Meridian 1

Option 11C

ISDN BRI Administration and Maintenance

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Contents

About this guide

This guide provides information for the ISDN Basic Rate Interface feature for the Option 11C system. The information includes:

— An overview of ISDN Basic Rate Interface

— Feature descriptions

— Feature packaging and prerequisites

— Network clocking

— ISDN BRI line and packet data implementation

— ISDN BRI trunk implementation

— Acceptance testing

— Administration and maintenance

— ISDN BRI traffic reports

Chapter 1 — ISDN Basic Rate Interface

Introduction

This chapter gives an overview of Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI).

> ***Note:*** This document is intended to support the Meridian 1 Option 11 (sometimes referred to simply as the Option 11) system. (When only the term “Meridian 1" is referenced, it is meant to include all members of the Meridian 1 family (Meridian 1 Option 11 through Option 81C).

ISDN Overview

Integrated Services Digital Network (ISDN) is a global networking strategy that provides an intelligent, universal network for voice and data communications. ISDN is a set of international standards that define the next generation of digital networking services.

Some of the benefits of ISDN are as follows:

- faster, more accurate, noise-free transmission, as well as greater security and reliability
- ability to carry multiple information types, including speech, data, image, and video
- standard interfaces to allow multi-vendor compatibility
- configuration flexibility when combining public and private networking facilities.

ISDN differs from traditional communication in that it uses “out of band” signaling. Signaling information is sent and received on a dedicated channel, called a D-channel, leaving the remaining channels, called B-channels, free for voice and data.

Option 11 provides the following ISDN accesses:

— Primary Rate Interface (PRI)

- 1.5 Mb T1 (23B+D)
- 2.0 Mb E1 (30B+D)

— Basic Rate Interface (BRI)

- A single digital access connection

This document focuses on Basic Rate Interface for the Option 11. For more information on PRI refer to 553-3011-310, *1.5 Mb DTI/PRI Administration and Maintenance guide* and 553-3011-315, *2 Mb DTI/PRI Administration and Maintenance guide*.

ISDN Basic Rate Interface

ISDN Basic Rate Interface (BRI) is a digital connection that provides three digital channels. These channels consist of two 64 kbps Bearer channels (B-channels) and one 16 kbps Data channel (D-channel). This 2B+D connection is know as a Digital Subscriber Loop (DSL) on the Option 11.

The DSL can be configured for the following functionalities:

L**ine Access** - As a line ISDN BRI provides a digital connection from the Option 11 BRI card to an ISDN terminal that comply with CCITT, ANSI, ETSI NET-3, INS NET-64, National ISDN, EuroISDN, 1TR6, Numeris VN2, D70, and Asia-Pacific standards (Numeris is the French ISDN signaling protocol; 1TR6 is the German ISDN signaling protocol; and D70 is the Japanese ISDN signaling protocol). Examples of terminals are: telephone sets, FAX machines, personal computers and video display terminals.

Trunk Access - The trunk access application provides CO/DID connections to local exchanges that support Numeris VN2, 1TR6, D70, EuroISDN, and Asia-Pacific protocols. This application also provides ISDN BRI TIE trunk connectivity, and QSIG ISDN BRI trunk connectivity.

> ***Note:*** ISDN BRI local exchange connectivity is not supported in North America.

Packet Data transmission - The Option 11 supports both B-channel and D-channel packet data transmission through an external DPN-100 packet handler.

ISDN BRI allows simultaneous voice, circuit-switched data, and packet data transmission over a single DSL.

ISDN BRI provides two interface types to the Option 11:

— **S/T interface**, that provides a 4-wire multi-point connection. This interface is provided by an NT6D70 SILC line card, which supports eight DSLs.

— **U interface**, that provides a 2-wire point-to-point connection that uses 2B1Q line encoding. This interface is provided by an NT6D71 UILC line card, which supports eight DSLs.

The following BRI functions are carried out by the **NTBK22 Multi-Purpose ISDN Signaling Processor (MISP)** card on the Option 11:

— Each MISP can support up to four line cards (UILC or SILC or any combination of the two). See Figure 1.

— The MISP executes Open System Interconnect (OSI) link and network layer protocol. Refer to *ISDN BRI protocol* in this chapter for further information.

— The MISP processes the signaling information received on the D-Channels from DSLs. D-Channels may also carry user packet data, which the MISP separates from signaling information and forwards to the external DPN-100 packet handler.

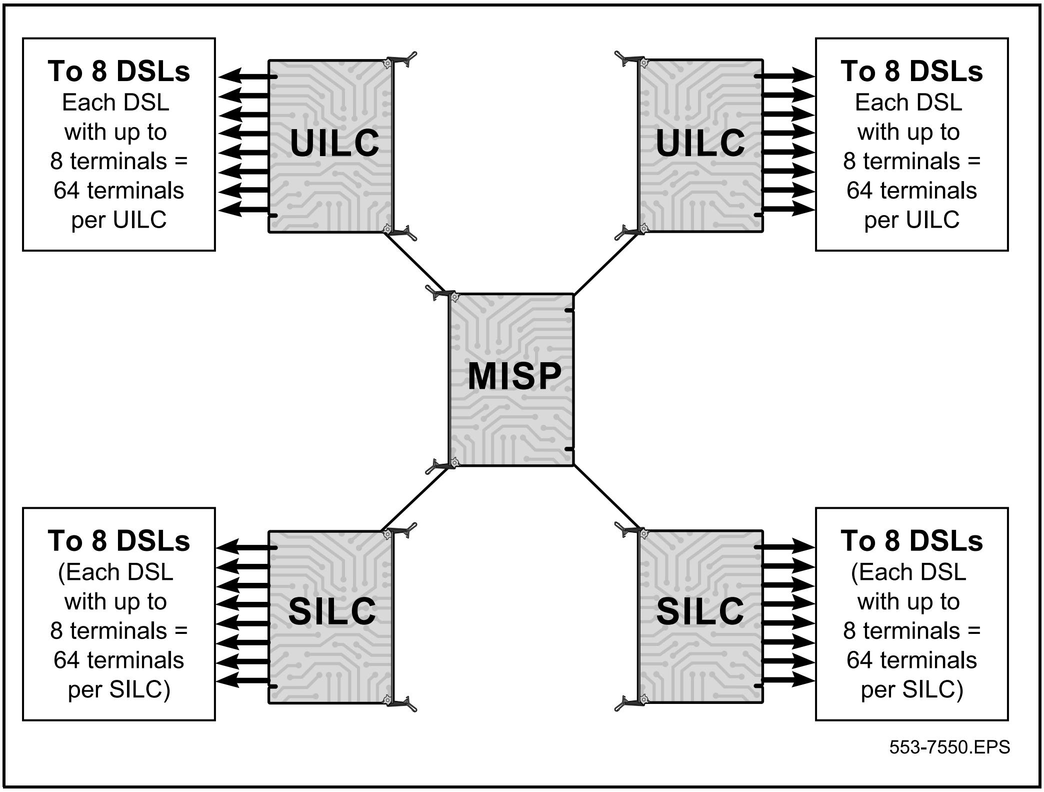
— control terminal initialization and addressing

— assign B-channels for switched voice and data transmission

— send call control messages to ISDN BRI terminals over the D-channel

— supports a clock controller daughter board for BRI trunking applications

Figure 1
ISDN BRI standard maximum configuration



ISDN BRI protocol

ISDN standards have adopted the Open System Interconnect (OSI) protocol model to control ISDN functions. The OSI model defines seven layers required to perform all ISDN functions from establishing an end-to-end physical connection between two terminals to making a decision about the type of application that is to be activated. Figure 2 shows the seven layer OSI model. ISDN BRI hardware utilizes only the first three layers. These are:

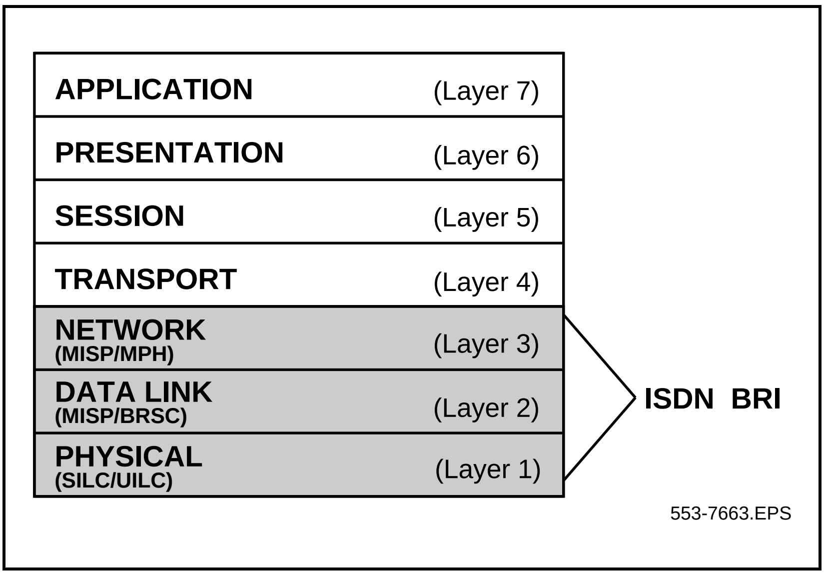
— **Physical layer** (layer 1) that provides network-to-terminal physical connections.

— **Data link layer** (layer 2) that provides point-to-point signaling used to establish a communication link between a terminal and its supporting BRI interface card. It also performs error checking and error recovery.

— **Network layer** (layer 3) that controls terminal initialization procedures and assigns service attributes to terminals. It also controls the call set up and disconnect procedures.

Once these three layers are established, the functional role of ISDN BRI hardware in the OSI protocol sequence is complete. The higher layers of the OSI protocol are handled by the system central processing unit (CPU) and the system operating software.

Figure 2
OSI model



ISDN BRI line access

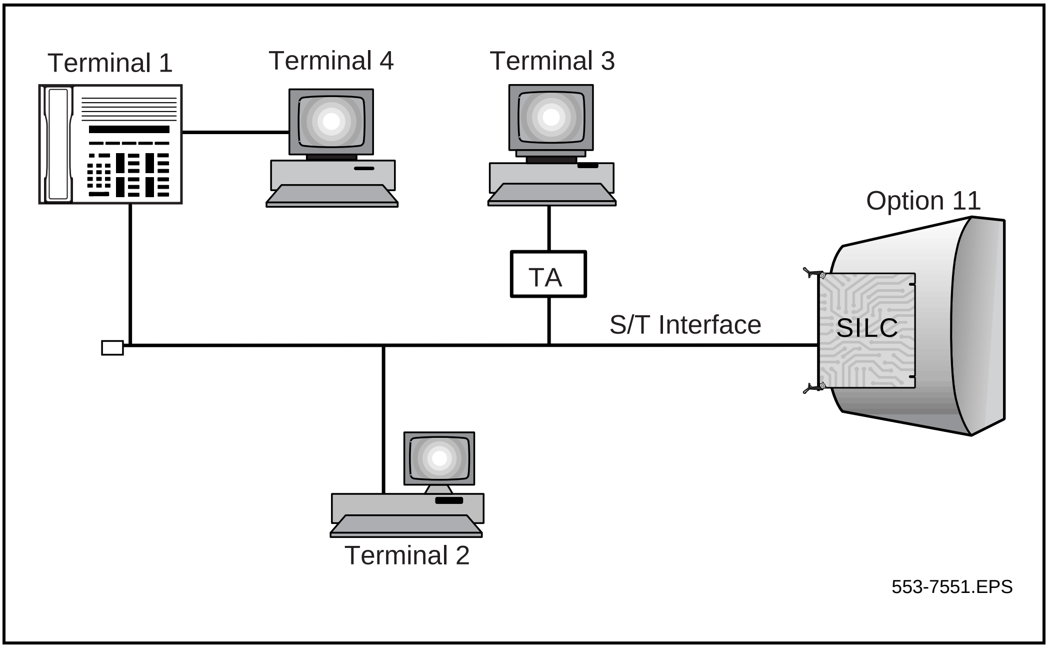
ISDN BRI line access provides 2B+D ISDN service to terminating equipment such as ISDN telephone sets and data terminals. ISDN BRI line connections are configured on a per DSL basis, that is, DSL line connections may be configured on any given DSL for any SILC or UILC.

The B-channels are automatically assigned to different voice and data terminals in circuit-switched line applications. The D-channel is permanently dedicated to a DSL and is used for signaling.

S/T interface

Figure 3 illustrates a typical ISDN BRI configuration showing an Option 11 with an ISDN BRI S/T interface and the terminals connected to it. ISDN BRI terminals that comply with CCITT, ANSI (T.607), ETSI NET-3, INS NET-64, National ISDN, EuroISDN, 1TR6, Numeris VN2, D70, and Asia-Pacific standards can be connected as shown in Figure 3.

Figure 3
ISDN Basic Rate Interface S/T interface configured as a line



The S/T interface permits 4-wire multi-point connection of up to eight physical voice and data terminals on one DSL. A physical terminal is any terminal device directly connected to a DSL. The terminals labeled 1, 2 and 3 in Figure 3 are physical terminals. Each S/T interface supports a maximum of eight physical connections and up to 20 logical terminals on one DSL. A logical terminal is any terminal that can communicate with the Option 11 over a DSL. It may be directly connected to the DSL through its own physical connection (physical terminal) or it may be indirectly connected through a common physical termination. Terminal 4 in Figure 3 is a logical terminal only, while terminals 1, 2 and 3 are physical terminals but are also logical terminals. Multiple logical terminals on a physical termination may, for example, be a combination voice and data terminal.

Each S/T interface provides two B-channels and one D-channel. All the logical terminals connected to the DSL share the two B-channels.

The length of an S/T interface DSL depends on the specific terminal configuration and the DSL wire gauge, however, it should not exceed 1 km (3280 ft). Refer to Chapter 5 for more information.

Terminal Adapters (TAs), as shown in Figure 3, are used to adapt non-BRI terminals to ISDN BRI line interface standards.

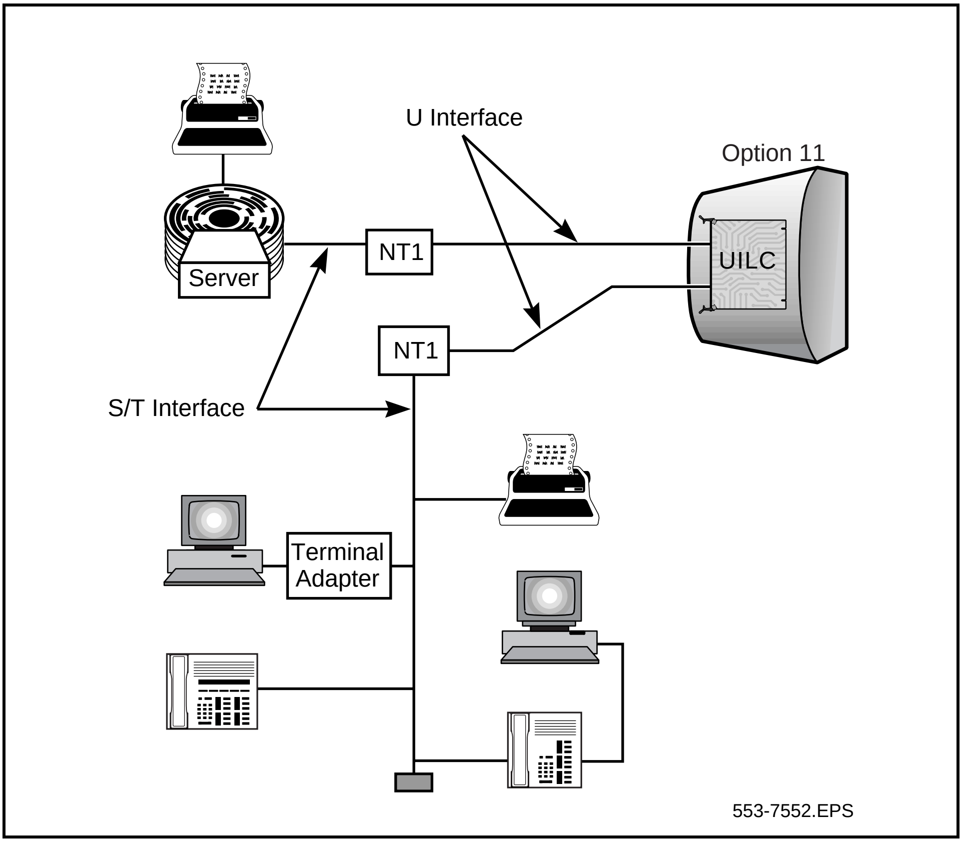
U interface

The U interface provides 2-wire point-to-point connection over a DSL. Each U interface provides two B-channels and one D-channel and supports only one physical termination. This termination may be to a Network Termination 1 (NT1) or directly to a single U interface terminal that contains an internal NT1. Normally this physical termination is to an **NT1**, (that supports 2B1Q line encoding) which provides a conversion from a U interface to an S/T interface that allows up to eight physical terminals to be connected.

The length of a UILC DSL depends on the specific terminal configuration and the DSL wire gauge, however, it should not exceed 5 km (16405 ft). When connected to an NT1 the DSL length is effectively extended to 6 km (19685 ft) and utilizes the multi-terminal capability of an S/T interface.

Figure 4 illustrates a typical ISDN BRI configuration showing an Option 11 with an ISDN BRI U interface. ISDN BRI terminals that comply with NT1 interface requirements can be connected as shown in this diagram.

Figure 4
ISDN Basic Rate Interface U interface configured as a line



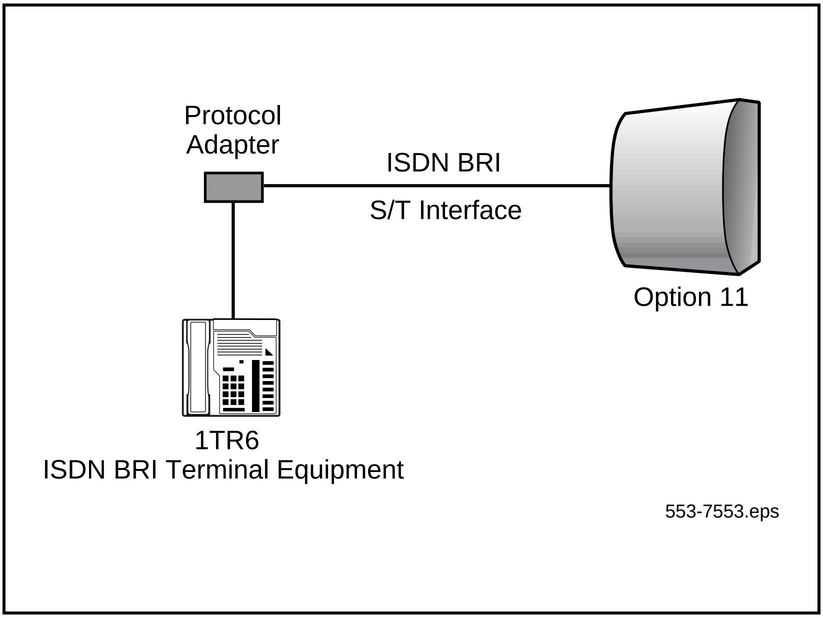
1TR6 terminal connectivity

1TR6 is the ISDN protocol used in Germany and in any country that supports this German protocol.

A protocol adapter has been specifically designed to interface with Option 11 ISDN BRI and 1TR6 terminals. Its main function is to convert 1TR6 protocol, sent from the 1TR6 ISDN Terminal Equipment, into the European Telecommunication Standard Institute (ETSI) protocol required for ISDN BRI, and vice versa. This conversion is necessary because the layer 3 requirements for 1TR6 and ETSI are different.

Figure 5 shows a 1TR6 ISDN BRI terminal connected to a 1TR6 protocol adapter, which is used to access the Option 11. For specific 1TR6 configuration guidelines refer to Chapter 5 (for line applications) and Chapter 6 (for trunk applications).

Figure 5
ISDN BRI/1TR6 terminal connectivity



ISDN BRI Packet Data Transmission

Packet switching differs from circuit switching in that the content of the call is switched rather than the call itself. The message that is being transmitted is broken down into packets that are then sent to their destination through the fastest route.

The Option 11 supports both B-channel and D-channel packet data transmission.

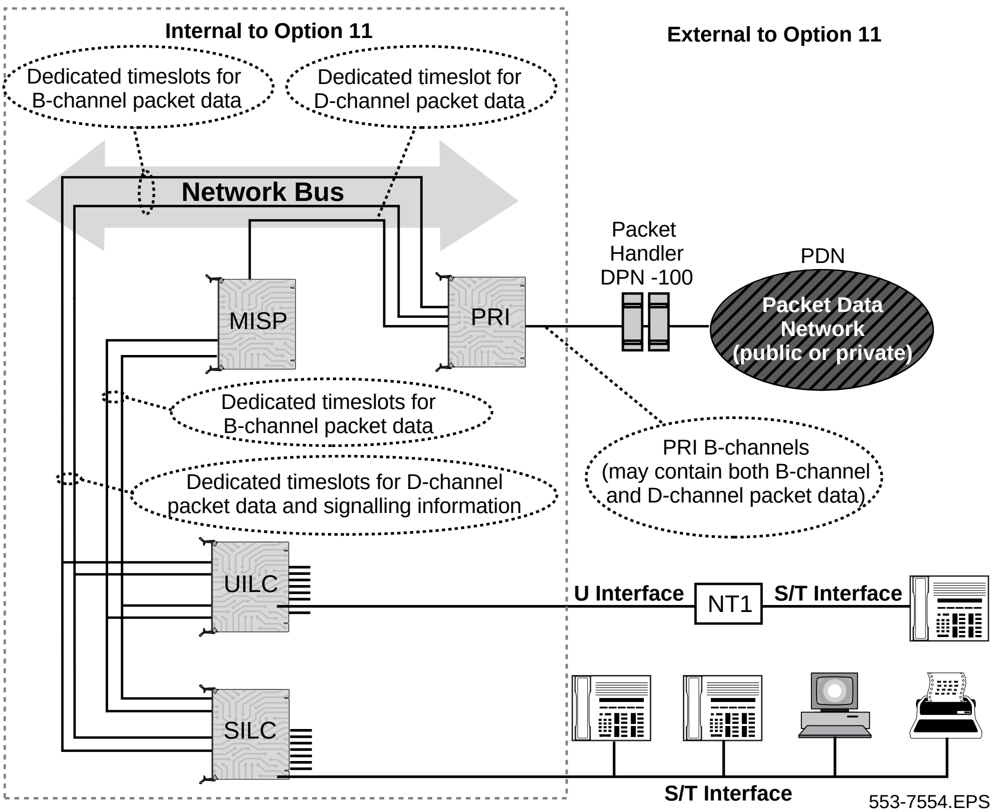
B-Channel packet data transmission - Data is transmitted over dedicated connections (configured in the data base for packet data transmission) from the SILC or UILC line card to a PRI card, and then over PRI B-Channels to an external packet data handler (DPN-100).

D-Channel packet data transmission - D-Channels can be used for both signaling and packet data transmission. Packet data and signaling information is transmitted over dedicated connections from the UILC or SILC line card to the MISP where the signaling information is separated from the packet data. The data is then transmitted over dedicated connections to a PRI card, and then over PRI B-Channels to an external packet data handler (DPN-100).

Northern Telecom's Data Packet Network (DPN-100) is used as an external packet handler to process the D-channel packet data sent by the MISP over a dedicated PRI B-channel, and the B-channel packet data sent from SILCs and UILCs.

Figure 6 illustrates the Option 11 packet data flow diagram showing the B-channel and the D-channel packet data routes starting at the SILC and UILC line cards and arriving at the external packet handler through dedicated connections and PRI B-channels.

Figure 6
Packet handling flow diagram



ISDN BRI trunk access

ISDN BRI trunk connections are configured on a per DSL basis, that is, DSL trunk connections may be configured on any given DSL for any SILC or UILC. The trunks can be accessed by both BRI and non-BRI terminals (such as digital and 500/2500-type telephones).

ISDN BRI trunk access supports Local Exchange CO/DID connectivity, ISDN BRI TIE trunk connectivity, and QSIG ISDN BRI trunk connectivity.

Local exchange CO/DID connectivity is accomplished through a MISP card and an S/T interface, using the SILC line card. This connectivity is supported for 1TR6, Numeris VN2, D70, EuroISDN, and Asia-Pacific protocols.

ISDN BRI TIE trunk connectivity is achieved through an MISP card and either S/T or U interfaces, using the SILC and UILC line cards respectively. For connectivity support, refer to Table 1.

connectivity is achieved through an MISP card and either S/T or U interfaces, using the SILC and UILC line cards respectively. For connectivity support, refer to Table 1.

Table 1
ISDN BRI trunk connectivity support

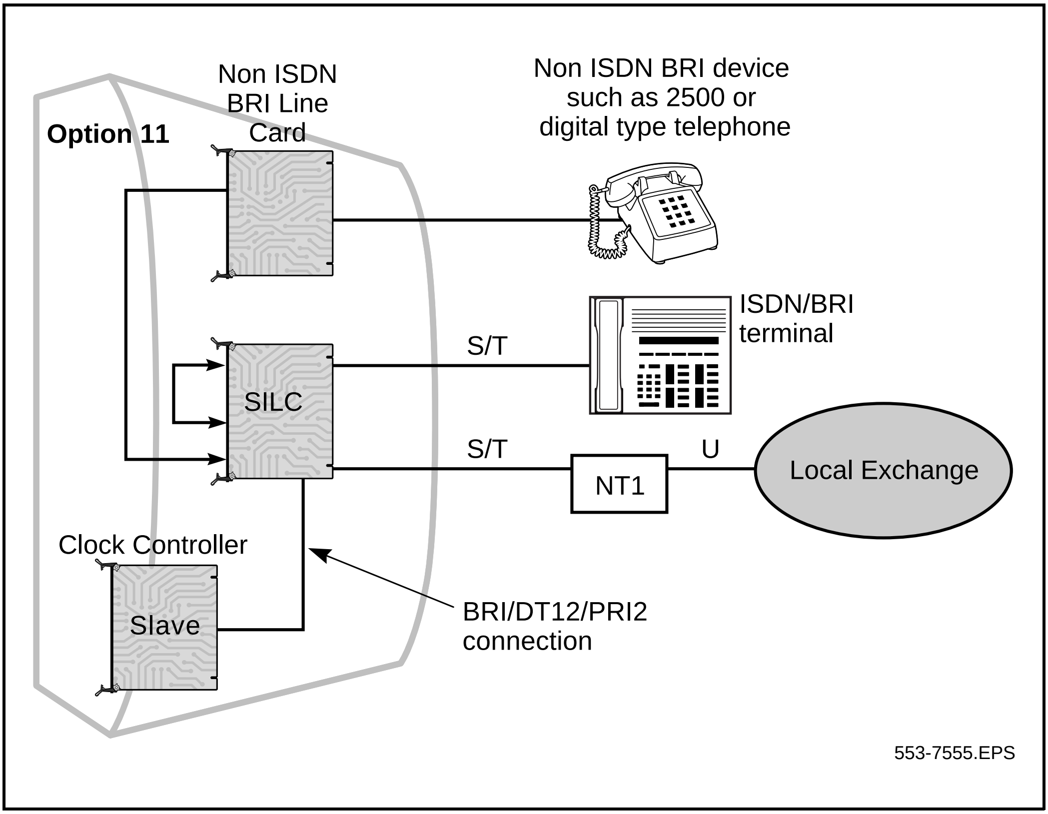
Trunk Connection	Where Supported
Local Exchange/DID connectivity (See Figure 7)	Supported for local exchanges that support any or all of 1TR6, Numeris VN2, D70, Asia Pacific, and EuroISDN protocols. Local exchange/DID connectivity is not supported in North America.
ISDN BRI TIE trunk connectivity through local exchange (See Figure 8)	Dependent on support from country specific local exchanges
ISDN BRI TIE trunk through NT1 (See Figure 9) ISDN BRI TIE trunk direct connection (See Figure 10)	Supported between any two Meridian 1 systems (see Note) Supported between any two Meridian 1 systems (see Note)
QSIG connectivity (peer-to-peer connectivity). (See Figure 11)	Supported between two Private Telecommunications Network Exchanges (PTNXs), between Centrex to Centrex, and between Centrex to PTNX, connected within a Private Telecommunications Network (PTN).
Note: In North America is possible only between two Option 11 systems. Contact your Northern Telecom representative for TIE trunk connectivity.	

ISDN BRI Local Exchange/DID connectivity

ISDN BRI Local Exchange connectivity is supported for 1TR6, Numeris, D70, EuroISDN, and Asia-Pacific protocols. This connection is accomplished through the SILC line card.

Figure 7 illustrates the ISDN BRI Local Exchange connectivity.

Figure 7
ISDN BRI trunk access local exchange connectivity



The ISDN BRI DSL is connected to a Network Termination (NT1) device, which is physically located on the same premises as the Option 11. The NT1 device connects to the Local Exchange that supports Numeris or 1TR6 protocol through a U interface. (The NT1 device is typically owned by the Local Exchange/Post Telegraph and Telephone allowing the Local Exchange/PTT to use any type of U interface, including proprietary implementations.)

The distance limitation of the NT1 from the Local Exchange depends on the distance supported by the Local Exchange.

Clock synchronization may be achieved by having the Option 11 slave to the local exchange; the clock source may be derived either from the ISDN BRI Local Exchange connection or from other PRI/DTI/ISDN BRI local exchange connections if available.

1TR6 local exchange connectivity

This facility provides 2B+D connectivity through an S/T interface to a local exchange that supports 1TR6 protocol through an S/T interface. The NT6D70BA SILC card provides the layer 1 interface, the MISP provides the layer 2 and layer 3 pre-processing interface, and the Option 11 software handles the layer 3 interface.

The ISDN BRI/1TR6 Local Exchange connectivity provides the following basic call and supplementary services:

> ***Note:*** Support for any feature is dependent upon the terminal equipment being used.

— Basic call service

— CCircuit switched voice and data on the B Channel

— Calling Line Identification Presentation and Restriction (CLIP and CLIR)

— Connected Number Delivery

— support for COT, DID, DOD, and TIE trunk types

— Channel negotiation

— Overlap sending

— Flexible Numbering Plan

— Network-wide interworking with ISDN BRI 1TR6 terminals

— T0 (2B+D) to T2 (30B+D) backup

The protocol adapter does not provide hold/retrieve functionalities, due to 1TR6 protocol limitations. Therefore, when the user has a call waiting, the user must first release the active call before answering the waiting call.

The following services are supported for 1TR6 to 1TR6 calls, in a stand-alone or network environment:

— Telephone

— Telefax group 4

— Data transmission (64 kbps)

— Videotex (64 kbps)

— Teletex.

Numeris VN2 local exchange connectivity

Numeris is the ISDN protocol used in France and in any country that supports French protocol.

This implementation provides 2B+D connectivity through an S/T interface to a local exchange that supports Numeris protocol. The NT6D70BA SILC card provides the layer 1 interface, the MISP provides the layer 2 and layer 3 pre-processing interface, and the Meridian 1 software handles the layer 3 interface.

The ISDN BRI/Numeris local exchange connectivity provides the following basic call and supplementary services:

— Basic call service

— Circuit switched voice and data on the B Channel

— Called/calling party subaddress (network-wide)

— Support for COT, DID, DOD, and TIE trunk types

— Channel negotiation

— 64 kbps clear bearer capability

— Flexible Numbering Plan

— Advice of charge during call and at end of call

— Network-wide interworking with ISDN BRI Numeris terminals

— T0 (2B+D) to T2 (30B+D) backup

Japan D70 (INS NET-64) local exchange connectivity (non-Asia Pacific protocol)

The Japan D70 local exchange connectivity (non-Asia Pacific protocol) provides 2B+D connectivity through an S/T interface to a local exchange that supports the D70 protocol (D70 is the ISDN Japan protocol). The SILC card provides the layer 1 interface, the MISP provides the layer 2 and layer 3 pre-processing interface, and the Meridian 1 software handles the layer 3 interface.

The ISDN BRI/Japan D70 local exchange connectivity provides the following basic call and supplementary services:

— Basic call service

— Circuit switched voice and data on the B Channel

— Calling Line Identification (public and private)

— Support for COT, DID, DOD trunk types

— Channel negotiation

— 64 kbps clear bearer capability

— Flexible Numbering Plan

— Advice of charge at end of call (COT, DID, DOD, and TIE trunk call types)

— Channel Negotiation (applicable only at the DSL level. If a route includes several BRI trunks, and hence several DSLs, Channel Negotiation fails to yield an acceptable channel on a given DSL, and no attempt is made to obtain a channel on another DSL).

— T0 (2B+D) to T2 (30B+D) backup

EuroISDN connectivity

The EuroISDN connectivity provides an interface between Meridian 1 PBXs and Central Offices/Public Exchanges that comply to the European Telecom Standards Institute (ETSI) specification ETS 300 102 for the Layer 3. The interfaces provided by this feature also comply with the country-specific Application Documents for Austria, Denmark, Finland, Germany, Holland, Ireland, Italy, Norway, Portugal, Sweden, and Switzerland. Other countries must comply with ETS 300 102 to be supported.

The SILC card provides the layer 1 interface, the MISP provides the layer 2 functions and the layer 3 protocol control functions, and the Meridian 1 software handles the layer 3 interface.

The Meridian 1 on the EuroISDN connectivity provides the following call services, for the complying countries:

- Basic call service
- Circuit switched voice and data on the B Channel
- Calling Line Identification Presentation and Restriction (CLIP and CLIR)
- Connected Line Presentation and Restriction
- Support for COT, DID, DOD, and TIE trunk types
- Channel negotiation
- Overlap sending and receiving
- Flexible Numbering Plan
- T0 (2B+D) to T2 (30B+D) backup

Asia-Pacifc connectivity

This Asia Pacific Connectivity provides interface between the Meridian 1 and Public Exchange/Central Offices in the following markets:

- Australia
- China
- Hong Kong
- Indonesia
- Japan
- Malaysia
- New Zealand
- Singapore
- Thailand

The following ISDN features are supported for the Asia Pacific connectivity:

- Basic Call Service
- Calling Line Identification Presentation and Restriction (CLIP and CLIR)
- Circuit switched voice and data on the B-channel (data calls are not supported on the Hong Kong interface)
- Overlap Sending (supported by all except Japan)
- Overlap Receiving (supported by the Indonesia, China, Malaysia, and Thailand interfaces only)
- COT, DID, DOD, and TIE trunk call types, as applicable
- 64 kbps unrestricted digital information
- Channel Negotiation

  Note: in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

- Flexible Numbering Plan

— PRI Route Back-up with BRI routes, and

— Sub-addressing

The following supplementary services are supported for the Australia connectivity only:

— Malicious Call Trace

— Advice of Charge (AOC) at End of Call

— Incoming Trunk Programmable CLID for analog trunks. This feature is available for use in a private or alternative carrier network, as required in Australia.

The following supplementary services are supported for the Indonesia connectivity only:

— Connected Line Identification Presentation and Restriction (COLP and COLR)

— Direct Dialing Inward (DDI/DID)

The following supplementary service is supported for the Japan connectivity only:

— Advice of Charge (considered a basic service)

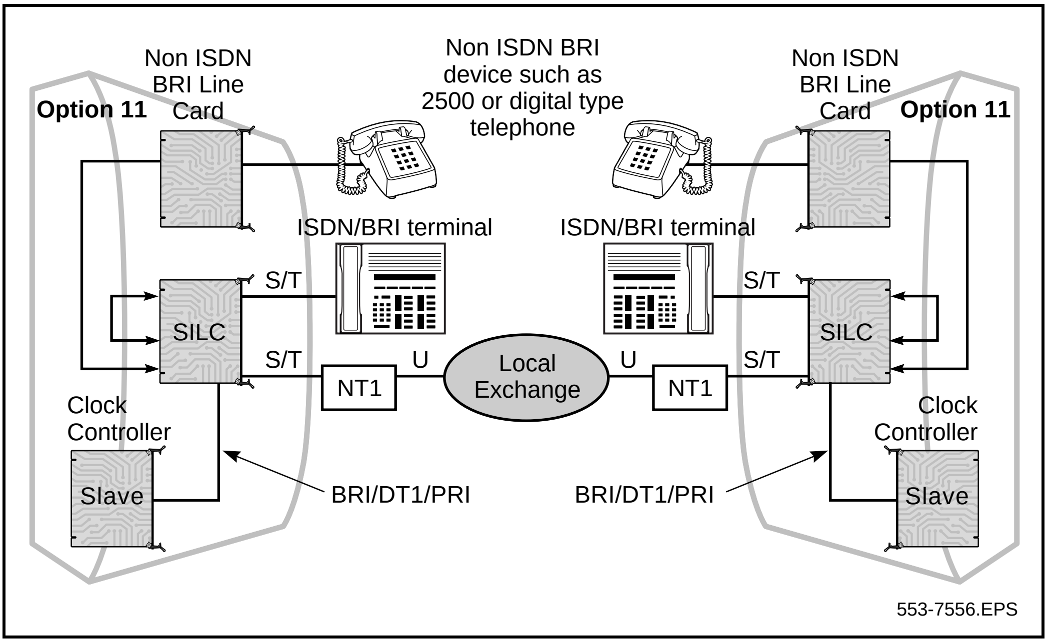
ISDN BRI trunk connectivity

ISDN BRI TIE trunk connectivity

ISDN BRI TIE trunk connectivity may have three implementations. In the first configuration (refer to Figure 8), a Meridian Customer Defined Networking (MCDN) TIE trunk connection may be implemented by connecting two Option 11s to the ISDN BRI leased line through the local exchange through two SILC cards. The S/T interface is connected to the local exchange using the NT1 supplied by the PTT.

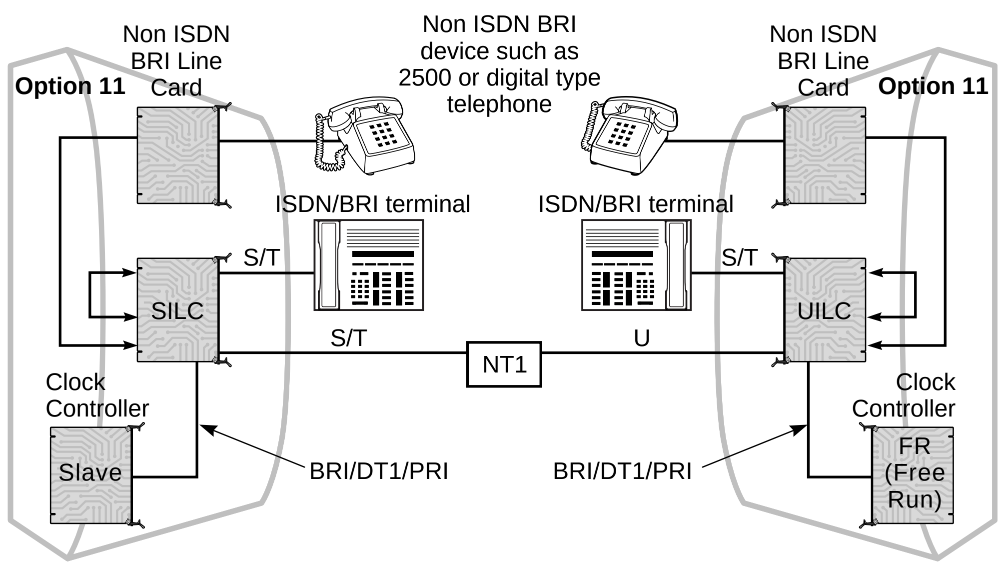
Clock synchronization may be achieved by having the Option 11 slave to the local exchange; the clock source may be derived either from any ISDN BRI local exchange connections or from other ISDN PRI/DTI local exchange connections if available.

Figure 8
ISDN BRI TIE trunk connectivity — first configuration



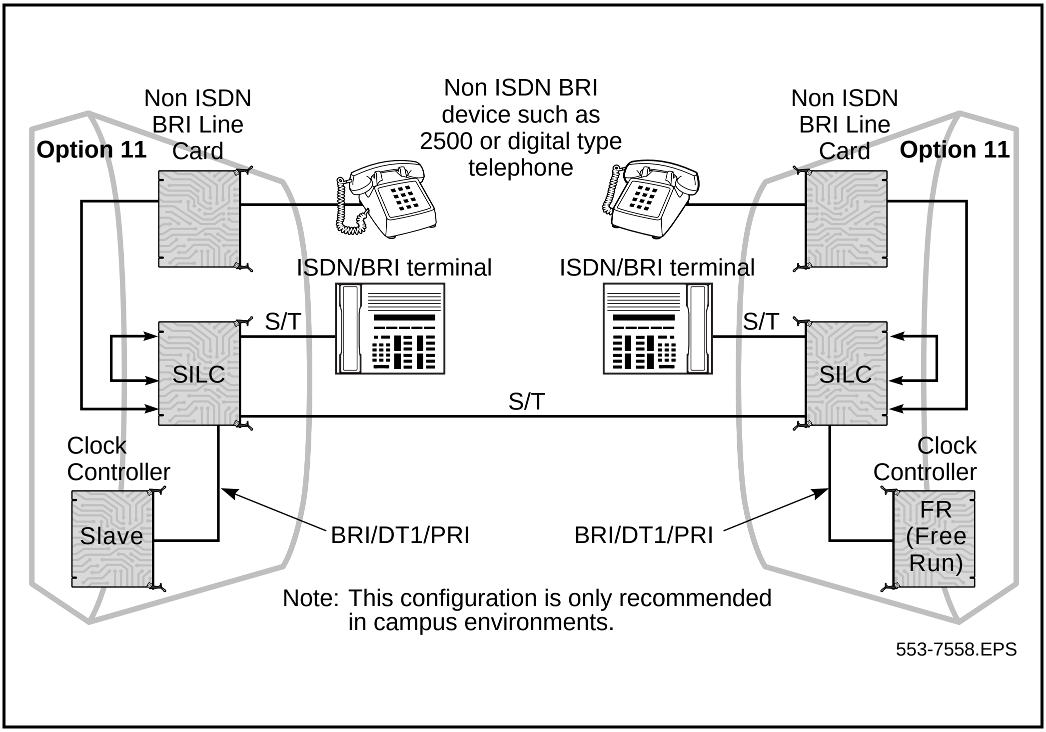
In the second configuration (refer to Figure 9), an MCDN TIE trunk connection may be achieved by connecting two Meridian 1s through an NT1 device. With this configuration, there is a distance limitation of 6.5 km (21325 ft), without any signal amplification device (such as a repeater). Clock synchronization may be achieved by having the Meridian 1 Option 11, equipped with the SILC, derive clock reference from the BRI TIE trunk connection or from other PRI/DTI/BRI connections if available. The Meridian 1 equipped with the UILC interface may be allowed to operate in free-run mode or derive the clock source from other PRI/DTI/BRI connections if available

Figure 9
ISDN BRI TIE trunk connectivity — second configuration



The third configuration (refer to Figure 10) establishes a MCDN TIE trunk link by connecting two Meridian 1s through a direct line between two back-to-back SILC interfaces. This configuration can be used in campus environments, although it is not recommended because of the lack of protection devices and because of the distance limitation of 1 km. Clock synchronization may be achieved by having one of the Meridian 1s derive clock reference from the BRI TIE trunk connection or from any other PRI/DTI/BRI connections if available. The other Meridian 1 may be allowed to operate in free-run mode or derive the clock source from any PRI/DTI/BRI connections if available.

Figure 10
ISDN BRI TIE trunk connectivity — third configuration



QSIG ISDN BRI trunk connectivity

The European Computer Manufacturer's Association (ECMA) has defined an ISDN protocol that specifies the Layer 3 signaling requirement for support of circuit switched call control at the "Q" reference point between Private Telecommunications Network Exchanges (PTNXs) connected within a Private Telecommunications Network (PTN). This protocol has been adopted by the European Telecommunications Standards Institute (ETSI) and the International Standards Institute (ISO). Most of the major European PTNX manufacturers will be supporting ISDN BRI (as well as PRI and ISL) connectivity based on this standard.

QSIG is oriented towards signaling and services that occur between peer-to-peer connectivity, that is, between two PBXs, between two Centrex PBXs, or between a PBX and a Centrex PBX; the signaling for services would be exchanged across a "Q" reference point.

For ISDN BRI, the QSIG interface will provide the following capabilities:

— Compliant Multi-vendor PBX/Centrex Private ISDN interworking (connectivity between the Private ISDN PBXs may be via PRI or ISDN BRI trunks)

— ETSI or ISO version of basic call service

— 64 kbps clear data

— Overlap Sending/Receiving

— Channel Negotiation

— Calling Line Identification Presentation (CLIP)

— Calling Line Identification Restriction (CLIR)

— Connected Line Identification Presentation (CLOP)

— Connected Line Identification Restriction (CLOR)

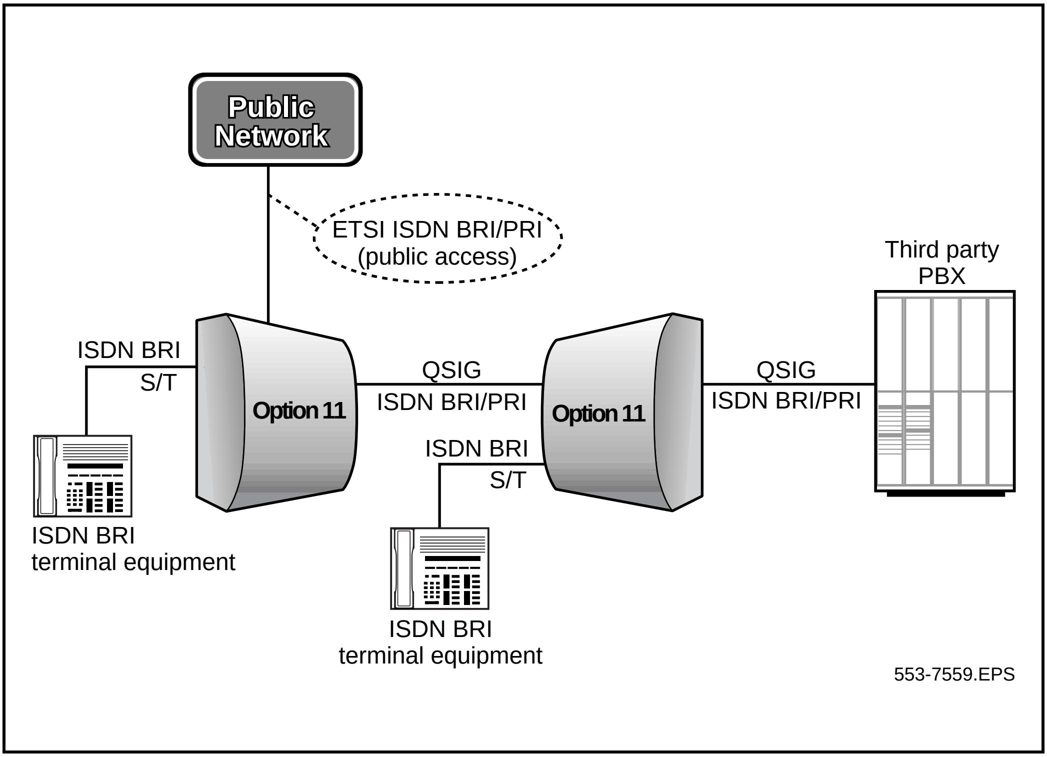
— Flexible Numbering Plan

— Support for TIE trunk call types

— Transit Count information transmitted when ISDN Call Connection Limitation (ICCL) is present (supported for ETSI QSIG only)

— Party Category (partially supported on ETSI QSIG)

Figure 11
QSIG ISDN BRI trunk connectivity



Chapter 2 — Feature descriptions

Introduction

This chapter describes Option 11 feature support and interaction with ISDN BRI. The chapter is divided into the following sections:

— A description and implemntation procedures for ISDN BRI specific features, including set-based ISDN BRI features on Meridian 1 ISDN BRI terminals (the M5317TDX and the M5209TDcp)

— Generic X11 features:

- ISDN BRI Lines
- ISDN BRI Trunks—TIE

— Generic X11 International features

- ISDN BRI Lines and Trunks

ISDN BRI specific features

The following unique ISDN BRI features are described below. Where applicable, implementation procedures are provided.

— Calling Line Identification Presentation/Calling Line Identification Restriction

— ISDN BRI National ISDN-1 Conference

— ISDN BRI circuit-switched data calls

— ISDN BRI Special Call Forward Busy

— ISDN BRI Special Hunting

— ISDN BRI ETSI Call Forwarding Unconditional

— ISDN BRI ETSI Conference

— ISDN BRI National ISDN-1 Call Forward All Calls

— ISDN BRI Connected Line Presentation (COLP)/Restriction (COLR)

— NI-1 BRI Compliance Enhancements

Calling Line Identification Presentation and Restriction

This feature allows or restricts the display of a Calling Line ID on the called party terminal. Calling Line ID Presentation (CLIP) controls the called party terminal's choice to display the calling line identification for incoming calls.

Presentation (PRES) controls the calling terminal's choice to send or PRES restricts sending the Calling Line ID when placing an outgoing call. The calling terminal can choose to send or restrict sending the calling line identification on a call-by-call basis. The PRES button on the ISDN BRI terminal can be set to YES to allow sending the calling line identification or set to NO to restrict sending the calling line identification to the called terminal. The PRES button on the terminal overrides the PRES parameter. CLIP and PRES parameters are configured for an ISDN BRI DN when configuring the TSP using LD 27.

The calling party number is contained in the calling party information element in the setup message. The information element is optional and need not be contained in the setup message. If the information element is not presented, the default DN selected in the TSP is used as the calling party DN.

If the call is originated from a non-ISDN BRI to an ISDN BRI terminal, the calling party number is based on the class of service of the non-ISDN BRI terminal. The class of service can be set for PDN which uses the primary DN of the non-ISDN BRI terminal as the calling party number or LDN which uses the listed DN of the non-ISDN BRI terminal customer as the calling party number.

If the calling party is using an ISDN BRI terminal and has called party number restricted, the called party's display shows the trunk access code rather than the ISDN BRI DN.

National ISDN-1 Conference

This version of ISDN BRI Conference is based on National ISDN-1.

Terminals which are supported are:

— Northern Telecom’s M5317TDX (version 2.3a and above)

— Northern Telecom’s M5209TDcp (version 2.28 and above), and

— third-party vendor manufactured terminals which are deemed compatible

ISDN BRI terminals can conference in both ISDN BRI and non-ISDN BRI terminal users. An ISDN BRI terminal can also be conferenced into a call by a non-ISDN BRI terminal.

Meridian 1 ISDN BRI supports two versions of Conference: A03, a 3-party Conference and A06, a 6-party Conference. See ISDN Basic Rate Interface administration (5533901300) for configuration details.

ISDN BRI Conference operates under the following conditions:

— the user employs the National ISDN-1 protocol (PRID=6) on the DSL

— the user is subscribed to Conference in its Terminal Service Profile.

— the Feature Activation Identifier and the Feature Indication Identifier are configured both in LD27 and on the ISDN BRI terminal.

— the logical terminal is the controller of only one conference call.

— the bearer capability of the call associated with the conference request is speech or 3.1 kHz audio.

Invoke Conference while making a call The ISDN BRI user may make a conference request by means of a pre-defined softkey or programmable key while dialing the outgoing digits.The provision of this capability is dependent on the implementation of the ISDN BRI terminal.

Invoke Conference during an established call An ISDN BRI user can invoke Conference after the network successfully translates the dialed digits, or while the called party is being rung, or while the user is on an answered call.

Add a conferee The ISDN BRI user can add a conferee with Consultation Hold, add a held call to an active conference, or add an active call to a held conference providing:

— the Conference Controller (an ISDN BRI user who is subscribed to Conference) is connected to only one active speech or 3.1 kHz audio call

— both the active call and the held call have been answered

— neither the active call nor the held call is undergoing call clearing

— the controller’s conference size is not exceeded

— the B-channel to which the Conference Controller is connected can be used to complete the conference

— both calls are not conference calls

Conference disconnect If the controller requests a disconnect signal, the network disconnects the entire conference if:

— only one party will remain after the controller disconnects

— none of the calls that will remain has been answered

— only two parties remain and both are outgoing trunk calls

— more than two parties remain and all are trunk calls

Otherwise, only the controller is disconnected and the rest of the conferees remain.

Call Transfer during Conference Using the Conference feature, a Call Transfer can be achieved in the following way:

Ann makes a call to Bob. Bob answers the call and conferences Carl. After Carl answers the call, Bob completes the conference. Then Bob can disconnect himself from the conference, thus transferring Ann to Carl.

The same conditions that determine whether the remaining parties in a conference should be dropped when one party disconnects from the conference apply here. For example, Bob makes a call to Ann. Then Bob conferences in Carl. If both Ann and Carl are on a remote node (that is, both calls made by Bob to Ann and Carl are outgoing trunk calls), then as Bob disconnects from the conference, both Ann and Carl will be dropped as well. Call Transfer cannot be achieved in this scenario.

Programming procedures for ISDN BRI National ISDN-1 Conference

The following steps should be used to configure ISDN BRI National ISDN-1 Conference:

1 **Configure National ISDN-1 protocol for a DSL using LD 27.**

2 **Configure Conference in the TSP using LD 27.**

LD 27 – Configuring National ISDN-1 for a DSL

Prompt	Response	Description
REQ	NEW/CHG	New, or change.
TYPE	DSL	Digital Subscriber Loop.
DSL	c dsl#	DSL address.
...		
PRID	6	Protocol Identification. Enter 6 for NI-1.
FDN	nnnnnnn	Flexible Call Forward No Answer DN.
...		

LD 27 – Configuring Conference in the TSP.

Prompt	Response	Description
REQ	NEW/CHG	New, or change.
TYPE	TSP	Terminal Service Profile.
DSL	c dsl#	DSL address.
...		
FEATID	aaa mmm nnn Xmmm <cr>	Feature ID (must be unique for a TSP), where: aaa = feature; enter AO6 for six-party conference (up to 30 parties can be conferenced, but it is not recommended), or AO3 for three-party conference. mmm = feature activation ID (1-127). nnn = feature indication ID (1-127). Xmmm = delete feature. <cr> = skip feature ID definition (aaa mmm nnn is re-prompted until <cr> is entered.
...		

ISDN BRI circuit-switched data calls

ISDN BRI to ISDN BRI circuit-switched data calls

Circuit-switched data calls between two ISDN BRI terminals are supported for all bearer capability encodings. The Meridian 1 screens for the validity of its bearer capability codepoints only; it does not screen for protocol compatibility between two ISDN BRI devices. The Meridian 1 presents the call to the terminating party; the two ISDN BRI devices determine whether they can communicate with the specified bearer capability. If the ISDN BRI terminals decide that the protocol is incompatible, either terminal may drop the call.

ISDN BRI accessing Meridian 1 data modules

Meridian 1 offers data access through special data adapters (for example, ASIM). These adapters provide Northern Telecom proprietary DM-DM protocol for data transmission. The ISDN BRI terminal cannot communicate with these adapters because of protocol incompatibility. Calls from an ISDN BRI terminal to these data modules are blocked; similarly, calls from these data modules to an ISDN BRI terminal are also blocked.

ISDN BRI terminals can communicate with these data modules under one condition: ISDN BRI terminals that support the TLINK protocol can communicate with these Meridian 1 data adapters if the circuit-switched data call is placed across an ISDN PRI or DTI link. This access is possible because the ISDN PRI or DTI pack provides protocol conversion from TLINK to DM-DM and vice versa.

ISDN BRI accessing Meridian Communication Adapters

The MCA operates in three modes: DM-DM, TLINK and PSDS. An MCA operating in TLINK mode communicates with ISDN BRI terminals that support TLINK protocol. Calls from an ISDN BRI terminal (with the appropriate bearer capability encodings) to an MCA and vice versa are allowed to terminate; however, if the protocol exchange fails between the ISDN BRI and MCA devices, if the MCA is not operating in TLINK mode, for example, then the call may be dropped by either device.

The following describe the bearer capability encodings used by ISDN BRI terminals that support TLINK protocol. Only calls originating from ISDN BRI with these bearer capability encodings are allowed to terminate to a MCA:

- 64k clear: Octet 3 = unrestricted digital information, octet 4 = 64 kbits/s, no octet 5s are included.
- 64k restricted: Octet 3 = restricted digital information,
- octet 4 = 64 kbits/s, no octet 5s are included.
- 56k: Octet 3 = restricted or unrestricted digital information,
- octet 4 = 64kbits/s, octet 5 = v.110 and octet 5a = 56kbits/s.

ISDN BRI accessing ADM trunks

ADM trunk is not a trunk; it groups ADM devices in a route to allow an idle ADM device defined in the given route to be searched or hunted easily when the route access code is dialed. The Meridian Communication Unit (MCU) may be defined as an ADM trunk with the MCU trunk as a subtype. Because MCU can support TLINK protocol, an ISDN BRI terminal accessing this type of ADM route is allowed to terminate to an idle device found in the route and the conditions described for accessing MCA apply here. However, if the ADM route is not an MCU trunk subtype, then ISDN BRI is blocked from accessing the ADM routes because of incompatible protocols.

ISDN BRI terminals may access an ADM trunk that are not MCU subtype under one condition: ISDN BRI terminals that support TLINK protocol can access an ADM trunk if the circuit-switched data call is placed across an ISDN PRI or DTI link. This access is possible because the ISDN PRI or DTI pack provides protocol conversion from TLINK to DM-DM and vice versa.

ISDN BRI accessing ISDN PRI

The ISDN PRI interface supports three bearer capability encodings:

- 64k clear: Octet 3 = unrestricted digital information, octet 4 = 64 kbits/s, no octet 5s are included.
- 64k restricted: Octet 3 = restricted digital information, octet 4 = 64 kbits/s, no octet 5s are included.
- 56k: Octet 3 = restricted or unrestricted digital information, octet 4 = 64kbits/s, octet 5 = v.110 and octet 5a = 56kbits/s.

ISDN BRI originated circuit-switched data calls are allowed access to ISDN PRI trunk if these encodings are used.

ISDN BRI devices using other bearer capability encodings can communicate with another ISDN BRI device across ISDN PRI under these conditions:

— the ISDN PRI interface is Meridian 1, Japan D70, or ESS#4/ESS#5;

and

— the remote capability for ISDN BRI interworking is turned on (in LD17) for all ISDN PRI interfaces involved in the call.

ISDN BRI accessing DTI trunks

ISDN BRI circuit-switched data call can access a DTI trunk only if the bearer capability is:

— 56k: octet 3 = restriction or unrestricted digital information, octet 4 = 64 kbits/s, octet 5 = v.110 and octet 5a = 56 kbits/s.

ISDN BRI terminals using V.120 protocol at 56 kbps are not supported over DTI trunks.

ISDN BRI circuit-switched data call tandem across ISDN PRI

In the ISDN PRI and DTI pack, a protocol convertor is inserted by default to convert DM-DM protocol to TLINK at the tandem node and vice versa. Because of this, an ISDN BRI circuit-switched data call tandem across ISDN PRI, DTI trunks or a combination of ISDN PRI and DTI trunks is supported only for ISDN BRI terminals that use TLINK protocol. ISDN BRI terminals using other protocols, such as V.110 and V.120, require the Transparent Data Networking feature to provide transparent data channel through the tandem nodes.

Public switched data service

Public switched data service provides a pure 56 kbps data transmission. The data module on both ends must establish identical parameters manually before the data call is made.

ISDN BRI terminals can access Public Switched Data Service provided a dedicated data route is used; when a voice/data shared route is used, the ISDN BRI terminal must generate a burst of tone to the network provider to turn off the echo cancellation.

ISDN BRI accessing analog line by means of a modem trunk

ISDN BRI circuit-switched data calls accessing analog lines through modem trunks are supported only if the data module connected to the modem uses TLINK, V.110 or V.120 protocol.

An ISDN BRI device with the TLINK protocol can access analog lines through modem trunk configuration using a DTE type MCU, because the MCU supports TLINK protocol. ISDN BRI devices cannot communicate with other Meridian 1 DTE type data modules that connect to modems because they use the DM-DM protocol.

ISDN BRI terminals may access analog lines through modem trunk configurations using DM-DM type data modules under one condition: ISDN BRI terminals that support TLINK protocol can access these modem trunks if the circuit-switched data call is placed across an ISDN PRI or DTI link. This access is possible because the ISDN PRI or DTI pack provides protocol conversion from TLINK to AM-AM and vice versa.

ISDN BRI Special Call Forward Busy

This feature is activated for a call terminated at a DSL. The call is forwarded to the attendant when a call encounters the following busy conditions. The calling party receives a busy tone in all other cases.

— the maximum number of calls on a DSL is exceeded, and

— an ISDN BRI DN has Call Forward busy enabled as configured in TSP using LD27

— ISDN Hunting is not allowed or the call fails to find an idle hunt DN.

With Call Forward Busy, Special Hunting, if both B-channels are defined and there is not a second DN, the result is Busy.

ISDN BRI Special Hunting

This feature is activated when a call terminating at a DSL encounters the following busy conditions:

— the maximum number of calls on a DSL is exceeded, or

— the total number of calls including active, on hold, waiting, and in progress exceeds the number of Bchannels provided for the incoming call type.

Hunting routes the call through predetermined steps until an idle DN is found for that call. Internal and external hunt DNs are configured in the DSL and Hunting Allowed and Call Forward by Call type are configured in the TSP using LD27. If Hunting is not allowed or the call fails to find an idle DN, the following occurs.

— a busy tone is given if the number of calls exceeds the maximum calls specified for that DSL and call forward busy does not succeed.

Note: The call is forwarded only if it is a DID call

— the call is presented as Call Waiting if the maximum number of calls for that DSL is not exceeded.

An ISDN BRI terminal originating the call is not updated to show on its display that the call was redirected to a different DN as a result of Hunting. This is due to a lack of standard for layer 3 messages used to update the terminal display.

ISDN BRI ETSI Call Forwarding Unconditional

The European Telecommunication Standards Institute (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 Meridian 1 system. The call is forwarded regardless of 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 (i.e., all the DNs defined under a Digital Subscriber Loop (DSL)), or an individual user (i.e., a DN).

The following functionalities are currently supported:

— When a call is forwarded, if the caller is using a BRI set they will be notified by the Meridian 1 that the call has been forwarded. In addition, the caller is provided with the forwarded-to number.

— When a call is forwarded from an ISDN BRI terminal that has CFU activated, the terminating terminal will be notified by the Meridian 1 that the ISDN BRI terminal forwarded the call.

Operating parameters

The ETSI CFU supplementary service is based on the Meridian 1 Call Forwarding All Calls feature. Therefore, Meridian 1 Call Forwarding All Calls feature limitations also apply to this feature.

ETSI CFU basic service is limited to speech, 3.1 kHz audio, unrestricted digital information and restricted digital information.

Interrogation of all served users in TSP 0 will be supported. However, if the number of DNs is too large to fit into one message, interrogation of all served users in TSP 0 will not be supported.

ETSI public ISDN partial rerouting will not be supported. According to ETSI standards, when the Meridian 1 receives a local exchange call and the call is forwarded within or outside of the system, the Meridian 1 should send a message to the local exchange to make the call directly to the forwarded-to user.

During a data dump, the forwarded-to user's address will not be saved because of protected data storage space. In LD 17, the CFWS prompt, which enables users to save Call Forwarding feature activation during data dump so that during SYSLOAD the feature will be activated, will be ignored for users of ISDN BRI.

The following hardware is required:

— Multi-purpose ISDN Signaling Processor

— S/T Interface Line Cards/U Interface Line Cards, and

— ISDN BRI terminals that support ETSI Call Forward Unconditional supplementary service.

Feature interactions

Call Waiting

User requesting all calls to be forwarded – ETSI CFU takes precedence over Call Waiting.

Forward-to user – A forwarded call can invoke Call Waiting.

Conference Call, Add-on

Calling user – If a conference controller calls a person who has CFU activated to establish a conference, the forwarded-to user will be alerted and added to the conference call after the call is answered.

Forwarded-to user – A call that has been forwarded to the conference controller can be added to an existing conference. A forwarded-to user can establish a conference using the existing forwarded call provided that the call is in the active state.

Call Forward All Calls

The Meridian 1 Call Forward All Calls feature allows only calls to the Prime DN or a single appearance DN to be forwarded. For an ISDN BRI set, calls are forwarded based on this basic service. Since ETSI CFU supplementary service is developed based on the Call Forward All Calls feature, all the existing feature interactions of Call Forward All Calls apply to ISDN BRI terminals.

BRI Special Call Forward Busy Call Forward No Answer

The ETSI CFU supplementary service takes precedence over BRI Call Forward Busy, and Call Forward No Answer.

Call Forward and Busy Status

Call Forward and Busy Status allows a user to forward calls and monitor the Call Forward and Busy Status from the forwarded-to user. This requires a Busy/Forward Status key. An ISDN BRI terminal cannot monitor other set's Call Forward Busy Status and in turn its Call Forward Busy Status cannot be monitored by other sets.

Remote Call Forward

Remote Call Forward allows a user to program Call Forwarding from a remote set. Call Forwarding remotely to an ISDN BRI terminal is supported. However, using Remote Call Forward from an ISDN BRI terminal is not supported.

Attendant and Network-wide Remote Call Forward

This feature allows the configuration of Call Forward from an Attendant Console and a remote set across a Meridian Customer Defined Network (MCDN). For an ISDN BRI terminal, Remote Call Forward is allowed from a set, or from an Attendant Console, but not from a BRI set either locally or network wide. When Call Forward is activated, it is assumed that the Call Forward for the BRI set is voice, not data.

Call Forward/Hunt Override via Flexible Feature Code

This feature allows all attendants and sets with Call Forward/Hunt Override Allowed (CFHA) Class of Service to override Call Forward All Calls (CFAC). Since an ISDN BRI terminal cannot access Flexible Feature Codes, it cannot override CFAC on other sets. However, an ISDN BRI set's Call Forward Unconditional can be overridden by a set having CFHA Class of Service or by an attendant in both standalone and network environments.

Internal Call Forward

An ISDN BRI terminal cannot activate the internal Call Forward feature.

Call Forward Reminder Tone

The Call Forward Reminder Tone is supported on ISDN BRI sets that have the Call Forward Unconditional feature active.

Call Forward Confirmation Tone

During activation or deactivation of Call Forward from a BRI terminal, a Call Forward confirmation tone is not provided to the BRI terminal. Instead, confirmation is done by sending a BRI message to the terminal.

Feature packaging

There is no new feature package defined for this feature; however, the following feature packages are required for ISDN BRI:

— Basic Rate Interface (BRI) package 216

— Basic Rate Interface Line Application (BRIL) package 235, and

— Meridian 1 Extended Peripheral Equipment (XPE) package 203.

Programming procedures for ISDN BRI ETSI Call Forwaring Unconditional

The following steps should be used to configure ISDN BRI ETSI Call Forwaring Unconditional:

1. **Configure ETSI protocol for a DSL using LD 27**
2. **Configure an ISDN BRI terminal using LD 27.**

LD 27 — Configuring ETSI protocol for a DSL

Prompt	Response	Comment
REQ	NEW	Enter new data.
TYPE	DSL	Digital Subsriber Loop.
DSL	c dsl#	DSL address.
...		
PRID	2	Protocol Identifier. Enter 2 for ETSI.
...		

LD 27 — Configuring an ISDN BRI terminal

Prompt	Response	Comment
REQ	NEW	Enter new data
TYPE	TSP	Terminal Service Profile
DSL	c dsl#	DSL address (as already entered in step 1).
USID	0-15	User Service Identifier. 0 = default TSP.
MPHC	No	This TSP is not configured for Meridian 1 Packet Handler.
SPID	aaaaaaaaa	Service Profile Identifier (up to nine characters; eight SPIDs per TSP).
DN	nnnnnnn	Directory Number associated with the TSP(up to seven digits)
CT	vce dta	Call type (enter vce for voice or dta for data)
...		
FEAT	CFXA	Allow Call Forward External for the DN.
SSRV_ ETSI	VCFW DCFW	For voice call type, enter VCFW for Voice Call Forward. For data call type, enter DCFW for Data Call Forward.
...		

ISDN BRI ETSI Conference

This feature development provides a subset of the European Telecommunication Standards Institute (ETSI) Conference capabilities to Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) users connected to a Meridian 1 using ETSI protocols.

The ISDN BRI Supplementary Services ETSI Conference feature supports the following conference capabilities:

— Conference invocation (beginning the conference from the active call state)

— Adding a conferee

— Disconnection by a conferee

— Termination of the conference (this subfeature will not be implemented as ETSI specifies. ETSI specifies that when a conference controller disconnects, all conferees will be disconnected; however, this subfeature follows the current Meridian 1 Conference feature in that when a conference controller disconnects the conference continues for the remaining parties).

An ISDN BRI user can conference a maximum of three or six parties depending on the Terminal Service Profile (TSP) configuration administered through LD 27. The ETSI Conference feature can be invoked by a user while the user is on an established call. Once conference is invoked, the user can add another party (active or held) to the conference call.

Operating parameters

ISDN BRI terminals must support both ETSI basic call and ETSI Conference Supplementary service signaling protocols.

ETSI Conference only supports speech or 3.1 kHz; other bearer services such as 7 kHz, unrestricted digital information, and restricted digital information are not supported.

In a conference call, a maximum of two parties (including conference controller and conferees) can be from the same Digital Subscriber Loop (DSL), due to the availability of only two B-channels per ISDN BRI interface.

The Meridian 1 only sends notification messages to conferees or the conference controller when conference operations are requested and performed if they are ISDN BRI users. If a user is on another node across ISDN or non-ISDN trunks, the Notify message will not be sent.

Feature interactions

Conference

ISDN BRI terminals can conference in both ISDN BRI and non-ISDN BRI terminal users; similarly, an ISDN BRI terminal can also be conferenced into a call by a non-ISDN terminal. However, in either case, the ISDN BRI terminal display will not be updated due to lack of protocol to support it.

ISDN PRI Network Call Redirection

When an ISDN BRI conference call is dropped to a simple call, if a party in the simple call is an ISDN BRI user, the corresponding BRI name and number will be updated on the other party’s non-ISDN set display. However, the ISDN BRI display will not be updated due to lack of standard protocol to support this function.

Held Call Clearing

Held Call Clearing allows a set to clear both active calls and held calls by going on-hook. This will not apply to an ISDN BRI set.

ISDN BRI Trunk Access

The ISDN BRI Trunk Access feature is similar to ISDN PRI Trunk Access. Therefore, an ISDN BRI ETSI conferee can be a user across an ISDN BRI trunk.

Feature packaging

There is no new feature package defined for this feature; however, the following feature packages are required for ISDN BRI:

— Basic Rate Interface (BRI) package 216

— Basic Rate Interface Line Application (BRIL) package 235, and

— Meridian 1 Extended Peripheral Equipment (XPE) package 203.

Programming procedures for ISDN BRI ETSI Conference

The following steps should be used to configure ISDN BRI ETSI Conference:

1. **Configure ETSI protocol for a DSL using LD 27**
2. **Configure Conference in the TSP using LD 27.**

LD 27 — Configuring ETSI protocol for a DSL

Prompt	Response	Comment
REQ	NEW	Enter new data.
TYPE	DSL	Digital Subsriber Loop.
DSL	c dsl#	DSL address.
...		
PRID	2	Protocol Identifier.
		Enter 2 for ETSI.
	(WTA), WTD	Enter WTD for Warning Tone Denied (Warning Tone Allowed has to be overridden),
...		

LD 27 — Configuring Conference in the TSP

Prompt	Response	Comment
REQ	NEW	Enter new data
TYPE	TSP	Terminal Service Profile
DSL	c dsl#	DSL address (as already entered in step 1).
...		
SUPL_SVC	AO6, AO3	Enter AO6 for 6-party Conference or AO3 for 3-party Conference.
...		

ISDN BRI National ISDN-1 Call Forward All Calls

This feature enables a user to have calls redirected from the user’s directory number to another directory number. 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 (i.e., the user may have voice calls forwarded, while data calls terminate normally).

In Release 20B, only the National ISDN-1 Feature Key Management interface is available for users to invoke the feature. When Call Forward is activated the Feature Activation Information Element (IE) is sent from the base DN to the Meridian 1 system for either feature activation or deactivation. The Feature Activation IE consists of the feature identifier which represents the combination of the Call Forward feature, the DN, and the call type. There are two methods of feature activation: Call associated; and Non-call associated. In both cases the Feature Activation Information Element is used to activate the feature for the DN and Call Type.

Operating parameters

This feature is based on the Meridian 1 Call Forward All Calls feature; therefore, it is subject to the same limitation as the Meridian 1 Call Forward All Calls feature.

ISDN BRI terminals must support the Feature Key Management protocol.

When a DN from a Terminal Service Profile (TSP) activates or deactivates the Call Forward feature, it applies to all appearances of the same DN from different TSPs on the same Digital Subscriber Loop (DSL). For example, if a boss and a secretary each has their own BRI terminal and the secretary has her boss’ DN on her set, when the boss activates Call Forward the call will not be terminated on the secretary’s set. If the secretary deactivates the feature, the call will be terminated on the boss’ and the secretary’s sets.

Data dump does not store the Call Forward numbers and Call Forward status for BRI terminals. Therefore, after SYSLOAD the Call Forward feature is no longer activated and the Call Forward numbers are not saved in the Meridian1.

There is no confirmation tone provided from the Meridian 1 when the Call Forward feature is invoked from an ISDN BRI terminal.

Only one BRI terminal from a Digital Subscriber Loop (DSL) is allowed to activate or deactivate the Call Forwarding feature at a time. If two BRI terminals try to activate or deactivate at the same time only the first action is allowed. The second terminal is denied the service.

Feature interactions

Call Forward All Calls

Meridian 1 Call Forward All Calls only allows calls to a prime DN or single appearance DN to be forwarded. For the BRI interface, the terminology of prime DN and single appearance DN does not apply. When Call Forward has been activated for a DN and Call Type, calls to the DN/Call Type are forwarded regardless of which Terminal Service Profile (TSP) that the DN/Call Type is assigned. In addition, redirecting information about the BRI terminal is delivered to the remote DN. If the remote DN is an ISDN BRI terminal, the redirecting information is passed in the Redirecting Number IE of the SETUP message to the BRI terminal.

When an ISDN BRI terminal has activated the Call Forward feature, it is treated as if it is a set from the Meridian 1 activating the feature. The Meridian1 features that are normally applicable to the set will also be applicable to the BRI terminal.

Call Forward No Answer Busy

As in the case of Call Forward All Calls, the National ISDN 1 Basic Rate Interface (BRI) Call Forward All Calls feature takes precedence over Call Forward No Answer, and Call Forward Busy.

Network Call Redirection

When a call to the BRI interface is forwarded, the redirecting DN and the reason for call redirection are passed to the remote user if the remote user is connected by ISDN. The redirecting information is encoded in the ISDN SETUP message for display purposes. In addition, Call Forward to another node from an ISDN BRI terminal is counted as one for the ISDN network Call Redirection counter which is defined in the customer data block.

Call Forward and Busy Status

This feature is not supported for ISDN BRI terminals.

Remote Call Forward

Remote Call Forward allows a user to program Call Forwarding from a remote set. Call Forwarding remotely to an ISDN BRI terminal is supported. However, using Remote Call Forward from an ISDN BRI terminal is not supported.

Attendant and Network-wide Remote Call Forward

This feature allows the configuration of Call Forward from an Attendant Console and a remote set across a Meridian Customer Defined Network (MCDN). For an ISDN BRI terminal, Remote Call Forward is allowed from a set, or from an Attendant Console, but not from a BRI set either locally or network wide. When Call Forward is activated, it is assumed that the Call Forward for the BRI set is voice, not data.

Internal Call Forward

An ISDN BRI terminal cannot activate the internal Call Forward feature.

Call Forward/Hunt Override via Flexible Feature Code

This feature allows all attendants and sets with Call Forward/Hunt Override Allowed (CFHA) Class of Service to override Call Forward All Calls (CFAC). Since an ISDN BRI terminal cannot access Flexible Feature Codes, it cannot override CFAC on other sets. However, an ISDN BRI set's Call Forward All Calls can be overridden by a set having CFHA Class of Service or by an attendant in both standalone and network environments.

Call Forward Reminder Tone

The Call Forward Reminder Tone is supported on ISDN BRI sets that have the Call Forward All Calls feature active.

Call Forward Confirmation Tone

During activation or deactivation of Call Forward from a BRI terminal, a Call Forward confirmation tone is not provided to the BRI terminal. Instead, confirmation is done by sending a BRI message to the terminal.

