PRIVATE LINE DATA SETS 2024, 2048, AND 2096
TEST PROCEDURES
STAND ALONE - MULTIPLE
"DATAPHONE®" II SERVICE

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1. GENERAL

1.01 This section contains information concerning procedures to be used when testing the private line version of data sets (DSs) 2024, 2048, and 2096 on an initial installation or during a maintenance visit.

1.02 Whenever this section is reissued, the reason for reissue will be contained in this paragraph.

1.03 Test circuitry built into the data sets continuously monitor the condition (health) of the data set and permits the test listed in Table A to be performed. As indicated in Table A certain tests only apply to control data set. For a description of the tests and the operation required to perform them refer to Section 592-040-120.

1.04 Before proceeding with the tests, verify that the private line facility meets the requirements specified in Section 314-410-500 and 314-410-105 (for DS 2096 only). The channel interface unit [data auxiliary set (DAS) 829] is considered part of the private line facility.

1.05 It should be kept in mind that the DATAPHONE® II service provides central-site network control. DATAPHONE II service provides continuous system monitoring and a continuous indication of the status of all the data sets and quality of the transmission facilities. These features change the installation and maintenance testing philosophy from that of other data systems.

1.06 The DATAPHONE II service provides extensive diagnostics that can rapidly identify the nature of a failure. These features provide a means for specific troubleshooting should the need arise. The maintenance part contains flowcharts that are the recommended approach.

1.07 The L1 data set (formerly called the data set circuit pack) will be the primary replacement unit for correcting field failures.

1.08 The technician will first attempt to correct stand-alone data set problems by changing out the L1 data set. The stand-alone data set plus the housing (the L1/2 data set) will not be changed-out unless the trouble cannot be corrected by changing out the L1 data set. No attempt should be made to repair the data sets in the field.

1.09 The data mounting should be returned only if it is defective. The defective data set and data mounting should be tagged to indicate the nature of the trouble and shipped in the protective packages for DATAPHONE II service data sets to a Western Electric Company distributing house for repair. Refer to working station plan in Section 666-617-104 for more details.

2. INSTALLATION TEST

2.01 This part provides the sequence in which tests are to be performed following installation of the data set. This test sequence provides a method of verifying that the installaton is satisfactory.

2.02 The self-test features of the data set are used for all installation testing—external test equipment is not required. The recommended test sequence is summarized in Fig. 1.

2.03 Each data set installed will be tested on a stand-alone basis. After the options are set according to the service order, the data set is installed and tested. An end-to-end data test with another distant data set should be performed whenever distant end data sets are available.

A. Stand Alone

2.04 Verify the following:

(1) Data set local address is set (back of mounting).

(2) Battery switch is turned ON (behind front panel).

(3) Power is applied.

(4) The data set is optioned according to the service order.

TABLE A

TEST MENU

CONTROL DATA SET DISPLAY	TRIBUTARY DATA SET DISPLAY	TEST NAME	REMARKS
AUTO	—	Automatic Network Test	Timed
MT	MT	Modem Test	Timed
DT	DT*	Digital Test	Timed
EE	EE*	End-to-End Test	Timed
TRMT*	TRMT*	Transmit Loss Test	Timed
RCV*	RCV*	Receive Loss Test	Timed
1004*	1004*	1004 Hz Tone Test	Nontimed
LL*	LL*	Local Loopback	Nontimed
DL*	DL*	Digital Loopback	Nontimed
C-MT*	C-MT*	Continuous Modem Test	Nontimed
ST*	ST*	Self Test	Nontimed
RSL	RSL	Receive Signal Level	Parameter
RSQ	RSQ	Receive Signal Quality	Parameter
LAMP	LAMP	Lamp Test	Hardware
ABRT	ABRT	Abort all Test	

* Only displayed in maintenance mode.

Note: Refer to Section 592-040-120 for description and operation required to perform various tests.

2.05 Perform lamp test:

Requirements: All light emitting diodes (LED) and all display segments light.

2.06 Perform modem test:

Requirements: Display indicates PASS.

2.07 Verify the following:

- That all cables are connected.
- Network address and local address is set (use front panel display).
- Green status light on data set is lighted. If the status light is red refer to Fig. 2.

2.08 Perform end-to-end test:

If there is a data set at the other end, perform an end-to-end test with the other data set. If this is a control data set, the results of the test will be indicated on the data set display. If this is a tributary data set, the data set must first enter the maintenance mode and then perform the end-to-end test for the results to be displayed.

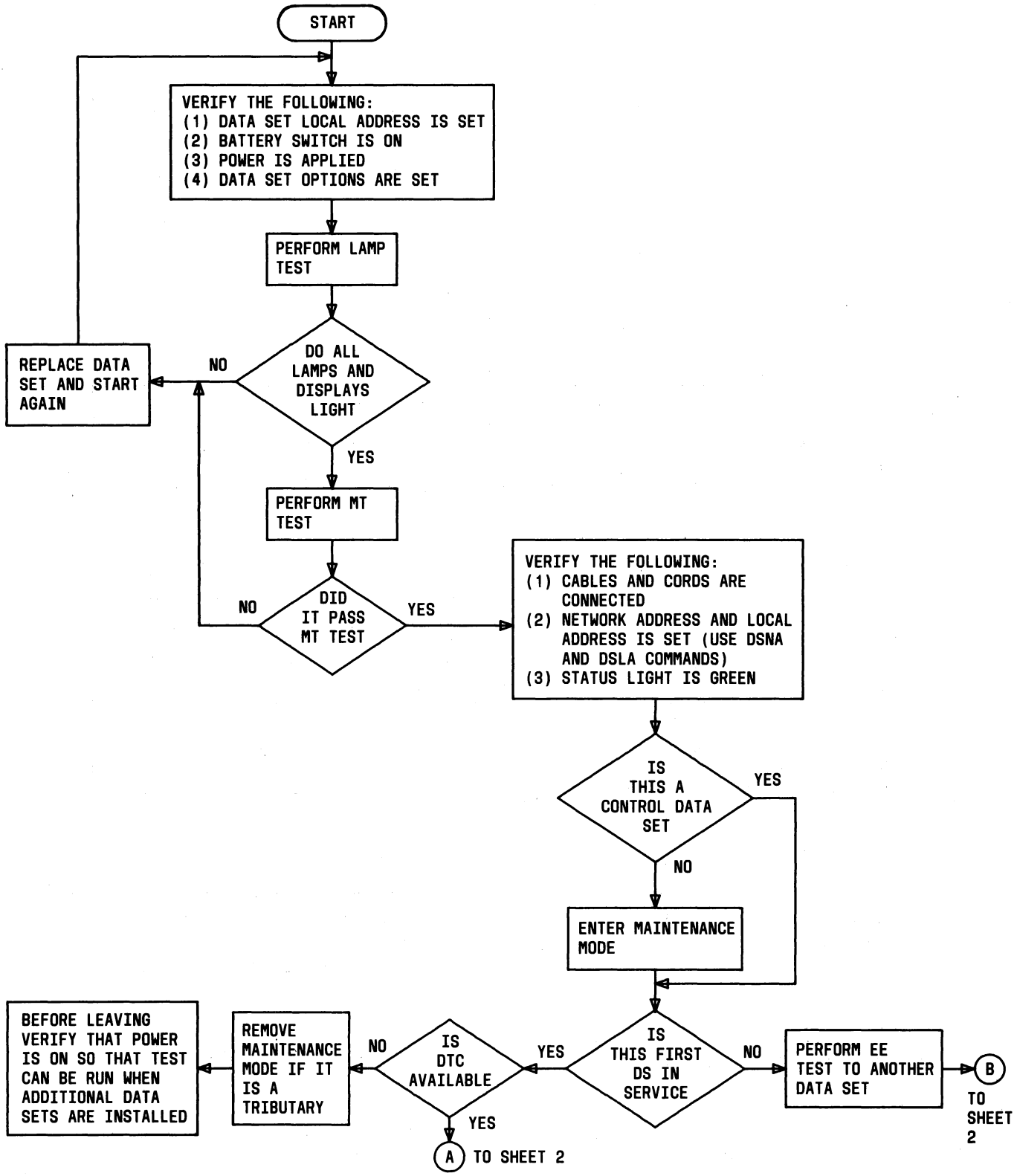


Fig. 1—Installation Test Sequence (Sheet 1 of 2)

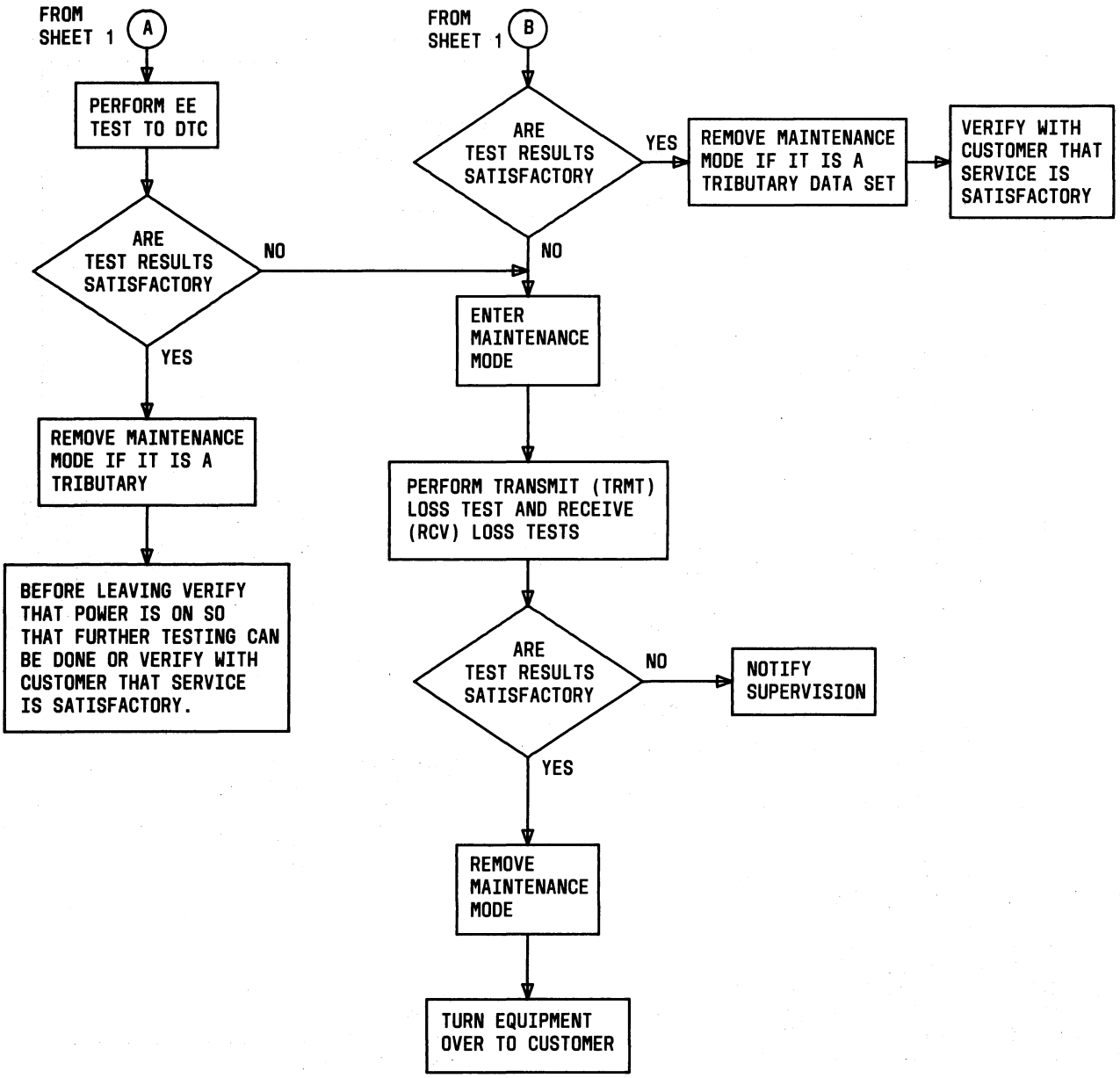


Fig. 1—Installation Test Sequence (Sheet 2 of 2)

Requirement:

Display reads briefly:

- EEXX (Network address of remote data set)
- XXEI (Number of errors inbound)
- XXEO (Number of errors outbound)

Satisfactory Result: No more than one error each way.

2.09 If this is the first data set in the service, establish a connection with the serving data test center (DTC) and follow instructions.

