

86B2 DATA SELECTIVE CALLING SERVICE

FULL-DUPLEX—150-WORD PER MINUTE DATA STATION

INSTALLATION

	CONTENTS	PAGE
1.	GENERAL	1
2.	INSTALLATION	1
3.	INTERCONNECTION OF STATION	4
4.	PREOPERATIVE ADJUSTMENTS AND TESTS—DATA SET 108-TYPE	4
5.	PREOPERATIVE ADJUSTMENTS AND TESTS—DATA SET 109E-TYPE	10

1. GENERAL

1.01 This section describes the procedures to be followed for the installation of a model 37-type teletypewriter (TTY) data station associated with the 86B2 Data Selective Calling Service.

1.02 This section is reissued to include information pertaining to the split ASR ORIG/TERM station and data sets 108E and 109E-type, to make reference to the lock strip bar (card-extracting tool), and to add Fig. 7, 9, and 10.

1.03 The 37-type TTY data station is a self-contained station which is intended to be completely assembled and tested by the distributing house prior to shipment.

1.04 The customer must furnish a standard 3-wire, grounding-type, 106- to 129-volt, 59.55- to 60.45-Hz ac power receptacle (to accept a plug equipped with two parallel blades and a round-shaped grounding pin). All TTYs of a station should be connected to the same power circuit. This circuit must be adequately fused for the maximum or shorting current as follows.

- (a) Originate only or split operation originate/terminate (without auxiliary receiver) station—20 amps.

(b) Standard originate/terminate (without auxiliary receiver) or split ASR originate/terminate (with auxiliary receiver) station—28 amps (if both machines start at the same time).

(c) Standard originate/terminate station (with auxiliary receiver)—37 amps (if all the machines start at the same time).

(d) Terminate only station (without auxiliary receiver)—9 amps.

(e) Terminate only station (with auxiliary receiver)—17 amps.

Note: The receptacle should not be under control of a switch.

1.05 Verify with the serving test center (STC) 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).

1.06 Reference directions (left, right, front, or rear) are in respect to facing the keyboard from the front of the 37-type TTY.

2. INSTALLATION

2.01 Verify that the location selected by the customer for the 37-type TTY data station is adequate for maintenance. The following TTY measurements should be exceeded to allow room for disassembly of the station, if required. The approximate weight of each type station is also given.

- 37 ASR—44-1/2 inches wide, 36-1/4 inches high, and 27-1/2 inches deep (33-1/2 inches with form box) and weighs approximately 360 pounds.

- 37 RO—32-1/2 inches wide (22-1/2 inches wide for auxiliary RO TTY), 36-1/4 inches high, and 24-1/2 inches deep (30-1/2 inches with form box) and weighs approximately 204 pounds.
- 37 ROTR—20 inches wide, 35 inches high, and 15 inches deep and weighs approximately 75 pounds.
- KS-20018-L1, -L2, -L3, or -L4 cabinet:

L1—24 inches wide, 12 inches high, and 12 inches deep

L2—24 inches wide, 17 inches high, and 12 inches deep

L3—24 inches wide, 24 inches high, and 12 inches deep

L4—24 inches wide, 30 inches high, and 12 inches deep.

2.02 Verify that the customer-provided ac power receptacle is within 7 feet of the selected location and that all the station TTYs are on a common ac power circuit.



Do not connect power to the TTY data station until instructed to do so.

2.03 To gain access to the data auxiliary set (DAS) 820A5, proceed as follows:

37 ASR or RO TTY

- (1) Open door on right-hand front side of TTY pedestal.
- (2) Raise plunger on front of 93A mounting bracket and slide controller and 93A bracket forward.
- (3) Carefully place controller and 93A bracket on floor in front of TTY (Fig. 1).

37 ROTR TTY

Note: Due to space limitation, the data set and DAS 820A5 are not mounted in the 37 ROTR TTY stand. When a 37 ROTR TTY

is used as a primary data station, a KS-20018-type cabinet is required. In addition, the DAS 804R3 connector assembly is mounted on the door of the stand.

- (1) Apply outward pressure at the top rear of the KS-20018-type cabinet panel until the catches disengage.
- (2) Lift the panel up to remove it from framework.

2.04 Verify that the proper circuit packs are installed in DAS 820A5 (Fig. 2), and that the R and CS switches are positioned properly according to the service order and/or worksheet.

Note: An option in DAS 820A5 is the encoding of the shift registers on AR18 and AR25 circuit packs.

2.05 Remove lock strip (card-retaining) bar by loosening the two screws holding it to the apparatus mounting. Slide the lock strip bar from beneath the screws to remove it.

2.06 Using the 748A tool or lock strip bar remove AR18 and AR25 circuit packs (Fig. 2) as follows:

- (1) Place pivots of 748A on faceplate of the circuit pack and gently push until pivots engage the faceplate.
- (2) Grasp the handle of the 748A and pull the circuit pack straight out, or pry out with end of lock strip bar.

2.07 Inspect shift register (Fig. 3). A properly encoded AR18 shift register should have **two** 36-gauge insulated wires running through the eight tubes. The AR25 shift register should have **one** wire running through the eight tubes.



In the event that the shift register is not encoded, refer to the section entitled 86B2 Data Selective Calling Service—Full-Duplex—150-Word Per Minute Data Station—Maintenance (581-136-303).

