2100A DATA CONTROL UNIT

(DIAGNOSTIC CONSOLE)

INSTALLATION AND CONNECTIONS

"DATAPHONE®" II SERVICE

CONTENTS	PAGE

1. GENERAL

1.01 This section contains the information needed to install and connect the DATAPHONE® II service 2100A-L1 data control unit (DCU) shown in Fig. 1.

1.02 This section is reissued to include installation and connection information about a new adapter (comcode 842993925) and to revise Uniform Service Order Code (USOC) information. Revision arrows are used to emphasize the more significant changes.

1.03 The 2100A-L1 DCU, hereafter referred to as the diagnostic console (DC) may be mounted on a desk, table, or stand. The DC is also designed to be installed in a 19- or 23-inch rack using two comcode 842531774 mounting kits.

1.04 The DC operates over an ambient temperature range of 40 to 120°F and a relative humidity of 20 to 95 percent noncondensing.

1.05 The DC requires a power source that provides 105 to 129 volts, up to 34 watts, at 57 to 63 Hz.

The customer must supply a power outlet that will accept the 3-prong ac power plug.

1.06 The DC may be connected to; and used in conjunction with; other DCs or a 2200A-L1 DCU, referred to as network controller (NC). The NC and DC are referred to jointly as diagnostic control devices (DCDs).

1.07 A power cord and an interface cable are present at the rear of the DC. The plug on the power cord is designed to be inserted into a 117-volt, 15A ac outlet. ▶The interface cable is terminated in a 25-pin male connector which is plugged into an adapter (comcode 842993925) equipped with two 10-pin control channel connectors and one 25-pin Electronic Industries Association (EIA) RS-232C connector. The interface cable may be extended to a maximum of 50-feet using M25A cable or cables.

1.08 Connection to the first local data set mounting (either stand alone or multiple) or another DCD in the control channel network is made from the DC adapter control channel-out (CC-OUT) connector (Table A) via a 10-pin M9G cord.

1.09 Connection to the first remotely located data set mounting in the control channel network is made from the DC adapter CC-OUT connector via a 10- to 25-pin M4BB cord and a data set (DS) 212A.◀ At the remotely located site, connection is made to the data mounting via a DS 212A and a 25- to 10-pin M4BA cord.

1.10 Connections to a local NC or second DC is made from the DC adapter control channel-in (CC-IN) connector (Table B) via a 10-pin M9G cord.

1.11 ▶Connection to a remotely located DCD or telephone company (telco) test center is made

Fig. 1—2100A-L1 Data Control Unit

from the DC adapter REMOTE connector (Table C) via a 25-pin M25A cord and a DS 212A (for 2-wire switched network facilities) or a data set (DS) 202T (for 4-wire private line facilities).◀

2. INSTALLATION

2.01 Mount the DC in such a way as to allow visual monitoring and convenient operation by the operator. When rack-mounting the DC, the DC may be installed in a Bell System or customer-provided cabinet.

> **Note:** Allow 3 inches of clearance below the DC for ventilation when rack mounting.

2.02 Connect the ac power cord to the customer-provided 3-prong power outlet. Observe the CONSOLE STATUS—red light comes on.

2.03 Lower the hinged door at the bottom of the DC front panel and remove the right-hand access panel by removing the four retaining screws (Fig. 2).

Set the DC address using the DIP switch found behind the door (Fig. 3). The address should be set to whatever is specified by the service order.

2.04 Remove the left-hand access panel by removing the four retaining screws. There are two switches behind the panel. A battery switch is to the right and the console key reset switch is to the left.

(1) Operate the battery switch to ON (switch operated to the right is ON). The CONSOLE STATUS lamps should change from RED to GREEN.

(2) Momentarily depress the white-capped console key reset switch. This resets the console key code to all zeros. The RESULTS display indicates KEY RESET.

2.05 Momentarily depress the CONSOLE STATUS TEST switch and observe the following:

(1) All displays and LEDs in the NETWORK FAULTS, EIA STATUS and ADDRESS

TABLE A

LOCAL CONTROL CHANNEL-OUT (CC-OUT)

PIN NO.	LEAD DESIGNATION	FUNCTION
1	FG	Fixed Ground
3	SDO	Send Data Out
4	RDO	Receive Data Out
5	SG	Signal Ground
6	RCO	Receive Common Out
7	RSO	Request-to-Send Out
8	CSO	Clear-to-Send Out
9	SCO	Send Common Out

TABLE B

LOCAL CONTROL CHANNEL-IN (CC-IN)

PIN NO.	LEAD DESIGNATION	FUNCTION
3	SDI	Send Data In
4	RDI	Receive Data In
5	SG	Signal Ground
6	RCI	Receive Common In
7	RSI	Request-to-Send In
8	CSI	Clear-to-Send In
9	SCI	Send Common In

groups light for approximately 5 seconds, then return to normal. RESULTS display indicates IN PROGRESS and SELECTION display indicates CONSOLE TEST.

(2) All LEDs in the TEST/COMMAND functional group light for approximately 5 seconds, then return to normal.

(3) SELECTION display indicates CONSOLE TEST and RESULTS display indicates IN PROGRESS while internal testing is being conducted.

(4) When all testing is complete the RESULTS display indicates PASS or FAIL. If the appropriate indications are not observed or if RESULTS display indicates FAIL, refer to Section 592-101-500 for action.