Call Forward Save on SYSLOAD

Call Forward Save on SYSLOAD is not supported for ISDN BRI terminals.

Feature packaging

There is no new feature package defined for this feature; however, the following feature packages are required for ISDN BRI:

— Basic Rate Interface (BRI) package 216

— Basic Rate Interface Line Application (BRIL) package 235, and

— Meridian 1 Extended Peripheral Equipment (XPE) package 203.

Programming procedures for ISDN BRI National ISDN-1 Call Forward All Calls

The following steps should be used to configure ISDN BRI National ISDN-1 Call Forward All Calls:

1 **Configure National ISDN-1 protocol for a DSL using LD 27**

2 **Configure Call Forward All Calls in the TSP using LD 27.**

LD 27 — Configuring National ISDN-1 protocol for a DSL

Prompt	Response	Comment
REQ	NEW	Enter new data.
TYPE	DSL	Digital Subsriber Loop.
DSL	c dsl#	DSL address.
...		
PGPN	1	Protocol Set Group Number.
PRID	6	Protocol Identifier. Enter 6 for National ISDN-1.
...		

LD 27 — Configuring Call Forward All Calls in the TSP

Prompt	Response	Comment
REQ	CHG	Change data.
TYPE	TSP	Terminal Service Profile
DSL	c dsl#	DSL address (as already entered in step 1).
...		
DN	nnnnnnn	Directory Number associated with the TSP(up to seven digits).
...		
FEAT	CFXA	Allow Call Forward External for the DN.
SSRV_NI	VCFA 15 16	Feature Identifiers for Call Forward voice activation.
	VCFD 15 16	Feature Identifiers for Call Forward voice deactivation.
	DCFA 16 26	Feature Identifiers for Call Forward data activation.
	DCFD 17 27	Feature Identifiers for Call Forward data deactivation.
...		

ISDN Basic Rate Interface Connected Line Presentation/Restriction

ISDN Basic Rate Interface Connected Line Presentation/Restriction is a supplementary service that enables the Meridian 1 to either allow or restrict the presentation of a connected party's ISDN number and sub-address on the display of an ISDN BRI terminal. The presentation of a ISDN number and sub-address to the calling party occurs when the connected party's ISDN BRI terminal answers the call. In addition to the BRI terminal, this service can be applied to Meridian 1 proprietary and Analog (500/2500 type) sets.

The Connected Line Presentation (COLP) service applies to the calling party. COLP allows the presentation of the connected party's ISDN number and sub-address to the calling party.

The Connected Line Restriction (COLR) service applies to the connected party. COLR restricts the presentation of the connected party's ISDN number and sub-address to the calling party. COLR is activated on the ISDN BRI terminal of the connected party.

The connected party's identification is only provided to the calling party, if the ISDN BRI terminal of the connected party supports this feature.

When COLP/COLR feature is activated, the system monitors the configuration of the terminal service profiles on the calling and connected parties ISDN BRI terminals. Depending on this configuration, the system determines whether or not information is allowed or restricted to the calling party.

Operating parameters

Through configuration, the Meridian 1 BRI terminal interface controls the provisioning of the connected party's information on the interface (COLP prompt). This avoids sending COLP when the terminal does not support this supplementary information.

With the presentation restricted option activated, some BRI terminals may not have the capability to restrict the presentation of digits from the connected party. The Meridian 1 BRI terminal interface has the capability to restrict sending the connected party information the calling party if COLR is activated (COLP prompt).

ISDN BRI COLP/COLR coding is based on ETSI protocol. COLP/COLR from or to the public network is available to all countries, using the EuroISDN DSS1 protocol on the BRI interface.

The construction of the ISDN BRI connected number follows the same rules that apply to Calling Line Identification when sending an extension number over the same interface. National and local prefixes can be added. The type of numbering plan can be modified the same way they are modified for other types of terminals.

Feature interactions

Digital Terminal Display

When a calling party's digital terminal with display receives the connected party's information element, the display is updated with the received number depending on the presentation status. The presentation status applies to calls originating from non-ISDN extensions.

ISDN BRI terminals

Depending on the configuration of the Terminal Service Profiles, there is or is not full transparency for connected number and connected sub-address exchange between ISDN BRI terminals.

ISDN Central Office Trunks

When a call from a ISDN Central Office (CO) is answered by a ISDN BRI terminal, the ISDN BRI terminal's connected number is sent over the ISDN CO trunk interface, provided that COLP/COLR service is supported. The existing rules to generate the connected number on the ISDN CO interfaces are not modified by COLP/COLR. With the exception of EuroISDN trunks, the connected number is passed only if a redirection occurs.

ISDN Private Trunks

When a call from a QSIG interface is answered by a ISDN BRI terminal, the ISDN BRI terminal's connected number is sent over the QSIG interface. This connected message is given, even though no prior redirection occurred.

When a call from a Meridian Customer Defined Network (MCDN) interface is answered by a ISDN BRI terminal, the ISDN BRI terminal's connected number is sent over the MCDN interface. A connect message is sent no matter how the D-channel is configured and only after a redirection has occurred.

ISDN Calling Line Identification Enhancement

The ISDN Calling Line Identification Enhancement allows the choice of National and Local prefixes. This is applicable to connected numbers received from a ISDN BRI terminal and sent over a ISDN trunk.

EuroISDN Continuation

The EuroISDN Continuation capability adds National and Local prefixes to the connected number being sent. This is programmed on a route basis and is applicable to connected numbers received from a ISDN BRI terminal and sent over a ISDN trunk.

DPNSS/DASS2

The mapping of the connected number information element in a connect message from or to a ISDN BRI terminal and the connected line identification in a CRM message from or to a DPNSS or DASS2 interface is supported.

Feature packaging

ISDN Basic Rate Interface Connected Line Presentation/Restriction requires the following packages:

— Basic Rate Interface Line Application (BRIL) package 235,

— Basic Rate Interface (BRI) package 216, and

— Extended Peripheral Equipment (XPE) package 203.

Feature operation

Connected Line Identification Presentation (COLP)

The number dialed and the connected number may not be the same due to call diversion.

The COLP service is disregarded if the connected party's ISDN BRI terminal has COLR enabled to 'presentation restricted'. As an example, assume that Set A, the calling party, has connected line presentation enabled (COLP = YES) and calls Set B. Set B has enabled 'presentation restricted'. Set A's request for connected line presentation is denied. In situations where the calling party has configured COLP = YES and the connected party has requested 'presentation restricted', the connected party's restriction request prevails.

Connected Line Restriction (COLR)

This service restricts the presentation of the connected party's ISDN number and sub-address to the calling party. When Connected Line Restriction (COLR) has been enabled on the connected party's ISDN BRI terminal, the Meridian 1 system transmits the connected party's information element, based on the Terminal Service Profile (TSP) configuration of the calling user (TRANS prompt in LD 27).

The default configurations for COLP/COLR are as follows. Connected Line Presentation has the default setting connected number presentation restricted (COLP = NO). The connected party's number and subaddress information element are not sent to the calling party's BRI terminal. The calling party's ISDN BRI terminal may display a generic message, such as "Connected User Information Restricted" only if COLP = YES and the connected party has 'presentation restricted'.

Connected Line Restriction has the default setting 'presentation allowed'. If no presentation option is set on the connected party's BRI terminal, the default is inserted. The connected party's number and subaddress information element is sent to the calling party's BRI terminal.

The following scenarios can occur, depending on the individual BRI terminal configuration of the calling party and connected party.

1 The BRI terminal of the calling party has the default setting connected number presentation restricted (COLP = NO). The BRI terminal of the connected party has the default setting 'presentation allowed'. The connected party's ISDN BRI number is not displayed to the calling party.

2 The BRI terminal of the calling party is configured with connected number presentation allowed (COLP = YES). The BRI terminal of the connected party has enabled 'presentation allowed'. The connected party's ISDN BRI number is displayed to the calling party.

3 The BRI terminal of the calling party is configured with connected number presentation allowed (COLP = YES). The BRI terminal of the connected party has enabled 'presentation restricted'. The connected party's ISDN BRI number is not displayed to the calling party.

Programming procedures for ISDN BRI Connected Line Presentation/Restriction

The following steps should be used to configure ISDN BRI Connected Line Presentation/Restriction:

1 Configure COLP/COLR on ISDN Basic Rate Interface terminals, using LD 27.

2 Configure Connected Line Presentation/Restriction for a Digital Subscriber Loop, using LD 27.

LD 27 – Configuring COLP/COLR for ISDN BRI terminals.

Prompt	Response	Description
REQ	CHG	Change.
TYPE	TSP	Terminal Service Profile Data.
...		
DN	xxx...x	Directory Number (1 to 7 digits) of ISDN BRI terminal.
- CLIP	(YES), NO	Calling Line Identification Presentation for Incoming Calls.
- PRES	(YES), NO	Presentation of Calling Line Identification to far end on outgoing calls (allowed) restricted.
- COLP	(NO), YES	YES = Connected, number is passed from Meridian 1 to ISDN BRI terminal. NO = Connected, number is not passed from Meridian 1 to ISDN BRI terminal.
- TRANS	(NO), YES	YES = Connected, number is transmitted to the ISDN BRI terminal as received with no modification. NO = Connected, number is transmitted to the BRI terminal after erasing digits within information element. TRANS is only applicable if the connected number received has presentation restricted.

LD 27 – Configuring Connected Line Presentation/Restriction for a DSL.

Prompt	Response	Description
REQ	CHG	Create new data block.
TYPE	DSL	Digital Subscriber Loop.
DSL	c dsl#	Digital Subscriber Loop address.
USID	x	User Service Identifier.
...		
PRID	2	Protocol Identification. Where: 2 = ETSI is only supported.

NI-1 BRI Compliance Enhancements

This feature enhances the Meridian 1 functional protocol to be compatible with the National ISDN-1 (NI-1) ISDN Basic Rate Interface (BRI) voice and data standard for line application. The NI-1 protocol is configured in Overlay 27, which is used for ISDN BRI administration, by entering “6” against the PRID prompt. This protocol information is downloaded to the Multi-purpose ISDN Signaling Processor’s (MISP) network layer for handling ISDN BRI line application interface with NI-1 compatible terminals.

Another enhancement introduced by this feature is that the alphanumeric value for the Service Profile Identification (SPID) has been expanded from 9 to 20 characters (although the NI-1 standard only requires that the SPID range be from 9-20, the Meridian 1 implementation supports 1-20). The SPID is configured in Overlay 27 (by administering the Terminal Service Profiles) for the network side, and programmed on NI-1 compatible ISDN BRI terminals for the user side (both entries for the SPID must be the same).

Operating parameters

There are no operating parameters for this feature.

Feature interactions

There are no feature interactions for this feature.

Feature packaging

The following packages are required:

— ISDN Basic Rate Interface (BRI) package 216

— ISDN BRI Line application (BRIL) package 235

— Multi-purpose Serial Data Link (MSDL) package 222

Programming procedures for NI-1 BRI Compliance Enhancements

The following steps should be used to configure NI-1 BRI Compliance Enhancements:

1 Administer the TSP for a DSL using LD 27.

2 Configure the NI-1 protocol for a DSL using LD 27.

LD 27 – Administer the Terminal Service Profiles (TSPs) on a Digital Subscriber Loop (DSL).

Prompt	Response	Description
REQ	NEW CHG	Add a TSP. Change a TSP.
TYPE	TSP	Administer the TSP on a DSL.
DSL	c dsl#	DSL location.
USID	0-15	User service identifier Set USID = 0 to configure a default TSP for non-initializing terminals. Set USID = 1-15 for initializing terminals, for example, the M5317TDX.
SPID	aaa...a <cr> Xaaa...a	Service profile ID aaa...a = any combination of one-20 alphanumeric characters. <cr> = Stops this prompt from being displayed again. A maximum of 8 valid SPIDs per TSP are allowed. This prompt appears only if USID = 1-15 (if 0 was entered for the USID, a SPID is not required). This SPID must be programmed in the initializing terminal to associate the terminal with a USID. Refer to the note which follows on page 59. Xaaa...a = removes the specified SPID.
...		

Note: The ISDN BRI terminal requires that Layer 2 and Layer 3 parameters be programmed at the terminal. When programming the SPID, the voice SPID and data SPID should each match the one entered in LD 27 when administering the TSP which contains the terminal's DN. Also, if the terminal has an option to select the standard protocol, select the NI-1 standard. Refer to your terminal documentation for complete instructions.

LD 27 – Configure the NI-1 protocol for a DSL.

Refer to the note above pertaining to selecting the NI-1 protocol on the ISDN BRI terminals.

Prompt	Response	Description
REQ	NEW CHG	Add a TSP. Change a TSP.
TYPE	DSL	Administer the DSL.
DSL	lll s cc dsl#	DSL location. For Options 51C-81C: lll (superloop) = 0-156 (must be a number divisible by 4) s (shelf) = 0-1 cc (card) = 0-15 dsl# (DSL location) = 0-7
...		
PRID	6	Defines the protocol to be used on the DSL. Enter 6 for NI-1. The values for this prompt are: 1=ANSI 2=ETSI 3=DMS 4=NET64 5=NUMERIS 6=NI-1
...		

Set-based ISDN BRI features on Meridian 1 ISDN BRI terminals

The following features are supported on M5317TDX terminals:

- AutoDial Keys (up to 9 keys each with 20 digit numbers)
- Inspect Key
- Data Port Configuration from the menu
- HandsFree
- Conference - Soft Key (recommended key #15)
- DiscData Soft key for Disconnecting Data Calls
- English/French Language Support
- Set based Ringing Patterns
- Set based Clock

The following features are supported on M5209TDcp terminals:

- Last Number Redial (invoked by ##)
- Set based Speed Call (Can store up to five 25 digit numbers)
- Store Number Redial (multiple keys)
- Conference (recommended key #9)
- DiscData Soft key for Disconnecting Data calls
- English/French Language Support
- Set based Ringing Patterns

Generic X11 features

ISDN BRI Lines — Generic X11

This section begins with a quick reference table (Table 2) of features with a column that indicates how this feature is supported by ISDN BRI lines. Reference to the notes at the end of the table provide some detail about the support of the feature.

The following legend and notes apply to Table 2.

Legend

yes = fully supported

n/a= Not Applicable or transparent to ISDN BRI

no = not supported due to ISDN BRI Standards limitations

P= partially support with description of limitation

Features labeled with "**" have a more detailed description later in this chapter.

For complete information on these features, refer to the *Features and Services Guide* 553-3001-306.

Note 1: ISDN BRI Terminal can ONLY initiate calls to the user equipped with this feature.

Note 2: ISDN BRI Terminal CAN NOT invoke this feature, however, the non-ISDN BRI calling party (calling an ISDN BRI user) will have access to this feature.

Note 3: Feature is ISDN BRI Terminal dependent.

Note 4: Automatic Number Identification, as used here, refers to the Hotel/Motel ANI feature. Please refer to "Calling Party Number" feature listed above for CLID.

Note 5: Camp-on feature can not be invoked against an ISDN BRI Terminal.

Note 6: Feature is not available to ISDN BRI user, however, ISDN BRI Terminal calling other non-ISDN BRI set equipped with this feature will receive appropriate call handling treatment.

Note 7: ISDN BRI Terminal display, if equipped, will not be updated to reflect call modification.

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
— A—		
Access Restrictions**	yes	See details later in this chapter
Access to Paging**	yes	See details later in this chapter
Access to Recorded Telephone Dictation**	yes	See details later in this chapter
ACD/CDR Q Record Option.	no	
ACD Night Call Forward without Disconnect Supervision	no	
Activity Codes for Not Ready State	no	
Application Module	n/a	
ARIES Automatic Gain Control	n/a	
ARIES Handsfree Download	n/a	
Attendant Administration	no	
Attendant Alternative Answering**	P	See Note 1 and details later in this chapter
Attendant Barge-in	no	
Attendant Blocking of DN	no	
Attendant Break-in	no	
Attendant Busy Verify	no	
Attendant Call Party Name Display.	yes	
Attendant Call Selection	n/a	
Attendant Calls Waiting Indication	n/a	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Attendant consoles	no	
Attendant End-to-End Signaling**	yes	See details later in this chapter
Attendant Incoming Call Indicators	n/a	
Attendant Interpositional Transfer	n/a	
Attendant Lockout	n/a	
Attendant Overflow Position**	P	See Note 1 and details later in this chapter.
Attendant Overflow Position Busy	no	
Attendant Position Busy. See also Night Service	n/a	
Attendant Recall**	P	See Note 2 and details later in this chapter.
Attendant Release**	P	See details later in this chapter.
Attendant Secrecy	yes	
Attendant Splitting	yes	
Attendant Supervisory Console	n/a	
Attendant Trunk Group Busy Indication	n/a	
Audible Message Waiting	yes	See Note 3
Audible Reminder of Held Call	no	
Autodial	yes	See Note 3
Autodial with Authorization Code.	no	
Automatic Answerback	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	**Supported**	**Comments**
Automatic Call Distribution**	P	See Note 1 and details later in this chapter.
Automatic Hold	no	
Automatic Line Selection	yes	See Note 3
Automatic Number Identification	no	See Note 4
Automatic Number Identification on DTI	no	See Note 4
Automatic Preselection of Prime DN	yes	See Note 3
Automatic Redial	no	
Automatic Set Relocation	no	
Automatic Timed Reminders**	P	See Note 5 and details later in this chapter.
Automatic Trunk Maintenance	n/a	
Automatic Wake Up	no	
Automatic Wake Up Flexible Feature Code Delimiter	no	
Auxiliary Processor Link	n/a	
Auxiliary Signaling	no	
— B —		
B-Channel Overload Control	no	
Background Terminal	no	
Barge-in	no	
Basic Alternate Route Selection	yes	
Basic Authorization Codes	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Basic Call, North American ISDN PRI Connectivity**	yes	See details later in this chapter
Bearer Capability in CDR	no	
Boss/Secretary Filtering Enhancement	no	
Bridging	no	
Busy Lamp Field Array	no	
Busy Tone Detection for Japan	no	
Buzz - See Manual Signaling (Buzz)	no	
— C —		
Call-Back Queuing	no	
Call-Back Queuing/Conventional Main	no	
Call Capacity Report Enhancement	no	
Call Detail Recording	yes	
Call Detail Recording Expansion	yes	
Call Detail Recording 100 Hour Call	no	
Call Detail Recording on Busy Tone	yes	
Call Detail Recording Outpulsed Digits	no	
Call Forward All Calls**	P	See details later in this chapter
Call Forward, Break-in and Hunt Internal or External Network Wide	no	
Call Forward Busy-	yes	See ISDN BRI Special Call For Busy
Call Forward Destination Deactivation	yes	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Call Forward External Deny	no	
Call Forward and Hunt by Call Type**	yes	See details later in this chapter
Call Forward No Answer**	yes	See details later in this chapter
Call Forward No Answer/ Flexible	yes	See Note 7
Call Forward/Save on Dump	no	
CFNA, Second Level for MWA stations	yes	See Note 7
Call Forward/Hunt Override via FFC	no	
Call Forward No Answer, Second Level	yes	See Note 7
Call Hold**	yes	See details later in this chapter
Call Hold, Deluxe	no	
Call Hold, Individual Hold Enhancement	no	
Call Hold, Permanent	no	
Calling line identification**	P	See details later in this chapter
Calling line identification presentation	yes	See details later in this chapter
Calling line identification restriction	yes	See details later in this chapter
Call Page Network Wide	yes	
Calling Party Privacy	no	
Calling Party Privacy Override	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Call Park**	P	See details later in this chapter
Call Park Network Wide	no	
Call Park on Unsupervised Trunks	no	
Call Party Name Display**	P	See details later in this chapter
Call Pickup	no	
Call Pickup, Directed	no	
Call Pickup Network Wide	no	
Call Processor Card NT5D10	n/a	
Call Redirection by Day	no	
Call Selection	n/a	
Call Splitting	yes	
Call Status Indication	n/a	
Call Transfer**	P	See Note 2 and details later in this chapter
Call Waiting/Internal Call Waiting**	yes/yes	See details later in this chapter
Called Party Control on Internal Calls	no	
Called Party Disconnect Control**	P	See details later in this chapter
Calling Line Identification**	P	See details later in this chapter
Calling Line Identification Presentation and Restriction**	yes	See details later in this chapter

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Calling Party Number	yes	
Calling Party Privacy Override	no	
Charge Account and Calling Party No	yes	See Note 1
Calls Waiting Indication (Attendant)	n/a	
CAMA Trunks	no	
Camp-on	no	
Capacity Expansion	yes	
Centrex Switchhook Flash	no	
Code Restriction	yes	
Charge Account and Calling Party Number **	P	See details later in this chapter
Charge Account, Forced	no	
CLASS: Calling Number and Name Delivery	no	
CLASS: Visual Message Waiting Indicator	no	
Class of Service	yes	
CO Trunk Priority Option - Call Pickup	no	
Conference	no	See Note 2
Conference Control	n/a	
Console Digit Display	n/a	
Console Presentation Group Level Services	no	
Control of Trunk Group Access	n/a	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Controlled Class Of Service	no	
Controlled Class of Service, Enhanced	no	
Coordinated Dialing Plan	yes	
Coordinated Call-Back Queuing	no	
Coordinated Call-Back Queuing - Main	no	
— D —		
Data access via Data Modules	P	See Note 2
Data Port Hunting	yes	
Data, Circuit Switched**	yes	See details later in this chapter
Data, Packet**	yes	See details later in this chapter
Deluxe Hold	no	
Departmental Listed Directory Number (LDN)**	yes	See details later in this chapter
Dial Access to Group Call	no	
Dial Intercom	no	
Dial Pulse/Dual Tone Multifrequency Conversion	n/a	
Dialed Number Identification Service	P	See Note 7
Digit Display	yes	See Note 7
Digital Trunk Interface	yes	
Direct Inward System Access	yes	
Directed Call Pickup	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	**Supported**	**Comments**
Directory Number	yes	
Directory Number Expansion**	yes	See details later in this chapter
Display of Access Prefix on CLID	no	
Distinctive/New Distinctive Ringing	no	
Distinctive Ringing by DN	no	
Distinctive Ringing for Dial Intercom	n/a	
Do Not Disturb**	yes	See details later in this chapter
DSN Station Loop Preemption	no	
Dual Value Added Server Identification	n/a	
— E—		
E.164/ESN Numbering Plan Expansion	yes	
Electronic Brandlining	no	
Electronic Switched Network	yes	
Emergency Services Access	yes	
End-to-End Signaling	yes	
Enhanced Controlled Class of Service	no	
Enhanced End-to-End Signaling	yes	
Enhanced Flexible Hot Line**	P	See Note 2
Enhanced Music	yes	
Enhanced Night Service	no	
Enhanced 911 Interface	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Electronic Lock Network Wide/Electronic Lock on Private Lines	no	
Equal Access Compliance	yes	
ESN Queuing	no	
Exclusive Hold	no	
— F —		
Fast Tone Digit Switch	n/a	
FCC Compliance for DID Answer Supervision	n/a	
Flexible Attendant DN	n/a	
Flexible Call Forward No Answer	yes	
Flexible Direct Inward Dialing	no	
Flexible ESN "0" Routing	yes	
Flexible Hot Line	P	See Note 2
Flexible Feature Codes	no	
Flexible Line Lockout	no	
Flexible Numbering Plan	no	
Flexible Numbering Plan Enhancement	no	
Flexible Orbit Prevention Timer	yes	
Flexible Tones and Cadences	no	
Flexible Voice/Data Terminal Number	no	
Forced Charge Account	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
— G —		
Global CDR Record	no	
Group Call	no	
Group Hunt**	P	See details later in this chapter
Guest Entry of Automatic Wake Up	no	
— H —		
History File	yes	
Hot Line	P	See Note 2
Hold	yes	Not supported by 1TR6 protocol
Hospitality Screen Enhancements	no	
Hotel/Motel features —	no	
— Automatic Wake-Up	no	
— Background Terminal	no	
— Controlled Class of Service	no	
— Maid ID	no	
— Property Mgmt. Sys. Interface	no	
— Room Service	no	
Hunting	yes	See ISDN BRI Special Hunting
— I, J—		
IMS/VMS**	P	See details later in this chapter

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
In-Band ANI	n/a	
Incoming DID Digit Conversion**	P	See Note 7 and details later in this chapter
Incremental Software Management**	yes	See details later in this chapter
Incoming Call Indicators	n/a	
Incoming Trunk Group Exclusion	n/a	
Incoming Trunk Programmable CLID	n/a	
Individual Hold	no	
INIT ACD Queue Call Restore	no	
Inspect key	yes	See Note 3
Instant ISM	no	
Integrated Messaging System Link	P	See IMS/IVMS
Integrated Voice and Data	yes	
Intercept Treatment**	yes	See details later in this chapter
Internal Call Detail Recording	yes	
Internal Call Waiting	yes	
Interpositional Transfer	n/a	
ISDN Application Protocol	no	
ISDN Call Connection Limitations	yes	
ISDN BRI Calls to MCA/MCU	yes	
ISDN BRI Circuit- Switched Data Call Accessing DTI Trunk	yes	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
ISDN BRI Connected Line Presentation/Restriction	yes	
ISDN BRI to ISDN BRI Circuit Switched Data Call	yes	
ISDN BRI Circuit-Switched Data Call over PRI	yes	
ISDN BRI Circuit- Switched Data Call for Tandem	yes	
ISDN BRI Network Ring Again	yes	
ISDN NI-1 BRI Compliance Enhancements	yes	
ISDN BRI Special Call Forward Busy	yes	
ISDN BRI Special Hunting	yes	
ISDN Calling Line Identification Enhancements	yes	
ISDN QSIG Alternate Routing	no	
ISDN QSIG Basic Call	no	
ISDN QSIG Call Completion	no	
ISDN QSIG Call Completion Enhancement	no	
ISDN QSIG Call Diversion Notification	yes	BRI sets are supported.
ISDN QSIG Call Diversion Notification Enhancement	yes	BRI sets are supported.
ISDN QSIG Call Transfer Notification	yes	BRI sets are supported.
ISDN QSIG Generic Functional Transport	yes	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	**Supported**	**Comments**
ISDN QSIG/ETSI Generic Functional Transport Enhancement	yes	
ISDN QSIG-BC and QSIG_GF Compliance Update	yes	
ISDN QSIG Channel ID Coding	no	
ISDN QSIG Name Display**	P	See details later in this chapter
ISDN QSIG Path Replacement	no	
ISDN QSIG Supplementary Services - Name Display Enhancements**	yes	
ISDN Semi-permanent Connection for Australia	no	
Japan TTC Common Channel Signaling	no	
— L —		
Last Number Redial	yes	See Note 3
Limited Access to Overlays	yes	
Line Load Control	no	
Line Lockout	no	
Listed Directory Numbers	n/a	
Lockout	n/a	
— M —		
Maid Identification	no	
Maintenance Telephone	no	
Make Set Busy	no	
Make Set Busy Enhancement	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Make Set Busy Improvement	no	
Malicious Call Trace**	P	See Note 2 and details later in this chapter
Manual Line Service	n/a	
Manual Signaling (Buzz)	no	
Manual Trunk Service	yes	
MCDN Alternate Routing	no	
MCDN End to End Transparency	no	
Meridian 1 Attendant Console Enhancement	n/a	
Meridian Communications Adapter (MCA) Data Module**	P	See details later in this chapter
Meridian Companion Enhanced Capacity	N/A	
Meridian Hospitality Voice Services	no	
Meridian MAX	n/a	
Meridian Mail	yes	Audible Indication
Meridian Mail Trunk Access Restriction**	P	See details later in this chapter
Message Center**	P	See details later in this chapter
Message Registration	no	
Message Waiting Lamp Maintenance	no	
Message Waiting Indicator by Directory Number	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Message Waiting (Meridian Mail)**	yes	See Note 3 and details later in this chapter
Modem Trunk Hunting	no	
MSDL Idle Code Selection	N/A	
MSDL Port Overload Counter	N/A	
MSDL Status Enquiry Message Throttle	N/A	
Multiple Appearance Directory Number (DN)**	P	On the same DSL ONLY. See details later in this chapter
Multiple Appearance Redirection Prime	no	
Multi-Language Wake Up	no	
Multi-Party Operation**	p	See details later in this chapter
Multiple-Customer Operation	yes	
Multiple-Console Operation	n/a	
Multiple DID Office Code Screening	n/a	
Multiple-Tenant Service	no	
Music	yes	
Music Broadcast	no	
Music, Enhanced	yes	
Music on Hold**	yes	See details later in this chapter
— N —		
N Digit DNIS	no	
Network Automatic Call Distribution	P	See Note 1

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Network Alternate Route Selection**	yes	See details later in this chapter
Network Attendant Service**	p	See details later in this chapter
Network Authorization Codes	no	
Network Call Transfer**	P	See Note 2 and details later in this chapter
Network Call Redirection Service**	P	See details later in this chapter
Network Call Trace and Call Diagnostics	no	
Network Class of Service**	yes	See details later in this chapter
Network Intercom	no	
Network Message Center	P	See Message Center
Network Message Services (Meridian Mail)	yes	
Network Call Party Name Display	P	
Network Signaling	yes	
Network Signaling for Network ACD**	P	See details later in this chapter
Network Speed Call	P	See Note 2
Network Traffic	n/a	
New Distinctive Ringing	no	
New Flexible Code Restriction	yes	
NI-2 Call By Call Service Selection	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Night Key for DID Digit Manipulation	no	
Night Service/TAFAS**	P	See Note 1 and details later in this chapter
Night Service by Time of Day	P	See Note 6
No Hold Conference	P	See Note 2
NPI and TON in CDR tickets	no	
— O —		
Off-Hook Alarm Security	no	
Off-Hook Queuing	no	
Off-Net Number Recognition	yes	
Off-Premise Extension	n/a	OPX — applicable to analog sets only
Office Data Administration System	no	
On-Hook Dialing	yes	See Note 3
Option 11 Set based installation	no	
Optional Outpulsing Delay	no	
Optional Privacy	no	
Outgoing Trunk Hunting	n/a	
Overflow Tone	yes	
Overlay Cache Memory	yes	
Override	no	
Outpulsing of Asterisk and pound**	yes	See details later in this chapter
— P —		

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Packet Switched Data Service	yes	
Paging	yes	
Permanent Hold	n/a	
Position Busy	n/a	
Preference Trunk Usage	yes	
Pretranslation**	yes	See details later in this chapter
Pretranslation and System Speed Call Enhancement	no	
Prime DN	n/a	
Priority Override**	p	See details later in this chapter
Privacy	no	
Privacy Override	no	
Privacy Release	no	
Private Line Service	no	
Property Management System Interface	no	
Packet Switched Data Service	yes	Supported for both B and D channels

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
— R —		
Recall (Attendant)**	P	See Note 2 and see details later in this chapter
Recall After Parking	no	
Recall to Same Attendant**	P	See details later in this chapter
Recorded Announcement**	yes	See details later in this chapter
Recorded Announcement Broadcast	no	
Recorded Overflow Announcement	yes	
Recorded Telephone Dictation	yes	
Recovery on Misoperation at the Attendant Console	no	
Remote Call Forward	no	
Remote Peripheral Equipment	no	
Remote Virtual Queuing	no	
Restricted Call Transfer	no	
Ring Again	no	
Ring Again on No Answer	no	
Ringing Number Pickup	no	
Room Status	no	
Round Robin Trunk Hunting	n/a	
— S —		
7 Digit DNIS for MAX	n/a	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Schedule Access Restriction	no	
Secrecy (Attendant)	yes	
Secretarial Filtering	no	
Selectable Conferee Display and Disconnect	no	
Short Buzz for digital sets	n/a	
Signal source and destination	no	
Single Appearance DN	yes	
Six Party Conference for 2500 Sets	yes	See Note 3
Software Capacity Expansion	yes	
Special Dial Tone	P	Message Waiting Indication
Special Service prefix (SPRE)	no	
Speed Call	P	See Note 2
Speed Call Delimiter	no	
Speed Call with Authorization Codes	no	
Speed Call, System	no	
Splitting** (See Attendant Splitting)	yes	See details later in this chapter
Station Category Indication	no	
Station Hunting--see ISDN BRI special hunting	yes	
Station Loop Preemption	no	
Station Camp-on	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Station-to-Station-Calling	yes	
Station-to-Station Call Waiting	yes	
Stored Number Redial	yes	See Note 3
Supervisory Attendant Console	n/a	
System Capacity Expansion	yes	
Switched 56 Kbps Service**	P	See details later in this chapter
— T —		
Time and Date	yes	See Note 3
Time Forced Disconnect** (See Paging)	yes	See details later in this chapter
Tones, Flexible Incoming	no	
Transfer**	P	See Note 2 and details for Call transfer later in this chapter
Trunk Answer From Any Station	no	
Trunk Anti-Tromboning	no	
Trunk Barring	yes	
Trunk Group Access Restrictions (TGAR)	yes	
Trunk Group Busy Keys/Indication**	yes	See details later in this chapter
Trunk Hunting	n/a	
Trunk Signaling Arrangements	n/a	
Trunk to Trunk Connection	no	

Table 2
Generic X11 features on ISDN BRI lines

Features and services	Supported	Comments
Trunk Verification from a Station	no	SPRE codes are not supported
— U —		
Uninterrupted Line Connections	no	
Uniform Dialing plan	yes	
— V —		
VIP Wake up	no	See Automatic Wake Up
Virtual Network Services in the UK with DASS2/DPNSS1 Bearers	no	
Virtual Network Services Virtual DN Expansion	no	
Voice Call	yes	See Note 3

The following two sections list the Generic X11 features that are tagged in the above table with a "**". These descriptions provide further details of the interaction of the feature with ISDN BRI

Features supported by ISDN BRI as a Line

The following descriptions provide additional information for the features tagged with "**" in Table 2.

Access Restrictions

Access restriction for an ISDN BRI terminal is based on assigned class of service, trunk group access restriction, and area and exchange codes dialed by the terminal.

Class-of-service and trunk group access restriction for an ISDN BRI terminal are defined when configuring DSL using Service Change ISDN BRI Program LD 27.

The same access restrictions apply to all voice and data ISDN BRI DNs defined for a DSL.

Access to Paging

An ISDN BRI terminal can access paging equipment by dialing a paging trunk access code. End-to-end signaling must be provided by the ISDN BRI terminal.

Access to Recorded Telephone Dictation

An ISDN BRI terminal can access dictation equipment by dialing an equipment access code. End-to-end signaling must be provided by the ISDN BRI terminal.

Attendant End-to-End Signaling

This feature is supported for ISDN BRI terminals where the attendant can signal to an ISDN BRI terminal and an ISDN BRI terminal can dial the attendant and request access to services requiring end-to-end signaling.

Call Forward No Answer

This feature is supported for calls originated by an ISDN BRI terminal and calls terminated at an ISDN BRI terminal. Internal and external call forward no answer DNs are defined in the DSL, and call forward no answer enable and call forward by call type are defined for ISDN BRI DNs in the TSP using Service Change ISDN BRI Program LDþ27.

An ISDN BRI DN can be defined as a call forward no answer DN allowing the features available on the ISDN BRI terminal to control the call.

Call forward no answer and second level call forward no answer are activated if FNA and SFA are selected for a DN when configuring the TSP using Service Change ISDN BRI Program LD 27. If a call is not answered after a predetermined timer expires, the initial call setup is released from the DSL and call forward no answer routes the call to an alternate DN.

An ISDN BRI terminal originating the call is not updated to show on its display that the call was redirected to a different DN as a result of call forward no answer. This is due to lack of standard for layer 3 messages used to update the ISDN BRI terminal display

Call Hold (not supported by 1TR6 protocol)

This feature is activated by pressing the Hold key on the terminal. This feature allows an ISDN BRI terminal to place an active call on hold to accept or originate another call. You can dial a new call and go back to the call on hold.

An ISDN BRI terminal can place an ISDN BRI or non-ISDN BRI terminal on hold.

Deluxe hold and permanent hold do not apply to an ISDN BRI terminal, however a non-ISDN BRI terminal can place an ISDN BRI terminal in deluxe hold or permanent hold.

Call Waiting

This feature alerts a busy ISDN BRI terminal that a call is waiting to be answered. To answer a waiting call, the ISDN BRI terminal must place the active call on hold or release the active call. If the ISDN BRI terminal user tries to answer a call waiting call when no B-channel is available, the call is released from the ISDN BRI terminal and extended to the attendant.

When both B-channels on a DSL are busy, an incoming call is presented to the DSL as call waiting as long as the number of calls on this DSL does not exceed the maximum number of calls specified, which include active calls, calls waiting, and calls on hold. This maximum number of simultaneous calls allowed is specified when configuring the DSL using Service Change ISDN BRI Program LD 27.

A call waiting from an ISDN BRI terminal is presented to a non-ISDN BRI terminal as a normal call waiting call.

Call waiting for a call terminating at a DSL will be activated only if do-not-disturb and hunting for this DSL are not enabled or fail to handle the call. ISDN BRI call waiting is subject to call forward no answer as defined in the Meridian 1.

Departmental LDN

This feature allows specified terminals to share the same numbering plan and to access the attendant console or consoles dedicated to a departmental LDN.

Directory Number Expansion

ISDN BRI terminal DNs can be increased from a maximum length of four digits to a maximum length of seven digits when the DN Expansion option is equipped.

Do-Not-Disturb

The attendant can place an ISDN BRI DN in do-not-disturb mode, which allows the terminal to make outgoing calls but it makes it look busy to incoming calls.

Incremental Software Management

Software pricing is implemented based on the number of ISDN BRI DSLs (United States only).

Intercept Treatment

A call originated by an ISDN BRI terminal that is intercepted can be routed to the attendant, given a busy tone, given an overflow tone, or routed to a recorded announcement. There is no special treatment for ISDN BRI terminals.

Message Waiting (Meridian Mail)

This feature is supported by ISDN BRI terminals if this feature is enabled for an ISDN BRI DN when configuring the TSP using Service Change ISDN BRI Program LD 27. Audible message is supported, however visual message display indicator is not supported due to lack of standards for layerþ3 messages.

When an ISDN BRI terminal with an active message waiting initiates a call, the system replaces the standard dial tone with a message waiting tone to alert the user that a message is waiting. If a terminal cannot get a dial tone, it also cannot get a message waiting tone.

A call terminating at an ISDN BRI DN can be redirected to Meridian Mail or Network Message Services-Meridian Mail (NMS-MM) through call forward no answer. A call originating from an ISDN BRI terminal to a non-ISDN BRI terminal can also be redirected to Meridian Mail or NMS-MM through call redirection on the non-ISDN BRI terminal.

An ISDN BRI terminal can access the mailbox and retrieve its messages by dialing Meridian Mail or NMS-MM DN. An ISDN BRI terminal does not have a message waiting or conference key.

An ISDN BRI terminal connected to Meridian Mail or NMS-MM cannot use Call Sender feature.

Message waiting forward busy redirects a DID call from a busy DSL interface to Meridian Mail or NMS-MM through FDN defined for a DSL. This feature is enabled on a customer basis for an ISDN BRI DN by setting call forward busy allowed and message waiting allowed class of services when configuring the TSP using Service Change ISDN BRI Program LD 27.

Music on Hold

ISDN BRI terminals on hold and terminals placed on hold by an ISDN BRI terminal can receive music if so configured. An ISDN BRI terminal can also access a music trunk by dialing the route access code.

Pretranslation

An ISDN BRI DN can be assigned to a first digit pretranslation group.

The first digit dialed on an ISDN BRI terminal can be pretranslated into a DN while making a call.

Pretranslation is configured for a DSL therefore all DNs for a DSL are assigned to the same pretranslation group.

An ISDN BRI DN can also be assigned as a translated DN in a pretranslation group's speed call list.

Recorded Announcement

An ISDN BRI terminal can be connected to a recorded announcement machine by an intercept condition, by the attendant, by an ACD agent, or by direct access to a recorded announcement machine.

Departmental listed directory number groupings are supported for ISDN BRI and are configured for a DSL using Service Change ISDN BRI Program LD 27. This allows assignment of a DSL to one of the four listed directory number groups. All DNs for a DSL are assigned to the same departmental LDN.

Network Alternate Route Selection

ISDN BRI terminals can have the following networking capabilities: simple network access codes, uniform dialing plan, digit manipulation, automatic least-cost routing, time-of-day routing, automatic on-net to off-net overflow, network control through network class of service, traveling class of service and facility restriction level, routing control through network class of service based on time-of-day schedule, 11 digit translation, free calling area screening, expensive route warning tone, network call detail recording, and network speed dial.

Network Class of Service

An ISDN BRI DSL can be assigned a network class of service to control access to routes, ability to receive expensive route warning tone, and ability to access network speed dial. All DNs for a DSL are assigned to the same NCOS.

Outpulsing of Asterisk and Outpulsing of Pound

Routes can be dedicated for the outpulsing of asterisks (*) and pound (#) when an ISDN BRI terminal is making a trunk call.

Splitting

The attendant selectively talks to either party of an established call made by an ISDN BRI terminal by excluding one party from the conversation or the other using the Exclude Source or Exclude Destination key.

Timed Forced Disconnect

An ISDN BRI terminal is disconnected if it uses the paging trunk longer than a preset time.

Trunk Group Busy Keys/Indication

When all trunks in a trunk group or its hunting groups are busy, a user-selectable tone is returned to the calling ISDN BRI terminal.

Features partially supported by ISDN BRI as a line

The following descriptions provide additional information for the features tagged with:**: in Table 2.

Attendant Alternative Answering

An ISDN BRI DN cannot be assigned as an attendant alternative answering DN. Calls originating from an ISDN BRI terminal can be forwarded to an attendant alternative answering DN defined for the attendant console when the attendant does not answer the call. The originating ISDN BRI terminal display is not updated.

Attendant Overflow Position

An ISDN BRI DN cannot be assigned as an attendant overflow position DN. Calls originated by ISDN BRI terminals can be automatically routed to a predefined DN, however, the terminal display will not be updated to show the call modification.

Attendant Recall

An ISDN BRI terminal communicating with a non-ISDN BRI terminal is recalled to the attendant as the source party if the recall is initiated by the non-ISDN BRI terminal. An ISDN BRI terminal cannot initiate an attendant recall.

Attendant Release

The attendant has no control over disconnection of an ISDN BRI terminal if the call is with another ISDN BRI terminal. The ISDN BRI terminal can release the call even if the attendant has not pressed the Release key.

Automatic Timed Reminders

A call made by an ISDN BRI terminal can be extended by the attendant to an ISDN BRI or non-ISDN BRI terminal and timed for slow answer or call waiting recall. When the timer expires, the call is recalled to the attendant.

Camp-on recall is not supported by the ISDN BRI DN.

Automatic Call Distribution

An ISDN BRI terminal cannot be an ACD agent terminal, however, an ISDN BRI terminal can place a call to an ACD agent.

Call Forward All Calls

An ISDN BRI terminal does not support call forward all calls. Calls originating from an ISDN BRI terminal can be forwarded if call forwarding is activated by a non-ISDN BRI terminal. The calling ISDN BRI terminal display is not updated to show the call change. An ISDN BRI DN can also be defined as a call forward DN.

Call Park

An ISDN BRI terminal cannot be parked nor can it park a call, however it can retrieve a parked call through a system park DN. An ISDN BRI DN can be used as a station park DN.

Call Party Name Display

Names are not displayed on ISDN BRI terminals, however, a name for an ISDN BRI DN can be defined using Calling Party Name Display Program LD 95 to allow a non-ISDN BRI terminal with display to identify the ISDN BRI terminal that originated the call. This name can be transmitted across ISDN PRI network.

Called Party Disconnect Control

A disconnect signal from an incoming trunk call to an ISDN BRI terminal is ignored by the terminal.

A call originating from an ISDN BRI terminal and to an outgoing trunk can be disconnected from either end.

Call Transfer

An ISDN BRI terminal can be transferred by a non-ISDN BRI terminal and a non-ISDN BRI terminal can transfer a call to an ISDN BRI terminal. In either case, the ISDN BRI terminal display is not updated to indicate call modification.

Calling Line Identification

Calling line identification is sent across ISDN PRI to and/or from ISDN BRI terminals. Trunk access code is displayed at the called ISDN BRI terminal instead of the calling line identification if it has calling party number restricted.

If a network call is redirected the calling line identification is not updated.

Charge Account/Calling Party Number

Charge account cannot be activated by an ISDN BRI terminal, however, a non-ISDN BRI terminal communicating with an ISDN BRI terminal can activate charge account and enter an ISDN BRI DN as the calling party number to be included in the call detail recording report.

Enhanced Flexible Hotline

Hotline is not available on an ISDN BRI terminal, however, an ISDN BRI DN can be defined as a hotline number.

Group Hunt

Group Hunt is partially supported on ISDN BRI terminals, as explained below:

— an ISDN BRI terminal cannot be a member of a group hunt list, due to lack of support of FFC (Group Hunt Deactivation is not possible);

— an ISDN BRI terminal cannot access a group hunt list, since FFCs are not supported;

— a call from an ISDN BRI terminal to another ISDN BRI terminal may be hunted, or call forwarded no answer, to a Group Hunt Pilot DN FFC.

Incoming DID Digit Conversion

An ISDN BRI DN can be defined as the converted DN, however, the dialed number identification service number will not be displayed on an ISDN BRI terminal.

IMS/IVMS

Calls originated from an ISDN BRI terminal may be redirected to IMS/IVMS and leave a text or voice message for the called party.

For voice messages, an ISDN BRI terminal that can generate end-to-end signaling can access other options available.

Calls terminated on an ISDN BRI terminal may be redirected to IMS/IVMS through call forward no answer or hunting, but the ISDN BRI DN will not have a mailbox defined and a caller may not leave a message for an ISDN BRI DN.

ISDN BRI Network Ring Again

The Network Ring Again feature cannot be activated from nor offered to an ISDN BRI terminal due to a lack of standardized functional protocol for supporting the feature. For non-ISDN terminals encountering a busy ISDN BRI terminal, the Network Ring Again feature is not offered to the non-ISDN terminals for the same reason.

ISDN QSIG Name Display

Calling Party Privacy (CPP) Flexible Feature Code is not supported on BRI sets. Therefore, Calling/Connected Name Identification Restriction on a per-call basis is not supported on BRI sets.

Malicious Call Trace

An ISDN BRI terminal cannot activate malicious call trace. A non-ISDN BRI terminal can activate malicious call trace on a call connected to an ISDN BRI terminal.

Meridian Mail Trunk Access Restriction

This feature does not support Call transfer from ISDN BRI sets.

Message Center

A call originating by an ISDN BRI terminal to a non-ISDN BRI terminal may be redirected to Network Message Service - Message Center. The associated MIK/MCK and the lamp states are not supported for the corresponding ISDN BRI terminal.

Multiple Appearance Directory Number

Multiple ISDN BRI terminals on the same DSL can have the same DN. An ISDN BRI and a non-ISDN BRI terminal cannot have the same DN.

ISDN BRI multiple appearance DN is not allowed across different DSLs and is also not allowed for non-ISDN BRI terminals.

Multi-Party Operations

Call Join

The Call Join feature allows a controlling party to conference-in or transfer an active party to a held party. The controlling party can then hang up. The controlling party's terminal must be equipped with a Conference 3/6 key, and at least one secondary DN or Call Waiting key.

ISDN BRI terminals cannot be the controlling party. If the ISDN BRI terminal is the active party or held party, the Call Join feature is supported as described; however, the ISDN BRI terminal display is not updated.

Three-Party Service

The Three Party Service feature allows a user of a 500/2500 terminal with Three Party Service Allowed (TSA) COS to toggle between an active party and a held party on an ISDN BRI terminal, through the use of the Call Hold feature. However, a three party conference cannot be formed.

AN ISDN BRI terminal may be placed on hold or placed in a three party conference by a controlling terminal that is a non-ISDN BRI terminal; however, the ISDN BRI terminal display is not updated.

Conference 6

The Conference 6 feature is an extension of Three-party service, allowing users of 500/2500 telephones, with TSA and C6A COS, the added capability of establishing a conference of up to six parties.

AN ISDN BRI terminal may be placed in a six party conference by a controlling terminal that is a non-ISDN BRI terminal; however, the ISDN BRI terminal display is not updated.

Recovery of Misoperation on Call Transfer

The Recovery of Misoperation of Call Transfer feature prevents external calls from being dropped due to misoperation of the Call Transfer feature. Optional treatments of a misoperation may be configured on a customer basis.

Recovery of Misoperation of Call Transfer is not available on ISDN BRI terminals. If the controlling station misoperates on a transfer of a call originating from an ISDN BRI terminal, the call receives the configured misoperation treatment; however, the ISDN BRI terminal display is not updated.

Network Signaling for Network ACD

ISDN BRI terminals cannot be configured as network ACD DNs, however, ISDN BRI terminals can make calls to the network ACD DNs.

Network Call Redirection Service

ISDN PRI redirection for ISDN BRI terminals is limited as follows:

— ISDN BRI terminals may be redirected across the PRI network, however, the terminal will not be notified about the redirection.

— ISDN BRI terminals may redirect a PRI call using hunting and call forward no answer. It may also redirect a call across PRI the same way.

Network Attendant Service

Network Attendant Service (NAS) provides the capability of stand alone attendant service, full or part time, across a Meridian 1 network.

NAS provides the following attendant features network wide:

— attendant routing, which allows calls to an attendant to be routed to any other destination within the network;

— night service;

— call extension, which allows calls to an attendant to be extended across a network;

— timed reminder recall, which allows unanswered calls to be recalled to the attendant. When the attendant extends a call to a destination at another node, the trunks are not released. This prevents call disconnection and gives the attendant control of the call, including the ability to exclude the source or destination;

— incoming call indication, which is received when a call reaches the attendant via NAS routing;

— Camp-on and Call Waiting;

— Break-in;

- attendant control, which gives the attendant control of the call, including control of disconnecting the call and the ability to exclude the source or destination;
- ring held party, which allows the attendant console to receive ringing if a terminal that originated a call to the attendant disconnects while attendant control is configured;
- attendant display of Calling Line Identification (CLID), which allows the CLID of the calling party to be displayed on the attendant console.

These feature are supported transparently for ISDN BRI, with the following exceptions:

- Camp-on;
- Break-in;
- network wide attendant control; when an ISDN BRI terminal disconnects from an attendant extended call, the call is released on the ISDN BRI side;
- ring held party; when an ISDN BRI terminal disconnects from an attendant extended call, the call is released on the ISDN BRI side.

The displays on ISDN BRI terminals are never updated

Network Call Transfer

An ISDN BRI terminal cannot transfer a call, but a call originating from an ISDN BRI terminal can be transferred to an ISDN BRI or a non-ISDN BRI terminal. The display on the ISDN BRI terminal will not be updated.

Night Service/TAFAS

A call originated by an ISDN BRI terminal to an attendant console in night service will be routed through a customer night DN. The display on the ISDN BRI terminal will not be updated to show call redirection.

Priority Override

Priority Override is partially supported on ISDN BRI terminals, as explained below:

— Priority Override to an ISDN BRI terminal is not possible, because Priority Override require Warning Tone Allowed Class of Service (ISDN BRI terminals are defaulted to WTD COS);

— Priority Override from an ISDN BRI terminal is not possible because feature keys and FFC are not supported for ISDN BRI;

Recall to Same Attendant

This feature is supported transparently; however, the displays on ISDN BRI terminals are not updated.

Switched 56 kbps Service

An ISDN BRI terminal can use switched 56 kbps service if a data route has been previously established or the ISDN BRI terminal can generate a 2100 Hz tone to the network. This 2100 Hz tone disables echo cancellation that is provided by the equal access carriers.

ISDN BRI Trunk Access features: Generic X11

ISDN PRI features interaction with ISDN BRI

All Meridian 1 networking features and services supported by ISDN PRI are also supported by ISDN BRI. The following exceptions apply:

ISDN PRI features not supported

The following ISDN PRI specific features are **not** supported by ISDN BRI:

— 1.5/2.0 Mb gateway

— 2 Mb gateway

— Automatic Trunk Maintenance

— Backup D-channel

— Channel negotiation - The channel negotiation capability applies at the DSL level. If channel negotiation fails on a route with several ISDN BRI trunks (several DSLs) there is no second call attempt on another DSL in the same route.

— Digital Private Network Signaling No. 1 (DPNSS 1) - ISDN BRI supports a gateway between IDA (DPNSS1 version of PRI) and MCDN protocols for basic call features. Ring again features are not supported.

— In Service Messaging

— Integrated Service Access (ISA)

— ISDN Primary Rate Access Meridian 1 to AXE-10 Sweden Connectivity

— ISDN Primary Rate Access Meridian 1 to AXE-10 Australia Connectivity

— ISDN Primary Rate Access Meridian 1 to SYS-12 Connectivity

— Integrated Service Digital Network Signaling Link (ISL)

— Non-Associated Signaling Channels (nB+D)

— Trunk Anti-tromboning - supported only over Virtual Network Services BRI trunks

— Trunk Optimization (SL-1 to SL-1 only)

— Virtual Network Services - VNS takes advantage of ISDN signaling through a private D-channel using the Public Exchange voice connections instead of TIE trunk connections. It is not possible to configure a D-channel of an ISDN BRI Trunk Access as a VNS D-channel. However, the voice connection through the Public Exchange of a VNS call may use an ISDN BRI Local Exchange trunk. Also, Trunk Anti-Tromboning is supported on VNS BRI trunks.

Other ISDN PRI features:

— The restrictions and limitations applicable to the remaining ISDN PRI features are similarly applicable to ISDN BRI trunks.

Generic X11 International features — lines and trunks

Generic X11 International features interaction

This section defines the Generic X11 International feature support and interaction with ISDN BRI. Table 3 indicates to what extent the Generic X11 International features are supported by ISDN BRI. A more detailed description of features partially supported by ISDN BRI is given following Table 3.

The following legend and notes apply to Table 3.

Legend

yes = fully supported

n/a = Not Applicable or transparent to ISDN BRI

no = not supported due to ISDN BRI Standards limitations

P= partially support with description of limitation

Features labeled with "**" have a more detailed description later in this chapter.

For complete information on these features, refer to the *Features and Services Guide* 553-3001-306, and the *International ISDN PRI features description and administration* 553-2901-301.

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
—A—		
ACD Answering Time in Night Service	no	
ACD Call Priority	no	
ACD Call Waiting Threshold	no	
ACD Calls on Hold	no	
ACD Enhancements	no	
— Call Delays	no	
— Dynamic Queue Threshold	no	
— Threshold Visual Indication	no	
ACD Least Call Queuing	no	
ACCL Enhancements	no	
Activity Codes for Not Ready State	no	
Advice of Charge for EuroISDN**	yes	See details later in this chapter
Advice of Charge for AXE-10 Australia and Japan D70**	yes	See details later in this chapter
Agent Observe Login (Adnvanced)	no	
Alternative Conference Pad Levels	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Alternative Loss Plan	yes	
Analog Semi-permanent Connection	no	
Asia Pacific CO Connectivity	yes	trunks only
Attendant and Network Wide Remote Call Forward**	P	See details later in this chapter
Attendant Blocking of DN**	P	See details later in this chapter
Attendant Display of Speed Call or Autodial	no	
Attendant Forward No Answer**	P	See details later in this chapter
Attendant Recall with Splitting Optional	no	
Attendant Through Dialing Network Wide	yes	trunks only
Australia ETSI	yes	
Autodial Tandem Transfer	no	
Automatic Gain Control Inhibit and Handset Volume Reset	no	
Automatic Guard Detection	yes	
Automatic Hold	no	
Automatic Redial	no	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
— B —		
Bar Reciprocal Call Forward	no	
Bearer Capability in CDR	no	
Boss/Secretary Filtering Enhancement	no	
Break-in Features	no	
— Break-in to inquiry calls		
— Break-in to line lockout denied		
Busy Tone Detection for APAC and CALA	no	
Busy Tone to Night DN on Busy DN**	P	See details later in this chapter
Busy Verify on Calling Party Control	no	
— C —		
Call Capacity Report Enhancement	no	
Call Connection Restriction	yes	
Call Detail Recording Enhancement	no	
Call Detail Recording with Optional Digit Suppression	yes	
Call Forward and Busy Status	no	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Call Forward, Break-In and Hunt Internal or External Network Wide	no	
Call Forward/Hunt Override via FFC**	p	See details later in this chapter
Call Forward to Trunk Restriction	yes	
Call Page Network Wide	yes	
Call Park Network Wide	no	
Call Redirection by Day	no	
Calling Number Display Restriction for Argentina	no	
Calling Party Privacy Override	yes	
Camp-on to Multiple Appearance DN	no	
Card LED Status	no	
Centralized Multiple Line Emulation	no	
Charge Display at End of Call	no	
China #1 Signaling Features**	P	See details later in this chapter
CIS ANI Reception	yes	sets only
CIS ANI Digit Manipulation and Gateway Enhancement	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
CIS Multifrequency Shuttle	no	
CIS Toll Dial Tone Detection	no	
— D —		
Default Loss Plan	yes	
Dial Tone Detection	no	
DID to Network Calling	yes	
Digital Private Networking Signaling System 1 (DPNSS1)	no	
DISA on Unsupervised Trunks	no	
Display of Access Prefix on CLID	yes	trunks only
Display of Calling Party Denied	no	
Distinctive Ringing by DN	no	
Distinctive Ringing Network Wide	no	
DNIS Length Flexibility	no	
— E—		
E.64/ESN Numbering Plan Expansion	yes	
End Dialing on Direct Inward/Outward Dialing	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
End of Selection	yes	
End of Selection Busy	yes	
End-to-End Signaling Display Enhancement	no	
Enhanced Charge Display	no	
Enhanced Malicious Call Trace	no	
Enhanced Secrecy	no	
EuroISDN**	yes	See details later in this chapter
EuroISDN 7kHv/Videotelephony Teleservices	yes	
EuroISDN Continuation	yes	
EuroISDN Continuation Phase III	yes	trunks only
EuroISDN ETS 300 403 Compliance	yes	
EuroISDN Malicious Call Identification	yes	trunks only
EuroISDN Network Side	yes	
Executive Distinctive Ringing	no	
— F —		
510 Trunk Route Member Expansion	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
FCC Compliance for Equal Access	yes	
FCC Compliance for Equal Access - CAC Expansion	no	
First-Second Degree Busy Indication	no	
Flexible Attendant Call Waiting Threshold	no	
Flexible Busy Tone Timer	no	
Flexible Dial Tone Detection	no	
Flexible Direct Inward Dialing	no	
Flexible Features Codes	no	
Flexible Key Assignment	no	
Flexible Tone and Digit Switch Control	no	
Forced Camp-on**	P	See details later in this chapter
Forward No Answer Call Waiting for DID	no	
— G —		
Global Incremental Software Management	no	
Global Line Cards	no	
— H —		

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Hold Features		
— Automatic Hold		
— Held Call Clearing		
Hunting by Call Type	yes	
Hunting and Speed Call Features**	P	See details later in this chapter
— I —		
Idle Extension Notification	no	
India Phase II	no	
Information Notification Service for Japan	yes	
Instant ISM	no	
Intercept Computer Interface Dial From Directory	no	
Intercept Computer Enhancements		
— Answering Machine enhancements	yes	
— Malicious Call Trace DN and TN print	yes	
— Call Forward interaction control**	P	See details later in this chapter
Intercept Computer Interface**	P	See details later in this chapter
Intercept Treatment Enhancement	no	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Interchangeable NPA	no	
IPE Completion	no	
IPE Loss Plan for China	no	
ISDN BRI Trunk Access for Japan	yes	
ISDN CLID Enhancements	yes	
ISDN QSIG Alternate Routing	no	
ISDN QSIG Basic Call	yes	
ISDN QSIG/EuroISDN Call Completion	yes	
ISDN QSIG/EuroISDN Call Completion Enhancement	yes	
ISDN QSIG Call Diversion Notification	yes	
ISDN QSIG Call Diversion Notification Enhancements	yes	
ISDN QSIG Call Transfer Notification	yes	
ISDN QSIG Generic Functional Transport	yes	
ISDN QSIG/ETSI Generic Functional Transport Enhancement	yes	
ISDN QSIG Name Display	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
ISDN QSIG Path Replacement	yes	trunks only
ISDN QSIG Supplementary Services - Name Display Enhancement	yes	
ISDN Semi Permanent Connection for Australia	no	
Italian Phase 2 Features for DTI2	no	
— J —		
Japan (D70) PRI nB+D	no	
Japan TTC Common Channel Signaling	no	
— L —		
Loop Start Supervisory Trunks	no	
Loop Start Supervisory Trunks (incoming calls)	no	
— M —		
M3900 Series Meridian Digital Telephone	no	
Make Set Busy	no	
Make Set Busy Improvement	no	
Malicious Call Trace Enhancement	no	
Malicious Call Trace Idle	no	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Malicious Call Trace on DID	no	
Manual Service Recall to Attendant	no	
Meridian 1 to New Zealand NEAX-61 ISDN PRI connectivity**	yes	See details later in this chapter
Meridian Hospitality Voice Services	no	
Meridian Mail Trunk Access Restriction	no	
Message Intercept	no	
Message Waiting Indicator by DN	no	
Message Waiting Unconditional	no	
MQA Enhanced Login	no	
Multi Language Messages	no	
Multifrequency Compelled Signaling Features**	P	See details later in this chapter
MSDL Idle Code Selection	N/A	
MSDL Port Overload Counter	N/A	
MSDL Status Enquiry Message Throttle	N/A	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
— N —		
NACD Source Table Viewer	no	
N Digit DNIS	no	
Network Anti-tromboning	no	
Network Application Protocol Link Enhancement	no	
Network Call Pick-up and TAFAS	no	
Network Drop Back Busy and Off-hook Queuing	yes	
Network Individual Do Not Disturb	no	
Network Ring Again	no	
Network Signaling on VNS	no	
Network Tenant Service	no	
Network Wide LDN**	P	See details later in this chapter
Networking Features**	P	See details later in this chapter
Night Service Class of Service	no	
Night Service Improvements	P	See details later in this chapter

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
— O —		
On Hold on Loudspeaker	no	
Option 11 Downloadable D-channel	n/a	
Overlap Signaling	yes	
— P —		
Partial Dial Timing	no	
Periodic Camp-on Tone	no	
Periodic Clearing	no	
Periodic Pulse Metering**	P	See details later in this chapter
Phantom TNs	no	
Process Notification for Networked Calls	no	
Preventing Reciprocal Call Forward	no	
Pulsed E&M DTI2 Signaling	no	
— R —		
Radio Paging Improvements**	P	See details later in this chapter
Radio Paging Product Improvement Continuation	no	
Recall with Priority During Night Service	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Recorded Announcement for Calls Diverted to External Trunks**	P	See details later in this chapter
Restricted DID Class of Service	yes	
Ring Again on No Answer	no	
Ring and Hold Lamp Status	no	
Ringing Change Key	no	
Ringing instead of Buzzing on Digital Telephones	no	
RPE (2Mb) Alarm Handling	no	
R2 Multifrequency Compelled (MFC) Signaling	yes	
R2 MFC Selective Route to Attendant	yes	
R2 MFC CNI/CDR Enhancements	yes	
R2 MFC Timer Control	no	
— S —		
Semi-automatic Camp-on	no	
Semi-compelled MFC and Calling Number Identification Changes	no	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Series Call	no	
Seizure Acknowledgment	yes	
Selectable Directory Number Size	yes	
Single Digit Access to Hotel Services	no	
Slow Answer Recall Modification	yes	
Source Included When Attendant Dials	no	
Spanish KD3 DID/DOD Interface	no	
Special Dialtone after Dialed Numbers**	P	See details later in this chapter
Source Included when Attendant Dials	no	
Speed Call DN Access	no	
Speed Call on Private Lines	no	
Standalone Meridian Mail	no	
Station Activity Record	yes	
Supervised CO Trunk Simplification		

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
— T —		
Taiwan R1 Modified Signaling	yes	sets only
Telelink Mobility Switch	no	
Telset Call Timer Enhancement	no	
Tone to Last Party	no	
Transfer Tone	no	
Trunk Direct Inward Dialing Digitone Receiver Acknowledgment	no	
Trunk Failure Monitor	no	
Trunk Hook Flash Enhancement	no	
— U —		
Universal ISDN Protocol Engine	yes	
— V —		
Variable Flash Timing and Ground Button	no	
Variable Guard Timing	yes	
Virtual Network Services	yes	

Table 3
Generic X11 International features on ISDN BRI

Features and services	Supported	Comments
Virtual Network Services in the UK with DASS2/DPNSS1 Bearers	no	
Virtual Network Services in the UK with Virtual DN Expansion	no	
Voice Call Override	no	

The following lists the Generic X11 International features that are tagged in the Table 3 with "**". These descriptions provide further details of the interaction of the feature with ISDN BRI.

Generic X11 International features partially supported

Attendant features

Attendant and Network Wide Remote Call Forward

Prior to Release 20, the Remote Call Forward (RCFW) feature allowed a user to administer call forward from a remote set within the Meridian 1 or from outside the Meridian 1 through the Direct Inward System Access (DISA) number. The RCFW feature was not available on a network wide basis, nor was it applicable to Attendant Consoles. This enhancement introduces the RCFW feature across the Meridian Customer Defined Network (MCDN), while also providing the attendant with RCFW capabilities.

The feature capabilities of the set-based (FFC activated) network wide application of the RCFW feature match those of the current standalone RCFW feature.

This feature is supported over ISDN BRI trunks within an MCDN environment; it is not supported on ISDN BRI sets

Attendant Blocking of DN

This feature allows a person to dial the attendant DN and request an external (long distance) call, and then disconnect while waiting for the call to be processed by the attendant. The requesting DN is idle and can receive and make calls.

When the attendant is ready to make the external (long distance) call, the Attendant Blocking of DN feature provides the attendant with the ability to block the DN while the external call request is being processed. The line appears busy to any caller attempting to contact the blocked DN. The blocked DN cannot be used to originate a call and will be connected to the attendant if it goes off hook. When the attendant has completed the external call, the blocked DN can be rung and the call extended. The attendant is guaranteed that the requesting DN is not busy and is available to take the call when the processing has been completed. This feature works in both standalone and Meridian Customer Defined Network (MCDN) environments.

This feature is supported over ISDN BRI trunks in an MCDN environment, if NAS is equipped. It is not supported if a call is extended to an ISDN BRI set.

Attendant Forward No Answer

This feature allows calls that are not answered by an attendant within a defined period of time, to be routed to the night DN or to another attendant. It also allows DID call that are not answered within a defined period of time, to be disconnected.

This feature is transparent to calling ISDN BRI terminals. However, originating a call routed by Attendant Forward No Answer cannot be updated. Also, an ISDN BRI terminal cannot be defined as a night terminal.

Busy Tone to Night DN on Busy DN

This feature allows busy tone, rather than ringback tone, to be provided to a night DN during night service.

This feature is supported transparently if the calling station is an ISDN BRI terminal; however, an ISDN BRI terminal cannot be supported as a night DN terminal.

Call Forward/Hunt Override via FFC

Call Forward/Hunt Override provides all telephone users (having a specific class of service) and attendants with the ability to override Intercept Computer Call Forward (ICP-CFW), Call Forward All Calls, Call Forward No Answer, Hunting and Make Set Busy by entering a Flexible Feature Code. Sets without Call Forward/Hunt Override denied (CFHD) class of service will not be able to use the Call Forward/Hunt Override Via Flexible Feature Code (FFC) feature.

Call Forward/Hunt Override Via FFC works in network environments with Meridian 1 nodes and Meridian Customer Defined Network (MCDN) links.

This feature is supported over ISDN BRI trunks in an MCDN environment, if NAS is equipped. It is not supported on ISDN BRI sets.

China #1 signaling features

Part 2 features

This group of features is comprised of the following:

— External Operator features, comprised of:

- Call Back
- Calling Party Control (CGPC);
- Called Party Control (CDPC);
- Toll Operator Break-in (TOBI).

— Multiple Frequency Compelled (MFC) Direct Outward Dial (DOD) with outgoing Calling Number Identification (CNI);

— Outgoing Toll Call Identification

The External Operator Call Back feature is used by CGPC, CDPC, and TOBI. It allows a calling station connected to a trunk call to be put on hold while going on hook. When the special operator signal is received over the trunk the system will ring the station again. CGPC allows the call to be kept on hold for a defined period of time, and to reconnect the call when the called party goes off hook. The call is released if the calling party goes on hook once more. CDPC allows an operator, involved in an operator-assisted call from a Meridian 1, to automatically recall a station without having to re-dial it. TOBI allows a toll operator to break in to an established call.

If an ISDN BRI terminal is the controlling party (that is, the called party in CDPC or the calling party in CGPC), the features are supported transparently, since disconnect messages from the trunk are ignored. If an ISDN BRI terminal is not the controlling party, when it goes on hook, this operation is not supported on ISDN BRI.

TOBI to an ISDN BRI terminal is not supported.

MFC DOD with outgoing CNI allows outgoing Calling Number Identification information on outgoing MFC trunk calls. CNI information is customer-related and terminal-related, both of which are supported for ISDN BRI. Terminal-related information is a category code defined in overlay 10 or 11. For ISDN BRI terminals, the category code is supported on a DSL basis. Overlay 27 has been modified to configure and print category codes, using the “category code” (CAC) prompt.

Outgoing Toll Call Identification allows outgoing toll calls to be identified in a new manner. This feature is supported transparently for ISDN BRI.

Addendum to Part 2 features

This group of features is comprised of the following:

— Operator call back feature enhancement;

— Special operator call back ringing;

— Malicious Call Trace enhancement;

— Tones and announcements;

— Active feature dial tone;

— Audible alarm.

The Operator call back enhancement allows Call Wait or Camp-On to Calling Party Control and Called Party Control calls, and Attendant Break-in to outgoing Calling Party Control calls and incoming Called Party Control calls. The Camp-on and Break-in capabilities are not supported on ISDN BRI, while the Call Wait capability is supported transparently for ISDN BRI.

The Special operator call back ringing enhancement provides operator control of ringing cadences used in Toll Operator Call Back. This capability is supported transparently for ISDN BRI.

The Malicious Call Trace enhancement allows a Meridian 1 to have Called Party Control on incoming calls when the Malicious Call Trace (MCT) feature is activated from a station, or when the Multifrequency Compelled (MFC) Idle Call Trace (IDCT) signal is sent. This enhancement is not provided on ISDN BRI.

The tones and announcement feature allows a howler tone to be given to indicate that a 500/2500 terminal is off-hook. This capability is not applicable to ISDN BRI terminals. This feature also provides new intercept treatments upon the reception of some MFC signals. This capability is supported transparently for ISDN BRI.

The active feature dial tone capability provides a distinctive dial tone to a station going off hook when it has the Do Not Disturb (DND) or Make Terminal Busy (MSB) feature active. This capability is not provided on ISDN BRI.

The audible alarm feature provides an alarm to be sounded when an emergency number has been dialed, or when the system is alerted of an incoming malicious call. This capability is supported transparently for ISDN BRI.

Part 4 - Ministry of Electricity and Industry (MOEI) features

This group of features is comprised of the following:

— KE Multifrequency Compelled Signaling;

— Flexible timers (dialtone, interdigit, and delayed answer);

— Calling party DN option;

— Flexible Feature Codes (FFCs).

KE Multifrequency Compelled Signaling is used to inform the Central Office that the call is a tandem call. This capability is supported transparently for ISDN BRI.

Flexible timers provides customer-defined parameters to control the following timeouts:

— the dialtone timeout, after the terminal has been placed off-hook and no digits dialed. After timeout, the terminal is placed in line lockout

— the interdigit pause timeout, between the first and second digits, and the interdigit pause timeout, after the second digit

— the delayed answer timer provides a customer-defined timeout to control the period that a terminal remains ringing before it is answered. If timeout occurs, the ringing and ringback stop, and the call is disconnected.

Flexible timers is not supported on ISDN BRI terminals.

Calling Party DN allows the Meridian 1 to send to the Toll Office the calling-party customer DN and, if applicable, the calling-party DID DN for all outgoing calls. This capability is supported when the calling party is an ISDN BRI terminal.

The Flexible Feature Code enhancement answers China's Ministry of Electronic Industry's requirement to access the following features from a 500/2500 telephone terminal, using Flexible Feature Codes:

— Autodial

— Call Waiting

— Make Terminal Busy

— Multiple Wake-up

This capability is not provided for ISDN BRI.

Forced Camp-on

Forced Camp-on allows a call to be camped on to a busy station while providing a warning tone. This is typically followed by the activation of Priority Override, which allows break-in to the established connection.

Forced Camp-on is activated automatically (if Automatic Forced Camp-on is defined); or, it can be activated manually using the Enhanced Override (EOVR) key on M1000 series and Meridian digital terminals or the Enhanced Override Flexible Feature Code on 500/2500 terminals. If the EOVR key is pressed again or the Enhanced Override Flexible Feature Code dialed again, Priority Override is activated.

The terminal performing the override must have a priority level equal to or higher than the terminal being overridden. To activate Priority Override, the user of a 500/2500 terminal dials the Override Flexible Feature Code, while the user of a M1000 series or Meridian digital terminal presses the Override key (OVR). Priority Override can also be activated using the Enhanced Override Flexible Feature Code or the Enhanced Override key (EOVR).

Forced Camp-on is partially supported on ISDN BRI terminals, as explained below:

— Forced Camp-on to an ISDN BRI terminal is not possible, because Forced Camp-on requires Warning Tone Allowed Class of Service (ISDN BRI terminals are defaulted to WTD COS);

— Forced Camp on from an ISDN BRI terminal is not possible because feature keys and FFC are not supported for ISDN BRI;

— a BRI terminal transferred to a non-BRI terminal may be have forced camp-on applied to it, if no COS restrictions apply; however, the ISDN BRI terminal display is not updated.

Intercept Computer Interface

This feature allows the Meridian 1 to use an intercept (attendant assistance service) computer for storing and retrieving call messages. Calls to an absent tenant's DN using this feature are routed to a designated Intercept Position (ICP) DN. A terminal at the ICP displays a message stating why the tenant at the DN is absent. The person at the ICP can then store the caller's message for the tenant's DN and activate the message waiting LED at the tenant's telephone. The tenant at the DN retrieves the stored caller messages by calling the ICP, where the messages are displayed on the terminal (or optionally printed).

The feature can be activated or deactivated by the following:

— Flexible Feature Code (FFC) dialed from the tenant's telephone. This code specifies the reason for the tenant's absence and can be extended with a date and time as extra information. The FFC decodes into a text message;

— Pressing the Call Forward All Calls (CFW AC) key on an SL-1 telephone (deactivation);

— From the ICP terminal;

— Automatically when a TN is disabled or enabled by a maintenance overlay program.

The Intercept Computer Interface is partially supported on ISDN BRI terminals, as explained below:

— an ISDN BRI terminal cannot access the ICP feature, since FFCs are not supported for ISDN BRI; also, the ICP feature cannot be activated on an ISDN BRI terminal from the intercept computer or via a maintenance overlay program, since the ICP feature is activated on a terminal basis;

— an ISDN BRI terminal cannot act as an intercept position, or be allowed to be a default DN for intercept transfer; only Message Center ACD DNs and attendant DNs are allowed to be intercept positions;

— a call originating from an ISDN BRI terminal and terminating on a non-ISDN BRI terminal with ICP active is intercepted according to the ICP configuration; the ISDN BRI terminal display cannot be updated after the call redirection.

Intercept Computer enhancements

Call Forward interaction control.

When an intercept transfer is activated from a customer's or tenant's extension, it may be configured that only external calls be forwarded to the external intercept DN (ECDN), while internal calls are forwarded to an answering machine, or the internal intercept DN (ICDN). Note that this capability applies only if the extension's flexible call forward no answer DN (FDN) is not configured as an intercept position.

This feature is partially supported on ISDN BRI terminals, as explained below:

— since an ISDN BRI terminal cannot access the ICP feature, it cannot support this ICP enhancement;

— a call originating from an ISDN BRI terminal that is considered as an internal calling party, and terminating on a non-ISDN BRI having the ICP feature active, is diverted to the intercept DN for internal calls.

Multifrequency Compelled Signaling features

R2 and MFC signaling on DID and TIE trunks

This feature allows line and register signaling on DID and TIE trunks, using an MF sender and receiver card. Each forward signal sent to the Central Office is acknowledged by a backward signal. This feature also allows the Meridian 1 to request Calling Number Identification (CNI) information, to be shown on the originating terminal's display.

The register signaling part of this feature is supported for ISDN BRI. The CNI display is not supported.

