500A-TYPE DATA SERVICE UNIT
INSTALLATION AND CONNECTIONS
DIGITAL DATA SYSTEM

CONTENTS PAGE

1. GENERAL

1.01 This section contains instructions for installing and connecting a 500A-type data service unit (DSU). Installation methods for the associated customer-provided equipment (CPE) are not included.

1.02 This section is reissued to include information concerning the replacement of option switches on circuit packs HN and HP1 with right angle headers. Also included is information concerning the fixed line build-out option (FLBO). Revision arrows are included to emphasize the more significant changes.

1.03 The 500A-type DSU is designed to be operated in an ambient temperature range from 40 to +120°F, with a relative humidity of less than 95 percent.

1.04 The 82A power unit, which is contained inside the DSU, supplies operating voltages of +5, +12, and -12 Vdc. An input of 105 to 129 Vac at a frequency of 57 to 63 Hz is required by the DSU. Each DSU is supplied with a 10-foot power cord for connection to the customer-provided ac source.

2. OPTION INSTALLATION

A. General

2.01 The 500A-type DSU is provided with three customer options and four TELCO options. The options should be specified on the service order or circuit layout record card (CLRC). Refer to Digital Data System—500A-Type Data Service Unit—Description and Operation, Section 595-200-100, for a description of these options. The option settings were initially made using KS-20983-L2 switches. However, the KS-20983-L2 switch is no longer available. Therefore, the option switches (S1 and S3) will be right angle headers on new circuit packs manufactured after 1978.

2.02 ▶Circuit packs (CPs) used in the DSU are given in Table A. For the earlier manufactured CPs that use the KS-20983-L2 switch the HP1 CP contains switch S3, and HN-type CPs contain switches S1 and S2 which are used to select the specific options. The switch locations are shown in Fig. 1 and the options are given in Table B. Figure 2 shows the three sections or rollers: A, B, and C of switches S1 and S3.◀ To access the switch rollers, the hinged protective cover must first be opened by raising it from the end marked with a dot. Each switch section roller is individually adjusted to one of two positions by using the screwdriver provided to ***gently*** rotate the adjustable roller. Switch positions are numbered as shown on the protective cover.

The final position of the roller must be such that it butts up against the spacer and the screwdriver slot is parallel with the spacer.

TABLE A

DSU SERVICE BIT RATE AND CIRCUIT PACKS

DSU LIST	DSU SERVICE BIT RATE	ANALOG CP	LOGIC CP
500A-L1/2	2.4 kb/s	HN1	HP1
500A-L1/3	4.8 kb/s	HN2	
500A-L1/4	9.6 kb/s	HN3	
500A-L1/5	56 kb/s	HN4	

2.03 ⧫For the newer manufactured CPs that use the right angle headers, HP1 CP contains header H2, and HN-type CPs contain switch S1 and header H1 which are used to select the specific options. The switch and header locations are shown in Fig. 3 and the options are given in Table C. Figure 4 is a representation of H1 and H2 showing the ten positions and the shunts. To install options, the shunts are slipped over the two pins which make up one position. Four shunts are provided with the header. One shunt is a spare and should be stored in position 10.⧫

B. Option Installation Procedure

2.04 To gain access to the switch rollers or headers, the front and rear faceplates must be removed. Both faceplates are removed by depressing the two tabs located on the bottom edge and simultaneously pulling outward. To replace

