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DMS/Meridian

MCDN Integrated Services Access

Network Services Guide

Document release 1.0 Date: August 1990

northern telecom

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Introduction

This document provides information about the Integrated Services Access (ISA) feature on the Primary Rate Interface (PRI). It is intended for managers and craftspersons concerned with implementing ISA across the network.

This document gives only the information necessary to make ISA work on the Meridian 1 and Digital Multiplex System (DMS) families. The Meridian 1 family includes the Meridian 1/SL-1 and the Meridian 1/SL-100. For brevity, these switches are hereafter referred to as SL-1 and SL-100. Detailed technical information on ISA operation and theory is available in the appropriate Northern Telecom publications (NTPs).

About this document

This document is divided into four sections. Each section gives the information necessary to make ISA work on a specific Northern Telecom product. The four switches discussed are:

- SL-1
- SL-100
- DMS-100
- DMS-250

Managers or craftspersons responsible for a single product can read just the applicable sections. Each section contains the following topics:

- General description
- Hardware provisioning
- Installation rules
- Maintenance rules
- Management concerns
- Technical concerns
- Datafill

- Translations
- Operational measurements
- Logs
- Service orders
- MAP considerations
- Testing

How to use COMPASS with this document

The COMPASS viewer gives you the capability to search this document using keywords. A keyword can be a single word or an acronym. Each page contains a header with the name of the switch discussed in that section. The titles of the figures and tables also contain references to the switch. This allows you to search for every figure, table, or page that contains a reference to the switch.

Using COMPASS, you can search for multiple keywords that appear on the same page. This gives you the ability to make comparisons between requirements or interactions of different switch types using the same MCDN feature.

For example, a manager who wants to know if there are any possible datafill conflicts in Table LTCALLS between the DMS-100 and DMS-250 can enter the following keywords in COMPASS:

- LTCALLS
- DMS-100
- DMS-250

COMPASS will generate a list of the pages which contain *all three* of the search words. Be careful not to define your search with too many keywords, however. You may have to try several different combinations of keywords to produce the desired information.

Important keywords and acronyms for ISA

Use COMPASS and the following list of acronyms to search this document for new or changed information related to ISA.

CALLATTR	Call Attribute table or index
CBC	Call By Call service
CDN	Called Number
CGN	Calling Number
COT	Central Office Trunk (SL-1 only)
DID	Direct Inward Dialing

DOD	Direct Outward Dialing
E.164	North American public dialing plan
FNPACONT	Foreign Numbering Plan Area Control table
FX	Foreign Exchange
FEX	Foreign Exchange (SL-1 only)
HNPACONT	Home Numbering Plan Area Control table
ISA	Integrated Services Access
INWATS	Inward Wide Area Telephone Service
LINEATTR	Line Attribute table or index
LTAP	Logical Terminal Access Privilege
LTCALLS	Logical Terminal Calls table
LTCLASS	Logical Terminal Class table
LTDATA	Logical Terminal Data table
LTDEF	Logical Terminal Definition table
LTGRP	Logical Terminal Group table
LTID	Logical Terminal Identifier
LTKEY	Logical Terminal Key
LTMAP	Logical Terminal Map table
LTNUM	Logical Terminal Number
NPI	Numbering Plan Indicator
NSF	Network Specific Facility
OFRT	Office Route table
PHI	Packet Handler Interface
PI	Progress Indicator
PNI	Private Number Identifier
PUB	Public call type
PVT	Private call type
RTEID	Route Identification Index
RTEREF	Route Reference table
RTESEL	Route Selector
SETUP	Call Setup message

SID	Service Identifier
TEI	Terminal Endpoint Identifier; Terminal Equipment Interface
TIE	Terminal Interexchange line or trunk
TRKGRP	Trunk Group table
TRKMEM	Trunk Member table
TRKSGRP	Trunk Subgroup table
WATS	Wide Area Telecommunications Service
XLAIBN	Integrated Business Network translation
XLAIEC	Interexchange Carrier translation
XLALEC	Local Exchange Carrier translation
XLARTE	Translation Route

General list of acronyms

Following is a list of general and ISDN-related telephony acronyms used in this document:

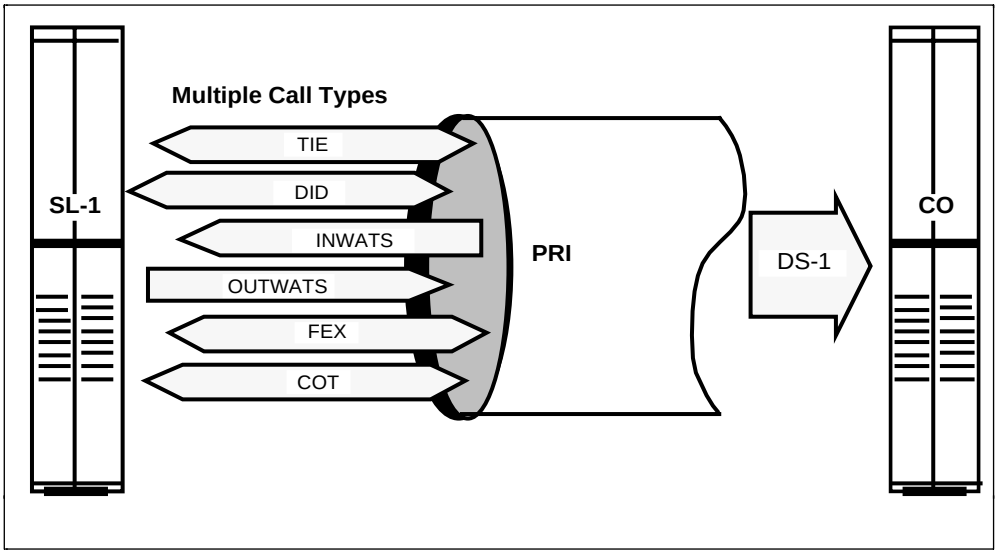
ANI	Automatic Number Identification
B8ZS	Bipolar 8-Zero Substitution
BC	Bearer Capability
BCH	B-Channel
BRI	Basic Rate Interface
CHID	Channel ID
CLLI	Common Language Location Identifier
CO	Central Office
DCH	D-Channel
DMI	Digit Manipulation Index
DMS	Digital Multiplex System
DTCI	ISDN Digital Trunk Controller
ESN	Electronic Switched Network
ETN	Electronic Tandem Network
IAC	ISDN Access Controller
IBN	Integrated Business Network
IEC	Inter Exchange Carrier

IID	Interface Identifier
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LATA	Local Access and Transport Area
LEC	Local Exchange Carrier
LEN	Line Equipment Number
MAP	Maintenance Administration Platform
MBG	Multiple Business Group
NCOS	Network Class of Service
NPA	Numbering Plan Area
PBX	Private Branch Exchange
POTS	Plain Old Telephone Service
PRI	Primary Rate Interface
PVN	Private Virtual Network
Q.931	ISDN protocol for D-channel messages
SAPI	Service Access Point Identifier
SS7	Signaling System 7
SWACT	Switch Activity
TCOS	Traveling Class of Service
TNCOS	Terminal Number Class of Service
TNS	Transit Network Selector
TON	Type of Number
VFG	Virtual Facility Group

Meridian 1/SL-1 perspective

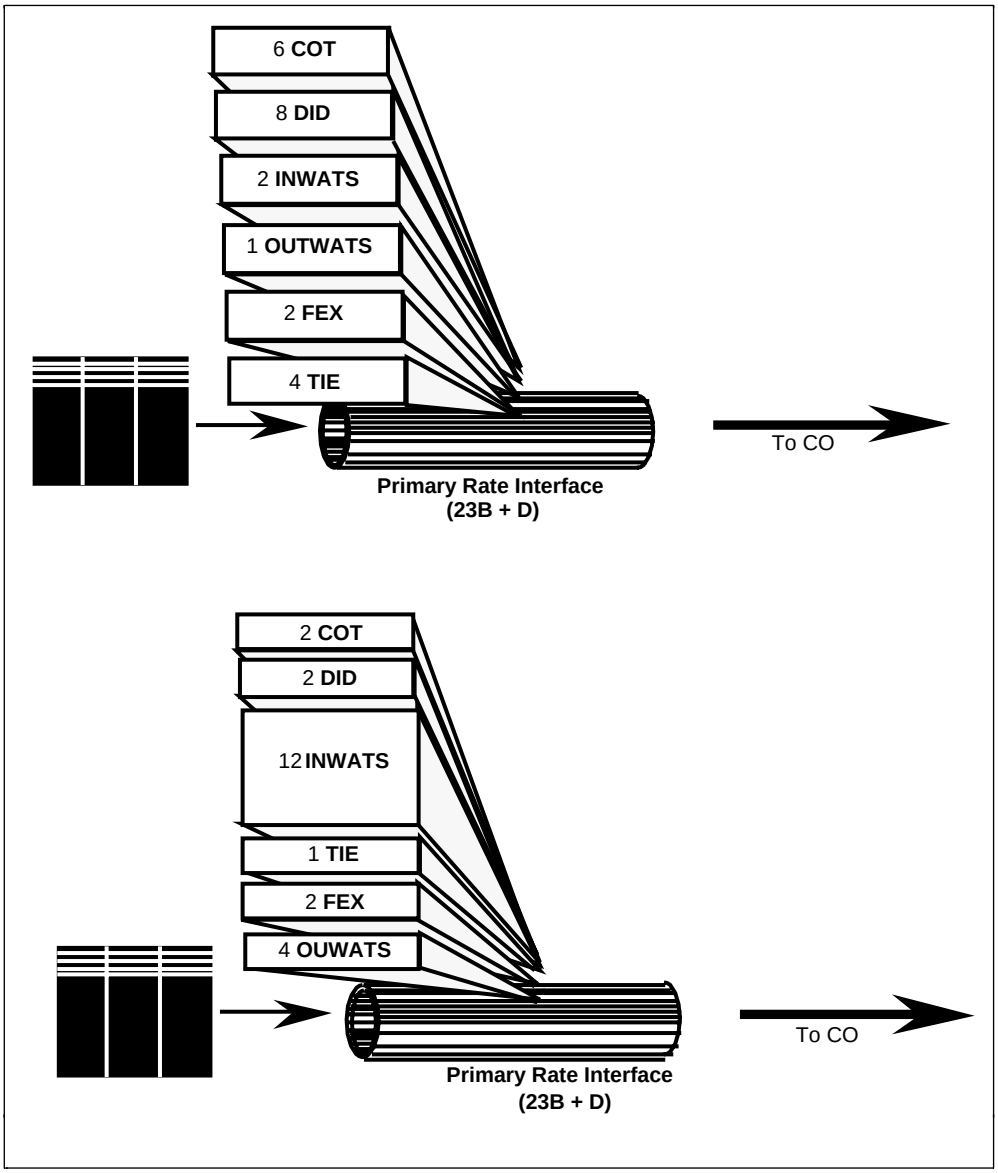
Integrated Services Access (ISA) gives the SL-1 the ability to combine calls of different types on a single DS-1. The available call types include TIE, FEX, DID, INWATS and OUTWATS. This allows dynamic call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

Figure 1
SL-1 Integrated Services Access on PRI



For example, PRI B-channels could be adjusted to allow a telemarketer more DID calls than COT, as shown in the following diagram.

Figure 2
Varying SL-1 B-channel assignments by call type



The SL-1 makes the selection of call type on a per-call basis, which provides a service-based architecture. A SETUP message is sent with each ISA call. This message includes information elements which the SL-1 uses to determine call type. Control of ISA features is accomplished by the SL-1 datafill through existing overlays.

The ISA feature gives an administrator control over trunk usage based on call type. For example, you can define:

- the maximum and minimum number of simultaneous calls of each type allowed on a PRI trunk
- the total number of calls allowed per service route
- the number of B-channels reserved for ISA use

The SL-1 creates ISA routes through service changes in Overlay 16. An ISA route contains a list of PRI B-channels that are available for use.

Routing of ISA calls is controlled by one of two methods:

- *Central Office* control performs Alternate Route Selection (ARS) on all calls across the PRI interface. Routing tables are set up in the CO by service orders. The SL-1 collects dialed digits only. Actual translation and routing is performed by the CO.
- *Shared*, or collocated control, requires routing and translation data to be stored at both the CO and the SL-1. In this case, the SL-1 retains control of the routing for leased trunk facilities residing at the CO.

Connectivity

The SL-1 provides ISA over the Primary Rate Interface between the following products:

- SL-1 to SL-100
- SL-1 to DMS-100
- SL-1 to DMS-250
- SL-1 to AT&T #4ESS (Call By Call Service)

SL-1 to SL-1

ISA between SL-1s is not supported.

SL-1 to SL-100

When an SL-100 is serving as a local exchange carrier (Class 5 central office), the SL-1 provides ISA selection of the following trunks on a per-call basis:

- TIE
- FX
- DID
- DOD
- COT

- OUTWATS
- INWATS

SL-1 to DMS-100 or DMS-250

When connected to a DMS-100 or a DMS-250, the SL-1 provides ISA selection of the following trunks on a per-call basis:

- TIE
- FX
- DID
- DOD
- COT
- OUTWATS
- INWATS

Hardware provisioning

ISA requires that the SL-1 be provisioned for the Primary Rate Interface (PRI). There are no special hardware rules or requirements for ISA on the SL-1.

Installation rules

There are no installation rules for ISA on the SL-1.

Maintenance rules

There are no maintenance rules for ISA on the SL-1.

Software provisioning

The SL-1 requires Release 15 and the following options for ISA:

- SW0000A: Base package (old Option 75, PBXI)
- SW0300A: ISDN Primary Rate Access (old Option 145, ISDN)
- SW0301A: ISDN Primary Rate Access (old Option 146, PRI)
- SW0302A: ISDN Signaling Link (old Option 147, ISL)
- SW0304A: Interexchange Carrier (old Option 149, IEC)
- SW0305A: Integrated Services Access (old Option 117, CBC)

The SL-100 and DMS products require BCS 30 or later for ISA connectivity to the SL-1.

Datafill considerations

Prior to datafilling the SL-1 for ISA, be sure all appropriate PRI-related overlays are complete.

You can define existing PRI routes as ISA routes by a three-step procedure:

1. Define an ISA route using LD16.
2. Configure ISA trunks using LD14.
3. Configure all the service routes (FX, TIE, INWATS, OUTWATS, COT, DID) using LD16.

   Assign an ISA route number to each service route. (Be sure the route does not have any dedicated trunk members. You cannot allocate a B-channel trunk as a service route.)

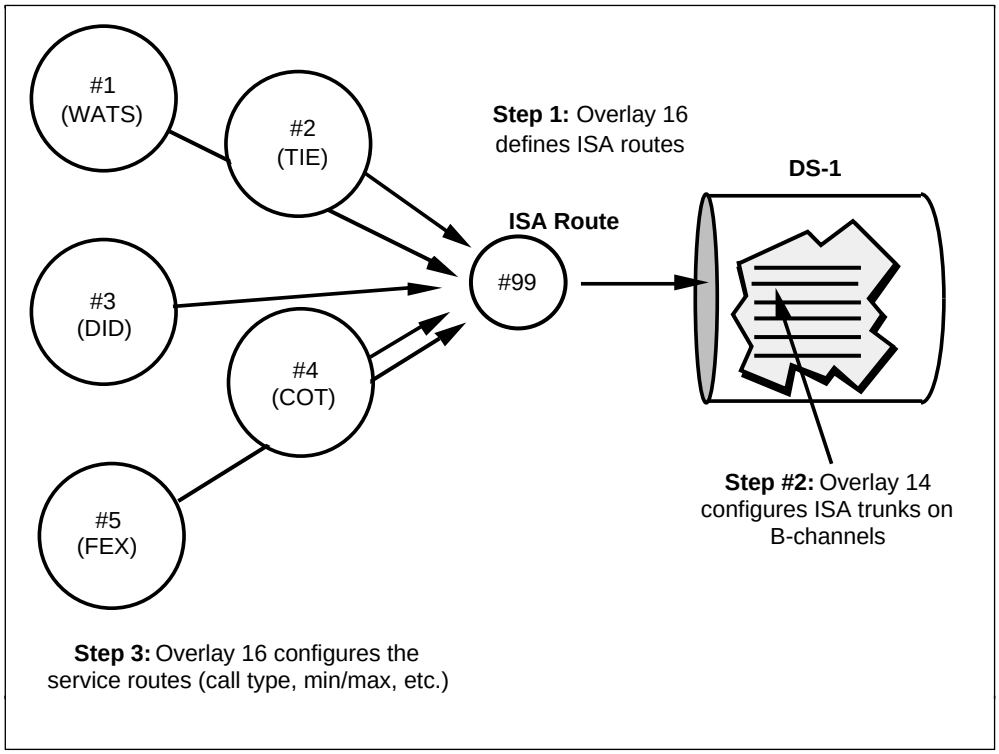
   Record the Service Identification number of each route, and coordinate routing tables with the local CO. The SL-1 uses the Service ID to route incoming calls.

   Define the minimum and maximum number of simultaneous calls allowed for each type of service route. Min/max values apply only when NSF = YES. The total minimum value of each service route cannot exceed the total number of ISA trunks defined in LD14. For example, if you defined 15 ISA trunks in LD14, the minimum number of all call types guaranteed completion cannot exceed 15.

   Note: The IFC of a service route and its ISA route must match.

The following figure gives a graphic example of the procedure:

Figure 3
Creating and defining SL-1 ISA routes



Step 1: Creating ISA routes

The following procedure shows how to create ISA routes using LD16. Default values are shown in brackets.

Table 1
Creating an SL-1 ISA route

Prompt	Range of Values	Description
PNI	1-32700	Private Number Identifier - One per customer. Use the same PNI in both Customer Data Block (LD15) and Route Data Block (LD16).
IFC	[D100] ESS4 SL1 D250	DMS-100 AT&T #4ESS SL-1 (to SL-1) DMS-250 ***Note:*** The IFC of an ISA route and its associated service route must match
srvc		
NCNA	[YES], NO	Network Call Name Allowed
NCRD	<cr>	Network Call Redirection - Enter carriage return.
NSF	[NO], YES	Network Specific Facility - (Prompted if IFC is anything other than SL-1. If NSF is YES, min/max is valid.)
COTR	nnn	DID/CO route number - (Prompted if IFC is anything other than SL-1. If NSF is YES, min/max is valid.)
TIER	nnn	TIE Route Number - (Prompted if IFC is anything other than SL-1. If NSF is YES, min/max is valid.)
WATR	nnn	WATS Route Number - (Prompted if IFC is anything other than SL-1. If NSF is YES, min/max is valid.)

Table 1
Creating an ISA route (continued)

auto		
ICOG	IAO ICT OGT	Incoming and Outgoing trunk Incoming trunk Outgoing trunk
SRCH	[LIN], RRB	LIN - Linear search; RRB - Round-robin search (use for outgoing trunks)

Step 2: Configuring SL-1 ISA trunks

The following procedure shows how to configure ISA trunks using Overlay 14. Default values are shown in brackets.

Table 2
Configuring an SL-1 ISA trunk

Prompt	Range of Values	Description
REQ	NEW, CHG, MOV, OUT	
TYPE	ISA	ISA trunk type
TN	lll ch: 0-159 1-24	Terminal Number - address loop number created in LD17. PRI Loop Number PRI Channel
TOTN	lll ch: 0-159 1-24	New loop and channel PRI Loop Number PRI Channel
CUST	xx	Customer Number
RTMB	0-511, 1-254	Route and Member numbers

Step 3: Configuring SL-1 service routes

The following procedure shows how to configure service routes using Overlay 16. Default values are shown in brackets.

Table 3
Configuring an SL-1 ISA service route

Prompt	Range of Values	Description
REQ	NEW, CHG, OUT	
TYPE	RDB	Route Data Block
CUST	0-99	Customer Number
ROUT	0-511	Route Number
TKTP	 TIE DID INWATS OUTWATS COT FX	Types of ISDN service routes: TIE trunk Direct Inward Dialing Inbound WATS Outbound WATS Central Office Trunk Foreign Exchange
SAT	[NO], YES	trunk route via satellite
RCLS	[EXT], INT	Class marked route as External or Internal
DTRK	YES, [NO]	Digital trunk?
ISDN	[NO], YES	ISDN option
PNI	1-32700	Private Number Identifier - unique to each customer. Use the same PNI in Customer Data Block (LD15) and the Route Data Block (LD 16).

Table 3
Configuring an SL-1 ISA service route (continued)

IFC	[D100] ESS4 SL1 D250	DMS-100 AT&T #4ESS SL-1 (to SL-1) DMS-250 ***Note:*** The IFC of an ISA route and its associated service route must match
SRVC	[ACC], SDN, M800, MEG	Service type for #4ESS (only prompted for #4ESS)
ISAR	YES	Stepping to ISA allowed. ISAR can only be YES when there are no trunk assignments in LD 14.
	[NO]	Stepping to ISA not allowed
RTN	0-127	Select Route Number of any configured ISA route. Prompted only when ISAR is yes.
SID	0-127, [ROUT]	Service Identifier for route. Prompted if NSF is YES and IFC is other than SL-1. *The SID must match the number at the receiving end.*
MIN	0-254	Minimum number of channels reserved on the ISA route (service-dependent). Prompted if ISAR is YES and IFC is other than SL-1.
MAX	1-254	Maximum number of channels reserved on the ISA route (service-dependent). Prompted if ISAR is YES and IFC is other than SL-1.

Table 3
Configuring an SL-1 ISA service route (continued)

NCOS	0-99	
CLS	[UNR], SRE, TLD, FRE, CUN, CTN, FR1, FR2	Class of Service restrictions for TIE routes. Prompted if ISAR is YES.
TGAR	0-31	Trunk Group Access Restriction (TIE only)
STEP	??	You cannot define a STEP route to another service route.

Further prompts follow the standard sequence for configuring service routes.

Operational measurement considerations

Traffic measurements associated with ISA routes include additional information on ISA trunks used by the route.

Traffic measurements for a trunk route contain information displayed in the following format:

<System ID> TFC002

<Customer Number>

<Group Number> COT

<Trunks Equipped> <Trunks Working>

<Incoming usage> <Incoming PC>

<Outgoing Usage> <Outgoing PC>

<Outgoing Overflow> <All Trunks Busy>

<Outgoing ISA Peg Count> <Incoming ISA Peg Count>

<Group Number> ISA

<Incoming Usage> <Incoming PC>

<Outgoing Usage> <Outgoing PC

<Outgoing Overflow> <All Trunks Busy>

<Toll PC>

<Outgoing ISA Peg Count> <Incoming ISA Peg Count>

Traffic measurements for an ISA route contain information displayed in the following format:

<System ID> TFC002

<Customer Number>

<Group Number> ISA

<Trunks Equipped> <Trunks Working>

<Incoming Usage> <Incoming PC>

<Outgoing Usage> <Outgoing PC>

<Outgoing Overflow> <All Trunks Busy>

<Toll PC>

<Outgoing ISA Peg Count> <Incoming ISA Peg Count>

Log considerations

There are no log considerations for ISA on the SL-1. For traffic analysis and maintenance purposes, refer to the history file available in LD22.

