DATA SET 109H-TYPE USED IN A DATA LINE CONCENTRATOR SYSTEM MAINTENANCE

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1. GENERAL

1.01 This section provides the maintenance procedures to be followed when using a Data Set 109H-type (Fig. 1) as part of a Data Line Concentrator System.

1.02 The Data Set 109H-type does not require routine or periodic maintenance; however, these maintenance procedures are used to aid in locating and clearing a trouble condition.

1.03 The data station is maintained by replacing the data set and/or associated components (Fig. 1) if they prove to be defective. This section provides information on the Data Set 109H-type only. It does not contain information on any associated business machine or customer-provided terminal (CPT).

1.04 When a data set 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 experienced should be affixed to the data set.

2. MAINTENANCE AIDS

2.01 No special tool or equipment is required to perform the following maintenance checks or activities. A KS-14510-L5 volt-ohm-milliammeter or equivalent can be used to make the checks or adjustments called for in these maintenance procedures.

2.02 The maintenance procedures used to isolate a trouble condition to a specific location or piece of equipment in a Data Line Concentrator System are contained in the section entitled 10-Type Data Line Concentrator System—Maintenance Procedures (591-810-300). The data line concentrator maintenance procedures are generally performed first in an attempt to isolate the trouble condition and avoid an unnecessary dispatch to the station. When the preceding concentrator tests have not been made, it should be verified that the station is actually in trouble before dispatching a telephone company employee to the station.

2.03 Before starting the maintenance procedures outlined in this section, a visual inspection of the data set should be made. This check should include all cords and connections.

A copy of the section entitled Data Set 109H-Type—Used in a Data Line Concentrator System—Installation and Connections (591-037-201) will be required to check station installation.

2.04 Determine the options required at this station, and using the installation BSP, check the connections required to install these options. All cords and connectors including the cord from the CPT should be checked to verify that they are not broken, damaged, or otherwise defective. After verifying that the data set is properly installed and undamaged, proceed with the trouble clearing procedures outlined in the following parts of this section.

3. MAINTENANCE PROCEDURES

Cover Removal

3.01 In order to remove the cover from Data Set 109, proceed as follows.

(1) Remove the power from the data set by unplugging the 2245 transformer power cord.

