297-2121-227
VINTAGE 03.02
STANDARD

DIGITAL SWITCHING SYSTEMS

DMS*-100 FAMILY DATAPATH*

DIALAN* SERVICE - INSTALLATION AND MAINTENANCE

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* DATAPATH, DIALAN, and DMS are trademarks of Northern Telecom

0 297-2121-227
0 VINTAGE 03.02

CONTENTS

CHAPTER 7: ABBREVIATIONS

ILLUSTRATIONS

FIGURES

TABLES

0 297-2121-227
0 VINTAGE 03.02

CHAPTER 1

USING THIS MANUAL

0 297-2121-227
0 VINTAGE 03.02

USING THIS MANUAL

Purpose of manual

The purpose of this manual is to:

* Briefly describe DIALAN service

* Provide instructions for installing the customer premises portion of DIALAN service

* Provide instructions for installing the central office portion of DIALAN service

* Provide instructions for verifying voice and data capabilities at a customer premises

* Provide instructions for troubleshooting and correcting DIALAN service faults from the central office and from the customer premises.

Who Will Use This Manual

This manual will be used by:

* Station installers at a customer premises (may be operating company, customer, or customer’s agent)

* Operating company installers at a central office

* Repair service personnel at a customer premises (may be operating company, customer, or customers agent)

* Operating company maintenance personnel at a central office

* Northern Telecom or operating company TAS (technical assistance service) groups

Where To Find Information In This Manual

Table 1.1 summarizes some major tasks and indicates the chapter and section where you can find out how to perform these tasks.

TABLE 1.1
TASK SUMMARY

TO	SEE
Install a CO IVDM at a central office	Installation at the Central Office on page 4-4 DIALAN Service Hardware on page 2-4
Install an IVDM at a customer premises	Installation at a Customer Premises on page 4-11 DIALAN Service Hardware on page 2-4
Verify DIALAN Service from a customer premises	Chapter 5 on page 5-1
Investigate a DIALAN Service complaint	Chapter 5 on page 5-1
Fix a voice fault	Correcting Voice Faults on page 6-1
Fix a data fault	Correcting Data Faults on page 6-2

SOFTWARE IDENTIFICATION

Software applicable to a specific DMS-100 Family office is identified by a BCS release number and by Northern Telecom (NT) Product Engineering Codes (PEC). The significance of the BCS number and the PEC is described in 297-1001-450 (section 450/32) and in the Office Feature Record D-190.

A display of the BCS number and PEC for the NT feature packages available in a specific office can be obtained by entering the command string:

```
PATCHER;INFORM LIST;LEAVE
```

at a Maintenance and Administration Position (MAP*).

PRACTICE APPLICATION

The information in this Practice applies to offices with Batch Change Supplement 35 (BCS35) release software. Unless reissued, the Practice also applies to any office with subsequent BCS release software. The correspondence between BCS releases and Northern Telecom Practice (NTP) issues is given in 297-1001-001, Master Index of Practices.

REASON FOR REISSUE

This document is reissued to add a new DIALAN service. The changes include:

* a new AILC card supporting the Hayes command set

* changes to references

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* MAP is a trademark of Northern Telecom

REFERENCES

References listed as prerequisites are essential for an understanding of this Practice. Those listed as informative contain detailed information concerning other items mentioned in this Practice, but are not essential. References are inserted at the appropriate places in the text.

Note: The documents listed may exist in more than one version. See 297-1001-001 to determine the release code of the version compatible with a specific release of software.

Prerequisite References

DOCUMENT NUMBER	TITLE
297-1001-100	System Description
297-2121-100	Guide to Documentation

Informative References

DOCUMENT NUMBER	TITLE
297-1001-001	Master Index of Practices
297-1001-010	Electrostatic Discharge Protection
297-1001-310	Table Editor Reference Manual
297-1001-451	Common Customer Data Schema
297-1001-805	Hardware Description Manual
297-2101-310	Service Order and Query System Reference Manual
297-2101-516	Line Maintenance Reference Manual
297-2121-103	MSL/DMS-100 Asynchronous Access General Description
297-2121-203	Asynchronous Access Installation
297-2121-224	Modem Pools - Installation and Maintenance
297-2121-303	Asynchronous Access Operations and Performance testing
P0697197	DATAPATH Keyboard Dialing Procedures

CHAPTER 2

INTRODUCTION TO DIALAN SERVICE

0 297-2121-227
0 VINTAGE 03.02

INTRODUCTION TO DIALAN SERVICE

Northern Telecom's DMS Integrated Local Area Network (DIALAN) Service provides Integrated Voice-Data access for DMS-100 subscribers over existing voice lines and the public switched telephone network. This chapter explains DIALAN Service capabilities, lists the hardware and software used for DIALAN Service, and gives examples of various DIALAN Service configurations.

DIALAN Service Capabilities

DIALAN Service provides a means of simultaneously connecting a telephone and a PC (personal computer) or ASCII terminal at a customer premises to a DMS-100 central office (CO) using an existing two-wire facility.

DIALAN Service requires the use of two commercially available modules: an Integrated Voice and Data Module (IVDM) at the customer premises, and a compatible Central Office Integrated Voice and Data Module (CO IVDM) at the Central Office (CO). The telephone and the PC or the ASCII terminal connect to the IVDM (at the customer premises). The CO IVDM (at the central office) connects to a voice line card (VLC) and to an asynchronous interface line card (AILC). See Figure 2.1.

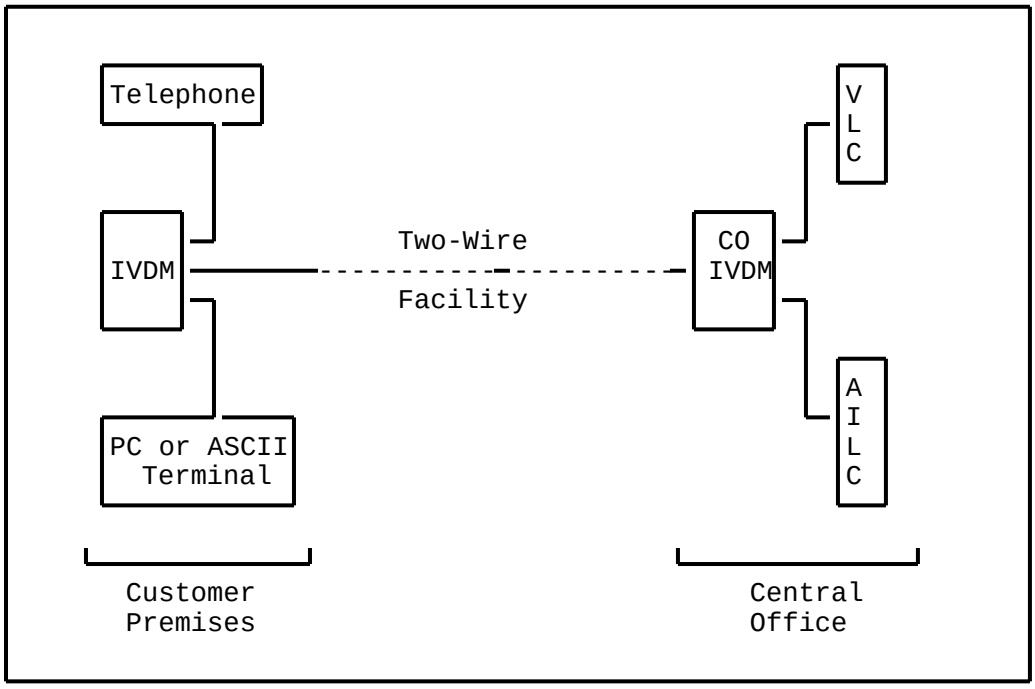

Figure 2.1 DIALAN SERVICE ACCESS TO DMS-100 CENTRAL OFFICE

0 Variations on IVDM/CO IVDM Usage

Some IVDM and CO IVDM (e.g., Lear-Siegler) can provide two data channels in addition to the voice channel. When such IVDM and CO IVDM are used, a second AILC may be used with the CO IVDM to support a second PC or ASCII terminal at the customer premises.

Some CO IVDM do not provide a four-wire RS-422 data port and when such is the case a RS-232C/RS422 converter must be used between the CO IVDM data port and the AILC.

The CO IVDM must be located in the same building as the LCM (line concentrating module) which houses the AILC (and which may also contain the VLC). This location is usually a DMS-100 Central Office. A DMS-100 Remote site may be used as the CO IVDM location if the AILC is housed in an LCM also located at this DMS-100 remote site.

0 Benefits of DIALAN Service:

Dialan Service has these benefits:

* is easy to install

* can be implemented one line at a time to exactly match demand

* allows the telephone operating company to choose a preferred vendor from amongst the many offering DIALAN Service compatible IVDMs and CO IVDMs.

* uses existing DMS-100 Central Office equipment and features

* provides simultaneous voice and data access to the public switched telephone network over a single twisted pair. (Voice and data are independent of each other and may be routed/dialed to either the same or different destinations.)

DIALAN Service and Other Products

DIALAN Service accesses the DMS-100 switch. This allows switched (dialed) access to all DMS voice and data products connected to that DMS-100 switch. In addition, other switches may be accessed via the public switched telephone network. Figure 2.2 shows DIALAN Service access to the major categories of products to which it can connect.

