Meridian 1

Enhanced Asynchronous Interface Line Unit

Description and formats

Document Number: 553-2731-203
Document Release: Standard 3.0
Date: December 1994

Revision history

August 10, 1990

Standard, release 1.0. Reissued for compliance with Northern Telecom standard 164.0.

August 31, 1992

Standard, release 2.0. This document was reissued to include technical content updates. Due to the extent of changes, revision bars were not used.

December 1994

Standard, release 3.0. Reissued to include editorial changes and indexing. Due to the extent of the changes, revision bars are not used.

Contents

List of figures

List of tables

Description

The Enhanced Asynchronous Interface Line Unit (EAILU) is a compact Electronics Industry Association (EIA) RS-232 to RS-422 cable line driver that provides terminal and host connectivity to Meridian 1. With terminal connectivity, the EAILU allows RS-232-C compatible data terminal equipment (DTE) such as ASCII data terminals, teleprinters, and personal computers to connect directly through an RJ-11 wall outlet to Meridian 1 to place and receive data calls. These data calls can use Meridian 1 features such as speed dial, auto dial, and ring again. All features are accessed from the terminal keyboard through menus and prompts. With host connectivity, the EAILU can also be used to connect directly to host computers at distances of up to 4000 ft from Meridian 1 using an asynchronous link.

Figure 1 illustrates how the following equipment is connected for data transmission between Meridian 1 and terminals and host computers.

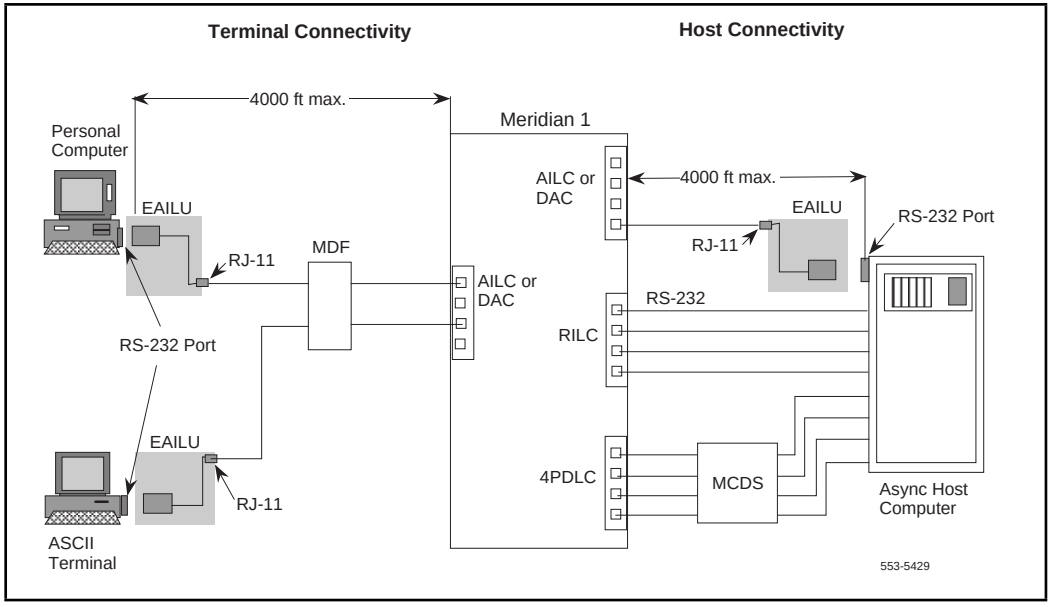
— EAILU (A0344336, male version, and A0344337, female version) for terminal and host computer connectivity up to 4000 ft from Meridian 1.

— DAC (Data Access Card) used for direct RS-232 Asynchronous Host Connectivity and RS-422 for intelligent peripheral equipment (IPE) module connectivity in Meridian 1 options 21 through 71 and option 11 main and expansion cabinets.

— RILC (RS-232 Interface Line Card) for direct Asynchronous Host Connectivity. Refer to *QPC723 RS-232 Interface Line Card description, installation, and operation* (553-2731-106).