Multifrequency Signaling for Socotel (MFE)

Multifrequency Signaling for Socotel (MFE) is similar to R2 Multifrequency Compelled (MFC) Signaling, but is not compelled in the same way. Instead of each signal being answered by another signal of some meaning, each signal is answered by a control frequency which indicates to the other end of the call that the signal has been received and its transmission can cease. In this way, signals may originate at either end of the call.

R2 MFC Signaling operates by answering each forward signal from the originating end, with a backward signal from the terminating end. Each signal must be interpreted using the appropriate table. Unlike R2 MFC Signaling, backward and forward signals use the same frequency combinations. The need for the concept of an incoming or outgoing sender/receiver is replaced by an MFE sender/receiver, which can act in both directions during any single call.

Pulsed signals, which are used in R2 MFC Signaling to indicate a message being initiated from the CO which normally replies, are no longer necessary with the new MFE card.

The sequence of messages sent to and received from the CO is transparent to the ISDN BRI terminal.

Networking features

International ISDN PRI interworking

The interworking between ISDN BRI and International ISDN PRI Central Office Connectivity allows voice calls to always be completed to and from ISDN BRI terminals; however, some restrictions may apply to data calls.

Advice of Charge for NUMERIS connectivity

This feature provides the total cost for a call made from a Meridian 1 switch to the ISDN access designed for France (NUMERIS). The Meridian 1 to NUMERIS PSTN connectivity is implemented using ISDN packages PRI2 and IPRI.

This feature is supported for ISDN BRI terminals as the Periodic Pulse Metering feature is supported.

Advice of Charge for AXE-10 Australia and Japan D70 connectivity

The Advice of Charge (AOC) at End of Call for AXE-10 Australia and Japan D70 feature supports charge information being sent from an AXE-10 (Australian) or D70 (Japanese) Central Office to the PBX, over an ISDN BRI connection. The information is sent for outgoing calls from the PBX.

Information is received and displayed when the call is taken down. It is displayed on the caller’s telephone display as supported by the Charge Display at End of Call feature. This feature appends the charge information to existing information on the display and retains the information displayed for 10 seconds. Charge Display applies to display-equipped Meridian Modular terminals, M2317, and M3000 sets only. The information is also printed as part of the Call Detail Recording (CDR) record.

Australia introduces PBX control of the AOC facility, meaning that the information must be requested for each outgoing call as opposed to expecting it for every call once the feature has been configured. Japan does not support PBX control of the AOC facility.

Message Registration (MR) and Periodic Pulse Metering (PPM) are both packaged under software package 101. Prior to the introduction of this feature, the method used to differentiate which feature was equipped was to check if the International Supplementary Features software package was equipped. If it was, PPM was required. Since the Supplementary Features package is not available in Japan and AOC requires PPM software, a new method of differentiation has been introduced. This method uses a system wide flag to allow the customer to select between MR and PPM. This flag is set by a prompt in LD 17

The AOC feature does not support AOC being sent to ISDN BRI terminals. A meter can be assigned to a DSL. All chargeable calls made by an ISDN BRI terminal on this DSL are charged against the DSL's meter.

Advice of Charge EuroISDN connectivity

This feature provides Integrated Services Digital Network (ISDN) Primary and Basic Rate Interfaces to Central Offices/Public Exchanges that comply to the European Telecom Standards Institute (ETSI) specification ETS 300 102 for the Layer 3. The interfaces provided by this feature also comply with the country-specific Application Documents for Austria, Denmark, Finland, Germany, Holland, Ireland, Italy, Norway, Portugal, Sweden, and Switzerland. Other countries must comply with ETS 300 102 to be supported.

The supplementary services Calling Line Identification Presentation, Calling Line Identification Restriction, Connected Line Identification Presentation and Connected Line Identification Restriction are provided for the above countries where Application Documents are available. In addition, Advice of Charge for EuroISDN is supported in some of these countries. For more information about Advice of Charge for EuroISDN, see the feature description contained in this document.

The EuroISDN feature also provides interworking with other ISDN or non-ISDN interfaces including Meridian Customer Defined Network (MCDN), QSIG, Digital Private Network Signaling System 1 (DPNSS1), R2 Multifrequency Compelled Signaling (R2 MFC), 2 Mbit Digital Trunk Interface (DTI2), and analog trunk interfaces. This feature also provides interworking between NET3 S0 (ETSI compliant BRI sets) and DPNSS2/DASS2 (Digital Access Signaling System 2) links.

Meridian 1 to New Zealand NEAX-61 ISDN PRI Connectivity

This feature provides an ISDN Primary Rate Interface (PRI) between a Meridian 1 (SL-1) and New Zealand NEAX-61. The design in based on the international 30B + D PRI configuration.

The NEAX-61 interface will support calls from ISDN BRI sets within the MCDN. These will be able to call out to and receive calls from the Public Switched Telephone Network (PSTN), also called the ISDN public network. Operation will be as though the call was a tandem trunk call.

Although ISDN BRI trunks to the NEAX-61 are not supported, any ISDN BRI trunks supported to other interfaces will be able to tandem to the PSTN transparently. Feature operation will appear to the user as though the call was from a normal PRI network trunk to the PSTN.

Network Wide Listed Directory Numbers

This feature enables LDNs to be recognized network wide when Network Attendant Service (NAS) is used. The same LDNs must be configured in multiple nodes. Network LDN is defined on a customer basis.

This feature is supported over ISDN BRI trunk DSLs.

Night Service improvements

All calls remain queued for night service

This feature allows all calls that are queued for an attendant when night service is entered, to remain queued in order to be presented to the night DN. This feature is supported for ISDN BRI-originated calls; however, the displays on the ISDN BRI terminals are not updated to reflect the call modification.

Automatic timed reminder recalls to the night DN

This feature allows any recall that times out during night service, to be presented or queued to the night DN. This applies to slow answer recall, call waiting and camp-on calls extended by an attendant, and camp-on calls extended by a terminal.

This capability applies to external call only, since there is no internal recall to a night DN unless done by NAS routing.

This feature is partially supported for ISDN BRI. If an external call has been extended an attendant to an ISDN BRI terminal, and the slow answer recall timer or the call waiting recall timer expires before the call is answered, the call is presented or queued to a local or remote night DN. The ISDN BRI terminal is disconnected in the case of the slow answer recall, and the call waiting canceled in the case of the call waiting. The camp-on recall timer does not apply, because Camp-on is not supported for ISDN BRI.

If a call originating from an ISDN BRI terminal has been extended or camped on by the attendant to a non-ISDN BRI terminal, the call is timed for slow answer recall, call waiting recall, or camp-on recall. If the timer expires, the call is dropped if not controlled by NAS routing. The call is also dropped if it is controlled by NAS routing and the night DN is at a remote node. If the call is controlled by NAS routing and the night DN is at the local node, the call is presented or queued to the night DN. When the recall timer expires, the terminating party is disconnected, or the call waiting or camp-on is canceled.

A non-ISDN BRI terminal cannot extend a camp-on to an ISDN BRI terminal, since Camp-on is not supported for ISDN BRI.

Periodic Pulse Metering

This feature, based on the Message Registration feature, allows meters to be assigned to terminals, attendant consoles, trunk routes, and customers. This permits Meridian 1 customers to maintain accurate records of Central Office and DOD calls, for billing or administrative purposes. The Call Detail Recording (CDR) feature has been enhanced to record the PPM metering information.

This feature has been adapted for ISDN BRI application as follows. Since meters cannot be assigned to ISDN BRI terminals, because there is no standard protocol to update an ISDN BRI terminal's meter, meters have been assigned to Digital Subscriber Loops (DSLs) instead. All charges due to ISDN BRI terminals located on the same DSL are accumulated on the assigned meter. The contents of this meter may be read or changed from any authorized non-ISDN BRI station.

The metering of conventional trunks is supported transparently. The metering of ISDN BRI trunks is not supported.

Meter recalls to the attendant and background terminal messaging uses the originating ISDN BRI CLID.

Meter charge transfers associated with the activation of Hunt or Call Forward No Answer from an ISDN BRI terminal are not supported; the calling party is charged for the entire call.

Recorded Announcement for Calls Diverted to External Trunks

Recorded Announcement for Calls Diverted to External Trunks (RANX) provides an optional recorded announcement when the call is being forwarded to external Public Exchange/Central Office (over DTI, DTI2, PRI2, PRI, or analog trunks) or over ISDN BRI trunks connected to AXE-10 or EuroISDN routes. The announcement notifies the calling party that call forwarding is taking place and the call may take longer than usual to set up. The delay depends on the required signaling to reach the destination party.

Radio Paging

This feature allows call paging through the use of a Flexible Feature Code. The paged party, who is notified of a call page by the buzzing of a special device, can later access the paging party by dialing another FFC. There are three methods of paging a call:

- pre-selection, whereby the paging is performed right away;
- post-selection, whereby a FFC is used in cases where the desired party is busy or does not answer;
- forwarding to a paging equipment.

Paging cannot be done from an ISDN BRI terminal, since FFCs are not supported for ISDN BRI. Paging to an ISDN BRI terminal is supported for the pre-selection and post-selection methods; it is not supported for the forwarding method.

Radio Paging Product Improvements

Attendant Recall over Network

This product improvement enables Radio Paging (RPA) to recall the attendant who originated the Radio Paging call only; the attendant may be located anywhere within an ISDN Meridian Customer Defined Network (MCDN) configured with Network Attendant Services (NAS).

Digit Display to Same Attendant

This improvement enables the attendant's display to be updated with paged name to display paged name instead of answering name on the paging party when answered, and to make network Radio Paging show the same display information as in the standalone operation.

Since ISDN BRI sets do not support FFCs, they cannot be used to access or answer RPA calls if the ISDN BRI sets are local on the paging node. For network situations, ISDN BRI sets can access and answer remote RPA calls. This is possible because the RPAX/RPAN FFCs are dialed as DSC/TSC steering codes.

Attendant Recall over Network is supported over ISDN BRI trunks within an ISDN Meridian Customer Defined Network (MCDN) configured with Network Attendant Services (NAS).

Special dialtone after dialed numbers

This feature allows special dial tones to be provided after certain dialed digits.

This feature is generally supported for digits dialed from ISDN BRI terminals. For each TERMINALUP and INFO message, the software determines if tones are required; however, if enblock dialing is used, it cannot be confirmed whether or not some of the messages contain only one digit, or several digits. If they contain several digits, some tones may be skipped.

Station Activity Record

Station activity records are generated for sets with class of service Call Detail Monitoring Allowed (CDMA) for all incoming and outgoing calls if Call Detail Recording (CDR) is allowed for the customer. Their format is identical to regular CDR records, but they have a new type identifier (D). Other CDR records are not affected by this new functionality.

Station activity records are supported on ISDN BRI sets with a class of service Call Detail Monitoring Allowed (CDMA), for external calls.

Chapter 3 — Feature packaging and prerequisites

Introduction

The Option 11C uses a series of software cartridges, each providing a number of features. Depending on your particular market, the features offered on any of the cartridges may vary.

This following is a description of the ISDN BRI related feature packages and their prerequisites.

Feature packages and prerequisites

Table 4 lists the ISDN BRI applications and their associated packages.

Table 4
Application and package requirements

Package	Application: Line	Trunk	Packet data
75 — PBXI (Note 1)		Ð	
145 — ISDN			Ð
154 — PRI2 (Note 2)			Ð (Note 2)
203 — XPE	Ð	Ð	Ð
216 — ISDN BRI	Ð	Ð	Ð
233 — ISDN BRI Trunk		Ð	
235 — ISDN BRI Line	Ð		Ð
261 — EuroISDN		Ð	
xx x— QSIG		Ð	

Note 1: Package 75 is only required when clocking BRI to a local exchange.

Note 2: Package 154 — PRI2 is only required when routing data over a 2 Mb PRI span.

ISDN Basic Rate Interface (BRI) packages

Option package 216

This package allows the ISDN BRI feature to be activated.

Prerequisites

XPE — Option package 203
This is the base package for Peripheral Software Downloading (PSDL).

ISDN — Option package 145
This package is required for the ISDN BRI Packet Data capability using 1.5 Mb PRI link. This is a requirement for transmission to the packet data handler, DPN100.

PRI2 — Option package 154
This package is required for the ISDN BRI Packet Data capability using 2 Mb PRI link.

ISDN BRI Trunk applications (BRIT) package

Option package 233

This package allows ISDN BRI Trunk Access application to be activated.

Prerequisites

ISDN BRI — Option package 216
This is the base package for ISDN BRI.

ISDN BRI Line applications (BRIL) package

Option package 235

This package allows the ISDN BRI Line application to be activated.

Prerequisites

ISDN BRI — Option package 216
This is the base package for ISDN BRI.

EuroISDN (EURO) package

Option package 261

This package allows the EuroISDN interface to be implemented.

QSIG (QSIG) package

Option package 263

This package allows the QSIG interface to be implemented.

Prerequisites

ISDN BRI — Option package 216
This is the base package for ISDN BRI.

ISDN BRIT — Option package 233
This is the base package for ISDN BRI.Trunk Access

Chapter 4 — Network clocking

Introduction

This chapter describes digital network clocking as it applies to systems equipped with the ISDN BRI feature.

> ***Note:*** The Option 11 is a member of the Meridian 1 family of systems. References to Meridian 1 or Meridian 1 SL-1 in this chapter include the Option 11 system unless stated otherwise.

The Need for Synchronization

When digital signals are being transported over a communication link, the receiving end must operate at the same frequency as the originating end to prevent loss of information. This is referred to as link synchronization.

If both ends of a communication link are not in synchronization, data bit slips will occur and therefore a loss of data will result. In general, accurate timing is very important, but more importantly, synchronized timing is a must for reliable data transfer.

When only two Meridian 1 PBX systems are interconnected in an isolated private digital network, synchronization can be achieved by operating the two systems in a master/slave mode whereby one system derives its timing from the other. In a network of digital systems, however, slips can be better prevented by forcing all digital systems to use a common reference clock through a network clocking hierarchy (see Figure 12).

Synchronization Methods

There are two common methods of maintaining timing coordination between switching systems.

a **Plesiochronous operation**: nodal clocks run independently (free run) at the same nominal frequency. There will be frequency differences between clocks resulting in frame slips. The magnitude of frame slips will be directly proportional to the frequency difference. Slips are inevitable but can be minimized by using very stable clocks and elastic stores or buffers. These buffers will be capable of absorbing a certain number of data bits to compensate for slight variances in clock frequencies.

b **Mesochronous operation**: nodal clocks are continuously and automatically locked to an external reference clock. With this method, frame slips can be eliminated if elastic stores are large enough to compensate for transmission variances. Mesochronous operation should be virtually slip free.

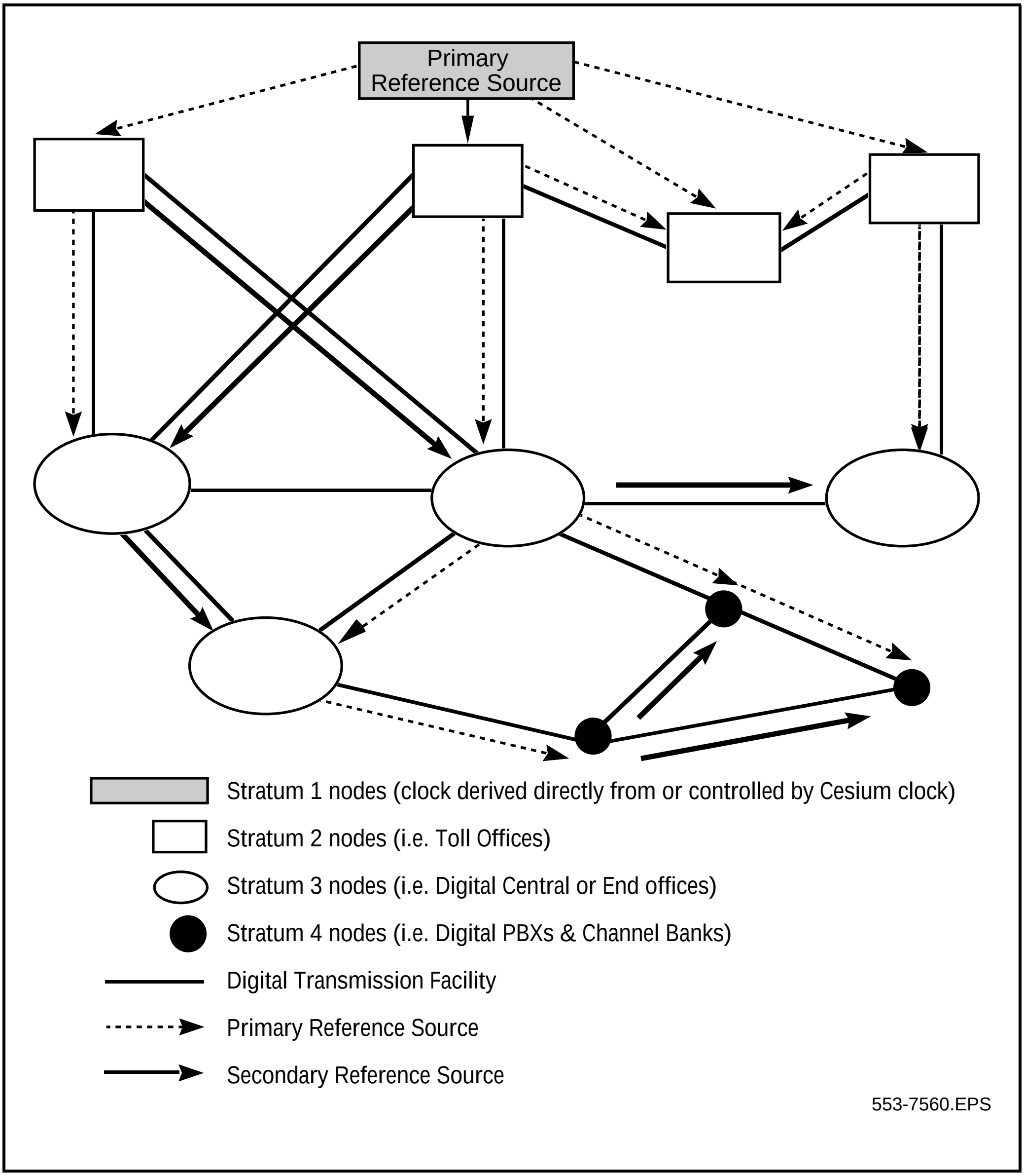
Whenever possible, the Meridian 1 PBX will operate in the Mesochronous mode by configuring the Clock Controller circuit cards to lock onto an external reference source. The above statement is true unless the Meridian 1 is used as a master in an independent/private network. An independent network has no digital links to a higher Node Category.

In an isolated private network, the Meridian 1 clock controller can operate in free run mode and act as a master clock to be tracked by other PBX systems in the private network.

Hierarchical synchronization

The figure on the following page provides a general view of a Digital Network Synchronization including the four stratum levels Node Categories of clocks (Stratum 1 being the highest--most accurate to Stratum 4 being the lowest). Meridian 1 clocking meets Node Category E--Stratum 4 requirements. Also shown are ways of providing a Secondary Clock Source while preventing timing loops.

Figure 12
Hierarchical Synchronization



Stratum Levels

In a digital network, nodes are synchronized using a priority master/slave method. Digital nodes are ranked in Stratum levels 1 to 4. Each node is synchronized to the highest ranking node in its neighborhood with which it has a direct link.

	Stratum 2	Stratum 3	Stratum 4
Accuracy	± 1.6 x 10^{-8} Hz	± 4.6 x 10^{-6} Hz	± 3.2 x 10^{-5} Hz
Holdover	1 x 10^{-10} per day	ð 255 frame slips in 1st 24 hours	Not Required
Hardware Duplication	Required	Required (Note 1)	Not Required
MTIE During Rearrangement	MTIE ð 1 msec Phase Change Slope: ð 81 ns in any 1.326 msec	MTIE ð 1 msec Phase Change Slope: ð 81 ns in any 1.326 msec	No Requirement (Note 2)
Pull-in Range	3.2 x 10^{-8} Hz	9.2 x 10^{-6} Hz	6.4 x 10^{-5} Hz
Dedicated Timing Required	Required	Required	Not required

Note 8: Non-duplicated clock hardware that meets all other stratum 3 requirements is referred to as stratum 3ND.

Note 9: Stratum 4 clock hardware that meets MTIE requirements during rearrangements is referred to as 4E.

Guidelines

Some key points to keep in mind when designing Network Synchronization:

— Where possible, the Master Clock Source should always be from a Node Category/Stratum with higher clock accuracy—i.e. PBX connected to the local exchange; the local exchange is the Master and the PBX is the Slave.

— The source should not be in free-run itself (providing its own clock) unless it is operating in a fully independent network where the source acts as a Master (see Plesiosynchronous operation).

— When connecting two PBXs together (no CO connections), the most reliable PBX should be the Master. Reliability here refers to Dual CPU/Dual Clock, battery back-up or stratum level of the clock controller.

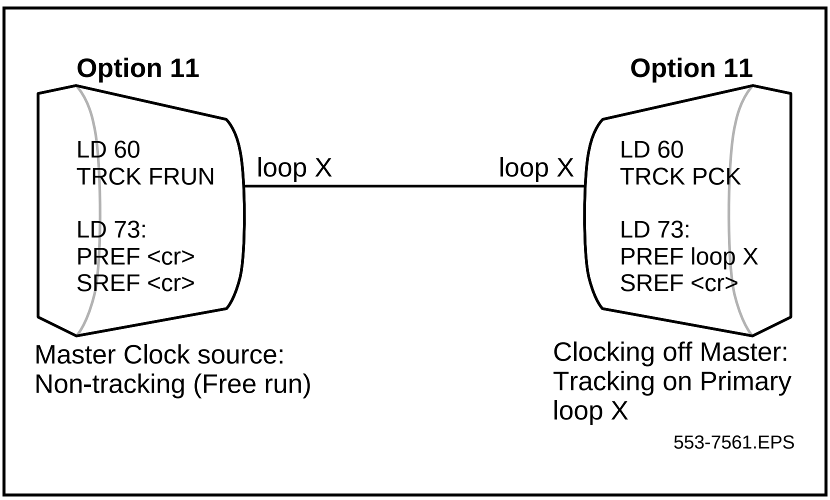
— Avoid timing loops. A timing loop occurs when a clock using as its reference frequency a signal that it itself traceable to the output of that clock. The formation of such a closed timing loop leads to frequency instability and is not permitted. Timing loops are sometimes unavoidable on the secondary clock reference source.

— Ensure all C.O./PBX links used as clock references have a traceable path back to the same stratum 1 clock source.

While it is beyond the scope of this guide to provide detailed Network Synchronization, the following examples illustrate some of the basic concepts to achieve stable clocking.

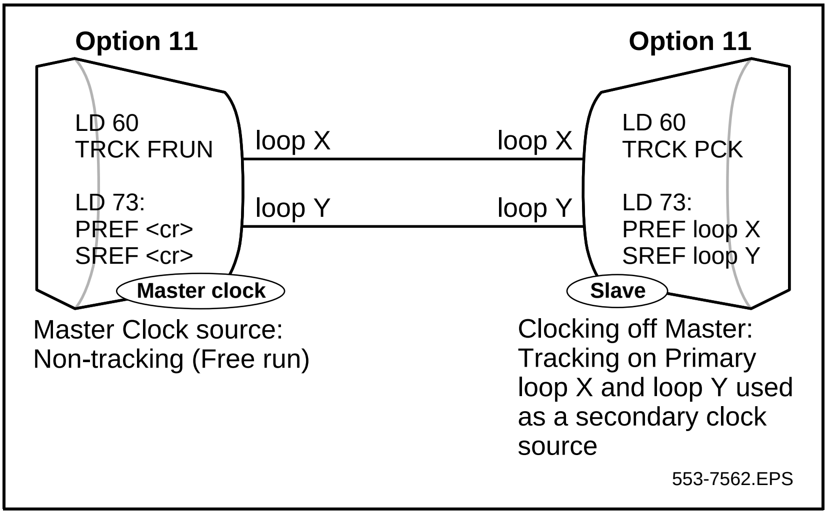
In Example 1, there is no digital connection to the local exchange.

Example 1
Isolated Private Network



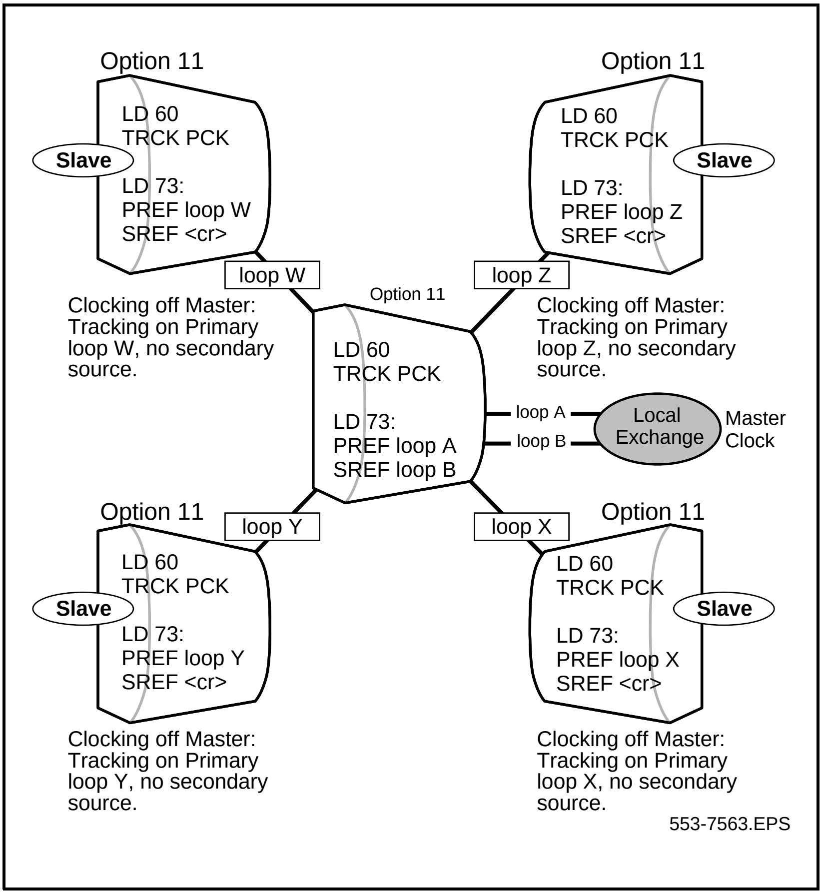
In Example 2, there is no digital connection to the local exchange. For TIE lines between PBXs facilitated by a local exchange, clocking is derived from the PBX, not the local exchange. When a second Digital loop is available, it can be used as a Secondary Clock source in case the Primary Source fails.

Example 2
Isolated Private Network with Secondary Reference Clock



Example 3 is an example of a “STAR” arrangement— one Hub PBX is linked to the local exchange and all other PBXs are connected as slaves. When a second Digital loop from the Meridian 1 which forms the hub of this network becomes available, it can be used as a Secondary Clock Source in case the Primary Source fails.

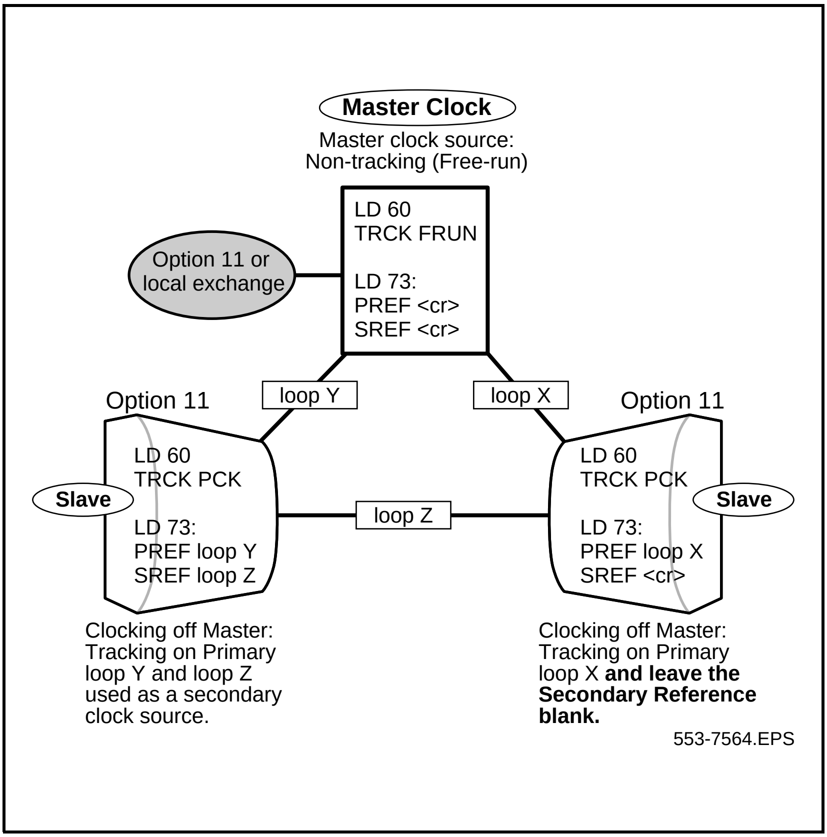
Example 3
Clocking Hierarchy referenced to a Public Network Master Clock



In Example 4, a digital connection to the local exchange may exist (i.e. Loops X and Y). When a second Digital loop from the local exchange or Master M-1 becomes available, it can be used as a Secondary Clock Source in case the Primary Source fails.

To avoid timing loops, in Example 4 the most reliable slave system should not have a Secondary Clock Source (SREF= <cr>). In this example, this is illustrated by the node which supports loops X and Z.

Example 4
Alternate Clocking from the same local exchange

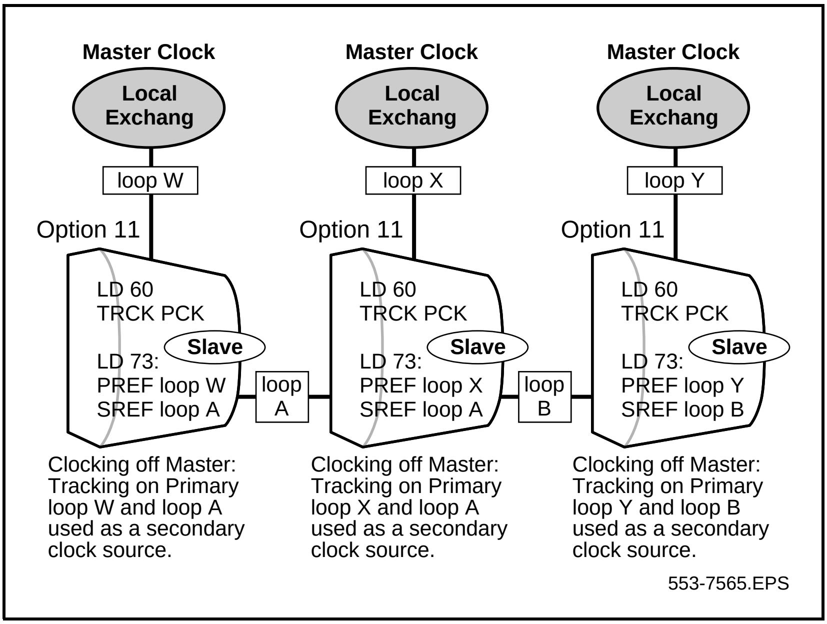


In Example 5, digital connections to the local exchange do exist. When a second Digital loop from the local exchange becomes available, it can be used as a Secondary Clock Source in case the Primary Source fails.

Slaves can track on each other as a secondary source since the chances of both links to the local exchanges going down at the same time are minimal (very unlikely).

All local exchanges must have a path back to the same stratum 1 source.

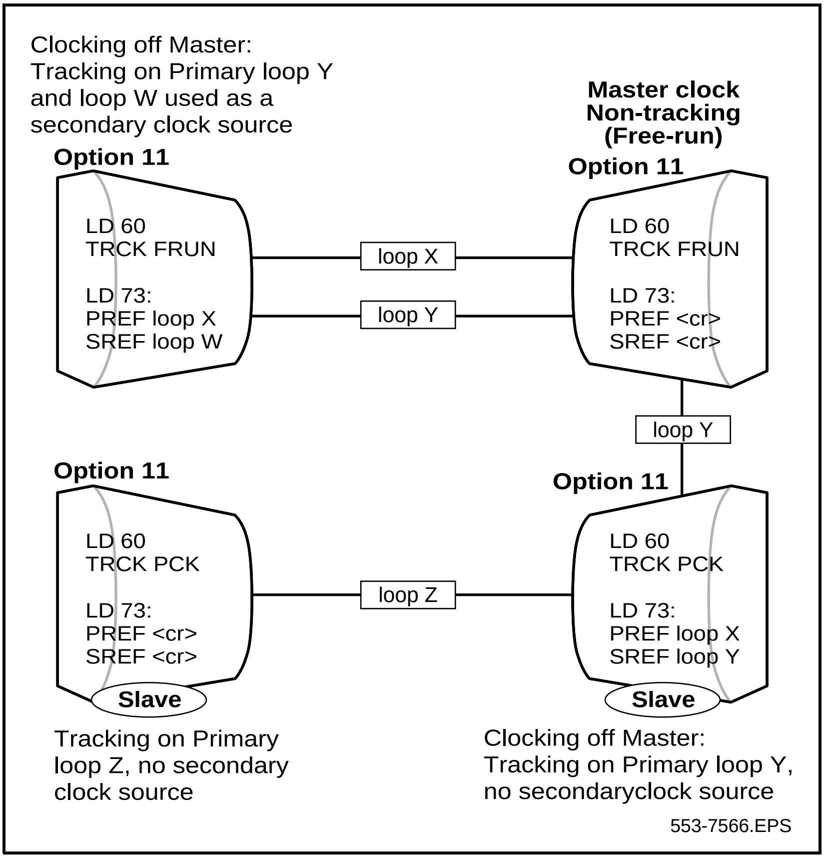
Example 5
Alternate clocking from local exchanges



Digital connections to the local exchange do not exist in Example 6. If it does, the PBX connected to it will track off the local exchange and will in turn be used as a clock source to other nodes.

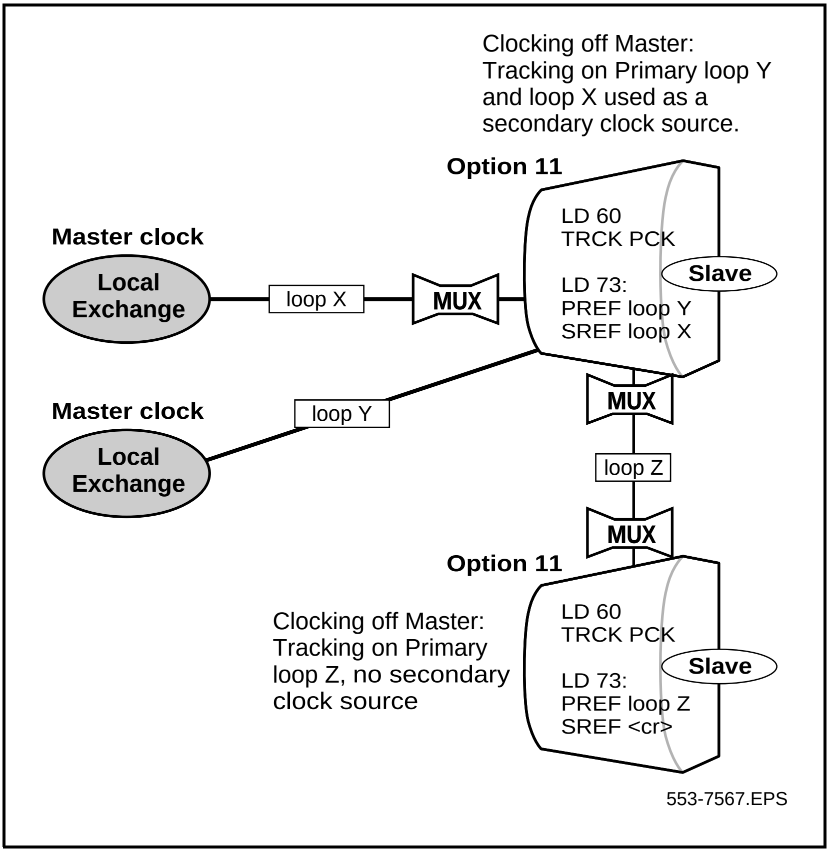
When a second Digital loop from the Master Meridian 1/SL-1 becomes available, it can be used as a Secondary Clock Source in case the Primary Source fails.

Example 6
Complex Isolated Private Network



In Example 7, the direct connection to the local exchange (without a MUX) should be used as a primary clock reference since there is the least amount of hardware involved. The MUX must pass the clock and not generate its own clock; in other words, it must also be a slave (not Free Run). Synchronized clocking is required.

Example 7
Network Clocking with MUX



Option 11 clock controllers

Digital trunking requires synchronized clocking so that a shift in one clock source will result in an equivalent shift of the same size and direction in all parts of the network.

The Option 11 system supports a single clock controller (CC) located on either:

— the NTAK09 1.5 Mb DTI/PRI

— the NTAK10 2 Mb DTI

— the NTAK79 2 Mb PRI

— the NTBK50 2 Mb PRI

— the NTBK22 MISP (BRI applications).

This clock controller can operate in one of two modes: tracking, or non-tracking (also known as free-run).

The Clock Controller circuitry synchronizes the Option 11 to an external reference clock and generates and distributes the clock to the system. This enables the Option 11 to function either as a slave to an external clock or as a clocking master.

Tracking mode

In tracking mode, a reference clock is supplied to the clock controller. The clock controller uses this reference to adjust the system clock so that the two are of the same frequency. The CC is capable of tracking to a primary or secondary reference supplied on the DTI/PRI/BRI circuit card, or to an external reference clock.

When tracking using a reference clock derived from a DTI/PRI/BRI source, an optional secondary clock source can be defined. The primary clock source is derived from the clock controller's host circuit card. The secondary source may be defined as any other DTI/PRI/BRI installed in the Option 11 system. The secondary reference acts as a back-up to the primary reference.

There are two stages to clock controller tracking:

— tracking a reference, and

— locked onto a reference.

When tracking a reference, the clock controller uses an algorithm to match its frequency to the frequency of the incoming clock. When the frequencies are very near to being matched, the clock controller is locked onto the reference. The clock controller will make small adjustments to its own frequency until both the incoming and system frequencies correspond.

If the incoming clock reference is stable, the internal clock controller tracks it, locks onto it, and matches frequencies exactly. Occasionally, however, environmental circumstances cause the external or internal clocks to drift. When this happens, the internal clock controller briefly enters the tracking stage.

If the incoming reference is unstable, the internal clock controller is continuously in the tracking stage. This condition does not present a problem, rather, it shows that the clock controller is continually attempting to lock onto the signal. If slips are occurring, however, it means that there is a problem with the clock controller or the incoming line.

Free-run (non-tracking)

In Free-Run (Non-tracking) mode, the clock controller does not synchronize on any source, it provides its own internal clock to the system. This mode can be used when the Option 11 is used as a master clock source for other systems in the network. Free-run mode is undesirable if the Option 11 is intended to be a slave. It can occur, however, when both the primary and secondary clock sources are lost due to hardware faults. It can also be turned on manually using software commands.

Chapter 5 — ISDN BRI line and packet data implementation

Introduction

This chapter describes Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) line and packet data implementation. Hardware requirements, installation procedures and software programming procedures for the Option 11 system are described.

This chapter is divided into the following sections:

- ISDN BRI Line configuration
- guidelines
- ISDN BRI terminals
- Packet Data configuration
- Hardware requirements
- Installing ISDN BRI hardware
- Programming procedures for line application and packet data transmission

ISDN BRI line configuration guidelines

The following recommendations should be considered when connecting terminals to DSLs:

— The total number of physical terminations on an S/T DSL may not exceed eight. Up to 20 logical terminals may be connected to an S/T DSL. A logical terminal may be directly connected to the DSL through its own physical termination, or it may be indirectly connected through a common physical termination.

For non-blocking traffic conditions: Two B-channel circuit-switched voice or data terminals may be connected on each S/T DSL. More than two B-channel terminals may be connected, however, only two will be able to communicate simultaneously. If more than two terminals are connected this could create a blocking condition where the terminals will contend for available B-channels. Any other terminals connected to this DSL can only be D-channel terminals. You can install more than one D-channel terminal if their combined packet data transmission speeds do not exceed the D-channel throughput of 16 kbps.

For blocking traffic conditions: If you accept blocking traffic conditions on DSLs, you can install any combination of B-channel and D-channel terminals as long as the total number of physical terminations connecting these terminals to the DSL does not exceed eight. These physical terminations may link up to 20 logical terminals The greater the number of terminals on a DSL, the greater the traffic blocking.

— Only one termination may be connected at the end of a UILC DSL. This termination may be to a Network Termination (NT1) or directly to a single U interface terminal. Normally this physical termination is to an NT1, (that supports 2B1Q line encoding) which provides an S/T interface that allows up to 8 physical terminals to be connected. These terminals communicate to the Option 11 through the NT1 and the UILC interface.

— Determine the type of DSL you wish to use to connect your terminals keeping in mind the wire type, the length, and the layout of your office wiring.

DSL configuration

Digital subscriber loops connect the Option 11 to ISDN BRI terminals. A DSL consists of a cable connecting the ISDN BRI port to the cross-connect terminal. From there, the loop is cross-connected to the office wiring, which terminates into 8-pin modular jacks (typically wall outlets). From these outlets, module cables of a maximum length of 10 m (33 ft) connect to ISDN BRI terminals.

The DSLs should be engineered with the following basic considerations in mind:

— loop length

— cable type and wire gauge

— distribution of terminals on a DSL

— type of terminals connected to a DSL

SILC DSL configuration

The SILC supports both point-to-point and point-to-multipoint transmission. The maximum DSL length must not exceed 1 km (3,280 ft); however, the actual length depends on the cable wire gauge, the number of terminals connected to the loop, and the differential round-trip time delay limits.

When you are configuring DSLs, follow these basic rules:

— maintain wiring polarity for both the transmit and receive pairs

— use a maximum of 10 m (33 ft) modular cable to connect each ISDN BRI terminal to the DSL

— keep the length of the cable stub (distance between the RJ-45 receptacle and the DSL cable) to less then 1 m (3.3 ft)

— don't allow bridge taps or split pairs on the DSL and make sure that the differential pairs (Tx-/Tx+ and Rx-/Rx+), each consist of a twisted pair along the entire length of the DSL

— make sure ISDN BRI terminals powered through the DSL do not exceed the total power of 2 Watts (see *Line powering* in this chapter)

— connect a maximum of two ISDN BRI terminals requiring B-channel transmission or one terminal using both circuit-switched voice and data to each DSL for a non-blocking configuration

— select the appropriate number of D-channel terminals based on the transmission speed of each terminal on the DSL

— select the appropriate timing mode when you configure the DSL using Service Change BRI Program LD 27

— place the terminating resistor box (A0378866) at the end of the loop, refer to Figure 13.

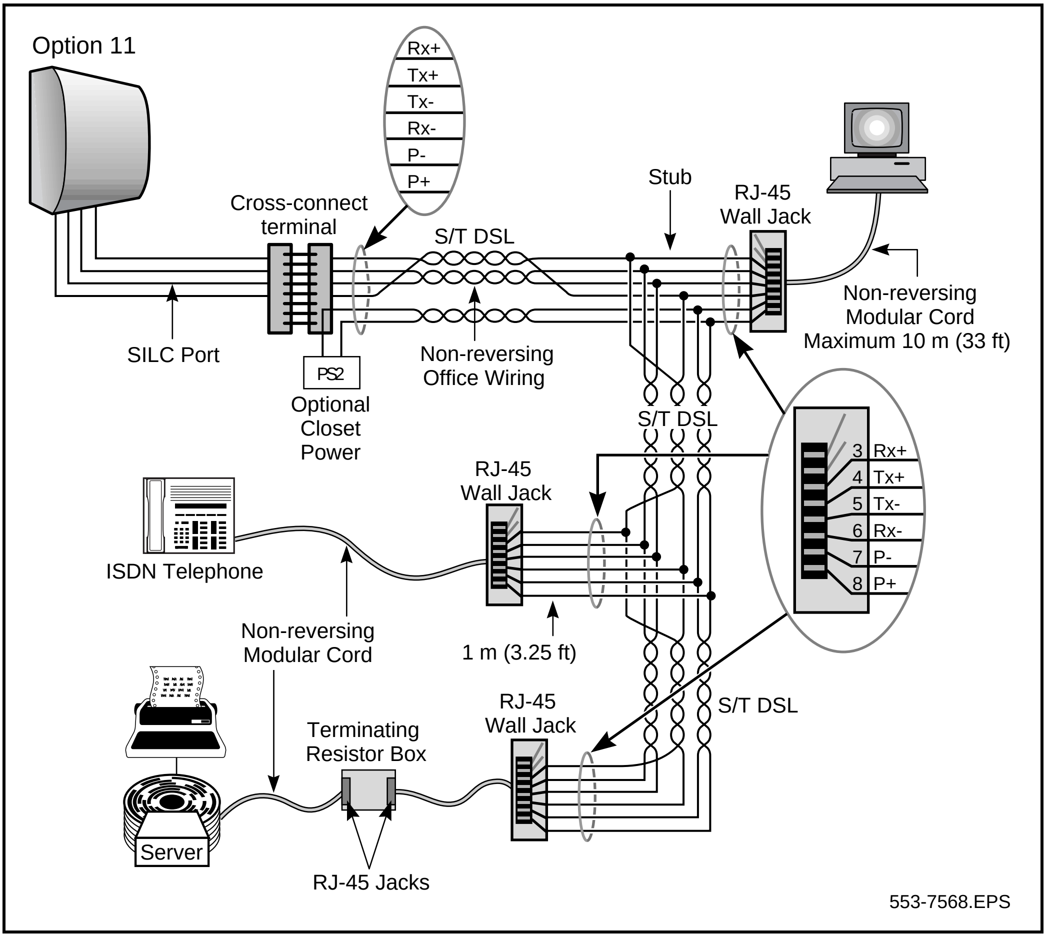
Line powering options

Figure 13 shows a wiring example of a SILC DSL with multiple physical terminations and the terminating resistor at the end of the loop. a SILC DSL consists of a six-wire twisted pair cable, but only four wires carry the signal and two wires provide conduit for an auxiliary power source. This external power source can be used when the total power consumption exceeds 2 Watts on each DSL. In this case the terminals need to be configured to use the auxiliary power source (PS2) or other auxiliary power supplies as part of their product packages.

> ***Note:*** An AC/DC adapter is available for the Northern Telecom M5317DX ISDN BRI telephone set. This is used when a closet optional power supply is not available and the set is not powered from the DSL. Power

When power is supplied from the S/T interface, the terminal devices must not draw more than 2 Watts of power. With this arrangement, power to the terminal devices on the DSL is not interrupted during commercial power failures if the Option 11 system is equipped with batteries.

Figure 13
S/T digital subscriber loop wiring example for ISDN BRI lines



Cable characteristics

Table 5 lists the parameters of the various cable types used in determining the S/T DSL configuration limits. The cables listed are those used for telephony wiring applications, and the characteristics listed are for Northern Telecom cable at 96 kHz and 20° C (68° F).

Table 5
Cable types and characteristics

Cable type	Gauge AWG	Loss dB/k ft (dB/km)	Delay µs/k ft (µs/km)
Outside PIC	22	1.6 (5.4)	1.7 (5.5)
Outside PULP	22	1.8 (6.0)	1.6 (5.3)
Outside PIC	24	2.3 (7.6)	1.7 (5.6)
Outside PULP	24	2.5 (8.2)	1.7 (5.5)
Outside PIC	26	3.3 (11.0)	1.8 (5.9)
Outside PULP	26	3.3 (11.0)	1.7 (5.7)
Inside riser	22	1.6 (5.2)	1.6 (5.2)
Inside riser	24	2.3 (7.5)	1.7 (5.6)
Inside riser	26	3.2 (10.5)	1.8 (5.9)
Inside Z station (FT1)	22	1.6 (5.2)	1.8 (5.9)
Inside Z station (FT4)	22	2.0 (6.6)	2.0 (6.6)
Inside type D (3 and 4 pair)	24	2.6 (8.5)	1.9 (6.2)
Inside type D (25 pair)	24	2.9 (9.5)	2.0 (6.6)

The following examples show some typical SILC DSL configurations. These are:

— point-to-point DSL

— short passive DSL

— extended passive DSL

— branched passive DSL

Point-to-point SILC DSL

This configuration is shown in Figure 14. It represents the simplest type of bus configuration. The Point-to-Point bus provides the longest DSL length.

Recommended rules:

— Configure the DSL as adaptive mode through overlay 27 (MODE = NTAS).

— Use a terminating resistor (A0378866) at the end of the DSL.

— Connect only one TE.

— Cable loss must not exceed 6 dB.

Maximum DSL length depends on the cable type and wire gauge. For a point-to-point bus, the DSL length is as shown in Table 6.

Figure 14
Point-to-Point SILC DSL

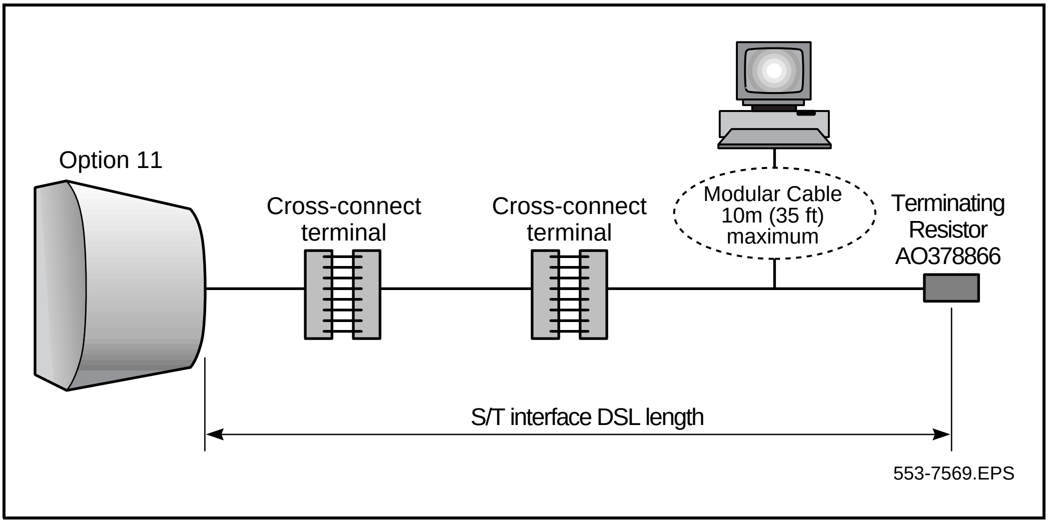


Table 6
Cable types and point-to-point SILC DSL lengths

Cable type	Gauge AWG	Maximum DSL length ft (m)
Outside PIC	22	3640 (1110)
Outside PIC	24	2590 (790)
Outside PIC	26	1770 (540)
Outside PULP	22	3280 (1000)
Outside PULP	24	2390 (730)
Outside PULP	26	1770 (540)
Inside riser	22	3770 (1150)
Inside riser	24	2620 (800)
Inside riser	26	1870 (570)
Inside Z station (FT1)	22	3770 (1150)
Inside Z station (FT4)	22	2980 (910)
Inside type D (3 and 4 pair)	24	2300 (700)
Inside type D (25 pair)	24	2070 (630)

Short passive SILC DSL

This configuration is shown in Figure 15. In the short passive DSL configuration the NT and terminals may be located anywhere along the DSL. This configuration has the shortest length, but the maximum number of terminals are allowed with no restrictions on the location of the Option 11 (Meridian 1) and the terminals.

Recommended rules:

— Configure the DSL as fixed timing mode through overlay 27 (MODE = NTFS).

— A maximum of eight terminals may be connected.

— Use a 100 ¾ terminating resistor (A0378866) at the end of the DSL.

— Terminate both ends of the DSL if the NT is not located at the end of the DSL. In this case the distance between the Meridian 1 and the DSL should not exceed 30 ft (9 m).

— The maximum round trip delay for the selected DSL cable is 2 µs.

Maximum DSL length depends on the cable type and wire gauge. For a short passive DSL, the length is as shown in Table 7.

Figure 15
Short passive SILC DSL

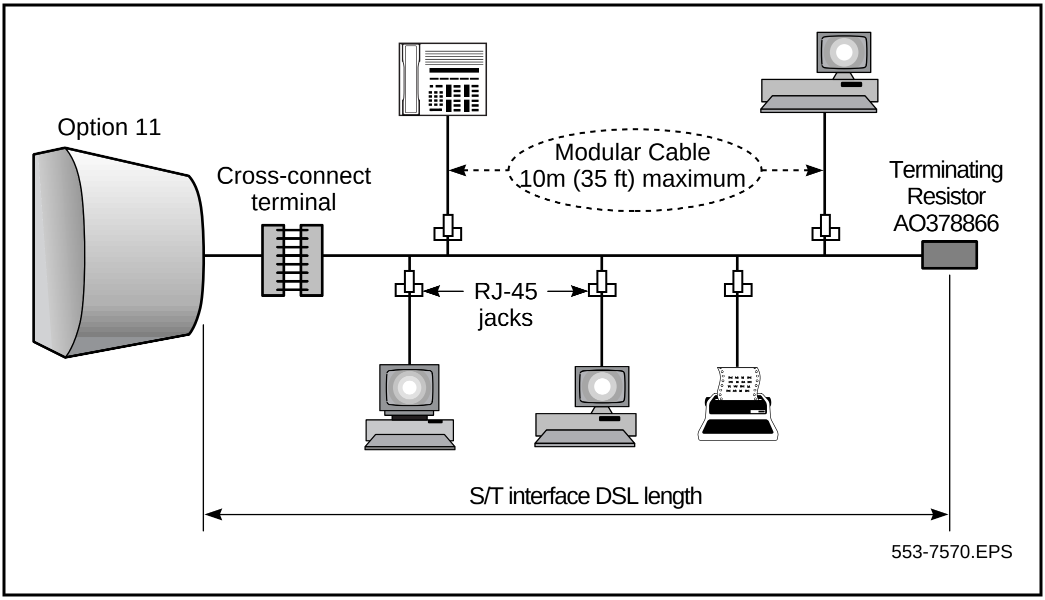


Table 7
Cable types and short passive SILC DSL lengths

Cable type	Gauge AWG	Maximum DSL length ft (m)
Outside PIC	22	560 (170)
Outside PIC	24	540 (165)
Outside PIC	26	510 (155)
Outside PULP	22	560 (170)
Outside PULP	24	560 (170)
Outside PULP	26	520 (160)
Inside riser	22	590 (180)
Inside riser	24	540 (165)
Inside riser	26	490 (150)
Inside Z station (FT1)	22	490 (150)
Inside Z station (FT4)	22	460 (140)
Inside type D (3 and 4 pair)	24	490 (150)
Inside type D (25 pair)	24	480 (145)

Extended passive SILC DSL

This bus configuration is shown in Figure 16. The extended passive bus is designed to allow up to four terminals to be located a long distance from the SILC. The length of the DSL and the separation between each terminal are the significant factors in this configuration.

Recommended rules:

— Configure the DSL in adaptive mode through overlay 27 (MODE = NTAS).

— Use a 100 ¾ terminating resistor (A0378866) at the end of the DSL.

— Configure no more than four terminals.

— The cable loss must not exceed 3.8 dB.

The maximum DSL length and separation between terminals is given in Table 8. Configure the first terminal at the end of the terminated DSL, then calculate the distance from the farthest to the nearest terminal. For every terminal (less than four) not configured, you may add 15 ft (5 m) to the distance of total terminal separation.

Figure 16
Extended passive SILC DSL

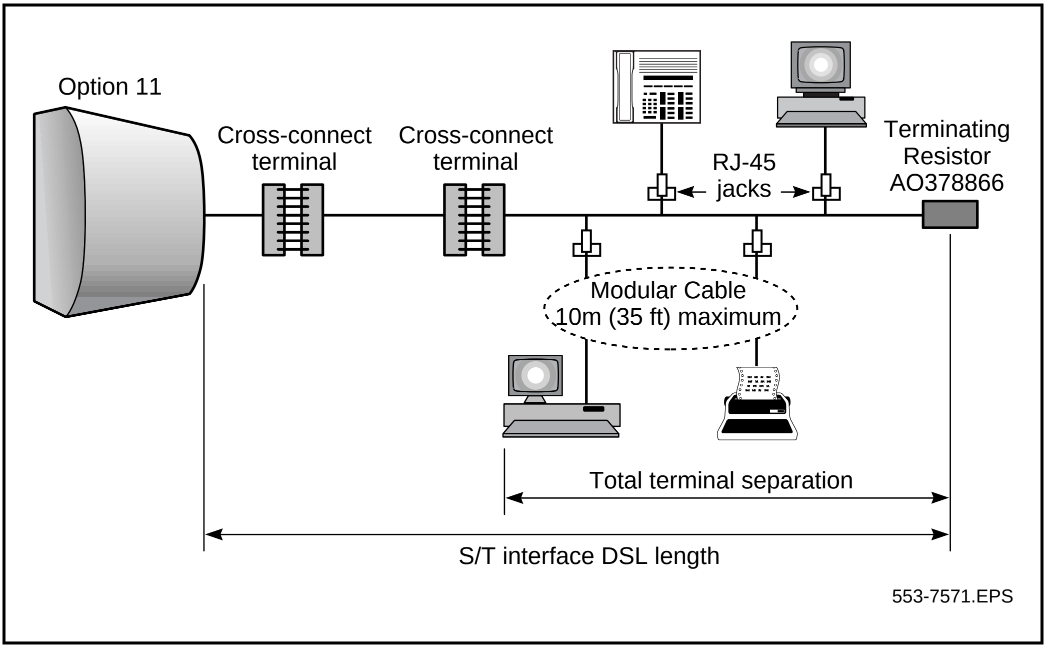


Table 8
Cable types and extended passive SILC DSL lengths

Cable type	Gauge AWG	Maximum DSL length ft (m)	Total terminal separation ft (m)
Outside PIC	22	2300 (700)	130 (40)
Outside PIC	24	1640 (500)	130 (40)
Outside PIC	26	1110 (340	120 (36)
Outside PULP	22	2070 (630)	140 (42)
Outside PULP	24	1510 (460)	130 (40)
Outside PULP	26	1110 (340)	120 (36)
Inside riser	22	2390 (730)	140 (42
Inside riser	24	1640 (500)	125 (38)
Inside riser	26	1180 (360)	115 (35)
Inside Z station (FT1)	22	2390 (730)	115 (35)
Inside Z station (FT4)	22	1870 (570)	110 (33)
Inside type D (3 and 4 pair)	24	1443 (440)	115 (35)
Inside type D (25 pair)	24	1310 (400)	115 (35)

Branched passive SILC DSL

This bus configuration is shown in Figure 17. The branched passive bus configuration uses the existing building wiring where the DSL is terminated in a telephone wiring closet. The significant factors in this configuration are the maximum DSL length, and the total length of the two branches.

Recommended rules:

— Configure the DSL as adaptive mode through overlay 27 (MODE = NTAS).

— Configure no more than four terminals.

— Configure no more than two terminals per branch.

— Use a 100 ¾ terminating resistor at the end of the DSL.

— The cable loss must not exceed 3.8 dB.

Figure 17
Branched passive SILC DSL

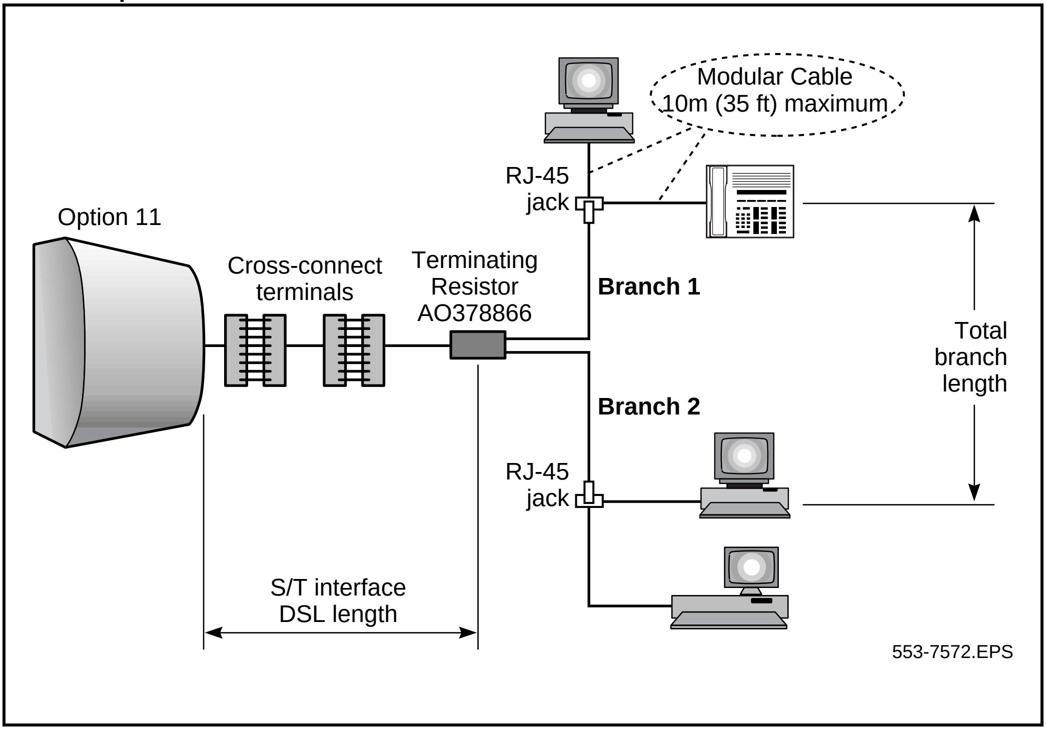


Table 9 shows the recommended maximum length of cable and branches at the end of the DSL. Calculate the length of the DSL, and the sum of the branches. Refer to Table 9 for maximum allowable limits.

Maximum SILC DSL length depends on the cable type and wire gauge. For a branched passive bus, the DSL length is typically:

— 585 m (1,919 ft) for Inside Z station type cable 22 AWG

— 365 m (1,197 ft) for Inside type D cable 24 AWG

— 315 m (1,033 ft) for Inside riser type cable 26 AWG

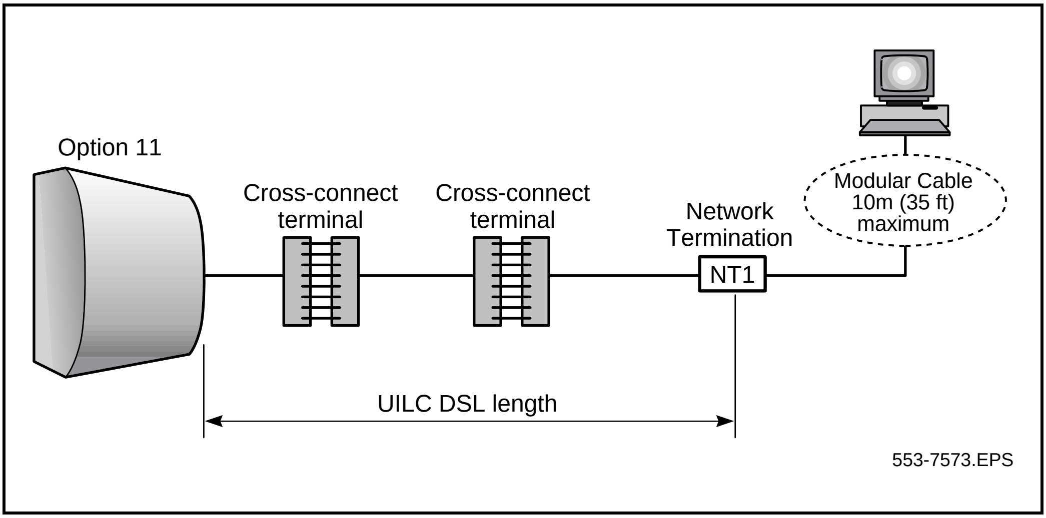
Table 9
Cable types and branched passive SILC DSL lengths

Cable type	Gauge AWG	Maximum DSL length ft (m)	Maximum total branch lengths ft (m)
Outside PIC	22	1115 (340)	345 (105)
Outside PIC	24	885 (270)	345 (105)
Outside PIC	26	705 (215)	330 (100)
Outside PULP	22	1030 (315)	360 (110)
Outside PULP	24	835 (255)	345 (105)
Outside PULP	26	705 (215)	310 (95)
Inside riser	22	1150 (350)	360 (110)
Inside riser	24	885 (270)	345 (105)
Inside riser	26	720 (220)	330 (100)
Inside Z station (FT1)	22	1150 (350)	330 (100)
Inside Z station (FT4)	22	965 (295)	310 (95)
Inside type D (3 and 4 pair)	24	820 (250)	330 (100)
Inside type D (25 pair)	24	235 (770)	310 (95)

UILC DSL configuration

The UILC supports only point-to-point transmission. The maximum DSL length should not exceed 5 km (16,404 ft). Figure 18 shows a typical U interface DSL with an NT1 terminating the DSL and providing an S/T interface to an ISDN BRI terminal.

Figure 18
Point-to-Point UILC DSL



This interface is designed to use most of the existing non-loaded twisted pair wiring in North America. Not all the twisted pair cables are suitable for ISDN BRI application. Before you use a section of this cable for Basic Rate Access, you must verify its suitability by performing the following tests:

— determine the type and length of the cable and total signal loss of the DSL

— determine total signal loss contributed by the bridge taps on the DSL

— verify that there are no consistent or random noise sources that may affect the transmission quality

— verify that the cable impedance is as expected, which indicates that there are no bridge taps, no wet cable, and no split pairs, or other damage.

— determine the outlet pinout at the terminal location

The maximum length of the U DSL is determined by maximum loop loss. The maximum loss is 46 dB at 40 kH. However, to meet bit error rate performance of 10^{-7} or better in all cases, a maximum limit of 40 dB cable loss is recommended. Table 10 lists the maximum recommended loop length that should be considered in U-interface DSL installations without any bridge taps.

Table 10
Maximum recommended U DSL length

Cable gauge AWG	Maximum recommended length kft (km)
26	14.5 (4.40)
24	21.5 (6.55)
22	29.0 (8.80)
mix	18.0 (5.50)

Table 11 is recommended as a guideline for calculating selected ISDN U-DSL loss. Use the **Length km (kft)** and **Loss dB** columns to record your calculations. Select the corresponding loss (dB/kft) based on the type of cable used and multiply by the cable length. After calculating all the losses due to the DSL used, calculate losses due to bridge taps. For any bridge tap with length exceeding 3 kft, only add 5.1 dB. Add all the losses due to the DSL and due to bridge taps. The total loss should not exceed the recommended maximum loss of 40 dB.

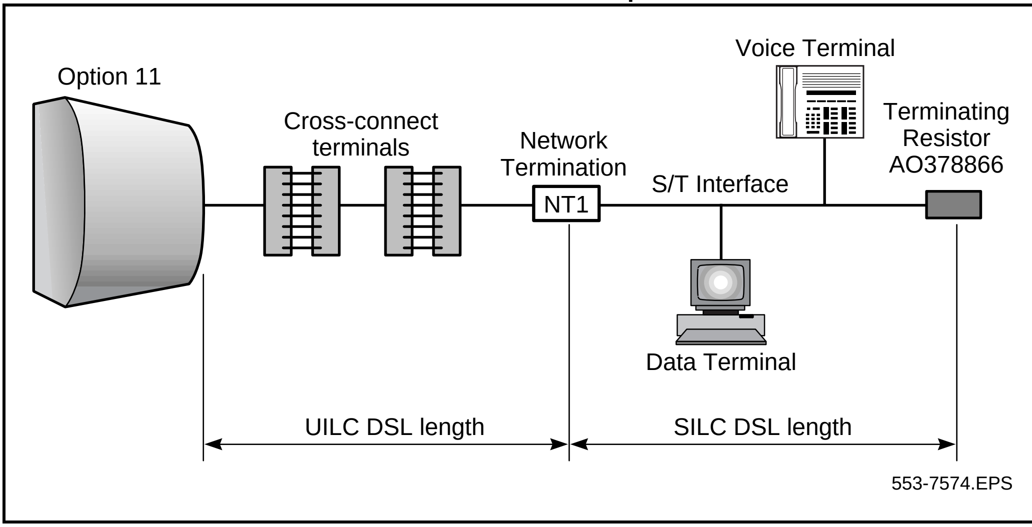
> ***Note:*** The bridge taps are not terminated and are left unused. A complete knowledge about the characteristics of the DSL selected is recommended. Keep the DSL as simple and as short as possible to obtain maximum performance.

Table 11
U DSL cable calculations

Item	Gauge AWG	Insulation type	Loss dB/km (dB/kft)	Length km (kft)	Loss dB
1	19	PIC	3.3 (1.0)		
2	19	PULP	3.6 (1.1)		
3	22	PIC	4.6 (1.4)		
4	22	PIC	4.9 (1.5)		
5	24	PIC	5.9 (1.8)		
6	24	PULP	6.3 (1.9)		
7	26	PIC or PULP	9.2 (2.8)		
8	Customer premises wiring		5.9 (1.8)		
9	Local exchange wiring		9.2 (2.8)		
10	Bridge tap 1				
11	Bridge tap 2				
12	Bridge tap 3				
13	Bridge tap 4				
14	Bridge tap 5				
15	Bridge tap 6				
Total loss in dB (add items 1 through 15)					
Recommended maximum loss = 40 dB					

Figure 19 shows a DSL extension where the U interface is used to extend the loop by 5 km to an NT1 and from the NT1 it shows an S/T interface connecting two ISDN BRI terminals.

Figure 19
UILC DSL used as an extension for an S/T interface loop



ISDN BRI terminals

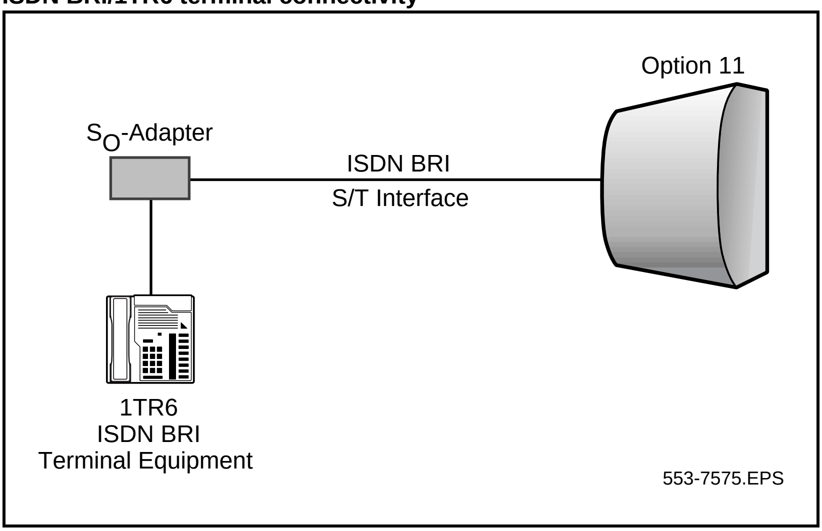
ISDN BRI terminals deemed compatible with the Option 11 system should comply with ANSI, ETSI NET-3, INS NET-64 or Numeris standards for ISDN BRI terminals. 1TR6 terminals are also supported through a 1TR6 to ETSI NET-3 converter box. The list of terminals deemed compatible may change without notice. To obtain the latest list of compatible terminals, contact your Northern Telecom representative.

1TR6 terminal connectivity

1TR6 is the ISDN protocol used in Germany and in any country that supports German protocol.

A Terminal Adapter (the S_0-Adapter) has been specifically designed to interface with Option 11 ISDN BRI and 1TR6 terminals. Its main function is to convert 1TR6 protocol, sent from the 1TR6 ISDN Terminal Equipment, into the European Telecommunication Standard Institute (ETSI) protocol required for ISDN BRI, and vice versa. This conversion is necessary because the layer 3 requirements for 1TR6 and ETSI are different. Figure 20 shows a 1TR6 ISDN BRI terminal connected to a 1TR6 terminal adapter (the S_0-adapter), which is used to access the Option 11.

Figure 20
ISDN BRI/1TR6 terminal connectivity



Terminal addressing and service profile assignment

ISDN BRI terminal addressing and Terminal Service Profile (TSP) assignment differs from the conventional approach where a Terminal Number (TN) identifies a terminal and its address and the protected line blocks in the database contain service related data for that terminal.

Terminal Service Profiles (TSPs) are service profile specifications stored in the database that can be associated with various terminals during terminal initialization and that define the terminal DN, class of service, call restriction levels, and other service and feature attributes. ISDN terminal initialization occurs when a terminal is installed, every time the system is initialized, or when the MISP or the line card the terminal is connected to is replaced.

ISDN BRI terminal addressing

An ISDN BRI terminal connected to a DSL is addressed by using both the physical address and the logical address, where:

— the physical address is **c, dsl#**, representing the *physical* (layer 1) identifier

— the logical address is defined as Terminal Endpoint Identifier (TEI), which is a *data link* (layer 2) identifier and the Terminal Service Profile (TSP), which is a *network* (layer 3) identifier

The Terminal Service Profile (TSP) is represented by the combination of the User Service Identifier (USID) and the Terminal Identifier (TID). The USID uniquely identifies the TSP assigned to one or more terminals on a DSL. Up to 16 TSPs can be configured per DSL.

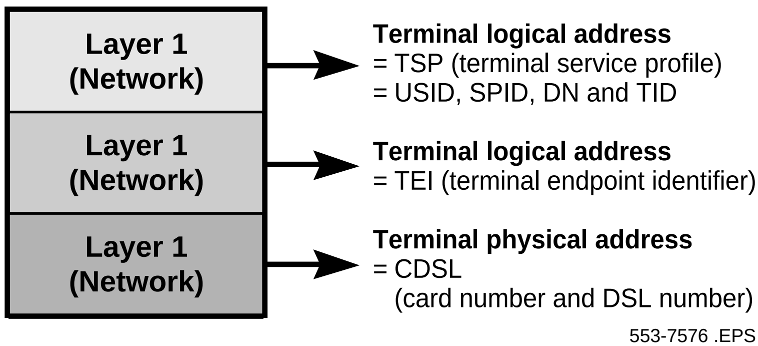
USID is entered in overlay 27, and is entered on the terminal keypad during initialization.

The SPID is an identification number (any combination of 1-20 alphanumeric characters) that is configured in the TSP in overlay 27 and is usually the DN with one or two numeric or alphanumeric (depending on the type of terminal) characters appended to it.

The TID identifies a specific terminal on a DSL using that TSP. All the terminals on a DSL that share the same TSP will have the same USID and a unique TID. TID is an internally assigned parameter that is transparent to the user.

Figure 21 shows the relationships of the physical and logical address components to the OSI model.

Figure 21
Physical and logical address 5-components



Assigning the Terminal Endpoint Identifier (TEI)

A TEI is associated with establishing the *data link* (layer 2) connection between a terminal and the network. The TEI is a terminal logical address that is used by the MISP to address a terminal during the exchange of layer 2 information messages with that terminal. Each logical terminal is associated with one unique TEI. Up to 20 TEIs can be assigned to the logical terminals on one DSL.

Option 11 provides two types of TEIs based on their assignment method. These are:

— dynamic TEI, automatically assigned by the MISP

— static TEI, entered into the terminal by the user on the terminal key pad.

Dynamic TEI

Terminals supporting the automatic endpoint identification procedure receive their TEI automatically when the terminal is connected to the DSL. The MISP detects the terminal on the loop and assigns to it an unassigned TEI. The range of the automatically assignable TEI numbers is from 64 to 126. TEI 127 is used for sending broadcast messages. A different TEI may be dynamically assigned to a terminal every time it is initialized by the system.

