DATA AUXILIARY SET 820B5

USED IN NO. 1 ELECTRONIC SWITCHING SYSTEM ADF

HALF-DUPLEX—150 WORD PER MINUTE DATA STATION

WITH CUSTOMER PROVIDED TERMINAL

INSTALLATION

1. GENERAL

1.01 This section describes the procedure to be followed for the installation of a half-duplex, 150-word per minute data station used with customer provided terminal associated with the No. 1 Electronic Switching System Arranged with Data Features (No. 1 ESS ADF).

1.02 The data station unit used with customer provided terminal consists of Data Auxiliary Sets 820B5 and 806C1. One or more data station units constitute a data station. *The installation of station units at the data station shall be performed on a local engineering basis to best suit the number of station units provided.* A typical data station installation using a KS-20093 cabinet is shown in Fig. 1.

1.03 The customer must furnish a standard 3-wire, grounding-type, 106- to 129-volt, 59.5 to 60.5 Hz ac power source suitable for handling the number of data station units installed (in accordance with customer requirements/specified on service order). Each data station unit is equipped with a 1/2-ampere fuse and power switch.
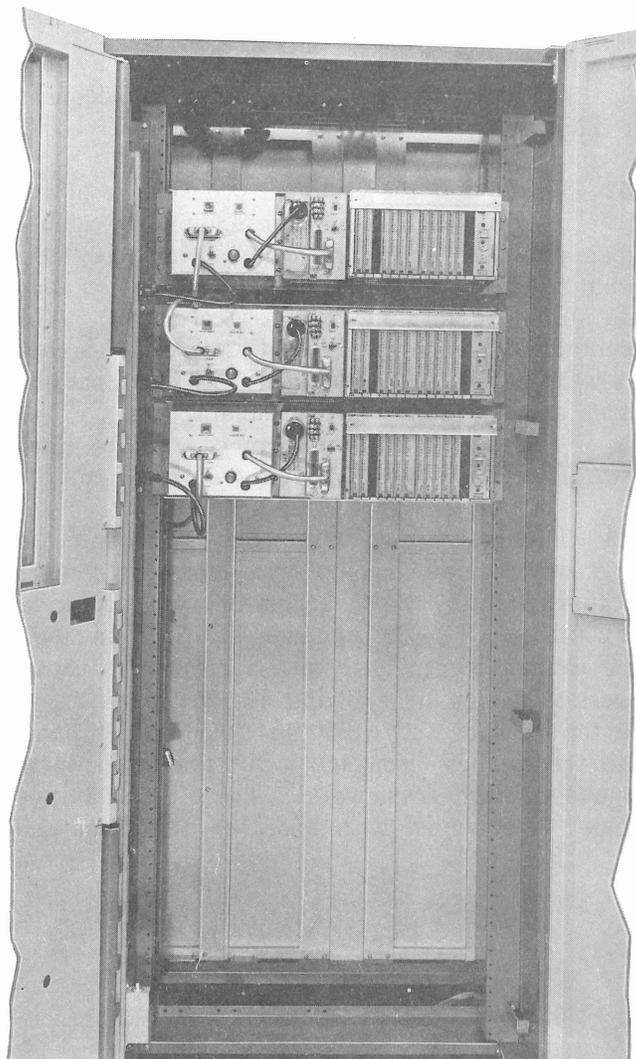

Fig. 1—Typical Data Station Installation

1.04 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).

1.05 Reference directions (left, right, front, or rear) are in respect to facing the plug-in circuit packages which are located at the front of the Data Auxiliary Set (DAS) 820B5.

2. INSTALLATION

2.01 Verify that the location selected by the customer for the data station is adequate for maintenance.

2.02 Verify that the customer-provided ac power is arranged to reach the equipment cabinet (when provided) or to provide a power receptacle within reach of the 10-1/2 inch power cord on each data station unit (if no cabinet is provided). The receptacle for each data station unit must accept a 3-wire power plug equipped with two parallel blades and a round-shaped grounding pin.

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

2.03 The data station unit(s) may be mounted in any frame or cabinet with mounting centers of approximately 24.3 inches or typically in a KS-20018 or KS-20093 type cabinet. The KS-20018 type cabinet is provided with a removable panel. Access is gained by applying outward pressure at the top rear of the KS-20018 type cabinet panel until the catches disengage. Lift the panel up to remove it from framework. The KS-20093 type cabinet is equipped with doors on the front and rear to provide easy access. The doors are secured by magnetic catches.

2.04 A typical installation using the KS-20093 cabinet is shown in Fig. 2. The illustration contains detailed information which may be used as a guide.

2.05 Verify that the proper circuit packs (CP) are installed in DAS 820B5 (Fig. 3) and that the R and CS switches are positioned properly according to the service order and/or worksheet.

> *Note 1:* An option in DAS 820B5 is the encoding of the shift register on CP AR37. Two other screw-switch type options are provided on CP AR389.

> *Note 2:* Two screw-switch type options are provided on the circuit card inside DAS 806C1.

