DMS-100 ä Terminal-to-Network Interface for Megalink ä

ATID-0006

June 1998

ISDN Primary Rate Interface (PRI)
- The New Brunswick Telephone Company, Ltd.

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DOCUMENT HISTORY

1	October 1997	Initial issue This issue replaces Stentor Interface Document ID-0005 issued on behalf of NBTel.
2	June 1998	Revised to include Release Link Trunk functionality and to update Nortel Interface Specification from NIS A211-1, Release 6.0 to NIS A211-1 Release 07.05.

Renamed as Aliant Telecom Inc. Interface Document ATID-0006 from Stentor ID-0033

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If further information is required, please contact:

Telephony Standards
Suite 640
160 Elgin Street
Ottawa, Ontario
K1G 3J4

In Canada:	1-877-77-TELCO (83526)
Worldwide:	613-781-7393
Fax:	613-781-1658
E-mail:	disclosure@aliant.cdn-telco.com
Web-site:	aliant.cdn-telco.com

1.0 SERVICE DESCRIPTION

This specification describes Digital Switched Service (Megalink™), The New Brunswick Telephone Company, Limited (NBTel) ISDN Primary Rate Interface (ISDN PRI). Megalink™ is based on the Northern Telecom DMS-100™ Central Office switch. The interface requirements are defined in relevant portions of the Nortel publication, NIS A211-1, Release 07.05, "ISDN Primary Rate User - Network Interface Specification", except where amended by this document.

This publication may be obtained from:

Telephony Standards
Suite 640
160 Elgin Street
Ottawa, Ontario
K1G 3J4

In Canada:	1-877-77-TELCO (83526)
Worldwide:	613-781-7393
Fax:	613-781-1658
E-mail:	disclosure@aliant.cdn-telco.com
Web-site:	aliant.cdn-telco.com

This Northern Telecom publication was developed to include markets in addition to NBTel, and thus contains information which may not be applicable to NBTel's Megalink ™ service.

All NBTel DMS-100™ switches will operate with at least Batch Change Supplement (BCS) 36 software level. Optional features Release Link Trunk are only available when DMS-100™ switch is at NA007 level or above.

This document further clarifies basic call services and supplementary services which are defined in NIS A211-1, Release 07.05. The supplementary services as listed in NIS A211-1, Release 07.05 that will be offered by NBTel are:

- Backup D-Channel
- Called Number Delivery
- Calling Number Delivery
- Integrated Service Access
- Network Redirection and Reason
- Special Number Services
- Network Name
- Equal Access
- Network Message Service
- Network Ring Again
- Release Link Trunk

2.0 SERVICE PROVISIONING

All PRIs provided by NBTel will be provided in a Call-by-Call service configuration. That is, with the exception of the D-channel, any DS-0/time slot may be used at any time to carry calls of any of the services subscribed to by the customer.

For basic call services, each B channel is switched independently by the network. Permanently connected B-Channels for dedicated access to link services are not supported.

On DS-1's which do not contain a primary or backup D channel, all 24 time slots may be used to carry calls. This is only applicable to Non-Facility Associated Signalling.

3.0 INTERFACE DESCRIPTION

3.1 Introduction

NIS A211-1, Release 07.05, Section 1 applies at the ISDN PRI, with the following clarifications:

1. Services supported by NBTel are those listed in Section 1.0 of this document.

2. Section 4 of NIS A211-1, Release 07.05 and Section 2.4 of this document should be referenced with regard to Bearer Services.

This technical interface specification is arranged, for disclosure purposes, in the same general format as in NIS A211-1, Release 07.05.

3.2 Physical Layer

Section 2 of the NIS A211-1, Release 07.05 specification defines the physical layer (Layer 1) of the DMS-100™ Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) with the following clarifications.

1. The point of connection to the ISDN PRI is the Service Interface Jack (SIJ), which is provided by NBTel. The SIJ is an 8 pin jack (CA48C) with pin assignments as described in CS-03 Part III. Optionally, the point of connection may be a 15-pin DS-1 Digital Interface connector (CA81A) with pin assignments as described in CS-03.

2. Megalink™ will only support the Extended Superframe Format (ESF) and the B8ZS line code. In addition, the network supports CRC-6 messages, Facility Data Link (FDL) alarms, and performance messages.

3. The option to support conventional bit robbing signaling trunks with A/B/C/D bit signaling or A/B bit signaling is not supported.

3.3 Data Link Layer

The data link layer is as specified in NIS A211-1, Release 07.05, Section 3.

3.4 Call Control Signaling

Section 4 of the NIS A211-1, Release 07.05 specification defines the call control signaling protocol for DMS-100™ to CPE applications using an Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI).

3.4.1 Bearer Service

Megalink™ supports the following bearer services:

- Speech
- 3.1 kHz audio
- 64 kbps unrestricted digital, rate adapted from 56 kbps
- 64 kbps clear unrestricted digital, circuit mode
- 64 kbps restricted, circuit mode

The above bearer services are specified in NIS A211-1, Release 07.05, with the following clarifications:

1. "Speech" and "3.1 kHz audio" bearer service requests in NBTel will be treated identically and calls with these bearer service requests will be routed over the regular PSTN (Public Switched Telephone Network). That is, end-to-end digital connectivity will not be assured.