— MCDS (Multi-Channel Data System) for High-Density Host Connectivity.

Figure 1
EAILU application diagram



Related documents

For complete information concerning Meridian data features, refer to these documents.

QPC723 RS-232 Interface Line Card description, installation, and operation (553-2731-106)

QMT21 High Speed Data Module description, installation, and operation (553-2731-107)

QPC918 High Speed Data Card description, installation, and operation (553-2731-108)

Meridian data features traffic engineering and configuration (553-2731-151)

Meridian data features operation and tests (553-2731-300)

NT7D16 Data Access Card description and operation (553-3001-191)

X11 input/output guide (553-3001-400)

X11 features and services (553-3001-305)

Note: For the purposes of this document, Meridian 1 refers to SL-1 ST, NT, RT, and XT machines as well as Meridian 1 system options 21, 51, 51C, 61, 61C, 71, and 81.

Compatible data terminal equipment (DTE) devices

DTE devices that have the following characteristics can be interfaced through an Enhanced Asynchronous Interface Line Unit (EAILU) to

— The Data Access Card (DAC) (NT7D16AA), which is housed in the intelligent peripheral equipment (IPE) module (NTED37) or Common Equipment/Peripheral Equipment (CE/PE) module (NT8D11) and supports connection of up to six EAILUs.

— The DAC, which can be housed in the main or expansion cabinet of a Meridian 1 option 11 system.

— The Asynchronous Interface Line Card (AILC) (QPC430), which can be housed in the peripheral equipment (PE) modules or shelves and connect up to four EAILUs. These PE modules/shelves are NT8D13 (PE module), QSD64, QSD65, QSD80, QSP35, and QSP36.

For Computer PBX Interface (CPI) application, use AILC (QPC430) vintage C or higher. For asynchronous host computer applications, use the Enhanced version EAILU, which must interface to AILCs (QPC430) vintage E or higher.

Mode	Full duplex (when connected to DAC or AILC)
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	Two stop bits for 110 bps One stop bit for all other speeds
Clock	Internal, +1% frequency tolerance
Signal level	5 V to 15 V dc (nominal)

Physical description

The Enhanced Asynchronous Interface Line Unit (EAILU) is a compact, high-impact plastic unit 2-1/4 in. (57 mm) long, 1-3/4 in. (44 mm) wide, and 1/2 in. (13 mm) high.

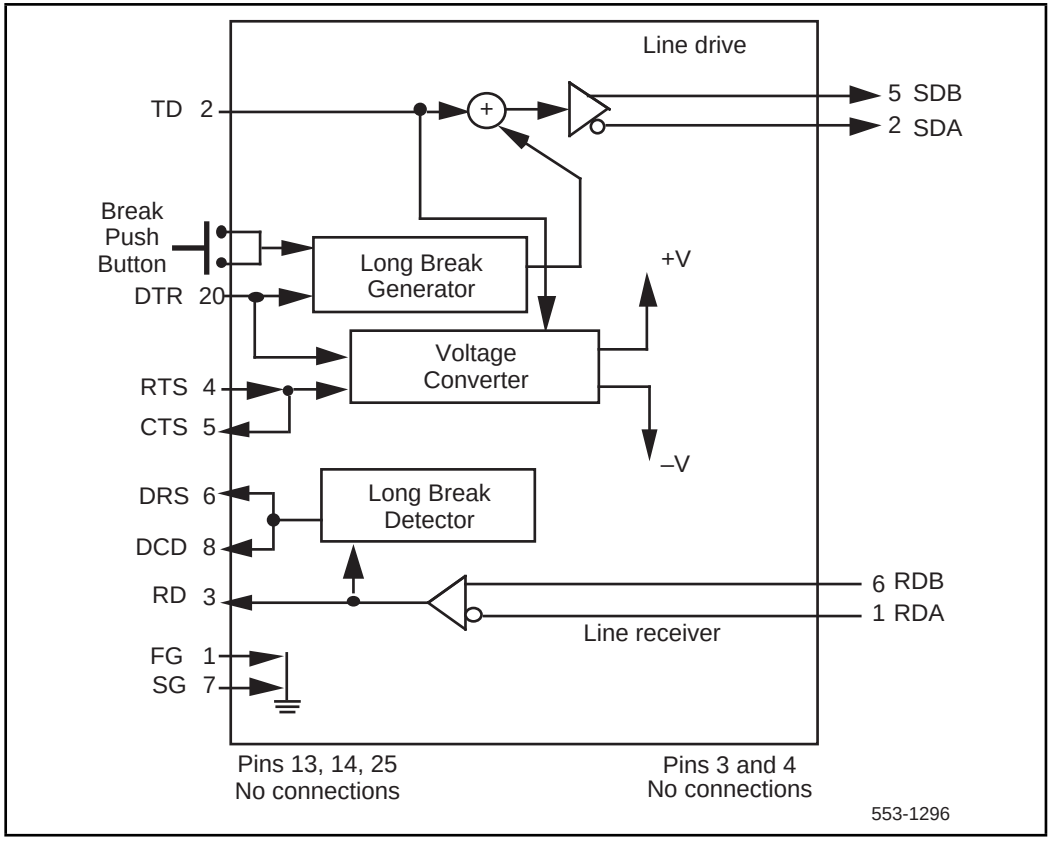
The unit is equipped with a connector to attach to the RS-232-C connector of the data terminal equipment (DTE) device and with a 7 ft (2133 mm), 4-conductor line cord that is terminated with a standard TELADAPT male plug to connect to an RJ-11 (or equivalent) jack. A push button located at the back of the unit is for long break generation purposes.