(5) Operate the −/+ switch to display the DC address. The DC address is displayed as DC ADRS = x, where x is the address set in paragraph 2.03 above. If the displayed address is different than the address chosen above, then refer to Fig. 3 for the correct switch settings. Operation of −/+ switch will also display the version of software used by the DC. (Displayed as SFTWR V_ _ _ _ _.)

2.06 Replace the right-hand and the left-hand access doors using the retaining screws.

2.07 Execute the console key (CONSOLE KEY) command to *unlock* the DC. (Refer to Section 592-101-100 for operating procedures.)

2.08 Make connections to other DCDs and to data sets in accordance with instructions and figures in Part 3, Connections.

2.09 Execute the DC poll list-acquire (DCPL_ACQUIRE) subcommand to obtain a poll list.

2.10 Execute the DC poll list-display (DSPL_DISPLAY) subcommand and verify that all local data sets are in the poll list.

2.11 Execute several nondisruptive tests or commands on local data sets. Some examples of tests or commands which may be used are: *modem status, modem identity, receive signal level,* and *receive signal quality.* Refer to Section 592-101-100 for proper result indications. Refer to Table D or E to determine whether a test or command is disruptive.

2.12 Execute the fault reports - enable subcommand (FR-ENABLE) to enable the reporting of network faults to the network faults functional group.

2.13 If it is possible, and with permission of the customer's representative, momentarily remove one data set in the control channel network

TABLE C

REMOTE ACCESS INTERFACE (REMOTE)

PIN NO.	FUNCTION	LEAD DESIGNATION RS-232C
1	Protective Ground	AA
2	Transmitted Data	BA
3	Received Data	BB
4	Request-to-Send	CA
5	Clear-to-Send	CB
6	Data Set Ready	CC
7	Signal Ground	AB
20	Data Terminal Ready	CD
21	Remote Digital Loopback	RL*
23	Speed Select	CH*
25	Make Busy/Analog Loopback	CN*

* Non-EIA RS-232C lead.

from service and verify that this introduced "fault" appears in the NETWORK FAULTS functional group displays. This "fault" will result in an indication of NR (no response) in the FAULT TYPE display and the data set address in NETWORK FAULTS-LOCAL. TOTAL FAULTS-ACTIVE will indicate *01*.

2.14 Secure the right- and left-hand panels and raise and close the hinged door at the bottom of the DC front panel after proper operation has been verified.

3. CONNECTIONS

3.01 Connections for the various DC installations are shown in Fig. 4 through 9. The emphasis in these diagrams is on equipment interconnections and not on system configuration. The figure numbers and titles of the connection diagram are listed below:

Fig. 4—Connection Diagram for Single DC With No Remote Access

Fig. 5—Connection Diagram for DC Colocated With Another DCD With No Remote Access

Fig. 6—Connection Diagram for Single DC Using Switched Network Telephone Facilities to Extend Control Channel Interface—No Remote Access
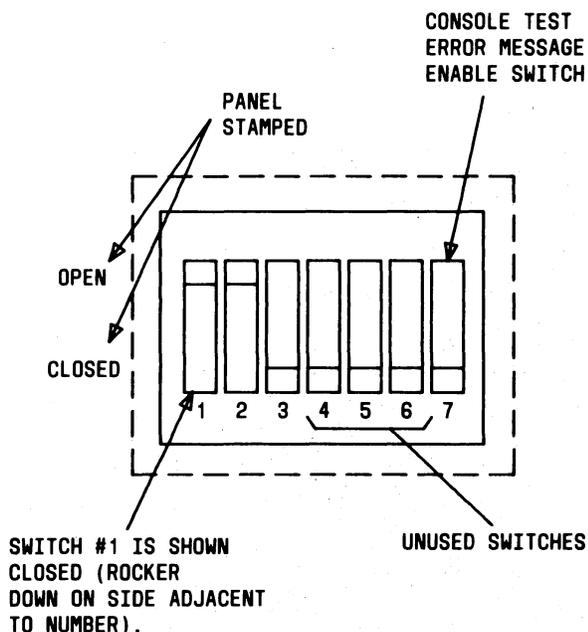
Fig. 7—Connection Diagram for Single DC Using Private Line Telephone Facilities to Extend Control Channel Interface—No Remote Access

Fig. 8—Connection Diagram for Single DC With Remote Access Via Switched Network Telephone Facilities

Fig. 9—Connection Diagram for Single DC With Remote Access Via Private Line Telephone Facilities

Fig. 2—DC Front View With Hinged Door Open

DC ADDRESS	SWITCH POSITION AND STATE		
	1	2	3
1	X	X	X
2	O	X	X
3	X	O	X
4	O	O	X
5	X	X	O
6	O	X	O
7	X	O	O
8	O	O	O

O REPRESENTS OPEN
X REPRESENTS CLOSED

CONSOLE TEST ERROR MESSAGE ENABLE SWITCH

PANEL STAMPED

OPEN

CLOSED

SWITCH #1 IS SHOWN CLOSED (ROCKER DOWN ON SIDE ADJACENT TO NUMBER).