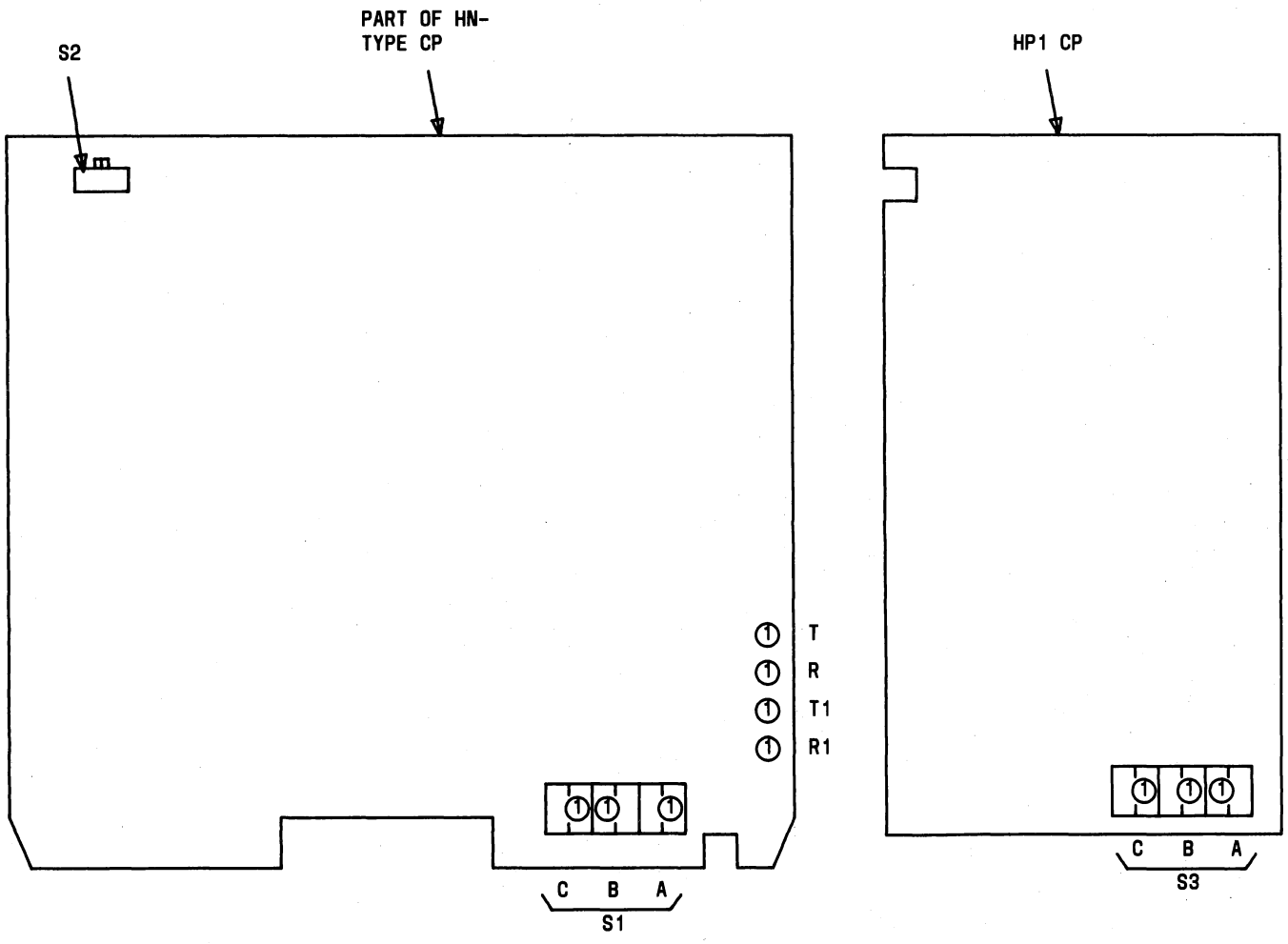


Fig. 1—DSU Option Switches

TABLE B

DSU OPTIONS

	OPTION	FEATURE	SWITCH	SWITCH POSITION	CP
CIRCUIT OPTIONS	WV	FIXED LINE BUILD-OUT NETWORK INSTALLED	S1A	3	HN TYPE
			S1B	5	
			S1C	9	
	WW	FIXED LINE BUILD-OUT NETWORK REMOVED	S1A	2	
			S1B	6	
			S1C	8	
	YK	SIGNAL GROUND CONNECTED TO FRAME GROUND	S2	IN	
	YL	SIGNAL GROUND DISCONNECTED FROM FRAME GROUND		OUT	
	YS	CONTINUOUS REQUEST TO SEND	S3A	2	HPI
	YT	SWITCHED REQUEST TO SEND		3	
	YQ	CIRCUIT ASSURANCE INSTALLED *	S3B	6	
	YR	CIRCUIT ASSURANCE REMOVED		5	
	XK	SYSTEM STATUS INSTALLED *	S3C	9	
	XL	SYSTEM STATUS REMOVED		8	
	*	THESE OPTIONS SHALL NOT BE INSTALLED EXCEPT AS REQUIRED IN OTHER INSTALLATION PRACTICES			
PHYSICAL OPTIONS	XM	SWITCH LED ASSEMBLY INSTALLED TO REAR			HN TYPE
	XN	SWITCH LED ASSEMBLY INSTALLED TO FRONT			
	XO	LL SPRING CLIP INSTALLED			
	XP	LL SPRING CLIP NOT INSTALLED			

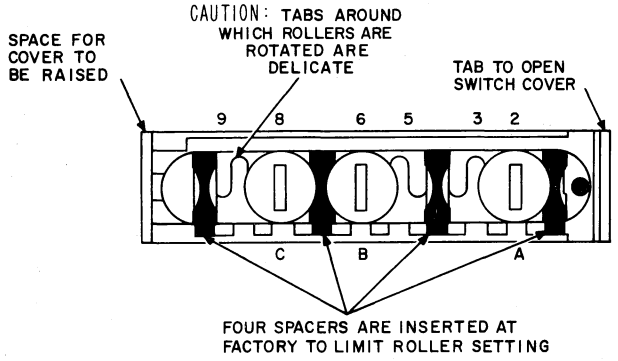


Fig. 2—Detail of Switch for Installing Options

the faceplates, hook the tabs on the aluminum housing into the slots on top and gently snap the bottom edge of the faceplates into position.

2.05 ▶The FLBO option will be designated OUT or removed when the loop expected measured loss (EML) is 10 dB or more and designated IN or installed when the loop EML is less than 10 dB. The FLBO option must be IN when the actual measured loss (AML) is less than 5 dB and OUT when the AML is greater than 15 dB. When the AML falls between 5 dB and 15 dB, apply the option as shown on the CLRC. The transmission engineer or design group must be notified when any switch setting or header position deviates from the CLRC.◀

