DATA AUXILIARY SET 820B5 USED IN NO. 1 ELECTRONIC SWITCHING SYSTEM ADF HALF-DUPLEX—150 WORD PER MINUTE DATA STATION WITH CUSTOMER PROVIDED TERMINAL MAINTENANCE

1. GENERAL

1.01 This section describes the maintenance requirements for a half-duplex, 150-word per minute data station used with customer provided terminal. The data station is used with No. 1 Electronic Switching System Arranged with Data Features (No. 1 ESS ADF).

1.02 There is no routine maintenance required for the data station which consists of Data Set 108A or for Data Auxiliary Sets (DAS) 820B5 and 806C1.

1.03 Stations suspected of being in trouble should be tested as described in 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).

1.04 Data Set 108A-type, or DAS 820B5 and 806C1 not meeting test requirements, should be replaced in order to restore customer service as quickly as possible. Data set replacement is covered in Part 6 of this section.

To prevent damage to circuit packs, disconnect power cord plug from the customer power receptacle before connecting or disconnecting circuit packs, connectors, or options.

1.05 When the data set or DAS 820B5 and 806C1 is replaced, the replacement should be tested in accordance with the section referenced in 1.03.

1.06 Exercise care in handling and transporting data sets and data auxiliary sets. If possible, use original cartons to store, transport, or ship them.

1.07 If maintenance spares are stocked, verify that they are checked and ready for immediate installation.

When DAS 820B5 and 806C1 are replaced and CP AR37 is also replaced, the replacement CP AR37 must be encoded as given in Part 3 of this section.

2. ACCESS TO DATA AUXILIARY SETS 820B5 and 806C1

2.01 Access to DAS 820B5 and 806C1 may vary according to the installation. If the data station units are installed in the KS-20093 cabinet(s), access is provided (Fig. 1) through full length doors (front and rear) equipped with magnetic catches. If a KS-20018 cabinet is employed, access is provided as follows:

(1) Apply outward pressure at the top of the KS-20018 type cabinet panel until the catches disengage.

(2) Lift the panel up to remove it from framework.

3. CP AR37—ENCODING THE SHIFT REGISTER

3.01 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.

3.02 The CP AR37 should be positioned as shown in Fig. 2. It is suggested that the encoding of the shift register be performed on a flat surface properly protected.

