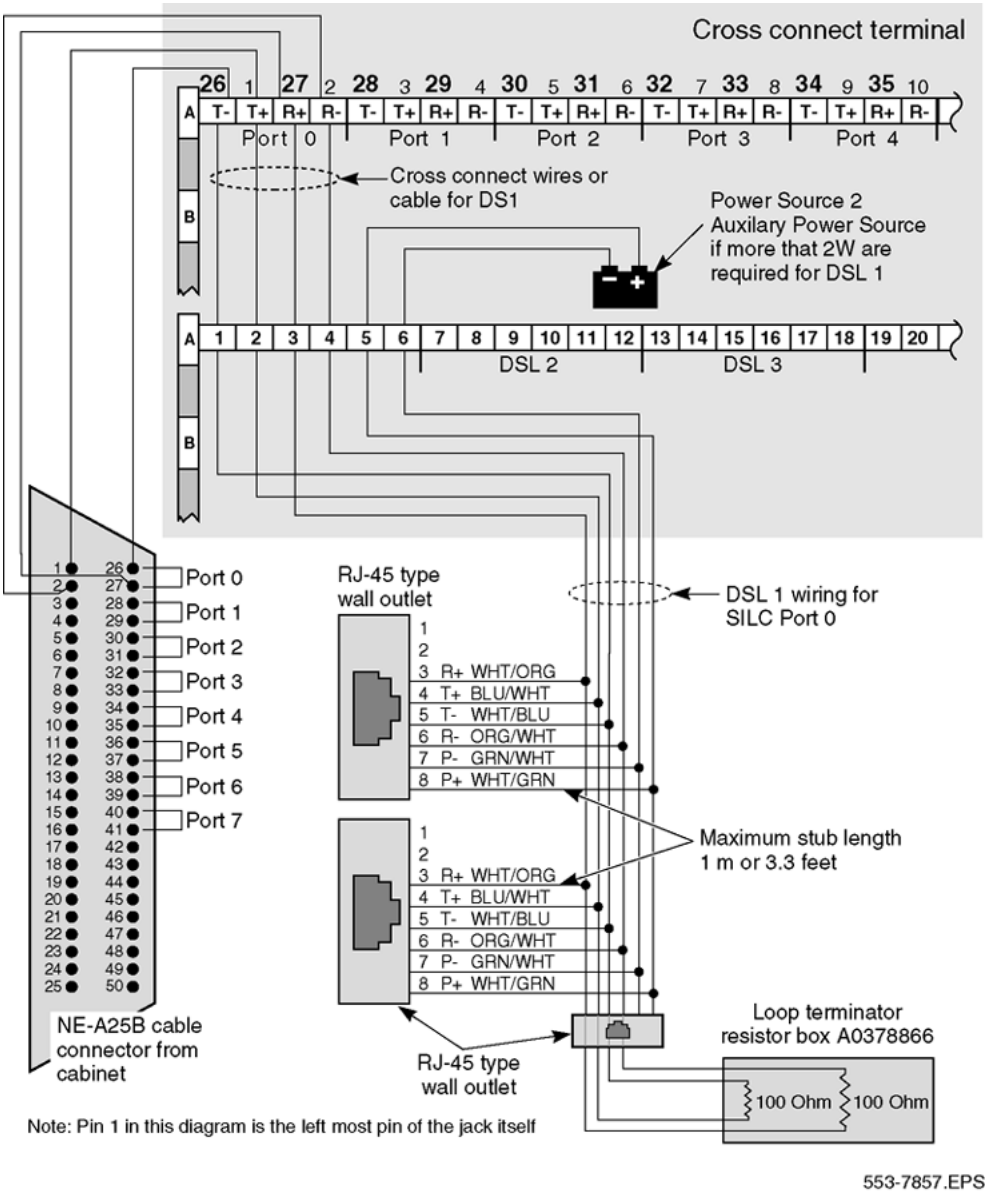


Figure 28: Cross-connecting a SILC port to the office wiring

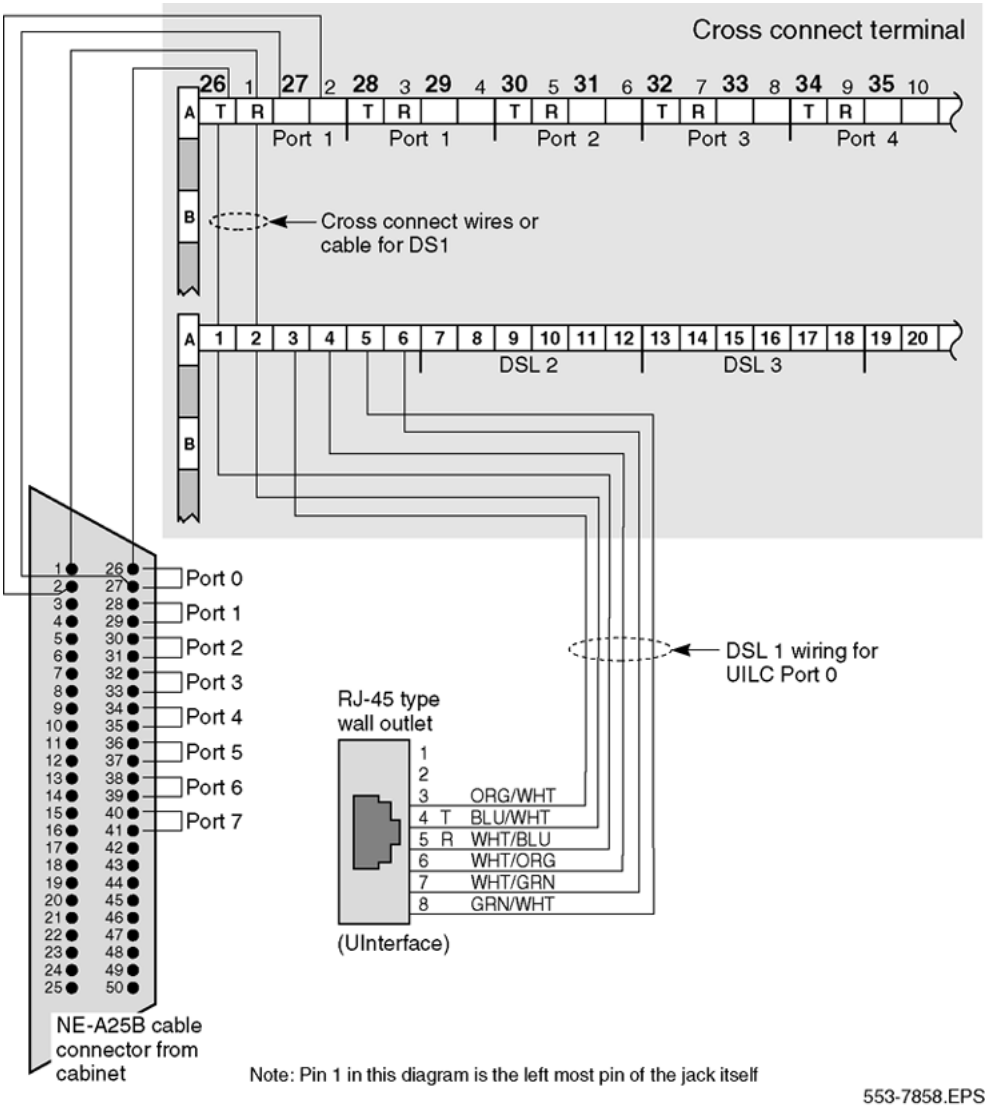


Figure 29: Cross-connecting a UILC port to the office wiring

Connecting the terminating resistor to the SILC DSL

Plug the end of the SILC DSL to the RJ-45 jack on the terminating resistor (A0378866) resistor.

Connecting the ISDN BRI terminals

ISDN BRI terminals are connected to DSLs using modular cables not longer than 10 m (33 ft) with RJ-45 type plugs on each end. One end of the cable is plugged into the terminal, and the other end is plugged into the telephone outlet.

All terminals must be compatible with the system and comply with one of the following protocols for ISDN BRI terminals:

- ETSI NET-3
- INS NET-64
- NUMERIS
- ANSI standards

Contact your Nortel Networks representative for the latest list of compatible terminals.

To connect 1TR6 terminals, an ETSI NET-3 to 1TR6 protocol converter is required. A terminal adapter (the So-Adapter) is specifically designed to interface with the ISDN BRI DSL and the 1TR6 terminals. Its main function is to convert 1TR6 protocol, sent from the 1TR6 terminal into the ETSI NET-3 protocol required for ISDN BRI.

S/T interface specification

The S/T interface uses an 8-conductor modular cable terminated with an 8-pin RJ-45 type plug. An 8-pin RJ-45 type jack located on the terminal connects the terminal to the DSL using this modular cable.

Table 17: S/T interface connector specification on page 73 shows the connector pin assignment for the jack and the plug. It also shows the signal names for each interface pin at the SILC and at the terminal.

Table 17: S/T interface connector specification

Pin number	RJ45 jack pin signal name	SILC signal name
1	Power Source 3	No connection
2	Power Source 3	No connection
3	TX +	RX +
4	RX +	TX +
5	RX -	TX -
6	TX -	RX -
7	Power Sink 2 (-)	No connection
8	Power Sink 2 (+)	No connection

Note:

Power Source 1 (PS1): Up to 2 Watts of power is supplied by the SILC to the terminals on the DSL. This power is simplexed over the TX and RX pairs provided by -48 V (-40 V for Europe) supply on the SILC. The RX pair is positive with respect to the TX pair.