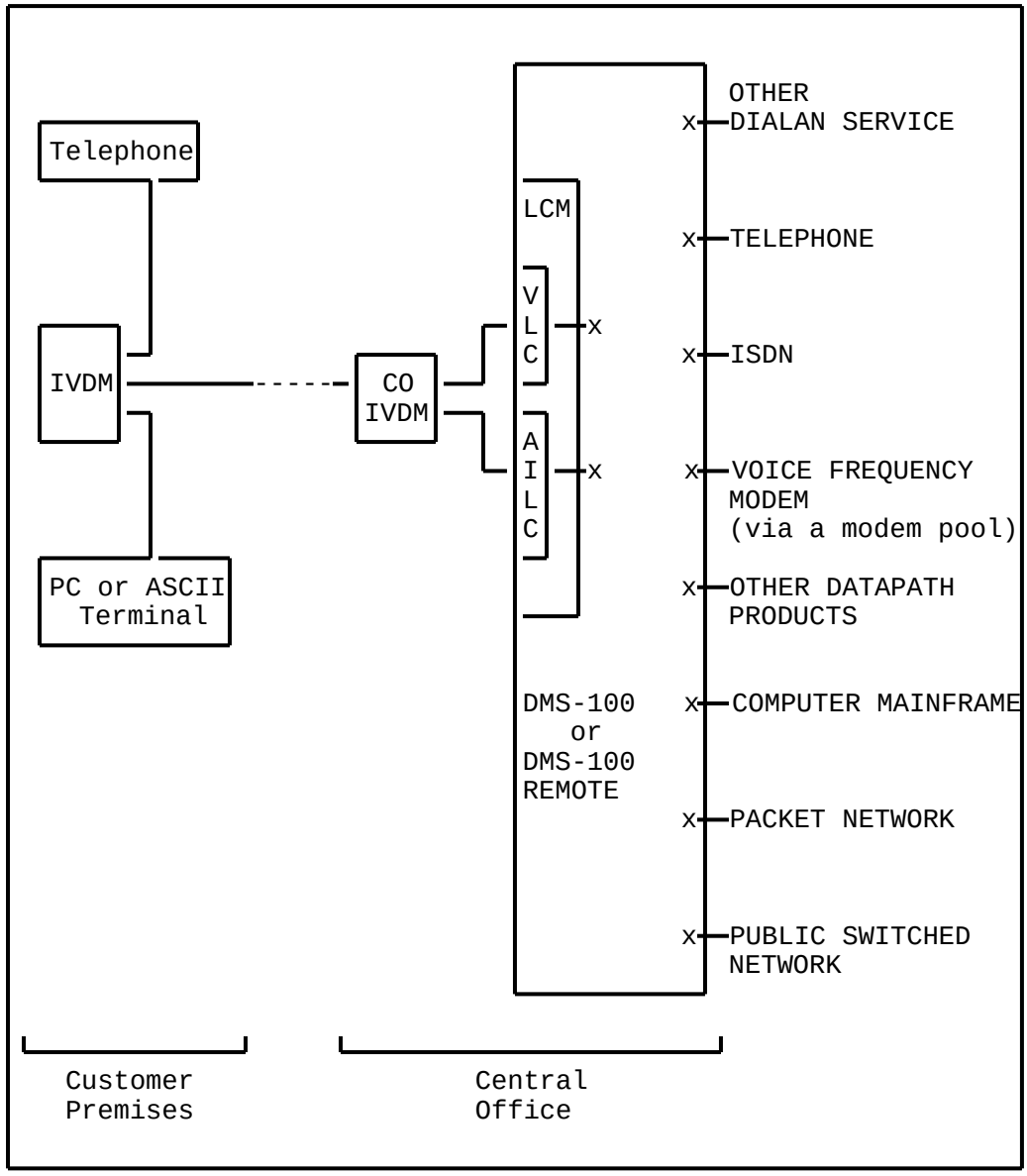

Figure 2.2 DIALAN SERVICE ACCESS TO OTHER PRODUCTS

DIALAN SERVICE HARDWARE

The hardware components that make up DIALAN Service are split over two locations that are joined by a two-wire facility. The two locations are:

- the customer premises
- the central office

Figure 2.3 on page 2-5 and Figure 2.4 on page 2-6 show the DIALAN Service hardware. Details of these figures are described later in this chapter.

READ

Inclusion of reference to other manufacturer's equipment in this document does not constitute an endorsement of that manufacturer or product by Northern Telecom.

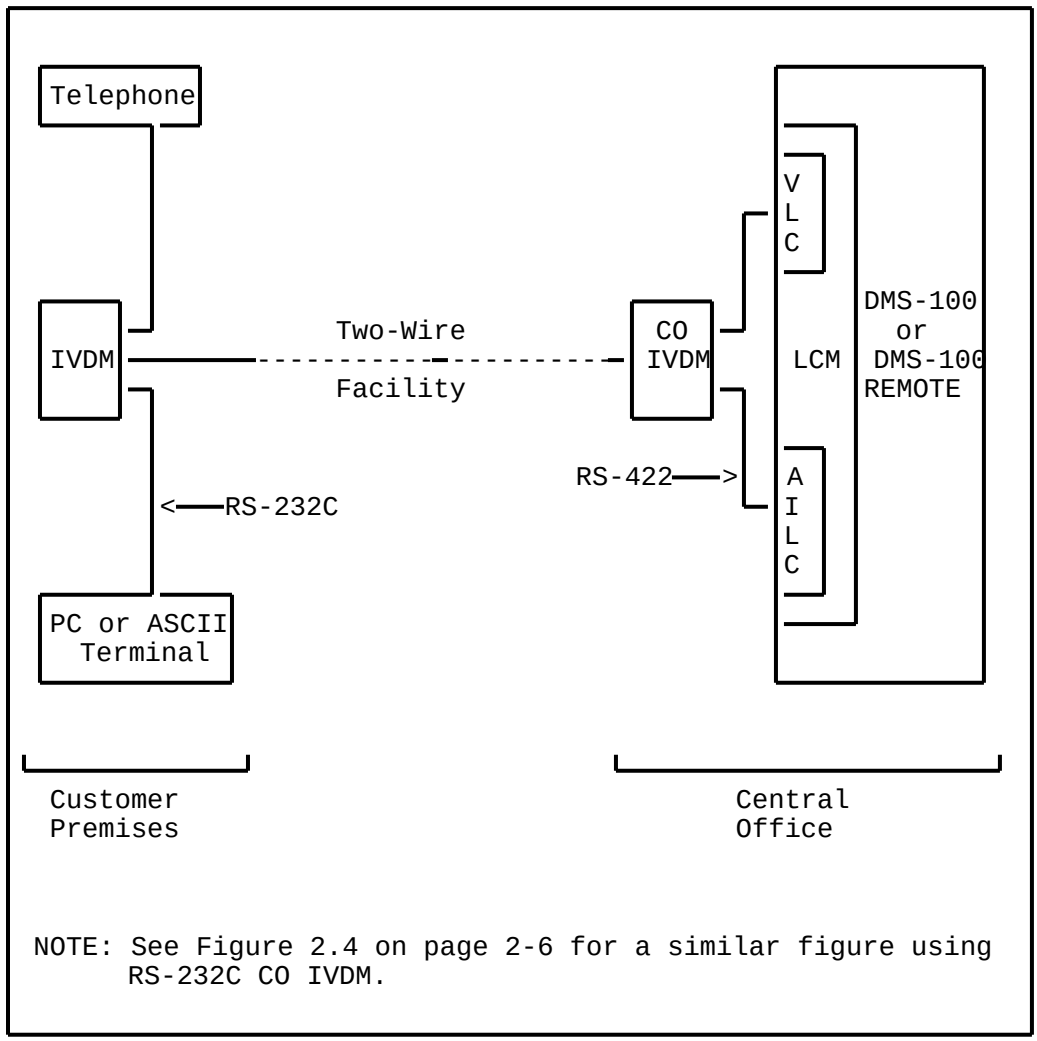

Figure 2.3 DIALAN SERVICE ACCESS TO DMS CENTRAL OFFICE USING RS-422 CO IVDM

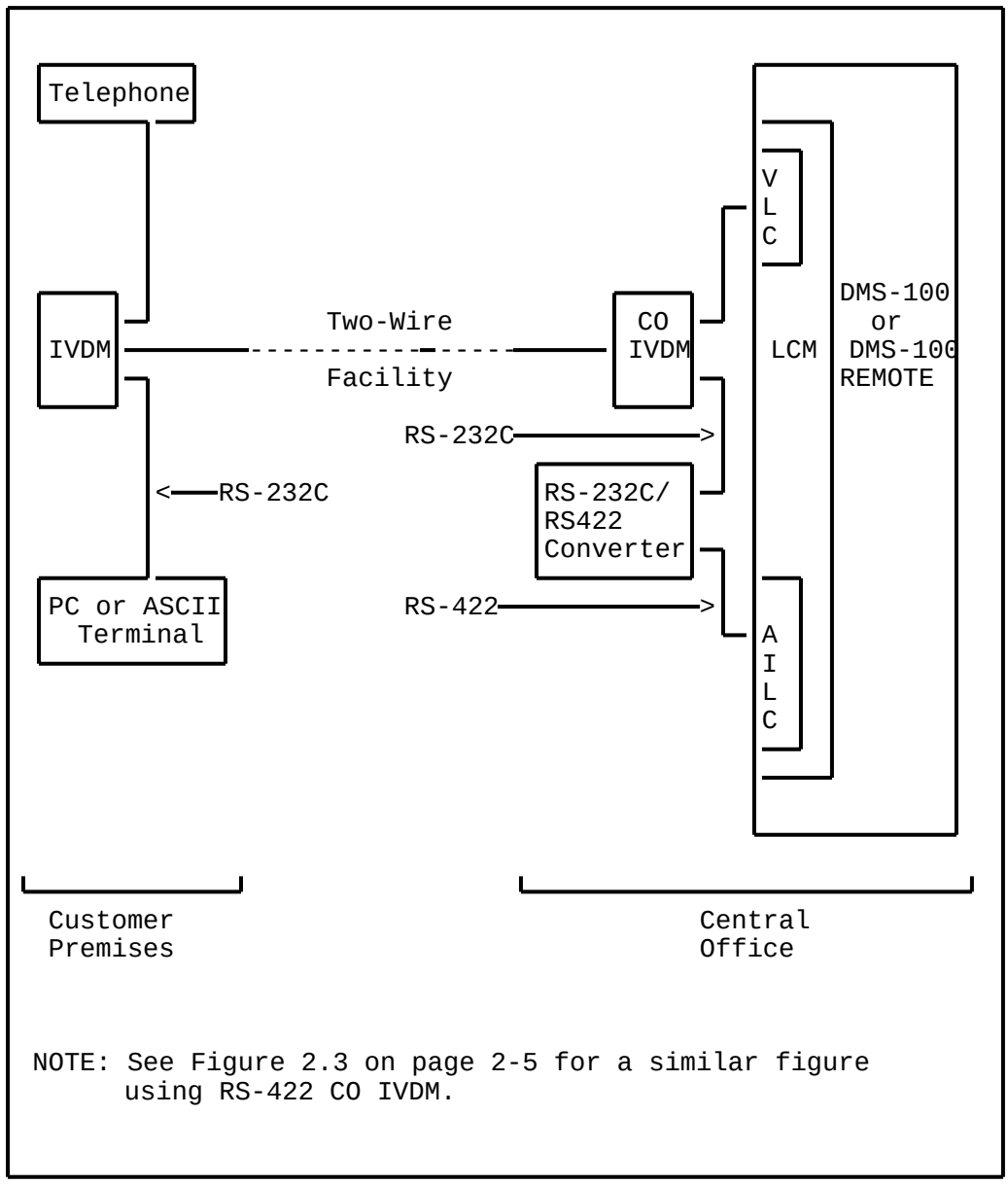

Figure 2.4 DIALAN SERVICE ACCESS TO DMS CENTRAL OFFICE USING RS-232C CO IVDM

Customer Premises Hardware

As shown in both Figure 2.3 on page 2-5 and Figure 2.4 on page 2-6 , the customer premises hardware consists of:

