Meridian 1

International Loss and Level Plan

Planning and engineering

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Issue 2.00. Standard. X11 Release 20, updated to include Release 20 features:

- Dynamic Loss Switching for Analog Line Units,
- Extended Off-premises Station (XOPS) line card,
- M1 IPE Loss Plan for China, and
- update Digital Trunk Interface, Primary Rate Interface, and Basic Rate Interface pad table implementation information.

July 1993

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- Generic XFCOT information added.

Contents

About this document

Reference list

The following are the references in this section:

- *Summary of transmission parameters (553-2201-182)*

This document is a guideline to assist in the installation of Meridian 1 in countries not on the North American continent.

Nortel Networks technical publication *Summary of transmission parameters (553-2201-182)* release 6.0 or later describes and defines general transmission concepts. This document takes the transmission concepts described in the aforementioned document and cross-references them to the appropriate Meridian 1 feature. Along with the cross-reference is a summary of how to administer the feature.

Introduction

The Meridian 1 is capable of meeting transmission requirements worldwide.

Government agencies define the transmission requirements that all equipment installed in that country must meet.

Configuring the Meridian 1 to meet country-specific requirements occurs during installation. If changes to the transmission settings must occur after installation, contact a Nortel Networks transmission specialist to help with the changes.

In the Meridian 1 an algorithm called the Loss and Level Plan controls the port-to-port loss between two ports or the signal level at any given port based on the port types involved in the connection. This plan is country-specific; therefore, within a given country, the plan controls the insertion and value of pads necessary to comply with the loss and level requirements of that country.

Transmission level adjustment

Introduction

Meridian 1 Peripheral Equipment (PE) cards meet a predetermined transmission level standard. The insertion of a pad in the transmission path on Existing Peripheral Equipment (EPE) and Intelligent Peripheral Equipment (IPE) cards or the alteration of the card loss on Flexible IPE cards changes the level.

Pads alter the power level of signals applied to them. Pads may either attenuate or amplify the applied signal. The term "*loss*" means the pad attenuates the signal. The term "*gain*" means the pad amplifies the signal. The use of pads ensures the power level is within acceptable limits at the far end. Far end, in this case, refers to the port connected to within the PBX. Application of pads may be in both the transmit and receive directions of a transmission path and the two pads are likely to be of different value.

With the introduction of Flexible IPE cards using B34 codecs, level adjustments are achieved by altering the card loss. The card loss acts in the same manner as a pad, i.e., it may provide gain or loss. This is achieved by scaling of the digitized signal.

The following Meridian 1 components have transmission adjustment capabilities:

— Existing Peripheral Equipment (EPE) Off-Premises Station (OPS) line cards (called OPX in pre-Release 20 versions),

— conference cards,

— analog trunk cards,

— digital trunk cards,

— B34 codec equipped International Intelligent Peripheral Equipment (IPE) Extended Flexible Analog Line Cards (XFALC); Extended Central Office Trunk Cards (XCOT), Extended Direct Inward Dial Cards (XDID), and Extended Flexible E&M Cards (XFEM) in Australia, New Zealand and Itlay; Extended Universal Trunk cards for China (XUTC) and XEMC in China,

— Basic Rate Interface Line and Trunk application cards,

— Meridian Modular Telephone sets,

— Extended Off-premises Station (XOPS) line card.

There are two approaches to loss settings. For non-flexible IPE cards, pad values are hardcoded on the card and the pad state required is indicated by a message sent to the card, and which pads are in or out for a particular type of connection are part of a predefined table. For flexible IPE cards, card losses are definable through software (LD 97).

Pad values are predefined on the following:

— Existing Peripheral Equipment (EPE),

— North American and North American based Intelligent Peripheral Equipment (IPE),

— 1.5 Mbit Digital Trunk Interface (DTI)/Primary Rate Interface (PRI) if the GPRI package (167) is *not* equipped,

— International IPE which is *not* equipped with both the B34 codec and "flexible" firmware, and

— Basic Rate Interface Line (BRIL) applications.

Pads and card losses are definable on the following:

— International Flexible IPE equipped with both the B34 codec and "flexible" firmware,

— 1.5 Mbit DTI/PRI if the GPRI package (167) is equipped,

— 2.0 Mbit DTI/PRI,

— Basic Rate Interface Trunk (BRIT) application,

— Meridian Modular Telephone sets, and

— Extended Off-Premises Station (XOPS) line cards, although the current implementation uses fixed software settings (not for China).

There are two basic approaches to loss planning. For the static loss approach the pad is either in or out and is of fixed value for all connection types. For the dynamic approach, the loss is different depending on the port type involved in the connection. In the Meridian 1 an algorithm called the Loss and Level Plan controls the port-to-port loss for the dynamic loss plan. For both static and dynamic plans, the plans are country-specific; therefore, within a given country, the plan controls the insertion and value of pads necessary to comply with the loss and level requirements of that country.

Line cards pads overview

Line cards can be categorized in a number of ways, as EPE or IPE, as flexible or non-flexible (B34 codec equipped or not) and as ONS or OPS class of service (ONP and OPX in pre-Release 20) and the categorizations overlap in some cases. OPS cards, both EPE and IPE, can be configured to function in ONS class of service.

Non-B34 equipped XFALCs are not flexible and are static with respect to loss level settings. B34 equipped XFALCs are flexible (loss is defined in software) but static. Analog line cards in general are static.

The XOPS is B34 equipped and is flexible. In OPS class of service it sets loss dynamically and in ONS class of service it is done statically.

For ONS class of service, non-flexible EPE cards have predefined static loss and flexible IPE cards have software definable downloaded static loss. For OPS class of service, non-flexible cards have predefined dynamic loss, and flexible cards have dynamic loss capability with country specific loss plans hard coded in software.

In general Existing Peripheral Equipment (EPE) line cards, except for the Off-premises Station (OPS) line card, have fixed card losses and no pads or dynamic transmission level adjustment capabilities.

EPE Off-premises Station (OPS) line cards have a fixed card loss and a software controlled 4 dB hardware pad.

With the introduction of B34 codec equipped Flexible Intelligent Peripheral Equipment (IPE) cards and Static Loss Plan Download (SLPD) features in X11 Release 18, the card losses are now defined in software by overlay input. With X11 Release 18 and earlier, dynamic transmission level adjustment capabilities are still only available on EPE OPS line cards.

With Release 20 the XOPS was introduced. The XOPS can be used for both off- and on-premises applications. The XOPS is equipped with the B34 codec, and therefore has the capability of having its card loss defined in software by overlay input for ONS class of service. For OPS class of service, loss is hardcoded in software. The XOPS uses a combination of hardware jumper settings and software configuration to determine its mode of operation. When the XOPS is used in an off-premises mode, the difference between the Base level loss value and the Alternate level loss value is 2 dBr. In X11 Release 20 and later, the Extended Off-Premises Station (XOPS) line cards continue to have dynamic transmission level adjustment capabilities in OPS class of service.

The XOPSC (specifically for China) was also introduced. For OPS class of service, loss is dynamically applied and for ONS class of service it is statically applied. The XOPSC is based on the XOPS described above but has a different loss plan implementation.

The new China Toll package introduced with Release 21 changes the Loss Plan as it applies to toll calls on a DTI2 trunk connection to a 500/2500 set. When a toll call is detected, the loss plan is changed on both the trunk and line cards, and following the completion of the call the change is reversed.

The following tables cross-reference the various line cards to the various Loss and Level Plan features and highlights their interactions. Table 1 cross-references the Off-premises line cards, while Table 2 cross-references all other line cards to Loss and Level Plan features.

Table 1
Off-premises line cards and Loss and Level Plan feature interactions

	Dynamic Pad Switching (DPS)	**Static Loss Plan Download (SLPD)**	**Dynamic Loss Switching**
EPE OPS	Fixed loss and pads on card. Pads switched in for OPS to trunk and OPS to OPS connections.	Not Applicable.	Not Applicable.
XOPS with OPS class of service	Loss dynamically applied. Alternate loss level applied for OPS to trunk and OPS to OPS connections. Base loss level applied to all other connections.	Not recommended. If XOPS installed, each unit would be treated as an ALC unit. Class of Service SHL and LOL determine which loss value, either ALUS or ALUL, to download from the SLPD table.	Not recommended. If XOPS installed, each unit would be treated as an ALC unit. ALU levels would be applied dynamically.
XOPS with ONS class of service	Loss value downloaded. Loss value equivalent to XALC or XMLC in North America.	Not recommended. If XOPS installed, each unit would be treated as an ALC unit. Class of Service SHL and LOL determine which loss value, either ALUS or ALUL, to download from the SLPD table.	Not recommended. If XOPS installed, each unit would be treated as an ALC unit. ALU levels would be applied dynamically.

Table 1
Off-premises line cards and Loss and Level Plan feature interactions

	Dynamic Pad Switching (DPS)	**Static Loss Plan Download (SLPD)**	**Dynamic Loss Switching**
XOPSC with OPS class of service (China)	Not Applicable.	Not Applicable.	Loss dynamically applied. Alternate loss level applied for OPS to trunk and OPS to OPS connections. Base loss level applied to all other connections. Loss is software definable.
XOPSC with ONS class of service (China)	Not Applicable.	Not Applicable.	Loss statically applied except as follows: With Release 21 China Toll package enabled, pad levels are dynamically applied only when the call is a DTI2 call terminating on a 500/2500 set. The ALUS entry is downloaded from the base table. No distinction between SOL and LOL class of service.
Not recommended indicatesthat mixing IPE and EPE cards for could result in a loss plan that is not within specification.			

Table 2
Line cards and Loss and Level Plan feature interactions

	Dynamic Pad Switching (DPS)	**Static Loss Plan Download (SLPD)**	**Dynamic Loss Switching**
EPE Analog Line Cards (500/2500)	Fixed loss on card, no pads. If loss and level adjustment required, it is performed by the port the ALU is connected to. Not Applicable.	Fixed loss on card. Not Applicable.	Fixed loss on card. Not Applicable.
North American ALUs: XALC, XMLC	Fixed loss on card, no pads. If loss and level adjustment required, it is performed by port the ALU is connected to. Not Applicable.	Fixed loss on card. Not Applicable.	Fixed loss on card. Not Applicable.

Table 2
Line cards and Loss and Level Plan feature interactions

	Dynamic Pad Switching (DPS)	**Static Loss Plan Download (SLPD)**	**Dynamic Loss Switching**
non-B34 XFALC	Fixed loss on card. Not Applicable.	Fixed loss on card. Not Applicable.	Fixed loss on card. Not Applicable.
B34 XFALC	Not Applicable.	Loss value downloaded. CLS SHL and LOL determine which loss value, either ALUS or ALUL, to download from the SLPD table.	Loss value downloaded. CLS SHL and LOL determine which loss value, either ALUS or ALUL, to download from the SLPD table.
Chinese ALUs: XALCC XMLCC	Not Applicable.	Not Applicable.	Loss value downloaded. Loss statically applied except as follows: With Release 21 China Toll package enabled, pad levels are dynamically applied only when the call is a DTI2 call terminating on a 500/2500 set. The ALUS entry is downloaded from the base table. No distinction between SHL and LOL class of service.

Conference pads overview

Meridian 1 conference bridge connections that involve three or more conferees that terminate on 2-wire ports have additional loss added. The additional loss compensates the reflection caused by the 2-wire ports. The amount of loss is a function of the number of 2-wire ports and the type of port. See page 35 and Table 8 for details.

Trunk pads overview

The Meridian 1 currently uses four software features to control transmission levels on analog trunk cards. The features are:

— Static Pad Download

— Static Loss Plan Downloading

— Dynamic Pad Switching

— Dynamic Loss Switching

The following tables cross-reference:

— trunk transmission level adjustment features and markets (Table 3), and

— transmission level adjustment features and trunk cards (Table 4).

Table 3
Cross-reference of transmission level adjustment features and markets

	Static Pad Download	Static Loss Plan Downloading	Dynamic Pad Switching	Dynamic Loss Switching
Markets	International countries that use Static Loss Plans, one loss setting is valid for all connection types.	International countries that use Static Loss Plans, one loss setting is valid for all connection types.	North America and countries that use the North American style Loss and Level Plan per-connection level adjustment method. Countries include China (EPE) and Australia (EPE).	International countries that require per-connection level adjustments. Countries supported currently are Australia, New Zealand, and China.

Table 4
Cross-reference of transmission level adjustment features and trunk cards

	Static Pad Download	**Static Loss Plan Downloading**	**Dynamic Pad Switching**	**Dynamic Loss Switching**
Existing Peripheral Equipment (EPE) Trunks	International Fixed card loss only. Pad switching is not supported.	International Fixed card loss only. Pad switching is not supported.	NorthAmerican, Chinese and Australian EPE trunks. Fixed card loss and pads on cards. Pad switching is supported.	Not applicable.
North American IPE Trunks (EXUT, XUT, and XEM)	Not applicable.	Not applicable.	Fixed card loss and pads on cards Pad switching is supported.	Not applicable.
International Generic XFCOT Trunks when NATP = YES	Not applicable.	Not applicable.	Fixed card loss and pads on cards Pad switching is supported.	Not applicable.
China IPE trunks: XUTC XEMC	Not applicable.	Not applicable.	Not applicable.	Class of Service dependent programmable loss. Pad switching (level adjustment) is supported.

Table 4
Cross-reference of transmission level adjustment features and trunk cards (Continued)

	Static Pad Download	Static Loss Plan Downloading	Dynamic Pad Switching	Dynamic Loss Switching
International IPE Trunks (XCOT, XDDI, XDID, XFCOT and XFEM)	Class of Service dependent fixed loss. Pad switching is not supported.	Class of Service dependent fixed loss. Pad switching is not supported.	Not applicable.	Not applicable.
Flexible International IPE Trunks (XCOT, XDDI, XDID, XFCOT and XFEM)	Class of Service dependent fixed loss. Pad switching is not supported.	Class of Service dependent programmable static loss. Pad switching is not supported.	Not applicable.	Class of Service dependent programmable loss. Pad switching (level adjustment) is supported.

Along with the level adjustments determined by the previously mentioned features, certain cards may use additional pads. Control of these pads is by switch or jumper setting for EPE cards and by overlay input or jumper setting for IPE cards.

Different trunk cards have different pad values, please refer to the specific trunk circuit card descriptions to determine what pad values they support.

Balance Impedance overview

Some two-wire analog trunk cards and the Extended Off-premises Station (XOPS) card have a three component compromise (3COM) impedance network that ensures proper impedance matches when connecting to a four-wire interface. The 3COM impedance network ensures stability and eliminates echo caused by impedance mismatches.

For EPE cards this option is controlled by switch setting, while for IPE cards this option is controlled by software configuration.

Terminating Impedance overview

Some analog trunk and the Extended Off-premises Station (XOPS) cards have Terminating Impedance options that ensure proper impedance matches when connecting to an external interface. The Terminating Impedance options are 600 ¾ and 900 ¾.

For EPE cards this option is controlled by switch setting, while for IPE cards this option is controlled by software configuration.

Digital Trunk and Primary Rate Interface overview

Digital Trunk Interface (DTI) and Primary Rate Interface (PRI) trunks adjust transmission level by applying software defined pad values based on the port type involved in the connection. The pad value may be either negative, e.g., -3.0 dB (*GAIN*), or positive, e.g., +3.0 dB (*LOSS*). The *gain* and *loss* sign conventions appear to be contrary to intuition, however, from the point of view of one looking at signals traversing cables, loss is the quantity of interest and is positive, therefore an increase in signal strength is a negative loss, refered to as a gain.

Basic Rate Interface Line and Trunk overview

Basic Rate Interface Lines and Trunks adjust transmission level in the same manner as DTI/PRI trunks do. That is, they apply pad values based on the port type involved in the connection. Basic Rate Interface Lines (BRIL) apply fixed pad values, while Basic Rate Interface Trunks (BRIT) apply software defined pad values.

Meridian Modular Telephones overview

Meridian Modular Telephones download software defined Objective Loudness Rating (OLR) settings which set the level at the Central Office or Public Exchange trunk interface to the same level as that of a 500/2500 set connected to the same trunk interface.

Off-premises stations

Reference list

The following are the references in this section:

- *X11 input/output guide (553-3001-311)*

Introduction

The Existing Peripheral Equipment (EPE) Off-premises Extension (OPS, called OPX in Release 19 and earlier versions) line cards are high gain line cards that allow sets to use a 1400 ¾ loop versus the standard 1000 ¾ loop. These cards have a 4 dB pad.

The Flexible Intelligent Peripheral Equipment (IPE) Extended Off-premises Station (XOPS) line cards are high gain cards that allow sets to use a loop of up to 2300 ¾. These cards are equipped with the B34 codec which enables the card loss to be defined by overlay input, but current applications only use software defined card losses. The XOPS units may be used for both Off- and On-premises applications. The unit's mode of operation is determined by both hardware jumper settings (not in the case of Chinese cards) and software configuration.