Note:

Power Sink 2 (PS2) provides an optional means of powering the terminal from a common supply in the wiring closet.

Note:

Power Source 3 (PS3) provides the power from the terminal to the NT1 if the NT1 does not have a local power source.

U interface specification

The U interface uses a 2-conductor, twisted pair cable terminated with an RJ-45 type jack. An RJ-45 type jack on the NT1 device connects the terminal to the DSL using this twisted pair cable.

The connector pin assignments for the jack and the plug are shown in Table 18: U interface connector specification on page 74. The table also shows signal names for each interface pin at the UILC and at the terminal.

Table 18: U interface connector specification

Pin number	RJ45 jack pin signal name	UILC signal name
1	Not used	No connection
2	Not used	No connection
3	Not used	No connection
4	Tip or Ring	Tip or Ring
5	Tip or Ring	Tip or Ring
6	Not used	No connection
7	Not used	No connection
8	Not used	No connection

Connecting the ISDN BRI terminals to the DSL

1. Plug one end of the modular cable into the ISDN BRI interface connector on the terminal. Plug the other end of the modular cable into the telephone outlet.
2. If the SILC S/T interface has an optional auxiliary power source, plug the power source into the wall outlet and then the 10-m (33-ft) modular cable into the power source's RJ-45 type jack.

   The power source must not feed the power back into the DSL through the RJ-45 wall outlet, only to the local ISDN BRI terminal. The power adapter is normally supplied with the terminal.

   Figure 30: Connecting the ISDN BRI terminal to the S/T interface on page 76 illustrates an ISDN BRI terminal connection to an S/T interface. Figure 31: Connecting the ISDN network terminator to the U interface on page 77 illustrates an ISDN BRI terminal connection to a U interface.
3. Enter the Static TEI at the terminal.

Note:

Do not perform this step to assign Dynamic TEIs since they are automatically assigned.

4. Enter the Service Profile ID number at the terminal.

   For detailed information about this procedure, refer to the terminal user guide.

