# DATA SETS 108D- AND E-TYPE MULTIPLE PRIVATE LINE STATION ARRANGEMENT USING 28A1 DATA MOUNTING AND 27B1 DATA UNIT MAINTENANCE

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## 1. GENERAL

**1.01** This section describes the maintenance procedures to be followed for data sets 108D- and E-type. Information is limited to the multiple data set arrangement using the 28A1 data mounting and the 27B1 data unit. In this section, data sets 108D- and E-type will be referred to as data sets 108D and E.

**1.02** Data sets 108D and E, 28A1 data mounting, and 27B1 data unit require no routine maintenance after the installation test and adjustments have been made.

**1.03** Care should be exercised when handling and transporting the data sets, data mountings, and data units. If possible, use the original cartons to store, transport, or ship these units.

**1.04** If maintenance spares are stocked, verify that they are checked and ready for immediate installation. When replacing a data set or data unit, ensure that the proper options are installed in the replacement.

## 2. MAINTENANCE PROCEDURES

**2.01** Since there is no routine maintenance required for data sets 108D or E, 28A1 data mounting, and 27B1 data unit, maintenance of the multiple private line station arrangement is limited to detection and replacement of defective units. Data set 108D or E multiple private line station arrangement suspected of trouble should be tested as described in Section 591-028-502. Refer to Part 5 for additional reference information if difficult problems are experienced that cannot be solved in this section.

**2.02** A KS-20538-L1 volt-ohm-milliammeter or equivalent is needed to perform some of the troubleshooting procedures which follow. Refer to Section 591-028-502 for a complete list of tests and test equipment available. A 748A tool or equivalent is also needed and is normally supplied with the 28A1 data mounting.

## 3. REMOVAL AND REPLACEMENT PROCEDURE

### A. Data Set 108D or E

**3.01** ***Removal***

(1) Gain access to data set as required.

(2) Remove locking strip, if provided.

(3) Remove the data set by using the 748A extracting tool. (In some cases, the locking strip is the extracting tool.)

**3.02** ***Replacement***

(1) Verify that proper options are installed in replacing data set.

(2) Position replacing data set in proper position and firmly push it into the nest until the data set faceplate is even with the edge of the nest.

(3) Replace locking strip, if provided.

(4) Verify proper send and receive levels as indicated on the circuit layout record card. See Section 591-028-202 for send and receive level adjustments.

(5) Restore station as required.

**B. 27B1 Data Unit**


***Removal of the 27B1 data unit will require a customer release on the working data circuits associated with the 27B1 data unit to be removed.***

**3.03** ***Removal***

(1) Gain access to 27B1 data unit as required.

(2) Remove P1 of 27B1 data unit from J1 of the 28A1 data mounting.

(3) Remove P2 of 27B1 data unit from J2 of the 28A1 data mounting.

(4) Tag or otherwise identify the customer-provided cables and then remove customer-provided cables from J1 through J8 of the 27B1 data unit.

**3.04** ***Replacement***

(1) Verify that proper options have been installed in replacing 27B1 data unit.

(2) Mount 27B1 data unit (on back of 28A1 data mounting or in cabinet as required).

(3) Plug P1 of 27B1 data unit into J1 of 28A1 data mounting.

(4) Plug P2 of 27B1 data unit into J2 of 28A1 data mounting.

(5) Plug customer-provided cables into J1 through J8 as removed.

(6) Restore station as required.

**C. 28A1 Data Mounting**


***Removal of the 28A1 data mounting will require a customer release on the working data circuits associated with the 28A1 data mounting to be removed.***

**3.05** ***Removal***

(1) Gain access to 28A1 data mounting as required.

(2) Remove all data sets from 28A1 data mounting.

(3) Remove J3 (A25B-type) connector cable from P3 of 28A1 data mounting.

(4) Remove P1 of 27B1 data unit from J1 of 28A1 data mounting.

(5) Remove P2 of 27B1 data unit from J2 of 28A1 data mounting.

(6) Remove 28A1 data mounting from 23- or 25-inch mounting rack arrangement.

**3.06** ***Replacement***

(1) Mount 28A1 data mounting in 23- or 25-inch mounting rack arrangement.

(2) Insert data sets in ***odd*** slots of 28A1 data mounting as required.

(3) Plug J3 of 27B1 data unit into P3 of 28A1 data mounting.

(4) Plug P1 of 27B1 data unit into J1 of 28A1 data mounting.

(5) Plug P2 of 27B1 data unit into J2 of 28A1 data mounting.

(6) Restore station as required.

## 4. TROUBLESHOOTING PROCEDURES

**4.01** Troubleshooting of data sets 108D and E should be in accordance with the flowchart shown in Fig. 1. The flowchart is a recommended

procedure to follow when investigating a customer trouble report. The information blocks in the flowchart are numbered to provide easy reference. The diamond represents a decision to be made, while the circles provide a means of referring to another numbered information block in the flowchart.