Off-premises level adjustment methods

Pads on the OPS card and card loss settings on the XOPS card dynamically adjust the transmission level. A predefined software matrix determines the transmission level required based on the port type at the far end. Table 5 shows the Off-premises level adjustment matrix.

In Table 5 the first cell element is the originator's state and the second cell element is the terminator's state. Following are the state indicators:

— 0 = no transmission level adjustment (pad out [pad not applied] or Base level loss).

— 1 = transmission level adjustment (pad in [pad applied] or Alternate level loss).

— T = other routine, e.g., Dynamic Pad Switching (DPS), determines transmission level.

— X = transmission levels not dynamically adjusted; constant transmission level.

Table 5
Off-premises level adjustment matrix

	Terminator					
Originator	Off-premises Line		On-premises Line		Trunk	
Off-premises Line	1	0	0	X	1	T
On-premises Line	X	0	X	X	X	T
Trunk	T	1	T	X	T	T

Upgrade strategies

EPE OPS and IPE XOPS cards may coexist in the same system, however, the system administrator must bear in mind that in connections where both an off-premises EPE OPS unit and an off-premises IPE XOPS unit are involved the resultant loss may be up to ±1 dB of the expected loss.

Administration

The OPS unit's transmission level adjustment is controlled by Class of Service (CLS) designation in LD 10. The CLS designations are:

LD 10

REQ	NEW	Create new data block
	CHG	Modify data block
TYPE	500	Analog Line Unit
TN	lll s cc uu	Terminal Number where: lll = loop number (0-159)

		s = shelf (0-3) cc = card (1-10) uu = unit (0-3)
CDEN		Card Density
	SD	*Must* be Single Density for OPS card.
...		
CLS	ONS	On-premises (default) Dynamic transmission level adjustment *not* performed by unit (OPS pad switching disabled).
	OPS	Off-premises Station Dynamic transmission level adjustment performed by unit (OPS pad switching enabled).
	ONP	Release 19 and earlier on-premises (default for those versions).
	OPX	Release 19 and earlier off-premises extension.

The XOPS unit's transmission level adjustment is controlled by a combination of CLS designation in LD 10 and hardware jumper setting. The CLS options are:

LD 10

REQ	NEW	Create new data block
	CHG	Modify data block
TYPE	500	Analog Line Unit
TN	lll s cc uu	Terminal Number where: lll = loop number (0-159) s = shelf (0-1) cc = card (0-15) uu = unit (0-7)
CDEN		Card Density
	DD	*Must* be Double Density for XOPS card.
...		
CLS		Class of Service
	ONS	On-premises Dynamic transmission level adjustment not performed by unit (only Base level settings applied).
	OPS	Off-premises Station (default) Dynamic transmission level

adjustment performed by unit (both Base and Alternate settings applied, setting determined by port type involved in connection).

ONP — Release 19 and earlier on-premises (default for those versions).

OPX — Release 19 and earlier off-premises extension.

...

TIMP — Terminating Impedance (not prompted for Chinese Loss Plan)

600 — Six hundred ohms (default)

900 — Nine hundred ohms

Prompted for XOPS units only (XOPS cards as identified by the fact that they are configured as Double Density cards on an octal density [Super] loop).

BIMP — Balance Impedance (not prompted for Chinese Loss Plan)

If CLS is set to ONS BIMP *must* be set to 600

3COM — Three Component compromise (default)

600 — Six hundred ohm resistance

900 — Nine hundred ohm resistance

COM2 — Three Component compromise Secondary setting

When the XOPS is used in an on-premises (ONS) mode the loss value downloaded to it depends on whether the system is configured to use the North American or Chinese transmission plan. The Chinese transmission plan settings are selected by activating the Dynamic Loss Switching (DLS) feature and entering the Chinese Loss Plan identifier in response to the APAD prompt in LD 15.

In Release 21 the China Toll package introduces an exception. When a toll call on DTI2 and a line card with ONS Class of Service terminates on a 500/2500 set, new loss levels are downloaded to the line card. When the call is terminated the loss levels are reset. The new loss levels are configured in LD 73 under the new prompts TOLT and TOLL.

See the *X11 input/output guide (553-3001-311)* for details. Following are the card losses downloaded:

	Downloaded values	
Transmission Plan	Rx dBr	Tx dBr
North American	9 3.5	17 - 0.5
China Hybrid EPE/ IPE	8 4.0	18 - 1.0
China Pure IPE	16 0.0	23 - 3.5

For information regarding the download parameters (Rx, Tx and dBr), refer to the section of this document titled “Static Loss Plan Downloading” on page 53. For information regarding Alternative Loss Plan administration refer to the section of this document titled “Dynamic Pad Switching” on page 41.

NT1R20 hardware strapping options:

For CLS set to ONS in LD 10:

- JX.0 and JX.1 — OFF

For CLS set to OPS in LD 10:

- JX.0 and JX.1 — OFF if loop loss is in the range 0-2.5 dB
- JX.0 and JX.1 — ON if loop loss is in the range >2.5-15 dB

Table 6 is a cross-reference of software and hardware settings required for various installations:

Table 6
XOPS software and hardware settings cross-reference for NT1R20 XOPS

	On-premises station			Off-premises station			
CLS	ONS			OPS			
Loop resistance	0-460 ¾			0-2300 ¾			
Loop loss (dB)	0-1.5	>1.5-2.5	>2.5-3.0	0-1.5	>1.5-2.5	>2.5-4.5	>4.5-15
Jumper settings	JX.0 & JX.1 — OFF			JX.0 & JX.1 – OFF		JX.0 & JX.1 — ON	
TIMP	600	600	600	600	600	600	600
BIMP	600 ¾	3COM	COM2	600 ¾	3COM	COM2	COM2

In Table 6 the X in JX.0 and JX.1 refers to the unit number (0-7) that is being configured. For example, if unit 5 were being configure for OPS operation with a loop resistance of 2300 ¾, and a loop loss of 6.0 dB, then J5.0 and J5.1 would both be ON.

NTRA06 hardware strapping options:

For CLS set to ONS in LD 10:

— JX.1 and JX.2 — OFF

For CLS set to OPS in LD 10:

— JX.1 and JX.2 — OFF if loop resistance is ≤600 ¾.

— JX.0 and JX.1 — ON if loop resistance is >600 ¾.

Table 7 is a cross-reference of software and hardware settings required for various installations:

Table 7
XOPS software and hardware settings cross-reference for the Chinese NTRA06 XOPS

	On-premises station	Off-premises station	
CLS	ONS	OPS	
Loop resistance	0-600 ¾	0-600 ¾	601-2300 ¾
Jumper settings	JX.1 and JX.2 — OFF	JX.1 and JX.2 — OFF	JX.1 and JX.2 — ON

In Table 7 the X in JX.1 and JX.2 refers to the unit number (0-7) that is being configured. For example, if unit 5 were being configure for OPS operation with a loop resistance of 2300 ¾ then J5.1 and J5.2 would both be ON.

Hardware requirements

For EPE the QPC 192 (µ-Law) or QPC 292 (A-Law) line card is required.

For IPE in countries other than China the NT1R20 line card is required.

For China the NTRA06 is required.

Conference

Introduction

Conference pad switching applies to Meridian 1 conference bridge connections with three or more conferees that terminate on 2-wire ports. All trunks involved in the conference have their pad states set to *pad out*, all other connections with pad switching capabilities involved in the conference use their non-trunk pad settings.

Pad switching methods

All conference pad switching algorithms switch hard-coded pads.

With X11 International Release 14.47E software and earlier there is only one software defined conference pad switching algorithm.

X11 International Release 15.58F introduced an enhancement to the Alternative Loss Plan (ALP) feature that allows the selection of an alternate software defined conference pad switching algorithm. The enhanced capability is Alternate Conference Pads (ACP) selection.

X11 International Release 16.67G introduced the Meridian 1 family of switches to the International marketplace. The Meridian 1 uses the NT8D17 Extended Conference and Tone and Digit Switch (XCT) card and its associated software. This combination allows the user to select, by overlay input, either the software controlled conference pad switching algorithm or the insertion of a fixed loss for all conference calls. The response to the CPAD prompt in LD 97 determines which method to use for all conference calls.

Depending on the country either software or hardware will be used to set the pad levels. Hardware set pads are defined by four dip switches (16 settings) on the card. When set in this manner the loss is fixed, irrespective of the number of parties in the conference. Pads implemented in software are set by default to the North American loss plan settings, but can be changed to the alternative conference pads as indicated above. The alternative conference pads insert less loss (see Table 8).

Option 11 uses a different method of setting losses. It assumes the North American loss plan or sets all pad values to zero (0) dB.

Alternative Conference Pads selection

Alternative Conference Pads (ACP) selection allows a different conference pad switching algorithm to be used during a conference. The ACP feature requires the use of a QPC 446 for µ-Law applications and QPC 447 for A-Law applications. ACP is supported for Existing Peripheral Equipment cards only.

The responses to the APAD prompt in LD 15 determine the conference pad switching algorithm used for the customer. Table 8 lists the attenuation levels for different conferences.

Table 8
Default and alternative conference pads

		Pads (dB)	
Number of trunks in conference	**Number of stations in conference**	**Default**	**Alternative**
1	3	0.0	0.0
1	4	1.2	0.0
1	5	4.0	0.0
1	>=6	5.4	0.0
>=2	3	5.4	1.2
>=2	4	8.2	1.2
>=2	5	10.4	1.2
>=2	>=6	12.2	1.2

Alternative Conference Pads selection administration

The responses to the APAD prompt in LD 15 determine the conference pads used for the customer. The input format for the APAD prompt is two fields that accept entries in the range 0-7. The first field is the Dynamic Pad Switching matrix identifier and the second field is the conference pads identifier. Following are the valid responses to the APAD prompt:

LD 15

REQ	NEW	Create new data block.
	CHG	Modify data block.
TYPE	CDB	Customer Data Block
...		
APAD	X Y	
	Where:	
		X = Alternative Dynamic Pad Switching matrix identifier (0)-7
		Y = Alternative Conference Pads identifier(0)-7

0 = default (North American)
1 = Alternative Conference Pads where used

Alternative Conference Pads selection hardware requirements

The Alternate Conference Pads option requires the use of QPC 446 or QPC 447 conference cards.

NT8D17 options

The NT8D17 may use either the conference pad switching algorithm or insert a predefined attenuation level depending on the response to the CPAD prompt in LD 97. Table 9 lists the software defined conference pad switching algorithm port-to-port loss for conferences using the NT8D17 with CPAD = 0 in LD 97 with three to six ports and IPE connections between analog lines and trunks. The values given in the table are the total loss values which include both the loss inserted by the conference card and the loss inserted by the line or trunk card(s) involved in the connection.

Table 9
NT8D17 Loss insertion for conference connections

	THREE PORTS		FOUR PORTS	
Connection (A-B)	**Loss A - B (dB)**	**Loss B - A (dB)**	**Loss A - B (dB)**	**Loss B - A (dB)**
Line to line	4.0	4.0	7.0	7.0
Line to CO trunk	0.5	0.5	3.5	3.5
Line to TIE trunk	2.5	0.5	5.5	3.5
CO trunk to CO trunk	0.0	0.0	0.0	0.0
CO trunk to TIE trunk	2.0	0.0	2.0	0.0
TIE trunk to TIE trunk	2.0	2.0	2.0	2.0
	FIVE PORTS		**SIX PORTS**	
Connection (A-B)	**Loss A - B (dB)**	**Loss B - A (dB)**	**Loss A - B (dB)**	**Loss B - A (dB)**
Line to line	8.5	8.5	10.0	10.0
Line to CO trunk	5.0	5.0	6.5	6.5
Line to TIE trunk	7.0	5.0	8.5	6.5
CO trunk to CO trunk	1.5	1.5	3.0	3.0
CO trunk to TIE trunk	3.5	1.5	5.0	3.0
TIE trunk to TIE trunk	3.5	3.5	5.0	5.0

Note: Three trunks is the recommended maximum on a conference connection.

When CPAD = 1 in LD 97 the NT8D17 applies a predefined attenuation level to all conference calls. Switch settings on the circuit card determine the attenuation level. Table 10 cross-references the switch settings to attenuation levels.

Table 10
NT8D17 attenuation level switch settings

Attenuation levels (dB)	SW2 settings		
	1	2	3
12.2	on	on	on
10.4	on	on	off
8.2	off	on	on
7.2	off	on	off
5.4	on	off	on
4.0	on	off	off
1.2	off	off	on
0.0	off	off	off

The NT8D17 can operate in either A-Law or µ-Law companding mode. Jumper settings determine the companding mode to operate in. See Table 11.

Table 11
NT8D17 companding option settings

Companding Law	J3 settings
µ-Law	jumper pins 1 and 2
A-Law	jumper pins 2 and 3

NT8D17 administration

The responses to the CPAD prompt in LD 97 determine whether the NT8D17 uses the software defined conference pad switching algorithm values or the hardware defined attenuation level for all conference calls. Following are the valid responses to the CPAD prompt:

LD 97

REQ	CHG	Modify data block.
TYPE	XCTP	Extended Conference and Tone and digit switch Parameters
CPAD	x Where:	
		x = conference pad selection method identifier (0)-1 0 = software defined conference pad switching algorithm 1 = hardware attenuation levels

Dynamic Pad Switching

Introduction

For X11 International Release 16.91G and earlier Dynamic Pad Switching (DPS) is the method of switching pads in the Meridian 1. For X11 International Release 16.91G and later, on generic XFCOTs the use of DPS is controlled by the response to the NATP (North American Transmission Plan) prompt in LD 97.

With DPS, pad switching occurs on the trunk side of the connection because all On-premises (OPS) lines have a fixed loss.

DPS determines the pad state on a per-connection basis for the following:

— Existing Peripheral Equipment (EPE) trunks

— North American and North American based Intelligent Peripheral Equipment (IPE) trunks,with the exception of Chinese IPE where Dynamic Loss Switching is used for both ONS and OPS classes of service.
  XTRK = XUT or XEM in LD 14

— International Generic XFCOT (NT5K16) Central Office Trunks (COT)

The use of the term "*per-connection*" highlights that within a single call there may be a number of different connections required. An example is an incoming trunk call. The trunk connects to the Tone and Digit Switch (TDS) to receive ring back tone; when the called party goes off hook, the trunk disconnects from the TDS and connects to the called party. This call may use two pad settings for the two different connections.

Dynamic Pad Switching overview

A predefined matrix that takes into account the port types involved in a connection is what determines the pad state. The following criteria identify the port types involved in a connection:

— unit type

— Class of Service (CLS)

— Trunk Signaling

— XTRK type

The trunk data block Class of Service (CLS) assignment characterizes the transmission properties of each trunk.

The DPS related options for EPE, XUT and XEM trunks are:

— VNL (Via Net Loss)

— Non-VNL, either:
TRC (Transmission Compensated)
or NTC (Non-Transmission Compensated)

Assignment of CLS VNL or non-VNL ensures stability and minimizes echo on long-haul connections, 4-wire TIE, and CCSA. Similarly, assignment of a non-VNL CLS applies to 2-wire TIE, COT, FEX, WAT, CCSA, and 4-wire non-VNL facilities. The DPS non-VNL CLS options are:

— TRC
— 2-wire non-VNL trunk facility with a loss of greater than 2 dB
— 2-wire non-VNL trunk facility with impedance compensation
— 4-wire non-VNL facility

— NTC
— 2-wire non-VNL trunk facility with a loss of less than 2 dB
— 2-wire non-VNL trunk facility when impedance compensation is not provided

The DPS related options for the International Generic XFCOT (NT5K16) COT are:

— SHL (Short line) — transmission lines of relatively short length, low loss

— LOL (Long line) — transmission lines of relatively long length, high loss

The DPS related options in an international context for all other trunks are:

— NTC (Non-Transmission Compensated) — transmission lines without compensation, high loss
Pad out (pad not applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK LINK setting.

— TRC (Transmission Compensated) — transmission lines with compensation, low loss
Pad in (pad applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK TIE setting.

— VNL (Via Network Loss) — no particular meaning in a European context, equivalent to TRC
Pad in (pad applied)
Applies to EAM and EM4 TIE trunks.
UK TIE setting.

Alternative Loss Plan overview

The Alternative Loss Plan (ALP) feature, introduced in Release 10.10C, uses five different matrices to meet country-specific Loss and Level Plan requirements. The matrices are:

0 Default (North American)

1 Australia

2 New Zealand

3 Italy

4 China

5 China

The ALP feature allows selection of a switching matrix on a per-customer basis.

Release 10.10C matricies have two elements per cell. The elements are:

- originator’s pad state
- terminator’s pad state

With the introduction of IPE trunks, expansion of the DPS matrix to 18 x 18 was necessary to accommodate the new XTRK port types; along with updated cell information because IPE trunks can switch the transmit and receive pads independently. This means that there are now four elements. The elements are:

- originator’s receive pad state
- originator’s transmit pad state
- terminator’s receive pad state
- terminator’s transmit pad state

In cells with four elements, EPE switching information is in the transmit element and the receive elements are "do not care."

For more information on connection matrix details consult a Nortel Networks transmission specialist.