- an IVDM
- a telephone
- a PC or ASCII terminal
- a telephone wall jack

IVDM

Generally, the IVDM manufacturers will supply stand-alone (desk-top) units for use at the customer premises. Contact your IVDM supplier for more information.

The IVDM must satisfy the following requirements:

- have a data port with a RS-232C interface
- have a voice port for a telephone connection
- meet safety standards of the appropriate regulatory agencies

Telephones

The telephone used must be compatible with the IVDM used. The following examples of NT telephones are compatible with some IVDM manufacturers.

- 500 type (dial pulse)
- 2500 type (DTMF)
- EBS (Electronic Business Set)

PCs

Below are specifications of acceptable types of PCs (personal computers):

- RS-232C data interface
- Data rate of 110, 300, 1200, 2400, 4800, 9600, or 19,200 baud asynchronous

The following are examples of acceptable PCs:

- IBM* PC
- MacIntosh*
- Compaq*

ASCII Computer Terminals

Specifications of acceptable types of ASCII computer terminals are:

- Asynchronous
- RS-232C
- Data rate of 110, 300, 1200, 2400, 4800, 9600, or 19,200 baud asynchronous

The following are examples of acceptable ASCII computer terminals:

- DEC* VT-100
- IBM*-3101

Telephone Wall Jack

The telephone jack will probably have a Teladapt connector. Note that telephone extension sets are not allowed between the IVDM at a customer premises and the central office.

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* IBM is a trademark of International Business Machines
Macintosh is a trademark of Apple Computer Corporation
Compaq is a trademark of Compaq Computer Corporation
DEC is a trademark of Digital Equipment Corporation (DEC)

Central Office Hardware

As shown in both Figure 2.3 on page 2-5 and Figure 2.4 on page 2-6 , the central office hardware consists of:

- a CO IVDM
- a RS232C/RS422 converter (required only if RS-232C CO IVDM used)
- a voice line card (VLC)
- an asynchronous interface line card (AILC)

CO IVDM

The CO IVDM interfaces the two-wire facility to both a VLC and an AILC in a LCM. Usually CO IVDM are of the rack mounted type. The CO IVDM must meet the following specifications:

- have one or more data ports with either RS-232C or RS-422 interface
- have an analog connection for a voice line card
- meet safety standards of appropriate regulatory agencies
- have ground isolation between CO IVDM data port(s) and the outside plant two-wire facility

RS-232C/RS-422 Converter

If the CO IVDM at the central office does not have RS-422 available but rather RS-232C, a converter must be used to interface the CO IVDM with the AILC. Figure 2.4 on page 2-6 shows a RS232C/RS422 converter used between a RS-232 CO IVDM and an AILC.

AILC

The data line card used for DIALAN Service is the asynchronous interface line card (AILC) NT6X76 - type L. This four-wire line card is described further in the Hardware Description Manual, 297-1001-805.

The data line card NT6X76AC or NT6X76AD is compatible with the NT6X76 - type L card and can be used to replace it. The NT6X76AD data line card supports the Hayes command set.

VLC

The voice line card (VLC) used for DIALAN Service is any line card that is compatible with the telephone set that is used with and supported by the IVDM. PECs (product engineering codes) of three VLC are:

* NT6X17 - Line card (Type A)
* NT6X18 - Line Card (Type B)

0 297-2121-227
0 VINTAGE 03.02

0 * NT6X21 - Line Card (EBS)

The Two-wire Facility

A metallic loop (usually copper twisted pair) is the basic form of two-wire facility. The loop should be non-loaded. The acceptability of bridge taps or bridge lifters on the loop is specified by the IVDM/CO IVDM manufacturer. Similarly, the maximum loop length of twisted pair will depend upon its gauge and is specified by the IVDM manufacturer.

To increase reach, various forms of loop extension may be used. The loop extension should provide a 4 kHz clear channel.

Some examples are:

* LS D4 - Lear-Siegler Carrier
* SLC 96 - Western Electric Subscriber Line Carrier

DIALAN SERVICE SOFTWARE

DMS-100 Software

Software must be installed in the DMS-100 switch which houses the AILC associated with a CO IVDM to allow DIALAN Service. In the case of AILCs and CO IVDM residing in a DMS-100 remote, the software requirement applies to the host office which supports the DMS-100 remote. The software packages required in the DMS-100 switch using DIALAN Service are:

- NTX100 Integrated Business Networks - Basic (IBN)
- NTX250 Datapath Basic
- NTX251 Datapath - Modem Pooling (only required if access to analog modems is desired)
- NTX426 Asynchronous Interface Line Card

PC Software

Examples of typical communication software programs for PCs connected to IVDM are:

- Procomm
- Smartcom
- Crosstalk
- Carbon Copy Plus

EXAMPLES OF DIALAN SERVICE CONFIGURATIONS

Some examples of DIALAN Service are described in the following pages where a call has been made and terminated on the same DMS-100 switch. The following configurations are described:

- basic DIALAN end-to-end call
- DIALAN call to a VF modem through a modem pool
- DIALAN call to an ISDN terminal

These configurations use a basic IVDM with one voice port and one data port. Also they use a RS-422 CO IVDM that does not need a RS232C/RS422 converter.

Basic End-To-End DIALAN Call

The call shown in Figure 2.5 on page 2-14 has been established between two DIALAN Service subscribers at customer premises A and B. The subscribers can speak to each other using their telephones and simultaneously exchange data between their PCs. If a data file is being transferred between the PCs and there is no further need to communicate with each other by telephone, the two subscribers may use their telephones for other unrelated calls through the network.

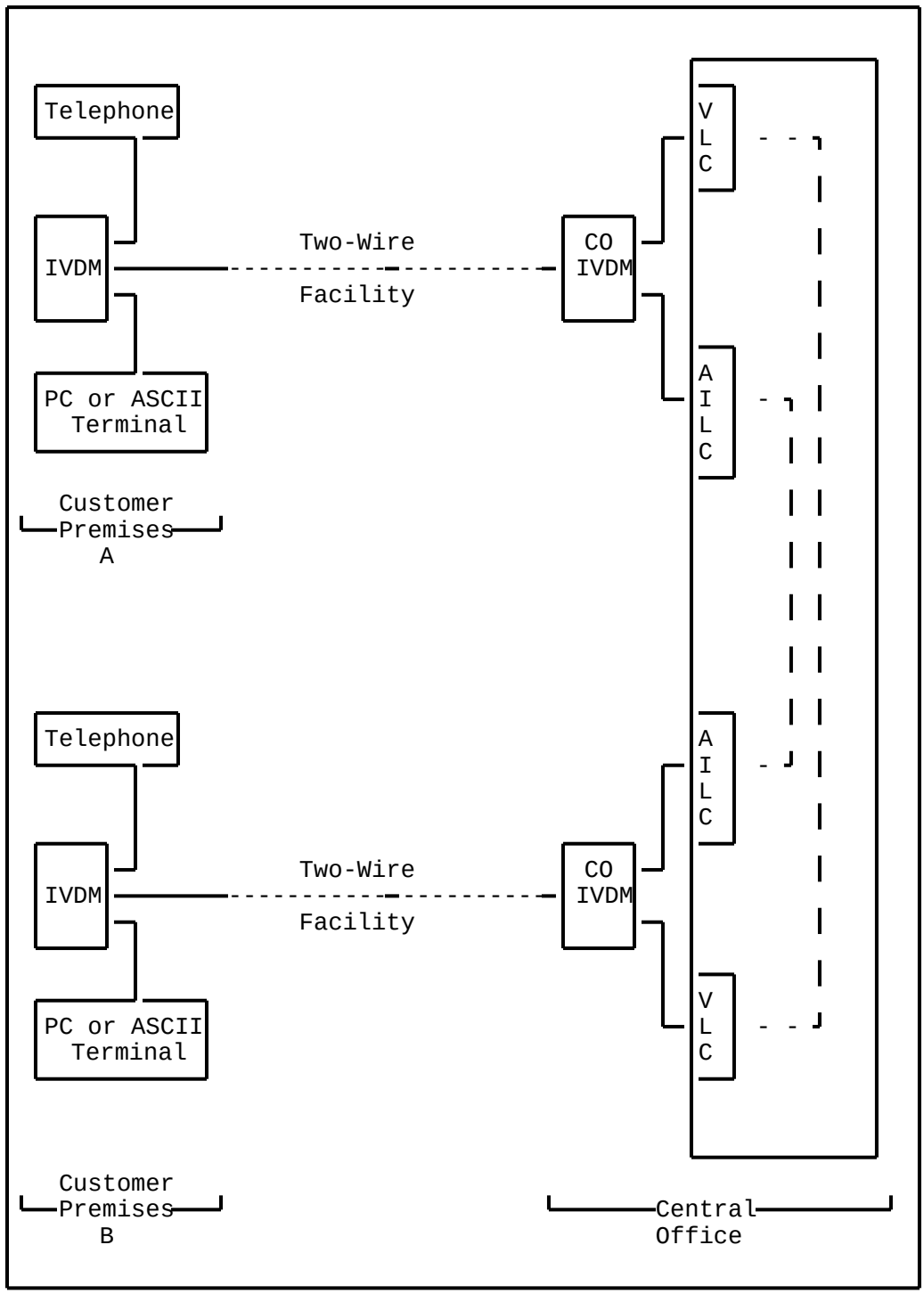

Figure 2.5 END TO END DIALAN CALL

0 DIALAN Call To a VF Modem Through a Modem Pool

The call shown in Figure 2.6 on page 2-16 has been established between a DIALAN subscriber's PC or ASCII terminal at customer premises C and a subscriber's PC or ASCII terminal at customer premises D. In this call data is being sent between the PC or ASCII terminal at customer premises C and the other PC or ASCII terminal at customer premises D. Use of the modem pool element is described in 297-2121-224. The DIALAN subscriber at location C may use the telephone to make calls, unrelated to the data connection, through the telephone switching network.

