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Meridian 1 Options 201, 211

Commercial Systems

Computer-to-PBX Interface General Description

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About this document

When to use this publication

This document is used to obtain a description of the Computer-to-PBX Interface (CPI) feature as it applies to the Meridian SL-100 Integrated Services Network.

This document provides information on the following topics:

- Feature description
- Elements-the components used for CPI
- Protocol-the communications control used for data exchanges
- Operation-how CPI operates
- Installation-how CPI is installed
- Maintenance-how the elements of CPI are maintained

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, 297-1001-001.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in *DMS-100 Family Guide to Northern Telecom Publications*, 297-1001-001.

References in this document

The following documents are referred to in this document:

- 297-1001-360, Basic XLA Tools Guide
- 297-1001-451, Common Customer Data Schema
- 297-1001-455, Office Parameters Reference Manual
- 297-1001-523, RLCM/OPM Routine Maintenence Procedures
- 297-1001-584, LTP Lines and Alarms Performance Monitoring
- 297-1001-585, LTP Trunk and PM Alarms
- 297-1001-589, LTP Card Replacement Procedures
- 297-1001-595, Trunks Maintenance Guide
- 297-1001-840, Log Report Manual
- 297-1001-451, Customer Data Schema
- 297-2121-100, Datapath Guide to Documentation
- 297-2121-226, Datapath Data Unit-Installation and Maintenance
- 555-4001-100, Packaged General Description
- 555-4141-100, Asynchronous Interface Line Unit Description

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

Feature description

Overview

This section describes the components that are combined to form the Computer-to-PBX Interface (CPI), and the Datapath components that make CPI accessible to the end user.

The CPI enables bidirectional (duplex) data transfers with a central processing unit through a T-1 link. The link is a digital T-1 span that connects the host computer to the Meridian SL-100. Meridian SL-100 provides connections between the users and the host. User access is provided by various types of Data Terminal Equipment (DTE), Data Communications Equipment (DCE), and Datapath equipment. The user can also be another computer system. Figure 1-1 illustrates the configuration of CPI with respect to the Meridian SL-100 and the user. Each network path connects one host port to one user.

The North American standard T-1 carrier system provides a 1.544 Mbps link that is divided into 24 separate NTL standard DS0 channels. Each DS0 channel is assigned to an individual host port and provides a 64-kbps bandwidth. The data equipment provides user access to the host.

Benefits

CPI uses the inherent line concentration and dynamic switching of the Meridian SL-100 to provide benefits in the following areas:

- Resource Sharing-Multiple users share common transmission facilities. This simplifies Meridian SL-100 administration and maintenance by reducing the complexity of facilities and assuring balanced facility usage. Access to more than one host is possible through the standardized SL-100 interfaces.
- User Interface-System features are more fully utilized due to the user-transparent operation of CPI. CPI operation is fully automatic, requiring no user interaction. Datafill in the Meridian SL-100 enables the link as a generic T-1/DS1 link without unique requirements or considerations.

- Interface Variety-CPI access is available to Datapath-connected DTE/DCE for synchronous and asynchronous data. Asynchronous access is available through Asynchronous Interface Module (AIM), Personal Computer Interface (PCI), directly connected Personal Computers (PCs), low speed Data Unit (DU), or modem pooling.
- Cost Savings-Savings are realized through simplification of the facilities required for access to the connected host computer.

