

555-4001-126

Meridian SuperNode

Meridian SL-100

Asynchronous Interface Line Unit Reference Manual

MSL03 Standard 01.02 April 1996



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The SL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL).

This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules

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Contents

About this document	vii
When to use this document	vii
How to check the version and issue of this document	vii
What precautionary messages mean	vii
How commands, parameters, and responses are represented	viii
Input prompt (>)	ix
Commands and fixed parameters	ix
Variables	ix
Responses	ix
Description	1-1
Purpose	1-1
Hardware description	1-1
Power requirements	1-1
Maintenance	1-1
Environmental specifications	1-2
Electrical specifications	1-2
Ordering information	1-3
Interface to a host computer	2-1
Compatible data terminal equipment (DTE) devices	2-1
Operation	2-2
List of terms	3-1
Northern Telecom Publications Customer Feedback Form	1
Tables	
1-2	
AILU DB-25 connector pin assignments	1-4
1-4	
Compatible DTE devices	2-1
Keyboard dialing - AILC commands	2-8
AILC prompts	2-9
2-9	

About this document

When to use this document

This document provides information on the asynchronous interface line unit (AILU) and the unit's interface to a host computer through the Meridian SL-100 system.

How to check the version and issue of this document

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

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

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

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in the *Defense Switched Network Master Index of Publications*, 555-4021-001, or the *Commercial Systems Master Index of Publications*, 555-4031-001.

What precautionary messages mean

The types of precautionary messages used in Northern Telecom (Nortel) documents include attention boxes and danger, warning, and caution messages.

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

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury



DANGER

Risk of electrocution

Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage



WARNING

Damage to the backplane connector pins

Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation



CAUTION

Possible loss of service

Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

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

Input prompt (>)

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

>BSY

Commands and fixed parameters

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

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

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

Responses

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

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

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

- 1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

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

Example of a MAP response:

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

Description

Purpose

The asynchronous interface line unit (AILU) is a compact RS-232-C to RS-422 cable line driver. It interfaces an asynchronous (start/stop) ASCII device to a host computer through an asynchronous interface line card (AIRC) in the Meridian SL-100 system.

The AILU enables users of RS-232-C data terminal equipment (DTE) devices to operate in full duplex mode. It supports data transmission speeds of 110, 150, 300, 600, 1200, 2400, 4800, 9600 and 19200 bps with loop lengths of up to 4000 ft (1200 m).

Hardware description

The AILU is a compact high-impact plastic unit with the following dimensions.

- 2.25 in (57 mm) long
- 1.75 in (44 mm) wide
- 0.50 in (13 mm) high

The unit is equipped with a connector to attach to the RS-232-C connector of the DTE device, and a 6 ft (1828 mm) 4-conductor line cord terminated on a standard RJ-11 plug. The plug is compatible with standard telephone wall jacks.

Power requirements

The AILU operates at 12 V dc. It derives its power from the RS-232-C connector of the connected DTE device. When the DTE device is turned on, 12–15 V dc (nominal) is applied to pin 20 (DTR) of the RS-232-C connector. There is no requirement for an external power source.

Maintenance

The AILU is a device that requires no preventive maintenance. There are no diagnostic programs, switches, configuration options, or straps associated with it. Instead of performing maintenance on a suspected faulty unit, field maintenance personnel simply replace the suspected unit with a known

working unit. Dispose of a defective AILU in accordance with local procedures.

Environmental specifications

The AILU is designed to operate within the following environmental limits:

- operating temperature: 0° C to +50 C
- storage temperature: 10° C to +70° C
- humidity: 5% to 95% RH non-condensing

Electrical specifications

Table 1-1 shows the electrical specifications of the AILU.