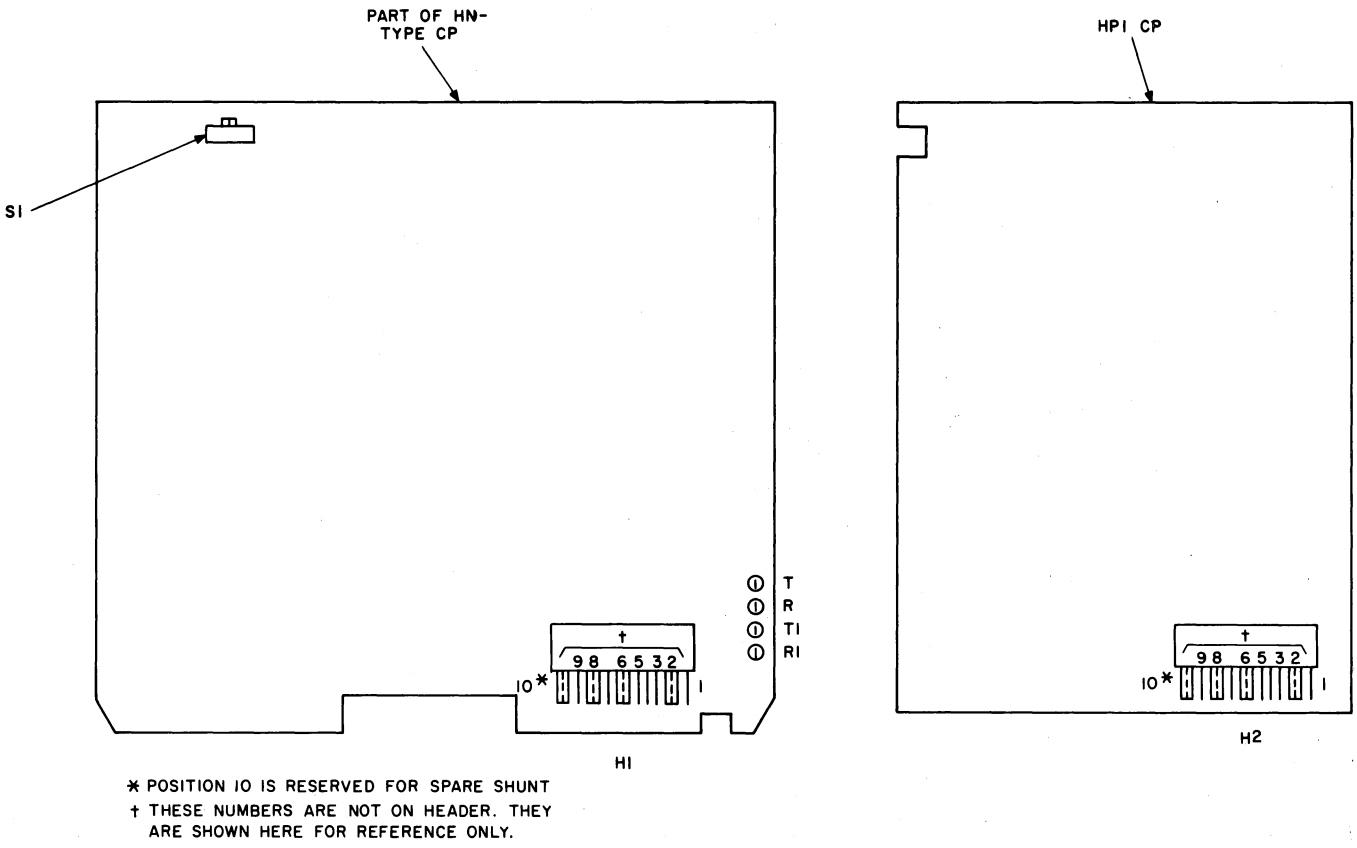


Fig. 3—DSU Option Switch and Headers

3. INSTALLATION AND CONNECTION PROCEDURES

3.01 Cable pairs must be tested in accordance with Digital Data System—Private Line Local Channel—Tests and Requirements, Section 314-410-510, prior to initial installation of the DSU.

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

A. Single Installation

3.02 The DSU should be installed on a nearby desk, table, or stand. Care must be used in placement to avoid stray fields from electromechanical equipment. For subrate services, the 500A-type DSU must be located from 1 to 50 feet from the CPE, while the 500A-L1/5 DSU operating at 56 kb/s may be located from 1 to 100 feet from the CPE.

3.03 When making connection to the line facility, the DSU must be located within 9 feet of the connector block in order for the DSU 4-conductor cord (D4BD-49) to reach the connector block.

3.04 The DSU must be located within 10 feet of a customer-provided ac outlet which is not under control of a switch. A power cord is supplied with the DSU and requires an outlet which accepts a plug with two parallel blades and a round grounding pin.

3.05 To minimize inductive interference to data signals on the local channel, the local cable pairs should not be installed within 6 inches of the customer interface cable. 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 within 6 inches of 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.

TABLE C

DSU OPTIONS

		OPTION	FEATURE	POSITION
HN-TYPE CP CIRCUIT OPTIONS	HEADER H1	WV	Fixed line build-out network installed	3
				5
				9
		WW	Fixed line build-out network removed	2
				6
				8
	SWITCH S1	YK	Signal ground connected to frame ground	IN
		YL	Signal ground disconnected from frame ground	OUT
HN-TYPE CP PHYSICAL OPTIONS		XM	Switch led assembly installed to rear	
		XN	Switch led assembly installed to front	
		XO	LL spring clip installed	
		XP	LL spring clip not installed	
HP1 CP CIRCUIT OPTIONS	HEADER H2	YS	Continuous request to send	2
		YT	Switched request to send	3
		YQ	Circuit assurance installed*	6
		YR	Circuit assurance removed	5
		XK	System status installed*	9
		XL	System status removed	8

* These options shall not be installed except as required in other installation practices.

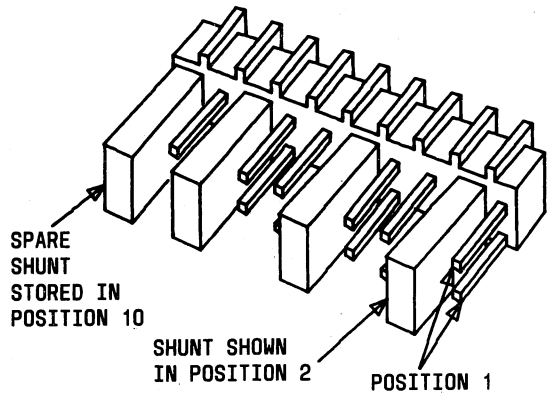


Fig. 4—Detail of Right Angle Header for Installing Options

The DSU is connected to the local channel as shown in Fig. 5.

3.06 A 25-pin connector is provided at the rear of subrate DSUs for connection to CPE. This connector is designed to mate with a customer-provided Cinch or Cannon DB-19604-432 plug equipped with a DB-51226-1 hood, or equivalent. DSUs operating at 56 kb/s have a 34-pin connector at the rear for connection to the CPE. This connector is designed to mate with a customer-provided Winchester MRA-34P-JTC6-H8 plug, or equivalent.

3.07 In DSU installations where access to the front faceplate is limited or where the customer interface connector is facing forward on a shelf or in a cabinet, the switch and light-emitting diode (LED) assembly may be removed from the front faceplate and mounted on the rear faceplate.

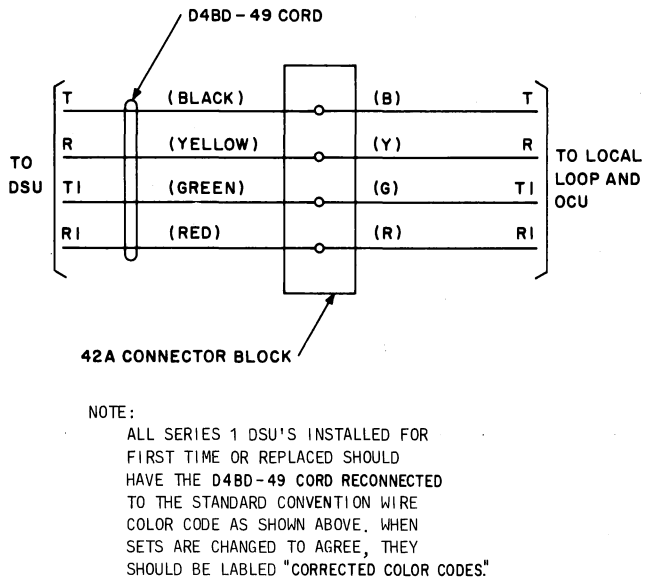


Fig. 5—A Typical Connection Diagram for the 500A-Type DSU (Series 2) Transmission Facility

To relocate the switch and LED assembly, proceed as follows:

(1) Remove both faceplates per paragraph 2.04.

(2) If the cover must be removed, loosen the two cover retaining screws located on the bottom of the DSU and slide the cover forward or backward.

(3) Disconnect the interconnecting cable harness from HP1 CP.

(4) Release the spring clip retaining HP1 CP and slide the CP out of the DSU.

(5) Remove the switch and LED assembly from the front faceplate by using gentle outward pressure on the plastic mounting tabs retaining the assembly.