The following table shows how to configure an XFCOT to perform like an XUT from a loss point of view.

Table 12
XFCOT to XUT DPS matrix element mapping

XFCOT				XUT		
XTRK	**TYPE**	**SIGL**	**CLS**	**XTRK**	**TYPE**	**CLS**
XCOT	COT	LOP	SHL	XUT	COT	TRC
XCOT	COT	LOP	LOL	XUT	COT	NTC

Alternative Loss Plan capabilities

The Alternative Loss Plan (ALP) feature is a X11 International Release 10.10C feature. This feature uses Dynamic Pad Switching with alternate switching matrices. The North American matrix is default. The ALP feature applies to analog trunks only.

In X11 Release 18 the concept of Loss Switching Connection Matrices (LSCM) was introduced to the ALP feature. This concept was introduced to accommodate the new 18 X 18 matrix required by the Intelligent Peripheral Equipment (IPE) and to interact with the Dynamic Loss Switching (DLS) feature introduced in X11 Release 18.21H.

ALP Release 10.10C capabilities

The capabilities introduced in Release 10.10C are:

— Alternative pad (APAD) switching for analog trunks only

— Australian Dynamic Pad Switching matrix

— A Multi Frequency Compelled (MFC) pad (MFPD) used during the MFC signaling portion of a call on high gain (-7 dB) DID and CO trunks.

ALP Release 15.58F capabilities

Release 15.58F enhances the ALP capabilities. The enhanced capabilities are:

— Alternative Conference Pads (ACP), and

— Chinese Dynamic Pad Switching matrix.

Release 15.58F introduced the ability to select an alternate conference pad switching algorithm with the North American conference pad switching algorithm being the default. The responses to the APAD prompt in LD 15 control which alternative conference pad switching algorithm is in use.

Release 21 introduces R2 Multi-Frequency Compelled Signalling on DTI 1.5, however, when this functionality is activated, it does not support the Alternate Loss Plan.

The ACP feature requires conference cards (QPC 446/QPC 447 or later) that have alternate attenuation levels.

Administration

DPS using International Generic XFCOT (NT5K16) administration

Following is an overview of the administration of DPS using the Generic XFCOT (NT5K16).

LD 97

REQ	CHG	Modify data block.
TYPE	LOSP	Loss plan Parameters
...		In Release 18 NATP appears following TYPE.
NATP	YES	Use North American Transmission Plan DPS method.

LD 14

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	COT	Central Office Trunk
...		
XTRK	XCOT	Extended Trunk type is Extended Central Office Trunk
...		
SIGL	LOP	Signaling method on trunk is Loop Start
...		
CLS	SHL	SHort Line Class of Service
	LOL	LOng Line Class of Service

ALP feature administration

Following is an overview of the ALP feature administration by Release Number of X11 International software.

Release 10.10C to 14.47E

LD 15

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CDB	Customer Data Block
...		
APAD	(0)-7	Alternative Dynamic Pad Switching matrix identifier 0 = default (North American)

1 = Australian
2-7 reserved for future use

Release 15.58F and later

LD 15

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CDB	Customer Data Block
...		
APAD	X Y	

Where:

X = Alternative Dynamic Pad Switching matrix identifier (0)-7
0 = default (North American)
1 = Australian
2 = reserved for future use
3 = reserved for future use
4 = China
5-7 reserved for future use

Y = Alternative Conference Pads identifier (0)-7
0 = default (North American)
1 = Alternative Conference Pads

X11 Release 20 and later

LD 15

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CDB	Customer Data Block
...		
APAD	X Y	

Where:

X = Alternative Dynamic Pad Switching matrix identifier (0)-7
0 = default (North American)
1 = Australian
2 = New Zealand
3 = Itlay
4 = China EPE and IPE matrix
5 = China IPE only matrix
6-7 reserved for future use

Y = Alternative Conference Pads identifier (0)-7
0 = default (North American)
1 = Alternative Conference Pads

Hardware requirements

Dynamic Pad Switching

All Existing Peripheral Equipment (EPE), and North American based Intelligent Peripheral Equipment (IPE) trunks use Dynamic Pad Switching algorithms to determine which pads to select.

— EPE are all cards beginning with QPC (or QPC based) codes

— North American based refers to XTRK = XUT or XEM in LD 14, except for China

— International Generic XFCOT (NT5K16)

Alternate Loss Plan for China

The Alternate Loss Plan for China (APAD prompt response number 4; see Administration above) requires the following EPE card:

— NT9C14

This EPE card requirement is for a hybrid system. All Chinese IPE cards will allow use of the Alternate Loss Plan for China.

The NT9C14 is a QPC 527 that has its - 4 dB pad modified to - 2 dB. For the proper levels ensure switch 1 position 8 is open. Switch 1 position 8 being open allows the software to control the state of the pad. Close switch 1 position 8 to insert the pad.

The Alternate Loss Plan for China (APAD prompt response number 4 or 5; see Administration above) requires the following IPE cards:

— NTRA02 XUTC

— NTRA03 XEMC

— NTRA04 XFALCC with Message Waiting

— NTRA05 XALCC without Message Waiting

— NTRA06 XOPSC Off-premises Station

Static Pad Download

Introduction

Static Pad Download (SPD) sets the pad state, either pad in or pad out, for COT, DID, and TIE trunks on a unit-by-unit basis as part of the enabling process of the unit. SPD is a X11 International Release 16 feature.

Static Pad Download overview

SPD is for countries where there is no need to alter the transmission level on a connection-by-connection basis for DID, COT, and TIE trunks. The SPD feature introduces the SHL (Short Line [pad in]) and LOL (Long Line [pad out]) Classes of Service for DID and COT trunks. TIE trunks set their pad state with the TRC (Transmission Compensated [pad in]), NTC (Non-Transmission Compensated [pad out]) and VNL (Via Network Loss [pad in]) transmission characteristic Classes of Service. The enabling process for the unit sets the pad state.

Following are definitions of the various Classes of Service in an international context:

— SHL (SHort Line) — transmission lines of relatively short length, low loss
Pad in (pad applied)
Applies to DID and COT trunks.

— LOL (LOng Line) — transmission lines of relatively long length, high loss
Pad out (pad not applied)
Applies to DID and COT trunks.

— NTC (Non-Transmission Compensated) — transmission lines without compensation, high loss
Pad out (pad not applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK LINK setting.

— TRC (Transmission Compensated) — transmission lines with compensation, low loss
Pad in (pad applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK TIE setting.

— VNL (Via Network Loss) — no particular meaning in a European context, equivalent to TRC
Pad in (pad applied)
Applies to EAM and EM4 TIE trunks.
UK TIE setting.

For the NTCK22 XDID trunk configured as TYPE TIE, XTRK XDID, and SIGL LDR:

— NTC is mapped to SHL,

— TRC and VNL are mapped to LOL.

Administration

Administration of the pad states is in **LD 14** by Class of Service designation. Following are the SPD related Classes of Service:

— Pad out settings:

For TYPE = DID and COT
CLS = LOL or NTC

For TYPE = TIE where XTRK = XFEM (LINK setting)
CLS = NTC

— Pad in settings:

For TYPE = DID and COT
CLS = SHL, TRC, or VNL

For TYPE = TIE where XTRK = XFEM (TIE setting)
CLS = TRC or VNL

Hardware requirements

All Intelligent Peripheral Equipment (IPE) circuit cards for use *outside* Canada, U.S.A., and Japan, support SPD, with the exception of those for China.

Static Loss Plan Downloading

Introduction

Static Loss Plan Downloading (SLPD) downloads software defined pad values to all International Intelligent Peripheral Equipment (IPE) cards (China is an exception) that use both the B34 codec and “flexible” firmware. SLPD is an X11 International Release 18.21H feature.

Static Loss Plan Downloading overview

SLPD downloads software defined Relative Input/Output Level settings to each of the B34 port types.

The following four variables determine the port types for trunks:

— unit’s XTRK type in LD 14

— unit’s TYPE in LD 14

— unit’s signaling type in LD 14

— unit’s transmission characteristics Class of Service (CLS) in LD 14

SLPD introduces the use of pads on B34 equipped Extended Flexible Analog Line Card (XFALC) units. Class of Service (CLS) designation controls the pad state. The CLS designations are LOL (Long Line) for pad out and SHL (Short Line) for pad in.

Table 13 lists the B34 port types for all Loss Plans with the exception of that for China. SLPD is not used in China.

Table 13
B34 port types for all Loss Plans with the exception of China

TYPE (unit type)	SIGL (signaling)	XTRK	CLS	B34 Port Type
COT, FEX, or WAT	ALL	ALL	SHL	COTS
			LOL	COTL
DID	ALL	ALL	SHL	DIDS
			LOL	DIDL
TIE	EAM	ALL	TRC	T2WT
			NTC	T2WN
			VNL	T2WV
	EM4, WR4, LDR and none of the above	ALL	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
RAN, MUS, RCD, or AWR	ALL	ALL	ALL	RANR
PAG	ALL	ALL	ALL	PAGT
none of the above	ALL	XCOT	SHL	COTS
			LOL	COTL
		XDID	SHL	DIDS
			LOL	DIDL
		XFEM	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
Analog Line Unit (500/2500)	Not Applicable	Not Applicable	SHL	ALUS
			LOL	ALUL

The usage of the downloaded Relative Input/Output Level setting is either to meet Loss Plan requirements where a single transmission level is acceptable for all connection types, or as the "Base Level" setting for the *Dynamic Loss Switching* feature.

If a system has both the SLPD and the Dynamic Loss Switching (DLS) features equipped, DLS takes precedence.

Relative Input/Output Level

Relative Input/Output Level refers to the power of the signal at the input or output interface with respect to 0 dBr (the digital reference point). Therefore the relative Input Level (Li) is equivalent to the card loss in the analog to digital (A/D) direction. Relative Output Level (Lo) is equivalent to the negative of the card loss in the digital to analog (D/A) direction.

The term card loss refers to the difference in signal power between the card interface point and the digital 0 dB reference point. Card loss is the sum of the loss designed into the circuitry plus the pad value selected.

Relative Input/Output Levels for a card with an A/D card loss of 2.0 dB and a D/A loss of 6.5 dB would be:

— Relative Input Level (Li) = 2.0 dBr

— Relative Output Level (Lo) = - 6.5 dBr

Loss Plan selection

Loss Plan selection requires the selection of a predefined Loss Plan table in LD 97. Two predefined modes of operation are available for Europe, they are:

— European Telecommunication Standards Institute (ETSI) mode — uses ETSI per-country input/output values as recommended in annexes to the ETSI standards, and

— Existing mode — uses per-country values as designed for Meridian 1 that were in existence prior to the formulation of the ETSI standards.

Two predefined modes of operation are also available for China, they are:

— for systems which have both EPE and IPE, and

— for systems which have IPE only.

LD 97 also allows the definition of Custom Loss Plan tables.

Table 16 shows the predefined Static Loss Plan tables applicable to the various countries and operating modes.

IPE cards transmission adjustment capabilities

There are several versions of IPE cards currently in use. Refer to Table 14 for a brief summary on the versions and their transmission adjustment capabilities.

Table 14
IPE cards transmission adjustment capabilities

	Static Pad Download (SPD)	Static Loss Plan Download (SLPD)	Default Loss Setting
non-B34 equipped trunk card	Yes	No	country specific set by H/W
“hard-coded” B34 equipped trunk card	Yes	No	country specific set by F/W
“flexible” B34 equipped trunk card	Yes (SLPD takes precedence)	Yes	universal value set by F/W
non-B34 equipped line card	N/A	N/A	country specific set by H/W
“flexible” B34 equipped line card	N/A	Yes	universal value set by F/W

Upgrade and new installation strategies

In general, existing systems (pre-Release 18.21H, such as 16.87G or 16.91G) and those systems upgrading to Release18.21H software do not require new flexible B34 IPE cards if their Loss Plan stays the same. Those systems will use the existing Loss Plan.

Newly installed systems with Release18.21H software will have the new flexible B34 cards and can operate with either the ETSI or existing loss plan.

Systems using both B34 and non-B34 cards will use the existing Loss Plan.

Relative Level setting download

Downloading of the Input/Output Relative Level settings occurs:

— at system initialization for all units

— when the card or unit is enabled

— when the Extended Peripheral Equipment Controller (XPEC) is enabled

— when the IPE shelf is enabled

— when a configured card is reseated

— after a trunk or line unit has undergone a NEW, CHG or MOV using LD 14 or LD 10

Administration

Configuration of the Loss Plan is on a system-wide basis in LD 97. The configuration of levels is by port type; refer to Table 13 for a list of B34 port types.

Entering a code in LD 97 defines the required level. Once downloaded, the B34 converts the code to a level. Table 15 provides a cross-reference between codes and Relative Input/Output Levels.

Table 15
LD 97 code to Relative Input/Output Level cross-reference

		Lines		Trunks				Lines		Trunks	
Code	**Level (dBr)**	**Rx**	**Tx**	**Rx**	**Tx**	**Code**	**Level (dBr)**	**Rx**	**Tx**	**Rx**	**Tx**
0	8.0	Đ			Đ	20	- 2.0	Đ	Đ	Đ	Đ
1	7.5	Đ			Đ	21	- 2.5	Đ	Đ	Đ	Đ
2	7.0	Đ			Đ	22	- 3.0	Đ	Đ	Đ	Đ
3	6.5	Đ			Đ	23	- 3.5	Đ	Đ	Đ	Đ
4	6.0	Đ			Đ	24	- 4.0	Đ	Đ	Đ	Đ
5	5.5	Đ			Đ	25	- 4.5	Đ	Đ	Đ	Đ
6	5.0	Đ			Đ	26	- 5.0	Đ	Đ	Đ	Đ
7	4.5	Đ			Đ	27	- 5.5	Đ	Đ	Đ	Đ
8	4.0	Đ	Đ	Đ	Đ	28	- 6.0	Đ	Đ	Đ	Đ
9	3.5	Đ	Đ	Đ	Đ	29	- 6.5	Đ	Đ	Đ	Đ
10	3.0	Đ	Đ	Đ	Đ	30	- 7.0	Đ	Đ	Đ	Đ
11	2.5	Đ	Đ	Đ	Đ	31	- 7.5	Đ	Đ	Đ	Đ
12	2.0	Đ	Đ	Đ	Đ	32	- 8.0		Đ	Đ	
13	1.5	Đ	Đ	Đ	Đ	33	- 8.5		Đ	Đ	
14	1.0	Đ	Đ	Đ	Đ	34	- 9.0		Đ	Đ	
15	0.5	Đ	Đ	Đ	Đ	35	- 9.5		Đ	Đ	
16	0.0	Đ	Đ	Đ	Đ	36	- 10.0		Đ	Đ	
17	- 0.5	Đ	Đ	Đ	Đ	37	- 10.5		Đ	Đ	
18	- 1.0	Đ	Đ	Đ	Đ	38	- 11.0		Đ	Đ	
19	- 1.5	Đ	Đ	Đ	Đ	39	- 11.5		Đ	Đ	

Note: Đ indicates a valid code for a line or a trunk in either Tx or Rx mode.

Configuration of the transmit (Tx) and receive (Rx) Relative Input/Output Levels for each port type is either automatic, i.e., the user selects a predefined SLPD table, or each port type has its level defined individually by going through the customization process in LD 97. For Relative Input/Output Levels transmit (Tx) corresponds to the D/A (decode) and receive (Rx) corresponds to the A/D (encode) direction for analog cards.

For the actual LD 97 coded input and resulting Relative Input/Output Level for each country and operating mode, refer to Table 16.