Service order considerations

There are no service order considerations for ISA on the SL-1.

Testing considerations

Test each PRI trunk to ensure that the SL-1 completes an ISA call. Run the following test for each of the available call types, TIE, FX, CO, INWATS, OUTWATS, and DID.

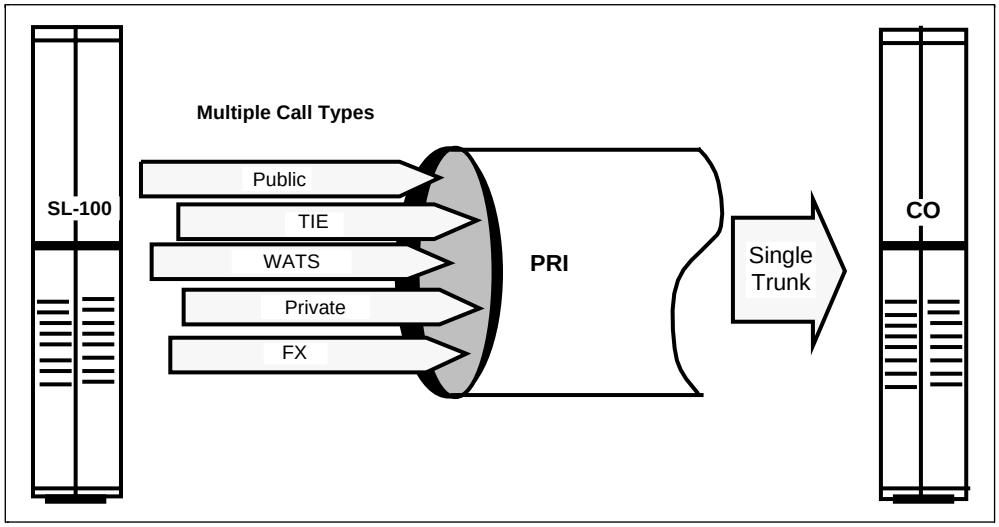
1. Select a PRI to be tested.
2. Access LD60. Stat all pertinent B-channels.
3. Set all the Min/Max values in all service routes to 1.
4. Make a test call on a trunk route that will access the PRI being tested. Be sure the test call is to a valid destination.
5. Use LD80 to ensure a B-channel from the ISA pool is in use. Then:
   - Place the call on hold.
   - Make another call. You should receive an overflow signal (fast busy).
   - Repeat this procedure for every outgoing service route.
6. Disconnect both calls.
7. Ask the terminating end to place an incoming call for each incoming call type. Then:
   - Place the call on hold.

     Ask the terminating end to place another call. They should receive a overflow signal (fast busy).
8. Disconnect both calls.

Meridian 1/SL-100 perspective

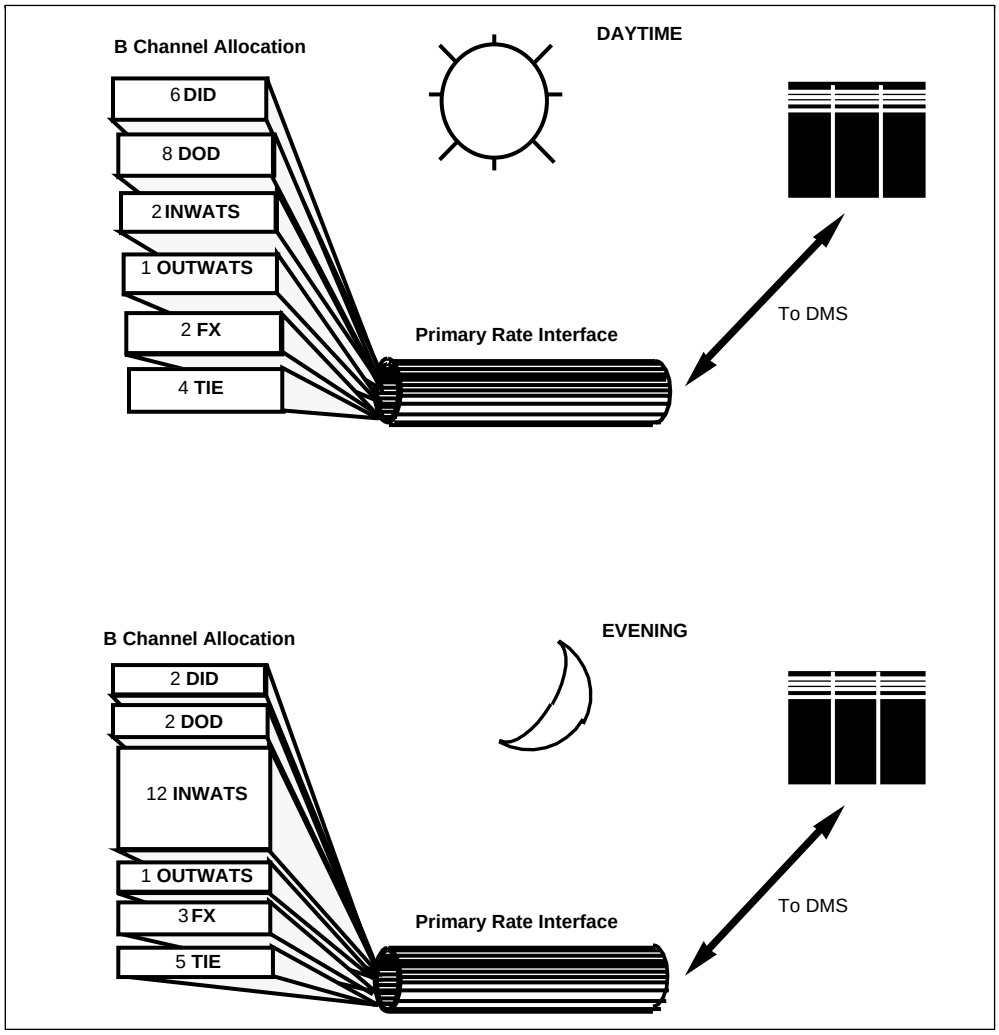
Integrated Services Access (ISA) gives the Meridian 1/SL-100 the ability to combine calls of different types on a single trunk group. The available call types include PUBLIC, PRIVATE, OUTWATS, INWATS, FX, or TIE. This allows call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

Figure 4
SL-100 Integrated Services Access on PRI



For example, PRI B-channels could be adjusted to allow a telemarketer more INWATS calls when needed, as shown in the following diagram.

Figure 5
Varying SL-100 B-channel allocation by call type



Selection of call type is made on a per-call basis, which provides a service-based architecture. A SETUP message is sent with each ISA call. This message includes information elements which the SL-100 uses to determine call type. Control of ISA features is accomplished by adding or modifying the SL-100 datafill through existing tables.

Connectivity

The SL-100 provides ISA over the Primary Rate Interface between the following products:

- SL-100 to SL-1
- SL-100 to SL-100
- SL-100 to DMS-100

Hardware provisioning

The SL-100 must be provisioned for ISDN PRI capability, including the ISDN Digital Trunk Controller (DTCI) for BCS 30 and later.

Software provisioning

ISA requires feature package NTX 793AA and Batch Change Supplement (BCS) 30 or later. The components of NTX 793AA are:

- LTCALLS Table Control
- ISA Routing Table Control

ISA also uses the following related features:

- Trunk Group Tables for PRI
- Call Processing Environment for ISDN PRI
- Signaling Manager For ISDN Functional Signaling
- Connection Manager for ISDN PRI
- PRI 250 to TCAP Interworking
- BELLCORE AMA-ENHANCED ARS Translations

Installation rules

There are no special installation rules for ISA at the network level.

Maintenance rules

There are no special maintenance rules for ISA at the network level.

Datafill considerations

Since ISA is a software feature, correct and accurate datafill is imperative. Although an incoming call defaults to PUBLIC if there is missing ISA data, outgoing calls are blocked unless properly datafilled.

Preliminary datafill

Be sure all PRI-related tables are correctly datafilled before adding ISA-specific data. For SL-100s equipped with the ISDN Digital Trunk Controller (DTCI), the PRI tables include:

- CARRMTC
- LTCINV
- LTCPSINV
- LTGRP
- LTDEF
- LTMAP
- LTCALLS
- TRKGRP
- TRKSGRP
- TRKMEM

ISA datafill

ISA uses the following tables to define, translate, and route calls:

- LTCALLS (Logical Terminal Calls)
- IBNRTE (Integrated Business Network Routing Table)
- OFRT (Office Route Table)
- RTEREF (Route Reference Table)
- VIRTGRPS (Virtual Facility Group Tables)

Call type significance

The dialed digits determine trunk selection for non-PRI calls. The SL-100 routes ISA calls based on the call type datafilled in tables. However, there is no global significance to the call type at any given point. Different legs of the same call may have different call types.

SETUP message

A SETUP message is included with each call. The information elements are:

- Bearer Capability
- Channel ID
- Network Specific Facilities
- Progress Indicator
- Calling Party Number
- Called Party Number

Numbering Plan Indicator

The SL-100 uses the Numbering Plan Indicator (NPI) for translations. The NPI is part of the CDN element of the SETUP message. There are two values for the NPI: PUBLIC and PRIVATE.

NPI=PUBLIC

When the NPI value is E.164 (PUBLIC), the SL-100 uses the PSTN facilities to route the call.

NPI=PRIVATE

When the NPI value is PRIVATE, the SL-100 uses the datafill in existing tables for translations. This datafill includes the use of ESN Information Signal digits. The datafill determines whether PVT or TIE lines will be used to route the call.

Network Specific Facilities

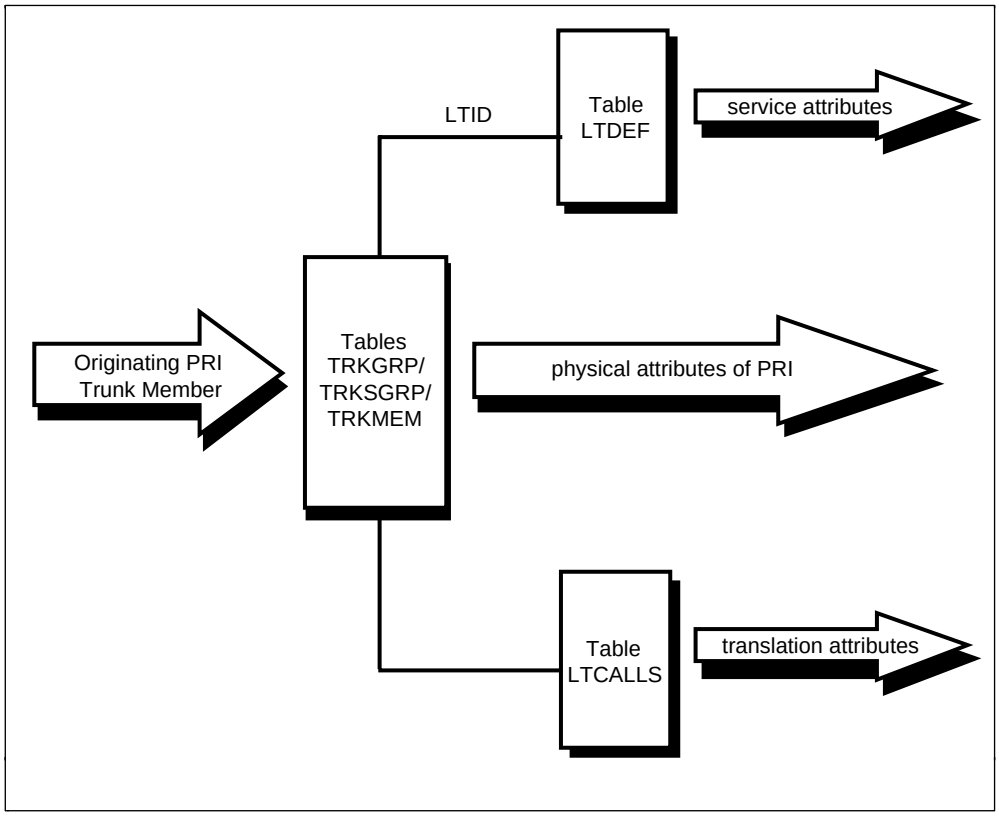
The Network Specific Facilities (NSF) element indicates which type of service a call requires. The NSF contains two elements:

- The Service Selector (Binary Code Facility Coding Value) specifies the type of service requested, such as TIE, WATS, FX.
- The Service Identifier is an optional element which specifies the actual facility used to route the call.

Originating ISA table flow

The following diagram shows the SL-100 tables used when a PRI trunk member originates an ISA call.

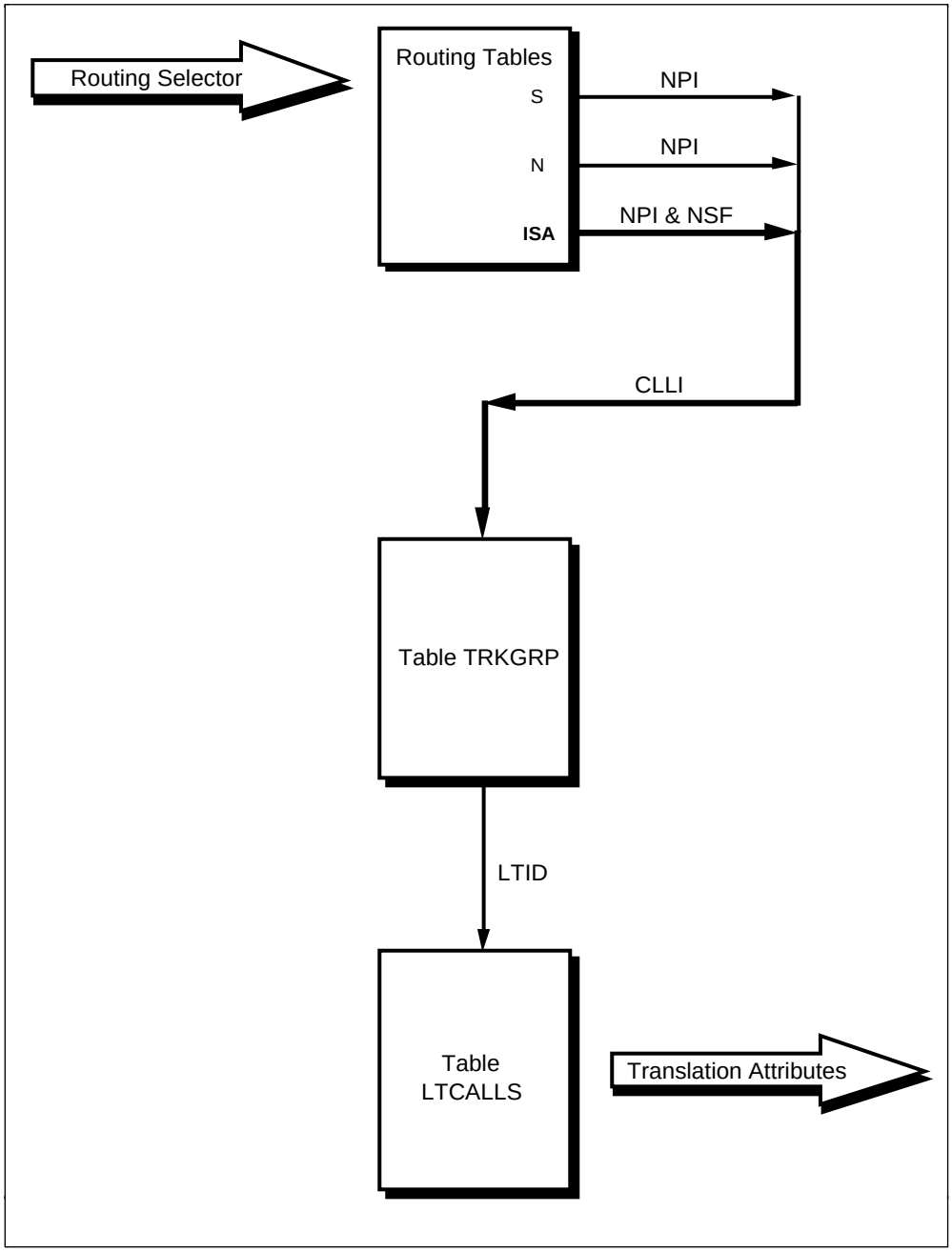
Figure 6
Originating ISA table flow (SL-100)



Terminating ISA table flow

The following figure shows the SL-100 tables used when a PRI trunk member terminates an ISA call.

Figure 7
Terminating ISA table flow (SL-100)



Logical terminal tables

The logical terminal tables provide the SL-100 with identification, service, and translation information about the terminals connected to a Primary Rate Interface (PRI).

The Logical Terminal tables should be datafilled in the following order:

- LTGRP
- LTDEF
- LTDATA
- LTCALLS
- KSETINV
- KSETLINE
- KSETFEAT
- LTMAP

Note: Although Tables KSETINV, KSETLINE, and KSETFEAT are not Logical Terminal tables, they should be datafilled before Table LTMAP.

The following figure shows the tables that define the physical attributes of an ISA member, where the service attributes are obtained, and finally, where the translation attributes are obtained. An explanation of the datafill for each table follows the figure.

Figure 8
SL-100 logical terminal tables

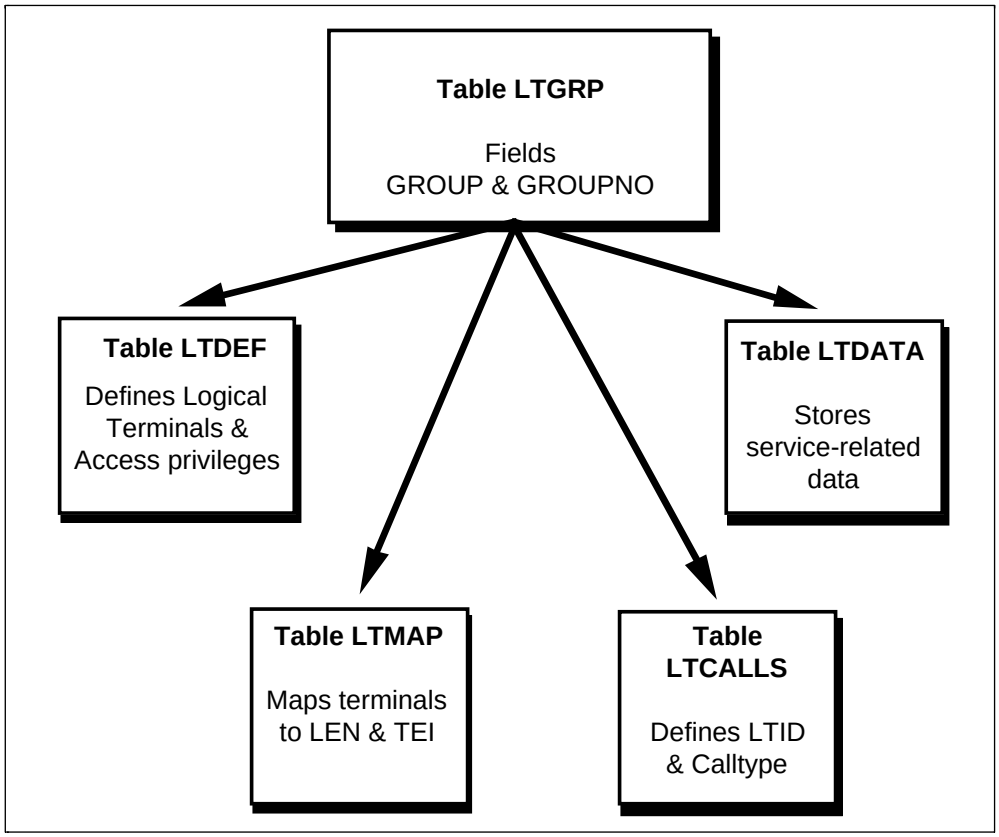


Table LTGRP

Table LTGRP defines a logical terminal group based on terminal type. The options field defines the terminal type for each group. The group “ISDN” is automatically filled as a permanent entry and cannot be changed or deleted.

Table LTGRP must be datafilled before Tables LTDEF, LTDATA, LTCALLS, and LTMAP.

The following table shows the fields and values for Table LTGRP.

Table 5
SL-100 Table LTGRP parameters

Field Name	Range of Values	Default value	Description
GROUP	8 characters: A-Z, 0-9	ISDN	Name of a group of logical terminals
GROUPNO	0-31	Default group ISDN is automatically assigned GROUPNO 0.	Number assigned to a group name
OPTIONS	SAPI16, $	$ (Note: The default group ISDN is automatically assigned as SAPI16)	The type of terminals allowed in a group. The only current option is SAPI16, to allow packet and circuit switched terminals.

The GROUP field is an important element in four other Logical Terminal tables: LTDEF, LTMAP, LTDATA, and LTCALLS. These four tables control how the SL-100 processes ISA calls. The datafill for these tables must match the value for GROUP in Table TRKGRP. The DMS-250 does not automatically enter or update the fields in these related tables.

Example of datafill

The following tuple is an example of the datafill for Table LTGRP:

```
group  groupno  options
ISDN     0     SAPI16
```

Table LTDEF

Table LTDEF defines logical terminals and specifies access privileges. The following table shows the fields and values for Table LTDEF.

Table 6
SL-100 Table LTDEF parameters

Field Name	Range of Values	Description
LTKEY	alphanumeric	Consists of subfields LTGRP and LTNUM
(subfield) LTGRP	alphanumeric, 8 characters	The name of the logical terminal group. Must match GROUP field in Table LTGRP.
(subfield) LTNUM	1-1022	Assigns a number to individual terminals within groups.
LTAP	B, D, BD, PB	Assigns the access privilege for each terminal: B = circuit switched; D = D-channel packet switched; BD = combined switching; PB = B-channel packet switching
LTCLASS	BRAKS, BRAFS, PRI	Assigns the set of services allowed for a terminal. ISA requires PRI.

When the value of LTCLASS is specified as PRI, the subfields shown in the following table appear.

Table 7
SL-100 LTCLASS subfields

Subfield Name	Range of Values	Description
NUMBCHNL	1-383	The number of B-channels this terminal can use at one time. The sum of this value for all LTIDs must not exceed the number of B-channels specified for the interface.
NUMCALLS	1-383	Number of calls allowed on the interface. Must be greater than or equal to the sum of INCCALLS and OUTCALLS.
INCCALLS	0-383	The number of reserved incoming-only calls allowed at one time.
OUTCALLS	0-383	The number of reserved outgoing-only calls allowed at one time.
OPTION	NOVOICE, NOVBD, NOCMD, NOPMD	NOVOICE = no voice calls ; NOVBD = no voice band data calls ; NOCMD = no circuit mode data calls; NOPMD = no packet mode data calls
CONTMARK	+, $	Continuation mark. Enter a plus mark (+) when the data continues to next line. Enter $ to signify end of string.