The EAILU allows control of near end call disconnect by the long break sent from the DTE device. Far end disconnect is indicated by a long break sent to the near end DTE. See Figure 2 for a block diagram of the EAILU.

The EAILU has a long break detection feature that will toggle the DSR, DCD leads in the RS-232-C interface when the far end initiates a call disconnect.

The EAILU can generate a long break signal to the AILC or the DAC by either manually pushing the push button at the back of the unit, or dropping the Digitone Receiver (DTR) lead from the DTE device.

Figure 2
EAILU block diagram



The enhancements allow the following:

— a terminal that cannot generate a break to control the call disconnect by pushing the push button

— a host computer device that does not have the long break generation capability to control the call disconnect by dropping the DTR lead

— a host computer device that does not have the long break detection capability to detect the far end call disconnect through the dropping of DSR or DCD leads

CAUTION

After the call is dropped, DSR and DCD will drop momentarily and return to the on condition. The host may interpret that another call is established. Nevertheless, the host should not time out on the port; otherwise unpredictable results can occur.

The EAILU supports asynchronous data transmissions over loop lengths of up to 4000 ft (1200 m). Speeds are determined by the autobauding procedure of the AILC or DAC.

The EAILU connects directly to the DTE RS-232 connector (DB-25). See Table 1 for EAILU pin assignment. The EAILU uses two-pair wires to connect to the AILC or DAC. There is no need to use an RS-232-C cable for the interconnection.

Table 1
EAILU DB-25 connector pin assignments

Pin number and description		EIA designation	CCITT	Description
1	PG	AA	101	Protective Ground
2	TXD	BA	103	Transmit Data from DTE
3	RXD	BB	104	Receive Data from DTE
4	RTS	CA	105	Request to Send from DTE
5	CTS	CB	106	Clear to Send to DTE
6	DSR	CC	107	Data Set Ready to DTE
7	SG	AB	102	Signal Ground
8	CD	CF	109	Carrier Detect to DTE
20	DTR	CD	108.2	Data Terminal Ready from DTE

Power requirements

There is no need for an external power source. The EAILU is powered from the RS-232-C connector of the connected DTE. When the DTE is turned on, 9 V dc (nominal) is applied to Pin 20 (DTR) and Pin 4 (RTS) of the RS-232-C connector.

Maintenance

The EAILU is a passive device that requires no preventive maintenance. There are no diagnostic programs, switches, configuration options, or straps associated with it.

If no response is received from the AILC or DAC, the user should ensure that the DTE is powered up, properly connected to the EAILU, and ready for data transmission with the proper speed and other parameters correctly set up.