Static TEI

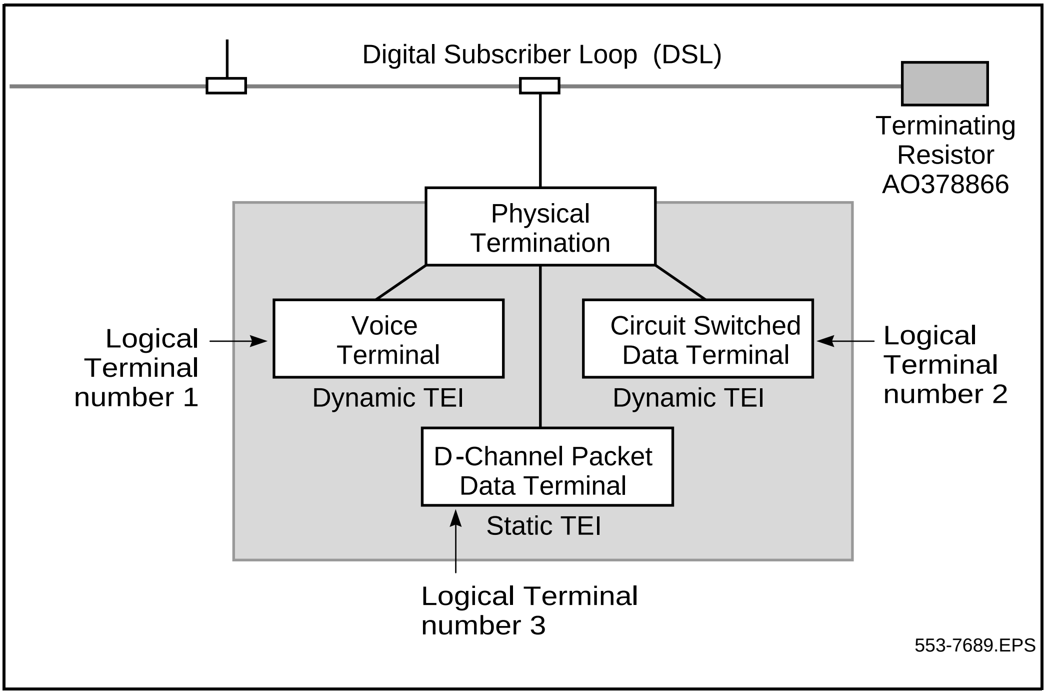
The terminals that do not support dynamic TEI assignment use static TEI assignment. The TEI can be uniquely identified at the data link layer (Layer 2). It can be assigned to one logical terminal at a time, that is, there is a one-to-one mapping of TEI to logical terminal.

The static TEI assignment is performed by entering an unassigned TEI number from 0 to 63 directly into the terminal. This TEI is assigned to that terminal as long as the terminal is operational.

Packet data terminals must use static TEIs.

Figure 22 illustrates how a single physical termination may actually connect multiple logical terminals. Each S/T DSL can support up to eight physical terminations and up to 20 logical terminals. Each logical terminal is assigned one unique TEI, which represents the layer 2 logical address for that terminal.

Figure 22
Multiple logical terminals on one physical termination



Types of ISDN BRI terminals

ISDN BRI terminals are divided into four categories based on layer 3 and layer 2 initialization procedures:

— initializing terminal with dynamic end-point identification

— initializing terminal with static end-point identification

— non-initializing terminal with dynamic TEI assignment

— non-initializing terminal with static TEI assignment

Initializing terminal with dynamic end-point identification

Each initializing terminal has an identification number called a Service Profile ID (SPID) that is entered into the terminal by the user when the terminal is installed. This number is usually the directory number with one or two alphanumeric characters appended to it, although it can be any numeric or alphanumeric (depending on the type of terminal) number up to nine digits long. The M5317TDX terminal is an example of a terminal with dynamic endpoint identification. The SPID is used by the MISP to identify the terminal and to assign to it specific service attributes during layer 3 initialization.

Before layer 3 terminal initialization can start, layer 2 must be fully established, which includes TEI assignment. The TEI may be Dynamic (the MISP assigns an unassigned TEI) or Static (the TEI in manually entered on the terminal key pad). The terminal must then have its SPID number entered at the terminal key pad.

Layer 3 initialization with dynamic endpoint identification starts when the terminal transmits its SPID to the MISP using an information message. The MISP acknowledges the message and sends an endpoint identifier message that contains two identification parameters; the User Service Identifier (USID) and the Terminal Identifier (TID).

Initializing terminal without dynamic endpoint identification

For an initializing terminal that does not support the dynamic end-point identification the end-point identification parameters USID and TID are not automatically assigned by the MISP.

Before layer 3 terminal initialization can start, the terminal must have its SPID entered at the terminal. The TEI may be dynamic (the MISP automatically assigns an unassigned TEI) or static (the TEI in manually entered on the terminal key pad)

Layer 3 initialization starts when the terminal transmits its SPID to the MISP using an information message. The MISP acknowledges the message and assigns a TSP to the terminal.

Non-initializing terminal with dynamic TEI assignment

A non-initializing terminal (such as a printer) does not support the dynamic endpoint identification procedure and is not associated with a SPID number. However, non-initializing terminals may support dynamic TEI assignment where the MISP automatically assigns an unassigned TEI when the terminal is installed or when the system or the cards are reset.

The range of the automatically assignable TEI numbers is from 64 to 126. Because these terminals do not support layer 3 initialization procedures, the MISP assigns the same default TSP to all terminals of this type on a specific DSL. The default TSP is defined by specifying USID= 0 in overlay 27.

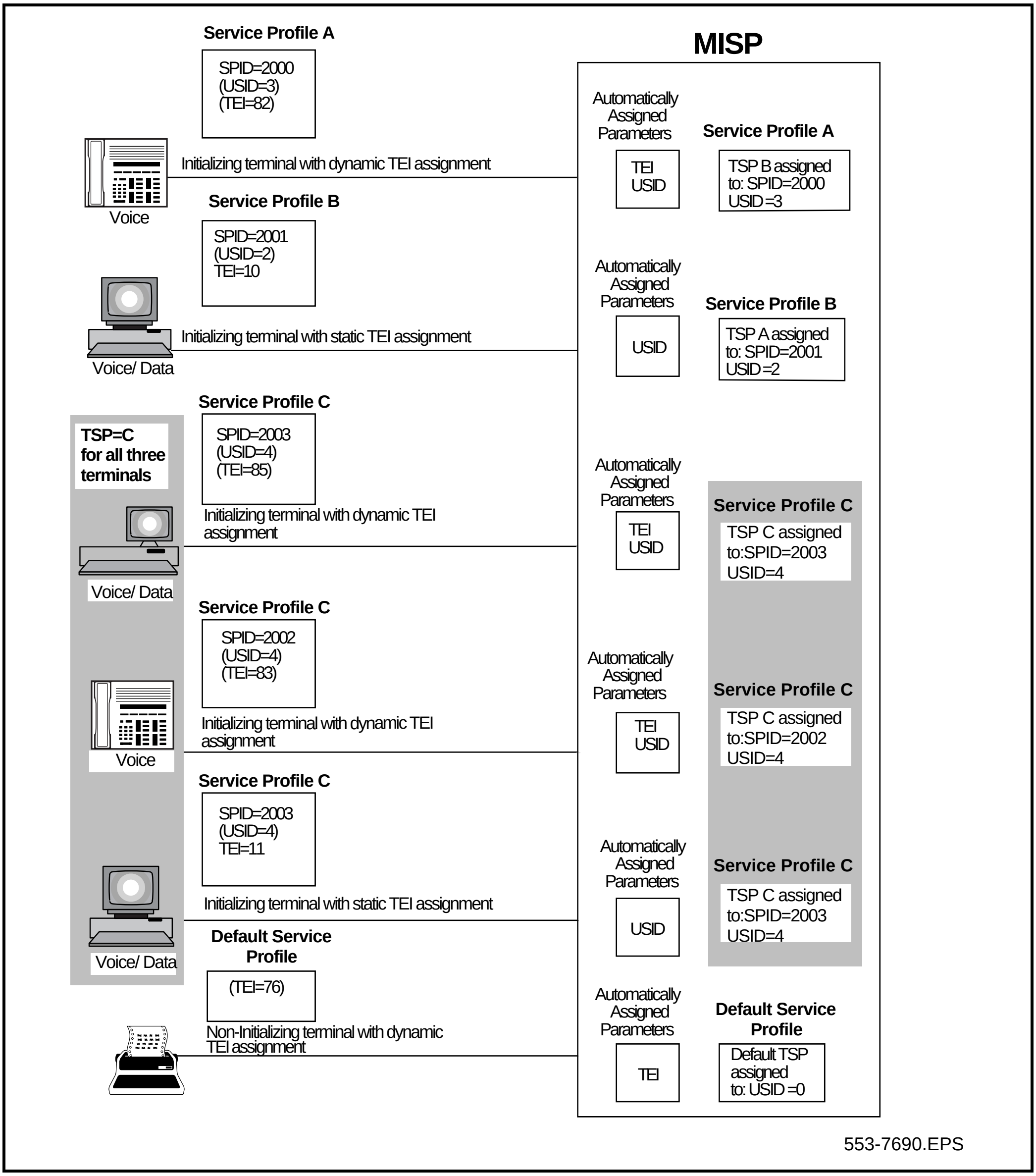
Non-initializing terminal with static TEI assignment

A non-initializing terminal (such as a printer) does not support the dynamic endpoint identification procedure and is not associated with a SPID number. The non-initializing terminals may support static TEI assignment where the user assigns an unassigned TEI by entering the TEI number on the terminal key pad when the terminal is installed or when the system or the cards are initialized.

The static TEI assignment is performed by entering an unassigned TEI number from 0 to 63 directly into the terminal using its key pad. Because these terminals do not support layer 3 initialization procedures, the MISP assigns the same default TSP to all terminals of this type on a specific DSL. The default TSP is defined by specifying USID= 0 in overlay 27.

Figure 23 shows different types of terminals and their relationship to each other when they are connected to the same DSL. It also shows how the terminal initialization parameters are handled for different types of terminals.

Figure 23
Terminal initialization and service profile assignment examples



Packet Data Configuration

Refer to Figure 24 for a diagram of packet handling flow.

D-channel packet data transmission

D-channel packet data from each DSL is multiplexed by the line card (SILC or UILC) into two sets of four D-channels and placed onto two 64 kbps connections for transmission to the MISP. The MISP separates the packet data from signaling and transmits the packet data over its dedicated connection to the PRI. A PRI B_D-channel is a dedicated 64 kbps clear B-channel that handles the D-channel packet data between the PRI and the DPN-100 external packet handler.

If the system is to uniquely identify the transmitted and received D-channel packet data for each terminal on a DSL, it must use an internal identification number. This identification number is called Logical Terminal Identifier (LTID) as defined in LD 27, which must be used together with the Logical Terminal Endpoint Identifier (LTEI) number during ISDN BRI configuration to uniquely define a logical terminal on a DSL. The LTEI is configured in Overlay 27.

To configure a terminal for D-channel packet data service, a specific LTID is assigned to an unused static LTEI and this information is sent to the MISP. The LTEI number is entered at the terminal and the LTID and the PRI ^{B}D-channel information is entered at the DPN-100 packet handler. The LTEI is entered at the terminal (as previously configured in Overlay 27).

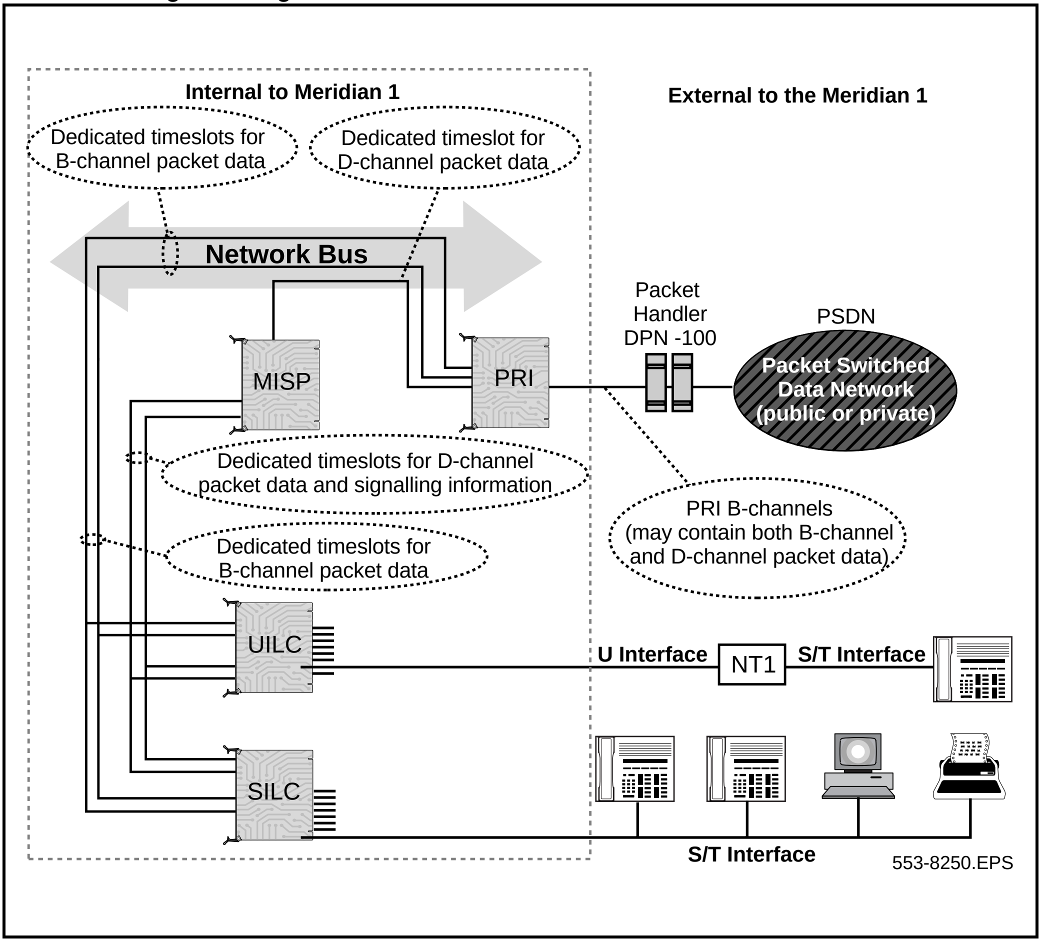
D-channel packet data service is determined separately for each MISP during ISDN BRI service configuration. When this data transmission method is selected during system configuration, you are prompted to enter the PRI loop and channel number to specify the dedicated connection to the packet handler. The Option 11 CPU sets up the B_D-channel to the packet handler and informs the MISP on which connection the B_D-channel is located.

B-channel packet data transmission

The B-channel packet data from each DSL is sent over the dedicated time slots to the PRI. A dedicated PRI B-channel handles the B-channel packet data between the PRI and the DPN-100 external packet handler. The number of dedicated B-channel time slots is limited to the number of available PRI channels.

The B-channels on a DSL are dedicated to the packet data transmission by assigning the packet mode data call to one or more B-channels on one or more DSLs during ISDN BRI service configuration. When the Option 11 CPU detects that the B-channel packet data transmission is being set up, it dedicates the PRI channel(s) to transmit this data to the packet handler if the PRI loop that is connected to the packet handler is configured in the MISP database.

Figure 24
Packet handling flow diagram



Hardware Requirements

Hardware requirements for ISDN BRI line and packet data applications are as follows:

> ***Note:*** Items required for Packet Data implementation only are noted.

— MISP circuit card — NTBK22

— **SILC circuit card**
NT6D70AA — -48V North American S/T interface line card
NT6D70BA — -40V International S/T interface line card

— **UILC circuit card**
NT6D71 — U interface line card

— A0378866 — Terminating resistor

— PRI circuit card

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

NTAK09 — 1.5 Mb DTI/PRI circuit card
NTAK79 — 2.0 Mb PRI circuit card
NTBK50 — 2.0 Mb PRI circuit card, used in conjuction with the Downloadable D-channel application.

— DPN-100 External Packet Handler

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

— ISDN BRI terminals

— **M5317TDX**
Meridian 1 set 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.

— **Other terminals**
Any other terminal deemed compatible by Northern Telecom.

— **Terminal adapters**
Required if connecting non-BRI terminals to the ISDN BRI line interface.

— **Network Termination 1 (NT1)**
Needed when conversion from a U to an S/T interface is required.

NT1 unit

NT1 standard power supply

NTBK22 Multi-Purpose ISDN Signaling Processor (MISP) card

The MISP card (NTBK22) is an Option 11 specific card (Options 21 through 71 use the NT6D73AA). It performs Data Link (Layer 2) and Network (Layer 3) processing associated with the OSI protocol.

Each MISP can support 4 line cards (UILC or SILC or any combination of the two). Each line card supports 8 DSLs, therefore each MISP supports 32 DSLs. Since each DSL uses two B-channels and one D-channel the MISP supports 64 B-channels and 32 D-channels. If the MISP is carrying packet data, it must dedicate one of its D-channels to communicate with the external packet handler. In this case the MISP support only 31 DSLs. The MISP supports the downloading of ISDN applications from the Option 11 software cartridge. The MISP will be downloaded with the appropriate application code:

— on the first enabling of the MISP card

— when Option 11 Software is upgraded

— when MISP Applications are added/changed

The applications for the MISP are copied from the software cartridge into RAM on the MISP card. Only the new/different applications are downloaded. This information is then copied into the Flash ROM on the MISP for storage. This process requires approximately 10 minutes to complete and is carried out while the MISP pack is operational. The next time the system or MISP card resets, the application is loaded from the MISP Flash ROM provided there are no new or different applications on the software cartridge.

Use the equation below to calculate the number of MISPs required to control SILCs and UILCs.

(SILCs + UILCs) ÷ 4 = MISPs
If the result is a fraction, round it off to the next highest number.

NT6D70AA/NT6D70BA S/T Interface Line card (SILC)

The Option 11 SILC cards (NT6D70AA -48V North America, NT6D70BA -40 V International) are the same circuit cards used by the rest of the Meridian 1 product line. The SILC is a globally accepted standard interface. The SILC circuit cards support the OSI physical layer (layer 1) protocol.

The SILC provides eight S/T 4-wire full duplex polarity sensitive interfaces that are used to connect ISDN BRI compatible terminals over DSLs to the Option 11. Each S/T interface provides two B-channels and one D-channel and supports a maximum of eight physical connections that can link up to 20 logical terminals on one DSL. A logical terminal is any terminal that can communicate with the Option 11 over a DSL. It may be directly connected to the DSL through its own physical termination or be indirectly connected through a common physical termination.

The length of a DSL depends on the specific terminal configuration and the DSL wire gauge, however, it should not exceed 1 km (3,280 ft).

The SILC interface uses a 4 conductor cable that provides a differential Transmit and Receive pair for each DSL. The SILC has options to provide a total of 2 Watts of power on the Transmit or Receive leads, or no power at all. When this power is supplied from the S/T interface, the terminal devices must not draw more than the 2 Watts of power. Any power requirements beyond this limit must be locally powered.

A terminating resistor, (AO378866), must be placed at the end of each DSL associated with an S/T interface to ensure proper operation.

Other functions of the SILC are:

— support point-to-point and multi-point DSL terminal connections.

— execute instructions received from the MISP to configure and control the S/T interfaces.

— provide channel mapping between ISDN BRI format (2B+D) and Meridian 1 system bus format.

— multiplexes 4 D-channels onto one connection.

— perform activation and deactivation of DSLs.

— provide loopback control of DSLs.

— provide a reference clock to the clock controller.

SILCs required for non-blocking conditions

Use the equations below to calculate the number of SILCs required to provide interfaces for the S/T type ISDN BRI terminals for non-blocking traffic conditions. To provide a non-blocking traffic condition on a DSL a maximum of 2 B-channel terminals may be connected.

SILC B-channel terminals ÷ 16 = SILCs

Note: A physical terminal that can use two or more B-channels simultaneously such as circuit-switched voice and data, should be counted as two terminals for the purpose of this calculation.

SILC D-channel terminals ÷ 8 (See Note) = SILCs

Note: This assumes one D-channel terminal per DSL, however, you can install more than one such terminal if their combined packet data transmission speeds do not exceed the D-channel throughput of 16 kbps.

If the result is a fraction, round it off to the next highest number. The larger of the two results obtained from the above two equations defines the number of SILCs required.

SILCs required in blocking conditions

If you accept blocking traffic conditions on DSLs, you can install any combination of B-channel and D-channel terminals on a DSL as long as the total number of physical terminations connecting these terminals to the DSL does not exceed eight. The greater the number of terminals on a DSL, the greater the traffic blocking.

If three or more B-channel voice or data terminals are connected to one DSL the following will occur:

— **Outgoing calls**
If there are two active calls on line, the third and subsequent telephone attempting to place a call will not receive dial tone. Calls cannot be placed from these sets until a B-channel becomes available.

— **Incoming calls**
See *BRI Special Hunting* in the features description chapter of this guide.

— **Data calls**
Data calls gets dropped.

To calculate the number of SILCs for a combination of terminals on a DSL, follow the equations below:

Total SILC B-channel terminals ÷ (number of B-channel terminals per DSLx 8) = SILCs

Total SILC D-channel terminals ÷ (number of D-channel terminals per DSLx 8) = SILCs

If the result is a fraction, round it off to the next highest number. The larger of the two results obtained from the above two equations represents the SILCs for blocking conditions.

NT6D71 U Interface Line Card (UILC)

The UILC interface supports a two-wire point-to-point loop consisting of a twisted pair engineered for 2B1Q line coding on the DSL. The Option 11 UILC card (NT6D71) is the same circuit card that is used by the rest of the Meridian 1 product line. It supports the OSI physical layer (layer 1) protocol. The UILC supports ANSI 2B1Q line encoding.

The UILC provides eight two-wire full duplex (not polarity sensitive) U interfaces that are used to connect ISDN BRI compatible terminals over DSLs to the Option 11 system. Each U interface provides two B-channels and one D-channel and supports one physical termination. This termination may be to a Network Termination (NT1) or directly to a single U interface terminal. Normally this physical termination is to an NT1, which provides an S/T interface that allows up to 8 physical terminals to be connected. The length of a DSL depends on the specific terminal configuration and the DSL wire gauge, however, it should not exceed 5 km (16,405 ft).

The main functions of the UILC are:

— provide eight ISDN U interfaces that use 2B1Q encoding.

— support point-to-point DSL terminal connections.

— provide channel mapping between ISDN BRI format (2B+D) and Meridian 1 bus format.

— multiplex 4 D-channels onto one connection.

— perform activation and deactivation of DSLs.

— provide loopback control of DSLs.

To calculate the number of **NT1s for non-blocking** operation take the larger resulting number from the two equations below:

S/T B-channel terminals ÷ 2 = NT1's

Note: A physical terminal that can use two B-channels simultaneously such as circuit-switched voice and data, should be counted as two terminals for the purpose of this calculation.

S/T D-channel terminals ÷ 6 = NT1's. This calculation is application sensitive. Up to 18 logical D-channel terminals may be connected as long as through-put does not exceed 16 kbps on D-channel

To calculate the number of **NT1s where blocking is acceptable** to allow maximum number of terminations on a DSL, use the two equations below:

S/T B-channel terminals ÷ 16 = NT1's

Note: This equation assumes that each S/T interface connects eight physical terminals where each physical terminal can use two B-channels simultaneously such as circuit-switched voice and data.

S/T D-channel terminals ÷ 20 = NT1's (maximum of 20 TEIs per DSL)

In both cases use the larger of the two results. If the result is a fraction, round it off to the next highest number. Add the number of NT1s to the number of true U interface terminals to determine the total number of UILC-supported terminals as follows:

Total UILC terminals = Number of NT1s + Number of true U interface terminals

For the sake of this calculation its fair to assume that each true U interface terminal represents an actual physical termination on a U interface type DSL.

To calculate the required number of UILCs to support the total number of UILC terminals (number of NT1s + number of true U interface terminals) in the system, use the following equation:

UILCs = Total UILC terminals ÷ 8

If the result is a fraction, round it off to the next highest number.

NTAK09/NTAK10/NTBK50 PRI card

Note 1: This item is required for packet data implementation only.

Note 2: Vintage NTBK50AA is required for Downloadable D-channel applications. When setting the timers for EuroISDN PRI2 loops in Overlay 73, the following settings are required:

If the Option 11 is connected to a local exchange that supports CRC-4 multiframing, enter CRC-4 in response to the MFF prompt, enter yes in response to the ACRC prompt (to select automatic CRC error reporting), and enter ALT in response to the ALRM prompt (to select alternate alarm mode).

If the Option 11 is connected to a local exchange that does not support CRC-4 multiframing, enter AFF in response to the MFF prompt, and enter ALT in response to the ALRM prompt (to select alternate alarm mode);

In response to the PERS prompt, enter 50 to set the alarm persistence timer to 100ms;

In response to the CLRS prompt, enter 1 to set the clearance persistence timer to 2ms.

ISDN PRI is required for packet data implementation to connect the Option 11 to the external packet handler (DPN-100). B and/or D-channel packet data is transmitted over clear 64 kbps PRI B-channels to the packet handler (a D-channel daughter board is not required). The maximum number of ISDN PRI channels available for communication with the packet handler should not exceed 23 with 1.5 Mb PRI or 30 with 2 Mb PRI.

Data Packet Network (DPN-100)

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

Northern Telecom's Data Packet Network (DPN-100) is used as the external packet handler to process the B and/or D-channel packet data sent to it over PRI B-channels.

Network Termination 1 (NT1)

Stand-alone NT1 unit

The stand-alone NT1 product, which is typically installed at the user's work area, consists of the following units:

— the NT1 unit (NTBX80)

— the optional NT1 power supply (NTBX81)

— a mounting plate (P0706571).

The stand-alone NT1 unit is a two-part molded housing 210 mm (8.27 in.) by 108 mm (4.25 in.), its depth tapering from about 50 mm (2 in.) to about 32 mm (1.25 in). On the unit's housing are four LED status indicators and three connectors. The bottom of the unit holds four rubber feet for desk-mounting the unit, and four slides that are used to attach the unit to the mounting plate. The unit contains the single NT1 circuit pack assembly.

NT1 power supply unit

The stand-alone NT1 is powered by one of two methods:

1 The NT1 power supply unit (NTBX81), which converts 110 V ac input to provide -48 V dc for the NT1, and optionally for the TEs on the S/T bus.

2 A customer-provided -48 V dc supply rated a 2 W minimum for NT1 powering. Additional power may be provided to power the TEs on the S/T bus.

The NT1 power supply unit is virtually identical to the NT1 unit. It is a two-part molded housing of 210 mm (8.27 in.) by 108 mm (4.25 in.), its depth tapering from about 50 mm (2 in.) to about 32 mm (1.25 in.). On the units housing are three connectors, one of which is a captive power cord. The bottom of the unit holds four rubber feet for desk-mounting the unit, and four slides that are used to attach the unit to the mounting plate. The unit contains a single circuit pack assembly.

Cables

Two cables are provided with the NT1 power supply unit:

— a 178 mm (7 in.) cable (A0346581) for connecting between the power supply and the NT1 unit.

— a captive power cord for connection the an ac power outlet.

ISDN BRI terminals

Contact your Northern Telecom representative for the latest list of compatible terminals.

Installing ISDN BRI Hardware

Installation procedures

The following lists the procedures that should be followed in the order shown to install ISDN BRI equipment for line and packet data implementation. The Option 11 should already be installed and operating before performing these procedures.

Note: Steps required for packet data implementation only are noted.

1 Selecting the card slots.

2 Installing the MISPs.

3 Installing the SILCs and/or UILCs.

4 Installing the PRI hardware.

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

5 Connecting ISDN BRI terminals.

— Connecting Option 11 cables to the cross-connect terminal

— Cross-connecting the wiring

— Connect terminating resistor (A0378866) to the end of the SILC DSL

— Connecting ISDN BRI terminals to the DSL

— Initializing the terminals

Selecting the card slots

Refer to Table 12 for ISDN BRI circuit card assignments in the main and expansion Option 11 cabinets.

> ***Note:*** Refer to the Option 11 Installation guide (553-3011-210) for instructions about adding a cabinet, if one is required.

Identify the card slots in the Option 11 cabinets that will house ISDN BRI cards. Refer to the *Card slot allocation plan* for the cabinets and identify vacant slots. (Refer to the *General installation and planning guide* — 553-3011-200, for information about the *Card slot allocation plan*.) The following rules apply when selecting the card slots:

— MISPs are inserted in the main cabinet in any available slots from 1 through 9.

— One MISP supports a set of four SILCs or UILCs, or a combination of both SILCs and UILCs.

— SILCs and UILCs can be installed in the main and expansion cabinets (slots 1 through 30)

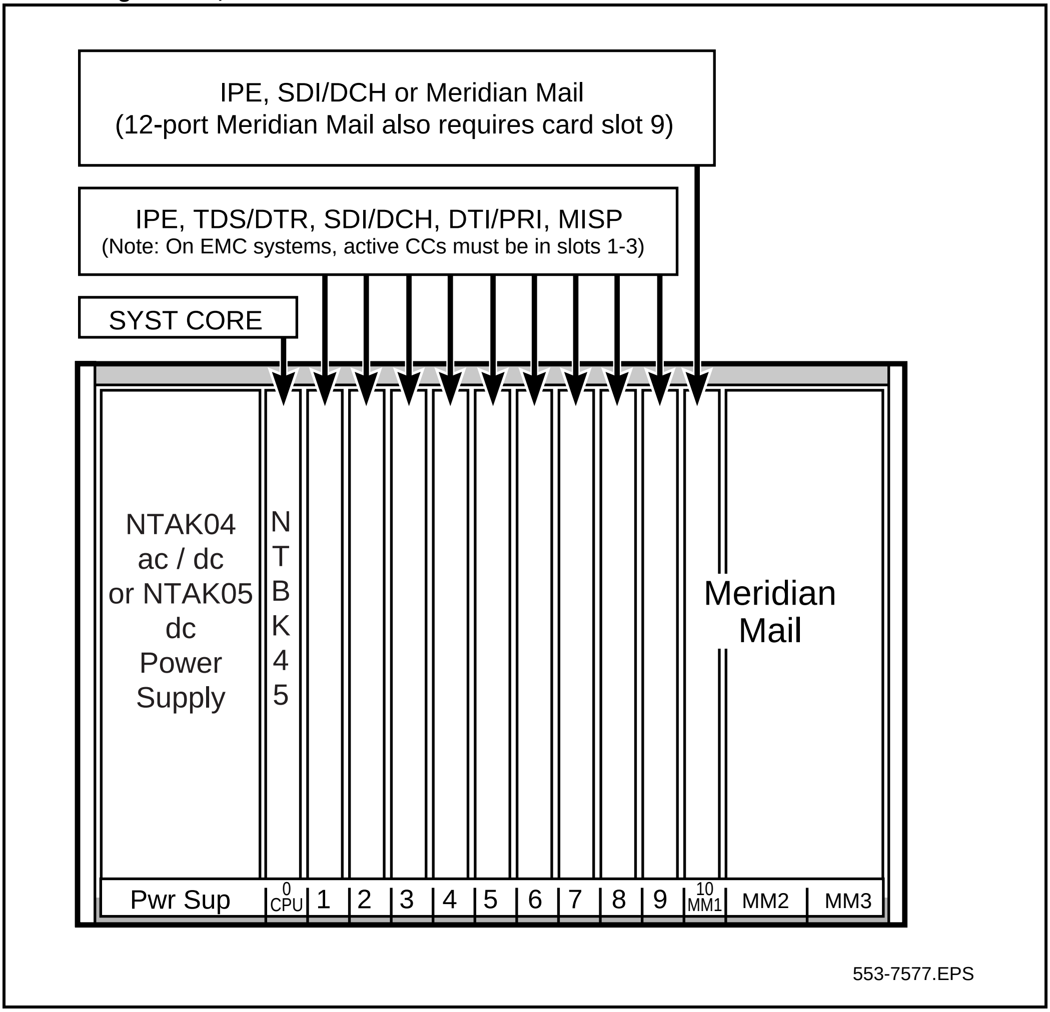
> ***Note:*** A SILC serving as a clock source in trunk access applications must reside in the main cabinet (any of slots 1 through 9).

Table 12
ISDN BRI card location

ISDN BRI Circuit Card	Main Cabinet	Expansion Cabinet
MISP	Slots 1 through 9	—
SILC not used as a clock reference	Slots 1 through 9	Slots 11 through 30
SILC used as a clock reference	Slots 1 through 9	—
UILC	Slots 1 through 9	Slots 11 through 30

Figures 25 and 26 show typical configurations for the Option 11 and the card slots into which ISDN BRI cards can be inserted.

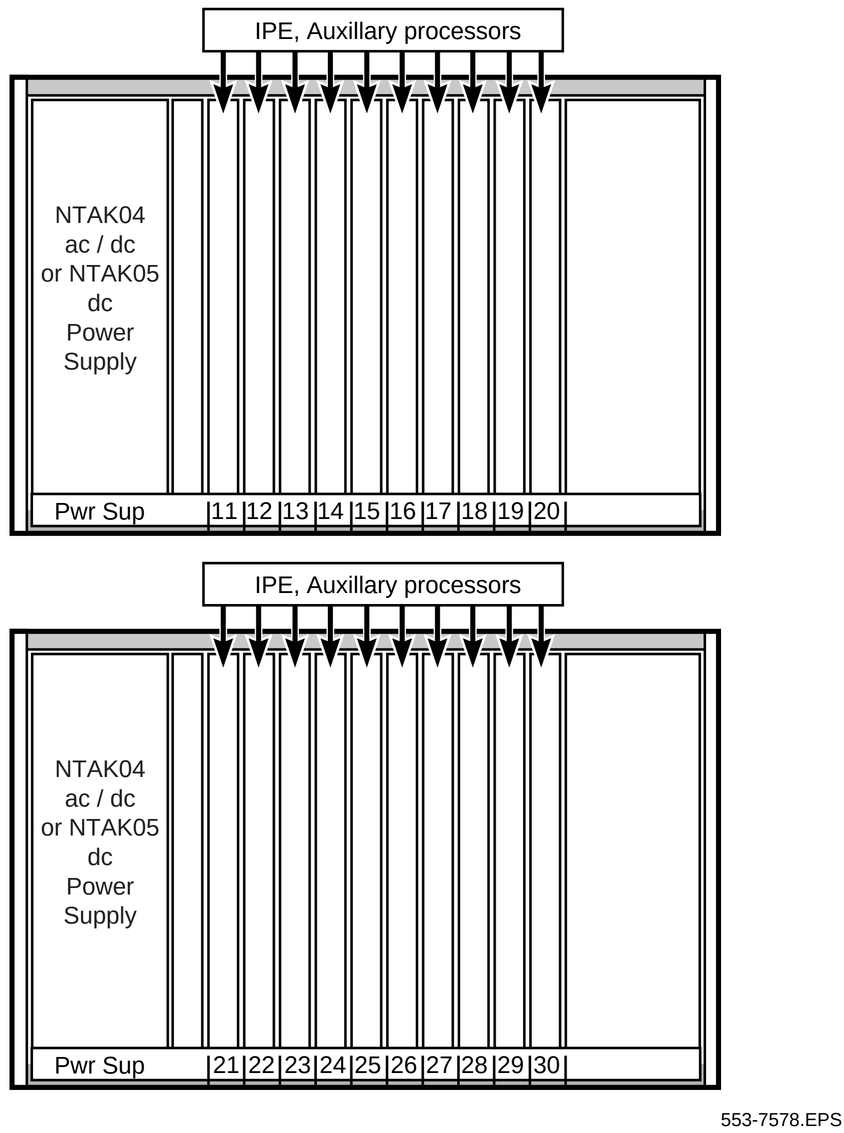
Figure 25
Shelf assignments, main cabinet



Note 1: The MISP circuit cards must reside in the main cabinet, slots 1 through 9. The Meridian Mail option, if it is equipped, requires slot 10 in the main cabinet.

Note 2: The SILC card must be installed in the main cabinet (slots 1 through 9) if it is used as a clock controller.

Figure 26
Shelf assignments, expansion cabinet



Installing the MISPs

The following procedure describes how to install MISPs into the Option 11 main cabinet. Refer to the *Card slot allocation plan* for the card slots assigned to MISP.

1 **Remove the cover from the main cabinet**.

> **CAUTION**
> The static discharge bracelet located inside the cabinet must be worn before handling circuit cards. Failure to wear the bracelet can result in damage to the circuit cards.

2 **Remove the MISP from its shipping package and hold it by its card locking devices.**

Note: While performing the next step observe the LED on the faceplate of the MISP.

3 **Insert the MISP into the selected card slot and lock it in place.**

The LED should light, flash three times then remain lit to indicate that the MISP is operating correctly but is not configured and enabled.
—or—
The LED should light, flash three times then extinguish to indicate that the MISP is operating correctly and is configured and enabled.

Any other LED indication suggests 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 will automatically be re-initialized when the MISP is installed (powered up). This operation will delay the completion of the self-test, and it will take five minutes for the LED to flash three times.

4 **Repeat the steps in this procedure for each MISP being installed.**

Installing SILCs and UILCs

The following procedure describes how to install SILCs and UILCs into the Option 11 cabinets. Refer to the *Card slot allocation plan* for the card slot assignments.

1 **Remove the cover from the assigned cabinet**.

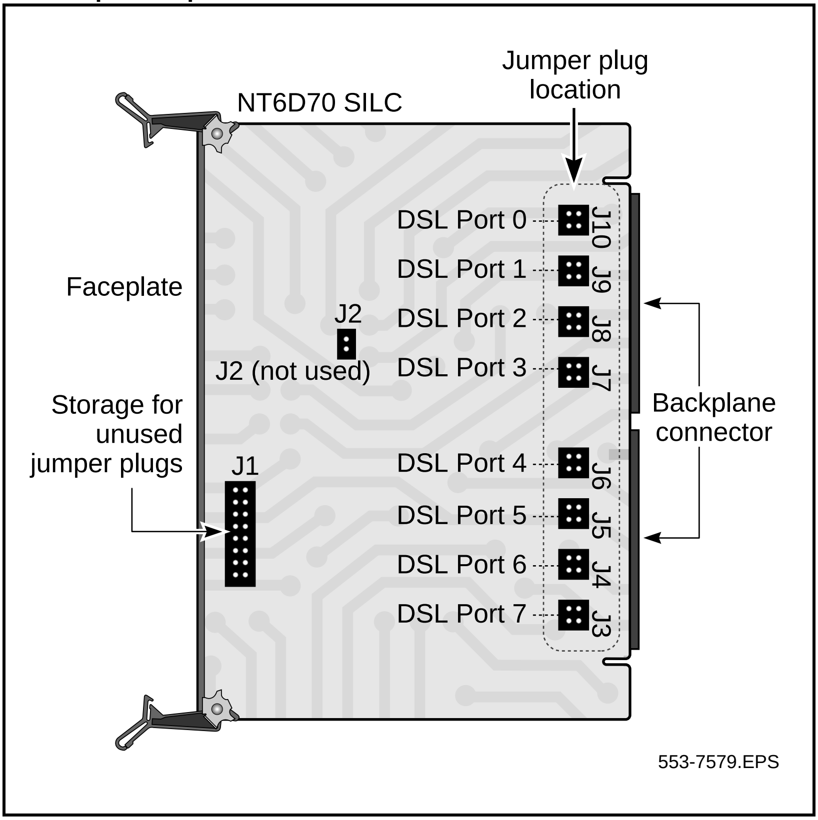
> **CAUTION**
> The static discharge bracelet located inside the cabinet must be worn before handling circuit cards. Failure to wear the bracelet can result in damage to the circuit cards.

2 **Remove the SILC or UILC from its shipping package and hold it by its card locking devices.**

3 **Configure the line powering options for the SILC using the jumper plugs. Each port is equipped with its own set of option jumper plugs to allow individual configurations for each DSL.**

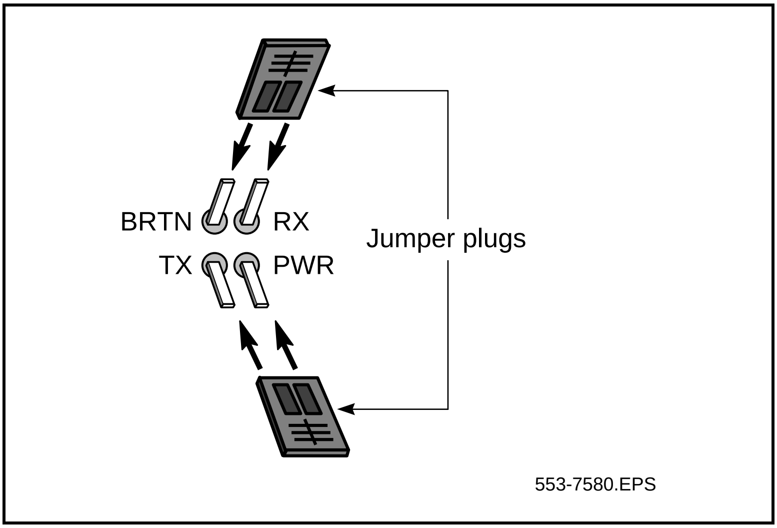
The SILC has three line powering options. These options are configured using the jumpers located near the backplane connector as shown in Figure 27.

Figure 27
Silc line power options

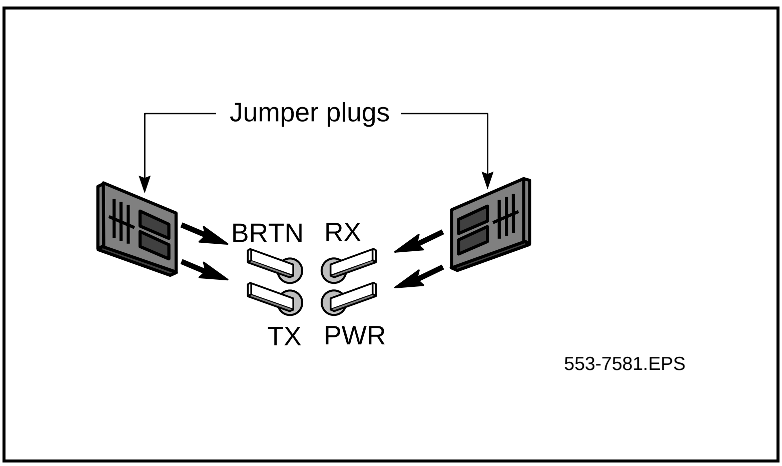


Unused jumper plugs should be stored on position J1 of the SILC for future use. The following describes the three options and their jumper settings.

a **Normal power on the Tx and Rx leads.** This option is set at the factory and provides normal power (-48 or -40 V) on the Tx lead and battery return (BRTN) on the Rx lead to power the terminal. It is implemented by installing one jumper plug across the Rx and BRTN pins, and one across the PWR and Tx pins as shown in the following illustration.



b **Reverse power on the Tx and Rx leads.** This option is used only in Japan and provides power (-48 or -40 V) on the Rx lead and battery return (BRTN) on the Tx lead to power the terminal. It is implemented by installing one jumper plug across the Rx and PWR pins, and one across the BRTN and Tx pins as shown in the following illustration.



c **No power on the Tx and Rx leads.** This option is used when the terminal is powered locally with an adapter provided with the terminal.
It is also used when a SILC DSL is used for trunking. See Chapter 6 for trunking information.
Remove the jumper plugs and store them on J1 to implement this option.

Note: Observe the LED on the faceplate of the SILC or UILC while performing the next step.

4 Insert the SILC or UILC into the selected card slot and lock it in place.

The LED should light, flash three times, then remain lit to indicate that the card is operating correctly but is not configured.
—or—
The LED should light, flash three times, then extinguish to indicate that the card is operating correctly and is configured.

Any other LED indication suggests a defective circuit card.

5 Repeat the steps in this procedure for each SILC or UILC being installed.

Installing PRI hardware

Please refer to “Installing PRI hardware” in Appendix A —2Mb PRI implementation.

Connecting ISDN BRI terminals

To complete the installation of ISDN BRI equipment, the ISDN BRI terminals must be connected to the Option 11. This consists of:

— Connecting the Option 11 to the cross-connect terminal

— Cross-connecting the wiring

— Connecting the terminating resistor (A0378866) to the SILC DSL

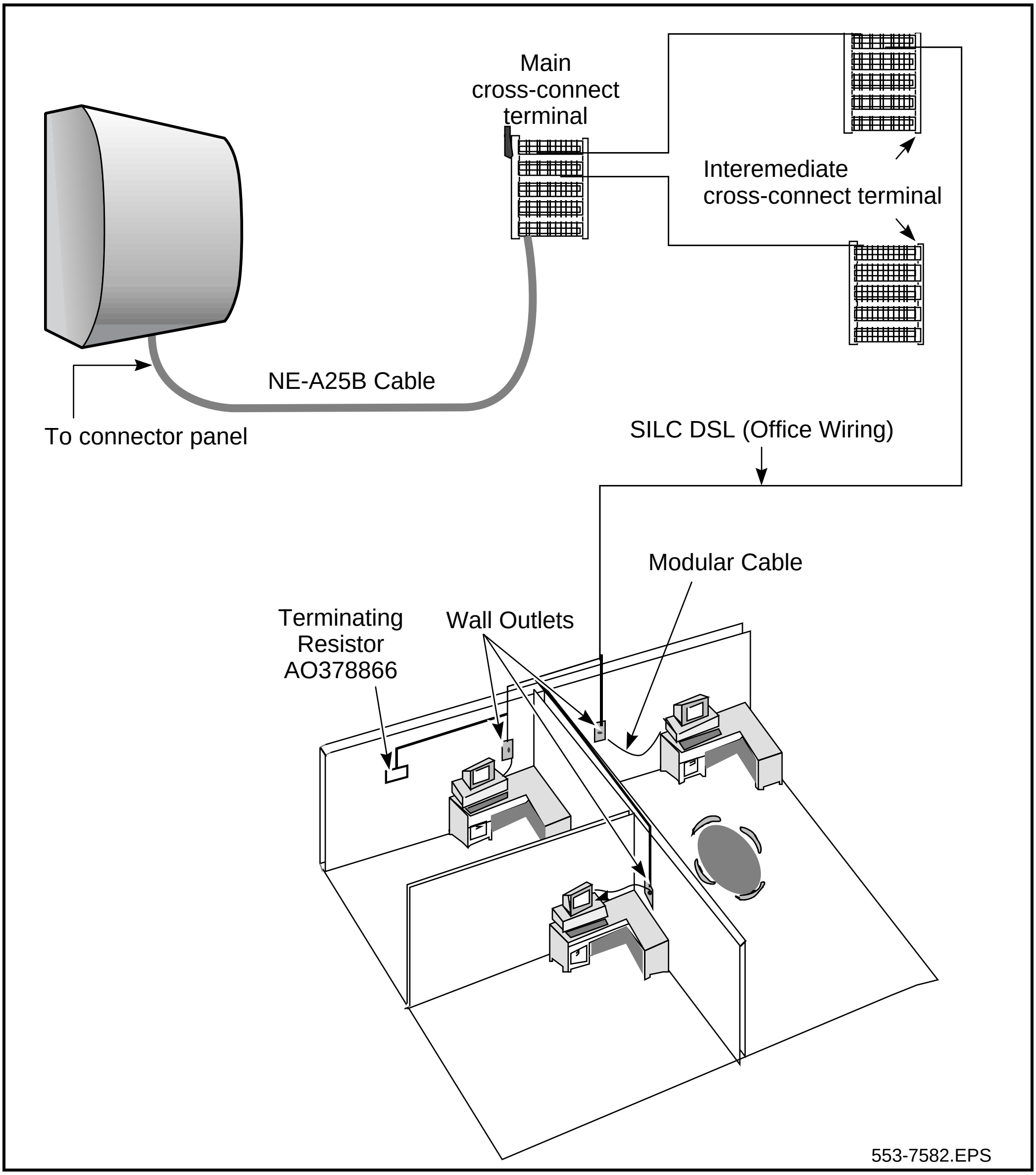
— Connecting ISDN BRI terminals to the DSL

— Initializing the terminals

Modular cord is used to connect a terminal to a DSL. The maximum length of this connection is 10 m (3.5 ft) from the terminal to the RJ-45 jack.

Figure 28 shows a typical DSL and ISDN BRI terminals connected to the Option 11.

Figure 28
Connecting ISDN BRI terminals to the Option 11



Connecting Option 11 cables to the cross-connect terminal

The following procedure describes how to connect the cables from the Option 11 cabinet to the cross-connect terminal.

Each card slot equipped with a SILC or UILC requires one NE-A25B 25-pair connector cable. The cables are connected to connectors located at the bottom of the cabinet and are routed through the openings in the lower part of the cabinet. Each connector is assigned to its corresponding card slot (example: connector J8 is assigned to card slot 8).

Connecting the cables

1 **Remove the connector retaining bar from the connector panel in the lower part of each cabinet. See Figures 29, 30, and Figure 31.**

2 **Connect an NE-A25B cable to each of the connectors associated with a card slot containing a SILC or UILC circuit card. See Figures 29, 30, and Figure 31.**

Make sure to tag both ends of each cable with the cabinet and connector numbers.

3 **Route the cables down through the opening at the bottom of the cabinet.**

4 **Replace the retaining bar when you have connected all the cables to the cabinet.**

5 **Terminate the 25-pair cables installed at the cross-connect terminal.**

6 **Label the cross-connect terminal for each connector (UILC or SILC).**

Figures 32 and 33 show the label used with the BIX cross connecting system.

Note: Use of the BIX cross-connect system is not mandatory. The Option 11 is designed to be used with other types of cross-connect equipment. Refer to the documentation provided with your cross-connect system for connection information.

Figure 29
Cable connectors in the main cabinet

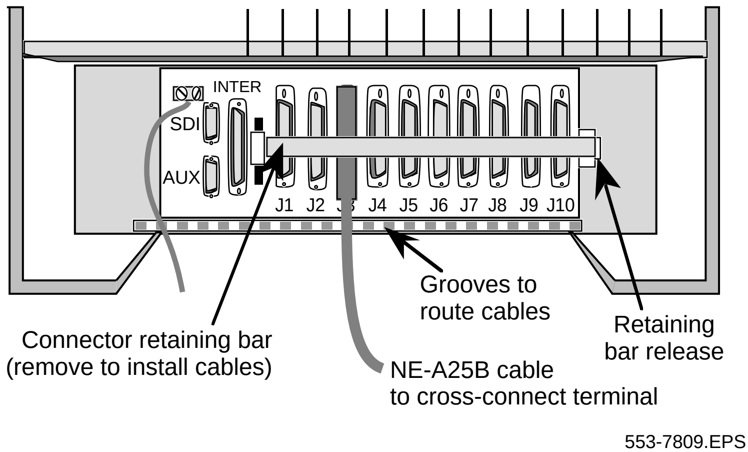


Figure 30
Cable connectors in the first expansion cabinet

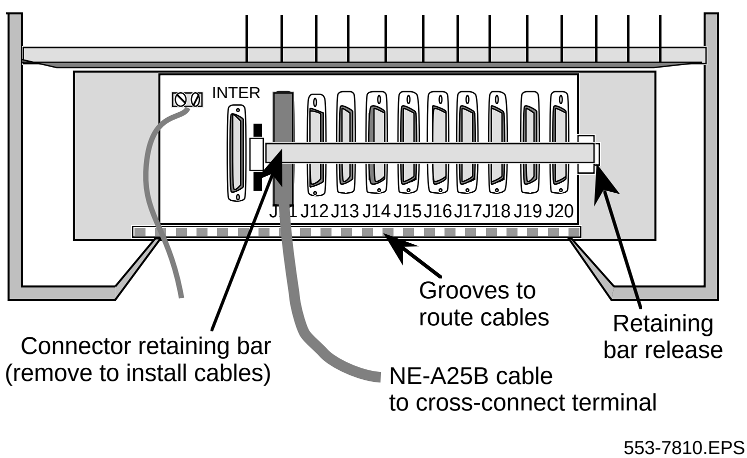


Figure 31 - Cable connectors in the second expansion cabinet

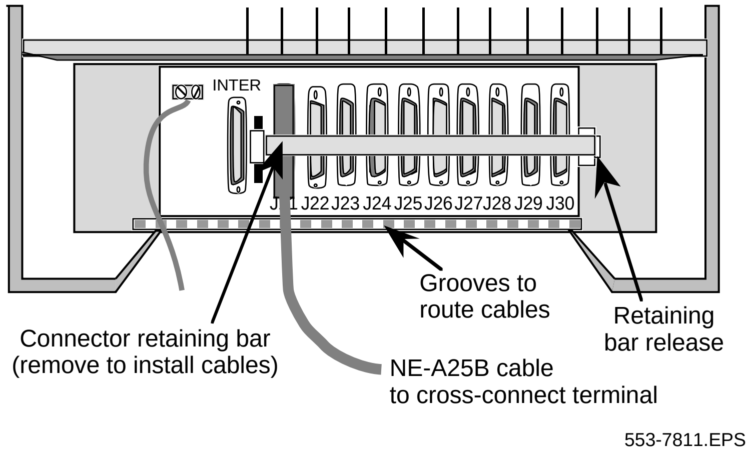
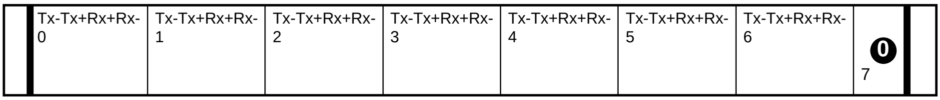


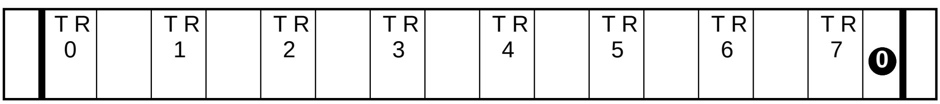
Figure 32
SILC port designation label at the cross-connect terminal



553-7812.EPS

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.

Figure 33
UILC port designation label at the cross-connect terminal



553-7813.EPS

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

Cross-connecting DSLs at the cross-connect terminal

Each SILC provides eight four-wire full duplex ports. These ports are connected to building wiring to form DSLs. The DSLs are polarity sensitive and signal polarity must be maintained along each loop as shown in Figure 34.

Each UILC provides eight two-wire full duplex ports. These ports are connected to twisted pair building wiring to form DSLs as shown in Figure 35. The UILC DSLs are not polarity sensitive.

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 13 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 13
SILC and UILC port assignments connectors at cross-connect terminal

SILC Port Signals	UILC Port Signals	Connector Pin Number and Wire Color Code		Card Ports
0 Tx- 0 Tx+ 0 Rx- 0 Rx+	0 T 0 R	26 1 27 2	W-BL BL-W W-O O-W	Port 0
1 Tx- 1 Tx+ 1 Rx- 1 Rx+	1 T 1 R	28 3 29 4	W-G G-W W-BR BR-W	Port 1
2 Tx- 2 Tx+ 2 Rx- 2 Rx+	2 T 2 R	30 5 31 6	W-S S-W R-BL BL-R	Port 2
3 Tx- 3 Tx+ 3 Rx- 3 Rx+	3 T 3 R	32 7 33 8	R-O O-R R-G G-R	Port 3
4 Tx- 4 Tx+ 4 Rx- 4 Rx+	4 T 4 R	34 9 35 10	R-BR BR-R R-S S-R	Port 4
5 Tx- 5 Tx+ 5 Rx- 5 Rx+	5 T 5 R	36 11 37 12	BK-BL BL-BK BK-O O-BK	Port 5
6 Tx- 6 Tx+ 6 Rx- 6 Rx+	6 T 6 R	38 13 39 14	BK-G G-BK BK-BR BR-BK	Port 6
7 Tx- 7 Tx+ 7 Rx- 7 Rx+	7 T 7 R	40 15 41 16	BK-S S-BK Y-BL BL-Y	Port 7

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 34
Cross-connecting a SILC port to the office wiring

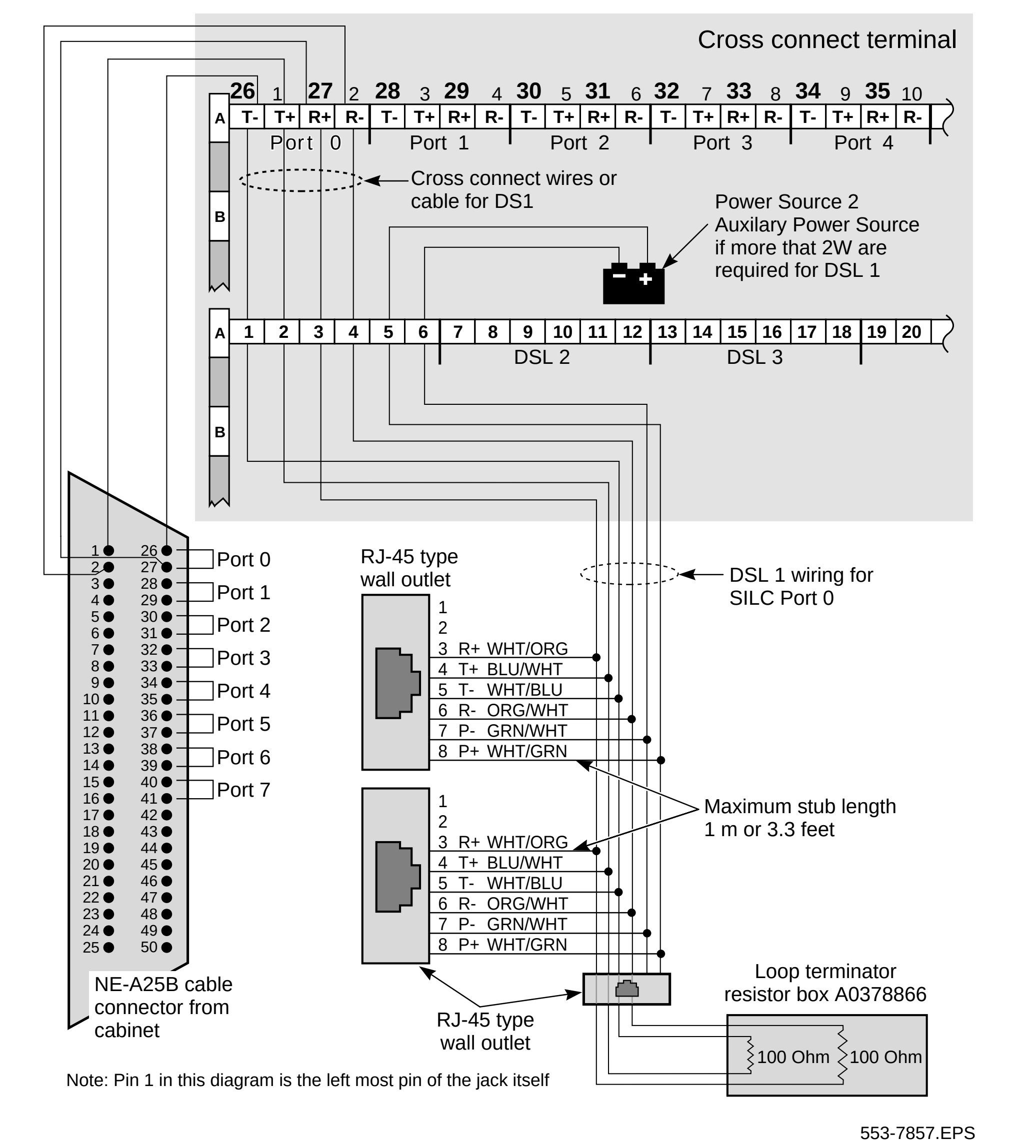
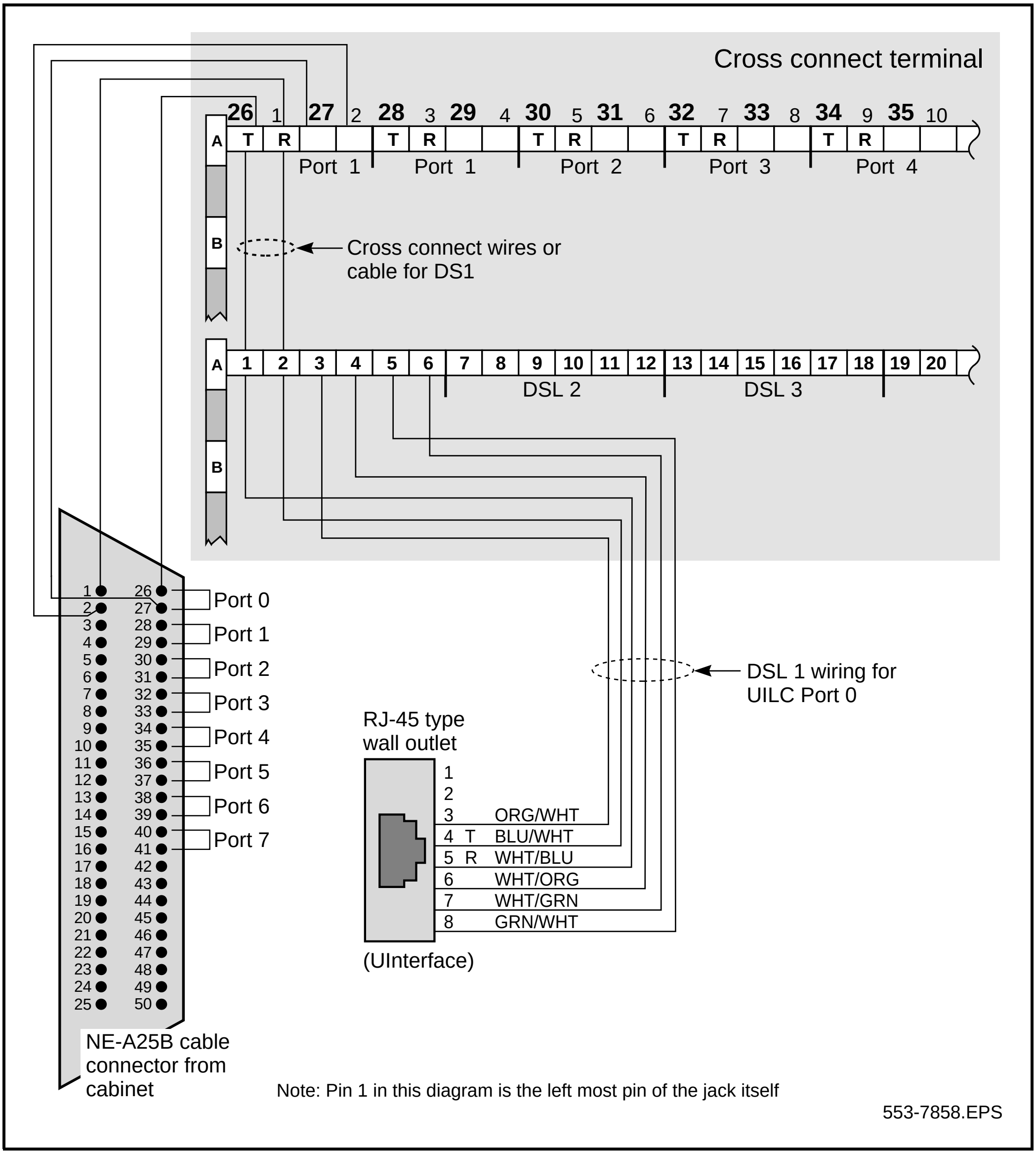


Figure 35
Cross-connecting a UILC port to the office wiring



Connecting the terminating resistor

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

Connecting ISDN BRI terminals to the DSL

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.

> ***Note:*** All terminals should comply with one of the following protocols: ETSI NET-3, INS NET-64, NUMERIS or ANSI standards for ISDN BRI terminals and be deemed compatible with Meridian 1. Contact your Northern Telecom representative for the latest list of compatible terminals.

To connect 1TR6 terminals, an ETSI NET-3 to the 1TR6 protocol converter is required. A terminal adapter (the S_o-Adapter) has been 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. See the user guide for configuration details.

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 is used to connect the terminal to the DSL using this modular cable.

Table 14 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 14
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.

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

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 a RJ-45 type jack. An RJ-45 type jack located on the NT1 device is used to connect the terminal to the DSL using this twisted pair cable.

The connector pin assignments for the jack and the plug are shown in the Table 15. The table also shows the signal names for each interface pin at the UILC and at the terminal.

Table 15
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

To connect ISDN BRI terminals to DSLs:

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 telephone outlet.**

2 **For a SILC S/T interface with 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 36 illustrates an ISDN BRI terminal connection to an S/T interface. Figure 37 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 steps 1 to 3 for each ISDN BRI terminal to be connected.**

Figure 36
Connecting the ISDN BRI terminal to the S/T interface

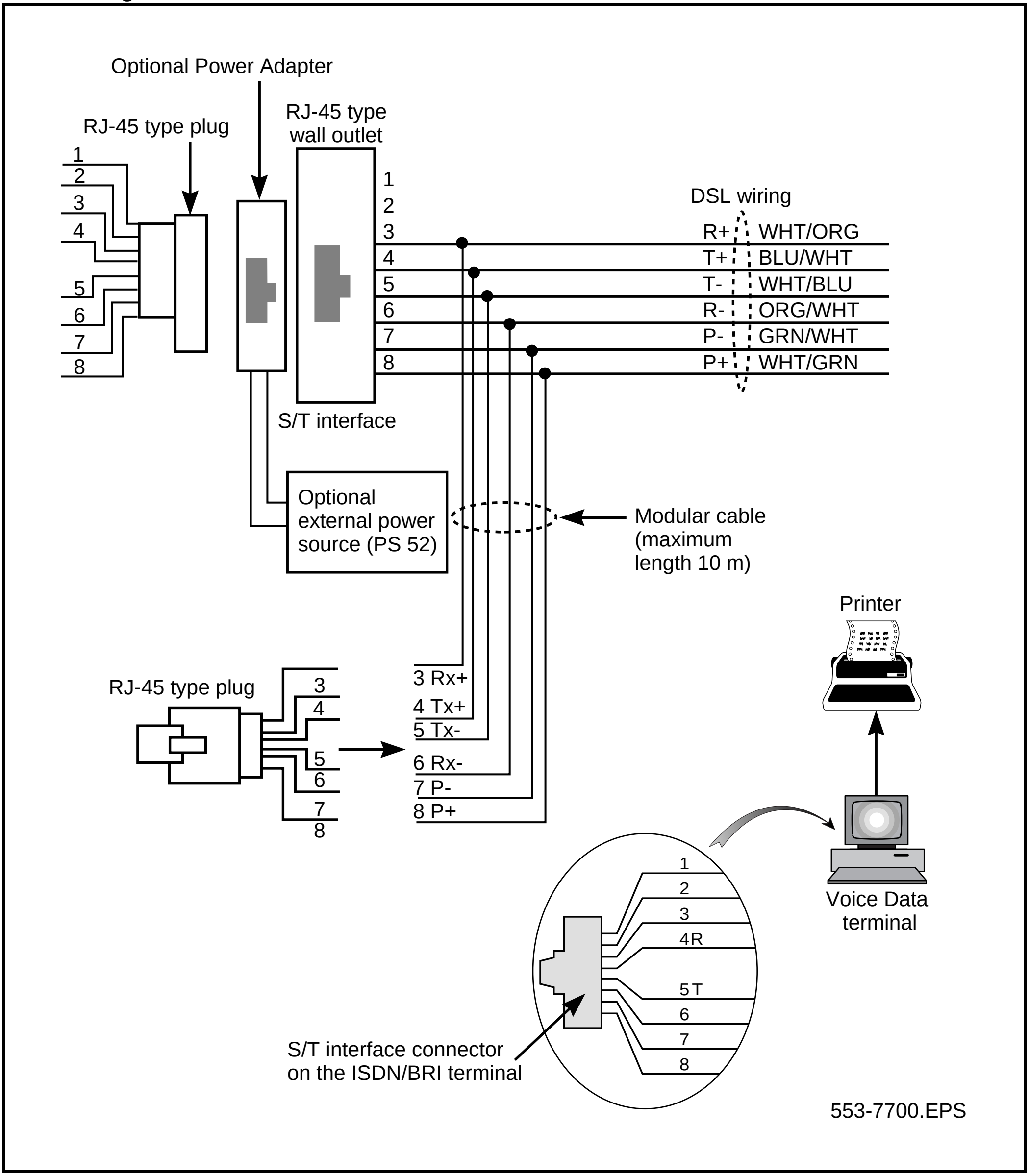
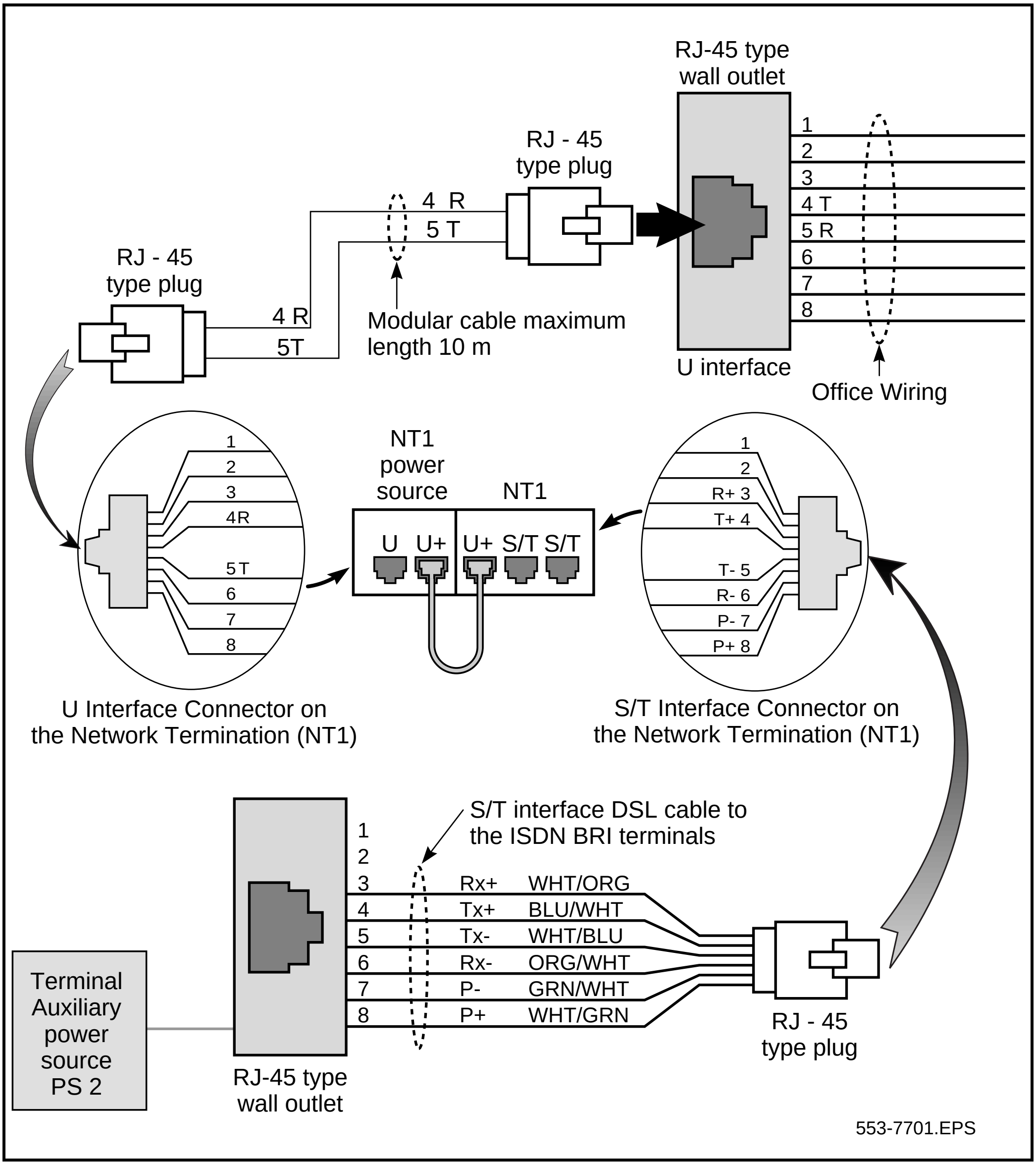


Figure 37
Connecting the ISDN network terminator to the U interface



Initializing a Northern Telecom M5317TDX terminal

The following is an example of the steps to follow to initialize an M5317TDX terminal. Table 16 is a list of error codes that may appear during terminal initialization and their meaning. 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 while holding down the RLS and HOLD keys as it powers up.**

3 **Press MAINROM.**

4 **Press INSTALL.**

5 **Press ENGLISH or FRANCAIS for your choice of language.**

6 **Press the soft key of the TEI you want to set PHONE, DATA or X25.**

   Note: With minimum firmware version 2.0 only dynamic TEI is supported.

   - **Enter * for dynamic TEI.**
   - **Enter the TEI on the terminal keypad for static TEI.**

7 **Press OK when you have finished setting the TEIs.**

8 **Enter the phone (voice) SPID. Press OK when finished.**

9 **Enter the data SPID. Press OK when finished.**

10 **Enter the data DN. Press OK when finished.**

11 **Press HEADSET until REAR is displayed.**

12 **Press SIGTYPE until MER1 is displayed.**

13 **Press A/MU until MU-LAW is displayed.**

14 **Press MORE.**

15 **Press DIALPLN until NATIONAL is displayed.**

16 **Press EXIT.**

17 **Press NO for execute SPM.**

18 Press YES for Enter datafill.

19 Press YES to delete existing datafill.

20 Press KEY# then enter on the keypad the key number you would like to program.

21 Press EDIT DN then enter on the keypad the DN's digits.

22 Press OK then SAVE after each DN.

23 Repeat steps 17-22 for each voice DN keypad you want. Press EXIT after all DN keys have been entered.

24 If you made a mistake, press INSTALL and begin at step 3. If the entries were correct, press EXIT.

25 Make a voice call to make sure the telephone is operational.

Table 16
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.

Initializing a Northern Telecom M5000 terminal adapter

The M5000 is Northern Telecom's Universal Terminal Adapter (UTA). It adapts a non-BRI data terminal or a 500/2500-type telephone to the ISDN BRI protocol. A terminal must be attached to the M5000 terminal adapter to initialize it. Refer to the M5000 terminal adapter user guide for detailed configuration procedures.

Programming procedures for line application and packet data transmission

You must configure the following components in the order listed below to configure ISDN BRI lines and/or packet data. Items required for packet data implementation only are noted.

1 **Optional: Configure a pad table using LD 73.**

This step is optional since if no pad values are configured the default values will be used.

Note: Pad table used for lines only when the protocol to be used on a DSL is set to ETSI NET-3, INS NET 64, Numeris or QSIG.

2 **Configure the LAPD Protocol Group using LD 27.**

3 **Configure the MISP using LD 27.**

4 **Configure the SILC or UILC using LD 27.**

Note: This step is optional. The SILC or UILC can also be configured when configuring the DSL (see next step).

5 **Configure the DSL using LD 27.**

6 **Configure the TSP using LD 27.**

7 **Configure the ISDN PRI trunk loop, route and channel assignments for packet data transmission using LD 15, LD 17, LD 16 and LD 14 respectively.**

The prompts and responses listed in the following overlay tables are specific to the line and packet data applications. For a complete list of the prompts and responses for any of the overlays listed, refer to the *X11 Software Guide Including Supplementary Features*.

Configuring pad tables

ISDN BRI software programming: Configuring pad tables, using overlay 73 (Optional). (Pad table can be used only for lines when the protocol to be used on a DSL is set to ETSI NET3, INS NET64 or Numeris.)

This step is optional since if no pad values are set the default values will be used. Define the pad settings if required. The digital pad provides gain or attenuation values to condition the level of the digitized transmission signal according to the network loss plan. This determines transmission levels for the B-channel circuit-switched voice calls.

LD 73 —Configuring pad tables

Prompt	Response	Comment
REQ	NEW	New settings
TYPE	BRIL	Table type
FEAT	PAD	Set the pad values
PDCA	1-16	PAD Category table.
		If one channel is using the specified table, then the command is aborted.
		Table 1 cannot be modified or deleted.
TNLS	YES (NO)	TN List. This is for the print command only.
		A YES response means that a list of the trunk TNs using the requested PAD category tables will be printed after the table.
PDCA	1-16	PAD Category table.
		Table 1 cannot be modified or deleted.
DFLT	(1)-16	For NEW only. The table is used for default values.
The following prompts define the pad levels. The receiving pad code is *r* and the transmission pad code is *t*. These entries have the range 0-26. The pad values (in decibels) relating to these codes are shown after this table.		
ONP	r t	On-premises extension
DSET	r t	Meridian Digital Set
OPX	r t	Off-premises extension
DTT	r t	Digital TIE trunks
SDTT	r t	digital Satellite TIE trunks
NTC	r t	Nontransmission compensated
TRC	r t	Transmission compensated
DCO	r t	digital COT, FEX, WAT, and DID trunks

Prompt	Response	Comment
VNL	r t	VIA NET LOSS
DTO	r t	2Mb DTI digital TOLL office trunks
ACO	r t	Analog local exchange or WATS trunks
AFX	r t	Analog FEX trunks
ADD	r t	Analog DID trunks
SATT	r t	Analog satellite TIE trunks
ATO	r t	Analog TOLL office trunks
PRI2	r t	2Mb PRI trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=2Mb PRI) Author's Note—p7/dave/gateway
XUT	r t	Analog local exchange trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
XEM	r t	Analog TIE trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
BRIL	r t	Basic Rate Interface Line
BRIT	r t	Basic Rate Interface Trunk ....