(6) Install the switch and LED assembly on the rear faceplate by gently depressing the assembly into the appropriate position.

(7) Replace the HP1 CP into the DSU and connect the interconnecting cable harness to HP1.

(8) If the cover was removed, replace the cover by reversing the procedure in Step (2).

(9) Replace both faceplates per paragraph 2.04.

3.08 If the DSU is being used on multipoint lines, the spring clip supplied with the DSU should be positioned over the switch (on the switch and LED assembly) to prevent it from being placed in the LL position.

B. Multiple Installation

3.09 For multiple installations, three DSUs may be stacked without exceeding the maximum internal operating temperature. The four clips supplied with each DSU are used to support the center and top DSUs. They are inserted into the slots provided on the dovetail feet as shown in Fig. 6. When the sets are stacked, the tabs drop into holes provided in the top of the plastic faceplates and provide a secure, stacked arrangement.

3.10 Multiple installations requiring more than three DSUs are handled by means of the 48A-L1/2 data mounting which accepts up to five DSUs. (See Section 590-102-139 for a detailed description of the 48A data mounting.)

3.11 The 500A DSUs must be adapted for mounting in the 48A-L1/2. The L1/2 designation provides bearing plates which are required for mounting the DSU in the data mounting. Figures 7 through 11 depict a 500A DSU being adapted for mounting into the 48A-L1/2 data mounting. The mounting procedure is as follows.

(1) Remove front and rear faceplates per paragraph 2.04.

(2) Remove switch and LED assembly per paragraph 3.07(5).

(3) Remove outer cover from DSU. (The front faceplate, outer cover, and power cord are not used in a multiple arrangement.)

(4) Position switch and LED assembly to rear (connector side) of DSU.

(5) Slide the two bearing plates into the slot on the dovetail feet of the DSU and secure with mounting screws (Fig. 10). A bracket is supplied to fill the space between the bearing

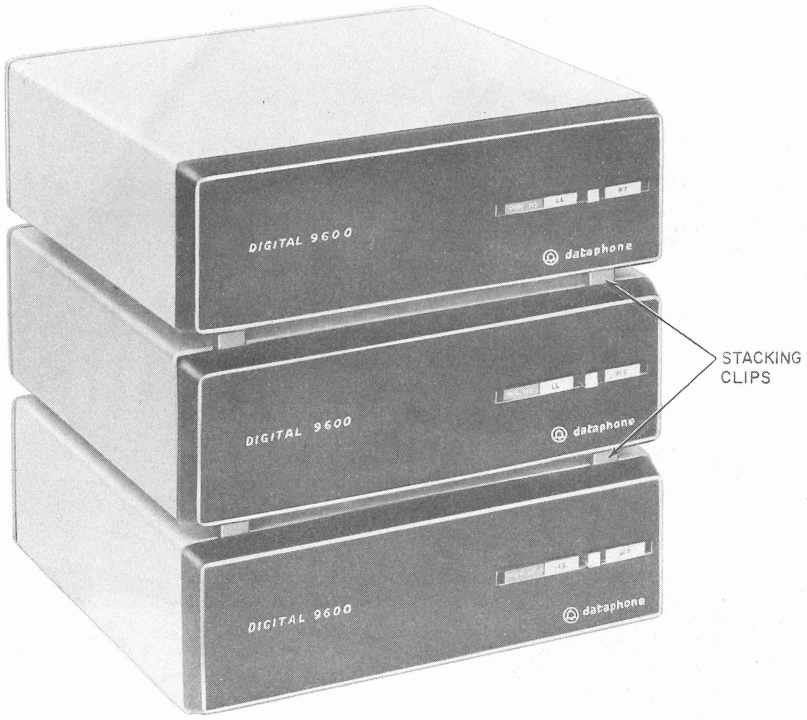


Fig. 6—Multiple Installation—Stacked Arrangement Using Clips for a Maximum of Three DSUs

plate and the DSU chassis and to provide rigidity to the DSU assembly.

(6) Dress the telephone line cord around the bearing plates as shown in Fig. 10.

(7) Insert the DSU (connector side first) into the rear of the data mounting by sliding the bearing plates into the slots in the upper and lower metal strips (Fig. 12 and 13). Make sure the switch and LED assembly clear the opening as the DSU is inserted.

(8) Secure the DSU by moving the lock strip to its leftmost position and tightening the lock-strip screw.

(9) Connect the tip and ring leads of each DSU to the terminal strips (TS-A through TS-E) located on the lower casting at each of the mounting positions as shown in Fig. 14. [Terminal strips are wired to a KS-16784-L4 (50-pin) connector mounted on the right side of the 48A data mounting.]

(10) Install the switch and LED assembly on the rear faceplate per paragraph 3.07(6).

(11) Install the rear faceplate into the 48A data mounting cover plate by engaging the three tabs at the left side of the opening and the two tabs on the faceplate.

(12) Attach the customer interface connector to the DSU and dress the cord with the cable ties located below each DSU (Fig. 13).

(13) Attach the multiple plug power cord, supplied with the 48A-L1/2, to each DSU power supply connector (Fig. 11).

(14) Access to the tip and ring connections is made via the KS-16786-L4 (50-pin) connector located on the right side of the mounting (Fig. 12).