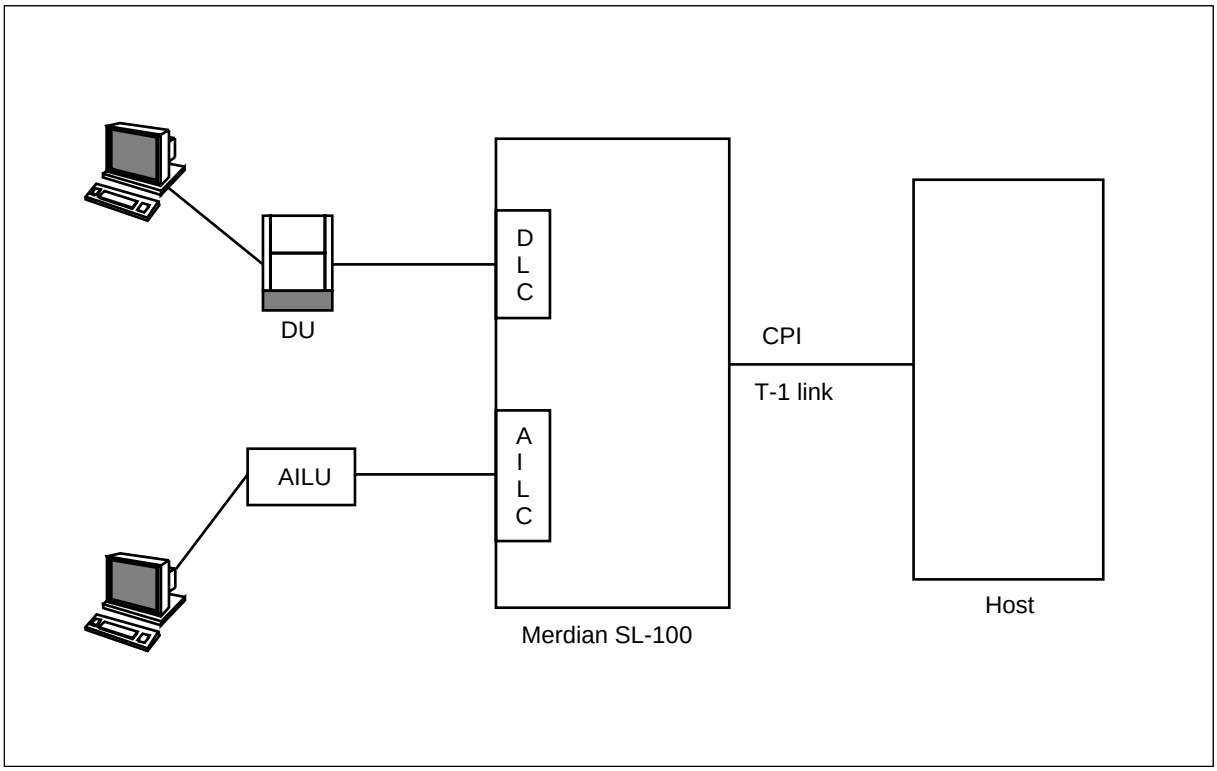
The datafill specifies the operation of the user and host interfaces. User interfaces are configured as standard keysets and host interfaces are configured as digital trunk groups.

CPI configuration

CPI and the T-1 equipment are located on the trunk side of the SL-100 switching network and connect to the host through the CPI interface of the host. User equipment is located on the station side of the switching network.

Figure 1-1xxx
SL-100/CPI configuration

FW-xxxxx



Operation

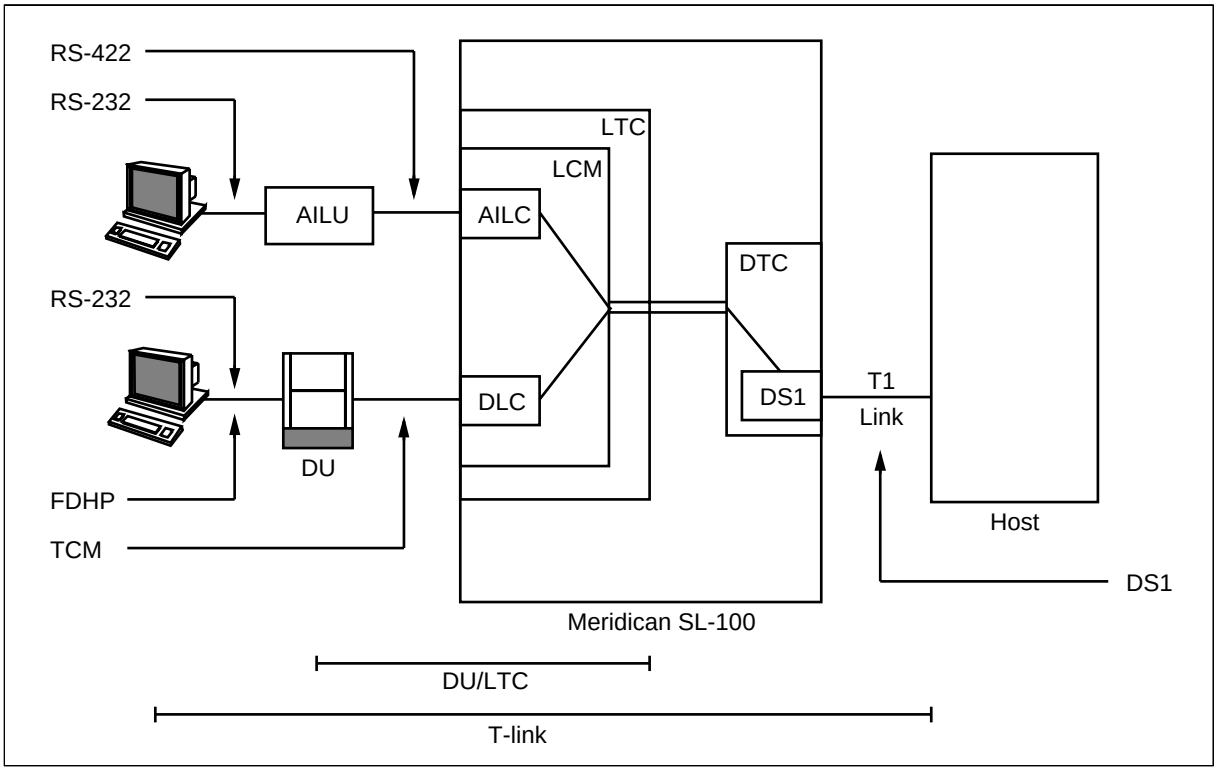
CPI operates as a user-transparent interface to a host computer system. Operation consists of establishing a stable link for the transfer of digital