Table 1-1
AILU electrical specifications

Specifications	Limits
Baud rate	Up to 19200 baud
Line length	4000 ft (1200 m) using 26 AWG cable
Transmitter output impedance	1500Ω (nominal)
Receiver input impedance	>4000Ω
Cable termination resistance at receiver	100Ω±5% +
Open circuit transmitter output voltage	±5 V (nominal)
Transmitter output voltage with 100Ω termination	±400 mV (nominal)
Signal voltage at 100Ω termination using 4000 ft line	±300 mV (nominal), ±200 mV (minimum)
Minimum receiver input level	±200 mV (nominal), ±620 mV (worst case maximum)
Common mode voltage present at transmitter output	-7 V<Vcm<+7 V
Common mode voltage for balanced receiver	-7 V<Vcm<+7 V
RS-232 signal level at receiver output	±3 V (nominal)
—continued—	

Table 1-1
AILU electrical specifications (continued)

Specifications	Limits
CTS	Enabled by RTS (0.0 ms delay)
DSR, CD	Enabled by DTR (0.0 ms delay)
—end—	

Ordering information

The AILU can be ordered with either a male or female DB-25 connector. The mod-tap plug and null connector are necessary when the AILU is used as a short-haul modem. Specify the following information when ordering the units from Northern Telecom.

AILU with male connector

- model: DEI-1000
- CPC number: AO322493
- engineering code: NPS 50512L1

AILU with female connector

- model: DEI-1001
- CPC number: AO322496
- engineering code: NPS 50512L2

Mod-tap

- CPC number: 143260

null connector

- CPC number: 232NT

Table 1- shows pin assignments on the DB-25 connector.

Table 1-2
AILU DB-25 connector pin assignments

Pin number	Designation	Circuit equivalent	Description
1	PG	AA	protective ground
2	TXD	BA	transmit data to AILC
3	RXD	BB	receive data from AILC
4	RTS	CA	request to send to AILC
5	CTS	CB	clear to send from AILC
6	DSR	CC	data set ready from AILC
7	SG	AB	signal ground
8	CD	CF	carrier detect from AILC
20	DTR	CD	data terminal ready to AILC
—end—			

Table 1-3 shows the pin assignments for the AILU RJ-11 plug.

Table 1-3
AILU RJ-11 plug pin assignments

Pin number	Color	Designation
1	Yellow	RDA
2	Green	SDA
5	Red	SDB
6	Black	RDB

Interface to a host computer

The asynchronous interface line unit (AILU) can be used to interface an asynchronous ASCII device to a host computer through an asynchronous interface line card (AIRC) in the Meridian SL-100 system.

The AILU and AIRC are interconnected through two-pair twisted wire, which eliminates the bulk and cost of an RS-232-C cable. The NT6X76AA AIRC occupies two card slots in a line drawer of a line concentrating module (LCM) of the Meridian SL-100 system. One AIRC interface with one AILU.

Compatible data terminal equipment (DTE) devices

DTE devices with the characteristics shown in Table 2-1 can be interfaced through an AILU to an AIRC.

Table 2-1
Compatible DTE devices

Characteristic	Value
data type	ASCII
signal format	asynchronous, start/stop
bits	8, including a parity bit
data rates	110, 150, 300, 600, 1200, 2400, 4800, 9600, and 19200 bps
stop bits	2 stop bits for 110 bps; 1 stop bit for all other speeds
clock	internal, $\pm 1\%$ frequency tolerance
signal level	12 V to 15 V dc (nominal)

Procedure 2-1 outlines the procedures required to interface an RS-232 DTE device, through an AILU, to an AIRC in the Meridian SL-100 system.

Procedure 2-1 Installation of the AILU

- 1 Unpack and inspect the AILU. Tag and return any defective units in accordance with local procedures.
- 2 Connect the DB-25 connector of the AILU to the appropriate RS-232 connector on the DTE device.
- 3 Secure the AILU connector to the DTE device connector with the attached screws.
- 4 Insert the RJ-11 plug of the AILU into the wall-mounted telephone jack. Ensure that the clip on the RJ-11 plug snaps securely into place.
- 5 Insert the RJ-11 plug of the AILU into the wall-mounted telephone jack. Ensure that the clip on the RJ-11 plug snaps securely into place.
- 6 If required, install an NT6X76AA AILC in a line drawer of a line concentrating module (LCM).
- 7 If required, use the maintenance administration position (MAP) workstation to add or verify the datafill for the AILC. Configure the following options in Table KSETFEAT.
 - Key 2 – Network Resource Selector (option NRS)
 - Key 3 – Automatic Dialing (option AUD)
 - Key 4 – Speed Call (option SCL)
 - Key 7 – Ring Again (option RAG)
- 8 Use Procedures 2-2 through 2-7 to verify correct operation of the AILU.