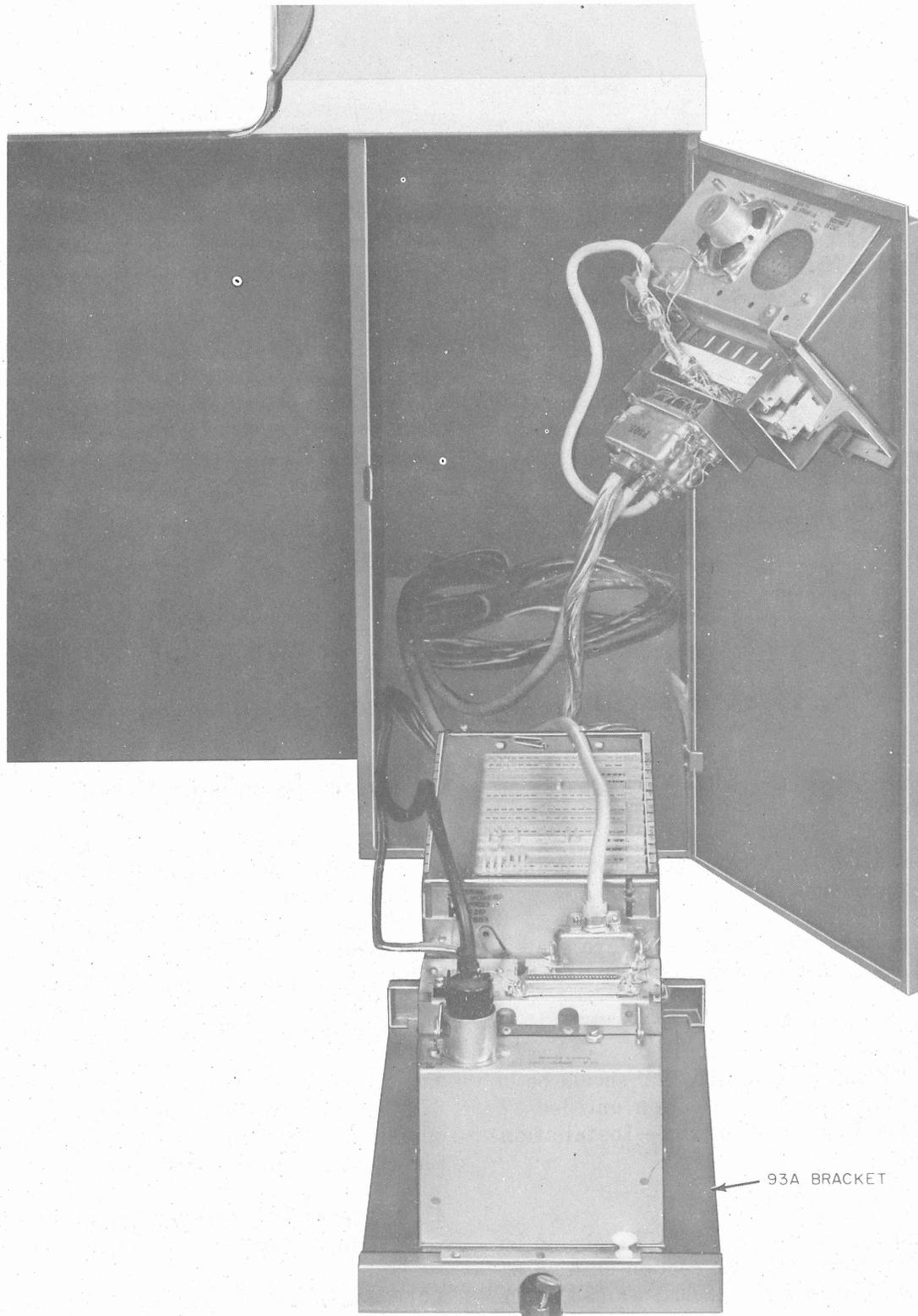


Fig. 1—37-Type Station With Controller in Maintenance Position

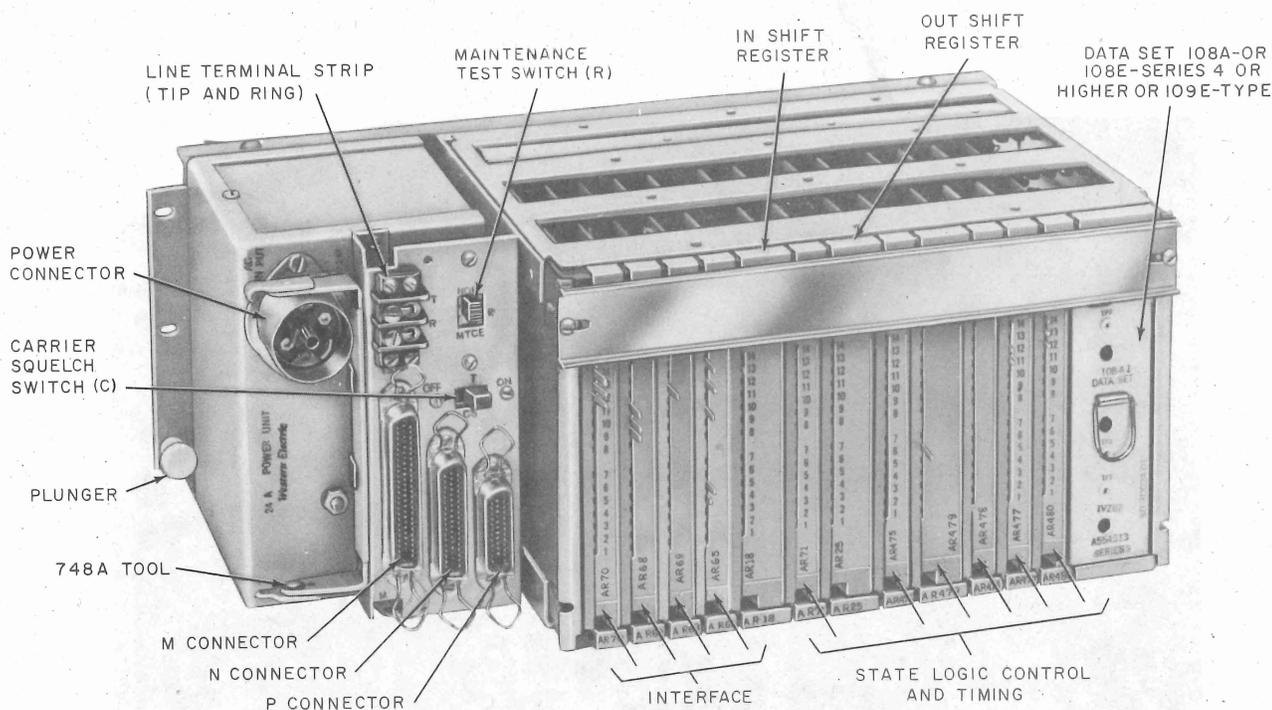


Fig. 2—DAS 820A5 Controller—Location of Circuit Packs and Components

2.08 Replace AR18 and AR25 circuit packs as follows:

- (1) Insert AR18 and AR25 circuit packs in their designated slots.
- (2) Verify that the circuit packs are seated properly in their connectors.
- (3) Remove the 748A tool assembly.

2.09 Installation of the 37 RO TTY should be in accordance with the section entitled 37 Receive Only Page Printer Set—Installation (574-300-200).

2.10 Installation of the 37 ASR TTY should be in accordance with the section entitled 37 Automatic Send Receive Set—Installation (574-302-200).

2.11 Installation of the 37 ROTR TTY should be in accordance with the section entitled 37 Receive Only Typing Reperforator (ROTR) Sets—Installation (574-303-200).

3. INTERCONNECTION OF STATION

3.01 The interconnection of the 37-type TTY station is shown in Fig. 4, 5, 6 and 7. The figures are shown for a primary station (with or without auxiliary TTY). Figure 4 illustrates a standard originate/terminate station; Figure 5 illustrates an originate only station, Figure 6 illustrates a terminate only station, and Figure 7 illustrates a split ASR originate/terminate station.

3.02 Verify that the TTY is properly option-wired for the type of station being installed. The options for the TTY should be specified on the service order and/or worksheet.

4. PREOPERATIVE ADJUSTMENTS AND TESTS—DATA SET 108-TYPE

4.01 Screw switch D (Fig. 8 for data set 108A-type or Fig. 9 for data set 108E-type) may have been set to provide maximum sensitivity (maximum gain of the receive buffer amplifier) during manufacturing tests. The gain may be reduced in steps as indicated in Table A. The gain must be adjusted to meet the requirements of each installation