A. CP AR37 Removal

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

2.07 Using the 748A tool assembly (card-extracting tool), remove CP AR37 from DAS 820B5 (Fig. 4) as follows:

(1) Place pivots of 748A on faceplate of CP and gently push 748A until pivots engage faceplate.
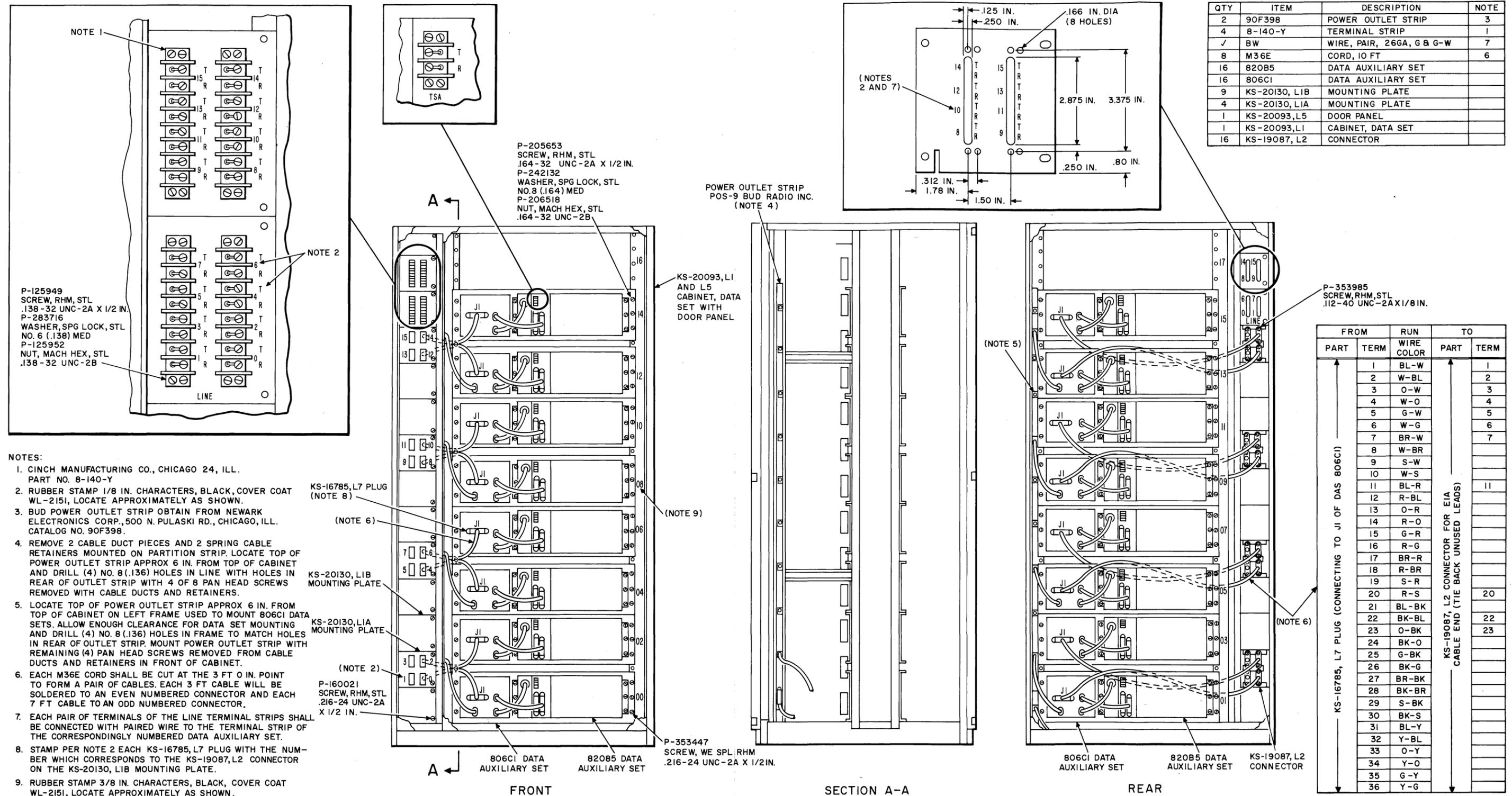
(2) Grasp handle of 748A and pull CP AR37 straight out.

NOTE 1

P-205653
SCREW, RHM, STL
.164-32 UNC-2A X 1/2 IN.
P-242132
WASHER, SPG LOCK, STL
NO.8 (.164) MED
P-206518
NUT, MACH HEX, STL
.164-32 UNC-2B

A

NOTE 2

P-125949
SCREW, RHM, STL
.138-32 UNC-2A X 1/2 IN.
P-283716
WASHER, SPG LOCK, STL
NO.6 (.138) MED
P-125952
NUT, MACH HEX, STL
.138-32 UNC-2B

POWER OUTLET STRIP
POS-9 BUD RADIO INC.
(NOTE 4)

(NOTES 2 AND 7)

.125 IN.
.250 IN.
.166 IN. DIA (8 HOLES)

2.875 IN. 3.375 IN.

.312 IN.
1.78 IN.
1.50 IN.
.250 IN. .80 IN.

QTY	ITEM	DESCRIPTION	NOTE
2	90F398	POWER OUTLET STRIP	3
4	8-140-Y	TERMINAL STRIP	1
✓	BW	WIRE, PAIR, 26GA, G & G-W	7
8	M36E	CORD, 10 FT	6
16	820B5	DATA AUXILIARY SET	
16	806CI	DATA AUXILIARY SET	
9	KS-20130, L1B	MOUNTING PLATE	
4	KS-20130, L1A	MOUNTING PLATE	
1	KS-20093, L5	DOOR PANEL	
1	KS-20093, L1	CABINET, DATA SET	
16	KS-19087, L2	CONNECTOR	

KS-20093, L1 AND L5 CABINET, DATA SET WITH DOOR PANEL

(NOTE 5)

P-353985
SCREW, RHM, STL
.112-40 UNC-2A X 1/8 IN.

