DIGITAL DATA SYSTEM
510A-TYPE DATA SERVICE UNIT
INSTALLATION AND CONNECTION

CONTENTS PAGE

1. GENERAL

1.01 This section contains information concerning the installation and connection of a 510A-type data service unit (DSU), Fig. 1. This section also contains option installation information as well as tests that should be performed to verify proper operation of the DSU after installation. With the exception of compatibility requirements, information regarding the associated customer-provided equipment (CPE) is not included.

1.02 Whenever this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 The 510A DSU is designed to be operated in an environment of +40 to +120°F, with a relative humidity of less than 95 percent.

1.04 The 112A power unit, which is contained inside the DSU, accepts customer supplied voltage of 105 to 129 Vac at a frequency of 57 to 63 Hz, not under the control of a switch. The 112A power unit rectifies and filters the ac voltage; supplies operating voltages of +5, +12, and -12 Vdc to all the circuit packs (CPs) in the DSU; and requires a maximum of 80 watts of power. Each DSU is supplied with a 10-foot ac power cord (KS-14532-L20) for connection to the customer-provided ac source.

2. OPTION INSTALLATION

A. General

2.01 Installer options are available to adapt the DSU to various operating conditions and customer requirements. The options should be specified on the service order or circuit layout record card (CLRC). Refer to Table A for specific options and the respective switch positions. For a description of these options, refer to Section 595-201-100, Digital Data System—510A-Type Data Service Unit—Description and Operation.

2.02 CPs KD21 (Fig. 2) and KD22 (Fig. 3) have screw-type option switches with 3 and 2 segments per switch, respectively. Each switch section is individually adjusted to a closed or open position by using a screwdriver to turn the screw in until the screw contacts the two terminals or to turn the screw out until the contact between the terminals is broken, respectively. CPs KD24 (Fig. 4) and KD26 (Fig. 5) have dual inline package (DIP) option switches which contain four and nine individual rocker switches, respectively.

B. Option Installation Procedure

2.03 To gain access to the option switches, the CPs containing the option switches must be removed from the frame by removing the cabinet faceplate, if the DSU is installed in a cabinet, and