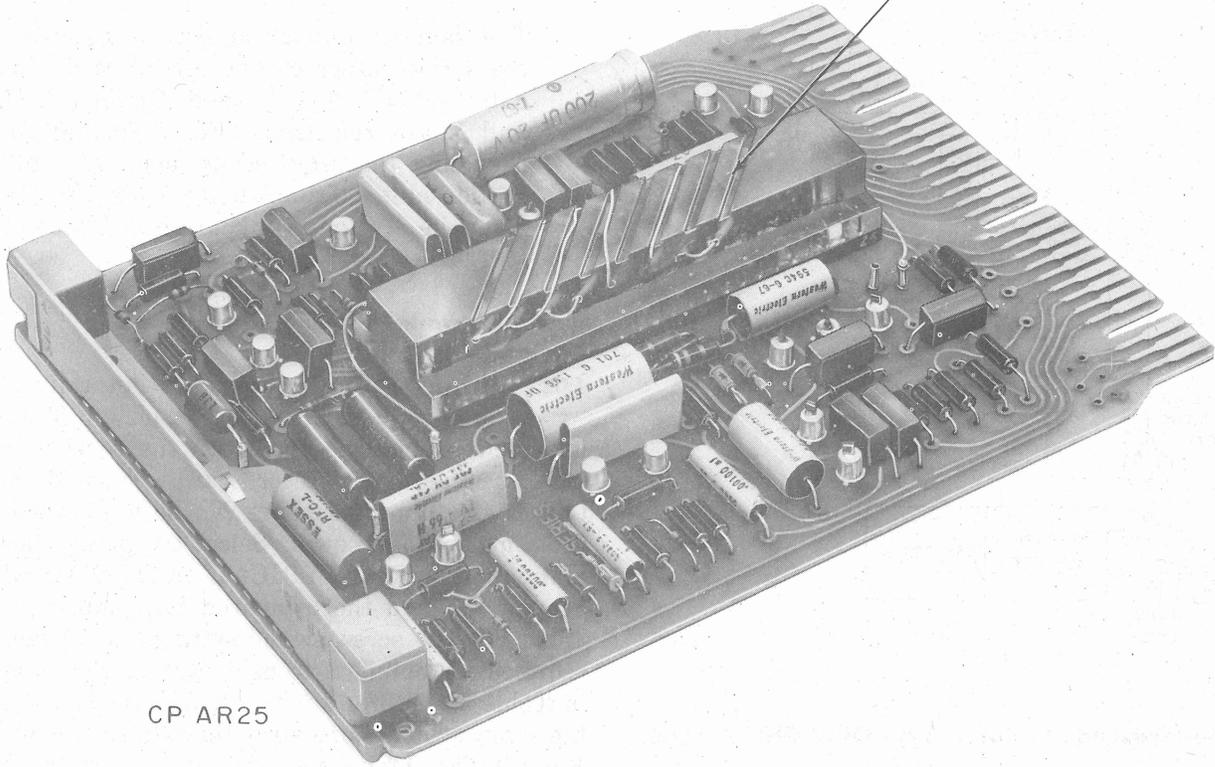
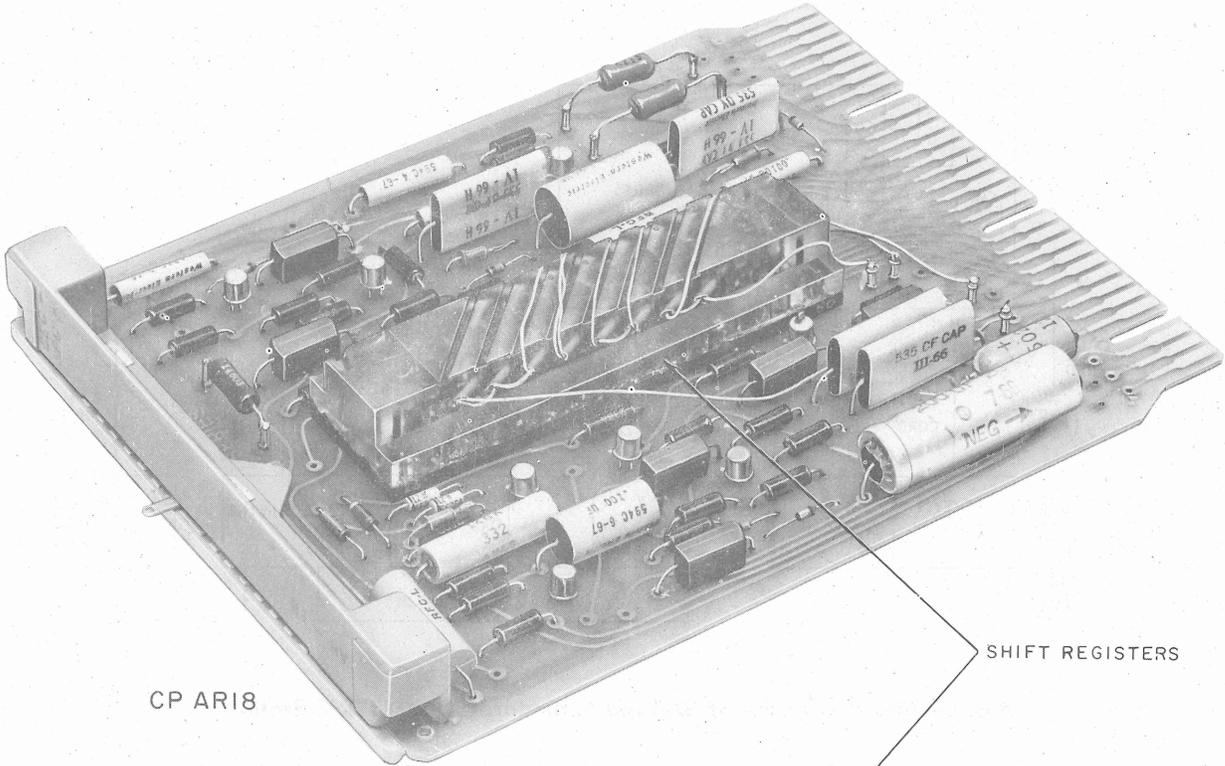


