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NEAX® 2000 IVS²

INTEGRATED VOICE SERVER

Data Interface System Manual

JULY, 2000

NEC America, Inc.

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NEAX2000 IVS^2
Data Interface System Manual

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INTRODUCTION

PURPOSE

This manual explains the installation, programming and operation test procedure for the Data Interface system on the NEAX2000 IVS^2.

OUTLINE OF THIS MANUAL

This manual contains the following chapters:

CHAPTER 1 GENERAL INFORMATION
This chapter explains the system outline, the name and functions of circuit cards required, system capacity, system specifications and system conditions of Data Interface system.

CHAPTER 2 INSTALLATION
This chapter explains the hardware installation procedure to provide Data Interface on the PBX.

CHAPTER 3 SYSTEM DATA PROGRAMMING
This chapter explains the programming procedure to provide the Data Interface on the PBX.

CHAPTER 4 OPERATION TEST
This chapter explains the operation tests to be performed after completing the installation of the Data Interface on the PBX.

CHAPTER 5 CIRCUIT CARD INFORMATION
This chapter explains the mounting location, the meaning of lamp indications, and the method of switch settings of each circuit card for the Data Interface.

REFERENCE MANUAL

During installation, refer also to the manuals below:

Command Manual:	Describes Customer Administration Terminal (CAT) operation, command function and setting data required for programming the system, and Resident System Program.
Office Data Programming Manual:	Contains the Customer Specification Sheet and Office Data Programming Sheet.
Maintenance Manual:	Describes the maintenance service features and the recommended troubleshooting procedure.
Installation Procedure Manual:	Explains the installation procedure for the PBX system.

CHAPTER 1

GENERAL INFORMATION

This chapter explains the Data Interface system outline, the name and functions of circuit cards required, system capacity, specifications, and conditions.

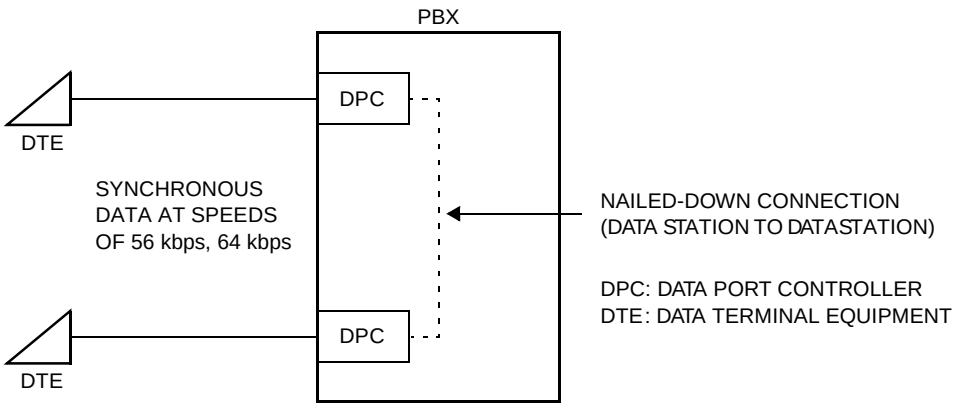
SYSTEM OUTLINE

The Data Interface can provide the intra- or inter-office digital data transmission on fixed path (Nailed-Down) connection. The Data Interface equips the V.11 (X.21) and the V.24/V.28 (RS-232C) interface. When you use the V.11 (X.21) interface, a maximum of 64 kbps digital data transmission is available. When you use the V.24/V.28 (RS-232C) interface, a maximum of 19.2 kbps digital data transmission is available.

To add the V.11 (X.21) or V.24/V.28 (RS-232C) Data Interface to the system, it is necessary to install the Data Port Controller (DPC) card. You can provide the V.35 interface DTE by the M03 card installed in addition to the DPC card. The M03 card converts the V.11 (X.21) interface to a V.35 interface. When you provide the inter-office digital data transmission, it is necessary to install the 24/30-channel Digital Trunk Interface (DTI) card in addition to the DPC card.

Figure 1-1 and Figure 1-2 show the outline of the Data Interface intra-office/inter-office connection.

Figure 1-1 System Outline of Intra-Office Data Connection



NOTE: The DPC card can only operate as DCE. If the DPC card is to be connected to a modem or other DCE, a null modem adapter is required.

When the PBX is an end office in the Inter-Office Digital Data Transmission through Nailed-Down Connection, the digital signal is transmitted directly. A maximum of 64 kbps digital data transmission is available for the direct digital transmission.

When the PBX is a tandem office in the Inter-Office Digital Data Transmission through Nailed-Down Connection, data transparency is provided, and a maximum of 64 kbps digital data transmission is available.

Table 1-1 shows the connecting pattern of the Inter-Office Data Transmission through Nailed-Down Connection.

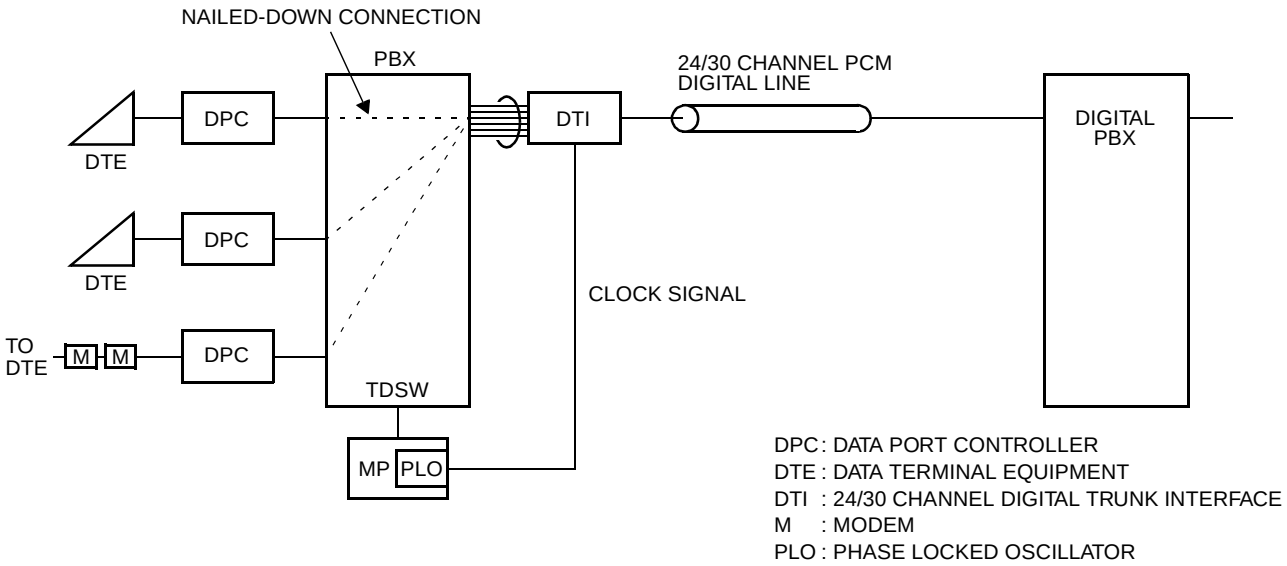
Table 1-1 Connecting Patterns

CONNECTING PATTERN			SYSTEM CONFIGURATION
FROM \ TO	LDT/ODT	DTI (DIGITAL SIGNAL)	
DPC	—	○	Figure 1-2
LDT/ODT	—	—	
DTI (Digital Signal)	—	●	Figure 1-2

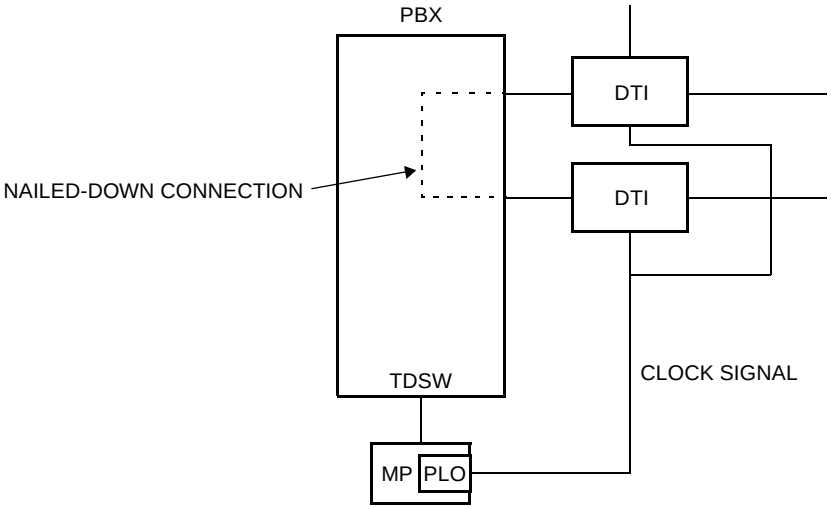
○ : Direct Connection
● : Tandem Connection
— : Not available

Figure 1-2 System Outline of Inter-Office Data Connection

(1) PBX IS AN END OFFICE:



(2) PBX IS A NTANDEM OFFICE:



DPC

The Data Port Controller (DPC) can accommodate a maximum of two DTE per cards with V.11 (X.21) or V.24/V.28 (RS-232C) interface, and can provide the intra-office or inter-office digital data transmission on Nailed-Down connection.

DTI

The Digital Trunk Interface (DTI) interfaces the PBX directly to a 24/30-channel PCM transmission line. The DTI has the following functions.

For 24DTI:

- Unipolar/Bipolar Conversion (AMI Format)
- Signaling Insertion/Extraction
- Alarm Detection/Insertion
- Digital PAD on Voice Signal Transmission
- Loopback Test (Local/Remote Loopback)
- Cyclic Redundancy Checking (based on ITU-T Rec. G704)

For 30DTI:

- Unipolar/Bipolar Conversion (HDB3 Format)
- Signaling Insertion/Extraction
- Alarm Detection/Insertion
- Digital PAD on Voice Signal Transmission
- Cyclic Redundancy Checking (based on ITU-T Rec. G704)
- Channel Associated Signaling (based on ITU-T Rec. 0421 Digital R2 Signaling Code)

For connection of a 24DTI and transmission line, twisted-pair cables can be used. For connection of a 30DTI and transmission line, either coaxial cable or twisted pair cable can be used.

M03

The M03 provides V.35 Data Terminal Equipment interface.
M03 is connected to the DPC and converts V.11 (X.21) interface to V.35 interface.

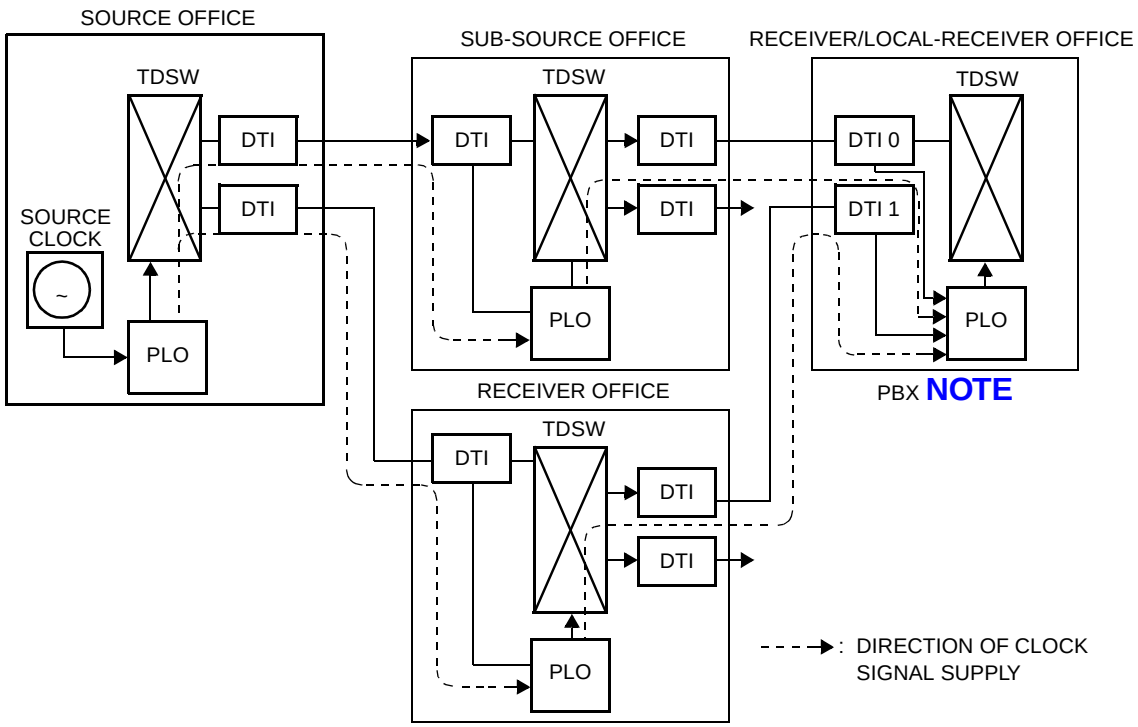
PLO

The Phase Locked Oscillator (PLO) equipped on the MP card synchronizes the system to the digital network clock.

When the PBX is a clock receiver office, the PLO generates the clock signals according to the source clocks received from the source office within the network. The source clock signals are extracted at DTI cards and supplied to the PLO. Two clock routes are available; one is the Route 0 from the source office, and the other is a standby Route 1 from a sub-source office. When no clock signals arrive from the source and sub-source office, due to a transmission line failure, the PLO keeps generating the clock signals at the frequency of the previous source clock. The PLO can receive different frequency of source clocks from the Route 0 and Route 1.

Figure 1-3 shows an example of the clock supply route when the system is a receiver office.

Figure 1-3 Clock Supply Route



NOTE: DTI 0 and DTI 1 must be mounted in PIM0.

CARD NAME AND FUNCTION

Table 1-2 shows the circuit card name and function for Data Interface.

Table 1-2 Card Name and Function

EQUIPMENT NAME	FUNCTIONAL NAME	FUNCTION
PN-CP14	MP	Main Processor Card Provides Memory, TDSW (1024CH × 1024CH), 16-line CFT, PB sender, Clock, PLO 2 ports (receiver mode/ source mode), two RS-232C ports, 2-line DAT (Recording duration: Max. 128 sec.), DK, 4-line PB receiver, Modem for remote maintenance (19.2 kbps), internal Music-on-Hold tone source and BUS interface. BUS interface functions as a driver/receiver of various signals, adjusts gate delay timing and cable delay timing, monitors I/O Bus and PCM BUS. One card is required per system.
PN-24DTA-C	DTI	Digital Trunk Interface (23B + D, 1.5 Mbps) Card Accommodates 24-channel PCM digital lines.
PN-30DTC-A	DTI	Digital Trunk Interface (2 Mbps) Card Accommodates 30-channel PCM digital lines.
PZ-M542 **[For Other Countries]**	CONN	Coaxial Cable Connection Card Used to connect a coaxial cable for the Digital Trunk Interface. Two cards maximum can be connected to LTC connector of each PIM.
PZ-M557 **[For Australia]**	CONN	Coaxial Cable Connection Card Used to connect a coaxial cable for the Digital Trunk Interface. Two cards maximum can be connected to LTC connector of each PIM.

Table 1-2 Card Name and Function (Continued)

EQUIPMENT NAME	FUNCTIONAL NAME	FUNCTION
PN-2DPCB	DPC	2-line Data Port Controller Card Used for the intra-office or inter-office digital data transmission on nailed down connection. Accommodates max. two DTEs with V.11 (X.21) interface or V.24/V.28 (RS-232C) interface.
PN-M03	M03	V.35 Data Terminal Equipment Interface Card Used together with the PN-2DPCB card to provide the V.35 interface.

SYSTEM CAPACITY

System Capacity for Data Interface

Table 1-3 System Capacity for Data Interface

DESCRIPTION	CAPACITY	REMARKS
DPC Card	50	
Circuits per DPC Card	2	
Fixed Path Connection	100	

System Capacity for Digital Trunk Interface

Table 1-4 System Capacity for Digital Trunk Interface

DESCRIPTION	CAPACITY		REMARKS
	24DTI	30DTI	
DTI Card	8	4	
DTI Trunk	192	124	
DTI Trunk Route	64	64	1 Route/DTI
Ports per DTI Card	24	31	

SYSTEM SPECIFICATIONS

DPC Specifications

Table 1-5 DPC Specifications

DESCRIPTION	SPECIFICATION
Synchronization	Synchronous
Transmission Rate	2.4, 4.8, 9.6, 14.4, 19.2, 48, 56, 64 kbps
Transmission Mode	Full/Half Duplex **NOTE 1**
Rate Adaptation **NOTE 2**	ITU-T V.110

NOTE 1: When the transmission rate is 56 or 64 kbps, only full duplex is available.

NOTE 2: For the transmission rate after Rate Adaptation, see Table 1-6.

Table 1-6 Rate Adaptation

TRANSMISSION RATE BEFORE RATE ADAPTATION	TRANSMISSION RATE AFTER RATE ADAPTATION	REMARKS
2.4-4.8 kbps	8 kbps	
9.6 kbps	16 kbps	
14.4 kbps	32 kbps	
19.2 kbps	32 kbps	
48-64 kbps	64 kbps	

Modem Specifications

Table 1-7 Modem Specifications

DESCRIPTION	SPECIFICATION
Synchronization	Synchronous
Transmission Rate	2.4, 4.8, 9.6, 14.4, 19.2, 48, 56, 64 kbps
Transmission Mode	Full/Half Duplex **NOTE**
Line	4 wire
Connecting Type	Leased

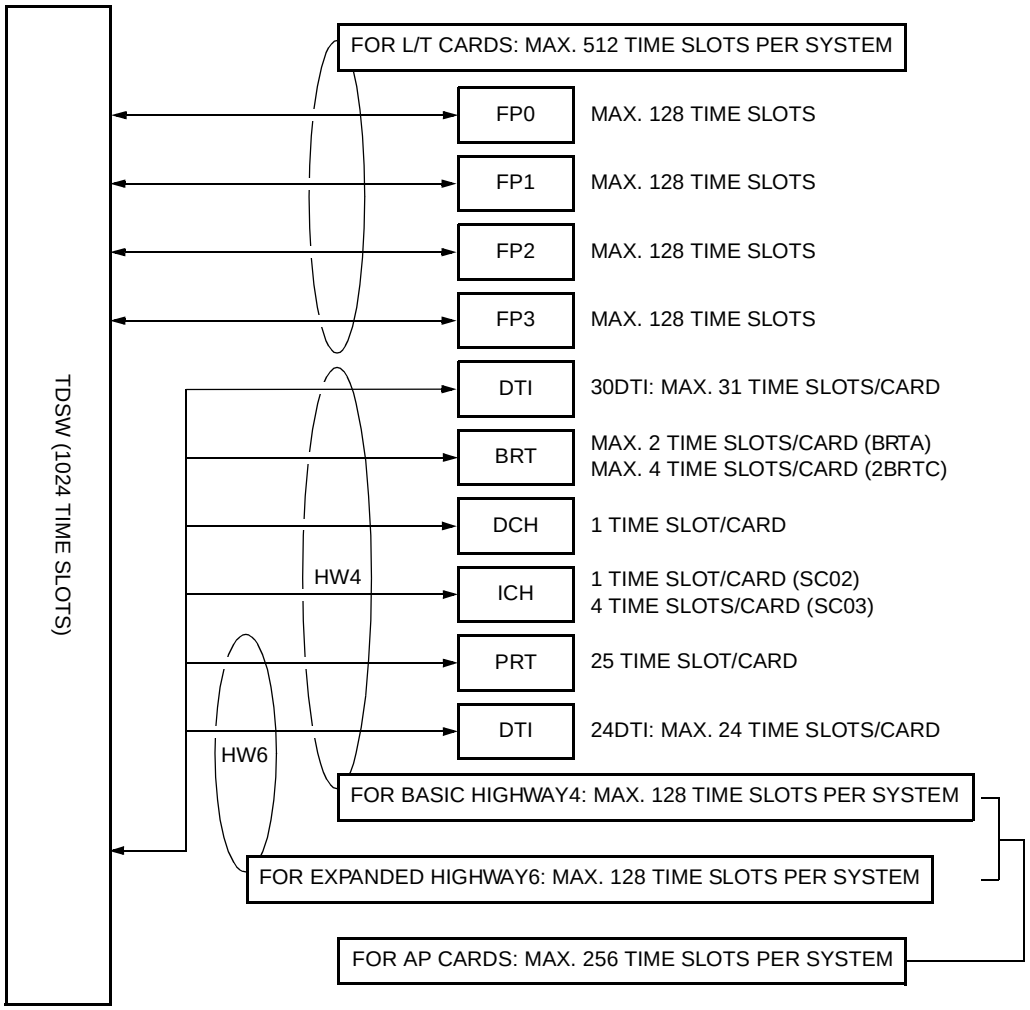
NOTE: When the transmission rate is 56 or 64 kbps, only full duplex is available.

SYSTEM CONDITIONS

Time Slot Assignment Condition

As shown in Figure 1-4, the 30DTI card uses the time slot on the basic Highway 4.
Therefore, the total number of time slots for all 30DTI card must be 128 time slots or less including all other application processor cards which use the Highway 4.
The 24DTI card can use the time slot on both the basic and expanded Highway 4 and 6.
Therefore, the total number of time slots for all 24DTI card must be 256 time slots or less.