Table 16
Predefined Static Loss Plan Download tables

	Table 1 Austria & Greece ETSI				Table 2 Austria Existing				Table 3 Belgium ETSI			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	28	- 6.0	18	- 1.0	24	- 4.0	22	- 3.0	24	- 4.0	22	- 3.0
COTL	28	- 6.0	18	- 1.0	28	- 6.0	18	- 1.0	28	- 6.0	18	- 1.0
DIDS	28	- 6.0	18	- 1.0	24	- 4.0	22	- 3.0	24	- 4.0	22	- 3.0
DIDL	28	- 6.0	18	- 1.0	28	- 6.0	18	- 1.0	28	- 6.0	18	- 1.0
T2WT	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0
T2WN	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0
T2WV	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0
T4WT	23	- 3.5	23	- 3.5	---	---	22	- 3.0	---	---	---	---
T4WN	23	- 3.5	23	- 3.5	---	---	22	- 3.0	---	---	---	---
T4WV	23	- 3.5	23	- 3.5	---	---	22	- 3.0	---	---	---	---
PAGT	---	---	---	---	---	---	---	---	---	---	---	---
RANR	---	---	---	---	---	---	---	---	---	---	---	---
ALUS	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0
ALUL	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 4 Belgium Existing				Table 5 Denmark ETSI				Table 6 Denmark Existing			
B34 Port Types	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	24	- 4.0	22	- 3.0	22	- 3.0	22	- 3.0	8	4.0	18	- 1.0
COTL	28	- 6.0	18	- 1.0	26	- 5.0	18	- 1.0	---	---	10	3.0
DIDS	24	- 4.0	22	- 3.0	22	- 3.0	22	- 3.0	8	4.0	18	- 1.0
DIDL	28	- 6.0	18	- 1.0	26	- 5.0	18	- 1.0	---	---	10	3.0
T2WT	8	4.0	10	3.0	---	---	28	- 6.0	8	4.0	18	- 1.0
T2WN	8	4.0	10	3.0	---	---	28	- 6.0	8	4.0	18	- 1.0
T2WV	8	4.0	10	3.0	---	---	28	- 6.0	8	4.0	18	- 1.0
T4WT	---	---	10	3.0	---	---	---	---	---	---	---	---
T4WN	---	---	10	3.0	---	---	---	---	---	---	---	---
T4WV	---	---	10	3.0	---	---	---	---	---	---	---	---
PAGT	---	---	---	---	---	---	22	- 3.0	---	---	10	3.0
RANR	---	---	---	---	---	---	---	---	8	4.0	---	---
ALUS	8	4.0	22	- 3.0	---	---	28	- 6.0	8	4.0	18	- 1.0
ALUL	8	4.0	22	- 3.0	---	---	28	- 6.0	8	4.0	18	- 1.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 7 Finland ETSI				Table 8 Germany ETSI/Existing				Table 9 Italy ETSI			
B34 Port Type	**Rx dBr**		**Tx dBr**		**Rx dBr**		**Tx**	**dBr**	**Rx dBr**		**Tx**	**dBr**
COTS	25	- 4.5	21	- 2.5	26	- 5.0	20	- 2.0	28	- 6.0	18	- 1.0
COTL	25	- 4.5	21	- 2.5	30	- 7.0	---	---	28	- 6.0	18	- 1.0
DIDS	25	- 4.5	21	- 2.5	26	- 5.0	20	- 2.0	28	- 6.0	18	- 1.0
DIDL	25	- 4.5	21	- 2.5	30	- 7.0	---	---	28	- 6.0	18	- 1.0
T2WT	---	---	30	- 7.0	10	3.0	31	- 7.5	---	---	30	- 7.0
T2WN	---	---	30	- 7.0	---	---	30	- 7.0	28	- 6.0	18	- 1.0
T2WV	---	---	30	- 7.0	10	3.0	31	- 7.5	---	---	30	- 7.0
T4WT	23	-3.5	23	-3.5	23	-3.5	23	- 3.5	23	- 3.5	23	- 3.5
T4WN	23	-3.5	23	-3.5	21	- 2.5	25	- 4.5	23	- 3.5	23	- 3.5
T4WV	23	-3.5	23	-3.5	23	-3.5	23	- 3.5	23	- 3.5	23	- 3.5
PAGT	---	---	---	---	---	---	30	- 7.0	---	---	23	- 3.5
RANR	---	---	---	---	---	---	---	---	23	- 3.5	---	---
ALUS	---	---	30	- 7.0	10	3.0	36	- 10.0	---	---	30	- 7.0
ALUL	---	---	30	- 7.0	---	---	30	- 7.0	---	---	30	- 7.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 10 Italy Existing				Table 11 Netherlands ETSI				Table 12 Netherlands Existing			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	---	---	10	3.0	24	- 4.0	22	- 3.0	29	- 6.5	17	- 0.5
COTL	---	---	10	3.0	28	- 6.0	18	- 1.0	29	- 6.5	17	- 0.5
DIDS	---	---	10	3.0	24	- 4.0	22	- 3.0	29	- 6.5	17	- 0.5
DIDL	---	---	10	3.0	28	- 6.0	18	- 1.0	29	- 6.5	17	- 0.5
T2WT	---	---	10	3.0	---	---	30	- 7.0	---	---	30	- 7.0
T2WN	---	---	10	3.0	---	---	30	- 7.0	---	---	30	- 7.0
T2WV	---	---	10	3.0	---	---	30	- 7.0	---	---	30	- 7.0
T4WT	---	---	10	3.0	---	---	---	---	---	---	10	3.0
T4WN	---	---	10	3.0	---	---	---	---	---	---	10	3.0
T4WV	---	---	10	3.0	---	---	---	---	---	---	10	3.0
PAGT	---	---	10	3.0	---	---	---	---	---	---	10	3.0
RANR	---	---	---	---	---	---	---	---	---	---	---	---
ALUS	8	4.0	18	- 1.0	---	---	30	- 7.0	---	---	30	- 7.0
ALUL	8	4.0	18	- 1.0	---	---	30	- 7.0	---	---	30	- 7.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 13 Norway ETSI				Table 14 Norway Existing				Table 15 Portugal ETSI			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	20	- 2.0	18	- 1.0	---	---	14	1.0	12	2.0	14	1.0
COTL	24	- 4.0	14	1.0	20	- 2.0	10	3.0	---	---	10	3.0
DIDS	20	- 2.0	18	- 1.0	---	---	14	1.0	12	2.0	14	1.0
DIDL	24	- 4.0	14	1.0	20	- 2.0	10	3.0	---	---	10	3.0
T2WT	14	1.0	24	- 4.0	8	4.0	22	- 3.0	8	4.0	18	- 1.0
T2WN	14	1.0	24	- 4.0	8	4.0	22	- 3.0	8	4.0	18	- 1.0
T2WV	14	1.0	24	- 4.0	8	4.0	22	- 3.0	8	4.0	18	- 1.0
T4WT	---	---	---	---	10	3.0	20	- 2.0	---	---	22	- 3.0
T4WN	---	---	---	---	10	3.0	20	- 2.0	---	---	22	- 3.0
T4WV	---	---	---	---	10	3.0	20	- 2.0	---	---	22	- 3.0
PAGT	---	---	18	- 1.0	---	---	14	1.0	---	---	---	---
RANR	20	- 2.0	---	---	---	---	---	---	---	---	---	---
ALUS	2	7.0	38	- 11.0	8	4.0	22	- 3.0	8	4.0	18	- 1.0
ALUL	12	2.0	26	- 5.0	8	4.0	22	- 3.0	8	4.0	18	- 1.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 16 Greece & Portugal Existing				Table 17 Spain ETSI/EXisting				Table 18 Sweden ETSI/Existing			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	12	2.0	14	1.0	24	- 4.0	22	- 3.0	20	- 2.0	10	3.0
COTL	---	---	10	3.0	28	- 6.0	18	- 1.0	20	- 2.0	22	- 3.0
DIDS	12	2.0	14	1.0	24	- 4.0	22	- 3.0	20	- 2.0	10	3.0
DIDL	---	---	10	3.0	28	- 6.0	18	- 1.0	20	- 2.0	22	- 3.0
T2WT	8	4.0	18	- 1.0	---	---	30	- 7.0	---	---	26	- 5.0
T2WN	8	4.0	18	- 1.0	---	---	30	- 7.0	20	- 2.0	22	- 3.0
T2WV	8	4.0	18	- 1.0	---	---	30	- 7.0	---	---	26	- 5.0
T4WT	---	---	22	- 3.0	18	- 1.0	24	- 4.0	11	2.5	23	- 3.5
T4WN	---	---	22	- 3.0	22	- 3.0	23	- 3.5	23	- 3.5	23	- 3.5
T4WV	---	---	22	- 3.0	18	- 1.0	27	- 5.5	11	2.5	23	- 3.5
PAGT	---	---	---	---	---	---	27	- 5.5	---	---	---	---
RANR	---	---	---	---	19	- 1.5	---	---	---	---	---	---
ALUS	8	4.0	18	- 1.0	---	---	30	- 7.0	4	6.0	26	- 5.0
ALUL	8	4.0	18	- 1.0	---	---	30	- 7.0	---	---	26	- 5.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 19 Switzerland ETSI				Table 20 Switzerland Existing				Table 21 UK ETSI/Existing			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	21	- 2.5	24	- 4.0	12	2.0	14	1.0	20	- 2.0	14	1.0
COTL	25	- 4.5	20	- 2.0	---	---	10	3.0	24	- 4.0	10	3.0
DIDS	21	- 2.5	24	- 4.0	12	2.0	14	1.0	20	- 2.0	14	1.0
DIDL	25	- 4.5	20	- 2.0	---	---	10	3.0	24	- 4.0	10	3.0
T2WT	---	---	29	- 6.5	8	4.0	18	- 1.0	22	- 3.0	---	---
T2WN	---	---	29	- 6.5	8	4.0	18	- 1.0	22	- 3.0	---	---
T2WV	---	---	29	- 6.5	8	4.0	18	- 1.0	22	- 3.0	---	---
T4WT	18	- 1.0	27	- 5.5	12	2.0	14	1.0	---	---	24	- 4.0
T4WN	22	- 3.0	23	- 3.5	---	---	10	3.0	---	---	---	---
T4WV	18	- 1.0	27	- 5.5	12	2.0	14	1.0	---	---	24	- 4.0
PAGT	---	---	27	- 5.5	---	---	14	1.0	---	---	24	- 4.0
RANR	19	- 1.5	---	---	10	3.0	---	---	10	3.0	---	---
ALUS	---	---	29	- 6.5	8	4.0	18	- 1.0	10	3.0	24	- 4.0
ALUL	---	---	29	- 6.5	8	4.0	18	- 1.0	10	3.0	24	- 4.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 22 France ETSI				Table 23 France Existing				Table 24 New Zealand Existing			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	26	- 5.0	28	- 6.0	22	- 3.0	24	- 4.0	28	- 6.0	---	---
COTL	32	- 8.0	22	- 3.0	28	- 6.0	18	- 1.0	32	- 8.0	10	3.0
DIDS	26	- 5.0	28	- 6.0	22	- 3.0	24	- 4.0	28	- 6.0	---	---
DIDL	32	- 8.0	22	- 3.0	28	- 6.0	18	- 1.0	32	- 8.0	10	3.0
T2WT	26	- 5.0	28	- 6.0	---	---	30	- 7.0	22	- 3.0	---	---
T2WN	20	- 2.0	34	- 9.0	28	- 6.0	18	- 1.0	26	- 5.0	12	2.0
T2WV	32	- 8.0	22	- 3.0	---	---	30	- 7.0	22	- 3.0	---	---
T4WT	23	- 3.5	23	- 3.5	23	- 3.5	23	- 3.5	22	- 3.0	---	---
T4WN	23	- 3.5	23	- 3.5	23	- 3.5	23	- 3.5	26	- 5.0	12	2.0
T4WV	23	- 3.5	23	- 3.5	23	- 3.5	23	- 3.5	22	- 3.0	---	---
PAGT	---	---	30	- 7.0	---	---	30	- 7.0	---	---	23	- 3.5
RANR	---	---	---	---	---	---	---	---	9	3.5	---	---
ALUS	20	- 2.0	34	- 9.0	---	---	30	- 7.0	9	3.5	33	- 8.5
ALUL	20	- 2.0	34	- 9.0	---	---	30	- 7.0	15	0.5	27	- 5.5

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 25 Australia Existing				Table 26 China EPE and IPE				Table 27 China IPE only			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	30	- 7.0	14	1.0	15	0.5	11	2.5	19	- 1.5	20	- 2.0
COTL	30	- 7.0	14	1.0	15	0.5	11	2.5	19	- 1.5	20	- 2.0
DIDS	30	- 7.0	14	1.0	15	0.5	11	2.5	19	- 1.5	20	- 2.0
DIDL	30	- 7.0	14	1.0	15	0.5	11	2.5	19	- 1.5	20	- 2.0
T2WT	19	- 1.5	25	- 4.5	15	0.5	11	2.5	21	- 2.5	18	- 1.0
T2WN	30	- 7.0	14	1.0	15	0.5	11	2.5	21	- 2.5	18	- 1.0
T2WV	19	- 1.5	25	- 4.5	15	0.5	11	2.5	21	- 2.5	18	- 1.0
T4WT	22	- 3.0	22	- 3.0	17	- 0.5	9	3.5	22	- 3.0	17	- 0.5
T4WN	22	- 3.0	22	- 3.0	17	- 0.5	9	3.5	22	- 3.0	17	- 0.5
T4WV	22	- 3.0	22	- 3.0	17	- 0.5	9	3.5	22	- 3.0	17	- 0.5
PAGT	---	---	23	- 3.5	---	---	11	2.5	---	---	18	- 1.0
RANR	9	3.5	---	---	15	0.5	---	---	21	- 2.5	---	---
ALUS	13	1.5	31	- 7.5	8	4.0	18	- 1.0	---	---	23	- 3.5
ALUL	---	---	28	- 6.0	8	4.0	18	- 1.0	---	---	23	- 3.5

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

Table 16
Predefined Static Loss Plan Download tables (continued)

	Table 28 CIS IPE only			
B34 Port Type	**Rx**	**dBr**	**Tx**	**dBr**
COTS	24	- 4.0	22	- 3.0
COTL	28	- 6.0	18	- 1.0
DIDS	23	- 3.5	23	- 3.5
DIDL	28	- 6.0	18	- 1.0
T2WT	---	---	30	- 7.0
T2WN	---	---	30	- 7.0
T2WV	---	---	30	- 7.0
T4WT	---	---	22	- 3.0
T4WN	---	---	22	- 3.0
T4WV	---	---	22	- 3.0
PAGT	---	---	---	---
RANR	---	---	---	---
ALUS	---	---	30	- 7.0

Note: Pad code 16 and its corresponding dB gain 0.0 are shown as "--- ---" in the table to reflect what is seen when the table is printed in LD 97

—continued—

When configuring or changing a table, the valid input ranges for Tx and Rx differ for lines and trunks. The valid ranges are:

— Rx for lines 0-31

— Tx for lines 8-39

— Rx for trunks 8-39

— Tx for trunks 0-31

You may also disable the SLPD feature in LD 97.

Table 17 lists the LD 10 prompts and responses, while Table 18 lists the LD 97 prompts and responses that apply to the SLPD feature.

Table 17
LD 10 SLPD prompts and responses

Prompt	Response	Description
REQ	NEW CHG	Create new data block. Modify data block.
TYPE	500	Analog Line Unit
CLS	(SHL), LOL	Short line, Long line Loss Plan classification

Table 18
LD 97 SLPD prompts and responses

Prompt	Response	Description
REQ	CHG	Modify data block.
TYPE	LOSP	Loss Plan table creation or modification
NATP	(NO), YES	North American Transmission Plan Dynamic Pad Switching method (Dynamic Pad Switching is only supported on Generic XFCOT [NT5K16] packs.)
TTYP		Table Type to be installed or modified
	(STAT),	Static Loss Plan table
	DYNM	Dynamic Loss Switching table

Table 18
LD 97 SLPD prompts and responses

Prompt	Response		Description
STYP			Static Loss Plan Table to be used
	(PRED),		Predefined table
	CSTM,		Customize Modify a table
	DISL		Disable Static Loss Plan Downloading
The following is prompted when TTYP = STAT and STYP = DISL			
PWD2			Level 2 Administrator password as defined in LD 17
The following is prompted when TTYP = STAT and STYP = PRED			
TNUM	1–28		Table number of one of the predefined Loss Plan tables
The following is prompted when TTYP = STAT and STYP = CSTM			
PWD2			Level 2 Administrator password as defined in LD 17
COTS	Rx	Tx	COT short line
	8-39	0-31	Where: Rx = Relative Input/Output Level code for the Receive (A/D) direction Tx = Relative Input/Output Level code for the Transmit (D/A) direction
COTL	Rx	Tx	COT long line
	8-39	0-31	
DIDS	Rx	Tx	DID short line

Table 18
LD 97 SLPD prompts and responses

Prompt	Response		Description
	8-39	0-31	
DIDL	Rx	Tx	DID long line
	8-39	0-31	
T2WT	Rx	Tx	TIE 2-wire, CLS = TRC
	8-39	0-31	
T2WN	Rx	Tx	TIE 2-wire, CLS = NTC
	8-39	0-31	
T2WV	Rx	Tx	TIE 2-wire, CLS = VNL
	8-39	0-31	
T4WT	Rx	Tx	TIE 4-wire, CLS = TRC
	8-39	0-31	
T4WN	Rx	Tx	TIE 4-wire, CLS = NTC
	8-39	0-31	
T4WV	Rx	Tx	TIE 4-wire, CLS = VNL
	8-39	0-31	
PAGT	Tx		Paging trunk
	0-31		
RANR	Rx		RAN trunk
	8-39		

Table 18
LD 97 SLPD prompts and responses

Prompt	Response		Description
ALUS	Rx	Tx	Analog Line Card unit CLS = SHL
	0-31	8-39	
ALUL	Rx	Tx	Analog Line Card unit CLS = LOL
	0-31	8-39	

Hardware requirements

All Intelligent Peripheral Equipment (IPE) cards equipped with the B34 codec and "flexible" firmware support Static Loss Plan Downloading with the exception of Chinese IPE cards.