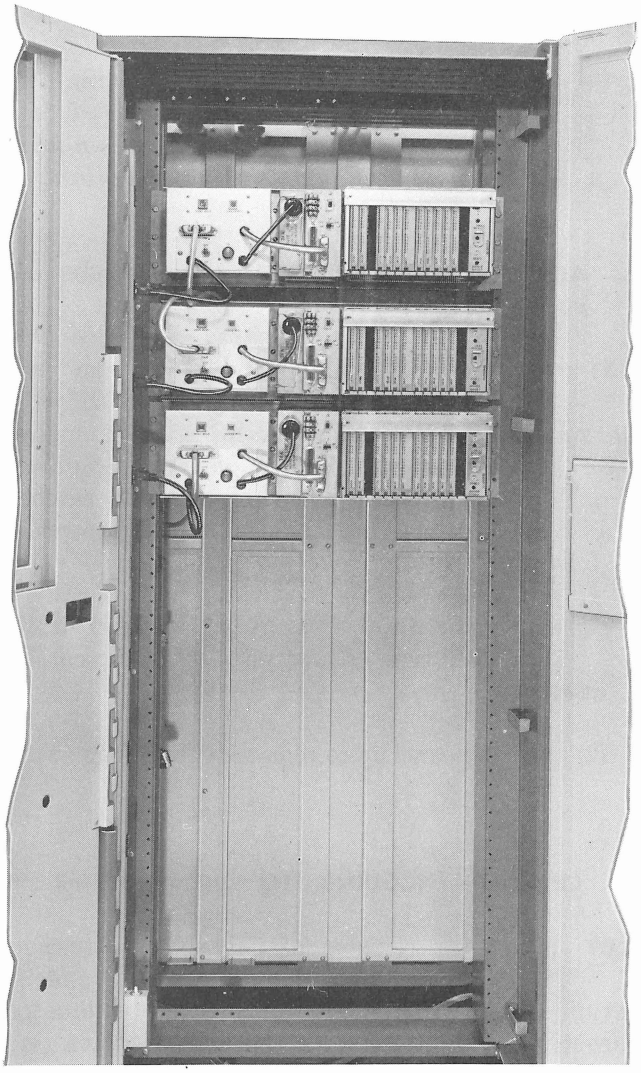

Fig. 1—Typical Data Station—Access for Maintenance

3.03 ***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. 3.

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

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. 2).

(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. 4.

(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. 2).

SPC CODE

(7) Connect one end of another above-mentioned conductor to the SPC terminal (Fig. 2).

(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. 4.

(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. 2).