(NOTE 9)

KS-16785, L7 PLUG
(NOTE 8)

(NOTE 6)

KS-20130, L1B
MOUNTING PLATE

KS-20130, L1A
MOUNTING PLATE

(NOTE 2)

P-160021
SCREW, RHM, STL
.216-24 UNC-2A X 1/2 IN.

(NOTE 6)

P-353447
SCREW, WE SPL, RHM
.216-24 UNC-2A X 1/2 IN.

806CI DATA AUXILIARY SET

82085 DATA AUXILIARY SET

806CI DATA AUXILIARY SET

820B5 DATA AUXILIARY SET

KS-19087, L2 CONNECTOR

FRONT

SECTION A-A

REAR

NOTES:

1. CINCH MANUFACTURING CO., CHICAGO 24, ILL. PART NO. 8-140-Y.

2. RUBBER STAMP 1/8 IN. CHARACTERS, BLACK, COVER COAT WL-2151, LOCATE APPROXIMATELY AS SHOWN.

3. BUD POWER OUTLET STRIP OBTAIN FROM NEWARK ELECTRONICS CORP., 500 N. PULASKI RD., CHICAGO, ILL. CATALOG NO. 90F398.

4. REMOVE 2 CABLE DUCT PIECES AND 2 SPRING CABLE RETAINERS MOUNTED ON PARTITION STRIP. LOCATE TOP OF POWER OUTLET STRIP APPROX 6 IN. FROM TOP OF CABINET AND DRILL (4) NO. 8 (.136) HOLES IN LINE WITH HOLES IN REAR OF OUTLET STRIP WITH 4 OF 8 PAN HEAD SCREWS REMOVED WITH CABLE DUCTS AND RETAINERS.

5. LOCATE TOP OF POWER OUTLET STRIP APPROX 6 IN. FROM TOP OF CABINET ON LEFT FRAME USED TO MOUNT 806CI DATA SETS. ALLOW ENOUGH CLEARANCE FOR DATA SET MOUNTING AND DRILL (4) NO. 8 (.136) HOLES IN FRAME TO MATCH HOLES IN REAR OF OUTLET STRIP. MOUNT POWER OUTLET STRIP WITH REMAINING (4) PAN HEAD SCREWS REMOVED FROM CABLE DUCTS AND RETAINERS IN FRONT OF CABINET.

6. EACH M36E CORD SHALL BE CUT AT THE 3 FT 0 IN. POINT TO FORM A PAIR OF CABLES. EACH 3 FT CABLE WILL BE SOLDERED TO AN EVEN NUMBERED CONNECTOR AND EACH 7 FT CABLE TO AN ODD NUMBERED CONNECTOR.

7. EACH PAIR OF TERMINALS OF THE LINE TERMINAL STRIPS SHALL BE CONNECTED WITH PAIRED WIRE TO THE TERMINAL STRIP OF THE CORRESPONDINGLY NUMBERED DATA AUXILIARY SET.

8. STAMP PER NOTE 2 EACH KS-16785, L7 PLUG WITH THE NUMBER WHICH CORRESPONDS TO THE KS-19087, L2 CONNECTOR ON THE KS-20130, L1B MOUNTING PLATE.

9. RUBBER STAMP 3/8 IN. CHARACTERS, BLACK, COVER COAT WL-2151, LOCATE APPROXIMATELY AS SHOWN.

KS-16785, L7 PLUG (CONNECTING TO J1 OF DAS 806CI)

KS-19087, L2 CONNECTOR FOR EIA CABLE END (TIE BACK UNUSED LEADS)

FROM		RUN	TO	
PART	TERM	WIRE COLOR	PART	TERM
	1	BL-W		1
	2	W-BL		2
	3	O-W		3
	4	W-O		4
	5	G-W		5
	6	W-G		6
	7	BR-W		7
	8	W-BR		
	9	S-W		
	10	W-S		
	11	BL-R		11
	12	R-BL		
	13	O-R		
	14	R-O		
	15	G-R		
	16	R-G		
	17	BR-R		
	18	R-BR		
	19	S-R		
	20	R-S		20
	21	BL-BK		
	22	BK-BL		22
	23	O-BK		23
	24	BK-O		
	25	G-BK		
	26	BK-G		
	27	BR-BK		
	28	BK-BR		
	29	S-BK		
	30	BK-S		
	31	BL-Y		
	32	Y-BL		
	33	O-Y		
	34	Y-O		
	35	G-Y		
	36	Y-G		

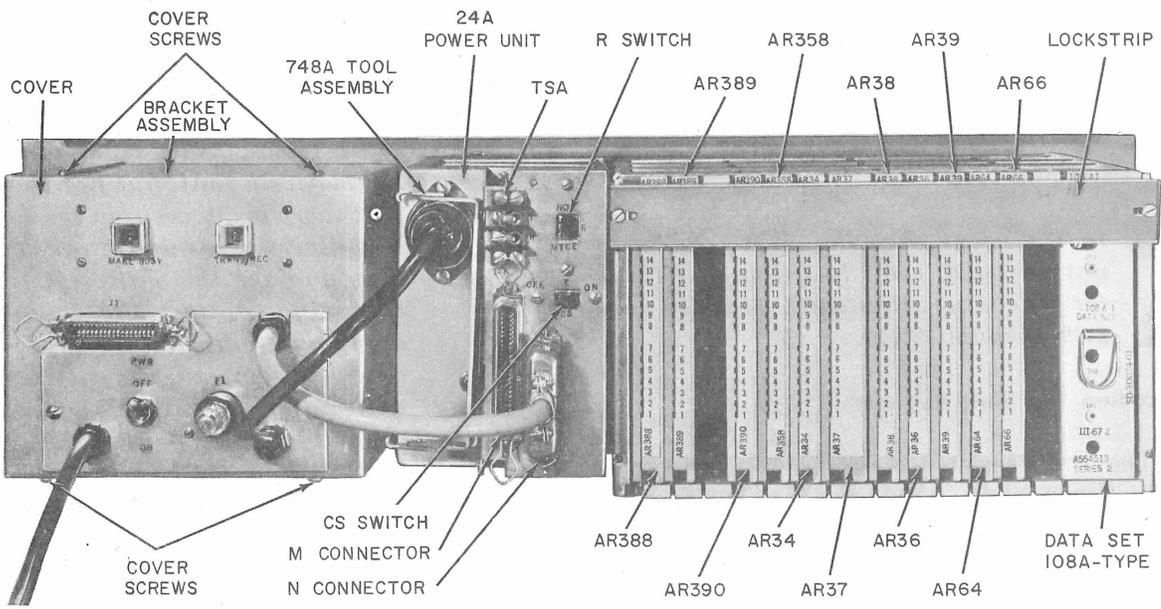**Fig. 2—Typical Installation Using the KS-20093 Cabinet**