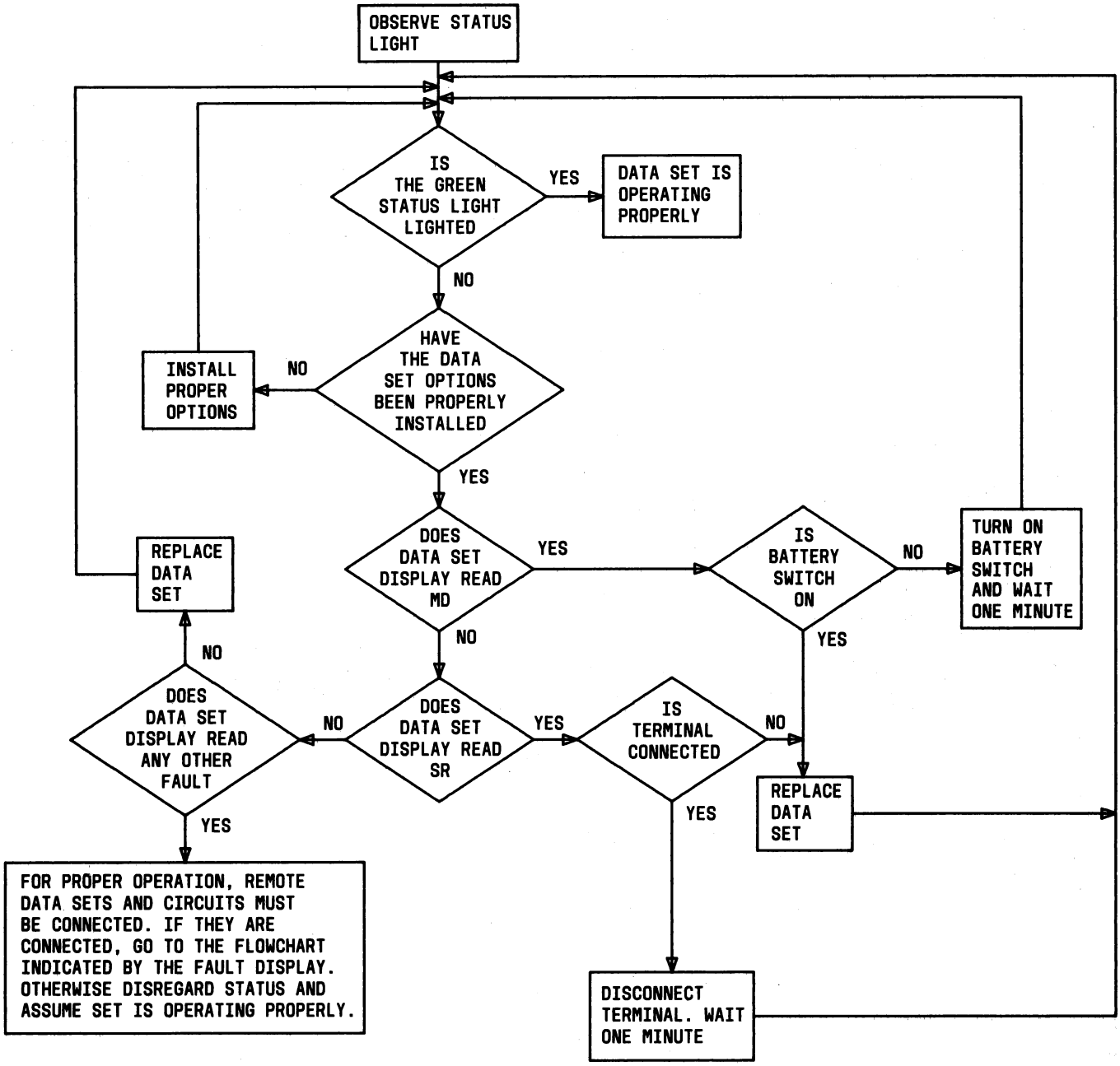


Fig. 2—Status Light Indicator Test

2.10 If this is the first data set in the service and connection to an DTC is not possible, leave the data set connected and power turned on so that it can be tested when another data set is added to the service.

2.11 Perform transmit loss test and receive loss test:

These tests are only available to data sets in the maintenance mode. A DATAPHONE II

service data set is needed at the far end to perform the test. The results of these tests will display "XXDB" with XX indicating the result as -XX dBm.

Satisfactory Result: -12 dBm to -20 dBm for replacement and -15 dBm to -17 dBm for new installation.

B. Multiple

2.12 The installation test for a multiple is the same as for a stand alone with the following differences:

(1) The network address must be set into each data set.

(2) Check the cabinet filter.

(3) If data station served from is separate source than customer-provided equipment (CPE), check for ground noise. Refer to Paragraph 4, SUPPLEMENTARY TEST, for description of this test.

(4) Check local address on each mounting.

3. MAINTENANCE

3.01 No routine maintenance is required; however, when the data set is replaced or the data station is visited the filters associated with the blower should be cleaned and/or replaced as necessary.

3.02 There are various test features built into the DATAPHONE II service data set. The use of these test features are determined to a great extent to what type of system the data set is operating in (point-to-point, multipoint, or extended service, etc) and secondly, in what capacity the data set is operating (control or tributary).

3.03 The DATAPHONE II service diagnostic system can isolate a trouble to any data set or connecting facility. The real time diagnostic system faults will be displayed on the data set front panel. The real time diagnostic system faults displayed on data sets are shown on Table B.

3 04 When investigating a trouble report, refer to Fig. 3 through 19 as an aid in isolating trouble. The figure numbers, titles, and page numbers are listed in the contents of this section.

4. SUPPLEMENTARY TEST

4.01 The supplementary test specifies a special purpose test that is not usually required during installation and maintenance.

Note: This test is available when RS-449 interface on data set is connected to RS-232 interface on CPE using a KS-21253,L1 adapter.

A. Ground Noise Test

4.02 If the data set and the CPE are not connected to the same ground, errors may be caused by a potential difference between data set ground and CPE ground. To detect the presence of noise potentials, a test should be made using the 6-type impulse counter. This counter is used to count the number of impulse noise peaks during a measured time period. The counter registers only the peaks that exceed a preset amplitude and that are separated by about 150 ms or more.

4.03 The following test equipment is required:

1—6H impulse counter ***or*** equivalent

1—914-type DTS ***or*** interface test adapter (cover of 901B DTS)

1—2W6A test cord (310 plug on one end, alligator clips connected to tip and ring on the other end).

Note: Refer to Section 103-620-101 for information on the 6H impulse counter. If the 6H impulse counter is not available, a 6A impulse counter may be used. Refer to Section 103-620-100 for information on the 6A impulse counter.

4.04 In this test, the impulse counter is connected between the grounds of the data set and the CPE. The impulse counter registers when potential differences of sufficient amplitude have developed between the separated grounds. The 914-type DTS is used to gain access to the ground interface leads. It is assumed that protective ground from the CPE appears at the customer interface.

TABLE B

REAL TIME DIAGNOSTIC SYSTEM FAULTS DISPLAY

CONTROL DATA SET DISPLAY (NOTE 1)	TRIBUTARY DATA SET DISPLAY	DEFINITION	COMMENTS
MDXX, MD	MD	Modem	Failure in data set.
FAXX, FA	FA	Facility	Receive signal level or receive signal quality out of specifications.
SRXX	SR	Streaming	Streaming options timed out.
NRXX	—	No Response	No response on diagnostic channel after several tries.
PRTX (Note 2)	—	Port 1, 2, 3, 4	DS 2096A to indicate a failure on extended network off Port X. DS 2024A and 2048A control data set to indicate a failure in extended network beyond tributary data set.

Note 1: XX following the acronym appearing at the control data set denotes the network address of tributary data set involved.

Note 2: X following the PRT acronym on a DS 2096A display indicates the port address 1, 2, 3, or 4. X following the PRT acronym on a DS 2024A and 2048A control data set display indicates port address 1 only.

4.05 Perform the test as follows:

(1) Using the interface cables provided with the 914-type DTS, connect the 914-type DTS connector A to the customer connector on the data set, and connect the 914-type DTS connector B to the data set connector on the CPE.

(2) On the 914-type DTS, remove all programming pins from the matrix. Pull up all A and B interface selector switches.

(3) Connect one clip of 2W6A cord to interface selector switch 7A and connect other clip to switch 7B.

(4) Verify that power is applied to data set and CPE.

(5) Insert 310 plug of 2W6A cord into 310 MEAS jack on 6H impulse counter.

(6) Set 6H impulse counter DIAL-MEAS switch to MEAS.

(7) Set 6H impulse counter DBRN dial to 90.

(8) Reset counter on 6H impulse counter to 0.

(9) Set 6H impulse counter MINUTES control to 15. At the end of the 15-minute period, record number of counter indications.

4.06 At the end of both 15-minute periods, there should be no indications on the counter of the 6H impulse counter. If there is an indication on the counter, the data set and CPE grounds must be bonded. At the end of the test, remove all test equipment and restore the data station to pretest condition.

5. REFERENCES

5.01 Additional information concerning the private line data sets is contained in the following Bell System Practices:

SECTION	TITLE
103-620-101	6H and 6HR Impulse Counters (J94006H and J94006HR)—Description, Operation, and Maintenance
107-101-100	914-Type Data Test Sets—Description and Operation
590-102-160	63A-Type Data Mounting—Identification
590-102-161	64A-Type Data Mounting—Identification
592-040-120	Data Set 2024, 2048, and 2096 Private Line—Stand Alone-Multiple Description and Operation
592-040-220	Data Set 2024, 2048, and 2096 Private Line—Stand-Alone-Multiple—Installation and Connections
592-101-100	2100A Data Control Unit—(Diagnostic Console)—Description and Operation—DATAPHONE II Service
592-101-200	2100A Data Control Unit (Diagnostic Console)—Installation and Connections—DATAPHONE II Service
592-101-500	2100A Data Control Unit (Diagnostic Console)—Test Procedures—DATAPHONE II Service
592-102-100	2200A Data Control Unit (Network Controller)—Description and Operation—DATAPHONE II Service
592-102-200	2200A Data Control Unit—(Network Controller)—Installation and Connections—DATAPHONE II Service
592-102-500	2200A Data Control Unit—(Network Controller) Test Procedures—DATAPHONE II Service
660-002-010	Data Test Centers—Maintenance Directory
660-005-011	Office Responsibilities—Special Services
666-513-100	DATAPHONE II Service—Private Line—Remote Test Access—Description and Operation
666-617-104	DATAPHONE II Service—Administrative Procedures
668-301-500	DATAPHONE II Service Test Position—Test Procedure—Data Test Centers
745-009-100	Protective Packaging and Handling of Returned Material