Fig. 3—Circuit Packs AR18 and AR25—Location of Shift Registers

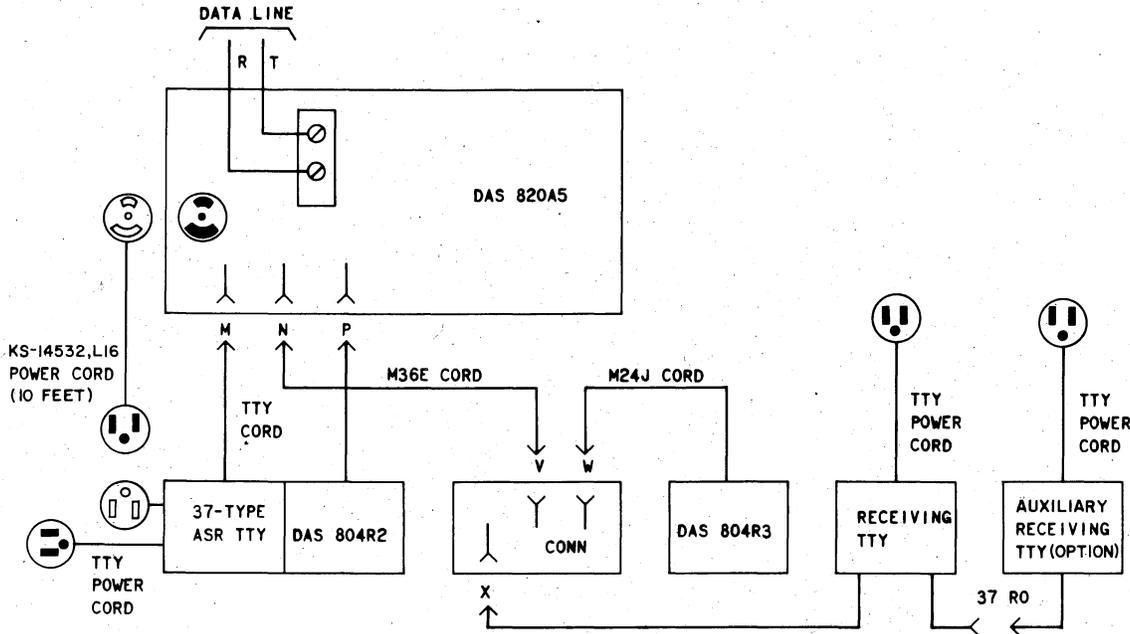


Fig. 4—Interconnection of 37-Type Standard ORIG/TERM Station

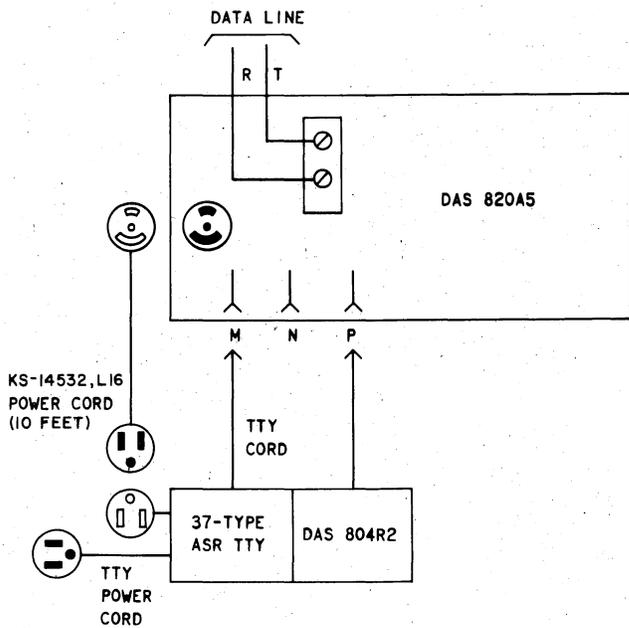


Fig. 5—Interconnection of 37-Type ORIG ONLY Station

by setting the screw switches as indicated on the service order and Table A.

Note: When data set 108-type is provided, a series 4, or later, model must be used.

The data set options should be specified on the service order or line record card. When data set 108E-type is used, Options S, U, X and Y are required. For information on providing the required options, refer to the Section entitled Data Sets 108D- and 108E-Types Used in Station Applications—Description (591-028-100).

Hybrid Network Strapping

4.02 Strapping of the hybrid is determined by the loop impedance of the facility. The loop impedance should be shown on the service order and/or circuit layout record card. Table B shows typical loop impedance that can be used when the cable makeup is known. Select the proper facility makeup from the TYPICAL LOOP FACILITY column or find the measured loop impedance in Table B. The screw-switch settings and strapping required for optimum trans-hybrid balance is given in Table B. Refer to Fig. 8 for the location of the screw switches and strap for data set 108A-type. Refer to Fig. 9 for the location of data set 108E-type screw switches.

4.03 Upon completion of hybrid network strapping and installation of the required data set options, plug the data set 108-type into the proper slot of DAS 820A5.