UNUSED SWITCHES

NOTE:
    SWITCH IS SHOWN AS VIEWED THROUGH
    THE DOOR OPENING. (ADDRESS SHOWN
    ON SWITCH = 5)

Fig. 3—DCD Address Switches and Console Test Error Message Enable Switch

4. UNIFORM SERVICE ORDER CODE (USOC) INFORMATION

4.01 ♦*USOC Structure:* The USOC structure for DATAPHONE II service consists of three basic elements. These elements are a 3-character *hardware designation,* a 2-character *universal suffix,* and *field identifiers.*

4.02 *USOC Hardware Designation:* The 3-character USOC assigned to the DC is 21D. This code identifies the DC and the appropriate cords and adapters.

4.03 *USOC ++ Universal Suffix:* The suffix for the DC is decoded using the Universal Suffix Table, a portion of which is reproduced in Table F. The decision matrix for the DC is shown in Table G.

As an example 21D*01* decodes as a DC desk mounted with remote access.♦

4.04 *Field Identifier (FID):* A single FID is used with the DC USOC to designate the DC address field. This FID, diagnostic apparatus address (DAA) follows the USOC (eg, 21D++/DAA 1). The address itself will be a number between 1 and 8.

4.05 The USOC will be a continuous line entry in the service and equipment portion of the service order.

5. REFERENCES

5.01 Additional information concerning DATAPHONE II service diagnostic control

devices and data sets is contained in the following Bell System Practices:

SECTION	TITLE
592-040-120	Private Line Data Sets 2024, 2048, and 2096—Description and Operation—Stand Alone-Multiple DATAPHONE® II Service
592-040-220	Private Line Data Sets 2024, 2048, and 2096—Installation and Connections—Stand Alone-Multiple —DATAPHONE® II Service
592-040-520	Private Line Data Sets 2024, 2048, and 2096—Test Procedures—Stand Alone-Multiple—DATAPHONE® II Service
592-101-100	2100A Data Control Unit (Diagnostic Console)—Description and Operation— DATAPHONE® II Service
592-101-500	2100A Data Control Unit (Diagnostic Console)—Test Procedures— DATAPHONE® II Service
592-102-100	2200A Data Control Unit (Network Controller)—Description and Operation—DATAPHONE® II Service
592-102-200	2200A Data Control Unit (Network Controller)—Installation and Connections—DATAPHONE® II Service
592-102-500	2200A Data Control Unit (Network Controller)—Test Procedures— DATAPHONE® II Service
592-102-101	2200A-L1A Data Control Unit (Network Controller) Description and Operation, DATAPHONE® II Service
592-102-201	2200A-L1A Data Control Unit (Network Controller) Installation and Connections DATAPHONE® II Service
592-102-501	2200A-L1A Data Control Unit (Network Controller) Test Procedures DATAPHONE® II Service

TABLE D

DIAGNOSTIC CONSOLE TEST MENU

TEST NAME (Note 1)	SELECTION DISPLAY	DISRUPTIVE TEST? (Note 2)	MAY BE DIRECTED TO:		REMARKS
			CONTROL DS	TRIBUTARY DS	
Modem Self Test	MODEM TEST				Timed Tests
Modem Test-Single	MT-SINGLE	Yes	✔	✔	
Modem Test-Continuous	MT-CONTS	Yes	✔	✔	
Automatic Network Test	AUTO NET TST	Yes	✔		
End-to-End BLER	END-END BLER				
End-to-End Blocks = 0100	EE-BLKS = 0100	Yes	✔		
End-to-End Blocks = ****	EE BLKS = ****	Yes	✔		
Digital Test	DIGITAL TEST				
Dig. Test Msgs = 0001	DT MSGS = 0001	Yes	✔		
Dig. Test Msgs = ****	DT MSGS = ****	Yes	✔		
Receive Signal Level	RCV SIG LEV	No	✔	✔	Timed Tests
Receive Signal Quality	RCV SIG QUAL	No	✔	✔	
Receive Signal Profile	RCV SIG PROF	No	✔	✔	
Send Test Tone	SEND TONE				Non-Timed Tests
Send 1004 Hz Tone	1004 HZ TONE	Yes	✔	✔	
Send 1804 Hz Tone	1804 HZ TONE	Yes	✔	✔	
Send 2804 Hz Tone	2804 HZ TONE	Yes	✔	✔	
Clear Test Tone	CLEAR TONE	Yes	✔	✔	
Circuit Loss	CIRCUIT LOSS				Timed Tests
CL-IN 1004 Hz	CL-IN 1004	Yes	✔	✔	
CL-IN 1804 Hz	CL-IN 1804	Yes	✔	✔	
CL-IN 2804 Hz	CL-IN 2804	Yes	✔	✔	
CL-OUT 1004 Hz	CL-OUT 1004	Yes	✔	✔	
CL-OUT 1804 Hz	CL-OUT 1804	Yes	✔	✔	
CL-OUT 2804 Hz	CL-OUT 2804	Yes	✔	✔	
Modem Loopback	MODEM LPBK				Non-Timed Tests
Analog Loopback	ANALOG LPBK	Yes	✔	✔	
Digital Loopback	DIGITAL LPBK	Yes	✔	✔	
Clear Loopback	CLEAR LPBK	Yes	✔	✔	
Report Terminal Power	RPT TERM PWR	No	✔	✔	Timed Tests
Abort Test	ABORT TEST	Yes	✔	✔	
Console Test*	CONSOLE TEST	No			
EIA Status†	EIA STATUS	No	✔	✔	

Note 1: Subtest names are indented.