If a unit is suspected to be faulty, replace it with a known working unit. Further failure indicates that the problem may be caused by Main Distribution Frame (MDF) cross-connection or the AILC or DAC line card.

Field repair of a defective unit is not recommended. The defective unit should be disposed of according to local instructions or returned for replacement if still under warranty.

Specifications

Environmental

The EAILU operates within the following environmental limits:

Operating temperatures	0°C to +50°C
Storage temperatures	–10°C to +70°C
Humidity	5% to 95% RH noncondensing

Electrical

The EAILU conforms to the following electrical specifications:

RS-422 line interface baud rates	up to 19200 baud
Line length	4000 ft (1200 m) using 26-gauge cable
RS-232-C port interface voltage level at receiver output points RD, DSR, DCD	4 V ± 1 V (nominal)

CAUTION

Vintage A or B of the QPC430 AILC will operate at up to 2500 ft (762 m).

Timing requirements

The following lists the minimum DTR turn off, break, and drop times for the EAILU:

Minimum DTR pin turned off time to generate a 1.5-second break signal (see Figure 3)	150 ms
Minimum break time in the line to activate the break detector	1.6 seconds
DSR, DCD drop time after detecting a long break (see Figure 4)	400 ms (typical) 100 ms (minimum)

Figure 3
Long Break generation by means of DTR drop

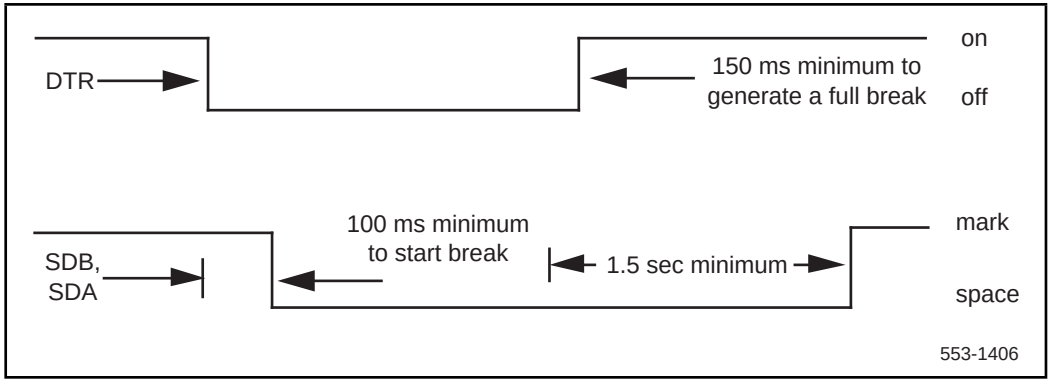
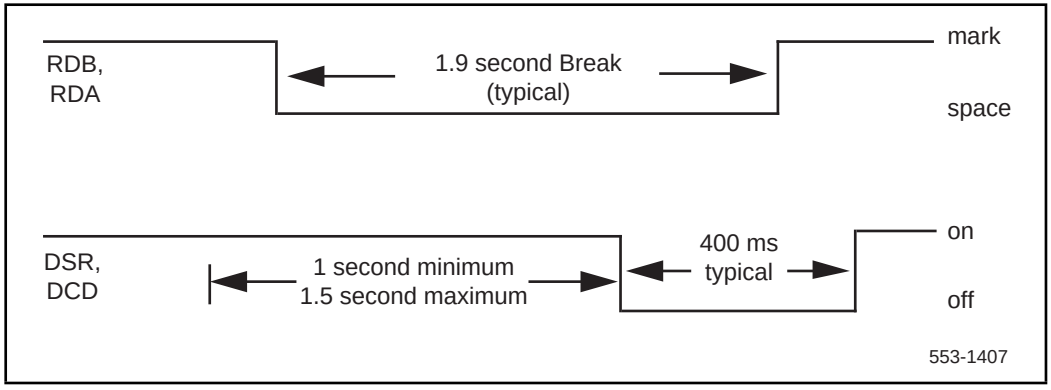