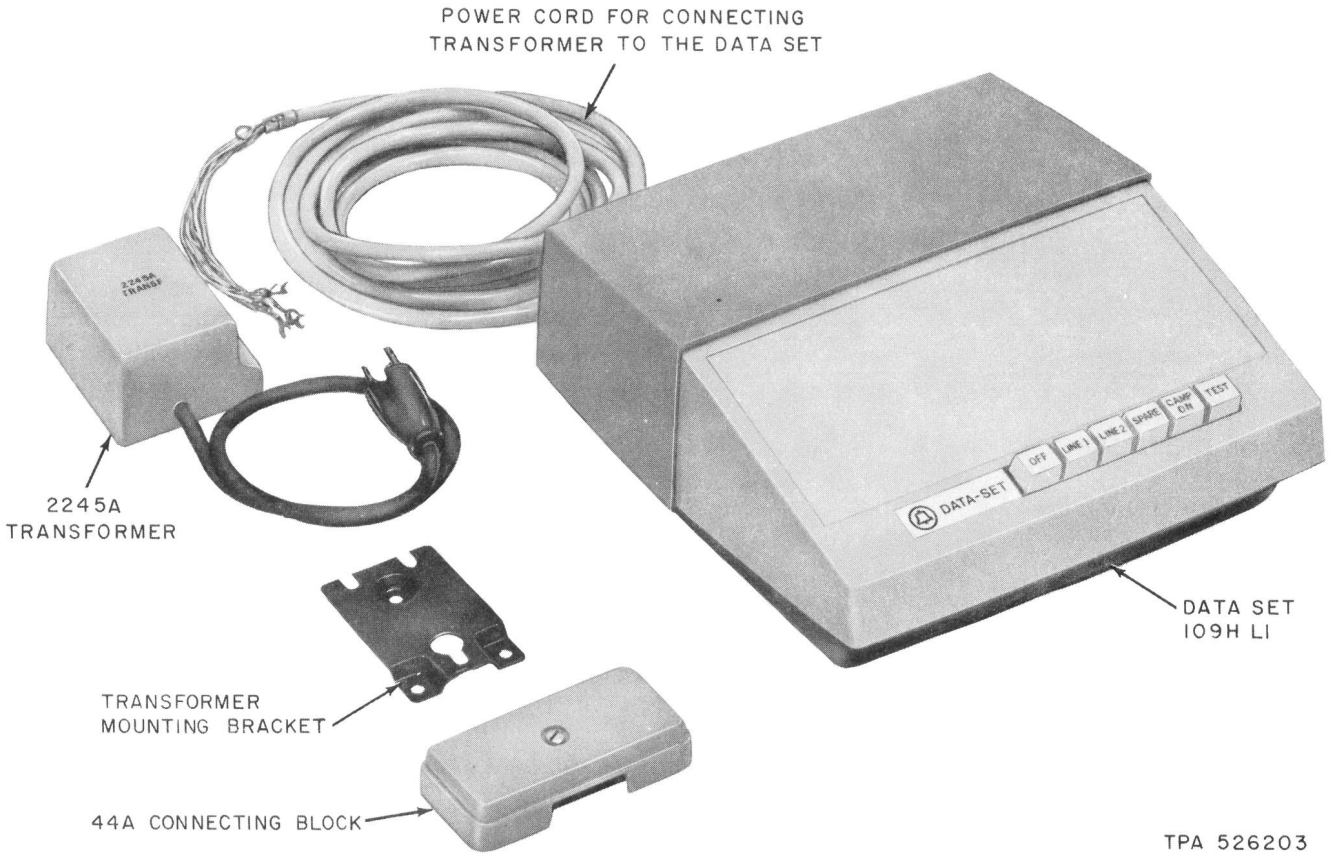

Fig. 1—Data Set 109H-L1

(2) Loosen the six captive cover retaining screws. The locations of the cover retaining screws are shown by Fig. 2.

(3) Remove the cover by lifting it up and off the data set basepan.

Note: The cover removal procedure is identical for all data set models including data sets equipped with a dial assembly.

Cover Replacement

3.02 To replace the cover on the data set, proceed as follows.

(1) Make sure the cover retaining screws are loose so they will accept the cover brackets.

(2) Lower the cover into place over the basepan so that the cover brackets engage the cover retaining screws. Check the positioning of the cover to make sure it is not binding on the data set keys or dial when so equipped.

(3) Tighten the cover retaining screws (Fig. 2) to lock the cover in place.

4. TROUBLESHOOTING PROCEDURES

4.01 A suggested sequence of maintenance is given by the flowchart in Fig. 3. 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 to the step numbers of the associated step-procedure.

4.02 The data set maintenance procedure should be performed by a properly trained and equipped craft employee of the local telephone company.