**4.02** In some cases, the serving test center (STC) will perform a remote loop-back test to determine if the trouble exists in the station or terminal equipment. Access by the STC simplifies the troubleshooting procedure shown in Fig. 1 by isolating trouble to station or terminal equipment as given in 4.15.

**4.03** The maintenance philosophy for station-to-station circuits without an STC is based on the data circuit not being option-wired for carrier squelch on carrier fail. In the event that the distant station is option-wired for carrier squelch on carrier fail, it may be necessary to dispatch a telephone employee to the distant station and remove the option prior to performing the maintenance procedure unless the trouble is obviously at the other station.

> ***Note:*** The number in parentheses ( ) refers to the ***numbered block*** in the flowchart.

### A. Serving Test Center Not Available

**4.04** When a Telco employee is dispatched to the station (1), check to see if all data sets are out of service. If all data sets are out of service, check station equipment (go to 4.07). If all data sets are ***not*** out of service, start checking the terminal equipment.

#### Terminal Equipment

**4.05** If all data sets are ***not*** out of service, determine if terminal is customer-provided or Bell System-provided. (If Bell System, go to 4.06.) When the terminal is customer-provided, request the customer to verify the operation of the terminal equipment (5). If the CPT is ***not*** operational, request the customer to repair or replace the terminal (6). Perform an operational test (29). When the CPT is operational and trouble still exists, go to block (8) and start checking station equipment per 4.10.

**4.06** If the terminal is Bell System equipment, check operation of the equipment (7). If the terminal is ***not*** operational, repair or replace the terminal (11) and verify its operation. In the event the trouble has cleared, perform an operational test (29) and then restore the station to normal service (30). If the trouble has ***not*** cleared, verify operation of Bell System terminal (7). If the Bell System terminal is operational, go to block (8) and start checking station equipment (4.10).

#### Station Equipment

**4.07** In the event all data sets are out of service, check that ac power is available and proper connections are made (2). If there is no ac power, locate trouble and restore power (3). If trouble has cleared and all data sets are back in service, perform an operational test (29) and restore station to normal condition (30). If ac power is available and trouble exists, perform power supply measurement (4) per 591-028-502.

**4.08** If power supply meets requirements (4) per 591-028-502, go to block (8) and 4.10. In the event the power supply does ***not*** meet requirements, systematically remove and/or replace data sets (9) to ensure that there is no short. When trouble is cleared by substitution (replacing defective data set), verify operation of station (29) and then restore the station to normal service (30).

**4.09** If substitution of the data sets (9) does ***not*** clear trouble, repair or replace KS-20575 rectifier (10) and perform operational test (29) to determine if trouble has been cleared. If trouble has ***not*** cleared, go to block (4).

**4.10** Gain access to data set and observe CF lamp indication (8). If CF lamp is lighted, the trouble is in the data set, loop, and/or far station (12). (When CF lamp is unlighted, go to 4.12.) Perform a far-end carrier test (13) per 591-028-502. If the test does ***not*** indicate a carrier frequency, perform a loop-loss measurement (16) per 591-028-502. (If test indicates presence of carrier, go to 4.11.) If loop loss is ***not*** within limits, turn back the loop for repair (18). When loop loss is within limits, verify proper data set receive level (19) per 591-028-202. Replace data set if loss cannot be compensated (20) and go to block (29) to verify operation of station.

**4.11** After performing far-end carrier test per block (13) and test indicates presence of correct unmodulated carrier frequency, replace data set (14) since loop and far station are functional.

If unmodulated carrier frequency is ***not*** correct, have far end put in test mode (15). The trouble is at far station if CF lamp is unlighted (17).

**4.12** After gaining access to data set (8) (4.10) and CF lamp indication is unlighted, short circuit receive loop momentarily and observe CF lamp indication (21). If CF lamp remains extinguished, replace data set (25). In the event the CF lamp lights after momentarily short-circuiting the receive loop (21), perform near-end carrier test (22). (If test indicates carrier, go to 4.13.) If the test indicates no carrier frequency, verify proper data set transmit level adjustment (23) per 591-028-202. If the level is ***not*** acceptable, replace the data set (25) and perform an operational test (29). If the level is acceptable, perform carrier shift test (24).

**4.13** If carrier shift test (24) per 591-028-502 indicates carrier does ***not*** shift, replace data set (25) and perform an operational test (29). If carrier shifts, perform loop-back test (26). (In the event the loop-back test (26) is unsatisfactory, go to 4.14.) If the loop-back test (26) is satisfactory, perform an operational test (29). If trouble has cleared, return station to normal condition (30). When trouble has ***not*** cleared (station not operational), request aid through proper channels (31) by use of data technical support plan.