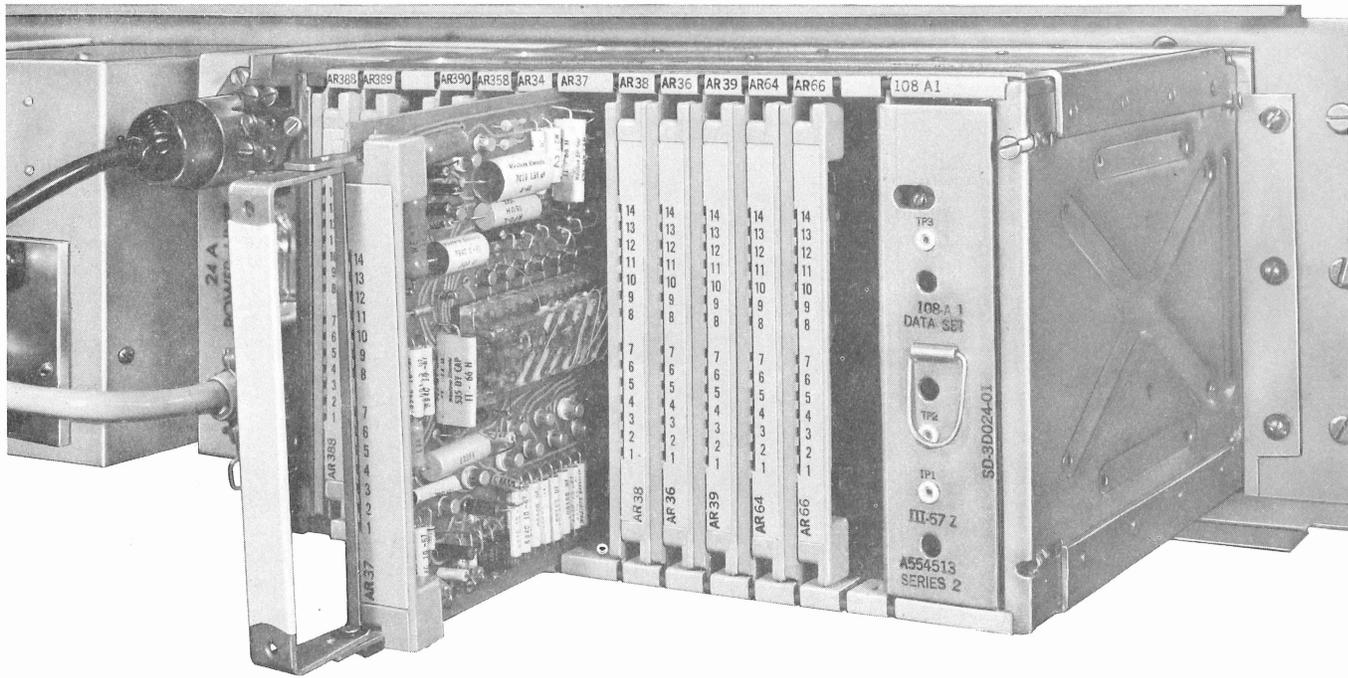Fig. 3—Data Auxiliary Sets 820B5 and 806C1—Locations of Circuit Packs and Components

Fig. 4—CP AR37 Removal

B. Inspecting the Shift Register

2.08 Inspect shift register (Fig. 5). A properly encoded CP AR37 shift register should have *three* polyurethane insulated No. 30 to No. 36 American Wire Gauge (AWG) wires running through each of the eight tubes.

> *In the event that the shift register is not encoded, refer to the instructions for encoding the shift register (see 2.09 through 2.11).*

C. Encoding the Shift Register

2.09 The shift register of CP AR37 is encoded by connecting conductors to a specific terminal on CP AR37, routing the conductors through the eight tubes of the shift register (in a specified direction), and connecting them to another specific terminal on CP AR37.