5. Repeat step 1 on page 74 to step 4 on page 75 for each ISDN BRI terminal.

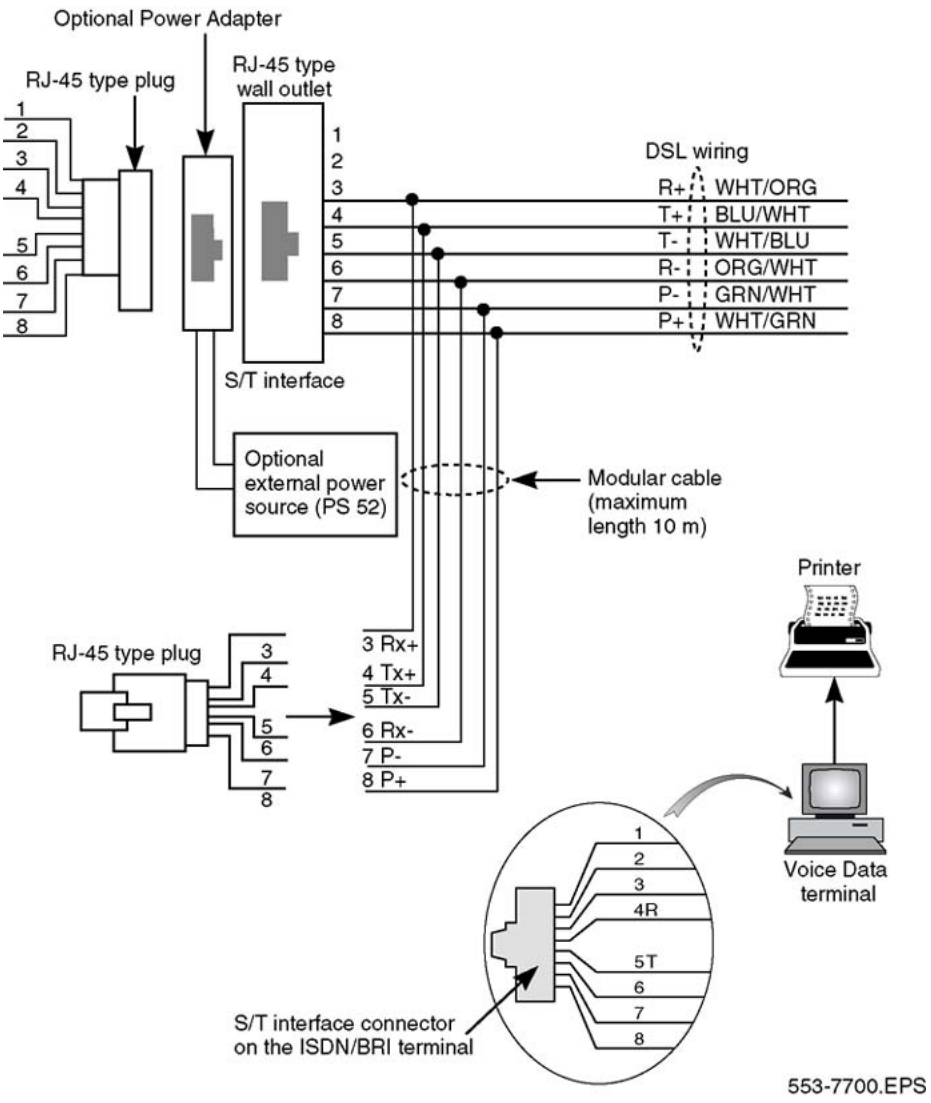


Figure 30: Connecting the ISDN BRI terminal to the S/T interface

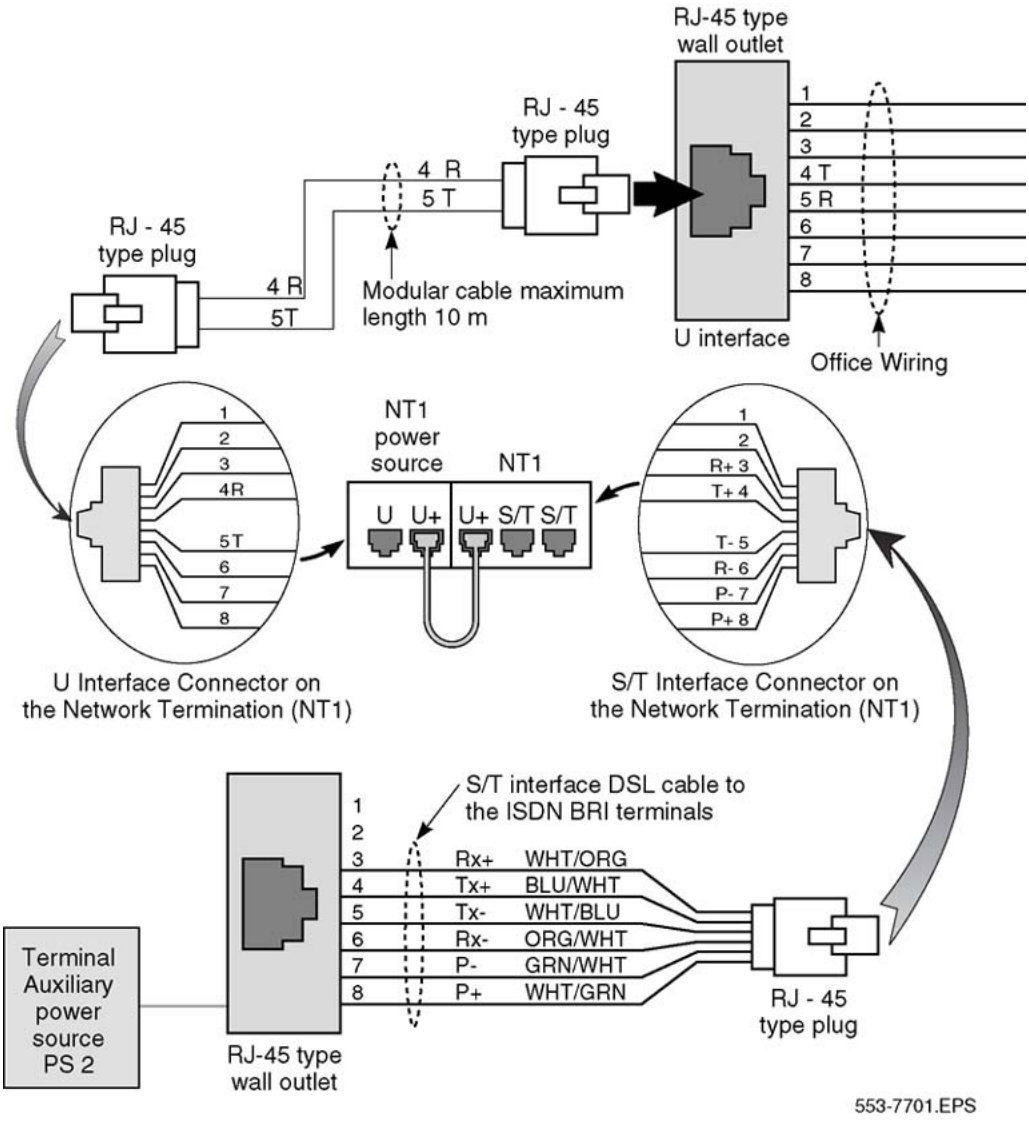


Figure 31: Connecting the ISDN network terminator to the U interface

Non-BRI terminals

The M5000 is Nortel Networks's Universal Terminal Adapter (UTA). It adapts a non-BRI data terminal or an analog (500/2500-type) telephone to the ISDN BRI protocol. Attach a terminal to the M5000 terminal adapter to initialize it. Refer to the M5000 terminal adapter user guide for detailed configuration procedures.

Initializing a Nortel Networks M5317TDX terminal

The following is an example of the steps to initialize an M5317TDX terminal. Table 19: M5317TDX terminal error codes on page 79 lists and describes error codes that can appear during terminal initialization. Additional information is contained in the M5317TDX user guide.

1. Set the switch on the bottom of the terminal for either line power or local power.
2. Plug in the M5317TDX terminal.
3. Press and hold down the RLS and HOLD keys as the terminal powers up.
4. Press MAINROM.
5. Press INSTALL.
6. Press ENGLISH or FRANCAIS for your choice of language.
7. Press the soft key of the TEI you want to set PHONE, DATA or X25.

   Note:
   Dynamic TEI is only supported with firmware version 2.0 or higher.
8. Enter * for dynamic TEI.
9. Enter the TEI on the terminal keypad for static TEI.
10. Press OK when you have finished setting the TEIs.
11. Enter the phone (voice) SPID. Press OK when finished.
12. Enter the data SPID. Press OK when finished.
13. Enter the data DN. Press OK when finished.
14. Press HEADSET until REAR displays.
15. Press SIGTYPE until MER1 displays.
16. Press A/MU until MU-LAW displays.
17. Press MORE.
18. Press DIALPLN until NATIONAL displays.
19. Press EXIT.
20. Press NO to execute SPM.
21. Press YES to enter datafill.
22. Press YES to delete existing datafill.
23. Press KEY# then use to keypad to enter the key number you want to program.
24. Press EDIT DN then use the keypad to enter the digits of the DN.
25. Press OK then SAVE after each DN.
26. Repeat 18 on page 78 to 25 on page 78 for each voice DN keypad you want.
27. Press INSTALL and begin at step 4 on page 78, If you entered incorrect data. If the entries were correct, press EXIT.
28. Make a voice call to make sure the telephone is operational.

Table 19: M5317TDX terminal error codes

Error Code Number	Description
>>10<<	S/T-loop sync loss and/or Frame sync loss.
>>11<<	L1 transmit timer expired.