2. In NBTel, a "64 kbps restricted" bearer service request shall be treated the same as a "64 kbps clear unrestricted digital" bearer service request.

3. The "64 kbps clear unrestricted digital" bearer service request shall ensure and guarantee end-to-end digital connectivity. If suitable digital facilities are not available, the call will be rejected with an appropriate cause value.

3.4.2 Basic Call Services

The basic call services are as specified in Section 4 of NIS A211-1, Release 07.05, with the following clarifications:

1. Routing of PRI calls is based on the dialed digits and the bearer capability. At this time no screening of bearer capability is performed by the network, all calls are presented to the PRI.

2. The ISDN PRI services provided are circuit-switched. The "dedicated" or "nailed-up" B channel, described in NIS A211-1, Release 07.05, Section 1, is not available.

3. Any call originating in the network which has evoked T-Link™ rate adaptation (Centrex III Data service) will be coded by the DMS-100™ as V.110 rate adaptation in the Bearer Capability IE Octet 5 in the SETUP message when presented to the Megalink™ Terminal equipment.

3.4.3 Protocol and Procedures

The protocol and procedures for the ISDN PRI are as specified in NIS A211-1, Release 07.05, Section 4, with the following clarifications:

1. The Notify message, described in Chapter 4-3 paragraph 3.1.6, is part of the Network Redirection and Reason service.

2. The Facility and Facility Reject messages described in Chapter 4-3 paragraph 3.3.1 and 3.3.2 and the Facility Information Element described in Chapter 4-4 paragraph 4.5.15 are part of the Network Ring Again, Network Message Service, and Release Link Trunk services.

3. The Calling Party Number information element, described in Chapter 4-4 paragraph 4.5.8, applies to the Calling Number Delivery service.

4. The Connected Number information element, described in Chapter 4-4 paragraph 4.5.12, applies to the Network Redirection and Reason service.

5. The Information Request information element, described in Chapter 4-4 paragraph 4.5.16, applies to the Network Redirection and Reason service.

6. The Network Specific Facilities information element, described in Chapter 4-4 paragraph 4.5.17, applies to the ISA service.

7. The Original Called Number and Redirection Number information elements, described in Chapter 4-4 paragraph 4.5.21 and 4.5.24, apply to the Network Redirection and Reason service.

8. Information elements used exclusively in supplementary services not supported by NBTel will be ignored.

9. Symmetric Call Control, as described in Annex D of Section 4, is not supported by NBTel.

10. The Display information element is not supported by NBTel in a NOTIFY message as described in Chapter 4-3 paragraph 3.1.6 since Connected Name Display is not supported.

3.5 Supplementary Services

This section defines the supplementary service capabilities which are being offered by NBTel.

NIS A211-1, Release 07.05, Section 5 applies to ISDN PRI with the following clarifications.

3.5.1 Backup D-Channel

The Backup D-Channel service is associated only with non-facility associated signaling, that is, where a single D-channel is used to provide call control signaling for more than one DS-1 interface. This service provides a procedure for employing a standby D channel which is used if the primary D channel fails. All active calls are maintained during the switch-over to the D-channel. The Backup D-Channel service is available as an option.

An overview of backup D-channel service is provided in Section 5 of NIS A211-1, Release 07.05. The detailed protocol and procedures for this service are in Section 4 of NIS A211-1, Release 07.05.

3.5.2 Called Number Delivery

If a called user subscribes to this service, the Called party number information element is included in the SETUP message on each terminating call.

If the called user does not subscribe to this service the terminating SETUP message does not contain the Called party number information element.

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.3 Calling Number Delivery

The Calling Number Delivery service provides the directory number of the calling party to the PRI.

When the Calling Number Delivery (CND) service is active, the information element containing the calling party number will be delivered in the SETUP message unless the calling party number is not available. The number is not available when a call is routed over certain existing signaling systems (e.g., MF). If a call encounters this routing, the Calling party number information element is sent with the presentation indicator set to "number not available due to interworking". If the calling party has requested that the number not be displayed, the Calling party number information element will be delivered with no digits and the presentation indicator set to "presentation restricted".

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.4 Integrated Services Access (ISA)

Integrated Services Access (ISA) permits a PRI to replace several dedicated trunk groups, resulting in efficiencies and simplified administration. ISA provides the capability to signal information which indicates the specific trunk type needed to complete a call, or from which a call is incoming. While dedicated facilities continue to exist in the network for INWATS, OUTWATS, TIE, PRIVATE and FX calls, a single PRI allows access to all of these facilities. ISA handles both incoming and outgoing calls on a PRI. This service is visible only to a telecommunications administrator, and does not affect end users.

This service is specified in Section 5 of NIS A211-1, Release 07.05, with the following clarifications:

1. Substitute "OUTWATS" with "WATS".

2. Substitute "INWATS" with "Toll free Service" or “800 Service”.

3. Service Selector FX may be used to indicate incoming PSTN calls when a Service Identifier (SID) is required.

4. The ISA service, as offered by NBTel, will only allow the combinations of Numbering Plan Identification (NPI - in the Called party number information element) and Binary Facilities Coding Value (BFCV - in the Network specific facilities information element) as shown in the following table. All other combinations will cause the call to be rejected. The combination chosen determines whether "normal" (public network) or "customer specific" translations will be used.