information between the host and the user's terminal. Each DS0 channel is dedicated to a single user for the length of the connection to the host. Access to the DS0 channels is controlled by the Meridian SL-100.

Descriptions of the elements

Because CPI is a data transfer mechanism that uses a T-1 link to tie a host computer to the SL-100, some peripheral information is necessary to illustrate the context in which CPI is used. Brief descriptions of the protocols and system components used with CPI follow. Figure 1-2 shows the equipment relationships.

Figure 1-2xxx
CPI elements



Protocol elements

Several types of protocols are used with CPI. The primary protocol is T-Link, which operates in conjunction with the following components:

- FDHP-Full Duplex Handshake Protocol provides control of data transfers between the DTE/DCE and the Data Unit. FDHP is also used in RS-422 connections that use the Asynchronous Interface Line Unit (AILU) and Asynchronous Interface Line Card (AILC). Checksum error detection and error correction take place by retransmission. Control communication occurs over the 8 kbps signaling channel with the remaining 56 kbps of the DS0 channel available for the user's data.
- DU/LTC-Controls data call originations and terminations along with testing of the loop between a Data Unit and a Line Trunk Controller. Control communication occurs over the 8 kbps signaling channel with the remaining 56 kbps of the DS0 channel available for the user's data.
- TCM-Time Compression Multiplexing provides the data transmission capability between a 2-wire Data Unit and Data Line Card (DLC) using standard twisted-pair telephone cable. TCM organizes data transfers into one-millisecond frames for a continuous data rate of 160 kbps. Alternating inbound and outbound frames accomplish duplex data transfers. Transmission is constant and serves to maintain the synchronization of the Datapath equipment. The effective bandwidth of the DU-to-SL-100 link is divided into separate 56 kbps data and 8 kbps signaling channels.
- RS-422-An Electronic Industry Association (EIA) standard data protocol operates between an Asynchronous Interface Line Unit and an Asynchronous Interface Line Card. The AILC supports 4-wire operation at rates from 110 bps to 19.2 kbps for the AIM, PCI, and directly connected PCs.
- T-Link-This protocol enables duplex, byte-oriented, synchronous/ asynchronous data transfers, using one DS0 channel per connection. The protocol operates between either a DU or an AILC and the distant end of the connection (the host).

Physical elements

The DS0 channel bandwidth of 64 kbps is divided into separate 56-kbps data and 8-kbps signaling channels. By allocating a portion of each channel for end-to-end signaling, control information and user data are exchanged concurrently.

Under special circumstances, the signaling channel can be used for data (56 to 64 kbps rates). The signaling channel is the eighth bit of each eight-bit byte.

The signaling channel carries the following information:

- on-hook
- off-hook status changes
- dialed digits
- EIA DTE status signals

Northern Telecom standard DS1 signaling operates on the T-1 link between the SL-100 and host to maintain the synchronization of the span.