Figure 1-4 Accommodation of DTI into TDSW

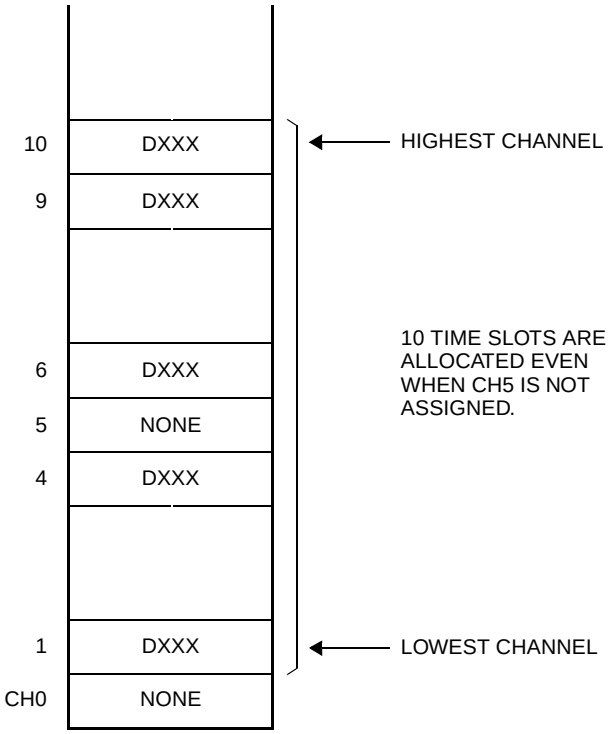


Time Slot Allocation for DTI Card

On each DTI card, the system recognizes the lowest and highest channel numbers to which trunk numbers have been assigned, and allocates time slots to all the channels within them. If trunk numbers are assigned to discontinuous channels in this case, the system also allocates time slots to channels not assigned.

For example, as shown in Figure 1-5, even when Channel 1 through Channel 10 have been assigned by the system data programming (CM07 YY=01) except Channel 5, the system allocates a total of 10 time slots for all the ten channels. Therefore, to avoid allocation of unnecessary time slots, it is recommended that consecutive channels are assigned on each DTI card.

Figure 1-5 Time Slot Allocation for DTI



CHAPTER 2

INSTALLATION

This chapter explains the hardware installation procedure to provide Data Interface to the PBX.

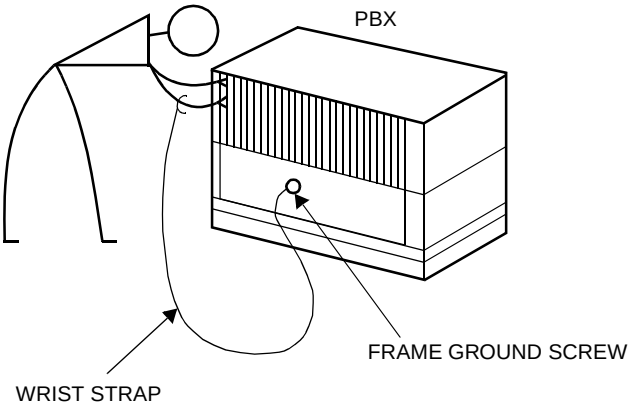
PRECAUTIONS

Static Electricity Guard

You must wear a grounded wrist strap to protect circuit cards from static electricity.

Figure 2-1 Static Electricity Guard (1 of 2)

- WHEN PLUGGING/UNPLUGGING A CIRCUIT CARD



- WHEN HOLDING A CIRCUIT CARD

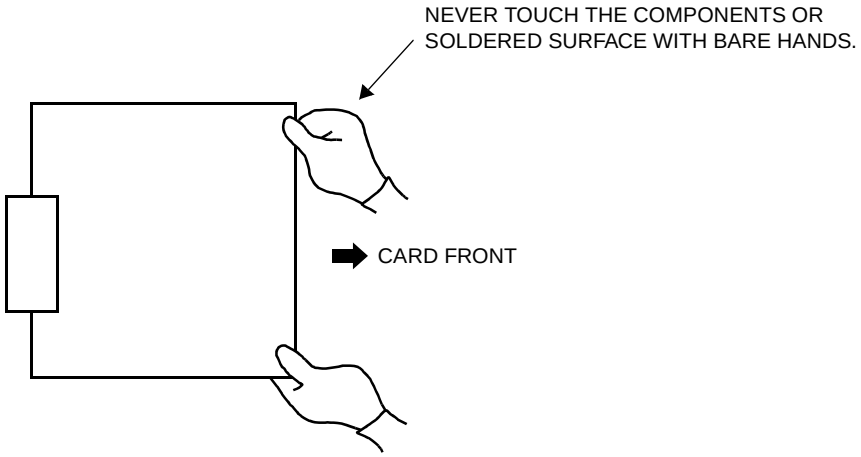
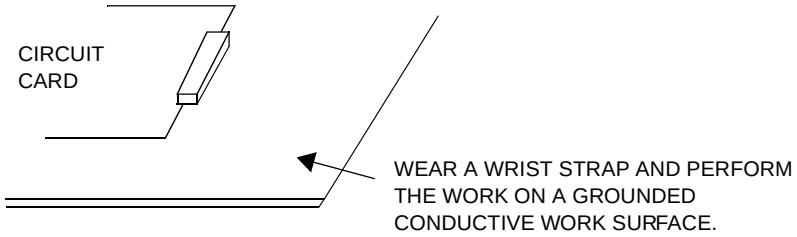
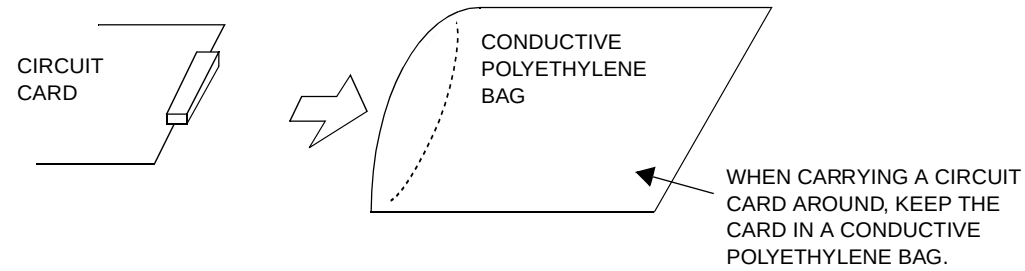


Figure 2-1 Static Electricity Guard (2 of 2)

- WHEN MAKING A SWITCH SETTING ON A CIRCUIT CARD



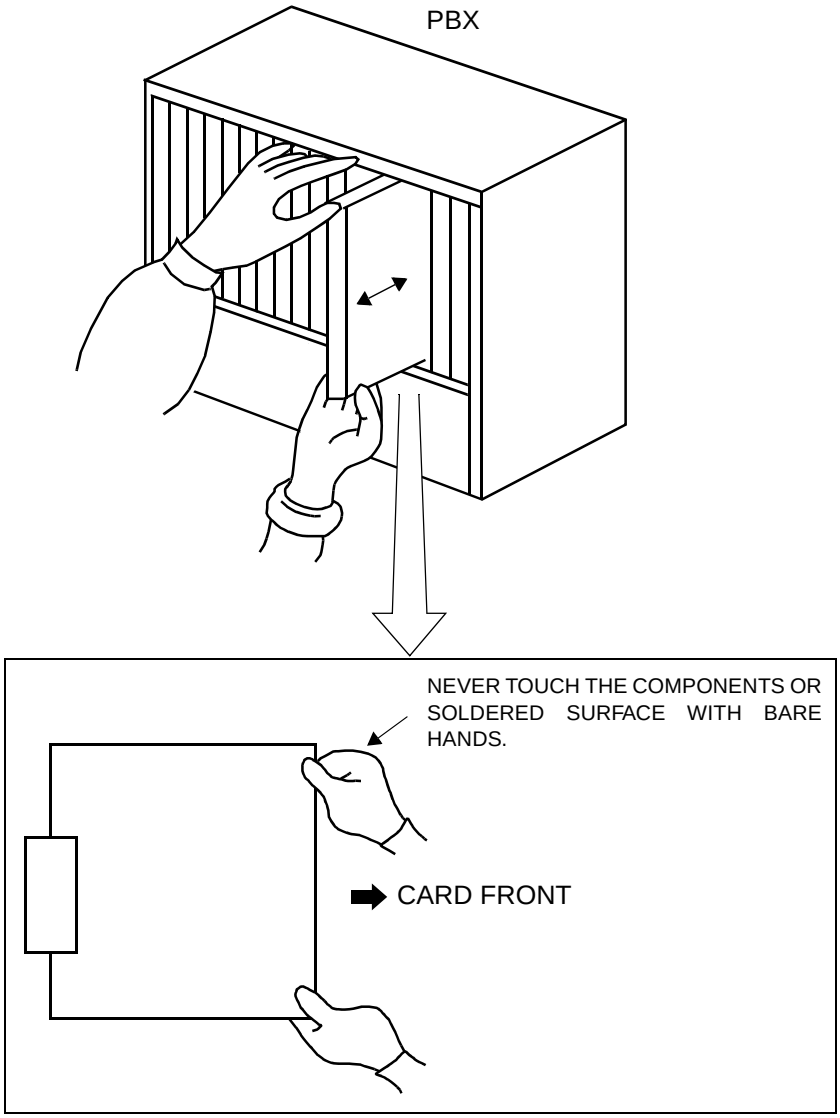
- WHEN CARRYING A CIRCUIT CARD



The mark shown below is attached to the sheet for the work in which circuit cards are handled. When engaging in such work, the installer must be careful not to cause damage by static electricity.

Caution

You must hold the edge of a circuit card when plugging or unplugging the circuit card. If you touch another area, you may be exposed to hazardous voltages.



REQUIRED EQUIPMENT

Table 2-1 shows the equipment required to provide the Data Interface on the system.

Table 2-1 Required Equipment

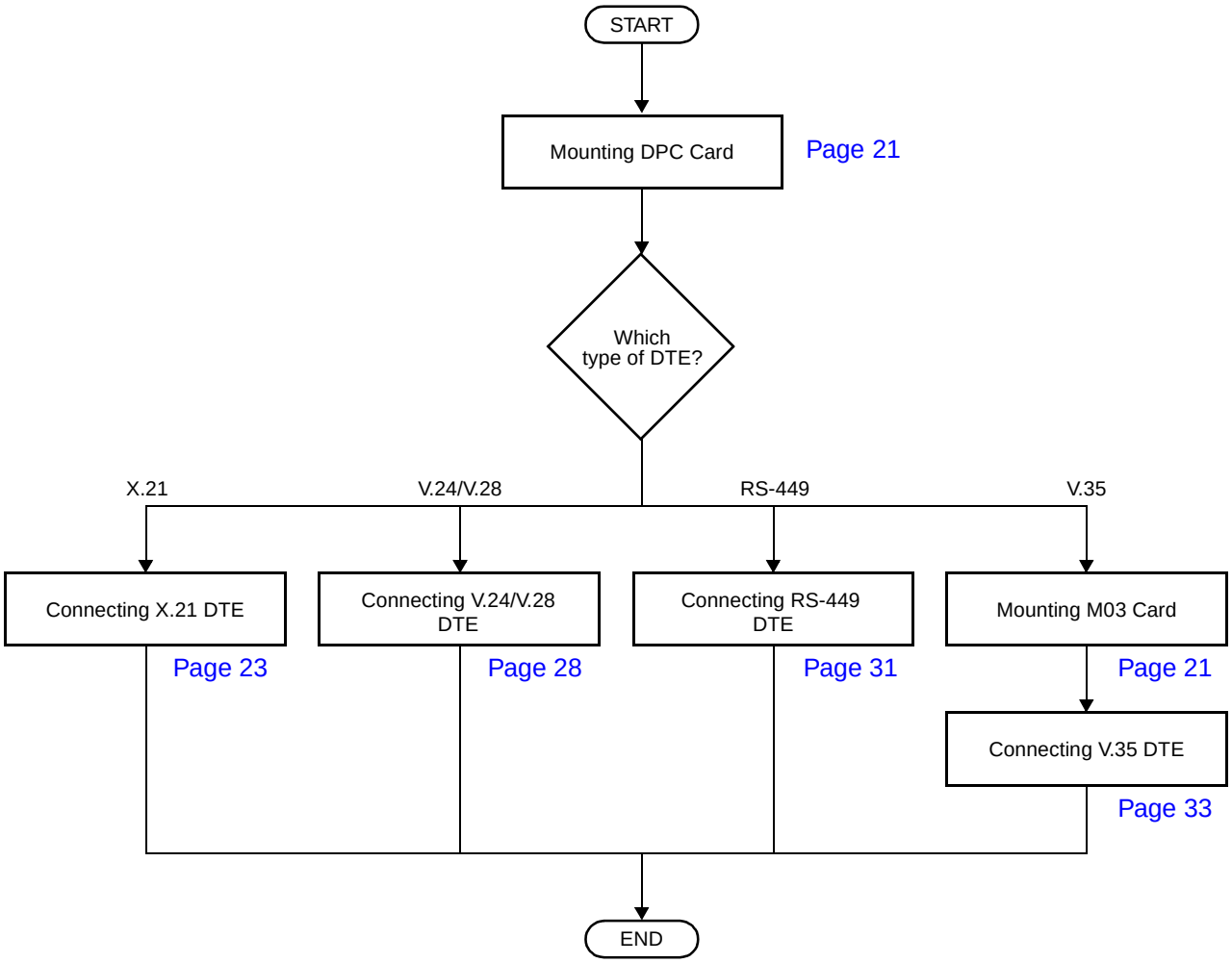
EQUIPMENT/CABLE	DESCRIPTION	QTY	REMARKS
• PN-2DPCB	Data Port Controller Card	1-50	
• PN-24DTA-C	24 channel DTI Card	1-8	For Inter-office
• PN-30DTC-A	30 channel DTI Card	1-4	For Inter-office
• PN-M03	V.35 DTE Interface Card	1-50	
• PZ-M542/M557	Coaxial Cable Connection Card	1-4	2 cards/PIM 1 card/DTI
• DPC V11 CABLE	Connection Cable between PN-2DPCB and V.11 (X.21) DTE	N	N: Number of V.11 (X.21) DTE 4 m (13.1 ft.)
• 17-TW-0.3 CONN CABLE-A	Connection Cable between PN-2DPCB and PN-M03	N	N: Number of V.35 DTE 0.3 m (1 ft.)
• DPC V35 CABLE	Connection Cable between PN-M03 and V.35 DTE	N	N: Number of V.35 DTE 4 m (13.1 ft.)
• DPC RS CABLE	Connection Cable between PN-2DPCB and V.24/V.28 DTE	N	N: Number of V.24/V.28 DTE 4 m (13.1 ft.)
• MODEM	Refer to "Modem Specifications". Page 12	2 × N	N: Number of DTE (As required) (Should be provided by customer.)
• Straight Cable	Connection Cable between DPC V11 CABLE/DPC RS CABLE and DTE	N	N: Number of DTE (When connecting DTE directly) (Should be provided by customer.)
• Reverse Cable	Connection Cable between DPC V11 CABLE/DPC RS CABLE and Modem	N	N: Number of DTE (When using modem) (Should be provided by customer.)

INSTALLATION PROCEDURE FOR DATA INTERFACE

Installation Summary for Data Interface

Install the equipment according to the procedure shown in Figure 2-2.

Figure 2-2 Installation Procedure for Data Interface



Mounting DPC Card

(1) Confirm the correct switch settings of the DPC card.
See CHAPTER 5. Page 63.

(2) Mount the DPC cards in LT00 through LT11 slots of PIM0 through PIM7.

Mounting M03 Card

(1) Confirm the correct switch settings of the M03 card.
See CHAPTER 5. Page 63.

(2) Mount the M03 cards in LT00 through LT11 slots of PIM0 through PIM7.

Conditions on Connecting DTE

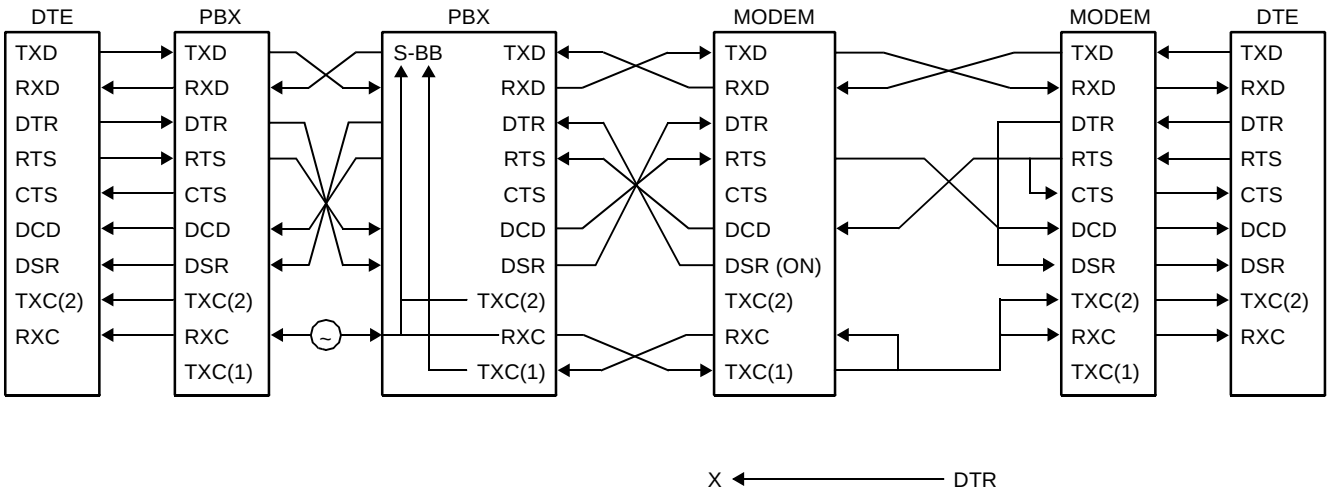
Forcible ON control of DTR, RTS/C signal:
When connecting the DTE which does not support the DTR signal and RTS/C signal, these signals can be turned to ON forcibly by switch setting on the DPC card.

Condition of CTS signal ON control:
The CTS signal is turned to ON after 60 ms from the time when receiving the RTS/C signal. And the CTS signal is turned to ON under the following conditions.

1. The DTR signal is ON.
2. The received X signal is ON (The synchronization of the opposite office is established).
3. The sending X signal is ON (The synchronization of the PBX is established).

Limitation on using modem:
When using modem, the DTR signal from the DTE can not be transmitted to the PBX (DPC card). Therefore, the DTE starting by the DTR signal can not be used.

Figure 2-3 Limitation on Using Modem

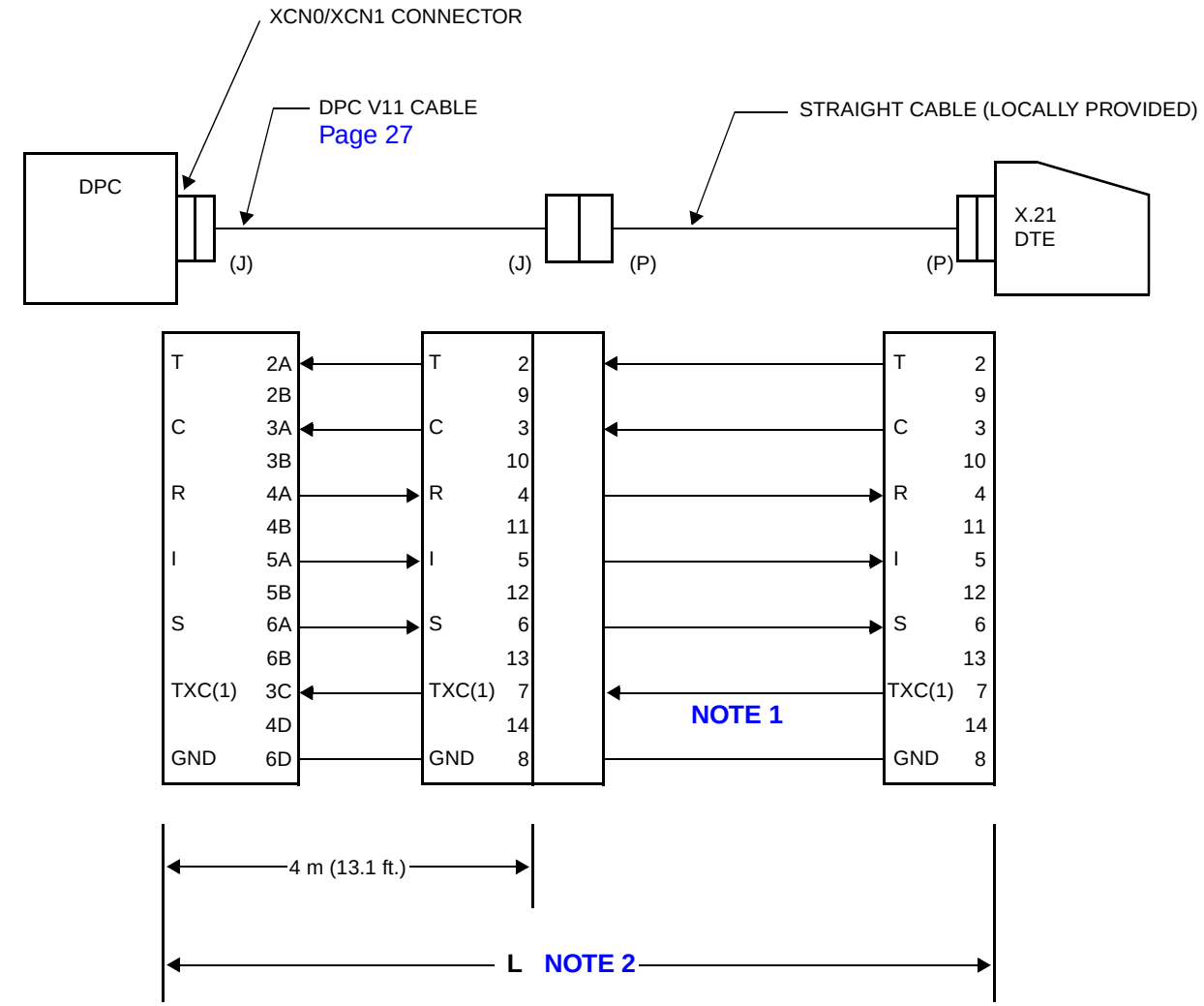


Connecting X.21 DTE

Connect the X.21 DTE/modem to the DPC card as shown in Figure 2-4.