Figure 4
DSR, DCD control by means of break detect



Ordering information

The EAILU can be ordered with either a male or a female DB-25 connector. See Table 2 for terminals that pass the qualification test. Specify the following information when ordering:

— EAILU with male connector

- CPC number: A0344336
- Engineering code: NPS 50705-L1
- Model Number: M232-422A

— EAILU with female connector

- CPC number: A0344337
- Engineering code: NPS 50705-L2
- Model Number: F232-422A

Table 2
Terminals that pass the qualification test

Manufacturer	Model
Digital Equipment	VT100 VT102 VT220
Data General	D-200 D-400
Hewlett-Packard	HP 2392A HP 2621A HP 2622A HP 2693A
Falco	Fame II TS-28 TS-1
Wang	2110
Wyse	WY-85
Qume	108
Zentec	Zephyr
Prime	PST-100
IBM PC	Async Comm Adaptor
AST Research Inc.	AST Multifunction Card

Installation and testing

Installation and testing procedures list the steps required to install and maintain the Enhanced Asynchronous Interface Line Unit (EAILU).

Preinstallation information

Perform the following tasks before installing the EAILU:

— Install all DACs and I/O cables.

Note: Refer to *NT7D16 Data Access Card description and operation* (553-3001-191) for detailed information on available intelligent peripheral equipment (IPE) card slot positions for DAC installation and I/O panel cable terminations to the Main Distribution Frame (MDF).

— Install all AILCs and I/O cables.

Note: An AILC can be installed in slots 1 through 10 of a peripheral equipment (PE) module/shelf but cannot be installed in an IPE module. Refer to Tables 3 and 4 for AILC and I/O cable wire and pin assignment information.

— Install all RJ-11 jacks, distribution blocks, facility wiring, and cross-connect wiring as illustrated in Figure 5. Ensure that the line length does not exceed 4000 ft using 26-gauge wire.

Note: The DTE that the EAILU is connected to must not share the same power outlet strip with electromagnetic interference (EMI) noisy equipment such as a fluorescent lamp. Otherwise, data corruption may occur.

— Install the DTE device.

— Configure Meridian 1 using the LD11 program to identify all DAC and AILC ports supporting EAILUs.

Note: If adding or changing AILC ports that support EAILUs, refer to *Meridian Data Services description* (553-2731-100). If adding or changing DAC ports, refer to *NT7D16 Data Access Card description and operation* (553-3001-191). Make sure all DAC ports supporting EAILUs are set to RS-422 using the LD 11 program by setting TYPE = RS-422. The minimum voltage levels, when the EAILU is connected to the Asynchronous Interface Line Card (AILC), are listed here.

- 700 mV between SDB and SDA at the EAILU
- 500 mV between SDB and SDA at the MDF
- 700 mV between RDB and RDA at the EAILU

EAILU installation

To install the EAILU into an asynchronous data link between Meridian 1 and a terminal or a host computer, follow the steps below.

1 Unpack and inspect the EAILU. Tag and return any defective units according to local instructions.

2 Connect the DB-25 connector on the EAILU to the appropriate DB-25 RS-232 connector at the rear of the DTE device. See Figure 5.

3 Secure the EAILU connector to the device connector with the attached screws.

4 Insert the RJ-11 plug of the EAILU into the RJ-11 wall-mounted telephone jack. Ensure that the clip on the RJ-11 plug snaps securely into place.

5 Use EAILU data station keyboard dialing procedures to verify the installation. Refer to *Meridian data features operation and tests* (553-2731-300) for the AIM keyboard dialing procedures.

