10A DATA LINE CONCENTRATOR (DATREX*)

INSTALLATION

CONTENTS PAGE

1. GENERAL

1.01 This section contains information needed to install the component apparatus of the 10A Data Line Concentrator. A typical installation of a 10A Data Line Concentrator in a KS-20093-L1 cabinet is shown in Fig. 1.

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1.02 The 10A Data Line Concentrator consists of the following major components.

- From one to four switch modules (18A1, 19A1, or 20A1 Data Mountings equipped with AR365 circuit packs)
- Trunk module (21A1 or 22A1 Data Mounting equipped with AR368 circuit packs)
- Control module (23A1 Data Mounting equipped with AR370, AR371, AR374, AR375, and AR384 circuit packs)
- Power supply module (71A apparatus mounting equipped with KS-20575 rectifiers or 71B apparatus mounting equipped with J87308 B converters)
- Manual test equipment (Data Auxiliary Set 803E1 and AR464 circuit pack).

Note: In the following text, the 10A Data Line Concentrator will be referred to as the concentrator. The word "module" will be used to refer to a data mounting equipped with circuit packs.

1.03 Concentrator units mount on 23- or 25-inch relay racks. Any appropriately sized cabinet designed to mount 23- or 25-inch units may be used. This section describes installation procedures using a KS-20093-L1 cabinet.

2. PREINSTALLATION SURVEY

2.01 Verify that the overall facilities meet transmission requirements specified in the section entitled Private Line Data Circuits—Voice Bandwidth Circuits for Miscellaneous Data—Overall Tests and Requirements (314-410-500).

2.02 Verify that the location selected by the customer for the concentrator is adequate for maintenance, keeping in mind such factors as sufficient clearance to remove circuit packs, get to test points, remove data mountings, etc. If the concentrator is installed in a cabinet, ensure that adequate clearance is available for opening all cabinet doors.

2.03 Make certain the customer-provided power 110-volt source is adequate. The largest fully-equipped (128 lines by 32 trunks) concentrator requires approximately 350 watts of ac power held to 60 $\pm$3 Hz at 105 to 129 volts.

Do not connect power to the concentrator until instructed to do so.

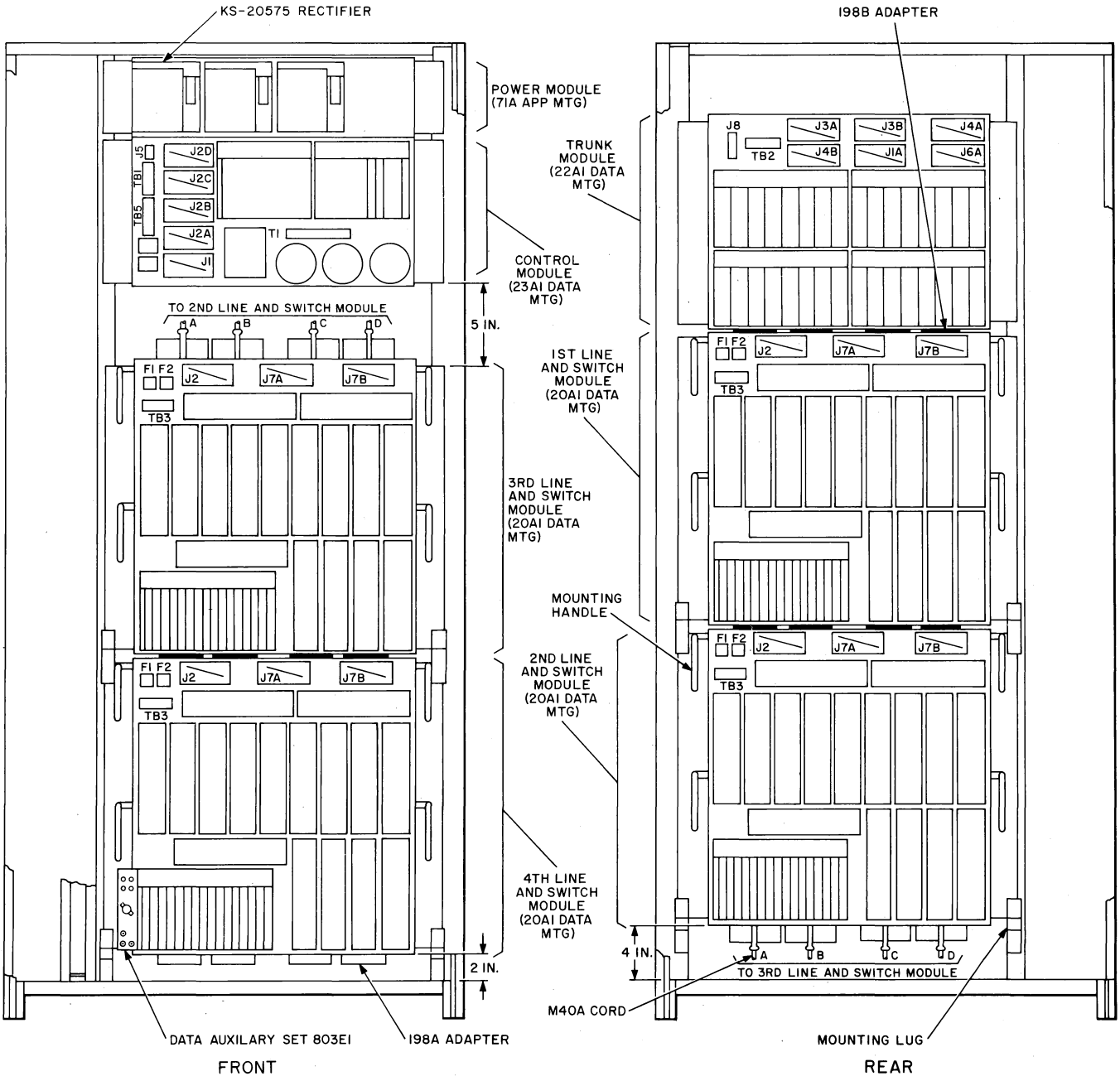

Fig. 1—10A Data Line Concentrator (128 Lines/32 Trunks)

2.04 Verify that the power source is within adequate distance of the proposed concentrator location. If an overhead power source (outlet) is used and the concentrator utilizes a power strip such as the KS-20129 power strip, it is recommended that a Twist-Lock® (or equivalent) receptacle be provided. The standard plug provided on the power strip should be replaced with a mating Twist-Lock plug.

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TYPICAL EQUIPMENT ARRANGEMENTS USING KS-20093-L1 CABINET

2.05 Mounting arrangements depend on the trunk group size and the number of lines to be serviced (the number of line and switch modules required).

2.06 The KS-20093-L1 cabinet provides front and rear mounting in a back-to-back arrangement. The front of the cabinet is considered to be the side that contains the customer access compartment. Concentrator apparatus does not interface with customer-provided equipment. Since the concentrator is part of a total system, equipment that does interface with customer-provided terminals (CPT) may share the same cabinet. When possible, concentrator installations should utilize the rear of the cabinet and leave excess mounting area in the front of the cabinet for other apparatus that may be located within this cabinet and require connection with CPTs.

2.07 Equipment arrangements will normally be custom engineered by the operating company engineering staff and provided as a part of the installation instructions. However, typical arrangements shown in Fig. 2 cover most installations for KS-20093-L1 cabinets.

2.08 Always install power module nearest top of cabinet for most efficient heat dissipation. Never store excess cables or place any other obstruction on the top of the KS-20093-L1 cabinet, since this will block ventilaton and interfere with the dissipation of heat.

2.09 Table A relates concentrator line and trunk size requirements to the applicable section of Fig. 2. The following paragraphs describe each of the corresponding arrangements shown in Fig. 2 (a-e).

(a) This arrangement provides a concentrator which can accomodate up to 8 trunks and up to 128 lines.

(b) This arrangement provides a concentrator which can accomodate up to 16 trunks and up to 64 lines.

(c) This arrangement provides a concentration which can accomodate up to 16 trunks and up to 128 lines.

(d) This arrangement provides a concentrator which can accomodate up to 32 trunks and up to 32 lines.

(e) This arrangement provides a concentrator which can accomodate up to 32 trunks and up to 128 lines.