3.12 The DSU is now connected for multiple operation.

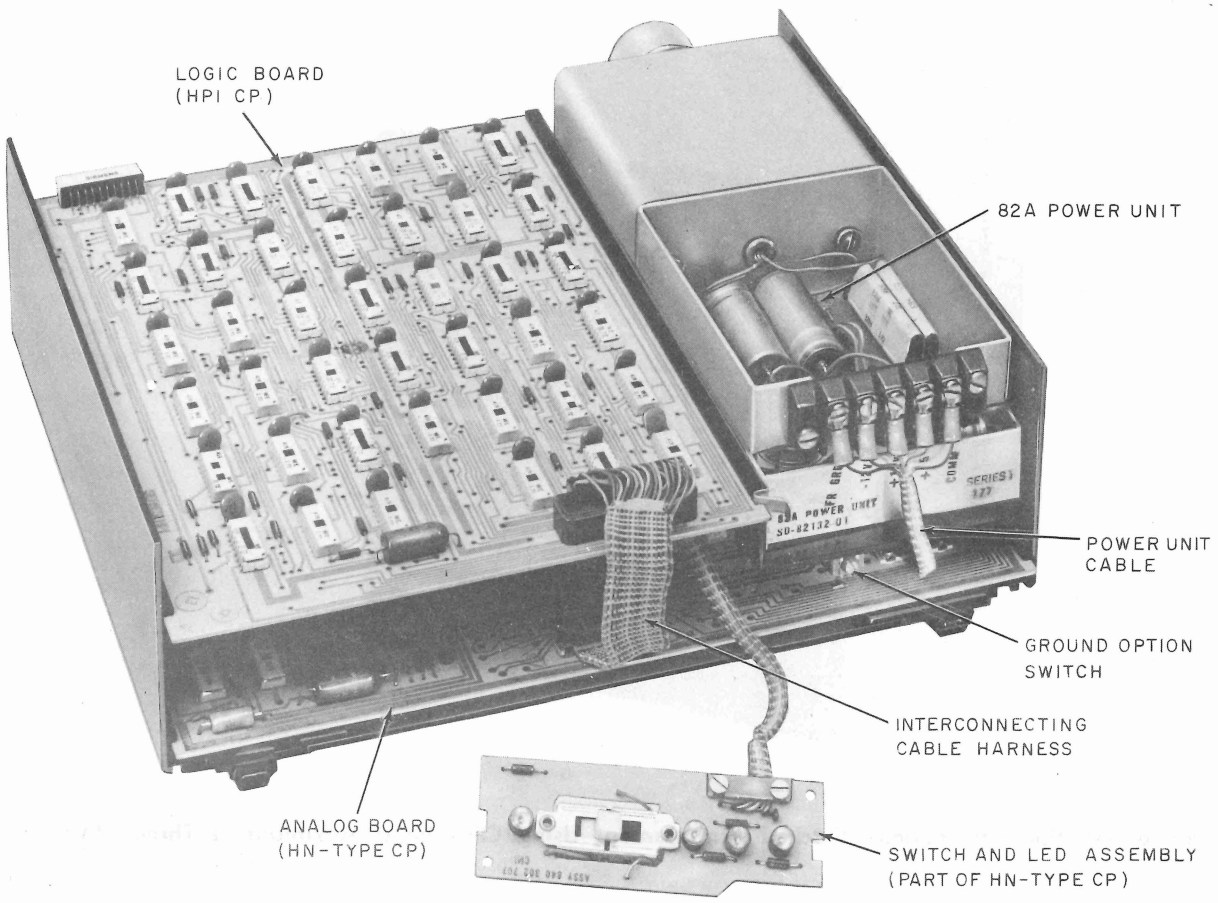


Fig. 7—500A-Type Data Service Unit—Front Internal View

4. TEST REQUIREMENTS

4.01 Perform the following installation tests in the order given and as instructed in Digital Data System—500A-Type Data Service Unit—Test Procedures, Section 595-200-500:

- Local test
- DSU functional test
- Straightaway test.

4.02 Blank labels are shipped attached to the inside of the front faceplate. List codes, customer option information, and other information may be recorded on these labels.

4.03 When DSUs are multiple mounted, the circuit number (CKT NO) and trouble number (TBL NO) for each DSU are written on the label attached to the bottom of each DSU.