The following table shows pads codes and their values. Positive dB represents loss and negative dB represents gain.

Pad codes and values

code	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					

Configuring the LAPD protocol group

A protocol group is added by using LD 27 and specifying its protocol group number. You also change its LAPD parameters or accept the default values. LAPD is a transmission protocol that specifies the transmission timers, the maximum number of retransmissions, the size of the data frame, and the number of negative acknowledgments before the system issues an alarm.

LD 27 — Configuring the LAPD protocol group

Prompt	Response	Comment
REQ	NEW	Add an ISDN protocol group
TYPE	LAPD	LAPD Protocol group
PGPN	0-15,<cr>	Protocol group number The values for this prompt are: 0-15=Adds a specified protocol group <cr>=Stops this prompt from being displayed again
LAPD	YES,(NO)	LAPD parameters —The values for this prompt are: YES=Define or modify the LAPD parameters NO=Does not prompt the LAPD parameters and assigns the default values shown in ( ) to these parameters.
T200	(2)-40	Retransmission timer specifies the time delay before the system retransmits the information. Delay is in increments of 0.5 seconds.
T203	4-(20)-80	Maximum time between transmission frames Delay is in increments of 0.5 seconds.
N200	1-(3)-8	Maximum number of retransmissions of unsuccessfully transmitted information.
N201	4-(260)	Maximum number of contiguous octets or bytes of information.
K	(1)-32	Maximum number of outstanding negative acknowledgment (NAKs) allowed before alarming the system.
N2X4	<cr>	For 1TR6 connectivity — number of status inquiries when the remote station is in peer busy state.
PGPN	<cr>	Press <cr> to prevent repetition of all the parameters starting with LAPD.

Configuring a MISP

A MISP is added to the system by specifying its card slot number using LD 27. You must also determine if the MISP will handle packet data and specify the PRI loop and channel numbers that will be used to transmit packet data to and from the packet handler.

LD 27— Configuring a MISP

Prompt	Response	Comment
REQ	NEW	Add an ISDN BRI MISP
TYPE	MISP	MISP
LOOP	1-9	MISP card slot number
APPL	BRIL	Application type for the MISP. APPL defaults to BRIL if BRIL is equipped; otherwise, it defaults to BRIT. A message of “DEFAULT TRUNK APPL CONFIGURED” or “DEFAULT LINE APPL CONFIGURED” is displayed as appropriate. APPL is prompted until <cr> is entered.
DSPD	YES, (NO)	YES = D-channel Packet Switched Data NO = No D-channel Packet Switched Data. If NO is entered, subsequent prompts will be skipped.
MPHC	(YES), NO	***Note:*** A response to this prompt is only required for packet data implementation. YES = DPSD are routed to a MPH NO = DPSD are routed to an external packet handler or PSDN. The MPH is not supported on Option 11. Respond MPHC = NO to choose the external packet handler.
TN	lll ch	lll (0-159) = PRI loop number ch (1-23) = The PRI channel on which the dedicated B-channel connection from the MISP is terminated.

Configuring a SILC or UILC

A new SILC or UILC is added by specifying its location, card type, and the MISP card slot that this card uses to transmit and receive signaling and D-channel packet data.

> ***Note:*** You have an option of skipping this step and specifying the card type when you configure the DSL. This procedure is used when you want to configure the cards without configuring its DSLs.

LD 27 — Configuring a SILC or UILC line card

Prompt	Response	Comment
REQ	NEW	Add a SILC or UILC line card
TYPE	CARD	SILC or UILC line card
DSL	c or c 0 0	Card slot location The values for this prompt are 1-20
MISP	1-9	MISP card slot number
CTYP	SILC,UILC	Card type to be added

Configuring a line DSL

A DSL is added by specifying its port location and its DSL characteristics. A DSL port location specifies a SILC or UILC port that is connected to a DSL.

LD 27 — Configuring a line DSL

Prompt	Response	Comment
REQ	NEW	Add a DSL
TYPE	DSL	DSL
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL number)=0-7 ***Note:*** You can assign only 31 DSLs for each MISP if you specified DCH or BDCH at the PH prompt in *MISP configuration procedures.*
OPT	BRIL	ISDN BRI line Application

Prompt	Response	Comment
DES	x...x	Designator you assign to a DSL (example, BUILD2) The values for this prompt are: x...x=1 to 6 alphanumeric DSL designator
CUST	0-31	Customer number
CTYP	SILC,UILC	SILC or UILC line card ***Note:*** This prompt is displayed only if the SILC or UILC has not been previously configured, or if another DSL has not been configured on the same SILC/UILC.
MISP	1-9	MISP card slot number This prompt is displayed only if the MISP has not been assigned to the specified SILC or UILC.
MODE	NTAS,NTFS	Network terminal line sampling mode The values for this prompt are: NTAS=Adaptive sampling Extended passive bus, Branched passive bus, Point-to-point bus NTFS=Fixed sampling Short passive bus This prompt is displayed only if you specified the card type as SILC and defaults to NTAS.
B1CT		B-channel 1 call type.
	(VCE) (DTA)	VCE = Circuit switched voice
	PMD	DTA = Circuit switched data
	XPMD	PMD = B-channel packet data with dedicated connection from DSL to a PRI channel using external packet handler. For B1CT = PMD, B-channel packet data must have been specified at the PH prompt in LD27. PMD cannot be combined with any other options. Do not select <cr> which defaults to VCE (circuit switched voice) and DTA (circuit switched data) which may not run concurrently with packet data. XPMD = Delete PMD call types. Enter <cr> to select voice and data as defaults.

Prompt	Response	Comment
TN	lll ch	lll (0-159) = PRI2 loop number which is connected to the external packet handler or the Packet Switched Data Network.
		ch (1-30) = the PRI2 channel on which the dedicated B-channel dedicated connection from the DSL B-channel is terminated.
		TN prompt is given only if call type = PMD.
		The PRI channel must be configured in LD17 and dedicated only to the connection of an external packet handler.
B2CT		B-channel 2 call type
	(VCE) (DTA)	VCE = Circuit switched voice
	PMD	DTA = Circuit switched data
	XPMD	PMD = B-channel packet data with dedicated connection from DSL to a PRI channel using external packet handler.
		For B2CT = PMD, B-channel packet data must have been specified at the PH prompt in LD27.
		PMD cannot be combined with any other options.
		Do not select <cr> which defaults to VCE (circuit switched voice) and DTA (circuit switched data) which may not run concurrently with packet data.
		XPMD = Delete PMD call types.
		Enter <cr> to select voice and data as defaults.
TN	lll ch	lll (0-159) = PRI2 loop number which is connected to the external packet handler or the Packet Switched Data Network.
		ch (1-30) = the PRI2 channel on which the dedicated B-channel dedicated connection from the DSL B-channel is terminated.
		TN prompt is given only if call type = PMD.
		The PRI channel must be configured in LD17 and dedicated only to the connection of an external packet handler.

Prompt	Response	Comment
LDN	0, 1, 2, 3 (NO)	Departmental listed directory number The values for this prompt are: 0, 1, 2, 3=Departmental listed directory number specified in Customer Data Block Program LD 15 NO=No departmental listed directory number associated with the DSL
XLST	(0)-254	Pretranslation group. This prompt appears if configured in customer data block.
MTEI	1-(8)-20	Maximum number of Terminal Endpoint Identifiers, both static and dynamic combined which can be assigned to the logical terminals on this DSL.
LTEI	n1 n2 mm, <cr>, Xmm	n1 = Logical Terminal Identifier (LTID) n2 = static Terminal Endpoint Identifier (TEI) mm (0-63) = MTEI, the maximum number of LTID and TEI n1 = 0 -15 and n2 = 0-1023 0 0 is invalid. 15 1023 is invalid. Logical Terminal Identifier (LTID) and static Terminal Endpoint Identifier (TEI) pair for D-channel packet data transmission. MTEI = the maximum number of these pairs. LTID = Logical Terminal Group (LTG) and Logical Terminal Number (LTN). LTG and LTN are entered as part of the DPN configuration. The TE I must match the one in the terminal. By entering all three here, the MISP is able to route data from the terminal to the DPN packet switch. Xmm = Deletes the LTID and TEI for the specified TEI.
MCAL	2-(16)-32	Maximum number of calls on a DSL at one time. This includes calls waiting and on hold. Warning is received if less than 8 is specified.
MTSP	1-(8)-16	Maximum number of TSPs allowed for a DSL
PGPN	0-15	Protocol group number The protocol group should be previously added as described in *Configuring a protocol group*.

Prompt	Response	Comment
PRID	1-6	Defines the protocol to be used on the DSL Selection of the protocol ID is terminal dependent The values for this prompt are: 1=ANSI 2=ETSI NET-3 3=DMS 4=INS NET64 5=Numeris 6 = NI-1 ***Note:*** A response of 6 allows the ISDN BRI Conference feature to be configured in the TSP of the DSL
PDCA	(1)-16	Pad table number PDCA is only prompted for lines when PRID is ETSI NET3, INS NET64 or Numeris
FDN	n...n	Flexible CFNA directory number Enter a 4-13 digit directory number.
EFD	n...n	Flexible external call CFNA directory number Enter a 4-13 digit directory number.
HUNT	n...n	Hunt directory number Enter a 4-13 digit directory number.
EHT	n...n	Hunt external call directory number Enter a 4-13 digit directory number
TGAR	(0)-31	Trunk group access restriction
NCOS	(0)-99	Network class of service

Prompt	Response	Comment
CLS		Class of service access restrictions. The values for this prompt are:
	(ICDD)	Internal Call Detail Recording Denied
	ICDA	Internal Call Detail Recording Allowed
	(MRD)	Message Restriction Denied
	MRA	Message Restriction Allowed
	(UDI)	Unrestricted DID
	RDI	Restricted DID
	(UNR)	Unrestricted) - **Releases 18 - 21.**
	(CTD)	Conditionally Toll Denied - **Release 22 and later.**
	CUN	Conditionally Unrestricted
	FR1	Fully Restricted class 1
	FR2	Fully Restricted class 2
	FRE	Fully Restricted
	SRE	Semi-Restricted
	TLD	Toll Denied
	ICDA	Internal Call Detail Recording allowed
	(ICDD)	(Internal Call Detail Recording denied)
	<cr>	Enter <cr> to select the defaults.
		More than one class of service can be entered byseparating each entry with a space.

Configuring a TSP

A TSP is added to a DSL by specifying the DSL location and its transmission characteristics as well as the class of service features for the terminals connected to the DSL. If you wish to accept the default value, press the Enter key <cr>.

> ***Note:*** This step is not required for packet data implementation.

LD 27 — Configuring a TSP

Prompt	Response	Comment
REQ	NEW	New TSP
TYPE	TSP	Assign a TSP to a DSL
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL location)=0-7 ***Note:*** The DSL must have been configured using the *DSL configuration procedures.*
USID	0-15	User service identifier USID=0 the default TSP is assigned to non-initializing terminals. The total number of TSPs defined for a DSL cannot exceed the maximum number as specified by the MTSP prompt in the *DSL configuration procedures*. A default TSP should be configured for non-initializing terminals. This is done by assigning USID=0 to the TSP.
MPHC	(YES) NO	The MPH is not supported on Option 11. Respond with MPHC = NO.

Prompt	Response	Comment
SPID	aaa...a <cr> Xaaa...a	Service profile ID aaa...a = any combination of 1-20 alphanumeric characters. <cr> = Stops this prompt from being displayed again. A maximum of 8 valid SPIDs per TSP are allowed. Xaaa...a removes the specified SPID. <cr>=Stops this prompt from being displayed again. A maximum of 8 valid SPIDs per TSP are allowed. This prompt appears only if the user service identifier is 1-15. It will be repeated until <cr> is entered but only up to 8 SPIDs are allowed per DSL. The SPID defined must be entered in the initializing terminal to associate the terminal with a USID.
FEATID	aaa mmm nnn <cr> Xaaa	ID associated with feature aaa, as follows: A03 = 3-party Conference A06 = 6-party conference mmm = Feature Activation ID(1-127) nnn = Feature Indication ID (1-127) (optional; if not entered, the value entered for mmm is assumed) <cr> = Skip the FEATID entry Xaaa = Delete the feature. Feature Activation ID and Feature Indication ID are feature key number assignments configured at the terminal level. Recommended terminal assignments are: - for the M5317TDX: A06 15 - for the M5209TDcp: A06 9

Prompt	Response	Comment
DN	xxxx (0)-N <cr>	Directory number to be associated with the TSP xxxx = DN to be associated with the TSP. (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). <cr>=Stops this prompt from being displayed again The directory number assigned cannot be shared by a non-BRI terminal. This prompt is repeated until <cr> is pressed. At least one and a maximum of 8 DNs can be assigned to a DSL. The directory number can be associated with multiple TSPs on a DSL but it cannot be associated with any other DSL.
CT	VCE DTA	This prompt defines the call type to be associated with the Directory Number. The values for this prompt are: VCE=Circuit switched voice DTA=Circuit switched data One or more call types can be entered by separating each entry with a space. ***Note:*** The call types entered must have been specified for the B1CT and B2CT prompts in the *DSL configuration procedures*.
MCAL	1-(4)-8	Maximum number of calls per DN at one time Defines the maximum number of calls allowed for a directory number. This total represents the sum of active calls, calls waiting, and calls on hold.
PRES	(YES),NO	Allows display of calling line identification to far end on outgoing calls. YES= allows this DN to be presented to the called party on outgoing calls NO= do not present this DN to the called party on outgoing calls
COLP	(NO) YES	Connected Number Information Elements (IEs) is (not) passed from the Meridian 1 to the Terminal Adapter (S_o).
TRANS	(NO) YES	CLID and Connected Number Information Element (IE) are (not) passed from the Meridian 1 to the Terminal Adapter (S_o), if presentation is restricted.

Prompt	Response	Comment
FEAT	HTA/(HTD) FNA/(FND) SFA/(SFD) CFTA/(CFTD) MWA/(MWD) FBA/(FBD) HBTA/(HBTD) DNO1/DNO2/(DNO3) DNDN/(DNDY)	Class of service features HTA = Hunt allowed (always assign if terminal has CWT capability) HTD = Hunt denied FNA = Call forward no answer allowed FND = Call forward no answer denied SFA = Second level call forward no answer allowed SFD = Second level call forward no answer denied CFTA = Call forward by call type allowed CFTD = Call forward by call type denied MWA = Message waiting allowed MWD = Message waiting denied FBA = Call forward busy allowed FBD = Call forward busy denied HBTA = Hunting by call type allowed HBTD = Hunting by call type denied DNO1/DNO2/(DNO3) = QSIG Call Diversion Notification for calling party where: DNO1 = no notification DNO2 = notification without forwarded-to (diverted) party's number and name (DNO3) = notification with forwarded-to (diverted) party's number and name when available (default). DNDN/(DNDY) = QSIG Call Diversion Notification for forwarded-to (diverted) party where: DNDN = no notification of called party's number and name notification (DNDY) = notification with called party's number and name when available (default). You can enter more than one class of service by separating each entry with a space. You can press <cr> and select multiple default features shown in parenthesis.

Prompt	**Response**	**Comment**
DN	xxxx (0)-N <cr>	xxxx = DN to be associated with the TSP. (0)-N = CLID entry, with N = CLID SIZE-1 (SIZE defined in LD 15). <cr>=Stops this prompt from being displayed again The directory number assigned cannot be shared by a non-BRI terminal. This prompt is repeated until <cr> is pressed. At least one and a maximum of 8 DNs can be assigned to a DSL. The directory number can be associated with multiple TSPs on a DSL but it cannot be associated with any other DSL.
DFDN	n...n	Default directory number Enter a 1 to 7-digit directory number. This directory number must have been previously defined at the prompt DN above. A directory number can be associated with multiple TSPs. Only one default DN can be defined for a TSP. This DN is sent in the outgoing setup if the terminal does not send a calling line identification number with the outgoing call.

Configuring ISDN PRI trunk assignments for packet data

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

The following describes how to configure ISDN PRI trunk assignments for packet data using LD 15, LD 17, LD 16 and LD 14 respectively.

LD 15 — Prompt formats for defining an ISDN customer

Prompt	Response	Comment
REQ	NEW/CHG	NEW for new customer or CHG for an existing customer
TYPE	CDB NET_DATA	Customer data block Networking Data (Release 21 gate opener).
CUST	0-31	Customer number.
...	...	
...	...	
ISDN	YES	YES customer is equipped with ISDN (only prompted with D-channel defined in overlay 17)
...	...	

LD 17 — Prompt formats for defining configuration data block

Prompt	Response	Comment
REQ	CHG	CHG to define data
TYPE	CFN	Configuration data block.
...	...	
CEQU	YES	CE parameter change
DLOP or PRI2	1-9 1-9	1.5 Mb PRI 2.0 Mb PRI
...	...	

LD 16 — Configuring ISDN BRI trunk route parameters

Prompt	Response	Comment
REQ	NEW	Add ISDN BRI protocol group settings
TYPE	RDB	Route data block.
CUST	0-31	Customer number.
DMOD	<cr>	Default model number for this route
ROUT	0-511	Route number.
TKPT	TIE	Trunk route type.
ESN	<cr>	Pad control
CNVT	<cr>	Conventional switch route
SAT	<cr>	Satellite transmission
RCLS	<cr>	Class marked route
DTRK	YES	Digital Trunk Route
BRIP	YES	BRI packet handler route
DGTP	PRI or PRI2	1.5 Mb PRI 2.0 Mb PRI
PTYP	<cr>	Port type
ACOD	xxxxxxx	Trunk route access code
TARG	<cr>	Access restriction group number

Prompt	Response	Comment
CNTL	<cr>	Changes to control timers
...	...	

LD 14 — Configuring the trunk data

Prompt	Response	Comment
REQ	NEW	Enter new trunk data
TYPE	TIE	Trunk type
TN	cc uu	Card and unit
CUST	0-31	Customer number
NCOS	<cr>	Network class of service group
RTMB	xx xx	Route and route member
MNDN	<cr>	Manual directory number
TGAR	<cr>	Trunk group access restriction
CLS	<cr>	Class of service
TKID	<cr>	Trunk identifier
...	...	

Chapter 6 — ISDN BRI trunk implementation

Note: ISDN BRI trunk access is not supported in North America.

Introduction

This chapter describes the implementation of the Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) trunk service, the associated equipment, installation procedures and software programming procedures for the Option 11 system.

This chapter is divided into the following sections:

— ISDN BRI trunk access

— Hardware requirements

— Installing ISDN BRI hardware

— ISDN BRI trunk software programming

ISDN BRI trunk access

ISDN BRI trunks may be configured for either local exchange/CO/DID trunk connectivity, MCDN Tie trunk connectivity, or QSIG trunk connectivity. ISDN BRI trunk connections are configured on a per DSL basis, that is, DSL trunk connections may be configured on any given DSL for any SILC or UILC. The trunks can be accessed using both ISDN BRI terminals and non ISDN BRI devices (such as digital and analog telephones).

ISDN BRI Local exchange CO/DID connectivity is accomplished via a MISP card and an S/T interface, using the SILC line card. This connectivity is supported for Numeris VN3, 1TR6, ETSI NET-3 (EuroISDN), INS NET-64 (Japan D70), and Asia-Pacific protocols; refer to Figure 38.

ISDN BRI MCDN Tie trunk connectivity is achieved via a MISP card and either S/T or U interfaces, using the SILC and UILC line cards respectively. This connectivity may be:

- between two Meridian 1 PBXs through a local exchange acting as a passive facility; the local exchange must support Numeris VN3, 1TR6, ETSI NET-3 (EuroISDN), INS NET-64 (Japan D70), or Asia-Pacific protocols; refer to Figure Figure 39.
- directly between two Meridian 1 PBXs; refer to Figure 40 and Figure 41.

ISDN BRI QSIG connectivity is achieved through an MISP card and either S/T or U interfaces, using the SILC and UILC line cards respectively. This connectivity is supported within a Private Telecommunications Network (PTN) between two Private Telecommunications Network Exchanges (PTNXs); examples may be a Centrex-to-Centrex connection, or a Centrex-to- PBX connection; refer to Figure 42 in the section “ISDN BRI QSIG connectivity” on page 255.

> ***Note:*** The BRSC cannot be utilized for ISDN BRI trunk access.

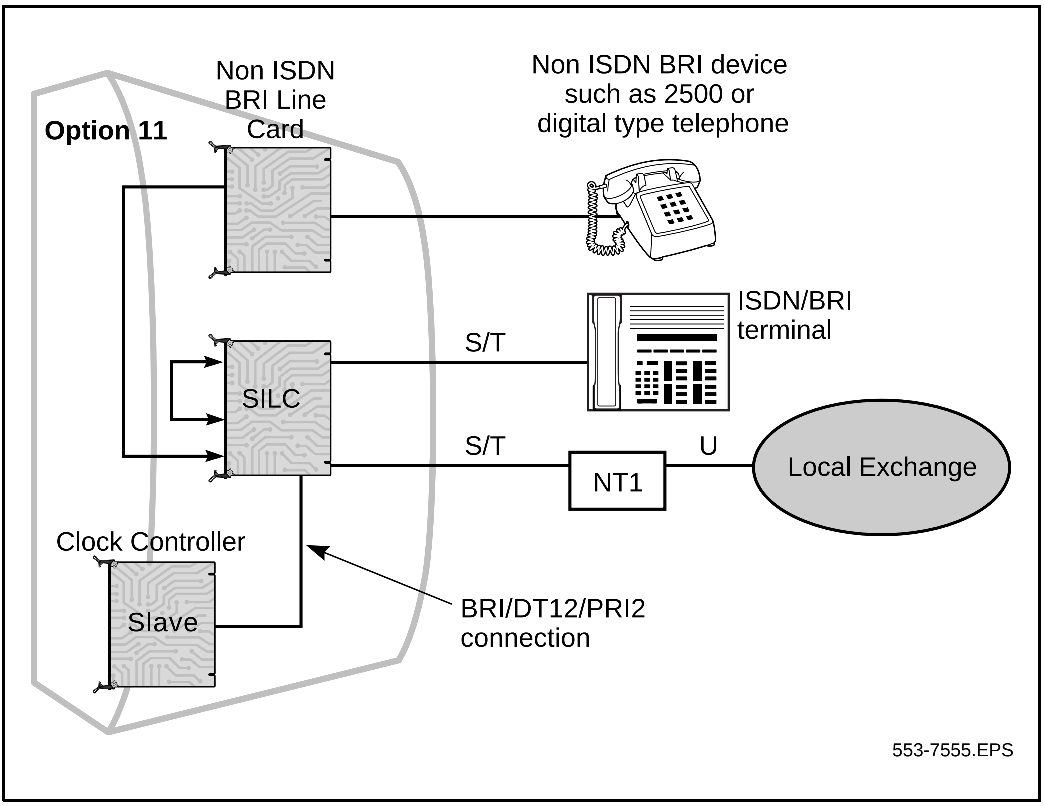
These configurations are explained in greater detail in the sections that follow.

ISDN BRI local exchange/CO/DIDconnectivity

ISDN BRI Local Exchange connectivity is supported in markets equipped with local exchanges that conform to Numeris VN3, 1TR6, ETSI NET-3 (EuroISDN), INS NET-64 (Japan D70), or Asia-Pacific protocols. This connection is accomplished through the SILC line card, with the designated DSL configured in the Terminal Equipment (TE) Mode. This configuration requires that the PBX acts as terminal equipment to the Local exchange. The interface from the PBX, looking towards the Local exchange is always an S/T interface.

Figure 38 illustrates the ISDN BRI local exchange connectivity.

Figure 38
ISDN BRI trunk access local exchange connectivity — not supported in North America



The ISDN BRI DSL is connected to a Network Termination (NT1) device which is physically located on the same premises as the Option 11. The NT1 device connects to a local exchange that supports Numeris or 1TR6 protocol through a U interface. (The NT1 device is typically owned by the local exchange/Post Telegraph and Telephone allowing the local exchange/PTT to use any type of U interface, including proprietary implementations.)

The distance limitation of the NT1 from the local exchange depends on the distance supported by the local exchange.

Clock synchronization may be achieved by having the Option 11 slave to the Local exchange; the clock source may be derived either from the ISDN BRI local exchange connection or from other PRI/DTI/BRI Local exchange connections if available.

The following Information Elements are supported on ISDN PRI and BRI access trunks (these elements are required for calls between ISDN BRI terminals and local exchange trunks):

— High Layer Compatibility

— Low Layer Compatibility

— Calling Party Subaddress

— Called Party Subaddress

All local exchange connectivity functionality and references also apply to DID trunks.

1TR6 local exchange connectivity

1TR6 local exchange connectivity provides 2B+D connectivity to a local exchange that supports 1TR6 protocol via an S/T interface. The ISDN BRI 1TR6 local exchange connectivity provides the following basic call and supplementary services:

> ***Note:*** Support for any feature is dependent upon the terminal equipment being used.

— Basic call service

— Circuit switched voice and data on the B-channel

— Calling Line Identification Presentation and Restriction

— Connected Number Delivery

— support for TIE, COT, DID, DOD trunk types

— Channel negotiation

> ***Note:*** in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

— Overlap sending

— Flexible Numbering Plan

— Indication of Call Charging to the calling party

— Network-wide interworking with ISDN BRI ETSI terminals

Numeris VN3 local exchange connectivity

The Numeris local exchange connectivity provides 2B+D connectivity through an S/T interface to a local exchange that supports Numeris VN3 protocol. The ISDN BRI/Numeris VN3 local exchange connectivity provides the following basic call and supplementary services:

— Basic call service

— Circuit switched voice and data on the B-channel

— Called/calling party subaddress (network-wide)

— Support for TIE, COT, DID, DOD trunk types

— Channel negotiation

Note: in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

— 64 kbps clear bearer capability

— Flexible Numbering Plan

— Advice of charge during call and at end of call

— Network-wide interworking with ISDN BRI Numeris terminals

Japan D70 (INS NET-64) local exchange connectivity

The Japan D70 (INS NET-64) local exchange connectivity provides 2B+D connectivity through an S/T interface to a local exchange that supports the D70 protocol (D70 is the Japanese version of the INS NET-64 protocol).The ISDN BRI/Japan D70 local exchange connectivity provides the following basic call and supplementary services:

— Basic call service

— Circuit switched voice and data on the B-channel

— Called/calling party subaddress (network-wide)

— Support for TIE, COT, DID, DOD trunk types

— 64 kbps clear bearer capability

— Flexible Numbering Plan

— Advice of charge at end of call

— Channel Negotiation

Note: in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

EuroISDN connectivity

The EuroISDN connectivity provides an interface between Meridian 1 PBXs and Central Offices/Public Exchanges that comply to the European Telecom Standards Institute (ETSI) specification ETS 300 102 for the Layer 3. The interfaces provided by this feature also comply with the country-specific Application Documents for Austria, Belgium, Commonwealth of Independent State (Russia and the Ukraine), Denmark, Finland, Germany, Holland, Ireland, Italy, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

The Meridian 1 on the EuroISDN connectivity provides the following call services, for the complying countries:

— Basic call service

— Circuit switched voice and data on the B Channel

— Calling Line Identification Presentation and Restriction (CLIP and CLIR)

— Connected Line Presentation and Restriction

— Calling and connected sub-addresses

— Support for TIE, COT, DID, and DOD trunk types

— Overlap sending and receiving

— Overlap and enbloc dialing

— Flexible Numbering Plan

— Channel negotiation

> ***Note:*** in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

Asia-Pacifc connectivity

This Asia Pacific Connectivity provides interface between the Meridian 1 and Public Exchange/Central Offices in the following markets:

This Asia Pacific Connectivity provides interface between the Meridian 1 and Public Exchange/Central Offices in the following markets:

- Australia
- China
- Hong Kong
- Indonesia
- Japan
- Malaysia
- New Zealand
- Singapore
- Thailand

The following ISDN features are supported for the Asia Pacific connectivity:

- Basic Call Service
- Calling Line Identification Presentation and Restriction (CLIP and CLIR)
- Circuit switched voice and data on the B-channel (data calls are not supported on the Hong Kong interface)
- Overlap Sending (supported by all except Japan)
- Overlap Receiving (supported by the Indonesia, China, Malaysia, and Thailand interfaces only)
- COT, DID, DOD, and TIE trunk call types, as applicable
- 64 kbps unrestricted digital information
- Channel Negotiation

Note: in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

— Flexible Numbering Plan

— PRI Route Back-up with BRI routes, and

— Sub-addressing

The following supplementary services are supported for the Australia connectivity only:

— Malicious Call Trace

— Advice of Charge (AOC) at End of Call

— Incoming Trunk Programmable CLID for analog trunks. This feature is available for use in a private or alternative carrier network, as required in Australia.

The following supplementary services are supported for the Indonesia connectivity only:

— Connected Line Identification Presentation and Restriction (COLP and COLR)

— Direct Dialing Inward (DDI/DID)

The following supplementary service is supported for the Japan connectivity only:

— Advice of Charge (considered a basic service)

The following supplementary services are supported for Australian connectivity:

— Malicious Call Trace, and

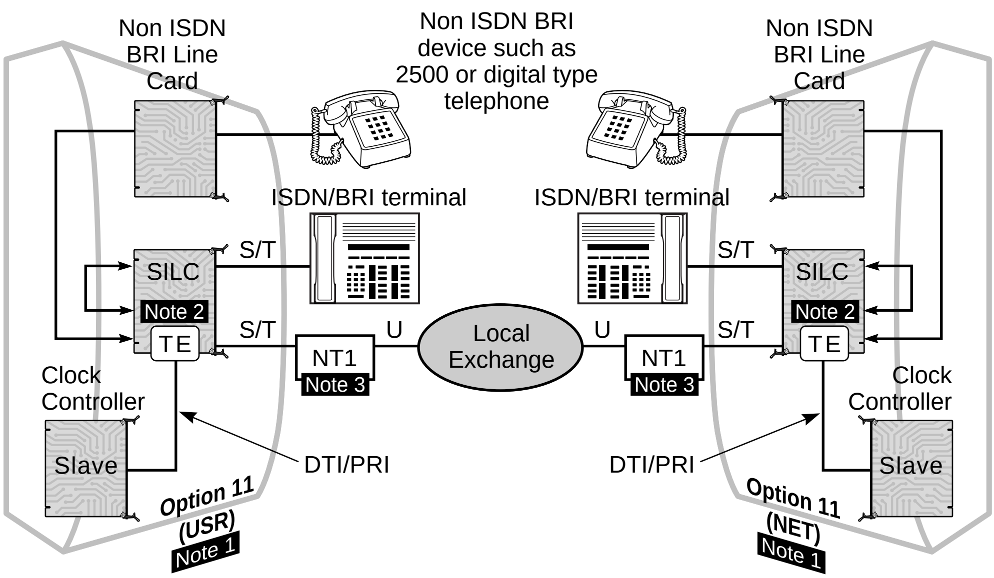
— Advice of Charge (AOC) at End of Call.

ISDN BRI MCDN Tie trunk connectivity

ISDN BRI TIE trunk connectivity may have three implementations. In the first configuration (refer to Figure 39), a Meridian Customer Defined Networking (MCDN) TIE trunk connection may be implemented by connecting two Meridian 1s to the BRI leased line through the local exchange by way of two SILC cards. The S/T interface is connected to the Local exchange using the NT1 supplied by the PTT.

Clock synchronization may be achieved by having the Option 11 slave to the local exchange; the clock source may be derived either from any ISDN BRI Local exchange connections or from other ISDN PRI/DTI local exchange connections if available.

Figure 39
ISDN BRI TIE trunk connectivity — first configuration (not supported in North America)



Note 1 USR and NET define the response for the SIDE prompt in Overlay 16.

Note 2 TE defines the response for the MODE prompt in Overlay 27.

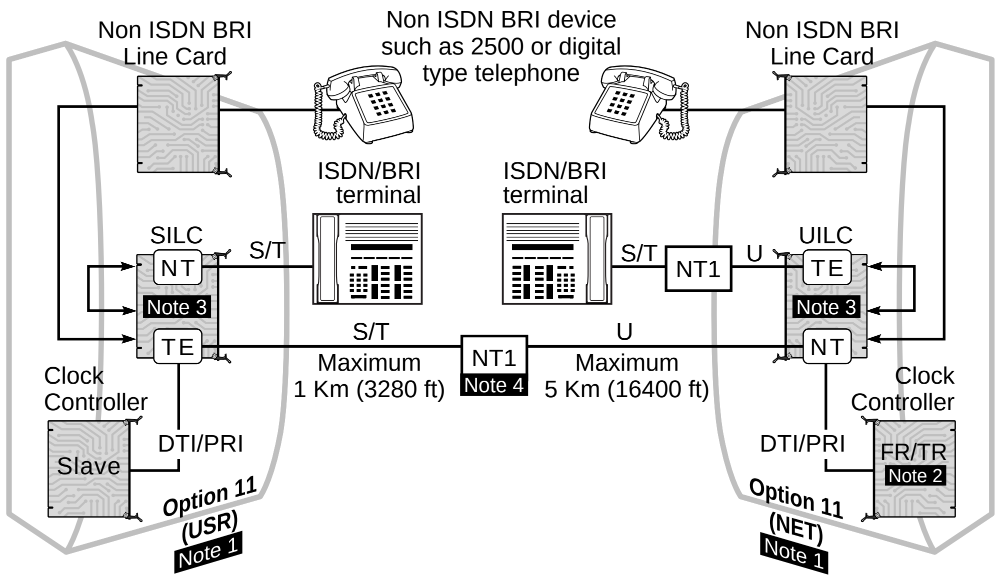
Note 3 In-circuit protection against power line crosses or lightning is not provided on the SILC card. When the SILC line card is used in TIE trunk applications in which the cabling is exposed to the outside plant conditions, an NT1 module certified for such applications must be used. Check local regulations before providing such service.

553-7859.EPS

In the second configuration (refer to Figure 40), an MCDN TIE trunk connection may be achieved by connecting two Meridian 1s through an NT1 device (that supports 2B1Q line encoding). The S/T end is connected to the Meridian 1 Option 11 equipped with an SILC DSL interface in Terminal Equipment (TE) mode; the other end is connected to the other Meridian 1 equipped with a UILC DSL interface in the Network Termination (NT) mode. With this configuration, there is a distance limitation of 6.5 km, without any signal amplification (repeater) device.

Clock synchronization may be achieved by having the Meridian 1 Option 11, equipped with the SILC, derive clock reference from the BRI TIE trunk connection or from other PRI/DTI/BRI connections if available. The Meridian 1 equipped with the UILC interface may be allowed to operate in free-run mode or derive the clock source from other PRI/DTI/BRI connections if available.

Figure 40
ISDN BRI TIE trunk connectivity — second configuration (supported in North America when both switches are Option 11)



Note 1 USR and NET define the response for the SIDE prompt in Overlay 16.

Note 2 Free running (FR) or Tracking (TR) mode.

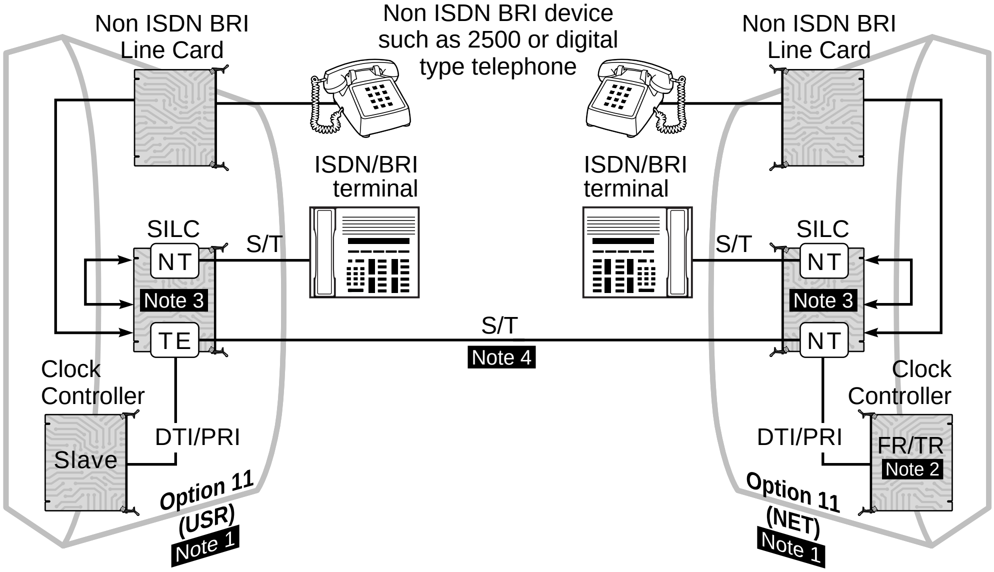
Note 3 NT and TE defines the response for the MODE prompt in Overlay 27.

Note 4 In-circuit protection against power line crosses or lightning is not provided on the SILC card. When the SILC line card is used in TIE trunk applications in which the cabling is exposed to the outside plant conditions, an NT1 module certified for such applications must be used. Check local regulations before providing such service.

553-7860.EPS

The third configuration (refer to Figure 41), can be used in campus environments, although not recommended because of the lack of protection devices and because of the distance limitation of 1 km, may establish a MCDN TIE trunk by connecting two Meridian 1s by way of a direct line between two back-to-back SILC interfaces. Clock synchronization may be achieved by having one of the Meridian 1s derive clock reference from the BRI TIE trunk connection or from any other PRI/DTI/BRI connections if available. The other Meridian 1 may be allowed to operate in free-run mode or derive the clock source from any other PRI/DTI/BRI connections if available.

Figure 41
ISDN BRI TIE trunk connectivity — third configuration (supported in North America when both switches are Option 11)



Note 1 USR and NET define the response for the SIDE prompt in Overlay 16.

Note 2 Free running (FR) or Tracking (TR) mode.

Note 3 NT and TE defines the response for the MODE prompt in Overlay 27.

Note 4 In-circuit protection against power line crosses or lightning is not provided on the SILC card. When the SILC line card is used in TIE trunk applications in which the cabling is exposed to the outside plant conditions, an NT1 module certified for such applications must be used. Check local regulations before providing such service.

553-7861.EPS

ISDN BRI QSIG connectivity

The European Computer Manufacturer's Association (ECMA) has defined an ISDN protocol that specifies the Layer 3 signaling requirement for support of circuit switched call control at the "Q" reference point between Private Telecommunications Network Exchanges (PTNXs) connected within a Private Telecommunications Network (PTN). This protocol has been adopted by the European Telecommunications Standards Institute (ETSI) and the International Standards Institute (ISO). Most of the major European PTNX manufacturers will be supporting ISDN BRI (as well as ISDN PRI) connectivity based on the ISDN QSIG (ETSI and ISO) standard.

QSIG is oriented towards signaling and services that occur between peer-to-peer connectivity, that is, between two PBXs, between two Centrex, or between a PBX and a Centrex; the signaling for services would be exchanged across a "Q" reference point. Figure 42Figure 42 illustrates an example of QSIG trunk connectivity. For ISDN BRI, the QSIG interface will provide the following capabilities:

— Compliant Multi-vendor PBX/Centrex Private ISDN interworking (connectivity between the Private ISDN PBXs may be via PRI or ISDN BRI trunks)

— ETSI or ISO version of basic call service

— 64 kbps clear data

— Overlap Sending/Receiving

— Channel Negotiation

  Note: in cases where several ISDN BRI trunks (and hence several DSLs) are configured on a route, if Channel Negotiation fails to yield an acceptable channel on any of these DSLs, it is not possible to use another channel on another DSL.

— Calling Line Identification Presentation (CLIP)

— Calling Line Identification Restriction (CLIR)

— Connected Line Identification Presentation (COLP)

— Connected Line Identification Restriction (COLR)

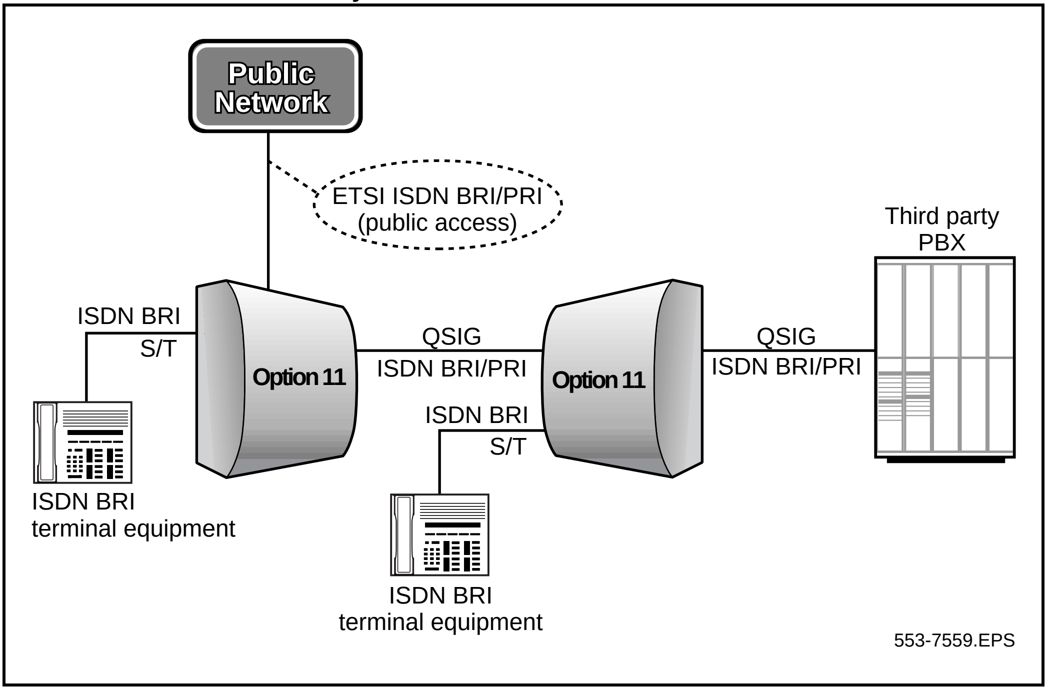
— Flexible Numbering Plan

— Support for Tie trunk call types

— Transit Count information transmitted when ISDN Call Connection Limitation (ICCL) is present (supported for ETSI QSIG only)

— Party Category (partially supported on ETSI QSIG)

Figure 42
ISDN BRI TIE trunk connectivity



Hardware Requirements

Hardware requirements for ISDN BRI trunk applications are as follows:

— **MISP circuit card**
NTBK22 — Multi-Purpose ISDN Signaling Processor
(Required for TIE and Local exchange connectivity)

— **SILC circuit card**
NT6D70AA — -48V North American S/T interface line card
NT6D70BA — -40V International S/T interface line card
(Required for TIE and Local exchange connectivity).

— **UILC circuit card**
NT6D71 — U interface line card
(Required for TIE connectivity only).

— **Clock Controller**
NTAK20AB — Stratum 3 clock controller daughter board
NTAK20BB — Stratum 4 clock controller daughter board
(Require one active clock controller for trunk applications).

— **NT1 (Network Termination)**
(Required for ISDN BRI TIE trunk connectivity SILC to UILC).
NT1 main unit
NT1 Stand-alone power supply

NTBK22 Multi-Purpose ISDN Signaling Processor (MISP) card

The MISP card (NTBK22) is an Option 11 specific card. It performs Data Link (Layer 2) and Network (Layer 3) processing associated with the OSI protocol. The MISP is required for MCDN TIE connectivity and for Numeris and 1TR6 Local exchange connectivity.

Each MISP can support 4 line cards (UILC or SILC or any combination of the two). Each line card supports 8 DSLs, therefore each MISP supports 32 DSLs. Since each DSL uses 2 B-channels and one D-channel the MISP supports 32 D-channels.

The MISP supports the downloading of applications from the Option 11 software cartridge. The MISP will be downloaded with the appropriate application code:

— on the first enable

— when Option 11 Software is upgraded

— when MISP Applications are added/changed.

The applications for the MISP are copied from the software cartridge into RAM on the MISP card. Only the new/different applications are downloaded. This information is then copied into the Flash ROM on the MISP for storage. This process requires approximately 10 minutes to complete and is carried out while the MISP pack is operational. Next time the system or MISP card resets, the application(s) is loaded from the MISP Flash ROM provided there are no new/different applications on the software cartridge.

Use the equation below to calculate the number of MISPs required to control SILCs and UILCs.

$$(\text{SILCs} + \text{UILCs}) \div 4 = \text{MISPs}$$

If the result is a fraction, round it off to the next highest number.

NT6D70AA/NT6D70BA S/T Interface Line card (SILC)

The Option 11 SILC cards (NT6D70AA -48V North America, NT6D70BA -40 V International) are the same circuit cards that are used by the rest of the Meridian 1 product line. SILC circuit cards support the OSI physical layer (layer 1) protocol. The SILC is a globally accepted standard interface. The SILC card is required for MCDN TIE connectivity and Local exchange connectivity.

The SILC provides eight S/T 4-wire full duplex polarity sensitive interfaces that can be configured on a per DSL basis. This means that DSL trunk connections may be configured on any of the 8 DSLs for any SILC. Each S/T interface provides two B-channels and one D-channel.

Since only one trunk can be configured per DSL, trunking applications are always non-blocking.

WARNING
Foreign and surge voltage protection

In-circuit protection against power line crosses or lightning is not provided on the SILC line card. When the SILC line card is used in TIE trunk applications in which the cabling is exposed to outside plant conditions, an NT1 module certified for such applications must be used. Check local regulations before providing such service.

NT6D71 U Interface Line Card (UILC)

The UILC interface supports a two-wire point-to-point loop consisting of a twisted pair engineered for 2B1Q line coding on the DSL. The Option 11 UILC card (NT6D71) is the same circuit card that is used by the rest of the Meridian 1 product line. UILC circuit cards support the OSI physical layer (layer 1) protocol. The UILC supports 2B1Q encoding. The UILC card is required for TIE trunk connectivity SILC to UILC as shown in Figure 40.

The UILC provides eight two-wire full duplex (not polarity sensitive) U interfaces. Each U interface provides two B-channels and one D-channel and supports one physical termination. This termination may be to a Network Termination (NT1). Normally this physical termination is to an NT1, (that supports ANSI 2B1Q line encoding) which provides an S/T interface.

The length of a UILC DSL depends on the DSL wire gauge, however, it should not exceed 5 km (16,405 ft).

Clock controller

A clock controller is required for ISDN PRI, DTI or BRI trunk applications. The Option 11 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 may be derived from either DTI, PRI or BRI spans/DSLs (DSL 0 and/or DSL 1).

Network Termination 1 (NT1)

Stand-alone NT1 unit

The stand-alone NT1 product, which is typically installed at the user's work area, consists of the following units:

— the NT1 unit

— the optional NT1 power supply

— a mounting plate

The stand-alone NT1 unit is a two-part molded housing 210 mm (8.27 in.) by 108 mm (4.25 in.), its depth tapering from about 50 mm (2 in.) to about 32 mm (1.25 in). On the unit's housing are four LED status indicators and three connectors. The bottom of the unit holds four rubber feet for desk-mounting the unit, and four slides that are used to attach the unit to the mounting plate. The unit contains the single NT1 circuit pack assembly.

NT1 power supply unit

The stand-alone NT1 is powered by one of two methods:

1 The NT1 power supply unit which converts 110 V ac input to provide -48 V dc for the NT1, and optionally for the TEs on the S/T bus.

2 A customer-provided -48 V dc supply rated a 2 W minimum for NT1 powering. Additional power may be provided to power the TEs on the S/T bus.

The NT1 power supply unit is virtually identical to the NT1 unit. It is a two-part molded housing of 210 mm (8.27 in.) by 108 mm (4.25 in.), its depth tapering from about 50 mm (2 in.) to about 32 mm (1.25 in.). On the units housing are three connectors, one of which is a captive power cord. The bottom of the unit holds four rubber feet for desk-mounting the unit, and four slides that are used to attach the unit to the mounting plate. The unit contains a single circuit pack assembly.

Cables

Two cables are provided with the NT1 power supply unit:

— a 178 mm (7 in.) cable (A0346581) for connecting between the power supply and the NT1 unit.

— a captive power cord for connection the an ac power outlet.

Cables

There are no ISDN BRI specific cables required.

Installing BRI hardware

Installation procedures

The following lists the procedures that should be followed in the order shown to install ISDN BRI equipment for a trunking configuration. The Option 11 should already be installed and operating before performing these procedures.

1 Selecting the card slots.

2 Installing clock controller on MISP if required.

3 Installing the MISPs.

4 Installing the SILCs and/or UILCs.

5 Connecting Option 11 cables to the cross-connect terminal.

6 Cross-connecting DSLs at the cross-connect terminal.

Selecting the card slots

Refer to Table 17 for ISDN BRI circuit card assignments in the main and expansion Option 11 cabinets.

> ***Note:*** Refer to the Option 11C Installation guide (553-3011-210) for instructions about adding a cabinet, if one is required.

Identify the card slots in the Option 11 cabinets that will house ISDN BRI cards. Refer to the *Card slot allocation plan* for the cabinets and identify vacant slots. (Refer to the *General installation and planning guide* — 553-3011-200, for information about the *Card slot allocation plan*.) The following rules apply when selecting the card slots:

— MISPs are inserted in the main cabinet in any available slots from 1 through 9.

— One MISP supports a set of four SILCs or UILCs, or a combination of both SILCs and UILCs.

— SILCs and UILCs can be installed in the main and expansion cabinets (slots 1 through 30)

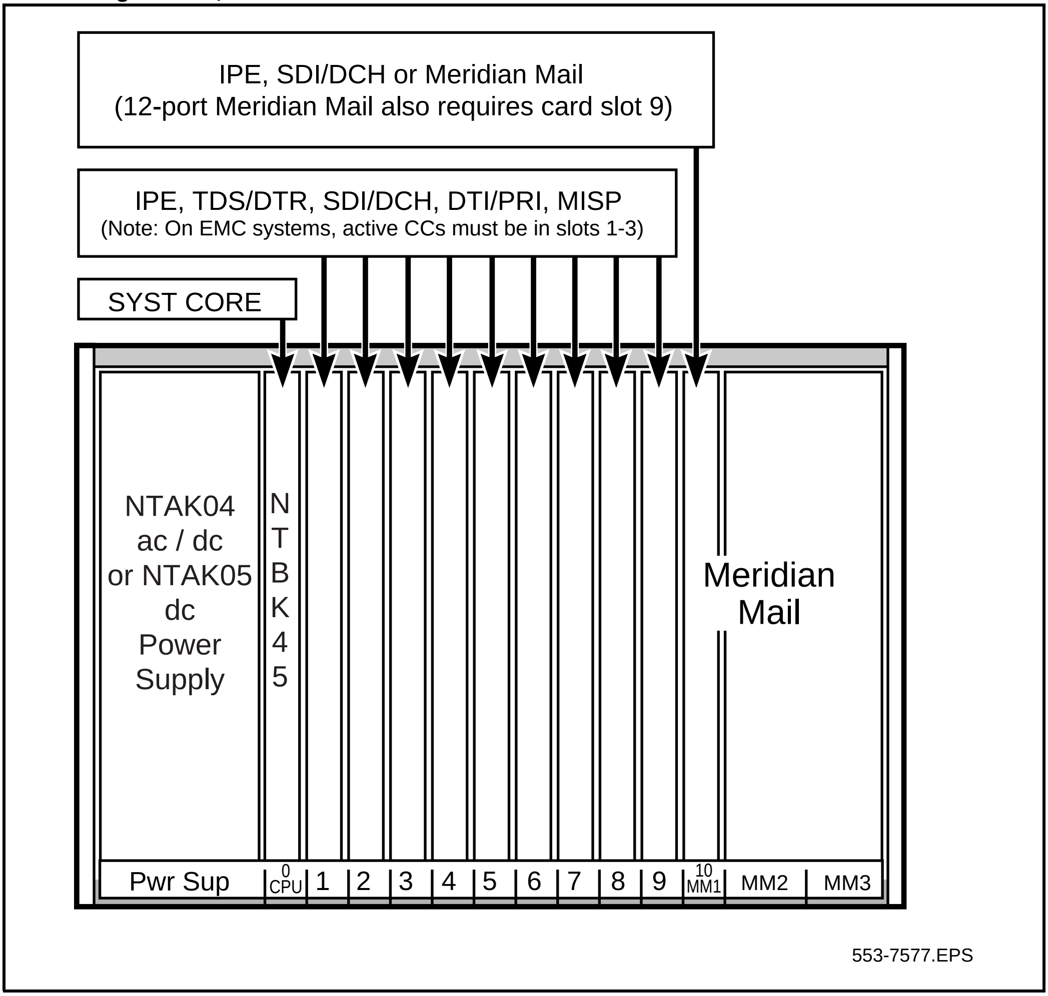
> ***Note:*** A SILC serving as a clock source in trunk access applications must reside in the main cabinet (any of slots 1 through 9).

Table 17
ISDN BRI card location

ISDN BRI Circuit Card	Main Cabinet	Expansion Cabinet
MISP	Slots 1 through 9	—
SILC not used as a clock reference	Slots 1 through 9	Slots 11 through 30
SILC used as a clock reference	Slots 1 through 9	—
UILC	Slots 1 through 9	Slots 11 through 30

Figures 43 and 44 and show typical configurations for the Option 11 and the card slots into which ISDN BRI cards can be inserted.

Figure 43
Shelf assignments, main cabinet

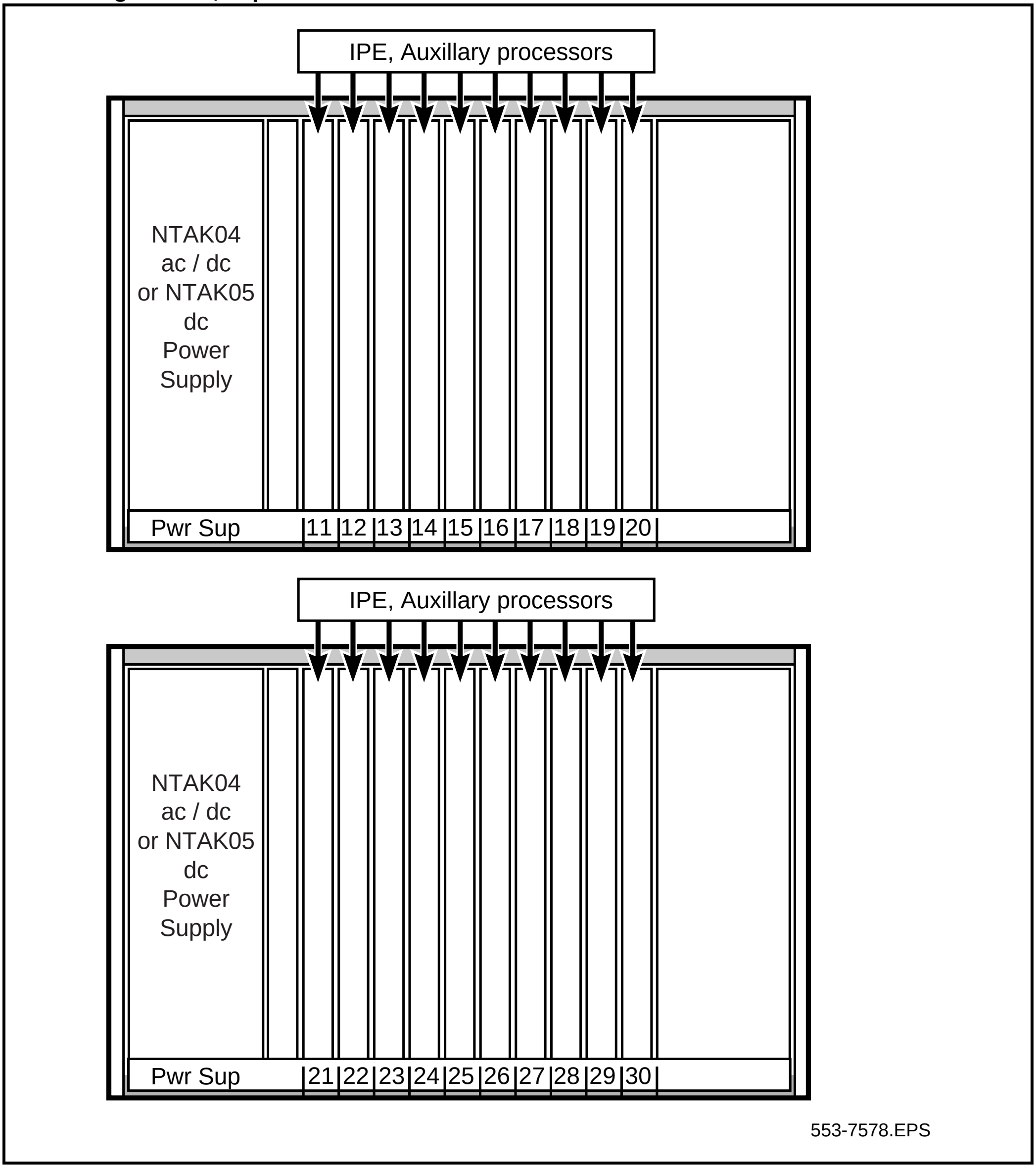


Note: The SILC circuit cards used as a clock reference for trunks may be placed in slots 1 to 9. MISP circuit cards must reside in the main cabinet, slots 1 to 9. The Meridian Mail option, if it is equipped, requires slot 10 in the main cabinet..

An optional clock controller daughter board (NTAK20AB—Stratum 3 or

NTAK20BB—Stratum 4) may reside on the MISP circuit card.

Figure 44
Shelf assignments, expansion cabinet



Installing the clock controller on the MISP

The line cards associated with BRI DSLs used as references must be installed in the Main Cabinet.

Clock controller installation guidelines

— If the primary reference clock source is to come from a PRI or DTI, then the clock controller (CC) must reside as a daughter board on the DTI/PRI card.

— If the primary reference clock is to be derived from a BRI DSL, then the CC daughter board must reside on the MISP associated with that line card, and **DSL0** of that line card is used to generate the reference clock.

— If a DTI/PRI is to be used as a secondary clock source reference, the CC daughter board can reside on either a DTI, PRI or MISP. The clock is extracted from the target DTI/PRI span and routed to the CC over the back plane.

— If a BRI DSL is to be used as a secondary clock source reference, the CC daughter board can reside on either a DTI/PRI or MISP. The clock is extracted from **DSL1** of the source line card and routed over the backplane to the CC.

Installing the MISPs

The following procedure describes how to install MISPs into the Option 11 main cabinet. Refer to the *Card slot allocation plan* for the card slots assigned to MISP.

1 **Remove the cover from the main cabinet**.

> **CAUTION**
> The static discharge bracelet located inside the cabinet must be worn before handling circuit cards. Failure to wear the bracelet can result in damage to the circuit cards.

2 **Remove the MISP from its shipping package and hold it by its card locking devices.**

Install a clock controller if one is required.

Note: Observe the LED on the faceplate of the MISP while performing the next step.

3 **Insert the MISP into the selected card slot and lock it in place. The LED should light, flash three times then remain lit to indicate that the MISP is operating correctly but is not configured and enabled.**
—or—
The LED should light, flash three times then extinguish to indicate that the MISP is operating correctly and is configured and enabled.

Any other LED indication suggests 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 will automatically be re-initialized when the MISP is installed (powered up). This operation will delay the completion of the self-test, and it will take five minutes for the LED to flash three times.

4 **Repeat the steps of this procedure for each MISP being installed.**

Installing SILCs and UILCs

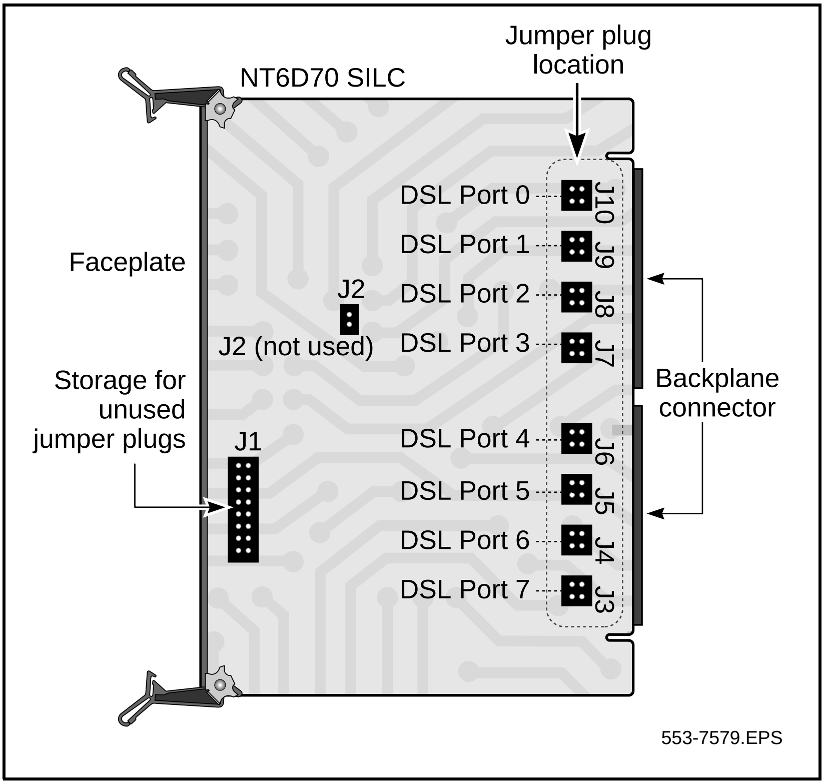
The following procedure describes how to install SILCs and UILCs into the Option 11 cabinets. Refer to the *Card slot allocation plan* for the card slot assignments.

1 Remove the cover from the assigned cabinet.

> **CAUTION**
> The static discharge bracelet located inside the cabinet must be worn before handling circuit cards. Failure to wear the bracelet can result in damage to the circuit cards.

2 Remove the SILC or UILC from its shipping package. Remove any option jumpers on the SILC (two jumpers per DSL) from the pin headers. Each port is equipped with its own set of option jumper plugs to allow individual configurations for each DSL.

No jumpers are required for trunking applications (when MODE = TE in LD 27). Unused jumper plugs should be stored for future use on the SILC by placing the plug on location J1. The location of the jumpers is shown in the following illustration.



Note: Observe the LED on the faceplate of the SILC or UILC while performing the next step.

3 **Insert the SILC or UILC into the selected card slot and lock it in place.**

The LED should light, flash three times, then remain lit to indicate that the card is operating correctly but is not configured.
—or—
The LED should light, flash three times, then extinguish to indicate that the card is operating correctly and is configured.

Any other LED indication suggests a defective circuit card.

4 **Repeat the steps in this procedure for each SILC or UILC being installed.**

Connecting Option 11 cables to the cross-connect terminal

The following procedure describes how to connect the cables from the Option 11 cabinet to the cross-connect terminal.

Each card slot equipped with an SILC or UILC requires one NE-A25B 25-pair connector cable. The cables are connected to connectors located at the bottom of the cabinet and are routed through the openings in the lower part of the cabinet. Each connector is assigned to its corresponding card slot (example: connector J8 is assigned to card slot 8).

Connecting the cables

1 **Remove the connector retaining bar from the connector panel in the lower part of each cabinet. See Figures 45, 46, and Figures 47**

2 **Connect an NE-A25B cable to each of the connectors associated with a card slot containing an SILC or UILC circuit card. See Figures 45, 46, and Figures 47.**

Make sure to tag both ends of each cable with the cabinet and connector numbers.

3 **Route the cables down through the opening at the bottom of the cabinet.**

4 **Replace the retaining bar when you have connected all the cables to the cabinet.**

5 **Terminate the 25-pair cables installed at the cross-connect terminal.**

6 **Label the cross-connect terminal for each connector.**

The Figures 48 and 49 show the label used with the BIX cross connecting system.

Figure 45
Cable connectors in the main cabinet

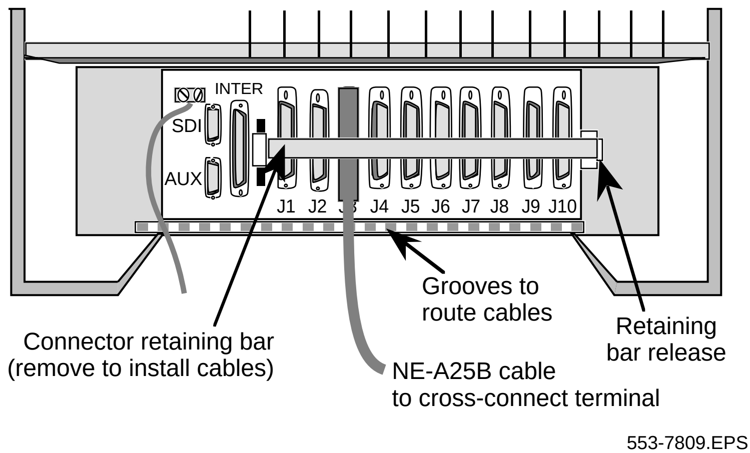


Figure 46
Cable connectors in the first expansion cabinet

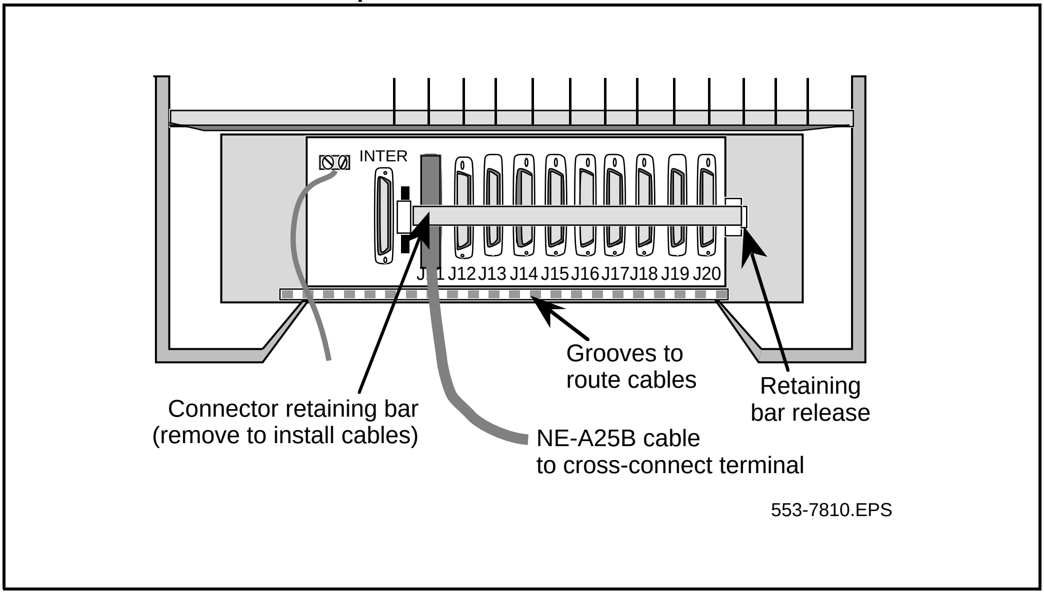


Figure 47- Cable connectors in the second expansion cabinet

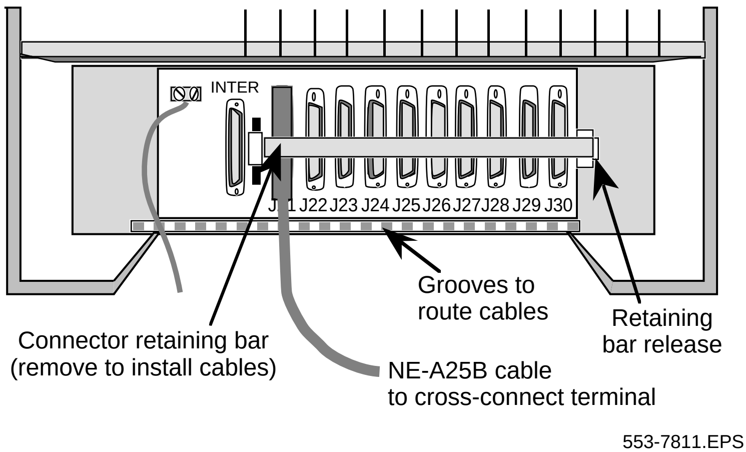


Figure 48
SILC port designation label at the cross-connect terminal

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

Note: The pair designated Tx- Tx+ is the transmit pair. The pair designated Rx- Rx+ is the receive pair. An 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.

Figure 49
UILC port designation label at the cross-connect terminal

T R 0		T R 1		T R 2		T R 3		T R 4		T R 5		T R 6		T R 7	0

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

Cross-connecting DSLs at the cross-connect terminal

Each SILC provides eight four-wire full duplex ports. These ports are connected to the trunk wiring facilities (typically cabling or wiring from outside the building) to form DSLs. The DSLs are polarity sensitive and signal polarity must be maintained along each loop as shown in Figure 50.

Each UILC provides eight two-wire full duplex ports. These ports are connected to twisted pair trunk wiring facilities to form DSLs as shown in Figure 51. The DSLs are not polarity sensitive and it is not necessary to maintain signal polarity along each loop.

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 18 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.**

Table 18
SILC and UILC port assignments connectors at cross-connect terminal

SILC Port Signals	UILC Port Signals	Connector Pin Number and Wire Color Code		Card Ports
0 Tx- 0 Tx+ 0 Rx- 0 Rx+	0 T 0 R	26 1 27 2	W-BL BL-W W-O O-W	Port 0
1 Tx- 1 Tx+ 1 Rx- 1 Rx+	1 T 1 R	28 3 29 4	W-G G-W W-BR BR-W	Port 1
2 Tx- 2 Tx+ 2 Rx- 2 Rx+	2 T 2 R	30 5 31 6	W-S S-W R-BL BL-R	Port 2
3 Tx- 3 Tx+ 3 Rx- 3 Rx+	3 T 3 R	32 7 33 8	R-O O-R R-G G-R	Port 3
4 Tx- 4 Tx+ 4 Rx- 4 Rx+	4 T 4 R	34 9 35 10	R-BR BR-R R-S S-R	Port 4
5 Tx- 5 Tx+ 5 Rx- 5 Rx+	5 T 5 R	36 11 37 12	BK-BL BL-BK BK-O O-BK	Port 5
6 Tx- 6 Tx+ 6 Rx- 6 Rx+	6 T 6 R	38 13 39 14	BK-G G-BK BK-BR BR-BK	Port 6
7 Tx- 7 Tx+ 7 Rx- 7 Rx+	7 T 7 R	40 15 41 16	BK-S S-BK Y-BL BL-Y	Port 7
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.				

For the Option 11 DSL in TE mode, the Tx and Rx pairs must be reversed as shown in Figure 52. 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 50
Cross-connecting an SILC port

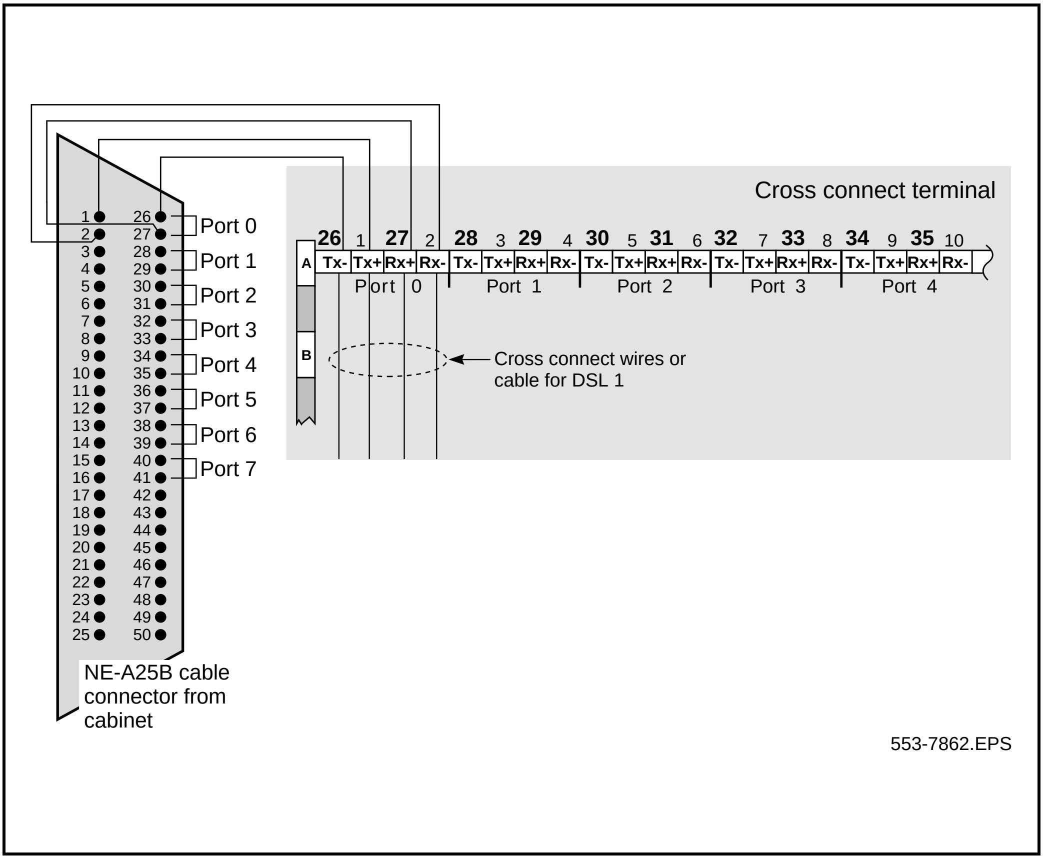


Figure 51
Cross-connecting a UILC port

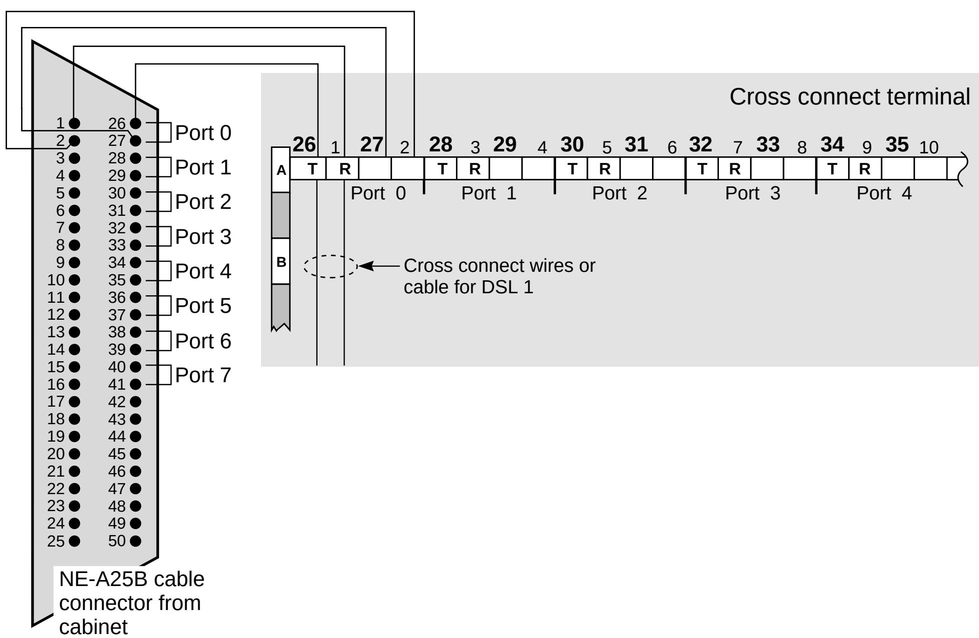
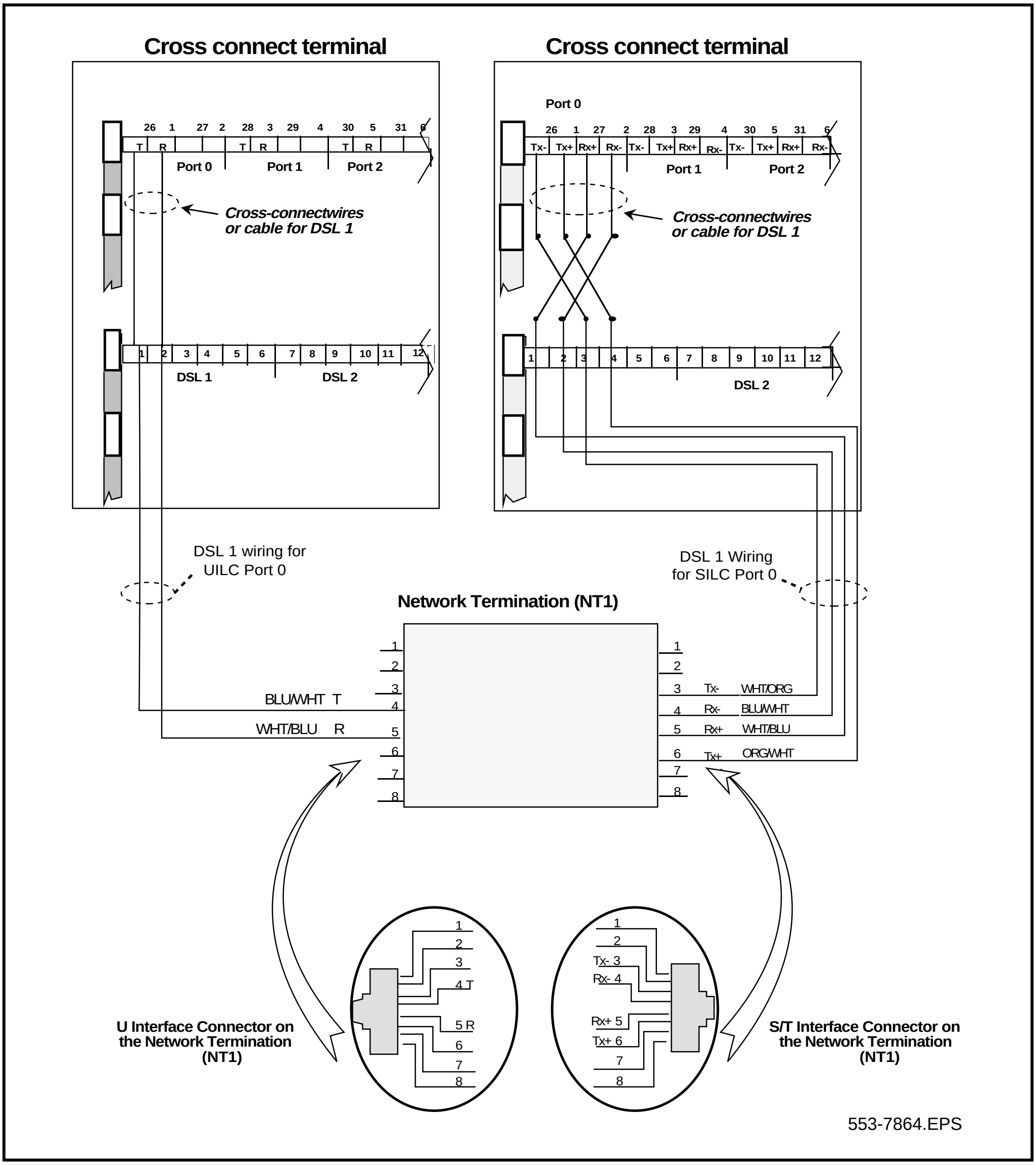


Figure 52
Connecting the ISDN network terminator to the U interface and to the S/T interface (in TE mode)



ISDN BRI trunk software programming

Various items must be configured in software to implement the ISDN BRI trunk feature.