TABLE A

CONCENTRATOR SIZE (LINES X TRUNKS) AND APPLICABLE SECTION OF FIG. 2

		TRUNKS		
		1-8	9-16	17-32
LINES	1-32	A*	b*	d*
	33-64			e*
	65-96		c*	
	97-128			

* Refers to part of Fig. 2.

3. INSTALLATION

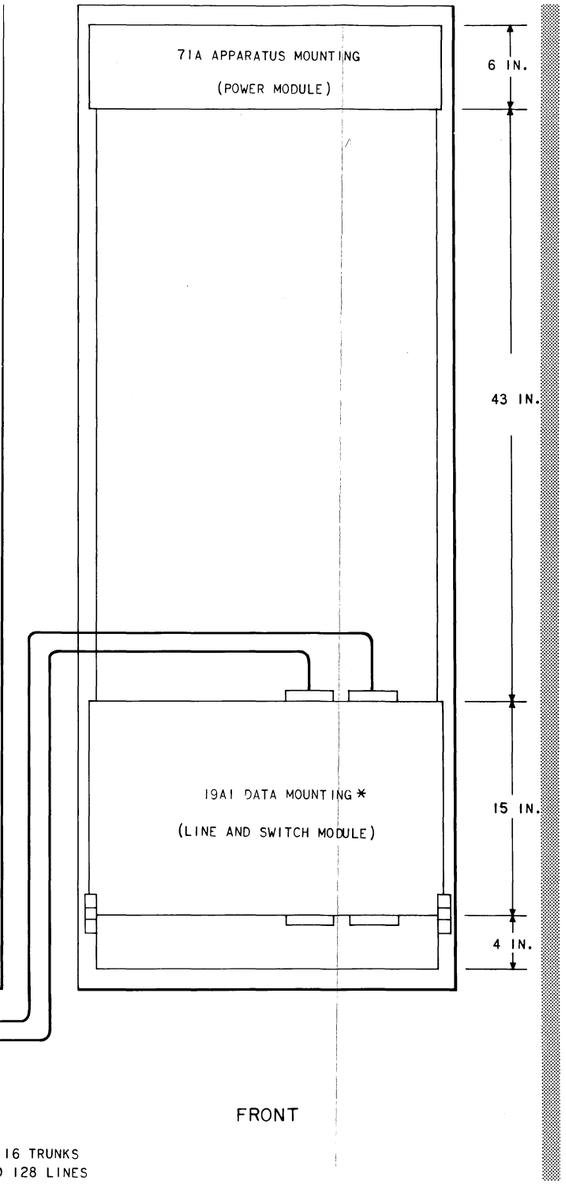
3.01 Reference directions on the data mountings (left, right, front, and rear) are with respect to the side of the mounting (front) into which the circuit packs plug.

3.02 The KS-20093-L1 cabinet depends on the installation of the data mountings and associated components for support and rigidity. For this reason, the following procedure should be used to assure proper alignment and leveling of the cabinet.

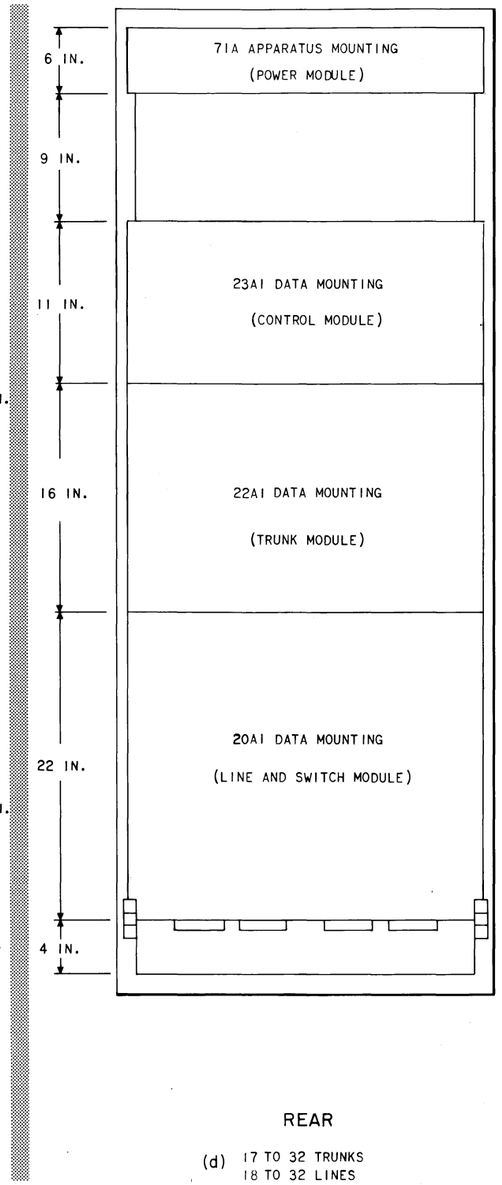
Note: Installation of data mountings will be made easier by using a screw-retaining screwdriver.

LEVELING PROCEDURES FOR THE KS-20093-L1 CABINET

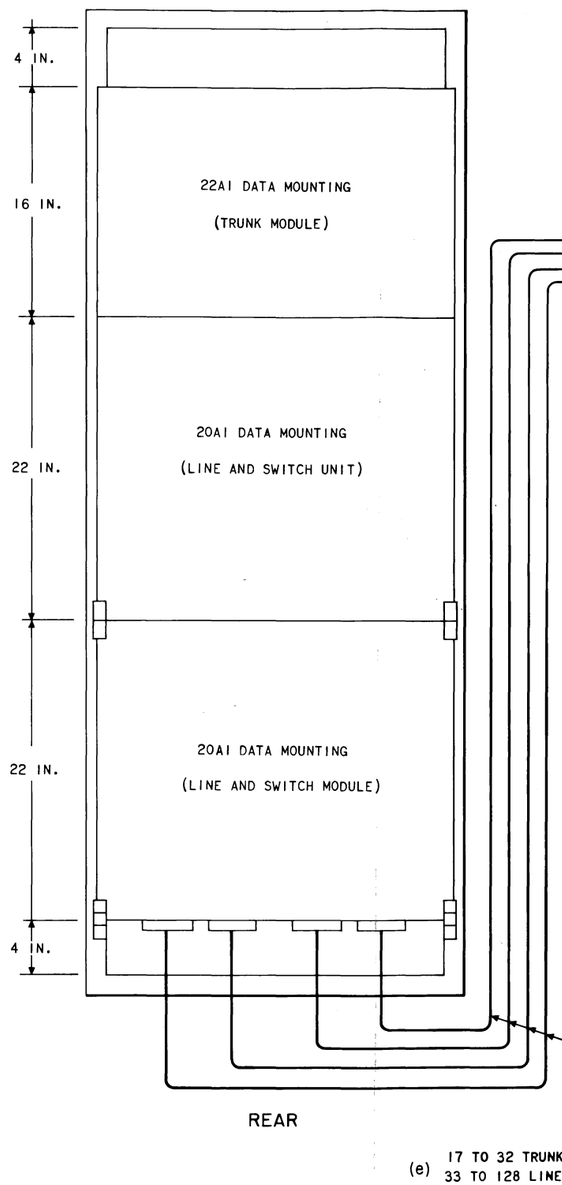
STEP	PROCEDURE
1	Remove stiffeners and kick plates from inside of cabinet.
2	For natural convection, install kick plates in the positions nearest the center of the cabinet. If the cabinet is to be installed above a cooling duct in the floor, install the kick plates in the positions that are farthest from the center of the cabinet so that air will flow up through and out the top of the cabinet.
3	Lower the cabinet as far as possible by releasing the locknuts on the four leveling feet and turning the adjusting screws counterclockwise with a screwdriver.
4	Verify that the mounting brackets are arranged to mount on 25-inch racks as shown in Fig. 3.
5	Install a 71A apparatus mounting (Fig. 4) without rectifiers at the top of the mounting rack. Tighten the screws finger tight only.
	 ***The mounting lugs (Fig. 5) shipped with the 19A1 and 20A1 Data Mountings align and support the mountings until hardware is applied. These two mountings are also provided with handles. When lifting these units, use the handles and do not support the units by the 258A switch cans.***
6	When using 19A1 or 20A1 Data Mountings, install two mounting lugs at the bottom of the mounting rack (Fig. 5) and leave adequate clearance as shown in Fig. 2. Position each mounting lug so that the lowest hole of the lug is 1-1/2 inches below the desired position of the bottom of the mounting. Place bolts only in the bottom two holes of each mounting lug. ***Caution: Two men are required to lift and position either the 19A1 or 20A1 Data Mounting because of its weight.***
7	Balance the bottom mounting in position until two panel mounting screws are installed at the top of the mounting. Install two more screws in the lower mounting holes. Tighten these four screws finger tight only.
8	Place a level with plumb vial against the front of the doors (closed), and adjust the cabinet leveling screws at the bottom until the cabinet stands vertically in a front-to-rear direction.
9	Adjust the cabinet for squareness by applying a sideward hand pressure to a side of the cabinet top.
10	Securely tighten the bottom data mounting screws. If the cabinet is not square, the top edges of the doors will be noticeably misaligned.
11	Place a level with plumb vial against the side of the cabinet and adjust the leveling screws so that the cabinet stands vertically in a side-to-side direction.