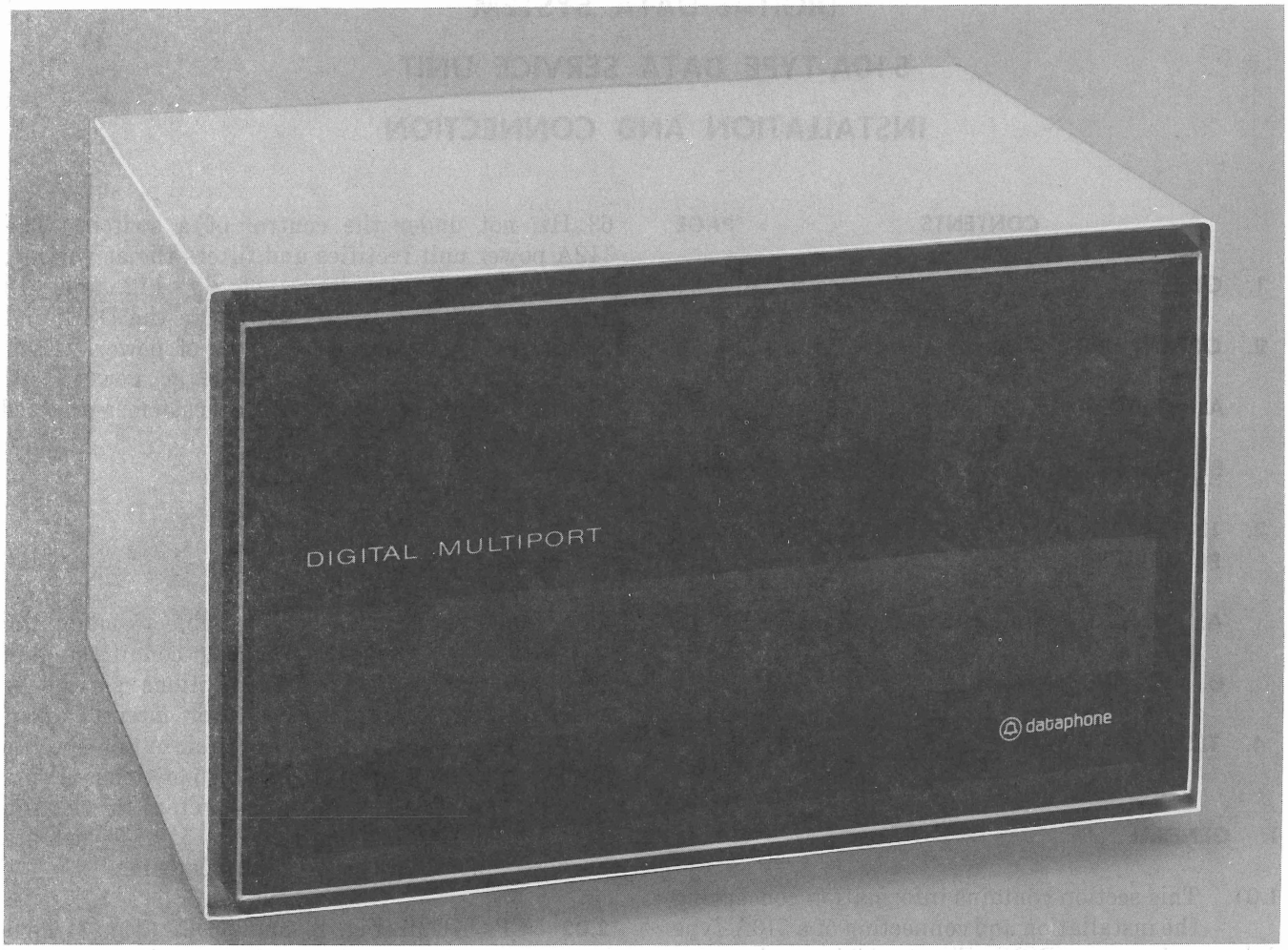

Fig. 1—Front View of a 510A DSU Mounted in a KS-20018-L19 Cabinet (510A-L1/2)

operating the CARD RELEASE lever to the released position.

2.04 Select the options per the service order or CLRC in accordance with Table A. The common circuit options on KD21, KD22 and KD25 CPs are strapped once per station. Options for individual ports must be set on each KD26 CP in the station.

3. INSTALLATION AND CONNECTION PROCEDURES

3.01 Prior to initial installation, cable pairs must be tested in accordance with Section 314-410-510, Digital Data System—Local Loop—Tests and Requirements.

Verify that the cable pair terminating resistors used in the above tests are removed prior to DSU installation.

A. Hardware Arrangements

3.02 The 510A-L1 DSU consists of a 2-shelf nest with CP connectors and backplane, customer interface panel, power unit with power cord, cooling fan, telephone cord, and four CPs: KD21, analog circuits; KD22, timing circuits; KD23, demultiplexer circuits; and KD24, multiplexer circuits (Fig. 6).

3.03 The 510A-L1 DSU can be mounted in several ways to meet customer requirements. It is equipped with two adjustable L-shaped mounting

TABLE A
510A DSU OPTIONS

OPTION	FEATURE	CP	SWITCH TYPE	ACTION			
				S1A	S1B	S2	
WV	FIXED LINE BUILD-OUT NETWORK INSTALLED (SHORT LINE OPTION)	KD21	SCREW	OPEN	OPEN	CLOSED	
WW	FIXED LINE BUILD-OUT NETWORK REMOVED (LONG LINE OPTION)	KD21	SCREW	CLOSED	CLOSED	OPEN	
				S1A	S1B		
X	2.4 KB/S (19 PORTS MAX) — BASIC STATION DATA RATE	KD22	SCREW	OPEN	OPEN		
Y	4.8 KB/S (9 PORTS MAX) — BASIC STATION DATA RATE	KD22	SCREW	OPEN	CLOSED		
Z	9.6 KB/S (4 PORTS MAX) — BASIC STATION DATA RATE	KD22	SCREW	CLOSED	CLOSED		
				S1:1	S1:2	S1:3	S1:4
T	80 BYTES DELAY (10.00 MS) — MUX REFRAME DELAY	KD24	DIP†	CLOSED	CLOSED	CLOSED	CLOSED