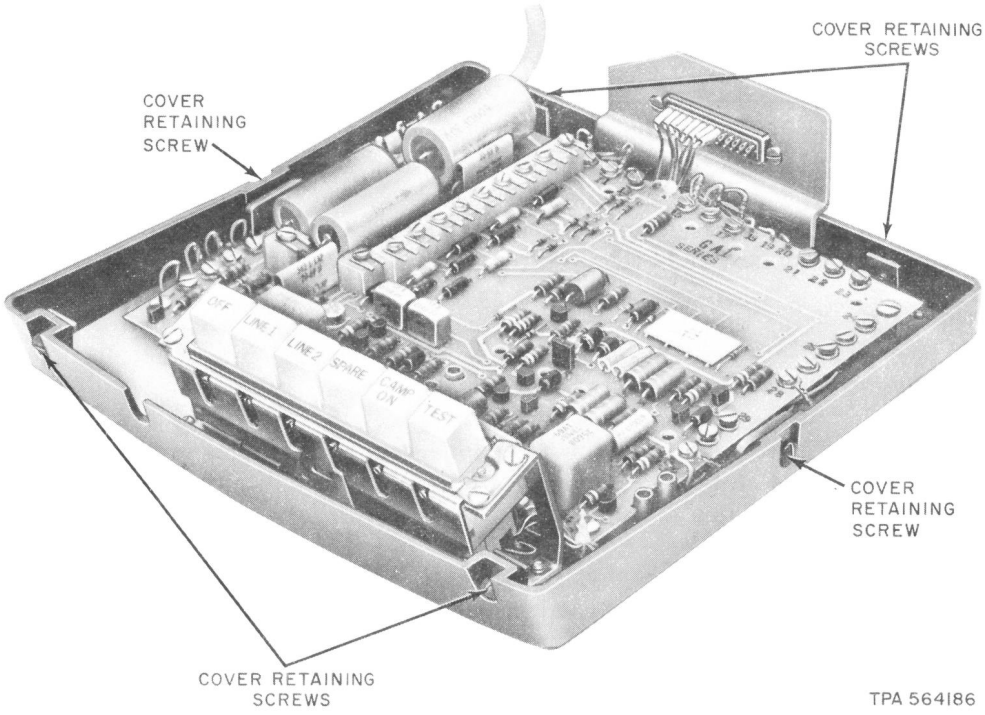

Fig. 2—Data Set 109H-Type—Cover Removed Showing Cover Retaining Screws

4.03 In the following step-procedure and Fig. 3, the term "station" refers to the data transmission equipment connected to the line side of the concentrator. The term "line" refers to the telephone pair or loop connected between the station data set and the concentrator, or in the case of remote service, between the station data set and the hub or transmission facility data set. The block diagram shown by Fig. 4 supplements the maintenance flowchart and text.

4.04 The following procedure does not attempt to isolate trouble in the concentrator, the trunk side of the concentrator, or equipment associated with the trunk side of the concentrator. Refer to the applicable BSPs for information on the other parts of this system.

STEP	PROCEDURE
1	When trouble is experienced with a Data Line Concentrator System, it is reported to the telephone company and a trouble report is filled out from the information supplied by the customer.
2	After a trouble report is received it should be analyzed to determine, if possible, the cause or location of the trouble condition.
3	If an analysis of the trouble report indicates the trouble condition could not be caused by the station on the line side of the concentrator (line station), proceed to Step 4. When the cause of the trouble seems to be at the line station or cannot be pinpointed from the trouble report, omit Step 4 and proceed to Step 5.