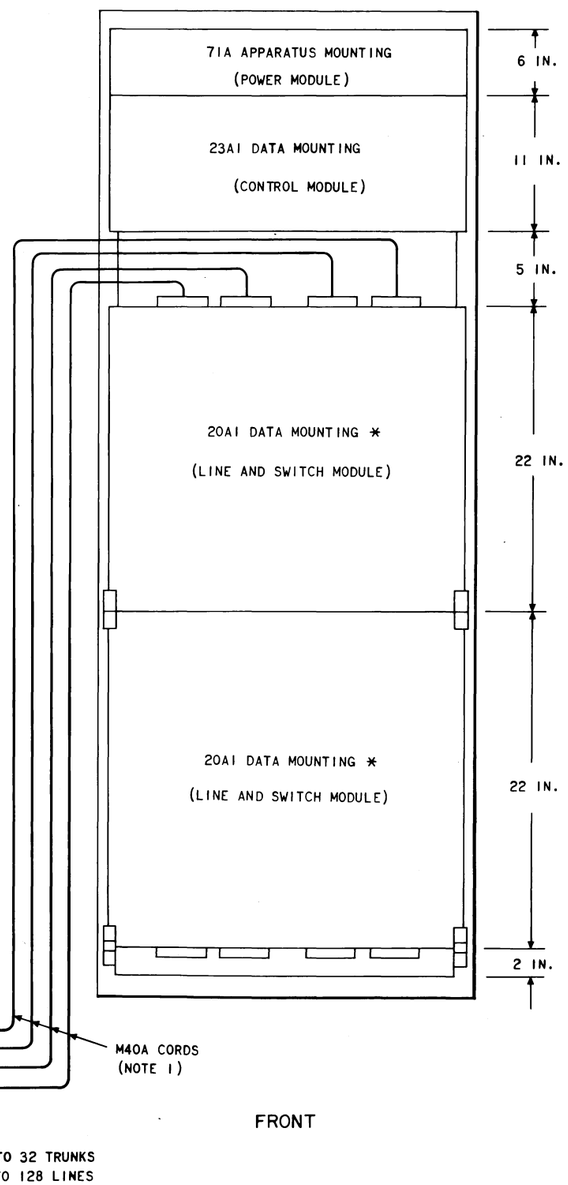


16 TRUNKS
0 128 LINES



(d) 17 TO 32 TRUNKS
18 TO 32 LINES





(e) 17 TO 32 TRUNKS
33 TO 128 LINES

NOTES:

1. USE M40A CORDS TO INTERCONNECT FRONT AND REAR LINE AND SWITCH MODULES AFTER 198B ADAPTERS HAVE BEEN INSERTED.
2. MOUNTING LUGS ARE USED UNDER AND BETWEEN 19A1 AND 20A1 DATA MOUNTINGS.
3. 198A ADAPTER(S) TERMINATES LAST LINE AND SWITCH MODULE. 198B ADAPTER(S) INTERCONNECT ADJACENT LINE AND SWITCH AND TRUNK MODULES.

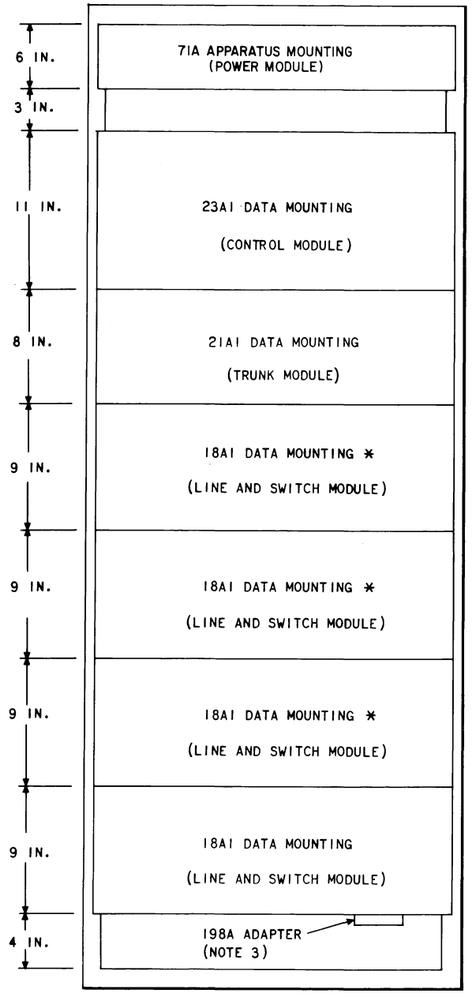
* USE THESE LINE AND SWITCH MODULES, IF NECESSARY. SEE CHART BELOW.

DATA MOUNTINGS REQUIRED FOR VARIOUS SIZE CONCENTRATORS

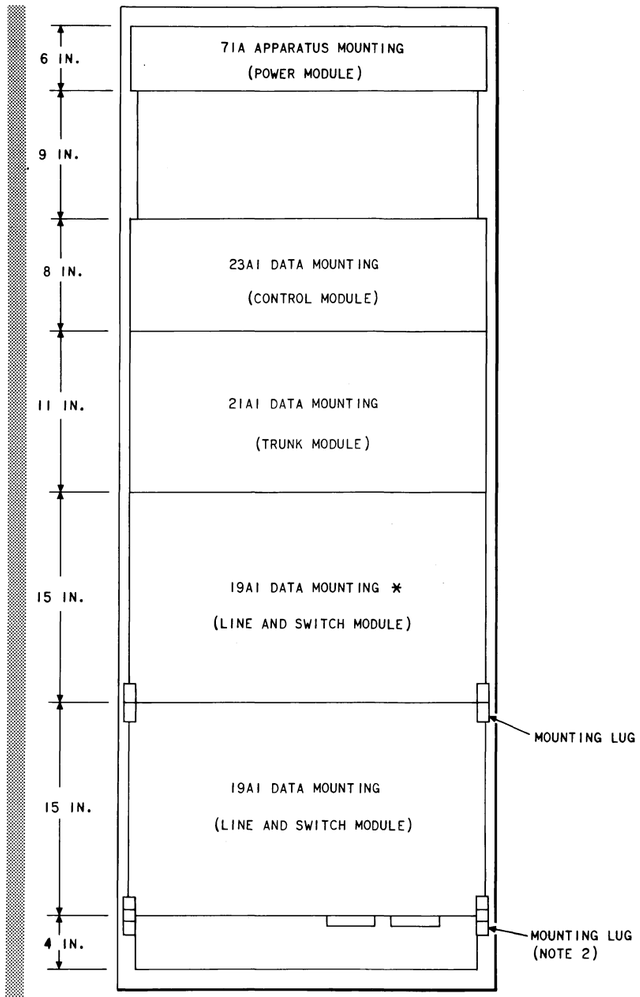
		TRUNKS		
		1-8	9-16	17-32
LINES	1-32	18A1 (1) † 21A1 (1)	19A1 (1) 21A1 (1)	20A1 (1) 22A1 (1)
	33-64	18A1 (2) 21A1 (1)	19A1 (2) 21A1 (1)	20A1 (2) 22A1 (1)
	65-96	18A1 (3) 21A1 (1)	19A1 (3) 21A1 (1)	20A1 (3) 22A1 (1)
	97-128	18A1 (4) 21A1 (1)	19A1 (4) 21A1 (1)	20A1 (4) 22A1 (1)