Note 2: Nondisruptive tests may be performed without **console key** enabled.

    *Initiated by depressing TEST switch.

   †Initiated by depressing EIA EXECUTE switch.

TABLE E

DIAGNOSTIC CONSOLE COMMAND MENU

COMMAND NAME (Note 1)	SELECTION DISPLAY	DISRUPTIVE COMMAND? (Note 2)	MAY BE DIRECTED TO:	
			CONTROL DS	TRIBUTARY DS
Modem Disable/Enable	MODEM DSBL/ENAB			
Disable Modem	DISABL MODEM	Yes	✓	✓
Enable Modem	ENABLE MODEM	Yes	✓	✓
Modem Status	MODEM STATUS	No	✓	✓
Make Busy	MAKE BUSY			
Make Busy Enable	MB-ENABLE	Yes		
Make Busy Release	MB-RELEASE	Yes		
Service Line	SERVICE LINE			
Service Line Connect	SL-CONNECT	Yes		
Service Line Release	SL-RELEASE	Yes		
Standby Facility	STANDBY FAC			
Standby Fac Connect	SF-CONNECT	Yes	✓	✓
Standby Fac Release	SF-RELEASE	Yes	✓	✓
Modem Identity	MODEM IDENT	No	✓	✓
DC Poll List	DC POLL LIST			
DC Poll List - Display	DCPL - DISPLAY	No		
DC Poll List - Acquire	DCPL - ACQUIRE	Yes		
DC Poll List - Add	DCPL - ADD ****	Yes		
DC Poll List - Delete	DCPL - DEL ****	Yes		
DC Poll List - Skip	DCPL - SKP ****	Yes		
Modem Poll List	MD POLL LIST			
Modem Poll List - Disp	MDPL - DISPLAY	No	✓	
Modem Poll List - Acq	MDPL - ACQUIRE	Yes	✓	
Modem Poll List - Add	MDPL - ADD ***	Yes	✓	
Modem Poll List - Del	MDPL - DEL ***	Yes	✓	
Modem Poll List - Skip	MDPL - SKP ***	Yes	✓	
Modem Options	MD OPTIONS	*	✓	✓
DS 2096 Chg Mux Mode	2096 CHG MUX			
Op Mode 1-96	OP MODE 1-96	Yes	✓	✓
Op Mode 1-72	OP MODE 1-72	Yes	✓	✓
Op Mode 1-48	OP MODE 1-48	Yes	✓	✓
Op Mode 2-72,24	OP MODE 2-72,24	Yes	✓	✓
Op Mode 2-48,48	OP MODE 2-48,48	Yes	✓	✓
Op Mode 2-24,24	OP MODE 2-24,24	Yes	✓	✓
Op Mode 3-48,24	OP MODE 3-48,24	Yes	✓	✓
Op Mode 4-24	OP MODE 4-24	Yes	✓	✓
Automatic Fault Reporting	FAULT REPTG			
Fault Reports - Enable	FR - ENABLE	Yes		
Fault Reports - Disable	FR - DISABLE	Yes		
Fault Reports - Clear	FR - CLEAR LST	Yes		
Diagnostic Console Key	CONSOLE KEY			
Console Key Status	CK-STATUS	No		
Console Key Locked	CK - LOCK ****	No		
Console Key Unlocked	CK - UNLK ****	No		
Change Console Key	CHG ********	No		

Note 1: Subcommand names are indented.

Note 2: Nondisruptive commands may be performed without **console key** enabled.

    * **No** when options are displayed, **yes** when options are changed.
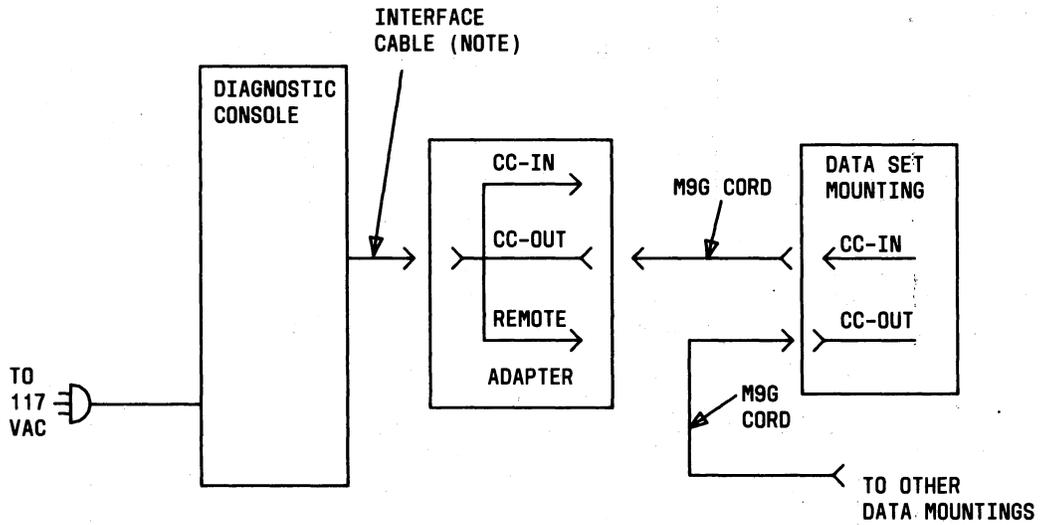
NOTE: MAY BE EXTENDED TO A MAXIMUM OF 400 FEET USING M25A
CABLE(S) AND M9G CORD(S) (CONTROL CHANNEL LIMITATION).