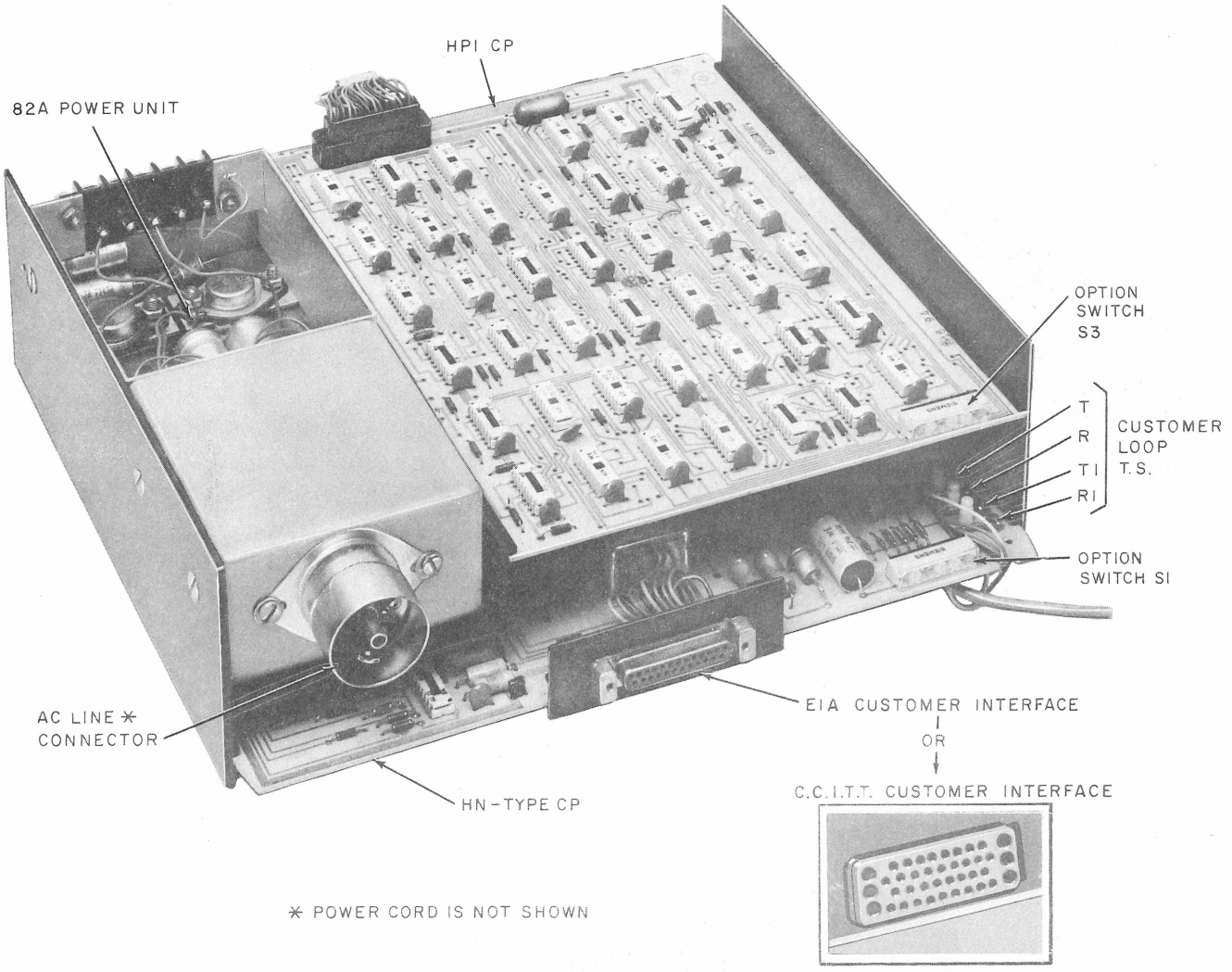


Fig. 8—500A-Type Data Service Unit—Rear Internal View

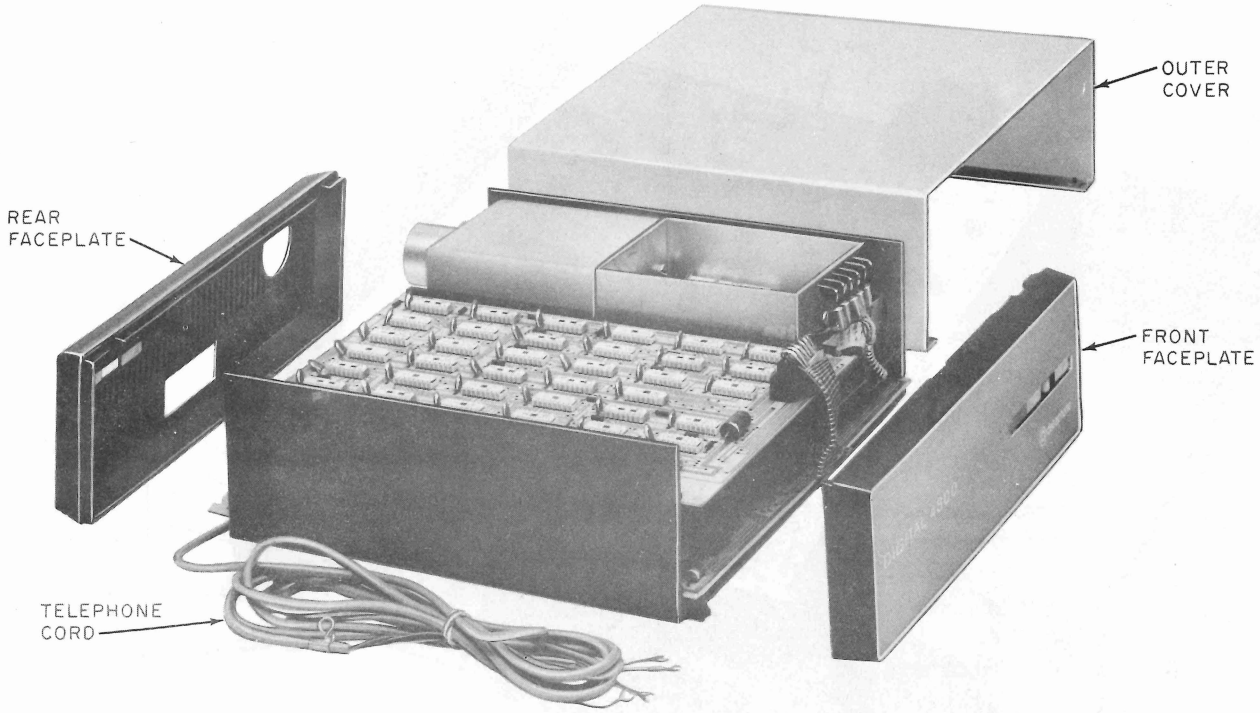


Fig. 9—500A-Type Data Service Unit—Exploded View

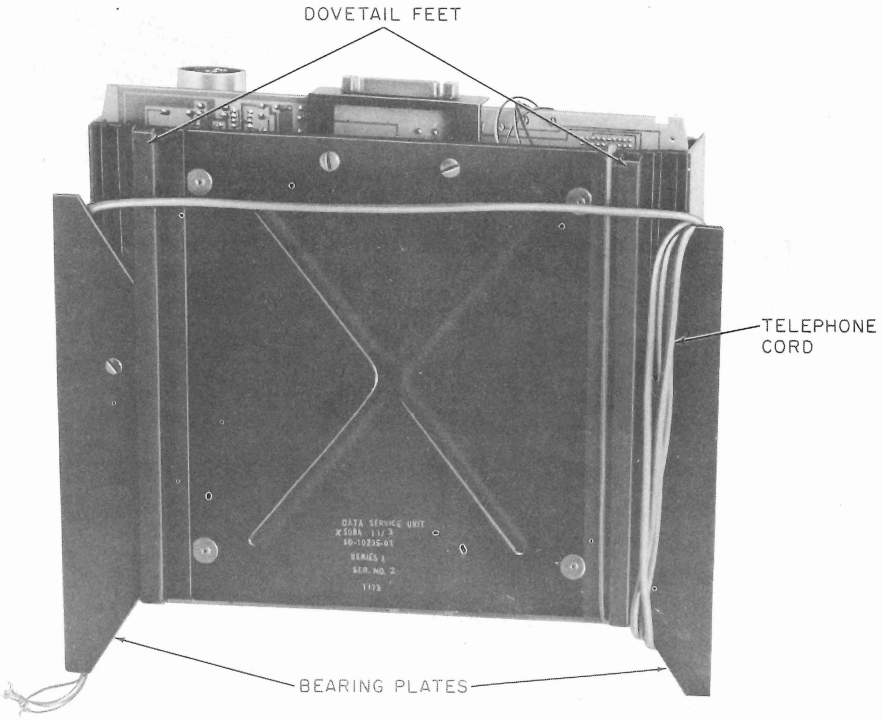


