

DATA SET 109A-TYPE
SINGLE PRIVATE LINE STATION
USING DATA AUXILIARY SET 820D-TYPE
MAINTENANCE PROCEDURES

1. GENERAL

1.01 This section covers the maintenance procedures for the data set 109A-type single private line station using a data auxiliary set (DAS) 820D-type. ♦The data set 109A-type is rated manufacture discontinued (MD).♦ In this section, the data set 109A-type mounted in a DAS 820D-type is referred to as a data station, exclusive of any Bell System- or customer-provided equipment (CPE) also used in the installation.

1.02 This section is reissued to:

- (a) Include notice that the data set 109A-type is rated MD.
- (b) Provide information pertaining to the use of DAS 830C with the DAS 820D-type to provide a 3- or 4- wire, 20-mA neutral current customer interface.

1.03 The data set 109A-type and associated DAS 820D-type do not require routine or periodic maintenance.

1.04 The data station is maintained by replacing the data set, circuit pack, or data auxiliary set if they prove defective.

1.05 This section provides maintenance procedure information on the data set 109A-type, DAS 820D-type, and AR17 circuit pack (CP). It does not contain information on the associated terminal equipment ♦or DAS 830C (if used).♦ For information on the terminal equipment, consult the customer or, in the case of a Bell System teletypewriter (TTY), consult the applicable field maintenance practice (FMP) for the type of TTY being used. ♦For information on the DAS 830C, consult the section entitled Data Auxiliary Set 830C-Type, Description, Installation, and Test Procedures (598-083-103).♦

1.06 When a data set or other unit is replaced, the defective unit should be carefully packed (in original type cartons if available) and returned to the distributing house. A tag describing the trouble should be affixed to the unit.

1.07 Data set 109A-type single private line station may be arranged for station-to-station or station-to-hub arrangement (Fig. 1). The suggested maintenance procedures outlined in this section are provided to cover both of the arrangements.

Note: In some cases the hub will be at the serving test center (STC). All references to the hub also apply to the STC.

2. MAINTENANCE AIDS

2.01 The following maintenance aids are provided for the performance of the maintenance procedures outlined below. These maintenance aids consist of reference sections and schematic diagrams, a list of special tools required, and troubleshooting charts.

2.02 The following sections and schematic diagrams may be required when making a maintenance visit to a data station.

SECTION	TITLE
591-024-100	Data Set 109A-Type—Identification
591-024-101	Data Set 109A-Type—Single Private Line Station—Using Data Auxiliary Set 820D-Type—Description and Operation
591-024-201	Data Set 109A-Type—Single Private Line Station—Using Data Auxiliary Set 820D-Type—Installation and Connection

NOTICE

Not for use or disclosure outside the
Bell System except under written agreement

SECTION 591-024-301

SECTION	TITLE
591-024-301	Data Set 109A-Type—Single Private Line Station—Using Data Auxiliary Set 820D-Type—Maintenance Procedures
591-024-501	Data Set 109A-Type—Single Private Line Station—Using Data Auxiliary Set 820D-Type—Test Procedures
598-058-100	Data Auxiliary Set 820D-Type—Identification
598-083-103	◆Data Auxiliary Set 820C-Type—Description, Installation and Test Procedures◆
SD- & CD-3D015-01	Data Set 109A-Type
SD- & CD-3D031-01	Data Auxiliary Sets 820D- and 820E-Type
SD- & CD-1D250-01	◆Data Auxiliary Sets 830A, 830B, and 830C-Types◆

2.03 The following equipment and test cords will be required to perform the maintenance procedures indicated in the following text and in the section entitled Data Set 109A-Type—Single Private Line Station—Using Data Auxiliary Set 820D-Type—Test Procedures (591-024-501).

(a) Test equipment

- 911A Data Test Set (DTS)
- KS-20538-L1 volt-ohm-milliammeter or equivalent
- 901B-L3 DTS (cover of 901B DTS)
- Data set 109A-type
- AR17 CP.

(b) EIA interface test cords

- W1AD cord, 4 feet 7 inches long, equipped with one 35 cord tip and one Mueller No. 27 test clip with insulator, black

- W1BB cord, 2 feet long, equipped with one KS-19531-L2 clip and one Mueller No. 30 test clip with one 32 Mueller insulator, black.

(c) Current interface test cords

- 2W6A cord, 10 feet long, equipped with one 310 plug and two alligator clip ends.
- 2W7A cord, 9 feet 6 inches long, equipped with one 347-type plug and two alligator clip ends.

2.04 The test procedures specified in this section are contained in Section 591-024-501 and are listed as follows:

- Power Supply Test
- Loop Resistance Test
- Circuit Pack Exchange Procedure
- End-to-End Test.