Fig. 4—▶Connection Diagram for Single DC—No Remote Access◀

TABLE F

PARTIAL UNIVERSAL
SUFFIX TABLE

USOC SUFFIX	A	B
01	1	3
02	2	3
03	1	4
04	2	4

TABLE G

DC USOC SUFFIX DECISION MATRIX

DECISION	DESCRIPTION
A1	Desk mounted
A2	Rack mounted
B3	With remote access
B4	Without remote access

NOTES:

1. THIS CORD CAN CONNECT TO THE FIRST DATA MOUNTING IN CONTROL CHANNEL NETWORK (AS SHOWN) OR CAN CONNECT TO ANOTHER DCD.

2. ENSURE THAT EACH DCD HAS A UNIQUE ADDRESS.

3. MAY BE EXTENDED TO A MAXIMUM OF 400 FEET USING M25A CABLE(S) AND M9G CORD(S) (CONTROL CHANNEL LIMITATION).
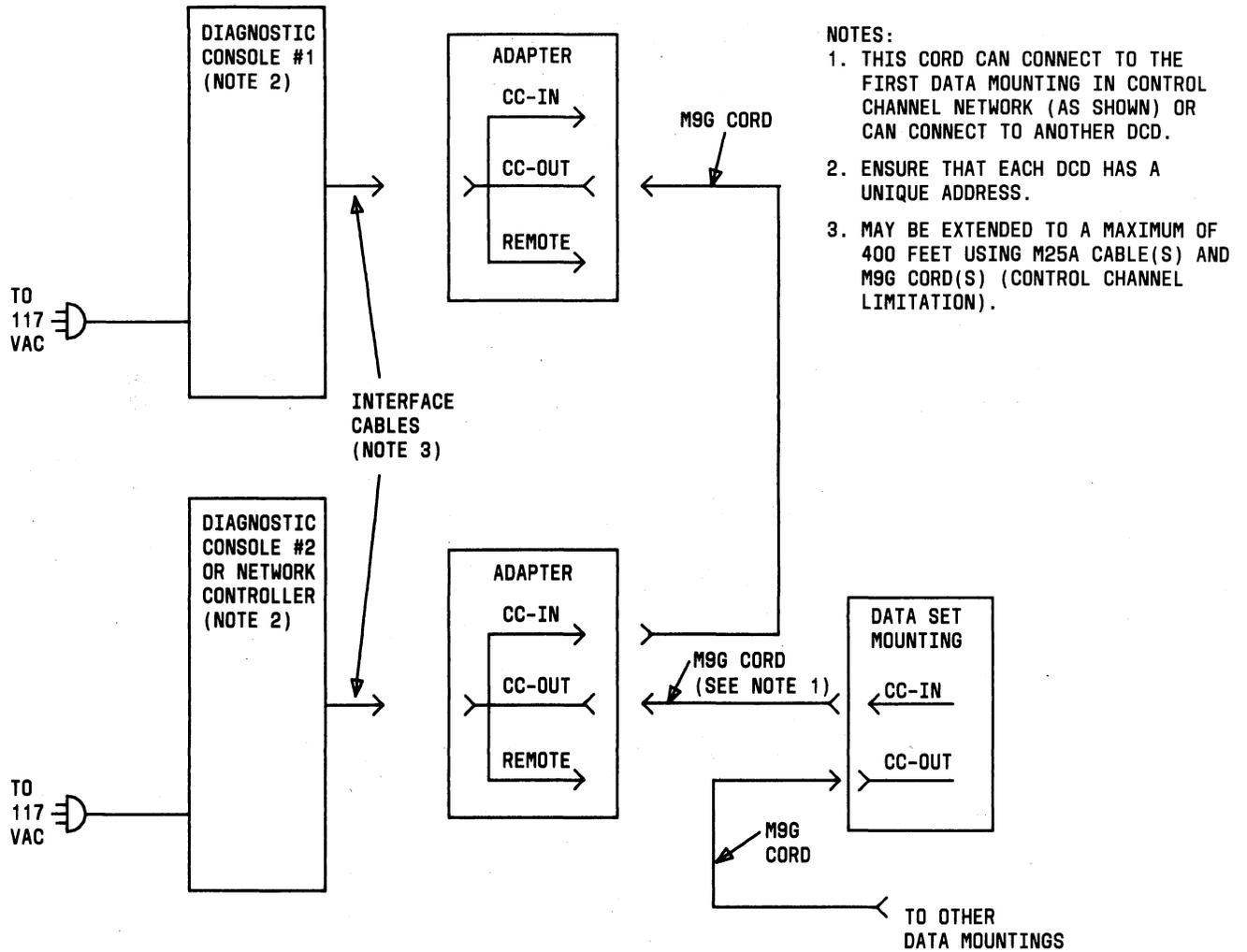
Fig. 5—▶Connection Diagram for DC Colocated With Another DCD—No Remote Access◀