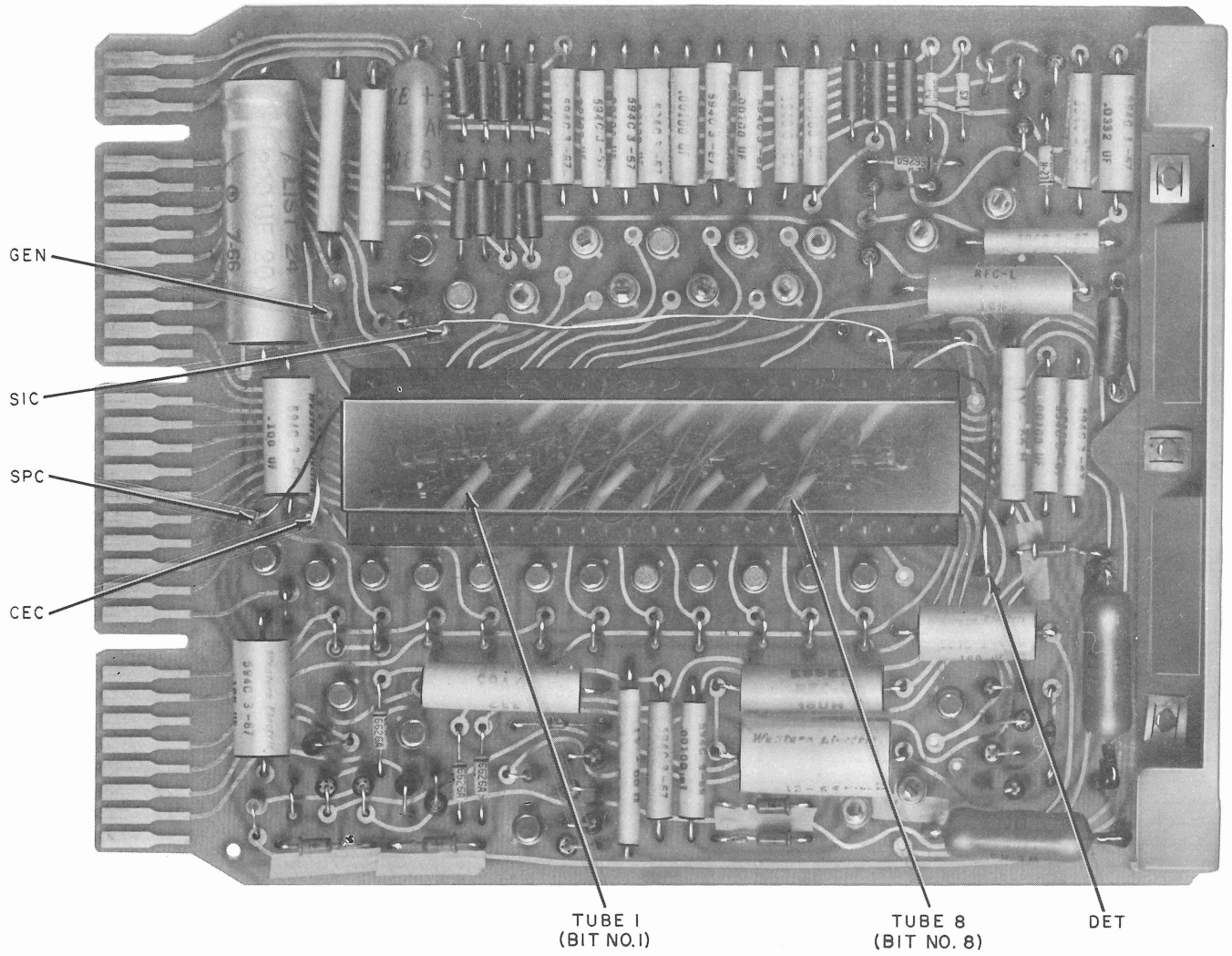

Fig. 2—CP AR37—Location of Terminals for Wiring Shift Register

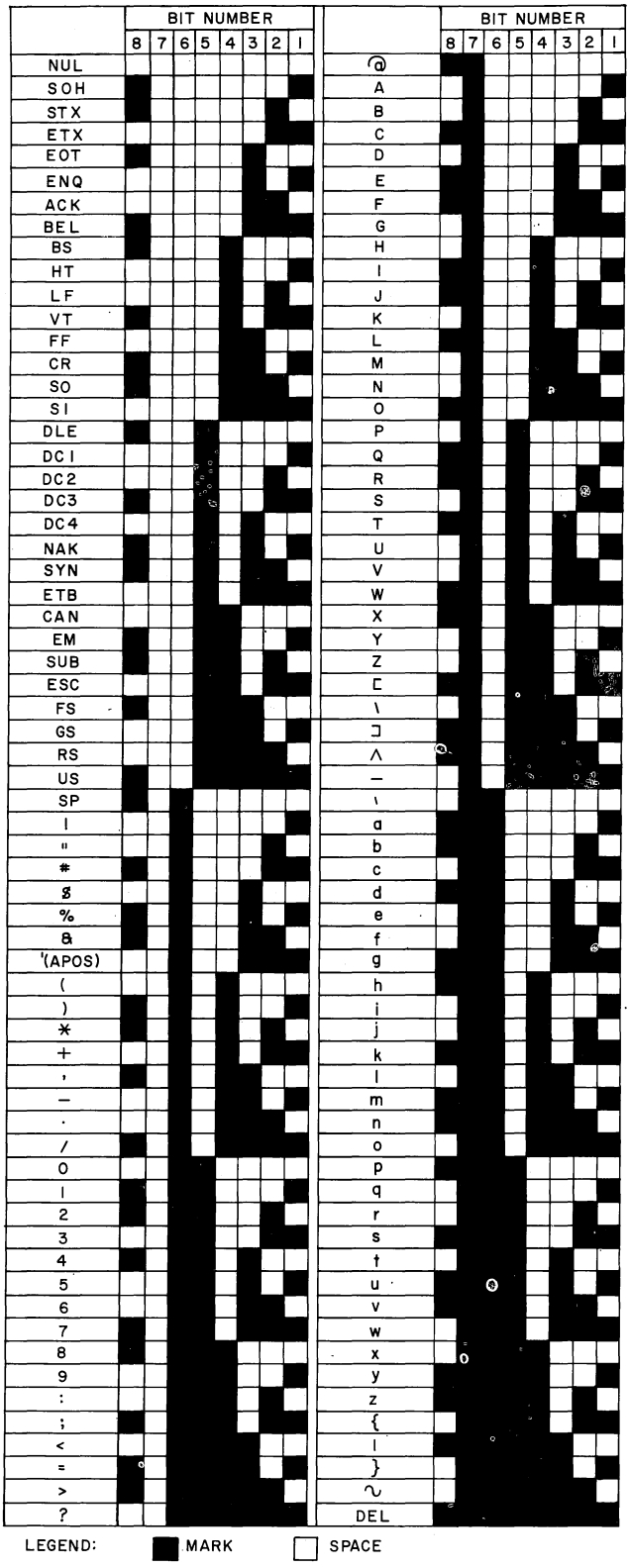

Fig. 3—USA Standard Code for Information Interchange (USAS X3.4—1967)