Example of datafill

The following tuple is an example of the datafill for Table LTDEF:

```
ltgrp  ltnum  ltap   ltclass
                              num     num    inc    out      options
                               bchnl   calls  calls  calls
ISDN     7      B      PRI    6      6     3      2      NOPMD   $
```

Table LTDATA

Table LTDATA stores service-related data for logical terminals. The terminals are defined by the LTGRP and LTNUM. The values entered in these fields of Table LTDATA must match those in Tables LTDEF, LTGRP, LTCALLS, and LTMAP.

The following table shows the fields and values for Table LTDATA.

Table 8
SL-100 Table LTDATA parameters

Field Name	Range of Values	Description
LTDKEY	alphanumeric	Logical Terminal Datakey. Consists of subfields LTGRP, LTNUM, and DATATYPE.
(subfield) LTGRP	alphanumeric, 8 characters.	Logical Terminal Group name
(subfield) LTNUM	1-1022	Logical Terminal Number of the individual member of the group.
(subfield) DATATYPE	DN	Logical Terminal Datatype. The only valid entry is DN.
LTDRESULT	alphanumeric	Logical Terminal Result. Consists of the DATATYPE and DFLTCGN subfields.
(subfield) DATATYPE	DN	Logical Terminal Datatype. The only valid entry is DN.
(subfield) DFLTCGN	10-digit DN	Default Calling Party Number. Enter the 10-digit DN to which call will default if no CGN is supplied on originations. When CGN screening is enabled, this is the only DN that can originate calls on this interface.
OPTIONS	alphanumeric	Consists of the subfields OPTIONS and CUSTGRP
(subfield) OPTIONS	CUSTGRP	Options. Enter the option, CUSTGRP.
(subfield) CUSTGRP	alphanumeric	Customer Group name

Example of datafill

The following tuple shows an example of the datafill for Table LTDATA:

```
        LTDKEY                LTDRESULT              OPTIONS
ltgrp  ltnum  datatype  datatype  dfltcgn      options custgrp
ISDN     7        DN        DN     7035693781  CUSTGRP NAVCC
```

Table LTCALLS

Table LTCALLS creates the Logical Terminal Identifier (LTID) from the LTGRP and LTNUM values. This table also assigns a call type to each terminal, and controls ISA translations.

Tables LINEATTR, STDPRTCT, HNPACONT, ZONEORDR, OFRT, IBNRTE, LTGRP, LTDEF, and LTDATA must be datafilled before LTCALLS.

The following table shows the fields and values for Table LTCALLS.

Table 9
SL-100 Table LTCALLS parameters

Field Name	Range of Values	Description
LTID	alphanumeric	Logical Terminal Identifier. Consists of the subfields LTGRP, LTNUM, and CALLTYPE.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name. Must match the values in Tables LTGRP, LTDEF, LTDATA, and LTMAP.
(subfield) LTNUM	1-1022	The Logical Terminal number of the member within the group. Must match the values in Tables, LTGRP, LTDEF, LTDATA, and LTMAP.
(subfield) CALLTYPE	PUB, PVT, WATS, INWATS, FX, TIE	Defines the call type assigned to a terminal. PUB = Public; PVT = Private; WATS = Outbound WATS; INWATS = Inbound WATS; FX = Foreign Exchange; TIE = Private lines between PBXs.
XLARTE	XLALEC, XLAIBN, XLAIEC, RTEREF	Selects the Translation Route. XLALEC = Local Exchange Carrier; XLAIBN = Integrated Business Network; XLAIEC = Inter Exchange Carrier; RTEREF specifies translations by a routing table, such as OFRT, IBNRTE, etc.

If the XLARTE selector is XLALEC, the following subfield appears:

LINEATTR	0-1023	Selects the index used to access Table LINEATTR for service-related data.

If the XLARTE selector is XLAIBN, the following subfields appear:

LINEATTR	0-1023	Selects the index used to access Table LINEATTR for service-related data.
CUSTGRP	alphanumeric	Customer Group Name
SUBGRP	0-7	Subgroup Number used to further define CUSTGRP.
NCOS	0-255	Network Class of Service. Determines the facilities to which each terminal will have access.

If the XLARTE selector is RTEREF, the following subfields appear:

RTEID	1-1023	Route Index. The index number used to select a route within the table.specified in XLARTE.
OPTIONS	$	Options. Enter $ to end entry. No options currently available.

Examples of datafill

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is XLALEC:

```
         LTID
ltgrp  ltnum  calltype   xlarte   lineattr
ISDN     7       PVT      XLALEC      37
```

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is XLAIBN:

```
         LTID
ltgrp  ltnum  calltype   xlarte   lineattr custgrp subgrp ncos
ISDN     7       PVT      XLAIBN      37      NAVCC     4     4
```

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is RTEREF:

```
         LTID
ltgrp  ltnum  calltype   xlarte   rteid  options
ISDN     7       PVT      RTEREF    12       $
```

Table LTMAP

Table LTMAP maps the logical terminals defined in the previous tables to a Line Equipment Number (LEN) and a Terminal Equipment Interface (TEI). This table also uses the LTKEY used in the previous logical terminal tables, and must be datafilled with the same values found in LTGRP and LTNUM for a given tuple.

Table LTMAP must be datafilled after Tables LTGRP, LTDEF, LTDATA, and LTCALLS.

The following table shows the fields and values for Table LTMAP.

Table 10
SL-100 Table LTMAP parameters

Field Name	Range of Values	Description
LTKEY	alphanumeric	Logical Terminal Key. Consists of the subfields LTGRP and LTNUM.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name.
(subfield) LTNUM	1-1022	The Logical Terminal Number of the member within the group.
MAPPING	LEN, CLLI	Logical Terminal Mapping. For PRI, the mapping must be to CLLI.
CLLI	alphanumeric, 16 characters	The Common Language Location Identifier of the PRI trunk to which the terminal is assigned.
LEN	alphanumeric	Consists of the subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.
(subfield) SITE	alphanumeric or blank	If the line is a remote, enter the site name. Leave blank for all others lines. and the field will default to HOST.
(subfield) FRAME	0-99	Line Module Frame Number. The line module or Line Concentrator frame module to which a line is assigned.
(subfield) UNIT	0-9	Line Module Unit Number. The Line module or Line Concentrator Module unit number.

Table 10
SL-100 Table LTMAP parameters (continued)

(subfield) DRAWER	0-23	Line Drawer or Line Subgroup. The number of the line drawer of the LM unit, or the line subgroup of the LCM unit.
(subfield) CIRCUIT	0-31	Line Card Circuit Number. The line card circuit number on the line drawer or line subgroup shelf to which the line is assigned.
OPTION	TEI, PHI, BCH, DCHCHNL, LTBYTE	Only TEI is valid for PRI.

If the OPTION selector is TEI, the following subfield appears.

TEI	0-63	Terminal Endpoint Identifier number.

Example of datafill

The following tuple is an example of the datafill for Table LTMAP:

```
ltgrp  ltnum  mapping         options
ISDN    7    CLLI DAL349VA  TEI 0 $
```

Routing ISA calls

The SL-100 obtains ISA routing information from Tables IBNRTE, OFRT, and RTEREF. These tables are indexed by ISA routing selectors contained in the Logical Terminal Tables. The ISA routing selector uses the Common Language Location Identifier (CLLI) to route calls to a specific trunk group

Table IBNRTE provides routing information for Integrated Business Network calls. Table OFRT provides routing for Integrated Business Network calls, as well as POTS calls. Table RTEREF is a subtable of Tables HNPACONT, FNPACONT, and FNPASTS.

The fields and values of all three tables are the same, with the exception of the first field. For Table IBNRTE, the name of the first field is IBNRTESEL. For Tables OFRT and RTEREF, the name of the first field is RTESEL. The function and values of these fields are the same for all three tables.

Tables IBNRTE, OFRT, and RTEREF

The following chart shows the fields and values for Tables IBNRTE, OFRT, and RTEREF.

Table 11
SL-100 Tables IBNRTE, OFRT, and RTEREF parameters

Field Name	Range of Values	Description
RTESEL,(IBNRTE: Table IBNRTE only)	ISA, N, S	Route Selector
OHQ	NO, YES	Selects off-hook queuing
CBQ	NO, YES	Selects call-back queuing
EXP	NO, YES	Designates this route as Expensive
CLLI	alphanumeric, 8 characters	Designates the PRI trunk group that routing terminates on. ***Note***: Only CLLIs defined as PRI (in Table CLLI) are valid entries in this field.
CALLTYPE	TIE, INWATS, WATS, FX, PVT, PUB	ISA call type
(subfield) FX, TIE		
FACNUM	0-1023	The facility number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) WATS		
ZONE	0-9, A, B, C, AUTO	OUTWATS Zone Number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) INWATS		
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PVT		
NPI	E164, PVT	Selects type of numbering plan

Table 11
SL-100 Tables IBNRTE, OFRT, and RTEREF parameters (continued)

DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PUB		
OATYPE	NONE, 0P, 0M	Type of Operator Access required
TNS	0-999, N, C	Transit Network Number to be requested in SETUP message. If none is required, specify N. If TNS should be determined from call's originator, specify C.
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission

Example of datafill

The following tuple shows an example of the datafill for Tables IBNRTE, OFRT, and RTEREF.

```
rtesel   ohq  cbq  exp   clli      calltype
                                          (facnum dmi)
ISA      N    N    N     DAL349VA    TIE       402    8
```

Special datafill for ISA INWATS routing to an SL-1

The following special datafill must be used when specifying routing for an INWATS call to a station on an SL-1. This datafill is in effect until BCS 33.

- Route INWATS trunk incoming calls from Table DN to an IBNRTE that uses the “IW” selector and a datafilled Virtual Facility Group (VFG) previously assigned in Table VIRTGRPS.
- Datafill Table DIGMAN to remove the incoming digits and include a new DN (see TRAVER example).
- If a customer group was used, use POTS digit collection in Table IBNXLA and route the call to an “INW” LINEATTR as shown in the sample TRAVER.
- Use Table DN to route the new DN to a previously assigned IBNRTE that has the ISA selector for the desired PRI trunk group and specifies call type TIE.
- Return to Table DIGMAN. Remove the previous new DN and substitute the actual four digit extension of the SL-1 station.

  Note 1: The incoming DMS INWATS call is sent to the SL-1 as a TIE call. The INWATS AMA record is generated correctly by the DMS.

  Note 2: The IBNRTE TIE “FACNUM” must match the Service Identifier (SID) parameter in the SL-1 TIE service route.

  Note 3: The SL-1 does not need an INWATS service route. Four digits are always sent to the PBX.

  Note 4: This workaround cannot be used if the customer needs both TIE and INWATS services.

SL-100 to SL-1 INWATS TRAVER examples

The following TRAVERs show the datafill used to route ISA INWATS calls to stations on an SL-1.

```
traver tr tcvr2w 6344300 b

TABLE TRKGRP
TCVR2W T2 61 TLD NCRT MI LIDL 0 Y N INC0 NSCR 702 NLCL Y
7 7
TABLE STDPRTCT
INC0 (1) (0)
    * SUBTABLE STDPRT
    * 63 6490000 N NP 0 NA
    * SUBTABLE AMAPRT
    * KEY NOT FOUND
    * DEFAULT VALUE IS: NONE N
TABLE HNPACONT
702 445 0 (53) (1) (0)
```

```
    * SUBTABLE HNPACODE
    * 634 634 DN 702 634
TABLE THOUGRP
702 634 4 Y C
TABLE DN
702 634 4300 T IBNRTE 182
TABLE DNATTRS
TUPLE NOT FOUND
TABLE IBNRTE
182 IW 10 732 IWPRI 169
    * TABLE DIGMAN
    * 169 (CL BEG) (REM7) (INC 7328021)
    * EXIT TABLE DIGMAN
EXIT TABLE IBNRTE


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES
1 VFG: IWPRI              7328021

1 OVFLTONE

+++ TRAVER: SUCCESSFUL CALL TRACE +++

traver v iwpri 7328021 b

TABLE VIRTGRPS
IWPRI SIZE 2 IBN 7026344300 IBTS 0 0 2 Y N N $
TABLE NCOS
IBTS 2 0 10 INWATS (XLAS IBX2 NXLA NDGT) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
VACTRMT, DIGCOL
IBTS NXLA IBX1 NXLA 1 NDGT
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE IBNXLA: XLANAME IBX2
IBX2 7328021 NET N N 0 N POTS N Y DOD N 10 NONE
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
10 INW WAT0 NT NSCR 0 702 NPRT NLCA NONE N 16 NIL NILSFC
NILLATA 0 NIL NIL 00
TABLE HNPACONT
702 445 0 (53) (1) (0)
```

```
    * SUBTABLE HNPACODE
    * 7328 7329 DN 702 732
TABLE THOUGRP
702 732 8 Y C
TABLE DN
702 732 8021 T IBNRTE 167
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNRTE
167 ISA N N N PRITEST TIE 3 E164 172
    * TABLE TRKGRP
    * PRITEST PRA 10 NPDGRP NCRT ASEQ N (ISDN 1) $
    * TABLE LTCALLS
    * ISDN 1 TIE XLAIBN 0 IBTS 0 1 $
    * TABLE DIGMAN
    * 172 (CL BEG) (REM 7) (INC 7919)
    * EXIT TABLE DIGMAN
EXIT TABLE IBNRTE


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES


1 PRITEST           E164 7919 TIE 3 BC SPEECH

TREATMENT ROUTES. TREATMENT IS: GNCT
1 OVFLTONE


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Operational measurement considerations

There are no operational measurement considerations for ISA on PRI.

Log considerations

There are no log considerations for ISA on PRI.

Service order considerations

There are no service order considerations for ISA on PRI.

Testing considerations

Testing of ISA calls requires functioning PRI hardware with a ISDN Digital Trunk Controller (DTCI).

A valid PRI trunk must be used to test an ISA originating and terminating call for each of the six call types (PUB, PVT, WATS, INWATS, FX, and TIE). The Translations Verification (TRAVER) can be performed first to check datafill. However, a successful TRAVER does not necessarily indicate that a call completed. Use TRAVER as part of complete testing plan, not a guarantee. Each call must be verified by actual completion.

Call type verification

This section gives information on using the table routing selectors to establish a test route for each originating and terminating call type. Remember that the test call must use a valid PRI trunk. Check the datafill in all PRI-related tables, as well as those specific to ISA.

Public call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE is set to PUB and verify that a call completes using this route.

Public call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

Private call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.

Private call type verification (terminating PRI)

- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.
- Set the NPI to E164. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.

OUTWATS call type verification (originating PRI)

OUTWATS calls must be verified for user-specified zone, PBX autobanding, and CO autobanding.

- Set the XLARTE selector in Table LTCALLS to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

OUTWATS call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table defined in Table OFRT.

INWATS call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is et to PUB and verify that a call completes using this route.

INWATS call type verification (terminating PRI)

- Set the XLARTE selector is Table LTCALLS to XLAIBN. Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

TIE call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is et to PUB and verify that a call completes using this route.

TIE call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

FX call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

FX call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table defined in Table OFRT.

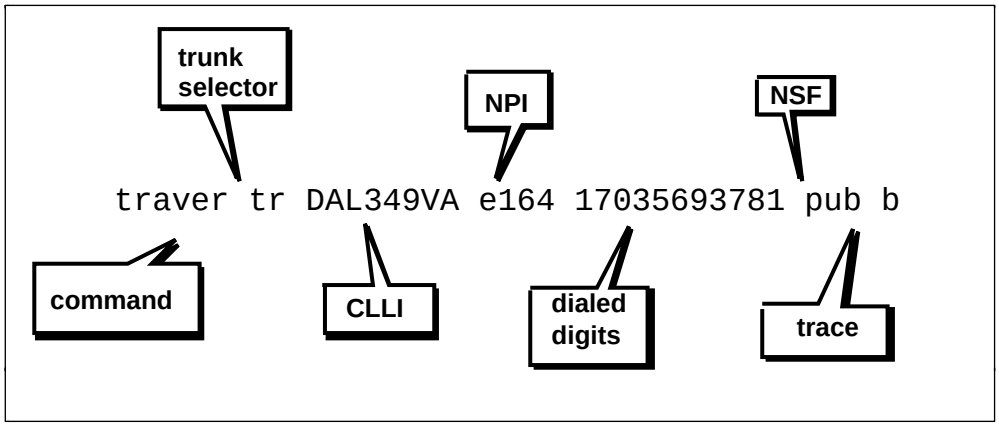
Translation verification (TRAVER)

A TRAVER should be run for originating and terminating PRI calls of each call type. The format for entering a TRAVER from the MAP is:

```
traver <ORIG> <NPI> <DIGITS> <OPT> <TRACE>
```

For example:

Figure 9
Sample SL-100 TRAVER command format



The following table shows the range of values and descriptions of the parameters of a TRAVER.

Table 12
SL-100 TRAVER parameters and values

Parameter	Range of Values	Description
ORIG		
trunk	TR• Trunk originator	CLLI Name
CGN	string	Calling Party Number for line calls
NPI	E164, PVT, PUB	Numbering Plan Indicator
Digits	string	Called Party Number
OPT		Options
NSF	FX, TIE, WATS, PUB, PVT	Network Specific Facility
FACNUM	0-1023 (FX & TIE only)	Facility Number
ZONE	0-9, A, B, C (OWT only)	OUTWATS Zone
BC	string ?	Bearer Capability
TRACE	T, NT, B	T - Trace all tables used NT - Display outpulsed digits B - Display tables and digits

Sample TRAVERs

The following examples show sample TRAVERs for each ISA call type. Where applicable, a TRAVER is shown for both terminating and originating ISA calls.

SL-100 public call type TRAVER (terminating)

The following TRAVER shows a Public ISA call using routing from Table OFRT:

```
traver l 7224020 '406211234' b

TABLE KSETLINE
HOST 00 0 00 16 1 DN Y 7224020 COMKODAK 0 25 613 (RAG)
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
613 722 4020 4020
(PUBLIC ( NAME COMI) $)$
TABLE NCOS
COMKODAK 25 0 0 KPRA ( XLAS KPRA25 KPRAF25 NDGT) ( OHQ 0)
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA
TABLE DIGCOL
KDK 4 COL L 2
TABLE IBNXLA: XLANAME KPRA25
KPRA25 40 ROUTE N N 2 Y 3 15 NDGT N T OFRT 400
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE OFRT
400 ISA N N N ATOB PUB NONE N 0
    TABLE TRKGRP
    ATOB PRA 0 PRAC NCRT ASEQ N (ISDN 952) $
    TABLE LTCALLS
    ISDN 952 PUB XLALEC 0 $
EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

ATOB     E164  6211234 NIL_NSF   BC SPEECH

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT
+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 public call type TRAVER (originating)

The following TRAVER shows an originating Public ISA call:

```
traver tr btoa '6211234' b

NOTE:  NPI=PUB is the default and is therefore not needed
in the input
TABLE TRKGRP
BTOA PRA 0 PRAC NCRT DSEQ N (ISDN 953) $
TABLE LTCALLS
ISDN 953 PUB XLALEC 0 $
TABLE LINEATTR
1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFC
TABLE STDPRTCT
P621 ( 1) ( 0)
    SUBTABLE STDPRT
    621 632 N NP 0 NA
    SUBTABLE AMAPRT
    KEY NOT FOUND
    DEFAULT VALUE IS:   NONE   N
TABLE HNPACONT
É  | 613 601 1 ( 32) ( 1) ( 84)
    SUBTABLE HNPACODE
    621 621 DN 613 621
TABLE THOUGRP
613 621 1 Y C
TABLE DN
613 621 1234 L HOST 00 0 14 00
•
•
TABLE LCASCRCN
613 L613 ( 11) OPTL N
    SUBTABLE LCASCR
    621 622
TABLE PFXTREAT
OPTL NP Y NP UNDT
TABLE CLSVSCRC
KEY NOT FOUND
DEFAULT IS TO LEAVE XLA RESULT UNCHANGED

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

LINE          6136211234
```

```
TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 Private call type TRAVER (terminating)

The following TRAVER shows a terminating Private ISA call.