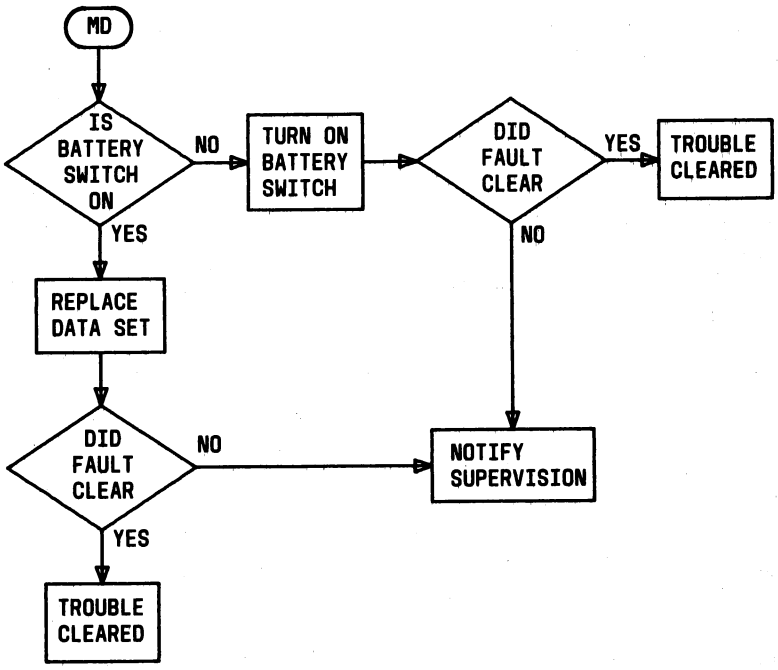


Fig. 3—Display Reads MD at Data Set—Point-to-Point

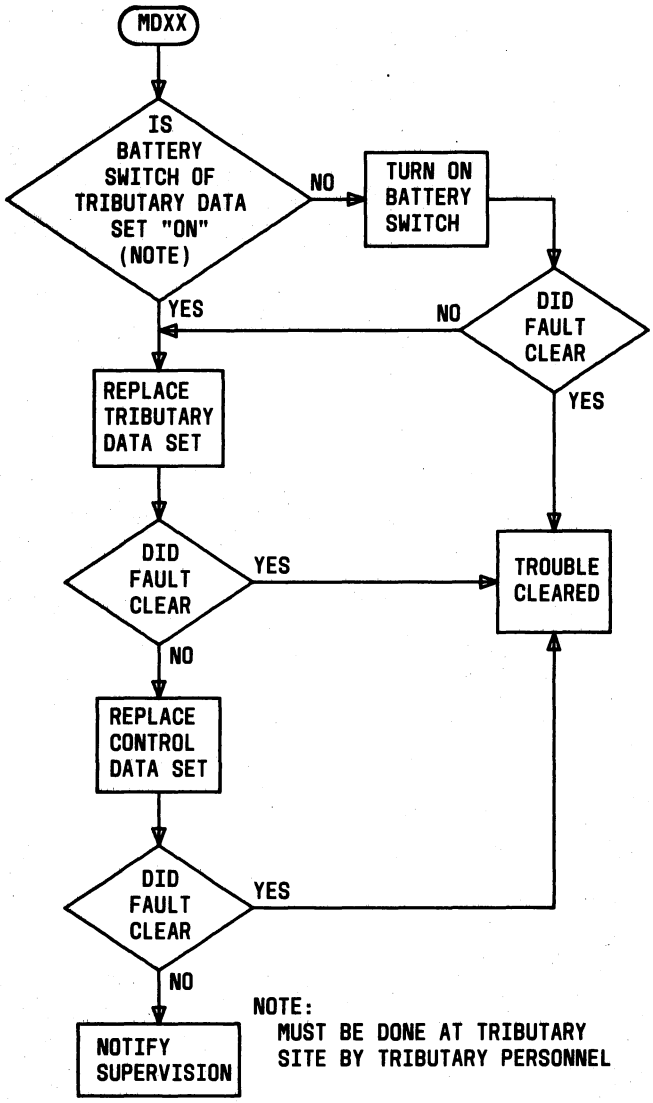


Fig. 4—Display Reads MDXX at Control Data Set—Point-to-Point

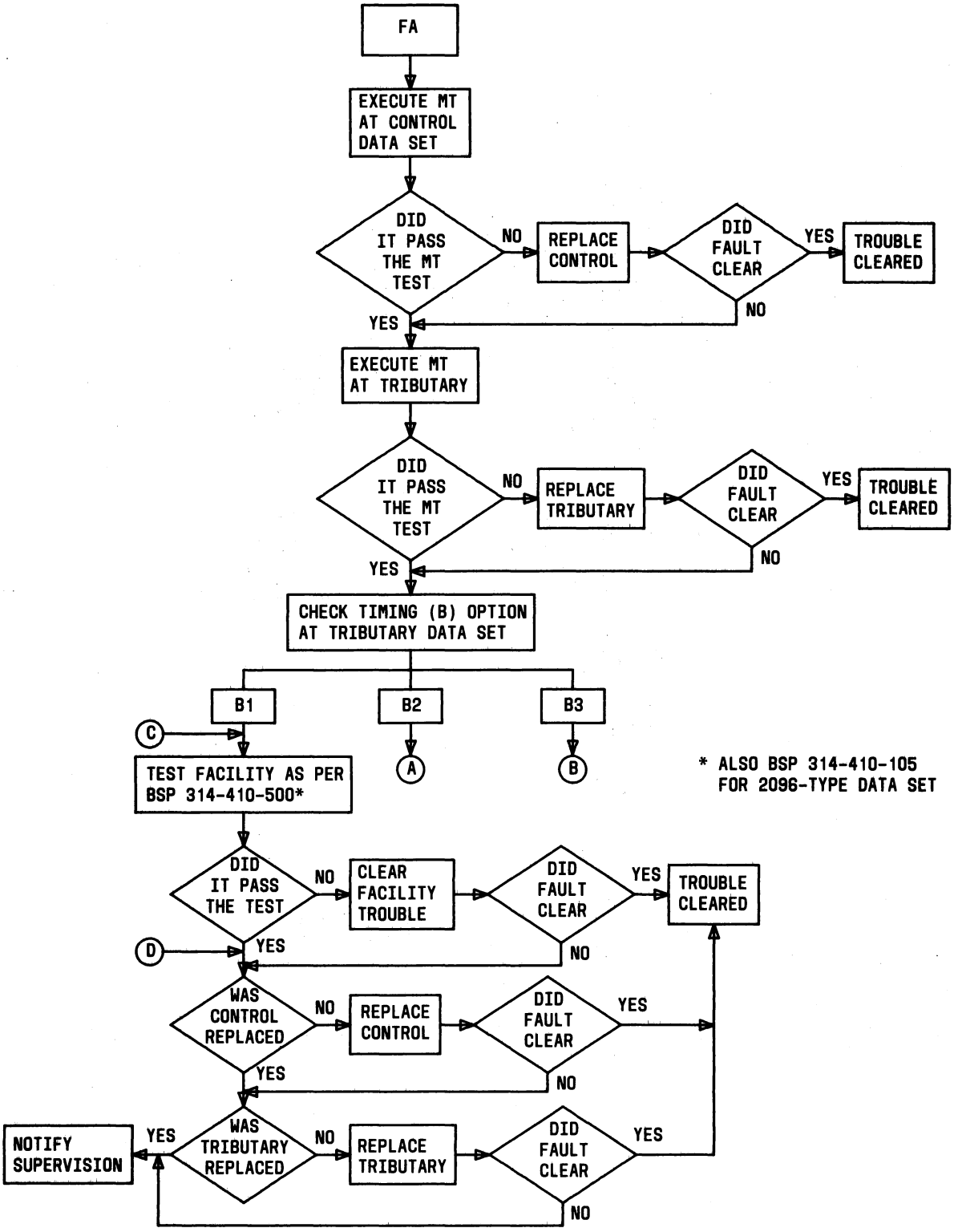


Fig. 5—Display Reads FA at Data Set—Point-to-Point (Sheet 1 of 3)

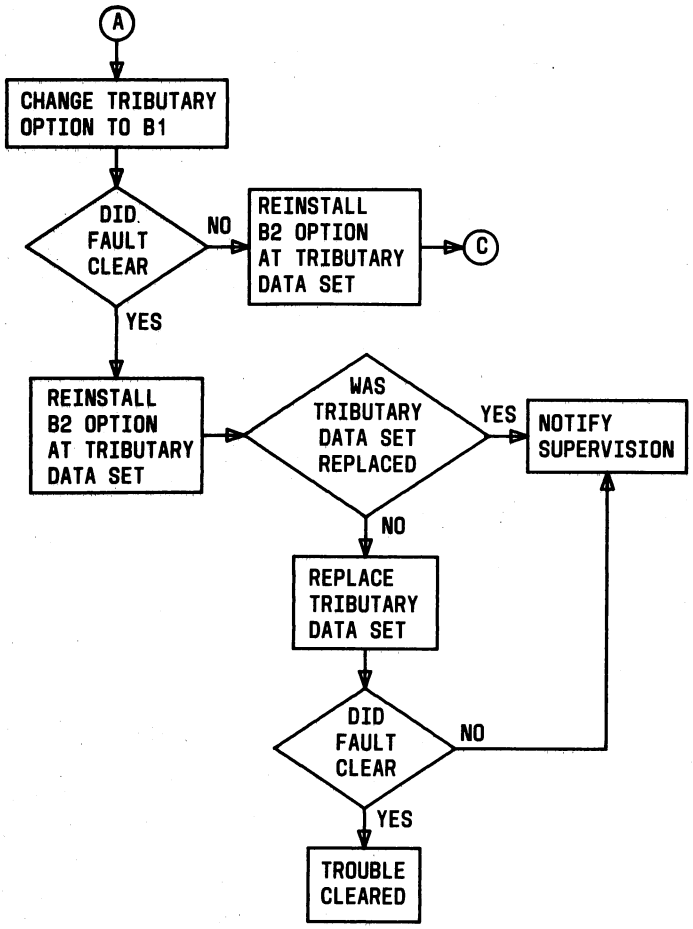


Fig. 5—Display Reads FA at Data Set—Point-to-Point (Sheet 2 of 3)

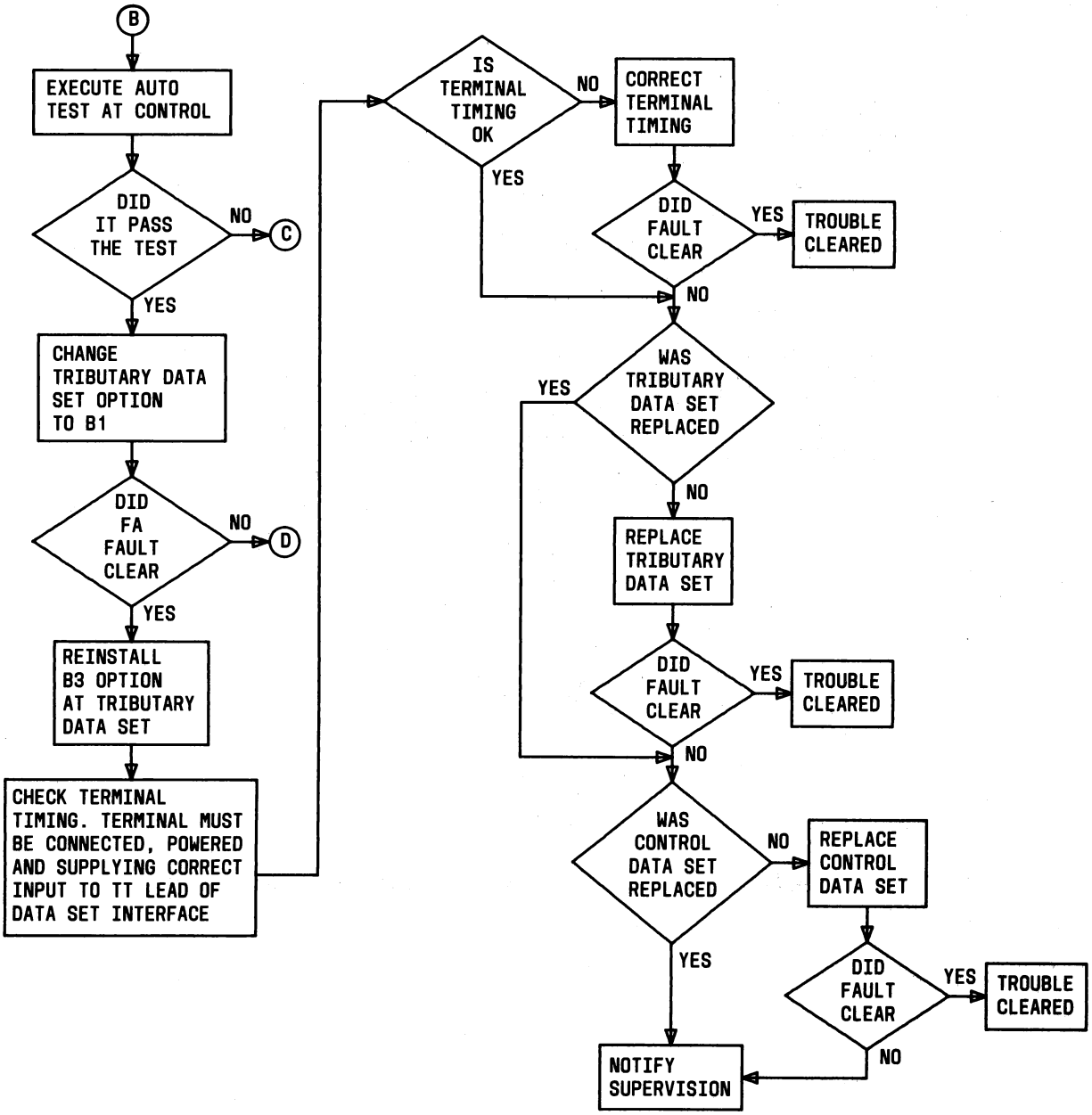


Fig. 5—Display Reads FA at Data Set—Point-to-Point (Sheet 3 of 3)