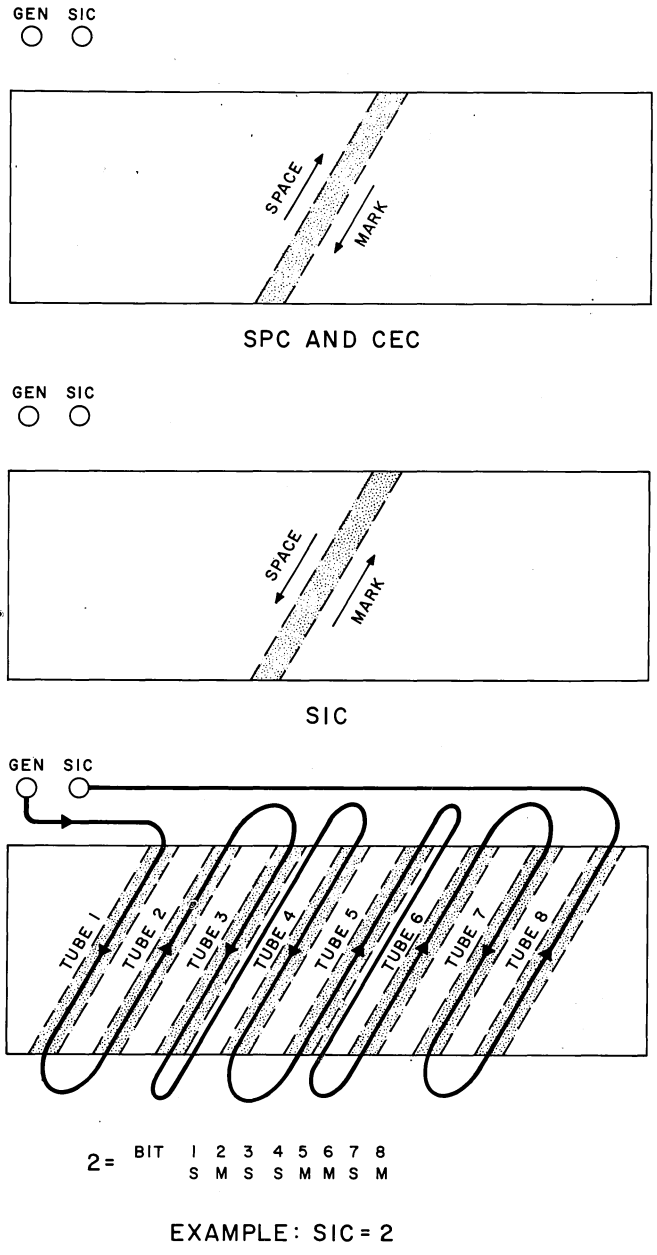

Fig. 4—Direction of Wires for Encoding Shift Register

CEC CODE

(10) Connect one end of the last of the three mentioned conductors to the CEC terminal (Fig. 2).

(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. 4.

(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. 2).

4. MAINTENANCE PHILOSOPHY

4.01 Maintenance of the half-duplex, 150-word per minute data station should be in accordance with the flow chart shown in Fig. 5. This flow chart is recommended for an organized trouble investigation with a minimum amount of time spent in locating the cause of the customer trouble report.

4.02 When a trouble report is dispatched, inquire whether a remote loop-back test of DAS 820B5 has been performed by the serving test center (STC). If the remote loop-back test has been performed, and the results were satisfactory, but the customer still reports trouble, replace the DAS 820B5 and 806C1 as described in 4.05. (This action is prescribed as a remedy for the small percentage of exceptional troubles which might not be detected through loop-back tests). If a remote loop-back test has not been performed, depress the MAKE BUSY key and request that the STC perform the test.