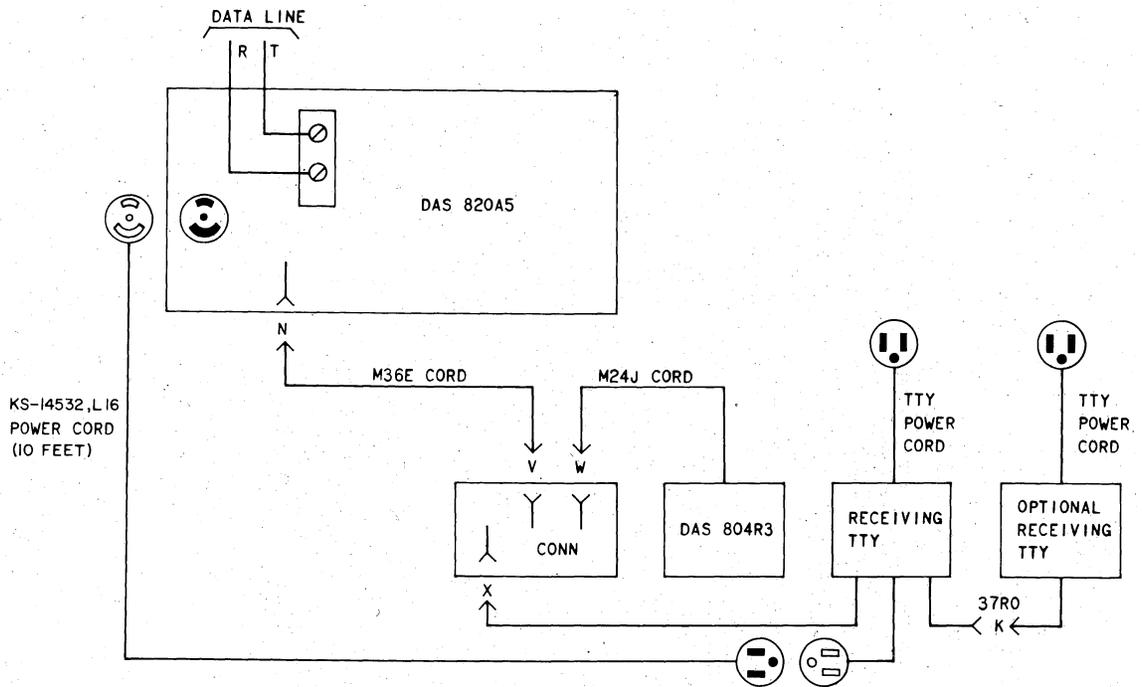


Fig. 6—Interconnection of 37-Type TERM ONLY Station

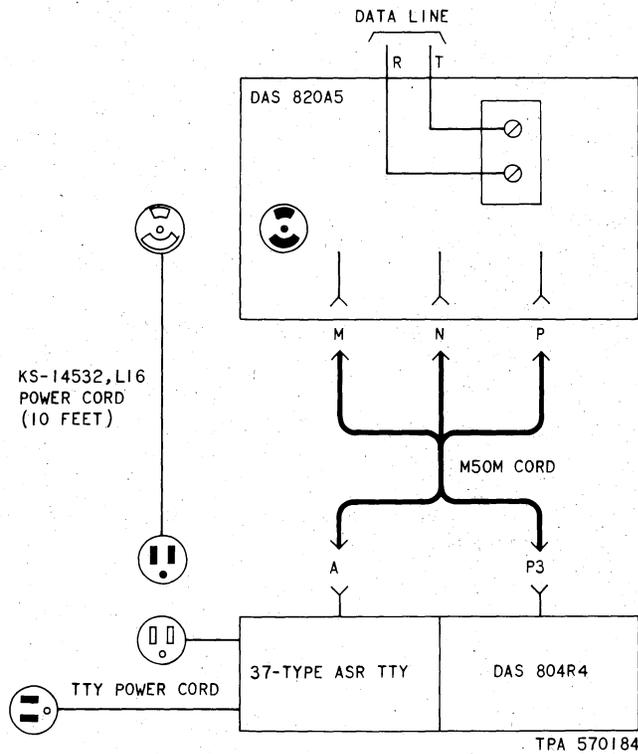


Fig. 7—Interconnection of 37-Type Split ASR ORIG/TERM Station

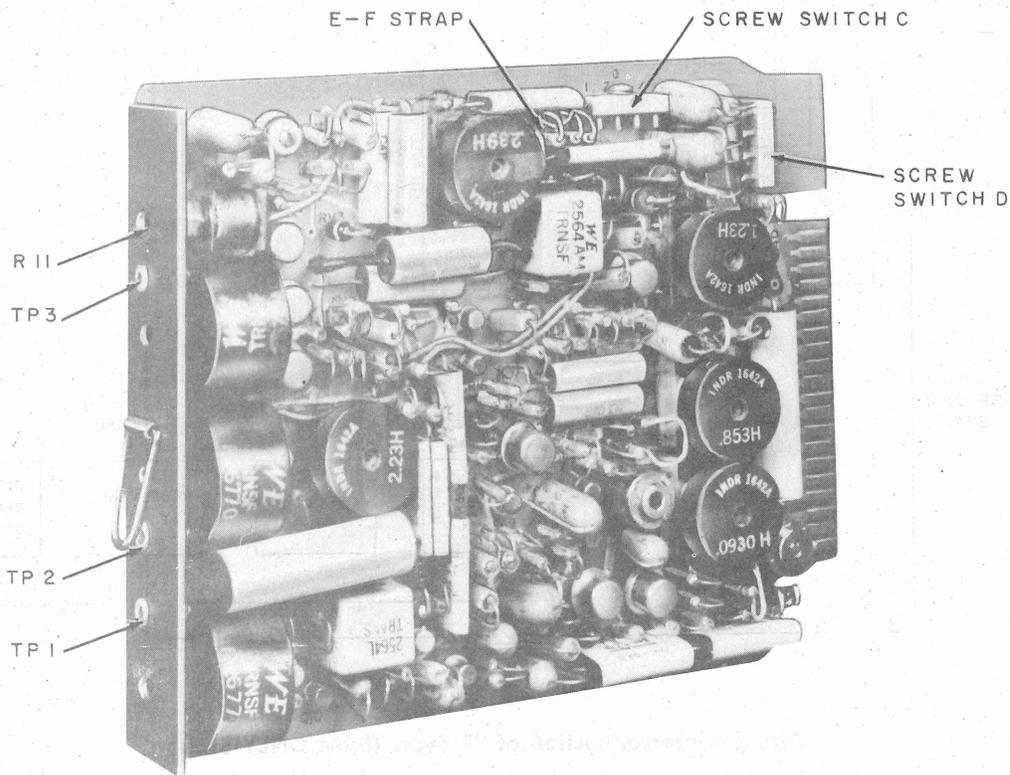


Fig. 8—Data Set 108A-Type—Location of Test Points and Screw Switches

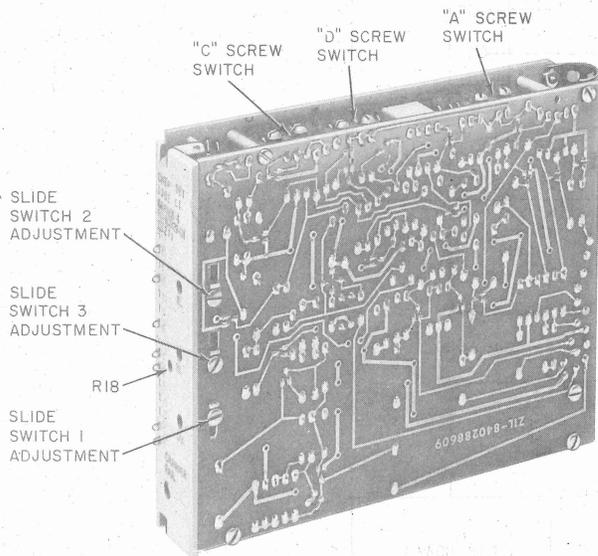


Fig. 9—Data Set 108E-Type—Location of Test Points and Screw Switches

Adjustment of Data Set 108-Type Transmit Level



Verify that proper options are installed in the replacement data set 108-type.