Following is a list of cards, and their associated countries, that are capable of using SLPD:

NT5K02	XFALC with Message Waiting	Australia Denmark Netherlands Italy New Zealand Norway Sweden Switzerland
NT5K17	XDDI	New Zealand
NT5K18	XCOT	New Zealand
NT5K19	XFEM	New Zealand
NT5K60	XDID	Commonwealth of Independent States
NT5K61	XDID	Commonwealth of Independent States
NT5K82	XCOT	Australia Belgium Switzerland
NT5K83	XFEM	Australia Belgium Denmark Netherlands Italy Norway Sweden Switzerland
NT5K84	XDDI/XDID	Australia Belgium

		Switzerland
NT5K90	XFCOT	Denmark
NT5K93	XFCOT	Norway
NT5K96	XFALC without Message Waiting	Belgium Denmark Netherlands Italy Norway Sweden Switzerland
NTCK18	XFCOT	Italy
NTCK22	XDID/TIE	Italy

Dynamic Loss Switching

Introduction

Dynamic Loss Switching (DLS) allows per-connection level adjustment for International Intelligent Peripheral Equipment (IPE) trunk cards equipped with the B34 codec and “flexible” firmware. Dynamic Loss Switching is an X11 Release 18.21H feature.

X11 Release 20 introduced the “M1 IPE Loss Plan for China.” This feature incorporates Loss Switching Connection Matrices (LSCM) introduced in X11 Release 18. LSCM uses Dynamic Pad Switching (DPS) matrices to determine which level is required. “M1 IPE Loss Plan for China” requires the “CHINA” package (285).

Release 21 introduces the China Toll package (292) that allows for special loss settings on DTI2 toll calls that terminate on a 500/2500 set.

DLS is not supported on Three Wire Analog Trunks for the Commonwealth of Independent States introduced in X11 Release 21. For EPE Analog Three Wire Trunk cards (E3W) no loss plan downloading or loss switching is done. For B34 codec equipped IPE Analog Three Wire Trunk cards (X3W) the Static Loss Plan Downloading feature is used.

Dynamic Loss Switching overview

DLS allows per-connection level adjustments based on the port types involved. Level adjustments are the result of switching up to four pads per connection. The pads are:

— originator’s receive pad

— originator’s transmit pad

— terminator's receive pad

— terminator's transmit pad

DLS introduces Base and Alternate level switching; this is similar to the pad in and pad out switching of Dynamic Pad Switching (DPS). The introduction of Base and Alternate level is to differentiate DLS from DPS because DLS has more flexibility. DPS switches hardware-defined pad values based on the port types involved in a connection. DLS switches software-defined card losses based on the port types involved in a connection.

The Relative Input/Output Levels in LD 97 define the card losses. A predefined country-specific software matrix, similar to the matrix used by DPS, chooses which level to apply to a given connection. DLS has three predefined matrices. They are:

— New Zealand matrix,

— Italian matrix, and

— Australian matrix.

In X11 Release 20 the term Loss Switching Connection Matrices (LSCM) is introduced. The LSCM uses 18 X 18 DPS matrixes to determine which level is required. Two LSCMs are introduced in Release 20. The LSCMs are:

— Chinese LSCM for switches which have both EPE and IPE Peripheral Equipment hardware equipped, and

— Chinese LSCM for switches which have only IPE Peripheral Equipment hardware equipped.

DLS uses the Static Loss Plan Download (SLPD) table as its base level Relative Input/Output Level settings and introduces alternate level tables.

As with the SLPD feature, there is a minimum vintage of International B34 equipped IPE card required. Refer to Table 20 for a list of IPE trunk cards and their transmission adjustment capabilities.

Static Loss Plan Download and Dynamic Loss Switching inter working

If a system has both the Static Loss Plan Download (SLPD) and the DLS features equipped:

— for IPE trunks DLS will take precedence over SLPD, level adjustments will be performed

— for IPE lines SLPD will still apply (toll calls in China are an exception under some circumstances)

Relative Input/Output Level

For an explanation, see the section of the same heading immediately after Table 13 in the chapter "Static Loss Plan Downloading."

Loss Plan selection

For an explanation, see the section of the same heading immediately after Table 13 in the chapter "Static Loss Plan Downloading."

LD 97 also allows the definition of Custom Loss Plan tables.

To see the tables showing the predefined “BASE” (SLPD) Relative Input/Output Level codes in LD 97 cross-referenced to the actual Relative Input/Output Levels, consult Table 16. Tables 24 through 27 within that larger table show Base Level SLPD values for New Zealand, Australia, China (both EPE ane IPE) and China (IPE only) respectively. Table 10 (Existing) shows Base Level SLPD values for Italy.

Table 19 cross-references the predefined “ALTERNATE” (DLS) Relative Input/Output Level codes in LD 97 to the actual Relative Input/Output Levels by country and table number. The Alternative Level (DLS) tables in Table 19 are not the same as the SLPD tables in Table 16.

The China Toll package (292) introduced in Release 21 allows for special treatment of toll calls that involve a DTI2 MFC trunk and which terminate on 500/2500 sets. Prior to this release the loss plan was provided according to the call type connected to the DTI2 trunk only if the line card had OPS Class of Service (COS). Loss levels for ONS COS cards were statically downloaded at initialization and were applied for all call types. The China Toll package provides specific losses on the DTI2 trunk and line cards if the call is recognized to be a toll call and the line card has either OPS or ONS COS. The new loss levels can be configured in LD 73 under the new prompts TOLT and TOLL. When the call is terminated, the original loss levels from the pre-defined base table are sent to the ONS line card. For all call types other than toll the loss plan on the ONS card is static. For the OPS line card the loss levels are downloaded on a per call basis.

The Toll Loss plan is only supported when a pure IPE Loss Plan for China is used, as defined by one of the following options:

- The APAD prompt in LD 15 is set to 5, or
- The Static Loss Plan table defined under the STYP prompt in LD 97 is the pre-defined Table 27, or
- The Dynamic Loss Plan table defined under the TTYP prompt (also DLSA for pre-Release 20) in LD 97 is the pre-defined Table 5.

The Toll Loss Plan is not supported for conference calls.

Table 19
Alternative Level (DLS) tables

	New Zealand				Australia			
B34	**TABLE 1**				**TABLE 2**			
Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	20	- 2.0	24	4.0	22	- 3.0	22	- 3.0
COTL	20	- 2.0	22	3.0	22	- 3.0	22	- 3.0
DIDS	20	- 2.0	24	4.0	22	- 3.0	22	- 3.0
DIDL	20	- 2.0	22	3.0	22	- 3.0	22	- 3.0

Table 19
Alternative Level (DLS) tables

T2WT	18	- 1.0	20	2.0	21	- 2.5	23	- 3.5
T2WN	18	- 1.0	20	2.0	22	- 3.0	22	- 3.0
T2WV	18	- 1.0	20	2.0	21	- 2.5	23	- 3.5
T4WT	18	- 1.0	20	2.0	14	1.0	30	- 7.0
T4WN	18	- 1.0	20	2.0	14	1.0	30	- 7.0
T4WV	18	- 1.0	20	2.0	14	1.0	30	- 7.0
PAGT	16	0.0	23	3.5	16	0.0	23	- 3.5
RANR	9	3.5	16	0.0	9	3.5	16	0.0

—continued—

Table 19
Alternative Level (DLS) tables (continued)

	Italy			
B34	**TABLE 3**			
Port Type	**Rx**	**dBr**	**Tx**	**dBr**
COTS	8	4.0	18	-1.0
COTL	8	4.0	18	-1.0
DIDS	12	2.0	14	1.0
DIDL	12	2.0	14	1.0
T2WT	12	2.0	14	1.0
T2WN	12	2.0	14	1.0
T2WV	12	2.0	14	1.0
T4WT	12	2.0	14	1.0
T4WN	12	2.0	14	1.0
T4WV	12	2.0	14	1.0
PAGT	---	---	10	3.0
RANR	16	0.0	---	---

Table 19
Alternative Level (DLS) tables (continued)

	China (systems with both EPE and IPE)				China (systems with IPE only)			
B34	**TABLE 4**				**TABLE 5**			
Port Type	**Rx**	**dBr**	**Tx**	**dBr**	**Rx**	**dBr**	**Tx**	**dBr**
COTS	11	2.5	15	0.5	16	0.0	23	- 3.5
COTL	11	2.5	15	0.5	16	0.0	23	- 3.5
DIDS	11	2.5	15	0.5	16	0.0	23	- 3.5
DIDL	11	2.5	15	0.5	16	0.0	23	- 3.5
T2WT	11	2.5	15	0.5	16	0.0	23	- 3.5
T2WN	11	2.5	15	0.5	16	0.0	23	- 3.5
T2WV	11	2.5	15	0.5	16	0.0	23	- 3.5
T4WT	13	1.5	13	1.5	16	0.0	23	- 3.5
T4WN	13	1.5	13	1.5	16	0.0	23	- 3.5
T4WV	13	1.5	13	1.5	16	0.0	23	- 3.5
PAGT	16	0.0	15	0.5	16	0.0	23	- 3.5
RANR	11	2.5	16	0.0	16	0.0	16	0.0

IPE trunk card transmission adjustment capabilities

There are several versions of IPE trunk cards currently in use. Refer to Table 20 for a brief summary on the trunk card versions and their transmission adjustment capabilities.

Table 20
IPE trunk card transmission adjustment capabilities

	Static Pad Download (SPD)	Static Loss Plan Download (SLPD)	Dynamic Loss Switching (DLS)	Default Loss Setting	Software supported
non-B34 equipped trunk card	Yes	No	No	country specific set by H/W	pre-8B
"hard-coded" B34 equipped trunk card	Yes	No	No	country specific set by F/W	pre-8B
"flexible 7C" B34 equipped trunk card	Yes (SLPD and DLS take precedence)	Yes (DLS takes precedence)	Yes	country specific set by F/W	All
"flexible 8B" B34 equipped trunk card	Yes (SLPD and DLS take precedence)	Yes (DLS takes precedence)	Yes	universal set by F/W	8B and later
"flexible" B34 CHINA	No	No	Yes	Hybrid set by F/W "pure" set by S/W	20 and later

Upgrade and new installation strategies

In general, existing systems (pre-Release 18.21H such as 16.91G or 16.87G) and those systems upgrading to Release 18.21H software will not require new flexible B34 IPE trunk cards unless their Loss Plan changes. Such systems shall use the existing mode of operation, if applicable.

Newly installed systems with Release 18.21H software will have the new flexible B34 trunk cards and can operate with either the ETSI or existing mode loss plan.

Systems using both B34 and non-B34 cards will use the existing Loss Plan.

Administration

Configuration of the Loss Plan is on a system-wide basis in LD 97.

The configuration of levels is by port type; refer to the Table 21 for the Chinese Loss Plan B34 port types and Table 21 for all other Loss Plan B34 port types.

Table 21
B34 port types for Chinese Loss Plan

TYPE (unit type)	SIGL (signaling)	XTRK	CLS	B34 Port Type
COT, FEX, or WAT	ALL	ALL	SHL	COTS
			LOL	COTL
DID	ALL	ALL	SHL	DIDS
			LOL	DIDL

Table 21
B34 port types for Chinese Loss Plan (Continued)

TIE	EAM	ALL	TRC	T2WT
			NTC	T2WN
			VNL	T2WV
	LDR	XDID, EXUT, and XUT	TRC	T2WT
			NTC	T2WN
			VNL	T2WV
		none of the above	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
	EM4, WR4, and none of the above	ALL	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
RAN, MUS, RCD, or AWR	ALL	ALL	ALL	RANR
PAG	ALL	ALL	ALL	PAGT

Table 21
B34 port types for Chinese Loss Plan (Continued)

none of the above	ALL	XCOT	SHL	COTS
			LOL	COTL
		XDID	SHL	DIDS
			LOL	DIDL
		XFEM, and XEM	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
		EXUT, and XUT	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
Analog Line Unit (500/2500)	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 22
B34 port types for all other Loss Plans

TYPE (unit type)	SIGL (signaling)	XTRK	CLS	B34 Port Type
COT, FEX, or WAT	ALL	ALL	SHL	COTS
			LOL	COTL
DID			SHL	DIDS
			LOL	DIDL

Table 22
B34 port types for all other Loss Plans (Continued)

TIE	EAM and LDR	ALL	TRC	T2WT
			NTC	T2WN
			VNL	T2WV
	EM4, WR4, and none of the above	ALL	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
RAN, MUS, RCD, or AWR	ALL	ALL	ALL	RANR
PAG	ALL	ALL	ALL	PAGT
none of the above	ALL	XCOT	SHL	COTS
			LOL	COTL
		XDID	SHL	DIDS
			LOL	DIDL
		XFEM	TRC	T4WT
			NTC	T4WN
			VNL	T4WV
Analog Line Unit (500/2500)	Not Applicable	Not Applicable	SHL	ALUS
			LOL	ALUL

Entering a code in LD 97 defines the required level. Once downloaded, the B34 converts the code to a level. Table 23 provides a cross-reference between codes and Relative Input/Output Levels.

Table 23
LD 97 code to Relative Input/Output Level cross-reference

Code	Level (dBr)	Rx	Tx	Code	Level (dBr)	Rx	Tx
0	8.0		Ð	20	- 2.0	Ð	Ð
1	7.5		Ð	21	- 2.5	Ð	Ð
2	7.0		Ð	22	- 3.0	Ð	Ð
3	6.5		Ð	23	- 3.5	Ð	Ð
4	6.0		Ð	24	- 4.0	Ð	Ð
5	5.5		Ð	25	- 4.5	Ð	Ð
6	5.0		Ð	26	- 5.0	Ð	Ð
7	4.5		Ð	27	- 5.5	Ð	Ð
8	4.0	Ð	Ð	28	- 6.0	Ð	Ð
9	3.5	Ð	Ð	29	- 6.5	Ð	Ð
10	3.0	Ð	Ð	30	- 7.0	Ð	Ð
11	2.5	Ð	Ð	31	- 7.5	Ð	Ð
12	2.0	Ð	Ð	32	- 8.0	Ð	
13	1.5	Ð	Ð	33	- 8.5	Ð	
14	1.0	Ð	Ð	34	- 9.0	Ð	
15	0.5	Ð	Ð	35	- 9.5	Ð	
16	0.0	Ð	Ð	36	- 10.0	Ð	
17	- 0.5	Ð	Ð	37	- 10.5	Ð	
18	- 1.0	Ð	Ð	38	- 11.0	Ð	
19	- 1.5	Ð	Ð	39	- 11.5	Ð	

Note: Ð indicates a valid code in either Tx or Rx mode.

To configure the Loss Plan manually the user must define the Relative Input/Output Levels for transmit (Tx) and receive (Rx) on a port type by port type basis. To configure the Loss Plan automatically the user must select a predefined table number.

For Relative Input/Output Levels transmit (Tx) corresponds to the D/A (decode) and receive (Rx) corresponds to the A/D (encode) direction for analog cards.

You may also disable the DLS feature in LD 97.

Table 24 lists the LD 97 prompts and responses that apply to the DLS feature:

Table 24
LD 97 DLS prompts and responses

Prompt	Response	Description
REQ	CHG	
TYPE	LOSP	Loss Plan table creation or modification
DLSA †	(NO), YES	Dynamic Loss Switching for ALUs
NATP	(NO), YES	North American Transmission Plan Dynamic Pad Switching method (Dynamic Pad Switching is only supported on Generic XFCOT [NT5K16] packs.)
TTYP		Table Type to be installed or modified
	(STAT),	Static Loss Plan table
	DYNM	Dynamic Loss Switching table
STYP		Static Loss Plan Table to be used
	(PRED),	Predefined table
	CSTM,	Customize Modify a table
	DISL	Disable Static Loss Plan Downloading

† This prompt does not appear in X11 Release 20 and later software.