† NUMBER REQUIRED

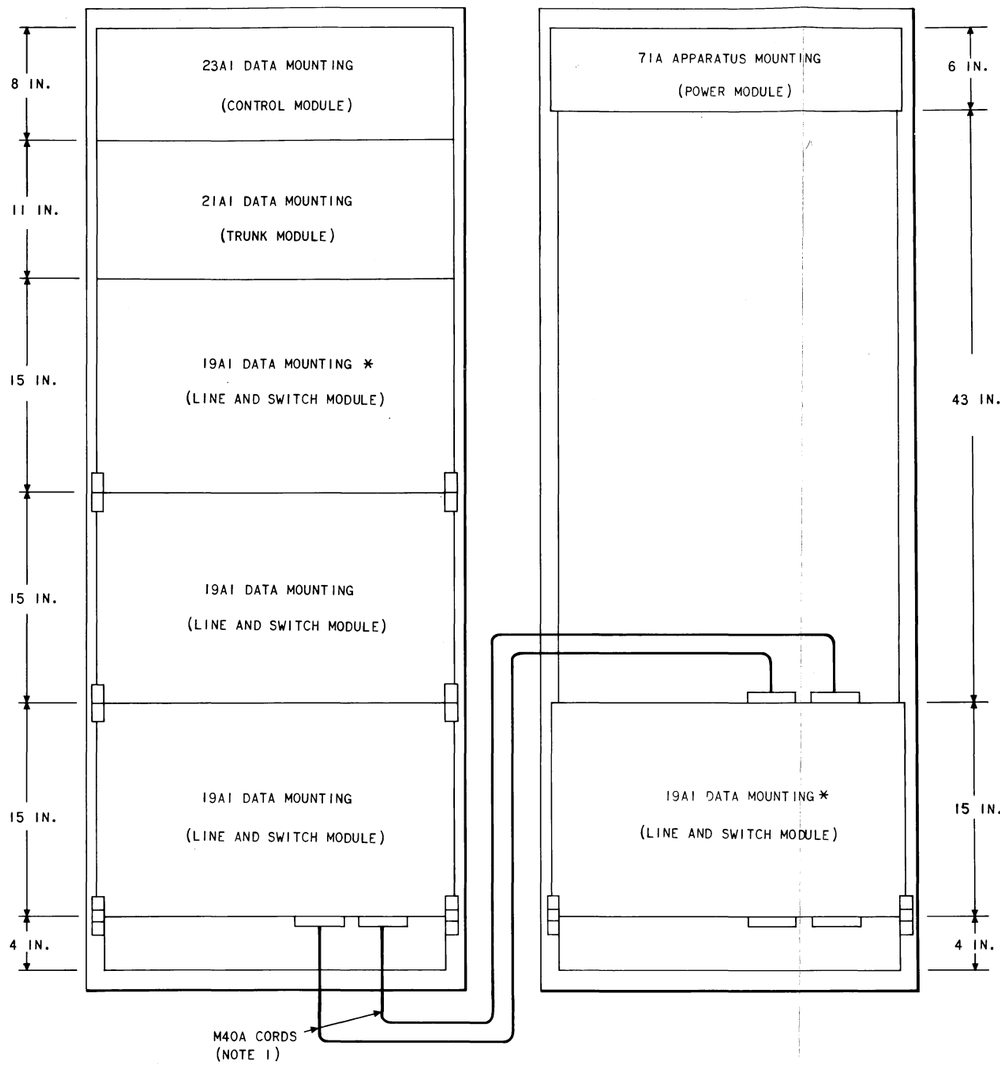
Fig. 2—Typical Concentrator Installations



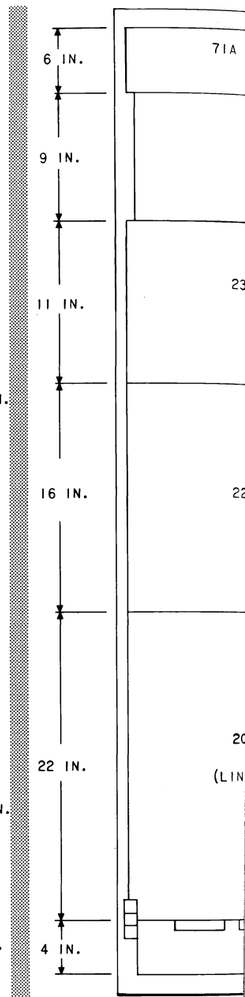
(a) 1 TO 8 TRUNKS
1 TO 128 LINES



(b) 9 TO 16 TRUNKS
10 TO 64 LINES

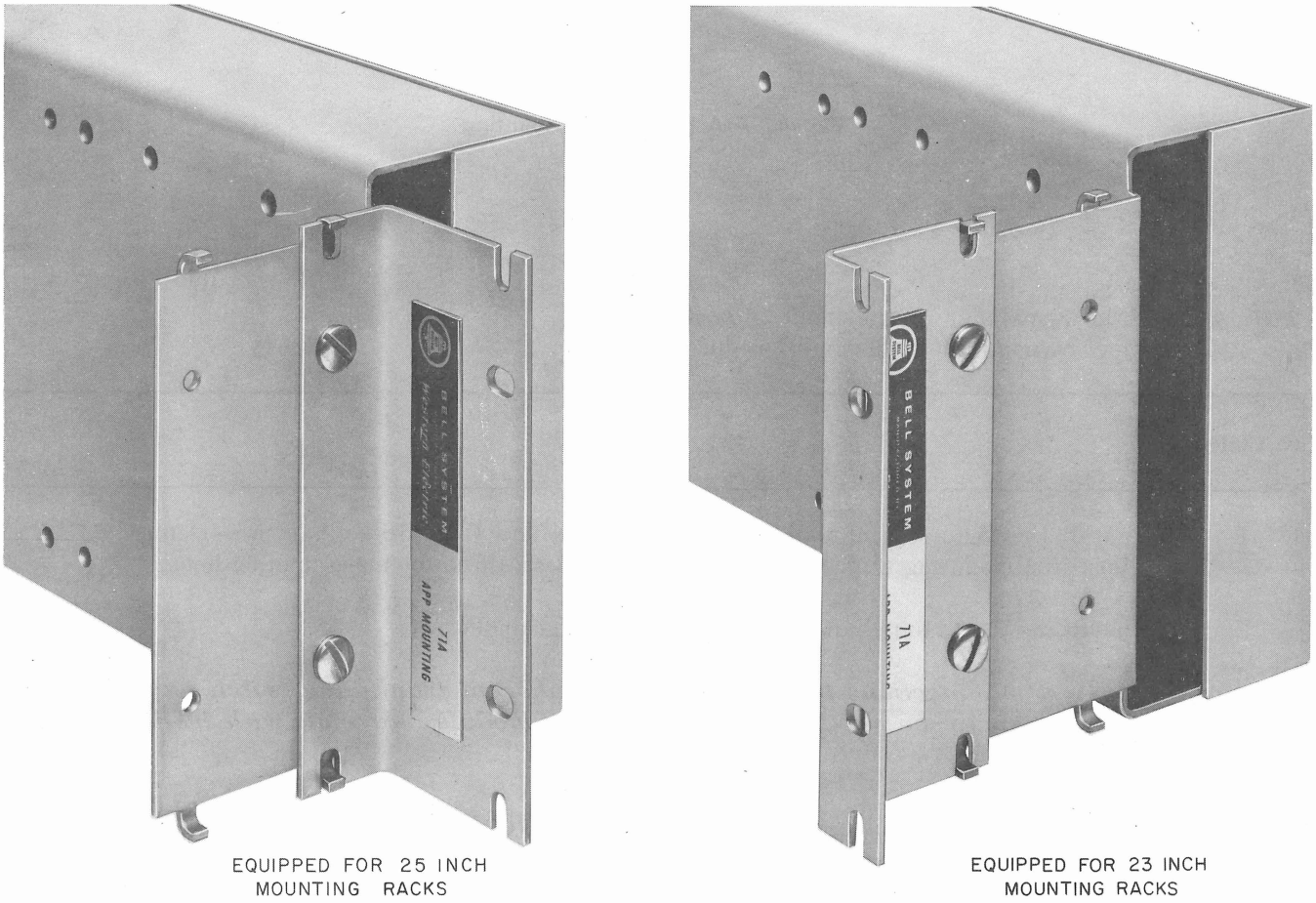


(c) 9 TO 16 TRUNKS
65 TO 128 LINES



(d)

STEP	PROCEDURE
12	Repeat Step 8, if necessary.
13	Tighten the locknuts on the leveling feet.
14	Remove the 71A (or 71B) apparatus mounting.
15	Install the front door panel. Install the KS-20129 power strip (if required) as shown in B-746670, Fig. 2. (This drawing is packed with the power strip).
16	When cabling is top fed, install cabinet duct work.