>>21<<	Voice TEI removed by network.
>>22<<	Circuit data TEI removed by network.
>>23<<	Voice and circuit data TEI removed.
>>24<<	X25 TEI removed.
>>25<<	Voice and X25 TEI removed.
>>26<<	Circuit data and X25 TEI removed.
>>27<<	All TEI removed.
>>28<<	Voice link not established.
>>29<<	Circuit data link not established.
>>2A<<	X25 link not established.
>>2B<<	No Layer 2 link established.
>>30<<	No Layer 3 link established.
>>31<<	No valid voice SPID.
>>32<<	No valid data SPID.
>>90<<	Restricted power mode in use. Lower ringer and speaker phone volumes apply.

Chapter 8: Testing ISDN BRI functions

Contents

This section contains information on the following topics:

Introduction on page 81

Voice calls on page 82

- Call Hold on page 82
- Call Waiting on page 83
- Call Forward No Answer on page 84
- Calling Line Identification Presentation and Restriction on page 85
- ISDN BRI Conference (National ISDN-1 and ETSI) on page 86
- ISDN BRI Special Hunting on page 88
- ISDN BRI National ISDN-1 Call Forward All Calls on page 89
- ISDN BRI ETSI Call Forwarding Unconditional on page 90
- Circuit-switched data calls on page 91
- Packet data transmission on page 92
- Testing an ISDN BRI trunk on page 94
- Removing the test setup on page 94

Introduction

This chapter describes some ISDN BRI functional tests used to verify the operation of ISDN BRI equipment. The tests include basic call connections, voice and data transmission, and verification of some features using ISDN BRI terminals. Testing of an ISDN BRI trunk DSL is also included.

The tests are divided into:

- voice calls
- circuit-switched data calls
- B-channel and D-channel packet data calls, using an external packet handler and an MPH
- ISDN BRI trunk

Voice calls

A voice call can be established between two voice terminals across a network (ISDN or non-ISDN), between two terminals on the same system, and between two terminals on the same DSL. Acceptance testing of ISDN BRI voice calls is conducted when testing the following system features supported by ISDN BRI terminals.

- Call Hold
- Call Waiting
- Call Forward No Answer
- Calling Line Identification Presentation and Restriction
- ISDN BRI National ISDN-1 Conference and Call Join
- Special ISDN BRI Hunting
- ISDN BRI ETSI Conference
- ISDN BRI ETSI Call Forwarding Unconditional
- ISDN BRI National ISDN-1 Call Forward All Calls

Call Hold

Call Hold is used to place an active call on hold to allow answering an incoming call or placing an outgoing call. After releasing an incoming or an outgoing call, retrieve the call on hold.