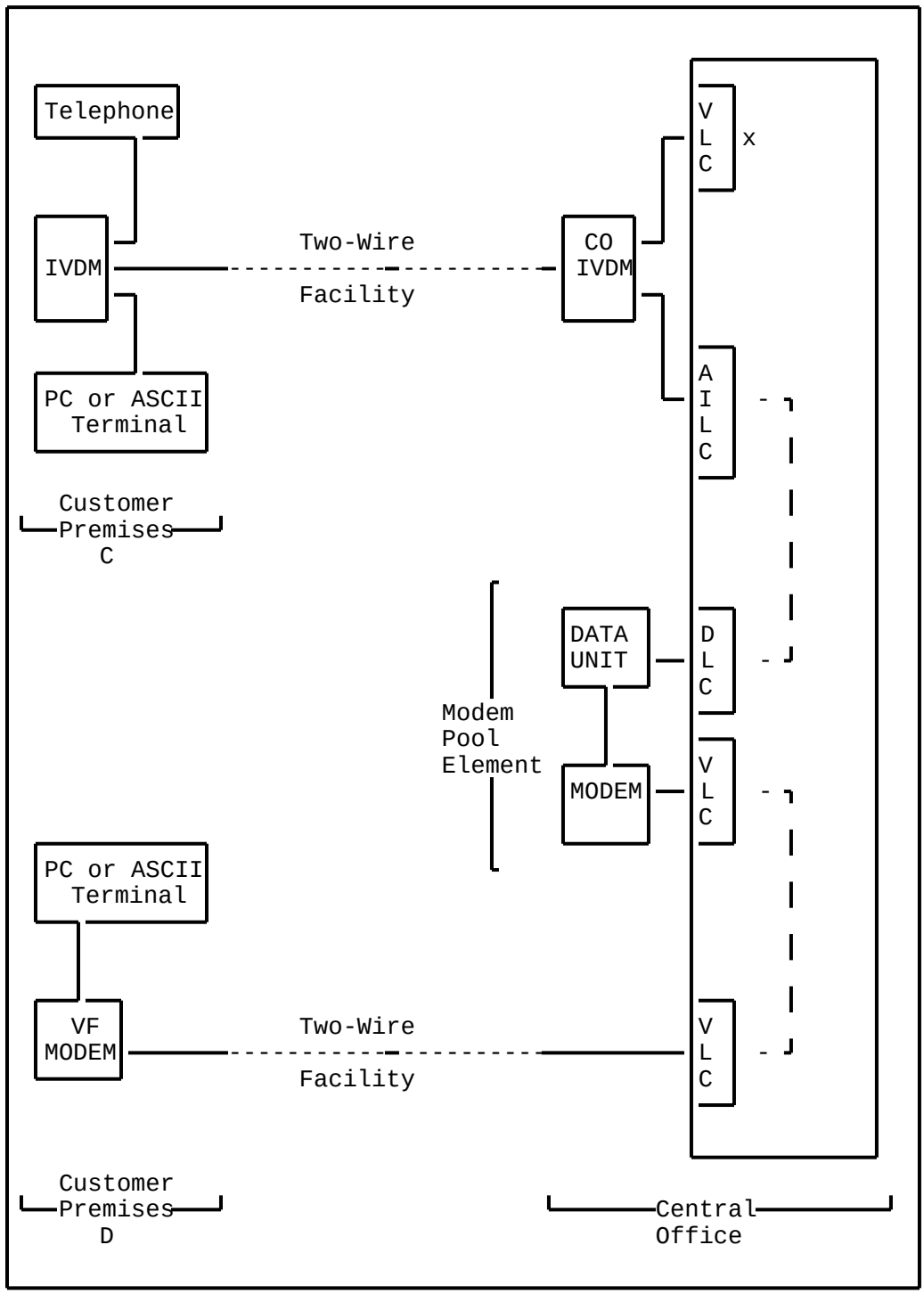

Figure 2.6 DIALAN CALL TO A VF MODEM THROUGH A MODEM POOL

0 DIALAN Call To an ISDN Terminal

The call shown in Figure 2.7 on page 2-18 has been established between a DIALAN subscriber's PC at customer premises E and an ISDN subscriber's PC at customer premises F. In this call data is being sent between the PC at customer premises E and the PC at customer premises F. The DIALAN subscriber at customer premises E may use the telephone to make, or receive, calls through the telephone network.

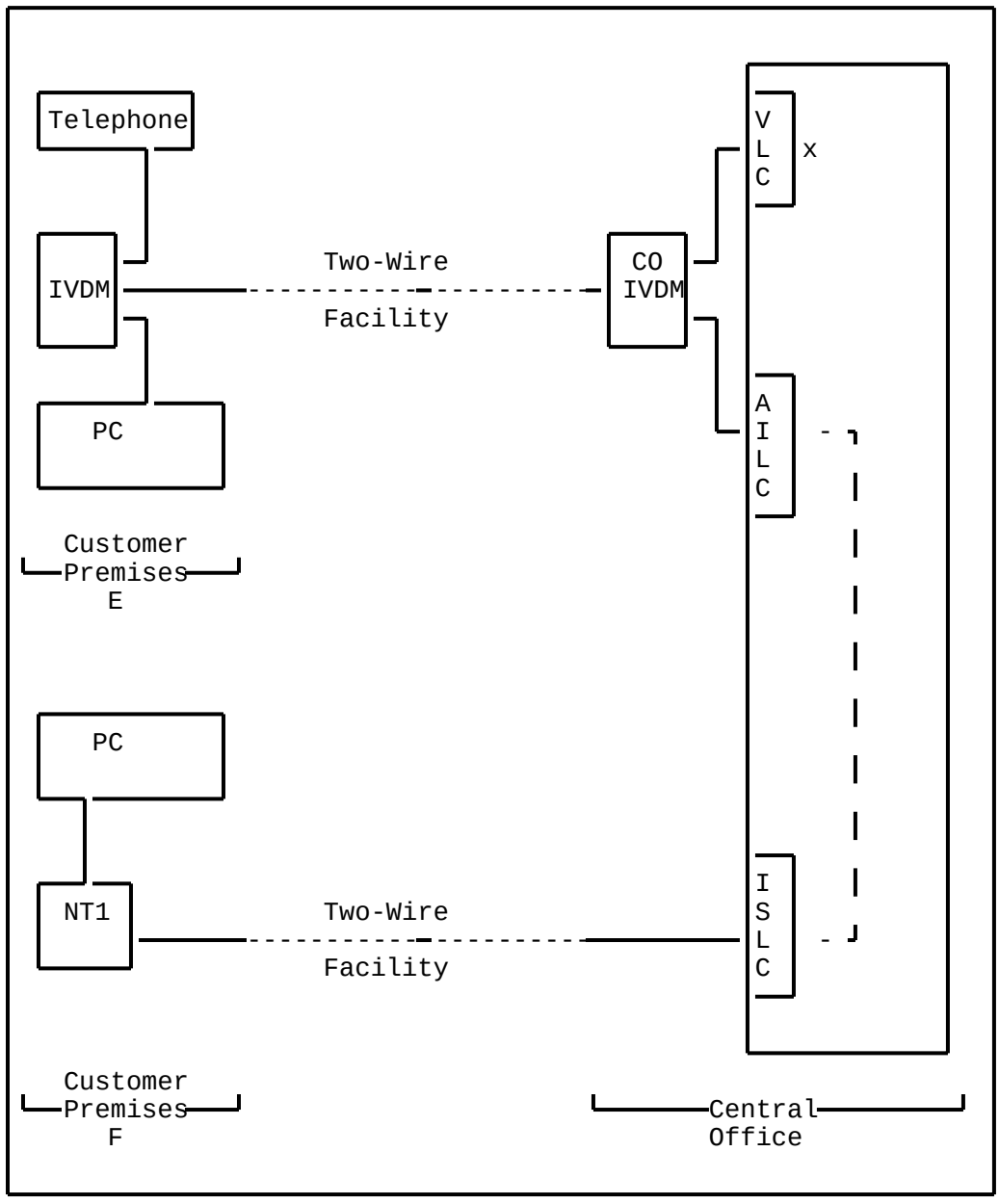

Figure 2.7 DIALAN CALL TO AN ISDN TERMINAL

CHAPTER 3

ENHANCED DIALAN SERVICE

0 297-2121-227
0 VINTAGE 03.02

ENHANCED DIALAN SERVICE

The AILC (NT6X76AC) enhances the DIALAN service. When appropriately datafilled for DIALAN service in table DPROFILE, this card, in addition to providing the basic functionality of the NT6X76-type L AILC, supports the following functions:

* profile downloading for DIALAN service

* idle timeout feature

* datapath closed user group (CUG)

* messaging protocol with the IVDM system

The Hayes Supported AILC (NT6X76AD) provides the Hayes command set for the DIALAN service. This card, in addition to providing the basic functionality of the Enhanced AILC (NT6X76AC), supports the following functions:

* the Hayes command set

* increased static memory

Profile Downloading for DIALAN

The AILC profile is used to configure its operating parameters. The DPROFILE table is datafilled for DIALAN service and the profile information is then downloaded to the AILC. This enables the AILC (NT6X76AC or NT6X76AD) to send DIALAN messaging protocol commands to the IVDM system.