> *Extreme care must be exercised when threading the conductors through the eight tubes. The conductors should be relatively taut, but not to the point that sharp bends occur in the conductors. Any excessive strain on the conductors may damage the shift register. After threading, protect the conductors by applying an insulating tape (E Vinyl, or equivalent) to prevent interference with adjacent circuit packs.*

2.10 The CP AR37 should be positioned as shown in Fig. 5. It is suggested that the encoding of the shift register be performed on a flat surface properly protected.
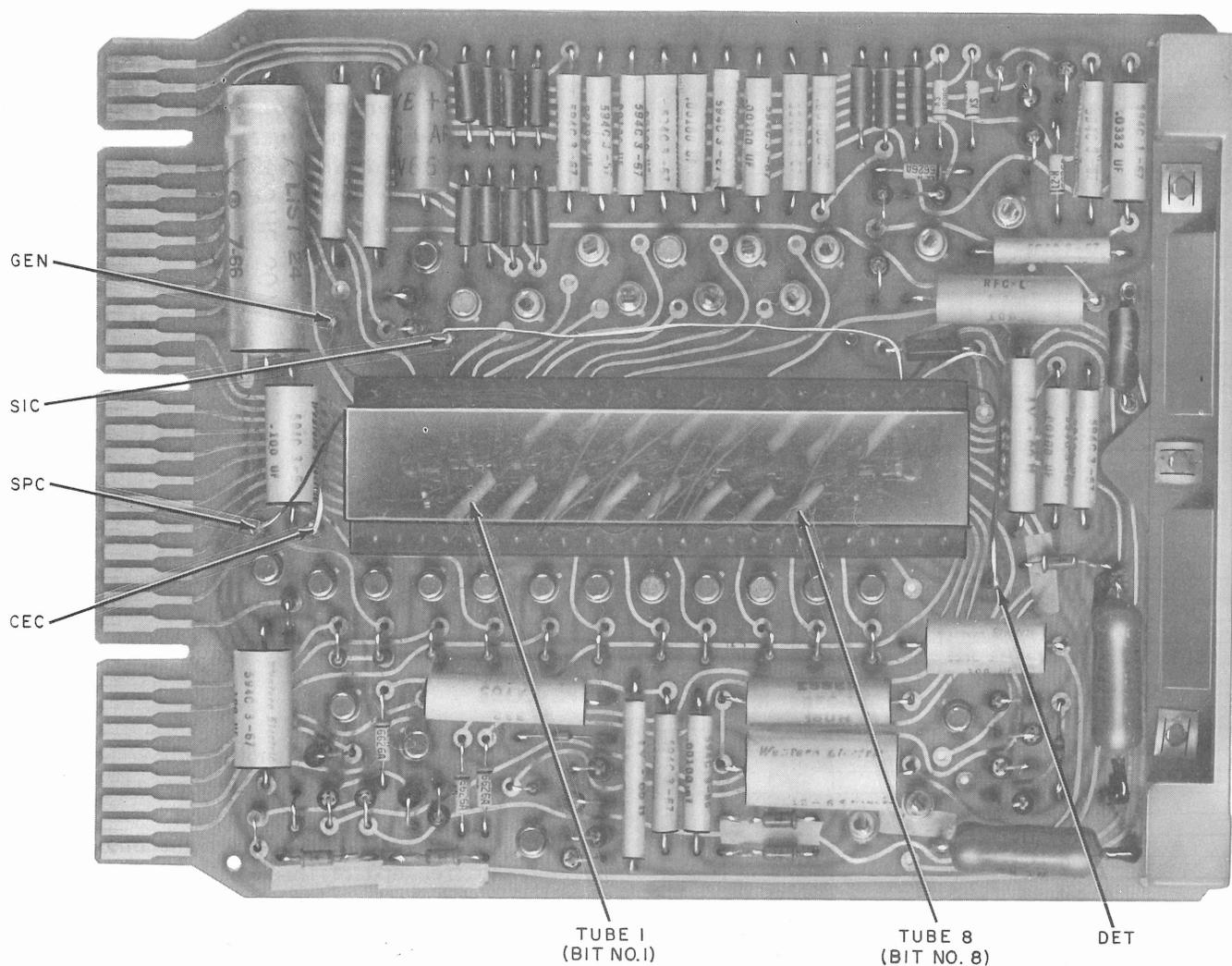
Fig. 5—CP AR37—Location of Terminals for Wiring Shift Register

2.11 The following procedure is recommended for encoding the shift register:

(1) Obtain the SPC, CEC, and SIC codes from the faceplate of the CP AR37 being replaced, or, for a new installation, from the service order and/or circuit layout record card.

(2) Select proper mark and space sequence for each code by using Fig. 6.

(3) Cut three pieces of polyurethane insulated No. 30 to No. 36 AWG, or equivalent, in two-foot lengths.

Fig. 6—USA Standard Code for Information Interchange (USAS X3.4—1967) — bit patterns (8 7 6 5 4 3 2 1) with LEGEND: ■ MARK □ SPACE

Character	Character
NUL	@
SOH	A
STX	B
ETX	C
EOT	D
ENQ	E
ACK	F
BEL	G
BS	H
HT	I
LF	J
VT	K
FF	L
CR	M
SO	N
SI	O
DLE	P
DC1	Q
DC2	R
DC3	S
DC4	T
NAK	U
SYN	V
ETB	W
CAN	X
EM	Y
SUB	Z
ESC	[
FS	\
GS	]
RS	^
US	_
SP	`
!	a
"	b
#	c
$	d
%	e
&	f
'(APOS)	g
(	h
)	i
*	j
+	k
,	l
-	m
.	n
/	o
0	p
1	q
2	r
3	s
4	t
5	u
6	v
7	w
8	x
9	y
:	z
;	{
<	|
=	}
>	~
?	DEL

LEGEND: ■ MARK □ SPACE

Fig. 6—USA Standard Code for Information Interchange (USAS X3.4—1967)

The following operations require the use of a KS-16346 L1 or L2 soldering iron (or an equivalent low wattage rated iron). Extreme care must be exercised when soldering the conductors to the specified terminal at the completion of threading operations.