```
traver l 7224020 '443325020' b

TABLE KSETLINE
HOST 00 0 00 16 1 DN Y 7224020 COMKODAK 0 0 613 (RAG)
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
613 722 4020 4020
    (PUBLIC ( NAME COMI) $)$
TABLE NCOS
COMKODAK 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA
TABLE IBNXLA: XLANAME KPRA25
KPRA25 44 NET N N 2 Y NDGT N Y GEN (LATTR 0) (RTE OFRT
406)
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFC
TABLE STDPRTCT
P621 ( 1) ( 0)
    SUBTABLE STDPRT
    3 407 N NP 0 NA
    SUBTABLE AMAPRT
    KEY NOT FOUND
    DEFAULT VALUE IS:   NONE   N
TABLE HNPACONT
613 601 1 ( 30) ( 1) ( 84)
    SUBTABLE HNPACODE
    332 332 LRTE 601
    SUBTABLE RTEREF
    601 N D A5TOB5 0 N N
      N D A3TOB3 0 N N
    EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE LCASCRCN
613 L613 ( 11) OPTL N
```

```
    SUBTABLE LCASCR
    TUPLE NOT FOUND.  DEFAULT IS NON-LOCAL
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE CLSVSCRC
KEY NOT FOUND
DEFAULT IS TO LEAVE XLA RESULT UNCHANGED
USING ROUTE FROM IBNXLA GEN SELECTOR RTE OPTION

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 private call type TRAVER (originating)

The following TRAVER is an example of an originating Private ISA call:

```
traver tr ctob pvt '3325020' prvt b

TABLE TRKGRP
CTOB PRA 0 PRAC NCRT DSEQ N (ISDN 952) $
TABLE LTCALLS
ISDN 952 PVT XLAIBN 0 CENTESN 0 25 $
TABLE IBNXLA: XLANAME CPRA25
CPRA25 332 EXTN N Y 613 722 7 $
TABLE THOUGRP
613 722 5 Y C
TABLE DN
613 722 5020 ILC HOST 00 0 09 07
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
613 722 5020 5020
    (PUBLIC ( NAME COMI) $)$

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                  6137225020

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 TIE call type TRAVER (terminating)

The following TRAVER is an example of a terminating TIE ISA call:

```
traver l 7224020 '4627020' b

TABLE KSETLINE
HOST 00 0 00 16 1 DN Y 7224020 COMKODAK 0 0 613 (RAG)
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
613 722 4020 4020
    (PUBLIC ( NAME COMI) $)$
TABLE NCOS
COMKODAK 0 0 0 KDK0 ( OHQ 0 TONE_OHQ) ( CBQ 0 3 N 2)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA
TABLE DIGCOL
KDK OCT RPT
NCOS OCT XLA name is NIL. Go to next XLA name
TABLE IBNXLA: XLANAME KPRA25
KPRA25 46 ROUTE N N 2 Y 3 15 NDGT N T OFRT 402
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE OFRT
402 ISA N N N ATOB TIE 7 0
    TABLE TRKGRP
    ATOB PRA 0 PRAC NCRT DSEQ N (ISDN 953) $
    TABLE LTCALLS
    ISDN 242 TIE XLAIBN 0 COMKODAK 0 25 $
EXIT TABLE OFRT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 ATOB                    PVT  27020 TIE 7   BC SPEECH

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 TIE call type TRAVER (originating)

The following TRAVER is an example of an originating TIE ISA call:

```
traver tr ctob pvt '27020' tie b

TABLE TRKGRP
BTOA PRA 0 PRAC NCRT ASEQ N (ISDN 240) $
TABLE LTCALLS
ISDN 241 TIE XLAIBN 0 COMKODAK 0 25 $
TABLE IBNXLA: XLANAME KPRA25
KPRA25 2 EXTN N Y 613 722 5 $
TABLE THOUGRP
613 722 7 Y C
TABLE DN
613 722 7020 IMC SCA 3
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
613 722 7020 7020
    (PUBLIC ( NAME COMI) $)$

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                  6137227020

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 OUTWATS call type TRAVER

The following TRAVER is an example of an OUTWATS ISA call:

```
traver l 2993333 65005503333 b
TABLE KSETLINE
HOST 00 0 00 28 1 ACD Y 2993333 COMKODAK 0 0 200 INCALLS
    Y NACDA 0 N (RAG) (MSB) (ACDNR) $
TABLE DNATTRS
200 299 3333
    (BNR (NAME GEORGE BRODY) $)
    (PUBLIC (NAME G_BRODY) $) $ $
TABLE DNGRPS
200 299 3333 3333
```

```
    (BNR (ADDRESS DDD 220 NNNN) $)$
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
    VACTRMT, AND DIGCOL
COMKODAK NXLA PXLA FXLA 0 KDK
TABLE DIGCOL
KDK 6 COL L 7
TABLE IBNXLA: XLANAME C000
C000 6 NET N N 1 Y NDGT N Y GEN (LATTR 0) (ESN)$
TABLE LINEATTR
0 IBN NONE NT NSCR 0 100 POTS NLCA N NONE N 0 NIL NILSFC
    LATA1 0 NIL NIL 00 N
LCABILL OFF - BILLING DONE ON  BASIS OF CALLTYPE
TABLE STDPRTCT
POTS (1) (0)
*   SUBTABLE STDPRT
*   KEY NOT FOUND
*   DEFAULT VALUE IS:     N NP 0 NA
*   SUBTABLE AMAPRT
*   KEY NOT FOUND
*   DEFAULT VALUE IS:     NONE OVERNONE N
TABLE HNPACONT
100 64 0 (20) (1) (0) (0)
*   SUBTABLE HNPACODE
*   50 50 HNPA 0
*   55 55 LRTE 14
*   SUBTABLE RTEREF
*        14 ISA N N N S100AD100APR WATS 0 E164 0
*             TABLE TRKGRP
*             S100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0
*             ASEQ 5 N ANSDISC 0 Y N N N N N Y Y 0 10 N 0
*             0 0 0 N N N N N N N N N (LTID ISDN 501) $
*             TABLE LTCALLS
*             ISDN 501 WATS XLALEC 0 $
*   EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

S100AD100APR   N CDN E164 5005503333 OWT 0 BC 3.1KHZ_AUD
```

```
TREATMENT ROUTES
1 T120
2 LKOUT


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 INWATS call type TRAVER

The following TRAVER is an example of an INWATS ISA call:

```
traver tr btoa 7224020 iwt b

TABLE TRKGRP
BTOA PRA 0 NPDGRP NCRT DSEQ N (ISDN 241) $
TABLE LTCALLS
ISDN 241 INWATS XLAIBN 0 COMKODAK 0 25 $
TABLE LINEATTR
0 1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFC
TABLE STDPRTCT
P621 (1) (0)
    SUBTABLE STDPRT
    7 810 N NP 0 NA
    SUBTABLE AMAPRT
    KEY NOT FOUND
    DEFAULT VALUE IS:     NONE N
TABLE HNPACONT
613 601 1 (54) (1) (84)
    SUBTABLE HNPACODE
    722 722 DN 613 722
TABLE THOUGRP
613 722 4 Y C
TABLE DN
613 722 4020 IMC SCA 3
TABLE DNATTRS
613 722 4020
    (PUBLIC (NONUNIQUE) $) $
TABLE DNGRPS
TUPLE NOT FOUND
TABLE LCASCRN
613 L613 (11) MNDT N
    SUBTABLE LCASCR
    TUPLE NOT FOUND. DEFAULT IS NON-LOCAL
TABLE PFXTREAT
TUPLE NOT FOUND. DEFAULT IS TO LEAVE XLA RESULT UNCHANGED
TABLE CLSVSCRC
KEY NOT FOUND
```

```
DEFAULT IS TO LEAVE XLA RESULT UNCHANGED

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES

1 LINE                    6137224020

TREATMENT ROUTES. TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

SL-100 FX call type TRAVER

The following TRAVER is an example of an FX ISA call:

```
traver l 2993333 65005303333  b

TABLE KSETLINE
HOST 00 0 00 28 1 ACD Y 2993333 COMKODAK 0 0 200 INCALLS
    Y NACDA 0 N (RAG) (MSB) (ACDNR) $
TABLE DNATTRS
200 299 3333
    (BNR (NAME GEORGE_BRODY) $)
    (PUBLIC (NAME G_BRODY $) $ $
TABLE DNGRPS
200 299 3333 3333
    (BNR (ADDRESS DDD 220 NNN) $) $
TABLE NCOS
COMKODAK 0 0 0 C000 (XLAS C000 NXLA NDGT) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
    VACTRMT, AND DIGCOL
COMKODAK NXLA PXLA FXLA 0 KDK
TABLE DIGCOL
KDK 6 COL L 7
TABLE IBNXLA: XLANAME C000
C000 6 NET N N 1 Y GEN (LATTR 0 (ESN) $
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
0 IBN NONE NT NSCR 0 100 POTS NLCA N NONE N 0 NIL NILSFC
    LATA1 0 NIL NIL 00 N
LCABILL OFF - BILLING DONE ON  BASIS OF CALLTYPE
TABLE STDPRTCT
POTS (1) (0)
*   SUBTABLE STDPRT
```

```
*   KEY NOT FOUND
*   DEFAULT VALUE IS:     N NP 0 NA
*   SUBTABLE AMAPRT
*   KEY NOT FOUND
*   DEFAULT VALUE IS:     NONE OVRNONE N
TABLE HNPACONT
100 64 0 (20) (1) (0) (0)
*   SUBTABLE HNPACODE
*   50 50 HNPA 0
*   56 56 LRTE 15
*   SUBTABLE RTEREF
*   15 ISA N N N S100AD100APR FX 0 E164 0
*   TABLE TRKGRP
*        S100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0 ASEQ
*        5 N ANSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 *
         0 N N N N N N N N (LTID ISDN 501) $
*        TABLE LTCALLS
*        ISDN 501 FX XLALEC 0 $
*   EXIT TABLE RTEREF
EXIT TABLE HNPACONT
LATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 S100AD100APRN CDN E164 5005603333 FX 0 BC 3.1 KHZ_AUD

TREATMENT ROUTES, TREATMENT IS: GNCT
1 T120
2 LKOUT


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Billing information

For ISA you must set billing options for three call types: PVT, TIE, and FX. The SL-100 determines the billing based on the call type field in Table LTCALLS. The following table shows the billing options for ISA call types.

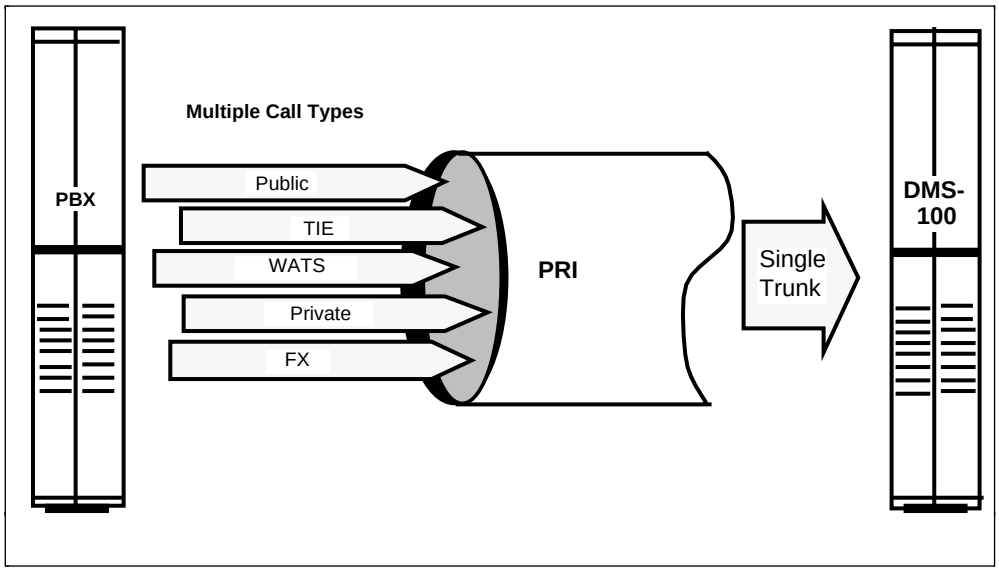
Table 13
SL-100 billing options

ISA Call Type	Billing Option
PUB	None
PVT	Tandem TIE Trunk
OUTWATS	None
INWATS	None
TIE	Tandem TIE Trunk
FX	FX

DMS-100 perspective

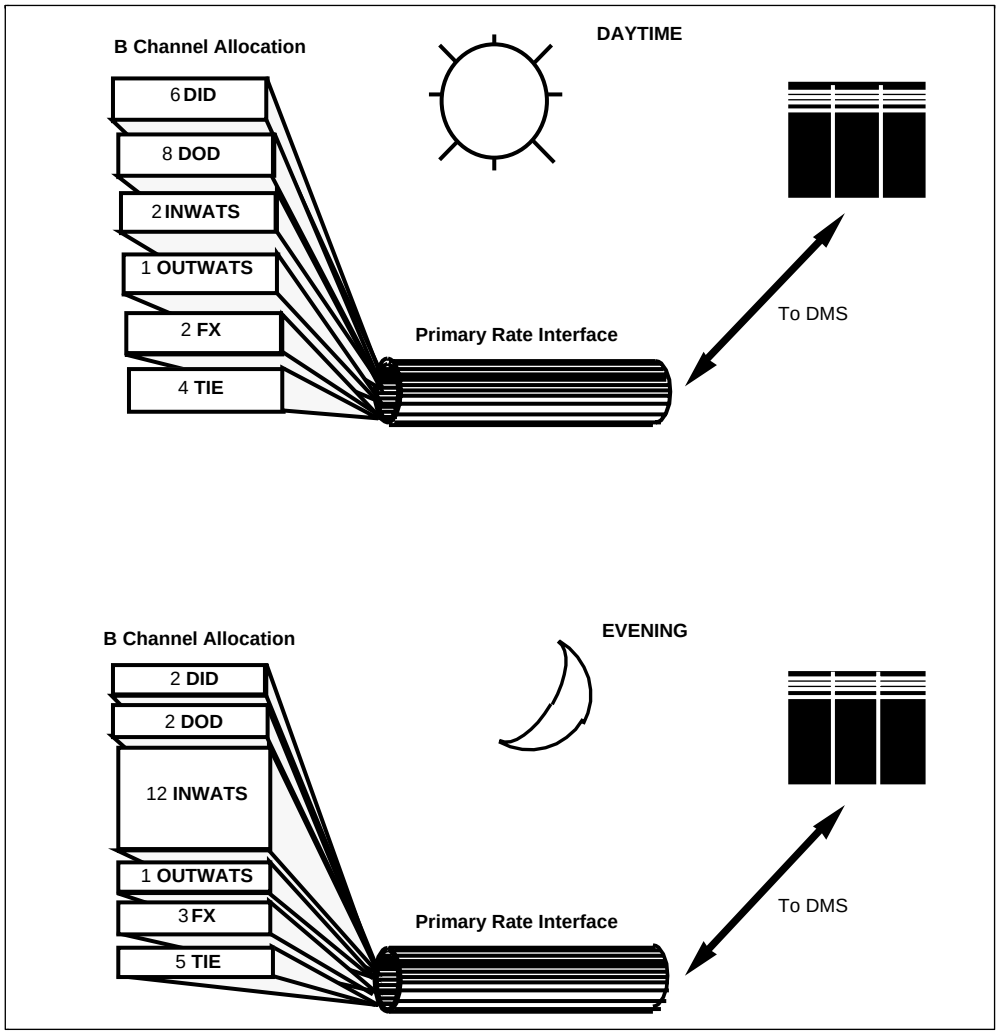
Integrated Services Access (ISA) gives the DMS-100 the ability to combine calls of different types on a single trunk group. The available call types include PUBLIC, PRIVATE, OUTWATS, INWATS, FX, or TIE. This allows call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

Figure 10
DMS-100 Integrated Services Access on PRI



For example, PRI B-channels could be adjusted to allow a telemarketer more INWATS calls when needed, as shown in the following diagram.

Figure 11
Varying DMS-100 B-channel allocation by call type



Selection of call type is made on a per-call basis, which provides a service-based architecture. A SETUP message is sent with each ISA call. This message includes information elements which the DMS-100 uses to determine call type. Control of ISA features is accomplished by adding or modifying the DMS 100 datafill through existing tables.

Connectivity

The DMS-100 provides ISA over the Primary Rate Interface between the following products:

- DMS-100 to SL-1
- DMS-100 to SL-100
- DMS-100 to DMS-100

Hardware provisioning

The DMS-100 must be provisioned for ISDN PRI capability, including the ISDN Digital Trunk Controller (DTCI) for BCS 30 and later.

Software provisioning

ISA requires feature package NTX 793AA and Batch Change Supplement (BCS) 30 or later. The components of NTX 793AA are:

- LTCALLS Table Control
- ISA Routing Table Control

ISA also uses the following related features:

- Trunk Group Tables for PRI
- Call Processing Environment for ISDN PRI
- Signaling Manager For ISDN Functional Signaling
- Connection Manager for ISDN PRI
- PRI 250 to TCAP Interworking
- BELLCORE AMA-ENHANCED ARS Translations

The SL-1 requires Release 15 for ISA connectivity to the DMS-100.

Installation rules

There are no special installation rules for ISA at the network level.

Maintenance rules

There are no special maintenance rules for ISA at the network level.

Datafill considerations

Since ISA is a software feature, correct and accurate datafill is imperative. Although an incoming call defaults to PUBLIC if there is missing ISA data, outgoing calls are blocked unless properly datafilled.

Preliminary datafill

Be sure all PRI-related tables are correctly datafilled before adding ISA-specific data. For DMS 100s equipped with the ISDN Digital Trunk Controller (DTCI), the PRI tables include:

- CARRMTC
- LTCINV
- LTCPSINV
- LTGRP
- LTDATA
- LTDEF
- LTMAP
- LTCALLS
- TRKSGRP
- TRKMEM

ISA datafill

ISA uses the following tables to define, translate, and route calls:

- LTCALLS (Logical Terminal Calls)
- IBNRTE (Integrated Business Network Routing Table)
- OFRT (Office Route Table)
- RTEREF (Route Reference Table)
- VIRTGRPS (Virtual Facility Groups Table)

In addition, INWATS and OUTWATS calls use the following tables:

- INWORICN
- INWORIBN
- INWTERCN
- INWTERTE
- OWATSZONE (OUTWATS Zone Table)

- ZONEORDR (Zone Order Table)

The sequence of tables used by the DMS-100 depends on whether the call is originating from, or terminating on, a PRI trunk.

Datafill Sequence

For DMS-100s equipped with the DTCI, the PRI tables should be filled in the following order:

- CLLI
- CLLICDR
- LTCINV
- LTCPSINV
- CARRMTC
- TRKGRP
- TRKSGRP
- TRKMEM
- LTGRP
- LTDEF
- LTDATA
- LTCALLS
- LTMAP
- OFRT
- HNPACONT.RTEREF
- FNPACONT.RTEREF
- FNPACONT.FNPASTS.RTEREF
- MSGRTE

Call type significance

The dialed digits determine trunk selection for non-PRI calls. The DMS-100 routes ISA calls based on the call type datafilled in tables. However, there is no global significance to the call type at any given point. Different legs of the same call may have different call types.

SETUP message

A SETUP message is included with each call. The information elements are:

- Bearer Capability
- Channel ID
- Network Specific Facilities
- Progress Indicator
- Calling Party Number
- Called Party Number

Numbering Plan Indicator

The DMS-100 uses the Numbering Plan Indicator (NPI) for translations. The NPI is part of the CDN element of the SETUP message. There are two values for the NPI: PUBLIC and PRIVATE.

NPI=PUBLIC

When the NPI value is E.164 (PUBLIC), the DMS-100 uses the PSTN facilities to route the call.

NPI=PRIVATE

When the NPI value is PRIVATE, the DMS-100 uses the datafill in existing tables for translations. This datafill includes the use of ESN Information Signal digits. The datafill determines whether PVT or TIE lines will be used to route the call.

Network Specific Facilities

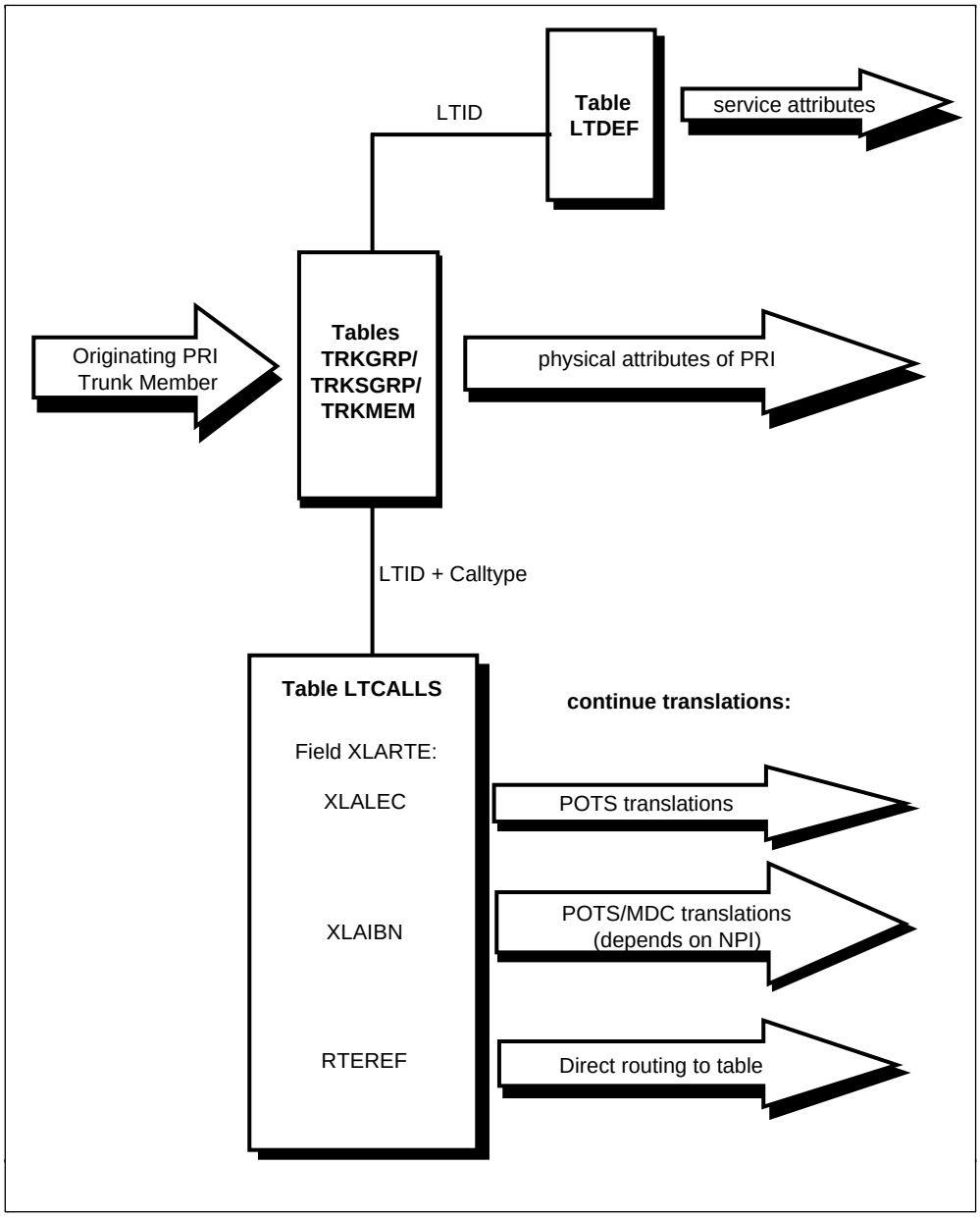
The Network Specific Facilities (NSF) element indicates which type of service a call requires. The NSF contains two elements:

- The Service Selector (Binary Code Facility Coding Value) specifies the type of service requested, such as TIE, WATS, FX.
- The Service Identifier is an optional element which specifies the actual facility used to route the call.

Originating ISA table flow

An originating ISA call is defined as one that is incoming to the DMS-100 from a PBX over a PRI trunk. The following diagram shows the DMS-100 tables used when a PRI trunk member originates an ISA call.