The datafill of DPROFILE table for this feature is shown in Table 3.1 on page 3-2. The Service Orders entries for this feature are shown in Table 4.1 on page 4-6.

Idle Timeout

The idle timeout feature, available with AILC (NT6X76AC or NT6X76AD), provides a means to save on DMS resources by allowing the AILC to release a call when no data is being transmitted or received during a specified (timeout) period. The datafill of DPROFILE table for this feature is shown in Table 3.1 on page 3-2. The Service Orders entries for this feature are shown in Table 4.1 on page 4-6. For more information on table DPROFILE, refer to Common Customer Data Schema, 297-1001-451.

TABLE 3.1
DPROFILE FOR DIALAN

FIELD	VALID ENTRY	DESCRIPTION
DPOPTS	DIALAN	Indicates that AILC is configured for DIALAN
IDLETO	0, 1, 2, 3	Represents idle timeout period: 0 = idle timeout disabled 1 = idle timeout after 15 minutes 2 = idle timeout after 30 minutes 3 = idle timeout after 60 minutes

Datapath Closed User Group (CUG)

The datapath CUG is a group of data users whose members may only originate calls to or receive calls from other members of certain CUGs. They are assigned unique CUG numbers which are verified for compatibility before a call is allowed between two data users.

The AILC (NT6X76AC or NT6X76AD) supports datapath CUG for DIALAN service. CUG is datafilled as a line feature in table KSETFEAT. For information on datafill of the KSETFEAT table, see Common Customer Data Schema, 297-1001-451. CUG is assigned as a line option through Service Orders as shown in Table 4.2 on page 4-8. For more information on the CUG option, refer to the Service Orders manual, 297-2101-310.

Messaging Protocol

The DIALAN messaging protocol provides the means to set loopback points at the IVDMs, and to signal call release. It provides an inband messaging channel between the AILC (NT6X76AC or NT6X76AD) and the IVDM system, and allows the AILC to send 1-byte commands to the IVDM system. These commands are used to

* activate local analog loopback

* activate remote digital loopback

* release IVDM loopbacks

* signal the IVDM system that the call has been disconnected

LOOPBK Command

The LOOPBK command is used to set loopbacks at the IVDMs. These loopbacks used with the BERT test provide a means of testing the integrity of the DIALAN data connection. The LOOPBK command and the BERT test are described in the Line Maintenance Reference Manual, 297-2101-516.

The LOOPBK command at the LTPDATA level of the Maintenance and Administration Position (MAP) of the DMS activates the loopbacks. At the LTPDATA level:

1. post the line for AILC (NT6X76AC or NT6X76AD)

2. enter LOOPBK command with the appropriate parameter: CO_IVDM for local analog loopback (at CO IVDM), or CPE_IVDM for remote digital loopback (at CP IVDM).

Upon activation, a message containing the loopback location is sent to the AILC which forwards this information to the appropriate IVDM. The AILC must be datafilled for DIALAN service in table DPROFILE.

Local Analog Loopback

The local analog loopback is set on the CO IVDM and the location of the CO IVDM loopback is shown in Figure 3.1 on page 3-4

Remote Digital Loopback

The remote digital loopback is set at the interface between the CP IVDM and the DTE, and the location of the loopback is shown in Figure 3.2 on page 3-5

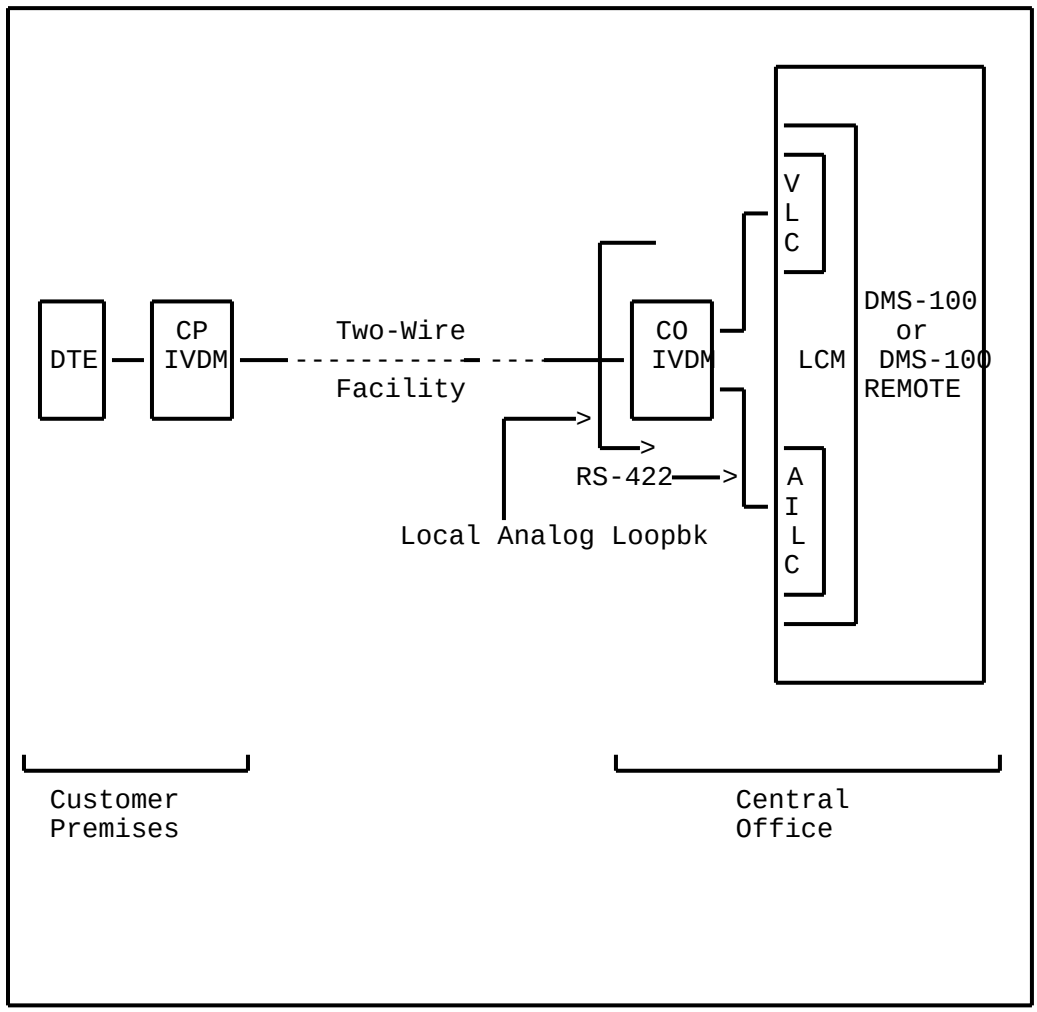

Figure 3.1 LOCAL ANALOG LOOPBACK FOR DIALAN

Release Loopback

To release a loopback, at the LTPDATA level of the MAP, enter the LOOPBK command with the parameter RLS.

Call Disconnect

When a call is taken down by the DMS, the AILC, configured for DIALAN service, sends the call disconnect indication to the IVDM system. The IVDM then indicates the completion of the current data session to the DTE.