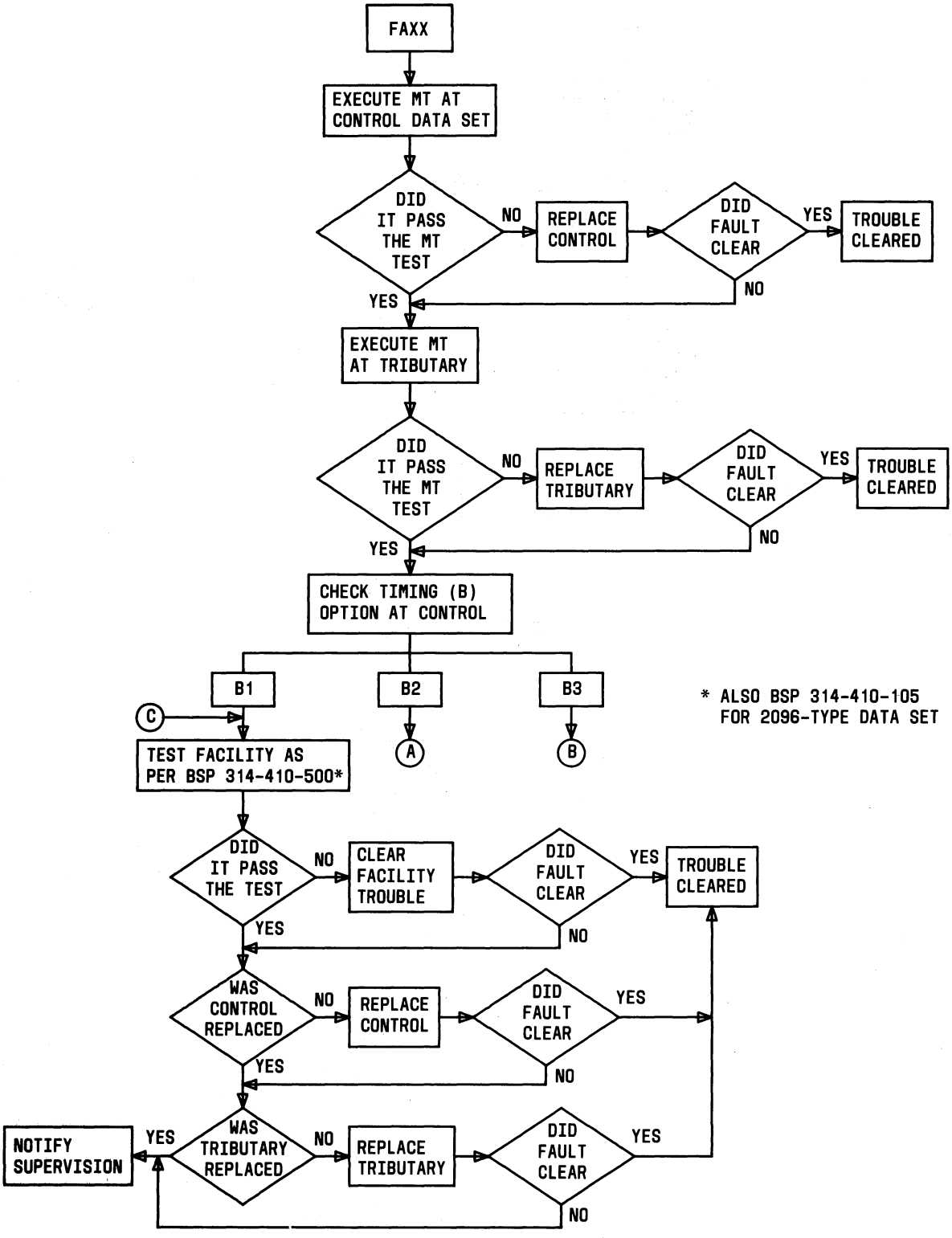


Fig. 6—Display Reads FAXX at Control Data Set—Point-to-Point (Sheet 1 of 3)

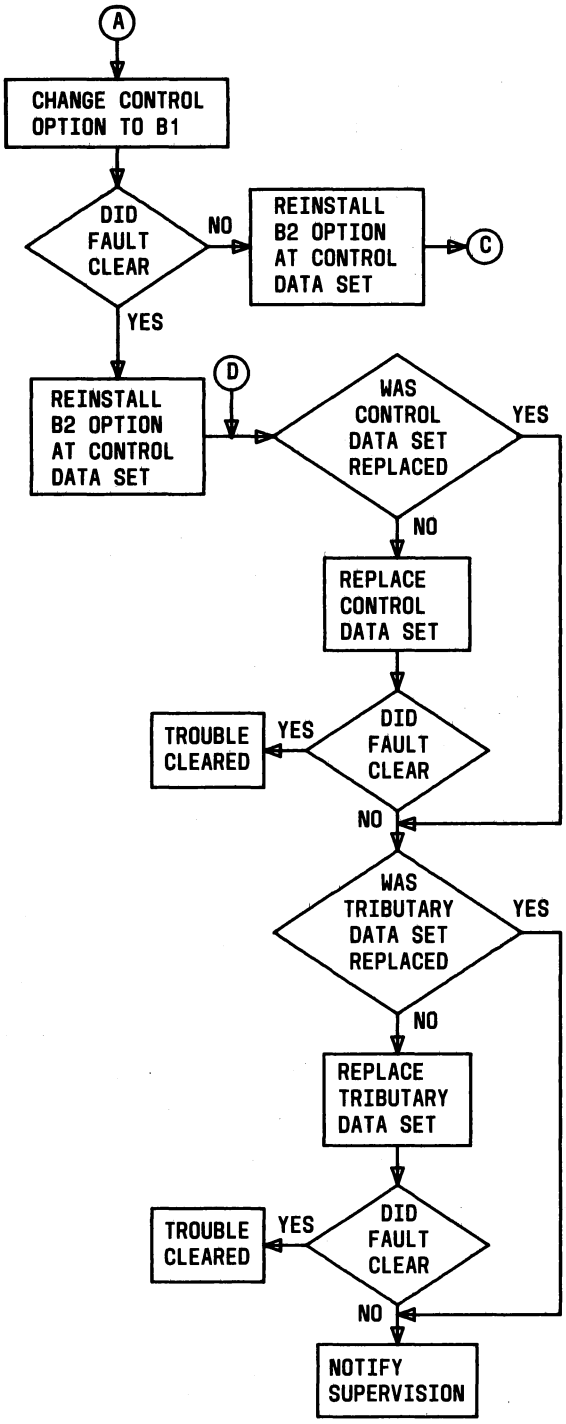


Fig. 6—Display Reads FAXX at Control Data Set—Point-to-Point (Sheet 2 of 3)

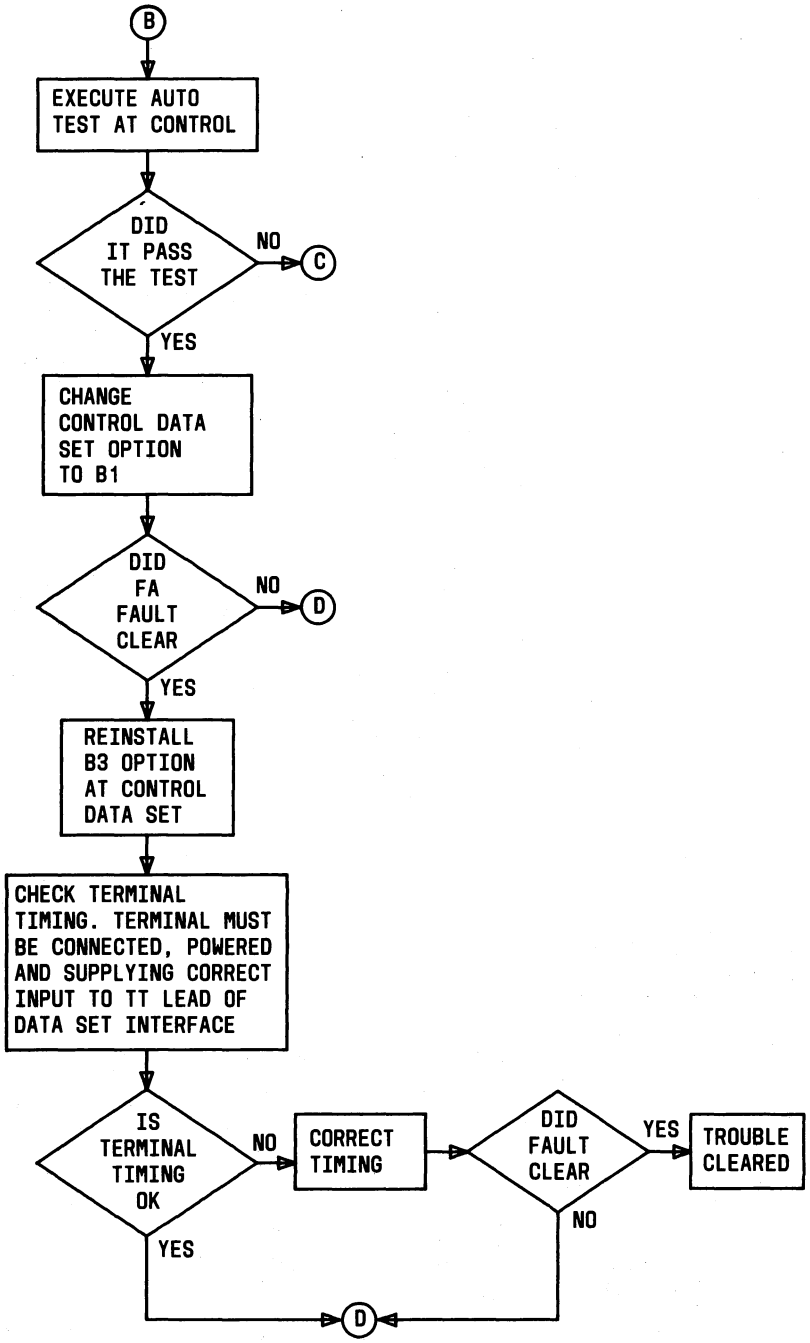


Fig. 6—Display Reads FAXX at Control Data Set—Point-to-Point (Sheet 3 of 3)

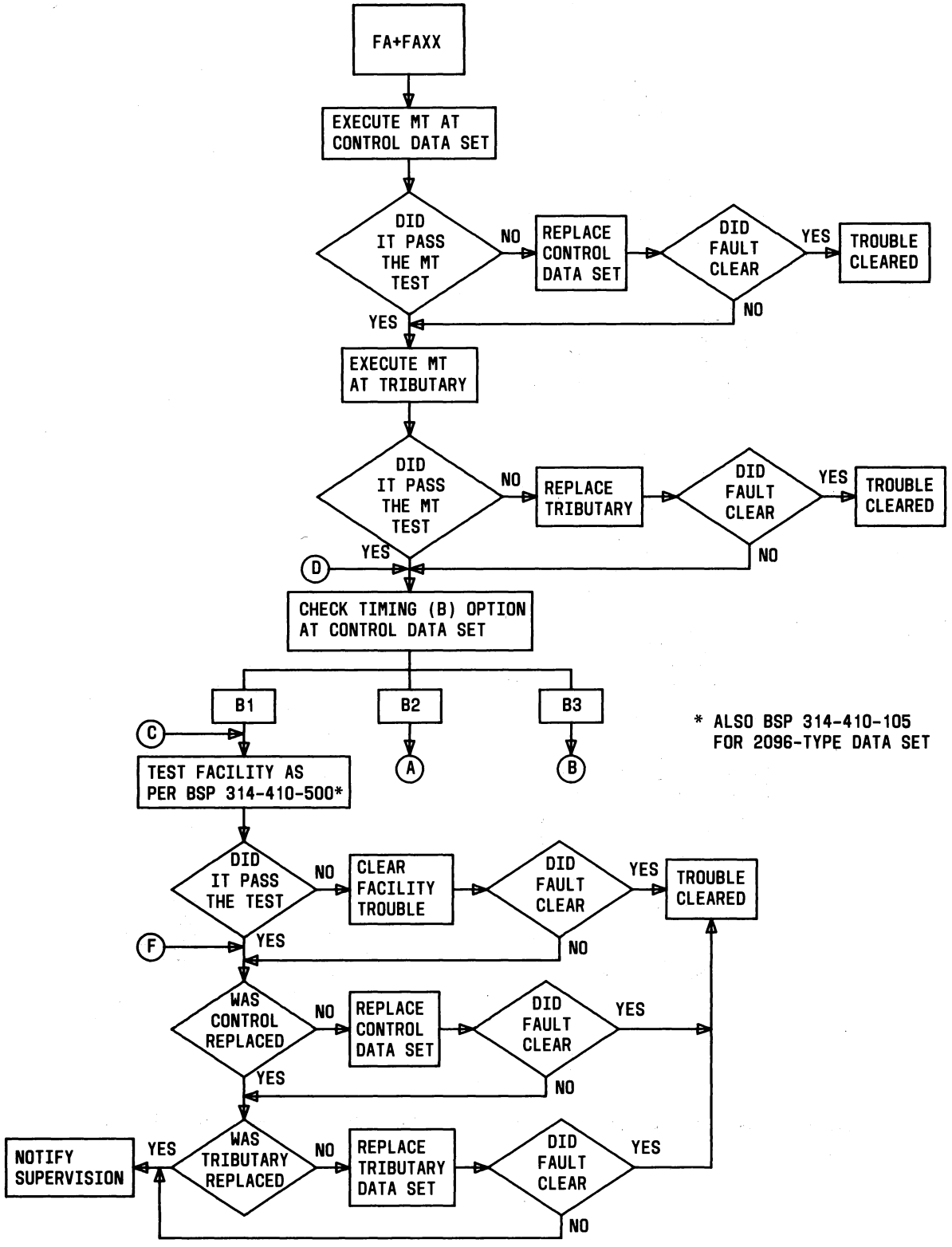


Fig. 7—Display Reads FA+FAXX at Control Data Set—Point-to-Point (Sheet 1 of 4)