EQUIPPED FOR 25 INCH MOUNTING RACKS

EQUIPPED FOR 23 INCH MOUNTING RACKS

Fig. 3—Data Mounting Brackets Oriented for 23- or 25-Inch Racks

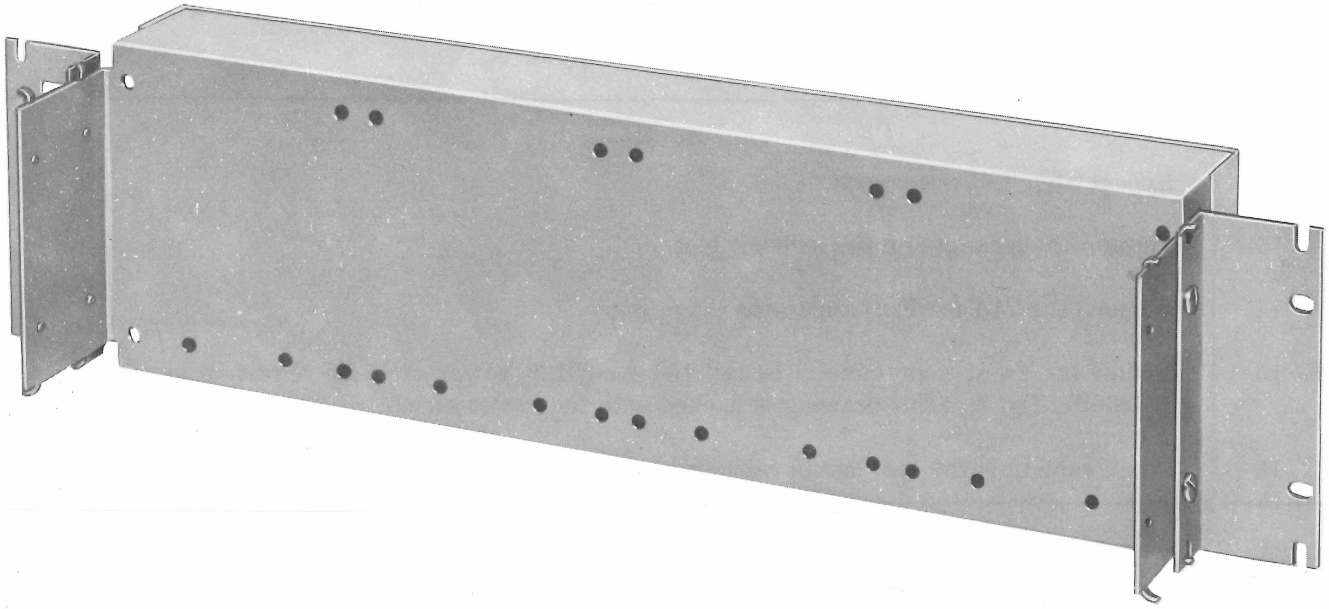


Fig. 4—71A Apparatus Mounting

3.03 Install the remainder of the mountings in the cabinet by using the following procedure.

STEP	PROCEDURE
1	Install the required number of KS-20575 rectifiers (for 110-volt ac power) on the 71A apparatus mounting (Fig. 6), one for 64 lines or less, three for more than 64 lines.
2	Install the power supply module in the top of the cabinet.
	 ***Connections between vertically adjacent trunk and switch modules and between vertically adjacent switch modules are made with 198B adapters (Fig. 7).***
3	Insert the required number of adapters into the top connectors on the lower mounting.
4	Install mounting lugs as shown in Fig. 8, if a 19A1 or 20A1 Data Mounting is to be placed above a lower one.
5	Lower second mounting carefully onto bottom mounting, making certain that mounting does not tilt forward and that guide pins on lower module engage correctly in top module.
6	Continue stacking mountings after placing 198B adapters in place.