Figure 2-4 Cable Connection between DPC Card and X.21 DTE/Modem

(1) Direct Connection



(Continued)

NOTE 1: When providing X.21 DTE with TXC(1) signal, this connection is required.

NOTE 2: The distance between the DPC card and X.21 DTE is as follows.

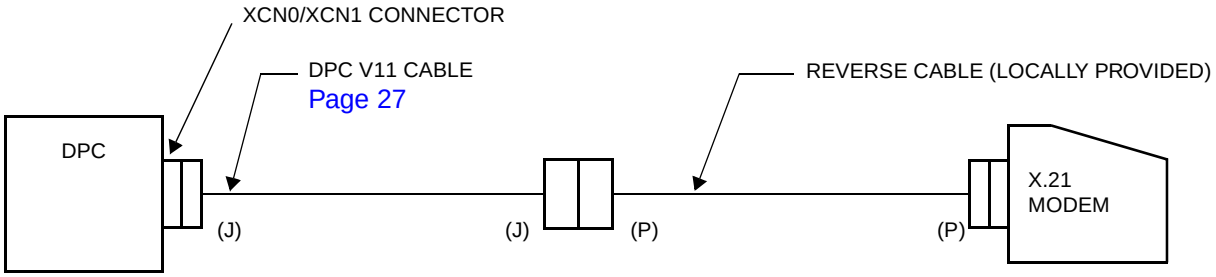
When providing X.21 DTE with TXC(1) signal: L=Max. 1000 m (3281 ft.)
When providing X.21 DTE without TXC(1) signal, the distance depends on the data speed.

Distance (L)	Data Speed
Max. 1000 m (3281 ft.)	Less than 9.6 kbps
Max. 800 m (2625 ft.)	19.2 kbps
Max. 350 m (1148 ft.)	48 kbps
Max. 300 m (984 ft.)	56 kbps
Max. 250 m (820 ft.)	64 kbps

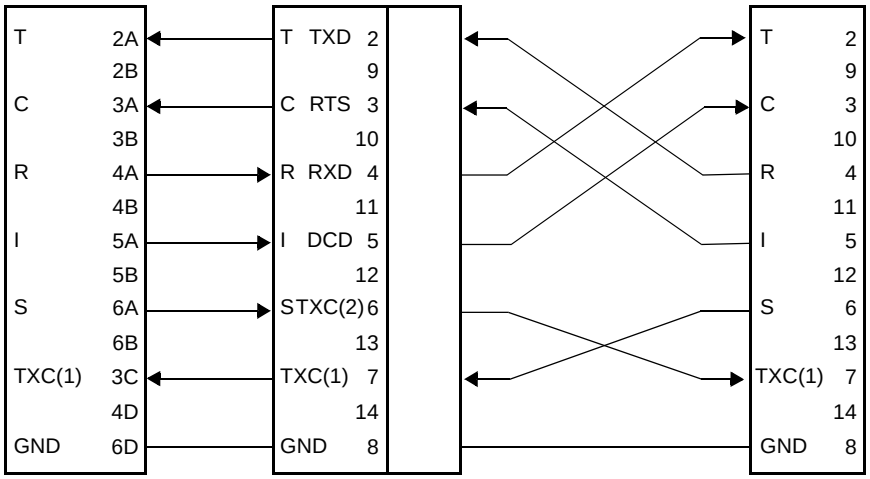
(Continued)

Figure 2-5 Cable Connection between DPC Card and X.21 DTE/Modem

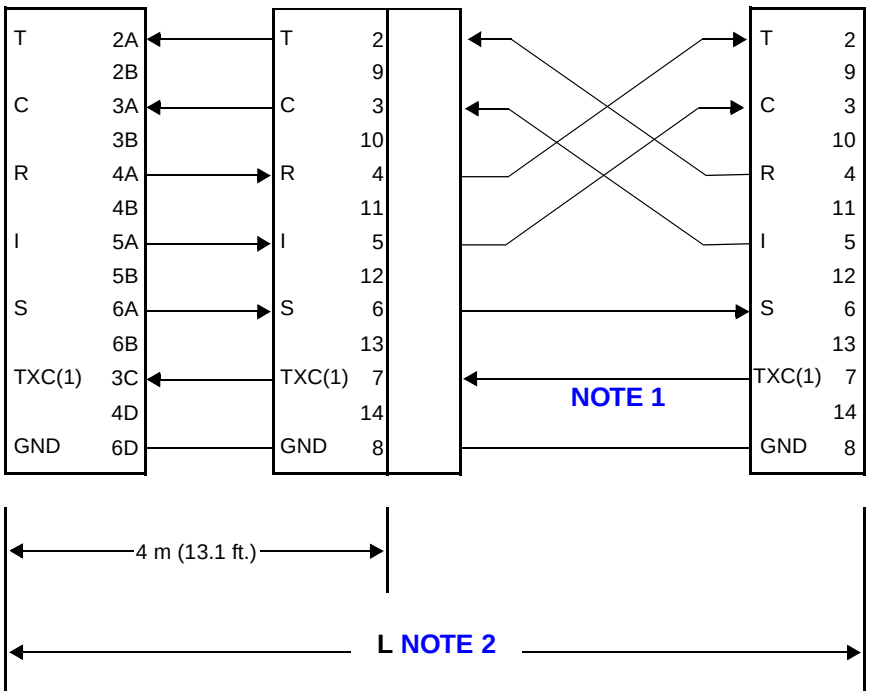
(2) Modem Connection



When using a modem that can provide TXC(1) signal



When using a modem that has not TXC(1) terminal



(Continued)

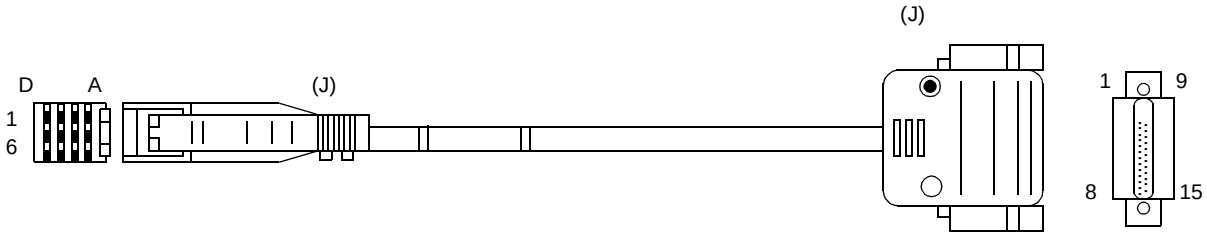
NOTE 1: When providing X.21 modem with TXC(1) signal, this connection is required.

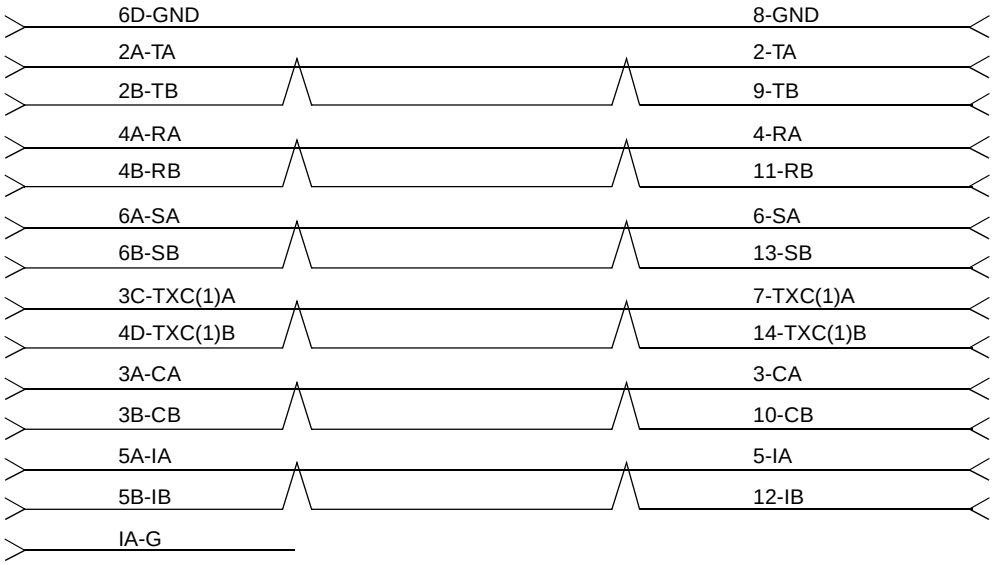
NOTE 2: The distance between the DPC card and X.21 modem is as follows.

When providing X.21 modem with TXC(1) signal: L=Max. 1000 m (3281 ft.)
When providing X.21 modem without TXC(1) signal, the distance depends on the data speed.

Distance (L)	Data Speed
Max. 1000 m (3281 ft.)	Less than 9.6 kbps
Max. 800 m (2625 ft.)	19.2 kbps
Max. 350 m (1148 ft.)	48 kbps
Max. 300 m (984 ft.)	56 kbps
Max. 250 m (820 ft.)	64 kbps

Figure 2-6 DPC V11 Cable





	D	C	B	A
6	GND		SB	SA
5		X	IB	IA
4	TXC(1)		RB	RA
3		TXC(1)	CB	CA
2	X		TB	TA
1		X		G

X: NOT CONNECTED
G: GROUND

8	GND
7	TXC(1)A
6	SA
5	IA
4	RA
3	CA
2	TA
1	X

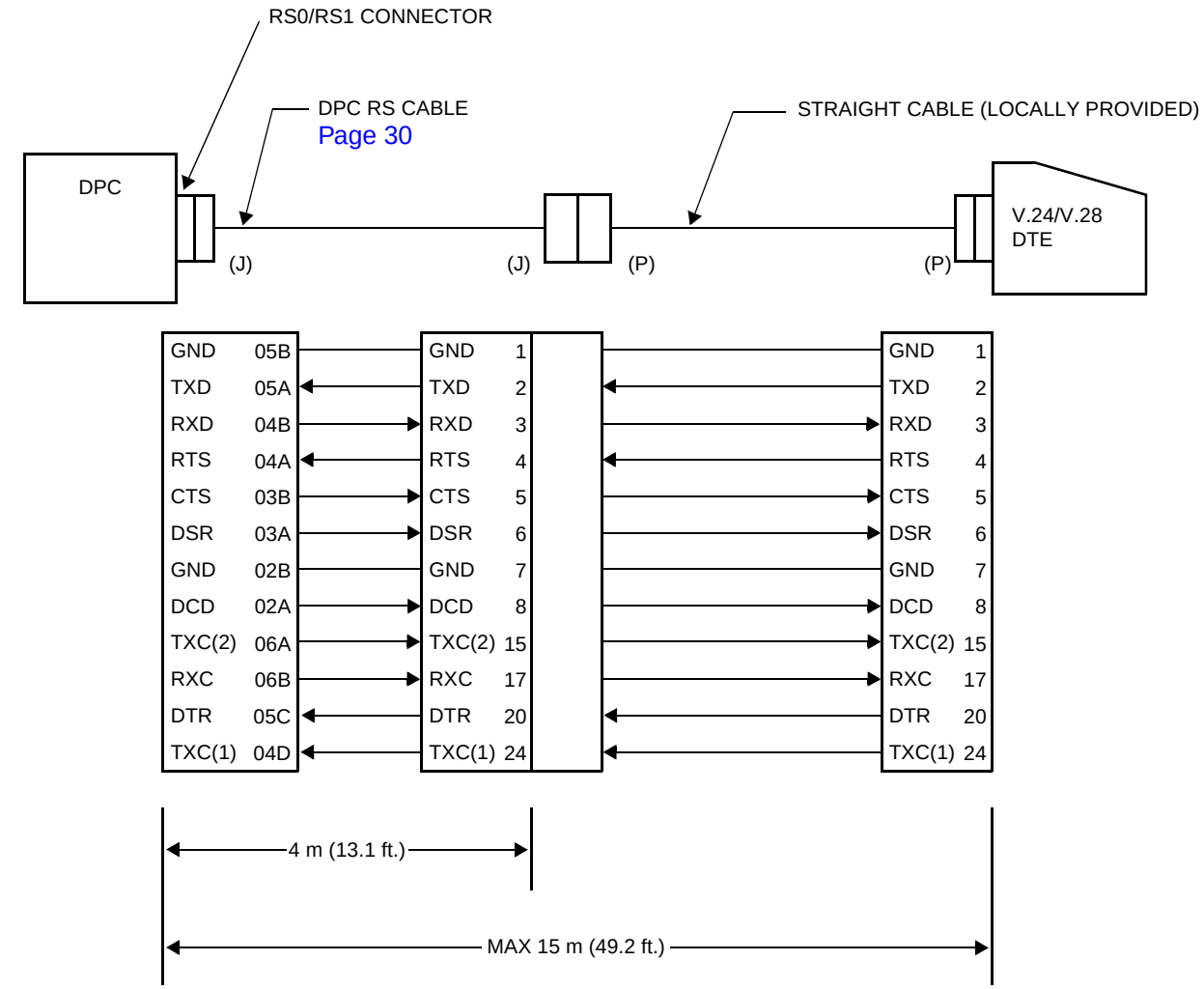
15	X
14	TXC(1)B
13	SB
12	IB
11	RB
10	CB
9	TB

Connecting V.24/V.28 DTE

Connect the V.24/V.28 DTE/modem to the DPC card as shown in Figure 2-7.

Figure 2-7 Cable Connection between DPC Card and V.24/V.28 DTE/Modem

(1) Direct Connection



(Continued)

Figure 2-8 Cable Connection between DPC Card and V.24/V.28 DTE/Modem

(2) Modem Connection

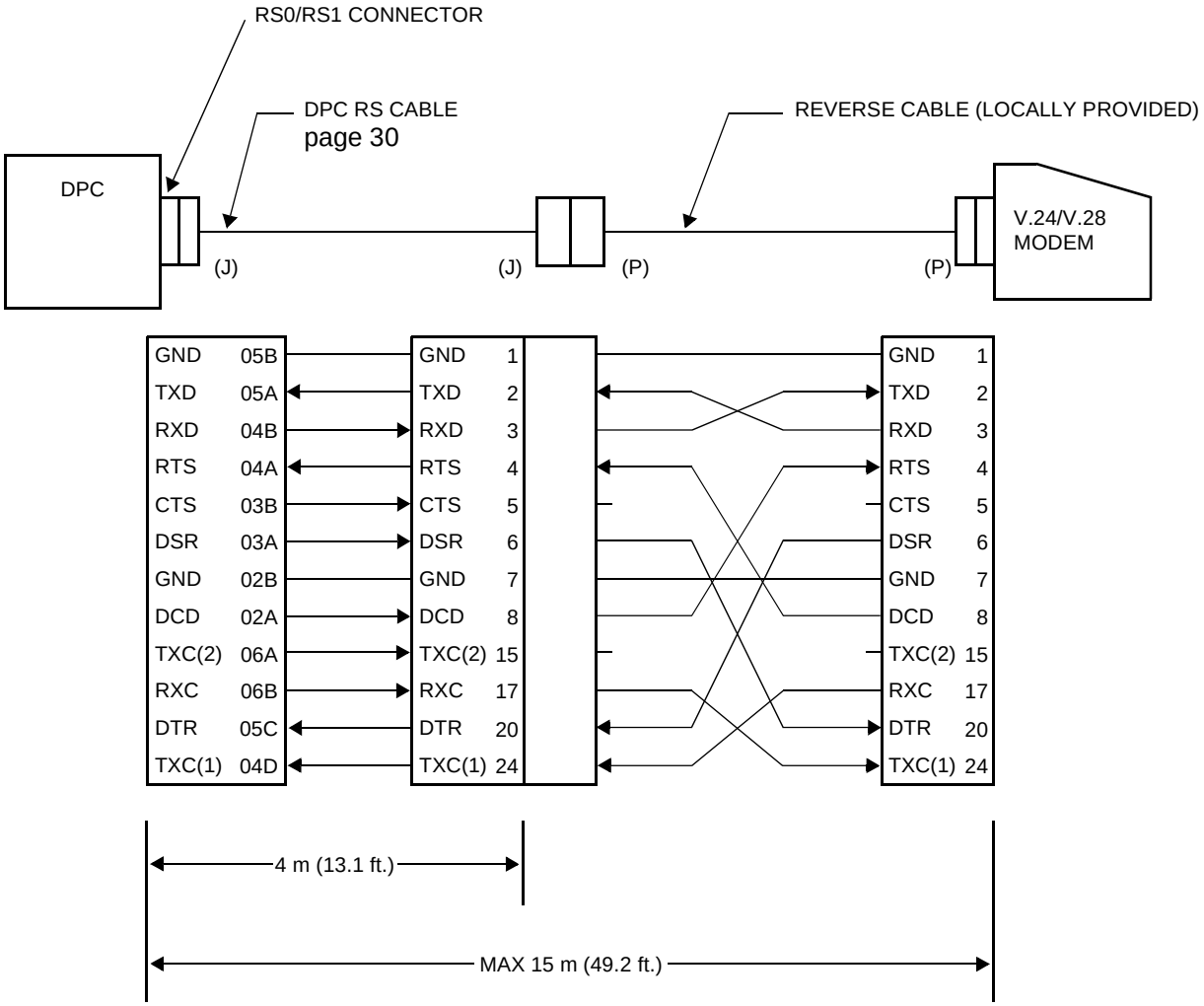
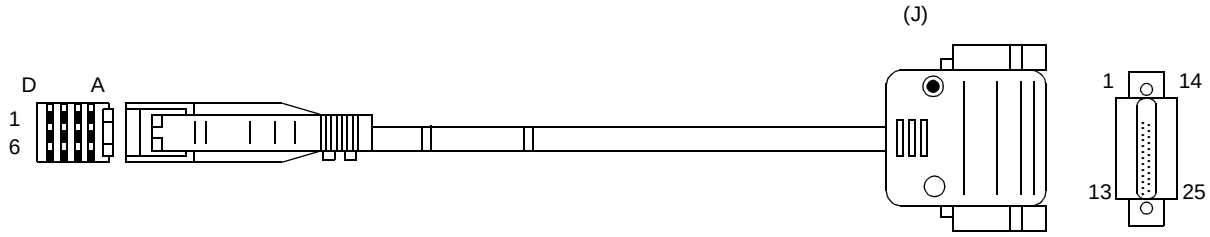
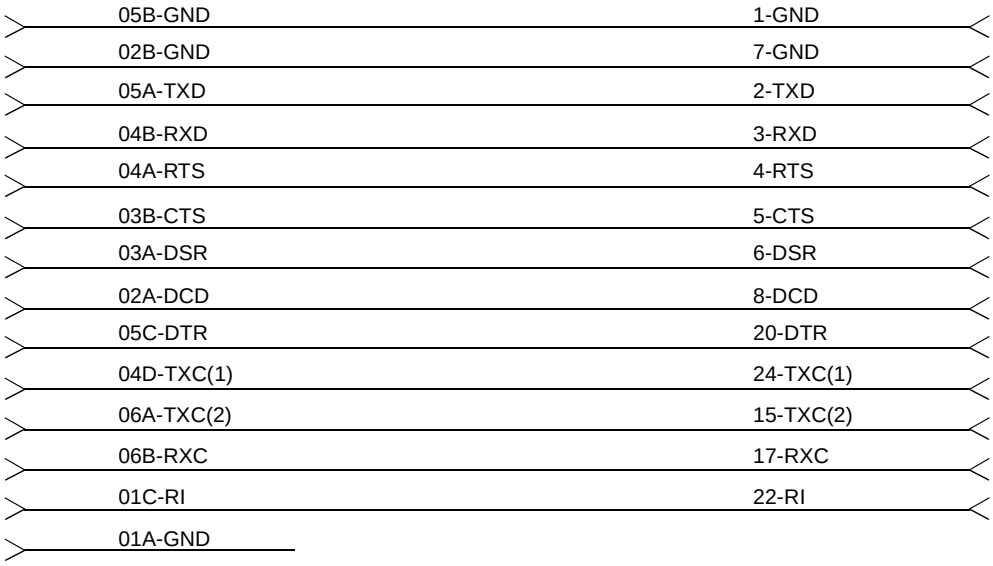


Figure 2-9 DPC RS Cable





	D	C	B	A
06	X		RXC	TXC(2)
05		DTR	GND	TXD
04	TXC(1)		RXD	RTS
03		X	CTS	DSR
02	X		GND	DCD
01		RI		G

X: NOT CONNECTED
G: GROUND

13	X
12	X
11	X
10	X
9	X
8	DCD
7	GND
6	DSR
5	CTS
4	RTS
3	RXD
2	TXD
1	GND

25	X
24	TXC(1)
23	X
22	RI
21	X
20	DTR
19	X
18	X
17	RXC
16	X
15	TXC(2)
14	X

Connecting RS-449 DTE

RS-449 DTE requires a locally provided conversion cable, as shown in Figure 2-10. This cable must be equipped with a 15-pin male D-type connector and a 37-pin D-type connector (male or female as required by DTE.) A modification is required to be installed in the 37-pin connector, as shown in the Table 2-2, Figure 2-11 and Figure 2-12.