NPI	BFCV	Translation
E.164	-	normal
Private	-	customer specific
E.164	INWATS	normal
E.164	OUTWATS	normal
Private	OUTWATS	customer specific
Private	PRIVATE	customer specific
Private	TIE	customer specific
E.164	FX	normal

5. A 'Public' calltype or service can only be specified by the absence of the NSF information element and an NPI of 'E.164'. A BFCV of 'Public' is not supported in either direction. Therefore, a Service Identifier is not supported for a 'Public' call

3.5.5 Equal Access

The Equal Access feature provides PRI users with equal access to carrier networks (for example, IEC networks) for public network calls. The preferred carrier may be specified on a per call basis in either the dialed digits of the Called Party Number Information Element (for example 10XXX+ or 101XXXX) or by including a Transit Network Selection Information Element in the Setup message.
If the preferred carrier is not specified on a per call basis, a default carrier is selected by the network. The default carrier is selectable for each Megalink™ System Group.

This functionality is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.6 Network Redirection and Reason

This service informs the calling and called parties about any redirection that may occur during the life of a call. Redirection may occur because of, for example, call forwarding or call transfer.

The redirection network service has three main features:

1. Notification of Redirection before answer: The calling party will be informed of the reason for redirection and the directory number of the new destination by means of the Redirection number information element in the NOTIFY message. Ex: call forward and call pickup.

2. Notification of Redirection after answer: The calling party will be informed of the reason for redirection by means of the Redirection Number information element in a Notify message and the directory numbers of the newly connected parties will be exchanged by means of the Connected Number information element in subsequent NOTIFY messages. Ex: call transfer.

3. Notification of Redirected Call: The new destination of a redirected call will be informed of the original destination and the reason for redirection by means of the Original called number information element, delivered in the SETUP message.

The following redirection services are supported:

- Call Forwarding Universal
- Call Forwarding Busy
- Call Forwarding No Answer
- Call Transfer
- Call Pickup

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.7 Special Number Services

Special Number Services enable access to certain NBTel services which are specified by dialed digits that do not necessarily conform to E.164, the ISDN/telephony numbering plan. Examples of these services include:

- 0
- 411
- 611
- 911

Not all of the above services are available in all areas, and some areas may have access to additional services.

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.8 Network Name

Network Name service allows the transport of Calling and Redirecting Names across PRI using the Setup Method. This allows an originating node to deliver the originator's name to the terminating node. Connected Party Name is not delivered by the network on redirected or on non-redirected calls.

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.9 Network Ring Again

Network Ring Again allows a calling user to be notified when a busy called party becomes idle. A user (A) encountering a busy station (B) can queue against that station and be recalled when it becomes idle. If user A accepts the recall, the original call will be set up again automatically. Note that both users A and B must be linked with private PRA facilities belonging to the same customer group.

The service is specified in Section 5 of NIS A211-1, Release 07.05

3.5.10 Network Message Service

Network Message Waiting Indication allows a message service on one node to activate or deactivate the message waiting indicator of a subscriber at a different node via D-channel signalling over the connecting PRI.

This service is specified in Section 5 of NIS A211-1, Release 07.05.

3.5.11 Release Link Trunk (RLT)

The Release Link Trunk (RLT) feature will provide PRI trunk optimization software which will allow the DMS100™ to release resources for redundant PRI trunks in a call. Example: A is a PSTN subscriber. A calls B. B is a subscriber on the CPE connected to the PSTN by a PRI. B transfers or forwards the call to C. C is another PSTN subscriber. This sets up 2 PRI trunks (B-channels), one incoming and one outgoing. When the transfer is completed, this feature will allow the two B-channels to be released and the DMS serving this PRI group will link the two calls together through its own internal network.

The DMS 100™ only supports the “network side” of this service, the PBX or CPE must implement the “user side” RLT protocol for proper performance.

This optional feature is only available on software loads NA007and higher.

This service is specified in Section 5 of NIS A211-1, Release 07.05.

APPENDIX A - Glossary

B8ZS:	Bipolar with 8-Zero Substitution
BFCV:	Binary Facility Coding Value
CND:	Calling Number Delivery
CPN:	Calling Party Number
CRC:	Cyclical Redundancy Check
ESF:	Extended Superframe Format
FDL:	Facility Data Link
FX:	Foreign Exchange
INWATS:	Inward Wide Area Telephone Service
ISA:	Integrated Services Access
ISDN:	Integrated Services Digital Network
kbps:	kilobits per second
MF:	Multi-frequency
NIS:	Network Interface Specification
NPI:	Numbering Plan Identification
OUTWATS:	Outward Wire Area Telephone Service
PBX:	Private Branch Exchange
PRI:	Primary Rate Interface
PSTN:	Public Switched Telephone Network
SIJ:	Service Interface Jack
TIE:	Tie trunk