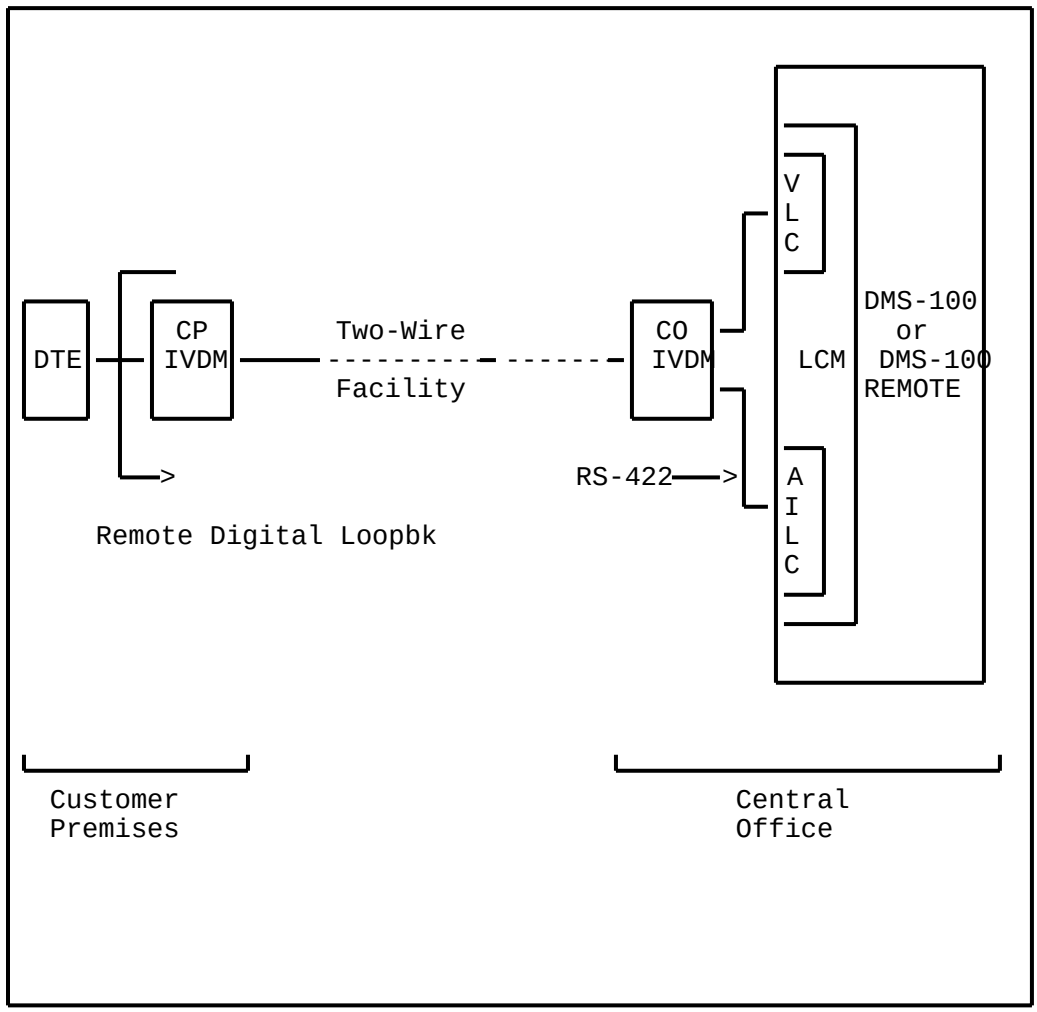

Figure 3.2 REMOTE DIGITAL LOOPBACK FOR DIALAN

0 297-2121-227
0 VINTAGE 03.02

CHAPTER 4

INSTALLING DIALAN SERVICE

0 297-2121-227
0 VINTAGE 03.02

INSTALLING DIALAN SERVICE

This chapter describes DIALAN Service equipment installation at a customer premises and at the central office (CO).

The installation at the central office should be performed and verified before a customer premises equipment installation so that the customer premises equipment can be verified with its companion CO equipment. The installation of the two-wire facility is not a part of DIALAN installation. For the addition of DIALAN Service to an existing voice service at a customer premises, the two-wire facility will be in place. For a new installation of DIALAN Service, a two-wire facility which will support voice service to the customer premises should be installed according to normal operating company procedure before the DIALAN Service installation begins.

Obtaining a Circuit Plan

A circuit plan should be obtained or created which lists the following:

* The cable pair to be used at the MDF for the two-wire facility

* The DN (directory number) and LEN (line equipment number) of the VLC (voice line card)

* The DN and LEN of the AILC (asynchronous interface line card) connected to the data port

  Note: Where the CO IVDM provides two data ports, two DN, two LEN, and two AILC will be required.

* The manufacturer and model of the CO IVDM along with the option settings

  Note: The IVDM at the customer premises and the CO IVDM must be compatible with each other.

* The manufacturer and model of the RS-232C/RS-422 converter if required

  Note: Where the CO IVDM has RS232C data port(s), a RS-232C/RS-422 converter will be required for each data port.

* The manufacturer and model of the IVDM for the customer premises along with the option settings

  Note: The IVDM at the customer premises and the CO IVDM must be compatible with each other.

* The manufacturer and model of the telephone at the customer premises

  Note: The telephone must be compatible with the VLC.

* The manufacturer and model of the PC or ASCII terminal at the customer premises

  Note: Where IVDM provide two data ports, two PCs, or two ASCII terminals, or one PC and one ASCII terminal may be connected to these ports.

Electrostatic Protection

WARNING

To protect DMS-100 circuit cards from electrical and mechanical damage, follow these precautions:

* When handling a circuit card not in an electrostatic discharge (ESD) protective container, personnel must be standing on a conductive floor mat, and wear a wrist strap connected, via a 1 Meg ohm resistor, to a suitably grounded object - such as a metal workbench or a DMS frame. DO NOT use the 48v battery return jack on the FSP for electrostatic discharging. See Note 1.

* When carrying a circuit card from one location in an office to another where a grounded wrist strap cannot be used, be sure that the card is in an ESD protective container. See Note 2.

* Store circuit cards in a maintenance spares storage (MSS) frame or in a ESD protective container and shipping carton.

* Handle circuit cards carefully by faceplate or latches if possible (some cards, such as line cards, must be handled by the edges). Do not touch edge connectors or components on cards.

* Do not drop circuit cards or stack them on or against each other.

Notes:

1. A detailed description of grounding procedures and associated equipment is given in NTP 297-1001-010.

2. An ESD protective container may be a conductive bag or other conductive package as described in NTP 297-1001-010.

INSTALLATION AT THE CENTRAL OFFICE

To install the equipment at the central office, perform the following procedures in this order.

1. Install the voice line card (VLC)

2. Install the asynchronous interface line card (AILC)

3. Install the CO IVDM

Installing the VLC

Install and datafill the VLC (voice line card) in an LM or LCM according to normal practice. The subscriber side of this line card will have a two-wire appearance on the voice MDF (main distributing frame). See Figure 4.1 on page 4-9 and Figure 4.2 on page 4-10 .

Installing the AILC

Install the AILC (Asynchronous Interface Line Card) according to normal operating company practice. The subscriber side of this line card will have a four-wire appearance on the data MDF (main distributing frame). See Figure 4.1 on page 4-9 and Figure 4.2 on page 4-10 .

To datafill this card, perform the following procedures in this order:

1. Enter datafill for this card in table LNINV. See the Table Editor Reference Manual 297-1001-310.

2. Enter datafill for this card using the SERVORD command. Refer to the Service Order and Query System Reference Manual 297-2101-310. See Table 4.1 on page 4-6 for entries.

Installing the CO IVDM

The CO IVDMs are of various manufacture and therefore only the typical plug-in connections are described here. Usually rack-mounted CO IVDM are used. Refer to manufacturer’s information for correct details. Set option switches using the circuit plan and manufacturer’s instructions. Connect power per manufacturers instructions. See Figure 4.1 on page 4-9 and Figure 4.2 on page 4-10 . for CO IVDM Connections.

Connecting the CO IVDM to the two-wire facility

The LINE port of the CO IVDM is cabled to the NETWORK MDF. See Figure 4.1 on page 4-9 and Figure 4.2 on page 4-10 .

- Use a two wire jumper to connect the NETWORK MDF to the HORIZ. MDF.
- Use a two wire jumper to connect the HORIZ. MDF to the protector appearance of the two-wire facility at the VERT. MDF.

Connecting the CO IVDM to the VLC

The VOICE port of the CO IVDM is cabled to the VOICE MDF. See Figure 4.1 on page 4-9 and Figure 4.2 on page 4-10 Use a two wire jumper to connect the VOICE MDF to the VLC appearance at the HORIZ. MDF.

Connecting the CO IVDM to the AILC

RS-422 CO IVDM:

The DATA port of the RS-422 CO IVDM is cabled to the DATA MDF. See Figure 4.1 on page 4-9. Use 2 two-wire jumpers to connect the DATA MDF to the AILC appearance at the MDF.

RS-232C CO IVDM:

The DATA port of the RS-232C CO IVDM is cabled through the RS-232C/RS-422 converter to the DATA MDF. See Figure 4.2 on page 4-10. Use 2 two-wire jumpers to connect the DATA MDF to the AILC appearance at the MDF.

Service Orders Entries for DIALAN

DIALAN features IDLETO and CUG can be assigned through the Service Orders as shown in Table 4.1 on page 4-6 and Table 4.2 on page 4-8 .

TABLE 4.1
SERVORD ENTRIES FOR DIALAN

FIELD	DESCRIPTION	ENTRY
DN	DIRECTORY NUMBER	Enter the directory number of PC or ASCII terminal
LCC	LINE CLASS CODE	Enter: DATA
GROUP	CUSTOMER GROUP	- user defined
SUBGROUP	CUSTOMER SUBGROUP	- user defined
NCOS	NETWORK CLASS OF SERVICE	- user defined
SNPA	SERVICE NUMBERING PLAN AREA	- user defined Enter: area code
RINGING	RINGING	Enter: N
CLASSDU	CLASS OF DATA UNIT	Enter: AILC
DOWNLOAD	DOWNLOAD PROFILE	Enter: Y
DATA RATE	DATA RATE	Value = 110, 300, 1200, 2400, 4800, 9600, 19200. - user defined
CHARLEN	CHARACTER LENGTH	Value = 8 or 7 - user defined
PARITY	PARITY	Value = NO, ODD, EVEN, MARK - user defined
KBDTYP	KEYBOARD TYPE	Enter: SYMB
PROMPTS	PROMPTS	Enter: Y
IDLETO	IDLE TIMEOUT	Value = 0, 1, 2, 3 0 = Idle timeout feature disabled 1 = Idle timeout after 15 minutes 2 = Idle timeout after 30 minutes 3 = Idle timeout after 60 minutes
DPOPTS	DATAPATH OPTIONS	- user defined list e.g. DIALAN

Table Continued

TABLE 4.1 (Continued)
SERVORD ENTRIES FOR DIALAN

FIELD	DESCRIPTION	ENTRY
LATA NAME	LATA NAME	- user defined
LEN	LINE EQUIPMENT NUMBER	- user defined Enter: len of AILC
OPTKEY	OPTION KEYS	- user defined Examples: (same as DATAPATH) 2 Network Resource 3 Autodial 4 Speed Call Short List 7 Ring Again

TABLE 4.2
SERVORD ENTRIES FOR CUG

FIELD	DESCRIPTION	ENTRY
DN_OR_LEN	DIRECTORY NUMBER or LEN	Enter the directory number or LEN for the AILC
OPTKEY	OPTION KEY	Enter one of the option keys
OPTION	DATA LINE OPTION	Enter CUG option
CUGID	ID TO IDENTIFY CUG	-user defined CUG identifier
OUTGOING	OUTSIDE CUG	Enter Y or N