Table 24
LD 97 DLS prompts and responses

DTYP		Dynamic Loss Switching table type
	(PRED),	Predefined table
	CSTM,	Customize Modify a table
	DISL	Disable Dynamic Loss Switching
The following is prompted when the response to TTYP is STAT and the response to STYP is DISL		
PWD2		Level 2 Administrator password as defined in LD 17
The following is prompted when the response to TTYP is DYNM and the response to DTYP is DISL		
PWD2		Level 2 Administrator password as defined in LD 17
The following is prompted when the response to TTYP is STAT and the response to STYP is PRED		
TNUM	1–28	Table number of one of the predefined Base Level tables
The following is prompted when the response to TTYP is DYNM and the response to DTYP is PRED		
TNUM	1–5	Table number of one of the predefined Alternative Level tables

Table 24
LD 97 DLS prompts and responses

The following are the prompts output if the response to STYP is CSTM or the response to DTYP is CSTM			
PWD2			Level 2 Administrator password as defined in LD 17
COTS	Rx	Tx	COT short line
	8-39	0-31	
COTL	Rx	Tx	COT long line
	8-39	0-31	
DIDS	Rx	Tx	DID short line
	8-39	0-31	
DIDL	Rx	Tx	DID long line
	8-39	0-31	
T2WT	Rx	Tx	TIE 2-wire, CLS = TRC
	8-39	0-31	
T2WN	Rx	Tx	TIE 2-wire, CLS = NTC
	8-39	0-31	
T2WV	Rx	Tx	TIE 2-wire, CLS = VNL
	8-39	0-31	
T4WT	Rx	Tx	TIE 4-wire, CLS = TRC
	8-39	0-31	
T4WN	Rx	Tx	TIE 4-wire, CLS = NTC
	8-39	0-31	
T4WV	Rx	Tx	TIE 4-wire, CLS = VNL
	8-39	0-31	

Table 24
LD 97 DLS prompts and responses

PAGT	Tx		Paging trunk
	0-31		

Following are the prompts output if the response to STYP is CSTM or the response to The following prompts are output DTYP is CSTM

PWD2			Level 2 Administrator password as defined in LD 17
COTS	Rx	Tx	COT short line
	8-39	0-31	
COTL	Rx	Tx	COT long line
	8-39	0-31	
DIDS	Rx	Tx	DID short line
	8-39	0-31	
DIDL	Rx	Tx	DID long line
	8-39	0-31	
T2WT	Rx	Tx	TIE 2-wire, CLS = TRC
	8-39	0-31	
T2WN	Rx	Tx	TIE 2-wire, CLS = NTC
	8-39	0-31	
T2WV	Rx	Tx	TIE 2-wire, CLS = VNL
	8-39	0-31	
T4WT	Rx	Tx	TIE 4-wire, CLS = TRC
	8-39	0-31	

Table 24
LD 97 DLS prompts and responses

T4WN	Rx	Tx	TIE 4-wire, CLS = NTC
	8-39	0-31	
T4WV	Rx	Tx	TIE 4-wire, CLS = VNL
	8-39	0-31	
PAGT	Tx		Paging trunk
	0-31		
RANR	Rx		RAN trunk
	8-39		

Following are the prompts output if the response to STYP is CSTM or the response to The following prompts are output DTYP is CSTM

PWD2			Level 2 Administrator password as defined in LD 17
COTS	Rx	Tx	COT short line
	8-39	0-31	
COTL	Rx	Tx	COT long line
	8-39	0-31	
DIDS	Rx	Tx	DID short line
	8-39	0-31	
DIDL	Rx	Tx	DID long line
	8-39	0-31	
T2WT	Rx	Tx	TIE 2-wire, CLS = TRC
	8-39	0-31	
T2WN	Rx	Tx	TIE 2-wire, CLS = NTC
	8-39	0-31	

Table 24
LD 97 DLS prompts and responses

T2WV	Rx	Tx	TIE 2-wire, CLS = VNL
	8-39	0-31	
T4WT	Rx	Tx	TIE 4-wire, CLS = TRC
	8-39	0-31	
T4WN	Rx	Tx	TIE 4-wire, CLS = NTC
	8-39	0-31	
T4WV	Rx	Tx	TIE 4-wire, CLS = VNL
	8-39	0-31	
PAGT	Tx		Paging trunk
	0-31		
RANR	Rx		RAN trunk
	8-39		

Table 25 lists the LD 15 prompts and responses that are required to configure the LSCM for China:

Table 25
LD 15 Chinese LSCM prompts and responses

Prompt	Response	Description
REQ	CHG	
TYPE	CDB	...
CUST	...	

Table 25
LD 15 Chinese LSCM prompts and responses

...		
APAD	X Y	Alternate PAD Where: X = Alternative Dynamic Pad Switching matrix identifier (0)-7 4 = China EPE and IPE matrix 5 = China IPE only matrix Y = Alternative Conference Pads identifier (0)-7 0 = default (North American) 1 = Alternative Conference Pads
...		

Table 26
LD 73 define TOLT and TOLL pad levels prompts and responses

Prompt	Response		Description
REQ	NEW/CHGPRT		
TYPE	DTI2		
FEAT	PAD		Pad category
PDCA	1 – 16		Pad category table
TNLS	YES, (NO)		TN list
DFLT	(1) – 16		Default table
..	..		
TOLT	Rx (0)	Tx (0)	Toll Call Pad data on DTI2 card. Default values 0 dB Receive, 0 dB Transmit (Valid range 0 – 26, see Table 28)
TOLL	Rx (16)	Tx (30)	Toll Call Pad data on DTI2 card. Default values 0 dB Receive, 7 dB Transmit (Valid range Rx: 0 – 31, Tx: 8 – 39, see Table 15 or Table 23)

Hardware requirements

Dynamic Loss Switching requires the following cards:

NT5K02	XFALC with Message Waiting	Australia New Zealand
NT5K17	XDDI	New Zealand
NT5K18	XCOT	New Zealand
NT5K19	XFEM	New Zealand
NT5K82	XCOT	Australia
NT5K83	XFEM	Australia
NT5K84	XDDI	Australia
NTRA02	XUTC	China
NTRA03	XEMC	China
NTRA04	XFALCC with Message Waiting	China
NTRA05	XALCC without Message Waiting	China
NTRA06	XOPSC Off-premises Station	China

Balance impedance adjustment

Introduction

Balance impedance adjustment applies to a small number of International Intelligent Peripheral Equipment trunk packs. Balance impedance adjustment is an X11 International Release 16.67G.

Administration

Implementation of the compromise impedance network varies between Meridian 1 Peripheral Equipment (PE) packs. On Existing Peripheral Equipment (EPE), selection of the compromise impedance network is by switch setting. On certain Intelligent Peripheral Equipment (IPE), selection of the compromise impedance network is by response to the BIMP prompt in LD 14.

Valid responses to the BIMP prompt in LD 14 are:

— 600 selects the primary setting

— 3COM selects the alternate setting

Hardware requirements

Balance impedance adjustment is available on the following circuit cards:

— NT5K90 XFCOT Denmark

— NTCK18 XFCOT Italy

— NTCK22 XDID/TIE Italy

Digital Trunk and Primary Rate Interface

Introduction

This section provides an overview of the 1.5 Mbit Digital Trunk Interface (DTI)/Primary Rate Interface (PRI), and 2.0 Mbit DTI/PRI, transmission concepts and controls.

To satisfy transmission loss plans, Meridian 1 trunk and line cards use pads to adjust signal level. On Existing Peripheral Equipment (EPE) analog line and trunk cards, 1.5 Mbit DTI/PRI trunks if GPRI package (167) is not equipped and XUT and XEM based (with the exception of China) Intelligent Peripheral Equipment (IPE) cards these values are hard-coded in hardware or firmware. For 2.0 Mbit DTI/PRI trunks, and 1.5 Mbit DTI/PRI trunks if GPRI package (167) is equipped pad values are selected by overlay input.

Each digital trunk and primary rate trunk have a pad category assigned in LD 14. The pad category determines which table of pad values to use. LD 73 is where definition of the tables occurs. The use of tables allows the assignment of different pad values to different trunk types and customers. It should be noted that, with the exception of the UK and Germany, most of Europe uses 0 dB pads on all digital trunks and connections.

Pad switching

For 2.0 Mbit DTI/PRI switching of the loss value is on the receive and transmit side, depending on the port type involved in the connection.

A trunk connected to a 2.0 Mbit DTI/PRI trunk will have its pad state set by the pad switching algorithm for that trunk type. If the connection is a 1.5 Mbit DTI/PRI trunk to a 2.0 Mbit DTI/PRI trunk, then the 1.5 Mbit DTI pad switching algorithm sets the 1.5 Mbit DTI/PRI trunk pad states. If the connection is an analog trunk to a 2.0 Mbit DTI/PRI trunk, then the pad switching method for that trunk type sets the analog trunk pad states.

EPE trunks have their pad state set to pad out.

XDID, XFCOT, and XFEM trunks have their pad state set to pad out (Base level).

XUT and XEM trunks set their pad states to pad out. Chinese packs use the values in the base table.

Treatment of EPE and IPE trunks is identical from the 2.0 Mbit DTI switched loss point of view.

Port type definition

The following criteria identify the port types involved in a connection:

— unit type

— Class of Service (CLS)

— Port type (PTYP) designation in LD 16

— Trunk Signaling

— XTRK type

With Release 21, R2 Multi-Frequency Compelled signalling capability is now available on Meridian 1s with DTI 1.5 TIE or DID trunks, and is configured as MFC Class of Service in LD 14. This capability does not support the Alternate Loss Plan.

The trunk data block Class of Service (CLS) assignment characterizes the transmission properties of each trunk. The options in a North American context are:

— Via Net Loss (VNL)

— Non-VNL, either:
Transmission Compensated (TRC)
or Non-Transmission Compensated (NTC)

Assignment of CLS VNL or non-VNL ensures stability and minimizes echo on long-haul connections, 4-wire TIE, and CCSA. Similarly, assignment of a non-VNL CLS applies to 2-wire TIE, COT, FEX, WAT, CCSA, and 4-wire non-VNL facilities. The non-VNL CLS options in a North American context are:

— TRC — 2-wire non-VNL trunk facility with a loss of greater than 2 dB
— 2-wire non-VNL trunk facility with impedance compensation
— 4-wire non-VNL facility

— NTC — 2-wire non-VNL trunk facility with a loss of less than 2 dB
— 2-wire non-VNL trunk facility when impedance compensation is not provided

The options in an international context are:

— NTC (Non-Transmission Compensated) — transmission lines without compensation, high loss
Pad out (pad not applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK LINK setting.

— TRC (Transmission Compensated) — transmission lines with compensation, low loss
Pad in (pad applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK TIE setting.

— VNL (Via Network Loss) — no particular meaning in a European context,
equivalent to TRC
Pad in (pad applied)
Applies to EAM and EM4 TIE trunks.
UK TIE setting.

The responses to the PTYP prompt in LD 16 define the port types for connections involving 2.0 Mbit DTI/PRI. The port type connected to the 2.0 Mbit DTI/PRI trunk determines which loss to apply. The response to the PTYP prompt in LD 16 defines the port type for all trunks except ISA trunks. ISA trunks use the service route's port type.

Following are the valid responses to the LD 16 PTYP prompt:

For analog TIE trunk routes:

— ATT analog TIE trunk

— AOT satellite PBX analog TIE trunks when PBX includes OPS set

— AST satellite PBX TIE or ESN trunk

For digital TIE trunk routes excluding 1.5 Mbit PRI routes:

— DCT combination satellite PBX TIE trunk

— DST digital satellite PBX TIE trunk

For analog COT, FEX, DID WAT trunk routes:

— ACO analog CO trunk

— ATO analog toll office trunk

For digital Central Office trunk routes:

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

For 1.5 Mbit PRI TIE trunk routes:

— PRI B-channel port classification

— DTT digital or combination TIE trunk

— DCT combination satellite PBX TIE trunk

— DST digital satellite PBX TIE trunk

For 1.5 Mbit PRI COT, FEX, DID WAT trunk routes:

— PRI B-channel port classification

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

Administration

PCM companding law

The Pulse Code Modulation (PCM) companding law is the method used to convert analog signals to digital signals and vice versa. The Meridian 1 can accommodate a number of different PCM companding laws:

— µ-Law

— A-Law inverted (Sweden only)

— A-Law even bit interleaved

The response to the PCML prompt in LD 14 defines the PCM companding law used by the Digital Trunk Interface (DTI) or Primary Rate Interface (PRI) channel.

The valid responses to the PCML prompt are:

LD 14

REQ	NEW	Create data block.
	CHG	Modify data block.
...		
PCML	A	DTI trunk use A-Law companding
	MU	DTI trunk use µ-Law companding

If the response to PCML in LD 14 differs from the PCML setting in LD 17, a companding law conversion occurs for each call on that channel; i.e., conversion to the system law, i.e., response to PCML prompt in LD 17, occurs for all incoming calls, while conversion to the far-end law, i.e., response to PCML prompt in LD 14, occurs for all outgoing calls.

DTI/PRI pad selection

Assignment of the pad category table occurs during the creation (NEW) or modification (CHG) of a trunk in LD 14

Pad category TABLE 1 in LD 73 is the system default. TABLE 1 always exists. Alteration or removal of TABLE 1 is not allowed. Table 27 shows the default pad code to pad value cross-reference for TABLE 1.

Table 27
Default 2.0 Mbit DTI/PRI pad category table

	TABLE			
	with GPRI package (167)			
Port Type	**Rx Code**	**Rx Pad (dB)**	**Tx Code**	**Tx Pad (dB)**
ONS	17	- 3.0	0	0.0
OPS	17	- 3.0	0	0.0
DTT	0	0.0	0	0.0
DCO	0	0.0	0	0.0
NTC	4	4.0	1	1.0
TRC	4	4.0	1	1.0
DTR	17	- 3.0		
VNL	4	4.0	1	1.0
ACO	4	4.0	1	1.0
AFX	4	4.0	1	1.0
ADD	4	4.0	1	1.0
PRI	0	0.0	0	0.0

LD 73 allows changes to the receive (Rx) and transmit (Tx) pad codes for the different port types for all tables except TABLE 1. Pad code values are in the range 0-26.

Table 28 cross-references pad codes and pad values.

Table 28
Pad code to pad value cross-reference

CODE	VALUE (dB)	CODE	VALUE (dB)	CODE	VALUE (dB)
0	0.0	9	9.0	18	- 4.0
1	1.0	10	10.0	19	- 5.0
2	2.0	11	11.0	20	- 6.0
3	3.0	12	12.0	21	- 7.0
4	4.0	13	13.0	22	- 8.0
5	5.0	14	14.0	23	- 9.0
6	6.0	15	- 1.0	24	- 10.0
7	7.0	16	- 2.0	25	Idle
8	8.0	17	- 3.0	26	0.6

Release 21 introduces DTI for the Commonwealth of Independent States (CDTI2). CDTI2 supports the same 16 different pad values as DTI2: 0, 1, 2, 3, 4, 5, 6, 8, 10, 15, 16, 17, 18, 20, 25, and 26.

LD 73 pad value definition

Definition of pad values is in response to the following LD 73 prompts. Output of these prompts occurs when FEAT = PAD:

Table 29
LD 73 pad value definition prompts and responses

Prompt	Response		Description
REQ	NEW CHG		Create new data block. Modify data block.
TYPE	DTI2 PRI2		2 Mbit Digital Trunk Interface 2 Mbit Primary Rate Interface
FEAT	PAD		
ONS	Rx	Tx	On-premises Station
DSET	Rx	Tx	Meridian Digital Set
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	Digital TIE trunks
SDTT	Rx	Tx	Digital Satellite TIE trunks
DCO	Rx	Tx	Digital COT, FEX, WAT, and DID trunks
DTO	Rx	Tx	Digital TOLL office trunks
NTC	Rx	Tx	Non-Transmission Compensated (Analog TIE)
TRC	Rx	Tx	Transmission Compensated (Analog TIE)
DTR	Rx		Pad value while DTR is connected (receive only).
VNL	Rx	Tx	Via Net Loss (Analog TIE)
SATT	Rx	Tx	Analog Satellite TIE trunks
ACO	Rx	Tx	Analog COT and WAT trunks
ATO	Rx	Tx	Analog TOLL office trunks
PRI	Rx	Tx	1.5 Mbit Primary Rate Interface trunk
PRI2	Rx	Tx	2.0 Mbit Primary Rate Interface trunk

UK 2.0 Mbit DTI/PRI settings

For digital trunks in the UK the following conditions obtain:

- DPNSS and DASS trunks have their loss pad values hard coded in software. For DPNSS trunks the values for both Tx and Rx are 0 dB. For DASS the Tx value is 0 dB and the Rx value is 4 dB.
- For any other digital trunk or BRIT it is necessary to create (key in at the TTY) the pad table. For digital CO trunks and digital TIE trunks the pad table is created in LD 73 using the above stated DPNSS loss values for all TIE trunks and DASS loss values for CO trunks. In this case it is necessary to point to the pad table by responding to the PDCA prompt in LD 14 (see the software I/O guide for details).

German 2.0 Mbit DTI/PRI settings

Table 30 shows the settings required for 2.0 Mbit DTI/PRI operation in Germany. Germany always uses the gateway (GPRI package 167 equipped) settings. The pad settings for all trunk types, in both the transmit and receive direction, are set at 3 dB.

Table 30
German 2.0 Mbit DTI/PRI settings with GPRI package (167)

Port Type	Rx Code	Rx Pad (dB)	Tx Code	Tx Pad (dB)
ONS	3	3.0	3	3.0
OPS	3	3.0	3	3.0
DTT	3	3.0	3	3.0
DCO	3	3.0	3	3.0
NTC	3	3.0	3	3.0
TRC	3	3.0	3	3.0
VNL	3	3.0	3	3.0
ACO	3	3.0	3	3.0
AFX	3	3.0	3	3.0
ADD	3	3.0	3	3.0
PRI	3	3.0	3	3.0

1.5/2.0 Mbit Gateway

Introduction

The 1.5/2.0 Mbit Gateway feature introduces enhanced transmission modification capabilities required when interconnecting 1.5 and 2.0 Mbit networks. The 1.5/2.0 Mbit Gateway is an X11 International Release 16.67G feature.