2.05 A suggested sequence of maintenance is given in the trouble locating procedure and maintenance flowchart in Fig. 2. The blocks of the flowchart are numbered to provide easy reference. Although the numbers are for reference only and do not indicate the sequence of operation, they correspond with the steps of the associated step procedure.

3. MAINTENANCE PROCEDURES

3.01 In order to perform the maintenance tests outlined in Section 591-024-501, it is necessary to gain access to the data station. Table A describes the actions for removal and replacement of each unit in order to perform maintenance.

4. MAINTENANCE ACTIVITIES

4.01 The following procedures are suggested steps to be followed in isolating a data station trouble. In these procedures and in Fig. 2, the term "station" refers to data transmission equipment. The term "line" refers to the telephone pair or loop connected to station data sets. The following procedures do not attempt to isolate trouble in

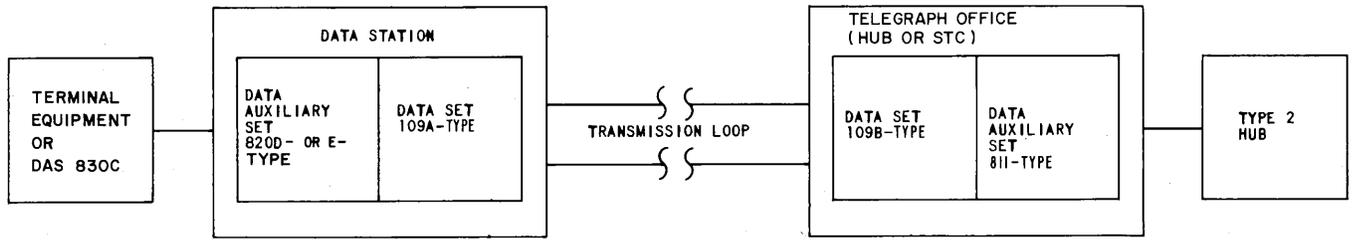
the equipment associated with the data sets since this is covered by other BSPs and FMPs.

arrangements are defined as a local data station (DAS 820D-type e/w data set 109A-type) connected to a data set 109-type at the hub or distant data station, respectively.

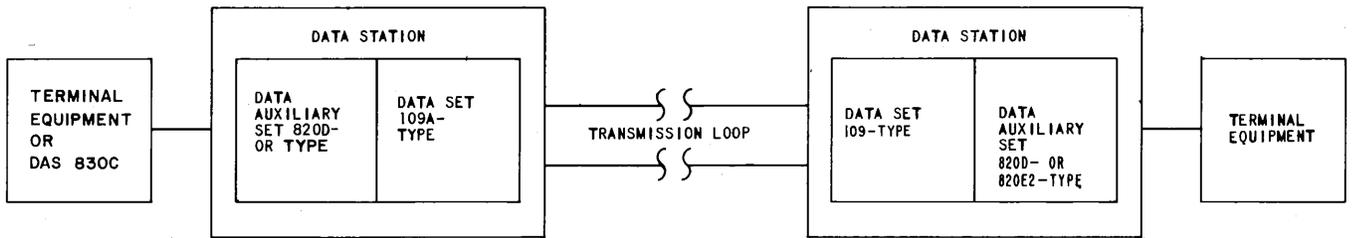
4.02 For purposes of this section, both the station-to-hub and station-to-station

STEP	PROCEDURE
1	<p>The initial step is to make an inspection of the local data station and perform the following checks:</p> <ul style="list-style-type: none"> (a) Verify that the local data station is properly powered. (b) Check all connections between the data station and the terminal equipment or DAS 830C. (c) If DAS 830C is used, check all connections between the DAS 830C and the terminal equipment (see 598-083-103). (d) Check to see that there are no shorted, bent, or broken pins on the connectors (J1 or J2) for the data set or AR17 CP. (e) Perform power supply test per Section 591-024-501.
2	If trouble is caused by a condition in Step 1, proceed to Step 3. If <i>not</i> , proceed to Step 4.
3	Make necessary repairs and/or replacement of equipment or cables.
4	Attempt normal operation of the data station.
	<p>Note: Both the local and remote stations must be connected when attempting operation of the data station.</p>
5	If the station is operating properly, proceed to Step 19. If the data station is <i>not</i> operating properly, proceed to Step 6.
6	With the aid of the remote station attendant or STC, perform the transmission loop resistance test outlined in Section 591-024-501.
7	If the transmission loop has shorted or the loop resistance has changed, proceed to Step 8. If the transmission loop has <i>not</i> changed, proceed to Step 9.
8	Readjust the line pads, repair or replace the transmission loop, and proceed to Step 17.
9	Perform the circuit pack exchange procedure outlined in Section 591-024-501.
10	If the data sets are good and the trouble cannot be attributed to either the data stations (local or remote), the STC, or the transmission loop, proceed to Step 11 (if DAS 830C is provided) or Step 14 (if DAS 830C is <i>not</i> provided).
11	If the DAS 830C is used, perform the tests given in Section 598-083-103.