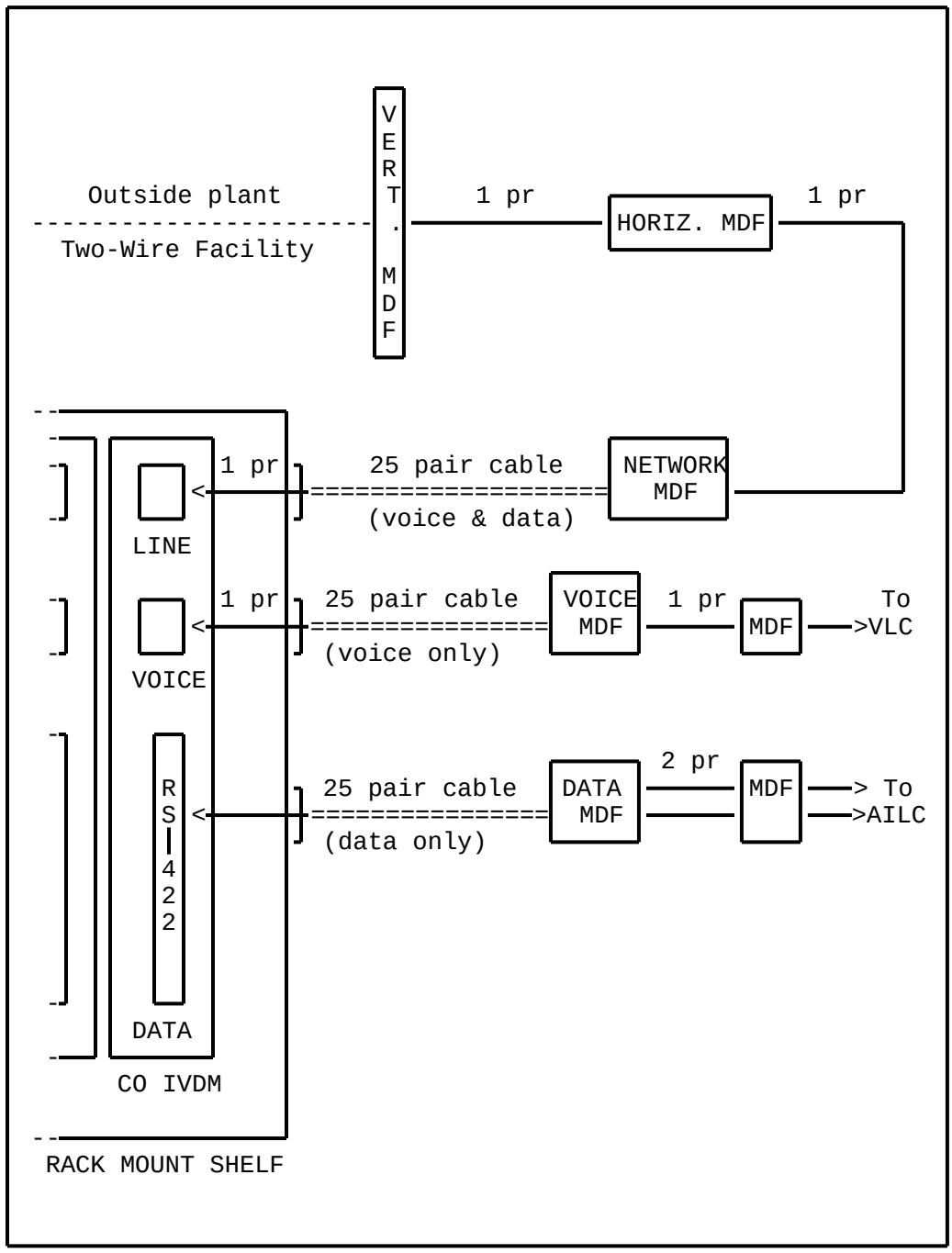

Figure 4.1 RS-422 CO IVDM in RACK MOUNT SHELF

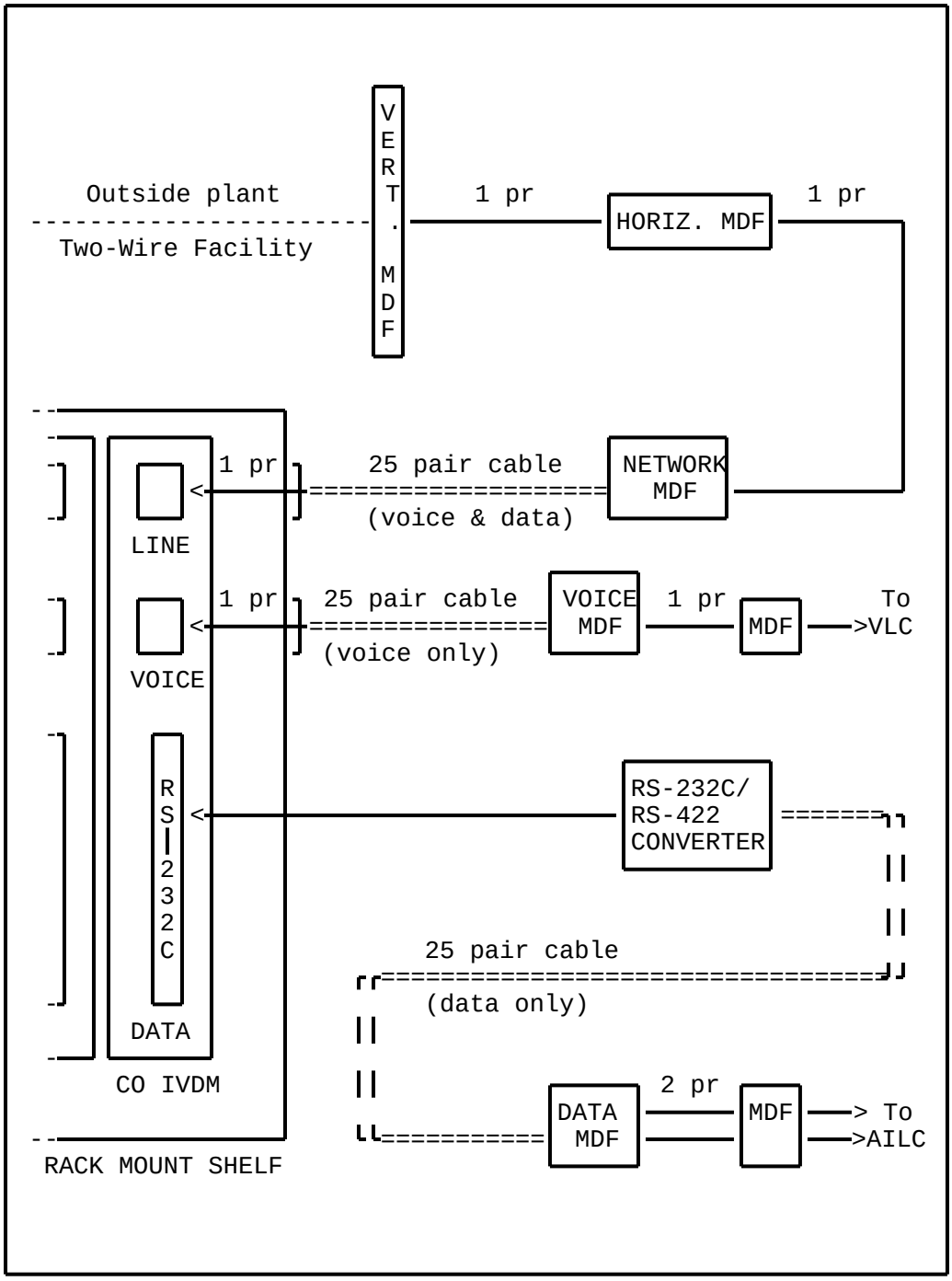

Figure 4.2 RS-232C CO IVDM in RACK MOUNT SHELF

INSTALLATION AT A CUSTOMER PREMISES

The installation of the equipment at the customer premises consists of:

1. Installing the IVDM
2. Installing the cord between the IVDM and the wall jack
3. Installing the Telephone
4. Installing the PC or ASCII Terminal

Installing the IVDM

Usually a desk-top IVDM with TELADAPT* connectors for line and voice connections and RS-232C connector(s) for the data connection will be used. Refer to IVDM manufacturers' information. Set any switches and connect power per manufacturers instructions. See Figure 4.3 on page 4-12 for IVDM Connections with either one or two data ports.

Installing the Cord Between IVDM and Wall Jack

Use a two-wire cord with Teladapt connector between the IVDM and the wall jack which terminates the customer end of the two-wire loop.

Installing the Telephone

Most telephone sets and most IVDM use the industry standard TELADAPT connectors. Plug the telephone cord into the voice port of the IVDM.

Installing the PC or ASCII Computer Terminal

The data port(s) of the IVDM is a RS-232C connector. The PC or ASCII terminal must have an associated cable with its far end terminating in a RS-232C connector compatible with the IVDM connector. Plug the PC or ASCII terminal cable connector into the RS-232C data port of the IVDM.