Fig. 10—500A-Type Data Service Unit—Under View Showing Bearing Plates

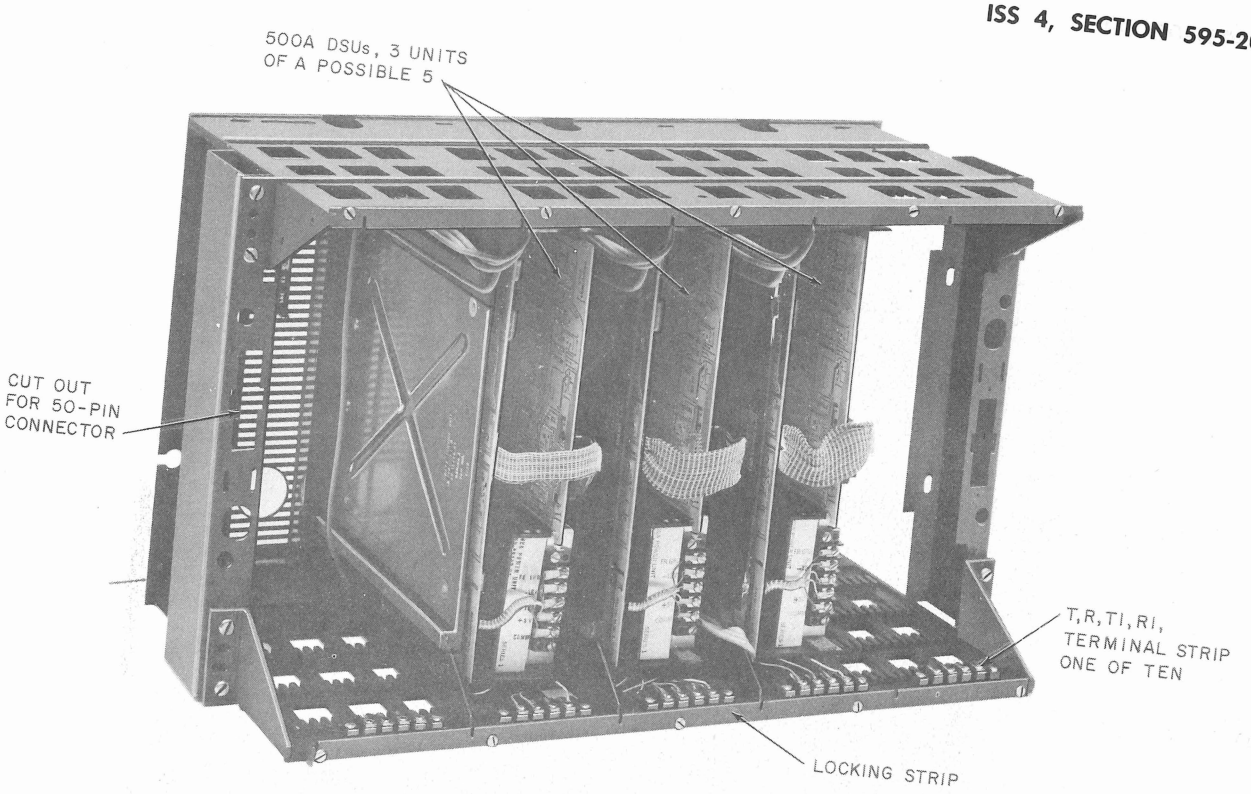


Fig. 11—48A-Type Data Mounting—Rear View Showing Three 500A-Type DSUs Installed

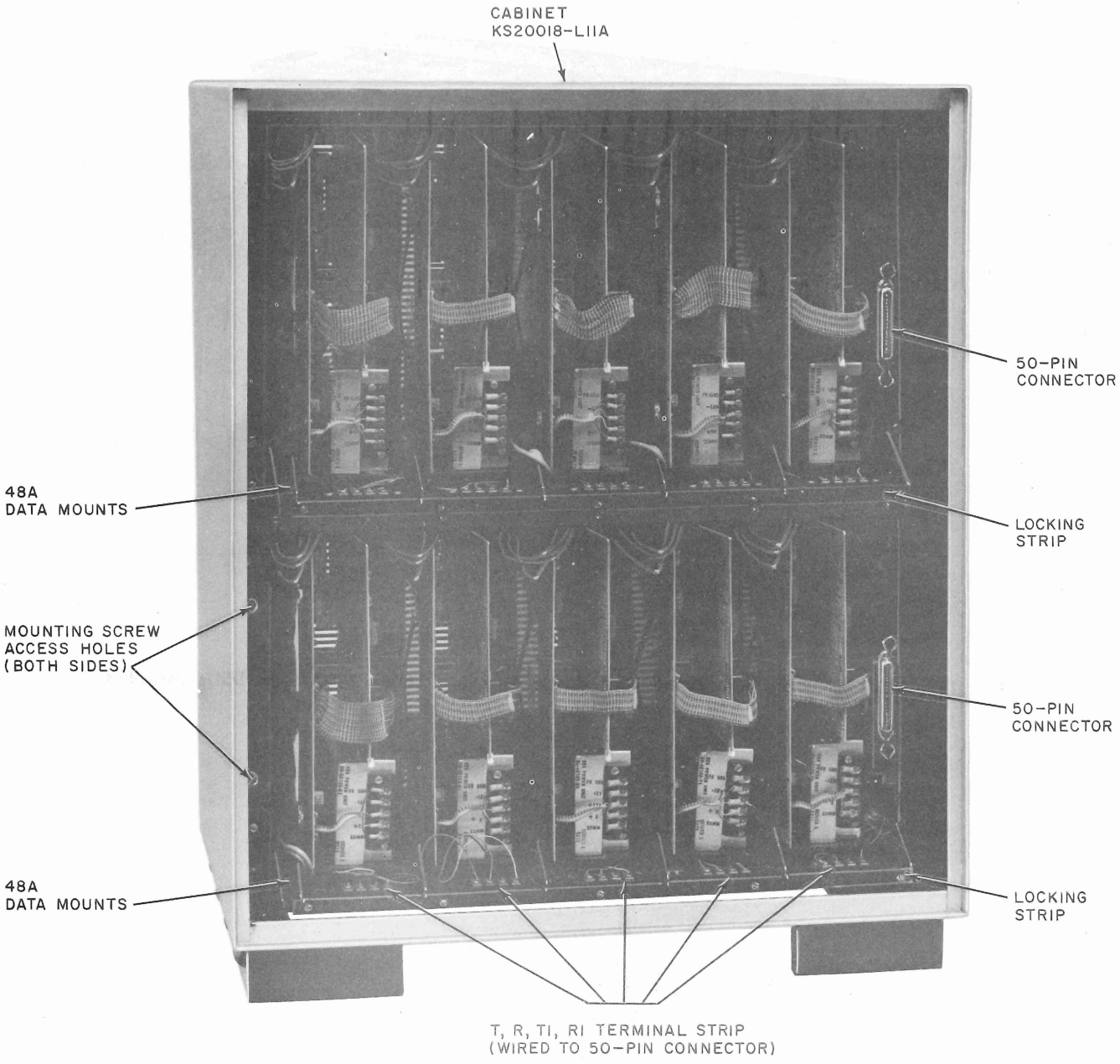


Fig. 12—Rear View—KS-20018-L11A Cabinet