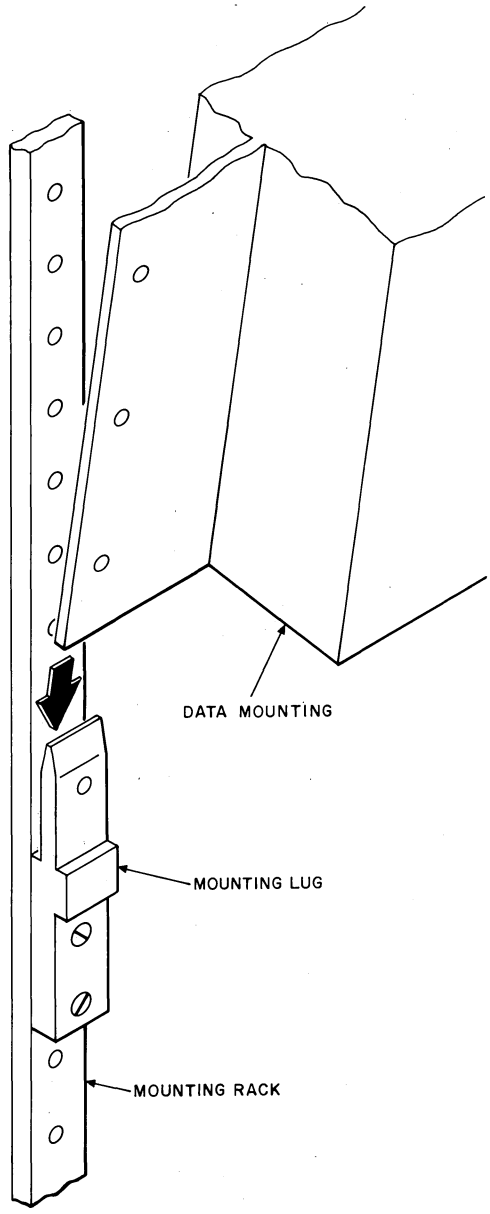


Fig. 5—Installing Bottom Module Using Mounting Lug

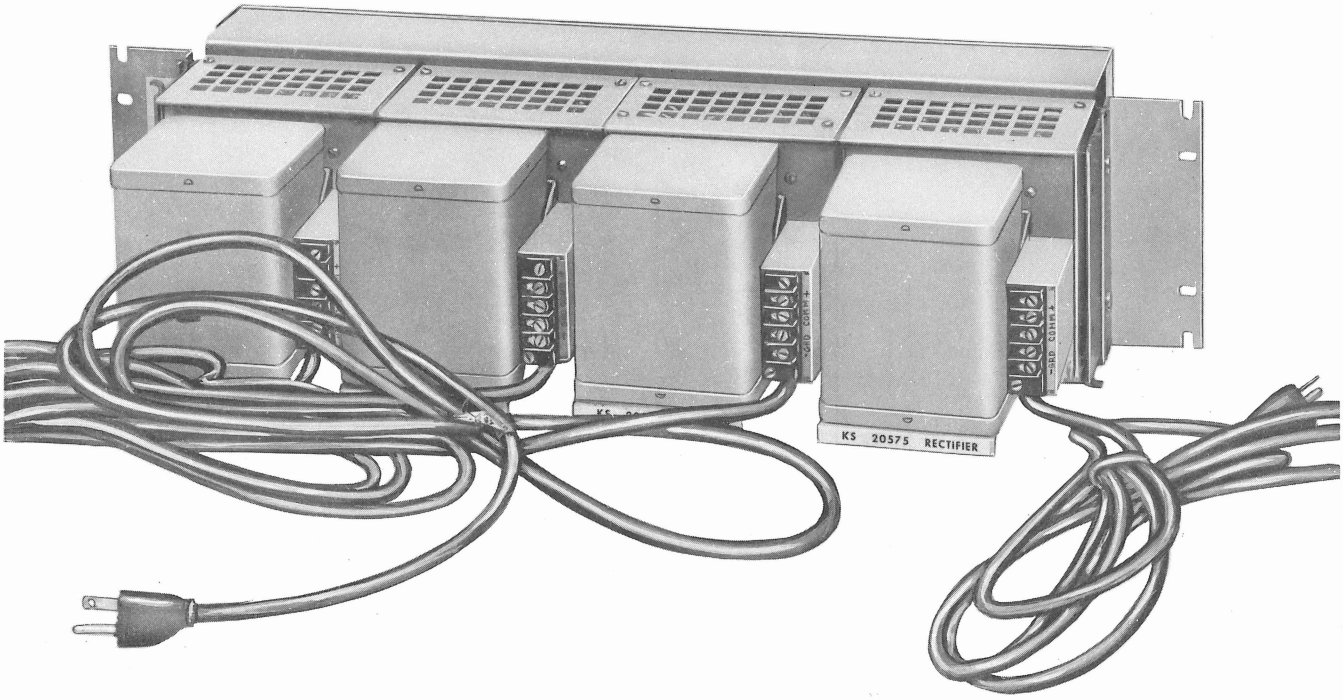


Fig. 6—71A Apparatus Mounting Equipped With Four KS-20575 Rectifiers

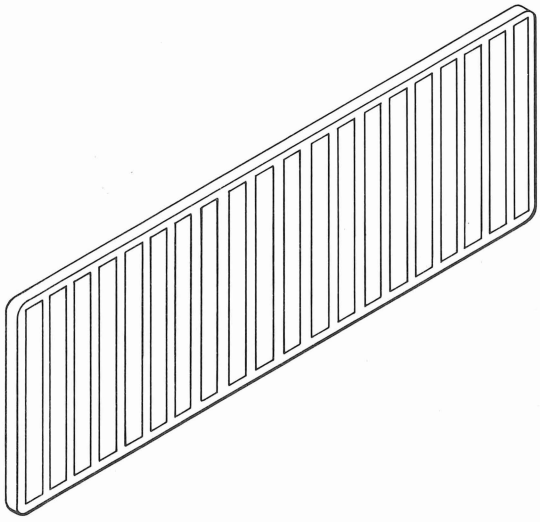


Fig. 7—198B Adapter

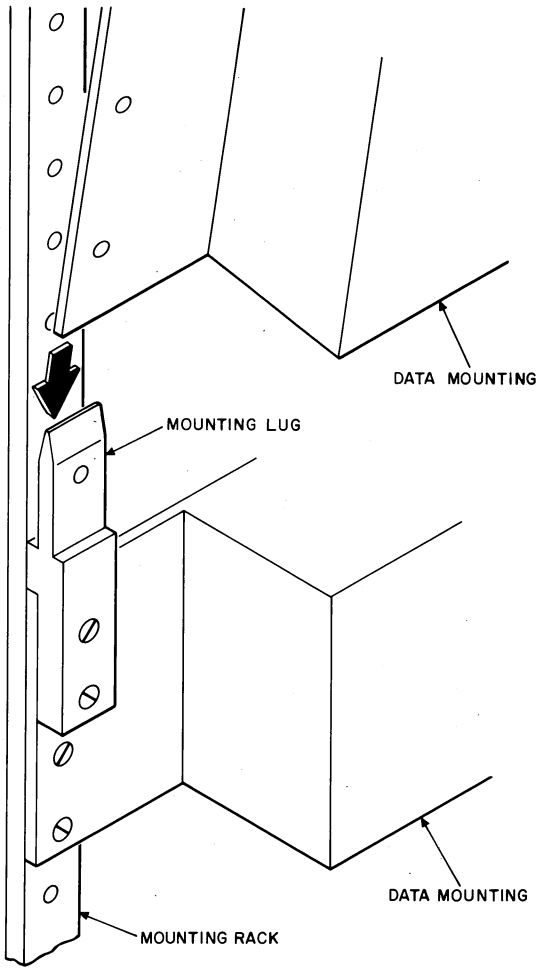


Fig. 8—Installing one Module Above Another Using Mounting Lug

STEP	PROCEDURE
7	If an 18A1, 19A1, or 20A1 Data Mounting is not adjacent to an 18A1, 19A1, 20A1, 21A1, or 22A1 Data Mounting, insert 198B adapters in both data mountings and interconnect the adapters by using M40A cords.
8	Terminate the last (bottom) 18A1, 19A1, or 20A1 Data Mounting by plugging 198A adapters (Fig. 9) into the bottom connectors. ***Note:*** The switch module that interconnects with the trunk module is considered to be the first switch module. The first switch module interconnects with the second switch module, etc.
9	Connect the 23A1 Data Mounting to the 21A1 or 22A1 Data Mounting and to each 18A1, 19A1, or 20A1 Data Mounting using M50H cords or double-ended A25D connector cables. J1 on the 23A1 Data Mounting connects to J1A on the 21A1 or 22A1 Data Mounting. J2A

STEP	PROCEDURE
	through J2D on the 23A1 Data Mounting interconnects with J2 on the first through fourth 18A1, 19A1, or 20A1 Data Mountings, respectively. TB1-M (terminal 1) on the 23A1 Data Mounting connects with TB2-M (terminal 1) on the 21A1 or 22A1 Data Mounting.
10	Connect power from the KS-20575 rectifiers to the mountings using the following procedure. (a) Use a single length of 16 gauge (or heavier) solid wire to interconnect the + terminals of the rectifier, the 21A1 or 22A1 Data Mounting, and the 23A1 Data Mounting. To do this, dress the wire and remove a portion of the insulation near the middle of the wire so that the ends will be long enough to dress to TB1 on the 23A1 Data Mounting and TB2 on the 21A1 Data Mounting. The exposed portion may now be wrapped once around the + screw terminal of the rectifier. Connect one end of the wire to the + terminal on TB2 of the 21A1 or 22A1 Data Mounting and the other end to the + terminal on TB1 of the 23A1 Data Mounting. (b) Repeat Step 10(a) for the − terminals of the rectifier and the 21A1 or 22A1 and 23A1 Data Mountings. (c) Use a similar procedure to provide ground to the 23A1 and 21A1 or 22A1 Data Mountings from the first rectifier. In this case, however, the wire should be connected to both the COM and GRD terminals on the rectifier. The ground terminal on the 23A1 and 21A1 or 22A1 Data Mountings is designated GRD. (d) Connect the +, −, and GRD terminals of the first 18A1, 19A1, or 20A1 Data Mounting to the +, −, and GRD terminals, respectively, of the 21A1 or 22A1 Data Mounting. (e) If a second 18A1, 19A1, or 20A1 Data Mounting is to be provided, connect its power and ground in series with (directly to) the first 18A1, 19A1, or 20A1 Data Mounting.