S	150 BYTES DELAY (18.75 MS) — MUX REFRAME DELAY	KD24	DIP†	OPEN	CLOSED	CLOSED	CLOSED
R	220 BYTES DELAY (27.50 MS) — MUX REFRAME DELAY	KD24	DIP†	OPEN	OPEN	CLOSED	CLOSED
Q	290 BYTES DELAY (36.25 MS) — MUX REFRAME DELAY	KD24	DIP†	OPEN	OPEN	OPEN	CLOSED
N	360 BYTES DELAY (45.00 MS) — MUX REFRAME DELAY	KD24	DIP†	OPEN	OPEN	OPEN	OPEN
				TS1 ON REAR OF UNIT			
YK	SIGNAL GROUND CONNECTED TO FRAME GROUND	—	—	STRAP TERM 2 TO TERM 3			
YL	SIGNAL GROUND DISCONNECTED FROM FRAME GROUND	—	—	STRAP TERM 1 TO TERM 2			
				S1:8	S1:9		
ZA	ONE HALF BASIC STATION DATA RATE — PORT DATA RATE	KD26	DIP†	CLOSED	OPEN		
YA	FULL BASIC STATION DATA RATE — PORT DATA RATE	KD26	DIP†	OPEN	CLOSED		
ZB	ACTIVATION OF RL TEST MODE AT INTERFACE — PORT OPTIONS	KD26	DIP†	CLOSE S1:1			
YB	INACTIVATION OF RL TEST MODE AT INTERFACE — PORT OPTIONS	KD26	DIP†	OPEN S1:1			
ZC	ACTIVATION OF LL TEST MODE AT INTERFACE — PORT OPTIONS	KD26	DIP†	CLOSE S1:2			
YC	INACTIVATION OF LL TEST MODE AT INTERFACE — PORT OPTIONS	KD26	DIP†	OPEN S1:2			
ZD	ACTIVATION OF TM TEST INDICATION — PORT OPTIONS	KD26	DIP†	CLOSE S1:3			
YD	INACTIVATION OF TM TEST INDICATION — PORT OPTIONS	KD26	DIP†	OPEN S1:3			
ZE	ACTIVATION OF DSR CKT (FOR RL OR LL TEST) — PORT OPTIONS	KD26	DIP†	CLOSE S1:4			
YE	INACTIVATION OF DSR CKT (FOR RL OF LL TEST) — PORT OPTIONS	KD26	DIP†	OPEN S1:4			
ZF	PERMANENT REQUEST TO SEND — PORT OPTIONS	KD26	DIP†	CLOSE S1:5			
YF	SWITCHED REQUEST TO SEND — PORT OPTIONS	KD26	DIP†	OPEN S1:5			
ZG	ACTIVATION OF SYSTEM STATUS* — PORT OPTIONS	KD26	DIP†	CLOSE S1:6			
YG	INACTIVATION OF SYSTEM STATUS — PORT OPTIONS	KD26	DIP†	OPEN S1:6			
ZH	ACTIVATION OF CIRCUIT ASSURANCE* — PORT OPTIONS	KD26	DIP†	CLOSE S1:7			
YH	INACTIVATION OF CIRCUIT ASSURANCE — PORT OPTIONS	KD26	DIP†	OPEN S1:7			