Data terminal equipment

Data Terminal Equipment (DTE) is a variety of user interface equipment that is required to access the host via CPI. This equipment can be either a video display or hard-copy terminal, but must conform to both EIA standards and the requirements of the host. The electrical specifications are set out in EIA standard RS-232-C. The host processor requirements are set out by the manufacturer.

RS-422-compatible DTE can be directly connected to an AILC. An RS-232-compatible DTE can be connected to an AILC through the AILU, that is an RS-232-to-RS-422 interface. The following interfaces are included:

- Directly connected PCs-The Macintosh PC can connect directly to an AILC.
- Personal Computer Interface (PCI)-This interface permits an IBM-compatible PC to connect directly to an AILC.
- Asynchronous Interface Module (AIM)-This interface accommodates a variety of terminals.
- Low-speed Data Unit-This Datapath-compatible interface accommodates a variety of terminals.

Data units

A variety of DUs and related interfaces are available for either asynchronous or synchronous data at rates up to 64 kbps. Physical packaging options permit either desktop or card shelf installations. DTE interfaces are available for RS-232-C (25-pin connector), RS-422 (37-pin connector), or coaxial cable. RS-422-compatible equipment can be directly connected to an AILC. RS-232-C equipment can be connected to an AILC through an AILU.

Data line card

The Data Line Card (NT6X71AA) is the Meridian SL-100 interface for one DU. This card accommodates all DU options and occupies two line card positions in a Line Concentrating Module (LCM, NT6X05AA) line drawer. Duplex data rates to 64 kbps with an 8-kbps data channel operate over the 2-wire non-loaded loop.

Asynchronous interface line card (NTX6X76AA)

Asynchronous ASCII data from 110 bps up to 19.2 kbps, RS-422 compatible.

T-1 interface

The T-1 interface (DS1, NT2X35AB) serves a single 24-channel T-1 digital span and is located in a Digital Carrier Module (DCM, NT2X31AH/AJ). A digital-span interface (DS1, NT6X50AA) operates in a Digital Trunk Controller (DTC, NT6X02AA). One T-1 interface is required per CPI link.

Host interface

The host interface provides the T-1 interface for the host hardware and software. The host provides control of this interface, with the host software determining the operation. The manufacturer of the host provides detailed information.

Control messages

Messages exchanged before transfer

Before actual data transfers begin, the DU/AILC and host port must successfully exchange version identification and parameter messages. These messages identify the T-link vintage/version of the sender and its operating parameters.

The messages are exchanged in half-duplex mode. The called device sends its Version ID and receives the caller's Version ID and operating parameter messages as a single message. This message specifies the required adaptation. The called device must return a set of parameter messages that match those of the caller before data transfer can begin. The following paragraphs describe these messages.

Version ID

This message identifies the T-link version resident in the sending device. It is compared by the receiving device to its own version ID and serves to synchronize the link.

Parameters

These messages transmit in a specific sequence and contain the operating parameters of the sending device. The parameters at each end of the connection must match before data is exchanged.

Adaptation

Adaptation permits one end of the connection to assume the parameters sent by the other end. The host typically enters this mode when the Version ID message is received from a DU. The host can also force the calling DU to adapt to its parameters when the DU is configured for adaptation. This

parameter is set by a switch option in the DU and is the default parameter in the host.

Messages exchanged during transfer

This section describes the different types of message exchanges that occur along with the data transfers. These messages consist of control information, which is typically exchanged during a DTE and host session. These messages do not affect the user/host path, which remains transparent.

DTE/DCE EIA status messages

This message type is used for modem status lead simulation. These messages control data transfers and provide device status indications.

The following RS-232-C signals are supported:

- Carrier Detect (CD) or Data Carrier Detect (DCD)
- Request To Send (RTS)
- Clear To Send (CTS)
- Data Terminal Ready (DTR)
- Data Set Ready (DSR)

FDHP uses the 8-kHz signaling channel to exchange information between the DU and the DLC. Data Unit-to-LTC communication also uses the 8-kHz signaling channel between the DU and the LTC.

Unassigned messages

CPI messages that are not defined or are received out of sequence are ignored.

Limitations

No operational limitations are placed on user/host communication, except for the physical limitations specified by the absolute number of digital trunks/DS1 links enabled by SL-100 datafill.

Limitations imposed by the host are beyond the scope of this publication but follow the same general lines of available ports and processing power. Some processing overhead is anticipated from the T-1 interface.