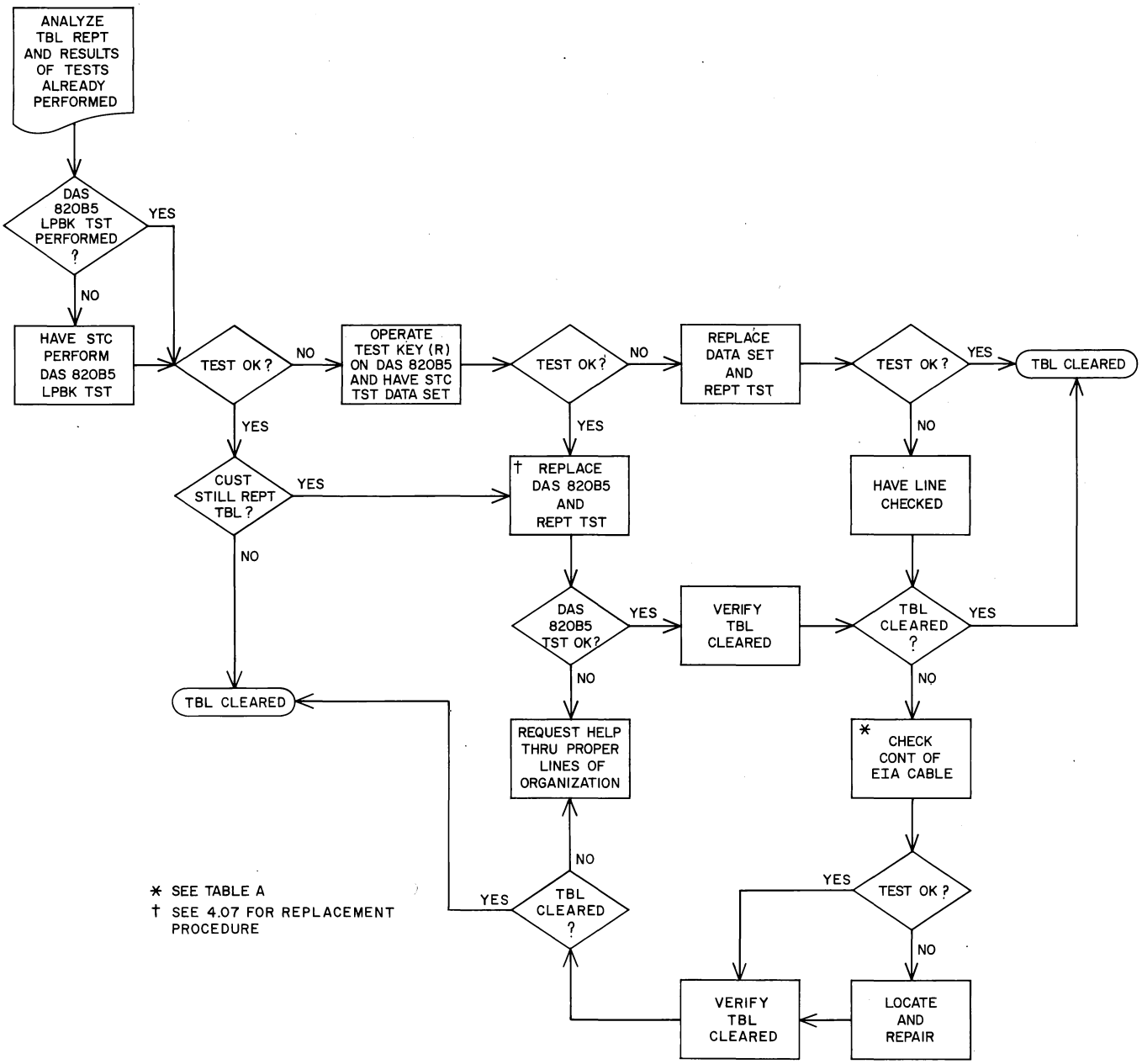

Fig. 5—Flow Chart—Maintenance Test Procedures

The MAKE BUSY lamp should light. If it does not, check the fuse in the Data Auxiliary Set 806C1.