STEP	PROCEDURE
4	When analysis of the trouble report indicates the trouble is located at the concentrator or other specific location instead of the line station, a telephone company craft employee will have to be dispatched to the probable trouble location to clear the trouble condition. When the trouble condition is located and corrected, this completes the trouble clearing procedures given in this practice, and Steps 5 through 21 can be omitted.
5	When analysis of the trouble report indicates the trouble is located at the line station or in cases where the location of the trouble cannot be pinpointed, a telephone craft employee will have to be dispatched to the station.
6	Upon arrival at the station, the telephone company employee should perform a visual inspection of the station to determine if there is any physical damage or obvious reason for the reported trouble.
7	When there has been some physical damage to the station (eg, broken cord or connectors, etc) proceed to Step 8. If a visual inspection of the station does not locate anything that could cause the trouble condition, proceed to Step 9.
8	Make the necessary repairs and/or replacements to restore the station to service. Proceed to Step 22 and perform an operational test of the station to verify that station is operative and the trouble condition has been cleared.
9	Attempt normal operation of the station.
10	When the station operates satisfactorily, proceed to Step 11. When trouble occurs during the attempt to operate the station, proceed to Step 12.
11	When the station operates properly, the trouble condition may have "come clear." In order to verify the station operation, proceed to Step 22 and perform the indicated operational test.
12	Measure the line resistance to determine the line resistance value and verify the line is not shorted. Refer to the section entitled Data Set 109H—Used in a Data Line Concentrator System—Test Procedures (591-037-501) for information on making this test.
13	When the line is not shorted, compare the measured resistance value with the line order or line circuit card. If the resistance has not changed appreciably, proceed to Step 15. If the line is shorted or there has been a large change in the line resistance, proceed to Step 14.
14	When the line is shorted, it must be repaired or replaced. If the resistance value of the line has changed, determine if the data set pads can be adjusted to compensate for this change. When the data set pads can be changed to give an acceptable total resistance value, the data set pad should be reset and the station retested to determine if the trouble condition has been cleared. When the data set pads cannot be adjusted to provide an acceptable resistance, the line will have to be repaired or replaced. Upon completion of the repair or replacement, proceed to Step 22 and test the operation of the station to verify the trouble condition has been cleared.

STEP	PROCEDURE
	Note: For information on setting the data set pads, refer to the section entitled Data Set 109H—Used in a Data Line Concentrator System—Installation and Connections (591-037-201).
15	When the previous tests indicate that the line is satisfactory and the station will not connect, perform a line current test or voltage test to determine if the data set is supplying an acceptable request-for-service signal. When making this test, refer to the section entitled Data Set 109H—Used in a Data Line Concentrator System—Test Procedures (591-037-501).
16	When the line current test indicates the data station is supplying an acceptable connection signal to the concentrator, proceed to Step 17. When the connection signal is unacceptable, proceed to Step 21.
17	When the line current is acceptable, the station is not the cause of the trouble experienced with connecting to the concentrator. In this case, the trouble is referred to the concentrator. This completes the trouble clearing procedure given in this practice and the remaining steps of this procedure can be omitted. ***Note:*** Step 18 refers to performance tests such as checking the slicing level and loop-back testing of the data set. An alternate method of locating a possible trouble is to perform an end-to-end distortion test as given in the section entitled Data Set 109H—Used in a Data Line Concentrator System—Test Procedures (591-037-501). An acceptable distortion test or slicing level test indicates that the data set is functioning properly and the CPT should be suspected of causing the trouble condition (See Step 20). When testing indicates high distortion, the data set should be suspected of causing the trouble (See Step 21).
18	Performance of the data set can be verified by checking the ability of the data set to detect and recognize marking and spacing signals. The data set may also be tested from the far end by simultaneously depressing the LINE 1 and TEST keys. This loops data through the data set and back to the far end. In order to perform either the slicing level test or loop around test, refer to the applicable sections of the practice entitled Data Set 109H-Type—Used in a Data Line Concentrator System—Test Procedures (591-037-501).
19	When testing indicates the data set is operating properly, proceed to Step 20. If the data set is causing the trouble condition, proceed to Step 21.
20	Inform the customer of the results of the preceding test and request that the CPT operation be checked and verified. After checking and verifying that the CPT is operative, an overall system operational test should be made to verify that the trouble condition has been cleared.
21	A known good data set can be substituted if the data set is suspected of causing the trouble. When a replacement data set is substituted, it must be equipped with all the required options and features provided by the data set that is being replaced. Refer to the section entitled Data Set 109H—Used in a Data Line Concentrator System—Installation and Connections (591-037-201) for information on providing the required features and options. Refer to the applicable parts of this section for information on gaining access, removal, and reinstallation of the data set. When a known good data set is substituted, the line to the concentrator should be rechecked.