Table 3
Pair-terminations at the NT8D13 PE Module I/O Panel connectors A, C, E, and G for the AILC QPC430 (Single Loop Mode) (Part 1 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors				AILC Card
				A	C	E	G	
1T 1R 2T 2R 3T 3R 4T 4R	RDA0 RDB0 SDA0 SDB0	26 1 27 2 28 3 29 4	W-BL BL-W W-O O-W W-G G-W W-BR BR-W	Slot X-1 Card 1	Slot X-4 Card 4	Slot X-7 Card 7	Slot X-10 Card 10	Unit 0
5T 5R 6T 6R 7T 7R 8T 8R	RDA1 DRB1 SDA1 SDB1	30 5 31 6 32 7 33 8	W-S S-W R-BL BL-R R-O O-R R-G G-R					Unit 1
9T 9R 10T 10R 11T 11R 12T 12R	RDA2 RDB2 SDA2 SDB2	34 9 35 10 36 11 37 12	R-BR BR-R R-S S-R BK-BL BL-BK BL-O O-BL					Unit 2
13T 13R 14T 14R 15T 15R 16T 16R	RDA3 RDB3 SDA3 SDB3	38 13 39 14 40 15 41 16	BK-G G-BK BK-BR BR-BK BK-S S-BK Y-BL BL-Y					Unit 3

Table 3
Pair-terminations at the NT8D13 PE Module I/O Panel connectors A, C, E, and G for the AILC QPC430 (Single Loop Mode) (Part 2 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors				AILC Card
				A	C	E	G	
17T 17R 18T 18R 19T 19R 20T 20R	RDA0 RDB0 SDA0 SDB0	42 17 43 18 44 19 45 20	Y-O O-Y Y-G G-Y Y-BR BR-Y Y-S S-Y	Slot X-2 Card 2	Slot X-5 Card 5	Slot X-8 Card 8	Spare	Unit 0
21T 21R 22T 22R 23T 23R 24T 24R	RDA1 RDB1 SDA1 SDB1	46 21 47 22 48 23 49 24	V-BL BL-V V-O O-V V-BR BR-V V-S S-V					Unit 1

Table 3
Pair-terminations at the NT8D13 PE Module I/O Panel connectors A, C, E, and G for the AILC QPC430 (Single Loop Mode) (Part 3 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors				AILC Card
				A	C	E	G	
1T 1R 2T 2R 3T 3R 4T 4R	RDA0 RDB0 SDA0 SDB0	26 1 27 2 28 3 29 4	W-BL BL-W W-O O-W W-G G-W W-BR BR-W	Slot X-1 Card 1	Slot X-4 Card 4	Slot Y-2 Card 2	Slot Y-5 Card 5	Unit 0
5T 5R 6T 6R 7T 7R 8T 8R	RDA1 RDB1 SDA1 SDB1	30 5 31 6 32 7 33 8	W-S S-W R-BL BL-R R-O O-R R-G G-R					Unit 1
9T 9R 10T 10R 11T 11R 12T 12R	RDA2 RDB2 SDA2 SDB2	34 9 35 10 36 11 37 12	R-BR BR-R R-S S-R BK-BL BL-BK BL-O O-BL					Unit 2
13T 13R 14T 14R 15T 15R 16T 16R	RDA3 RDB3 SDA3 SDB3	38 13 39 14 40 15 41 16	BK-G G-BK BK-BR BR-BK BK-S S-BK Y-BL BL-Y					Unit 3

Table 3
Pair-terminations at the NT8D13 PE Module I/O Panel connectors A, C, E, and G for the AILC QPC430 (Single Loop Mode) (Part 4 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors				AILC Card
				A	C	E	G	
17T 17R 18T 18R 19T 19R 20T 20R	RDA0 RDB0 SDA0 SDB0	42 17 43 18 44 19 45 20	Y-O O-Y Y-G G-Y Y-BR BR-Y Y-S S-Y	Slot X-2 Card 2	Slot X-5 Card 5	Slot Y-3 Card 3	Spare	Unit 0
21T 21R 22T 22R 23T 23R 24T 24R	RDA1 RDB1 SDA1 SDB1	46 21 47 22 48 23 49 24	V-BL BL-V V-O O-V V-BR BR-V V-S S-V					Unit 1

Table 4
Pair-terminations at the NT8D13 PE Module I/O Panel connectors B, D, and F for the AILC QPC430 (Single Loop Mode) (Part 1 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors			AILC Card
				B	D	F	
1T 1R 2T 2R 3T 3R 4T 4R	RDA2 RDB2 SDA2 SDB2	26 1 27 2 28 3 29 4	W-BL BL-W W-O O-W W-G G-W W-BR BR-W	Slot X-2 Card 2	Slot X-5 Card 5	Slot X-8 Card 8	Unit 2
5T 5R 6T 6R 7T 7R 8T 8R	RDA3 RDB3 SDA3 SDB3	30 5 31 6 32 7 33 8	W-S S-W R-BL BL-R R-O O-R R-G G-R				Unit 3