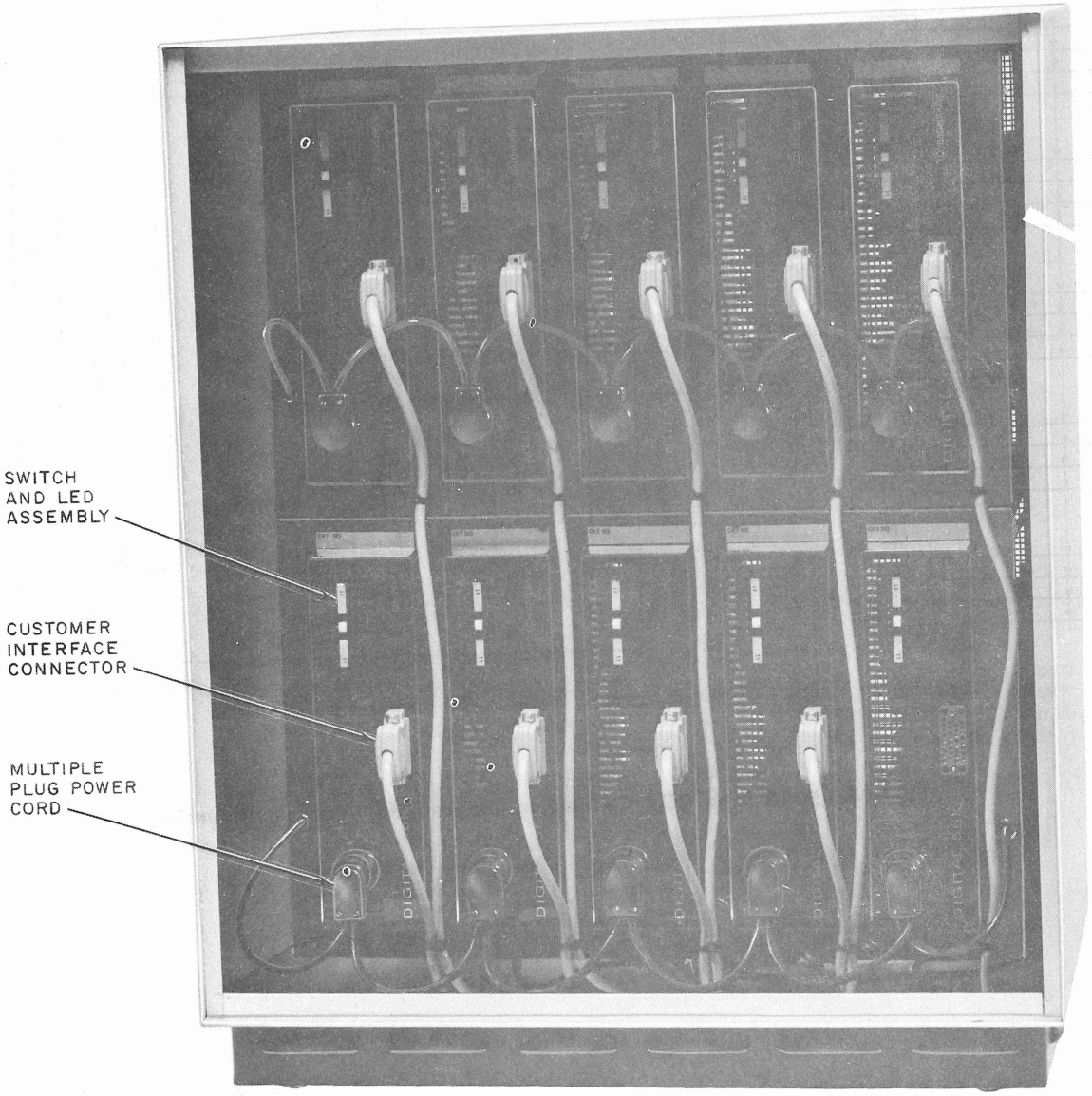
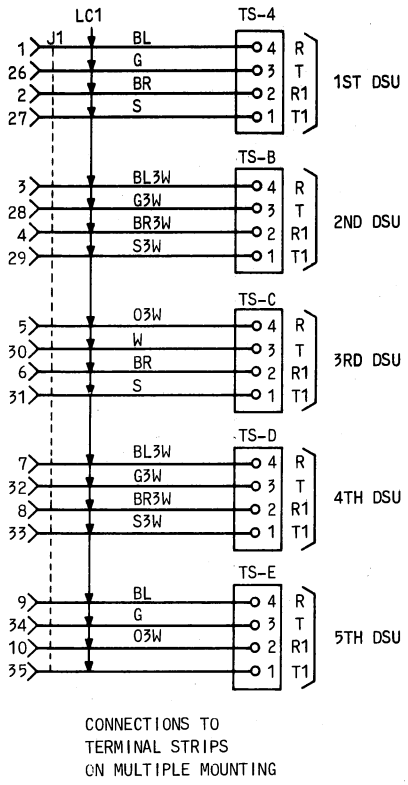


Fig. 13—Front View—KS-20018-L11A Cabinet



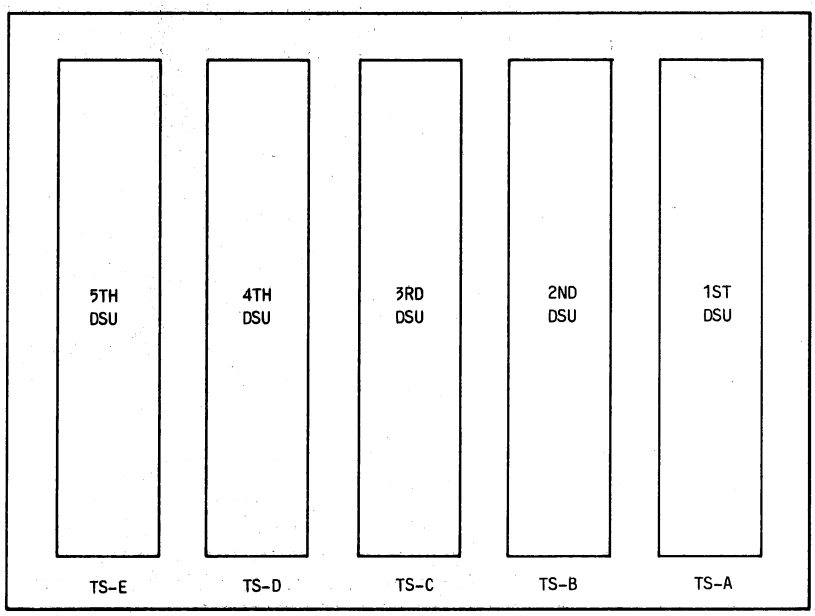


Fig. 14—500A-Type DSU Connection Diagram for Multiple Mounting