* NOT INSTALLED EXCEPT AS REQUIRED IN OTHER PRACTICES
† EACH SWITCH CONTACT ON THE DIP SWITCHES IS OPEN WHEN THE ROCKER IS DOWN ON THE SIDE OPPOSITE THE NUMBER. EACH CONTACT IS CLOSED WHEN THE ROCKER IS DOWN ON THE SIDE ADJACENT TO THE NUMBER.

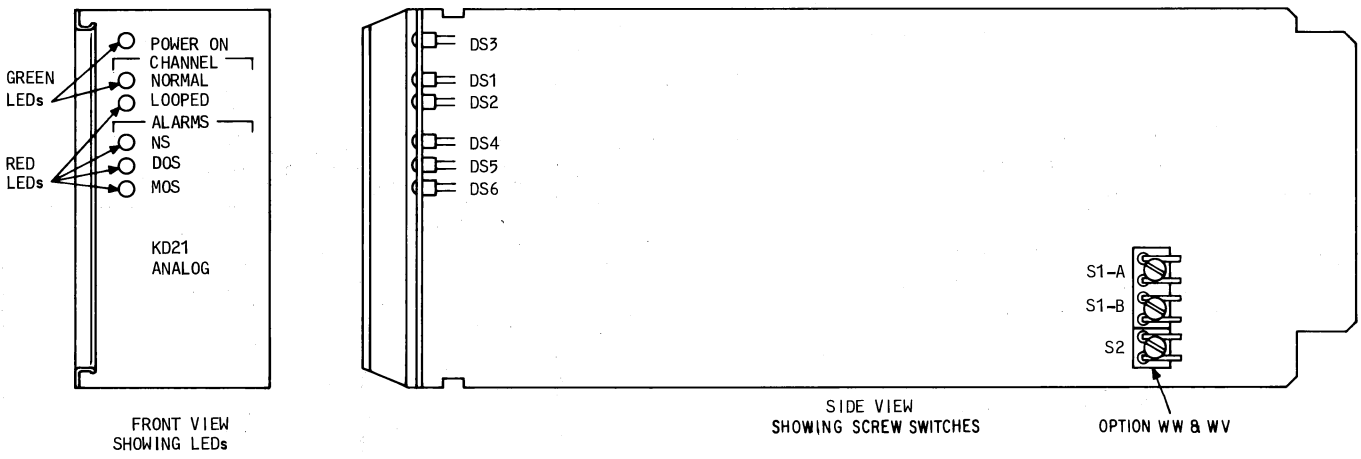

Fig. 2—Analog CP KD21

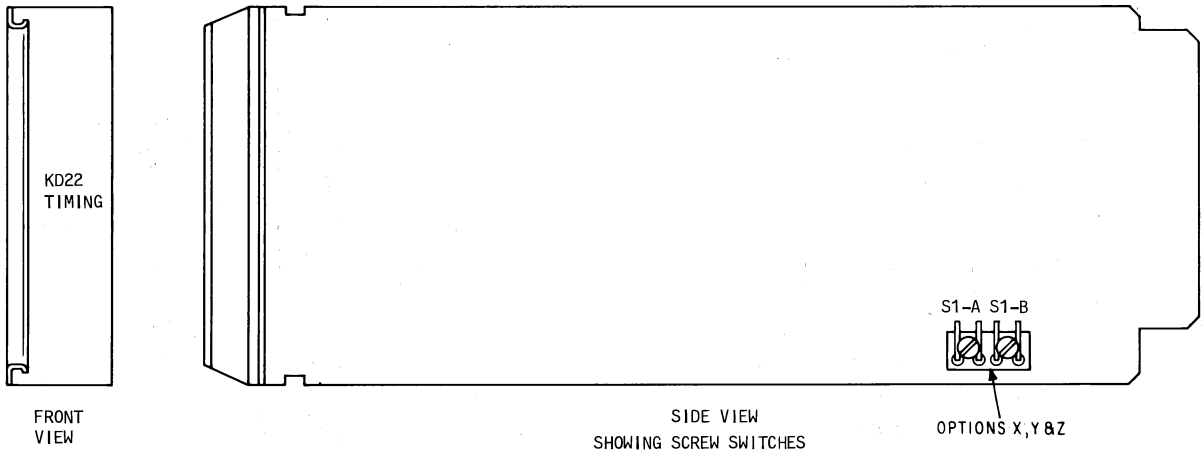

Fig. 3—Timing CP KD22

brackets, with unequal legs, so they can be reversed to fit either 19- or 23-inch racks with EIA or Bell System mounting hole spacing (Fig. 7). Each bracket can be attached at several possible locations along the side of the nest, so the front of the DSU can be properly positioned in the mounting channels. The three primary mounting arrangements are as follows (Fig. 7):

- 19-inch EIA—ears at front
- 19-inch Bell—ears at rear (used in cabinet)
- 23-inch Bell—ears at center.

3.04 Each bracket can be mounted facing front or rear, so there are four possible bracket orientations for each of the mounting positions.

A 23-inch configuration with the brackets in the front or next-to-front position should not be attempted as the brackets may bend under the unbalanced load.

3.05 If cabinet mounting is desired, the DSU can be ordered as the 510A-L1/2, which is the L1 unit described above plus a KS-20018-L19 cabinet (shipped separately) (Fig. 8). The cabinet is approximately 20.3 inches wide, 12.9 inches high, 14.7 inches deep, and has rubber feet for table or