Operation

Once the DTE-AILU-AILC interface is installed, use the procedures in Procedures 2-2 through 2-7 to verify correct operation.

Procedure 2-2 Testing a basic DTE to DCE call

- 1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:
The cursor appears on the screen.
- 2 Enter a period (.) followed by a carriage return.

Response:
A colon (:) prompt is displayed to signify that the AILC has accepted the autobaud characteristics of the DTE, and is ready to receive commands.
- 3 Enter the plus (+) sign.

Response:

The octothorpe (#) prompt appears, indicating that the AILC is ready to receive digits.

- 4 Enter the number to be dialed to establish a call to the DCE. Spaces or dashes are not required between the digits.

Note 1: If an error is made while entering the number, enter a single exclamation point (!) and return to Step 3.

Note 2: The octothorpe (#) is displayed a second time if additional digits, such as an authorization code, are required to complete the call.

Response:

Three periods (...) are displayed to indicate that call setup is in progress. When the DCE answers the call, the > prompt appears, together with an optional message or greeting from the DCE.

Note: The octothorpe (#) prompt appears to indicate that the AILC is ready to receive digits.

- 5 Begin the data session.
- 6 To end the data session, enter three exclamation points (!!!) in succession with no spaces. The three exclamation points must be preceded by and followed by at least one second of no data entry. The time between entry of successive exclamation points must not exceed one second.

Response:

The colon (:) prompt appears and the DTE becomes idle. To initiate another call, return to Step 3.

Procedure 2-3 **Testing speed call**

- 1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:

The cursor appears on the screen.

- 2 Enter a period (.) followed by a carriage return.

Response:

A colon (:) prompt is displayed to signify that the AILC has accepted the autobaud characteristics of the DTE, and is ready to receive commands.

3

If	Do
the call is being initiated through an already programmed speed call number	Step 4
a speed call number is being programmed or changed.	Step 6

4 *Using speed call*

Enter the plus (+) sign.

Response:

The octothorpe (#) prompt appears to indicate that the AILC is ready to receive digits.

5 Enter an equal sign (=) followed by the 1-digit or 2-digit speed call list code. Do not enter spaces between the equal sign and the speed call list code.

Response:

Three periods (...) are displayed to indicate that the speed call digits are being outpulsed. The > prompt appears when the DCE answers the call. Go to Step 8.

6 *Programming or changing a speed call number*

Enter an equal sign (=).

Response:

An octothorpe (#) is displayed to indicate that the AILC is prepared to receive digits.

7 Enter the 1-digit or 2-digit speed call list code, followed by the digits of the speed call number, followed by an equal sign (=). Spaces are not required between the digits and the equal sign.

Note: If an error occurs while entering the digits of the number to be dialed, enter a single exclamation point (!) and return to Step 6.

Response:

The digits are echoed on the screen as they are entered. The colon (:) prompt is displayed when the AILC has successfully stored the speed call digits.

8 You have completed this procedure.

**Procedure 2-4
Testing autodial**

1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:

The cursor appears on the screen.

- 2 Enter a period (.) followed by a carriage return.

Response:

A colon (:) prompt is displayed to signify that the AILC has accepted the autobaud characteristics of the DTE, and is ready to receive commands.

- 3

If	Do
the call is being initiated through an already programmed autodial number	Step 4
an autodial number is being programmed or changed.	Step 6

- 4 **Using autodial**

Enter the plus (+) sign.

Response:

The octothorpe (#) prompt appears to indicate that the AILC is ready to receive digits.

- 5 Enter the 'at' sign (@).

Response:

Three periods (...) are displayed to indicate that the autodial digits are being outpulsed. The > prompt appears when the DCE answers the call. Go to Step 8.

- 6 **Programming or changing a speed call number**

Enter the 'at' sign (@).

Response:

An octothorpe (#) prompt appears to indicate that the AILC is ready to receive digits.

- 7 Enter the digits of the autodial number followed by the 'at' sign (@). Spaces are not required between the entries.

Note: If an error occurs while entering the digits of the number to be dialed, enter a single exclamation point (!) and return to Step 6.

Response:

The digits are echoed on the screen as they are entered. The colon (:) prompt is displayed when the AILC has successfully stored the autodial number.

- 8 You have completed this procedure.

Procedure 2-5
Testing the network resource selector (NRS)

- 1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:

The cursor appears on the screen.