Table 4
Pair-terminations at the NT8D13 PE Module I/O Panel connectors B, D, and F for the AILC QPC430 (Single Loop Mode) (Part 2 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors			AILC Card
				B	D	F	
9T 9R 10T 10R 11T 11R 12T 12R	RDA0 RDB0 SDA0 SDB0	34 9 35 10 36 11 37 12	R-BR BR-R R-S S-R BK-BL BL-BK BL-O O-BL	Slot X-3 Card 3	Slot X-6 Card 6	Slot X-9 Card 9	Unit 0
13T 13R 14T 14R 15T 15R 16T 16R	RDA1 RDB1 SDA1 SDB1	38 13 39 14 40 15 41 16	BK-G G-BK BK-BR BR-BK BK-S S-BK Y-BL BL-Y				Unit 1
17T 17R 18T 18R 19T 19R 20T 20R	RDA2 RDB2 SDA2 SDB2	42 17 43 18 44 19 45 20	Y-O O-Y Y-G G-Y Y-BR BR-Y Y-S S-Y				Unit 2
21T 21R 22T 22R 23T 23R 24T 24R	RDA3 RDB3 SDA3 SDB3	46 21 47 22 48 23 49 24	V-BL BL-V V-O O-V V-BR BR-V V-S S-V				Unit 3

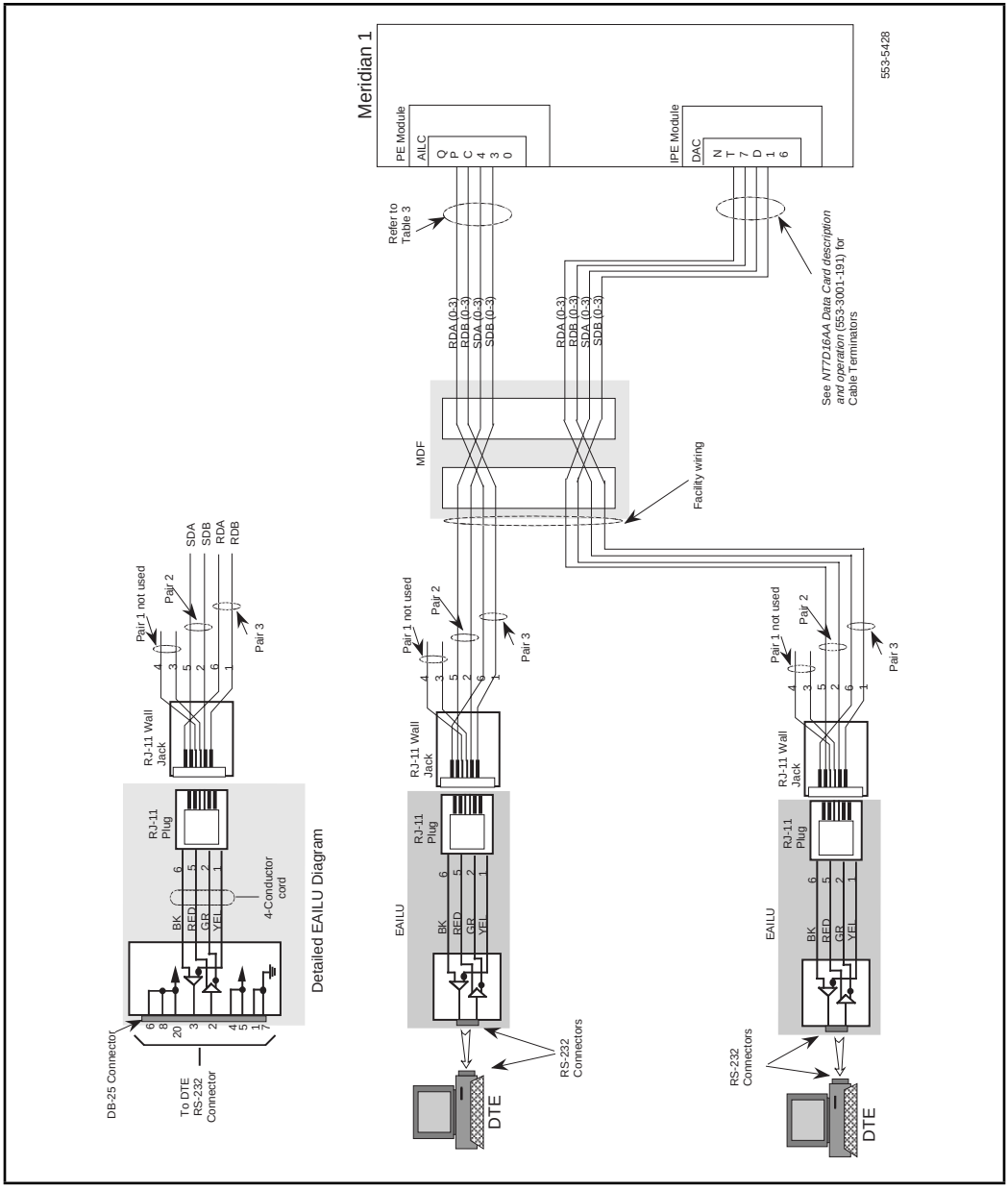
Table 4
Pair-terminations at the NT8D13 PE Module I/O Panel connectors B, D, and F for the AILC QPC430 (Single Loop Mode) (Part 3 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors			AILC Card
				B	D	F	
1T 1R 2T 2R 3T 3R 4T 4R	RDA2 RDB2 SDA2 SDB2	26 1 27 2 28 3 29 4	W-BL BL-W W-O O-W W-G G-W W-BR BR-W	Slot X-2 Card 2	Slot X-5 Card 5	Slot Y-3 Card 3	Unit 2
5T 5R 6T 6R 7T 7R 8T 8R	RDA3 RDB3 SDA3 SDB3	30 5 31 6 32 7 33 8	W-S S-W R-BL BL-R R-O O-R R-G G-R				Unit 3