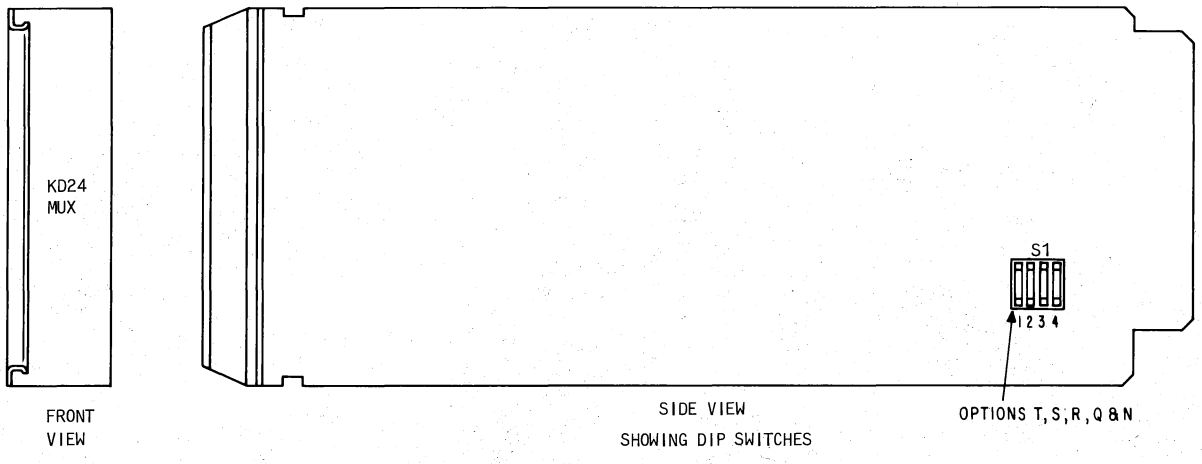

Fig. 4—Multiplexer CP KD24

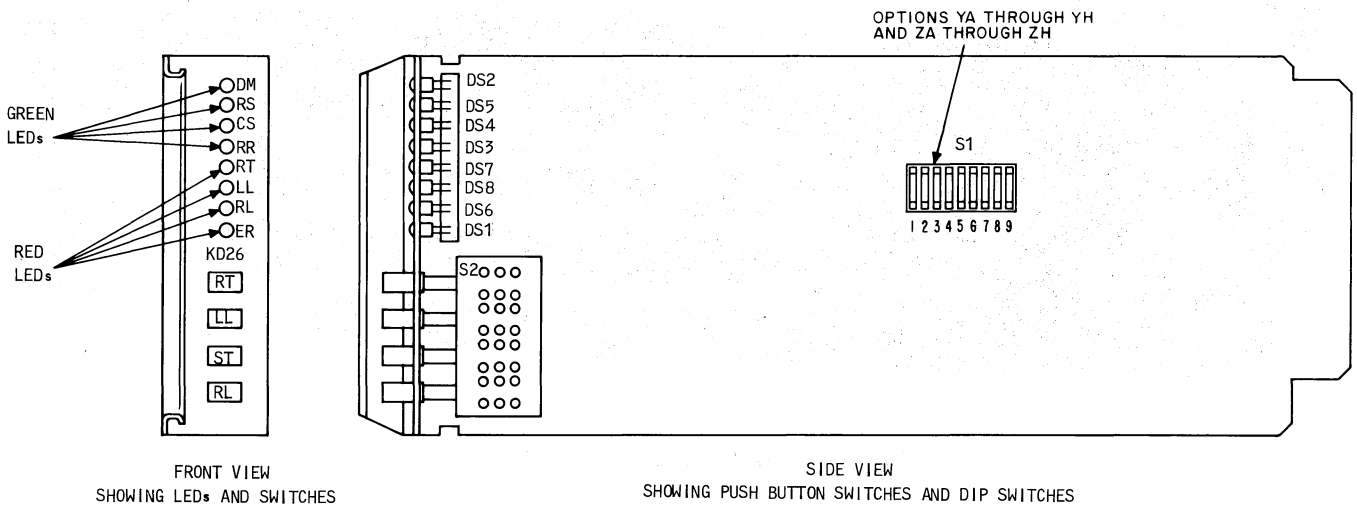

Fig. 5—Port CP KD26

shelf mounting. The fully equipped weight of the 510A-L1/2 DSU is approximately 66 pounds. The front cover is transparent so that the light-emitting diode (LED) indicators on the CPs can be observed without opening the cabinet.

3.06 All electrical access to the DSU is from the rear of the cabinet as shown in Fig. 9 and 10. Telephone line connections are made via the attached 14-foot D4BD-87 cord, which has spade lug connectors suitable for connection to a telephone connecting block. A 10-foot, 3-conductor ac power cord, supplied with the DSU, provides customer supplied power of 105 to 129 Vac at 57 to 63 Hz. An optional strapping arrangement is provided on a rear panel terminal strip (TS1), located near the bottom of the panel, to bond the power unit signal ground to the frame ground provided by the third (green) wire in the ac power cord.

3.07 Nineteen 25-pin connectors are provided on the rear panel for customer interface with each of the 19 possible ports (Fig. 9). Each connector will mate with a customer-provided Cinch or Cannon DB-19604-432 plug, or equivalent, as normally used for subrate service according to EIA Standard RC-232-C.

3.08 These interface connectors do ***not*** provide a connection to frame (protective) ground on pin 1, as was provided on the 500A DSU and on most analog data sets. This connection was

Fig. 6—Front View of a 510A-L1 DSU

omitted because the interface cabling cannot safely carry power supply fault currents. Instead, a heavy-duty terminal strip is provided on the rear panel of the 510A DSU for those cases in which it is desired to bond the 510A DSU frame to the customer equipment frame. Terminal 4 on the terminal strip (TS1) should be used for this connection. The terminal strip will accept wire up to 12 gauge. The bonding connection should use wire no smaller than 18 gauge. Provided that the customer equipment has its frame bonded to the building "green wire" ground, frame-to-frame bonding should not be required except to combat unusual noise problems.

To minimize inductive interference to data signals on the local channel, the local cable pairs should not be carried in the same run as the cable between the DSU and the CPE. If this condition cannot be met, it will be necessary to run the local cable pairs with type-SK (shielded) wire as far as it is carried in the same run with the interface cable. Ground the shield at one end only, preferably at the distribution terminal to prevent a potential difference between the ends of the cable shield. The DSU is connected to the local channel as shown in Fig. 11.

B. CP Arrangements

3.09 Each DSU requires one each of four common CPs: KD21, analog circuits; KD22, timing circuits; KD23, demultiplexer circuits; and KD24,