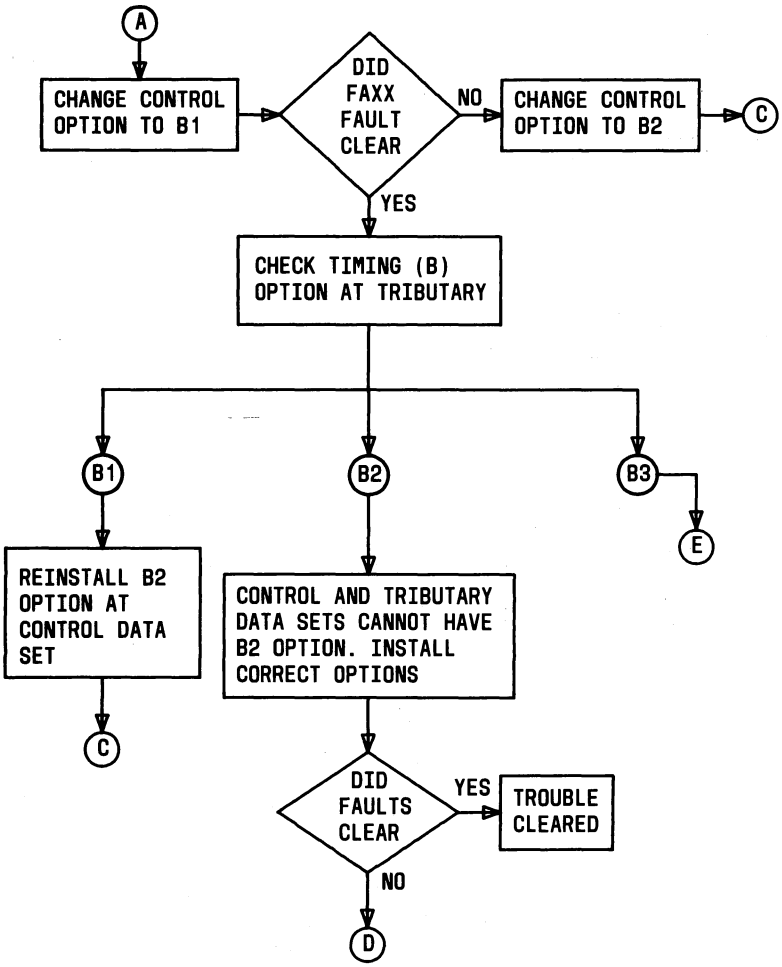


Fig. 7—Display Reads FA+FAXX at Control Data Set—Point-to-Point (Sheet 2 of 4)

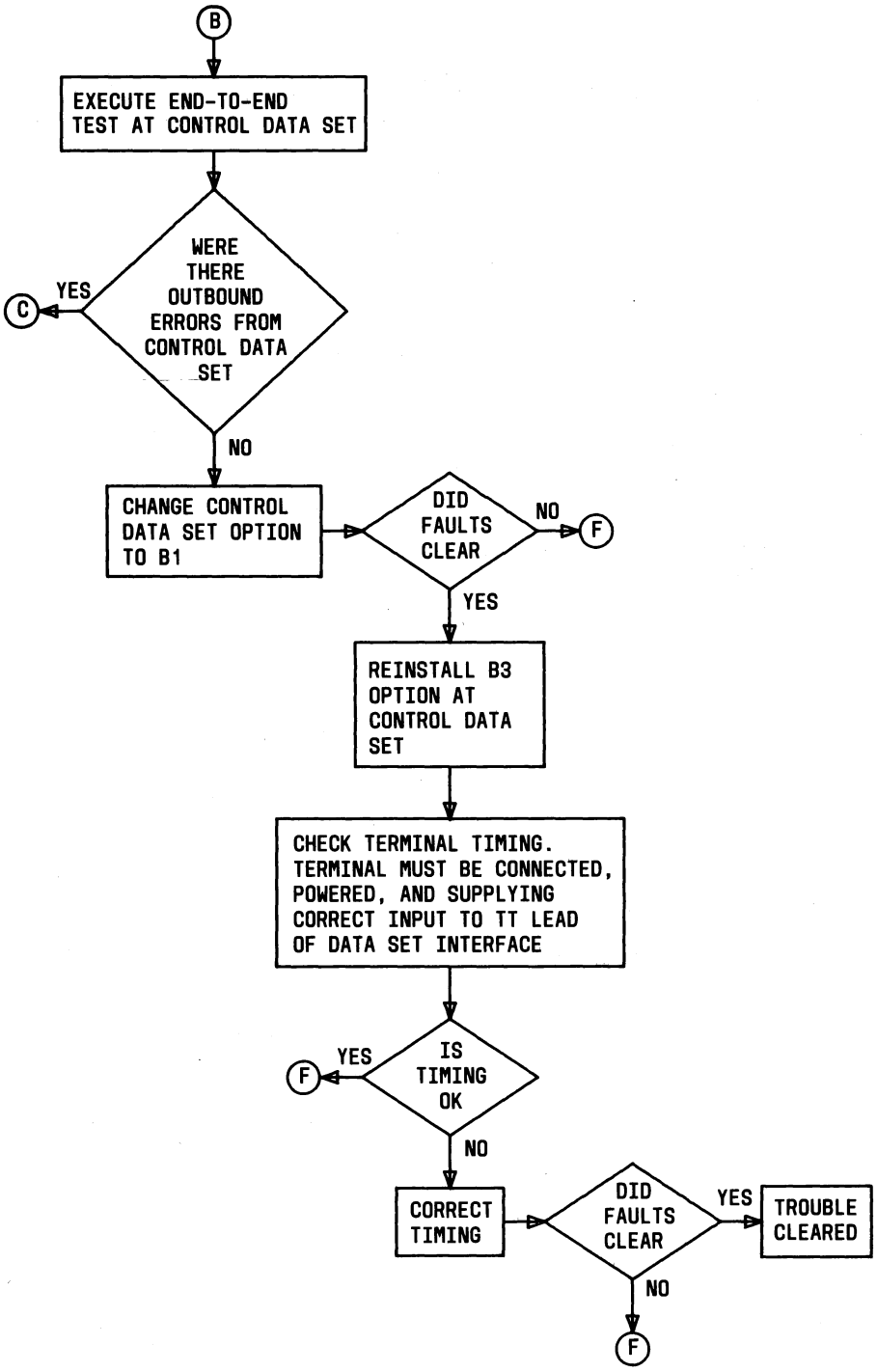


Fig. 7—Display Reads FA+FAXX at Control Data Set—Point-to-Point (Sheet 3 of 4)

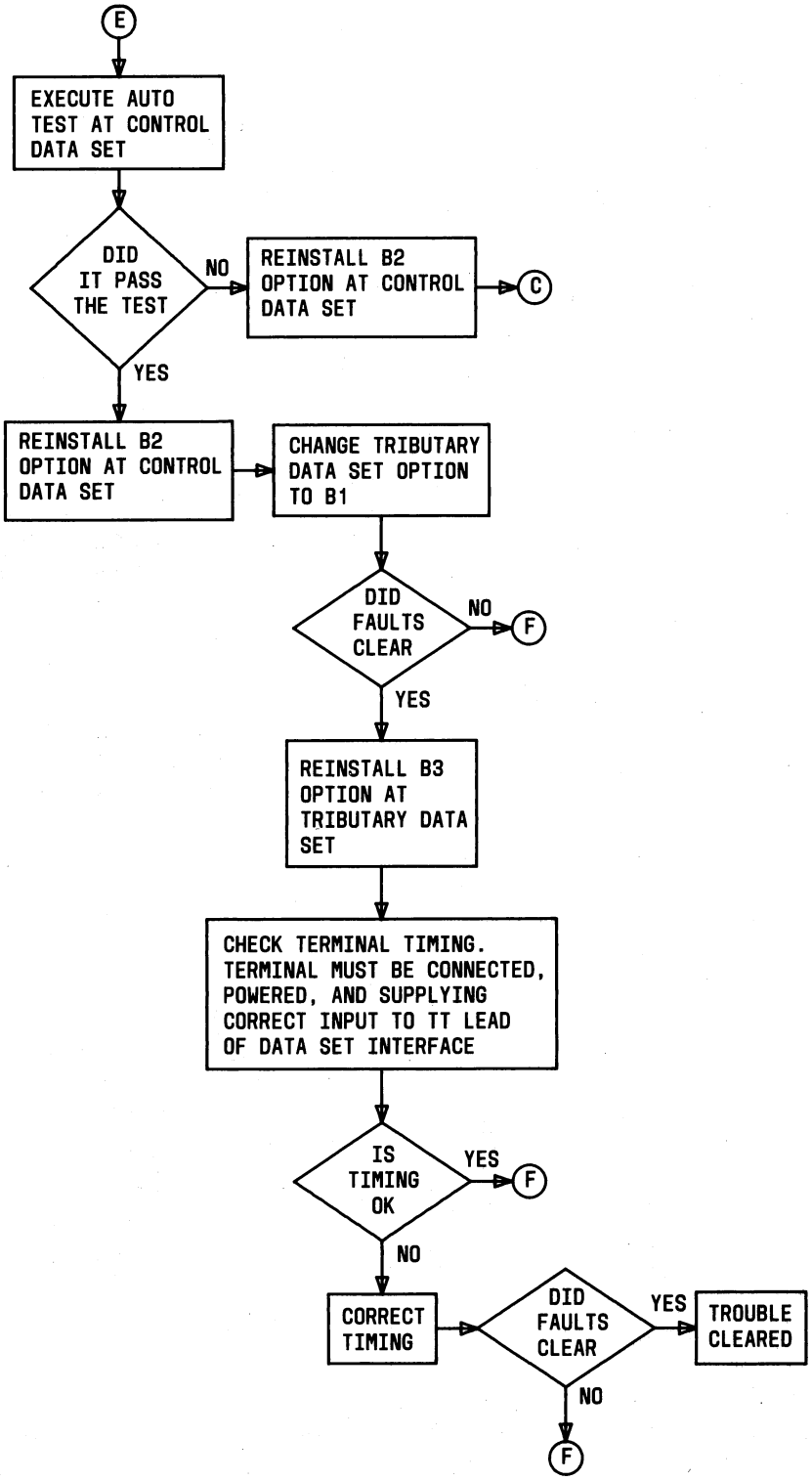


Fig. 7—Display Reads FA+FAXX at Control Data Set—Point-to-Point (Sheet 4 of 4)