4.03 Assuming that the results of the loop-back test indicate a failure, a manual loop-back test of the data set should be performed to isolate the trouble to either the data set, DAS 820B5 or 806C1. If the data set fails the loop-back test, replace the data set with one known to be good and repeat the loop-back test. The replacement data set should pass the test which indicates that the replaced data set caused the trouble report. If the replacement data set fails the test, the line must be checked. Should the line fail the test requirements given in the section entitled Private Line Data Circuits—Voice Bandwidth Circuits For Miscellaneous Data—Overall Tests and Requirements (314-410-500), the line facilities should be replaced

in order to restore customer service with a minimum amount of outage.

4.04 If the data set passes the loop-back test, the trouble must be in DAS 820B5 and 806C1.

4.05 ***Replacement procedures for DAS 820B5 and 806C1 are:***

- Disconnect the external power cord.
- Disconnect the external data cable from connector J1.
- Disconnect the line (tip and ring) connections from TS A.
- Remove the screws at each end of the mounting plate which secure DAS 820B5 and 806C1 in the cabinet.
- Remove the defective unit from the cabinet and replace with a spare unit.
- Replace screws to secure the replacement unit in the cabinet.
- Reconnect the line, data cable, and power cord.

To reduce the time required, it is suggested that CP AR37 of DAS 820B5, that is to be replaced, should be installed in the replacing DAS 820B5.

If DAS 820B5 fails again on the repeated test, CP AR37 of the replacing DAS 820B5 will have to be encoded for the station. See Part 3 of this section for the encoding procedure.

4.06 The station should now pass the remote loop-back test after the replacement.

Continuity Test of EIA Cable to Terminal

4.07 If the DAS 820B5 and 806C1 were replaced, and the trouble is not cleared, a continuity test of the EIA signal and control cable to the terminal should be made.

Turn the power switch to the OFF position and/or remove power cord from the ac receptacle before performing this test.

(1) Gain access to DAS 820B5 and 806C1 (refer to 2.01).

(2) Disconnect the EIA cable from connector J1 of DAS 806C1 and the corresponding connector at the terminal end. ***This removal should be done only after notification of the customer.***

(3) Using a KS-14510 L1 volt-ohm-milliammeter, perform continuity test shown in Table A.

TABLE A

EIA CABLE BETWEEN CUSTOMER TERMINAL AND DATA AUXILIARY SET 806C1

TERMINAL END PINS	EIA CIRCUIT DESIGNATION	EIA CIRCUIT DESCRIPTION	TO AND FROM CONTROLLER	DATA STATION DESIGNATION	J1 END PINS
1	AA	Protective Ground	—	PG	1
2	BA	Transmitted Data	To	TD	2
3	BB	Received Data	From	RD	3
6	CC	Data Set Ready	From	DSR	6
7	AB	Signal Ground	—	SG	7
4	CA	Request to Send Regular	To	RTSR	4
5	CB	Clear to Send	From	CTS	5
11	—	Request to Send Priority	To	RTSP	11
20	CD	Data Terminal Ready	To	DTR	20
22	CE	Call Indicator	From	CI	22
23	—	Service Message Indicator	From	SMI	23

CUSTOMER VERIFICATION

4.08 When the preceding tests have been completed and the test requirements specified in 1.03 have been met, suggest to the customer that he verify that the service is satisfactory. Request the customer to transmit a message or have a message sent to him to verify that the service is satisfactory. If the customer has no messages to transmit or receive, consider the data station satisfactory for service.