LOCAL SITE   REMOTE SITE

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┌──────────┐        ┌──────────────┐                                                                              ┌──────────┐
│DIAGNOSTIC│        │   CC-IN      │         DS 212AR                                    DS 212AR                 │  DATA    │
│CONSOLE   │        │     ───→     │                                                                             │ MOUNTING │
│          │        │              │  M4BB ┌──────────┐  M13F ┌─────────┐  ┌TO 2-WIRE ┌─────────┐ M13F ┌──────────┐ M4BA │          │
│          │  ───→  │>  CC-OUT  >  │< CORD>│CUST      │< CORD>│2565HKM  │< │ SWITCHED │2565HKM  │<CORD>│     CUST  │<CORD>│  CC-IN   │
│          │        │              │       │INT   TEL │       │TEL SET  │  │ NETWORK  │TEL SET  │      │ TEL  INT  │      │   ←───   │
│          │   ↗    │              │       │  ──→   ──→│      │  ←───   │  │ TELEPHONE│  ──→    │      │ ←──       │      │          │
│          │        │   REMOTE     │       └──────────┘       └─────────┘  │ FACILITY └─────────┘      │ (NOTE 1)  │      │  CC-OUT  │
│          │        │     ───→     │                                                                   └──────────┘      │   >───   │
│          │        │   ADAPTER    │                                                                                     │          │
│          │        └──────────────┘                                                                                     │  REMOTE  │
└──────────┘                                                                                                            │   ←───   │
     INTERFACE                                                                                                          └──────────┘
     CABLE (NOTE 2)
```
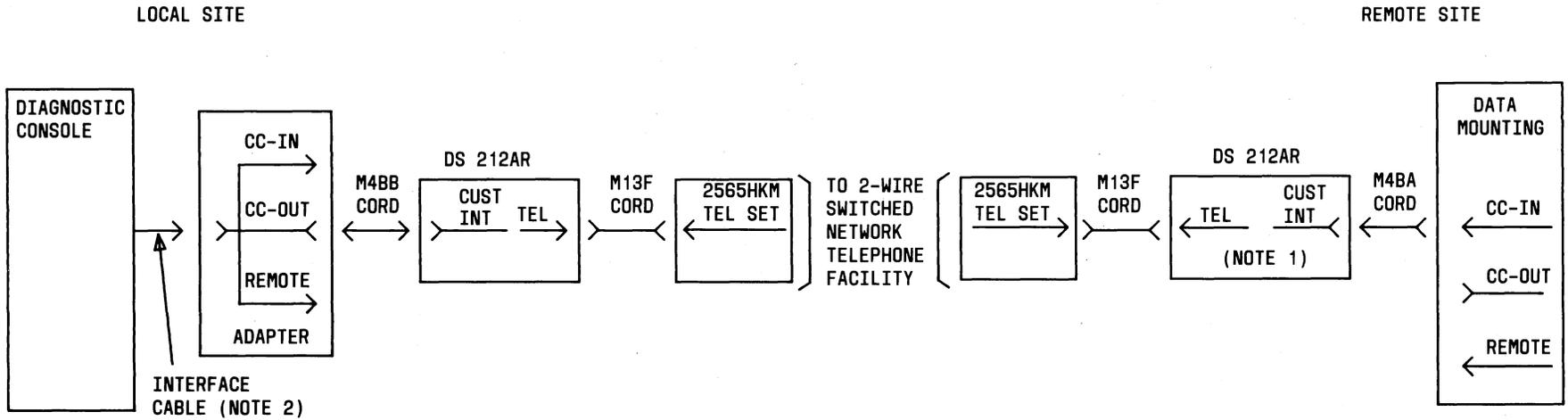
NOTES:
1. OPTION S (LOSS OF CARRIER DISCONNECT - IN) MUST BE INSTALLED IN DS 212AR. REFER TO SECTION 592-039-200.
2. MAY BE EXTENDED TO A MAXIMUM OF 50 FEET USING M25A CABLE(S) AND M4BB CORD(S).

Fig. 6—▶Connection Diagram for Single DC Using Switched Network Telephone Facilities to Extend Control Channel Interface—No Remote Access◀

DIAGNOSTIC
CONSOLE

CC-IN

CC-OUT

REMOTE

ADAPTER

M4BB
CORD

DS 202T

CUST
INT   TEL

M8K
CORD

DAS
829-
TYPE

TO 4-WIRE
PRIVATE
LINE
TELEPHONE