- 2 Enter a period (.), followed by a carriage return.

Response:

A colon (:) prompt is displayed to signify that the AILC has accepted the autobaud characteristics of the DTE, and is ready to receive commands.

- 3 Enter the plus sign (+).

Response:

The octothorpe (#) is presented to indicate that the AILC is ready to receive digits.

- 4 Enter the digits to be dialed to complete the NRS call.

Response:

An ampersand and question mark (&?) are displayed together to indicate that the call is being placed through the NRS feature.

- 5 At least once every second, enter the ampersand symbol (&).

Response:

Three periods (...) are displayed when the modems are connected and digits are being outpulsed. The > prompt appears when the data call is established.

Procedure 2-6
Testing ring again

- 1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:

The cursor appears on the screen.

- 2 Enter a period (.) followed by a carriage return.

Response:

A colon (:) prompt is displayed to signify that the AILC has accepted the autobaud characteristics of the DTE, and is ready to receive commands.

- 3 Enter the plus sign (+).

Response:

The octothorpe (#) is presented to indicate that the AILC is ready to receive digits.

- 4 Enter the digits to be dialed to complete the call.

Response:

A percent sign and question mark (%?) are displayed together to indicate that the destination number is busy.

Note: A plus sign and question mark (+?) are displayed together to indicate when the called number becomes idle (ring again recall).

- 5 **Invoke ring again**

Enter the percent symbol (%).

Response:

The colon (:) prompt is displayed to indicate that the ring again request is accepted, and the AILC is idled.

- 6 **Reject ring again offer**

Enter a single exclamation point (!), or wait until the ring again offer times out.

Response:

The colon (:) prompt appears to indicate that the ring again offer has been rejected (or a previously accepted ring again offer has been cancelled), and the AILC is idled.

- 7 **Cancel ring again**

To cancel a ring again offer that has been accepted previously, enter the percent symbol (%).

Response:

The colon (:) prompt appears to indicate that the ring again offer has been rejected (or a previously accepted ring again offer has been cancelled), and the AILC is idled.

- 8 Within 30 seconds, enter the plus (+) sign to accept the recall.

Response:

The octothorpe (#) prompt appears.

- 9 Enter the percent (%) sign to invoke redialing of the digits originally dialed to complete the call.

Response:

Three periods (...) are displayed to indicate digit outputting. The > prompt appears when the DCE answers.

Procedure 2-7

Testing the far-end loopback

- 1 Turn the power on to the DTE device. Ensure that the device is configured to operate in full duplex mode.

Response:

The cursor appears on the screen.

- 2 Enter a dollar sign and plus sign (\$+).

Response:

The octothorpe (#) is presented to indicate that the AILC is ready to receive digits.

- 3 Enter the digits to be dialed to complete the far-end loopback call.

Response:

Three periods (...) are displayed to indicate that the digits are being outpulsed. The > prompt appears when the loopback is established.

Table 2-2 shows the keyboard dialing (KBD) commands.

Table 2-2
Keyboard dialing - AILC commands

Command	Use
+	Enter the plus sign to initiate a data call, answer a ring again callback, or manually answer an incoming call at a DTE that is not arranged for auto-answer.
!	Enter a single exclamation point to abort a data call that has not been completely dialed, or to reject a ring again offer. Enter three exclamation points in succession (no spaces) to abort an already established data call.
@	Enter the commercial 'at' sign to access the autodial feature (to use or change the feature).
=	Enter the equal sign to access the Speed Call feature (to use or change the feature).
&	Enter the ampersand to invoke the Network Resource Selector feature (to use modem pooling for the data call). The key must be pressed approximately every second until the call is established (that is, > is displayed).
%	Enter the percent symbol to invoke the Ring Again feature. This can also be used to cancel a previous ring again request.
—continued—	

Table 2-2
Keyboard dialing - AILC commands (continued)

Command	Use
\$+	Enter the dollar sign-plus sign to initiate a far-end loopback test call. The octothorpe (#) is prompted to request input of the digits to be dialed to complete the call.
Control T	Press these keys simultaneously to invoke a self test of the AILC. If the test is successful, OK is displayed; otherwise, an X is displayed.
—end—	

Table 2-3 is a list of AILC prompts and their meanings.