Note:
The following test requires the terminal placing the calls on hold to have multiple DN appearances. Otherwise, this test cannot be performed as written.

Performing a call hold test

1. From an ISDN BRI terminal, dial an ISDN BRI or a non-ISDN BRI terminal and establish an active call connection.
2. Verify that voice transmission is established by talking with the person at the other terminal.

3. Press the HOLD key to place the active call on hold.

Note:
To use feature keys on different ISDN BRI terminals, consult the user manual supplied with the terminal.

4. Place an outgoing call by dialing an idle ISDN BRI or a non-ISDN BRI terminal.
5. Complete this outgoing call and hang up.
6. Have another ISDN BRI or non-ISDN BRI terminal call while the first call is still on hold.
7. Answer the incoming call and place it on hold.
8. Retrieve the call first held.
9. Complete the call and hang up.
10. Retrieve the second call on hold.
11. Complete the call and hang up.

This test can be repeated for terminals connected to the same DSL, different DSLs on the same card, different DSLs on cards associated with different MISPs/BSRCs, and between ISDN BRI and non-ISDN BRI terminals.

Call Waiting

Call Waiting informs an ISDN BRI terminal user engaged in an active call that a call is waiting to be answered. A call setup message is sent to a DSL when both B-channels are busy and an incoming call is in progress. This causes a warning tone to the terminal speaker. To accept the new call, the user must place the currently active call on hold or release the call.

Call Waiting is activated only if Hunting is not enabled or fails to handle the incoming call. The incoming call may originate from an ISDN BRI or a non-ISDN BRI terminal.

Note:
The following test requires that the terminal receiving the second (call waiting) call has multiple DN appearances. Otherwise, this test will fail.

Perform a Call Waiting test

1. Set the FEAT parameter to HTD to disable Hunting. Use LD 27 to specify this parameter when configuring the Terminal Service Profile (TSP) for the two voice ISDN BRI DNs on one of the DSLs. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
2. From an ISDN BRI terminal with disabled hunting, dial another ISDN BRI terminal and establish an active call connection.

3. From the second ISDN BRI terminal with disabled hunting, dial another ISDN BRI terminal and establish another active call connection. Both B-channels on the DSL are now busy.

   Note:
   Only two ISDN BRI terminals may be on the same DSL to allow them to connect. The other two ISDN BRIs are on a different DSL.
4. Place an incoming call to one of the busy ISDN BRI terminals with disabled hunting.
5. Observe the called ISDN BRI terminal. The ringing or warning tone should sound, indicating that a call is waiting.
6. Place the active call on hold and answer the call that is waiting.
7. Complete the incoming call and hang up.
8. Retrieve the call on hold.
9. Complete the call and hang up.

Call Forward No Answer

Call Forward No Answer and Second Level Forward No Answer forwards an unanswered call to a Call Forward No Answer Directory Number (DN) after a predetermined number of rings. This feature is enabled at the TSP level when defining the ISDN BRI DN. Both the external and internal Call Forward No Answer features are configured at the DSL level using LD 27. The call can be specified to be forwarded to the attendant, to an assigned hunting DN, or to a flexible Call Forward No Answer DN by using LD 15.

When a call originated by an ISDN BRI terminal is forwarded to a predetermined DN specified in LD 15, the display on that ISDN BRI terminal is not updated to indicate a call modification.

Performing a Call Forward No Answer test

1. Set the FEAT parameter to **FNA** and **SFA** to enable Call Forward No Answer and Second Level Forward No Answer. (SFA is needed only to test two levels of Call Forward No Answer.) Use LD 27 to specify these parameters when configuring the TSP for one of the two voice ISDN BRI terminal DNs. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
2. Specify the attendant as the forwarding DN using LD 15. At the FNAL prompt, enter **ATT** to specify forward to attendant. Refer to LD 15 in the *Software Input Output Administration (NN43001-611)* for more details.
3. From an ISDN BRI terminal, place a call to the ISDN BRI terminal with the enabled Call Forward No Answer feature and the specified call forward to attendant.
4. Do not answer the call. After a predetermined number of rings, the call is forwarded to the attendant. The display on the call-originating ISDN BRI terminal will not be updated to indicate that the call is modified and forwarded to the attendant.

5. Verify the call was forwarded to the attendant by answering the call at the attendant console. The attendant console will display the call-originating identification number and the notification of call redirection.
6. Hang up at the call-originating ISDN BRI terminal to release the call connection.

Calling Line Identification Presentation and Restriction

Calling Line Identification Presentation and Restriction allows a calling party number (Calling Line Identification) to be shown on a called party ISDN BRI terminal display. Use LD 27 to specify this feature when configuring the TSP for the ISDN BRI terminal DN. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

This feature gives the calling and the called parties the option of displaying the calling line identification as follows:

- The called party ISDN BRI terminal must have the calling line presentation (CLIP) parameter value set to **YES** to accept the calling line identification and show it on its display.
- If there is an option on the ISDN BRI terminal that enables the calling party to allow or restrict the presentation of the calling line ID on a per call basis, select the option to allow presentation. This option on the terminal overrides the PRES parameter values entered in the TSP data block when configuring the TSP. This depends on the telephone configuration default. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

Perform a Calling Line Identification Presentation test

1. Configure both the calling and the called party ISDN BRI terminal DN with CLIP = **YES** and PRES = **YES**.
2. Place a call from one terminal to the other and observe the display on the called party ISDN BRI terminal. The Calling Line Identification should be displayed during ringing and for the duration of the call.
3. Release the call at the called or calling party terminal.
4. Set PRES = **NO** in the TSP data block for the calling party ISDN BRI terminal. If the calling party ISDN BRI terminal has an option on the set to allow or restrict the presentation of the calling party number, select the option to allow presentation and place a call to another ISDN BRI terminal.
5. Observe the called party ISDN BRI terminal display. You should see the number being displayed.
6. Release the call connection.