Interactions

There are no user interactions with CPI. SL-100 maintenance personnel access CPI facilities as standard DS1 digital trunks.

System operation

Overview

Calls can be originated by either a user or the host. Operation of each SL-100 component is specified by its datafill. Likewise, the host requires a related set of datafill to support CPI.

Three types of operations are described:

- SL-100 to host
- host to SL-100
- disconnect

Call sequences

Four distinct phases occur during the processing of each call:

- establish connection
- exchange parameters
- transfer data
- disconnect call

A typical call arriving at the host port causes the host interface to send an initial synchronization message (Version ID) a number of times. Upon receipt of the initial message, the host port prepares to adapt to the parameters provided by the caller. After the parameter messages have been successfully exchanged and a parameter match exists, data exchanges can begin.

If the initial messages are not exchanged within a specified time period, the connection is assumed to be incomplete and the called device assumes the role of the caller and attempts to establish the call. This mechanism permits the connection to occur when the originally called device could not adapt to the parameters from the caller.

The following tables describe the steps that occur during call processing. Table 2-1 describes a call that begins at a DU, where the user places a call to the host. Table 2-2 a call where the host places a call to the user. Tables 2-3

through 2-5 describe the possible disconnect sequences. Table 2-6 describes a call restart sequence.

Table 2-1xxx
Call from SL-100 to host

Action	Response
DU idle, terminal off.	POWER indicator on
Power turned on to DTE.	DTR set to DU by DTE. DTR indicator on.
DN pressed to call host.	Dial tone from speaker. DN indicator on.
User dials host phone number.	SL-100 analyzes digits and seizes an idle T-1 channel.
Network path reserved between DU and idle host T-1 channel.	A/B signals off-hook to host interface. Seized channel marked busy.
Host interface detects off-hook.	Host interface notifies host software by asserting DTR and RI.
Host software sets DTR to interface to answer the call.	Host interface answers call by returning off-hook to SL-100 through A/B signaling.
SL-100 interface detects answer by the host, and establishes a network path. DU and host exchange parameters.	Following successful parameter exchange, host interface alerts host software that data transfers can begin by asserting CTS and DCD.
Data transfer begins.	Transfer control signals in control channel, terminal data in data channel.

Table 2-2xxx
Call from host to SL-100

Action	Response
Host software identifies need to place call.	Host queues phone number.
Host software alerts interface of call origination by setting DTR, and supplies digits to dial.	Interface seizes an idle channel and sends off-hook through channel supervision bits.
SL-100 interface receives off-hook and returns a start dial signal when ready to collect digits.	Host interface dials digits in dial pulse format.
SL-100 interface collects digits.	SL-100 routes call and rings dialed station.

-continued-

Table 2-2xxx
Call from host to SL-100 (continued)

Action	Response
Called DU rings from the speaker. DN indicator is off.	User presses DN button to answer call. CONNECT and DN indicators light.
SL-100 sends off-hook signal to host interface.	
Host interface and DU exchange parameters.	Successful parameter exchange causes host interface to alert host software of impending data transfer by setting CTS and DCD
Data transfer begins.	Transfer control and terminal data in appropriate data channels.
-end-	

Disconnect

The following tables describe the possible disconnect sequences. Table 2-3 describes a DU-initiated disconnect. Table 2-4 describes a host-initiated disconnect. Table 2-5 describes either a terminal going offline or a power failure. Table 2-6 describes a call that is being restarted.

Table 2-3xxx
DU-initiated disconnect

Action	Response
RELEASE button pressed to end call.	DN and CONNECT indicators turn off.
DU sends on-hook message to SL-100.	SL-100 sends on-hook to host interface.
Host interface receives on-hook and drops DTR.	Host interface goes on-hook and drops CTS and DCD.
SL-100 interface goes on-hook.	Channel and user port idle.
SL-100 software releases call and marks DS0 channel free after guard interval.	SL-100 sends call release message to DU.