STEP	PROCEDURE
12	◆If the DAS 830C tests are good, proceed to Step 14.◆
13	If the trouble clears after replacing data sets ◆or DAS 830C (if used)◆ , proceed to Step 17.
14	If the terminal equipment is a CPE, instruct the customer to ensure proper operation of the CPE; if the terminal is a Bell System TTY, ensure proper operation per appropriate FMP.
15	If the terminal equipment is not operational, proceed to Step 16. If the terminal equipment is operational, proceed to Step 17.
16	Instruct the customer to repair or replace the CPE or perform TTY maintenance procedures per appropriate FMP.
17	Perform the station-to-station or station-to-hub end-to-end test, as required, in Section 591-024-501.
18	If the end-to-end test verifies proper operation of the system, proceed to Step 19. If the end-to-end test does <i>not</i> verify proper operation of the system, proceed to Step 20.
19	Return the system to proper operational status.
20	If none of the preceding maintenance procedures indicates the source of the trouble, request aid through the proper channels.



A. STATION-TO-HUB OPERATION



B. STATION-TO-STATION OPERATION

Fig. 1—System Block Diagram

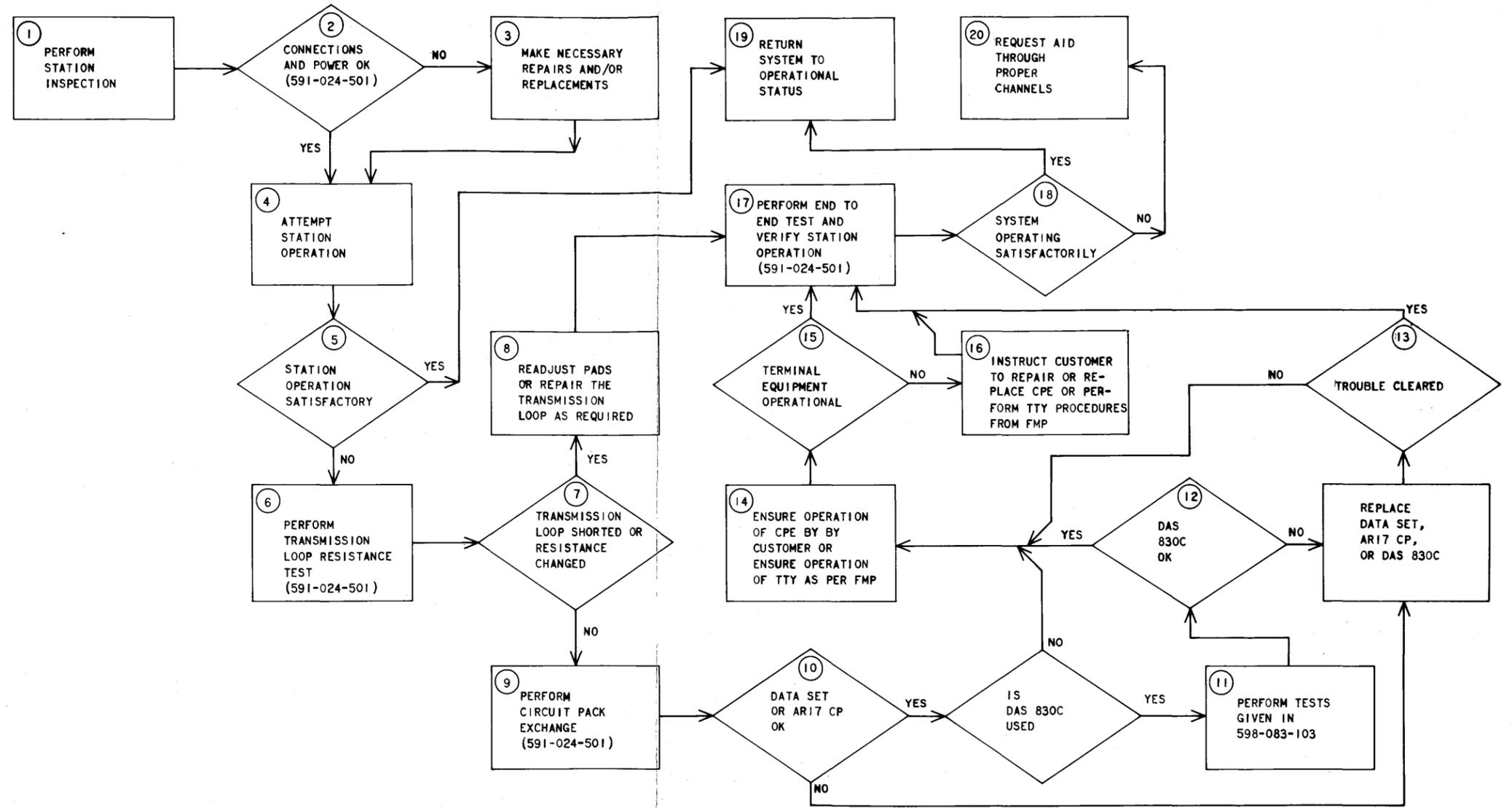


Fig. 2—Trouble Locating Procedure and Maintenance Flowchart for Data Set 109A-Type Single Private Line Arrangement