- 4.04 Disconnect the incoming data line from the tip (T) and ring (R) terminals on the controller.
- 4.05 Connect terminals + and - of portable station test set TTS-28 to TP1 and TP2 of the data set (Fig. 8 or 9). Set FUNCTION switch of TTS-28 to DBM 900Ω TERM 0 position.
- 4.06 Connect TTY power cord to the customer-provided ac receptacle.
- 4.07 Adjust R11 on data set 108A or R18 on data set 108E for the output level specified on service order and/or circuit layout record card (see Fig. 8 or 9).

→ TABLE A ←

DATA SET 108-TYPE
SCREW SWITCH D SETTINGS
FOR REDUCING GAIN OF THE
RECEIVE BUFFER AMPLIFIER

LOOP FACILITY WITH 2300 HZ LOSSES (DB)	DATA SET 108A-TYPE			DATA SET 108E-TYPE		
	REDUCTION IN GAIN (DB)	SCREW SWITCH D		REDUCTION IN GAIN (DB)	SCREW SWITCH D	
		CLOSED	OPEN		CLOSED	OPEN
0 to 3	8		1-2, 3-4			
3.1 to 7	4	1-2	3-4	6		1-2
7.1 and Greater	0	3-4	1-2	0		1-2

→ TABLE B ←

DATA SET 108-TYPE
HYBRID NETWORK

TYPICAL LOOP FACILITY	TYPICAL 2-WIRE LOOP IMPEDANCE MEASURED AT 2125 HZ	DATA SET 108E-TYPE				DATA SET 108A-TYPE		E-F CONNECTION
		SCREW SWITCH C		SCREW SWITCH D		SCREW SWITCH C		
		OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE	
—	900*	1-2,3-4	2-3		3-4	1-2,3-4	2-3	STRAPPED
—	850	2-3,3-4	1-2	3-4		2-3,3-4	1-2	CUT
—	750	1-2,2-3	3-4	3-4		1-2,2-3	3-4	CUT
26 NL (HC)	650	2-3	1-2,3-4	3-4		2-3	1-2,3-4	CUT
24 NL (HC)	500	2-3,3-4	1-2		3-4	2-3,3-4	1-2	STRAPPED
22 NL (HC)	400	1-2,2-3	3-4		3-4	1-2,2-3	3-4	STRAPPED
19 NL (HC)	280	2-3	1-2,3-4		3-4	2-3	1-2,3-4	STRAPPED
16 NL (HC)	200	2-3	1-2,3-4		3-4	2-3	1-2,3-4	STRAPPED
26 H88 (HC)	1300	1-2,3-4	2-3	3-4		1-2,3-4	2-3	CUT
24 H88 (HC)	1260	1-2,3-4	2-3	3-4		1-2,3-4	2-3	CUT
22 H88 (HC)	1250	1-2,3-4	2-3	3-4		1-2,3-4	2-3	CUT
19 H88 (HC)	1240	1-2,3-4	2-3	3-4		1-2,3-4	2-3	CUT
16 H88 (HC)	1340	1-2,3-4	2-3	3-4		1-2,3-4	2-3	CUT

NL — Nonloaded (HC) — High Capacity

*Compromise hybrid network switching

SECTION 581-136-203

Note: If no output level is measured, operate the carrier squelch (CS) switch on DAS 820A5 to OFF. Restore the CS switch after adjustment of R11 or R18 and remove TTS-28.

4.08 Connect the incoming data line removed in 4.04, to the T and R terminals on TS A located on DAS 820A5.

4.09 Perform installation tests in accordance with the section entitled 86B2 Data Selective Calling Service—Full-Duplex—150-Word Per Minute Data Station—Test Procedures (581-136-503).

5. PREOPERATIVE ADJUSTMENTS AND TESTS—DATA SET 109E-TYPE

5.01 When data set 109E-type is used, the correct options must be installed and the line resistance pads must be set. The line pad screw switches are set to obtain a total loop resistance of approximately 2000 ohms.

5.02 Three adjustable screw switches (S1, S2, and S3) are used to select options on data set 109E-type (Table C). Screw switch S1 is subdivided into two sections (S1A and S1B) and screw switch S3 is subdivided into twelve sections. Two of these sections (S3-1 and S3-2) are used

for options; eight of the remaining sections (S3-4 through S3-7, and S3-9 through S3-12) are used in selecting the proper line pad resistance (Table D). Sections S3-3 and S3-8 are not used and should not be equipped with screws. Refer to Fig. 10 for the location of the screw switches.

5.03 Install the required options and line padding in the replacement data set in accordance with Tables C and D, the service order, and the data set 109E-type being replaced.