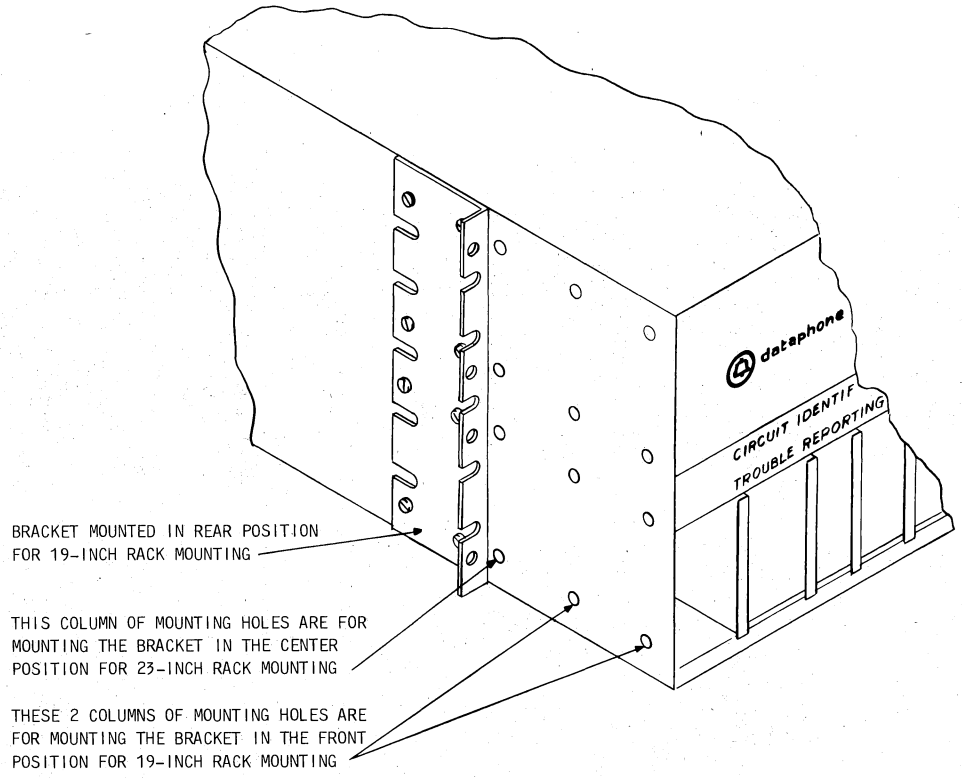

Fig. 7—Location of Mounting Brackets on 510A-L1 DSU

multiplexer circuits. These CPs are supplied as part of a 510A-type DSU. In addition, one KD25 group register CP is needed for the first nine ports.

The KD25 CP is needed for customer ports 2 through 10 only, since port 1 is used internally by the 510A DSU for subrate data multiplexer (SRDM) framing. A second KD25 CP is required for ports 11 through 20, if equipped.

3.10 Each customer data terminal served by the DSU requires one KD26 port CP for EIA RS-232-C service. Due to the flexibility in number of ports, the KD25 and KD26 CPs were not included in the 510A-L1 DSU. They must be ordered separately as required for each installation.

4. TEST REQUIREMENTS

4.01 On the telephone (facility) side, the 510A DSU acts as a 56-kb/s DSU, while the customer interface side appears to be a group of subrate DSUs. Because of the multiplexing operations of the 510A DSU, detailed straightaway testing is required on only one of the ports.

4.02 Perform the following installation tests in the order given and as instructed in Section 595-201-104, Digital Data System—510A-Type Data Service Unit—Test Procedures.

- Local test
- DSU functional test
- Straightaway test.

4.03 An option record label is provided on the front surface of the power unit (behind the hinged cover). The installer should record all common-circuit options on this label at the time of installation. No specific provision is made to record all port options; however, the specific data rate of each port should be recorded in the appropriate port assignment box on the port designation strip located between the two CP shelves (Fig. 8). Space should be left in each box of the port designation strip for customer use in identifying channels.