ISDN BRI Conference (National ISDN-1 and ETSI)

ISDN BRI Conference allows an ISDN BRI terminal user to bridge multiple parties into a conversation. The user can:

- invoke Conference on a call
- add a new party to an existing call
- Call Join two separate parties on the terminal
- disconnect from the Conference

Perform an ISDN BRI Conference test

The same procedures can be used to test ISDN BRI NI-1 or ETSI Conference.

1. In the DSL configuration in LD 27, set PRID = 6 to select the National ISDN-1 protocol, or set PRID = 2 for the ETSI protocol.
2. In the TSP configuration in LD 27, define conference under FEATID:

   FEATID aaa mmm <nnn>, where

   aaa = A03 (3-party conference) or A06 (6-party conference) mmm = feature activation ID (0 - 127) nnn = feature indication ID (0 - 127) (If nnn is not entered, it is assumed to be the same as mmm)
3. Select National ISDN-1 or ETSI protocol on the ISDN BRI terminal if signaling type/protocol is configurable.
4. On the ISDN BRI terminal, configure Conference. This procedure largely depends on the implementation of feature key management on individual terminals. In general:
   a. The terminal provides Conference as a selectable feature to be programmed on a hard/soft key. For example, on a soft key on an M5317TDX, select FA to be FCC; on a hard key on an M5209TDcp, select CONF.
   b. The Conference key number selected on the terminal must correspond to the feature activation ID entered for the TSP in LD 27.
5. Configure at least two DN appearances on the ISDN BRI terminal. On some ISDN BRI terminals, the second DN appearance allows the user to initiate the second call.
6. Place an outgoing call from the ISDN BRI terminal.
7. After the call is established, press the Conference key. The first call is put on hold automatically; a second key is lit to allow the user to place the second call.
8. Place another outgoing call from the second key.

9. After the second call is established, press the Conference key again to bridge the two calls. All three parties should be in a conference.
10. Press the RELEASE key to drop from the call. The ISDN BRI user should be disconnected from the Conference; the remaining two parties should still be connected, for two outgoing trunk calls, in which case all parties should be disconnected.

Perform a Call Join test on Conference

1. In the DSL configuration in LD 27, set PRID = 6 to select the National ISDN-1 protocol, or PRID = 2 for ETSI protocol.
2. In the TSP configuration in LD 27, define conference under FEATID:

   FEATID aaa mmm <nnn>, where

   aaa = A03 (3-party conference) or A06 (6-party conference) mmm = feature activation ID (0 - 127) nnn = feature indication ID (0 - 127) (If nnn is not entered, it is assumed to be the same as mmm)
3. On the ISDN BRI terminal, if the signaling type/protocol is configurable, then select National ISDN-1or ETSI protocol.
4. On the ISDN BRI terminal, configure Conference. This procedure largely depends on the implementation of feature key management on individual terminals. In general:
   a. The terminal provides Conference as a selectable feature to be programmed on a hard/soft key. For example, on a soft key on an M5317TDX, select FA to be FCC; on a hard key on an M5209TDcp, select CONF.
   b. The Conference key number selected on the terminal must correspond to the feature activation ID entered for the TSP in LD 27.
5. Configure at least two DN appearances on the ISDN BRI terminals. On some ISDN BRI terminals, the second DN appearance is used to allow the user to initiate the second call.
6. Place an outgoing call from the ISDN BRI terminal.
7. After the first call is established, place an incoming call to the ISDN BRI terminal.
8. Hold the first call and answer the second call.
9. Press the Conference key; the second call is put on hold.
10. Retrieve the first call and press the Conference key again. All three parties should be in a conference.
11. Press the RELEASE key to drop from the call. The ISDN BRI user should be disconnected from the conference; the remaining two parties should still be connected, except for two outgoing trunk calls, in which case all parties should be disconnected.

ISDN BRI Special Hunting

ISDN BRI Special Hunting allows a call encountering a destination that has a call in progress to be automatically routed to a different destination in a hunt chain. Hunting continues along a predetermined sequence of DNs in a hunting group until an idle ISDN BRI or non-ISDN BRI terminal DN is found or until the maximum number of hunt steps is exhausted. Use LD 27 to define the hunting DNs in the DSL. See "DSL configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

Special hunting for ISDN BRI supports calls terminating at an ISDN BRI terminal. This feature is activated when a call terminating at a DSL encounters a busy condition and if hunting is enabled. Internal and external hunt DNs can be specified when configuring the DSL.

A busy condition occurs:

- if the maximum number of calls on a DSL exceeds the specified limit of calls on a DSL including active, calls held, calls waiting, and calls in progression (as configured on LD 27), or
- if the total number of calls including active, calls held, calls waiting, and calls in progress exceeds the number of channels configured to handle the incoming call type.

If the call limit on a DSL is not exceeded, an incoming call is presented to the DSL interface as a call waiting call. If Hunting is enabled, the call will be hunted.

Use LD 27 to enable or disable Hunting when configuring the TSP for the ISDN BRI terminal DN. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

Perform a hunting test

1. Set the FEAT parameter to **`HTA`** to enable hunting for two voice ISDN BRI terminals. Use LD 27 to specify this parameter when configuring the TSP. See "TSP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
2. Use LD 27 to specify the HUNT parameter DNs when configuring the DSL. These hunt parameter DNs specify the members of a hunting chain. See "DSL configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
3. Place two calls, one for each voice ISDN BRI terminal, on a DSL to create a DSL busy condition.
4. Place a voice call to one of the busy ISDN BRI terminals with hunting enabled. Since the channel type required to handle the incoming call type is busy, hunting is automatically invoked to find an idle DN in the hunting chain.

   The following can occur:

   - If the call finds an idle voice ISDN BRI or non-ISDN BRI terminal, it will ring that terminal.