Line Pad Adjustment

5.04 Determine from the circuit layout record card the resistance of the line between the station and the hubbing point, including the amount of line pad resistance that has been inserted into the hub data set. Subtract this amount from 2000 ohms and locate the amount closest to but not greater than the result in the LINE PAD RESISTANCE (OHMS) column of Table D. Open and close the sections of screw switch S3- associated with the amount of line pad resistance to be installed in the data set in accordance with Table D. Upon completion of the line pad installation, plug the data set 109E-type into the proper slot of DAS 820A5.

→ TABLE C ←

SCREW SWITCH SETTINGS FOR OPTIONS ON DATA SET 109E

FUNCTION PROVIDED		OPTION DESIG	FACTORY EQUIPPED	SCREW SWITCH SETTING	
				CLOSE	OPEN
Current Squelch		Z	✓	S2	
No Current Squelch		Y	†		S2
BB LEAD	SPACE HOLD	V		S1A*	S1B*
	MARK HOLD	U	✓	S1B*	S1A*
CROSSOVER SHIFT	SPACE	R		S3-2	S3-1
	MARK	Q	✓		S3-1 & S3-2
	NONE	P		S3-1	S3-2

*Screw switch should not be inserted in the center positions of screw switch S1A and S1B.

† Y option must be installed for this service.

→ TABLE D ←

DATA SET 109E-TYPE
LINE PAD ADJUSTMENTS

LINE PAD RESISTANCE (OHMS)	SCREW SWITCH S3 SETTINGS	
	CLOSE S3-	OPEN S3-
00.0	4,5,6,7,9,10,11,12	
136.2	4,5,6,10,11,12	7,9
266.0	4,5,7,9,11,12	6,10
402.2	4,5,11,12	6,7,9,10
522.0	4,6,7,9,10,12	5,11
658.2	4,6,10,12	5,7,9,11
788.0	4,7,9,12	5,6,10,11
924.2	4,12	5,6,7,9,10,11
1022.0	5,6,7,9,10,11	4,12
1158.2	5,6,10,11	4,7,9,12
1288.0	5,7,9,11	4,6,10,12
1424.2	5,11	4,6,7,9,10,12
1544.0	6,7,9,10	4,5,11,12
1680.2	6,10	4,5,7,9,11,12
1810.0	7,9	4,5,6,10,11,12
1946.2		4,5,6,7,9,10,11,12

5.05 Connect the incoming data line to the T and R terminals on TS A located on DAS 820A5.



The data line must be connected to the DAS 820A5 correctly, ie, tip to T terminal and ring to R terminal, due to the polar signals used by this data set. The tip lead can be identified by the positive potential from the

STC when the STC data set 109B-type is in the marking condition.

5.06 Connection of the data line completes the installation of the data set 109E-type. To verify that the unit is operating properly, the entire station can be tested as outlined in the practice entitled 86B2 Data Selective Calling Service—Full-Duplex—150-Word Per Minute Data Station—Test Procedures (581-136-503).◀

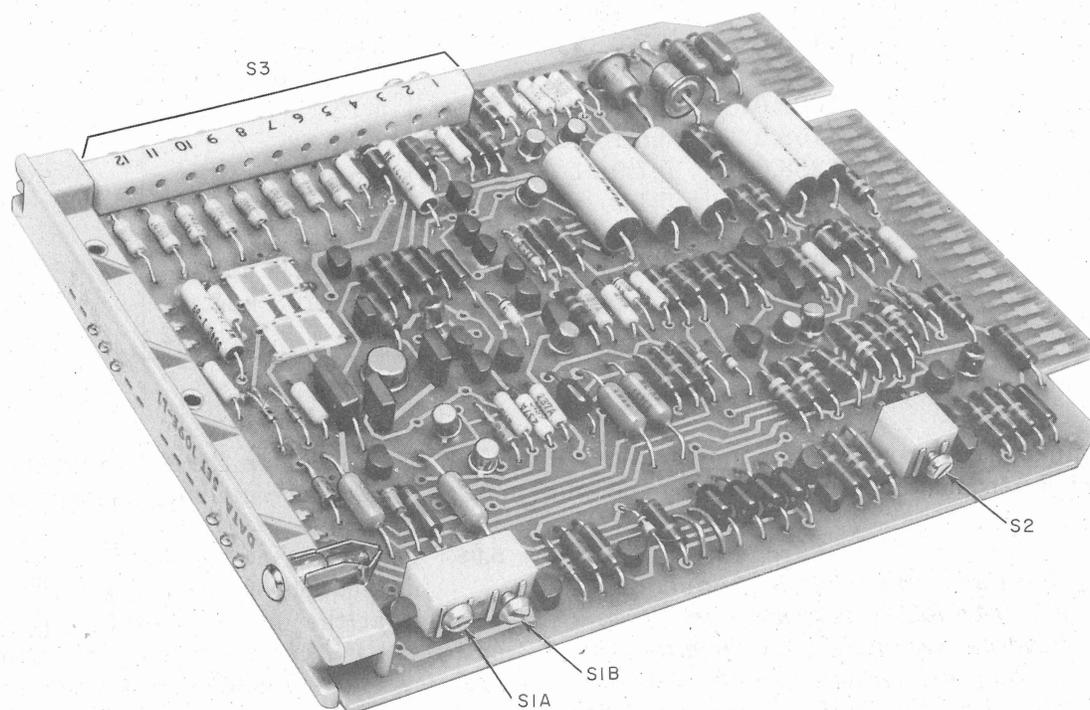


Fig. 10—Data Set 109E-Type—Location of Screw Switches