FACILITY

DAS
829-
TYPE

M8K
CORD

DS 202T

TEL   CUST
           INT

M4BA
CORD

DATA
MOUNTING

CC-IN

CC-OUT

REMOTE

INTERFACE
CABLE (NOTE)

NOTE: MAY BE EXTENDED TO A MAXIMUM OF 50 FEET
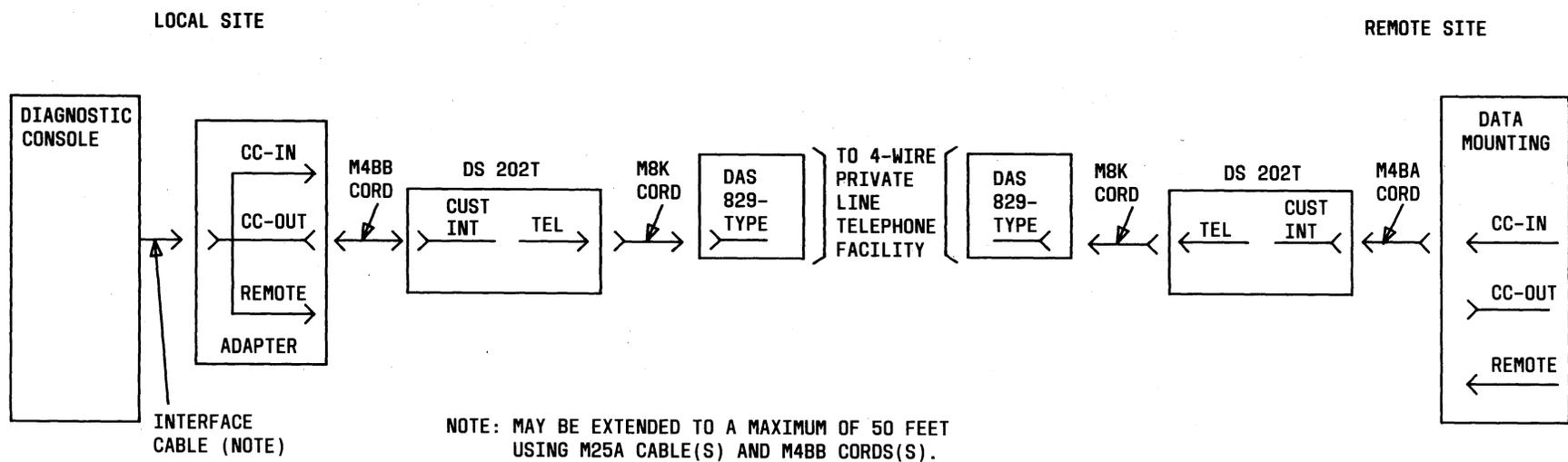   USING M25A CABLE(S) AND M4BB CORDS(S).

Fig. 7—▶Connection Diagram for Single DC Using Private Line Telephone Facilities to
Extend Channel Interface—No Remote Access◀

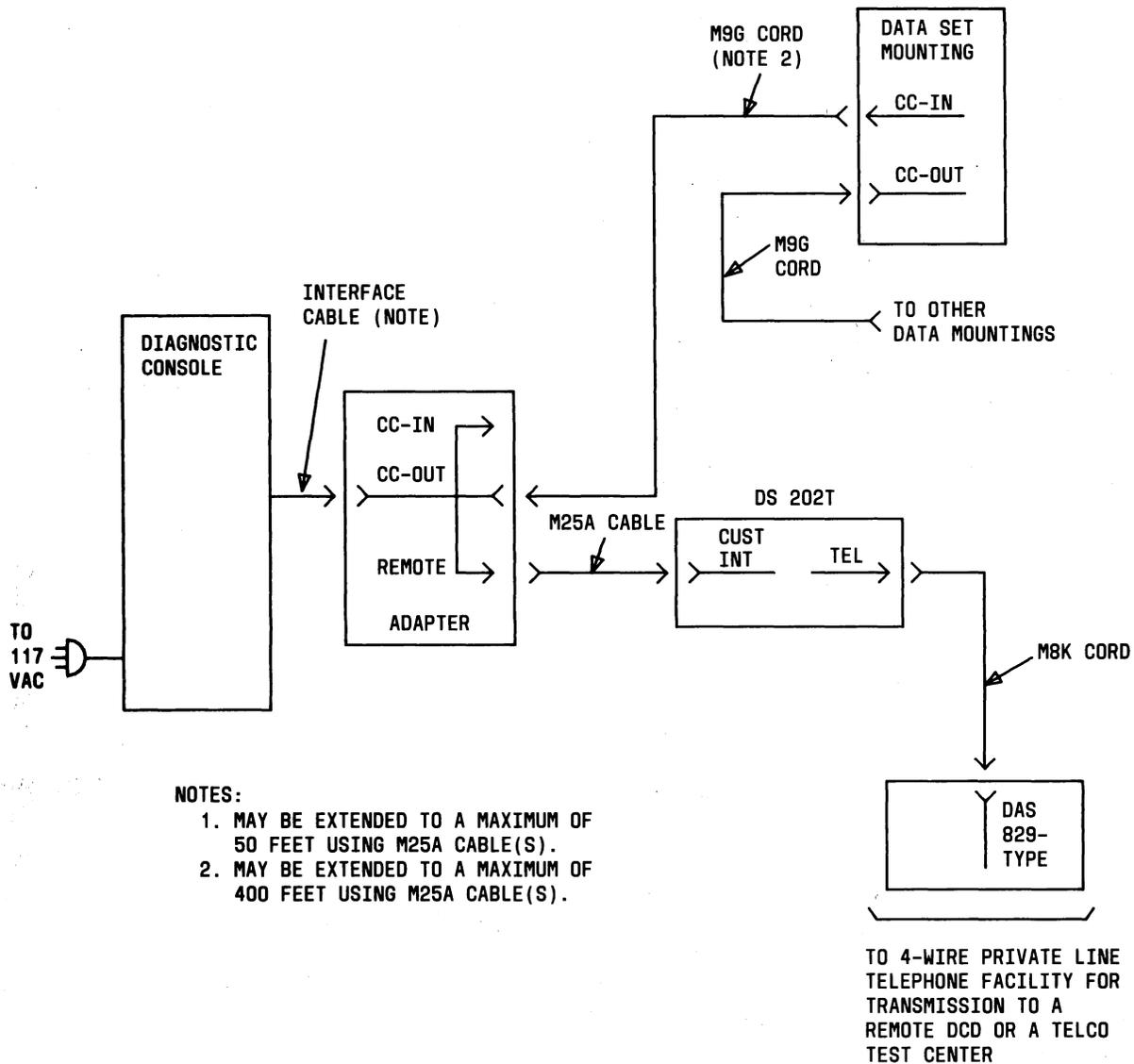Fig. 8—▶Connection Diagram for Single DC With Remote Access via Switched Network Telephone Facilities◀

DATA SET
MOUNTING

M9G CORD
(NOTE 2)

CC-IN

CC-OUT

M9G
CORD

TO OTHER
DATA MOUNTINGS

DIAGNOSTIC
CONSOLE

CC-IN

CC-OUT

REMOTE

ADAPTER

M25A CABLE

DS 212AR

CUST
INT

TEL

TO
117
VAC

INTERFACE
CABLE (NOTE 1)

M13F
CORD

2565HKM
TELEPHONE SET

NOTES:
1. MAY BE EXTENDED TO A MAXIMUM
   OF 50 FEET USING M25A CABLE(S).
2. MAY BE EXTENDED TO A MAXIMUM OF
   400 FEET USING M25A CABLE(S).

TO 2-WIRE SWITCHED NETWORK
TELEPHONE FACILITY
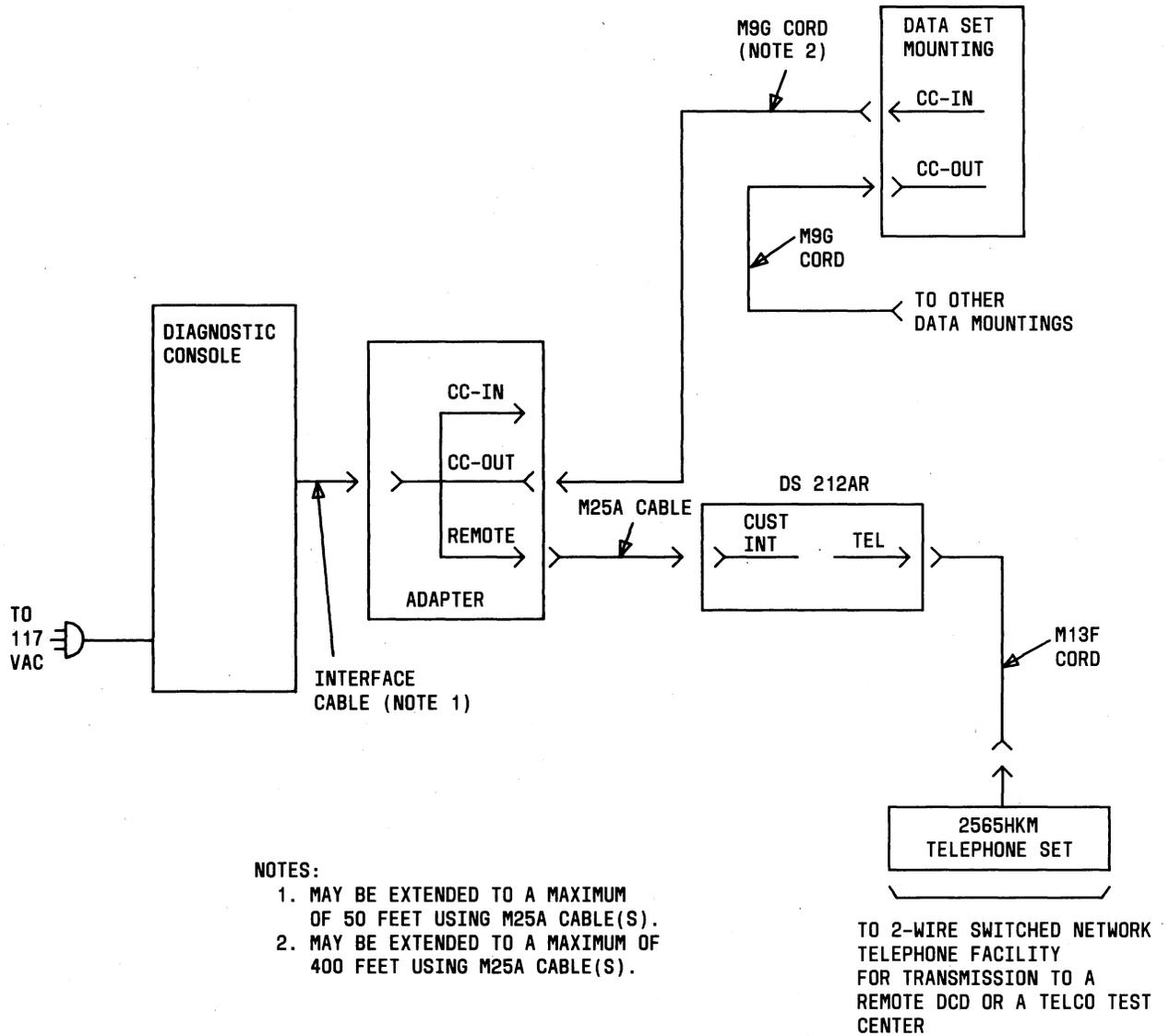FOR TRANSMISSION TO A
REMOTE DCD OR A TELCO TEST
CENTER

Fig. 9—▶Connection Diagram for Single DC With Remote Access via Private Line Telephone Facilities◀