- If hunting is not successful:
  - the originating party receives a busy tone if the total number of calls on the DSL (as configured on LD 27) exceeds the maximum number of calls allowed, or
  - the call is placed in call waiting if the maximum number of calls on the DSL is below the specified limit.
- If the call is placed in call waiting, observe the called ISDN BRI terminal. You should get a visual indication of the next DN and receive an audible tone.

5. Place the active call on hold and answer the incoming call that is waiting.
6. Complete the incoming call and hang up.
7. Retrieve the call on hold.
8. Release the call connection.

ISDN BRI National ISDN-1 Call Forward All Calls

National ISDN-1 Call Forward All Calls enables a user of an ISDN BRI terminal to have calls redirected from the user's DN to another DN. Calls are redirected regardless of the busy or idle status of the interface to the user. Call Forward is assigned on the basis of the directory number and call type (that is, the user may have voice calls forwarded, while data calls terminate normally).

Perform an ISDN BRI NI-1 Call Forward All Calls test

The following is to test the forwarding of a voice call from an ISDN BRI M5317 set.

1. Set up ISDN BRI NI-1 Call Forward All Calls in LD 27 (refer to the "Configuring ISDN BRI features" chapter in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*).
   a. Select the NI-1 protocol for the DSL.
   b. Configure the Call Forward All Calls feature ID for a particular DN and call type (enter voice call type).
2. On the ISDN BRI terminal, configure ISDN BRI National ISDN-1 Call Forward All Calls.
3. Configure two DN appearances on the ISDN BRI terminal (use the first DN to forward a call, and the second DN to place a call to test the call forward). On some ISDN BRI terminals, the second DN appearance allows the user to initiate the second call.
4. Activate ISDN BRI National ISDN-1 Call Forward All Calls on the ISDN BRI terminal, for the first DN:
   a. Press the `Forward` key.
   b. Dial the number where calls are to be forwarded.
   c. Press the `Forward` key.

5. From the second DN, place a call to the first DN to verify that the call is forwarded.
6. To cancel National ISDN-1 Call Forward All Calls, Press the `Forward` or the `Cancel` key.

ISDN BRI ETSI Call Forwarding Unconditional

The ISDN BRI ETSI Call Forwarding Unconditional (CFU) supplementary service allows an incoming call to an ISDN BRI terminal to be forwarded to a predetermined destination, within or outside the system. The call is forwarded whether the user is busy or idle.

An ISDN BRI user can assign the same address or a different address for voice or data calls being forwarded. Calls can also be forwarded to an ISDN BRI terminal or a non-ISDN BRI terminal. When the CFU feature is activated, outgoing calls can still be made from the ISDN BRI terminal.

The ETSI supplementary service provides Call Forwarding capabilities to all users on the access (that is, all the DNs defined under a Digital Subscriber Loop (DSL), or an individual user (that is, a DN).

Perform an ISDN BRI ETSI Call Forwarding Unconditional test

The following test is for forwarding a voice call from an ISDN BRI M5317 set.

1. Set up ISDN BRI ETSI Call Forwarding Unconditional in Overlay 27 (refer to the "Configuring ISDN BRI features" chapter in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.
    a. Select the ETSI protocol for the DSL.
    b. Configure the call type (enter voice call type) and Call Forward (enter voice call forward).
2. On the ISDN BRI terminal, configure ISDN BRI ETSI Call Forward Unconditional.
3. Configure two DN appearances on the ISDN BRI terminal (use the first DN to forward a call, and the second DN to place a call to test the call forward). On some ISDN BRI terminals, the second DN appearance allows the user to initiate the second call.
4. Activate ISDN BRI ETSI Call Forwarding Unconditional on the ISDN BRI terminal, for the first DN:
    a. Press the `Forward` key.
    b. Dial the number where calls are to be forwarded.
    c. Press the `Forward` key.

Note:
Call Forward Reminder Tone should be provided to the ISDN BRI terminal.

5. From the second DN, place a call to the first DN, to verify that the call has been forwarded.
6. To cancel ISDN BRI ETSI Call Forwarding Unconditional:

   Press the `Forward` or the `Cancel` key.

Circuit-switched data calls

A circuit-switched data call can be established between two data terminals over a B-channel. The call is set up the same way as a voice call. Dial a call using the ISDN BRI terminal key pad or keyboard, depending on the type of ISDN BRI terminal used. After the connection is established and the called ISDN BRI terminal sends an acknowledgment that it is ready to receive data, the call-originating ISDN BRI terminal can start transmitting user data.

If the call-originating ISDN BRI terminal requests access to data stored in another ISDN BRI or non-ISDN BRI terminal, it may have to provide a password to be able to access that data.

Note:
Follow the instructions in the ISDN BRI terminal user manual for a detailed description of how to set up a call connection and how to transmit and receive data.

In general, data terminals are divided into the following categories:

- intelligent terminals, such as personal computers
- dumb terminals such as video display terminals

Repeat this test on several terminals, including both intelligent and dumb terminals as needed.

Perform a circuit-switched data call test

1. From an ISDN BRI data terminal, dial another ISDN BRI data terminal and establish an active call connection.
2. After receiving an acknowledgment that the other terminal is ready, begin transmitting data.
3. Verify that the transmitted data is received successfully by checking transmitted information for accuracy. Read the information on the screen or print it on the local printer.
4. Release the connection.

Packet data transmission

A packet data call can be established between two data terminals over a B-channel or a D-channel.

B-channel packet data terminals communicate with the packet handler at 64 kbps over dedicated B-channels. The packet handler may be an external packet handler, the DPN-100, or the integrated MPH. The packet handlers processes and distributes the data to local terminals for local calls or over the packet data network for remote calls.

D-channel packet data terminals communicate at a baud rate of up to 9.6 kbps. The packet data is multiplexed onto a 64 kbps BD that is linked with the external packet handler through a dedicated ISDN PRI B-channel, or, in the case of the MPH, through a dedicated connection.