Figure 2-10 Cable Connection between DPC Card and RS-449 DTE

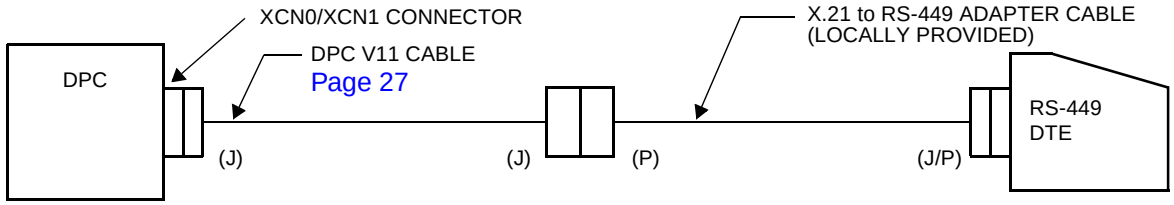
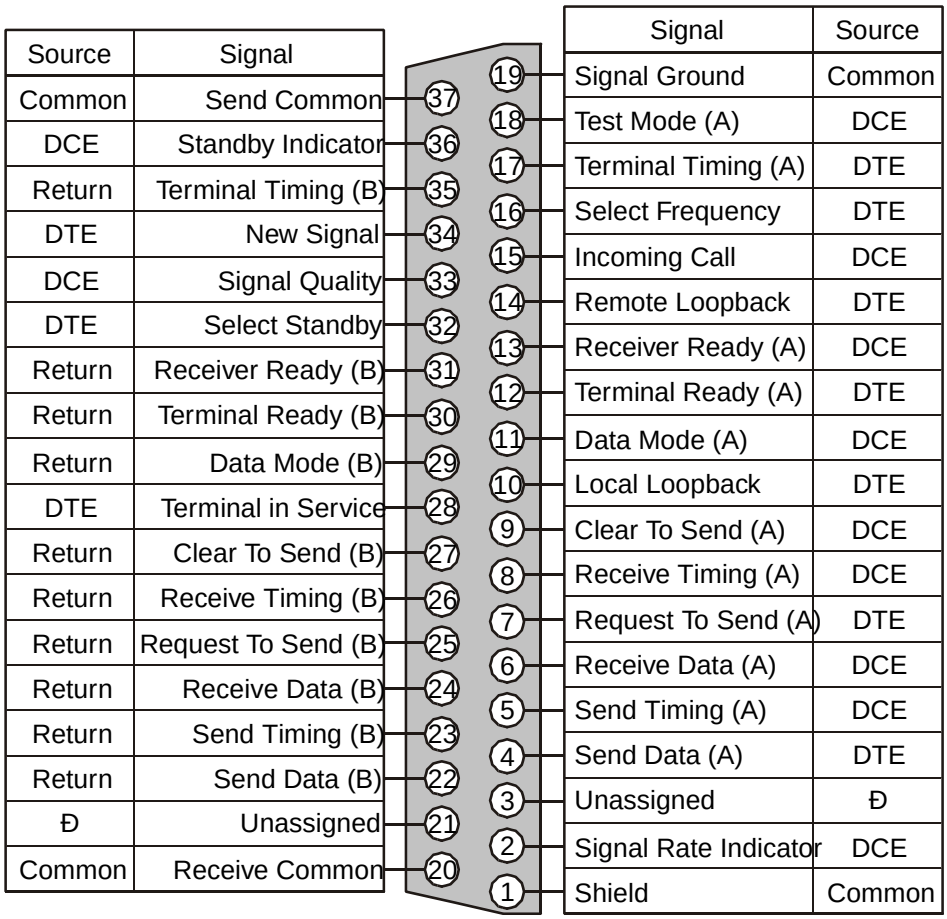


Table 2-2 X.21 to RS-449 Adapter Cable Connections

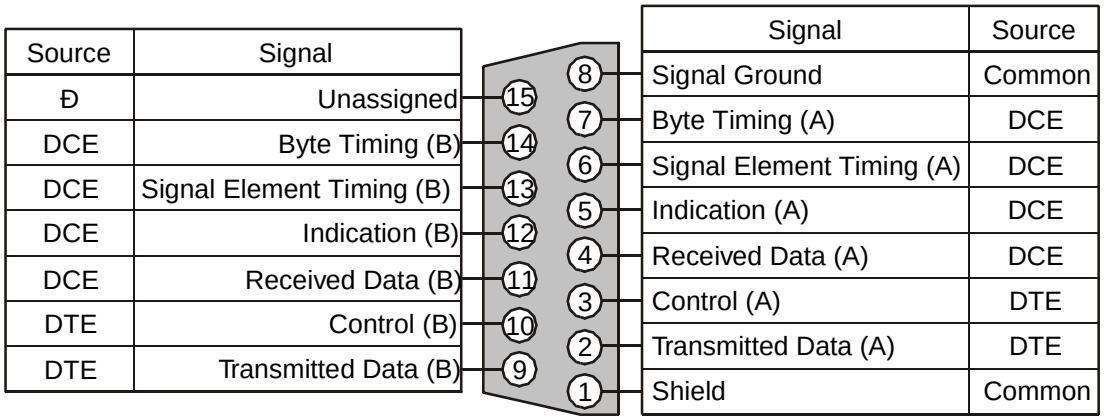
DPC (DCE) X.21, 15-pin Male D-type				DTE RS-449, 37-pin D-type		
Name	**Function**	**Pin**	⟷	**Pin**	**Name**	**Source**
TA	Transmit data A	2		4	TXD +	DTE
TB	Transmit data B	9		22	TXD –	DTE
RA	Receive data A	4		6	RXD +	DCE
RB	Receive data B	11		24	RXD –	DCE
SA	Clock A	6		5	SCT +	DCE
				8	SCR +	DCE
SB	Clock B	13		23	SCT –	DCE
				26	SCR –	DCE
CA	Control A	3		7	RTS +	DTE
CB	Control B	10		25	RTS –	DTE
IA	Indicate A	5		13	DCD +	DCE
				11	DSR +	DCE
				9	CTS +	DCE
IB	Indicate B	12		31	DCD –	DCE
				29	DSR –	DCE
				27	CTS –	DCE
SG	Signal ground (zero volts)	8		19	Signal ground	Common
				20	RCV common	Common
				37	SND common	Common

Figure 2-11 RS-449 Connector Pin Assignments



Source	Signal			Signal	Source
Common	Send Common	37	19	Signal Ground	Common
DCE	Standby Indicator	36	18	Test Mode (A)	DCE
Return	Terminal Timing (B)	35	17	Terminal Timing (A)	DTE
DTE	New Signal	34	16	Select Frequency	DTE
DCE	Signal Quality	33	15	Incoming Call	DCE
DTE	Select Standby	32	14	Remote Loopback	DTE
Return	Receiver Ready (B)	31	13	Receiver Ready (A)	DCE
Return	Terminal Ready (B)	30	12	Terminal Ready (A)	DTE
Return	Data Mode (B)	29	11	Data Mode (A)	DCE
DTE	Terminal in Service	28	10	Local Loopback	DTE
Return	Clear To Send (B)	27	9	Clear To Send (A)	DCE
Return	Receive Timing (B)	26	8	Receive Timing (A)	DCE
Return	Request To Send (B)	25	7	Request To Send (A)	DTE
Return	Receive Data (B)	24	6	Receive Data (A)	DCE
Return	Send Timing (B)	23	5	Send Timing (A)	DCE
Return	Send Data (B)	22	4	Send Data (A)	DTE
Ð	Unassigned	21	3	Unassigned	Ð
Common	Receive Common	20	2	Signal Rate Indicator	DCE
			1	Shield	Common

Figure 2-12 X.21 Connector Pin Assignments



Source	Signal			Signal	Source
Ð	Unassigned	15	8	Signal Ground	Common
DCE	Byte Timing (B)	14	7	Byte Timing (A)	DCE
DCE	Signal Element Timing (B)	13	6	Signal Element Timing (A)	DCE
DCE	Indication (B)	12	5	Indication (A)	DCE
DCE	Received Data (B)	11	4	Received Data (A)	DCE
DTE	Control (B)	10	3	Control (A)	DTE
DTE	Transmitted Data (B)	9	2	Transmitted Data (A)	DTE
			1	Shield	Common

Connecting V.35 DTE

(1) Connect the M03 card and the DPC card as shown in Figure 2-13.

(2) Connect the V.35 DTE/modem to the M03 card in the following pages.

Figure 2-13 Outline of V.35 Cable Connection

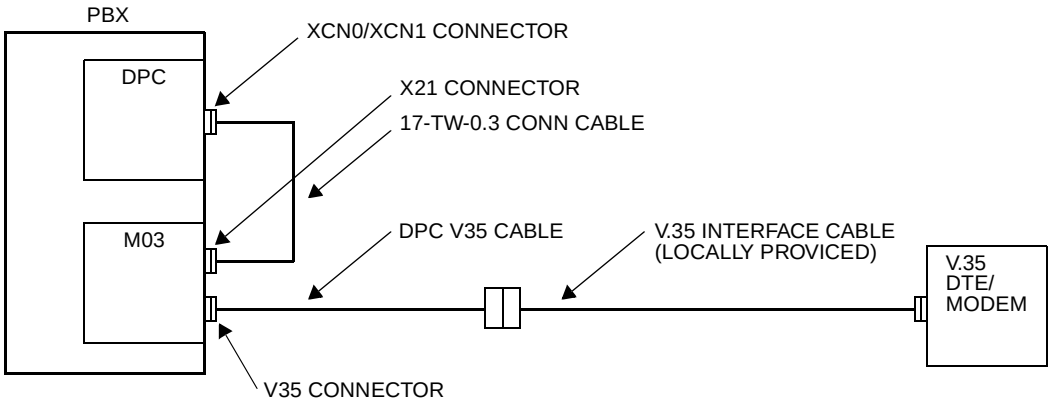
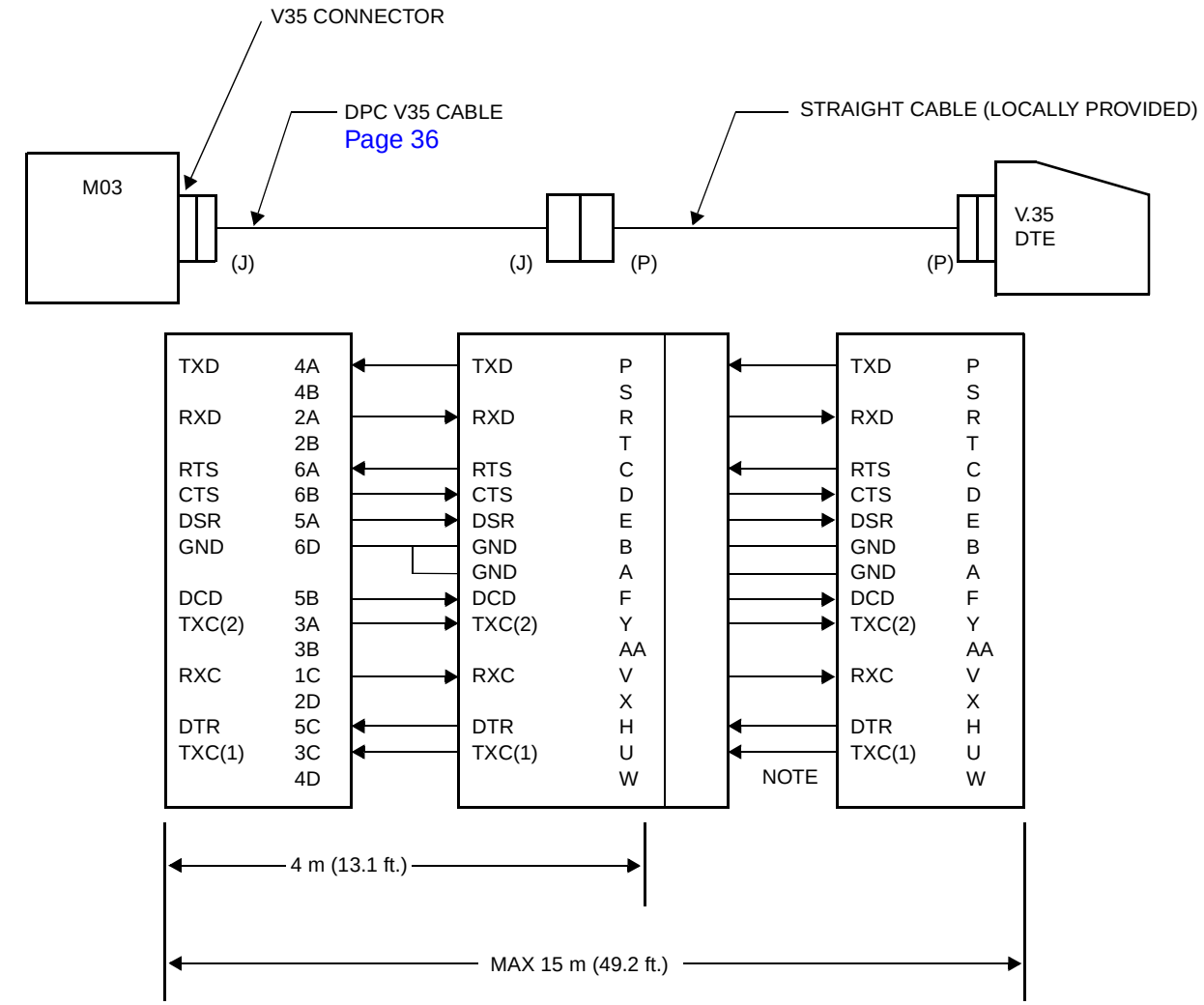


Figure 2-14 Cable Connection between M03 Card and V.35 DTE/Modem

(1) Direct Connection



NOTE: When you provide V.35 DTE using TXC(1) signal, this connection is required.

(Continued)

Figure 2-15 Cable Connection between M03 Card and V.35 DTE/Modem

(2) Modem Connection

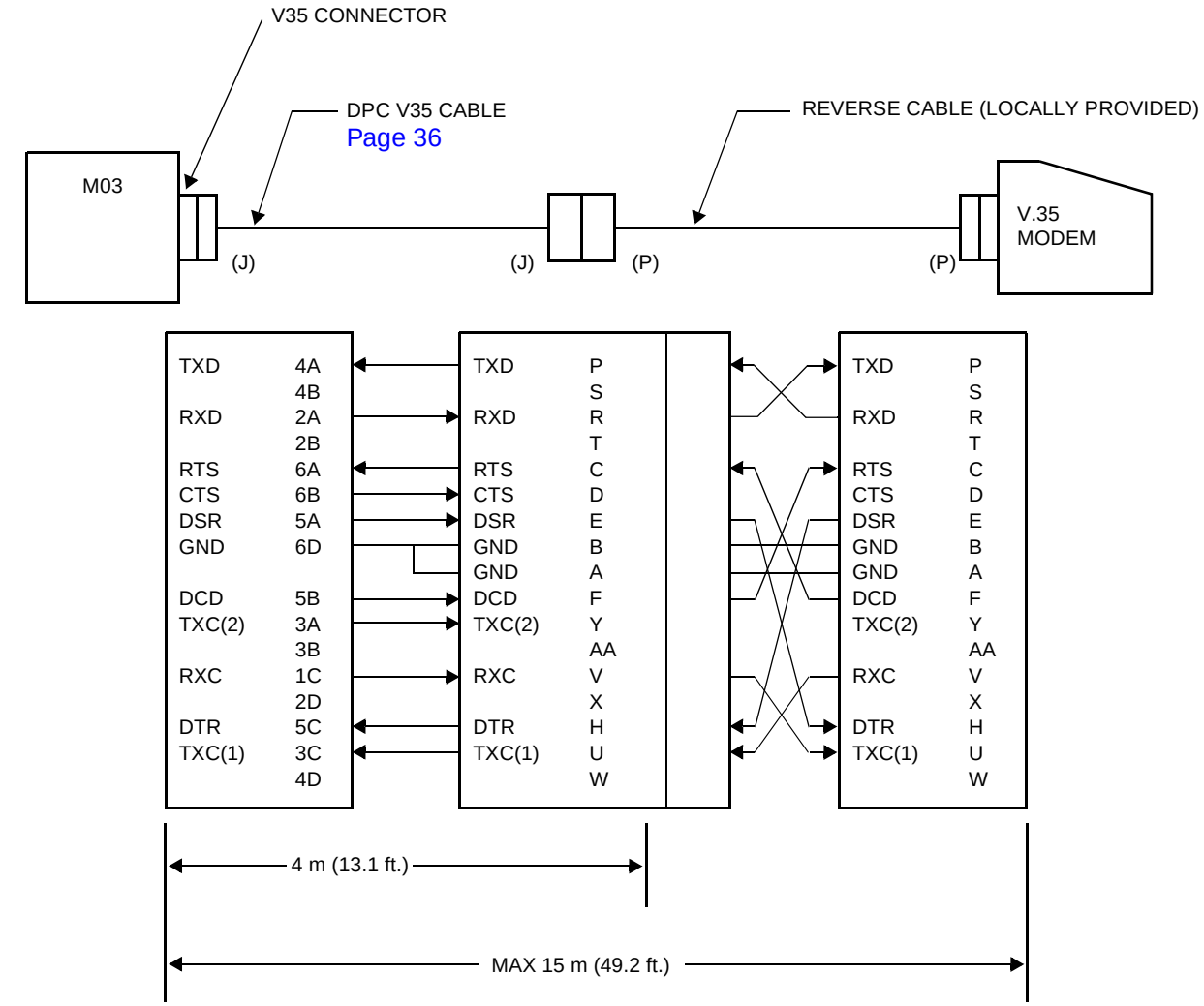
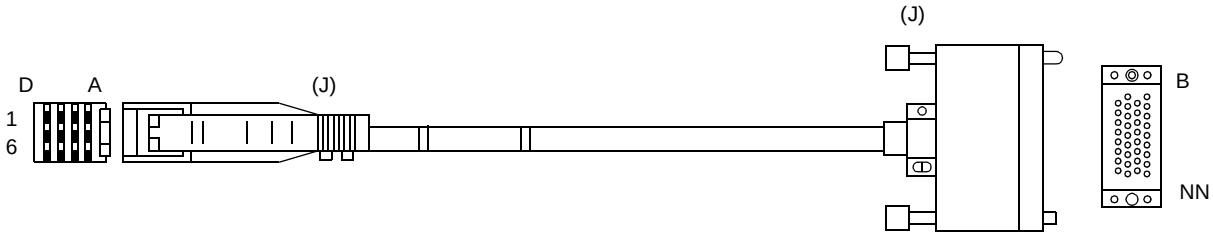
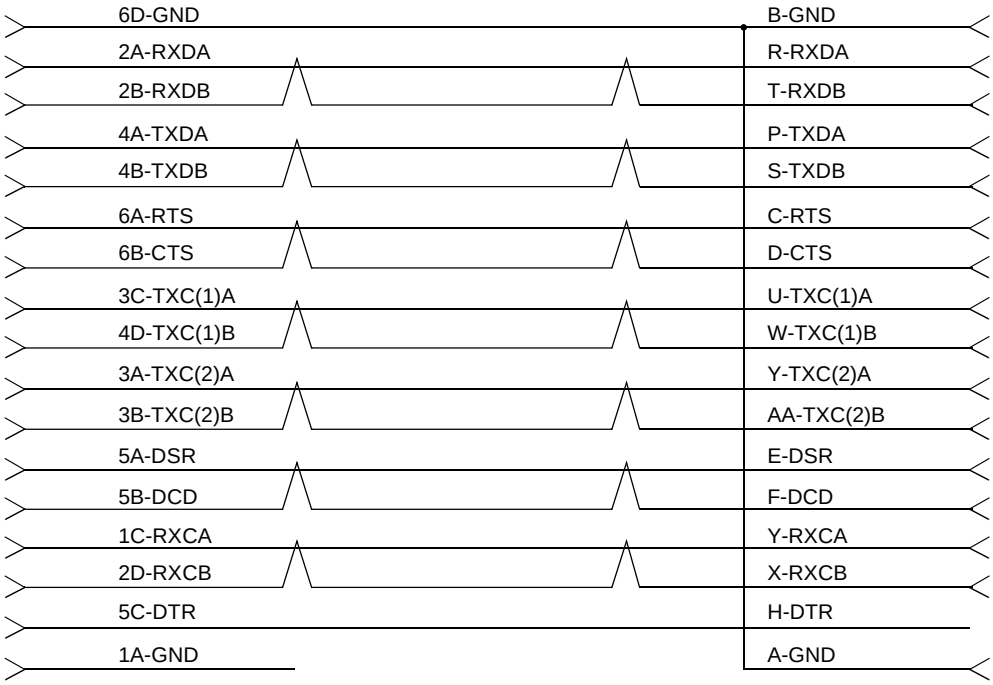