Table 2-4xxx
Host-initiated disconnect

Action	Response
Host software drops DTR.	Host interface goes on-hook, drops CTS and DCD, and sends on-hook to SL-100.
SL-100 interface receives on-hook and goes on-hook.	SL-100 software releases call and marks DS0 channel free after guard interval.
SL-100 sends call release message to DU.	
-end-	

Table 2-5xxx
Terminal offline or power failure disconnect

Action	Response
Terminal is taken offline or power fails.	DU drops DTR and notifies SL-100.
SL-100 software tells T-1 interface to go on-hook.	T-1 interface sends on-hook to host interface.
Host interface receives on-hook and drops DTR, CTS, and DCD to host software.	Host software drops DTR. DU indicator turns off.
Host interface goes on-hook.	T-1 interface goes on-hook.
SL-100 sends disconnect message to DU.	CONNECT indicator turns off.
-end-	

Table 2-6xxx
Call restart

Action	Response
Normal call experiences parameter change, byte alignment shift, or loss of connection on one or all channels.	Data exchanges halt. CONNECT indicator flashes.
Call start-up sequence repeated when link is re-established.	DU and host wait for link.
Both ends wait for either the link to return or for the call to be manually dropped.	

Feature installation

Hardware

The following hardware components are required for CPI:

- Meridian SL-100 with DCM or DTC hardware or both
- DS1 interface connected to host computer
- host with CPI interface

Software

This section describes a sample CPI datafill.

CPI requires the following software components:

- SL-100 with DCM or DTC package or both
- host with CPI package and T-1 interface

SL-100 requirements

The DS1 interface that is connected to the host computer is dedicated to CPI. The DS1 interface can be located in any vacant slot of any installed DTC. There is no interaction between the CPI T-1 interface and other T-1 interfaces located in the same DTC. For installations that do not require all 24 channels, the remaining channels do not need to be datafilled.

The following table descriptions are in the sequence in which they are datafilled. Refer to *Basic Translations Tool Guide*, 297-1001-360, for datafill procedures and guidelines.

Common Language Location Identifier (CLLI)

Table 3-1 contains unique names used for announcement, tone, or trunk groups. Refer to *Customer Data Schema*, 555-4031-851 for related fields.

Table 3-1xxx
CPI field descriptions in Table CLLI

Prompt	Response	Note
>	table clli	
TABLE CLLI		
>	add	
CLLI:		
>	cpi	The Trunk Group ID is also used in field SGRPKEY of Table TRKSGRP.
TRKGRSIZ		
>	50	
ADMININF:		
>	computer_pbx_i/f	

Translator Name (XLANAME)

Table 3-2 controls the addition or deletion of translators to IBN translation tables. Refer to *Customer Data Schema*, 555-4031-851 for related fields.

Table 3-2xxx
IBN translator control fields in Table XLANAME

Prompt	Response	Note
>	table xlaname	
TABLE: XLANAME		
>	add	
XLANAME:		
>	cpii	This translator name is used in field CUSTXLA in Table CUSTHEAD.

Customer Engineering (CUSTENG)

This table identifies the trunk group name along with IBN characteristics. Refer to *Customer Data Schema*, 555-4031-851 for related fields.

Table 3-3xxx
Trunk group and IBN fields for CPI in Table CUSTENG

Prompt	Response	Note
>	table custeng	
TABLE: CUSTENG		
>	add	
CUSTNAME:		
>	cpitest	This identifier is the same as field CUSTGRP in Table CUSTHEAD.
NONCOS:		
>	5	
NOIBNTMT:		
>	9	
CONSOLES:		
>	n	
CUSTTYPE:		
>	private	

IBN Customer Group Feature (CUSTHEAD)

Table 3-4 lists the values for customer group parameters and options for each customer group. Refer to *Customer Data Schema*, 555-4031-851. The following fields are relevant to CPI.

Table 3-4xxx
Table CUSTHEAD translator control fields for IBN translator tables

Prompt	Response	Note
>	table custhead	
TABLE: CUSTHEAD		
>	add	
CUSTXLA:		
-continued-		

Table 3-4xxx
Table CUSTHEAD translator control fields for IBN translator tables (continued)

Prompt	Response	Note
>	cpii	This entry is the same as field XLANAME in Table XLANAME.
DGCOLNM:		
>	ndgt	
-end-		

Network Class Of Service (NCOS)

Table 3-5 contains the NCOS number assigned to attendant consoles, IBN stations, incoming trunks, and customer groups. Refer to *Customer Data Schema*, 555-4031-851 for related fields.