Note:

To perform packet data transmission verification, the system must be connected to a DPN-100, or configured with MPH. Also, packet data transmission functions must be selected when configuring the B-channel and D-channel transmission characteristics. Use LD 27 to specify the packet data transmission functions. See "MISP configuration procedures" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

In addition to configuring the MISP and the DSL in LD 27, ensure the following:

- the ISDN PRI loop carrying packet data was configured in LD 17
- the packet handler route was specified in LD 16
- an ISDN PRI channel for the packet handler route was configured using LD 14

See *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)* for a detailed description of how to configure relevant ISDN BRI packet data transmission parameters in LD 17, LD 16, and LD 14.

Perform a B-channel packet data transmission test using an external packet handler

1. From an ISDN BRI B-channel packet data terminal, dial another local or a remote ISDN BRI packet data terminal and establish an active call connection.

   After the call-originating ISDN BRI terminal receives an acknowledgment that the receiving ISDN BRI terminal is ready, the call-originating ISDN BRI terminal can begin transmitting packet data.
2. Verify that the transmitted data is received successfully by checking the transmitted information for accuracy. Read the information on the screen or print it on the local printer.
3. Release the connection.

Repeat this test on other ISDN BRI packet data terminals as needed.

Perform a D-channel packet data transmission test using an external packet handler

1. From an ISDN BRI D-channel packet data terminal, dial another ISDN BRI packet data terminal and establish an active call connection.

   After the call-originating ISDN BRI terminal receives an acknowledgment that the receiving ISDN BRI terminal is ready, the call-originating ISDN BRI terminal can begin transmitting packet data.
2. Verify that the transmitted data is received successfully by checking the transmitted information for accuracy. Read the information on the screen or print it on the local printer.
3. Release the connection.

Perform a D-channel Switched Virtual Circuit packet data transmission test using an MPH

1. From an ISDN BRI D-channel packet data terminal, dial another local ISDN BRI packet data terminal or a remote packet data terminal (depending on how you have configured your MPH application). Establish an active call connection.
2. After the call-originating ISDN BRI terminal receives an acknowledgment that the receiving ISDN BRI terminal is ready, the call-originating ISDN BRI terminal can begin transmitting packet data.
3. Verify that the transmitted data is received successfully by checking the transmitted information for accuracy. Read the information on the screen or print it on the local printer.
4. Perform this test between two ISDN BRI terminals on the same MPH for local transmission and between a system ISDN BRI terminal and a remote ISDN BRI terminal over the Packet Switched Data Network (PSDN).
5. Release the connection.

Perform a B-channel Switched Virtual Circuit packet data transmission test using an MPH

1. From an ISDN BRI B-channel packet data terminal, dial the Network Terminal Numbers (NTNs) as configured in LD 27. Establish an active call connection.
2. After the call-originating ISDN BRI terminal receives an acknowledgment that the receiving ISDN BRI terminal is ready, the call originating ISDN BRI terminal can begin transmitting packet data.
3. Verify that the transmitted data is received successfully by checking the transmitted information for accuracy. Read the information on the screen or print it on the local printer.
4. Perform this test between two ISDN BRI terminals on the same MPH for local transmission and between a system ISDN BRI terminal and a remote ISDN BRI terminal over the packet data network.
5. Release the connection.

Testing an ISDN BRI trunk

Perform procedure to test an ISDN BRI trunk DSL

1. Set up the ISDN trunk test configuration to be used, as described previously in the chapter "Set up ISDN BRI test terminals and trunks".
2. Place a call across the ISDN BRI trunk.
3. Complete the call and hang up.

Removing the test setup

After acceptance testing is completed and the results show the system is operating correctly, remove the ISDN BRI terminal setup and configure ISDN BRI equipment according to the customer configuration. If the actual customer configuration was used to perform these tests, no changes are needed.

Chapter 9: Generating traffic reports

Contents

This section contains information on the following topics:

[Introduction](#) on page 95

Introduction

This chapter describes how to generate traffic reports to verify that the traffic generated during voice and data transmission testing is stored by the system and can be printed on demand. To verify traffic generated during acceptance testing, use the following command:

INVS (options)*

The asterisk (*) denotes that the ENTER key must be pressed after the desired option numbers are entered.

Reports are generated using one or more of the following option numbers.

Option	Meaning
1	Network traffic report
11	ISDN BRI MISP and/or BRSC traffic report
12	ISDN BRI MISP and/or BRSC D-channel management messages report
13	ISDN BRI MISP and/or BRSC messages report
14	Trunk DSL system traffic report
15	MPH traffic report

For example, to verify ISDN BRI traffic generated during acceptance testing, select the network traffic report and the MISP traffic report as follows:

INVS 1 11

The system printer should print these two reports. Check the reports to make sure the traffic generated during the test is reflected in the reports.

The network traffic report shows the traffic activities for lines and trunks, including ISDN BRI DSLs. Figure 32: Network traffic report on page 96 is an example of the Network traffic report.

0111 TFS000

004	TERM	00000	0000120	00090	00000	0000535	00300
008	TDS	00000	0000050	00060	00000	0000200	00100
012	CONF	00001	0000010	00020	00003	0000090	00080
016	TERM	00000	0000000	00000	00000	0000000	00000
020	TERM	00000	0000200	00093	00000	0000980	00800
024	TERM	00000	0000005	00030	00000	0000039	00034
028	CONF	00000	0000030	00040	00000	0000090	00080
032	TERM	00000	0000080	00030	00000	0000235	00230
036	TERM	00000	0000070	00050	00000	0000450	00300
040	TDS	00000	0000070	00050	00000	0000226	00131
044	TERM	00002	0000060	00051	00003	0000120	00100
048	TERM	00000	0000070	00060	00000	0000240	00200
052	TERM	00000	0000030	00222	00000	0000100	00094
056	TERM	00000	0000080	00075	00000	0000450	00400

Note: DSLs are included in TERM type.

Figure 32: Network traffic report

For a detailed description of how to set up and print traffic reports, see "Set up ISDN BRI traffic reports" in *ISDN Basic Rate Interface Feature Fundamentals (NN43001-580)*.

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