SIC CODE

(4) Connect an end of one above-mentioned conductor (3) to the GEN terminal (Fig. 5).

(5) Starting with tube 1 (for bit one), thread the free end of this conductor through the eight tubes in the shift register as indicated in Fig. 7.

(6) At the completion of threading, remove the excess length of wire and connect the free end of this conductor to the SIC terminal (Fig. 5).

SPC CODE

(7) Connect one end of another above-mentioned conductor to the SPC terminal (Fig. 5).

(8) Starting with tube 1 (for bit one), thread the free end of this conductor through the eight tubes in the shift register as indicated in Fig. 7.

(9) At the completion of threading, remove the excess length of wire and connect the free end of this conductor to the DET terminal (Fig. 5).

CEC CODE

(10) Connect one end of the last of the three mentioned conductors to the CEC terminal (Fig. 5).

(11) Starting with tube 1 (for bit one), thread the free end of this conductor through the eight tubes in the shift register as indicated in Fig. 7.

(12) At the completion of threading, remove the excess length of wire and connect the free end of this conductor to the DET terminal (Fig. 5).

GEN SIC
○ ○

SPC AND CEC

GEN SIC
○ ○

SIC

GEN SIC
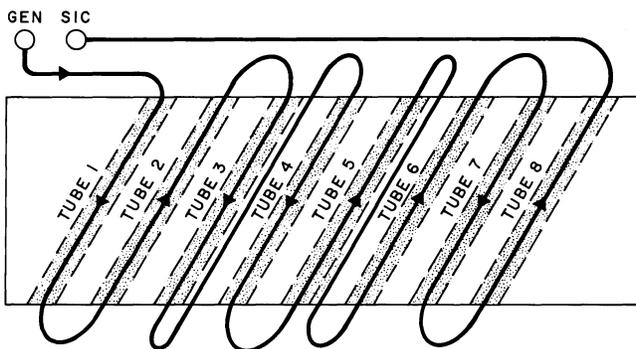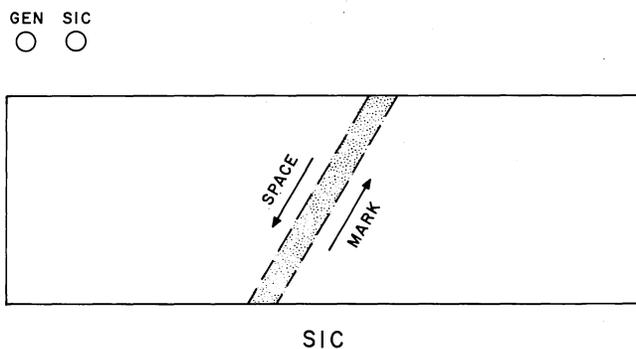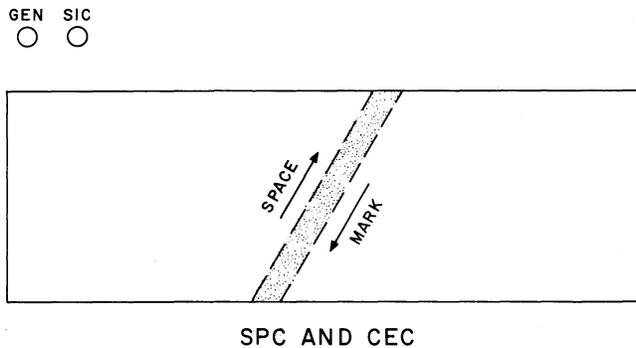
2 =
BIT | 1 2 3 4 5 6 7 8
S M S S M M S M

EXAMPLE: SIC = 2

Fig. 7—Direction Wires for Encoding Shift Register

D. Replacing CP AR37

2.12 Replace CP AR37 as follows:

(1) Insert CP AR37 in slot 13.

(2) Verify that CP AR37 is seated properly in its connector.

(3) Remove the 748A tool assembly by springing the bottom pivot down to disengage pivot from CP faceplate.

(4) Lift up 748A to disengage top pivot.

E. CP AR389 Inspection

2.13 Using the 748A tool assembly, remove CP AR389. Verify that the screw switches (Fig. 8) are properly conditioned to provide option Y or Z, if required. Option Y provides an SMI indication to the customer provided terminal for message reception alarm service messages. Option Z provides a CI indication when SMI is on. The options should be specified on the service order and/or worksheet. Replace CP AR389, verify that the package is seated properly, and remove the 748A tool assembly.

F. DAS 806C1 Inspection

2.14 Disconnect the interconnecting power cord and EIA signal cable from DAS 820B5 to permit removal of the DAS 806C1 cover. (External power cord and EIA signal cable to terminal should not be connected). Remove the cover as follows:

(1) Loosen the four screws (Fig. 3) which secure the cover to the top and bottom sides of the bracket assembly (front edge).

(2) Pull the cover back from the mounting plate to clear the bracket assembly.

2.15 Verify that the screw switches (Fig. 9) are properly conditioned to provide option W or X, if required by service order and/or worksheet. Option W causes all positive polling responses to be priority. Option X causes all positive polling responses to be routine.

2.16 Replace cover on bracket assembly, tighten the four screws which secure the cover to the bracket assembly, and reconnect the interconnecting cord and cable disconnected in 2.14.