Table 2-3
AILC prompts

Prompt	Meaning
:	The AILC is ready to receive input from the DTE.
#	Enter the digits to be dialed to establish a data call (or program/change an autodial or speed call number). A comma (,) can be used to insert a 1-second pause before subsequent digits are processed. This can be required for calls that are placed using a tandem tie trunk network (TTTN).
...	Indicates that a data call connection is in progress (for example, digits are being outpulsed, call is ringing).
>	The outgoing data call is connected to the called DCE. Begin the data session.
<	An incoming call has been answered by a DTE device that is arranged for auto-answer.
<?	An incoming call is being presented to a DTE that is not arranged for auto-answer. Enter the plus sign (+) to answer the incoming call.
Note: When presented on the screen of the DTE, the following prompts are accompanied by a bell or beep at the DTE: >, <, <?, %?, +?, and &?.	
—continued—	

Table 2-3
(continued) **AILC prompts**

Prompt	Meaning
%?	The called number is busy. To invoke the Ring Again feature, enter the percent sign (%); otherwise, enter a single exclamation point (!) to abort the call.
+?	A ring again recall is being presented to the DTE. To accept the recall, enter the plus sign (+) within 30 seconds of receiving the ring again recall offer.
&?	An NRS call is in progress. To continue, enter the ampersand (&) to continue the call; otherwise, enter a single exclamation point (!) to abort the call.
Note: When presented on the screen of the DTE, the following prompts are accompanied by a bell or beep at the DTE: >, <, <?, %?, +?, and &?.	
—end—	

List of terms

AILC

asynchronous interface line card (NT6X76)

AILU

asynchronous interface line unit

American Standard Code for Information Interchange

A coded character set used for the interchange of information among information processing systems, communications systems, and associated equipment. ASCII defines a format in which data is exchanged between an I/O device and the device controllers of the switch.

ASCII

See American Standard Code for Information Interchange

AUD

See autodial

autodial (AUD)

A feature that allows assignment of a frequently called number, account code, or authorization code to a feature key.

data connecting equipment

The equipment that provides the functions required to establish, maintain, and terminate a connection, as well as the signal conversion required for communications between the data terminal equipment and the telephone line or data circuit. *See also* data terminal equipment.

data terminal equipment

Data communication devices, such as computers and terminals.

DCE

See data connecting equipment

DTE

See data terminal equipment

KBD

keyboard dialing

line concentrating module

A peripheral module that connects the line trunk controller or line group controller and up to 640 subscriber lines using two to six DS30-A links.

LCM

See line concentrating module

main distributing frame

A frame containing terminal blocks where cables from outside plant and office equipment are terminated. Outside plant equipment is terminated on vertical columns of blocks and office equipment on horizontal rows. Cross-connection flexibility and organization is provided by jumper pair between horizontal and vertical terminal blocks.

Maintenance and Administration Position

A group of components that provide a user interface between operating company personnel and the switch. The interface consists of a video display unit (VDU) and keyboard, a voice communications module, test facilities, and special furniture.

MAP

See Maintenance and Administration Position

MDF

See main distributing frame

NRS

network resource selector

RAG

See ring again

ring again (RAG)

A feature that allows a calling party encountering a busy station to be connected automatically with that station when it becomes available.

SCL

speed call

tandem tie trunk network (TTTN)

The switched interconnection of tie trunk networks.

TTTN

See tandem tie trunk network

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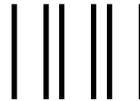
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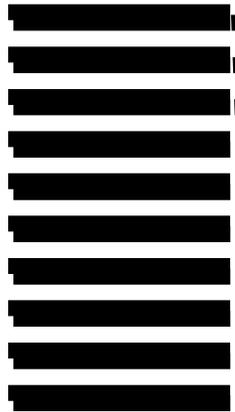


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Meridian SL-100
Asynchronous Interface Line Unit
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Allowing this equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of FCC Rules, Docket No. 89-114, 55FR46066

The SL-100 system is certified by the Canadian Standards Association (CSA) with the Nationally Recognized Testing Laboratory (NRTL).

This equipment is capable of providing users with access to interstate providers of operator services through the use of equal access codes. Modifications by aggregators to alter these capabilities is a violation of the Telephone Operator Consumer Service Improvement Act of 1990 and Part 68 of the FCC Rules

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