You must configure the following components in the order listed below to configure ISDN BRI trunks:

1 **Configure ISDN customer, using overlay 15.**

2 **Configure trunk pad tables, using overlay 73 (Optional step).**

This step is optional. If no pad values are configured, the default values are used.

3 **Configure the LAPD Protocol Group, using overlay 27.**

4 **Configure the ISDN BRI trunk route data block, using overlay 16.**

5 **Configure the MISP using overlay 27.**

6 **Configure the SILC and/or UILC card using overlay 27.**

7 **Configure trunk DSL, using overlay 27.**

8 **If the SILC clock is configured, enter the ISDN BRI trunk clock reference in overlay 73.**

Configuring customer data

Define an ISDN customer using the Customer Data Block (overlay 15).

LD 15 — Prompt formats for defining an ISDN customer

Prompt	Response	Comment
REQ	NEW/CHG	NEW for new customer or CHG for an existing customer
TYPE	CDB NET_DATA	Customer data block. Networking Data (Release 21 gate opener).
CUST	0-31	Customer number.
...	...	
...	...	
ISDN	YES	YES customer is equipped with ISDN
...	...	
...	...	
...	...	

Configure trunk pad tables, using overlay 73 (Optional step)

Define the pad settings if required. This step is optional because if no pad values are configured the default values are used. The digital pad provides gain or attenuation values to condition the level of the digitized transmission signal according to the network loss plan. This determines transmission levels for the B-channel circuit-switched voice calls.

LD 73 —Configuring trunk pad tables

Prompt	Response	Comment
REQ	NEW	New settings
TYPE	BRIT	Table type
FEAT	PAD	Set PAD values used for BRIT
PDCA	1-16	PAD Category table. If one channel is using the specified table, then the command is aborted. Table 1 cannot be modified or deleted.
TNLS	YES (NO)	TN List. This is for the print command only. A YES response means that a list of the trunk TNs using the requested PAD category tables will be printed after the table.
PDCA	1-16	PAD Category table. If one channel is using the specified table, then the command is aborted. Table 1 cannot be modified or deleted.
DFLT	(1)-16	For NEW only. The table is used for default values.

— continued —

LD 73 —Configuring pad tables (continued)

Prompt	Response	Comment
The following prompts define the pad levels. The receiving pad code is *r* and the transmission pad code is *t*. These entries have the range 0-26. The pad values (in decibels) relating to these codes are shown after this table.		
ONP	r t	On-premises extension
DSET	r t	Meridian Digital Set
OPX	r t	Off-premises extension
DTT	r t	Digital TIE trunks
SDTT	r t	digital Satellite TIE trunks
NTC	r t	Nontransmission compensated
TRC	r t	Transmission compensated
DCO	r t	digital COT, FEX, WAT, and DID trunks
VNL	r t	VIA NET LOSS
DTO	r t	2Mb DTI digital TOLL office trunks
ACO	r t	Analog local exchange or WATS trunks
AFX	r t	Analog FEX trunks
ADD	r t	Analog DID trunks
SATT	r t	Analog satellite TIE trunks
ATO	r t	Analog TOLL office trunks
PRI2	r t	2Mb PRI trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=2Mb PRI) Author's Note—p7/dave/gateway
XUT	r t	Analog local exchange trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
XEM	r t	Analog TIE trunk (prompted only if the 1.5/2Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
BRIL	r t	Basic Rate Interface Lines
BRIT **....**	r t	Basic Rate Interface Trunk ....

The following table shows pads codes and their values. Positive dB represents loss and negative dB represents gain.

Pad codes and values

code	0	1	2	3	4	5	6	7
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					

Configuring the LAPD protocol group

A protocol group is added by using LD 27 and specifying its protocol group number. You also change its LAPD parameters or accept the default values. LAPD is a transmission protocol that specifies the transmission timers, the maximum number of retransmissions, the size of the data frame, and the number of negative acknowledgments before the system issues an alarm.

LD 27 — Configuring the LAPD protocol group

Prompt	Response	Comment
REQ	NEW	Add an ISDN protocol group
TYPE	LAPD	Protocol group
PGPN	0-15,<cr>	Protocol group number The values for this prompt are: 0-15=Adds a specified protocol group <cr>=Stops this prompt from being displayed again
LAPD	YES,(NO)	LAPD parameters The values for this prompt are: YES=Define or modify the LAPD parameters NO=Does not prompt the LAPD parameters and assigns the default values shown in ( ) to these parameters.
T200	(2)-40	Retransmission timer specifies the time delay before the system retransmits the information. Delay is in increments of 0.5 seconds.
T203	4-(20)-80	Maximum time between transmission frames Delay is in increments of 0.5 seconds.
N200	1-(3)-8	Maximum number of retransmissions of unsuccessfully transmitted information.
N201	4-(260)	Maximum number of contiguous octets or bytes of information.
K	(1)-32	Maximum number of outstanding negative acknowledgment (NAKs) allowed before alarming the system.
N2X4	0-(10)-20	For 1TR6 connectivity. Number of Status Inquiries when the remote station is in peer busy state.

Configuring ISDN BRI trunk route data block parameters

Route data block parameters for the ISDN BRI Trunk access capability are configured using LD 16.

LD 16 — Configuring ISDN BRI trunk route data block parameters

Prompt	Response	Comment
REQ	NEW	Add ISDN BRI protocol group settings
TYPE	RDB	Route data block.
CUST	0-31	Customer number.
DMOD	<cr>	Default model number for this route
ROUT	0-511	Route number.
TKTP	TIE/COT/DID	Trunk route type.
RCLS	<cr>	Class marked route
DTRK	YES	Digital Trunk Route
BRIP	NO	BRI packet handler route
DGTP	BRI	Digital trunk type.
		Note: BRI cannot be entered for DGTP if an ISDN BRI Route Packet Handler has been configured on the route.
NASA	YES/(NO)	(International only) Network Attendant Service Interface.
MBGA	YES/(NO)	Multi Business Group interface on the D Channel.

Prompt	Response	Comment
IFC		DCH interface type.
	(SL1) EURO D100 D250 ESS4 ESS5 S100 SS12 AXEA AXES D70 ISIG ISGF ESIG ESGF 1TR6 NUME TCNZ APAC	SL1 = Meridian SL-1 EURO = EuroISDN D100 = Meridian DMS-100 D250 = Meridian DMS-250 ESS4 = AT&T ESS#4 ESS5 = AT&T ESS#5 S100 = Meridian SL-100 SS12 = SYS-12 for Norway AXE = Ericsson AXE-10 for Australia AXS = Ericsson AXE-10 for Sweden D70 = Japan D70 ISIG = ISO QSIG ISIG with GF platform ESIG = ETSI QSIG ESIG with GF platform 1TR6 = Germany 1TR6 NUME = France Numeris TCNZ = Telecom New Zealand (NEAX-61) interface. Asia Pacific interface. ***Note:*** IFC cannot be changed without disabling all ISDN BRI trunk members associated with this route.
CNTY		Enter the country pertaining to the EuroISDN interface.
	AUS DEN (ETSI) FIN GER ITA NOR POR SWE EIR DUT SWI BEL ESP UK FRA CIS	Austria Denmark ETS 300-102 basic protocol Finland Germany Italy Norway Portugal Sweden Ireland Holland Switzerland Belgium Spain United Kingdom France Commonwealth of Independent States (Russia and the Ukraine).

- continued on next page -

Prompt	**Response**	**Comment**
CNTY (cnt'd.)		Enter the country pertaining to the Asia Pacific interface.
	AUST CHNA HKNG INDO JAPN MSIA SING TCNZ THAI	Australian interface. China interface. Hong Kong interface. Indonesia interface. Japan interface. Malaysia interface. Singapore interface. New Zealand interface Thailand interface.
...		
CDR	(NO), YES	YES = CDR on route
		(NO) = No CDR on trunk route
		If answer supervision is defined for the trunk, CDR records will only be generated on call completion.
CLID	OPT4	OPT4 is the CLID option for the Asia Pacific interface.
PROG		Progress signal.
	NCHG	No Change. This is the default for all Asia Pacific interfaces except Japan and Australia.
	MALE	Alert message. This is the default for the Japan interface.
	MCON	Connect message. This is the default for the Australia interface.
...		
CPFXS		Customer-defined Prefixes option.
	NO	If CPFXS = NO, when constructing the Calling or Connected Line Identification, the prefixes are retrieved from the Route Data Block via the HNTN and HLCL prompts which follow.
		Enter NO for APAC.
	(YES)	If CPFXS = YES, when constructing the Calling or Connected Line Identification, the prefixes are retrieved from the Customer Data Block via the HNTN and HLCL prompts in LD 15, as is currently done. This is the default response.

Prompt	Response	Comment
HNTN	0-9999	This prompt applies to APAC only if CPFXS = NO. Home National Number. This number is similar to the PFX1 number prompted in LD 15. It is added to this overlay so that this prefix can be configured on a route basis. As is the case with PFX1, the HNTN prefix can be from one-to-four digits long.
HLCL	0-9999	This prompt is applies to APAC only if CPFXS = NO. Home Location Number. This number is similar to PFX2 number prompted in LD 15. It is added to this overlay so that this prefix can be configured on a route basis. As is the case with PFX2, the HLCL prefix can be from one-to-four digits long.
...		
OTL	(NO), YES	YES = CDR on outgoing toll calls (NO) = No CDR on toutgoing toll calls
...		
OAN	(NO), YES	YES = CDR on all answered outgoing toll calls (NO) = No CDR on all answered outgoing toll calls
MR		Allow Advice of Charge for EuroISDN, Japan D70, or Australia (for Asia Pacific interface).
	DURC ENDC STAC	DURC = Activation of the AOC-D subservice ENDC = Activation of the AOC-E subservice STAC = Activation of the AOC-S subservice.
RUCS	0-3199	Route Unit Cost. This prompt does not appear for Denmark or Sweden.
RURC	0-3199 (0)-3	Route unit reference cost. Note that the formula for the route unit reference cost is: X*10(-Y). where X = 0 - 9999, Y = 0 - 3 The default value of X is identical to the previously entered RUCS value. This prompt does not appear for Denmark or Sweden.
RUCF	0 - (1) - 9999	Route Unit Conversion Factor.
	(0) - 3	This prompt does not appear for Denmark or Sweden.
...		

Prompt	Response	Comment
MCTS	YES	Enable Malicious Call Trace signaling for AUST or TCNZ.
- MCTM	(0)-30	Malicious Call Trace request timer is defined in seconds. This is the disconnection delay which is used. It overrides T306 for calls to/from Malicious Call Trace capable sets (Australia only).
MTND	(NO), YES	Malicious Call Trace disconnect delay for tandem calls (Australia only).
...		
SIDE	NET/USR	Meridian SL-1 node type, prompted only if IFC = SL1. If IFC is not SL-1, it defaults to USR. If IFC is SL1, it defaults to NET. Cannot be changed from NET to USR if NT mode members exist on route; NT mode DSLs must be on NET side. Refer to the configuration Figures 38, 39, 40, 41 to determine the NET or USR side for the configuration being implemented.
CNEG	YES/(NO)	Channel Negotiation Option, prompted only for local exchange connectivity, that is, if IFC = 1TR6 or NUME.
OVLR	YES/(NO)	Overlap Receiving Allow/Disallow. Not prompted if IFC=NUME (will default to NO)
DIDD	(0)-15	Number of leading digits that are ignored for DID calls during Overlap Receiving.
OVLS	YES/(NO)	Overlap Sending Allow/Disallow. Not prompted if IFC=NUME (will default to NO)
OVLT	(0)-8	Inter-INFO timer during Overlap Sending.
PGPN	0-15	Protocol Group, as defined previously in overlay 27. ***Note:*** PGPN cannot be changed without disabling all BRI trunk members associated with this route.

Prompt	Response	Comment
RCAP		Remote D-Channel capabilities. Enter X followed by the option to remove the configured capability. This prompt is repeated until <cr> is entered.
	NCT RVQ, ND1 ND2 NAS BRI COLP	NCT = Network Call Trace RVQ = Remote Virtual Queueing ND1 = Network Name Display 1 ND2 = Network Name Display 2 NAS = Network Attendant Service BRI = allows ISDN line/trunk interworking) COLP = Connected Line ID supplementary service (for APAC Indonesia only).
	DV1I DV1O DV2I DV2O DV3I DV3O	These are QSIG SS Call Diversion Notification remote capability responses, used to configure sending of QSIG Diversion Notification Information, treatment of Rerouting request and coding of operations. If coded as Object Identifier, the remote capability ends with ‘O”, whereas for Integer Value, the remote capability ends with ‘I’. Only one remote capability is allowed. Refer to Table 19, “Remote Capability Meanings for ISDN BRI routes,” on page 294 for more information.
...	....	....

Table 19
Remote Capability Meanings for ISDN BRI routes

Remote capability	Meaning for Operation Coding	Meaning for Notification Informations	Meaning for Rerouting request
None of the following remote capabilities.	Not applicable (nothing sent)	Not sent	Not processed when received
DV1O	Sent coded as Object Identifier	Sent	Not processed when received
DV1I	Sent coded as Integer Value		
DV2O	Sent coded as Object Identifier	Not Sent	Processed when received
DV2I	Sent coded as Integer Value		
DV3O	Sent coded as Object Identifier	Sent	Processed when received
DV3I	Sent coded as Integer Value		

When using Table 19 consider the following:

— Only nodes subject to be Originating, Served, Diverted or Rerouting nodes with respect to QSIG Call Diversion Notification need to have diversion remote capability configured. Transmit nodes pass the information transparently.

— When choosing the Operation Coding Choice, the interface type should be considered. When the QSIG interface used is ISO (IFC ISGF), operations are mostly coded with Integer Values.

Only one remote capability allows the QSIG Diversion configuration on an ISDN BRI route. This remote capability gathers the three following possibilities for the route:

— coding of operations sent to the remote switch, which can be coded as either as Object Identifier or as Integer Value. If coded as Object Identifier, the remote capability ends with as ‘O’, whereas for Integer Value, the remote capability ends with as ‘I’. This means that remote capabilities explained below in 2 and 3 are defined twice.

— sending of QSIG Diversion Notification Information to the remote switch: these informations are sent only if the remote capability is of first or third type, i.e. DV1x or DV3x, where the x is either ‘I’ or ‘O’ as explained in 1.

— treatment of Rerouting requests received from the remote switch: a rerouting request is only processed if the remote capability is of second or third type, i.e. DV2x or DV3x, where x is either ‘I’ or ‘O’ as explained above.

Configuring an MISP

An MISP is added to the system by specifying its card slot number using LD 27.

LD 27 — Configuring an MISP

Prompt	Response	Comment
REQ	NEW	Add an ISDN BRI MISP
TYPE	MISP	MISP
LOOP	1-9	MISP card slot number
APPL		Application type for the MISP.
	BRIT,BRIE,	Enter BRIT for ISDN BRI trunking.
	XBRIE	Enter BRIE for BRI trunking for IFC = EuroISDN, QSIG, or APAC.
		APPL is prompted until <cr> is entered.
DSPD	YES, (NO)	YES = D-channel Packet Switched Data
		(NO) = No D-channel Packet Switched Data.
		Use the default value (NO).
		Subsequent prompts will be skipped.

Configuring an SILC or UILC

A new SILC or UILC is added by specifying its location, card type, and the MISP card slot that this card uses to transmit and receive signals.

> ***Note:*** You have an option of skipping this step and specifying the card type when you configure the DSL. This procedure is used when you want to configure the cards without configuring its DSLs.

LD 27 — Configuring an SILC or UILC

Prompt	Response	Comment
REQ	NEW	Add an SILC or UILC line card
TYPE	CARD	SILC or UILC line card
TN	c	Card slot location The values for this prompt are 1-20 ***Note:*** If this card is a SILC defined as the reference clock source for ISDN BRI trunk applications it must reside in the main cabinet (card slots 1-10). If the trunk is to serve as the primary clock source, it must reside on DSL 0. If it is to be used as a secondary clock source it must use DSL 1.
MISP	1-9	MISP card slot number
CTYP	SILC,UILC	Card type to be added

Configuring a trunk DSL

A DSL is added by specifying its port location and its DSL characteristics. A DSL port location specifies an SILC or UILC port that is connected to a DSL.

LD 27 — Configuring a trunk DSL

Prompt	Response	Comment
REQ	NEW	Add a DSL
TYPE	DSL	DSL
DSL	c dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL number)=0-7 ***Note:*** You can assign only 31 DSLs for each MISP if you specified DCH or BDCH at the PH prompt in *MISP configuration procedures.*
APPL	BRIT,BRIE, XBRIE	Trunk application Defines the application which the DSL is provisioning. Enter BRIT for ISDN BRI trunking. Enter BRIE for BRI trunking for IFC = EuroISDN, QSIG, or APAC. Enter XBRIE to remove the loadware (all associated DSLs must be first removed for XBRIE).
CUST	0-31	Customer number
CTYP	SILC, UILC	Card type ***Note:*** This prompt is displayed only if the SILC or UILC has not been previously configured, or if another DSL has not been configured on the same SILC/UILC.
MISP	1-9	MISP card slot number This prompt is displayed only if the MISP has not been previously assigned to the specified SILC or UILC.

Prompt	Response	Comment
MODE	TE/NT	The mode for the trunk DSL. TE is entered for Terminal Equipment, NT is used for Network Termination. See the Trunk configuration figures earlier in this chapter to determine the Mode to be set based on the configuration you are implementing. This prompt is displayed only if SILC was specified as the card type. For UILC, this entry defaults to NT mode. For SILC, the default is TE. ***Note:*** Cannot change MODE from TE to NT if clock on DSL is referenced in the digital data block or DTI2/PRI2 system data. The reference must first be removed. If MODE is set to NT, CLOK will be set to NO.
MTFM	YES/(NO)	Enable/Disable multi-frame option. Prompted only if MODE=TE If enabled this prompt allows you to receive more diagnostic messages.
TKTP	TIE/COT/ DID	Trunk type
CLOK	YES/(NO)	Whether this trunk DSL is provisioned for clock source. The SILC must be residing in slot 1-10 in the main cabinet. This prompt appears if the following conditions are met: - the card type is SILC - the DSL# is 0 or 1 - the trunk DSL has been defined as TE mode ***Note:*** The clock prompt cannot be changed from YES to NO if the clock on the DSL is referenced in the Digital Data Block or the DTI2/PRI2 system data. The reference must first be removed.
TSET	(0)-15	Clock error threshold set ***Note:*** The threshold Set is currently not used. Press <cr> to accept the default 0 value.
PDCA	(1)-16	Pad table number (previously configured in LD 73) to be associated with this DSL

Prompt	**Response**	**Comment**
ROUT	0-511	Route number for the trunk DSL. The specified route must match the ISDN BRI trunk type specified at the TKTP prompt. If the DSL is in the NET mode (MODE = NT in LD 27), the entered route must be NET side (SIDE = NET in LD 16).
B1	YES/(NO)	Configure B Channel 1. If REQ = NEW, a response to this prompt is not required, because B1 parameters are mandatory. The system will display the following prompts.
MEMB	1-254	Route member number to be associated with B-channel 1.
TGAR	(0)-31	Trunk Group Access Restriction.
NCOS	(0)-99	Network Class of Service Group Number
CLS	aaa	Class of Service options. Possible inputs are as follows: APN = ACD Priority not allowed APY = ACD Priority allowed UNR = Unrestricted (default) CTD = Conditionally Toll Denied (valid for TIE trunks only) CUN = Conditionally Unrestricted (valid for TIE trunks only) FR1 = Fully Restricted class 1 (valid for TIE trunks only) FR2 = Fully Restricted class 2 (valid for TIE trunks only) FRE = Fully Restricted (valid for TIE trunks only) SRE = Semi-Restricted (valid for TIE trunks only) TLD = Toll Denied (valid for TIE trunks only). MRA = Message Registration Allowed (assigning meters to ISDN BRI sets, for Advice of Charge for EuroISDN, APAC (Australia and Japan), or Australia-AXE and Japan D70). MRD = Message registration denied. PGNA = Call Page Network Wide Allowed. (PGND) = Call Page Network Wide Denied. CUN, CTD, TLD, SRE, FRE, FR1, and FR2 are allowed only for TIE trunks. Input is accepted until <cr> is entered.

Prompt	**Response**	**Comment**
B2	YES/(NO)	Configure B Channel 2. If REQ = NEW, and the default of NO is entered to this prompt, all parameters entered for B1 will be applied to B2, except the route member number will be an unused value. The message “B2 will use Route # Member #” will be displayed.
MEMB	1-254	Route member number.
TGAR	(0)-31	Trunk Group Access Restriction.
NCOS	(0)-99	Network Class of Service Group Number

Configuring trunk clock reference source

In the case where an ISDN BRI trunk is providing a reference clock source to the system clock controller, the Digital Data Block (overlay 73) must be modified as follows.

LD 73 — Configuring trunk clock reference source, for 1.5 Mb PRI/DTI

Prompt	Response	Comment
REQ	NEW	Action request
TYPE	DDB	Digital data block.
CLKN	c	Card slot number of the DTI/PRI/MISP on which the clock controller resides
PREF	c	Card slot number of the PRI/DTI/SILC card from which the primary reference clock source is to be extracted and routed to the clock controller. If on SILC, DSL0 must be defined as trunk and CLOK = YES in LD 27.
SREF	c	Card slot number of the PRI/DTI/SILC card from which the secondary reference clock source is to be extracted and routed to the clock controller. If on SILC, DSL0 must be defined as trunk and CLOK = YES in LD 27.
...	...	...

Note: The items in the following table are only defined for systems that require 2 Mb DTI/PRI functionality.

LD 73 — Configuring trunk clock reference source for 2.0 Mb PRI/DTI

Prompt	Response	Comment
REQ	NEW	New settings
TYPE	DTI2/PRI2	Digital system data block.
FEAT	SYTI	Digital system timers and counter (only one set per system).
...	...	...
PERS	0-(100)-256	Persistence timer for group II problems.
CLKN	c	Card slot number for clock controller
PREF CK0	c	Card slot number of the primary reference clock for Clock Controller 0, from a PRI2/DTI2card. If on SILC, DSL0 must be defined as trunk and CLOK = YES in LD 27.
SREF CK0	c	Card slot number of the secondary reference clock for Clock Controller 0, from a PRI2/DTI2/SILC card. If on SILC, DSL0 must be defined as trunk and CLOK = YES in LD 27.
...	...	...

Chapter 7 — Acceptance testing

Verifying ISDN BRI operation

After ISDN BRI equipment has been 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, the MISP is disabled or faulty. If it is extinguished, the MISP is enabled and operating. To enable the MISP or to correct a problem, go to *MISP fault isolation and correction* in the *Service changes and maintenance* section of this guide.

— Check the red LED located on the SILC and UILC faceplates. If the red LED on an SILC or a UILC is extinguished, that SILC or UILC is enabled and operating correctly. If the red LED is lit, that SILC or UILC is manually disabled or faulty. To enable an SILC or a UILC or to correct a problem, go to *SILC or UILC fault isolation and correction* in the *Service changes and maintenance* section of this guide.

If all indicator LEDs on ISDN BRI equipment are extinguished (with the exception of the CC LED on a MISP), the equipment is functional and you may proceed with setting up the terminals you wish to use for this test.

Setting up ISDN BRI test terminals and trunks

Designating ISDN BRI test terminals

To conduct acceptance testing, you must have a setup that can verify basic ISDN BRI functions and features. Figure 53 shows an example of the ISDN BRI terminal arrangement. You may wish to establish a different test setup, which may be determined by the type of terminals implemented in a specific customer configuration. You may want to set up communication between ISDN BRI and non-ISDN terminals.

Refer to the *ISDN BRI line and packet data implementation* chapter of this guide for ISDN BRI terminal installation instructions:

To perform acceptance testing using the configuration shown in Figure 53:

— select three digital subscriber loops (DSLs), two connected to different SILCs and one to a UILC.

— equip each SILC DSL with two voice, one circuit-switched data, and one low speed packet data ISDN BRI terminals.

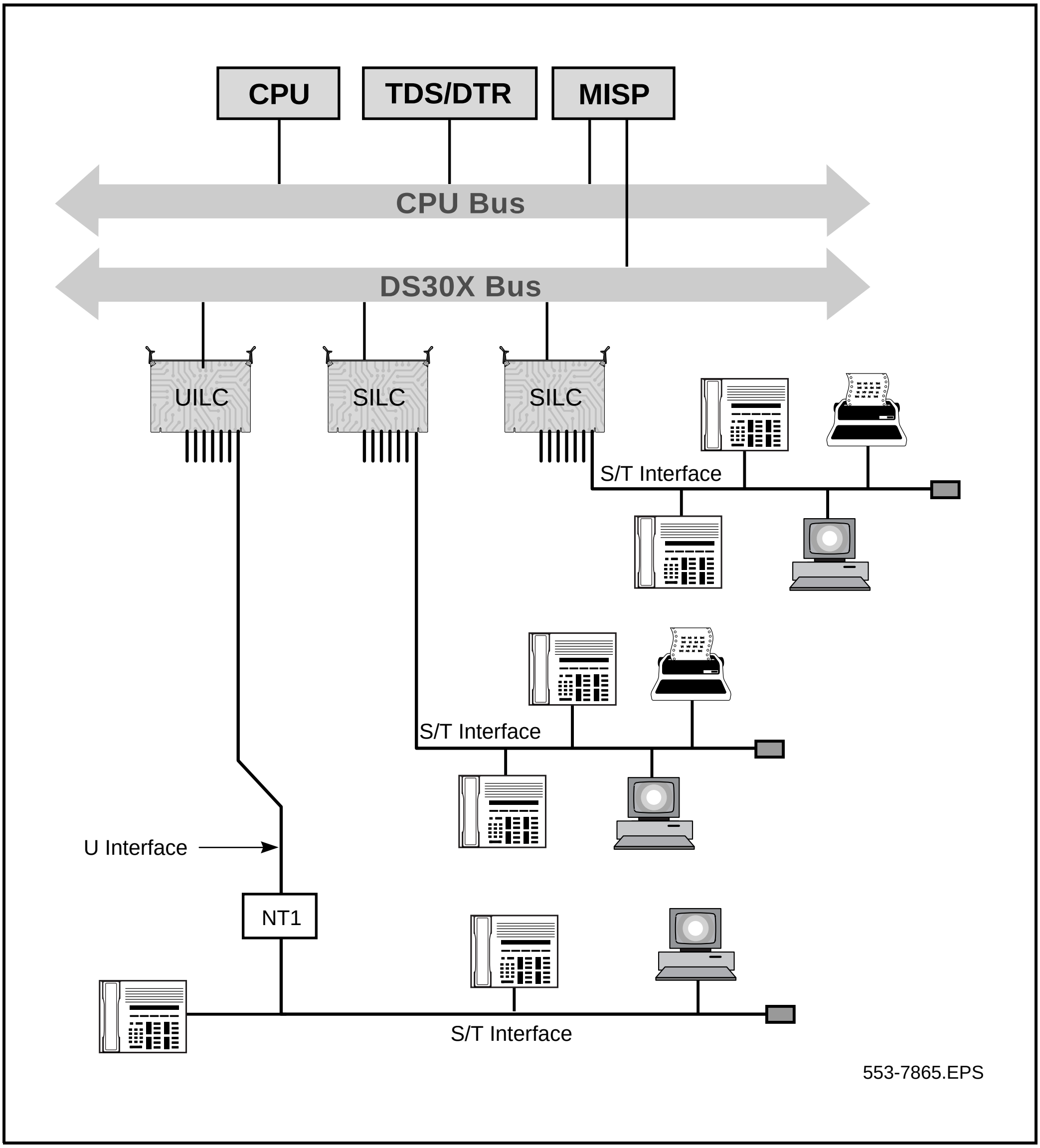
Note: Packet data testing can be conducted only if the packet handler is installed as part of the customer configuration. If packet handler is not part of the configuration, do not equip the DSLs with packet data terminals and skip all the packet data tests specified in this section.

— 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.

— configure the DSLs to support these ISDN BRI terminals and initialize the terminals as described in the *ISDN BRI line and packet data implementation* chapter of this guide.

After you have completed the setup to perform acceptance testing, you can proceed with the tests.

Figure 53
ISDN BRI acceptance testing setup



Setting up ISDN BRI trunking - 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 Option 11. The NT1 device connects to the Local Exchange that supports Numeris or 1TR6 protocol via a U interface. The distance limitation of the NT1 from the Local Exchange depends on the distance supported by the Local Exchange. Refer to the section titled "ISDN *BRI local exchange/DID connectivity"* in Chapter 6 for more information.

After you have completed the setup to perform acceptance testing, you can proceed with the test described in this chapter.

Setting up ISDN BRI trunking - TIE trunk connectivity

A Meridian Customer Defined Networking (MCDN) TIE trunk connection may be implemented by connecting two Meridian 1s to the ISDN BRI leased line through the local exchange via two SILC cards. The S/T interface is connected to the local exchange using the NT1. Refer to the section titled "ISDN *BRI TIE trunk connectivity"* in Chapter 6 for more information.

After you have completed the setup to perform acceptance testing, you can proceed with the test described in this chapter.

Testing ISDN BRI functions

The following describes some ISDN BRI tests used to verify the operation of ISDN BRI features. The tests include basic call connections, voice and data transmission, and verification of features using ISDN BRI terminals.

The tests are divided into:

— voice calls

— circuit-switched data calls

— B-channel and D-channel packet data calls

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 Option 11, and between two terminals on the same DSL.

Acceptance testing of ISDN BRI voice calls is conducted when testing the following basic system features supported by ISDN BRI terminals:

— Call hold/call retrieve

— Call waiting

— Call forward no answer

— Call forward busy

— Calling line identification presentation and restriction

— Hunting

— Message waiting (audible)

Call hold (not applicable to 1TR6)

Call hold is used to place an active call on hold in order to answer an incoming call or place an outgoing call. After releasing an incoming or an outgoing call, you can retrieve the call on hold.

To perform a call hold test:

1. **From a ISDN BRI terminal, dial a BRI or a non-ISDN 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 find out how to use the 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 terminal.**
5. **Complete this outgoing call and hang up.**
6. **Have another ISDN BRI or non-ISDN terminal call you 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.**

Repeat this test for terminals connected to the same DSL, different DSLs on the same card, different DSLs on cards associated with different MISPs, and between ISDN BRI and non-ISDN terminals.

ISDN BRI Call waiting

Call waiting informs a 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 the call waiting lamp on the called ISDN BRI terminal to flash. 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. The incoming call may originate from an ISDN BRI or a non-BRI terminal.

To perform a call waiting test:

1 **Set the FEAT parameter to HTD to disable hunting when configuring the TSP for the two voice ISDN BRI terminal DNs on one of the DSLs by using Service Change BRI Program LD 27.**

2 **From a 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.

4 **Place an incoming call to one of the busy ISDN BRI terminals with disabled hunting.**

5 **Observe the button light on the called ISDN BRI terminal. The lamp should flash and the 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 DN after a predetermined number of rings. This feature is enabled at the TSP level when defining the BRI DN. Both the external and internal call forward no answer are configured at the DSL level using Service Change BRI Program 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 Customer Data Block Program LD 15.

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

To perform 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.**

   These parameters are specified when configuring the TSP for one of the two voice ISDN BRI terminal DNs using Service Change BRI Program LD 27. Refer to the *ISDN BRI line implementation* section of this guide in *TSP configuration procedures.*

2 **Specify the attendant as the forwarding DN using Customer Data Block Program LD 15.**

   At the FNAL prompt, enter **ATT** to specify forward to attendant. Refer to LD 15 in *X11 software guide* for a detailed description of the program.

3 **From a 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 will be forwarded to the attendant.

5 **Verify that 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.**

The display on this terminal will not be updated to indicate that the original call has been modified and forwarded to attendant.

Call forward busy

This feature automatically routes your incoming calls to the attendant console when your telephone is busy.

To perform a call forward busy test:

1 **Set the MCAL prompt (maximum calls allowed) for the DSL to 2.**

2 **Set the FEAT parameter for the TSP with the following class of service:**

CFTD HTD FBA

3 **Place two calls on this DSL.**

4 **Place an incoming DID call to this DSL.**

The incoming call should be routed to the attendant.

Calling line identification presentation and restriction

This feature allows a calling party number, also known as calling line identification, to be shown on a called party ISDN BRI terminal display. Parameters that specify this feature are set when configuring the TSP for the ISDN BRI terminal DN by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

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.

— The calling party ISDN BRI terminal must have the presentation (PRES) key enabled, which corresponds to PRES parameter set to YES, to allow the calling line identification number to be sent to the called terminal. It the PRES key on the terminal is disabled, which corresponds to PRES parameter set to NO, the calling line identification will not be sent to the called party terminal. The PRES key on the terminal overrides the PRES parameter value entered in the TSP data block when configuring the TSP in the *ISDN BRI line and packet data implementation* chapter of this guide *TSP configuration procedure*.

To perform a calling line identification 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 B**RI 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 for the calling party ISDN BRI terminal and place a call to another ISDN BRI terminal.**

5 **Observe the called party ISDN BRI terminal display.**

It should not display the calling line identification of the calling terminal.

6 **Release the call connection.**

Hunting

Hunting allows calls that encounter a busy condition at the original call destination 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 terminal DN is found to answer the call or until the maximum number of hunt steps is exhausted. The hunting DNs are defined in the DSL by using Service Change Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *DSL configuration procedures*.

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

A busy condition occurs when:

— the maximum number of calls on a DSL exceeds the specified limit of simultaneous calls on a DSL as defined for MCAL in LD 27, or

— if the total number of calls including active, calls held, calls waiting, and calls in progress exceed the number of channels configured to handle the incoming call type

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

Hunting is enabled or disabled when configuring the TSP for the ISDN BRI terminal DN by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

To perform a hunting test:

1 Set the FEAT parameter to HTA to enable hunting for two voice ISDN BRI terminals.

Specify this parameter when configuring the TSP by using Service Change BRI Program LD 27. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *TSP configuration procedures*.

2 **Specify the HUNT parameter DNs when configuring the DSL by using Service Change BRI Program LD 27.**

These hunt parameter DNs specify the members of a hunting chain. Refer to the *ISDN BRI line and packet data implementation* chapter of this guide in *DSL configuration procedures*.

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 enabled hunting.**

Since the channel type required to handle the incoming call type is busy, hunting will be automatically invoked to find an idle DN in the hunting chain.

5 **If in the process of hunting the call finds an idle voice ISDN BRI or non-ISDN terminal, it will ring that terminal.**

6 **If hunting is not successful:**

- the call originating ISDN BRI terminal should receive a busy tone if the total number of calls on the DSL 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

7 **If the call is placed in call waiting, observe the call waiting lamp on the called ISDN BRI terminal.**

The lamp should flash indicating that a call is waiting.

8 **Place the active call on hold and answer the incoming call that is waiting.**

9 **Complete the incoming call and hang up.**

10 **Retrieve the call on hold.**

11 **Release the call connection.**

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. You can 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 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:

— intelligent terminals such as personal computers

— dumb terminals such as video display terminals

An intelligent terminal can transmit files of information that are stored in its memory or receive and store files of information from another data terminal. A dumb terminal cannot store the information and a user has to type the information on the terminal's keyboard as it is being transmitted to another terminal. A dumb terminal can only display or print the information received from a terminal, it cannot store it.

To perform a circuit-switched data call test:

1 **From a ISDN BRI data terminal, dial another ISDN BRI data terminal and establish an active call connection.**

2 **After you receive an acknowledgment that the other terminal is ready, you can start transmitting data.**

3 **Verify that the transmitted data has been received successfully by checking transmitted information for acc**uracy.

You can read the information on the screen or print it on the local printer.

4 **Release the connection.**

You may wish to repeat this test on several terminals including both intelligent and dumb terminals.

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 external packet handler at 64 kbps over dedicated ISDN PRI B-channels. The external packet handler processes the data and distributes it to local terminals for local calls or over the packet data network for remote calls.

D-channel packet data terminals communicate at the baud rate of up to 9.6 kbps. The packet data is multiplexed onto a 64 kbps B_D-channel that is linked through a dedicated ISDN PRI B-channel with the external packet handler. The packet handler processes the data and distributes it to local terminals for local calls or over the packet data network for remote calls.

> ***Note:*** To perform packet data transmission verification, the system must be connected to a packet handler and packet data transmission functions must be selected when configuring the B-channel and D-channel transmission characteristics using Service Change BRI Program LD 27. To specify this feature, refer to the *ISDN BRI line and packet data implementation* chapter of this guide in MISP configuration procedures.

In addition to configuring the MISP and the DSL using Service Change BRI Program LD 27, you must make sure that:

— the ISDN PRI loop to carry packet data has been configured using Configuration Record Program LD 17

— the packet handler route is specified by using Trunk Route Administration Program LD 16

— a PRI channel for the packet handler route has been configured using Trunk Administration Program LD 14

Refer to the *ISDN BRI line and packet data implementation* chapter in this guide for a detailed description of how to configure relevant ISDN BRI packet data transmission parameters using LD 17, LD 16, and LD 14 programs.

To perform a B-channel packet data transmission test:

1. **From a ISDN BRI B-channel packet data terminal, dial another local or a remote ISDN BRI packet data terminal and establish an active call connection.**
2. **After the call originating ISDN BRI terminal receives an acknowledgment message that the receiving ISDN BRI terminal is ready, the call originating ISDN BRI terminal can start transmitting packet data.**
3. **Verify that the transmitted data has been received successfully by checking transmitted information for accuracy.**

   You can read the information on the screen or print it on the local printer.
4. **Perform this test between two ISDN BRI terminals on the Option 11 for local transmission and between an Option 11 ISDN BRI terminal and a remote ISDN BRI terminal over the network.**
5. **Release the connection.**

You may wish to repeat the above test on several ISDN BRI packet data terminals.

To perform a D-channel packet data transmission test:

1. **From an ISDN BRI D-channel packet data terminal, dial another ISDN BRI packet data terminal and 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 start transmitting packet data.**
3. **Verify that the transmitted data has been received successfully by checking transmitted information for accuracy.**

   You can read the information on the screen or print it on the local printer.
4. **Perform this test between two ISDN BRI terminals on Option 11 for local transmission and between an Option 11 ISDN BRI terminal and a remote ISDN BRI terminal over the network.**
5. **Release the connection.**

Testing ISDN BRI trunk connectivity

Perform the following procedure to test an ISDN BRI trunk DSL.

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

Removing the test setup

After acceptance testing has been completed and the results show that the system is operating correctly, you should remove ISDN BRI terminals set up to conduct the testing and configure ISDN BRI equipment according to the customer configuration.

If you used the actual customer configuration to perform these tests, you do not have to change or remove the set-up.

Chapter 8 — Service changes and maintenance

Introduction

This chapter describes how to administer the Option 11 ISDN BRI feature and how to identify and clear faults related to it. It includes ISDN BRI equipment replacement procedures.

Before proceeding you should have a basic knowledge of the Option 11 ISDN BRI feature (described in this guide) to be able to administer it. To clear ISDN BRI related faults, you should have a basic knowledge of fault indicators, diagnostic tools and fault clearing methods as described in the Option 11 *Fault clearing guide* provided with the Option 11 system.

ISDN BRI maintenance commands

Maintenance commands

Maintenance commands are used to manipulate the status and perform diagnostic tests on specific circuit cards and DSLs. The main role of these commands is to disable the card you plan to test, to perform the specified tests, and to enable the card.

Table 20 lists the ISDN BRI specific commands and their associated diagnostic programs. A complete list of diagnostic commands is included in the *X11 Software guide Including Supplementary Features* provided with the Option 11.

Table 20
Maintenance commands

Command	Description	Program
DIS CC x	Disable system clock controller (0 or 1)	LD 60
DISC BRIL c	Disables the ISDN BRI line application on MISP c	LD 32
DISC BRIT c	Disables the ISDN BRI trunk application on the MISP located in card slot c	LD 32
DISC BRIT c REM	Disables and removes the application loadware for the ISDN BRI trunk application on the MISP located in card slot c	LD 32
DISC c	Disables the card in slot c	LD 32
DISI c	Disables the card in slot c when idle	LD 32
DISU c dsl#	Disables the DSL in card slot c dsl#	LD 32
DISS s	Disable shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
DSCK loop	Disables the clock for loop	LD 60
DSRB c dsl#	Remove the ISDN BRI trunk on card c dsl# from remote loop back mode	LD 32
DSTS c dsl#	Remove the ISDN BRI trunk on card c dsl# from test mode	LD 32
DSYL loop	Disables yellow alarm processing for loop	LD 60
ENL CC x	Enable system clock controller x	LD 60
ENCK loop	Enable clock for loop	LD 60
ENLC BRIT c	Enables the ISDN BRI trunk application on the MISP located in card slot c	LD 32
ENLC BRIT c FDL	Enables and force downloads the application loadware for the ISDN BRI trunk application on the MISP located in card slot c	LD 32

Table 20
Maintenance commands

Command	Description	Program
ENLC BRIL c	Enables the ISDN BRI line application on MISP c	LD 32
ENLC c	Enables the card in slot c	LD 32
ENTS c dsl#	Set the ISDN BRI trunk on card c dsl# in test mode for loop back test	LD 32
ENLS s	Enable shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
ENLU c dsl#	Enables the DSL in card slot c dsl#	LD 32
ENRB c dsl#	Set the ISDN BRI trunk on card c dsl# in remote loop back mode	LD 32
ENYL loop	Enable yellow alarm processing for loop	LD 60
EREF	Enable automatic switchover of system clocks	LD 60
ESTU c dsl#	Establish a D-channel link on card c dsl#	LD 32
IDC c	Displays the MISP card ID number, the loadware version for the MISP base code and all resident applications on the Flash ROM for the MISP in card slot c	LD 32
LBSY s	List busy units on shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
LDIS s	List disabled units on shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
LIDL s	List idle units on shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
LMNT s	List maintenance busy units on shelf s (0 for main cabinet, 1 for expansion cabinet)	LD 32
MREF	Disable switchover of system clocks	LD 60
PCON c dsl#	Print the configuration parameters for the ISDN BRI trunk on card c dsl#	LD 32

Table 20
Maintenance commands

Command	Description	Program
PERR c	Print the error log for the MISP or ISDN BRI card c	LD 32
PLOG c dsl#	Print the protocol log for the ISDN BRI trunk on card c dsl#	LD 32
PMES c dsl#	Print layer 3 message log for the ISDN BRI trunk on card c dsl#	LD 32
PTAB c dsl# <tbl#>	Print layer 3 message configuration table for the ISDN BRI trunk on card c dsl#	LD 32
PTRF c dsl#	Print the traffic report for the ISDN BRI trunk on card c dsl#	LD 32
RLBT c dsl#	Start remote loop back test on ISDN BRI trunk on card c dsl#	LD 32
RLSU c dsl#	Release the D-channel link on card c dsl#	LD 32
STAT BRIL c	Query the status of ISDN BRI line application	LD 32
STAT BRIT c	Queries the status of the ISDN BRI trunk application on the MISP located in card slot c	LD 32
STAT c	Queries the status of card in slot c	LD 32
STAT c dsl#	Queries the status of a DSL on card c dsl#	LD 32
SLFT c	Performs self-test on the SILC or UILC in card slot c	LD 32
SLFT c <1,2>	Performs self-test on the MISP card c, type 1 or 2 Type 1 test is a comprehensive test Type 2 test is a power-on/reset test Response NWS632 indicates self-test failed Response NWS637 indicates self-test passed	LD 30
SSCK x	Get status of system clock x	LD 60
SWCK	Switch system clock from active to standby	LD 60

Table 20
Maintenance commands

Command	Description	Program
TEIT c dsl#	Performs TEI test on card c dsl#	LD 30
TRCK aaa	Set clock controller tracking to primary, secondary or free run	
XCON0 H (0-182) M (0-59) S (0-60)	Performs loopback test from the MISP to an SILC or UILC that checks the signaling channel. It does not test the SILC or UILC but only the peripheral bus interface and backplane connectors. 0 = performs only one loopback test H, M, S = performs loopback test for the number of hours, minutes, or seconds entered	LD 45
TEIT c dsl#	Performs TEI test on card c dsl#	LD 30

MISP and SILC/UILC message monitoring commands

Link Diagnostic Overlay Program 48 (LD 48) is used to monitor and print messages sent and received by the MISP, SILC, and UILC cards.

These commands are used to monitor ISDN BRI activity during normal system operation and to facilitate system maintenance.

Table 21 lists LD 48 commands and functions.

Table 21
MISP and SILC/UILC message monitoring commands

LD 48 Command	Command Description
SETM MISP <card #> DBG	Activates the debug option on the MISP
SETM MISP <card #> MON	Activates the printing option for incoming and outgoing messages for the MISP
SETM MISP <card #> MNT	Prints status messages for the MISP.
SETM MISP <card #> AMO	Activates sending audit messages from the CPU to the MISP
SETM MISP BRIM <number>	Prints input/output messages form the CPU to the MISP and SILCs/UILCs and from these cards back to the CPU
SETM TNx c dsl#	Activates printing of messages for a specified DSL
SETM TNx c 31	Activates printing of messages for a specified ISDN BRI card
RSET MISP <card #> DBG	Resets the command for debug option
RSET MISP <card #> MON	Resets the command for monitor option
RSET MISP <card #> MNT	Resets the command for printing maintenance messages
RSET MISP <card #> AMO	Resets the command for audit option
RSET MISP BRIM	Resets the command for printing messages for a DSL or line card
RSET TNx	Resets the command for printing of messages for a specified DSL
RSET ALL	Resets the command for a group of commands

Changing, removing and printing an LAPD protocol group

The following table gives the prompts and responses used to change, remove and print LAPD protocol groups.

LD 27— Changing a protocol group

Prompt	Response	Comment
REQ	CHG	Change an ISDN/BRI component
TYPE	LAPD	LAPD Protocol group
PGPN	0-15,<cr>	Protocol group number The values for this prompt are: 0-15=Changes a specified protocol group from 0-15. Only one group can be changed at the time. <cr>=No change to the value at the prompt
LAPD	YES, (NO)	LAPD parameters The values for this prompt are: YES=Define or modify the LAPD parameters NO=Does not display the LAPD parameters.
T200	(2)-40	Retransmission timer specifies the time delay before the system retransmit the information. Delay is in increments of 0.5 seconds.
T203	4-(20)-80	Maximum time between transmission frames Delay is in increments of 0.5 seconds.
N200	1-(3)-8	Maximum number of retransmissions of unsuccessfully transmitted information.
N201	4-(260)	Maximum number of contiguous octets or bytes of information.
K	(1)-32	Maximum number of outstanding negative acknowledgment (NAKs) allowed before alarming the system.
N2X4	1-(10)-20	For 1TR6 connectivity — number of status inquiries when the remote station is in peer busy state.

Removing an LAPD protocol group

You can remove a previously configured LAPD protocol group that is not currently assigned to a DSL. If a protocol group is assigned to a DSL, you must delete the DSL before removing the protocol group. You can also remove all protocol groups not assigned to DSLs by entering ALL at the PGPN prompt.

LD 27— Removing a protocol group

Prompt	Response	Comment
REQ	OUT	Remove an ISDN/BRI component
TYPE	LAPD	Protocol group
PGPN	0-15,ALL, <cr>	Protocol group number The values for this prompt are: 0-15=Removes a specified protocol group from 0-15 ALL=Removes all protocol groups <cr>=No change, i. e. the protocol group doesn't get removed. You cannot remove a protocol group if it is assigned to a DSL or a route.

Printing a protocol group

You can print the configuration information for a specific protocol group or for all protocol groups.

LD 27— Printing a protocol group

Prompt	Response	Comment
REQ	PRT	Prints an ISDN BRI component
TYPE	LAPD	Protocol group
PGPN	0-15,<cr>	Protocol group number The values for this prompt are: 0-15=Prints a specified protocol group from 0-15 <cr>=Prints all protocol groups and the number of DSLs in each group

Changing, removing and printing an MISP

Changing an MISP

You can change voice and data handling status of an MISP. You can remove packet data handling from an MISP or change the PRI card slot and channel assigned for packet data transmission. To do this, first disable the MISP using the DISC c command in Diagnostic Program LD 32. After you completed the service changes, enable the MISP using ENLC c command. If you do not wish to change a parameter, press the Enter key and the next prompt will appear.

LD 27 — Changing a MISP

Prompt	Response	Comment
REQ	CHG	Change an ISDN BRI component
TYPE	MISP	MISP
LOOP	1-9	MISP card slot number
APPL	(BRIL) BRIT XBRIL, XBRIT	ISDN BRI line or trunk application XBRIL, XBRIT to remove Must remove all SILC/UILC before application can be removed
PH	DCH,BCH, BDCH,X	Packet handler The values for this prompt are: DCH=D-channel communicates with packet handler BCH=B-channel communicates with packet handler. If this capability is removed, a warning will be displayed. BDCH=Both D-channel and B-channel communicate with packet handler X=Removes packet data transmission option. All PRI trunks must be removed before B-D-channel can be removed. <cr>= No change, following prompts will not appear. If you select DCH or BDCH, DSL#7 on the last (4th) line card cannot be used.
PRI	c	PRI card slot number The PRI card is connected to the external DPN packet handler by the carrier cable. The card must have already been added using Configuration Record Program LD 17.

Prompt	Response	Comment
CH	1-23 1-30	PRI 1.5 Mb (1-23) or PRI 2 Mb (1-30) channel number This channel carries B_D-channel packet data. To change this parameter, first disable the MISP. This prompt appears only if you selected DCH or BDCH for the PH prompt.

Removing an MISP

You can remove an MISP by specifying its card slot number. Before you can remove the MISP, you must remove all DSLs connected to SILCs and/or UILCs that are associated with the MISP.

LD 27 — Removing a MISP

Prompt	Response	Comment
REQ	OUT	Remove an ISDN BRI component
TYPE	MISP	MISP
LOOP	1-9	Card slot number The MISP must be disabled before removing it. All SILC and/or UILC DSLs associated with the MISP must be removed before removing the MISP. Refer to *Removing an SILC or UILC* in this chapter.

Printing an MISP

You can print the configuration information for an MISP by specifying its card slot number.

LD 27 — Printing a MISP

Prompt	Response	Comment
REQ	PRT	Prints an ISDN BRI component
TYPE	MISP	MISP
LOOP	1-9 <cr>	Card slot number If you do not know the MISP card slot number, use Print Program LD 22 to print out the system configuration. <cr>=print all MISPs in the system

Changing, removing and printing an SILC or UILC

Changing an SILC or UILC

You can change a card type and the MISP card slot number with which the SILC or UILC is associated. Before changing the SILC or UILC, you must disable the card by executing the **DISC c** command in Diagnostic Program LD 32. If you do not wish to change a parameter, press the Enter key and the next prompt will appear.

LD 27 — Changing an SILC or UILC

Prompt	Response	Comment
REQ	CHG	Change an SILC or UILC line card
TYPE	CARD	SILC or UILC line card
TN	1-20	Card slot location The values for this prompt are1-20 Remove any DSLs that are configured for this line card before changing the line card.
MISP	1-9	MISP card slot number ISDN BRI applications on the MISP must be disabled when changing the MISP card number. The SILC or UILC must be disabled before changing the MISP card slot number.
CTYP	SILC,UILC	Card type

Removing an SILC or UILC

You can remove an SILC or UILC by specifying its card location. Before you can remove the SILC or UILC, you must first remove all configured DSLs from the card by using the *Removing a DSL* procedure. When you remove the last DSL, you automatically delete the card.

When you remove (OUT) the card, you also delete its database information from the data block. Print Program LD 20 can be used to list the cards that are configured.

LD 27 — Removing an SILC or UILC

Prompt	Response	Comment
REQ	OUT	Remove an SILC or UILC line card
TYPE	CARD	SILC or UILC line card
TN	1-20	Card slot location The values for this prompt are1-20 Remove any DSLs that are configured for this line card before removing the line card.

Printing an SILC or UILC

You can print the configuration information for an SILC or UILC by specifying its card location.

LD 27 — Printing a SILC or UILC

Prompt	Response	Comment
REQ	PRT	Print an ISDN BRI component
TYPE	CARD	ISDN BRI line card
TN	1-20 <cr>	Used to print the data of a specific card To print all SILC and UILC in the system

Changing or Removing a DSL

Changing a line DSL

You can change the characteristics of a line DSL by changing one or more parameters to adapt it to new transmission or feature requirements. If you wish to skip a parameter, press the Enter key and the next prompt will appear.

> ***Note:*** The DSL must be idle or disabled before proceeding. Use the STAT c and DISU c dsl# commands in LD 32 to query the status of the DSL and to disable it.

LD 27 — Changing a line DSL

Prompt	Response	Comment
REQ	CHG	Change a DSL
TYPE	DSL	DSL
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL number)=0-7
DES	x...x,<cr>	DES designator The values for this prompt are: x...x=1 to 6 alphanumeric designator <cr>=No change
APPL	BRIL	ISDN BRI line application
CUST	0-99	Customer number
CTYP	SILC, UILC	Card type ***Note:*** This prompt is displayed only if the SILC or UILC has not been previously configured, or if another DSL has not been configured on the same SILC/UILC.
MISP	1-9	MISP card slot number This prompt is displayed only if the MISP has not been previously assigned to the specified SILC or UILC.
MODE	NTAS,NTFS	Network terminal line sampling mode The values for this prompt are: NTAS=Adaptive sampling Extended passive bus, Branched passive bus, Point-to-point bus, U interface DSL NTFS=Fixed sampling Short passive bus NTAS, NTFS response valid only if APPL=BRIL TE, NT response valid only if APPL=BRIT This prompt is displayed only if you specified the card type as SILC. ***Note:*** Cannot change from TE to NT if the clock on the DSL is referenced in the Digital Data Block or the 2 Mb DTI/PRI system data. The reference must first be removed. If mode is changed to NT, CLOK will reset to NO.

Prompt	Response	Comment
B1CT	VCE DTA PMD XVCE XDTA XPMD	B-channel 1 call type The values for this prompt are: VCE=Adds circuit switched voice. DTA=Adds circuit switched data PMD=Adds packet mode data (B-channel packet data must have been specified in the *MISP configuration procedures*). XVCE=Removes circuit switched voice XDTA=Removes circuit switched data XPMD=Removes packet mode data (B-channel packet data must have been specified at the PH prompt in the *MISP configuration procedures*) You can enter more than one B-channel call type by separating each entry with a space. You cannot select PMD simultaneously with VCE and/or DTA.
B2CT	VCE DTA PMD XVCE XDTA XPMD	B-channel 2 call type The values for this prompt are: VCE=Adds circuit switched voice DTA=Adds circuit switched data PMD=Adds packet mode data (B-channel packet data must have been specified at the PH prompt in the *MISP configuration procedures*) XVCE=Removes circuit switched voice XDTA=Removes circuit switched data XPMD=Removes packet mode data You can enter more than one B-channel call type by separating each entry with a space. You cannot select PMD simultaneously with VCE and/or DTA.
LDN	0-3,NO	Departmental listed directory number The values for this prompt are: 0-3=Listed directory number 0, 1, 2, or 3 specified in Customer Data Block Program LD 15 NO=No listed directory number associated with this DSL
XLST	0-254	Pretranslation group. This prompt comes up if configured in customer data block
MTEI	1-(8)-20	Maximum number of Terminal Endpoint Identifiers Both static and dynamic combined.

Prompt	**Response**	**Comment**
LTEI	n1 n2 m <cr>	***Note:*** A response to this prompt is only required for packet data implementation. The Logical Terminal Endpoint Identifier(LTEI) is used to address D-channel packet data terminals. LTEI consists of two components: n1 and n2 = Logical Terminal Identifier (LTID) m = Static Terminal Identifier (TEI) The maximum number of Logical Terminal Endpoint Identifiers (LTEIs) that can be configured is defined above by the prompt MTEI. The ranges for all entries are: n1 = Logical Terminal Group (LTG) = 1-15 n2 = Logical Terminal Number (LTN) = 1-1023 m = Static TEI = 0-63 ***Note:*** LTG=15 and LTN=1023 is an invalid combination. Xm=Deletes LTID and TEI as a pair for the specified TEI.
MCAL	2-(16)-32	Maximum number of calls per DSL
MTSP	1-(8)-16	Maximum number of TSPs Can be changed to a smaller number only if the TSPs defined for this DSL do not exceed this number. If they do, remove all extra TSPs before changing the maximum number of TSPs.
PGPN	0-15	Protocol group number The protocol group must be previously added.
PRID	1-5	Protocol ID The values for this prompt are: 1=ANSI 2=ETSI NET3 3=DMS 4=INS NET64 5=Numeris
PDCA	(1)-16	PAD TABLE # — only prompted if PRID=ETSI NET3, INS NET64 or Numeris
FDN	n...n Xn...n	Flexible CFNA directory number Enter a directory number from 1 to 13 digits long. Enter Xn...n to delete the parameter.

Prompt	Response	Comment
EFD	n...n Xn...n	Flexible external call CFNA directory number Enter a directory number from 4 to 13 digits long. Enter Xn...n to delete the parameter.
HUNT	n...n Xn...n	Hunt directory number Enter a directory number from 4 to 13 digits long. Enter Xn...n to delete the parameter.
EHT	n...n Xn...n	Hunt external call directory number Enter a directory number from 4 to 13 digits long. Enter Xn...n to delete the parameter.
TGAR	0-31	Trunk group access restriction
NCOS	0-99	Network class of service
CLS	(UNR) TLD SRE FRE CUN CTD FR1 FR2 (UDI) RDI (MRD) MRA	Class of service access restrictions The values for this prompt are: UNR=Unrestricted TLD=Toll denied SRE=Semi-restricted FRE=Fully restricted CUN=Conditionally unrestricted CTD=Conditionally toll denied FR1=Fully restricted class 1 FR2=Fully restricted class 2 UDI=Unrestricted DID RDI=Restricted DID MRD=Message registration denied MRA=Message registration allowed You can enter more than one class of service by separating each entry with a space. You can press <cr> and select the default features shown in parenthesis.

LD 27 — Changing a line DSL (continued)

Prompt	Response	Comment
TGAR	0-31	Trunk group access restriction
NCOS	0-99	Network class of service
CLS	(UNR) TLD SRE FRE CUN CTD FR1 FR2 (UDI) RDI (MRD) MRA	Class of service access restrictions The values for this prompt are: UNR=Unrestricted TLD=Toll denied SRE=Semi-restricted FRE=Fully restricted CUN=Conditionally unrestricted CTD=Conditionally toll denied FR1=Fully restricted class 1 FR2=Fully restricted class 2 UDI=Unrestricted DID RDI=Restricted DID MRD=Message registration denied MRA=Message registration allowed You can enter more than one class of service by separating each entry with a space. You can press <cr> and select the default features shown in parenthesis.

Changing a trunk DSL

You can change the characteristics of a trunk DSL by changing one or more parameters to adapt it to new transmission or feature requirements. If you wish to skip a parameter, press the Enter key and the next prompt will appear.

> ***Note:*** The DSL must be idle or disabled before proceeding. Use the STAT c and DISU c dsl# commands in LD 32 to query the status of the DSL and to disable it.

LD 27 — Changing a trunk DSL

Prompt	Response	Comment
REQ	CHG	Changing a DSL
TYPE	DSL	DSL
DSL	c dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL number)=0-7
APPL	BRIT,BRIE, XBRIE	ISDN BRI trunk application Enter BRIT for ISDN BRI trunking, BRIE to download the Universal ISDN Protocol Engine loadware on the DSL, or XBRIE to remove the loadware (all associated DSLs must be first removed for XBRIE).
CUST	0-99	Customer number
CTYP	SILC, UILC	Card type
MISP	1-9	MISP card slot number
MODE	TE/NT	The mode for the trunk DSL. TE is entered for Terminal Equipment, NT is used for Network Termination. See the Trunk configuration figures to determine the Mode to be set based on the configuration you are implementing. This prompt is displayed only if SILC was specified as the card type. For UILC, this entry defaults to NT mode. For SILC, the default is TE. ***Note:*** Cannot change MODE from TE to NT if clock on DSL is referenced in the digital data block or DTI2/PRI2 system data. The reference must first be removed. If MODE is set to NT, CLOK will be set to NO.
MTFM	YES/(NO)	Enable/Disable multi-frame option. Prompted only if MODE=TE If enabled this prompt allows you to receive more diagnostic messages.
TKTP	TIE/COT/ DID	Trunk type

Prompt	Response	Comment
CLOK	YES/(NO)	Whether this trunk DSL is provisioned for clock source. The SILC must be residing in slot 1-10 in the main cabinet. This prompt appears if the following conditions are met: - the card type is SILC - the DSL# is 0 or 1 - the trunk DSL has been defined as TE mode ***Note:*** The clock prompt cannot be changed from YES to NO if the clock is active; the trunk DSL must first be removed using LD 73. Also, you cannot out a trunk DSL if an active clock exists on it; the trunk DSL must first be disabled.
TSET	(0)-15	Clock error threshold set ***Note:*** The threshold Set is currently not used. Press <cr> to accept the default 0 value.
PDCA	(1)-16	Pad table number
ROUT	0-511	Route number for the trunk DSL.
B1	YES/(NO)	Configure B Channel 1. B1 will automatically be YES if ROUT was changed because a new member must be entered.
MEMB	1-254	Route member number associated with B-channel 1.
TGAR	(0)-31	Trunk Group Access Restriction.
NCOS	(0)-99	Network Class of Service Group Number

Prompt	Response	Comment
CLS	aaa	Class of Service options. Possible inputs are as follows: (UNR)=Unrestricted TLD=Toll denied SRE=Semi-restricted FRE=Fully restricted CUN=Conditionally unrestricted CTD=Conditionally toll denied FR1=Fully restricted class 1 FR2=Fully restricted class 2 (APN)=ACD priority not required APY=ACD priority required MRA = Message Registration Allowed (assigning meters to ISDN BRI sets, for Advice of Charge for EuroISDN or Australia-AXE and Japan D70). (MRD) = Message registration denied UNR, APN and MRD are defaults. CUN, CTD, TLD, SRE, FRE, FR1, and FR2 are allowed only for TIE trunks. Input is accepted until <cr> is entered.
B2	YES/(NO)	Configure B Channel 2. If REQ = CHG, and NO is entered to this prompt, and ROUT was changed, all parameters for B2 will remain the same except the route member will be an unused member number. The message “B2 will use Route # Member #” will be displayed.
MEMB	1-254	Route member number.
TGAR	(0)-31	Trunk Group Access Restriction.
NCOS	(0)-99	Network Class of Service Group Number

Prompt	Response	Comment
CLS	aaa	Class of Service options. If TKTP is no longer TIE, CLS will be set to UNR. APN/APY will remain the same as before. Possible inputs are as follows: (UNR)=Unrestricted TLD=Toll denied SRE=Semi-restricted FRE=Fully restricted CUN=Conditionally unrestricted CTD=Conditionally toll denied FR1=Fully restricted class 1 FR2=Fully restricted class 2 (APN)=ACD priority not required APY=ACD priority required MRA = Message Registration Allowed (assigning meters to ISDN BRI sets, for Advice of Charge for EuroISDN or Australia-AXE and Japan D70). (MRD) = Message registration denied UNR, APN and MRD are defaults. CUN, CTD, TLD, SRE, FRE, FR1, and FR2 are allowed only for TIE trunks.

Printing a DSL

You can print the configuration information for a single DSL by specifying its location, all DSLs on a card by specifying the card location, all DSLs in a module by specifying the loop and shelf number, or all DSLs associated with a network loop by specifying the loop number.

LD 27 — Printing a DSL

Prompt	Response	Comment
REQ	PRT	Print an ISDN BRI component
TYPE	DSL	DSL
DSL	cc dsl#, cc <cr>	DSL information The values for this prompt are: cc dsl#=Prints information for the specified dsl# on card cc cc=Prints information for all DSLs on the specified card cc <cr>=Prints the data for all DSLs in the system
DATE	(<cr>) x y z	Print data and display the last active date, where: x=day (1-31) y=month (JAN-DEC), z=year (1979-9999) specifies the starting date of the data to be displayed or printed.
PAGE	YES, (NO)	yes=prints one DSL per page, no=prints without paging
DES	xxxxxx <cr>	1 to 6-digit alphanumeric DSL designator Not prompted if DSL=cc dsl# and trunk DSL <cr>=No designator for DSLs
NACT	YES, (NO)	Activity date is updated to current date

Removing a DSL

You can remove a DSL by specifying its location. To remove a DSL, you must first remove all the TSPs assigned to this DSL. When you remove the last configured DSL on a card, the card is automatically disabled.

> ***Note:*** You cannot OUT a DSL if an active clock exists on the DSL. The DSL must be idle or disabled before proceeding. Use the STAT c and DISU c dsl# commands in LD 32 to query the status of the DSL and to disable it.

LD 27 — Removing a DSL

Prompt	Response	Comment
REQ	OUT	Remove an ISDN BRI component
TYPE	DSL	DSL
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL location)=0-7

Changing, removing and printing a TSP

Changing a TSP

You can change the characteristics of a TSP on a DSL by specifying the DSL location and the user service identifier. You can then modify the service parameters to adapt the TSP to new service requirements for the terminals on that DSL. If you do not wish to change a parameter, press the Enter key and the next prompt will appear. When you want to change a TSP, you must disable the DSL, make the changes to the TSP, and enable the DSL. A warning message will be displayed and all the active calls on the DSL will be disconnected.

> ***Note:*** The DSL must be idle or disabled before proceeding. Use the STAT c and DISU c dsl# commands in LD 32 to query the status of the DSL and to disable it.

LD 27 — Changing a TSP

Prompt	Response	Comment
REQ	CHG	Change TSP
TYPE	TSP	TSP
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL location)=0-7 The DSL must have been configured using the *DSL configuration procedures.*
USID	0-15	User service identifier USID=0 is default TSP assigned to non-initializing terminals. The total number of TSPs defined for a DSL cannot exceed the maximum number of TSPs allowed for a DSL as specified by the MTSP prompt in the *DSL configuration procedures.* A default TSP must be configured for non-initializing terminals. This is done by assigning a user service identifier of 0 to the TSP.
SPID	x...x,Xx...x, <cr>	Service profile ID The values for this prompt are: x...x=Adds a 9-character numeric or alphanumeric (depending on type of terminal) service profile ID Xx...x=Removes service profile ID. <cr>=Stops this prompt from being displayed again This prompt appears only if you specified a user service identifier of 1-15. If you remove all the service profile IDs, you must define a new one. This prompt will be repeated 8 times or until <cr> is entered.

Prompt	**Response**	**Comment**
DN	n...n,Xn...n, <cr>	Directory number to be associated with TSP The values for this prompt are: n...n=Adds a 4 to 7-digit directory number Xn...n=Removes a 4 to 7 digit directory number <cr>=Stops this prompt from being displayed again This prompt is repeated until <cr> is pressed. At least one DN must be assigned to a DSL. The directory number cannot be shared by a non-ISDN BRI terminal. The directory number can be associated with multiple TSPs on a DSL but it cannot be associated with any other DSL. If you remove the directory number that is also assigned as a default directory number, a new default directory number must be defined at the DFDN prompt.
CT	VCE DTA XVCE XDTA	Directory number call type The values for this prompt are: VCE=Adds circuit switched voice DTA=Adds circuit switched data XVCE=Removes circuit switched voice XDTA=Removes circuit switched data One or more call types can be entered. by separating each entry with a space. The call types entered must have been specified for the B1CT and B2CT prompts in the *DSL configuration procedures*.
MCAL	1-(4)-8	Maximum number of calls per DN at one time Defines the maximum number of calls allowed for the directory number, which includes active calls, calls waiting, and calls on hold.
CLIP	(YES),NO	Calling line identification is displayed on the called terminal for incoming calls if CLIP is set to YES.
PRES	(YES),NO	Allows calling line identification presentation as default The key on the calling terminal toggles the presentation status on a per call basis to allow or restrict sending calling line identification to the called terminal.

Prompt	**Response**	**Comment**
FEAT	HTA (HTD) FNA (FND) SFA (SFD) CFTA (CFTD) MWA (MWD) FBA (FBD) HBTA (HBTD)	Class of service features The values for this prompt are: HTA=Hunt allowed (always assign if terminal does have CWT capability) HTD=Hunt denied FNA=Call forward no answer allowed FND=Call forward no answer denied SFA=Second level call forward no answer allowed SFD=Second level call forward no answer denied CFTA=Call forward by call type allowed CFTD=Call forward by call type denied MWA=Message waiting allowed MWD=Message waiting denied FBA=Call forward busy allowed FBD=Call forward busy denied HBTA=Hunting by call type allowed HBTD=Hunting by call type denied You can enter more than one class of service by separating each entry with a space. You can press <cr> and select multiple default features shown in parenthesis
DN	n...n,<cr>	Multiple DN. Press <cr> to go to the next parameter.
DFDN	n...n	Default directory number Enter a 1 to 7-digit directory number. This directory number must have been previously defined at the prompt DN.

Removing a TSP

You can remove a TSP from a DSL by specifying the DSL location and the user service identifier or you can remove all TSPs from a DSL by entering ALL for the USID prompt. All calls associated with the removed TSP will be disconnected.

> ***Note:*** The DSL must be idle or disabled before proceeding. Use the STAT c and DISU c dsl# commands in LD 32 to query the status of the DSL and to disable it.

LD 27 — Removing a TSP

Prompt	Response	Comment
REQ	OUT	Remove an ISDN BRI component
TYPE	TSP	TSP
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL location)=0-7
USID	0-15,ALL	User service identifier The values for this prompt are: 0-15=Removes a specified TSP from 0 to 15 ALL=Removes all TSPs for the specified DSL

Printing a TSP

You can print the configuration information for a TSP based on characteristics such as user service identifier, service profile ID, and directory number.

LD 27 — Printing a TSP

Prompt	Response	Comment
REQ	PRT	Print an ISDN BRI component
TYPE	TSP	TSP
DSL	cc dsl#	DSL location The values for this prompt are: cc (card)=1-20 dsl# (DSL location)=0-7 The DSL must have been configured using the *DSL configuration procedures.*
OPT	SPID,USID, DN,DNS,<cr>	Print option The values for this prompt are: SPID=Prints the TSPs with the specified service profile ID (SPID) USID=Prints the TSP with the specified user service identifier (USID) DN=Prints the TSPs with the specified directory numbers DNS=Prints all the directory numbers defined for the DSL <cr>=Prints all the TSPs defined for the DSL
USID	0-15	User service identifier This prompt appears only if you specified USID at the OPT prompt.
SPID	x...x	Service profile ID Enter a 9-digit alphanumeric service profile ID This prompt appears only if you specified SPID at the OPT prompt.
DN	n...n	Directory number associated with the TSP Enter a 1 to 7-digit directory number This prompt appears only if you specified DN at the OPT prompt.

Isolating and correcting faults

Newly installed ISDN BRI equipment

Problems that occur during the installation of an entire system with ISDN BRI equipment are usually caused by:

— Improperly installed cards

— Loose or improperly connected external communication cables or improperly wired cross-connect in the DSL

— Incorrect ISDN BRI configuration

Previously operating ISDN BRI equipment

Problems that occur during the normal operation of ISDN BRI equipment are usually caused by:

— Faulty cards

— Disconnected or faulty cables

— Faulty power supply

— Improper environmental conditions

Isolating faults

Fault isolation table

Table 22 is used to diagnose the problems based on symptoms you observe. They direct you to a test procedure or suggest a possible solution.

Table 22
ISDN BRI equipment problems

Symptoms	Diagnosis	Solution
Red LED on the MISP is permanently lit.	The MISP is faulty, has not been configured, or is disabled.	Go to *Procedure 8-1* of *MISP fault isolation and correction* in this chapter to check the MISP status.
	Program software download (PSDL) failed due to MISP or data cartridge failure.	If all the MISPs in the system show red LED lit, check the program software download, otherwise replace the defective MISP.
Automatic recovery routine is activated every 30 seconds to enable or disable the MISP as indicated by the MISP LED flashing every 30 seconds.	Incompatibility between software configuration and the application indicating missing or incorrectly configured MISP.	Check that the MISP is installed in the correct card slot. To verify the MISP configuration parameters, refer to the *Administration* section of this manual *MISP configuration procedures.*
	The MISP is faulty.	Go to *Procedure 8-2, Performing the MISP self-test.*
Red LEDs on one or more SILCs or UILCs are permanently lit.	The SILCs and/or UILCs are faulty, disabled, or not configured.	Go to *Procedure 8-6* of *SILC or UILC fault isolation and correction* in this chapter to check the card status.
Calls cannot be placed or received on all SILCs and/or UILCs associated with a specific MISP.	The MISP is faulty, has not been configured, or is disabled.	Go to *Procedure 8-1* of *MISP fault isolation and correction* in this chapter to check the MISP status.
Calls cannot be placed or received on some SILCs and/or UILCs associated with a specific MISP.	The SILCs and/or UILCs are faulty or disabled.	Go to *Procedure 8-6* of *SILC or UILC fault isolation and correction* in this chapter to check the card status.
	Signaling link between the MISP and the SILCs or UILCs is faulty.	Go to *Procedure 8-3 Performing MISP loopback tests* in this chapter to check the continuity of the signaling channel.