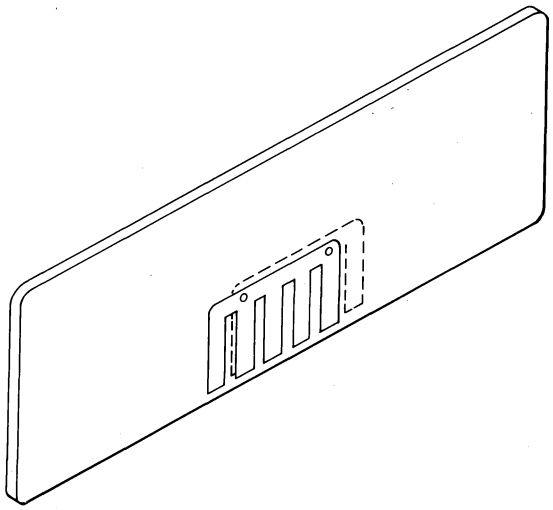


Fig. 9—198A Adapter

STEP	PROCEDURE
11	If more than two switch modules are required, perform the following steps (using 16-gauge solid wire). Otherwise, proceed to Step 12. (a) Connect the + and − terminals of the second rectifier to the + and − terminals, respectively, of the third 18A1, 19A1, or 20A1 Data Mounting. Use a single length of wire to connect the GRD terminal of the third 18A1, 19A1, or 20A1 Data Mounting to both the GRD and COM terminals of the second rectifier. (b) If a fourth 18A1, 19A1, or 20A1 Data Mounting is required, connect its power in series with the third 18A1, 19A1, or 20A1 Data Mounting. (c) Connect a wire from the − terminal on the third rectifier to TB1-P (terminal 5) of the 23A1 Data Mounting. Connect one end of a wire to both the + and GRD terminals of the third rectifier, then connect the other end of this wire to the GRD terminal of the 23A1 Data Mounting. Proceed to Step 13.
12	If no more than two switch modules are provided, connect a 16-gauge solid wire from the − terminal on the rectifier to TB1-P (terminal 5) of the 23A1 Data Mounting.
13	Using 16-gauge BG wire (or equivalent), connect TB1-M (terminal 1) of the 23A1 Data Mounting to TB2-M (terminal 1) of the 21A1 or 22A1 Data Mounting. ***Caution: This lead carries 750-volt (peak) pulses of approximately 400-μsec duration each time a matrix connection is made. Care should be exercised to avoid exposure of the bare conductor and it should be dressed with care to prevent damage to the insulation. Place protective covers over terminal strips, if furnished.***
14	Plug power strip into ac outlet. Plug power units into power strip.
15	Check voltages and polarities at all data mounting power terminal strips, and verify that they are correct by using a KS-16979-L1 (or equivalent) meter. The dc voltages measured between the + and GRD terminals or − and GRD terminals of the data mountings shall be +25 ±1.5V dc or −25 ±1.5V dc, respectively. If a third rectifier is used, the voltage measured between the P terminal (1) of the 23A1 Data Mounting and GRD terminal shall be −50 ±3V dc.
16	Disconnect ac power.
17	Dress cords neatly along sides of cabinet using clips provided. Magnetic cable retainers (such as KS-20093-L8) should also be used in all but the smallest installations.
18	Verify proper camp-on duration option strap is installed in AR384 circuit pack. The strap should be set to correspond to the speed of the station terminals; that is, 300 for 300 baud, 150 for 150 baud, or 75 for 75 to 110 baud terminals.
19	Plug control circuit packs (AR379, AR372, and AR373 are not used) into the 23A1 DAta Mounting as indicated on the card nests. Line pairs are brought out on J7A and J7B of the 18A1, 19A1, or 20A1 Data Mounting, and trunk pairs are brought out on J4A of the

STEP	PROCEDURE
	21A1 Data Mounting and J4A and J4B of the 22A1 Data Mounting. Pin assignments for line and trunk circuit equipment positions are given in Tables B and C, respectively. These appearances are compatible with key telephone wiring practices using 25-pair cables. Insert line and trunk circuit packs (AR365 and AR368) into the appropriate equipment locations. Each AR365 circuit pack provides two line circuits, so that the total used will be only half the number of lines to be served. Each AR368 circuit pack contains one trunk circuit, so that the number required will be equal to the number of trunks to be served.
20	Connect the Data Auxiliary Set 803E1 to the AR464 circuit pack in the control module via the 11-foot cord which is provided as a part of the circuit pack. The DAS 803E1 is provided with a clip so that it may be stored on the left side of one of the 18A1, 19A1, or 20A1 Data Mountings.
21	Apply power to concentrator.
22	Repeat Step 15 using +24 ±2V dc, −24 ±2V dc, and −48 ±4V dc as the required voltages. The +24 and −24 volt readings must be within 2 volts of each other.

4. INSTALLATION TESTS (Before Lines are Connected)

4.01 Two test procedures are described in the following text. The first utilizes the manual test equipment and the second utilizes a test jig (Fig. 11) that may be built from standard parts. Using the manual test set, about 30 seconds will be required to test each crosspoint. (The total number of crosspoints is equal to the product of the number of lines and the number of trunks.) The second test fixture allows testing of each crosspoint in about three seconds.

Tests Using Manual Test Equipment

Caution: On completion of testing using the manual testing equipment, remove AR464 circuit pack from its own slot and store it in an undesignated (empty) slot.

4.02 After the concentrator installation is complete, it may be tested for proper line to trunk connections by using the manual test equipment (DAS 803E1 and AR464 circuit pack). A meter, such as the KS-16979-L1 (or equivalent) is also required.

4.03 Maintenance personnel at the concentrator can establish any desired line-to-trunk connection through the concentrator switching network by using the manual test equipment.

4.04 The manual test equipment connects the the line and trunk circuits through the use of two cords—a line cord from the Data Auxiliary Set (DAS) 803E1 and a trunk cord from the AR464 circuit pack. The line and trunk cords connect to the line circuit packs (AR365) and trunk circuit packs (AR368) corresponding to the line and trunk to be tested.

TABLE B

LINE CONNECTIONS TO LINE AND SWITCH MODULES

CKT PACK	LINE NO.	PIN NO.		JACK
		TIP	RING	
1	1	1	26	J7A
	2	2	27	
2	3	3	28	
	4	4	29	
3	5	5	30	
	6	6	31	
4	7	7	32	
	8	8	33	
5	9	9	34	
	10	10	35	
6	11	11	36	
	12	12	37	
7	13	13	38	
	14	14	39	
8	15	15	40	
	16	16	41	
9	17	1	26	J7B
	18	2	27	
10	19	3	28	
	20	4	29	
11	21	5	30	
	22	6	31	
12	23	7	32	
	24	8	33	
13	25	9	34	
	26	10	35	
14	27	11	36	
	28	12	37	
15	29	13	38	
	30	14	39	
16	31	15	40	
	32	16	41	

TABLE C

TRUNK CONNECTIONS TO TRUNK MODULE

TRUNK NO.	PIN NO.		JACK
	TIP	RING	
1	26	1	J4A
2	27	2	
3	28	3	
4	29	4	
5	30	5	
6	31	6	
7	32	7	
8	33	8	
9	34	9	
10	35	10	
11	36	11	
12	37	12	
13	38	13	
14	39	14	
15	40	15	
16	41	16	
17	26	1	J4B
18	27	2	
19	28	3	
20	29	4	
21	30	5	
22	31	6	
23	32	7	
24	33	8	
25	34	9	
26	35	10	
27	36	11	
28	37	12	
29	38	13	
30	39	14	
31	40	15	
32	41	16	

4.05 Initial installation tests consist of checking every crosspoint in the switching matrix. For small concentrators, these tests may be performed by using the following procedure.

STEP	PROCEDURE
1	Place switch on DAS 803E1 (Fig. 10) in OFF position. Since each AR365 circuit pack contains two complete line circuits, two groups of test points are brought out on the card. On each red test clip of the line cord, two numbers are imprinted. On the black test clip of the line cord, four numbers are imprinted. Disregard numbers 1 and 9 on this test clip. The numbers 2, 3, 4, 5, and 6 correspond to test points TP2, TP3, TP4, TP5, and TP6, and the numbers 10, 11, 12, 13, and 14 correspond to test points TP10, TP11, TP12, TP13, and TP14 on the AR365 circuit pack. On each black test clip of the trunk cord, a single number is imprinted corresponding to a test point on the AR368 circuit pack. Disregard the numbers 1 and 9 since they are not used.
2	Connect line cord to the test points of the line circuit pack corresponding to line number 1 on the first line and switch module (connected directly to the trunk module).
3	Connect trunk cord from AR464 circuit pack to the test points of the trunk circuit pack corresponding to trunk No. 1 on the trunk module (TP1, TP2, TP9, TP10, TP11, TP12, TP13, and TP14).