Overview

This feature introduces a number of new capabilities. The first is new pad values for both the 1.5 and 2.0 Mbit Digital Trunk Interfaces (DTI) and Primary Rate Interfaces (PRI) to support the required losses to allow interconnection of 1.5 and 2.0 Mbit networks. The second is ability to configure pad values in LD 73 for the 1.5 Mbit DTI/PRI. The last is the 1.5 Mbit DTI/PRI pad switching algorithm now requires the pads on analog trunks be switched in when the connection involves a 1.5 Mbit DTI/PRI.

The default pad table (TABLE 1) in LD 73 will meet current North American loss and level requirements when the 1.5/2.0 Mbit Gateway (GPRI) package (167) is equipped.

Supported hardware:

— QPC 720 (Version C or later) — 1.5 Mbit PRI card

— NT8D72 — 2.0 Mbit PRI card

— QPC 536 — 2.0 Mbit DTI card

— Meridian MS-1 Audio Teleconferencing bridge

Pad switching

1.5 Mbit DTI/PRI and 2.0 Mbit DTI/PRI all use dynamic pad switching (DPS). 1.5 Mbit DTI/PRI and 2.0 Mbit DTI/PRI use the loss value input for the port type in LD 73.

Following are descriptions of the pad switching algorithm and port type definitions for the 1.5 and 2.0 DTI/PRI from a Gateway point of view.

1.5 Mbit DTI/PRI

For the 1.5 Mbit DTI/PRI switching of loss values occurs in the receive and transmit directions. The applied losses depend on the port type involved in the connection with the 1.5 Mbit DTI/PRI.

If the port type involved in the connection to the 1.5 Mbit DTI/PRI is an analog trunk port, then the analog trunk sets its pad state to pad in and the DTI/PRI applies the LD 73 defined loss values for that port type. If the port type involved in the connection to the 1.5 Mbit DTI/PRI is digital trunk port, then the originating side applies zero loss and the terminating side applies the LD 73 defined loss values for that port type.

2.0 Mbit DTI/PRI

For 2.0 Mbit DTI/PRI switching of loss values occurs in the receive and transmit directions. The applied losses depend on the port type involved in the connection with the 2.0 Mbit DTI/PRI.

A trunk port involved in a connection with a 2.0 Mbit DTI/PRI trunk will have its pad state set by the pad switching algorithm for that port type. If the port involved in the connection to a 2.0 Mbit DTI/PRI trunk is a 1.5 Mbit DTI/PRI trunk, then the 1.5 Mbit DTI/PRI pad switching algorithm sets the losses for the 1.5 Mbit DTI/PRI trunk. If the port involved in a connection to a 2.0 Mbit DTI/PRI trunk is an analog trunk, then the pad switching method for that trunk type sets the pad states for the analog trunk.

EPE trunks have their pad state set to pad out.

XDID, XFCOT, and XFEM trunks have their pad state set to pad out (Base level).

XUT and XEM trunks have their pad state set to pad out.

Treatment of EPE and IPE trunks is identical from the 2.0 Mbit DTI/PRI switched loss point of view.

Port type definition

The following criteria identify the port types involved in a connection:

— unit type

— Class of Service (CLS)

— Port type (PTYP) designation in LD 16

— Trunk Signaling

— XTRK type

The trunk data block Class of Service (CLS) assignment characterizes the transmission properties of each trunk. The options in a North American context are:

— Via Net Loss (VNL)

— Non-VNL, either:
Transmission Compensated (TRC)
or Non-Transmission Compensated (NTC)

Assignment of CLS VNL or non-VNL ensures stability and minimizes echo on long-haul connections, 4-wire TIE, and CCSA. Similarly, assignment of a non-VNL CLS applies to 2-wire TIE, COT, FEX, WAT, CCSA, and 4-wire non-VNL facilities. The non-VNL CLS options in a North American context are:

— TRC
— 2-wire non-VNL trunk facility with a loss of greater than 2 dB
— 2-wire non-VNL trunk facility with impedance compensation
— 4-wire non-VNL facility

— NTC
— 2-wire non-VNL trunk facility with a loss of less than 2 dB
— 2-wire non-VNL trunk facility when impedance compensation is not provided

The options in an international context are:

— NTC (Non-Transmission Compensated) — transmission lines without compensation, high loss
Pad out (pad not applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK LINK setting.

— TRC (Transmission Compensated) — transmission lines with compensation, low loss
Pad in (pad applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK TIE setting.

— VNL (Via Network Loss) — no particular meaning in a European context, equivalent to TRC
Pad in (pad applied)
Applies to EAM and EM4 TIE trunks.
UK TIE setting.

The responses to the PTYP prompt in LD 16 define the port types for connections involving DTI/PRI. The port type connected to the DTI/PRI trunk determines which loss to apply. The response to the PTYP prompt in LD 16 defines the port type for all trunks except ISA trunks. ISA trunks use the service route's port type.

Following are the valid responses to the LD 16 PTYP prompt:

For analog TIE trunk routes:

— ATT analog TIE trunk

— AOT satellite PBX analog TIE trunks when PBX includes OPS set

— AST satellite PBX TIE or ESN trunk

For digital TIE trunk routes excluding 1.5 Mbit PRI routes:

— DTT digital or combination TIE trunk

— DCT combination satellite PBX TIE trunk

— DST digital satellite PBX TIE trunk

For analog COT, FEX, DID WAT trunk routes:

— ACO analog CO trunk

— ATO analog toll office trunk

For digital Central Office trunk routes:

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

For 1.5 Mbit PRI TIE trunk routes:

— PRI B-channel port classification

— DTT digital or combination TIE trunk

— DCT combination satellite PBX TIE trunk

— DST digital satellite PBX TIE trunk

For 1.5 Mbit PRI COT, FEX, DID WAT trunk routes:

— PRI B-channel port classification

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

Loss value definition

Following are the supported port types and input format for the pad values in LD 73 when the system disks include the 1.5/2.0 Mbit Gateway (GPRI) package (167) and TYPE = DTI/PRI/DTI2/PRI2. The default is the North American requirement.

When TYPE = DTI or PRI:

ONS	Rx	Tx	On-premises Station
DSET	Rx	Tx	Meridian Digital set
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	1.5 Mbit DTI/PRI Digital TIE trunk
SDTT	Rx	Tx	Digital Satellite TIE trunk
DCO	Rx	Tx	1.5 Mbit DTI/PRI Digital COT, FEX, WAT, and DID trunk
DTO	Rx	Tx	1.5 Mbit DTI/PRI Digital Toll Office trunk

VNL	Rx	Tx	Via Network Loss Analog TIE trunk
SATT	Rx	Tx	Analog Satellite TIE trunk
ACO	Rx	Tx	Analog COT, FEX, WAT, and DID trunk
ATO	Rx	Tx	Analog Toll Office trunk
PRI	Rx	Tx	1.5 Mbit PRI trunk, PTYP = PRI for route
PRI2	Rx	Tx	2.0 Mbit DTI/PRI trunk
XUT	Rx	Tx	Extended Universal Trunk Analog COT, FEX, WAT, and DID trunk
XEM	Rx	Tx	Extended E&M Trunk Analog TIE trunk
BRIL	Rx	Tx	Basic Rate Interface Line application
BRIT	Rx	Tx	Basic Rate Trunk application

When TYPE = DTI2 or PRI2:

ONS	Rx	Tx	On-premises Station
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	2.0 Mbit DTI/PRI Digital TIE trunk
DCO	Rx	Tx	2.0 Mbit DTI/PRI Digital COT, FEX, WAT, and DID trunk
NTC	Rx	Tx	Non-transmission compensated Analog TIE
TRC	Rx	Tx	Transmission compensated Analog TIE
DTR	Rx		Pad value while DTR is connected (receive only).
VNL	Rx	Tx	Via Network Loss Analog TIE trunk
ACO	Rx	Tx	Analog COT trunk
AFX	Rx	Tx	Analog FEX trunk
ADD	Rx	Tx	Analog DID trunk
PRI	Rx	Tx	1.5 Mbit DTI/PRI trunk
DSET	Rx	Tx	Meridian Digital set
BRIL	Rx	Tx	Basic Rate Interface Line application
BRIT	Rx	Tx	Basic Rate Trunk application

Administration

Assignment of the pad category table occurs during the creation (NEW) or modification (CHG) of a trunk in LD 14

LD 73 allows changes to the receive (Rx) and transmit (Tx) pad codes for the different port types for all tables except TABLE 1. Pad code values are in the range 0-26.

Table 34 shows the 0-26 code to pad value cross-reference.

Table 31
Pad code to pad value cross-reference

CODE	VALUE (dB)	CODE	VALUE (dB)	CODE	VALUE (dB)
0	0.0	9	9.0	18	- 4.0
1	1.0	10	10.0	19	- 5.0
2	2.0	11	11.0	20	- 6.0
3	3.0	12	12.0	21	- 7.0
4	4.0	13	13.0	22	- 8.0
5	5.0	14	14.0	23	- 9.0
6	6.0	15	- 1.0	24	- 10.0
7	7.0	16	- 2.0	25	Idle
8	8.0	17	- 3.0	26	0.6

LD 73 pad value definition

Definition of pad values is in response to the following LD 73 prompts. Output of these prompts occurs when FEAT = PAD:

Table 32
LD 73 pad value definition prompts and responses for 1.5 Mbit DTI and PRI

Prompt	Response		Description
REQ	NEW CHG		Create new data block. Modify data block.
TYPE	DTI PRI		1.5 Mbit Digital Trunk Interface 1.5 Mbit Primary Rate Interface
FEAT	PAD		
ONS	Rx	Tx	On-premises Station
DSET	Rx	Tx	Meridian Digital Set
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	Digital TIE trunks
SDTT	Rx	Tx	Digital Satellite TIE trunks
DCO	Rx	Tx	Digital COT, FEX, WAT, and DID trunks
DTO	Rx	Tx	Digital TOLL office trunks

Table 32
LD 73 pad value definition prompts and responses for 1.5 Mbit DTI and PRI

VNL	Rx	Tx	Via Net Loss (Analog TIE)
SATT	Rx	Tx	Analog Satellite TIE trunks
ACO	Rx	Tx	Analog COT and WAT trunks
ATO	Rx	Tx	Analog TOLL office trunks
PRI	Rx	Tx	1.5 Mbit Primary Rate Interface trunk
PRI2	Rx	Tx	2.0 Mbit Primary Rate Interface trunk
XUT	Rx	Tx	IPE Analog CO trunk ***Note:*** Prompted when GPRI is equipped
XEM	Rx	Tx	IPE Analog TIE trunk ***Note:*** Prompted when GPRI is equipped
BRIL	Rx	Tx	Basic Rate Interface Line application
BRIT	Rx	Tx	Basic Rate Interface Trunk application

Table 33
LD 73 pad value definition prompts and responses for 2 Mbit DTI and PRI

Prompt	Response		Description
REQ	NEW CHG		Create new data block. Modify data block.
TYPE	DTI PRI		1.5 Mbit Digital Trunk Interface 1.5 Mbit Primary Rate Interface
FEAT	PAD		
ONS	Rx	Tx	On-premises Station
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	Digital TIE trunks
DCO	Rx	Tx	Digital COT, FEX, WAT, and DID trunks
NTC	Rx	Tx	Non-Transmission Compensated (Analog TIE)
TRC	Rx	Tx	Transmission Compensated (Analog TIE)
DTR	Rx		Pad value while DTR is connected (receive only).
VNL	Rx	Tx	Via Net Loss (Analog TIE)
ACO	Rx	Tx	Analog COT and WAT trunks
AFX	Rx	Tx	Analog FEX trunk
ADD	Rx	Tx	Analog DID trunks
PRI	Rx	Tx	1.5 Mbit Primary Rate Interface trunk
DSET	Rx	Tx	Meridian Digital Set
BRIL	Rx	Tx	Basic Rate Interface Line application
BRIT	Rx	Tx	Basic Rate Interface Trunk application

Table 34 and 35 show the TABLE 1 default pad settings for 2.0 Mbit DTI/PRI and 1.5 Mbit DTI/PRI.

Table 34
2.0 Mbit DTI/PRI pad category table defaults

	TABLE 1			
Port Type	**Rx Code**	**Rx Pad (dB)**	**Tx Code**	**Tx Pad (dB)**
ONS	17	- 3.0	0	0.0
OPS	17	- 3.0	0	0.0
DTT	0	0.0	0	0.0
DCO	0	0.0	0	0.0
NTC	4	4.0	1	1.0
TRC	4	4.0	1	1.0
DTR	17	- 3.0		
VNL	4	4.0	1	1.0
ACO	4	4.0	1	1.0
AFX	4	4.0	1	1.0
ADD	4	4.0	1	1.0
PRI	0	0.0	0	0.0
DSET	6	6.0	0	0.0
BRIL	0	0.0	0	0.0
BRIT	0	0.0	0	0.0

Table 35
1.5 Mbit DTI/PRI pad category table defaults

	TABLE 1			
Port Type	**Rx code**	**Rx PAD (dB)**	**Tx code**	**Rx PAD (dB)**
ONS	6	6.0	0	0.0
DSET	6	6.0	0	0.0
OPS	6	6.0	0	0.0
DTT	0	0.0	0	0.0
SDTT	3	3.0	0	0.0
DCO	3	3.0	0	0.0
DTO	0	0.0	0	0.0
VNL	6	6.0	0	0.0
SATT	6	6.0	0	0.0
ACO	6	6.0	0	0.0
ATO	6	6.0	0	0.0
PRI	0	0.0	0	0.0
PRI2	0	0.0	0	0.0
XUT	6	6.0	0	0.0
XEM	3	3.0	0	0.0
BRIL	0	0.0	0	0.0
BRIT	0	0.0	0	0.0

German 2.0 Mbit DTI/PRI settings

See the same heading on page 122.

Basic Rate Interface Lines and Trunks

Introduction

This section provides an overview of the Basic Rate Interface Line (BRIL) and Basic Rate Interface Trunk (BRIT) transmission concepts and controls. BRI is an X11 International Release 18.21H feature.

Pad switching

Pad switching algorithms differ for BRIL and BRIT. Both switch pads on a per-connection basis. BRIL switches predefined pad values based on the port type involved in the connection. BRIT uses the loss value input for the port type in LD 73.

For BRIL switching of loss values occurs in the receive and transmit directions. The applied losses depend on the port type involved in the connection with the BRIL. Table 36 shows port type determination and Table 37 shows the switched losses for BRIL connections.

Table 36
Port type determination for BRIL connections

2.0 Mbit DTI/PRI	Trunk Type	LD 16 PTYP	XTRK	DATA CALL	Port Type
YES					2.0 Mbit DTI/PRI
NO	COT, DID, FEX, WAT	ACO			ACO
		ATO			ATO
		none of the above	YES		IPE
			NO	YES	DATA
				NO	OTHER
	none of the above		YES		IPE
			NO	YES	DATA
				NO	OTHER

Table 37
Switched losses for BRIL connections

Port Type	Rx (dB)	Tx (dB)
2.0 Mbit DTI/PRI	0.0	0.0
ACO	0.0	- 6.0
ATO	6.0	0.0
IPE	0.0	- 6.0
DATA	0.0	0.0
OTHER	3.0	- 3.0

For BRIT switching of loss values occurs in the receive and transmit directions. The applied losses depend on the port type involved in the connection with the BRIL.

Port type definition

The following criteria identify the port types involved in a connection:

— unit type

— Class of Service (CLS)

— Port type (PTYP) designation in LD 16

— Trunk Signaling

— XTRK type

The trunk data block Class of Service (CLS) assignment characterizes the transmission properties of each trunk. The options in a North American context are:

— Via Net Loss (VNL)

— Non-VNL, either:
Transmission Compensated (TRC)
or Non-Transmission Compensated (NTC)

Assignment of CLS VNL or non-VNL ensures stability and minimizes echo on long-haul connections, 4-wire TIE, and CCSA. Similarly, assignment of a non-VNL CLS applies to 2-wire TIE, COT, FEX, WAT, CCSA, and 4-wire non-VNL facilities. The non-VNL CLS options in a North American context are:

— TRC
  — 2-wire non-VNL trunk facility with a loss of greater than 2 dB
  — 2-wire non-VNL trunk facility with impedance compensation
  — 4-wire non-VNL facility

— NTC
  — 2-wire non-VNL trunk facility with a loss of less than 2 dB
  — 2-wire non-VNL trunk facility when impedance compensation is not provided

The options in an international context are:

— NTC (Non-Transmission Compensated) — transmission lines without compensation, high loss
Pad out (pad not applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK LINK setting.

— TRC (Transmission Compensated) — transmission lines with compensation, low loss
Pad in (pad applied)
Applies to EAM, EM4 and WR4 TIE trunks.
UK TIE setting.

— VNL (Via Network Loss) — no particular meaning in a European context, equivalent to TRC
Pad in (pad applied)
Applies to EAM and EM4 TIE trunks.
UK TIE setting.

The responses to the PTYP prompt in LD 16 define the port types for connections involving BRI Trunks. The port type connected to the BRI Trunk determines which loss to apply. The response to the PTYP prompt in LD 16 defines the port type for all trunks except ISA trunks. ISA trunks use the service route's port type.