Symptoms	Diagnosis	Solution
Calls cannot be placed or received on some DSLs on a particular line card.	The DSLs incorrectly configured, not configured, or disabled.	Go to *Procedure 8-7* of S*ILC or UILC fault isolation and correction* in this chapter to check the status of each DSL.
	Signaling link between the MISP and the SILCs or UILCs is faulty.	Go to *Procedure 8-3 Performing MISP loopback tests* in this chapter to check the signaling link between the MISP and the SILCs and/or UILCs.
	ISDN BRI terminal faulty or incorrectly configured.	Check the ISDN BRI terminal user manual to determine if the terminal is operating correctly.
	DSL wiring faulty.	Check the DSL wiring.
Problems with features on ISDN BRI terminals.	Incorrect DSL and/or TSP configuration for the connected ISDN BRI terminals.	Use the configuration procedures in the *Administration* section of this manual to verify the DSL and the TSP configuration parameters.
User reports problems with calls on specific type terminals.	Mismatch between the DSL configuration and the terminal type connected to the DSL, a faulty terminal, or a faulty connection to the DSL.	Go to *Procedure 8-7* of S*ILC or UILC fault isolation and correction* in this chapter to check the status of each DSL. Check DSL wiring between the main frame connection and the terminal. Wiring includes building cabling, mounting cords and wall jacks. Check the ISDN BRI terminal user manual to determine if the terminal is operating correctly and is configured correctly.

MISP fault isolation and correction

The MISP provides a communication interface between the CPU and the peripheral devices. It processes the signaling information received on the D-channels from the DSLs. These D-channels may also carry packet data that the MISP separates from signaling information and forwards to the packet handler.

To isolate and correct the MISP-related problems, follow the procedures below.

Procedure 8-1: Checking the MISP status

The diagnosis in Table 22 indicates that the MISP may be faulty, not configured, or disabled.

To obtain the MISP status:

1 **Log-in on the maintenance terminal and load overlay program 32.**

2 **Enter STAT c where c is the card slot number of the MISP you are testing.**

If the response is;
c: MISP LOOP
mm DSBL nn BUSY
MISP c: ENBL ACTIVATED xx/xx/xx xx:x
BRIL or BRIT: ENBL

BRIL or BRIT is the ISDN BRI LINE or TRUNK (whichever one is configured) application on the MISP. The MISP is enabled, where **mm** is the number of disabled connections on the Card, which should be 0 and **nn** is the number of busy connections on the MISP. This number is equal to 2x(# of line cards + 1) where 1 indicates that packet data transmission is configured, (there are 2 connections for each SLIC or UILC and an additional connection for packet data handling). The xx/xx/xx xx:x is the date and time the MISP base code was activated.

If **mm** is greater than 0, it indicates disabled connections. The disabled connections may indicate faulty line cards. Go to *Procedure 8-6*.

If the response is
c:MISP LOOP
DISABLED RESPONDING
MISP c MAN DSBL

the MISP card slot is disabled but the MISP is responding. The card has been manually disabled using the **DISC c** command in this program, an overload condition exists on the card, or when enabling the MISP the self-test failed.

If the application is manually disabled, the response is BRIL or BRIT: MAN DSBL

If the application is system disabled, the response is BRIL or BRIT: SYS DSBL

If there is no application configured on the MISP, the response is NO APPLICATION CONFIGURED.

Type **ENLL c** and press the Enter key to enable the card, where **c** is the MISP card number. A message indicating that the MISP is enabled and working is displayed on the console. Also observe the red LED on the MISP. If it extinguishes, the MISP is functioning correctly. If the LED stays lit, the MISP probably failed self-test and a message should be displayed on the maintenance terminal indicating that.

If the message indicates that the MISP is faulty, replace the card.

If the response is:
c:MISP LOOP
DISABLED RESPONDING
MISP c SYS DSBL - xxxxxxxx

the MISP is disabled but is responding. The card has been system disabled, an overload condition exists on the card, or when enabling the MISP the self-test failed.

Where xxxxxxxx may indicate
SELF TESTING - when the card is performing self test
SELFTEST PASSED - when the card successfully completed self test
BOOTLOADING - when the basecode is being downloaded to the MISP
SELFTEST FAILED - when the self test failed

FATAL ERROR - when the MISP has a serious problem
SHARED RAM TEST FAILED - when the card has a memory problem
OVERLOAD - when the card is faulty and it experiences an overload
RESET THRESHOLD - when the card is faulty and reaches the specified threshold
STUCK INTERRUPT - when the MISP has hardware failure and the interrupt is permanently on

If the response is:
c:MISP LOOP
DISABLED NOT RESPONDING
MISP c MAN DSBL

the MISP is manually disabled and the MISP is not responding, is missing, installed in an incorrect slot, or faulty. Check for these conditions and go to the appropriate test procedure based on you findings. It has to be enabled by using **ENLC c** in LD 32 when the NOT RESPONDING condition is cleared.

If the response is:
c:MISP LOOP
DISABLED NOT RESPONDING
MISP c SYS DSBL - NOT RESPONDING

the MISP is system disabled and the MISP is not responding, is missing, installed in an incorrect slot, or faulty. A background routine will try to enable the MISP as soon as the cause of NOT RESPONDING is cleared.

3 **To obtain the ISDN BRI application status, enter STAT BRIL c (for a line) or STAT BRIT c (for a trunk) and observe the response.**

If the response is
c:MISP LOOP
APPLICATION ENBL ACTIVATED - xx/xx/xx xx:xx

the application has been activated at the date and time specified by xx/xx/xx xx:xx.

enable the MISP as soon as the cause of NOT RESPONDING is cleared.

If the response is:
c:MISP LOOP
APPLICATION NOT CONFIGURED

the application is not configured for the specified MISP.

If the response is:
c:MISP LOOP
DISABLED NOT RESPONDING

the application status is not displayed because the MISP running the application is disabled or faulty and is not responding.

If the response is:
c:MISP LOOP
DISABLED RESPONDING

the application status is not displayed because the MISP running the application is responding but is disabled.

If the response is
c:MISP LOOP
APPLICATION MAN DISABLED

the application is manually disabled using LD 32. It has to be enabled using **ENLC c** command in LD 32.

If the response is:
c:MISP LOOP
APPLICATION SYS DISABLED

the application is system disabled and the background routine will attempt to enable it again.

Procedure 8-2: Performing the MISP self-test

If the MISP status indicates that the MISP is faulty, you should conduct the self-test to verify that this MISP is actually faulty before replacing it.

To start the self-test, follow the steps below:

1. **Log-in on the maintenance terminal and load overlay program 32 (LD 32).**
2. **Type DISC c and press the Enter key to disable the MISP card, where c is the MISP card number you are disabling.**
3. **Exit LD 32 by typing **** and load overlay program 30 (LD 30).**
4. **Type SLFT c type and press the Enter key to start the self-test, where c is the MISP card number and type is 1 for a detailed self-test and 2 for minimal test.**

   If the response is:

   NWS637
   the MISP card passed the self-test and is functional but must be enabled to extinguish the red LED and to start processing calls. It may take up to 20 seconds to display this response.

   If the MISP passed the self-test, but the problem persists, other cards that interface with the MISP may be faulty. To verify the peripheral equipment cards interfacing with the MISP, go to Procedure 8-3 and 8-4.

   If the response is

   NWS632
   the MISP card failed the self-test and is faulty. Replace the MISP as described in *Replacement procedures*. Other NWSxxx message may be displayed as a result of a command activated self-test if the MISP is missing or not configured.

Performing the MISP loopback tests

If the MISP self-test indicates that the MISP is not faulty, you should conduct loopback tests to isolate the problems that may exist on the connections between the MISP and the SILCs and/or UILCs.

You can perform two types of MISP loopback tests. These are:

— MISP loopback at a DSL interface as described in *Procedure 8-3*

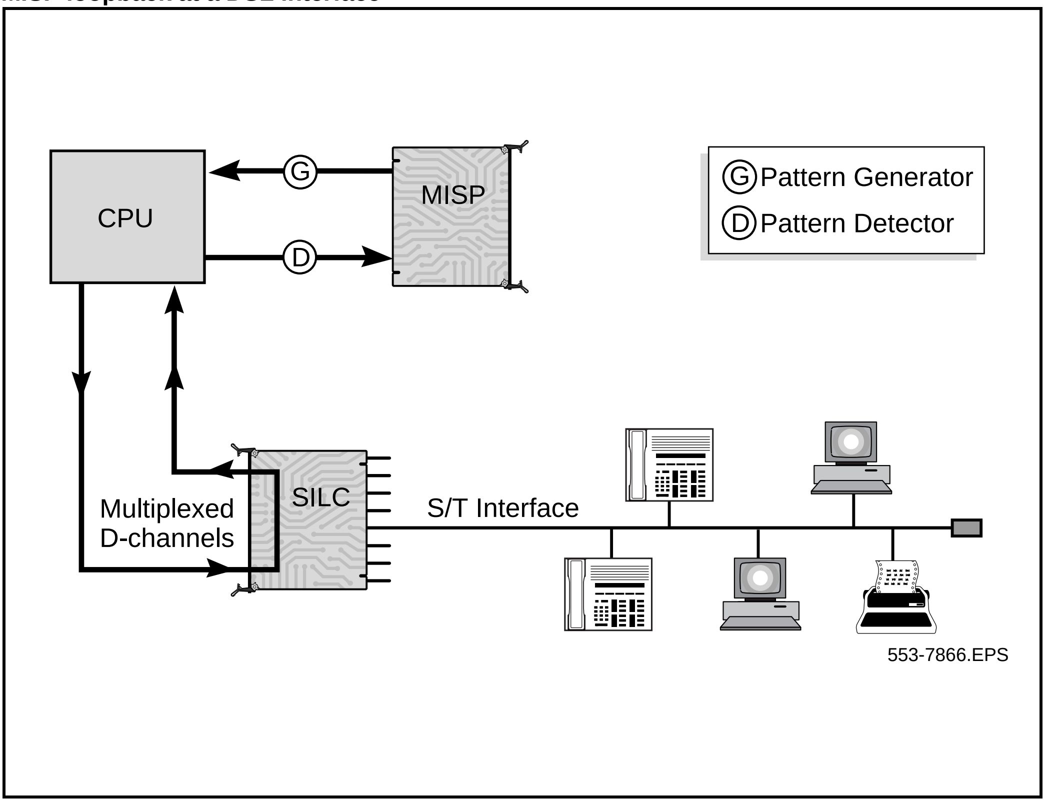
— MISP loopback at the SILC or UILC DS30X bus interface as described in *Procedure 8-4*

Procedure 8-3: MISP loopback at a DSL interface

The loopback at a DSL interface checks the continuity of the D-channel signaling path between the MISP and an individual SILC or UILC port.

Figure 54 illustrates a DSL loopback path and the MISP as a test pattern generator and detector.

Figure 54
MISP loopback at a DSL interface



To start the loopback test:

1. **Log-in on the maintenance terminal and load overlay program 45 (LD 45).**

2. **Select test condition:**

   Enter **XCON 0** and press the Enter key if you wish to perform only one loopback test.

   Enter one test period shown in **XCON H 0-182, M 0-59, S 0-60** and press the Enter key to select continuous loopback testing for a selected time span, where **H 0-182** is 0 to 182 hours, **M 0-59** is 0 to 59 minutes, and **S 0-60** is 0 to 60 seconds.

   Example: **XCON M 5** specifies the duration of the test to be 5 minutes**.**

3. **At the TEST prompt, type 9 and press the Enter key.**

   Continue responding to the prompts to configure the loopback test as follows:

Prompt	**Response**	**Comment**
TEST	9	Selects loopback at the DSL
PATT	x	x is the selected pattern, where **x** is 0-7
TYPG	5	MISP is generating and transmitting the pattern
LOOP	c	MISP number, where **c** is card slot number
LBTY	3	DSL is requested to loop back
LBTN	c dsl#	The address of the looped back DSL, where **c** is an SILC or UILC card slot, and **dsl#** is DSL
TAG	xx	TAG is automatically assign by the system. If the loopback test is continuous, the system tags the test with a number from 0 to 15 to keep track of the tests.

4 Check the test results.

The result is automatically displayed if you specified XCON 0 test conditions, otherwise you must specify XSTA or XSTP with the test TAG number to check the status.
XSTA gets the status of the manual continuity test and XSTP stops the manual continuity test.
If the results show BSDxxx messages, refer to the list and description of these messages in this guide. The BSDxxx messages indicate the possible problem causes, which you should check to isolate the problem.

If the loopback continuity test passes, the problem may be somewhere in the DSL or the ISDN BRI terminal.

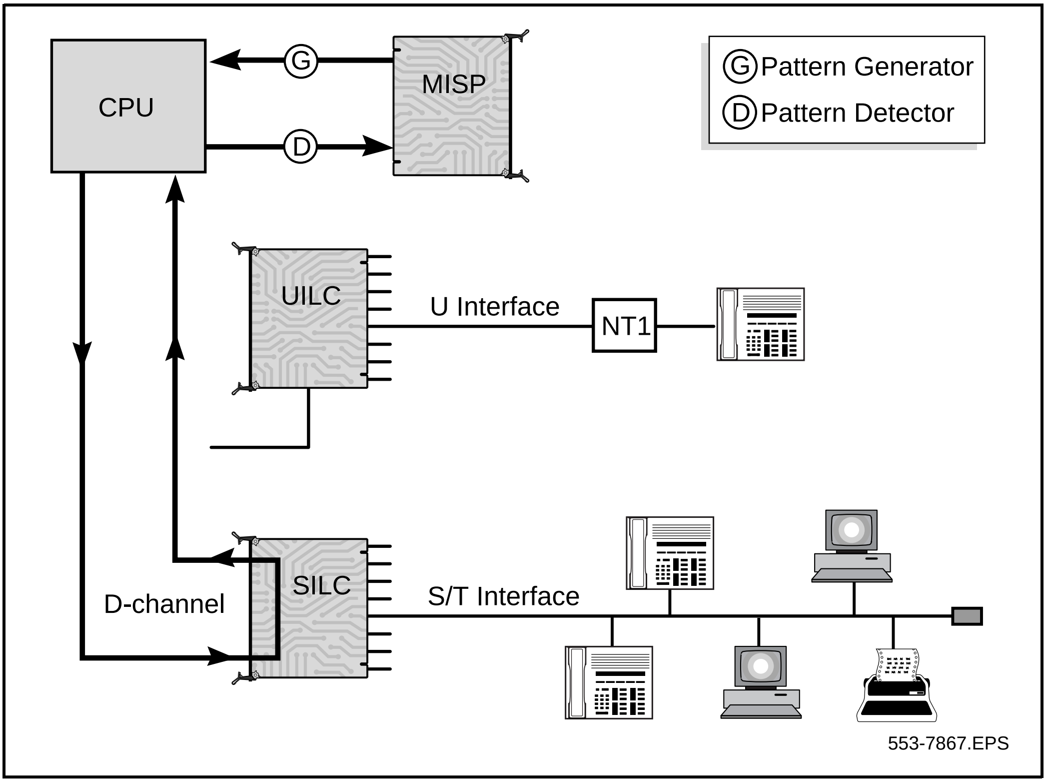
If the loopback continuity fails, go to *Procedure 8-4*.

Procedure 8-4: MISP loopback at the SILC or UILC interface

The loopback at the SILC or UILC interface checks the continuity between the MISP and the SILC or UILC and its ability to communicate with the MISP over the multiplexed D-channels.

Figure 55 illustrates the SILC or UILC loopback path and the MISP as a test pattern generator and detector.

Figure 55
MISP loopback at the SILC or UILC peripheral bus interface



Before you can start loopback testing at the SILC or UILC, you must disable the card you want to test.

1 **Log-in on the maintenance terminal if you are not already logged in and load overlay program 32 (LD 32).**

2 **Type DISC c and press the Enter key to disable the SILC or UILC, where c is the card slot number.**

3 **Exit LD 32 by typing **** and load overlay program 45 (LD 45).**

4 Select test conditions

Enter **XCON 0** and press the Enter key, if you wish to get only one loopback test.

Enter one test period shown in **XCON H 0-182, M 0-59, S 0-60** and press the Enter key to select continuous loopback testing for a selected time span where **H 0-182** is 0 to 182 hours, **M 0-59** is 0 to 59 minutes, and **S 0-60** is 0 to 50 seconds.

For example: **XCON H 1** conducts the test for one hour.

5 At the TEST prompt, enter 9 and press the Enter key.

Continue responding to the prompts to configure the loopback test as follows:

Prompt	Response	Comment
TEST	9	Selects loopback at the SILC/UILC
PATT	x	x is the selected pattern, where x=0-7
TYPG	5	MISP is generating and transmitting the pattern
LOOP	c	MISP card number, where c is the card slot number
LBTY	4	Card is requested to loop back
LBTN	c dsl#	The address of the looped back card, where c is the card slot number and dsl# is the port.
TAG	xx	If the loopback test is continuous, the system tags the test with a number from 0 to 15.

6 Check the loopback test results.

The result is automatically displayed if you specified XCON 0 test conditions, otherwise you must specify XSTA or XSTP with the test TAG number to check the status.

If the results show BSDxxx messages, refer to the list and description of these messages in this guide. The BSDxxx messages indicates the possible problem causes, which you should check to isolate the problem.

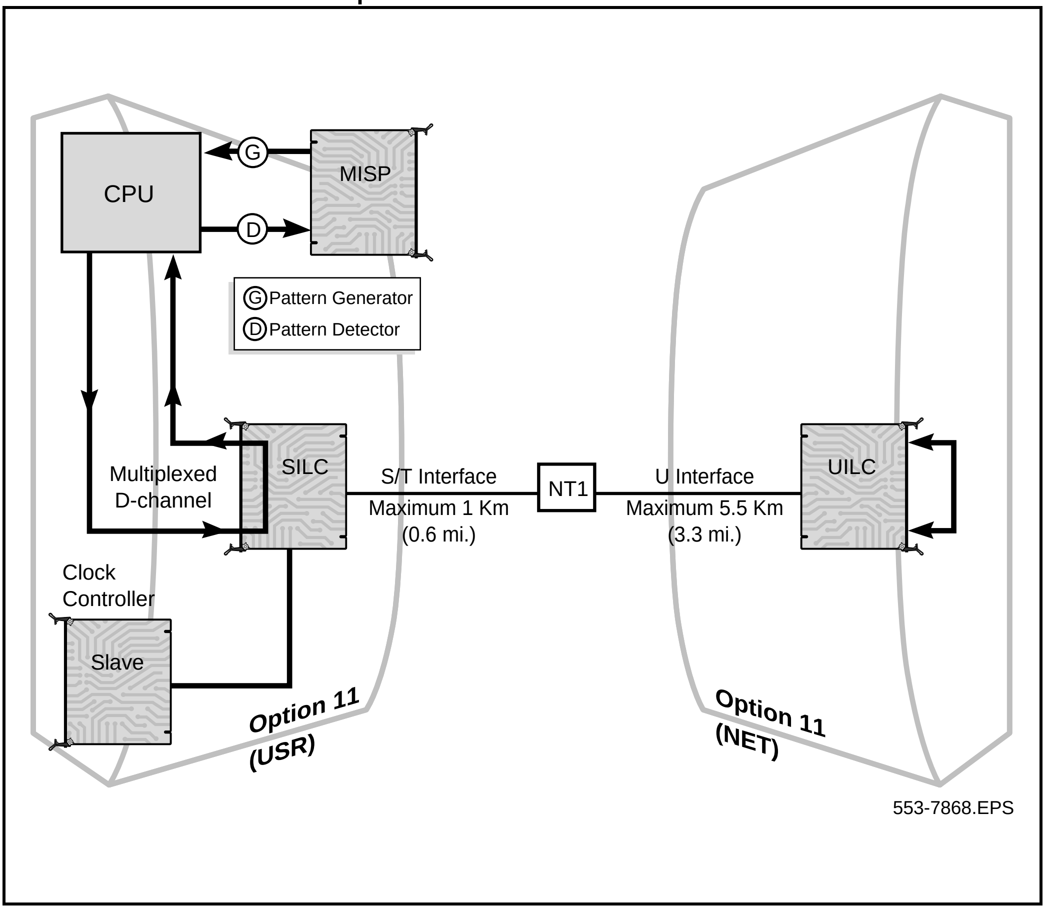
If the loopback continuity test passes and the MISP loopback test failed, the problem may be in the line card.

If the loopback continuity test fails, the problem may be between the MISP and the line cards.

Procedure 8-5: ISDN BRI trunk remote loopback test

Figure 56 illustrates a remote loopback test for an ISDN BRI trunk DSL provisioned as a MCDN Tie configuration; the Tie connection is achieved by connecting two Meridian 1s through an NT1 device.

Figure 56
ISDN BRI trunk DSL remote loopback



The following steps are used to perform the remote loopback test for a ISDN BRI trunk DSL provisioned as a MCDN Tie configuration.

Performing the ISDN BRI trunk remote loopback test

1 **Log in on the maintenance terminal and load overlay 32 (type in LD 32).**

2 **Put the far-end and near-end of the ISDN BRI trunk in the test mode by entering the ENTS c dsl# command, and pressing the ENTER key. Note: the ISDN BRI trunk DSL must be configured for the ISDN BRI trunk application, and must be either in the release or enabled state.**

   If the reference clock source is configured on the DSL, you will be prompted with **“CLOCK SOURCE ON DSL # OF SILC C, PROCEED?”** to ensure that you have taken necessary precautions for uninterrupted clock reference for the system.

3 **Put the far-end ISDN BRI trunk DSL in the remote loopback mode by entering the ENRB cc dsl# command, and pressing the ENTER key.**

4 **Run the remote loopback test by entering the RLBT c dsl# command, and pressing the ENTER key.**

   The result of the test will be displayed as follows:

   DSL: C / C RLB TEST TIME: xx:xx

   TEST: PASS

   TEST: FAIL - NO DATA RCV FAR END

   TEST: FAIL - CORPT DATA RCV FAR END

   TEST: FAIL - REASON UNKNOWN

   If the test failed due to no data or corrupt data being received from the far end, verify that proper test data is being used; if the test failed for unknown reasons, make ensure that the ISDN BRI trunk DSL has been properly configured for the ISDN BRI trunk application, and perform the test again.

5 **Take the far-end ISDN BRI trunk DSL out of remote loopback mode by entering the DSRB c dsl# command, and pressing the ENTER key.**

The the far-end and near-end ISDN BRI trunk DSLs are placed in the test mode.

6 **Take the far-end and near-end ISDN BRI trunk DSLs out of test mode by entering the DSTS c dsl# command, and pressing the ENTER key.**

The ISDN BRI trunk DSLs are reset in their release or established state.

7 **Enable the ISDN BRI trunk DSL by entering the ENLU command.**

SILC fault isolation or UILC fault isolation and correction

The SILC and UILC intelligent peripheral cards provide eight S/T interfaces and eight U interfaces respectively, which are used to connect ISDN BRI compatible terminals or trunks over DSLs to the Option 11 system.

Procedure 8-6: Checking the SILC or UILC status

The diagnosis in Table 22 indicates that an SILC or a UILC may be faulty, not equipped, or disabled. The first step in identifying the problem is to verify the status of the card.

To obtain the card status:

1 **Log-in on the maintenance terminal and load overlay program 32 (LD 32).**

2 **Type STAT c and press the Enter key, where c is the card slot** number.

If the response is:
ll = UNIT ll = UNEQ
the card has not been configured for the specified card slot.

For ISDN BRI trunks
If the response is:
ll = UNIT ll = *swstate type L2 _state L1_state dch_stat*e *clk (mode)*

For ISDN BRI lines
If the response is:
ll = UNIT ll = *swstate type L2 _state L1_state*

Where:
***swstate*= software state of DSL**
***L2_state* = layer 2 state on the MISP**
***L1_state* = layer 1 state on the line card**
***dch_state* = software state on the D-channel link**
- **ESTA — link is established**
- **RLSU — link is released**
- **TEST-IDLE — link is in test state**
- **TEST-RLBT — link is in remote loopback test state**

***clk* = software state of reference clock (if configured)**
- **DSBL — reference clock configured but not active**
- **SREF — secondary reference clock is active**
- **PREF — primary reference clock is active**

mode= mode of trunk DSL
- **{NT, TE}**

Example:

SW DSLL2L1D— CHANNELCLK
00 = UNIT 00 = IDLELINEESTAUP
01 = UNIT 01 = IDLETRNKESTAUP ESTASREF (TE)
02 = UNIT 02 = IDLELINEESTADOWN
03 = UNIT 03 = UNEQ
04 = UNIT 04 = UNEQ
05 = UNIT 05 = UNEQ
06 = UNIT 06 = DSBLTRNKDSBLUNEQRLS(NT)
07 = UNIT 07 = DSBLTRNKDSBLUNEQRLS(TE)

Table 23 lists DSL software states. ***Software_state*** is the status of a DSL as perceived by the Option 11.

Table 24 lists the DSL status as perceived in the MISP call application.

Table 25 lists line card states to indicate the status of a DSL.

Table 23
DSL software status in the CPU

software_state **(DSL)**	**Description**	**Comments**
IDLE	No active calls.	No action required.
BUSY	Call is active.	No action required.
MBSY	DSL is in maintenance busy mode.	No action required. The DSL is being tested.
DSBL	DSL is disabled.	Enable DSL using LD 32.
UNEQ	DSL is unequipped.	The DSL is not configured. Refer to the *Administration* section of this manual, *DSL configuration procedures* to configure the DSL.

Table 24
DSL Layer 2 status in the MISP

MISP_*state*	**Description**	**Comments**
NTAN	DSL is not assigned to an MISP.	DSL is not properly configured. Refer to the *Administration* section of this manual, *DSL configuration procedures* to configure the DSL.
UNEQ	Unequipped.	MISP not configured. Refer to the *MISP configuration procedures* to configure the MISP.
IDLE	No active calls.	No action required.
BUSY	Call is active.	No action required.
MBSY	DSL is in maintenance busy mode.	No action required. The DSL is being tested.
DSBL	DSL is disabled.	Enable DSL using LD 32.
UNDN	DSL is in an undefined state.	Check the DSL configuration in the *DSL configuration procedures*.
RLS	Link layer is not established.	Terminal not connected to the DSL or faulty. Check terminal using terminal user guide.
ESTA	Link layer is established.	No action required.
MPDB	MISP is disabled.	Enable MISP using LD 32.
APDB	MISP call application is disabled.	Enable MISP application using LD 32.
MPNR	MISP not responding or message is lost.	Go to *Procedure 8-1* to check the MISP status.
UTSM	CPU unable to send message to MISP.	Go to *Procedure 8-1* to check the MISP status.

Table 25
DSL Layer 1 status in the line card

LC_*state*	**Description**	**Comments**
UNEQ	Not equipped. DSL is disabled.	DSL is not configured. Refer to the *DSL configuration procedures* to configure the DSL.
DOWN	Link layer is not established.	DSL faulty or terminal not connected or faulty. Perform a pack self test. Check cables. Check the terminal using terminal user guide.
UP	Link layer is established.	No action required.
LCNR	Line card is not responding.	Faulty line card. Go to Procedure 8-6, Checking the SILC and UILC status.
DSBL	DSL is disabled.	Enable DSL using LD 32.
UNDN	DSL is in an undefined state.	Check the DSL configuration in the *DSL configuration procedures*.
UTSM	CPU unable to send message to the line card.	Faulty line card or the path between the CPU and the card. Go to *Procedure 8-3*.

Note: After you have obtained the status of all the DSLs for a selected card, you may wish to continue checking the status of individual DSLs by continuing with Procedure 8-7 or you can go to Procedure 8-8 to perform the self-test on the card.

Procedure 8-7: Checking the DSL status

If the card status shows that some of the DSLs on the card are undefined, unequipped, disabled, or unable to send a message to the MISP, you can check the individual DSLs to obtain more specific data on its state by following the steps below:

To check the status:

Type STAT c dsl#, where c is the card slot number and dsl# is one of the eight ports (DSLs) on the card, and press the Enter key.

The response is:

DSL type: SW= ***SW_state*** **L2=** ***l2_state*** **L1=** ***l1_state*** **LK=*****dch_state*** **CLK =** ***clk***
B1= b1_state **B2=** ***b2_state***

The possible states for the *swstate* are listed in Table 23, for the *mstatus* in Table 24, and for the *lcstatus* in Table 25. The B*status* is listed below.

B*status*	Description	Comments
IDLE	No active calls.	No action is required.
BUSY	Call is active.	No action is required.
MBSY	B-channel is in maintenance busy mode.	No action required. The channel is used for maintenance testing.
DSBL	B-channel is disabled.	Enable DSL using LD 32.

Procedure 8-8: Performing the SILC or UILC self-test

If the card or DSL status indicates that the SILC or UILC is faulty, you should conduct a self-test to verify that the SILC or UILC is actually faulty before you replace it. This test verifies the basic SILC or UILC functions and outputs a fail or pass message after the test is completed.

To start the self-test:

1. **Log-in on the maintenance terminal and load overlay program 32 (LD 32).**
2. **Type DISC c and press the Enter key to disable the card.**

   Enter the appropriate card address, where **c** is the card slot number.
3. **Exit LD 32 by typing ****.**
4. **Load overlay program 30 (LD 30).**
5. **Type SLFT c and press the Enter key to start the self-test.**

   Enter the appropriate card address where **c** is the card slot number.

   During the self-test observe the red LED on the front panel. The LED is lit during the test. It flashes three times and extinguishes if it passes the test, otherwise it failed the test.

   If the card passes the self-test, it is automatically enabled and ready to start processing calls.

   If the response is

   NWS637
   the card passed the self-test and is functional but the problem may be in the DSL cabling or the terminals or trunks.

   Check the DSL connections from the Option 11 cabinet through the cross-connect terminal to ISDN BRI terminals or trunks connected to this DSL. You may see other NWSxxx messages, which indicate different problem causes.

   NWS632
   the card failed the self-test and is faulty or missing. If the card is faulty, replace it as described in *Replacement procedures* or install a card into the empty card slot if is missing.

Replacing ISDN BRI cards

The following procedures describe how to remove and replace defective cards, verify the operation of ISDN BRI equipment, and package and ship the defective cards to an authorized repair center.

Removing and replacing the MISP

The MISP can be removed and inserted without turning off the power. This allows the system to continue processing calls not associated with the defective MISP.

> ***Note:*** A clock controller is required for ISDN PRI, DTI or BRI trunk applications. If the MISP being removed is providing the clock function, the clock must be reassigned to another location. Refer to the chapter ISDN BRI trunk implementation for more information.

To remove a MISP:

1. **Log-in on the maintenance terminal or telephone and load overlay program 32 (LD 32). Check the status of the MISP by entering STAT c, where c is the card slot number of the MISP.**

   Note: Make sure the MISP is idle before proceeding with the next step to avoid interrupting active calls.

2. **When the MISP is idle, type DISC c and press the Enter key to disable the MISP, where c is the card slot number of the MISP.**

3. **Remove the MISP.**

   Remove the clock controller if there is one.

   Place it in an antistatic bag away from the work area.

4. **Insert and secure the replacement MISP in its card slot.**

   Install the clock controller if one is required.

   The MISP automatically starts a self-test.

   Observe the Dis LED on the front of the MISP. It is lit during the test. If it flashes three times and stays lit, it has passed the test. If it does not flash three times and then stays lit, it has failed the test.

5 **At the > prompt in LD 32, type ENLC c and press the Enter key to enable the MISP.**

If the Dis LED on the MISP extinguishes, the MISP is functioning correctly and is ready to process calls.

Removing and replacing the SILC or UILC

The SILCs and UILCs can be removed from and inserted without turning off the power. This allows the system to continue processing calls on functional SILCs and UILCs.

> ***Note:*** In the case where an ISDN BRI trunk connected to the card is providing a reference clock source to the system clock controller, the reference source must be reassigned to another location. Refer to the chapter entitled ISDN BRI trunk implementation for more information about the clock controller source.

To remove an SILC or UILC:

1 **Log-in on the maintenance terminal or telephone and load overlay program 32 (LD 32).**

Note: Make sure the MISP is idle before proceeding with the next step to avoid interrupting active calls.

2 **Type DISI c and press the Enter key to disable the SILC or UILC, where c is the MISP card slot number.**

Note: The DISI command waits until all units on the card are idle before disabling it. You may also use the DISC command, however, all calls associated with the card will be disconnected.

3 **Remove the card.**

Place it in an antistatic bag away from the work area.

4 **Insert and secure the replacement card in its card slot.**

The card automatically starts a self-test.

Observe the red LED on the front of the card. It is lit during the test. If it flashes three times and stays lit, it has passed the test. Go to step 9. If it does not flash three times and then stays lit, it has failed the test.

5 **At the > prompt in LD 32 program, type ENLC c and press the Enter key to enable the card.**

If the red LED on the card extinguishes, it is functioning correctly and is ready to process calls.

Verifying operation

After you have replaced faulty cards with the spares and enabled them, you should perform some basic tests to verify that the replacement card solved the problem.

To verify the operation of an SILC or UILC card:

1 **Place an outgoing voice, data or packet data call, as appropriate, on an ISDN BRI terminal or trunk connected to a previously faulty card or DSL to verify the outgoing transmission and signaling channels.**

2 **Place an outgoing voice or data call on an ISDN BRI terminal to the ISDN BRI terminal or trunk in step 1 to verify the incoming transmission and signaling channels.**

3 **Repeat these two steps for other previous**ly faulty cards and DSLs.

To verify the operation of an MISP:

1 **Place an outgoing voice, data or packet data call, as appropriate, on an ISDN BRI terminal or trunk connected to a DSL associated with a previously faulty MISP to verify its ability to process the signaling information received on D-channels.**

2 **Disconnect the call after you determined that the connection was successful.**

Packing and shipping defective cards

To ship defective circuit cards to a repair center, you should:

1 **Tag the defective card with the description of the problem.**

2 **Package the defective card for shipment using the packing material from the replacement card and securely closing the box with tape.**

Testing and troubleshooting ISDN BRI terminals

Verifying a new M5317T terminal installation

Verifying user operation

Any problems found during this phase should be corrected before turning equipment over to the customer. Refer to the "Troubleshooting" chapter.

1 Examine loop length.

2 If under-carpet cabling is used, evaluate the cables for loss, impedance, crosstalk, and propagation delay.

3 Examine all telephone connections.

4 Set up a communication path to another M5317.

5 Go through some call routines, using the enabled features. (Refer to the M5317 Voice Features User Guide for procedures to establish and answer telephone calls.)

6 Verify that the display is showing the appropriate responses.

Troubleshooting the M5317T

Trouble conditions may be reported by the telephone user (customer report), by way of automatic routine tests, or during installation procedures.

Isolating switch problems

1 Run the LD32 diagnostic program for the Meridian 1 switch.

2 Check for error and location codes in the diagnostic output.

3 If the codes indicate a faulty component, replace it. Refer to the “Replacing ISDN BRI cards” section in this document.

4 Run the diagnostic programs again to confirm that the error and location codes have been cleared.

Clearing error codes

Perform the following steps if the telephone displays error codes after initialization. After each step, check the display. If an error code persists, go to the next step.

1. If the static X.25 TEIs in the telephone and the network do not match, datafill the telephone TEIs manually.
2. If the SPIDs in the telephone and the network do not match, correct the telephone SPIDs.
3. Confirm that a terminating resistor is present in the loop.
4. Perform a loop-back test with the suspect telephone connected to an external shorting jack.
5. Substitute a different telephone, datafilling it with the same information as the suspect telephone.
6. Replace or repair any defective wiring between the telephone and the network termination or line card.
7. Confirm that non-reversing cables are used.
8. Replace the telephone and repeat the installation process.

Restoring dial tone

If there is no dial tone or if you cannot make a telephone call, follow these procedures. Check for dial tone and try to make a call after each step.

1. Check and re-insert any loose Teladapt connectors.
2. Wiggle the line cord or handset cord while listening for sounds from the handset. If you hear crackling or ticking sounds, replace the cords.
3. Check the teladapt socket for the handset or try another handset.
4. Re-run any defective wiring between the line card, distribution panel, and telephone.
5. Check the switch software to confirm the correct telephone assignment and voice channel operation in the network.
6. Replace the telephone.

Isolating faulty keys

Refer to the M5317T Installation Guide for procedures to follow if you suspect faulty key operation or if the display is behaving strangely.

Verifying a new M5209T terminal installation

Procedures are provided for the following tests:

- Running a self-test
- Running a panel test
- Making a test voice call
- Making a test data call (applies to the M5209TDp and M5209TDcp models only)
- Assigning the test display language (M5209TDcp models only)

Running a self-test

WARNING

If you have made changes to SPIDs or TEIs, wait 20 seconds for the set to update its memory before continuing.

1 Unplug the RJ45 line cord from the jack, wait five seconds, then plug it in. The set automatically does a self-test on power up.

2 Check the display for the following message:

SELF TEST PASSED

If this message appears, the self-test was completed successfully. If the self-test failed, the display shows the following message:

code: **SELF TEST FAILED**
V:TWait P:TWait C:TWait

Where ***code:*** refers to a specific code number. Write down the code number(s) and refer to the “Troubleshooting displayed error messages” section of the M5209T Installation Guide.

Running a panel test

1 Press the Hold and Rls keys simultaneously until the following main menu is displayed:

MAIN MENU
CONFIG

2 Press #. The following prompt is displayed:

ENTER PASSWORD

3 Dial 4736 (ISDN) and press #. The following message is displayed:

CONFIGURATION MENU
TEI

4 Press * until the following option is displayed:

CONFIGURATION MENU
KEY TEST

5 Press # to begin the key test.

The M5209T tests the display and indicators by flashing a checkerboard pattern on the display, and by turning on the half-diamonds one at a time.

After the display test, the following message appears:

DEPRESS ALL KEYS

Press the following keys; as you do, check that each key is displayed as it is pressed.

0-9 (dial pad keys)
*
#
volume up/volume down
Hold
Rls

When all keys have been tested, the following should be displayed:

0123456789*#UDHR

6 Press each feature/line key.

As you press each key, a diamond appears on the associated feature/line indicator. When you press the last indicator, a diamond does not appear. Instead, the following message is displayed:

CONFIGURATION MENU
EXIT

7 Note any problems that you encountered during the test, and refer to the Troubleshooting section.

8 Exit the test by pressing Rls.

Making a test voice call

1 Make a voice call using a standard test DN. Note any problems that you encountered during the test, and refer to the Troubleshooting section.

Making a test data call

Note: Skip this test if the installed set is an M5209T (voice only set).

1 If you have been trained in making and troubleshooting data call, refer to the appropriate set manuals to make the test data call. If you are not familiar with data call procedures, contact the customer representative and have him make a data call for you.

Assigning the test display language

Note: This test applies to the M5209TDcp only.

1 Press the Hold and Rls keys simultaneously until the following main menu is displayed:

MAIN MENU
CONFIG

2 Press * until the following option is displayed:

MAIN MENU
LANGUAGE

3 Press #. The following message is displayed:

LANGUAGE
ENGLISH

4 Press * to select the desired display language.

5 Press #. The following message is displayed:

MAIN MENU
EXIT

Troubleshooting the M5209T

Trouble conditions may be reported by the telephone user (customer report), by way of automatic routine tests, or during installation procedures. The following are general troubleshooting procedures to follow when problems are found with the M5209T; for more detailed information on troubleshooting the M5209T, refer to the M5209T Installation Guide.

> ***Note:*** You should bring the following spare replacement parts to the installation site to be tested:
> • installed set model
> • handset
> • handset cord
> • RJ45 line cord
> •RS-232C interface cable

Power and cable connection problems

When no response is received from the M5209T, the cable and power connections should first be checked before proceeding with any other troubleshooting sequence.

Check the cable connections and power supply, by ensuring that:

1 The RJ45 line cord is properly connected to the wall jack or Terminator Resistor (TR) box.

2 If used, the RS-232C interface cable is properly connected to both the DTE port and the M5209 data port.

3 The handset cord is properly connected to both the handset and the handset jack underneath the set.

4 The cable from the wall jack or TR box, to the NT1, is properly connected.

5 The U-loop cable and the NT1 is properly connected.

6 The S-loop cable and the NT1 is properly connected

7 The NT1 is functioning properly.

Whether the NT1 is a stand-alone or rack-mount model, both types are functioning properly when the LED status indicators appear as summarized below:

Status Indicator	**LED light**
Power	On
S/T	OFF
U-sync	OFF
Test	OFF

If the NT1 indicators are not as shown above, it is not ready for use with the M5209; contact your supervisor for direction.

Once you have checked the cable connections and power supply, and the M5209 is still not responding:

8 Unplug the RJ45 line cord from the wall jack or TR box for five seconds, then plug it back in and perform a power reset on the M5209.

9 If problems still exist, try another M5209T set, using the existing cables. If this set works, the problem is with the original set; it should be replaced.

If the replacement M5209T does not work, replace the existing cables with your spare cables; repeat step 8.

If problems persist, contact your supervisor.

Problems with the set components

Problems with the set components may include:

- the keys are not responding, or responding improperly;
- the feature key indicators are not functional
- the display is not functional
- the handset has no audio, or the audio is distorted
- the speaker has no audio, or the audio is distorted

1 Check the cable connections using the procedures described in the “Power and cable connection problems” section. For handset problems, try another handset cord or another handset.

2 If cables are not the source of the problem, run a panel test as described in the “Verifying a new M5209T terminal installation” chapter.

If the panel test fails, replace the set.

Troubleshooting displayed error messages

When a self test is performed as described in the “Verifying a new M5209T terminal installation” chapter, and it fails, a code number is displayed to indicate the type of error that is at hand. Refer to the “Troubleshooting displayed error messages” section of the M5209T Installation Guide for a complete description of these codes, and the steps required to fix the problem situation.

ISDN BRI messages

The following is a list of several types of messages that are displayed on the administration terminal or printed on the system printer or teletype (TTY). These messages may indicate routine system activities, system faults, input or errors made during ISDN BRI configuration procedures. For additional messages refer to the X11 Software Input/Output Guide provided with the Option 11 system.

Basic Rate Interface messages (BRIxxx)

The following messages are printed on demand by using SETM MISP <card#> MNT command in Link Diagnostic Program LD 48. By using RSET MISP <card#> MNT command in Link Diagnostic Program LD 48, you stop printing these messages.

BRI100
MISP sent line card update message. This message consists of two words, where each word indicates the status of the line card update message followed by the time when the message was printed. The possible status conditions are:

0H	No error
1H	Invalid DSL address
2H	Forced disconnect has timed out
3H	Invalid state change
4H	MISP application failed to complete layer 1 connection
7H	MISP application failed to queue the request

Example:
BRI100 004003 000000, where 4 indicates that the application failed to complete layer 1 connection due to 3 - invalid state change

BRI101
MISP sent line card B-channel update message. This message consists of four words, where each word indicates the B-channel status followed by the time when the status was printed. The possible status conditions are:

0H	No error
1H	Invalid DSL address
2H	Forced disconnect has timed out
3H	Invalid state change
4H	MISP application failed to complete layer 1 connection
7H	MISP application failed to queue the request

BRI102

MISP sent DSL update message. This message consists of one word that indicates the DSL status followed by the time when the status was printed. The possible status conditions are:

0H	No error
1H	Invalid DSL address
2H	Forced disconnect has timed out
3H	Invalid state change
4H	MISP application failed to complete layer 1 connection
7H	MISP application failed to queue the request

BRI103

MISP sent DSL B-channel update message. This message consists of two words, where each word indicates the B-channel status followed by the time when the status was printed. The possible status conditions are:

0H	No error
1H	Invalid DSL address
2H	Forced disconnect has timed out
3H	Invalid state change
4H	MISP application failed to complete *physical* (layer 1) connection
7H	MISP application failed to queue the request

BRI104
MISP sent DSL status message. The first number after the address displays the new DSL status message, the second number displays the reason for the change of status, and the third number displays the time when the status was printed. DSL states are:

0H	Unequipped
1H	Disabled
2H	Maintenance busy
3H	Reserved for future use
4H	Enabled, but network (layer 2) is in release state
5H	Enabled and network (layer 2) is established
6H	Busy

Possible reasons for change of state are:

1H	The first *network* (layer 2) link has been established
2H	The last *network* (layer 2) link has been released
3H	A DSL overload counters has been reached
4H	Excessive *physical* (layer 1) errors on a DSL have been detected

BRI105
MISP sent DSL B-channel status message.

BRI107
MISP received line card audit message.

BRI108
MISP received DSL audit message.

BRI109
MISP received line card status audit message.

BRI110
MISP received line card B-channel status audit message.

BRI111
MISP received DSL status audit message.

BRI112
MISP received DSL B-channel status audit message.

BRI113
MISP sent TEI check message.

BRI114
MISP sent TEI restore message.

BRI115
MISP sent TEI remove message.

BRI200
Line card self test response. The response is indicated by the number following the line card address. Possible responses are:

0H	Passed self-test
1H	Line card microcontroller's internal RAM failure
2H	Line card microcontroller's external RAM failure
3H	Line card microcontroller's EPROM failure
4H	Network timeslot controller failure
5H	PAD EPROM failure
6H	Microwire controller failure
7H	Reserved for future use

8H	DSL 0 transceiver failure
9H	DSL 1 transceiver failure
AH	DSL 2 transceiver failure
BH	DSL 3 transceiver failure
CH	DSL 4 transceiver failure
DH	DSL 5 transceiver failure
EH	DSL 6 transceiver failure
FH	DSL 7 transceiver failure

BRI201
DSL reports layer 1 status. For SILCs in network terminator (NT) mode, the possible status conditions can be:

0H	S/T transceiver failure
1H	*Physical* (layer 1) is activated successfully
2H	*Physical* (layer 1) is de-activated successfully
3H	*Physical* (layer 1) is losing synchronization
4H	*Physical* (layer 1) is in the process of being established
5H	*Physical* (layer 1) failed to get established

For SILCs in terminal equipment (TE) mode, the possible status conditions can be:

0H	S/T interface transceiver failure
1H	*Physical* (layer 1) is activated successfully
2H	Deactivation was requested from far end
3H	*Physical* (layer 1) is losing synchronization
4H	*Physical* (layer 1) is in the process of being activated
5H	*Physical* (layer 1) failed to get established

For UILCs in terminal equipment (TE) mode, the possible status conditions can be:

0H	U interface transceiver failure
1H	*Physical* (layer 1) is activated successfully
2H	Deactivation was requested from far end
3H	*Physical* (layer 1) is loosing synchronization
4H	*Physical* (layer 1) is in the process of being activated
5H	*Physical* (layer 1) failed to get established
6H	*Physical* (layer 1) failed to be activated

BRI202
Line card responds to audit DSL state message. Five decimal numbers are displayed following the DSL address indicating the status of the DSL. These numbers specify the mode, B1and B2 channel status, DSL sampling, framing, and activation:

Mode	B1,B2	Framing activation
Mode	0	Disabled
	1	NT1 mode, adaptive sampling
	2	NT1 mode, fixed sampling
	3	TE mode

B1, B2 0 B-channel disabled

1 B-channel enabled

Framing 0 Multi-framing disabled

1 Multi-framing enabled

Activation0 Waiting to be activated

1 Automatically activated

BRI203
Line card report for query message available.

BRI204
Line card responds to terminal equipment query message.

BRI300
MISP sent interface data download message.

BRI301
MISP sent timeslot download message.

BRI302
MISP sent packet data download message.

BRI303
MISP sent protocol data download message.

BRI304
MISP sent TSP data download message.

BRI305
MISP sent DSL traffic request message.

BRI306
MISP sent DSL layer 2 traffic request message.

BRI312
Downloading Layer 3 tables to MISP time-out. Default tables in MISP will be used.

BRI313
MISP did not respond to Layer 3 download messages. Default tables in MISP will be used.

BRI314
Downloading Layer 3 tables to the MISP failed. Default tables in the MISP will be used.

The following messages are printed automatically as they occur.

BRI800
The MISP being enabled or disabled is not present in network shelf.

BRI801
Dedicated connection between the MISP and the line card cannot be established.

BRI802
Task is aborted.

BRI803
Application is being enabled.

BRI804
Peripheral loadware is being downloaded.

BRI805
Error detected while downloading protocol to application; application is still being enabled.

BRI806
Protocol download message not acknowledged; application is still being enabled.

BRI807
Line card update message cannot be sent to the application.

BRI808
Line card cannot be put in maintenance busy mode because message cannot be sent to the MISP.

BRI809
Basecode application has been enabled or disabled.

BRI810
MISP is not present in the specified shelf. Make sure that you specified the correct shelf.

BRI811
Data corrupted.

BRI812
Resources not available to process the task; try again later.

BRI813
Another task waiting to be processed; wait at least 30 seconds and try again.

BRI814
Command is illegal. Make sure you enter the correct command.

BRI815
Not equipped. Specify correct card.

BRI816
Not configured as an MISP card.

BRI817
MISP basecode/application is already enabled.

BRI818
Specified application is not configured on the MISP.

BRI819
Peripheral loadware downloading to the MISP failed; check to see that loadware is present on the diskette and the diskette is inserted in disk drive.

BRI820
MISP self test failed. Check the MISP card. If the problem persists, replace the card.

BRI821
Application cannot be enabled or disabled because software is being downloaded.

BRI822
Task aborted. Firmware download cannot be completed because the application is enabled.

BRI823
Unable to send message to the MISP to enable or disable basecode application.

BRI824
MISP cannot perform the enable/disable tasks.

BRI825
Message cannot be sent to remove application from the MISP's EPROM.

BRI826
Socket IDs have not been assigned to this application. Task is aborted.

BRI827
Message to enable or disable has timed out; task aborted.

BRI828
MISP is disabled; task cannot be performed.

BRI829
This application is not resident in the MISP.

BRI830
Basecode application is in transient state; try the command again later.

BRI831
MISP has sent an undefined response.

BRI832
Protocols could not be downloaded to the MISP. Make sure that the MISP is enabled.

BRI833
HDLC data could not be downloaded to the MISP. The accompanying number indicates the error code returned from the message handler.

BRI834
Hardware fault has been detected on the MISP.

BRI835
MISP failed to process “Protocol Download Request” message.

BRI836
All applications must be disabled before disabling basecode.

BRI837
MISP basecode disabled without disabling the application(s); will attempt to release application's resources but an INIT might be required if problems persist.

BRI838
MISP could not be accessed.

BRI839
MISP failed to remove requested application.

BRI840
Enabling or disabling process took too long; process was aborted.

BRI841
Dedicated channel to the packet handler could not be established.

BRI842
Dedicated channel to the packet handler could not be disconnected.

BRI843
MISP basecode application failed; will try again in 0.5 second.

BRI844
Application software should be downloaded after enabling is completed by using Network and Peripheral Equipment Diagnostic Program LD 32. The download cannot be accomplished as long as LD 32 is active. Exit the program before starting the download.

BRI845
Enabling process was aborted and application firmware was not downloaded. Check to see that the firmware is present on the diskette and the diskette is inserted in the disk drive. Also the MISP may be busy updating the flash EPROM.

BRI846
Application cannot be automatically enabled. Five tries to download the application firmware failed. Enable it in the Network and Peripheral Equipment Diagnostic Program LD 32.

BRI847
Application loadware has been removed from the MISP.

BRI848
Application is not identified with a socket ID, no communication with the MISP.

BRI849
Task aborted. Meridian 1 cannot access the application information block on the MISP.

BRI850
DSL parameter cannot be downloaded because one or more pointers are nil. Try manually enabling the DSL to force the parameter to download. If this doesn't work, remove the DSL and then recreate it using ISDN BRI Service Change Program LD 27.

BRI851
DSL parameter cannot be downloaded because Meridian 1 could not send message to the MISP.

BRI852
DSL parameter cannot be downloaded because no call register is available.

BRI853
DSL parameter cannot be downloaded because the download request message was invalid.

BRI854
DSL parameter cannot be downloaded because the specified TSP is invalid.

BRI855
DSL parameter cannot be downloaded because the MISP did not acknowledge the download message.

BRI856
DSL parameter cannot be downloaded because download procedure timed out.

BRI857
DSL parameter cannot be downloaded because the MISP and/or application is disabled.

BRI858
Line card does not exist, thus a dedicated connection cannot be established or removed.

BRI858
Only an ISDN BRI card can have a dedicated connection.

BRI860
Software BUG.

BRI861
MISP is disabled, could not make a dedicated connection.

BRI862
No path available to setup a D-channel dedicated connection.

BRI863
Cannot send a message to the MISP to update the HDLC.

BRI864
Cannot send a message to the MISP to update the HDLC.

BRI865
Software BUG. ISDN PRI pointer is nil.

BRI866
PRI is disabled and a dedicated connection cannot be made.

BRI867
Dedicated connection cannot be established or removed because it is not in PRI MODE.

BRI868
B-channel is busy.

BRI869
A B-channel is not available to establish a dedicated connection.

BRI870
Call Register is not available to establish a B-channel or $B_{D\text{-channel}}$ dedicated connection.

BRI871
A dedicated connection cannot be established because there is no available path between the Network and the ISDN PRI.

BRI872
Invalid number for the specified B-channel or $B_{D\text{-channel}}$ type.

BRI873
Unable to establish or remove a dedicated B-channel or $B_{D\text{-channel}}$ connection because the ISDN PRI is disabled.

BRI874
Unable to establish or remove a dedicated B-channel or $B_{D\text{-channel}}$ connection because the channel is in disabled state.

BRI875
Unable to establish or remove a dedicated B-channel or B_D-channel connection because the channel is in maintenance busy state.

BRI876
Specified B_D-channel is busy.

BRI877
B_D-channel dedicated connection cannot be established because there is no available path between the MISP and the ISDN PRI.

BRI878
Cannot send a message to the MISP to update the HDLC about the B_D-channel.

BRI879
Cannot send a message to the MISP to update the timeslot mapping for the dedicated B_D-channel connection.

BRI880
Cannot establish D-channel, B-channel, or B_D-channel dedicated connection because the MISP application is disabled.

BRI881
Cannot establish B_D-channel dedicated connection because the B-channel on the ISDN PRI is busy.

Basic Rate Interface Trunk messages (BRIT)

BRIT messages are equivalent to PRI messages as described in the *X11 Software Guide Including Supplementary Features*
(example: BRIT241 = PRI241).

Background signaling diagnostic messages (BSDxxx)

BSD800
Command is being executed.

BSD801
Call register not available. Wait and try the command again. If the problem persists, increase the number of call registers using Configuration Record Program LD 17.

BSD802
Specified card slot not equipped.

BSD803
Specified card not equipped.

BSD804
Time slot is busy.

BSD805
Time slots are not available.

BSD806
Loopback channel is not available.

BSD807
Timeout is waiting for network response.

BSD808
DSL is busy.

BSD809
DSL is in maintenance busy mode.

BSD810
Specified Controller card does not belong to the specified Network card. Make sure you entered correct shelf number.

BSD811
Terminals not installed at specified DSL.

BSD812
Digital terminal not available at specified terminal number.

BSD815
Wait for the prompt.

BSD816
Tags not available. Stop a test by executing XSTP command and try again.

BSD817
Generate message could not be sent. The system is temporarily out of message registers. Wait and try again.

BSD818
Detect message could not be sent. The system is temporarily out of message registers. Wait and try again.

BSD819
XMI message could not be sent. The system is temporarily out of message registers. Wait and try again.

BSD820
Last one-shot test still running. Wait until the test is completed or stop the test by executing XSTP 0 command and try again.

BSD821
Tag number has not been assigned to a test.

BSD822
Database error. The pointer is nil.

BSD823
One-shot status not printed. Use XSTA command to get the test status.

BSD824
Card slot is disabled.

BSD825
Card is disabled.

BSD826
DSL is disabled.

BSD827
Message could not be sent to the MISP application. Check the MISP and the application status.

BSD828
Message could not be sent to the MISP because the MISP express output buffer is not available.

BSD829
Loopback cannot be performed on a non-ISDN BRI line card.

BSD830
Loopback can only be performed between an MISP and one of the ISDN BRI line cards assigned to it.

BSD831
MISP does not respond; use XSTP command to terminate test.

BSD832
Tags suspended; use XSTP command to terminate test and check the cases where the Network card did not acknowledge reception of the test message.

BSD833
Message cannot be sent to the MISP. Check the MISP status.

BSD834
Line cards not defined at the specified DSL.

BSD835
All DSLs must be in disabled state.

BSD836
Card slot is not an MISP.

BSD837
Test case number does not match test case data.

BSD838
Command not applicable to Network/DTR card.

BSD899
Input invalid. Please re-enter the input value.

Software error monitor messages (BUGxxxx)

BUG5438
DSLs already configured have reached the limit.

BUG5439
Logical terminal IDs already specified have reached the limit.

BUG5441
D-channel dedicated connections could not be established.

BUG5442
Messages could not be sent to the line card.

BUG5443
Source invalid to ISDN BRI call processing module.

BUG5444
ISDN BRI call processing message timeout is in the wrong state.

BUG5445
B-channel specified by the MISP is used by another call and cannot be released.

BUG5446
Information element is missing in incoming ISDN BRI call processing message.

BUG5447
Information element is invalid in the incoming ISDN BRI call processing message.

BUG5448
ISDN BRI call processing packet message length is invalid.

BUG5449
ISDN BRI message handler failed to send a message.

BUG5450
Main progress marker (Mainpm) is invalid after digit translation; call is cleared.

BUG5451
Address translation cannot be performed on the specified DSL.

BUG5452
New call reference cannot be obtained.

BUG5453
ISDN BRI call cannot be connected because of incompatibility of the B-channel with the incoming call type.

BUG5454
Message CR cannot be found for incoming PRI call destined for an ISDN BRI terminal.

BUG5455
ISDN BRI call cannot be held; protected card pointer is nil.

BUG5456
ISDN BRI call cannot be retrieved; protected card pointer is nil.

BUG5457
Problem encountered when releasing the call.

BUG5458
Source invalid for BRI_INTERACT procedure.

BUG5459
Source invalid for BRI_MAINT module.

BUG5460
Source undefined for BRI_MAINT module for the MISP.

BUG5461
Source undefined for BRI_MAINT module for the line card.

BUG5462
Card type expected is ISDN BRI line card.

BUG5463
Protected card pointer is nil.

BUG5464
Non-key function data pointer is nil for DSL data.

BUG5465
Address translation failed for the DSL.

BUG5466
MISP protected pointer is nil.

BUG5467
MISP unprotected pointer is nil.

BUG5468
MSDL/MISP pointers cannot be set up.

BUG5469
Timeslot assignment controller data failed to be downloaded.

BUG5470
HDLC data failed to be downloaded.

Equipment data dump messages (EDDxxx)

EDD114
DSL data cannot be found.

EDD115
USID map cannot be found.

EDD116
Protected MISP data block cannot be found.

Error monitor messages (ERRxxxx)

ERR5157
ISDN BRI call is in wrong state; call attempt is aborted.

ERR5158
ISDN BRI call reference invalid.

ERR5159
ISDN BRI B-channel status out of sync between Meridian 1 and the MISP; call attempt is aborted.

ERR5160
ISDN BRI calls exceeded the limit for the DSL.

ERR5161
ISDN BRI call cannot be connected because of incompatibility of the call type with the B-channel.

ERR5162
ISDN BRI call cannot be connected because a call register cannot be allocated.

ERR5163
ISDN BRI call processing message has timed out.

ERR5164
ISDN BRI B-channel is in maintenance busy state.

ERR5165
Message received from invalid card slot.

ERR5166
Message received from wrong ISDN BRI line card.

ERR5167
Message received from ISDN BRI line card is invalid.

ERR5168
Output buffer not available to send scan and signal distributor (SSD) message.

ERR5169
ISDN BRI line card reports message problem.

Network link messages (LNKxxx)

LNK101
Incorrect card type. The card type must be a TERM, DTI, DLI, or MISP.

LNK133
Wrong password entered for the MISP command.

Network and peripheral replacement messages (NPRxxx)

NPR509
DSL configuration download failed.

NPR510
DSL is already enabled.

NPR511
Shelf contains at least one ISDN BRI card, wait about 45 seconds to enable the loop.

NPR512
The command is being executed.

NPR514
Unit cannot be enabled.

NPR515
ISDN BRI line card did not send activation acknowledgment for DSL.

NPR516
ISDN BRI line card self test can not be invoked.

NPR517
Line card self test failed; line card not enabled.

NPR519
Line card does not respond.

NPR522
MISP does not respond; command is aborted.

NPR533
“Line Card State Change” message not received from the MISP.

NPR534
“DSL State Change” message not received from the MISP.

NPR551
Message cannot be sent to the MISP because of invalid message or conditions.

NPR555
Express output queue is full.

NPR556
MISP output buffer is not available.

NPR561
Input valid only for the MISP card

NPR562
Message cannot be sent to the line card.

NPR570
Application information blocks cannot be read from the MISP.

NPR605
Application is not configured on this MISP.

NPR606
Trunk DSL needs to be in RELEASED state.

NPR607
Trunk DSL needs to be in ESTABLISHED state.

NPR608
Trunk DSL needs to be in TEST mode.

NPR609
Trunk DSL needs to be in REMOTE LOOPBACK mode.

NPR611
Trunk DSL needs to have TKTP = TIE and IFC = SL1.

NPR612
Trunk Application is DISABLED.

Network and signal diagnostic messages (NWSxxx)

NWS620
Express output queue full, CPU can not send the message to the MISP.

NWS621
MISP output buffer not available.

NWS622
Message cannot be sent to the MISP because of invalid message or conditions.

NWS623
Message cannot be sent to a line card.

NWS624
Shelf contains at least one ISDN BRI card, wait about 45 seconds to enable the loop.

NWS625
Database error. Database protected pointer is nil.

NWS626
Self test command only applies to the MISP network cards and ISDN BRI line cards. Make sure you specify correct card.

NWS627
Self test can only be invoked if card is disabled.

NWS628
Self test can only be invoked if line card is disabled.

NWS630
Card slot is unequipped.

NWS631
Card slot does not respond.

NWS632
Self test failed.

NWS633
MISP status is undefined.

NWS635
Line card does not respond.

NWS636
MISP self test cannot be activated.

NWS637
Self test passed.

NWS638
Unit is not equipped.

NWS639
TEI test could not be performed.

NWS640
MISP does not respond.

NWS641
Command cannot be performed on the MISP; use Network and IPE Diagnostic Program LD 32 to check the MISP.

Service change messages (SCHxxxx)

SCH0000
Illegal input character.

SCH4127
Signaling/pad category table cannot be removed because there are references to this table. Remove references to this table before OUTing the table.

SCH5366
Protocol group already exists.

SCH5367
Protocol group does not exist.

SCH5368 x
Protocol group x cannot be removed. Remove the DSL associated with this protocol and try again.

SCH5369
MISP has already been enabled.

SCH5370
MISP has not been configured.

SCH5371
Not a PRI. Enter a PRI number.

SCH5372
I/O polling table is full.

SCH5373
MSDL/MISP index cannot be obtained because the table is full.

SCH5374
Warning: B-channel is not configured for packet data transmission.

SCH5375
Specified PRI channel is busy. Enter an idle PRI channel number.

SCH5376
Number of DSLs exceeded the defined system limit.

SCH5377
Not a MISP. Enter a MISP card slot number.

SCH5379
MISP supports only four ISDN BRI line cards.

SCH5380
DSL# 7 of this ISDN BRI line card cannot be configured. D-channel is configured for packet handler

SCH5381
Non superloop is not allowed. Enter a superloop number.

SCH5382
Disable the card by removing all the DSLs on the card.

SCH5383
ISDN BRI line card already configured.

SCH5384
ISDN BRI line card has not been configured.

SCH5385
Non ISDN BRI line cards are not allowed.

SCH5386
Non DSL terminal number (TN) is not allowed.

SCH5387
Disable the ISDN BRI line card to configure its DSL.

SCH5388
Remove all DSLs on the line card to change the card type.

SCH5389
DSL number is out of range. Enter a number from 0 to 7.

SCH5390
DSL data block has not been created. Configure the DSL.

SCH5391
DSL data block has already been created.

SCH5392
B-channel packet data option not enabled. B-channel packet data option must be configured in MISP.

SCH5393
Warning: Make sure the call type matches the changed DN and TSP.

SCH5394
Specify at least one type of call, which can be VCE, DTA, or PMD.

SCH5395
System contains additional LTEIs.

SCH5396
Remove all TSPs from the DSL before removing the DSL.

SCH5397
Enter three values LTG and LTN for Logical Terminal Id and one for TEI.

SCH5398
LTIDs exceed the specified system limit.

SCH5399
LTEIs exceed maximum limit allowed for this DSL.

SCH5400
LTEI has not been configured.

SCH5401
Warning: Make sure MCAL value does not exceed the maximum number of calls for a DSL specified in TSP.

SCH5402
System contains additional configured TSPs.

SCH5403
ISDN BRI DN is not allowed.

SCH5404
MISP not allowed.

SCH5405
A non-ISDN BRI terminal can not be configured for the specified ISDN BRI line card.

SCH5406
This DSL cannot be configured because a D-channel is used for packet handler.

SCH5407
LTID TEI pair database block has not been configured.

SCH5408
Enter TEI you wish to delete.

SCH5409
Enter the call type you wish to delete.

SCH5410
Address translation failed.

SCH5411
This is not a DSL line. Enter the TN of a valid DSL line.

SCH5412
USID map is not defined.

SCH5413
TSPs have reached the allowable limit.

SCH5414
TSP is already configured.

SCH5415
TSP does not exist. Assign a configured TSP.

SCH5416
USID has not been removed.

SCH5417
TSP does not exist.

SCH5418
Define at least one SPID.

SCH5419
SPID has not been configured.

SCH5420
Input has exceeded the maximum allowed SPIDs per TSP. Specify a maximum or 8 SPIDs for each TSP.

SCH5421
DN input must be specified.

SCH5422
DNs exceed the allowed limit.

SCH5423
DN database block does not exist.

SCH5424
DN does not exist for the specified TSP.

SCH5425
DN has already been deleted.

SCH5426
Invalid input. Check the input value and try again.

SCH5427
Call type is not defined in the DSL.

SCH5428
Default DN must be entered.

SCH5329
Warning: Default DN has not been defined.

SCH5430
Insufficient memory.

SCH5431
DN tree is corrupted.

SCH5432
DN is not an ISDN BRI DN. Specify an ISDN BRI DN.

SCH5433
DN is already defined for a different DSL.

SCH5434
USID does not exist. Specify an available USID.

SCH5435
SPID has been defined in the TSP.

SCH5436
SPID value is to long. Enter correct SPID value not to exceed 9 characters.

SCH5437
TSP has not been defined for the specified SPID.

SCH5438
Card is not configured in the MISP data block.

SCH5439
ISDN BRI package is not installed in the specified card slot.

SCH5440
Card slot has already been assigned. Specify a card slot.

SCH5441
Cannot remove MISP because at least one BRI SILC/UILC line card remains configured in software.

SCH5442
ISDN BRI line card cannot be moved or swapped. Make sure all the DSLs have been removed from the card first.

SCH5443
ISDN BRI DN cannot be a customer night DN.

SCH5444
Card slot is used by MISP.

SCH5445
ISDN BRI DN cannot be a hotline DN.

SCH5446
ISDN BRI DN cannot be a night DN.

SCH5447
ISDN BRI DN cannot be a customer night DN.

SCH5448 l
Disconnect dedicated D-channel connection command for the specified MISP l has failed. Check MISP status.

SCH5449 l
Send DSL or line card status command for the specified MISP l has failed. Check MISP status.

SCH5450 l
Parameter download procedure for the specified MISP l has failed. Check MISP status.

SCH5451 l
B-channel dedicated connection to PRI has failed.

SCH5452 l
Disconnect B-channel dedicated connection to PRI command has failed.

SCH5453 l
Send maintenance pending message to MISP l has failed.

SCH5454
Invalid LTID, LTG=15 and LTN=1023 is not allowed simultaneously

SCH5455
DSL has already been configured.

SCH5456
DSL does not exist.

SCH5848
The specified application is not configured on this MISP. Configure the application to the MISP.

SCH5849
ISDN BRI trunk types can only be TIE, COT and DID.

SCH5850
Cannot change these parameters without disabling all associated trunk members.

SCH5851
Interface type must be SL1, 1TR6, NUMR or D70.

SCH5852
Cannot remove BRIL application without disabling the application. Disable the application using LD 32.

SCH5853
Cannot remove BRIL application without first removing all associated DSLs.

SCH5854
The specified route is not an ISDN BRI route.

SCH5855
ISDN BRI trunk package is not equipped on this system.

SCH5856
The new MISP for this card does not have BRIL configured but there is a BRIL DSL on this card. Enter a MISP with a BRIL application.

SCH5857
ISDN BRI route is not allowed if an ISDN BRI Route Packet Handler exists. Use a different route or take out the ISDN BRI Route Packet Handler option on this route before proceeding.

SCH5858
PRI is not supported if the DTI package and the PRI package are not equipped.

SCH5859
A DSL trunk in NT mode must be associated with a route on NET side. Check the Network and User configuration for ISDN BRI route and Network and Terminal configuration on the DSL route.

SCH5860
Protocol group cannot be removed if there are one or more ISDN BRI routes using this protocol set group. Remove the routes associated with this protocol before proceeding.

SCH5861
Cannot remove the BRIT application without first disabling it. Use LD 32 and disable the application.

SCH5862
Cannot remove the BRIT application without first removing all associated DSLs.

SCH5863
The new MISP for this card does not have BRIT configured but there is a BRIT DSL on this card. Enter a MISP with a BRIT application.

SCH5864
BRIL package is not equipped on this system.

SCH5965
The ISDN option must be configured in the Customer Data Block before an ISDN BRI route can be configured. Use LD 15 and enable the ISDN option for this customer.

SCH5866
Either the BRIL or BRIT package is not equipped on this system.

SCH5867
The line card is not an SILC. An SILC line card must be entered if the clock source is to be drawn from an ISDN BRI line.

SCH5899
The appropriate DSL on this card (DSL#0 for PREF or DSL#1 for SREF) must be a trunk DSL. Enter an SILC card with an ISDN BRI Trunk clock source configured on the appropriate DSL, or use LD 27 to configure an ISDN BRI trunk clock source on the appropriate DSL.

SCH5900
The appropriate DSL on this card (DSL#0 for PREF or DSL#1 for SREF) is not provisioned for a clock source. Use LD 27 to change the CLOK parameter on the appropriate DSL to YES. The DSL must first be in TE mode.

SCH5901
Either no card exists in this slot or the slot must be a DTI, JDMI or PRI slot.

SCH5902
Either the card in this slot is not an SILC card or the slot must be a DTI JDM or PRI slot.

SCH5903
Either the appropriate DSL in this slot (DSL#0 for PREF or DSL#1 for SREF) is not a trunk DSL, or the slot must be a DTI, JDMI or PRI slot.

SCH5904
Either the appropriate DSL in this slot (DSL#0 for PREF or DSL#1 for SREF) is not provisioned for a clock source, or the slot must be a DTI, JDMI or PRI slot.

SCH5905
The appropriate DSL in this slot (DSL#0 for PREF or DSL#1 for SREF) is not configured. Use LD 27 to configure the appropriate trunk clock source.

SCH5906
Either the appropriate DSL in this slot (DSL#0 for PREF or DSL#1 for SREF) is not configured, or the slot must be a DTI, JDMI or PRI slot.

SCH5907
The clock on this DSL is referenced in the Digital Data Block. This reference must be removed using LD 73 before the mode can be changed to NT.

SCH5908
The clock on this DSL is referenced in the Digital Data Block. Reference must be removed using LD 73 before CLOK can be changed to NO on this DSL.

SCH5919
The clock on this DSL is referenced in the Digital Data Block. Reference must be removed using LD 73 before DSL can be removed.

SCH5926
The clock on this DSL is referenced by the DTI2/PRI2 system data. This reference must be removed using LD 73 before the mode can be changed to NT.

SCH5927
The clock on this DSL is referenced by the DTI2/PRI2 system data. This reference must be removed using LD 73 before CLOK can be changed to NO on this DSL.

SCH5928
The clock on this DSL is referenced by the DTI2/PRI2 system data. This reference must be removed using LD 73 before this DSL can be removed.

SCH5929
DTI package is restricted. If the BRIT package is equipped, enter TYPE =DTI2 or TYPE = PRI2.

SCH5930
The slot number is not a valid DTI/PRI/MISP slot. Configure the DTI/PRI slot using LD 17 or configure the MISP using LD 27.

SCH5931
The slot number is not a valid DTI2/PRI2 /MISP slot. Configure the DTI2/PRI2 slot using LD 17 or configure the MISP using LD 27.

SCH5932
This MISP is referenced as a clock controller in the Digital Data Block. This reference must be removed using LD 73 before the MISP can be removed.

SCH5933
This MISP is referenced as a clock controller in the DTI2/PRI2 system data. This reference must be removed using LD 73 before the MISP can be removed.

SCH5938
The requested change cannot be processed because the route would be changed to USR side, but here are NT mode DSL members on this route; NT mode DSLs must be on NET side. Remove the NT mode DSLs from this route before changing the route to USR side.

SCH5939
This is not an SILC card. This slot is valid input only for SILC clock references. Configure an SILC clock source at this slot.

SCH6089
Either the MSDL package or the BRIL package or the BRIT package needs to be equipped. You do not have the required packages to continue configuring this data.

SCH6409
A protocol engine active (inactive) interface type is allowed to be changed to another protocol engine active (inactive) interface type only if there is no DSL associated with the route.

SCH6410
The route entered for the BRIE application must have the protocol engine active; the route entered for the BRIT application should not have the protocol engine active.

SCH6412
The new MISP for this card does not have BRIE configured, but there is a BRIE DSL on this card.

SCH6426
The Call Forward External allow/deny is only allowed for ETSI and NI-1 protocol.

SCH6427
Invalid supplementary feature.

SCH6428
Cannot subscribe Call Forward Unconditional for this call type because the DN does not subscribe to this call type.

SCH6429
Cannot delete this Call Forward Unconditional service because it is active now.

SCH6435
Supplementary service is not defined in the database.

SCH6436
Invalid supplementary feature.

SCH6437
There are supplementary services defined in the TSP(s) of this DSL.

System loader messages (SYSxxxx)

SYS4206
Data can only be loaded when PRI2, DTI2, BRIT or BRIL package is selected.

SYS4413
DSL can not be loaded. The number of DSLs exceeds the limit.

SYS4414
Protected storage cannot be allocated.

SYS4415
DSL data cannot be found.

SYS4416
ISDN BRI card cannot be inserted in the slot.

SYS4417
MISP cannot be associated with line card because protected data block for the card does not exist.

SYS4418
MISP cannot be associated with line card because protected card data block for the card does not exist.

SYS4419
USID map cannot be found.

SYS4420
Multiple DSLs associated with the specified ISDN BRI directory number.

SYS4421
Logical terminal IDs exceeds limit on the specified DSL.

SYS4590
BRIT package restricted.

SYS4592
BRIL package restricted.

SYS4593
Either the BRIL or BRIT package needs to be equipped.

SYS4594
BRIL application will not be configured on any MISP because the BRIL package is not equipped.

SYS4595
BRIT application will not be configured on any MISP because the BRIT package is not equipped.

SYS4600
The DTI package is restricted and either the BRIT package is restricted or the DTI2 package is equipped or the PRI2 package is equipped.

Chapter 9 — ISDN BRI traffic reports

Introduction

This chapter describes the traffic reports that can be generated for ISDN BRI equipment. It describes and shows examples of each report.

Traffic report types

Option 11 generates and stores traffic statistics about ISDN BRI equipment. These statistics can be displayed on the administration terminal or printed on the administration printer. To set up and print traffic reports use Traffic Program LD 2.

The following ISDN BRI traffic reports can be generated:

— **TFS001 — Network traffic** shows ISDN BRI and non-ISDN BRI traffic on the card slots.

— **TFS011 — MISP/DSL traffic** shows ISDN BRI DSL traffic on the MISP cards.

— **TFS012 — MISP D-channel management messages** shows the management messages handled by each D-channel on the MISP cards

— **TFS013 — MISP messages** shows all the messages handled by the MISP cards

— **TFS014 — MISP messages for BRIT application** shows all messages handled by the BRIT application on MISP cards

Understanding Option 11 traffic reports

The Option 11 system is designed internally as a non-blocking system. It is always configured in a non-blocking concentration, having an internal superloop for every four IPE card slots. Traffic measurements for IPE cards (XDLC, XUT, DTR) are provided in groups of four line cards corresponding to the internal superloops as follows:

Table 26

CARD SLOT	SUPER LOOP	CARD SLOT	SUPER LOOP	CARD SLOT	SUPER LOOP
1	0	11	8	21	32
2	0	12	8	22	32
3	0	13	12	23	32
4	0	14	12	24	32
5	4	15	12	25	36
6	4	16	12	26	36
7	4	17	16	27	36
8	4	18	16	28	36
9	8	19	16	29	40
10	8	20	16	30	40

Traffic measurements for network level cards configured in LD 17 (such as DTI, PRI, DTI2, PRI2, TDS) are assigned internally to a set of loops separate from the superloops assigned to the IPE cards. They are as follows:

Table 27

CARD SLOT	SUPER LOOP
1	20
2	21
3	22
4	23
5	24
6	25
7	26
8	27
9	28

Traffic measurements for the three conference circuits on thesystem core card are reported under loops 29, 30 and 31.