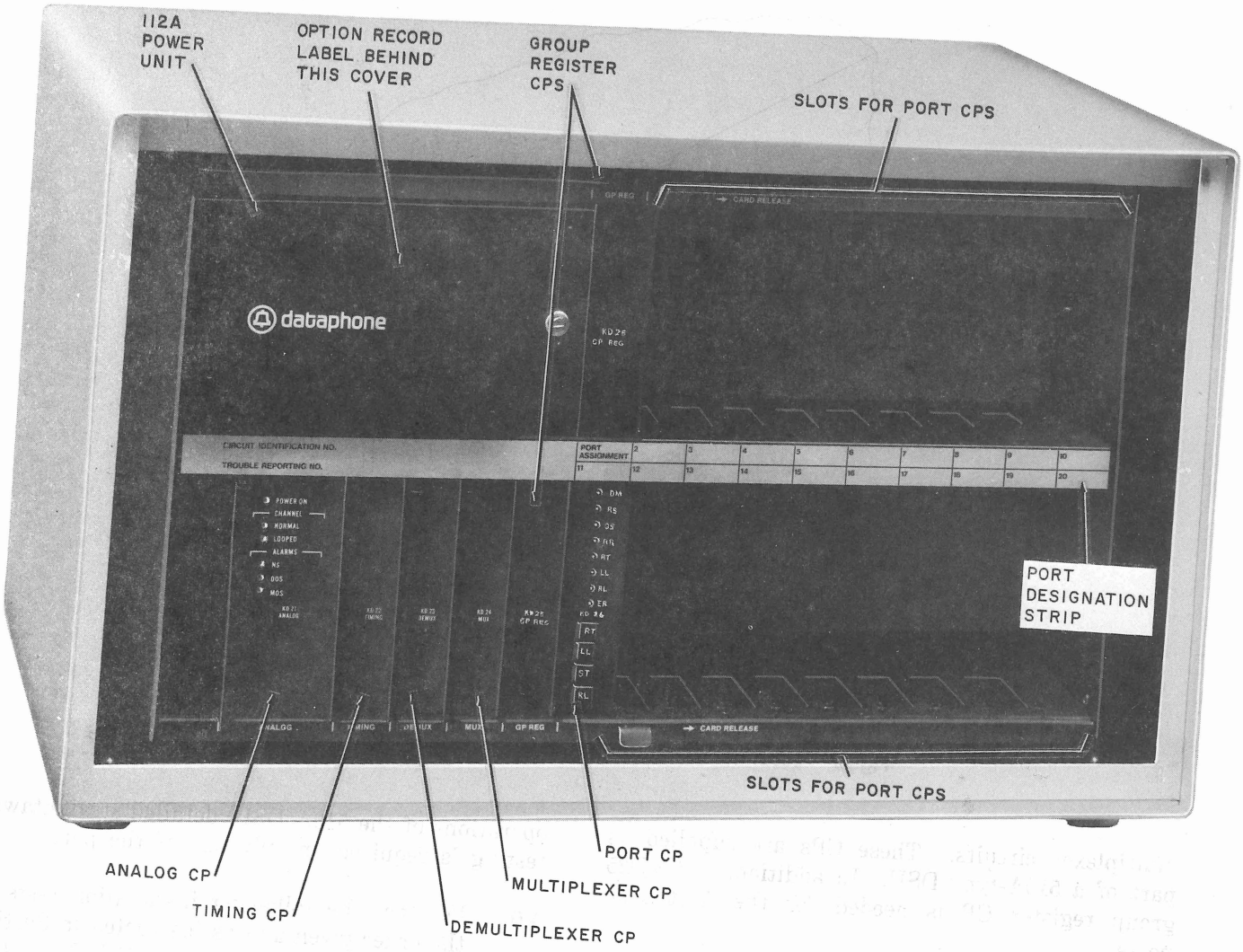

Fig. 8—Front View of a 510A-L1/2 DSU With Cabinet Cover Removed

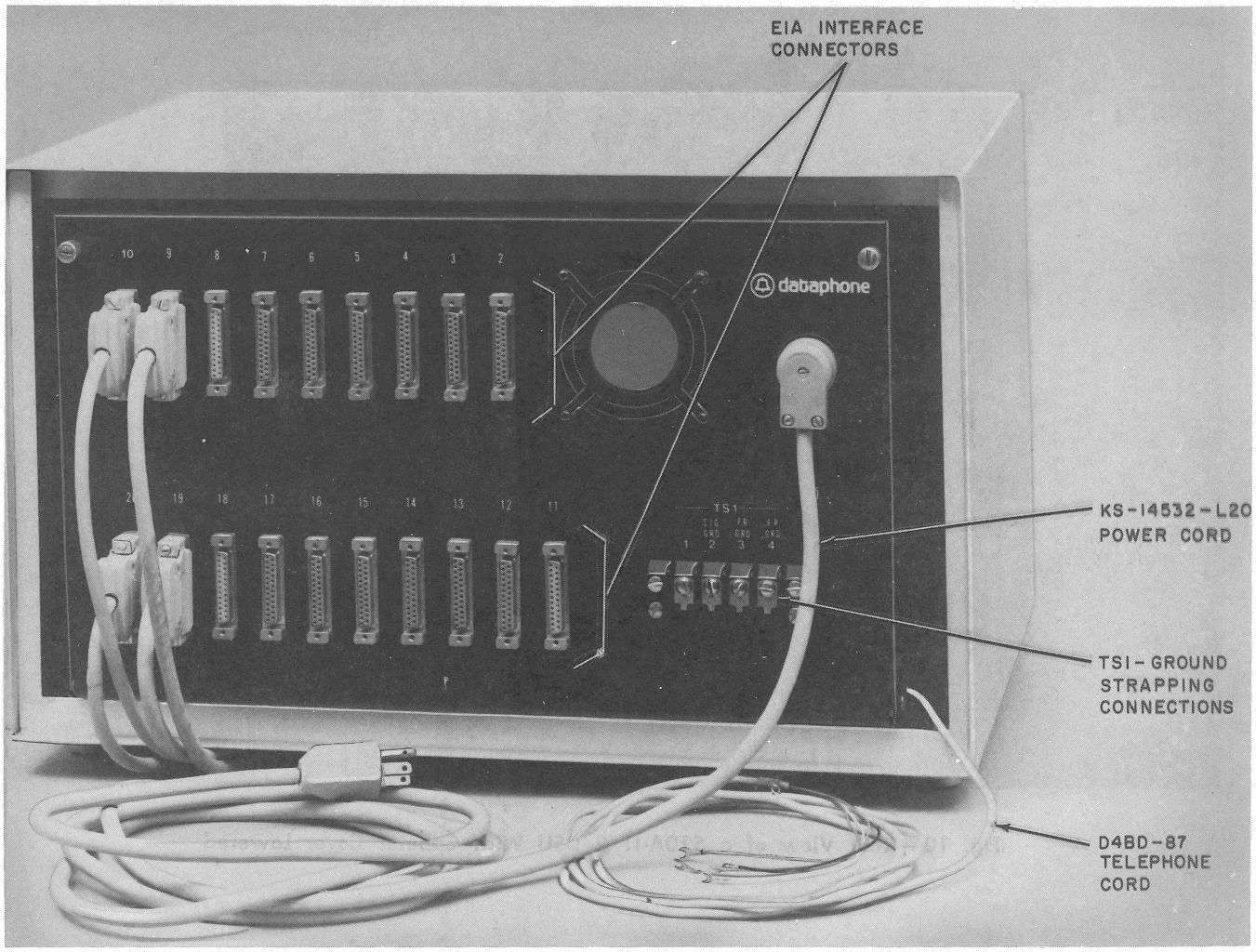

Fig. 9—Rear View of a KS-20018-L19 Cabinet Housing a 510A DSU