Figure 12
Originating ISA table flow (DMS-100)



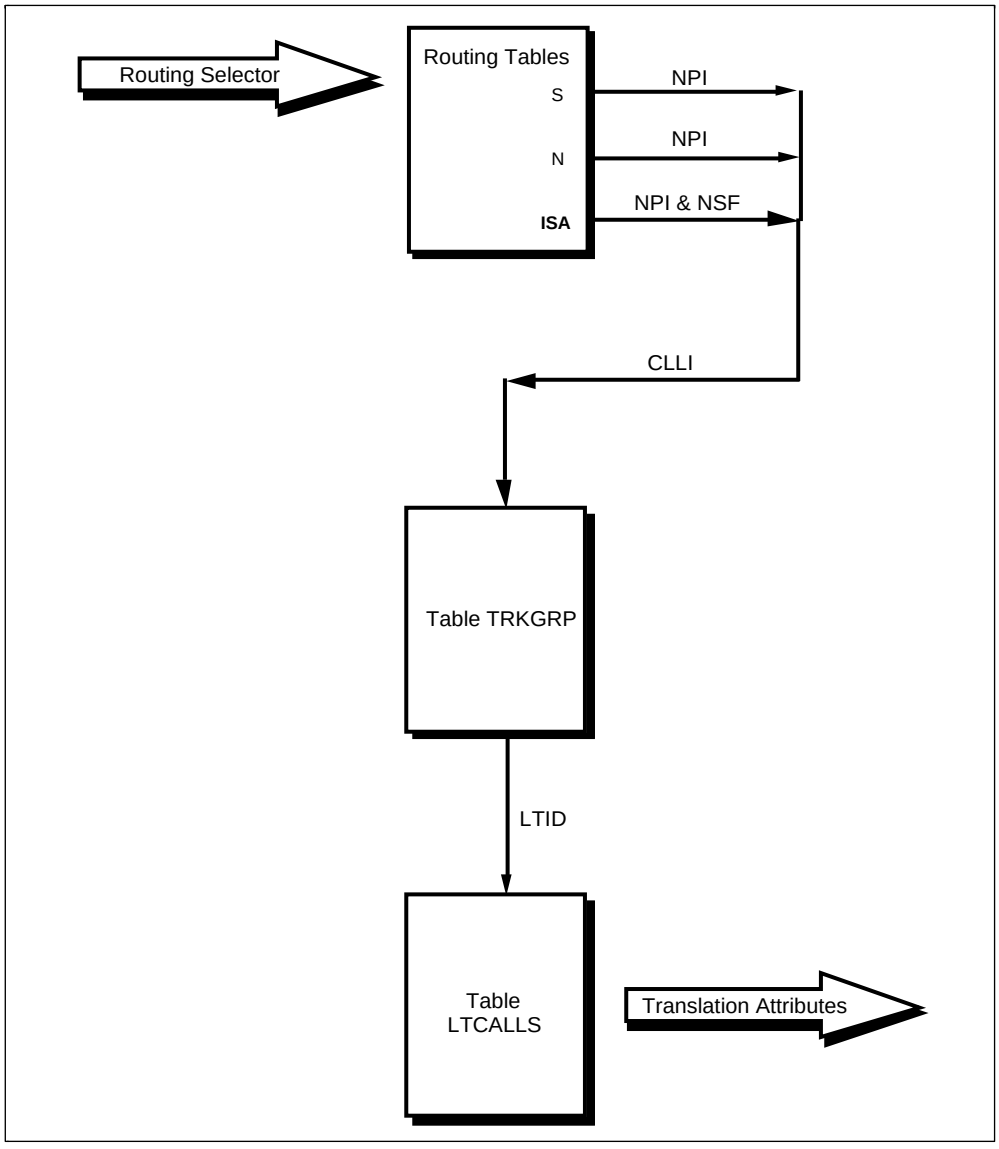
The DMS-100 uses four steps to translate an originating ISA call:

1. Use the SETUP message to determine call type from NPI and NSF.
2. Use Tables TRKMEM, TRKSGRP, and TRKGRP to determine originating trunk group characteristics. Get LTID from Table TRKGRP.
3. Use LTID to access Table LTDEF and determine access privileges (service attributes).
4. Use LTID and call type to access Table LTCALLS. Use value of XLARTE selector to determine further translations based on dialed numbers.

Terminating ISA table flow

A terminating ISA call is defined as one that is outgoing from the DMS-100 to a PBX over a PRI trunk. The following figure shows the DMS-100 tables used when a PRI trunk member terminates an ISA call.

Figure 13
Terminating ISA table flow (DMS-100)



The DMS-100 uses the following routing tables for terminating ISA calls:

- OFRT
- IBNRTE
- HNPACONT.RTEREF
- FNPACONT.RTEREF
- FNPACONT.FNPASTS.RTEREF

The ISA selector must be datafilled in each routing table, along with the trunk group CLLI and the call type.

The DMS-100 uses three steps to route terminating ISA calls:

1. Using the ISA selector, a routing table specifies the CLLI of a trunk group. This provides an index to Table TRKGRP.
2. Table TRKGRP provides an LTID for the CLLI. The LTID and calltype provide an index to Table LTCALLS.
3. Table LTCALLS searches for a tuple that matches the LTID and call type. If none exists, the call is blocked. Valid tuples are forwarded to the terminating PBX. The SETUP message, containing the NPI and NSF, is also forwarded.

The following restrictions exist for terminating ISA calls:

- The call must be routed through a Virtual Facility Group (VFG) to generate a billing record.
- The ISA selector in the routing tables can be used in conjunction with a digit manipulation index, if desired. This index points to Table DIGMAN for modification of the called number digits (CDN).
- The ISA selector in the routing tables is the only selector that generates an NSF and NPI for the outgoing call. It is not necessary to use the ISA selector for public and private call types. However, selectors of “N” or “S” will not generate an NSF. Only the NPI is generated and passed to the PBX.

Logical terminal tables

The logical terminal tables provide the DMS-100 with identification, service, and translation information about the terminals connected to a Primary Rate Interface (PRI).

The Logical Terminal tables should be datafilled in the following order:

- LTGRP
- LTDEF
- LTDATA

- LTCALLS
- LTMAP

The following figure shows the tables that define the physical attributes of an ISA member, where the service attributes are obtained, and finally, where the translation attributes are obtained. An explanation of the datafill for each table follows the figure.

Figure 14
DMS-100 logical terminal tables

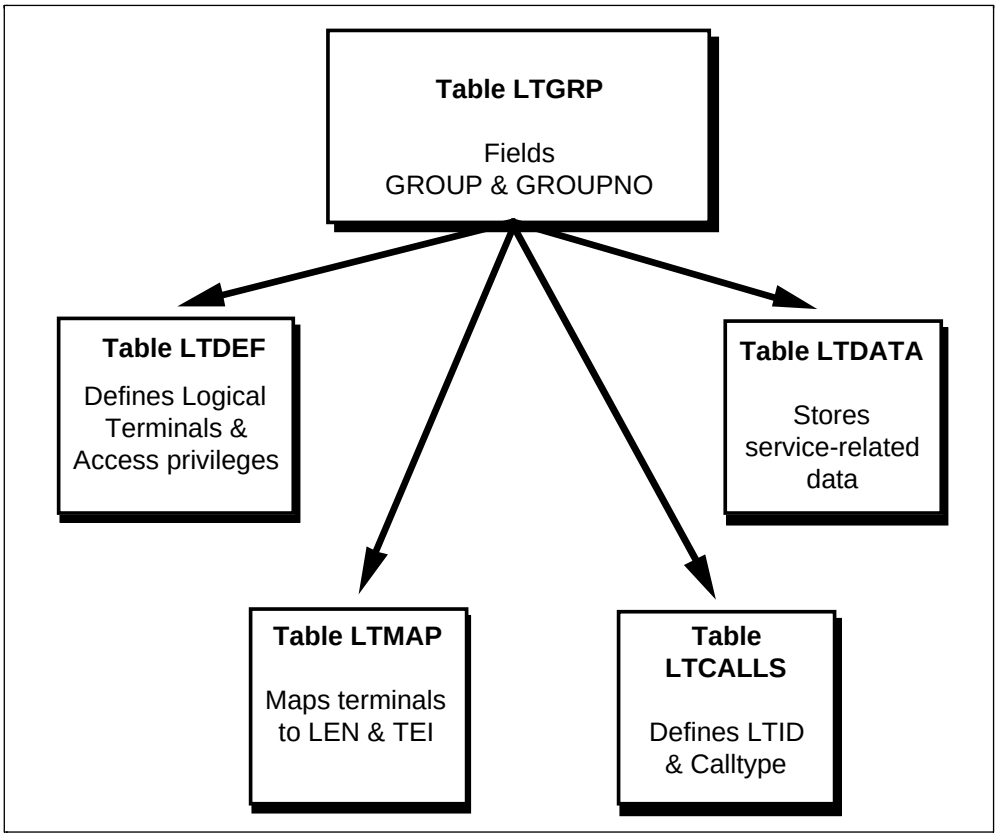


Table LTGRP

Table LTGRP defines a logical terminal group based on terminal type. The options field defines the terminal type for each group. For PRI, the group “ISDN” is automatically filled as a permanent entry and cannot be changed or deleted.

Table LTGRP must be datafilled before Tables LTDEF, LTDATA, LTCALLS, and LTMAP.

The following table shows the fields and values for Table LTGRP.

Table 14
DMS-100 Table LTGRP parameters

Field Name	Range of Values	Default value	Description
GROUP	8 characters: A-Z, 0-9	ISDN	Name of a group of logical terminals
GROUPNO	0-31	Default group ISDN is automatically assigned GROUPNO 0.	Number assigned to a group name
OPTIONS	SAPI16, $	$ (Note: The default group ISDN is automatically assigned as SAPI16)	The type of terminals allowed in a group. The only current option is SAPI16, to allow packet and circuit switched terminals.

The GROUP field is an important element in four other Logical Terminal tables: LTDEF, LTMAP, LTDATA, and LTCALLS. These four tables control how the DMS-100 processes ISA calls. The datafill for these tables must match the value for GROUP in Table TRKGRP. The DMS-250 does not automatically enter or update the fields in these related tables.

Example of datafill

The following tuple is an example of the datafill for Table LTGRP:

```
group  groupno  options
ISDN     0     SAPI16
```

Table LTDEF

Table LTDEF defines logical terminals and specifies access privileges. The following table shows the fields and values for Table LTDEF.

Table 15
DMS-100 Table LTDEF parameters

Field Name	Range of Values	Description
LTKEY	alphanumeric, ? characters	Consists of subfields LTGRP and LTNUM
(subfield) LTGRP	alphanumeric, 8 characters	The name of the logical terminal group. Must match GROUP field in Table LTGRP.
(subfield) LTNUM	1-1022	Assigns a number to individual terminals within groups.
LTAP	B, D, BD, PB	Assigns the access privilege for each terminal: B = circuit switched; D = D-channel packet switched; BD = combined switching; PB = B-channel packet switching
LTCLASS	BRAKS, BRAFS, PRI	Assigns the set of services allowed for a terminal. ISA requires PRI.

When the value of LTCLASS is specified as PRI, the subfields shown in the following table appear.

Table 16
DMS-100 LTCLASS subfields

Subfield Name	Range of Values	Description
NUMBCHNL	1-383	The number of B-channels this terminal can use at one time. The sum of this value for all LTIDs must not exceed the number of B-channels specified for the interface in ?
NUMCALLS	1-383	Number of calls allowed on the interface. Must be greater than or equal to the sum of INCCALLS and OUTCALLS.
INCCALLS	0-383	The number of reserved incoming-only calls allowed at one time.
OUTCALLS	0-383	The number of reserved outgoing-only calls allowed at one time.
OPTION	NOVOICE, NOVBD, NOCMD, NOPMD	NOVOICE = no voice calls ; NOVBD = no voice band data calls ; NOCMD = no circuit mode data calls; NOPMD = no packet mode data calls
CONTMARK	+, $	Continuation mark. Enter a plus mark (+) when the data continues to next line. Enter $ to signify end of string.

Example of datafill

The following tuple is an example of the datafill for Table LTDEF:

```
ltgrp  ltnum  ltap   ltclass
ISDN    7     B     PRI 6 6 3 2 NOPMD  $
```

Table LTDATA

Table LTDATA stores service-related data for logical terminals. The terminals are defined by the LTGRP and LTNUM. The values entered in these fields of Table LTDATA must match those in Tables LTDEF, LTGRP, LTCALLS, and LTMAP.

The following table shows the fields and values for Table LTDATA.

Table 17
DMS-100 Table LTDATA parameters

Field Name	Range of Values	Description
LTDKEY	alphanumeric, ?characters.	Logical Terminal Datakey. Defines subfields LTGRP, LTNUM, and DATATYPE.
(subfield) LTGRP	alphanumeric, 8 characters.	Logical Terminal Group name
(subfield) LTNUM	1-1022	Logical Terminal Number of the individual member of the group.
(subfield) DATATYPE	DN	Logical Terminal Datatype. The only valid entry is DN.
LTDRESULT	alphanumeric	Logical Terminal Result. Consists of the DATATYPE and DFLTCGN subfields.
(subfield) DATATYPE	DN	Logical Terminal Datatype. The only valid entry is DN.
(subfield) DFLTCGN	10-digit DN	Default Calling Party Number. Enter the 10-digit DN to which call will default if no CGN is supplied on originations. When CGN screening is enabled, this is the only DN that can originate calls on this interface.
OPTIONS	alphanumeric, ? characters	Consists of the subfields OPTIONS and CUSTGRP
(subfield) OPTIONS	CUSTGRP	Options. Enter the option, CUSTGRP.
CUSTGRP	alphanumeric, ? characters	Customer Group name

Example of datafill

The following tuple shows an example of the datafill for Table LTDATA:

```
        LTDATA                  LTDRSLT          OPTIONS
ltgrp  ltnum  datatype  datatype  dfltcgn     options custgrp
ISDN    7       DN        DN   7035693781   CUSTGRP NAVCC
```

Table LTCALLS

Table LTCALLS creates the Logical Terminal Identifier (LTID) from the LTGRP and LTNUM values. This table also assigns a call type to each terminal, and controls ISA translations.The DMS-100 also uses the XLARTE selector in Table LTCALLS to determine translations of originating ISA calls.

Tables LINEATTR, STDPRTCT, HNPACONT, ZONEORDR, OFRT, IBNRTE, LTGRP, LTDEF, and LTDATA must be datafilled before LTCALLS.

The following table shows the fields and values for Table LTCALLS.

Table 18
DMS-100 Table LTCALLS parameters

Field Name	Range of Values	Description
LTID	alphanumeric	Logical Terminal Identifier. Consists of the subfields LTGRP, LTNUM, and CALLTYPE.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name. Must match the values in Tables LTGRP, LTDEF, LTDATA, and LTMAP.
(subfield) LTNUM	1-1022	The Logical Terminal number of the member within the group. Must match the values in Tables, LTGRP, LTDEF, LTDATA, and LTMAP.
(subfield) CALLTYPE	PUB, PVT, WATS, INWATS, FX, TIE	Defines the call type assigned to a terminal. PUB = Public; PVT = Private; WATS = Outbound WATS; INWATS = Inbound WATS; FX = Foreign Exchange; TIE = Private lines between PBXs.
XLARTE	XLALEC, XLAIBN, RTEREF	Selects the Translation Route. XLALEC = Local Exchange Carrier; XLAIBN = Integrated Business Network; RTEREF specifies translations by a routing table, such as OFRT, IBNRTE, etc.

If the XLARTE selector is XLALEC, the following subfield appears.

LINEATTR	0-1023	Selects the index used to access Table LINEATTR for service-related data.

If the XLARTE selector is XLAIBN, the following subfields appear.

LINEATTR	0-1023	Selects the index used to access Table LINEATTR for service-related data.
CUSTGRP	alphanumeric	Customer Group Name
SUBGRP	0-7	Subgroup Number used to further define CUSTGRP.
NCOS	0-255	Network Class of Service. Determines the facilities to which each terminal will have access.

If the XLARTE selector is RTEREF, the following subfields appear.

RTEID	1-1023	Route Index. The index number used to select a route within the table.specified in XLARTE
OPTIONS	$	Options. Enter $ to end entry. No options currently available.

The following sections give examples of the datafill for the three possible values of the XLARTE field.

XLALEC datafill example

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is XLALEC:

```
          LTID
ltgrp   ltnum   calltype    xlarte    lineattr
ISDN      7        PUB       XLALEC       37
```

The line attribute number provides an index into Table LINEATTR. Translations continue from this table using standard POTS translations. Note that a call with an NPI of private cannot use the XLALEC selector in the XLARTE field. XLALEC routing is only for the public numbering plan.

XLAIBN datafill example

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is XLAIBN:

```
          LTID
ltgrp   ltnum   calltype    xlarte    lineattr custgrp subgrp ncos
ISDN      7        PVT       XLAIBN       37      NAVCC     4     4
```

The XLAIBN selector can be used with any call type. Tuples using the XLAIBN selector specify a line attribute index number, along with MDC customer group information. This information contains the group name, subgroup number, and network class of service number. The NPI determines whether the DMS-100 uses the line attribute number or the MDC customer group information.

For calls with an NPI of public, the value in the `lineattr` field provides an index to Table LINEATTR. From here, the DMS-100 uses standard POTS translations and ignores the remaining customer group information.

For calls with an NPI of private, the DMS-100 uses the customer group information for standard MDC translations and ignores the `lineattr` field.

RTEREF datafill example

The following tuple is an example of the datafill for Table LTCALLS if the XLARTE selector is RTEREF:

```
          LTID
ltgrp   ltnum   calltype    xlarte    rteid   options
ISDN      7        PVT       RTEREF     12       $
```

The RTEREF selector provides an index to a routing table and can be used with any NPI.

Table LTMAP

Table LTMAP maps the logical terminals defined in the previous tables to a Line Equipment Number (LEN) and a Terminal Equipment Interface (TEI). This table also uses the LTKEY used in the previous logical terminal tables, and must be datafilled with the same values found in LTGRP and LTNUM for a given tuple.

Table LTMAP must be datafilled after Tables LTGRP, LTDEF, LTDATA, and LTCALLS.

The following table shows the fields and values for Table LTMAP.

Table 19
DMS-100 Table LTMAP parameters

Field Name	Range of Values	Description
LTKEY	alphanumeric	Logical Terminal Key. Consists of the subfields LTGRP and LTNUM.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name.
(subfield) LTNUM	1-1022	The Logical Terminal Number of the member within the group.
MAPPING	LEN, CLLI	Logical Terminal Mapping. For PRI, the mapping must be to CLLI.
CLLI	alphanumeric	The Common Language Location Identifier of the PRI trunk to which the terminal is assigned.
LEN	alphanumeric	Consists of the subfields SITE, FRAME, UNIT, DRAWER, and CIRCUIT.
(subfield) SITE	alphanumeric or blank	If the line is a remote, enter the site name. Leave blank for all others lines. and the field will default to HOST.
(subfield) FRAME	0-99	Line Module Frame Number. The line module or Line Concentrator frame module to which a line is assigned.
(subfield) UNIT	0-9	Line Module Unit Number. The Line module or Line Concentrator Module unit number.

Table 19
DMS-100 Table LTMAP parameters (continued)

Field Name	Range of Values	Description
(subfield) DRAWER	0-23	Line Drawer or Line Subgroup. The number of the line drawer of the LM unit, or the line subgroup of the LCM unit.
(subfield) CIRCUIT	0-31	Line Card Circuit Number. The line card circuit number on the line drawer or line subgroup shelf to which the line is assigned.
OPTION	TEI, PHI, BCH, DCHCHNL, LTBYTE	TEI is the only valid option for PRI.

If the OPTION selector is TEI, the following subfield appears.

TEI	0-63	Terminal Endpoint Identifier number.

Example of datafill

The following tuple is an example of the datafill for Table LTMAP:

```
ltgrp  ltnum  mapping         options
ISDN    7    CLLI DAL349VA  TEI 0 $
```

Routing ISA calls

The DMS-100 obtains routing information for terminating ISA calls from Tables IBNRTE, OFRT, and RTEREF. Table LTCALLS controls routing for originating ISA calls. For more information on Table LTCALLS, see “Logical Terminal Tables”.

Table IBNRTE provides routing information for Integrated Business Network calls. Table OFRT provides routing for Integrated Business Network calls, as well as POTS calls. Table RTEREF is a subtable of Tables HNPACONT, FNPACONT, and FNPACONT.FNPASTS.

The fields and values of all three tables are the same, with the exception of the first field. For Table IBNRTE, the name of the first field is IBNRTESEL. For Tables OFRT and RTEREF, the name of the first field is RTESEL. The function and values of these fields are the same for all three tables.

Tables IBNRTE, OFRT, and RTEREF

The following chart shows the fields and values for Tables IBNRTE, OFRT, and RTEREF.

Table 20
DMS-100 Table IBNRTE, OFRT, and RTEREF parameters

Field Name	Range of Values	Description
RTESEL,(IBNRTE: Table IBNRTE only)	ISA, N, S	Route Selector
OHQ	NO, YES	Selects off-hook queuing
CBQ	NO, YES	Selects call-back queuing
EXP	NO, YES	Designates this route as Expensive
CLLI	alphanumeric, 8 characters	Designates the PRI trunk group that routing terminates on. ***Note***: Only CLLIs defined as PRI (in Table CLLI) are valid entries in this field.
CALLTYPE	TIE, INWATS, WATS, FX, PVT, PUB	ISA call type
(subfield) FX, TIE		
FACNUM	0-1023	The facility number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) WATS		
ZONE	0-9, A, B, C, AUTO	OUTWATS Zone Number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) INWATS		
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PVT		
NPI	E164, PVT	Selects type of numbering plan

Table 20
DMS-100 Tables IBNRTE, OFRT, and RTEREF parameters (continued)

DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PUB		
OATYPE	NONE, 0P, 0M	Type of Operator Access required
TNS	0-999, N, C	Transit Network Number to be requested in SETUP message. If none is required, specify N. If TNS should be determined from call's originator, specify C.
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission

Example of datafill

The following tuple shows an example of the datafill for Tables IBNRTE, OFRT, and RTEREF.

```
rtesel   ohq  cbq  exp   clli      calltype
                                              FACNUM  DMI
ISA       N    N    N    DAL349VA    TIE        402    8
```

Special datafill for ISA INWATS routing to an SL-1

The following special datafill must be used when specifying routing for an INWATS call to a station on an SL-1. This datafill is in effect until BCS 33.

- Route INWATS trunk incoming calls from Table DN to an IBNRTE that uses the “IW” selector and a datafilled Virtual Facility Group (VFG) previously assigned in Table VIRTGRPS.
- Datafill Table DIGMAN to remove the incoming digits and include a new DN (see TRAVER example).
- If a customer group was used, use POTS digit collection in Table IBNXLA and route the call to an “INW” LINEATTR as shown in the sample TRAVER.
- Use Table DN to route the new DN to a previously assigned IBNRTE that has the ISA selector for the desired PRI trunk group and specifies call type TIE.
- Return to Table DIGMAN. Remove the previous new DN and substitute the actual four digit extension of the SL-1 station.

  Note 1: The incoming DMS INWATS call is sent to the SL-1 as a TIE call. The INWATS AMA record is generated correctly by the DMS.

  Note 2: The IBNRTE TIE “FACNUM” must match the Service Identifier (SID) parameter in the SL-1 TIE service route.

  Note 3: The SL-1 does not need an INWATS service route. Four digits are always sent to the PBX.

  Note 4: This workaround cannot be used if the customer needs both TIE and INWATS services.