Network traffic report

The Network traffic report shows the traffic activities for the Option 11 lines and trunks including ISDN BRI DSLs. It is used to determine system peak traffic requirements and traffic load distribution. It contains the following columns of information:

1 Loop number

2 Card type, which can be a DSL, terminal, conference, or TDS

3 Number of call attempts that failed to match the channel call type

4 Traffic load on the card

5 Number of call attempts over the card

6 Total number of call attempts that failed to match for all terminals on the card

7 Total traffic load on the card

8 Total number of calls handled by all the terminals on the card

9 The letter S indicates a superloop

Note: Superloops exist in multiples of four (4, 8, 12, 16 and so on). For example, if superloop 4 exists, loops 5, 6 and 7 do not.

The following is an example of the Network traffic report. The number above each column coincides to a number from 1 to 9 above, which describe the function of each column. These numbers indicate the loop call activity and success rate. If columns 3 and 6 show high numbers there may be a problem in handling calls indicating possible faulty loops or other peripheral equipment. Actually the report header does not contain column numbers or titles, however the numbers from 1 to 9 are shown here to describe what each column represents.

0222 TFS001

1	2	3	4	5	6	7	8	9
000	TERM	00000	0000000	00000	00000	0000002	00001	S
004	TERM	00000	0000000	00000	00000	0000000	00000	S
008	TERM	00000	0000000	00000	00000	0000011	00001	S
012	TERM	00000	0000000	00000	00000	0000002	00006	S
016	TERM	00000	0000000	00000	00000	0000000	00000	S
020	TDMF	00000	0000000	00000	00000	0000001	00059	
022	TERM	00000	0000001	00005	00000	0000017	00019	
024	TERM	00000	0000000	00000	00000	0000007	00006	
025	TERM	00000	0000000	00000	00000	0000000	00001	
026	TERM	00000	0000000	00000	00000	0000000	00000	
027	TERM	00000	0000000	00000	00000	0000007	00006	
029	CONF	00000	0000000	00000	00000	0000000	00027	
030	CONF	00000	0000000	00000	00000	0000000	00027	
031	CONF	00000	0000000	00000	00000	0000000	00030	

MISP/DSL traffic report

The MISP/DSL traffic report shows the call processing activities of all DSLs associated with each MISP in the system. It contains the following columns of information for each MISP in the system:

1 Number of attempted calls, which include all the successfully completed calls and the attempted calls that have not been completed

2 Number of successfully completed calls for the reported period

3 Average length of a call, which shows an average duration of a successfully completed call in seconds

4 Number of signaling messages sent by the MISP to the terminals on the D-channels

5 Number of signaling messages sent by the terminals to the MISP on the D-channels

6 Number of D-channel data packets sent by the MISP to the terminals

7 Number of D-channel data packets sent by the terminals to the MISP

The following is an example of the MISP/DSL traffic report where numbers 1 to 7 correspond to the column descriptions from 1 to 7above.

0222 TFS011
MISP002

1	2	3	4	5	6	7
00000	00000	00000	02397	02398	00000	00000

MISP D-channel management messages report

The MISP D-channel management messages report contains the traffic management activity for each DSL based on the exchange of signaling messages between the MISP and the terminals over the D-channels. It is used by the maintenance technician to see if there are any communication problems between the MISP and the terminals. It contains the following columns of information for each MISP in the system:

1 Number of MISP-initiated link initializations

2 Number of terminal-initiated link initializations

3 Number of management messages sent from the MISP to terminals

4 Number of management messages sent from terminals to the MISP

5 Number of times the links associated with D-channels were not able to complete calls

6 Number of management data link errors

The following is an example of the MISP D-channel management messages report where numbers 1 to 6 correspond to the column descriptions from 1 to 6 above.

0222 TFS012
MISP002

1	2	3	4	5	6
00000	00000	03828	03827	00000	00000

MISP messages report

The MISP messages report shows the total number of call processing, maintenance, and management messages sent through each MISP in the system. The totals are grouped according to the size of the message. It is used by the maintenance technician to determine if these messages are within the specified lengths. The report contains the following columns of information for each MISP in the system:

1 Total number of messages that are from 1 to 10 bytes long

2 Total number of messages that are from 11 to 20 bytes long

3 Total number of messages that are over 20 bytes long

The following is an example of the MISP messages report where numbers 1 to 3 correspond to the column descriptions from 1 to 3 above.

0222 TFS013
MISP002

1	2	3
00002	00000	00000

MISP messages for BRIT application

The MISP messages for BRIT application report shows the total number of maintenance, administration and protocol messages received and transmitted as well as protocol errors and D-channel failures. The report contains the following columns of information for each MISP in the system:

1 Total number of maintenance messages transmitted

2 Total number of maintenance messages received

3 Total number of administration messages transmitted

4 Total number of administration messages received

5 Total number of protocol messages transmitted

6 Total number of protocol messages received

7 Total number of L3 protocol errors.

8 Total number of L2 protocol errors.

9 Total number of L1 errors.

10 Total number of times D-channel went down.

The following is an example of the MISP messages for BRIT application report where numbers 1 to 10 correspond to the column descriptions from 1 to 10 above.

0111 TFS014
MISP002

1	2	3	4	5	6	7
0000	0000	0000	0000	0000	0000	0000

8	9	10
0000	0000	0000

Generating traffic reports

The following describes how to print traffic reports to verify that the traffic generated during voice and data transmission testing has been stored by the system and can be printed on demand.

To print the last traffic report generated during acceptance testing, use the following command in LD 2:

INVC (CUSTOMER) (OPTIONS)

Note: Data accumulating for the next report is not accessible.

The parameters for this command are:

customer Number of the customers for which reports are to be generated. This must be a number from 0 to 31.

options Reports to be generated. This must be one or more of the following numbers:

Number	Meaning
1	Network traffic report
11	MISP/DSL traffic report
12	MISP D-channel messages report
13	MISP messages report

For example, to print or display MISP traffic and MISP messages reports for customer 29 on demand, you enter the information shown below.

INVC 29 11 13

To print or display traffic reports for the whole system, you enter the information shown below.

INVS

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

INVC (CUSTOMER) 1 11

The system printer should print these two reports, which you should check to make sure that the traffic generated during the test is reflected in the reports.

The network traffic report shows the traffic activities for Option 11 lines and trunks including ISDN BRI DSLs.

Appendix A — 2Mb PRI implementation

Overview

This Appendix provides the information required to install 2Mb PRI on a Meridian 1 Option 11 system:

— hardware installation

— software programming instructions

Hardware requirements

Circuit cards

To implement 2.0 Mb PRI on the Meridian 1 Option 11, an NTAK79 or an NTBK50 PRI card plus associated daughterboards is required.

Table 28
2.0 Mb PRI hardware requirements

Circuit card	Description
NTBK50	2.0 Mb PRI circuit card Supports the NTAK20 clock controller daughterboard and a D-channel handler interface daughterboard: •NTAK93 D-channel handler, or •NTBK51 Downloadable D-channel handler
NTAK79	2.0 Mb PRI circuit card Supports an on-board clock controller and an on-board D-channel handler interface.
NTAK20	Clock-controller daughterboard. Option 11 supports only one active clock controller per system. Connects to the NTBK50 PRI card
NTAK93	D-Channel-handler interface (DCH) daughterboard Connects to the NTBK50 PRI card.
NTBK51	Downloadable D-Channel daughterboard (DDCH). Connects to the NTBK50 PRI card.

Cables

The following cables are required for PRI connections:

— CEPT Cable - NTBK05DA (120 ¾ twisted pair—6.15 m length)
or
CEPT Cable - NTBK05CA (75 ¾ coaxial—6.15 m length)

Hardware description

2.0 Mb PRI cards

Two PRI cards are available on the Option 11 system:

— NTAK79 2.0 Mb PRI card

— NTBK51 2.0 Mb PRI card

The difference between the two PRI cards is the ability of the NTBK50, when equipped with the NTBK51 D-channel daughterboard, to download software onto the card. This feature is based on the MSDL platform and essentially replaces the D-channel circuit on the NTAK79 PRI card. (The NTAK79 PRI card does not support the NTBK51 Downloadable D-channel handler daughterboard.)

A second difference between the NTAK79 and NTBK50 2.0 Mb PRI cards is that the NTAK79 has an on-board clock controller while the NTBK50 supports the NTAK20 clock controller daughterboard.

> ***Note:*** If the NTAK93 D-channel daughterboard is attached to the NTBK50 PRI card instead of the NTBK51 Downloadable D-channel daughterboard, the NTBK50 PRI card functions in the same manner as the NTAK79 PRI card.

NTAK79 2 Mb PRI circuit card

The 2 Mb Primary Rate Interface card provides the physical interface for the digital E-1 carrier on the Option 11 system. The card includes an on-board clock controller and on-board D-channel handler. It is installed in slots 1 through 9 in the main cabinet.

NTBK50 2 Mb PRI circuit card

The 2 Mb Primary Rate Interface card provides the physical interface for the digital E-1 carrier on the Option 11 system. The card is installed in slots 1 through 9 in the main cabinet and supports clock controller and D-channel handler daughterboards:

— NTAK20 clock controller daughterboard

— NTAK93 D-channel handler daughterboard, or NTBK51 Downloadable D-channel daughterboard.

If the NTAK93 D-channel daughterboard is attached, the NTBK50 PRI card functions in the same manner as the NTAK79 PRI card. If the NTBK51 D-channel daughterboard is attached, software is downloaded to the card instead of residing in a D-channel circuit.

For more information on the operation of the clock controller, refer to the chapter in this guide called “Network clocking”.

NTAK20 Clock Controller (CC) daughterboard

The NTAK20 Clock Controller daughterboard is used with the NTBK50 2.0 Mb PRI card. (The NTAK79 PRI card has an *on-board* clock controller).

Digital Trunking requires synchronized clocking so that a shift in one clock source will result in an equivalent shift of the same size and direction in all parts of the network. On Option 11 systems, synchronization is accomplished with the NTAK20 clock controller circuit card.

The Clock Controller circuitry synchronizes the Option 11 to an external reference clock, and generates and distributes the clock to the system. Option 11 can function either as a slave to an external clock or as a clocking master. The NTAK20AB version of the clock controller meets AT&T Stratum 3 and Bell Canada Node Category D specifications. The NTAK20BB version meets CCITT stratum 4 specifications. See the chapter called *Network clocking* for details.

NTAK93 D-Channel Handler Interface (DCHI) daughterboard

The NTAK93 DCHI daughterboard interfaces with the Meridian 1 Option 11 Central Processing Unit (CPU) and mounts on the NTBK50 PRI card for PRI (but not ISL) applications. The equivalent circuit is contained on-board the NTAK79 2.0 Mb PRI card.

The DCHI is responsible for performing the Q.921 layer 2 protocol information. It transfers layer 3 signaling information between two adjacent network switches.

The NTAK93 DCH daughterboard, when installed on the NTBK50 circuit card, is addressed in the same slot as the NTBK50. The NTAK93 can use SDI I/O addresses 0 to 15 and port 1.

A minimum of one NTAK93 is required for each PRI link. If more than one PRI link is connected to the same end location, a single DCHI circuit card can support up to a maximum of 8 PRI connections for the Option 11 system. This allows for the support of 240 B-Channels or PRI trunks.

NTBK51 Downloadable D-Channel daughterboard

The NTBK51 DDCH daughterboard interfaces with the Meridian 1 Option 11 Central Processing Unit (CPU) and mounts on the NTBK50 2.0 Mb PRI circuit card for PRI D-Channel applications. The DDCH is equivalent to the MSDL card used on the larger Meridian 1 systems, but it only supports D-channel applications (no SDI or ESDI).

The NTBK51 DDCH daughterboard, when installed on the NTBK50 circuit card, is addressed in the same slot as the NTBK50.

A minimum of one NTBK51 is required for each PRI link. If more than one PRI link is connected to the same end location, a single DDCH circuit card can support up to a maximum of 8 PRI connections for the Option 11 system. This allows for the support of 240 B-Channels or PRI trunks.

Installing PRI hardware: NTAK79 PRI card

The steps required to install PRI are as follows:

1 Inspect the PRI card

2 Set the switches on the PRI card

3 Insert the PRI card in the main cabinet (slots 1-9 only)

4 Connect the cables

Each of these steps is described in the pages that follow. The PRI hardware installation procedure is the same regardless of the type of system at the far end (i.e. another Meridian 1, AXE-10, SYS-12, etc.).

Inspecting the NTAK79 circuit card

— Locate the NTAK79 2 Mb circuit card and carefully remove it from its packaging.

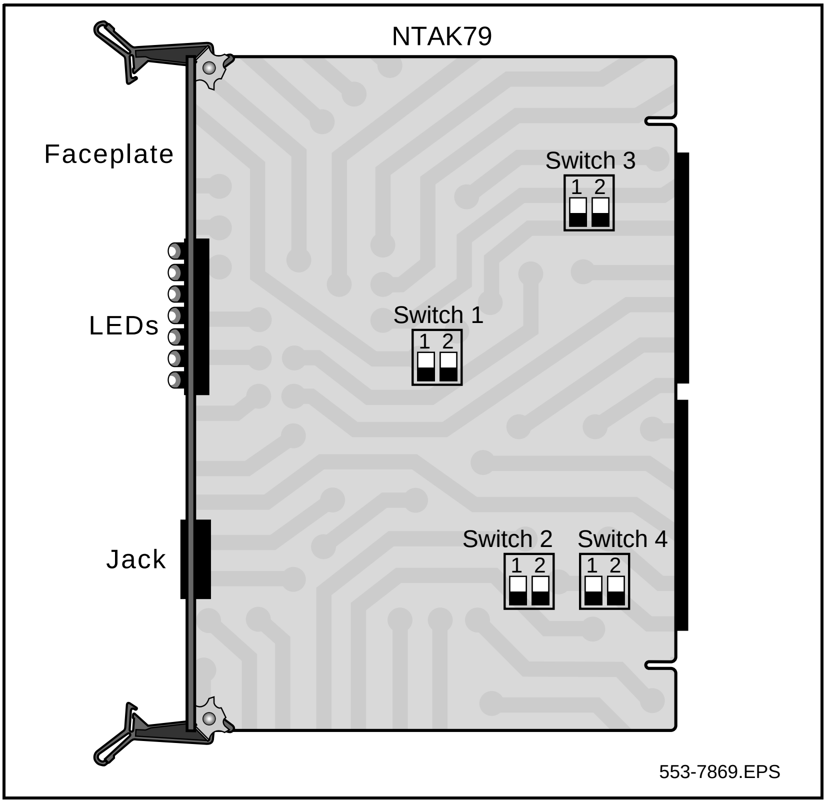
— Inspect the circuit card for any visible damage which may have occurred during shipping.

Setting the switches on the NTAK79

The NTAK79 incorporates four on-board dip switches. The tables that follow provide information on the various settings and related functions of these switches.

> ***Note:*** The ON position for all the switches is towards the bottom of the card. This is indicated by a white dot printed on the board adjacent to the bottom left corner of each individual switch.

NTAK79 with Switch locations



Set the switches found on the circuit card as per the requirements of your specific installation:

Switch SW1—DCHI Configuration

This switch enables/disables the on-board DCHI and sets the operating mode of the DCHI.

For the U.K., use DPNSS1 mode. For all other countries, use Q.931 mode.

Switch	Down (On)	Up (Off)
SW 1-1	enable DCHI	disable DCHI
SW 1-2	DPNSS1/DASS2	Q.931

Switch SW2—Carrier Impedance Configuration

This switch sets the carrier impedance to either 120¾ or 75¾. Twisted pair cable is usually associated with 120¾. Coaxial cable is usually associated with the 75¾ setting.

Cable Type	SW 2-1	SW 2-2
75¾	Up (Off)	Down (On)
120¾	Down (On)	Up (Off)

Switch SW3—Clock Controller Configuration

This switch enables/disables (H/W) the on-board Clock Controller. SW 3-2 should be disabled if the on-board clock controller is not in use.

Switch	Down (On)	Up (Off)	Note
SW 3-1	—	—	Spare
SW 3-2	Disabled	Enabled	

Switch SW4—Carrier Shield Grounding

This switch allows for the selective grounding of the Tx and/or Rx pairs of the carrier cable. Closing the switch (down position) applies Frame Ground (FGND) to the coaxial carrier cable shield, creating a 75¾ unbalanced configuration. This applies only to the NTBK05CA cable.

Switch	Down (On)	Up (Off)
SW 4-1	Rx—FGND	Rx—OPEN
SW 4-2	Tx—FGND	Tx—OPEN

Note: The usual method is to ground the outer conductor of the receive coax signal.

Inserting the NTAK79 into the main cabinet

Slide the circuit card into any unused card slot 1 through 9 in the main cabinet. Secure the circuit card in the cabinet by locking the lock latch assemblies. The card number associated with a 2 Mb PRI card is based on the slot in which the card is installed.

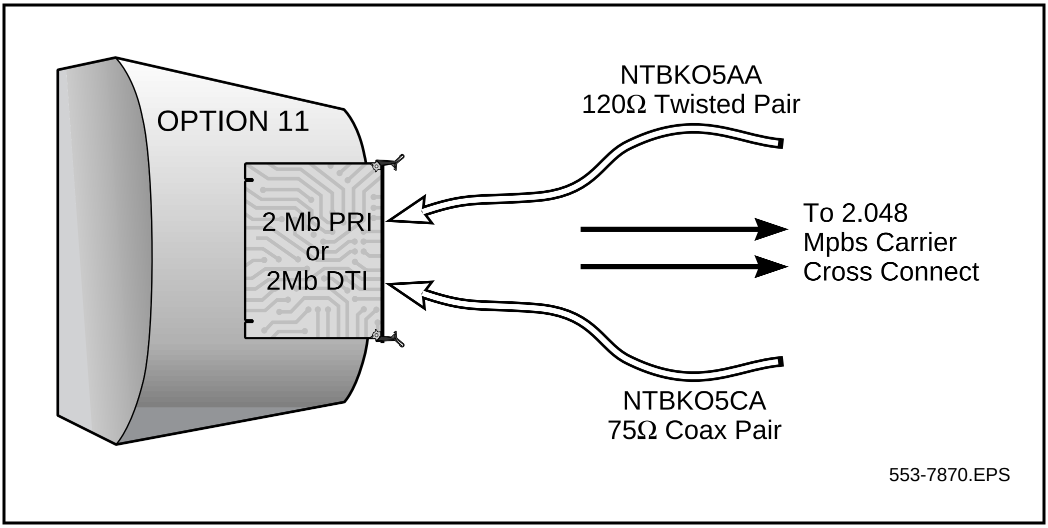
Connecting the cables

Follow the instructions below to connect cables to the NTAK79 PRI card.

— In the cabling area, located directly below the card cage, remove the retaining bar used to secure the MDF cables. Connect the NTBK05DA/CA interface cable to the 50 pin Amphenol connector below the slot in which the NTAK79 is installed. Re-install the retaining bar to secure the cable(s) in place.

— Terminate the NTBK05DA/CA carrier cable as required.

NTAK79 Cabling



NTBK05DA pinouts

The pinouts for the NTBK05DA cable are as follows:

From: 50 pin MDF connector	To: 9 pin connector	Color	Signal
pin 23	pin 6	Black	R0
pin 48	pin 7	White	T0
pin 50	pin 9	Bare	R0/T0 FGND
pin 24	pin 2	Black	R1
pin 49	pin 3	Red	T1
pin 25	pin 5	Bare	R1/T1 FGND

NTBK05CA pinouts

The pinouts for the NTBK05CA cable are as follows:

From: 50 pin MDF connector	To: Transmit coax connector	To: Receive coax connector	To: 50 pin MDF connector
pin 23	Inner conductor	—	—
pin 48	outer conductor	—	—
pin 24	—	Inner conductor	—
pin 49	—	outer conductor	—

Installing PRI hardware: NTBK50 PRI card

The NTBK50 serves as a motherboard to the NTAK20 clock controller, and either the NTBK51 Downloadable D-Channel handler or the NTAK93 D-channel handler.

The steps required to install PRI are as follows:

1 Inspect the PRI card and daughterboards

2 Set the switches on the PRI card

3 Mount the daughterboard(s) on the PRI card

4 Insert the PRI card in the main cabinet

5 Connect the cables

Each of these steps is described in the pages that follow. The PRI hardware installation procedure is the same regardless of the type of system at the far end (i.e. another Meridian 1, AXE-10, SYS-12, etc.).

Inspecting the NTBK50 circuit card

— Locate the NTBK50 2 Mb circuit card plus associated daughterboard(s) and carefully remove them from their packaging.

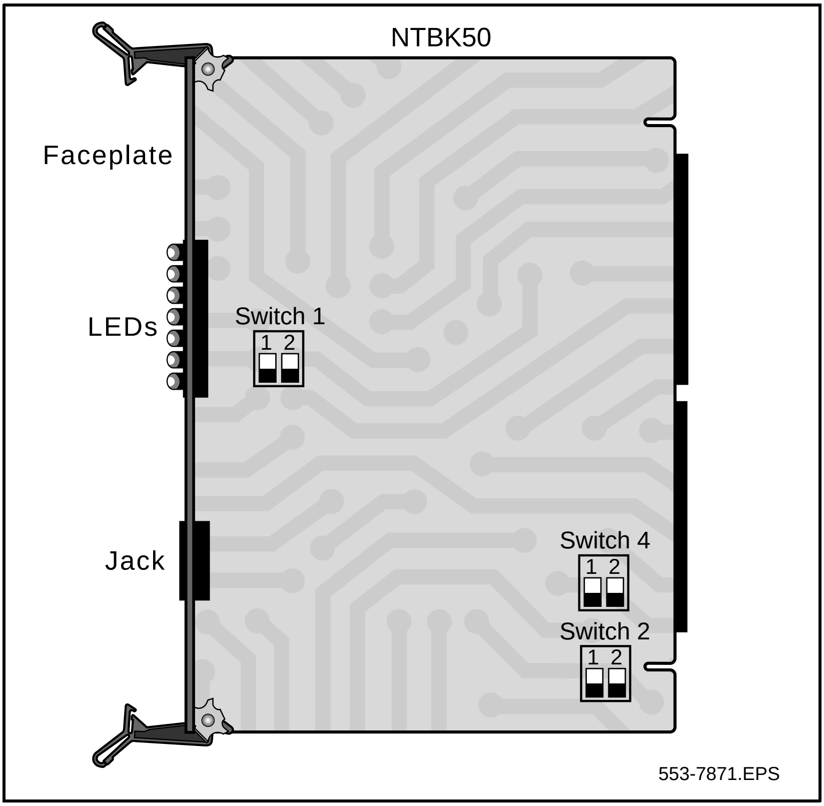
— Inspect the circuit cards for any visible damage which may have occurred during shipping.

Setting the switches on the NTBK50

The NTBK50 incorporates four on-board dip switches. The following tables provided information on the various settings and related functions of these switches.

> ***Note:*** The ON position for all the switches is towards the bottom of the card. This is indicated by a white dot printed on the board adjacent to the bottom left corner of each individual switch.

NTBK50 with switch locations



Set the switches found on the circuit card as per the requirements of your specific installation:

Switch SW1—DCHI Configuration (NTAK93 only)

This switch enables/disables the DCHI and sets the operating mode of the DCHI. It is only used if an NTAK93 D-channel handler daughterboard is being used. It has no effect when using the NTBK51 DDCH daughterboard.

For the U.K., use DPNSS1 mode. For all other countries, use Q.931 mode.

Switch	Down (On)	Up (Off)
SW 1-1	—	—
SW 1-2	DPNSS1/DASS2	Q.931

Switch SW2—Carrier Impedance Configuration

This switch sets the carrier impedance to either 120¾ or 75¾. Twisted pair cable is usually associated with 120¾. Coaxial cable is usually associated with the 75¾ setting.

Cable Type	SW 2-1	SW 2-2
75¾	Down (On)	Down (On)
120¾	Up (Off)	Up (Off)

Switch SW4—Carrier Shield Grounding

This switch allows for the selective grounding of the Tx and/or Rx pairs of the carrier cable. Closing the switch (down position) applies Frame Ground (FGND) to the coaxial carrier cable shield, creating a 75¾ unbalanced configuration. This applies only to the NTBK05CA cable.

Switch	Down (On)	Up (Off)
SW 4-1	Rx—FGND	Rx—OPEN
SW 4-2	Tx—FGND	Tx—OPEN

Note: The usual method is to ground the outer conductor of the receive coax signal.

Mounting the daughterboards on the NTBK50

Use the following procedure to mount and remove the NTAK20 CC and the NTBK51 DDCH or NTAK93 DCHI daughterboards onto the NTBK50 PRI.

Install the NTAK93 or NTBK51 daughterboard before the NTAK20 daughterboard. Work on a flat surface when mounting or removing daughterboards.

1 Visually inspect the connector pins on the underside of the daughterboard. Any pins that are bent should be re-aligned prior to mounting.

2 Place the NTBK50 down flat on an anti-static pad.

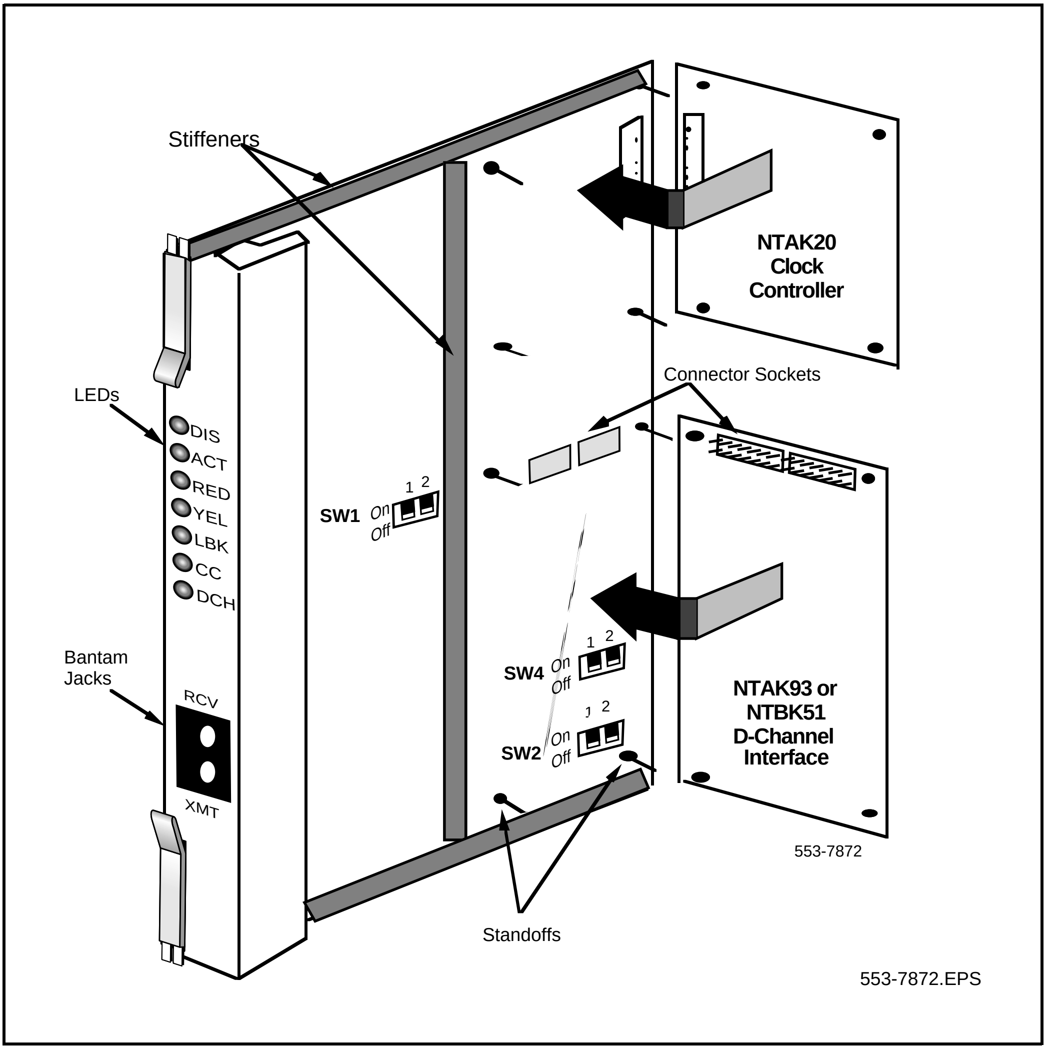
3 From an overhead viewpoint, with the daughterboard parallel above the NTBK50 and the connector pins aligned over the connector sockets, line up the mounting holes on the daughterboard (see figure below) with the tops of the standoffs on the NTBK50.

4 Slowly lower the daughterboard towards the NTBK50, keeping the standoffs in line with all four holes, until the holes are resting on the tops of the four standoffs.

If more than a very slight amount of pressure is required at this point, the connector pins may not be aligned with the connector socket. If so, lift the daughterboard off the NTBK50 and return to step 2.

5 Gently apply pressure along the edge of the board where the connector is located until the standoffs at the two corners adjacent to the connector snap into a locked position. Then press down on the two corners on the opposite side until they also are locked into place.

Figure 57
Daughterboard installation



Removing the daughterboards from the NTBK50

Use these guidelines to remove the NTAK20 and NTBK51 or NTAK93 from the NTBK50 PRI card. Because of the physical layout of the mother and daughterboards, the NTAK20 should be removed before the NTAK93 or NTBK51.

1 Starting at the two corners opposite the connector, gently lift each corner out of the locking groove of the standoff.

2 At the two corners adjacent to the connector, gently lift the entire side until the mounting holes are clear of the locking groove of the standoff.

3 To remove the connector pins, grasp the edge of the board adjacent to the connector and lift gently.

If more than one NTBK50 card is installed, the additional cards may not carry daughterboards, depending on the system configuration. At least one NTAK20 (per system) is always required, however.

Inserting the NTBK50 into the main cabinet

Slide the circuit card into any unused card slot 1 through 9 in the main cabinet. Secure the circuit card in the cabinet by locking the lock latch assemblies. The card number associated with a 2 Mb PRI card is based on the slot in which the card is installed.

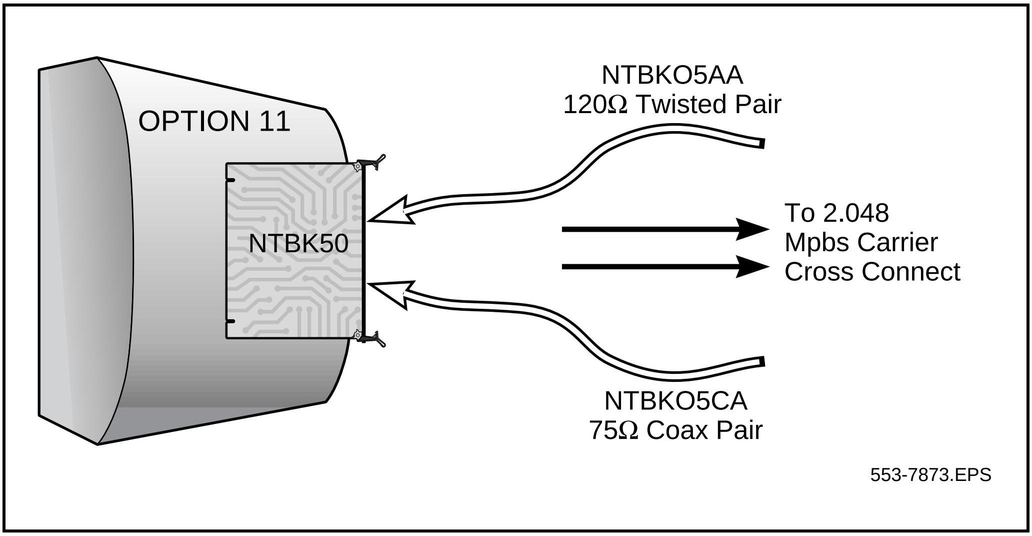
Connecting the cables

Follow the instructions below to connect cables to the NTBK50 PRI card.

— In the cabling area, located directly below the card cage, remove the retaining bar used to secure the MDF cables. Connect the NTBK05DA/CA interface cable to the 50 pin Amphenol connector below the slot in which the NTBK50 is installed. Re-install the retaining bar to secure the cable(s) in place.

— Terminate the NTBK05DA/CA carrier cable as required.

Figure 58
2 Mb PRI Cabling



NTBK05DA pinouts

The pinouts for the NTBK05DA cable are as follows:

From: 50 pin MDF connector	**To: 9 pin connector**	**Color**	**Signal**
pin 23	pin 6	Black	R0
pin 48	pin 7	White	T0
pin 50	pin 9	Bare	R0/T0 FGND
pin 24	pin 2	Black	R1
pin 49	pin 3	Red	T1
pin 25	pin 5	Bare	R1/T1 FGND

NTBK05CA pinouts

The pinouts for the NTBK05CA cable are as follows:

From: 50 pin MDF connector	To: Transmit coax connector	To: Receive coax connector	To: 50 pin MDF connector
pin 23	Inner conductor	—	—
pin 48	outer conductor	—	—
pin 24	—	Inner conductor	—
pin 49	—	outer conductor	—

PRI software programming

Use the following procedure to configure PRI loops, the DCHI/DDCH interface, the DCH link and ISDN trunk route and trunks (B-channels). No feature applications other than Basic Call Service are programmed.

Prompts which do not show a response can be left at default. For more information on any of these prompts, refer to Option 11 *Software guides.*

Overlay 17 is used to create, change or remove a logical D-Channel which is associated with:

— a D-channel handler interface (DCHI):
  - NTAK79 PRI card
  - NTAK02 SDI/DCH
  - NTBK50 PRI card with the NTAK93 daughterboard

— a downloadable D-channel handler (DDCH) on an NTBK50 PRI card with the NTBK51 daughterboard.

Limitations

PRI loops must be configured before defining DCH links or PRI applications. The following restriction apply when configuring a D-Channel:

— The card slot number used for the DCHI/DDCH must be between 1-9.

— The port number must be set to 1.

- — A primary D-Channel can not act as the backup D-Channel of another primary D-Channel.
- — A primary D-Channel with a backup D-Channel can not be taken out. The craftsperson must first take out the backup D-Channel.
- — The D-Channel must be disabled if any DCH parameters are changed.
- — Card type of the backup D-channel must be the same as the card type of the primary D-channel. (Example: an NTAK02 DCH can not act as a backup to an NTAK79 DCH. The backup must be another NTAK02).
- — The MOV DCH command is not supported.

Procedure summary

Step	Overlay	Action
1	LD 17 (CFN)	Add a PRI loop.
2	LD 17 (CFN)	Add a DDCH/DCHI card.
3	LD 15 (CDB)	Define a PRI customer.
4	LD 16 (RDB)	Define a PRI service route.
5	LD 14 (TDB)	Define service channels (B channels) and PRI trunks.
6	LD 73 (PRI2)	Define clock controller parameters.
7	LD 73 (PRI2)	Define PRI parameters and thresholds. ***Note***: In most cases, the settings should be left at their default values. However, if changes to these values are necessary, use this step to make them.
8	LD 73 (PRI2)	Change trunk pad category values.

1 Add a PRI loop. Use Overlay 17.

Prompt	Response	Description
REQ	CHG	
TYPE	CFN	configuration data block
CEQU	YES	changes to common equipment
PRI2	XXX	where XXX is the PRI2 digital card number (1-9)

2 Add a DCHI or DDCH. Use Overlay 17.

Prompt	**Response**	**Description**
REQ		
TYPE	CFN	configuration data block
ADAN	NEW DCH 1-15 CHG DCH 1-15 OUT DCH 1-15	Add a primary D-Channel port number. Any unused SDI port number Change a primary D-Channel Out the primary D-Channel
CTYP	DCHI/MSDL	DCHI for D-Channel configuration on the NTAK79, NTAK02, NTAK93 D-channel. MSDL for Downloadable D-Channel configuration (NTBK51 D-channel). The MSDL base and D-Channel application software are downloadable into the DDCH card.
CDNO	1-9	Card slot number to be used as the primary DDCH/DCHI
PORT	1	PORT must be set to “1”
ADAN	NEW BDCH 1-15 CHG BDCH 1-15 OUT BDCH 1-15	Add a backup D-Channel port number. Any unused SDI port number Change a backup D-Channel Out a backup D-Channel
PDCH	X	Primary D-Channel X as defined above
CTYP	DCHI/MSDL	Card type (automatically printed because it must be the same as the primary D-Channel)
CDNO	1-9	Card slot number to be used as the backup D-Channel
PORT	1	PORT must be set to “1”
DES	<CR>	Back-up DCHI port number, if required
DPNS	NO	Default is no
USR	PRI	D-channel is for ISDN PRI only. ***Note:*** 2.0 Mb only supports PRI or SHA user mode.
IFC	SL1	Interface type is Meridian 1 - Meridian 1

Prompt	Response	Description
DCHL	(1-9)	PRI card number which will be carrying the D-channel. Must match entry made for the “CDNO” associated with the “DCHI” prompt above
PRI2	<CR>	Additional PRI Loops controlled by this DCHI. Remember one DCHI can control up to 16 PRI loops going to the same destination. For the Option 11 system, the maximum limit is eight loops.
OTBF	1-(16)-127	number of output request buffers. Note: for a single PRI link, leave this prompt at default (16). Add 5 output request buffers per additional link.
SIDE	NET (USR)	Prompted only if IFC is set to SLl. Default is set to slave. NET = network, the controlling switch USR= slave to the controller ***Note:*** In X11 release 17 and earlier, enter MAS for NET and SLAV for USR.
RLS	20	X11 software release of far-end. This is the current software release of the far end. If the far end has an incompatible release of software, it prevents the sending of application messages, i.e. for Network Ring Again.
RCAP	MSL	MSDL RCAP capability only applies to SL-1 interface and on release 18 or above.
OVLR	<CR>	Allow or disallow overlap receiving on a D-channel. Default is NO.
LAPD	YES,(NO)	change LAPD parameters. Enter carriage return if timers are to be left at default. The following timers are prompted only if LAPD is set to YES. The following can all be left at default during initial set-up.
T23	1-(20)-31	interface guard timer checks how long the interface takes to respond. In units of 0.5 seconds (default 20 = 10 seconds).
T200	2-(3)-40	retransmission timer in units of 0.5 seconds (default 3 = 1.5 seconds).
N200	1-(3)-8	maximum number of retransmissions

Prompt	Response	Description
N201	4(260)	maximum number of octets in information field
K	1-(7)-32	maximum number of outstanding unacknowledged frames (NAKS)

3 Define a PRI customer. Use Overlay 15.

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	CDB NET_DATA	customer data block Release 21 gate opener
CUST	0-31	customer number
LDN	XXXX	enter the customer's Listed Directory Number
AC2		Access Code 2. Enter call types (type of number) that use access code 2. Multiple responses are permitted. This prompt only appears on NARS equipped systems. If a call type is not entered here, it is automatically defaulted to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber
	INTL	International
	SPN	Special Number
	LOC	Location Code
ISDN	YES	customer is equipped with ISDN
PNI	1-32700	customer private network identifier. This number must be unique to this customer in the private network. e.g. it is used as part of the setup message for feature operation such as Network Ring Again, Network ACD....Note that if set to zero (0), NRAG and NACD will not work.
HNPA (PFX1)	NPA	telephone area code for this Meridian 1. Sent as part of setup message as calling line identification.

Prompt	Response	Description
HNXX (PFX2)	NXX	telephone local exchange code for this Meridian 1. Sent as part of setup message as calling line identification.
HLOC	XXX	home location code (NARS)
LSC	1-9999	one to four digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt is required for Calling Line I.D. and Network ACD.

4 Define a PRI service route. Use Overlay 16.

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	RDB	route data block
TKTP	TIE	TIE trunk only, allowed between MSL-1.
DTRK	YES	digital trunk route
DGPT	PRI2	
ISDN	YES	ISDN option
MODE	PRI	route used for PRI only
PNI	1-32700	customer private network identifier-must be the same as the CDB PNI at far end.
IFC	SL1	interface type: Meridian 1 to Meridian 1
CHTY	BCH	signaling type- prompted if DTRK is YES. D-channel signaling for B-channels.
CTYP	<CR>	Call Type. Enter the call type to be associated with the outgoing route for direct dialing using the trunk access code (instead of NARS access code) See the “X11 Software Guide - Including Supplementary Features” for a listing of possible responses.

Prompt	Response	Description
INAC	YES	Insert Access Code. Permits the NARS AC1 or AC2 access code to be re-inserted automatically on an incoming ESN call. This prompt only appears on a TIE route and must be set to “YES” in order for features such as Network ACD to function. On an existing ESN network, setting this prompt to “YES” may also require modifying the Digit Manipulation Index (DMI) associated with this route at the far end (so that the Access Code doesn't get re-inserted twice). The INSERT prompt (INST) is bypassed if INAC is set to YES.

5 Define service channels and PRI trunks. Use Overlay 14.

Prompt	Response	Description
REQ	NEW,CHG	Note: when assigning several members at once use the multiple create command NEW XX.
TYPE	TIE	TIE trunk only, allowed between MSL-1.
TN	c ch	enter the PRI trunk card (c) and channel number (ch). c = 1-9, ch = 1-30
RTMB	RR MM	route (created in step 5) (RR) and member number (MM).
INC		
TKID		

6 Define clock controller parameters. Use Overlay 73.

Free-run is used when this Meridian PBX serves as the clock source master for the private network. This is only prompted if the CC has been physically connected to the system. See the *“Network clocking”* chapter for more details on clocking.

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	SYTI	System timers
CLKN	1-9	Card slot number of the PRI circuit card which will have the active clock controller.
PREF	1-9	Primary reference source for clock controller. Enter the PRI card number of the PRI card which will have an active clock controller. This is the PRI which the clock controller will use as it's primary source to synchronize (to track) the system network clock. A carriage return <CR> here signifies the system will operate in free-run (non-tracking).
SREF	1-9	Secondary reference source for clock controller—prompted only if primary source is not free-run. Enter the card number of the PRI card that is to be used as the secondary clock reference. This is the PRI link that the clock controller will use as it's secondary source to synchronize (to track) the network clock. It is only used when unable to track on the primary source (i.e. too many slips).
CCAR	0-(15)	Clock Controller Audit Rate. Enter the time (in minutes) between normal CC audits.

7 Define PRI parameters and thresholds. Use Overlay 73.

Prompt	**Response**	**Description**
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	LPTI	
LOOP	X	X is the slot number of the 2 Mb PRI card.
MFF	AFF, (CRC)	The Framing Mode.
FIRM	(REG), ALT	Default or alternate alarms selected
SLP	mc mt oc ot	Slip error count, *mc*—Maintenance threshold slip count, 1-(5)-255 *mt*—Maintenance threshold time, default 24 hours, see Note after Step 3 *oc*—Out-of-service threshold slip count, 1-(30)-255 *ot*—Out of service threshold time, default 1 hour, see Note after Step 3
BPV	n1 n2	Bipolar violation error count, 1-(128)-255 for n1, 1-(122)-255 for n2. n1 is multiplied by 16 to obtain the actual count, giving an actual count range of 16-4080.
RATS	1-(10)-15	number seconds firmware has to check and validate error rate condition.
CRC	n1 n2	Cyclic redundancy check error count 1-(201)-255 for n1, 1-(97)-255 for n2. n1 is multiplied by 4 to obtain the actual count, giving an actual count range of 4-1020.
FAP	n1 n2	Frame alignment problem error count 1-(28)-255 for n1, (1)-255 for n2.

Prompt	Response	Description
GP2	T2 mt dt ct ot	Group 2 error thresholds. This is the maximum amount of time that can occur before software checks the associated thresholds of 120 to 32,640 msec and rounds it to the closest multiple of 128 msec. T2 = Error count values are in the range 1-(20)-255 mt = Maintenance threshold time (MNT)(default =100S) dt = No new data calls threshold time (NNDC)(default =12S) ct = No new calls threshold time (NNC)(default =12S) ot = Out of service threshold time (OOS)(default =4S). ***Note:*** The following requirements must be met for input mt = >dt = >ct = >ot. ***Note:*** Threshold times must be one of the following nnnnT, nnnS, nnnM, or nnH, where
MNG1	nnnM	Maintenance Guard time Group 1 default = 15M
NCG1	nnnM	No New Calls Guard time Group 1 default = 15M
OSG1	nnnM	Out Of Service Guard time Group 1 default = 15M
MNG2	nnnS	Maintenance Guard time Group 2 default = 15S
NCG2	nnnS	No New Calls Guard time Group 2 default = 15S
OSG2	nnnS	Out Of Service Guard time Group 2 default = 15S
PERS	ttt	Persistence Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).
OOSC	nnn	Out of Service Counter. Range for *nnn* of 0-255 with a default of 5.

8 Use Overlay 73 to change trunk pad category values

Prompt	Response	Description
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	PADS	
PDCA	#	PAD table-0 is default and is hard coded
The following prompts define the pad levels. The receiving pad code is *r* and the transmission pad code is *t*. These entries have the range 0-15. The pad values (in decibels) relating to these codes are shown after this table.		
ONP	r t	On-premises extension
DSET	r t	Meridian Digital set (prompted only if the 2 Mb Gateway feature is equipped) Author's Note—p7/dave/gateway
OPX	r t	Off-premises extension
DTT	r t	Digital TIE trunks
SDTT	r t	digital Satellite TIE trunks
NTC	r t	Nontransmission compensated
TRC	r t	Transmission compensated
DCO	r t	digital COT, FEX, WAT, and DID trunks
VNL	r t	VIA NET LOSS
DTO	r t	2 Mb PRI2 digital TOLL office trunks
ACO	r t	Analog CO or WATS trunks
AFX	r t	Analog FEX trunks
ADD	r t	Analog DID trunks
SATT	r t	analog satellite TIE trunks
ATO	r t	analog TOLL office trunks
PRI2	r t	2 Mb 2 Mb PRI trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=2 Mb PRI) Author's Note—p7/dave/gateway

Prompt	Response	Description
XUT	r t	analog CO trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway
XEM	r t	analog TIE trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author's Note—p7/dave/gateway

The following are the pads available to 2 Mb PRI. Positive dB represents loss and negative dB represents gain.

code	0	1	2	3	4	5	6	7
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					

PRI software programming: Option 11 to Central Office (ISA)

Introduction

Connection to a Central Office can be accomplished using three methods:

1. **Dedicated channels** (similar to Digital Trunking-DTI) but with Calling Line Identification--CLID, speed of call setup and out-of-band signaling.
2. **Call by Call (ISA)** service selection **without** maximum or minimum settings for each trunk type. This arrangement would ultimately provide blockage to some routes.
3. **Call by Call (ISA)** service selection **with** maximum and minimum settings for each trunk type. This may also be referred to as **Dynamically allocating** trunk types on a call-by-call basis.

Note that a combination of options is also possible on the same link. An example is dynamically allocating some channels, while providing a number of dedicated channels.

Options 2 and 3 are explained in detail in this section.

Purpose

Accessing an ISA member

Integrated Service Access (Call by Call or Dynamic Channel Assignment) simply provides a path for the various services using it. Therefore the ISA MEMBER IS NEVER ACCESSED DIRECTLY. Instead, Service Routes are defined (COT, DID, WATS, FX and TIE) and these are accessed through the normal fashion (see example that follows).

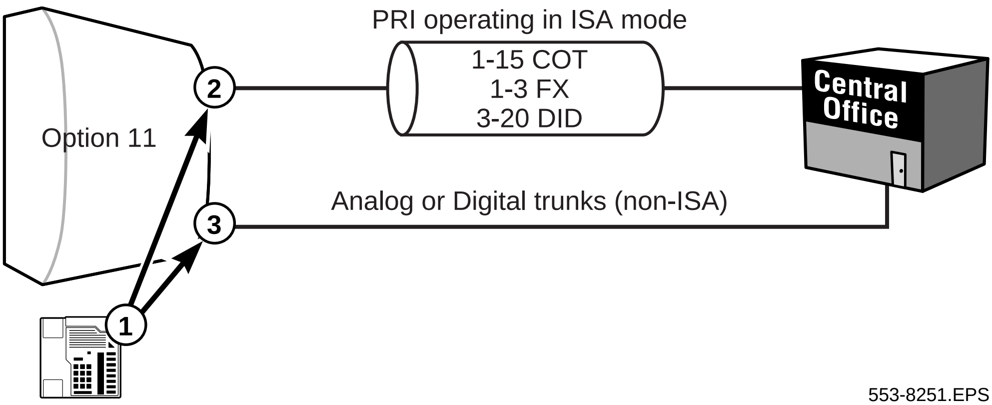
Outgoing Calls: Since ISDN requires some form of ESN (CDP or/and NARS), then the Route List Tables (ESN LD 86) include the Service route(s). Therefore. the Meridian 1 software performs the digit translation and sends the call out on an ISA route associated with the service route selected. This feature is transparent.

Incoming Calls: Similar translation is performed by the Central Office and an ISA channel is selected based on the service required. This feature is transparent.

Limitations

The caller is prevented from dialing the access code of an ISA route directly. It is also possible to step to a standard trunk route (NON-ISA) when all ISA channels are busy. This is done by using the STEP prompt (for direct access) or as part of the route list table (ESN-LD 86).

Figure 59
ISA Call Routing



1 Callers usually accesses the PRI Service Route by dialing the usual ESN number (NARS or CDP).

2 The Service Route does not have any trunk members of its own and therefore selects an ISA "B" channel.

3 In the event that all ISA "B" channels are busy or the Service Route MAX setting has been reached (i.e. 15 outgoing COT calls), stepping to a non-ISA trunk member (if so equipped) is possible.

Dependencies

Basic PRI configuration must be performed before Integrated Services Access (ISA) is defined (Steps 1, 2, 3, 4 and 8 under programming the PRI-ISA which follows). An ISA route and associated ISA trunks are then defined, followed by service routes. Service routes (COT, DID, FX, WATS, TIE) DO NOT HAVE TRUNK MEMBERS but utilize the ISA trunk members. Therefore the ISA trunks are shared by the various service routes associated with them on a call-by-call basis.

ISA Prompt Assignments

The following few pages identify and describe some of the most important prompts which are used to control the Dynamic Channel Assignment mechanism.

- **a** MIN and MAX
- **b** SID
- **c** NSF

MIN and MAX

You can control the number of simultaneous calls of a certain type (from a certain service route) through an ISA route by defining the Maximum and Minimum settings found in the service routes. You can define a maximum number of calls allowed per service route. In addition, you can define a minimum number of “B” channels that are ready for use by a service route (in other words channels which are reserved by a service route). The MIN and MAX prompts appear when the NSF prompt is set to YES in the ISA route.

The MIN and MAX prompts in LD 16 limit the minimum and maximum simultaneous calls associated with each service route. The rule of thumb for setting these two threshold is as follows:

MIN--The sum of all MIN values of the service routes associated with an ISA route MUST never exceed the number of “B” channels (ISA trunks) defined for the ISA route.

Sum of all the MIN values = or < total “B” channels.

MAX--The MAX settings for any service route:

MAX for service route “X” = or < Total “B” channels - (sum of all the MINs except this service route).

If the service route exceeds its maximum number of simultaneous calls allowed, or all the ISA “B” channels are busy, then you can specify an overflow route in LD 16 (STEP prompt) or LD 86 Route List Table Entry. The route number for the step prompt is not permitted to be an ISA route number or a service route number.

Service Identifier (SID)

In addition to the call type (route type), each call is identified by a service identifier (SID) which is used by the Meridian 1 and the CO for routing. The SID prompt is available when the NSF prompt is set to YES. These service identifier must be set up in coordination with the CO on a per route basis. The function of the SID is simply to identify the Service Route being used; since the Route number as we know it (LD 16) as programmed in the Meridian 1 does not mean anything to the CO

Note that what we call SID on the Meridian 1, is referred to by the DMS table as “FACNUM.”

Network Service Facility (NSF)

NSF=NO

Disabling the Network Service Facility provides the Call-by-Call Pool of trunks without the MIN and MAX settings (therefore no control as to the number of “B” channels used for any one service). Additionally, when you assign NSF to NO in LD 16, a route number for COTR and TIER should also be assigned. The COTR can be a route number for an incoming CO or incoming DID route. It is used for public calls. For incoming public calls, if COTR is a CO route, it is routed to the attendant. If it is a DID route, it translates the 3 or 4 digits. For private calls (TIER), the called number is translated based on the programming for the Tie service route in overlay 16 (i.e. INAC) and ESN digit manipulation table if appropriate.

NSF=YES

This is the preferred method which provides control over the allocation of ISA "B" channels for the various Service Routes. When the NSF prompt is YES, then a route for COTR and WATR should be assigned. The COTR can be a route number for an incoming CO or incoming DID route same as above. The WATR is the route used for WATS service. The TIER prompt does not appear and TIE calls are handled based on their SID. Additionally, when NSF is set to YES, the MIN and MAX prompts must be programmed as explained earlier. When the MAX value is reached in a service route, the All Trunks Busy counter is incremented. (The ATB count is not incremented when NSF is NO). The ATB value is provided during the printing of traffic reports. The ATB counter of an ISA route is also incremented when the last "B" channel of the ISA is busied. This occurs regardless of whether the NSF prompt is YES or NO.

Configuring Option 11 to Central Office (ISA)

Applicability

Use the following procedure to configure ISA between Option 11 and a CO.

Prompts that do not show a response can be left at default. For more information on any of these prompts, refer to Option 11 *Software guides*.

Limitations

PRI loops must be configured before defining DCH links or PRI applications.

Procedure summary

Step	Overlay	Action
1	LD 17 (CFN)	Add a PRI loop.
2	LD 17 (CFN)	Add a DCHI/DDCH card.
3	LD 15 (CDB)	Define a PRI customer.
4	LD 16 (RDB)	Define a PRI service route.
5	LD 14 (TDB)	Define service channels (B channels) and PRI trunks.
6	LD 73 (PRI2)	Define clock controller parameters.
7	LD 73 (PRI2)	Define PRI parameters and thresholds.
8	LD 73 (PRI2)	Change trunk pad category values. In most cases, the settings should be left at their default values. However, if changes to these values are necessary, use this step to make them.

1 Add a PRI loop. Use Overlay 17.

Prompt	**Response**	**Description**
REQ	CHG	
TYPE	CFN	configuration data block
CEQU	YES	changes to common equipment
PRI2	XXX	where XXX is the DTI/PRI digital card number (1-9)
MODE	PRA	select Primary Rate Interface mode

2 Add a DCHI or DDCH. Use Overlay 17.

Prompt	**Response**	**Description**
REQ	CHG	
TYPE	CFN	Configuration data block
ADAN	NEW DCH 1-15 CHG DCH 1-15 Out DCH 1-15	Add a primary D-Channel port number. Any unused SDI port number Change a primary D-Channel Out the primary D-Channel

Prompt	Response	Description
CTYP	DCHI/MSDL	DCHI for existing D-Channel configuration. (NTAK93 D-channel) MSDL for Downloadable D-Channel configuration (NTBK51 D-channel). The MSDL base and D-Channel application software will be downloadable into the DDCH card.
CDNO	1-9	Card slot number to be used as the primary DDCH/DCHI
PORT	1	PORT must be set to “1”
ADAN	NEW BDCH 1-15 CHG BDCH 1-15 OUT BDCH 1-15	Add a backup D-Channel port number. Any unused SDI port number Change a backup D-Channel Out a backup D-Channel
PDCH	X	Primary D-Channel X as defined above
CTYP	DCHI/MSDL	Card type (automatically printed because it must be the same as the primary D-Channel)
CDNO	1-9	Card slot number to be used as the backup D-Channel
PORT	1	PORT must be set to “1”
DES	<CR>	Back-up DCHI port number, if required
DPNS	NO	Default is no
USR	PRI	PRI: D-channel is for ISDN PRI only
IFC	 (D100) S100 ESS4 ESS5 AXEA SS12 D250 1TR6 AXES NUME APAC	Interface type for the route DMS-100 SL-100 AT&T ESS#4 AT&T ESS#5 Australian AXE-10 Norwegian SYS-12 DMS-250 1 TR 6 Swedish AXE-10 Numeris France Asia-Pacific

Prompt	**Response**	**Description**
DCHL	1-9	PRI card number which will be carrying the D-channel. Must match entry made for the “CDNO” associated with the “DCHI” prompt above
PRI2	<CR>	Additional PRI Loops controlled by this DCHI. Remember one DCHI can control up to 16 PRI loops going to the same destination. For the Option 11 system, the maximum limit is eight loops.
OTBF	1-(16)-127	number of output request buffers. Note: for a single PRI link, leave this prompt at default (16). Add 5 output request buffers per additional link.
SIDE	NET (USR)	Prompted only if IFC is set to SLI. Default is set to slave. NET = network, the controlling switch USR= slave to the controller ***Note:*** In X11 release 17 and earlier, enter MAS for NET and SLAV for USR.
RLS	20	X11 software release of far-end. This is the current software release of the far end. If the far end has an incompatible release of software, it prevents the sending of application messages, i.e. for Network Ring Again.
RCAP	MSL	MSDL RCAP capability only applies to SL-1 interface and on release 18 or above.
OVLR	<CR>	Allow or disallow overlap receiving on a D-channel. Default is NO.
LAPD	YES,(NO)	change LAPD parameters. Enter carriage return if timers are to be left at default value. The following timers are prompted only if LAPD is set to YES. The following can all be left at default during initial set-up.
T23	1-(20)-31	interface guard timer checks how long the interface takes to respond. In units of 0.5 seconds (default 20 = 10 seconds).
T200	2-(3)-40	retransmission timer in units of 0.5 seconds (default 3 = 1.5 seconds).
N200	1-(3)-8	maximum number of retransmissions

Prompt	Response	Description
N201	4(260)	maximum number of octets in information field
K	1-(7)-32	maximum number of outstanding unacknowledged frames (NAKS)

3 Define a PRI customer. Use Overlay 15.

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	CDB NET_DATA	customer data block Release 21 gate opener
CUST	0-31	customer number
LDN	XXXX	enter the customer's Listed Directory Number
ISDN	YES	customer is equipped with ISDN
PNI	1-32700	customer private network identifier. This number MUST be unique to this customer in the private network. e.g. it is used to as part of the setup message for feature operation such as Network Ring Again, Network ACD...
HNPA	NPA	telephone area code for this Meridian 1. Sent as part of setup message as calling line identification.
HNXX	NXX	telephone local exchange code for this Meridian 1. Sent as part of setup message as calling line identification.
HLOC	XXX	home location code (NARS)
LSC	1-9999	one to four digit Local Steering Code established in the Coordinated Dialing Plan (CDP). The LSC prompt is required for Calling Line I.D. and Network ACD.
AC2		Access Code 2. Enter call types (type of number) that use access code 2. Multiple responses are permitted. This prompt only appears on NARS equipped systems. If a call type is not entered here, it is automatically defaulted to access code 1.
	NPA	E.164 National
	NXX	E.164 Subscriber

Prompt	Response	Description
	INTL	International
	SPN	Special Number
	LOC	Location Code

4 Configure the ISA route. Use Overlay 16

Prompt	Response	Description
REQ	NEW, CHG	
TYPE	RDB	route data block
TKTP	ISA	create an ISA trunk route
DTRK	YES	digital trunk route
DGPT	PRI2	
ISDN	YES	ISDN option
MODE	PRI	route used for PRI only
PNI	1-32700	customer private network identifier-must be the same as the CDB PNI at the far end.
IFC		interface type for the route
	(D100)	interface to DMS-100
	S100	interface to SL-100
	ESS4	interface to AT&T ESS#4
	ESS5	interface to AT&T ESS#5
	AXEA	interface to Australian AXE-10
	SS12	interface to Norwegian SYS-12
	D250	interface to DMS-250
	1TR6	interface to 1 TR 6
	AXES	interface to Swedish AXE-10
	APAC	nterface to Asia-Pacific
	NUME	interface to Numeris France
NSF	YES,(NO)	Network Service facility.
COTR	0-511	incoming or combination DID/CO route number--prompted if NSF is set to YES or NO.

Prompt	Response	Description
TIER	0-511	incoming or combination TIE route number--prompted if NSF is NO.
WATR	0-511	incoming or combination WATS route number--prompted if NSF is YES.

5 Configure the ISA trunks. Use Overlay 14

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	ISA	ISA trunk type
TN	c ch	enter the DTI/PRI trunk card (c) and channel number (ch). c = 1-9, ch = 1-30
RTMB	RR MM	ISA route (created in step 5) (RR) and member number (MM).

6 Configure the service route. Use Overlay 16. Repeat step 6 for as many service routes as required.

Prompt	Response	Description
REQ	NEW,CHG	
TYPE	RDB	route data block
TKTP	XXX	types of service routes allowed with ISDN: COT, FEX, WAT, DID and TIE.
DTRK	YES	digital trunk route
DGPT	PRI2	
ISDN	YES	ISDN option
IFC	XXX	interface type: must match interface specified in the ISA route data block from Step 4.
SRVC		Service type for an AT&T connection only
	(ACC)	Accunet Data Service
	SDN	Software Defined Network
	M800	Megacom 800 service
	MEG	Megacom Service

Prompt	Response	Description
SRVC (continued)	IWAT	In-Wats Service (AT&T ESS5)
	WATM	Maximum Subscribed (AT&T ESS5)
	WATB	WATS parameterized band (AT&T ESS5)
	SRPM 0-(9)	WATS parameterized band. Prompted only if SRVC=WATB.
MODE	PRI	route used for PRI only
PNI	1-32700	customer private network identifier-must be the same as the CDB PNI at the far end.
INAC	YES	Insert Access Code. Permits the NARS AC1 or AC2 access code to be re-inserted automatically on an incoming ESN call. This prompts only appears on a TIE route and must be set to “YES” in order for features such as Network ACD to function. On an existing ESN network, setting this prompt to “YES” may also require modifying the Digit Manipulation Index (DMI) associated with this route at the far end (so that the Access Code doesn't get inserted twice). The INSERT prompt (INST) is bypassed if INAC is set to YES.
ISAR	YES	stepping to ISA allowed, in other words this is a service route which will be using ISA channels on a call by call basis. Setting this prompt to NO allows this service route to be used with standard dedicated “B” channels. If ISAR is set to YES the following prompts will appear.
RTN	0-511	specify the ISA route to be used by this service route.
SID	0-511	service ID for this route. The service route ID must match the far end.
MIN	0-254	minimum number of channels reserved on the ISA route (service dependent). See text preceding the programming for details. Coordinate with the far end.

Prompt	**Response**	**Description**
MAX	1-254	maximum number of channels on the ISA route to be used by this service route (service dependent). See text preceding the programming for details. Coordinate with the far end.
CLS	(UNR), SRE	class of service restrictions for TIE routes.
IEC	1-999	Inter-exchange Carrier--prompted if TKTP is COT, FEX or WAT. U.S. market only.

7 Assign clock reference source. Use Overlay 73. Refer to NTAK79 error detection for programming of the prompts.

Prompt	**Response**	**Description**
REQ	CHG	
TYPE	PRI2	2 Mb PRI
FEAT	LPTI	
LOOP	X	X is the slot number of the 2 Mb PRI card.
MFF	AFF, (CRC)	The Framing Mode.
SLP	mc mt oc ot	Slip error count, *mc*—Maintenance threshold slip count, 1-(5)-255 *mt*—Maintenance threshold time, default 24 hours, see Note after Step 3 *oc*—Out-of-service threshold slip count, 1-(30)-255 *ot*—Out of service threshold time, default 1 hour, see Note after Step 3
BPV	n1 n2	Bipolar violation error count, 1-(128)-255 for n1, 1-(122)-255 for n2. n1 is multiplied by 16 to obtain the actual count, giving an actual count range of 16-4080.

Prompt	Response	Description
CRC	n1 n2	Cyclic redundancy check error count 1-(201)-255 for n1, 1-(97)-255 for n2. n1 is multiplied by 4 to obtain the actual count, giving an actual count range of 4-1020.
FBER	n1 n2	Frame alignment problem error count 1-(28)-255 for n1, (1)-255 for n2.
GP2	T2 mt dt ct ot	Group 2 error thresholds. This is the maximum amount of time that can occur before software checks the associated thresholds of 120 to 32,640 msec and rounds it to the closest multiple of 128 msec. T2 = Error count values are in the range 1-(20)-255 mt = Maintenance threshold time (MNT)(default =100S) dt = No new data calls threshold time (NNDC)(default =12S) ct = No new calls threshold time (NNC)(default =12S) ot = Out of service threshold time (OOS)(default =4S). ***Note:*** The following requirements must be met for input mt = >dt = >ct = >ot. ***Note:*** Threshold times must be one of the following nnnnT, nnnS, nnnM, or nnH, where
MNG1	nnnM	Maintenance Guard time Group 1 default = 15M
NCG1	nnnM	No New Calls Guard time Group 1 default = 15M
OSG1	nnnM	Out Of Service Guard time Group 1 default = 15M
MNG2	nnnS	Maintenance Guard time Group 2 default = 15S
NCG2	nnnS	No New Calls Guard time Group 2 default = 15S
OSG2	nnnS	Out Of Service Guard time Group 2 default = 15S

Prompt	Response	Description
PERS	ttt	Persistence Timer for Group II problems. Enter 0 - 256 msec in increments of 2 msec. Default is 50 (=100ms).
OOSC	nnn	Out of Service Counter. Range for *nnn* of 0-255 with a default of 5.

8 Change trunk pad category values. Use Overlay 73.

Prompt	Response	Description	
REQ	CHG		
TYPE	PRI2	2 Mb PRI	
FEAT	PADS		
PDCA	#	PAD table-0 is default and is hard coded	
The following prompts define the pad levels. The receiving pad code is *r* and the transmission pad code is *t*. These entries have the range 0-15. The pad values (in decibels) relating to these codes are shown after this table.			
ONP	r t	On-premises extension	ONP
DSET	r t	Meridian Digital set (prompted only if the 2 Mb Gateway feature is equipped) Author's Note—p7/dave/gateway	DSET
OPX	r t	Off-premises extension	OPX
DTT	r t	Digital TIE trunks	DTT
SDTT	r t	digital Satellite TIE trunks	SDTT
NTC	r t	Nontransmission compensated	NTC
TRC	r t	Transmission compensated	TRC

Prompt	Response	Description	
DCO	r t	digital COT, FEX, WAT, and DID trunks	DCO
VNL	r t	VIA NET LOSS	VNL
DTO	r t	2 Mb PRI2 digital TOLL office trunks	DTO
ACO	r t	Analog CO or WATS trunks	ACO
AFX	r t	Analog FEX trunks	AFX
ADD	r t	Analog DID trunks	ADD
SATT	r t	analog satellite TIE trunks	SATT
ATO	r t	analog TOLL office trunks	ATO
PRI2	r t	2 Mb 2 Mb PRI trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=2 Mb PRI) Author’s Note—p7/dave/gateway	PRI2
XUT	r t	analog CO trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2) Author’s Note—p7/dave/gateway	XUT
XEM	r t	analog TIE trunk (prompted only if the 1.5/2 Mb Gateway feature is equipped and TYPE=PRI2)	XEM

The following are the pads available to 2 Mb PRI:

code	0	1	2	3	4	5	6	7
value (dB)	0.0	+1.0	+2.0	+3.0	+4.0	+5.0	+6.0	+7.0
code	8	9	10	11	12	13	14	15
value (dB)	+8.0	+9.0	+10.0	+11.0	+12.0	+13.0	+14.0	-1
code	16	17	18	19	20	21	22	23
value (dB)	-2	-3	-4	-5	-6	-7	-8	-9
code	24	25	26					
value (dB)	-10	idle	+0.6					

List of terms and abbreviations

The following is a list of terms and abbreviations used throughout this guide.

1TR6

The ISDN protocol used in Germany and in any country that supports German protocol

ACD

Automatic Call Distribution

AML

Applications Module Link

ANSI

American National Standards Institute

AST

Associate Set

APPL

Application

AWG

American Wire Gauge

B & D

Bearer and Data

B1CT

B-channel 1 Call Type

B2CT

B-channel 2 Call Type

Backup D-channel

64 kbps channel carrying D channel packet data

BC

Bearer Capability

B_D-channel

64 kbps channel carrying D channel packet data

BRA

Basic Rate Access

BRI

Basic Rate Interface. A standard format for ISDN access and transmission of both voice and data communications between individual user stations and the supporting PBX switch.

BRIL

Basic Rate Interface Line

BRIT

Basic Rate Interface Trunk

CC

Clock Controller

CCITT

International Telegraph and Telephone Consultative Committee

CFNA

Call Forward No Answer

CFTA

Call Forward by Call Type Allowed

CFTD

Call Forward by Call Type Denied

CH

PRI Channel Number

CLID

Calling Line Identification

CLIP

Calling Line Identification Presentation

CLIR

Calling Line Identification Restriction

CLS

Class of Service

CO

Central Office (local exchange)

COT

Local exchange Trunk

CPU

Central Processing Unit

CTD

Conditionally Toll Denied

CTYP

Card Type

CUN

Conditionally Unrestricted

CUST

Customer Number

DCH
D-Channel

DES
DSL Designator

DFDN
Default Directory Number

DID
Direct Inward Dial

DMS
Digital Multiplex Switching

DN
Directory Number

DSL
Digital Subscriber Loop. Any one of eight physical BRI ports which are supported by a BRI line card (either a UILC or SILC). Each DSL supports two B-channels and one D-channel.

DTE
Data Terminal equipment

DTI
1.5 Mbps Digital Trunk Interface

DTI2
2.0 Mbps Digital Trunk Interface

EFD
Flexible External Call CFNA Directory Number

EHT
Hunt External Call Directory Number

ENET

Enhanced Network

ESN

Electronic Switching Network

ETSI

European Telecommunications Standards Institutes

ETSI NET-3

ISDN Protocol in European countries

FBA

Call Forward Busy Allowed

FBD

Call Forward Busy Denied

FDN

Flexible CFNA Directory Number

FEAT

Class of Service Features

FNA

Call Forward No Answer Allowed

FND

Call Forward No Answer Denied

FR

Free Run (for clock controller)

FR1

Fully Restricted Class 1

FR2

Fully Restricted Class 2

FRE

Fully Restricted

HBTA

Hunting By Call Type Allowed

NBTD

Hunting By Call Type Denied

HDLC

High Level Data Link Control

HTA

Hunt Allowed

HTD

Hunt Denied

HUNT

Hunt Directory Number

IE

Information Element

I/O

Input/Output

INS NET-64

Protocol used in Japan

IPE

Intelligent Peripheral Equipment

ISDN BRI

Integrated Services Digital Network Basic Rate Interface

ISDN

Integrated Services Digital Network. A digital data communications network providing for the universal access and transmission of data, voice, image, facsimile and other communication formats either separately or simultaneously.

ISM

Incremental Software Management

IVD

Integrated Voice and Data

Kbps

Kilobits per second

LAPB

Link Access Procedure, Balanced

LAPD

Link Access Procedure on the D-channel

LDN

Listed Directory Number

LOOP

Loop Number

LTEI

Logical Terminal Endpoint Identifier. A terminal logical address used by the MISP to address a terminal during the exchange of layer 2 information.

LTG

Logical Terminal Group

LTID

Logical Terminal Identifier. An internal identification number that uniquely identifies the transmitted and received D-channel packet data for each terminal on a DSL. It is assigned to an unused static TEI during ISDN BRI configuration to uniquely define a logical terminal on a DSL for the MISP.

LTN

Logical Terminal Number

M5000TD-1 UTA

The M5000TD-1 Universal Terminal Adapter (NTBX94AA) is a Northern Telecom ISDN BRI device that connects non-ISDN BRI terminals to an ISDN BRI S/T bus, and supports simultaneous Voice and Data communications using non-ISDN BRI voice and data terminals.

M5317TDX

A Northern Telecom terminal that offers simultaneous Voice and Data communications over an S/T interface.

Mbit

Megabits per second

MCAL

Maximum Number of Calls on a DSL at one time

MCDN

Meridian Customer Defined Networking

MCU

Micro Controller Unit

MDF

Main Distribution Frame

MHz

MegaHertz (Millions of cycles per second)

MISP

Multi-Purpose ISDN Signaling Processor. A BRI circuit pack that processes signals between the CPU and the BRI line circuit packs. One MISP can support up to four BRI line cards (SILCs and UILCs in any combination).

MODE

Network Terminal Mode

MPU

Main Processor Unit

MRA

Message Registration Allowed

MRD

Message Registration Denied

MSC

Maintenance Signaling Channel

MSDL

Multi-Purpose Serial Data Link

MTEI

Maximum Number of Terminal Endpoint Identifiers

MTSP

Maximum Number of TSPs Defined for a DSL

MUX

Multiplexed

MWA

Message Waiting Allowed

MWD

Message Waiting Denied

NCOS

Network Class of Service

NT

Network Termination

NT1

A BRI device used between a UILC and the BRI terminal devices (such as BRI telephones). The NT1 converts U-loop signals to S/T signals and S/T signals to U-loop signals.

NT2

Network Terminator 2, or Meridian 1

NTAS

NT1 Adaptive Sampling

NTFS

NT1 Fixed Sampling

NUMERIS

The ISDN protocol used in France and in any country that supports French protocol.

OSI

Open System Interconnect

OPX

Off Premise Extension

PBX

Private Branch Exchange

PDN

Packet Distribution Network

PE

Peripheral Equipment

PGPN

Protocol Group Number

PH

Packet Handler

PIC

Polyolefin Insulated Cable

PRA

Primary Rate Access

PRES

Presents/Restricts Calling Party Number Display

PRI

1,5 Mbps Primary Rate Interface

PRI2

2.0 Mbps Primary Rate Interface

PRID

Protocol ID

PSDL

Peripheral Software Downloading

PSTN

Public Switched Telephone Network

PULP

Paper-Pulp Insulated cable

PSWV

Peripheral Software Version

RDI

Restricted DID

ROM

Read Only Memory

SAPI

Service Access Point Identifier

SDI

Serial Data Interface

SFA

Second Level Call Forward No Answer Allowed

SFD

Second Level Call Forward No Answer Denied

SILC

The SILC is an S/T Interface Line Card that processes S/T signals between the BRI terminal devices (such as BRI telephones) and the Meridian 1.

S_0

A Terminal Adapter designed to interface with Option 11 ISDN BRI and 1TR6 terminals

SPID

Service Profile Identifier is an identification number used by the MISP to identify a specific terminal and to assign to that terminal specific service attributes during initialization. The SPID is entered directly into the terminal device by the user when the terminal is installed.

SRE

Semi-Restricted

SSD

Scan and Signal Distributor

TCM

Time Compression Multiplexing

TA

Terminal Adapter used to adapt non-BRI terminals to ISDN BRI line interface

TE

Terminal Equipment

TEI

Terminal Endpoint Identifier is a terminal logical address assigned and used by the MISP to address a terminal during the exchange of layer 2 information. Each logical terminal is associated with one unique TEI. Up to 20 TEIs can be assigned on a single DSL. ISDN BRI protocol supports two types of TEIs; Dynamic TEIs automatically assigned by the MISP, and Static TEIs that are entered into the terminal by the user.

TGAR

Trunk Group Access Restriction

TID

Terminal Identifier is an identification number that uniquely identifies a terminal on a DSL. Each terminal on a DSL that shares the same TSP will still have a unique TID. The TID is one of two parameters (see USID) generated and returned to the terminal by the MISP in response to the terminal sending its SPID to the MISP.

TLD

Toll Denied

TN

Terminal Number

TR

Tracking (for clock controller)

TS

Time Slot

TSP

Terminal Service Profile is a specification that defines a terminal's features, class-of-service, call restriction levels, and other service and feature attributes. Up to 16 TSPs can be configured per DSL.

UDI

Unrestricted DID

UILC

The UILC is a U Interface Line Card that processes U-loop signals between an NT1 adapter and the Meridian 1.

UNR

Unrestricted

USID

User Service Identifier is an identification number that uniquely identifies a TSP assigned to one or more terminals on a DSL. All terminals on a DSL that share the same TSP will have the same USID. The USID is one of two parameters (see TID) generated and returned to the terminal by the MISP in response to the terminal sending its SPID to the MISP.

XLST

Pretranslation Group

Meridian 1

Option 11C

ISDN BRI Administration and Maintenance

P0891472

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NORTEL NETWORKS

How the world shares ideas.