5. DATA AUXILIARY SET 806C1

LAMPS

5.01 ***To replace lamps:***

(1) Remove 77A key cap.

(2) Using a 553A tool (lamp extractor), remove lamp.

(3) Replace J2 lamp.

(4) Replace key cap.

6. DATA SET REPLACEMENT

6.01 ***The replacement of the data set is as follows:***

(1) Obtain access to DAS 820B5 (Part 2).

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

(3) Grasp handle on Data Set 108A-type and pull straight out.

7. ADJUSTMENT OF DATA SET 108A-TYPE

Verify that proper options are installed in the replacement Data Set 108A-type.

7.01 Disconnect incoming data line from the T and R terminals on TS A of DAS 820B5.

7.02 Connect terminals + and - of Portable Station Test Set TTS-28 to TP 1 and TP 2 of the data set (Fig. 6). Set FUNCTION switch of TTS-28 to DBM 900Ω TERM 0 position.

7.03 Turn the power switch to the ON position.

7.04 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.

7.05 Connect the incoming data line to the T and R terminals on TS A located on DAS 820B5.

7.06 Perform installation tests on the replacement data set in accordance with Section 598-046-510.

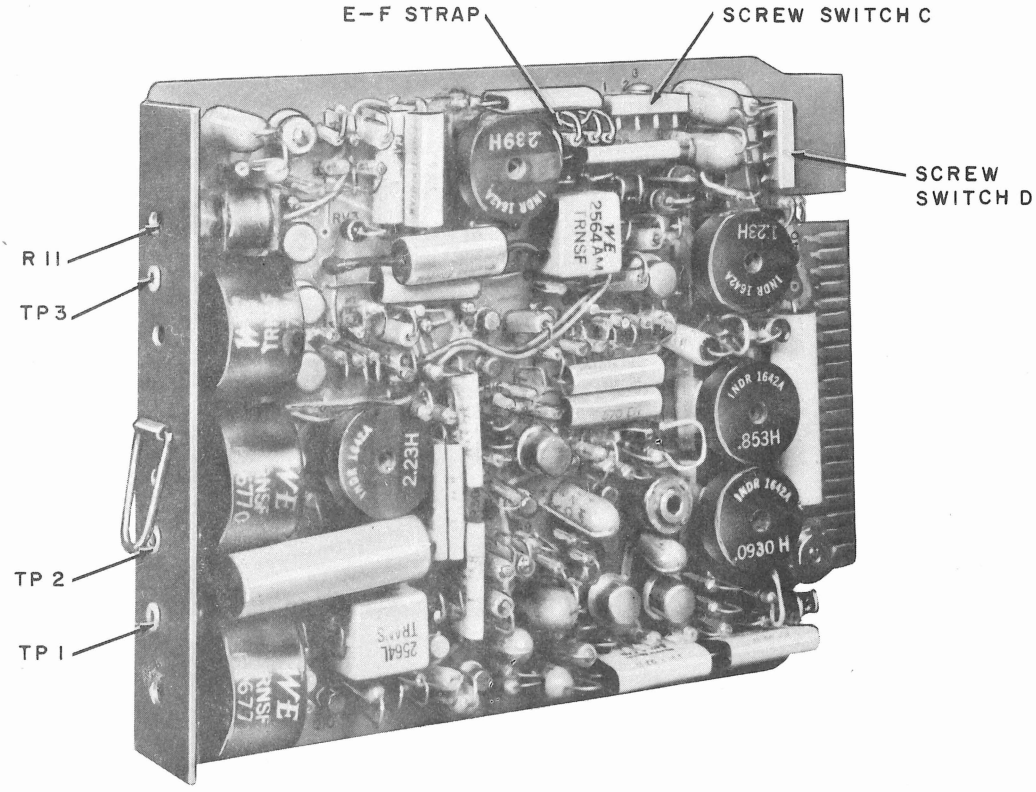

Fig. 6—Data Set 108A-Type—Location of Test Points and Screw Switches