DMS-100 to SL-1 INWATS TRAVER examples

The following TRAVERs show the datafill used to route ISA INWATS calls to stations on an SL-1.

```
traver tr tcvr2w 6344300 b

TABLE TRKGRP
TCVR2W T2 61 TLD NCRT MI LIDL 0 Y N INC0 NSCR 702 NLCL Y
7 7
TABLE STDPRTCT
INC0 (1) (0)
    * SUBTABLE STDPRT
    * 63 6490000 N NP 0 NA
    * SUBTABLE AMAPRT
    * KEY NOT FOUND
    * DEFAULT VALUE IS: NONE N
TABLE HNPACONT
702 445 0 (53) (1) (0)
```

```
    * SUBTABLE HNPACODE
    * 634 634 DN 702 634
TABLE THOUGRP
702 634 4 Y C
TABLE DN
702 634 4300 T IBNRTE 182
TABLE DNATTRS
TUPLE NOT FOUND
TABLE IBNRTE
182 IW 10 732 IWPRI 169
    * TABLE DIGMAN
    * 169 (CL BEG) (REM7) (INC 7328021)
    * EXIT TABLE DIGMAN
EXIT TABLE IBNRTE


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES
1 VFG: IWPRI              7328021

1 OVFLTONE

+++ TRAVER: SUCCESSFUL CALL TRACE +++

traver v iwpri 7328021 b

TABLE VIRTGRPS
IWPRI SIZE 2 IBN 7026344300 IBTS 0 0 2 Y N N $
TABLE NCOS
IBTS 2 0 10 INWATS (XLAS IBX2 NXLA NDGT) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
VACTRMT, DIGCOL
IBTS NXLA IBX1 NXLA 1 NDGT
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE IBNXLA: XLANAME IBX2
IBX2 7328021 NET N N 0 N POTS N Y DOD N 10 NONE
TABLE DIGCOL
POTS specified: POTS digit collection
TABLE LINEATTR
10 INW WAT0 NT NSCR 0 702 NPRT NLCA NONE N 16 NIL NILSFC
NILLATA 0 NIL NIL 00
TABLE HNPACONT
702 445 0 (53) (1) (0)
```

```
    * SUBTABLE HNPACODE
    * 7328 7329 DN 702 732
TABLE THOUGRP
702 732 8 Y C
TABLE DN
702 732 8021 T IBNRTE 167
TABLE DNATTRS
TUPLE NOT FOUND
TABLE DNGRPS
TUPLE NOT FOUND
TABLE IBNRTE
167 ISA N N N PRITEST TIE 3 E164 172
    * TABLE TRKGRP
    * PRITEST PRA 10 NPDGRP NCRT ASEQ N (ISDN 1) $
    * TABLE LTCALLS
    * ISDN 1 TIE XLAIBN 0 IBTS 0 1 $
    * TABLE DIGMAN
    * 172 (CL BEG) (REM 7) (INC 7919)
    * EXIT TABLE DIGMAN
EXIT TABLE IBNRTE


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES


1 PRITEST           E164 7919 TIE 3 BC SPEECH

TREATMENT ROUTES. TREATMENT IS: GNCT
1 OVFLTONE


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Operational measurement considerations

There are no operational measurement considerations for ISA on PRI.

Log considerations

There are no log considerations for ISA on PRI.

Service order considerations

There are no service order considerations for ISA on PRI.

Testing considerations

Testing of ISA calls requires functioning PRI hardware with an ISDN Digital Trunk Controller (DTCI) or Integrated Access Controller (IAC).

A valid PRI trunk must be used to test an ISA originating and terminating call for each of the six call types (PUB, PVT, WATS, INWATS, FX, and TIE). The Translations Verification (TRAVER) can be performed first to check datafill. However, a successful TRAVER does not necessarily indicate that a call completed. Use TRAVER as part of complete testing plan, not a guarantee. Each call must be verified by actual completion.

Call type verification

This section gives information on using the table routing selectors to establish a test route for each originating and terminating call type. Remember that the test call must use a valid PRI trunk. Check the datafill in all PRI-related tables, as well as those specific to ISA.

Public call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE is set to PUB and verify that a call completes using this route.

Public call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

Private call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.

Private call type verification (terminating PRI)

- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.
- Set the NPI to E164. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.

OUTWATS call type verification (originating PRI)

<< (section incomplete-missing info) >>OUTWATS calls must be verified for user-specified zone, PBX autobanding, and CO autobanding.

- Set the XLARTE selector in Table LTCALLS to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

OUTWATS call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table defined in Table OFRT.

INWATS call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

INWATS call type verification (terminating PRI)

- Set the XLARTE selector is Table LTCALLS to XLAIBN. Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

TIE call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

TIE call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

FX call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to to XLALEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to XLAIBN. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

FX call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table IBNRTE.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table defined in Table OFRT.

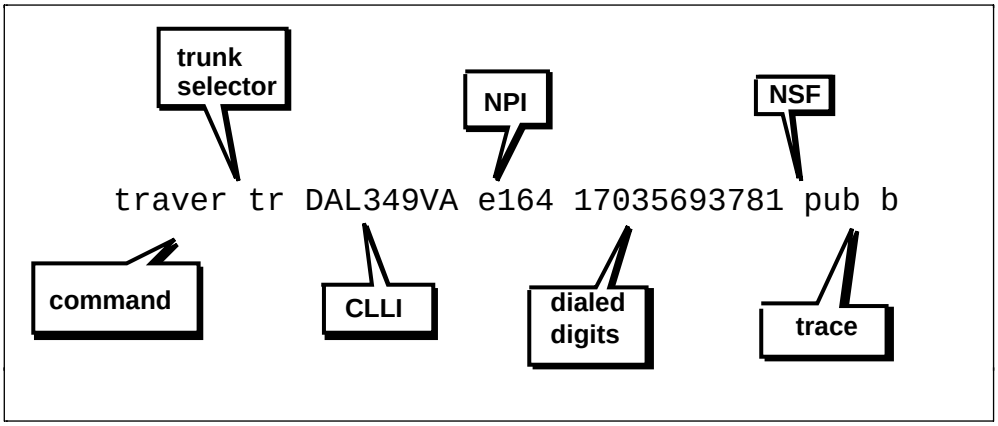
Translation verification (TRAVER)

A TRAVER should be run for originating and terminating PRI calls of each call type. The format for entering a TRAVER from the MAP is:

```
traver <ORIG> <NPI> <DIGITS> <OPT> <TRACE>
```

For example:

Figure 15
Sample DMS-100 TRAVER command format



BCS 31 and later requires the following TRAVER format if the NPI=PVT:

```
traver <ORIG> <N CDN> <NPI> <OPT> <TRACE>
```

In the above example, the N stands for no key pad digits, and the CDN is the called number digits.

The following table shows the range of values and descriptions of the parameters of a TRAVER.

Table 21
DMS-100 TRAVER parameters and values

Parameter	Range of Values	Description
ORIG		
trunk	TR• Trunk originator	CLLI Name
CGN	string	Calling Party Number for line calls
NPI	E164, PVT (add N + CDN for BCS 31 and later), PUB	Numbering Plan Indicator
Digits	string	Called Party Number
OPT		Options
NSF	FX, TIE, WATS, PUB, PVT	Network Specific Facility
FACNUM	0-1023 (FX & TIE only)	Facility Number
ZONE	0-9, A, B, C (OWT only)	OUTWATS Zone
BC	string ?	Bearer Capability
TRACE	T, NT, B	T - Trace all tables used NT - Display outpulsed digits B - Display tables and digits

Sample TRAVERs

The following examples show sample TRAVERs for each ISA call type.

DMS-100 public call type TRAVER (terminating)

The following TRAVER shows an example of a terminating public ISA call:

```
traver l 6211234 '7224020' b

TABLE LINEATTR
0 1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILLATA
TABLE STDPRTCT
P621 ( 1)
    SUBTABLE STDPRT
    722 745 N NP 0 NA
TABLE HNPACONT
613 128 1 ( 43) ( 1)
    SUBTABLE HNPACODE
    722 722 LRTE 200
    SUBTABLE RTEREF
    200 ISA N N N A5TOB5 PUB NONE N 0
          TABLE TRKGRP
          A5TOB5 PRA 0 PRAC NCRT ASEQ N (ISDN 242)$
          TABLE LTCALLS
          ISDN 242 PUB XLAIBN 601 COMKODAK 0 25 $
            ISA N N N A2TOB2 PUB NONE N 0
          TABLE TRKGRP
          A2TOB2 PRA 0 PRAC NCRT ASEQ N (ISDN 241)$
          TABLE LTCALLS
          ISDN 241 PUB XLAIBN 601 COMKODAK 0 25 $
    EXIT TABLE RTEREF
EXIT TABLE HNPACONT
TABLE LCASCRN
613 L613 ( 11) OPTL N
    SUBTABLE LCASCR
    TUPLE NOT FOUND. DEFAULT IS NON LOCAL
TABLE PFXTREAT
OPTL NP N DD UNDT
TABLE CLSVSCRC
KEY NOT FOUND
DEFAULT IS TO LEAVE XLA RESULTS UNCHANGED
DATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL

+++ TRAVER: SUCCESSFUL CALL TRACE +++

DIGIT TRANSLATION ROUTES
```

```
1 A5TOB5              E164   7224020  NIL BC SPEECH
2 A2TOB2              E164   7224020  NIL BC SPEECH


TREATMENT ROUTES. TREATMENT IS: GNCT
1 *OFLO
2 LKOUT

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

DMS-100 public call type TRAVER (originating)

The following TRAVER is an example of an originating Public ISA call:

```
traver tr btoa '6211234' b
NOTE:  NPI=PUB is the default and is therefore not needed
in the input
TABLE TRKGRP
BTOA PRA 0 PRAC NCRT DSEQ N (ISDN 953) $
TABLE LTCALLS
ISDN 953 PUB XLALEC 0 $
TABLE LINEATTR
0 1FR NONE NT FR01 0 613 P621 L613 TSPS N 10 NIL NILSFC
TABLE STDPRTCT
P621 ( 1) ( 0)
    SUBTABLE STDPRT
    621 632 N NP 0 NA
    SUBTABLE AMAPRT
    KEY NOT FOUND
    DEFAULT VALUE IS:   NONE   N
TABLE HNPACONT
613 601 1 ( 32) ( 1) ( 84)
    SUBTABLE HNPACODE
    621 621 DN 613 621
TABLE THOUGRP
613 621 1 Y C
TABLE DN
613 621 1234 L HOST 00 0 14 00
•
•
TABLE LCASCRCN
613 L613 ( 11) OPTL N
    SUBTABLE LCASCR
    621 622
TABLE PFXTREAT
OPTL NP Y NP UNDT
```

```
TABLE CLSVSCRC
KEY NOT FOUND
DEFAULT IS TO LEAVE XLA RESULT UNCHANGED

+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE          6136211234

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 *OFLO

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

DMS-100 private call type TRAVER

The following TRAVER is an example of a terminating Private ISA call:

```
traver tr d100ad100apr e164 2002203333 fx  b

TABLE TRKGRP
D100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0 ASEQ 5 N
    AWSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 0 N N N N N N N
    N N (LTID ISDN 501) $
TABLE LTCALLS
ISDN 501 PVT XLAIBN 0 CONKODAK 0 5 $
TABLE NCOS
COMKODAK 5 0 0 C005 (XLAS C005 NXLA NDGT) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
    VACTRMT, AND DIGCOL
COMKODAK NXLA PXLA FXLA 0 KDK
TABLE DIGCOL
KDK 1 RPT
TABLE IBNXLA: XLANAME C005
COO5 1 PROTO 0 1 7 10
TABLE PACMAN
0 (FLD COS 2 SL100AIC) (END) $
NEW NCOS:  6  PREFIX FENCE:  3
TABLE IBNXLA: XLANMAE C006
C006 2 NET N N 0 Y NDGT N Y GEN (LATTR 0) (ESN) $
TABLE DIGCOL
NDGT specified: digits collected individually
TABLE LINEATTR
```

```
0 IBN NONE NT NSCR 0 100 POTS NLCA NONE N 0 NIL NILSFC
    NILLATA 0 NIL NIL 00 N
TABLE STDPRTCT
POTS (1) (0)
    *     SUBTABLE STDPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  N NP 0 NA
    *     SUBTABLE AMAPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  NONE  N
TABLE HNPACONT
100 64 0 (19) (1) (0)
    *     SUBTABLE HNPACODE
    *     22 29 DN 200 299
TABLE THOUGRP
200 299 3 Y C
TABLE DN
200 299 3333 L HOST 00 0 00 28
LATA IS NIL, THERFORE NOT AN EQUAL ACCESS CALL


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                    2002993333

TREATMENT ROUTES:   TREATMENT IS: GNCT
1 T120


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

DMS-100 TIE call type TRAVER

The following TRAVER is an example of a TIE ISA call:

```
traver tr D100ad100apr pvt 1112203333 tie  b
TABLE TRKGRP
D100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0 ASEQ 5 N
    AWSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 0 N N N N N N N
    N N (LTID ISDN 501) $
TABLE LTCALLS
ISDN 501 TIE XLAIBN 0 COMKODAK 0 5 $
TABLE NCOS
COMKODAK 5 0 0 C005 (XLAS C005 NXLA NDGT) $
TABLE CUSTHEAD: CUSTGRP, PRELIMXLA, CUSTXLA, FEATXLA,
    VACTRMT, AND DIGCOL
COMKODAK NXLA PXLA FXLA 0 KDK
TABLE DIGCOL
KDK 1 RPT
TABLE IBNXLA: XLANAME C005
C005 1 PROTO 0 1 7 10
TABLE PACMAN
0 (FLD COS 2 S100AIC) (END) $
NEW NCOS:      6     PREFIX FENCE: 3
TABLEIBNXLA: XLANAME C006
C006 2 NET N N 0 Y NDGT N Y GEN (LATTR 0) (ESN) $
TABLE DIGCOL
NDGT specified: digits collected individually.
TABLE LINEATTR
0 IBN NONE NT NSCR 0 100 POTS NLCA NONE N 0 NIL NILSFC
    NILLATA 0 NIL NIL 00 N
TABLE STDPRTCT
POTS (1) (0)
    *     SUBTABLE STDPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  N NP 0 NA
    *     SUBTABLE AMAPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  NONE  N
TABLE HNPACONT
100 64 0 (19) (1) (0)
    *     SUBTABLE HNPACODE
    *     22 29 DN 200 299
TABLE THOUGRP
200 299 3 Y C
TABLE DN
200 299 3333 L HOST 00 0 00 28
LATA IS NIL, THEREFORE NOT AN EQUAL ACCESS CALL
```

```
+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                    2002993333

TREATMENT ROUTES:   TREATMENT IS: GNCT
1T120


+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

DMS-100 FX call type TRAVER

The following TRAVER is an example of an FX ISA call:

```
traver tr d100ad100apr e164 2002203333 fx  b

TABLE TRKGRP
D100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0 ASEQ 5 N
    AWSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 0 N N N N N N N
    N N (LTID ISDN 501) $
TABLE LTCALLS
ISDN 501 FX XLALEC 0 $
TABLE LINEATTR
0 IBN NONE NT NSCR 0 100 POTS NLCA NONE N 0 NIL NILSFC
    NILLATA 0 NIL NIL 00 N
TABLE STDPRT
POTS (1) (0)
    *     SUBTABLE STDPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  N NP 0 NA
    *     SUBTABLE AMAPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  NONE  N
TABLE HNPACONT
100 64 0 (19) (1) (0)
    *     SUBTABLE HNPACODE
    *     20 21 HNPA 0
    *     22 29 DN 200 299
TABLE THOUGRP
200 299 3 Y C
TABLE DN
200 299 3333 L HOST 00 0 00 28
```

```
+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                    2002993333

TRETAMENT ROUTES:   TREATMENT IS GNCT
1 T120


+++TRAVER: SUCCESSFUL CALL TRACE +++
```

INWATS call type TRAVER

The following TRAVER is an example of an INWATS ISA call:

```
traver tr d100ad100apr e 164 2002203333 iwt  b

TABLE TRKGRP
D100AD100APR IBNT2 0 NPDGP NCRT COMKODAK 0 ASEQ 5 N
    AWSDISC 0 Y N N N N N Y Y 0 10 N 0 0 0 0 N N N N N N N
    N N (LTID ISDN 501) $
TABLE LTCALLS
ISDN 501 INWATS XLAIBN 0 COMKODAL 0 5 $
TABLE LINEATTR
0 IBN NONE NT NSCR 0 100 POTS NLCA NONE N 0 NIL NILSFC
    NILLATA 0 NIL NIL 00 N
TABLE STDPRT
POTS (1) (0)
    *     SUBTABLE STDPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  N NP 0 NA
    *     SUBTABLE AMAPRT
    *     KEY NOT FOUND
    *     DEFAULT VALUE IS:  NONE  N
TABLE HNPACONT
100 64 0 (19) (1) (0)
    *     SUBTABLE HNPACODE
    *     20 21 HNPA 0
    *     22 29 DN 200 299
```