Figure 2-16 DPC V35 Cable





	D	C	B	A
6	GND		CTS	RTS
5		DTR	DCD	DSR
4	TXC(1)B		TXDB	TXDA
3		TXC(1)A	TXC(2)B	TXC(2)A
2	RXCB		RXDB	RXDA
1		RXCA		G

B	GND
F	DCD
L	X
R	RXDA
V	RXCA
Z	X
DD	X
JJ	X
NN	X

D	CTS
J	X
N	X
T	RXDB
X	RXCB
BB	X
FF	X
LL	X

A	GND
E	DSR
K	X
P	TXDA
U	TXC(1)A
Y	TXC(2)A
CC	X
HH	X
MM	X

C	RTS
H	DTR
M	X
S	TXDB
W	TXC(1)B
AA	TXC(2)B
EE	X
KK	X

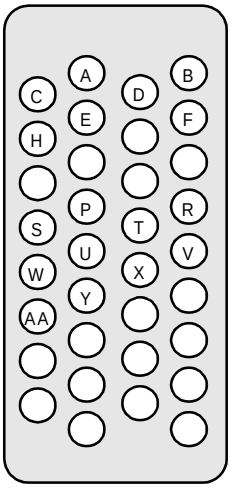
X: NOT CONNECTED
G: GROUND

Table 2-3 V.35 Interface Cable Connector Pin Assignments

Pin	Name	Function	Specification	Source
A	GND	Frame Ground	—	—
B	GND	Signal Ground	—	—
C	RTS	Request To Send	RS-232	DTE
D	CTS	Clear To Send	RS-232	DCE
E	DSR	Data Set Ready	RS-232	DCE
F	RLSD	Received Line Signal Detector	RS-232	DCE
H	DTR	Data Terminal Ready	RS-232	DTE
P S	TXD	Send Data	V.35	DTE
R T	RXD	Receive Data	V.35	DCE
U W	SCTE	Serial Clock Transmit External (A) Serial Clock Transmit External (B)	V.35	DTE
V X	SCR	Serial Clock Receive (A) Serial Clock Receive (B)	V.35	DCE
Y AA (or aa)	SCT	Serial Clock Transmit (A) Serial Clock Transmit (B)	V.35	DCE
L, M, N, Z, BB, CC, DD, EE, HH, JJ, KK, LL, MM, NN		Reserved for future V.35 use		

Figure 2-17 V.35 Connector Pin Assignment

Signal	Pin
Chassis Ground	A
Request To Send	C
Data Set Ready	E
Data Terminal Ready	H
Transmitted Data	P
Transmitted Data	S
Transmit Timing	U
Transmit Timing	W
Transmit Timing	Y
Transmit Timing	AA



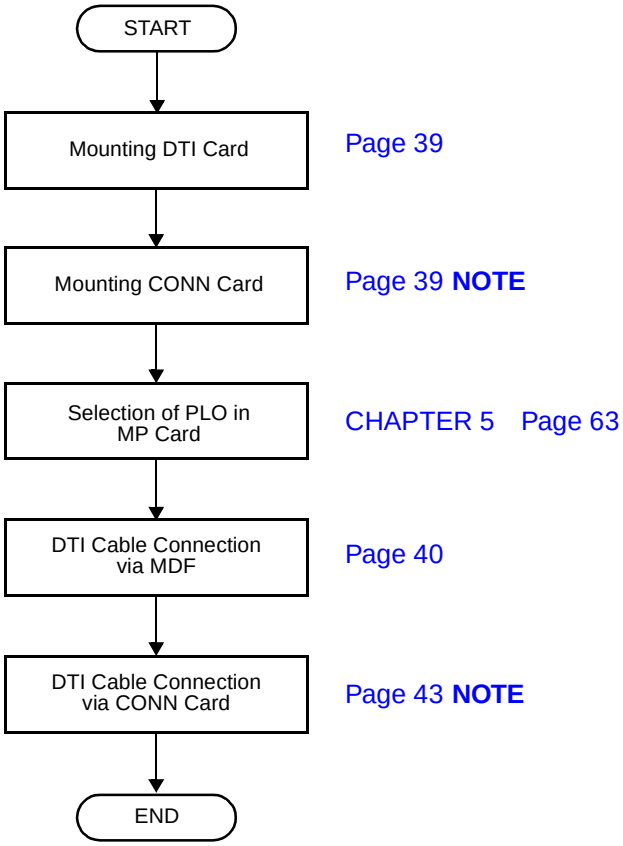
Pin	Signal
B	Signal Ground
D	Clear To Send
F	Receive Line Signal Detect
R	Received Data
T	Received Data
V	Receive Timing
X	Receive Timing

INSTALLATION PROCEDURE FOR DIGITAL TRUNK INTERFACE

Installation Summary for Digital Trunk Interface

Install the equipment according to the procedure shown in Figure 2-18.

Figure 2-18 Installation Procedure for DTI



NOTE: This procedure is required when you provide CONN card to connect a coaxial cable for 30DTI.

Mounting DTI Card

(1) Before mounting the DTI (PN-24DTA-C/PN-30DTC-A) card, set the MB switch to UP position, and set the other switches to appropriate position.
See CHAPTER 5. Page 63

(2) Mount the DTI card in the following AP slots on PIM0-PIM7.
PIM0: AP00-AP10 slots
PIM1-7: AP00-AP11 slots

After mounting the card, set the MB to DOWN position to put the card in service.

NOTE: The DTI card (DTI 0, DTI 1) which sends a clock signal to PLO of the MP card must be mounted in the AP slots on PIM0.

Mounting CONN Card

When you provide CONN (PZ-M542/M557) card to connect a coaxial cable for 30DTI, do the following installation.

(1) Confirm the correct switch settings of the CONN card.
See CHAPTER 5. Page 63

(2) Mount the CONN card on LTC connector on BWB in the PIM which accomodates the DTI cards.
For details, refer to the Installation Procedure Manual.

DTI Cable Connection via MDF

When you use a twisted-pair cable, connect the cable to a CSU via the MDF as shown below.

- Location of AP Slots and LTC Connectors for DTI - Page 41
- Example of MDF Cross Connection for DTI - Page 42

Figure 2-19 DTI Cable Connection via MDF

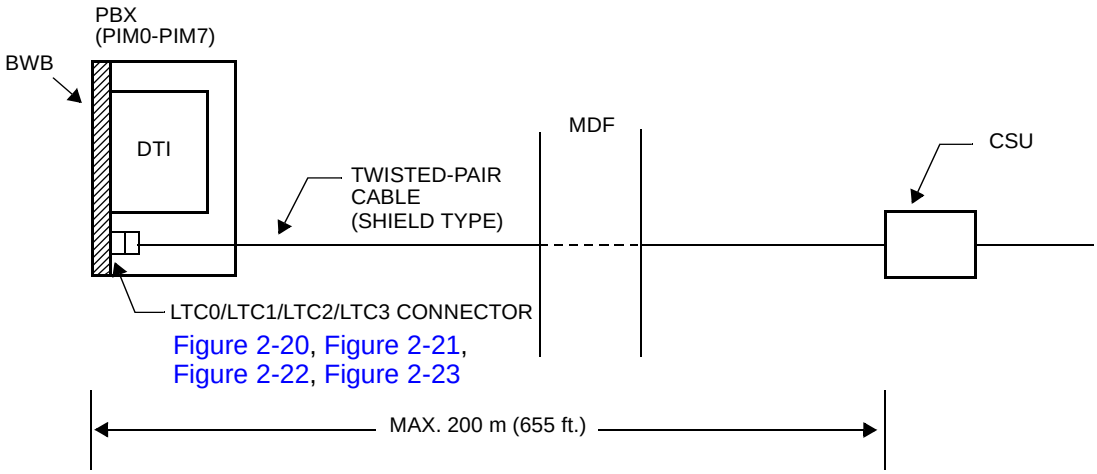


Figure 2-20 Location of the AP Slots and the LTC Connectors for DTI

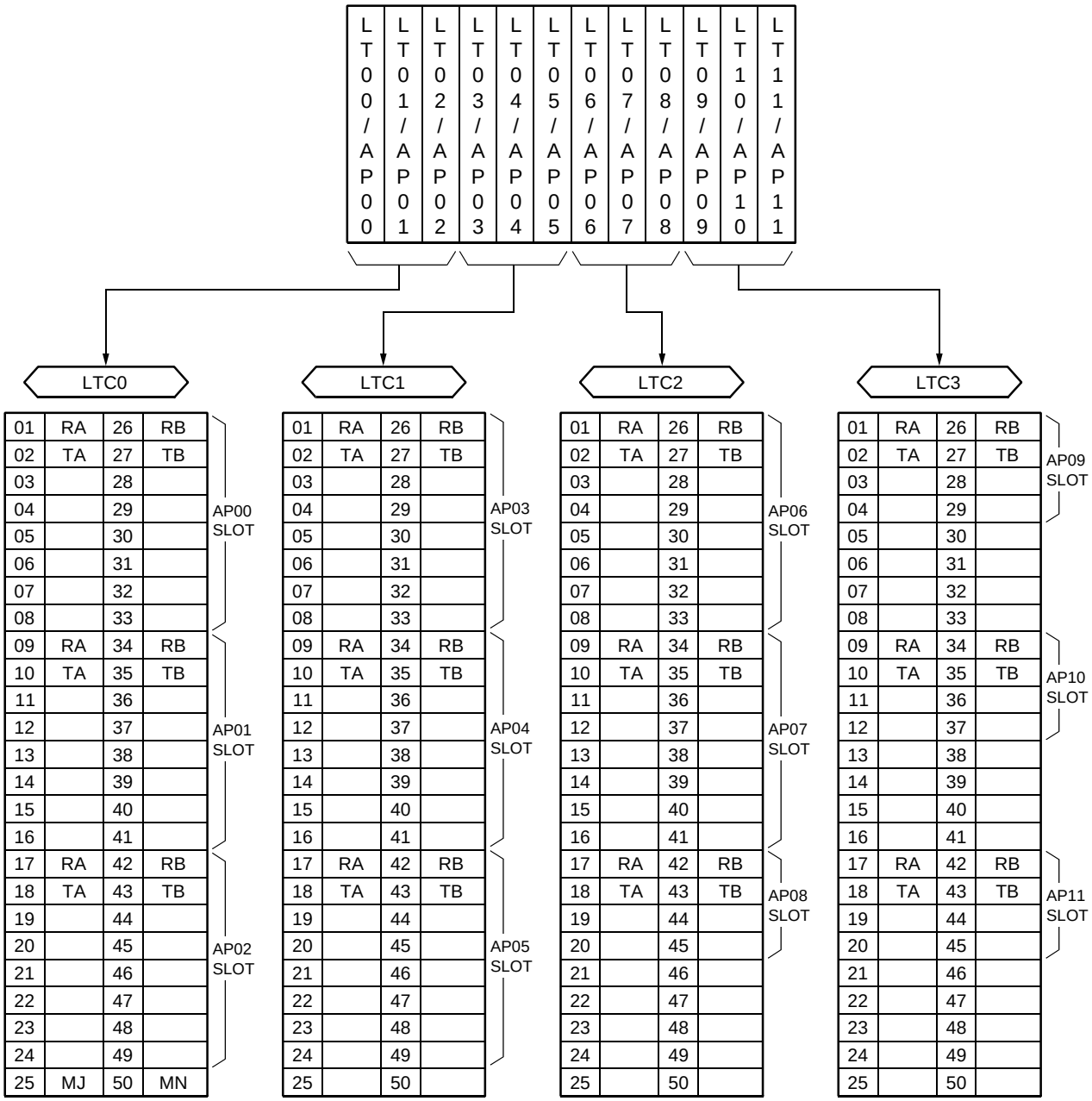
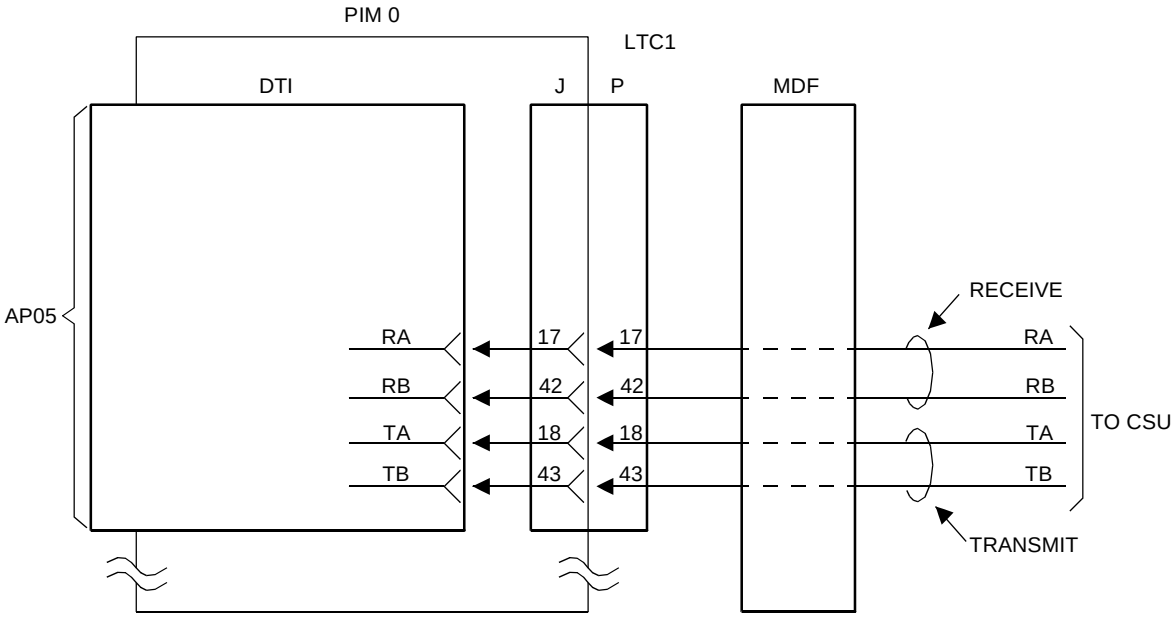
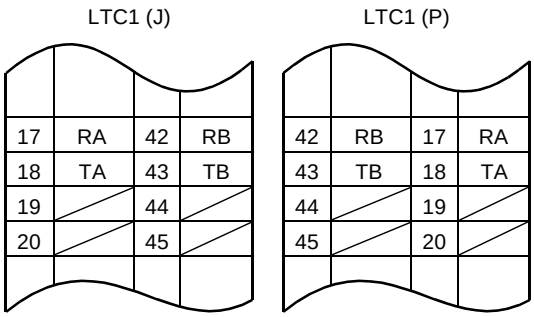


Figure 2-21 Example of MDF Cross Connection for DTI





DTI Cable Connection via CONN Card

When you use an coaxial cable, connect the cable to a CSU via the CONN (PZ-M542/M557) card as shown in Figure 2-22.

Figure 2-23 shows an example of the cable connection when the 30DTI card is mounted in the AP05 slot of PIM0.

Figure 2-22 DTI Cable Connection via CONN Card

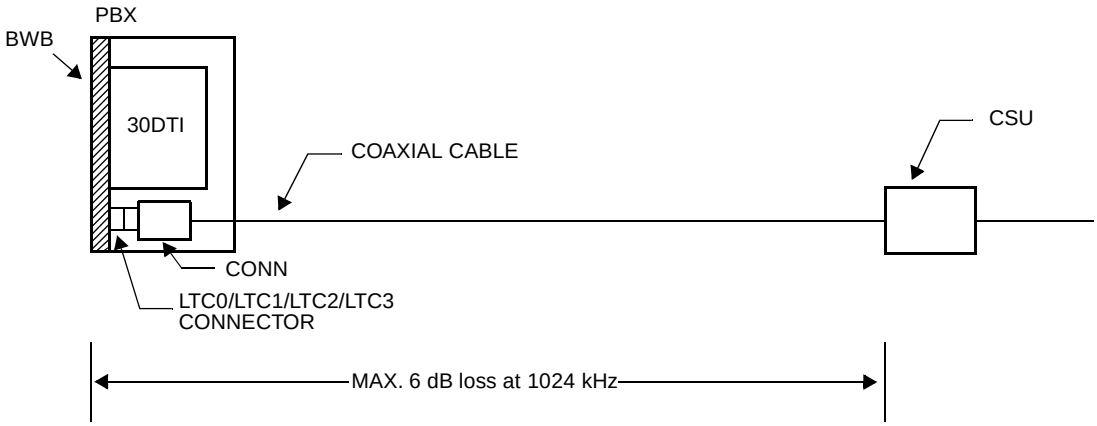
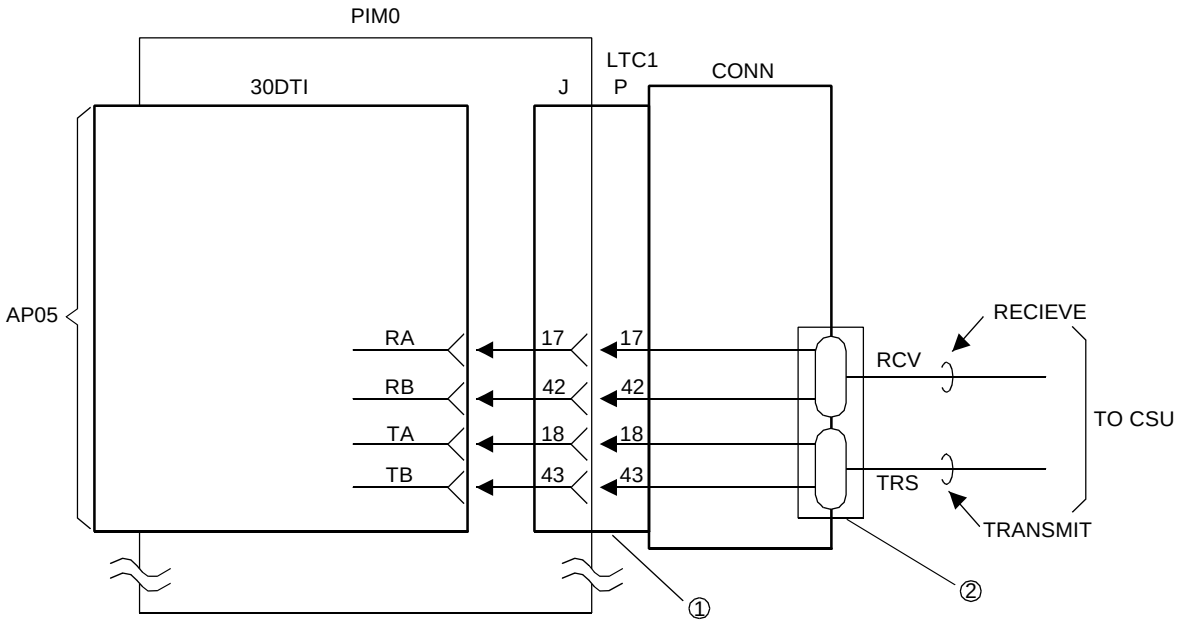


Figure 2-23 Example of Coaxial Cable Connection



① LTC1 CONNECTOR

LTC1 (J)

17	RA	42	RB
18	TA	43	TB
19		44	
20		45	

LTC1 (P)

42	RB	17	RA
43	TB	18	TA
44		19	
45		20	

② COAXIAL CONNECTOR

CHAPTER 3

SYSTEM DATA PROGRAMMING

This chapter explains the programming procedure to provide the Data Interface to the PBX.

HOW TO READ THIS CHAPTER

In the programming procedure, the meaning of (1), (2) and markings are as follows.

(1) : 1st Data

(2) : 2nd Data

◀ : Initial Data; With the system data clear command (CM00, CM01), the data with this marking is automatically set for each command.

(INITIAL) : A reset of the MP card is required after data setting.
Press SW1 switch on the MP card.

(DTI INITIAL) : A reset of the DTI card is required after data setting.
Set the Make Busy switch to UP and then DOWN.

DATA INTERFACE ASSIGNMENT

START	DESCRIPTION	DATA
CM10	To assign data station number by CM1A, assign a station number (dummy number) to each port (LEN) on the DPC card. **NOTE 1:** The station number must be assigned to the first LEN (level 0) and the third LEN (level 2) of each LT slot (The station number must be also assigned to the unused port on the DPC card). **NOTE 2:** The "*" and "#" can not be used as a station number.	(1) 000-763: LEN (2) FX-FXXXXXXXX: Station No. X: 0-9
CM1A	Assign a data station number to the station number assigned by CM10. (INITIAL) **NOTE:** The data station number must be also assigned to the unused port on the DPC card.	(1) X-XXXXXXXX: Station No. assigned by CM10 (2) X-XXXXXXXX: Data Station No.
CM20	Assign an access code for data station.	• Y=0-3 Numbering Plan Group 0-3 (1) X-XXXX: Access Code (2) 801: 1 digit station 802: 2 digits station 803: 3 digits station 804: 4 digits station 805: 5 digits station 806: 6 digits station 807: 7 digits station 808: 8 digits station
CMA0	Assign the type of data terminal interface to the data station number. (INITIAL) **NOTE:** This data must be also assigned to the unused port on the DPC card.	(1) X-XXXXXXXX: Data Station No. (2) 04: DPC
A		

A

CMA1

B

DESCRIPTION

Assign the attribute data for data station (assigned by CM1A) in accordance with the specification of the DTE connected.