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* TELADAPT is a trademark of Northern Telecom

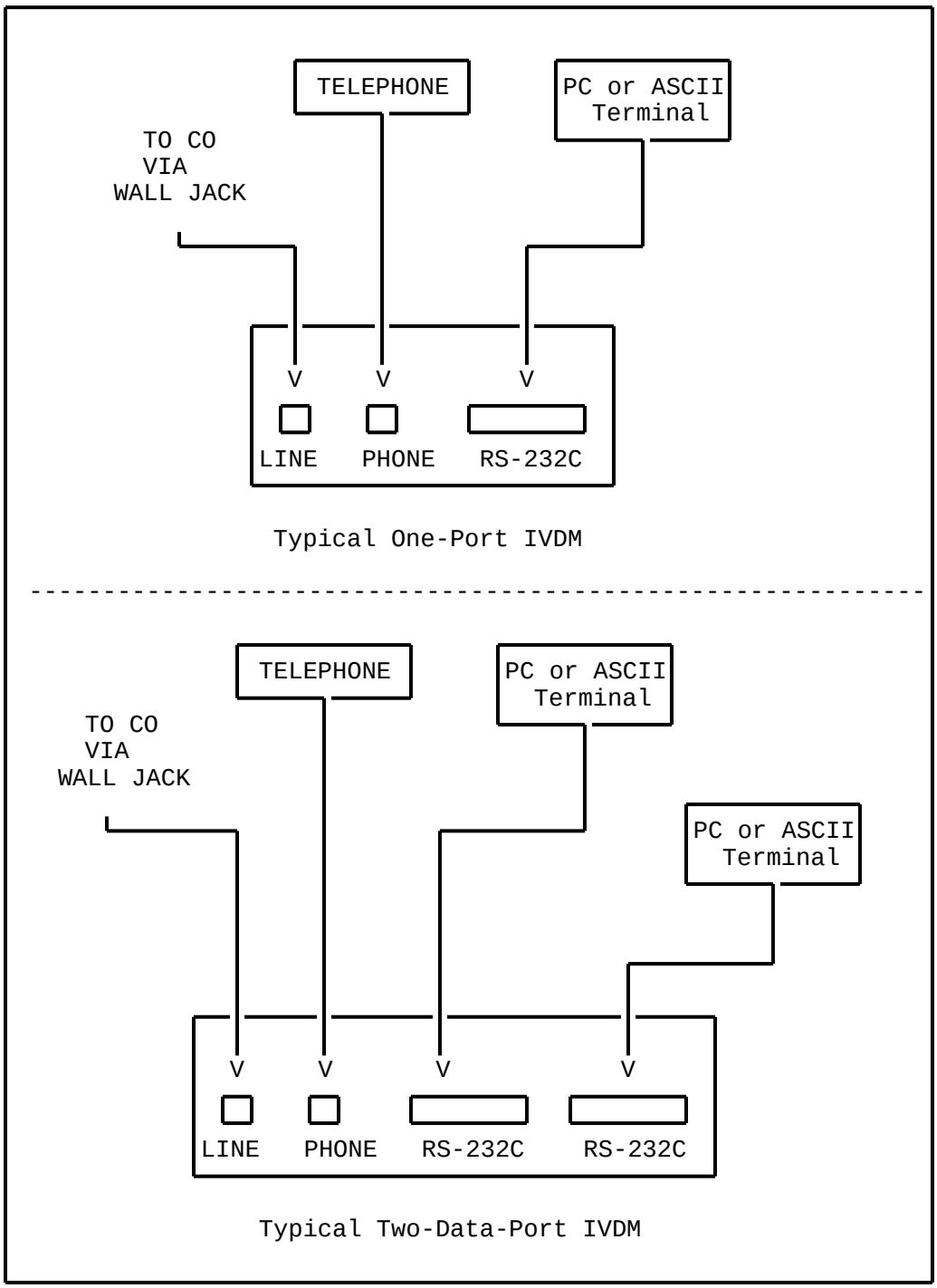

Figure 4.3 IVDM CONNECTIONS

CHAPTER 5

VERIFYING DIALAN SERVICE

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VERIFYING DIALAN SERVICE

This section explains how to identify faults in DIALAN Service operation. This information will be used by a repair service person at the customer premises. Use the next chapter to correct any fault identified.

Perform the verifications in this order:

1. Verify voice service

2. Verify data service

3. Verify simultaneous voice and data service

Verifying Voice Service

Turn off the PC or ASCII terminal connected to the IVDM. Use the telephone connected to the IVDM at the customer premises to place a call to another known-to-be-working telephone. This procedure tells you whether or not there is a fault:

* If the call is completed and the voice transmission is of acceptable quality, there is not a voice fault.

* If the call is not completed or if the voice transmission is of unacceptable quality, there is a voice fault. See Correcting Voice Faults on page 6-1.

Verifying Data Service

Ensure that the telephone connected to the IVDM is on-hook. Use the PC or ASCII terminal connected to the IVDM at the customer premises to place a call to another known-to-be-working PC or ASCII terminal. See Table 5.1 on page 5-2 for a sample call set-up procedure. This procedure tells you whether or not there is a fault:

* If the call is completed and data communication can take place (both sending and receiving) there is not a data fault.

* If the call is not completed, or data communication does not take place, or data errors are generated there is a data fault. See Correcting Data Faults on page 6-2.

Verifying Simultaneous Voice and Data Service

This precedure verifies data transmission only. Telephone voice quality is not likely to be affected by interference from the data transmission. The following steps check for data transmission corruption.

1. Leave the telephone connected to the IVDM on-hook.

2. Place a call from the PC or ASCII terminal connected to the IVDM to another data terminal.

3. Arrange to have data transmitted between the data terminals.

4. While data is being transmitted, place a telephone call to an assistant. Arrange for the assistant to call you back.

5. Hang up the telephone and wait for at least three ring cycles before answering.

This procedure tells you whether or not there is a fault:

* If the data transmission is unaffected by telephone dialing, voice transmission, or ringing, there is not a simultaneous voice and data fault.

* If the data transmitted is corrupted during telephone dialing, voice transmission, or ringing, there is a simultaneous voice and data fault. See Correcting Data Faults on page 6-2.

TABLE 5.1
SAMPLE CALL ORIGINATION USING NT KEYBOARD DIALING

STEP	DISPLAY	ACTION
1		Turn on PC or ASCII terminal
2	DTR LED BRIGHT	Input: CONTROL R
3		Enter: . (period followed by carriage return)
4	:	Input: + (to originate a call)
5	#	Input: directory number of destination
6	...	(call is being set up)
7	>	(call has been established)

Refer to the DATAPATH KEYBOARD DIALING PROCEDURES user card (P0697197) for more information.

CHAPTER 6

TROUBLESHOOTING AND CORRECTING DIALAN SERVICE FAULTS

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TROUBLESHOOTING AND CORRECTING DIALAN SERVICE FAULTS

This chapter explains how to troubleshoot and correct a fault in the voice service and data service. This information is used by both the repair service at the customer premises and the operating company maintenance personnel at the central office to efficiently repair a faulty DIALAN Service installation.

Level of Troubleshooting

The troubleshooting and repair measures outlined here identify the trouble down to the major component level:

* an IVDM
* a telephone
* a PC or ASCII terminal
* a two-wire facility
* a CO IVDM
* a VLC
* an AILC

Order of Fault correction

Perform troubleshooting in this order:

1. Voice fault
2. Data fault

This order assures the integrity of the two-wire facility on which the data transmission depends.

CORRECTING VOICE FAULTS

The following steps are recommended. When a fault has been identified and corrected, return to Chapter 5 on page 5-1 to verify the DIALAN Service.

<u>At the customer premises:</u>

1. Ensure that the telephone is of the same type specified on the Circuit Plan (see Chapter 4 on page 4-1).

2. Ensure integrity of cable connections between the telephone and the IVDM.

3. Ensure integrity of cable connections between the IVDM and the wall jack.

4. Verify the telephone by substituting a known-good telephone for the existing one.

5. Verify the IVDM by substituting a known-good IVDM for the existing one.

At the central office::

1. Ensure integrity of cable connections between the VOICE MDF and the VLC appearance at the MDF (see Figure 4.1 on page 4-9or Figure 4.2 on page 4-10).

2. Verify the CO IVDM by substituting a known-good CO IVDM for the existing one.

3. Test the VLC from the DMS-100 MAP* Line Test Position (LTP). Refer to 297-2101-516.

If you have not found the fault, ensure the integrity of the two-wire facility from the vertical MDF to the Teladapt jack at the customer premises.

A central office may contain a "test customer premises" consisting of an IVDM, a telephone, and a PC or ASCII terminal. For elusive problems, such "test customer premises" could be temporarily connected to the CO IVDM of the circuit in trouble for detailed analysis of the problem.

CORRECTING DATA FAULTS

The following steps are suggested. When a fault has been identified and corrected, return to Chapter 5 on page 5-1 to verify the DIALAN Service.

At the customer premises::

1. Ensure that the PC or ASCII terminal is of the same type as specified on the Circuit Plan (see Chapter 4 on page 4-1).

2. Ensure integrity of the cable connections between the PC or ASCII terminal and the IVDM.

3. Ensure that the IVDM options are set as specified on the Circuit Plan.

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* MAP is a trademark of Northern Telecom

4. Substitute a known-good PC or ASCII terminal for the existing one to verify that the existing one is good.

5. Substitute a known-good IVDM for the existing one to verify that the existing one is good.

At the central office::

1. Ensure integrity of the cable connections between the DATA MDF and the AILC appearance on the MDF (see Figure 4.1 on page 4-9).

2. Ensure that the CO IVDM options are set as specified on the Circuit Plan.

3. Substitute a known-good CO IVDM for the existing CO IVDM to verify that the existing one is good.

4. Substitute a known-good RS-232C/RS-422 converter for the existing RS-232C/RS-422 converter to verify that the existing one is good.

5. Test the AILC from the DMS-100 MAP* Line Test Position (LTP). Refer to 297-2101-516.

If the central office contains a "test customer premises" consisting of an IVDM, a telephone, and a PC or ASCII terminal, this could be temporarily connected to the CO IVDM of the circuit in trouble for detailed analysis.

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CHAPTER 7

ABBREVIATIONS

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This Part of the Practice contains a list of abbreviations and expansions:

AILC	Asynchronous Interface Line Card
BCS	Batch Change Supplement
CLASS	Custom Local Area Signalling System (telephone)
CO	Central Office
CO IVDM	Central Office Integrated Voice and Data Module
CP IVDM	Customer Premises Itegrated Voice and Data Module
CUG	Closed User Group
DIALAN	DMS Integrated Access Local Area Network
DN	Directory Number
DTE	Data Terminal Equipment
EBS	Electronic Business Set
HORIZ.	Horizontal (MDF)
ISDN	Integrated Services Digital Network
IVDM	Integrated Voice and Data Module
LCM	Line Concentrating Module
LEN	Line Equipment Number
LM	Line Module
LS D4	Lear-Siegler Carrier
LSG	Line Sub Group
LTP	Line Test Position
MAP	Maintenance Administration Position
MDF	Main Distributing Frame
PC	Personal Computer
PEC	Product Engineering Code
SLC 96	Western Electric Subscriber Line Carrier

TAS	Technical Assistance Service
VERT.	Vertical (MDF)
VLC	Voice Line Card