Table 4
Pair-terminations at the NT8D13 PE Module I/O Panel connectors B, D, and F for the AILC QPC430 (Single Loop Mode) (Part 4 of 4)

Port Pairs	AILC Port Pins	Connector Pin Number and Wire Color Code		I/O Panel Connectors			AILC Card
				B	D	F	
9T 9R 10T 10R 11T 11R 12T 12R	RDA0 RDB0 SDA0 SDB0	34 9 35 10 36 11 37 12	R-BR BR-R R-S S-R BK-BL BL-BK BL-O O-BL	Slot X-3 Card 3	Slot Y-1 Card 1	Slot X-4 Card 4	Unit 0
13T 13R 14T 14R 15T 15R 16T 16R	RDA1 RDB1 SDA1 SDB1	38 13 39 14 40 15 41 16	BK-G G-BK BK-BR BR-BK BK-S S-BK Y-BL BL-Y				Unit 1
17T 17R 18T 18R 19T 19R 20T 20R	RDA2 RDB2 SDA2 SDB2	42 17 43 18 44 19 45 20	Y-O O-Y Y-G G-Y Y-BR BR-Y Y-S S-Y				Unit 2
21T 21R 22T 22R 23T 23R 24T 24R	RDA3 RDB3 SDA3 SDB3	46 21 47 22 48 23 49 24	V-BL BL-V V-O O-V V-BR BR-V V-S S-V				Unit 3

Figure 5
EAILU connections



Meridian 1

Enhanced Asynchronous Interface Line Unit

Description and formats

Publication number: 553-2731-203
Document release: Standard 3.0
Date: December 1994
Printed in the United States of America

Copyright Statement

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules, and the radio interference regulations of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
SL-1 and Meridian 1 are trademarks of Northern Telecom.

NORTEL
NORTHERN TELECOM