DATA

- YY=04 Data speed

(1) X-XXXXXXXX: Data Station No.

(2) 00-05 : 1200 bps
06 : 600 bps
07 : 1200 bps
08 : 2400 bps
09 : 4800 bps
10 : 9600 bps
11 : 19.2 kbps
12 : 48 kbps
13 : 56 kbps
14 : 64 kbps
15 : 7200 bps
16 : 14.4 kbps
17-31◀ : 1200 bps

- YY=05 Parity Check

(1) X-XXXXXXXX: Data Station No.

(2) 0 : Effective
1◀ : Ineffective

- YY=06 Synchronous/Asynchronous

(1) X-XXXXXXXX: Data Station No.

(2) 0 : Synchronous
7◀ : Asynchronous

- YY=07 Transmission Mode

(1) X-XXXXXXXX: Data Station No.

(2) 0 : Half Duplex
1◀ : Full Duplex

B

CMA1

DESCRIPTION

DATA

- YY=08 Stop Bit

(1) X-XXXXXXXX: Data Station No.
(2) 0 : 2-Stop Bit
1◀ : 1-Stop Bit

YY=09 Type of Code

(1) X-XXXXXXXX: Data Station No.
(2) 00 : ASCII (7-bit) + even parity
01 : ASCII (7-bit) + odd parity
02 : ASCII (7-bit) + parity (0)
03 : ASCII (7-bit) + parity (1)
04 : JIS (7-bit) + even parity
05 : JIS (7-bit) + odd parity
06 : JIS (8-bit)
07 : EBCDIC (8-bit)
15◀ : Non character (Binary Data)

- YY=19 S Buffer

(1) X-XXXXXXXX: Data Station No.
(2) 0 : Effective
1◀ : Ineffective

CMA5

Provide the Nailed-Down Connection with the connecting patterns.

1ST AND 2ND DATA / CONNECTING PATTERN	1ST DATA (1)	2ND DATA (2)
Data station to Data station	X-XXXX XXXX	X-XXXX XXXX
Data station to trunk	X-XXXX XXXX	DXXX
Trunk to trunk (Tandem Connection)	DXXX	DXXX

- YYY=00-99, 000-199
Memory Block 00-99, 000-199

(1) X-XXXXXXXX: Data station No. assigned by CM1A
DXXX : Trunk No. assigned by CM07
(2) X-XXXXXXXX: Data station No. assigned by CM1A
DXXX : Trunk No. assigned by CM07

See left table

END

DIGITAL TRUNK INTERFACE ASSIGNMENT

START

CM05

DESCRIPTION

Assign an AP number to the DTI card. The AP number must match the SENSE switch setting on the DTI card.

(INITIAL)

DATA

- Y=0

(1) 04-15, 20-31: AP No.
(2) 09: DTI

DESCRIPTION

Specify the AP highway channel for 24DTI card.

(INITIAL)

DATA

- Y=1

(1) 04-15, 20-31: AP No.
(2) 0 : Expanded Highway channel (128 time slots)
1◀ : Basic Highway channel (128 time slots)

CM07

DESCRIPTION

Assign trunk numbers to each channel number on the DTI card.

(INITIAL)

The system allocates time slots to consecutive channels from the lowest to the highest channel number assigned. To minimize the number of time slots allocated, assign trunk numbers to consecutive channels on each card. Never skip channels in CM07.

DATA

- YY=01

(1) XX ZZ
XX: 04-15, 20-31: AP No. assigned by CM05 Y=0
ZZ: 00-23: Channel No. of 24DTI
01-15, 17-31: Channel No. of 30DTI
(2) D000-D255: Trunk No.
Any trunk number already assigned by CM10 cannot be used.

A

	DESCRIPTION	DATA
A		
CMAA	Assign the necessary functions to the 24DTI card. (DTI INITIAL) After entering the data, set the MB switch on the DTI card to UP, and then to DOWN, for DTI initialization.	• YY=00 Data Mode (1) 04-15, 20-31: AP No. assigned by CM05 Y=0 (2) 0: Based on AT&T Spec. YY=01 Frame Configuration (1) 04-15, 20-31: AP No. assigned by CM05 Y=0 (2) 0 : 12-Multi Frame 1◀ : 24-Multi Frame YY=02 Zero Code Suppression (1) 04-15, 20-31: AP No. assigned by CM05 Y=0 (2) 1◀ : Not available (Transparent) YY=03 (1) 04-15, 20-31: AP No. assigned by CM05 Y=0 (2) 7◀ : Associated Channel Interoffice Signaling
CM30	Assign a trunk route number for tie line interface to each DTI. **NOTE:** The DTI route must be separated from any analog trunk route.	• YY=00 (1) 000-255: Trunk No. assigned by CM07 Y=01 (2) 00-63: Trunk Route No.
CM35	Assign trunk route data to each DTI route.	• YY=00 Kind of Trunk Route (1) 00-63: Trunk Route No. (2) 04: Tie Line trunk • YY=01 Dialing Signal Type (1) 00-63: Trunk Route No. (2) 7◀ : DP/DTMF (Incoming) DTMF (Outgoing)
B		

B

CM35

C

DESCRIPTION

CM35 Y=19 DTI PAD
[For Australia]

CONNECTION PATTERNS	PAD DATA OF DTI [dB]			
	DATA =4 (T/R)	DATA =5 (T/R)	DATA =6 (T/R)	DATA =7 (T/R)
Station-DTI				0/0
Tone-DTI				0/0
COT/DID/LDT-DTI				0/0
ODT-DTI				0/0
DTI-DTI				0/0

T/R: Transmitter PAD/Receiver PAD

[For North America/Other Countries]

CONNECTION PATTERNS	PAD DATA OF DTI [dB]			
	DATA =4 (T/R)	DATA =5 (T/R)	DATA =6 (T/R)	DATA =7 (T/R)
Station-DTI	–3/–8	–3/–3	–3/–3	–3/–8
Tone-DTI	0/0	0/0	0/0	0/0
COT/DID/LDT/ODT (2W E&M)-DTI	0/0	0/0	0/0	0/0
ODT (4W E&M)-DTI	+3/–3	0/0	0/0	+3/–3
DTI-DTI	0/–6	0/0	0/–6	0/0

T/R : Transmitter PAD/Receiver PAD
\+ : Gain
– : Loss

DATA

- YY=04
  Answer Signal from distant office
(1) 00-63: Trunk Route No.
(2) 2: Answer signal arrives

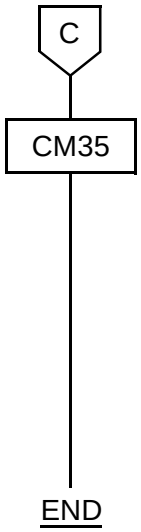
- YY=05
  Release Signal from distant office
(1) 00-63: Trunk Route No.
(2) 1◀ : Release signal arrives

- YY=09 Incoming Connection Signaling
(1) 00-63: Trunk Route No.
(2) 03: Wink Start
  04: Delay Dial
  05: Immediate Start
  06: 2nd DT/Timing Start-Tie Line

- YY=19 DTI Pad
(1) 00-63: Trunk Route No.
(2) 0-3: Programmable PAD by CM42
  4-7◀ : Fixed PAD (See left table)

- YY=20 Sender start condition
(1) 00-63: Trunk Route No.
(2) 00 : Wink Start
  01 : Delay Dial
  02 : Ground Start
  15◀ : Timing Start

- YY=89 Cyclic Redundancy Checking for Bit Error Detection
(1) 00-63: Trunk Route No.
(2) 0: To provide



DESCRIPTION

Specify the kind of digital data transmission.

DATA

- YY=92

(1) 00-63: Trunk Route No.

(2) 0 : Digital Data Transmission (48 kbps)
1 : Digital Data Transmission (56 kbps)
2 : Digital Data Transmission (Transparent)
3 : Reversal of F&S Bits
7◀ : Data Transmission via Modem

CHAPTER 4

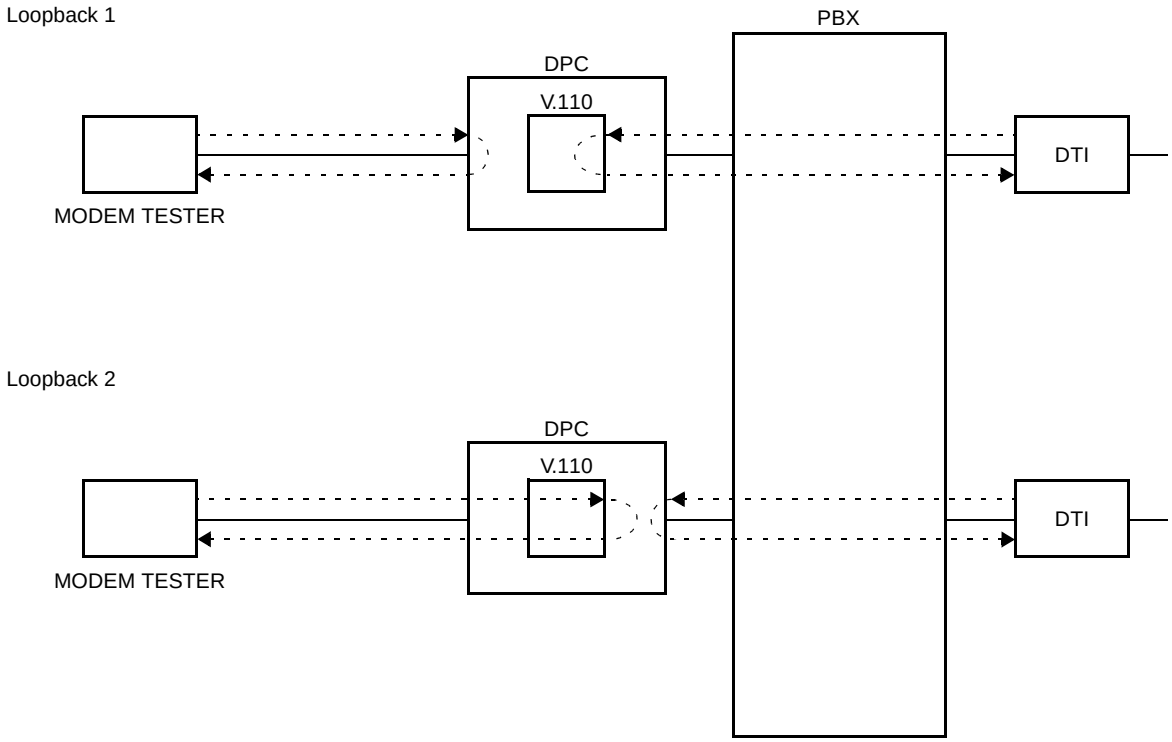
OPERATION TEST

This chapter explains the operation tests to be performed after you have completed the installation of the Data Interface to the PBX.

DPC LOOPBACK TEST

This test is the intra-office loopback test on the DPC card using a modem tester. There are two kinds of loopback (Loopback 1, Loopback 2) as shown in Figure 4-1. Either the Loopback 1 or the Loopback 2 can be selected by switch settings on the DPC card.

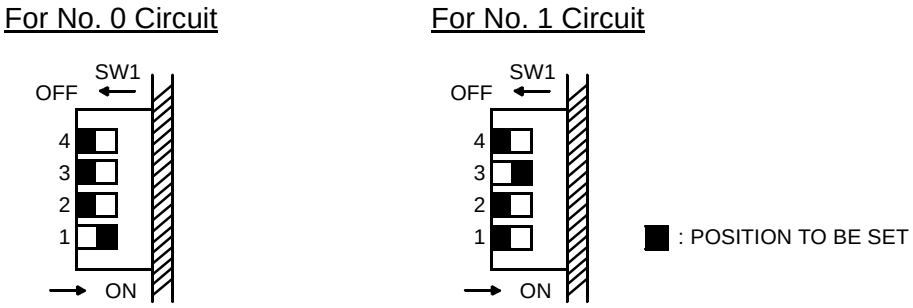
Figure 4-1 DPC Loopback Tests



NOTE: The modem tester is locally provided.

DPC Loopback 1 Test

(1) Set the SW1 on the DPC card as shown below.



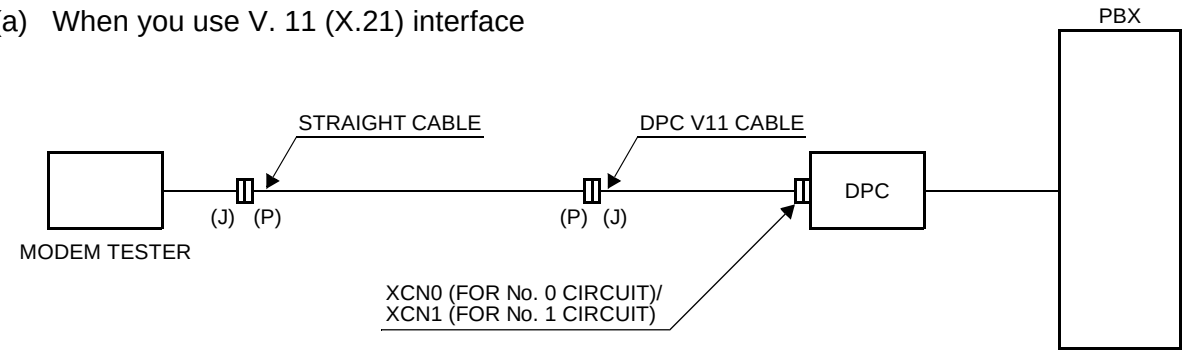
(2) Confirm whether the LB01 lamp (for No. 0 circuit) or the LB11 lamp (for No. 1 circuit) on the DPC card lights.

- If the LB01 lamp or the LB11 lamp does not light, check the switch settings on the DPC card and the system data assignment.

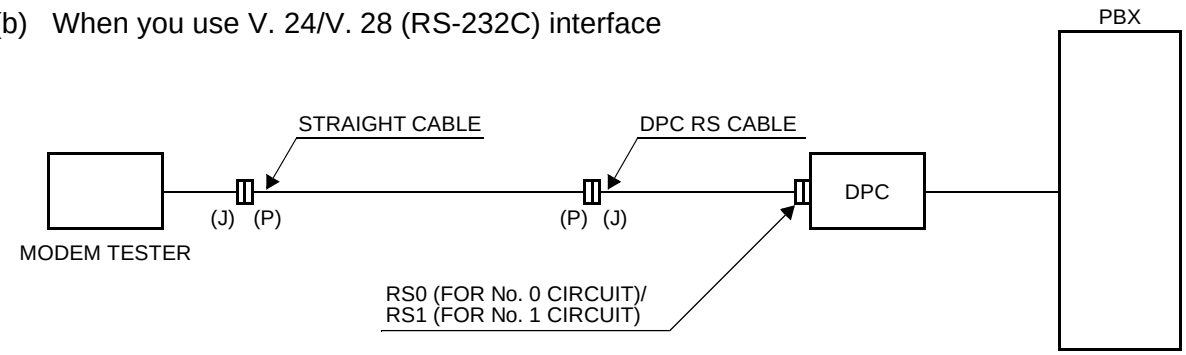
(3) Connect a modem tester to the DPC card as shown in Figure 4-2.

Figure 4-2 Connection of Modem Tester

(a) When you use V. 11 (X.21) interface



(b) When you use V. 24/V. 28 (RS-232C) interface



(4) Set the attributes of modem tester (transmission rate, etc.).

(5) To confirm whether the data is transmitted correctly, send the PN Pattern 9 (511 Pattern) from the modem tester.

(6) Count bit errors on the modem tester for 1 minute.

- If bit errors do not occur, the cable connection between DPC card and modem tester is normal.

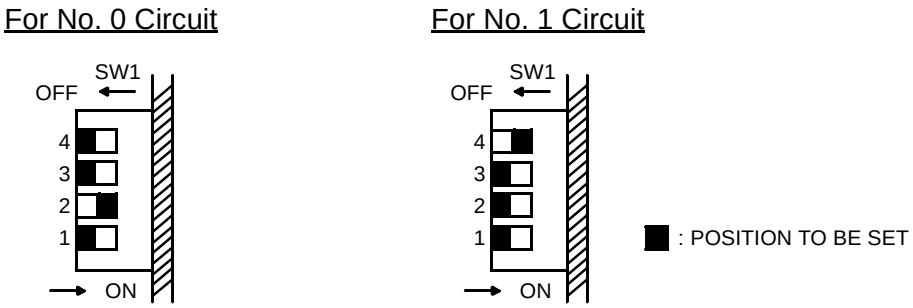
(7) If bit errors occur, check the cable connection, and replace the DPC card.

(8) After this test, set all the SW1-1 through SW1-4 on the DPC card to OFF.

DPC Loopback 2 Test

After you complete the DPC Loopback 1 Test, do the following steps.

(1) Set the SW1 on the DPC card as shown below.



(2) Confirm whether the LB02 lamp (for No. 0 circuit) or the LB12 lamp (for No. 1 circuit) on the DPC card lights.

- If the LB02 lamp or the LB12 lamp does not light, check the switch settings on the DPC card and the system data assignment.

(3) Connect a modem tester to the DPC card as shown in Figure 4-2 "Connection of Modem Tester."

(4) Set the attributes of modem tester (transmission rate, etc.).

(5) To confirm whether the data is transmitted correctly, send the PN Pattern 9 (511 Pattern) from the modem tester.

(6) Count bit errors on the modem tester for 1 minute.

- If bit errors do not occur, the DPC card is normal.

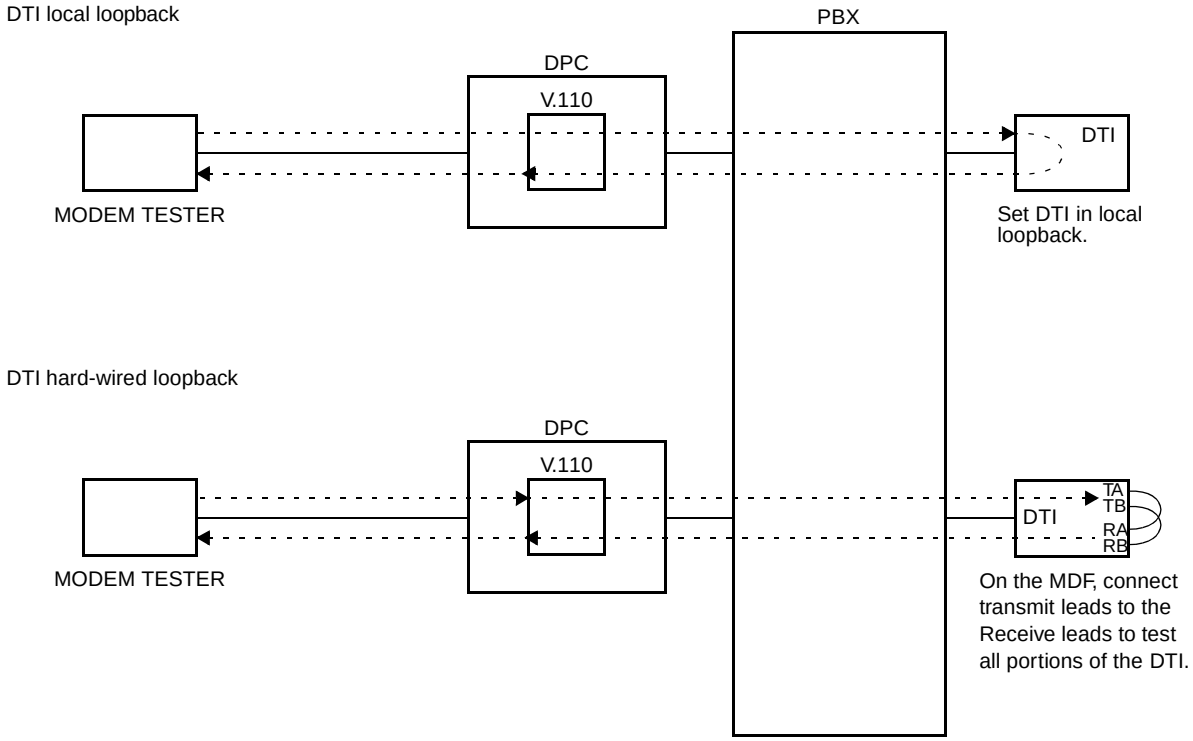
(7) If bit errors occur, check the system data assignment, and replace the DPC card.

(8) After this test, set all the SW1-1 through SW1-4 on DPC card to OFF.

OTHER LOOPBACK TESTS

Two additional forms of loopback test are shown in Figure 4-3.

Figure 4-3 Other Loopback Tests

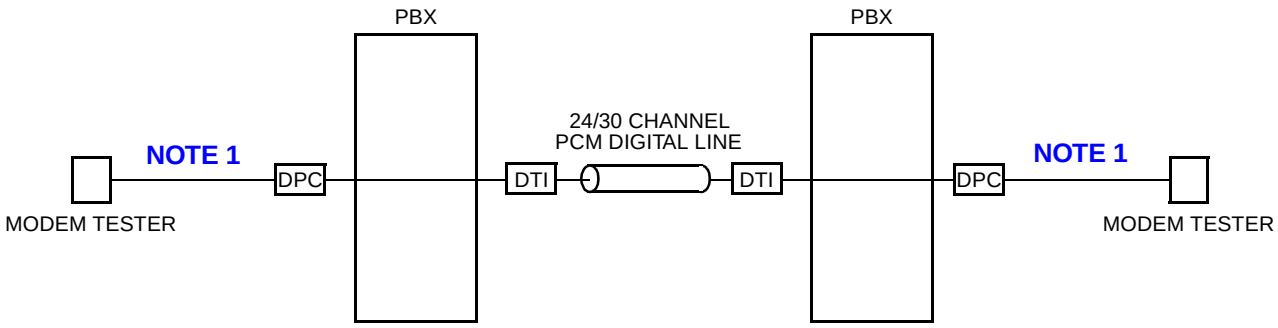


INTER-OFFICE DIGITAL DATA TRANSMISSION TEST

This test is the inter-office digital data transmission test using modem testers. After you complete the loopback tests, do the following steps.