Table 3-5xxxx
Table NCOS trunk group and IBN characteristics for CPI

Prompt	Response	Note
>	table ncos	
TABLE: NCOS		
>	add	
CUSTGRP:		
>	cpitest	This entry is the same as field XLANAME in Table XLANAME.
NCOS:		
>	0	
NCOSNAME:		
>	cpit	This NCOS name is the same as field CUSTNAME in Table TRKGRP.
LSC:		
>	0	
-continued-		

Table 3-5xxxx
Table NCOS trunk group and IBN characteristics for CPI (continued)

Prompt	Response	Note
NCOSOPTN		
>	$	
	-end-	

Trunk Group (TRKGRP)

Table 3-6 defines the host using Table TRKGRP. With CPI, the host typically adapts to the caller so that a single trunk group can carry calls to the host. Refer to *Customer Data Schema*, 555-4031-851 for related fields. Unlisted entries use the default value. The following fields are related to CPI.

Table 3-6xxx
Defining the host using Table TRPGRP

Prompt	Response	Note
>	table trkgrp	
TABLE: TRKGRP		
>	add	
GRPTYP:		
>	ibnt2	
TRAFSNO:		
>	0	
PADGRP:		
>	npdgp	
NCCLS:		
>	ncrt	
CUSTNAME:		
>	cpitst	This entry is the same as field CUSTNAME in Table CUSTENG and field CUSTGRP in Table NCOS.
	-continued-	

Table 3-6xxx
Defining the host using Table TRPGRP (continued)

Prompt	Response	Note
SUBGRPNO:		
>	0	
SELSEQ:		
>	midl	
NCOS:		This entry is the same as field NCOS in Table NCOS.
>	0	
BILLDN:		
>	n	
SUPV:		
>	ansdisc	
DISCTSEL:		
>	1	
INTRAGRP:		
>	n	
DIGIT0:		
>	n	
DIGIT1:		
>	n	
DTI:		
>	n	
TES:		
>	n	
CDR:		
>	n	
SMDR:		
>	n	
TRC:		

-continued-

Table 3-6xxx
Defining the host using Table TRPGRP (continued)

Prompt	Response	Note
>	0	
ALTNCOS:		
>	0	
TRKDSR:		
>	n	
LSCFN:		
>	0	
ALTLSCFN:		
>	0	
LSCINCPT:		
>	0	
ALSCINCP:		
>	0	
IGA::		
>	n	
FDN:		
>	n	
FDV:		
>	n	
FLASH:		
>	n	
PREEMPT:		
>	n	
-end-		

Trunk Subgroup (TRKSGRP)

Table 3-7 defines the host. It also contains supplementary information for each subgroup assigned to a Trunk Group. Refer to *Customer Data Schema*, 555-4031-851. The following fields are related to CPI.

Table 3-7xxx
Supplementary subgroup information

Prompt	Response	Note
>	table trksgrp	
TABLE: TRKSGRP		
>	add	
SGRPKEY:		
>	cpi	This subgroup key is the same as field CLLI in Table CLLI.
CLLI		
>	cpi	
SGRP		
>	0	
CARDCODE:		
>	ds1sig	
SIGDATA:		
>	std	
DIR:		
>	2w	
IPULSTYP:		
>	dt	
ISTARTSG:		
>	im	
OVLP:		
>	n	
PSPDSEIZ:		
>	30	
PARTDIAL:		
>	30	
OPULSTYP:		

-continued-

Table 3-7xxx
Supplementary subgroup information (continued)

Prompt	Response	Note
>	dt	
OSTARTSG:		
>	im	
IDGTIME:		
>	7	
NUMSTOPS:		
>	0	
GLAREYD:		
>	n	
CCONT:		
>	no	
RNGBCK:		
>	no	
ESUPR:		
>	n	
SAT:		
>	n	
REMBSY:		
>	y	
DIALMODE:		
>	m	
TRKGRDTM:		
>	15	
	-end-	

Trunk Member (TRKMEM)

Table 3-8 defines the location of the host and lists data for each trunk assigned to a Trunk Group, excluding intertoll trunk groups with command

channel interoffice signaling. Refer to *Customer Data Schema*, 555-4031-851. The following fields are related to CPI.

Table 3-8xxx
Line data per trkgrp

Prompt	Response	Note
>	table trkmem	
TABLE: TRKMEM		
>	add	
CLLI:		
>	cpi	
EXTRKNM:		
>	0	
SGRP:		
>	0	
PMTYPE:		
>	dcm	
DTCNO:		
>	001	Three-digit entries are required for the module, card, and time slot number.
DTCCKTNO		
>	002	Three-digit entries are required for the module, card, and time slot number.
DTCCKTTS:		
>	000	Three-digit entries are required for the module, card, and time slot number.