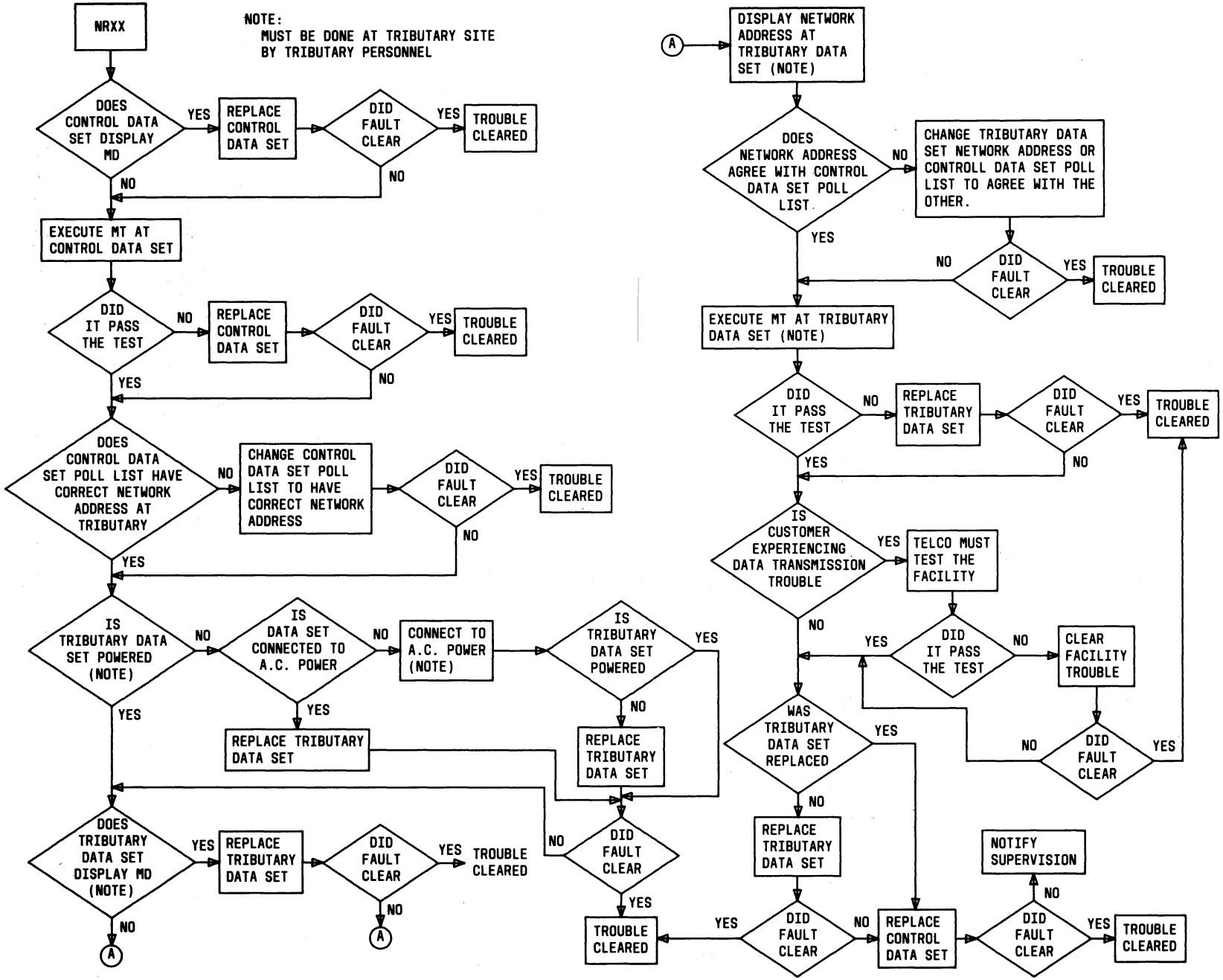


Fig. 8—Display Reads NRXX at Control Data Set—Point-to-Point

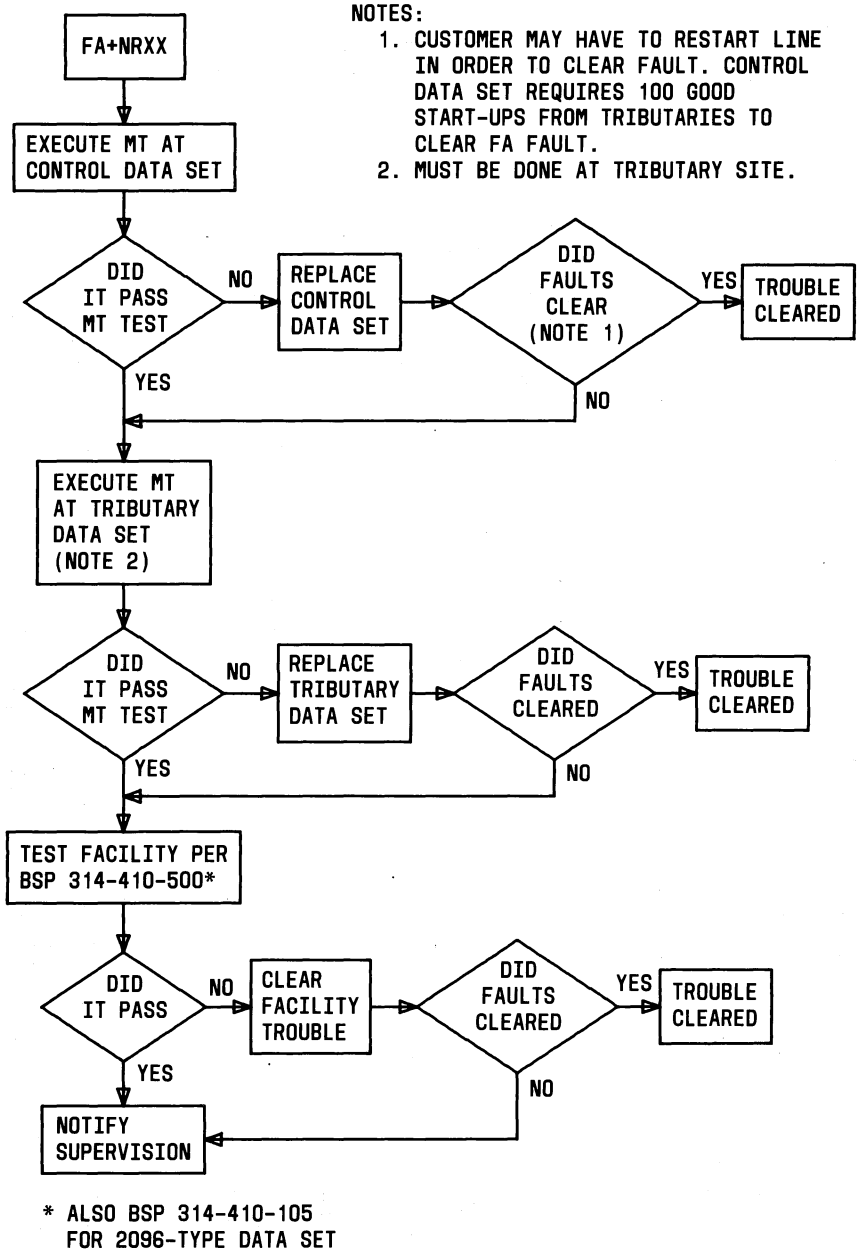


Fig. 9—Display Reads FA+NRXX at Control Data Set—Point-to-Point

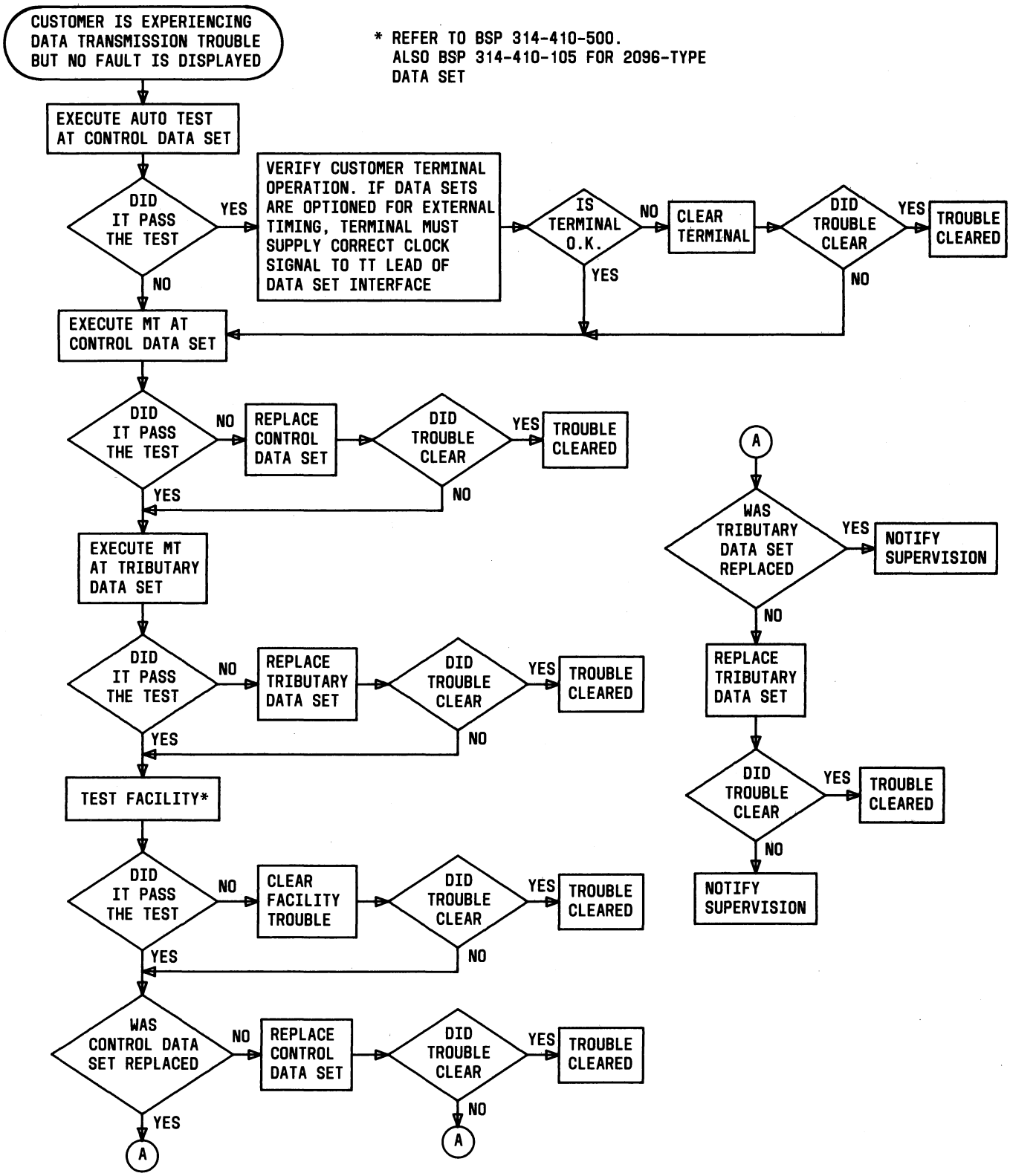


Fig. 10—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Point-to-Point

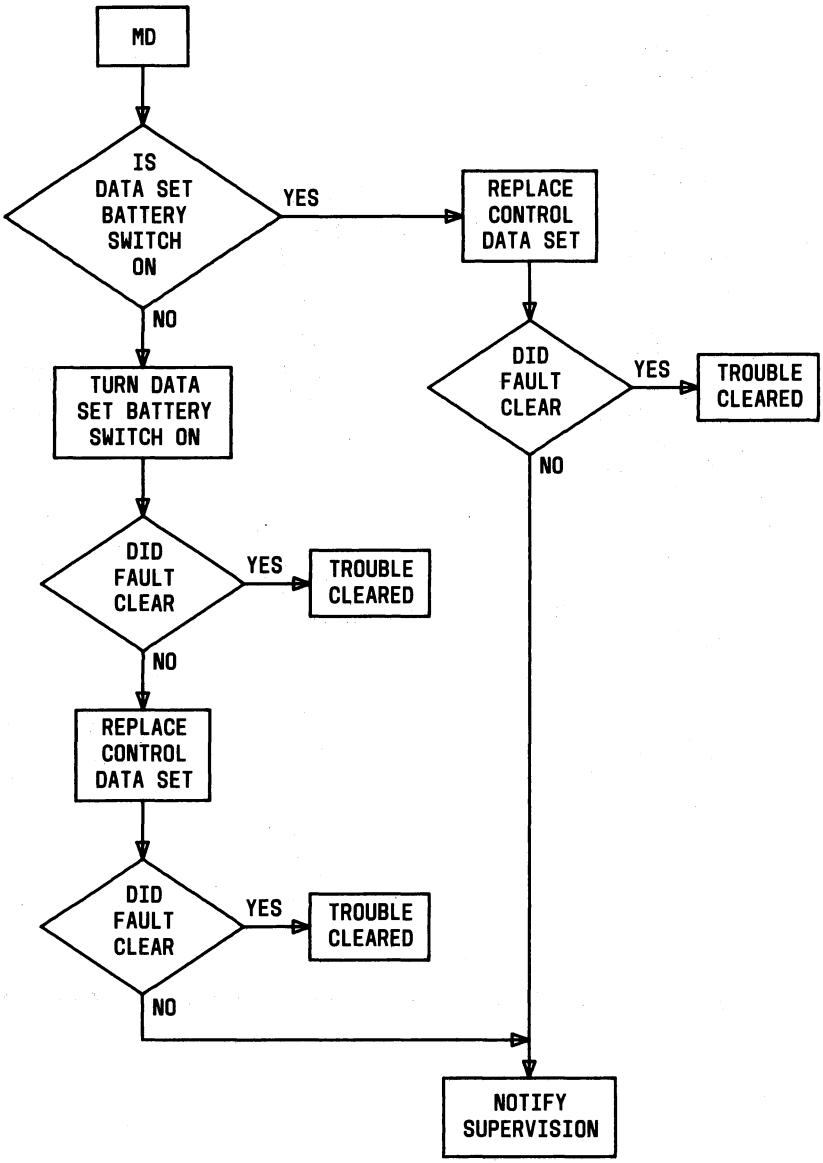


Fig. 11—Display Reads MD at Data Set—Multipoint