Following are the valid responses to the LD 16 PTYP prompt:

For analog TIE trunk routes:

— ATT analog TIE trunk

— AOT satellite PBX analog TIE trunks when PBX includes OPS set

— ASTs satellite PBX TIE or ESN trunk

For digital TIE trunk routes excluding 1.5 Mbit PRI routes:

— DTT digital or combination TIE trunk

— DCT combination satellite PBX TIE trunk

— DST digital satellite PBX TIE trunk

For analog COT, FEX, DID WAT trunk routes:

— ACO analog CO trunk

— ATO analog toll office trunk

For digital Central Office trunk routes:

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

For 1.5 Mbit PRI TIE trunk routes:

— PRI B-channel port classification

— DTT digital or combination TIE trunk

— DCT combination satellite PBX TIE trunk

— DST asdigital satellite PBX TIE trunk

For 1.5 Mbit PRI COT, FEX, DID WAT trunk routes:

— PRI B-channel port classification

— DCO digital or combination CO trunk

— DTO digital or combination toll office trunk

Administration

BRIT pad selection

Assignment of the pad category table occurs during creation (NEW) or modification (CHG) of the trunk in LD 27.

LD 73 allows changes to the receive (Rx) and transmit (Tx) pad codes for the different port types for all tables except TABLE 1. Pad code values are in the range 0-26.

Table 38 cross-references pad codes to their respective loss values.

Table 38
Pad code to pad value cross-reference

CODE	VALUE (dB)	CODE	VALUE (dB)	CODE	VALUE (dB)
0	0.0	9	9.0	18	- 4.0
1	1.0	10	10.0	19	- 5.0
2	2.0	11	11.0	20	- 6.0
3	3.0	12	12.0	21	- 7.0
4	4.0	13	13.0	22	- 8.0
5	5.0	14	14.0	23	- 9.0
6	6.0	15	- 1.0	24	- 10.0
7	7.0	16	- 2.0	25	Idle
8	8.0	17	- 3.0	26	0.6

LD 73 pad value definition

Definition of pad values is in response to the following LD 73 prompts (See Table 39). Output of these prompts occurs when FEAT = PAD:

Table 39
LD 73 pad value definition prompts and responses

Prompt	Response		Description
REQ	NEW CHG		Create new data block. Modify data block.
...			
FEAT	PAD		
ONS	Rx	Tx	On-premises Station
OPS	Rx	Tx	Off-premises Station
DTT	Rx	Tx	Digital TIE trunks
DCO	Rx	Tx	Digital COT, FEX, WAT, and DID trunks
NTC	Rx	Tx	Non-Transmission Compensated (Analog TIE)
TRC	Rx	Tx	Transmission Compensated (Analog TIE)
DTR	Rx		Pad value while DTR is connected (receive only)
VNL	Rx	Tx	Via Net Loss (Analog TIE)
ACO	Rx	Tx	Analog COT and WAT trunks
AFX	Rx	Tx	Analog FEX trunk
ADD	Rx	Tx	Analog DID trunks
PRI	Rx	Tx	1.5 Mbit Primary Rate Interface trunk
DSET	Rx	Tx	Meridian Digital Set
BRIL	Rx	Tx	Basic Rate Interface Line application
BRIT	Rx	Tx	Basic Rate Interface Trunk application

Table 40 shows the default pad code settings for BRIT.

Table 40
Default BRIT pad category table

	TABLE 1			
Port Type	**Rx Code**	**Rx Pad (dB)**	**Tx Code**	**Tx Pad (dB)**
ONS	17	- 3.0	0	0.0
OPS	17	- 3.0	0	0.0
DTT	0	0.0	0	0.0
DCO	0	0.0	0	0.0
NTC	4	4.0	1	1.0
TRC	4	4.0	1	1.0
DTR	17	- 3.0		
VNL	4	4.0	1	1.0
ACO	4	4.0	1	1.0
AFX	4	4.0	1	1.0
ADD	4	4.0	1	1.0
PRI	0	0.0	0	0.0
DSET	6	6.0	0	0.0
BRIL	0	0.0	0	0.0
BRIT	0	0.0	0	0.0

Meridian Modular Telephones

Introduction

Meridian Modular Telephones have the following system-defined transmission parameters:

— codec coding law (CODE)

— transmit objective loudness rating (TOLR)

— receive objective loudness rating (ROLR)

— sidetone objective loudness rating (SOLR)

— handsfree transmit objective loudness rating (HTLR)

— handsfree receive objective loudness rating (HRLR)

— automatic gain control (AGCD)

— handset volume reset (VOLR)

Transmission parameters definition occurs in the Configuration Record (LD 17) and downloading to all Meridian Modular Telephones occurs after a system reload (SYSLOAD). This accommodates the needs of international installations where different loss and level plans are in place.

> ***Note:*** Download of transmission parameters does not occur during parallel reload procedures.

The default transmission settings for Meridian Modular Telephones ensure that the levels at the Central Office trunk interface are equivalent to those of a 500/2500 set connected to the same interface under the North American Loss and Level Plan.

Codec PCM companding law

The codecs in the Meridian Modular telephones are able to accommodate a number of different PCM companding laws. The laws are:

— µ-Law

— A-Law inverted (Sweden only)

— A-Law even bit interleaved

Administration

Selection of the companding law is by response to the CODE prompt in LD 17. Valid inputs to the CODE prompt are:

— 0 — µ-Law

— 1 — A-Law inverted (Sweden only)

— 2 — A-Law even bit interleaved

The companding law selected must agree with the companding laws defined by the following:

For Intelligent Peripheral Equipment (IPE):

LD 97

REQ	CHG	Modify data block.
TYPE	SYSP	SYStem Parameters
INTN	YES	IPE is using A-Law companding
	NO	IPE is using µ-Law companding

For the system:

LD 17

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CFN	Configuration
...		
PCML	A	System default is A-Law companding
	MU	System default is µ-Law companding

Receive and transmit objective loudness rating

When using the North American Loss and Level Plan, the following transmission parameters meet the requirements of most situations:

— transmit offset of - 45 dB (LD 17 prompt TOLR = 0)

— receive offset of + 45 dB (LD 17 prompt ROLR = 0)

Table 41 shows the values entered for LD 17 prompts ROLR and TOLR and the associated loudness rating for North America.

Definition of ROLR and TOLR are in terms of loss. For example:

— ROLR

- If the ROLR of a telephone changes from + 45 dB to + 50 dB, there is 5 dB *more loss* and, consequently, the receive path is *quieter*.
- If the ROLR changes from + 45 dB to + 39 dB, there is 6 dB *less loss* and, consequently, the receive path is *louder*.

— TOLR

- If the TOLR changes from - 45 dB to - 50 dB, there is 5 dB *less loss* and, consequently, the transmit path is *louder*.
- If the TOLR changes from - 45 dB to - 40 dB, there is 5 dB *more loss* and, consequently, the transmit path is *quieter*.

Another way of looking at both TOLR and ROLR is that if the number *increases* in value (becomes more positive or less negative) the path will be *quieter*, and as the number *decreases* in value (becomes less positive or more negative), the path will be *louder*.

Administration

Table 41 lists X11 international ROLR and TOLR values. In addition, separate definitions for Handsfree receive (HRLR) and transmit (HTLR) objective ratings are possible. Refer to Table 43 for the HRLR and HTLR settings.

Table 41
Handset receive and transmit international transmission parameters

Quieter				
LD 17 value	**Change from nominal**		**LD 22 output**	
#	**ROLR (dB)**	**TOLR (dB)**	**ROLR (dB)**	**TOLR (dB)**
00	0.00	0.0	45.00	- 45.00
01	0.85	0.5	45.85	- 44.50
02	1.70	0.5	46.70	- 44.50
03	2.55	1.0	47.55	- 44.00
04	3.40	1.5	48.40	- 43.50
05	4.25	2.0	49.25	- 43.00
06	5.10	2.0	50.10	- 43.00
07	5.95	2.5	50.95	- 42.50
08	6.80	3.0	51.80	- 42.00
09	7.65	3.5	52.65	- 41.50
10	8.50	3.5	53.50	- 41.50
11	9.35	4.0	54.35	- 41.00
12	10.20	4.5	55.20	- 40.50
13	—	5.0	—	- 40.00
14	—	5.0	—	- 40.00
15	—	5.5	—	- 39.50
16	—	6.0	—	- 39.00
17	—	6.5	—	- 38.50
18	—	6.5	—	- 38.50
19	—	7.0	—	- 38.00
20	—	7.5	—	- 37.50
21	—	8.0	—	- 37.00
22	—	8.0	—	- 37.00
23	—	8.5	—	- 36.50
24	—	9.0	—	- 36.00
25	—	9.5	—	- 35.50
26	—	9.5	—	- 35.50
27	—	10.0	—	- 35.00
28	—	10.5	—	- 34.50
29	—	11.0	—	- 34.00
30	—	11.0	—	- 34.00
31	—	11.5	—	- 33.50

Table 41
Handset receive and transmit international transmission parameters (continued)

Louder				
LD 17 value	**Change from nominal**		**LD 22 output**	
#	**ROLR (dB)**	**TOLR (dB)**	**ROLR (dB)**	**TOLR (dB)**
32	0.00	0.0	45.00	- 45.00
33	0.85	0.5	44.15	- 45.50
34	1.70	1.0	43.30	- 46.00
35	2.55	1.0	42.45	- 46.00
36	3.40	1.5	41.60	- 46.50
37	4.25	2.0	40.75	- 47.00
38	5.10	2.5	39.90	- 47.50
39	5.95	2.5	39.05	- 47.50
40	6.80	3.0	38.20	- 48.00
41	7.65	3.5	37.35	- 48.50
42	8.50	4.0	36.50	- 49.00
43	9.35	4.0	35.65	- 49.00
44	10.20	4.5	34.80	- 49.50
45	11.05	5.0	33.95	- 50.00
46	11.90	5.5	33.10	- 50.50
47	12.75	5.5	32.25	- 50.50
48	13.60	6.0	31.40	- 51.00
49	14.45	6.5	30.55	- 51.50
50	15.30	7.0	29.70	- 52.00
51	—	7.0	—	- 52.00
52	—	7.5	—	- 52.50
53	—	8.0	—	- 53.00
54	—	8.5	—	- 53.50
55	—	8.5	—	- 53.50
56	—	9.0	—	- 54.00
57	—	9.5	—	- 54.50
58	—	10.0	—	- 55.00
59	—	10.0	—	- 55.00
60	—	10.5	—	- 55.50
61	—	11.0	—	- 56.00
62	—	11.5	—	- 56.50
63	—	11.5	—	- 56.50

Table 42
Handsfree receive and transmit international transmission parameters

Quieter				
LD 17 value	**Change from nominal**		**LD 22 output**	
#	**HRLR (dB)**	**HTLR (dB)**	**HRLR (dB)**	**HTLR (dB)**
00	0.00	0.0	42.00	- 44.00
01	0.85	0.5	42.85	- 43.50
02	1.70	0.5	43.70	- 43.50
03	2.55	1.0	44.56	- 43.00
04	3.40	1.5	45.40	- 42.50
05	4.25	2.0	46.25	- 42.00
06	5.10	2.0	47.10	- 42.00
07	5.95	2.5	47.95	- 41.50
08	6.80	3.0	48.80	- 41.00
09	—	3.5	—	- 40.50
10	—	3.5	—	- 40.50
11	—	4.0	—	- 40.00
12	—	—	—	—
13	—	—	—	—
14	—	—	—	—
15	—	—	—	—
16	—	—	—	—
17	—	—	—	—
18	—	—	—	—
19	—	—	—	—
20	—	—	—	—
21	—	—	—	—
22	—	—	—	—
23	—	—	—	—
24	—	—	—	—
25	—	—	—	—
26	—	—	—	—
27	—	—	—	—
28	—	—	—	—
29	—	—	—	—
30	—	—	—	—
31	—	—	—	—

—continued—

Table 42
Handsfree receive and transmit international transmission parameters (continued)

Louder				
LD 17 value	**Change from nominal**		**LD 22 output**	
#	**HRLR (dB)**	**HTLR (dB)**	**HRLR (dB)**	**HTLR (dB)**
32	0.00	0.0	42.00	- 44.00
33	0.85	0.5	41.15	- 44.50
34	1.70	1.0	40.30	- 45.00
35	2.55	1.0	39.45	- 45.00
36	3.40	1.5	38.60	- 45.50
37	4.25	2.0	37.75	- 46.00
38	5.10	2.5	36.90	- 46.50
39	5.95	2.5	36.05	- 46.50
40	6.80	3.0	35.20	- 47.00
41	—	3.5	—	- 47.50
42	—	4.0	—	- 48.00
43	—	4.0	—	- 48.00
44	—	4.5	—	- 48.50
45	—	5.0	—	- 49.00
46	—	5.5	—	- 49.50
47	—	5.5	—	- 49.50
48	—	6.0	—	- 50.00
49	—	6.5	—	- 50.50
50	—	7.0	—	- 51.00
51	—	7.0	—	- 51.00
52	—	7.5	—	- 51.50
53	—	8.0	—	- 52.00
54	—	8.5	—	- 52.50
55	—	—	—	—
56	—	—	—	—
57	—	—	—	—
58	—	—	—	—
59	—	—	—	—
60	—	—	—	—
61	—	—	—	—
62	—	—	—	—
63	—	—	—	—

Sidetone objective loudness rating

Sidetone is the coupling of a portion of the transmitted voice signal back to the telephone receiver. This allows you to hear your own voice, which provides a natural quality to the conversation. The value of the SOLR is a measure of the loss of sidetone.

Administration

The recommended North American SOLR value is 12 dB. Table 43 lists the values allowed for LD 17 prompt SOLR.

Table 43
SOLR values

SOLR	X11 North American Loudness rating	X11 International Loudness rating
0	7 dB	9 dB (default)
1	12 dB (default)	15 dB
2	17 dB	21 dB
3	22 dB	27 dB
4	sidetone disabled	sidetone disabled

Note: The default value in the North American X11 Release 14 and 15 is 0 (7 dB). The default value in the North American X11 Release 16 and later is 1 (12 dB). The recommended value for all North American Releases is 1 (12 dB).

As the SOLR value increases, the receiver has *less* of the transmitted signal coupled back to it. As the SOLR value decreases, the receiver has *more* of the transmitted signal (near end person's voice, room noise) coupled back to it.

Factoring in the return loss of the trunk interface, the default SOLR value of 12 dB produces an effective SOLR of 9 dB with nominal return loss on external calls.

Note that changing the SOLR value (transmission setting) only affects the integral sidetone control circuits in the telephone. Other sources that contribute sidetone (such as return loss at trunk interfaces at the switch, CO, and through the entire network to the far end) are independent of the SOLR transmission setting.

> ***Note:*** All Meridian Modular Telephones except the M2216ACD-1 and M2216ACD-2, which have their sidetone values fixed at the North American default level of 12 dB, except the SOLR download.

Automatic Gain Control

To keep the sound heard in the handset within a specified range the Meridian Modular Telephones use an Automatic Gain Control (AGC) circuit. The AGC lowers the levels of sounds above and below the range. Lowering of loud sounds ensures they will fit into the range, while lowering of soft sounds reduces background noise.

Administration

Automatic Gain Control settings:

LD 17

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CFN	Configuration
...		
ATRN	YES	Aries Transmission
...		
AGCD	YES	Automatic Gain Control disabled for all sets
	NO	Automatic Gain Control enabled for all sets

Handset volume reset

The handset volume reset feature resets the handset volume to a nominal level every time a user hangs up or changes to handsfree.

Administration

Handset volume reset settings:

LD 17

REQ	NEW	Create data block.
	CHG	Modify data block.
TYPE	CFN	Configuration
...		
ATRN	YES	Aries Transmission
...		
VOLR	YES	Handset volume reset enabled for all sets
	NO	Handset volume reset disabled for all sets

Country-specific settings

Following are the mandatory settings for different countries:

Table 44
Country-specific Meridian Modular Telephone settings

Country	CODE	SOLR	ROLR	TOLR	AGCD	VOLR	HRLR	HTLR
North America µ-Law	0	0	0	0	N	N	0	0
North America A-Law	2	0	0	0	N	N	0	0
Australia	2	1	6	58	N	N	7	0
Austria	2	1	33	55	Y	Y	0	54
Belgium	2	1	0	49	Y	Y	0	54
China								
Denmark	2	0	9	47	Y	Y	8	48
France	2	0	37	49	Y	Y	8	40
Germany	2	1	0	63	Y	N	0	51
Holland	2	0	3	41	Y	Y	0	0
Hong Kong	0	1	0	43	N	N	4	54
New Zealand	2	1	9	48	N	N	4	54
Norway	2	0	2	60	Y	Y	4	54
Sweden	2	0	1	63	Y	N	4	11
Switzer-land	2	1	36	41	Y	Y	4	54
UK	2	0	6	63	Y	Y	0	0

Meridian 1

International Loss and Level Plan

Planning and engineering

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