IBN Route (IBNRTE)

Table 3-9 contains the routing tables used by IBN. Refer to *Customer Data Schema*, 555-4031-851. The following fields are related to CPI.

Table 3-9xxx
Table IBNRTE IBN routing tables

Prompt	Response	Note
>	table ibnrte	
TABLE: IBNRTE		
>	add	
POS:		
>	98	
IBNRTSEL:		
>	s	
OHQ:		
>	n	
CBQ:		
>	n	
EXP:		
>	n	
CLLI		
>	cpi	This entry is the same as field CLLI in Table CLLI.
CLLI		
>	$	

IBN Translator (IBNXLA)

Table 3-10 contains the translator name and tables of prefixes used to dial the host through IBN. Refer to *Customer Data Schema*, 555-4031-851 for related fields. The following fields are related to CPI.

Table 3-10xxx
IBN translator name and tables of prefixes

Prompt	Response	Note
>	table ibnxla	
TABLE: IBNXLA		
>	add	
XLANAME:		
>	cpii	
DGLIDX:		
>	8	
TRSEL:		
>	route	
ACR	n	
>		
SMDR		
>	n	
NOACDIGS:		
>	1	
SDT:		
>	n	
MINDIGS:		
>	1	
MAXDIGS		
>	10	
DGCOLNM:		
>	ndgt	
INTRAGRP		
>	n	
TAB_OR_CLLI:		
>	t	

-continued-

Table 3-10xxx
IBN translator name and tables of prefixes (continued)

Prompt	Response	Note
EXTRTEID:		
>	ibnrte 98	
	-end-	

Host requirements

The manufacturer of the host system provides appropriate configuration and installation information.

Maintenance

CPI maintenance consists of evaluating the operation of the DS1 interface(s) and related equipment. Routine DS1 evaluation or test procedures or both are used.

Repair operations are limited to the isolation of the source of data transmission errors and the replacement of faulty components.

Standard DS1 and DU error messages are used with CPI. There are no unique CPI error messages. DS1 and T-1 transmission error (slip and framing) limits are specified by datafill. The datafill also specifies the error limits for notification and removal from service actions. Error quantities are also specified except for bipolar violations (BPV) errors which have a fixed quantity.

Data errors

Data transmission errors can occur at any point in the data path. The path can be reduced to the smallest testable portion and expanded, with restesting occurring at each expansion to isolate the faulty portion of the path.

Testing involves the establishment of a sequence of different loopback connections from the terminal that is experiencing the errors. Loopback tests consist of entering keyboard characters and monitoring the display for the appearance of the proper characters. Initial testing could involve a loopback connection at the host computer interface, testing the entire path, or at the local DU, testing only the terminal and DU.

MAP terminal testing of the DTC components permits rapid failure analysis and problem correction. Individual DS0 channels are accessed like other types of trunks at the TRKS level of the MAP workstation. The DTC and DS1 interfaces are accessed for MAP terminal testing at the CARRIER level of the MAP workstation. LCM components are tested by way of the PM level of the MAP workstation.

Appendix A: Acronyms

AILC

Asynchronous Interface Line Card

AILU

Asynchronous Interface Line Unit

AIM

Asynchronous Interface Module

CD

Carrier Detect

COS

Class Of Service

CPI

Computer-to-PBX Interface

CTS

Clear To Send

DCD

Data Carrier Detect

DCE

Data Communications Equipment

DCM

Digital Carrier Module

DLC

Digital Line Card

DSR

Data Set Ready

DTC

Digital Trunk Controller

DTE

Data Terminal Equipment

DTR

Data Terminal Ready

DU

Data Unit

EIA

Electronic Industry Association Electronic Industry Association

FDHP

Full Duplex Handshake Protocol

IBN

Integrated Business Network

LCM

Line Concentrating Module

LTC

Line Trunk Controller

PCI

Personal Computer Interface

RTS

Request To Send

TCM

Time Compression Multiplexing

Meridian 1 Options 201, 211

Commercial Systems

Computer-to-PBX Interface General Description

Information Systems
Northern Telecom
220 Athens Way
Nashville, Tennessee 37228

Publication number: 555-4001-125
Product release: MSL03
Document release: Standard 01.01
Date: March 1995
Printed in the United States of America