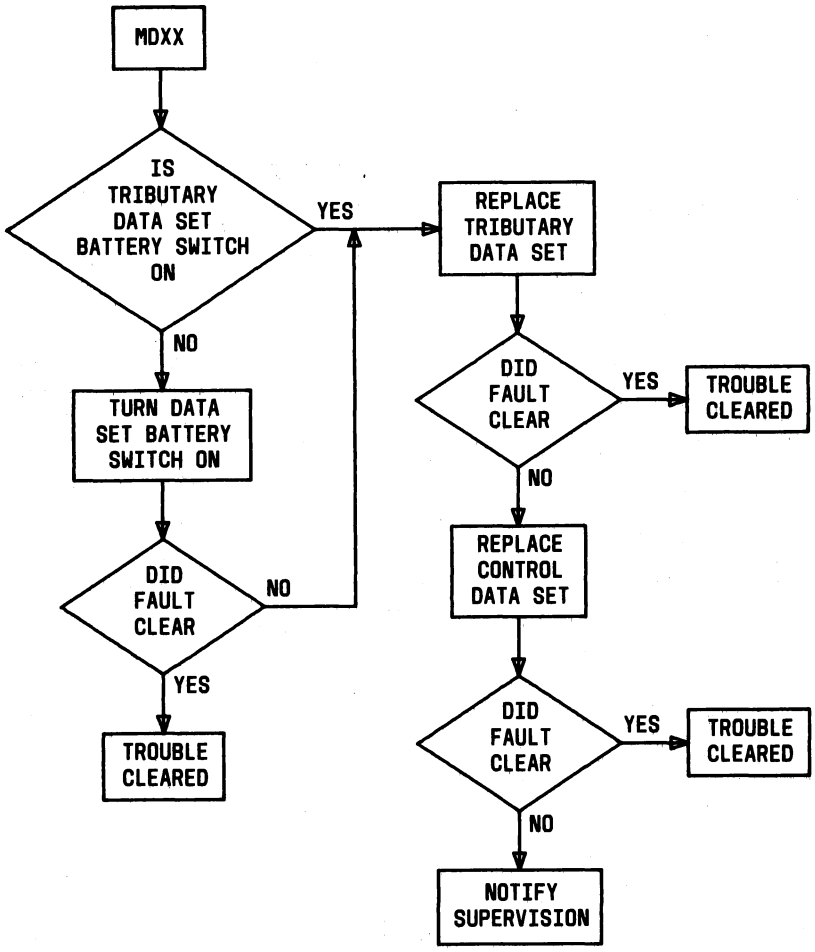


Fig. 12—Display Reads MDXX at Control Data Set—Multipoint

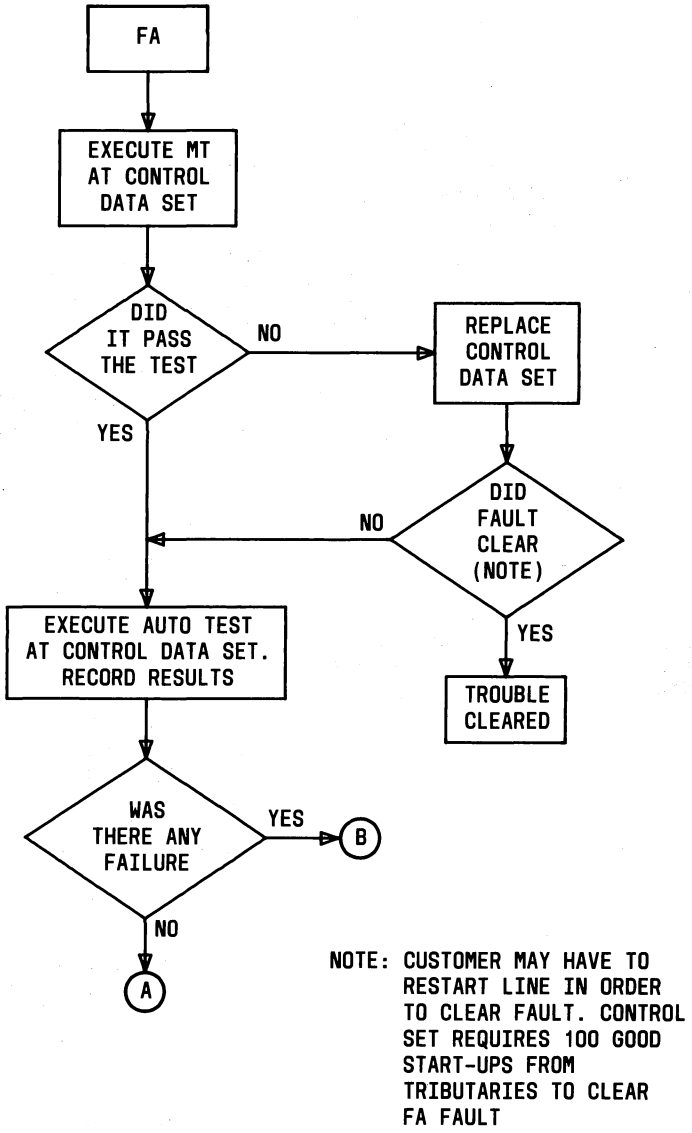


Fig. 13—Display Reads FA at Data Set—Multipoint (Sheet 1 of 4)

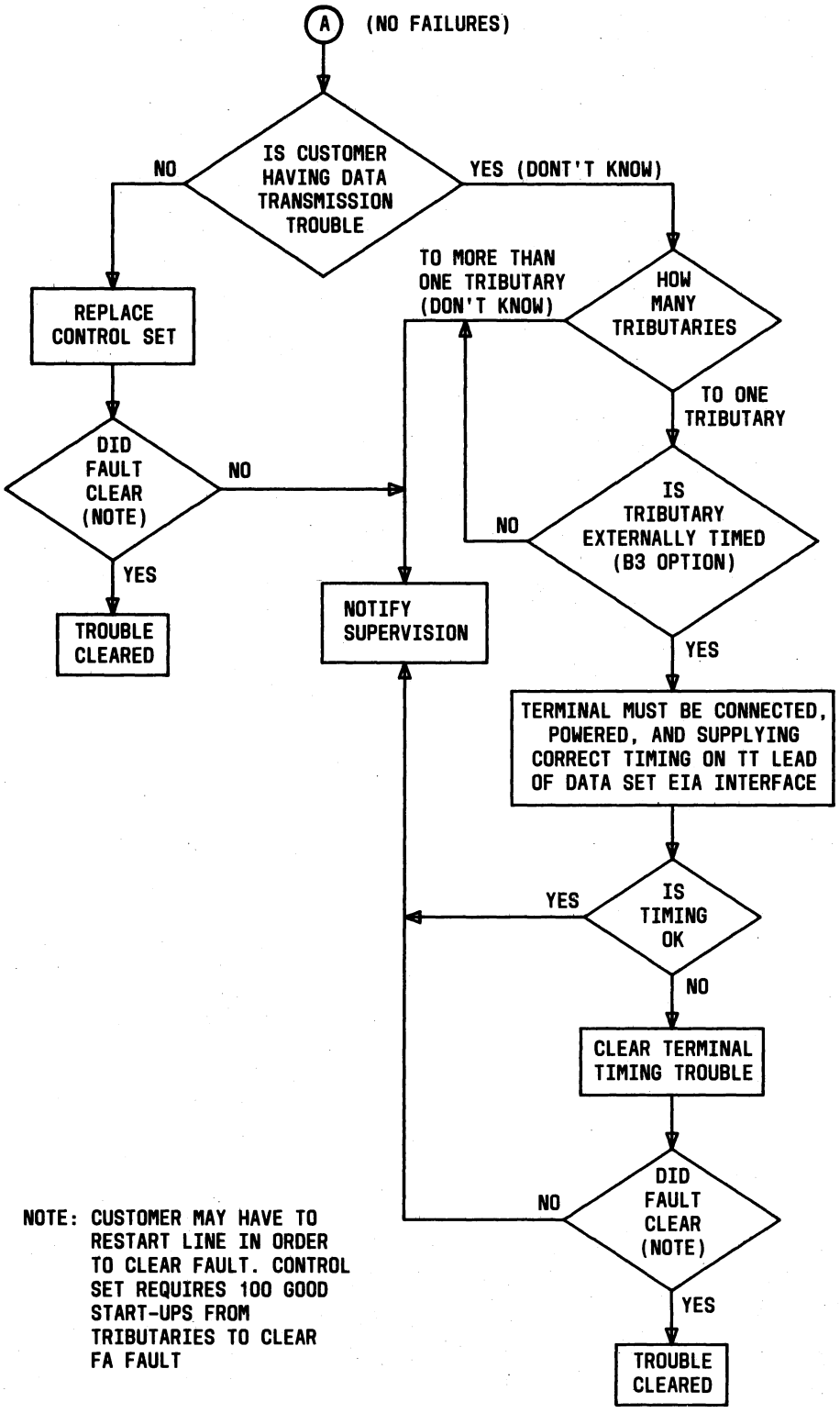


Fig. 13—Display Reads FA at Data Set—Multipoint (Sheet 2 of 4)

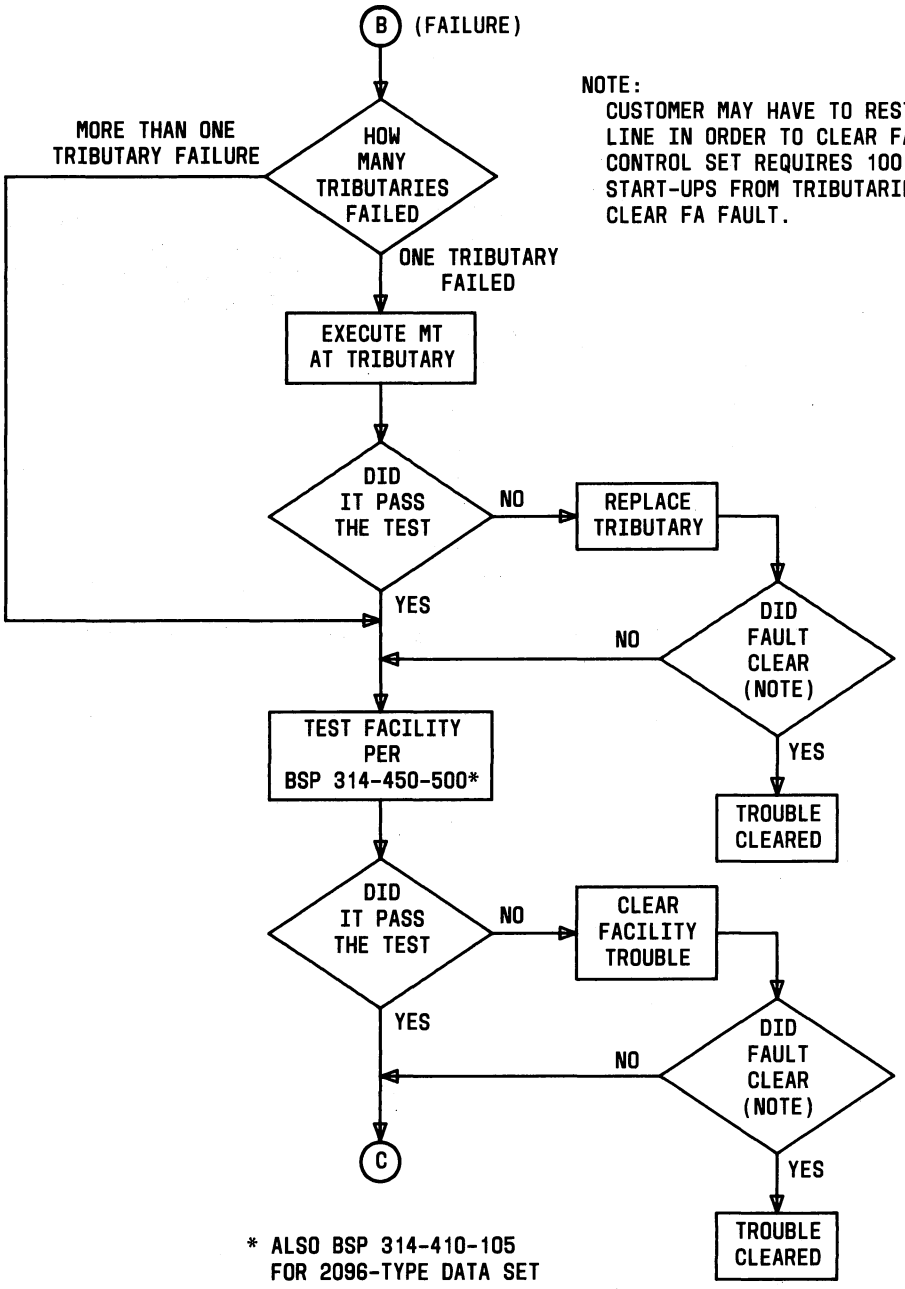


Fig. 13—Display Reads FA at Data Set—Multipoint (Sheet 3 of 4)