(1) Connect modem testers to the both PBXs as shown in Figure 4-4.

Figure 4-4 Inter-Office Digital Data Transmission Test



NOTE 1: For details of cable connection between the DPC card and the modem tester, see Figure 4-2 "Connection of Modem Tester."

NOTE 2: The modem tester is locally provided.

(2) Set the attributes of both modem testers (transmission rate, etc.).

NOTE: If both the attributes do not match, this test is not available.

(3) To confirm whether the data is transmitted correctly, send the PN Pattern 9 (511 Pattern) from the modem testers.

(4) Count bit errors on the modem testers for 1 minute.

- If bit errors do not occur, the inter-office digital data transmission is normal.

(5) If bit errors occur, check the following items.

- System data assignment
- DTI card
- PCM digital line
- Opposite PBX

CHAPTER 5

CIRCUIT CARD INFORMATION

This chapter explains the mounting location, the meaning of lamp indications, and the method of switch settings of each circuit card for the Data Interface system.

HOW TO READ THIS CHAPTER

This chapter explains each circuit card used in this system for the following items. Explanations are given in the alphabetical order of the circuit card names within each circuit card category (Control, Application Processor, and Line/Trunk).

(1) Locations of Lamps, Switches, and Connectors
The locations of lamps, switches, and connectors of each circuit card are shown by a face layout.

(2) Lamp Indications
The name, color, and functions of each indicator lamp equipped on each circuit card are described in a table.

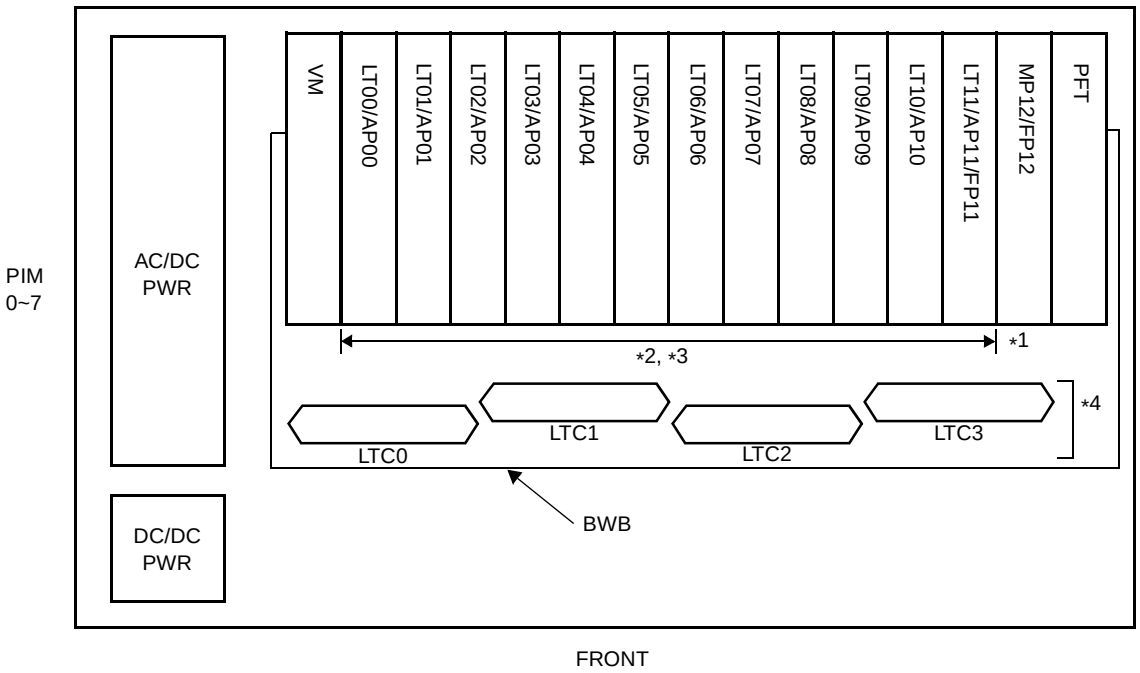
(3) Switch Settings
The name, settings, and functions of each switch equipped on each circuit card are described in a table.

Each switch setting table has a “CHECK” column. Make necessary entries in the CHECK column during and/or after the system installation and maintenance, and use each table as a reference for subsequent system maintenance and operations.

MOUNTING LOCATION OF CIRCUIT CARD

This section explains the conditions for mounting circuit cards for the Data Interface. Figure 5-1 shows circuit card mounting slots allocated in the PIM.

Figure 5-1 Mounting Location of Circuit Card



***1** PN-CP14 (MP) card on the MP12 slot on PIM0.
***2** PN-24DTA-C/PN-30DTC-A (DTI) card on the AP00-AP11 slots on PIM0-PIM7.
***3** PN-2DPCB (DPC) and PN-M03 (M03) card on the LT00-LT11 slots on PIM0-PIM7.
***4** PZ-M542/PZ-M557 (CONN) card on the LTC0-LTC3 connectors on the PIM which accommodates 30DTI card.

LIST OF REQUIRED CIRCUIT CARDS

Table 5-1 shows the required circuit cards to be explained in this section.

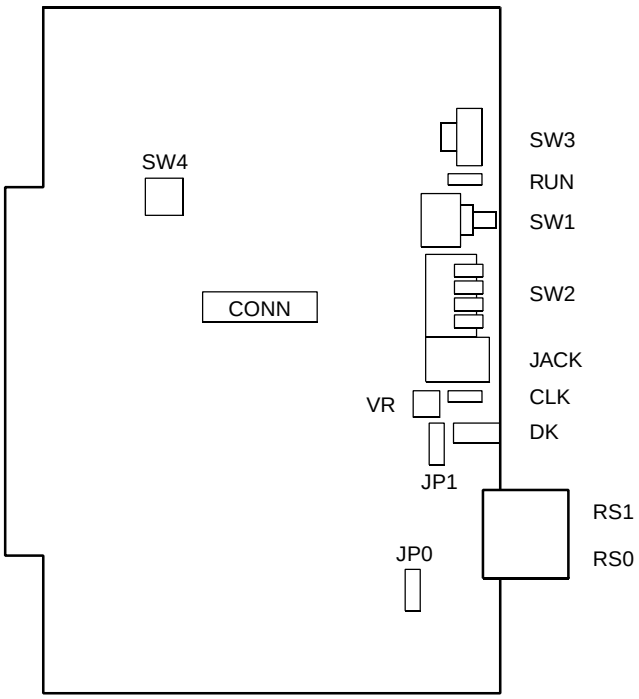
Table 5-1 List of Required Circuit Cards

NAME (FUNCTIONAL NAME)	LAMP X: PROVIDED –: NOT PROVIDED	SWITCH X: PROVIDED –: NOT PROVIDED	EXTRACTION/ INSERTION WITH POWER ON X: ALLOWED Δ: ALLOWED AFTER MB* –: NOT ALLOWED	REFERENCE PAGE
PN-CP14 (MP)	X	X	–	Page 67
PN-24DTA-C (DTI)	X	X	Δ	Page 72
PN-30DTC-A (DTI)	X	X	Δ	Page 78
PZ-M542 (CONN)	–	X	X	Page 84
PZ-M557 (CONN)	–	X	X	Page 86
PN-2DPCB (DPC)	X	X	X	Page 88
PN-M03 (M03)	X	X	X	Page 92

*MB = Make Busy

PN-CP14 (MP)

Locations of Lamps, Switches, and Connectors



CONN: To CONNR connector on PZ-M537 (EXPMEM)

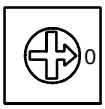
Lamp Indications

LAMP NAME	COLOR	FUNCTION
RUN	Green	Flashes at 120 IPM while this card is operating normally.
CLK	Green	Remains lit while receiving clock signals to the PLO.

Switch Settings

CAUTION

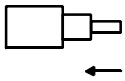
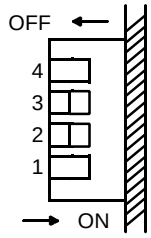
When the operating power is being supplied to this circuit card, do not plug/unplug this circuit card into/from its mounting slot.

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
SW3 (Rotary SW)  **NOTE 1**	0-F	0	On Line (Call processing is in progress)	
		2	Off Line (Call processing is stopped) • I/O port: As per CM40 YY=08	
		3	Off Line (Call processing is stopped) • I/O port: 9600bps (Fixed)	
		5 **NOTE 2**	Off Line (Call processing is stopped) • I/O port: 9600bps	
		6 **NOTE 2**	Off Line (Call processing is stopped) • I/O port: 19200bps	
		7 **NOTE 2**	Off Line (Call processing is stopped) • I/O port: 38400bps	
		8 **NOTE 2**	Off Line (Call processing is stopped) • I/O port: 57600bps	
		B	For clearing the office data	
		C	For setting the resident system program	
		1, 4, 9 A, D-F	Not used	

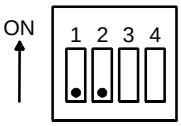
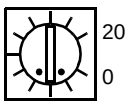
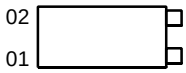
(Continued)

NOTE 1: Set the groove on the switch to the desired position.

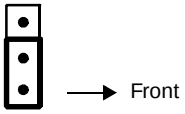
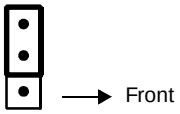
NOTE 2: Only when executing “MP Program Download” in MATWorX, set the SW3 to 5-8.

<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING POSITION</th><th>FUNCTION</th><th>CHECK</th></tr>
<tr><td>SW1 (Push SW)
  </td><td></td><td></td><td>For initializing CPU</td><td></td></tr>
<tr><td rowspan="4">SW2
(Piano Key SW)
  </td><td rowspan="2">1</td><td>ON</td><td>A-law (Australia)</td><td></td></tr>
<tr><td>OFF</td><td>μ-law (North America)</td><td></td></tr>
<tr><td>2, 3</td><td colspan="2">Selection of PLO0 input
(Phase Locked Oscillator)
• For clock receiver office:
<table><tr><th>SW2-2</th><th>SW2-3</th><th>FUNCTION</th></tr><tr><td>OFF</td><td>OFF</td><td>1.5 MHz clock
[For PN-24DTA-C/PN-24PRTA]</td></tr><tr><td>ON</td><td>OFF</td><td>192 kHz clock
[For PN-BRTA]</td></tr><tr><td>OFF</td><td>ON</td><td>2 MHz clock
[For PN-30DTC-A/PN-2BRTC]</td></tr><tr><td>ON</td><td>ON</td><td>Not used</td></tr></table>• For clock source office:
SW2-2 SW2-3
OFF OFF</td><td></td></tr>
<tr><td>4</td><td>ON</td><td>When using RS1 port for built-in MODEM</td><td></td></tr>
<tr><td></td><td>OFF</td><td>When using RS1 port for RS-232C</td><td></td></tr>
</table>

(Continued)

<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING POSITION</th><th>FUNCTION</th><th>CHECK</th></tr>
<tr><td rowspan="3">SW4 (Dip SW)
 
</td><td>1</td><td>OFF</td><td>Not used</td><td></td></tr>
<tr><td>2</td><td>OFF</td><td>Not used</td><td></td></tr>
<tr><td>3, 4</td><td colspan="2">Selection of PLO1 input
(Phase Locked Oscillator)
• For clock receiver office:
<table>
<tr><th>SW4-3</th><th>SW4-4</th><th>FUNCTION</th></tr>
<tr><td>OFF</td><td>OFF</td><td>1.5 MHz clock
[For PN-24DTA-C/PN-24PRTA]</td></tr>
<tr><td>ON</td><td>OFF</td><td>192 kHz clock
[For PN-BRTA]</td></tr>
<tr><td>OFF</td><td>ON</td><td>2 MHz clock
[For PN-30DTC-A/PN-2BRTC]</td></tr>
<tr><td>ON</td><td>ON</td><td>Not used</td></tr>
</table>
• For clock source office:
SW4-3 SW4-4
OFF OFF</td><td></td></tr>
<tr><td>VR (Rotary SW)
 
</td><td></td><td></td><td>Variable Resister for External Hold Tone Source
(0 - 20 Kohms : Clockwise)</td><td></td></tr>
<tr><td rowspan="2">DK (Connector)
 
</td><td>02</td><td colspan="2">Ground detection</td><td></td></tr>
<tr><td>01</td><td colspan="2">Ground sending</td><td></td></tr>
</table>

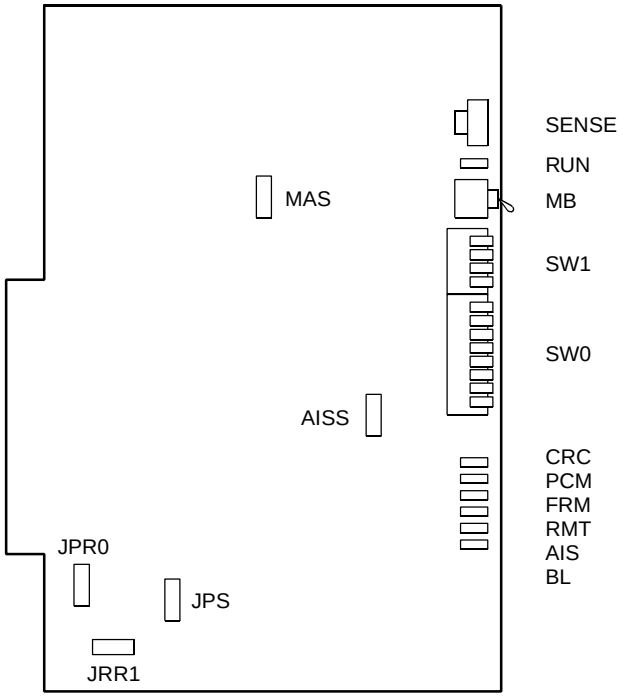
(Continued)

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
JP0 (Jumper pin) 		UP	Not used (Memory backup OFF)	
		(DOWN)	For normal operation (Memory backup ON)	
JP1 (Jumper pin) 		(UP)	For using internal tone source	
		DOWN	For using external tone source	

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

PN-24DTA-C (DTI)

Locations of Lamps, Switches and Connectors

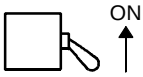


Lamp Indications

LAMP NAME	COLOR	FUNCTION
RUN	Green	Flashes at 120 IPM while this card is operating normally.
CRC	Red	Remains lit when detecting Cyclic Redundancy Checking (CRC) errors.
PCM	Red	Remains lit when detecting PCM signal loss.
FRM	Red	Remains lit when detecting Frame Alignment signal loss.
RMT	Red	Remains lit when receiving Frame Alignment signal loss alarm from a distant office.
AIS	Red	Remains lit when a pattern of consecutive “1” is received. The distant office transmits this signal for a loop-back test.
BL	Red	B channel status ON : More than 10 channels are busy OFF : All channels are idle Flash (60 IPM) : Only one channel is busy Flash (120 IPM) : 2 through 10 channels are busy

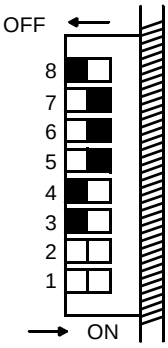
Switch Settings

<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING POSITION</th><th>FUNCTION</th><th>CHECK</th></tr>
<tr><td rowspan="2">SENSE
(Rotary SW)
 

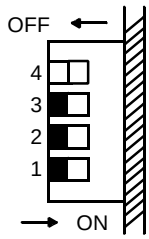
NOTE 1</td><td>0-3</td><td colspan="2">Not used</td><td></td></tr>
<tr><td>4-F</td><td colspan="2">Set the switch to match the AP Number (04-31) to be set by CM05.
<table><tr><td rowspan="2">AP No.</td><td>SW1-4: ON</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td>09</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr><tr><td>SW1-4: OFF</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr><tr><td colspan="2">SW No.</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td></tr></table></td><td></td></tr>
<tr><td rowspan="2">MB (Toggle SW)
 

NOTE 2</td><td rowspan="2"></td><td>UP</td><td>For make-busy</td><td></td></tr>
<tr><td>DOWN</td><td>For normal operation</td><td></td></tr>
</table>

(Continued)

<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING POSITION</th><th>FUNCTION</th><th>CHECK</th></tr>
<tr><td rowspan="12">SW0
(Piano Key SW)
 
</td><td rowspan="2">1
NOTE 3
NOTE 4</td><td>ON</td><td>Source clock signal from network is sent to the PLO 0 input on MP card.</td><td></td></tr>
<tr><td>OFF</td><td>Source clock signal from network is not sent to the PLO 0 input on MP card.</td><td></td></tr>
<tr><td rowspan="2">2
NOTE 3
NOTE 4</td><td>ON</td><td>Source clock signal from network is sent to the PLO 1 input on MP card.</td><td></td></tr>
<tr><td>OFF</td><td>Source clock signal from network is not sent to the PLO 1 input on MP card.</td><td></td></tr>
<tr><td rowspan="2">3</td><td>ON</td><td>Remote loop-back</td><td></td></tr>
<tr><td>OFF</td><td>For normal operation</td><td></td></tr>
<tr><td rowspan="2">4</td><td>ON</td><td>Local loop-back (AIS send)</td><td></td></tr>
<tr><td>OFF</td><td>For normal operation</td><td></td></tr>
<tr><td rowspan="2">5</td><td>ON</td><td rowspan="4">Set equalizer according to the cable length between the PBX and the MDF.
<table><tr><th>SW0-5</th><th>SW0-6</th><th>SW0-7</th><th>CABLE LENGTH</th></tr><tr><td>ON</td><td>ON</td><td>ON</td><td>0-40m (0-131.2 ft.)</td></tr><tr><td>ON</td><td>ON</td><td>OFF</td><td>40-80m (131.2-262.5 ft.)</td></tr><tr><td>ON</td><td>OFF</td><td>ON</td><td>80-120m (262.5-394 ft.)</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td><td>120-160m (394-525 ft.)</td></tr><tr><td>OFF</td><td>ON</td><td>ON</td><td>160-200m (525-656 ft.)</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td><td>Signal is not sent</td></tr></table></td><td></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">6</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td rowspan="2">7</td><td>ON</td><td></td></tr>
<tr><td>OFF</td><td></td></tr>
<tr><td>8</td><td>OFF</td><td>Not used</td><td></td></tr>
</table>

(Continued)

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
SW1 (Piano Key SW)  **NOTE 4**	1	OFF	Not used	
	2	OFF	Not used	
	3	OFF	Not used	
	4	ON	AP No. 04-15	
		OFF	AP No. 20-31	
JPR0 (Jumper pin) 		UP	Neutral grounding on the receiving line is provided.	
		DOWN	Neutral grounding on the receiving line is not provided.	
JPR1 (Jumper pin) 		Right	Line impedance: 100 ohms	
		Left	Line impedance: 110 ohms	
JPS (Jumper pin) 		UP	Neutral grounding on the transmitting line is provided.	
		DOWN	Neutral grounding on the transmitting line is not provided.	
MAS (Jumper pin) 		UP	Clock Source	
		DOWN	Clock Receiver	
AISS (Jumper pin) 		UP	AIS signal is sent out when make-busy or power on.	
		DOWN	AIS signal is not sent out when make-busy or power on.	

(Continued)

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

NOTE 1: Set the groove on the switch to the desired position.

NOTE 2: When the power is on, flip the MB switch to ON (UP position) before plugging/ unplugging the circuit card.

NOTE 3: Set SW0-1 and SW0-2 as follows:

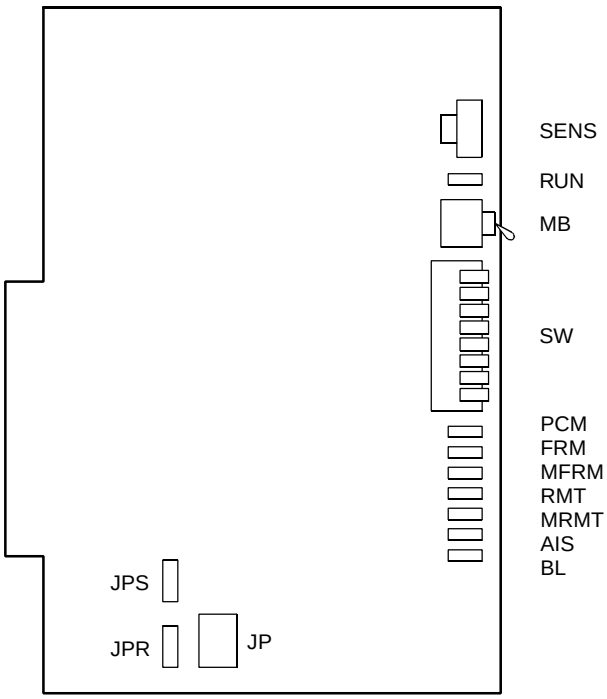
CONDITIONS	DTI0		DTI1		DTI2		DTI3		DTI4		REMARKS
	SW 0-1	SW 0-2	SW 0-1	SW 0-2	SW 0-1	SW 0-2	SW 0-1	SW 0-2	SW 0-1	SW 0-2	
When one DTI is provided.	ON	OFF	–	–	–	–	–	–	–	–	MP card will receive the clock signal from DTI0 at its PLO0 input.
When more than one DTI is provided.	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	MP card will receive the clock signal from DTI0 at its PLO0 input, under normal conditions. Should a clock failure occur with DTI0, MP card will automatically switch to the PLO1 input which gets clock from DTI1.