**4.14** After performing loop-back test (26) and the test is unsatisfactory, perform a distortion measurement test (27) per 591-028-502. If distortion measurement test is satisfactory, perform an operational test (29). In the event the distortion measurement test is unsatisfactory, perform a transhybrid loss measurement (28) per 591-028-502. If the loss is ***not*** within limits, request help through proper channels (31) by use of data technical support plan. When the loss is within limits, perform an operational test (29).

### B. Serving Test Center Available

**4.15** A remote loop-back test should be performed prior to dispatching a Telco employee to determine if the trouble exists in the station or terminal equipment.

#### Terminal Equipment

**4.16** When the station meets the remote loop-back test requirements, the trouble should be in the terminal equipment. If the terminal is CPT, the STC may request the customer to verify the operation of the terminal equipment (5). When the CPT is ***not*** operational, the STC requests the customer to repair or replace the terminal (6).

#### Station Equipment

**4.17** In the event the station does ***not*** meet the remote loop-back test requirements, a Telco employee is dispatched to the station (1) and performs the investigation procedures as outlined in 4.07 through 4.14.

## 5. REFERENCES

**5.01** The following documents pertain to data sets 108D and E multiple private line station arrangement:

SD- & CD-73060-01 Data Set 108D

SD- & CD-1D229-01 Data Set 108E

SD- & CD-1D176-01 Data Systems Station 28-Type Data Mounting

SD- & CD-1D183-01 Data Systems 27-Type Data Unit

| SECTION | TITLE |
|---|---|
| 590-100-114 | 27-Type Data Units, Identification |
| 590-102-124 | 28A1 Data Mounting, Identification |
| 591-028-100 | Data Sets 108D- and 108E-Type Used in Station Applications, Description |
| 591-028-102 | Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit, Description |
| 591-028-202 | Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit, Installation and Connections |
| 591-028-502 | Data Sets 108D- and E-Type, Multiple Private Line Station Arrangement Using 28A1 Data Mounting and 27B1 Data Unit, Test Procedures. |

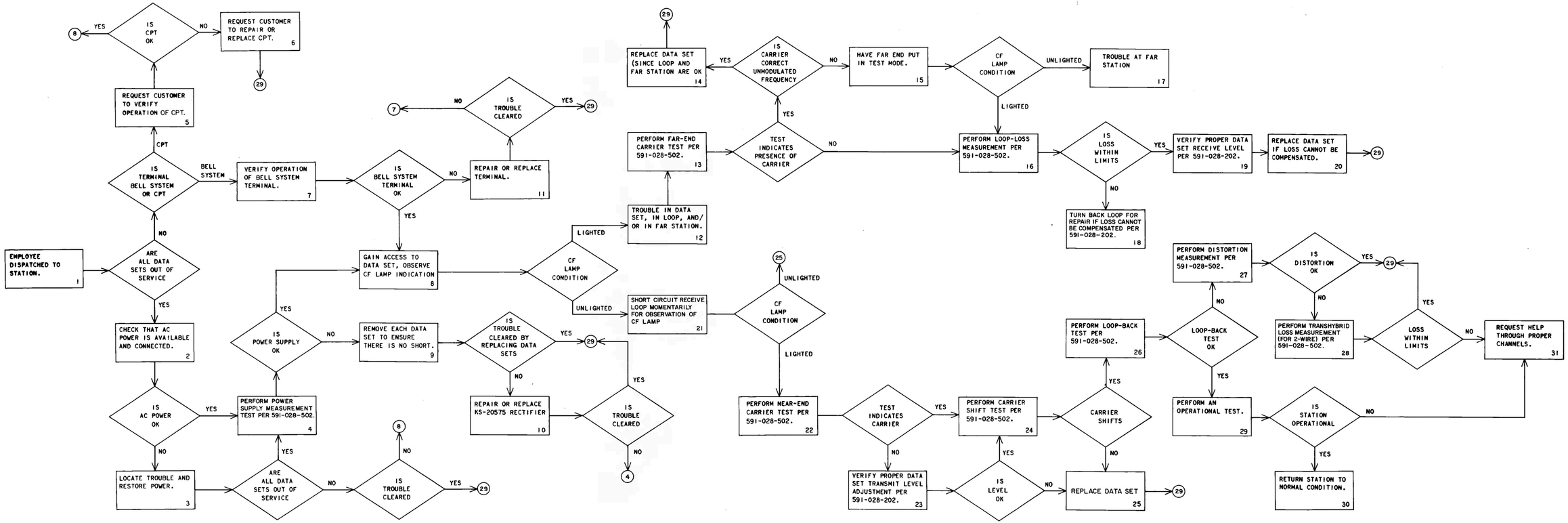


**Fig. 1—Troubleshooting Flowchart—108D and E Multiple Private Line Station Arrangement**