2.17 *The equipment should be tagged or otherwise marked to indicate any internal options used.*
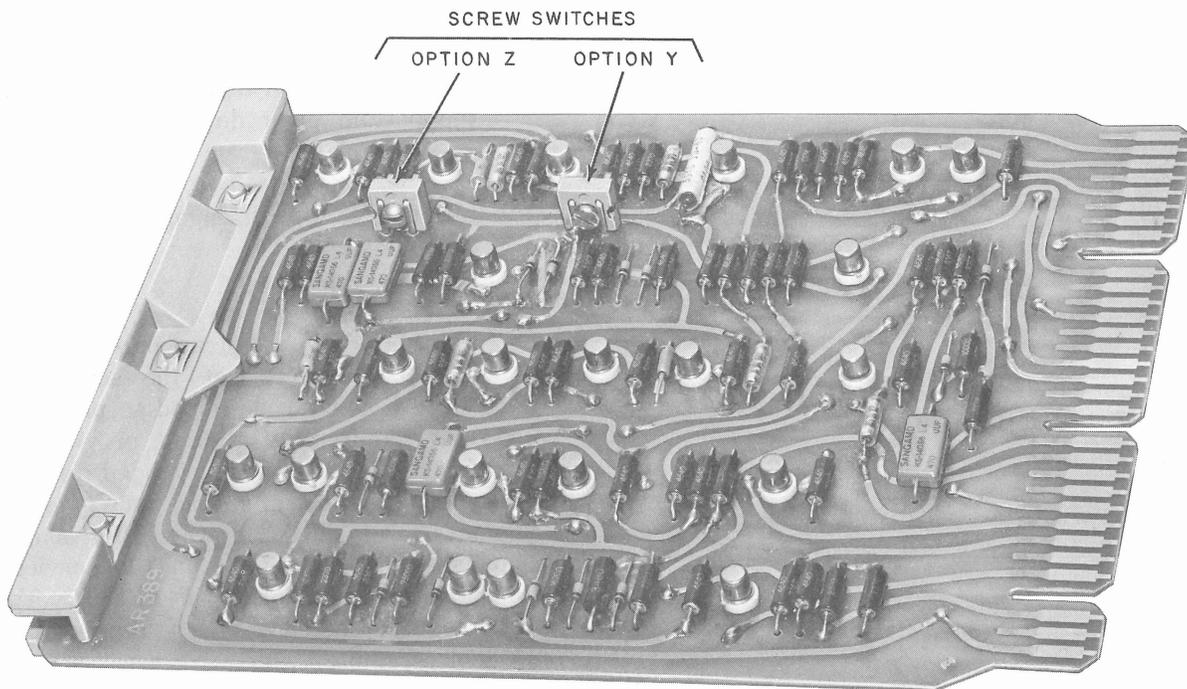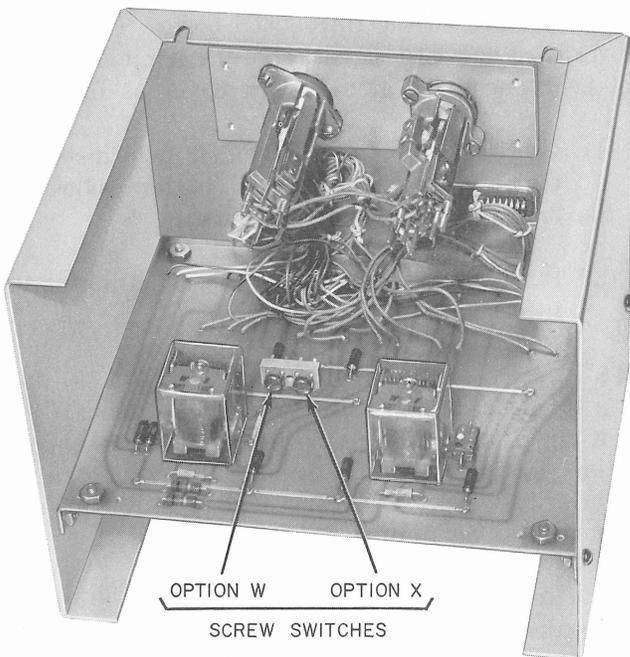
Fig. 8—CP AR389 Removed for Inspection

Fig. 9—Data Auxiliary Set 806C1 Cover—Rear View

3. INTERCONNECTIONS OF STATION

3.01 The interconnections of a data station unit used with customer provided terminal are shown in Fig. 10.

3.02 The following cords and cables are a part of Data Auxiliary Set 806C1:

- Interconnecting EIA cable with connector P1 (to N connector of DAS 820B5)

- Interconnecting power cord with connector P2 (to DAS 820B5)

- External power cord, 10 inches long, with connector P3 (to 117v ac power source)