```
TABLE THOUGRP
200 299 3 Y C
TABLE DN
200 299 3333 L HOST 00 0 00 28


+++ TRAVER: SUCCESSFUL CALL TRACE +++


DIGIT TRANSLATION ROUTES

1 LINE                    2002993333

TRETAMENT ROUTES:   TREATMENT IS GNCT
1 T120


+++TRAVER: SUCCESSFUL CALL TRACE +++
```

Billing information

For ISA you must set billing options for three call types: PVT, TIE, and FX. The DMS-100 determines the billing based on the call type field in Table LTCALLS. The following table shows the billing options for ISA call types.

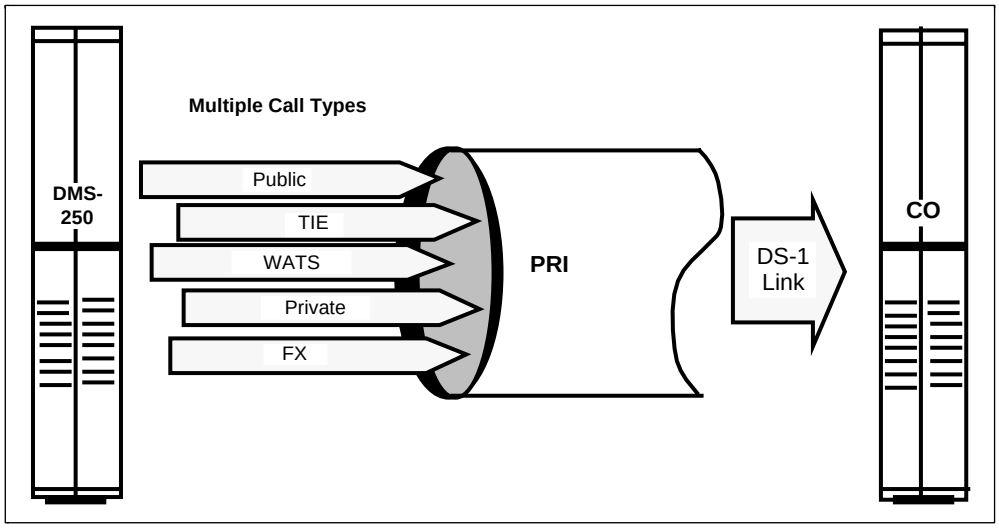
Table 22
DMS-100 ISA billing options

ISA Call Type	Billing Option
PUB	None
PVT	Tandem TIE Trunk
OUTWATS	None
INWATS	None
TIE	Tandem TIE Trunk
FX	FX

DMS-250 perspective

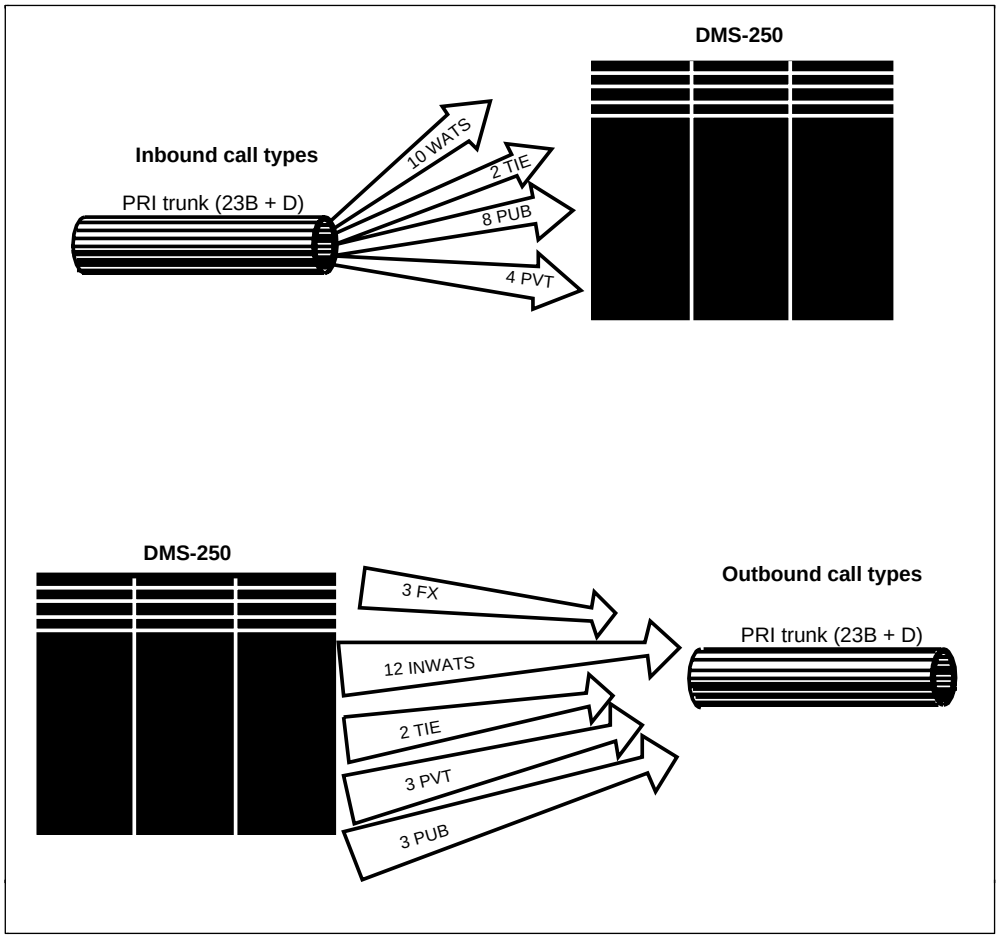
Integrated Services Access (ISA) gives the DMS-250 the ability to combine calls of different types on a single PRI trunk group. The available call types include PUBLIC, PRIVATE, OUTWATS, INWATS, FX, or TIE. This allows call-by-call service selection and provides the capability to match trunk requirements to peak periods of call usage.

Figure 16
DMS-250 Integrated Services Access on PRI



For example, PRI B-channels could be adjusted to allow a telemarketer more INWATS calls when needed, as shown in the following diagram.

Figure 17
Varying DMS-250 B-channel allocation by call type



Selection of call type is made on a per-call basis, which provides a service-based architecture. A SETUP message is sent with each ISA call. This message includes information elements which the DMS-250 uses to determine call type. Control of ISA features is accomplished by adding or modifying the DMS 250 datafill through existing tables.

The minimum and maximum number of each call type on the PRI trunk is determined through datafill at the originating switch.

Connectivity

The DMS-250 provides ISA over the Primary Rate Interface between the following products:

- DMS-250 to SL-1
- DMS-250 to SL-100

Hardware provisioning

The DMS-250 must be provisioned for ISDN PRI capability, including the ISDN Digital Trunk Controller (DTCI) for BCS 30 and later.

Software provisioning

ISA requires feature package NTXL09AA and Batch Change Supplement (BCS) 30 or later. The components of NTXL09AA are:

- LTCALLS Table Control
- CALLATTR Table Control

ISA also uses the following related features:

- Trunk Group Tables for PRI
- Call Processing Environment for ISDN PRI
- PRI 250 to TCAP Interworking

Installation rules

There are no special installation rules for ISA at the network level.

Maintenance rules

There are no special maintenance rules for ISA at the network level.

Datafill considerations

Since ISA is a software feature, correct and accurate datafill is imperative. Although an incoming call defaults to PUBLIC if there is missing ISA data from the call setup request, outgoing calls are blocked unless properly datafilled.

Preliminary datafill

Be sure all PRI-related tables are correctly datafilled before adding ISA-specific data.

The DMS-250 PRI tables include:

- CARRMTC
- LTCINV
- LTCPSINV
- LTGRP
- LTDEF
- LTMAP
- LTCALLS
- TRKGRP
- TRKSGRP
- TRKMEM

ISA datafill

ISA uses the following tables to define, translate, and route calls:

- LTCALLS (Logical Terminal Calls)
- CALLATTR (Call Attributes)
- OFRT (Office Route Table)
- RTEREF (Route Reference Table)

Datafill Sequence

The PRI tables should be filled in the following order:

- CLLI
- CLLICDR
- LTCINV
- LTCPSINV

- CARRMTC
- TRKGRP
- TRKSGRP
- TRKMEM
- LTGRP
- LTDEF
- LTCALLS
- LTMAP
- OFRT
- HNPACONT.RTEREF
- FNPACONT.RTEREF
- FNPACONT.FNPASTS.RTEREF
- MSGRTE

Call type significance

The dialed digits determine trunk selection for non-PRI calls. The DMS-250 routes ISA calls based on the call type datafilled in tables. However, there is no global significance to the call type at any given point. Different legs of the same call may have different call types.

SETUP message

A SETUP message based on the Q.931 protocol is included with each call. The message contains information elements which the DMS-250 uses for translation and routing. The information elements are:

- Bearer Capability (BC)
- Channel ID (CHID)
- Network Specific Facilities (NSF)
- Progress Indicator (PI)
- Calling Party Number (CGN)
- Called Party Number (CDN)

Numbering Plan Indicator

The DMS-250 uses the Numbering Plan Indicator (NPI) for translations. The NPI is part of the CDN element of the SETUP message. There are two values for the NPI: PUBLIC and PRIVATE.

NPI=PUBLIC

When the NPI value is E.164 (PUBLIC), the DMS-250 uses the PSTN facilities to route the call.

NPI=PRIVATE

When the NPI value is PRIVATE, the DMS-250 uses the datafill in existing tables for translations. This datafill includes the use of ESN Information Signal digits. The datafill determines whether PVT or TIE lines will be used to route the call.

Valid NPI/call type combinations

Not all combinations of the NPI and call type are valid. The DMS-250 applies a Feature Not Allowed (FNAL) treatment to originating PRI calls with a disallowed call type. Also, the DMS-250 applies FNAL treatment to calls which are not datafilled in Table LTCALLS.

The following table shows the NPI/call type combinations and results.

Table 23
DMS-250 NPI/call type combinations

Call Types	NPI = PUB (e.164)	NPI = PVT
PUB	Standard HNPA translations using CALLATTR to access translations and screening data.	An inbound call should not use this value. NOT RECOMMENDED.
PVT	On-net translations using CALLATTR to access translations and screening data.	On-net translations using CALLATTR to access translations and screening data.
TIE	TIE services are provided to private network customers only. TIE customers should not use this value, but will not be rejected. NOT RECOMMENDED.	Either: • ISA Route Reference, to choose an outgoing route directly or • On-net translations using CALLATTR

Table 23
DMS-250 NPI/call type combinations (continued)

WATS	Either: • ISA Route Reference, to choose an outgoing route directly or • Standard HNPA translations, using CALLATTR	Outward WATS does not apply when trying to reach private network subscribers. NOT RECOMMENDED.
INWATS	Not provided by this release of PRI on the DMS-250. PROTOCOL ERROR.	Not provided by this release of PRI on the DMS-250. PROTOCOL ERROR.
FX	Not provided by this release of PRI on the DMS-250. PROTOCOL ERROR.	Not provided by this release of PRI on the DMS-250. PROTOCOL ERROR.

Network Specific Facilities element

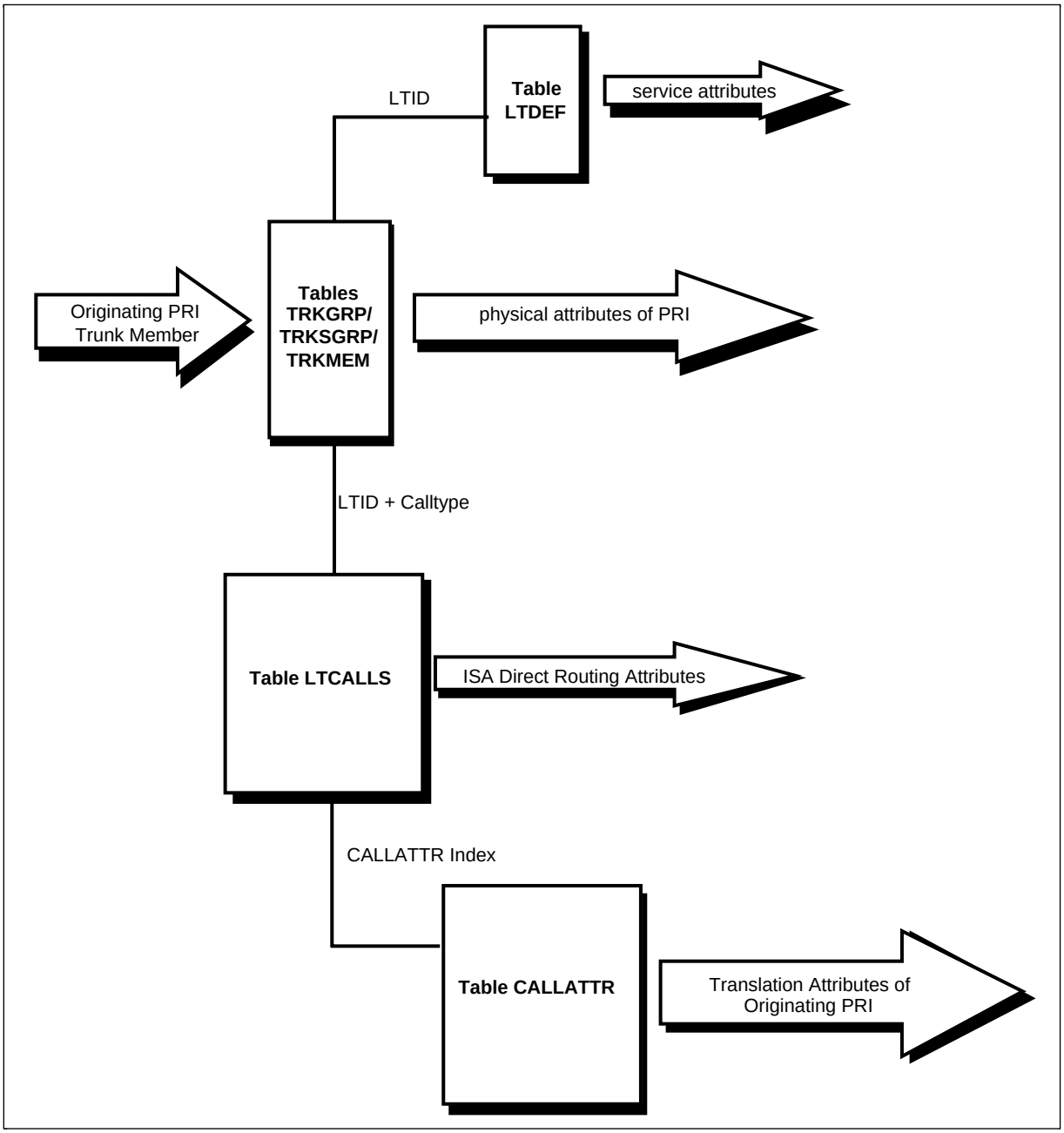
The Network Specific Facilities (NSF) element indicates which type of service a call requires. The NSF contains two elements:

- The Service Selector (Binary Code Facility Coding Value) specifies the type of service requested, such as TIE, WATS, FX.
- The Service Identifier (SID) is an optional element which specifies the actual facility used to route the call. This element is not supported on the DMS-250 until BCS 31 (limited availability).

Originating ISA table flow

The following diagram shows the DMS-250 tables used when a PRI trunk member originates an ISA call.

Figure 18
Originating ISA table flow (DMS-250)



IEC translations vs. ISA routing

The DMS-250 processes incoming calls using either Interexchange Carrier (IEC) translation and routing, or ISA direct routing. The craftsperson has the option of choosing the routing method best suited to the needs of the PRI.

IEC translations and routing (XLAIEC)

This method uses the existing set of procedures for DMS-250 digit interpretation, translations, screening, and routing. The XLAIEC selector provides an index to the appropriate tables.

ISA route reference routing (ISA RTEREF)

This method routes calls immediately after authcode screening, without the need for digit interpretation or translation. This results in a substantial decrease in call completion time. The use of ISA routing does not, however, preclude authcode verification or other types of screening and routing.

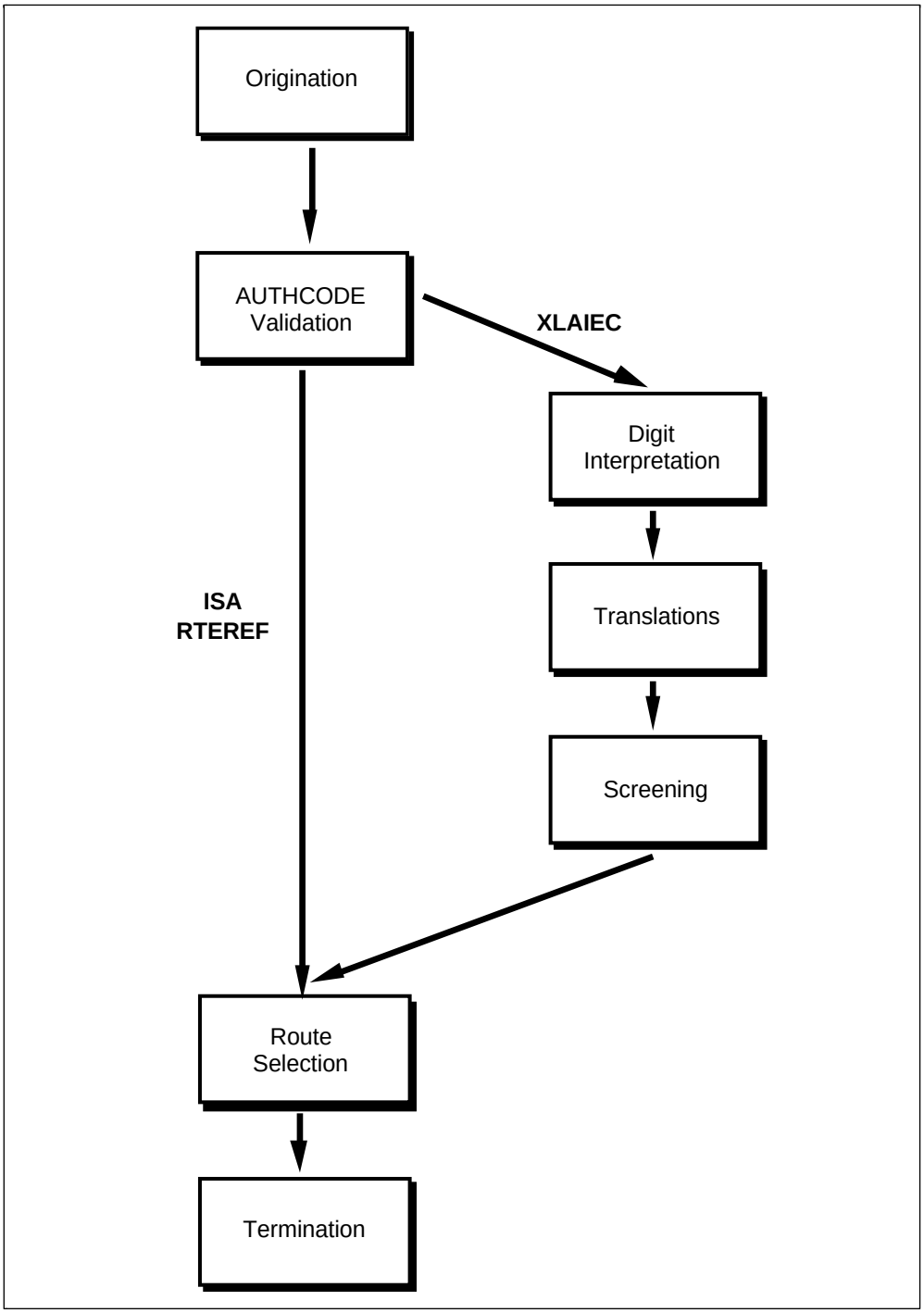
Call flow and datafill

IEC and ISA routing can be mixed over a PRI interface. For example, the craftsperson may specify IEC translations for private and public calls (by omitting the RTEREF field), while TIE calls use ISA routing. TIE calls are especially suited to ISA routing since use of the RTEREF parameter provides a “virtual nailed-up” connection between the originator and terminator. This essentially provides the originator with a dedicated connection to the terminator.

Assignment of a call to XLAIEC or ISA RTEREF is based on call type and is datafilled in Table LTCALLS. Datafill the XLARTE selector with XLAIEC to specify that the call type will receive translation and routing information from the IEC translations tables. Datafill the RTEREF field with a routing index to specify that the call type should be routed directly without translation or screening. RTEREF is an optional field and should be datafilled with “$” if unused.

The following figure shows the difference in call flow between the two types of routing.

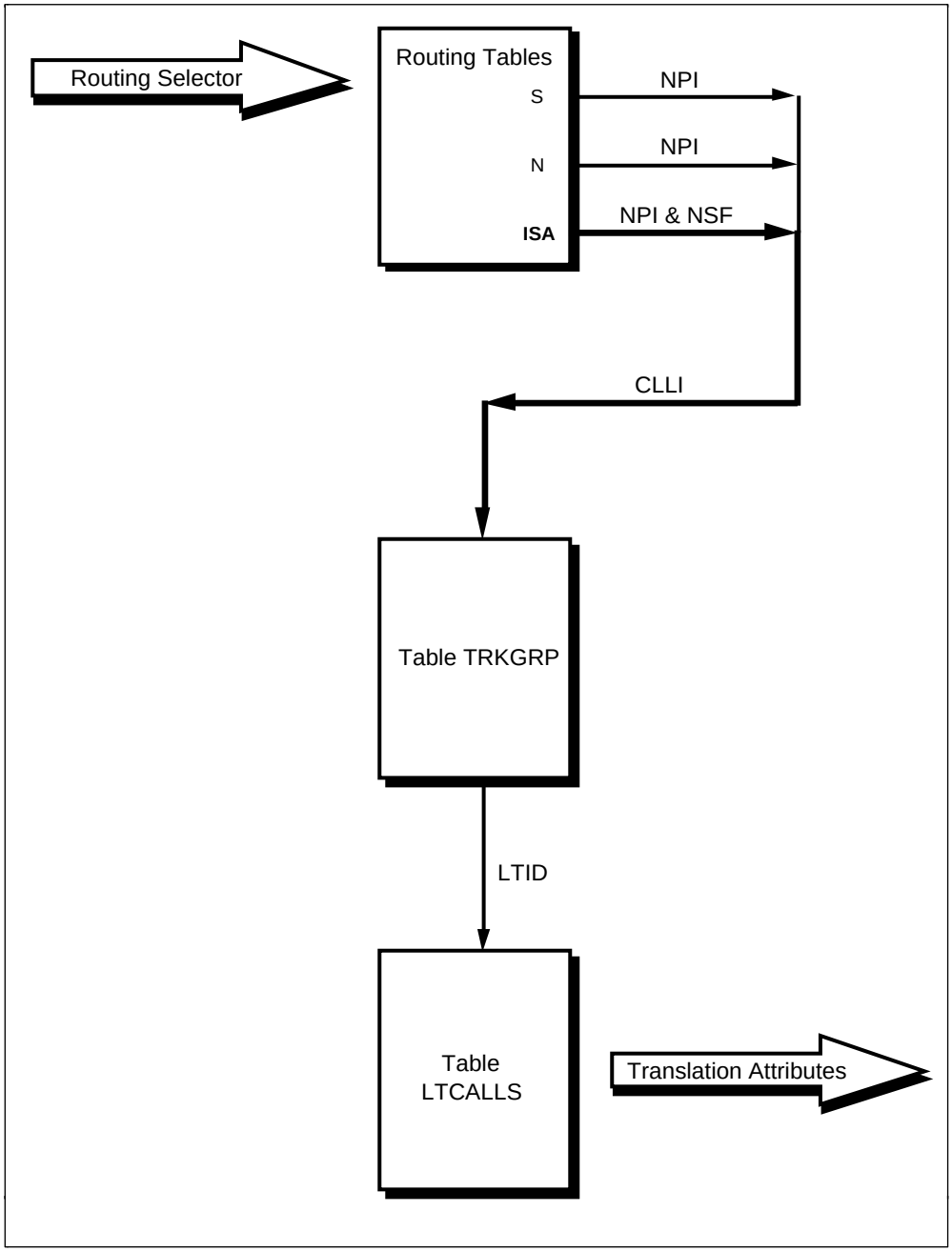
Figure 19
DMS-250 IEC translations vs. ISA routing



Terminating ISA table flow

The following figure shows the DMS-250 tables used when a PRI trunk member terminates an ISA call.

Figure 20
Terminating ISA table flow (DMS-250)



Logical terminal tables

The logical terminal tables provide the DMS-250 with identification, service, and translation information about the terminals connected to a Primary Rate Interface (PRI).

The Logical Terminal tables should be datafilled in the following order:

- LTGRP
- LTDEF
- LTCALLS
- CALLATTR
- LTMAP

The following figure shows the tables that define the physical attributes of an ISA member, where the service attributes are obtained, and finally, where the translation attributes are obtained. An explanation of the datafill for each table follows the figure.

Figure 21
DMS-250 Logical terminal tables

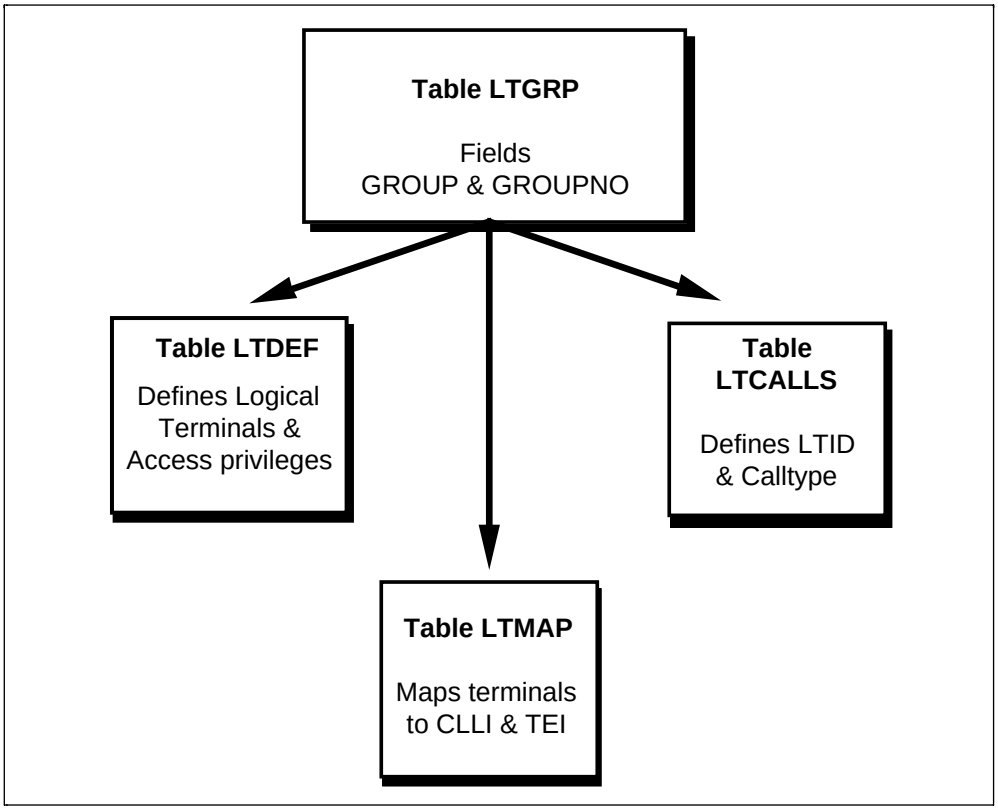


Table LTGRP

Table LTGRP defines a logical terminal group based on terminal type. The options field defines the terminal type for each group. For PRI, the group “ISDN” is automatically filled as a permanent entry and cannot be changed or deleted.

Table LTGRP must be datafilled before Tables LTDEF, LTCALLS, and LTMAP.

The following table shows the fields and values for Table LTGRP.

Table 24
DMS-250 Table LTGRP parameters

Field Name	Range of Values	Default value	Description
GROUP	8 characters: A-Z, 0-9	ISDN	Name of a group of logical terminals
GROUPNO	0-31	Default group ISDN is automatically assigned GROUPNO 0.	Number assigned to a group name
OPTIONS	$	$	The type of terminals allowed in a group.

The GROUP field is an important element in four other Logical Terminal tables: LTDEF, LTMAP, and LTCALLS. These four tables control how the DMS-250 processes ISA calls. The datafill for these tables must match the value for GROUP in Table TRKGRP. The DMS-250 does not automatically enter or update the fields in these related tables.

Example of datafill

The following tuple is an example of the datafill for Table LTGRP:

```
group  groupno  options
ISDN     0        $
```

Table LTDEF

Table LTDEF defines logical terminals and specifies access privileges. The following table shows the fields and values for Table LTDEF.

Table 25
DMS-250 Table LTDEF parameters

Field Name	Range of Values	Description
LTKEY		Consists of subfields LTGRP and LTNUM
(subfield) LTGRP	alphanumeric, 8 characters	The name of the logical terminal group. Must match GROUP field in Table LTGRP.
(subfield) LTNUM	1-1022	Assigns a number to individual terminals within groups.
LTAP	B, D, BD, PB	Assigns the access privilege for each terminal: B = circuit switched; D = D-channel packet switched; BD = combined switching; PB = B-channel packet switching
LTCLASS	PRA	Assigns the set of services allowed for a terminal. ISA requires PRI.

When the value of LTCLASS is specified as PRA, the subfields shown in the following table appear.

Table 26
DMS-250 LTCLASS subfields

Subfield Name	Range of Values	Description
NUMBCHNL	1-479	The number of B-channels this terminal can use at one time.
NUMCALLS	1-479	Number of calls allowed on the interface. Must be greater than or equal to the sum of INCCALLS and OUTCALLS.
INCCALLS	0-479	The number of reserved incoming-only calls allowed at one time. (Not used at this time)
OUTCALLS	0-479	The number of reserved outgoing-only calls allowed at one time. (Not used at this time)
OPTION	NOPMD	Always set to NOPMD (No packet mode data calls)

Example of datafill

The following tuple is an example of the datafill for Table LTDEF:

```
ltgrp  ltnum  ltap   ltclass
ISDN    7     B     PRI 6 6 3 2 NOPMD  $
```

Table LTCALLS

Table LTCALLS creates the Logical Terminal Identifier (LTID) from the LTGRP and LTNUM values. This table also assigns a call type to each terminal, and controls ISA translations.

Tables STDPRTCT, HNPACONT, OFRT, LTGRP, and LTDEF must be datafilled before LTCALLS.

The following table shows the fields and values for Table LTCALLS.

Note: You must datafill Table LTCALLS for both incoming and outgoing calls.

Table 28
DMS-250 Table LTCALLS parameters

Field Name	Range of Values	Description
LTID	alphanumeric	Logical Terminal Identifier. Consists of the subfields LTGRP, LTNUM, and CALLTYPE.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name. Must match the values in Tables LTGRP, LTDEF, and LTMAP.
(subfield) LTNUM	1-1022	The Logical Terminal number of the member within the group. Must match the values in Tables, LTGRP, LTDEF, and LTMAP.
(subfield) CALLTYPE	PUB, PVT, WATS, INWATS, FX, TIE	Defines the call type assigned to a terminal. PUB = Public; PVT = Private; WATS = Outbound WATS; INWATS = Inbound WATS; FX = Foreign Exchange (Outbound only); TIE = Private lines between PBXs.
XLARTE	XLAIEC	Selects the Translation Route. XLAIEC = Inter Exchange Carrier;
(subfield) CALLATTR	0-2047	Call Attributes Index. Provides a numerical index into Table CALLATTR.
(subfield) RTEID	OFRT and index, $	Route Reference. (optional field) Selects the outgoing route for all calls originating against the LTID with a given calltype. Entering $ indicates no RTEID desired.

Example of datafill

The following tuple is an example of the datafill for Table LTCALLS:

```
          LTID
ltgrp   ltnum   calltype    xlarte   callattr   rteref
ISDN      7       PVT       XLAIEC     25         $

ISDN      10      TIE       XLAIEC     32      OFRT 123
```

Table LTMAP

Table LTMAP maps the logical terminals defined in the previous tables to a trunk group CLLI. This table also uses the LTKEY used in the previous logical terminal tables, and must be datafilled with the same values found in LTGRP and LTNUM for a given tuple.

Table LTMAP must be datafilled after Tables LTGRP, LTDEF, and LTCALLS.

The following table shows the fields and values for Table LTMAP.

Table 29
DMS-250 Table LTMAP parameters

Field Name	Range of Values	Description
LTKEY	alphanumeric	Logical Terminal Key. Consists of the subfields LTGRP and LTNUM.
(subfield) LTGRP	alphanumeric, 8 characters	Logical Terminal Group name.
(subfield) LTNUM	1-1022	The Logical Terminal Number of the member within the group.
MAPPING	LEN, CLLI	Logical Terminal Mapping. For PRI, the mapping must be to CLLI.
CLLI	alphanumeric, 16 characters	The Common Language Location Identifier of the PRI trunk to which the terminal is assigned.
OPTION	TEI	Option. TEI = Terminal Endpoint Identifier
(subfield) TEI	0-63	Terminal Endpoint Identifier number. Must be entered as TEI 0

Example of datafill

The following tuple is an example of the datafill for Table LTMAP:

```
ltgrp  ltnum  mapping         options
ISDN    7    CLLI DAL349VA  TEI 0 $
```

Routing ISA calls

The DMS-250 obtains ISA routing information from Tables OFRT and RTEREF. These tables are indexed by ISA routing selectors contained in Table LTCALLS. The ISA routing selector uses the Common Language Location Identifier (CLLI) to route calls to a specific trunk group

Table OFRT can provide routing for POTS and PRI calls. Table RTEREF is a subtable of Tables HNPACONT, FNPACONT, and FNPACONT.FNPASTS.

Table RTEREF

The following chart shows the fields and values for Table RTEREF when the RTESEL is ISA.

Table 30
DMS-250 Table RTEREF parameters for RTESEL = ISA

Field Name	Range of Values	Description
RTESEL	ISA, N, S	Route Selector (values for the N & S selectors are not shown)
OHQ	NO, YES	Selects off-hook queuing. Set to NO. (Not supported)
CBQ	NO, YES	Selects call-back queuing. Set to NO. (Not supported)
EXP	NO, YES	Designates this route as expensive. Set to NO. (Not supported)
CLLI	alphanumeric, 16 characters	Designates the PRI trunk group that routing terminates on. ***Note***: Only CLLIs defined as PRI (in Table CLLI) are valid entries in this field.
CALLTYPE	TIE, INWATS, WATS, FX, PVT, PUB	ISA call type
(subfield) FX, TIE		
FACNUM	0-1023	The facility number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) WATS		
ZONE	0-9, A, B, C, AUTO	OUTWATS Zone Number to be included in NSF selector
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) INWATS		

Table 30
DMS-250 Table RTEREF parameters for RTESEL = ISA (continued)

DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PVT		
NPI	E164, PVT	Selects type of numbering plan
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission
(subfield) PUB		
OATYPE	NONE, 0P, 0M	Type of Operator Access required. Set to NONE.
TNS	0-999, N, C	Transit Network Number to be requested in SETUP message.Set to N. (Not supported)
DMI	0-32767	Digit Manipulation Index - used to modify CDN before transmission

Example of datafill

The following tuple shows an example of the datafill for Tables OFRT and RTEREF.

```
rtesel   ohq  cbq  exp   clli      calltype
                                              FACNUM  DMI
ISA       N    N    N    DAL349VA    TIE        402    0
```

Operational measurement considerations

There are no operational measurement considerations for ISA on PRI.

Log considerations

There are no log considerations for ISA on PRI.

Service order considerations

There are no service order considerations for ISA on PRI.

Testing considerations

Testing of ISA calls requires functioning PRI hardware with an ISDN Digital Trunk Controller (DTCI).

A valid PRI trunk must be used to test an ISA originating and terminating call for each of the six call types (PUB, PVT, WATS, INWATS, FX, and TIE). The Translations Verification (TRAVER) can be performed first to check datafill. However, a successful TRAVER does not necessarily indicate that a call completed. Use TRAVER as part of complete testing plan, not a guarantee. Each call must be verified by actual completion.

Call type verification

This section gives information on using the table routing selectors to establish a test route for each originating and terminating call type. Remember that the test call must use a valid PRI trunk. Check the datafill in all PRI-related tables, as well as those specific to ISA.

Public call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIEC. Be sure the CALLTYPE selector is set to PUB and verify that a call completes using this route.

Public call type verification (terminating PRI)

- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table OFRT.

Private call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIEC. Be sure the CALLTYPE selector is set to PVT and verify that a call completes using this route.

Private call type verification (terminating PRI)

- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table RTEREF.

- Set the NPI to PVT. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.
- Set the NPI to E164. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Set the NPI to E164. Verify that a PVT ISA call completes to a PRI trunk using a route defined in Table OFRT.

OUTWATS call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIEC. Be sure the CALLTYPE selector is set to WATS and verify that a call completes using this route.

INWATS call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIEC. Be sure the CALLTYPE selector is set to WATS and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is et to WATS and verify that a call completes using this route.

TIE call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to XLAIEC. Be sure the CALLTYPE selector is set to TIE and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is et to TIE and verify that a call completes using this route.

TIE call type verification (terminating PRI)

- Verify that a TIE ISA call completes to a PRI trunk using a route defined in Table RTEREF.

FX call type verification (originating PRI)

- Set the XLARTE selector in Table LTCALLS to to XLAIEC. Be sure the CALLTYPE selector is set to FX and verify that a call completes using this route.
- Set the XLARTE selector in Table LTCALLS to RTEREF. Be sure the CALLTYPE selector is set to FX and verify that a call completes using this route.

FX call type verification (terminating PRI)

- Verify that a FX ISA call completes to a PRI trunk using a route defined in Table RTEREF.
- Verify that a PUB ISA call completes to a PRI trunk using a route defined in Table defined in Table OFRT.

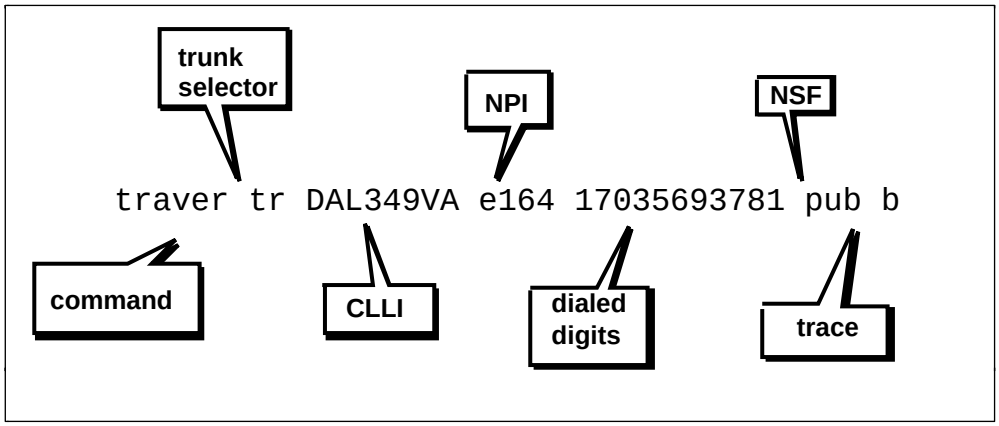
Translation verification (TRAVER)

A TRAVER should be run for PRI calls of each call type. Note that the DMS-250 supports TRAVER for incoming call types only. The format for entering a TRAVER from the MAP is:

```
traver <ORIG> <NPI> <DIGITS> <OPT> <TRACE>
```

For example:

Figure 22
Sample DMS-250 TRAVER command format



The following table shows the range of values and descriptions of the parameters of a TRAVER.

Table 31
DMS-250 TRAVER parameters and values

Parameter	Range of Values	Description
ORIG trunk		CLLI Name
NPI	E164, PVT, PUB	Numbering Plan Indicator
Digits	string	Called Party Number
OPT NSF FACNUM ZONE BC	 FX, TIE, WATS, PUB, PVT 0-1023 (FX & TIE only) 0-9, A, B, C (OWT only) string ?	Options Network Specific Facility Facility Number OUTWATS Zone Bearer Capability
TRACE	T, NT, B	T - Trace all tables used NT - Display outpulsed digits B - Display tables and digits

Sample TRAVERs

The following examples show sample TRAVERs for each ISA call type. Note that the DMS-250 only supports TRAVERs for incoming call types.

Incoming public call type TRAVER

```
traver tr d250as100apr 4114235900 b

STS USED FOR TRAVER IS: 230
TABLE STSTOPAR
230 11 10
TABLE TRKGRP
D250AS100APR PRA250 0 NPDGP NCRT USSPRINT N 0 4 N
VOICE_DATA N N N ASEQ N NIL 0
    N 214 0 (ISDN 1) $
TABLE LTCALLS
ISDN 1 PUB XLAIEC 1 $ $
TABLE CALLATTR
```

```
1 USSPRINT 10 N CLID 2002990000 ALWAYS N APRT 0 NSCR NONE
NIL
TABLE STDPRTCT
APRT ( 1) ( 0)
 . SUBTABLE STDPRT
 . 411 411 CT ONNET 10 10 0
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
230 128 0 ( 14) ( 1) ( 0) ( 0)
 . SUBTABLE HNPACODE
 . 41 41 HNPA 0
 . 423 425 LRTE 2
 . SUBTABLE RTEREF
 .    2 N D D250AD250CS7 0 N N
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

STS USED FOR TRAVER IS: 230

DIGIT TRANSLATION ROUTES

1 D250AD250CS7          4114235900         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

Incoming private call type TRAVER

```
traver tr d250as100apr 4114235900 prvt b

STS USED FOR TRAVER IS: 230
TABLE STSTOPAR
230 11 10
TABLE TRKGRP
D250AS100APR PRA250 0 NPDGP NCRT USSPRINT N 0 4 N
VOICE_DATA N N N ASEQ N NIL 0
    N 214 0 (ISDN 1) $
TABLE LTCALLS
ISDN 1 PVT XLAIEC 1 $ $
TABLE CALLATTR
```

```
1 USSPRINT 10 N CLID 2002990000 ALWAYS N APRT 0 NSCR NONE
NIL
TABLE STDPRTCT
APRT ( 1) ( 0)
 . SUBTABLE STDPRT
 . 411 411 CT ONNET 10 10 0
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
230 128 0 ( 14) ( 1) ( 0) ( 0)
 . SUBTABLE HNPACODE
 . 41 41 HNPA 0
 . 423 425 LRTE 2
 . SUBTABLE RTEREF
 .    2 N D D250AD250CS7 0 N N
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

STS USED FOR TRAVER IS: 230

DIGIT TRANSLATION ROUTES

1 D250AD250CS7          4114235900         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

TIE call type TRAVER

```
traver tr d250as100apr 4114235900 tie b

STS USED FOR TRAVER IS: 230
TABLE STSTOPAR
230 11 10
TABLE TRKGRP
D250AS100APR PRA250 0 NPDGP NCRT USSPRINT N 0 4 N
VOICE_DATA N N N ASEQ N NIL 0
    N 214 0 (ISDN 1) $
TABLE LTCALLS
ISDN 1 TIE XLAIEC 1 $ $
TABLE CALLATTR
```

```
1 USSPRINT 10 N CLID 2002990000 ALWAYS N APRT 0 NSCR NONE
NIL
TABLE STDPRTCT
APRT ( 1) ( 0)
 . SUBTABLE STDPRT
 . 411 411 CT ONNET 10 10 0
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
230 128 0 ( 14) ( 1) ( 0) ( 0)
 . SUBTABLE HNPACODE
 . 41 41 HNPA 0
 . 423 425 LRTE 2
 . SUBTABLE RTEREF
 .    2 N D D250AD250CS7 0 N N
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

STS USED FOR TRAVER IS: 230

DIGIT TRANSLATION ROUTES

1 D250AD250CS7          4114235900         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

INWATS call type TRAVER

```
traver tr d250as100apr 4114235900 iwt b

STS USED FOR TRAVER IS: 230
TABLE STSTOPAR
230 11 10
TABLE TRKGRP
D250AS100APR PRA250 0 NPDGP NCRT USSPRINT N 0 4 N
VOICE_DATA N N N ASEQ N NIL 0
    N 214 0 (ISDN 1) $
TABLE LTCALLS
ISDN 1 INWATS XLAIEC 1 $ $
TABLE CALLATTR
```

```
1 USSPRINT 10 N CLID 2002990000 ALWAYS N APRT 0 NSCR NONE
NIL
TABLE STDPRTCT
APRT ( 1) ( 0)
 . SUBTABLE STDPRT
 . 411 411 CT ONNET 10 10 0
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
230 128 0 ( 14) ( 1) ( 0) ( 0)
 . SUBTABLE HNPACODE
 . 41 41 HNPA 0
 . 423 425 LRTE 2
 . SUBTABLE RTEREF
 .    2 N D D250AD250CS7 0 N N
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

STS USED FOR TRAVER IS: 230

DIGIT TRANSLATION ROUTES

1 D250AD250CS7          4114235900         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

OUTWATS call type TRAVER

```
traver tr d250as100apr 4114235900 owt none b

STS USED FOR TRAVER IS: 230
TABLE STSTOPAR
230 11 10
TABLE TRKGRP
D250AS100APR PRA250 0 NPDGP NCRT USSPRINT N 0 4 N
VOICE_DATA N N N ASEQ N NIL 0
    N 214 0 (ISDN 1) $
TABLE LTCALLS
ISDN 1 WATS XLAIEC 1 $ $
TABLE CALLATTR
1 USSPRINT 10 N CLID 2002990000 ALWAYS N APRT 0 NSCR NONE
NIL
TABLE STDPRTCT
APRT ( 1) ( 0)
 . SUBTABLE STDPRT
 . 411 411 CT ONNET 10 10 0
 . SUBTABLE AMAPRT
 . KEY NOT FOUND
 . DEFAULT VALUE IS:   NONE OVRNONE  N
TABLE HNPACONT
230 128 0 ( 14) ( 1) ( 0) ( 0)
 . SUBTABLE HNPACODE
 . 41 41 HNPA 0
 . 423 425 LRTE 2
 . SUBTABLE RTEREF
 .    2 N D D250AD250CS7 0 N N
 . EXIT TABLE RTEREF
EXIT TABLE HNPACONT

+++ TRAVER: SUCCESSFUL CALL TRACE +++

STS USED FOR TRAVER IS: 230

DIGIT TRANSLATION ROUTES

1 D250AD250CS7          4114235900         ST

TREATMENT ROUTES.  TREATMENT IS: GNCT
1 T120

+++ TRAVER: SUCCESSFUL CALL TRACE +++
```

ESN Signaling Summary

The use and support of ESN signaling on the DMS-250 is network-specific. This section describes requirements and considerations for ESN signaling on a valid private network over PRI links.

Note: The DMS-250 provides only basic call services for ESN on PRI. The full set of ESN features is not supported.

Requirements

ESN signaling over PRI links requires BCS 29 or later and the standard PRI feature packages.

Implementation

ESN is supported only over PRA250 trunks for direct links to a PBX, or shared IMT or ETN-IMT trunks for transit calls (ESN pass-through).

ESN support is accomplished by manipulation of the Called Number (CDN) digits in the following manner:

- The DMS-250 converts the TCOS from an incoming ESN call to a COS index for COS screening. (COS screening is optional)
- The DMS-250 converts the COS index from an outgoing ESN call to a TCOS. The TCOS is then appended to the end of the dialed digits for outpulsing.

The DMS-250 transports ESN TCOS over the following facilities:

- Incoming PRI trunks
- Outgoing PRI trunks
- Incoming ETN/Shared IMT (ISUP or PTS trunks)
- Outgoing ETN/Shared IMT (ISUP or PTS trunks)

Networking considerations

The TCOS + address dialing plan is supported.

Datafill considerations

Table CALLATTR, indexed by the CALLATTR field in Table LTCALLS, identifies an ESN call with the PRIVDIAL field. Table FRLCOS maps the TCOS to a COS index for incoming calls, or maps the COS to a TCOS for outgoing calls.

To ensure that the TCOS is passed through the network, be sure that:

- In Table FRLCOS, none of the eight COS indexes within a tuple are set to 0 for the associated OPART. The original TCOS could be lost or converted to 7.

- If a call is routed through a shared IMT, then both switches must have the same FRLCOS datafill for the same OPART.

When interworking with ETN/shared IMT, a default FRL value can be obtained from OFCVAR if it is not available from Table FRLCOS.

Note: An ESN TCOS is equivalent to an ETN FRLCOS (Facility Restriction Level COS). No digit translation capability is provided.

Table FRLCOS datafill

The following table shows the datafill required to map an FRL or TCOS to a COS for COS screening. Up to 801 combinations are allowed.

Note 1: The same COS index cannot be assigned to more than one FRLK within a tuple (i.e., per OPART key).

Note 2: Each entry in the table maps eight FRLs/TCOSs to one COS.

Note 3: This table is bi-directional, allowing access to either the associated FRL or COS for that OPART.

Table 33
DMS-250 Table FRLCOS datafill

Field	Entry
OPART	0-800
FRL0COS	0-1023
FRL1COS	0-1023
FRL2COS	0-1023
FRL3COS	0-1023
FRL4COS	0-1023
FRL5COS	0-1023
FRL6COS	0-1023
FRL7COS	0-1023

DMS-250 ESN call processing

Call processing for incoming ESN calls involves the following:

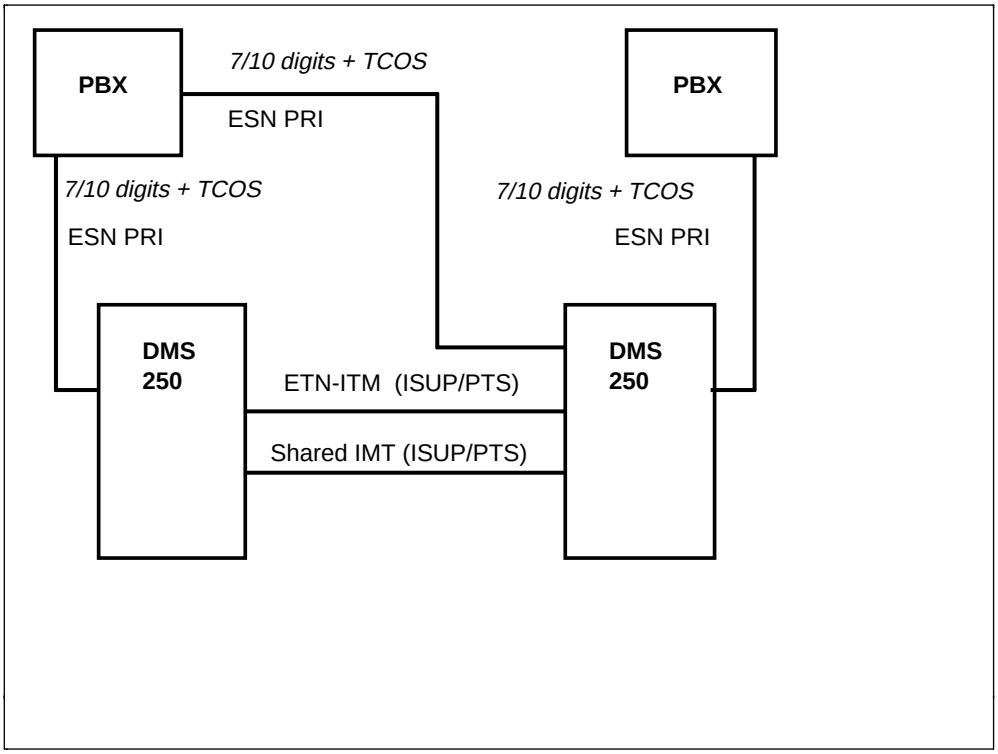
- The authcode is validated by VAUTHFLD in Table CALLATTR. This table is referenced by the LTID and call type provided by Table LTCALLS.
- Field PRIVDIAL in Table CALLATTR is checked. If PRIVDIAL = ESN, the call must have a PRIVATE call type, or a call treatment is invoked.

- If PRIVDIAL = NIL, then basic call screening is performed.
- If PRIVDIAL = ESN, COS screening is performed. The TCOS (the last digit received in the SETUP message) and the OPART (from the authcode table) are used to index Table FRLCOS. This provides the COS index used for COS screening. If the OPART is not datafilled, a COS index of 0 is generated and no COS screening is performed.

DMS-250 ESN connection capabilities

The following figure shows the connection capabilities provided by the DMS-250.

Figure 23
DMS-250 ESN TCOS on PRI trunks



DMS/Meridian

MCDN Integrated Services Access

Network Services Guide

Address comments to:
MCDN Program Manager
2435 N. Central Expwy.
Richardson, TX 75080

NTP 555-8001-102
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