STEP	PROCEDURE
22	Perform an operational test of the data station to verify that the trouble condition has been cleared before returning the station to service. Refer to the section entitled Data Set 109H—Used in a Data Line Concentrator System—Test Procedures (591-037-501). *Note:* If the trouble condition has not been located and eliminated by the preceding Step-Procedure, request help through proper lines of authority to clear the trouble condition. The other components of the Data Line Concentrator System should be suspected of causing the trouble condition.

4.05 After completion of the maintenance procedures and verification that the trouble condition has been eliminated, return the station to service.

5. REFERENCES

5.01 For additional information on the concentrator system refer to the following BSPs and the additional practices listed therein.

(a) 10-Type Data Line Concentrator System (DLCS)—Description (591-810-100)

(b) 10-Type Data Line Concentrator System (DLCS)—Maintenance (591-810-300)

(c) 10-Type Data Line Concentrator (591-811-Series).

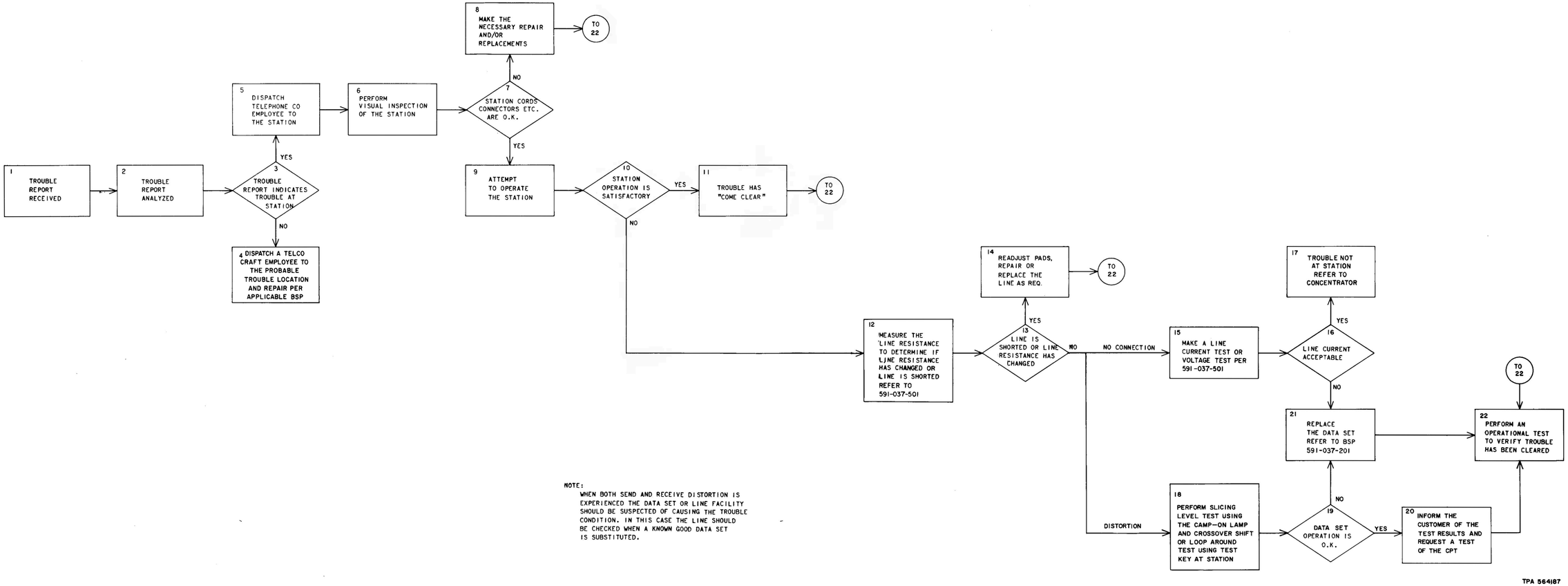

Fig. 3—Trouble Locating Procedure and Maintenance Flowchart

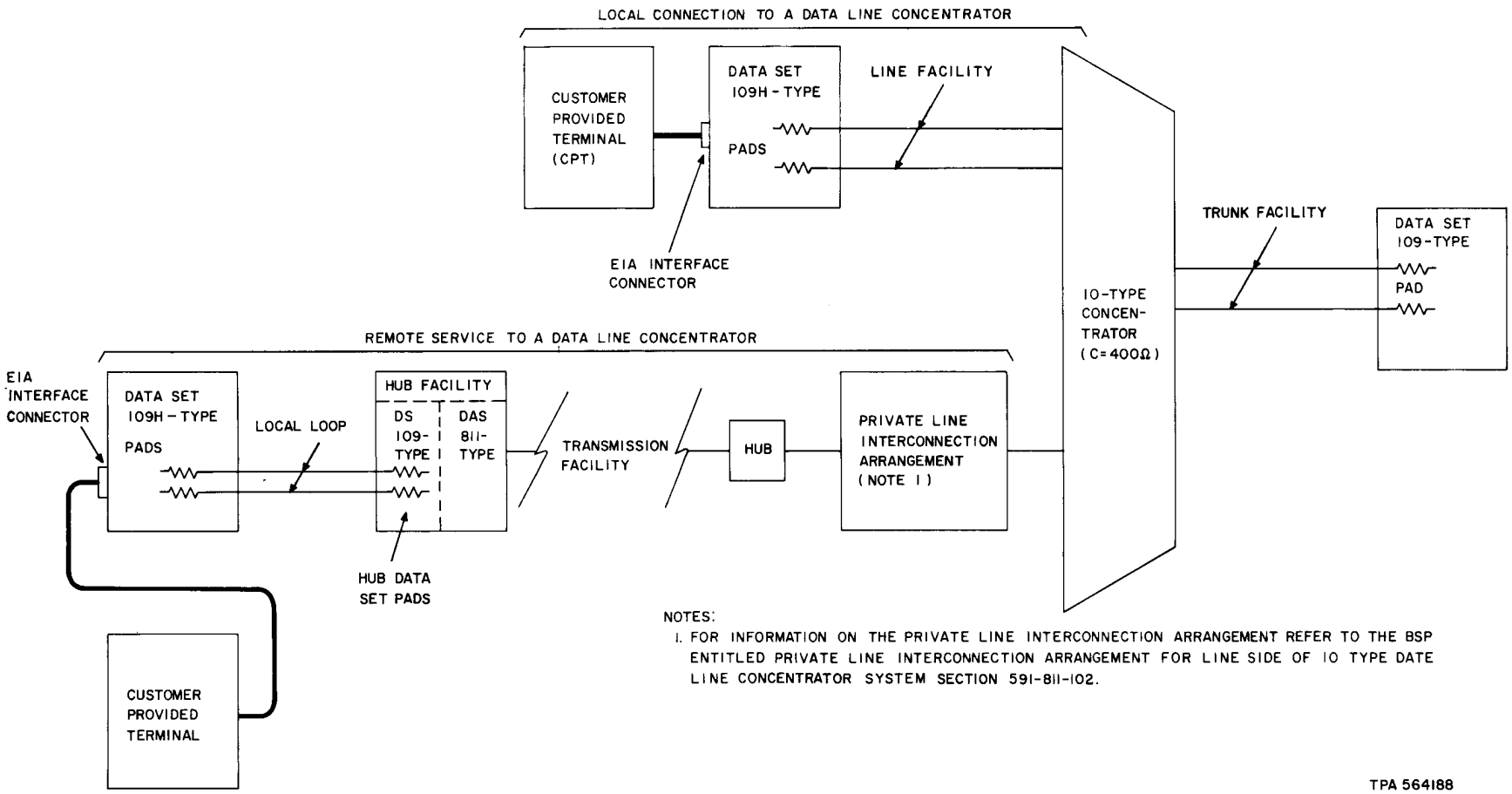

Fig. 4—Data Line Concentrator System—Block Diagram