3.03 The following signal cables provide external connections:

- EIA cable (11 lead) between DAS 806C1 (connector J1) and the EIA connector

- Data Line (tip and ring) between DAS 820B5 (TS A) and the serving test center (STC) via 2-wire private-line facility.
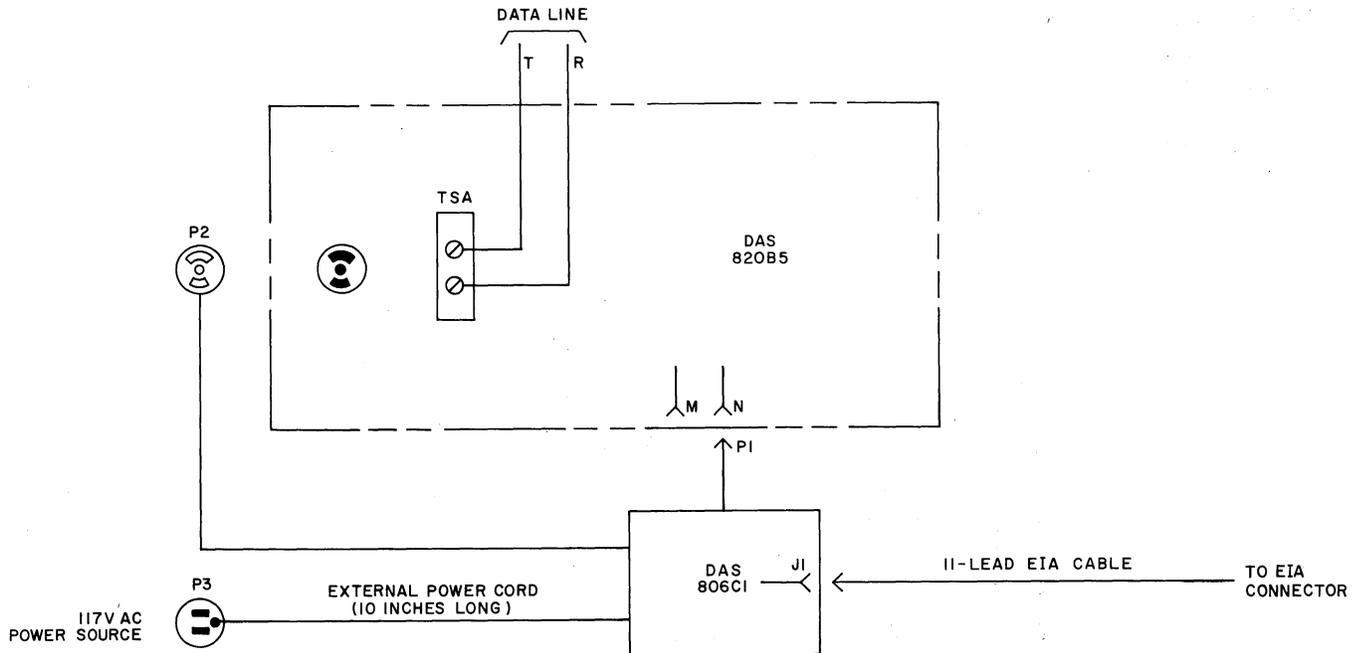
Fig. 10—Interconnections for Data Station Unit(s) Used With Customer Provided Terminal

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

4.01 Screw switch D (Fig. 11) on Data Set 108A-type will have been closed to provide maximum sensitivity (maximum gain of the receive buffer amplifier) during manufacturing tests. The gain of the amplifier may be reduced in two 4-dB steps and should be adjusted to fit the requirements of each installation. Table A shows the reduction in gain for each screw setting. The screw switches should be set according to the service order and/or worksheet.

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 if the cable make-up is known. Select the proper facility make-up under the TYPICAL LOOP FACILITY column. Find the typical loop impedance at 2125 Hz corresponding to the Data Set 108A-type operation. When the impedance is found, refer to Table C for the strapping required for the optimum transhybrid balance. Set screw switch C and strap E-F as

indicated in table. Refer to Fig. 11 for the location of screw switches and the strap.

4.03 Upon completion of hybrid network strapping, plug Data Set 108A-type into DAS 820B5.

DATA SET LEVEL ADJUSTMENT

4.04 Connect terminals + and − of Portable Station Test Set TTS-28 to TP 1 and TP 2 of the data set (Fig. 11). Set FUNCTION switch of TTS-28 to DBM 900Ω TERM 0 position.

4.05 Connect the external power cord to the ac power source and turn the power switch to the ON position. Depress the MAKE BUSY key to illuminate the MAKE BUSY lamp (if not already in the made busy state).

4.06 Adjust R11 potentiometer on data set for output level specified on service order and/or circuit layout record card.

Note: If no output level is measured, operate carrier squelch (CS) switch on DAS 820B5 to OFF. Restore CS switch after adjustment of R11 and remove TTS-28.

4.07 Connect the incoming data line to the tip (T) and ring (R) terminals on TS A located on DAS 820B5.

4.08 Perform installation tests in accordance with the section entitled Data Auxiliary Set 820B5 used in No. 1 Electronic Switching System ADF—Half-Duplex—150 Word Per Minute Data Station with Customer Provided Terminal—Test Procedures (598-046-510).

Fig. 11—Data Set 108A-Type—Locations of Test Prints and Screw Switches

TABLE A

DATA SET 108A-TYPE

SCREW SWITCH D SETTINGS

DESENSITIZING PAD STRAPPING

FOR REDUCING GAIN OF THE

RECEIVE BUFFER AMPLIFIER

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

TABLE B

TYPICAL LOOP IMPEDANCE

TYPICAL LOOP FACILITY	TYPICAL LOOP IMPEDANCE
	2125 HZ (DATA SET 108A-TYPE)
26 NL (HC)	650
24 NL (HC)	500
22 NL (HC)	400
19 NL (HC)	280
16 NL (HC)	200
26 H88 (HC)	1300
24 H88 (HC)	1260
22 H88 (HC)	1250
19 H88 (HC)	1240
16 H88 (HC)	1340

NL—Nonloaded   (HC)—High Capacity

TABLE C

DATA SET 108A-TYPE

HYBRID NETWORK STRAPPING

LOOP IMPEDANCE	DATA SET 108A-TYPE SCREW SWITCH C CLOSED	DATA SET 108A-TYPE E-F CONNECTION
1255	2-3	Cut
900	2-3	Strapped
850	1-2	Cut
750	3-4	Cut
575	1-2, 3-4	Cut
500	1-2	Strapped
410	3-4	Strapped
220	1-2, 3-4	Strapped