NOTE 4: When the PBX is a clock source office, set the SW0-1 and SW0-2 on all the DTI cards mounted in PIM0 to “OFF”.

NOTE 5: Mount the DTI card which receives a source clock signal into PIM0.

PN-30DTC-A (DTI)

Locations of Lamps, Switches and Connectors

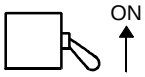


Lamp Indications

LAMP NAME	COLOR	FUNCTION
RUN	Green	Flashes at 120 IPM when this card is normally operating.
PCM	Red	Remains lit when detecting PCM signal loss.
FRM	Red	Remains lit when detecting Frame Alignment signal loss.
MFRM	Red	Remains lit when detecting Multi-Frame Alignment signal loss on time Slot 16.
RMT	Red	Remains lit when receiving the alarm from a distant office because Frame Alignment signal loss has been detected at the distant office.
MRMT	Red	Remains lit when receiving the alarm from a distant office because Multi-Frame Alignment signal loss has been detected at the distant office.
AIS	Red	Remains lit when indicating that the pattern of consecutive “1” is being received. The distant office transmits this signal for a loop-back test distant.
BL	Red	B channel status ON : More than10 channels are busy OFF : All channels are idle Flash (60 IPM) : Only one channel is busy Flash (120 IPM) : 2 to 10 channels are busy

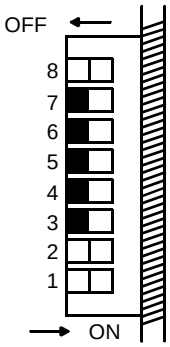
Switch Settings

<table>
<tr><th>SWITCH NAME</th><th>SWITCH NUMBER</th><th>SETTING POSITION</th><th>FUNCTION</th><th>CHECK</th></tr>
<tr><td rowspan="2">SENS
(Rotary SW)
 

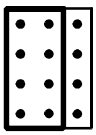
NOTE 1</td><td>4-F</td><td colspan="3">Set the switch to match the AP Number (04-31) to be set by CM05.
<table><tr><td rowspan="2">AP No.</td><td>SW-8: ON</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td>09</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr><tr><td>SW-8: OFF</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr><tr><td colspan="2">SW No.</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td></tr></table></td></tr>
<tr><td>0-3</td><td colspan="2">Not used</td><td></td></tr>
<tr><td rowspan="2">MB (Toggle SW)
 

NOTE 2</td><td rowspan="2"></td><td>UP</td><td>For make-busy</td><td></td></tr>
<tr><td>DOWN</td><td>For normal operation</td><td></td></tr>
</table>

(Continued)

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
SW (Piano Key SW)  	1 **NOTE 3** **NOTE 4**	ON	Source clock signal from network is sent to the PLO 0 input on MP card.	
		OFF	Source clock signal from network is not sent to the PLO 0 input on MP card	
	2 **NOTE 3** **NOTE 4**	ON	Source clock signal from network is sent to the PLO 1 input on MP card.	
		OFF	Source clock signal from network is not sent to the PLO 1 input on MP card.	
	3	ON	Remote loop-back	
		OFF	For normal operation	
	4	ON	Local loop-back (AIS send)	
		OFF	For normal operation	
	5	ON	Transmission line cable: Coaxial cable (75 ohms)	
		OFF	Transmission line cable: Twisted-pair cable (120 ohms)	
	6	OFF	Always set to OFF	
	7	OFF		
	8	ON	AP No. 04-15	
		OFF	AP No. 20-31	

(Continued)

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
JPS (Jumper pin) 		UP	Balanced transmission (For twisted-pair cable)	
		DOWN	TA is grounded on the transmission line (For coaxial cable)	
JPR (Jumper pin) 		UP	Balanced transmission (For twisted-pair cable)	
		DOWN	RA is grounded on the transmission line (For coaxial cable)	
JP (Jumper pin) 		RIGHT	Line impedance: 75 ohms (For coaxial cable)	
		LEFT	Line impedance: 120 ohms (For twisted-pair cable)	

(Continued)

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

NOTE 1: Set the groove on the switch to the desired position.

NOTE 2: When the power is on, flip the MB switch to ON (UP position) before plugging/ unplugging the circuit card.

NOTE 3: Set the SW-1 and SW-2 as follows:

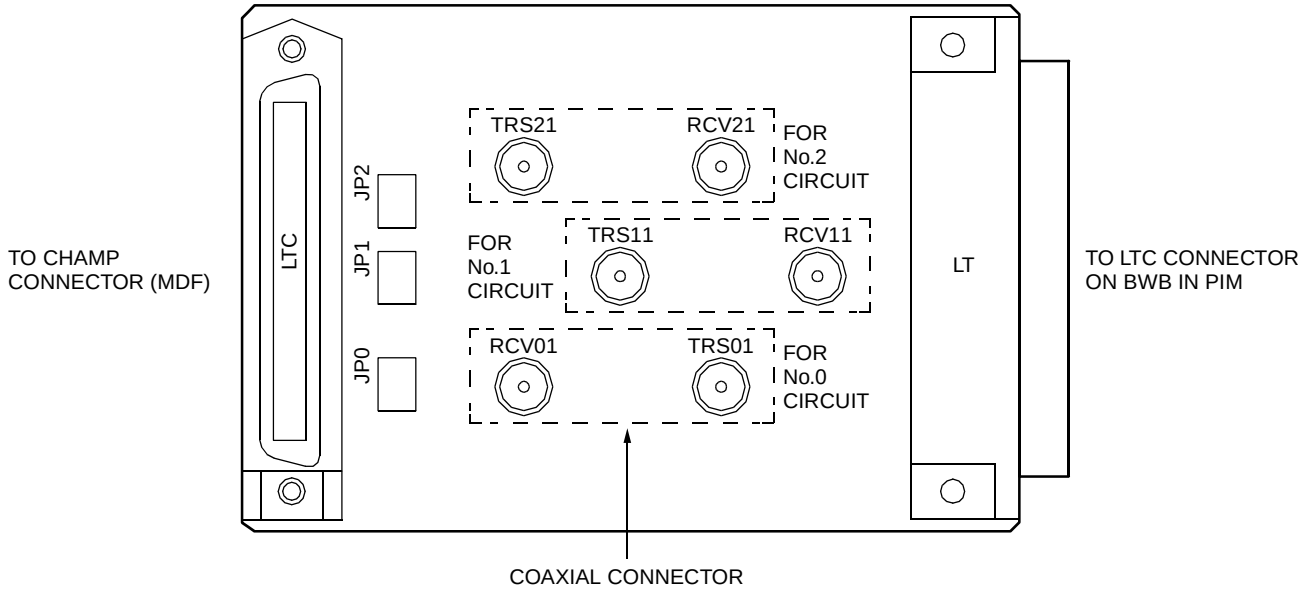
CONDITIONS	DTI0		DTI1		DTI2		DTI3		REMARKS
	SW -1	SW -2	SW -1	SW -2	SW -1	SW -2	SW -1	SW -2	
When one DTI is provided.	ON	OFF	–	–	–	–	–	–	MP card will receive the clock signal from DTI0 at its PLO0 input.
When more than one DTI is provided.	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF	MP card will receive the clock signal from DTI0 at its PLO0 input, under normal conditions. Should a clock failure occur with DTI0, MP card will automatically switch to the PLO1 input which gets from DTI1.

NOTE 4: When the PBX is a clock source office, set the SW-1 and SW-2 on all the DTI cards mounted in PIM0 to “OFF”.

NOTE 5: Mount the DTI card which receives a source clock signal into PIM0.

PZ-M542 (CONN)

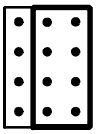
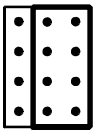
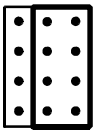
Locations of Lamps, Switches and Connectors



Lamp Indications

This card has no lamps.

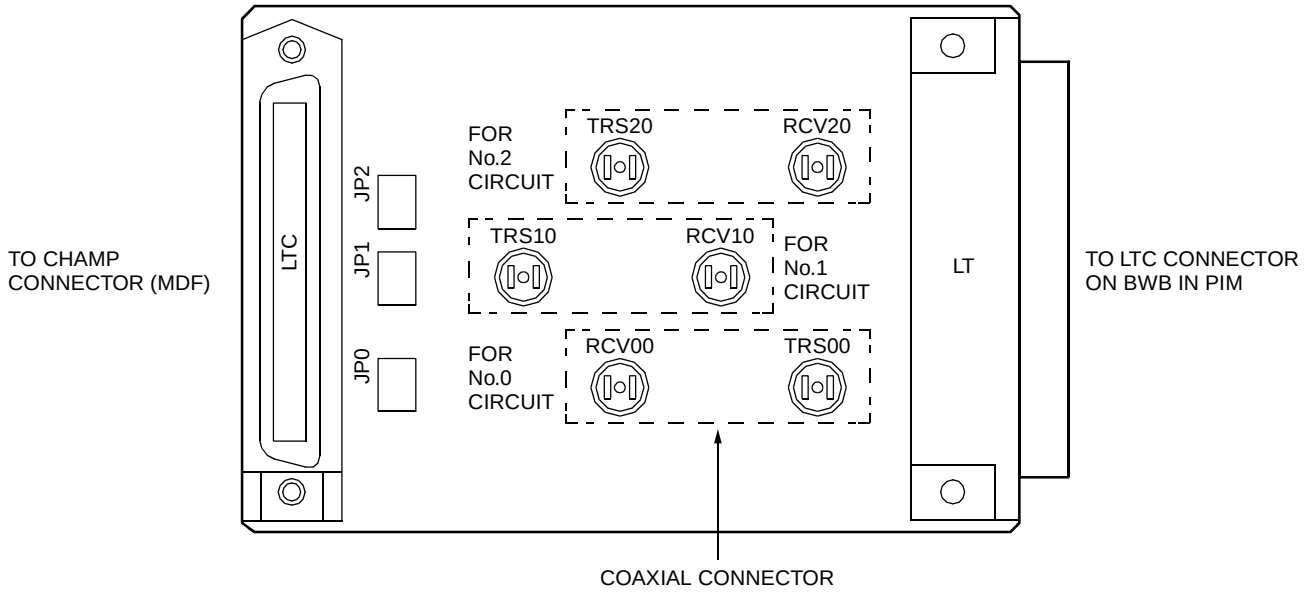
Switch Settings

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
JP0 		RIGHT	For coaxial connectors (No.0 circuit)	
		LEFT	For champ connector (LT connector) (No.0 circuit)	
JP1 		RIGHT	For coaxial connectors (No.1 circuit)	
		LEFT	For champ connector (LT connector) (No.1 circuit)	
JP2 		RIGHT	For coaxial connectors (No.2 circuit)	
		LEFT	For champ connector (LT connector) (No.2 circuit)	

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

PZ-M557 (CONN)

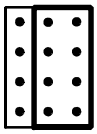
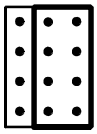
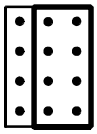
Locations of Lamps, Switches and Connectors



Lamp Indications

This card has no lamps.

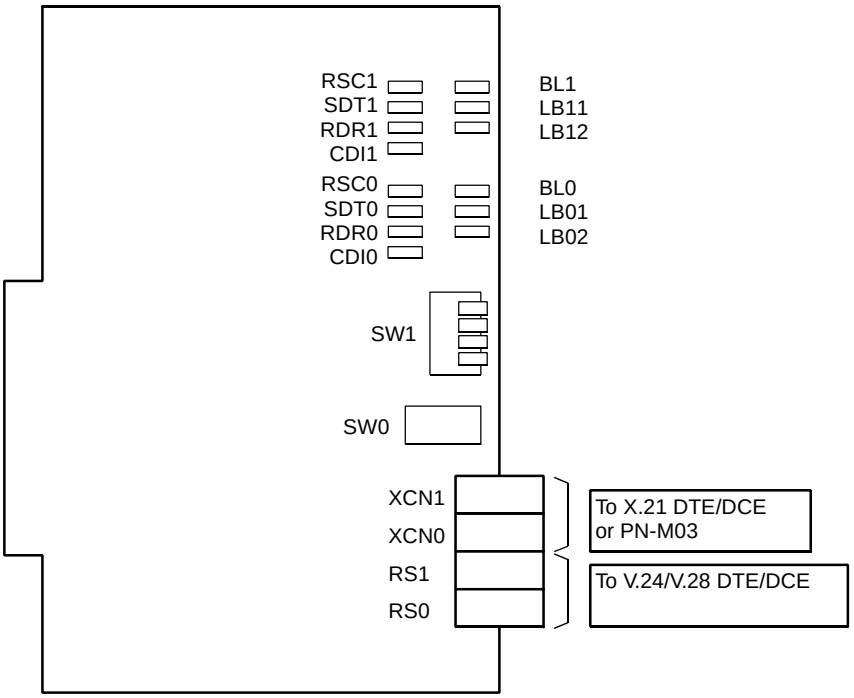
Switch Settings

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
JP0 		RIGHT	For coaxial connectors (No. 0 circuit)	
		LEFT	For champ connector (LT connector) (No. 0 circuit)	
JP1 		RIGHT	For coaxial connectors (No. 1 circuit)	
		LEFT	For champ connector (LT connector) (No. 1 circuit)	
JP2 		RIGHT	For coaxial connectors (No. 2 circuit)	
		LEFT	For champ connector (LT connector) (No. 2 circuit)	

The figure in the SWITCH NAME column and the position in ⬭ in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ⬭, the setting of the switch varies with the system concerned.

PN-2DPCB (DPC)

Location of Lamps, Switches and Connectors



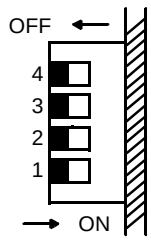
Lamp Indications

LAMP NAME	COLOR	FUNCTION	
BL0	Red	No. 0 Circuit	ON: Ready for digital data transmission or the circuit is busy. OFF: Fixed path is not connected. Flash (60IPM): Make-busy state or the system data for this card is not assigned. Flash (120IPM): Fixed path is connected.
LB01	Red		ON: Loop Back 1 is set. OFF: Normally operating.
LB02	Red		ON: Loop Back 2 is set. OFF: Normally operating.
RSC0	Green		ON: RTS/C signal ON OFF: RTS/C signal OFF
SDT0	Green		ON: TXD/T signal is “0”. OFF: TXD/T signal is “1”.
RDR0	Green		ON: RXD/R signal is “0”. OFF: RXD/R signal is “1”.
CDI0	Green		ON: DCD/I signal ON OFF: DCD/I signal OFF

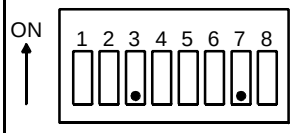
(Continued)

LAMP NAME	COLOR	FUNCTION	
BL1	Red	No. 1 Circuit	ON: Ready for digital data transmission or the circuit is busy. OFF: Fixed path is not connected. Flash (60IPM): Make-busy state or the system data for this card is not assigned. Flash (120IPM): Fixed path is connected.
LB11	Red		ON: Loop Back 1 is set. OFF: Normally operating.
LB12	Red		ON: Loop Back 2 is set. OFF: Normally operating.
RSC1	Green		ON: RTS/C signal ON OFF: RTS/C signal OFF
SDT1	Green		ON: TXD/T signal is “0”. OFF: TXD/T signal is “1”.
RDR1	Green		ON: RXD/R signal is “0”. OFF: RXD/R signal is “1”.
CDI1	Green		ON: DCD/I signal ON OFF: DCD/I signal OFF

Switch Settings

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION		CHECK
SW1 (Piano Key SW)  	1	ON	No. 0 Circuit	Loop Back 1 ON	
		OFF		Loop Back 1 OFF	
	2	ON		Loop Back 2 ON	
		OFF		Loop Back 2 OFF	
	3	ON	No. 1 Circuit	Loop Back 1 ON	
		OFF		Loop Back 1 OFF	
	4	ON		Loop Back 2 ON	
		OFF		Loop Back 2 OFF	

(Continued)

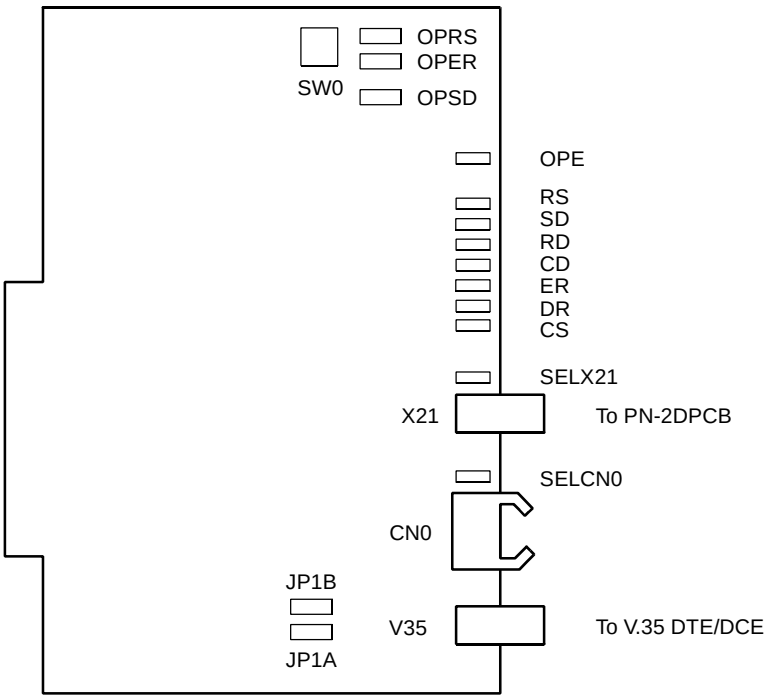
SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION		CHECK
SW0 (Dip SW) 	1	ON	No. 0 Circuit	Forcibly turning the DTR signal to ON	
		OFF		The DTR signal from DTE goes through the card	
	2	ON		Forcibly turning the RTS/C signal to ON	
		OFF		The RTS/C signal from DTE goes through the card	
	3	OFF		Not used	
	4	ON		V.11 (X.21) interface	
		OFF		V.24/V.28 (RS-232C) interface	
	5	ON	No. 1 Circuit	Forcibly turning the DTR signal to ON	
		OFF		The DTR signal from DTE goes through the card	
	6	ON		Forcibly turning the RTS/C signal to ON	
		OFF		The RTS/C signal from DTE goes through the card	
	7	OFF		Not used	
	8	ON		V.11 (X.21) interface	
		OFF		V.24/V.28 (RS-232C) interface	

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

NOTE: When the power is on, disconnect the cables before unplugging the circuit card, and connect the cables after plugging the circuit card.

PN-M03 (M03)

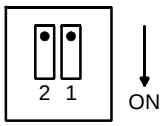
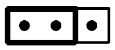
Location of Lamps, Switches and Connectors



Lamp Indications

LAMP NAME	COLOR	FUNCTION
OPE	Green	ON: This card is normally connected to the PN-2DPCB. OFF: This card is abnormally connected to the PN-2DPCB.
RS	Green	ON: RTS signal is ON. OFF: RTS signal is OFF.
SD	Green	ON: TXD signal is “0” (Space condition). OFF: TXD signal is “1” (Mark condition).
RD	Green	ON: RXD signal is “0” (Space condition). OFF: RXD signal is “1” (Mark condition).
CD	Green	ON: DCD signal is ON. OFF: DCD signal is OFF.
ER	Green	ON: DTR signal is ON. OFF: DTR signal is OFF.
DR	Green	ON: DSR signal is ON. OFF: DSR signal is OFF.
CS	Green	ON: CTS signal is ON. OFF: CTS signal is OFF.
SELX21	Green	ON: Connecting to the PN-2DPCB is available. OFF: Connecting to the PN-2DPCB is not available.
SELCN0	Green	Not used

Switch Settings

SWITCH NAME	SWITCH NUMBER	SETTING POSITION	FUNCTION	CHECK
SW0 (Dip SW) 	1	OFF	Always set to OFF	
	2	OFF	Not used	
JP1A (Jumper pin)  **NOTE**		Right	TXC(2) signal is sent out.	
		Left	TXC(2) signal is inputted.	
JP1B (Jumper pin)  **NOTE**		Right	TXC(2) signal is sent out.	
		Left	TXC(2) signal is inputted.	
OPSD (Jumper pin) 		Right	Set the function of extending distance for TXD signal.	
		Left	Cancel the function of extending distance for TXD signal.	
OPRS (Jumper pin) 		Right	Set the function of extending distance for RTS signal.	
		Left	Cancel the function of extending distance for RTS signal.	
OPER (Jumper pin) 		Right	Set the function of extending distance for DTR signal.	
		Left	Cancel the function of extending distance for DTR signal.	

The figure in the SWITCH NAME column and the position in ( ) in the SETTING POSITION column indicate the standard setting of the switch. When the switch is not set as shown by the figure and ( ), the setting of the switch varies with the system concerned.

NOTE: The JP1A and JP1B must be set to the same position each other.