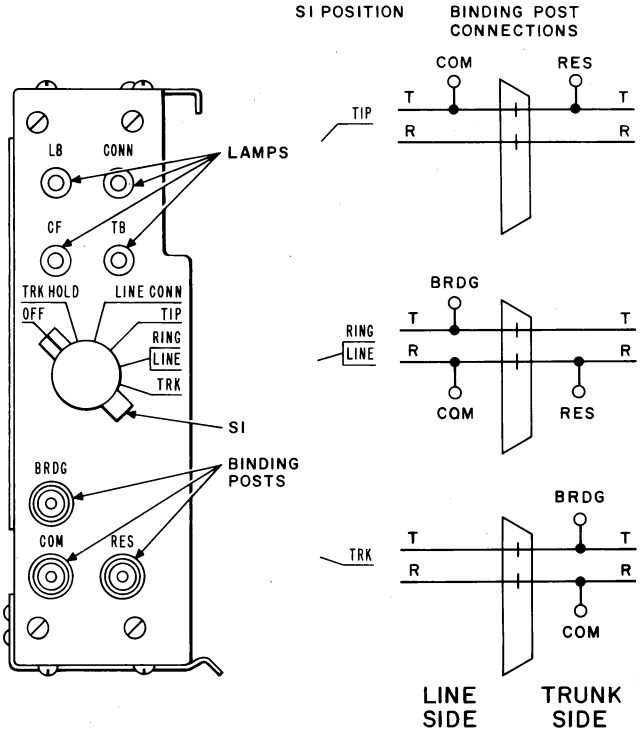


Fig. 10—Data Auxiliary Set 803E1

STEP	PROCEDURE
4	Place switch on DAS 803E1 in TRK HOLD position.
5	Check line and trunk busy/idle status by examining LB and TB lamps. If either lamp is lighted, the circuit is busy and Step 6 cannot be performed until both become free (lamps extinguished).
6	Move switch to LINE CONN position. The CONN, TB, and LB lamps will light indicating that a proper connection has been established. Disregard indications of CF lamp.
7	The concentrator connection may now be tested.
8	Check the tip-to-tip (line-to-trunk) continuity by placing the switch in the TIP position and measuring the resistance between the COM and RES binding posts on the DAS 803E1 (Fig. 10). The resistance shall be less than 200 ohms.
9	Check the ring continuity by moving the switch to the RING/LINE position and measuring resistance between the same two binding posts as in Step 8. The resistance shall be less than 200 ohms.
	REPEAT TRUNK TEST
10	Move switch to TRK HOLD position.
11	Disconnect line cord from line just tested and connect to next line.
12	Repeat Steps 5 through 9 for this connection.
13	Repeat Steps 10 through 12 for all lines. These tests confirm that all lines can be connected to the selected trunk.
	REPEAT LINE TEST
14	Move switch to OFF.
15	Disconnect trunk cord from the previously selected trunk circuit.
16	Connect trunk cord to next trunk circuit to be tested.
17	Repeat Steps 2, and 4 through 13 to check all line connections to this trunk.
18	Repeat Steps 14 through 17 for all trunks.
19	Turn switch to OFF, and disconnect line and trunk cords from circuit packs.

Tests Using Test Fixture

4.06 Initial installation tests may also be performed using the apparatus shown in Fig. 11. This method involves the use of apparatus which must be built by telephone company personnel. However, its use greatly reduces the time required for initial installation tests. The procedure is as follows.

STEP	PROCEDURE
1	Connect P7 of the test fixture to P7A on the line and switch module containing the line circuit pack to be tested using an M50H cord.
2	Connect P4 of the test fixture to P4A on the trunk module by using an M50H cord.
3	Set the "line select switch" to position 1-17. In this position, the test apparatus will be connected to line 1.
4	Connect KS-16979-L1 meter (or equivalent) + probe to TP10 on the AR368 circuit pack (trunk circuit) corresponding to trunk number 1. Connect the – lead to ground (frame). Set on 50-volt scale (meter reads +24 volts when trunk is idle, 0 volts when trunk is connected to a line).
5	Adjust potentiometer P to zero ohms.
6	Operate pushbutton S causing line 1 to be connected to an arbitrary trunk. Current should flow and should be adjusted to 3 mA by varying potentiometer P.
7	Repeatedly operate and release button S until trunk scanner in concentrator steps to trunk number 1. This will be indicated by a zero reading on the KS-16979-L1 volt-ohm-milliammeter.
8	Decrease loop current with potentiometer P until the trunk-line connection is dropped. This will be noted by a 24-volt reading on the voltmeter and should occur when the loop current drops to a point between 1.5 to 2.0 mA. Release switch S.
9	Return potentiometer P to zero ohms. Press switch S. This will cause the line to connect to trunk number 2. Repeat Step 8.
10	Repeat Step 9 once for each remaining trunk circuit plugged into the concentrator (up to 16 since P4 provides battery for only the first 16 trunks when the 22A1 Data Mounting is used).
11	When the voltmeter indicates zero volts (indicating that the scanner has stepped back to trunk number 1), move the "line select switch" to position 2-18 and adjust potentiometer P to obtain 3-mA loop current. Operate switch S once for each trunk circuit plugged into the concentrator (up to 16).
12	Repeat Step 11 for the "line select switch" in each of positions 3-19 through 16-32.
13	Move the cord to the line and switch module from P7A to P7B.
14	Repeat Steps 1 through 12 for lines 17 to 32 (if provided).
15	When the 22A1 trunk module is used, repeat Steps 8 through 14 with P4 connected to P4B (of the trunk module) to test trunks 17 to 32 (if provided).

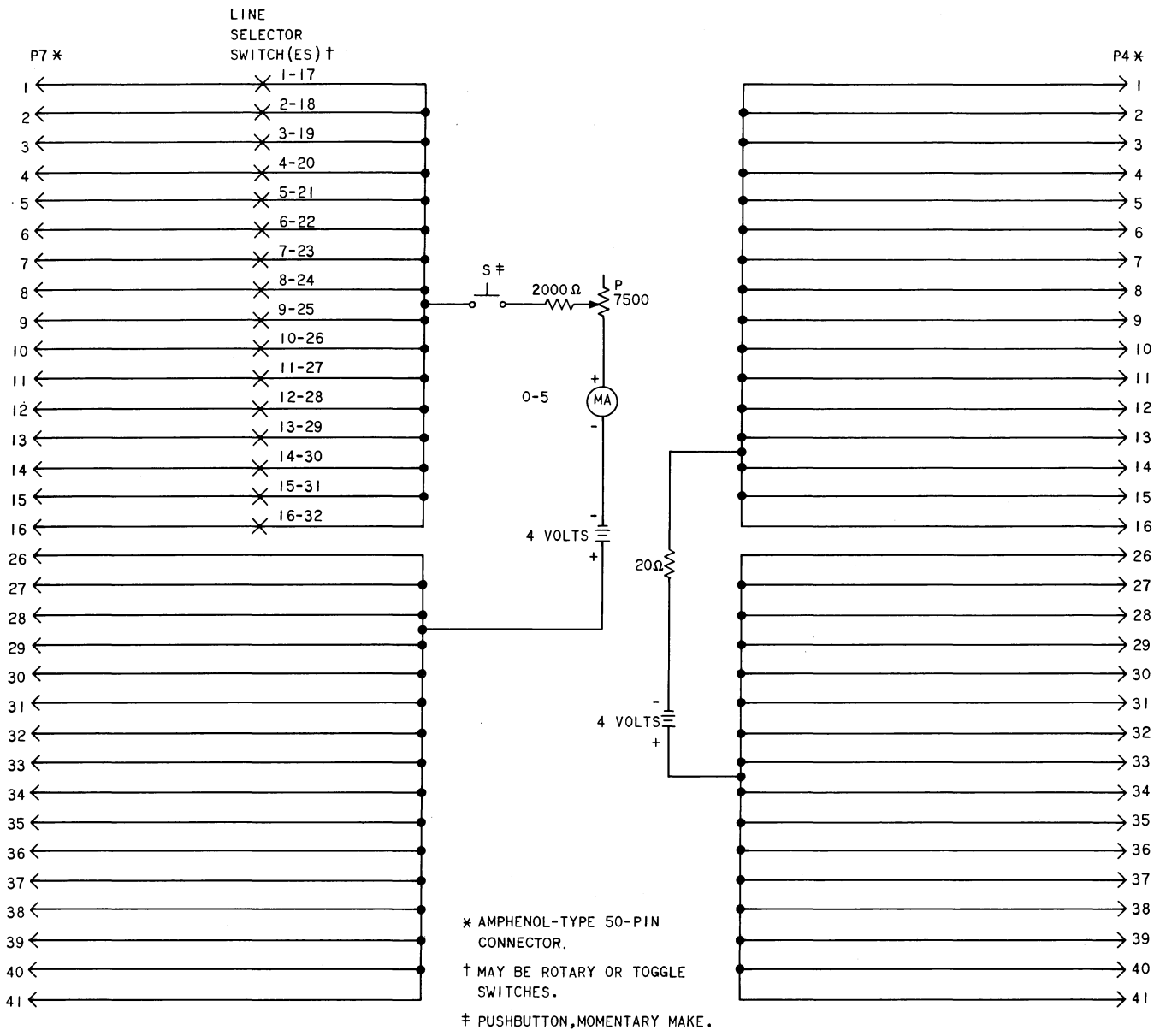


Fig. 11—Optional Concentrator Installation Test Set