TABLE A
REMOVAL AND REPLACEMENT PROCEDURES

UNIT	REMOVAL	REPLACEMENT
DAS 820D-L1 Cover	<p>(1) Remove power from DAS.</p> <p>(2) Loosen, but do not remove, the four screws located around the base of the DAS.</p> <p>(3) Carefully lift the plastic cover from the base.</p>	<p>(1) Position retaining wedges of the cover screws in such a manner as to receive cover lugs.</p> <p>(2) Place plastic cover on DAS and carefully position cover lugs directly over cover screws. Place cover in position and tighten screws.</p> <p><i>Note:</i> Care must be taken to avoid stripping the plastic threads when tightening the cover screws.</p> <p>(3) Apply power to the DAS.</p>
Data Set 109A-Type and AR17 Circuit Pack	<p>(1) Remove cover from DAS 820D-L1.</p> <p><i>Note:</i> DAS 820D-L1A is not supplied with a plastic cover.</p> <p>(2) Use 748A tool to extract the data set 109A-type.</p> <p>(3) Use pull ring to extract AR17 circuit pack from DAS.</p>	<p>(1) When data set and/or AR17 CP is replaced, verify that proper options are installed in replacing data set and/or AR17 CP and that power has been removed from the DAS.</p> <p>(2) Position replacement AR17 CP or data set and firmly push it into locking position.</p> <p><i>Note:</i> Data set and AR17 CP are keyed to prevent positioning in the wrong slots.</p> <p>(3) Replace cover on DAS 820D-L1.</p>
DAS 820D1 DAS 820D-L1	<p>(1) Remove power cord and business machine mounting cord from J3.</p> <p>(2) Remove cover from DAS 820D-L1.</p> <p>(3) Tag, or identify otherwise, and remove tip and ring connections from terminals 1 and 2 of TSA for DAS 820D1. (Terminals 1 and 2 of TB1 for DAS 820D-L1)</p>	<p>(1) Position the new unit (DAS 820D1 or DAS 820D-L1) within range of the business machine cord.</p> <p>(2) Reconnect tagged leads to terminals 1 and 2 of appropriate terminal board.</p> <p>(3) Make certain that AR17 CP and the data set are properly secured, that proper options are installed and that cover is replaced.</p> <p>(4) Connect business machine cord to 25-pin connector J3 and power cord to power receptacle on DAS.</p>

TABLE A (Cont)

REMOVAL AND REPLACEMENT PROCEDURES

UNIT	REMOVAL	REPLACEMENT
DAS 820D2 and DAS 820D-L1A	<p>(1) Remove the chad container on the 35 Automatic Send and Receive (ASR) Teletypewriter (TTY) by sliding it to the left, raising the right side, and sliding it to the right.</p> <p>(2) Operate the two pushbutton fasteners located at the top of the lower compartment panel.</p> <p>(3) Depress the spring clip underneath the keyboard and pivot the lower compartment panel to the floor.</p> <p>(4) Disengage the kneewell panel from pivot screws and remove.</p> <p><i>Note:</i> The procedure for a 35 receiver-only TTY is the same as the 35 ASR TTY, with the exception that only one pushbutton fastener is used to hold the lower compartment panel, and no chad container is provided.</p> <p>(5) Remove interface cord from J3 and power cord.</p> <p>(6) Tag, or identify otherwise, and remove R and T connections from TSA (TB1 for DAS 820D-L1A). DAS 820D2 may now be removed.</p> <p>(7) To remove DAS 820D-L1A, loosen spring clips holding DAS 820D-L1A to the 180 backboard, and lift DAS 820D-L1A out of the cabinet.</p>	<p>(1) Position DAS 820D2 or DAS 820D-L1A on 180A backboard and tighten spring clips.</p> <p>(2) Connect tagged leads to terminals 1 and 2 of TSA on DAS 820D2.</p> <p>(3) Connect tagged leads of telephone line to terminals 1 and 2 of TB1 on DAS 820D-L1A.</p> <p>(4) Verify that AR17 CP and the data set are properly secured and proper options installed.</p> <p>(5) Connect interface cord to 25-pin connector J3 and power cord to power receptacle on DAS.</p> <p>(6) Replace kneewell panel by reversing removal procedure.</p>