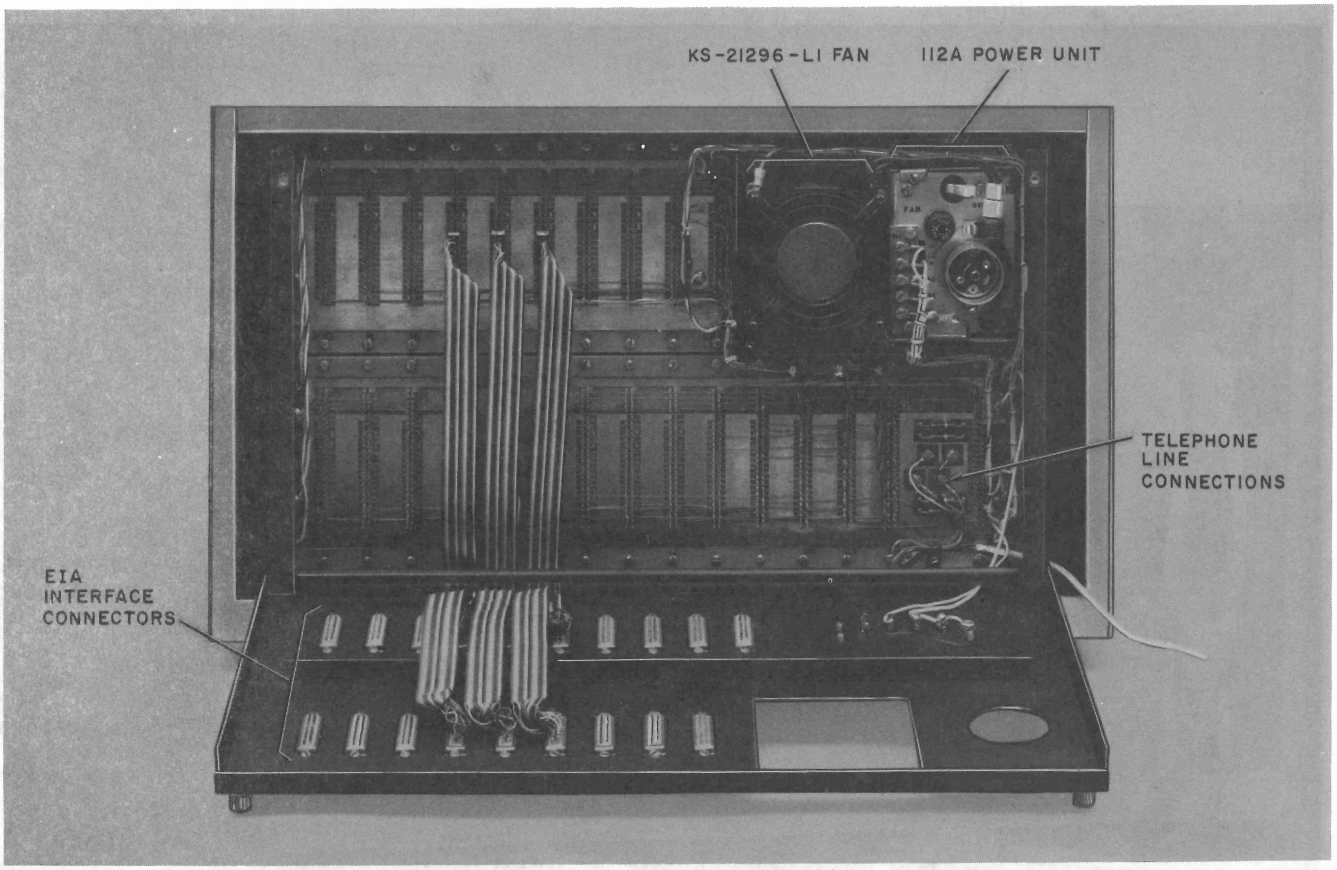

Fig. 10—Rear View of a 510A-11/2 DSU With Cabinet Cover Lowered

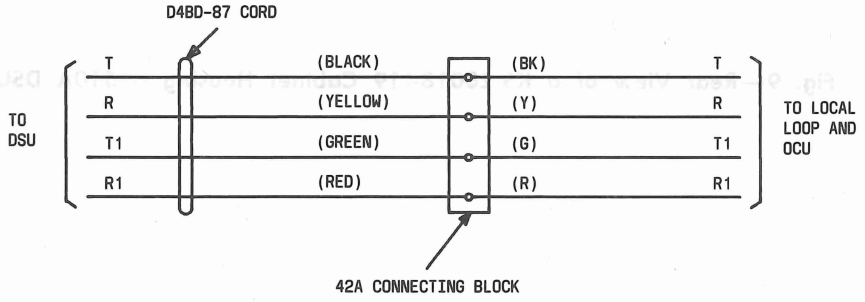

Fig. 11—A Typical Connection Diagram for the 510A-Type DSU to the Transmission Facility