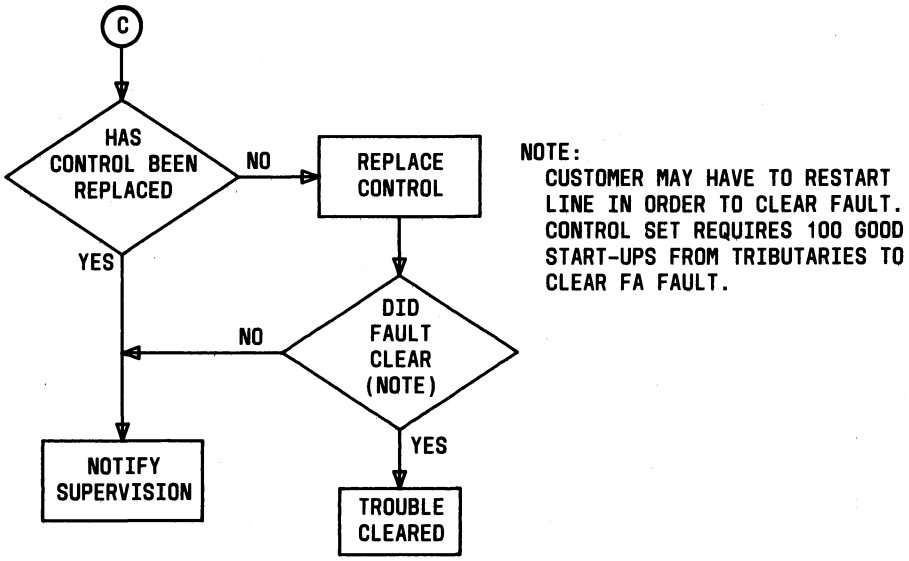
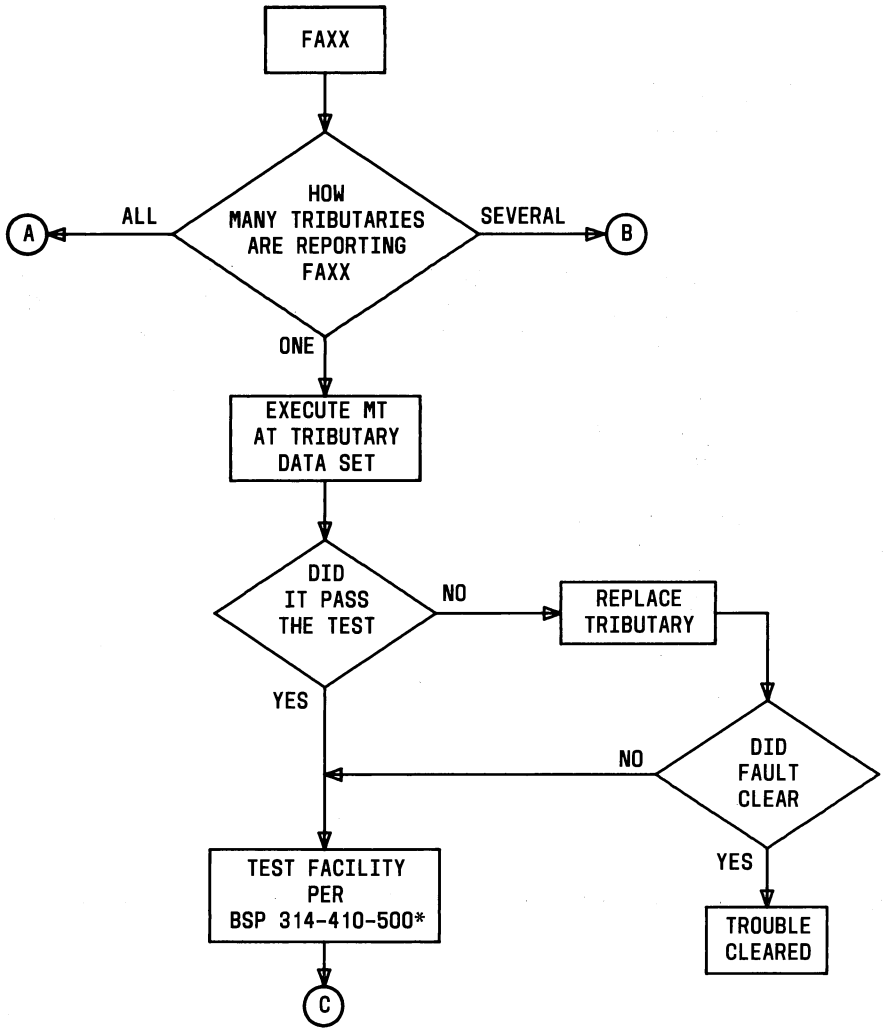


Fig. 13—Display Reads FA at Data Set—Multipoint (Sheet 4 of 4)



* ALSO BSP 314-410-105
FOR 2096-TYPE DATA SET

Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 1 of 6)

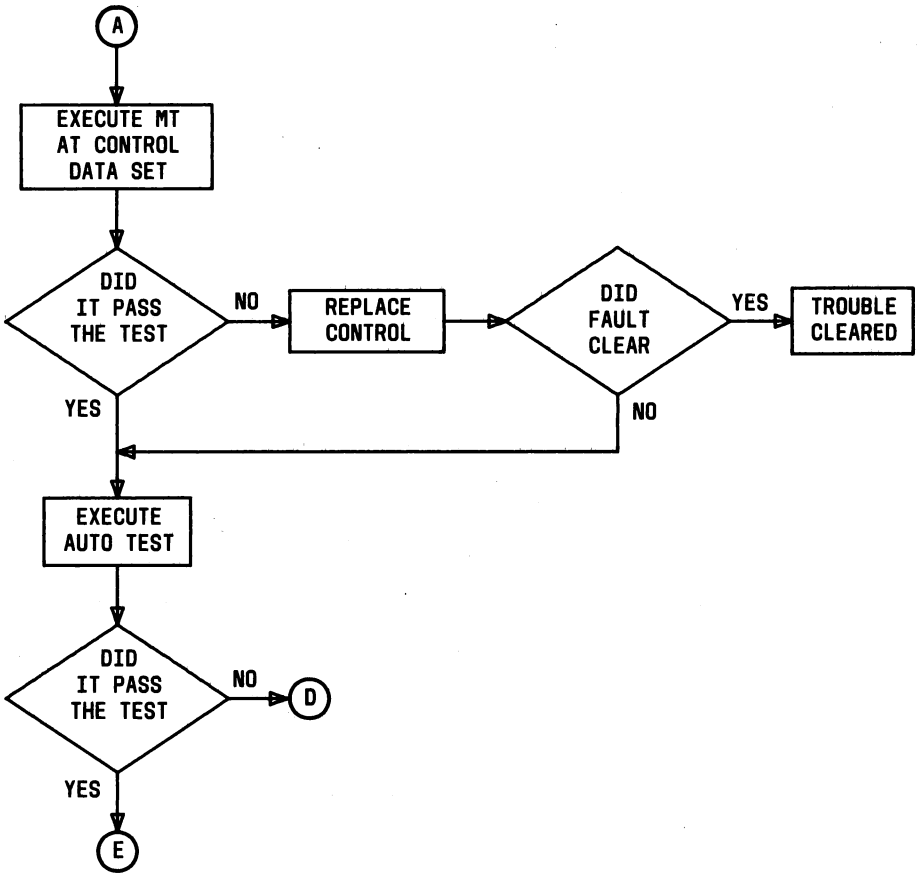


Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 2 of 6)

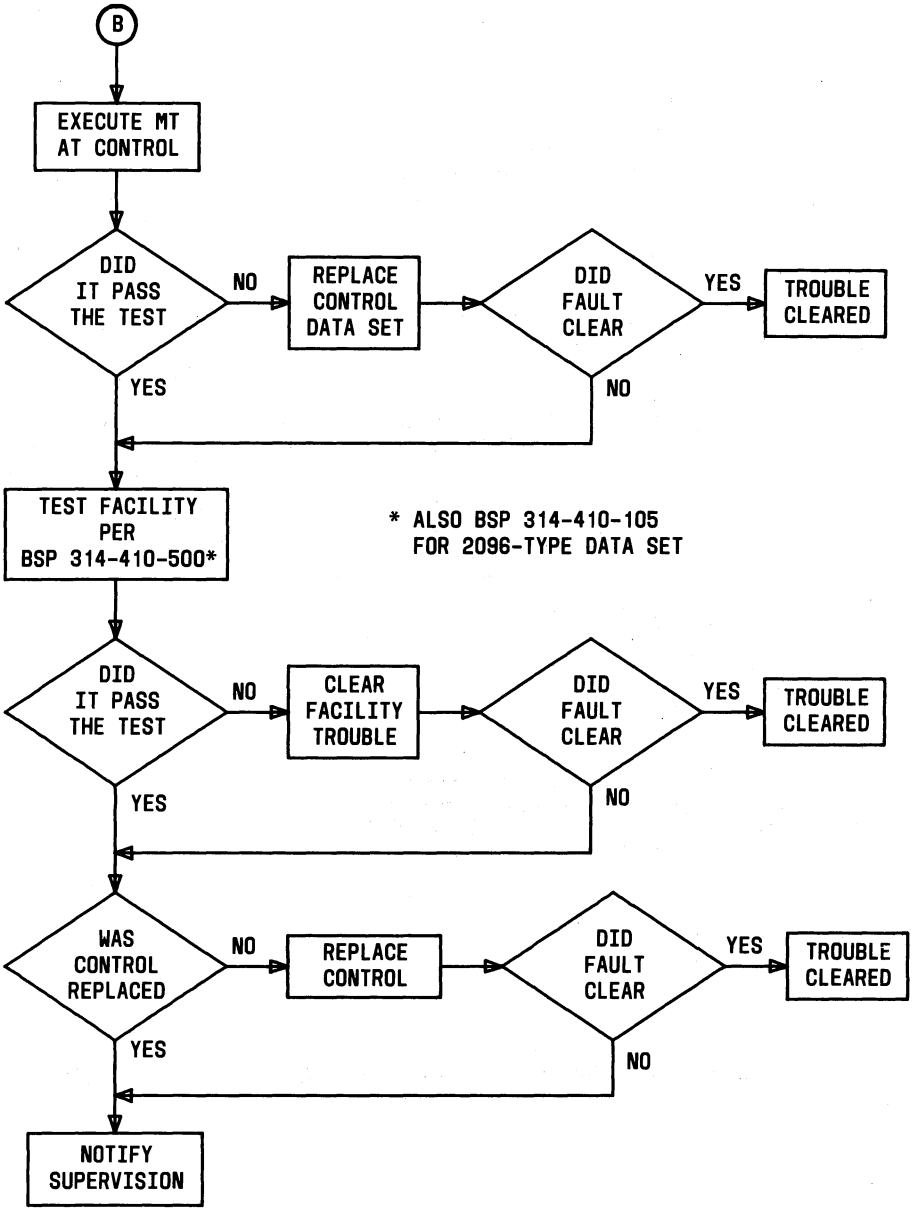


Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 3 of 6)

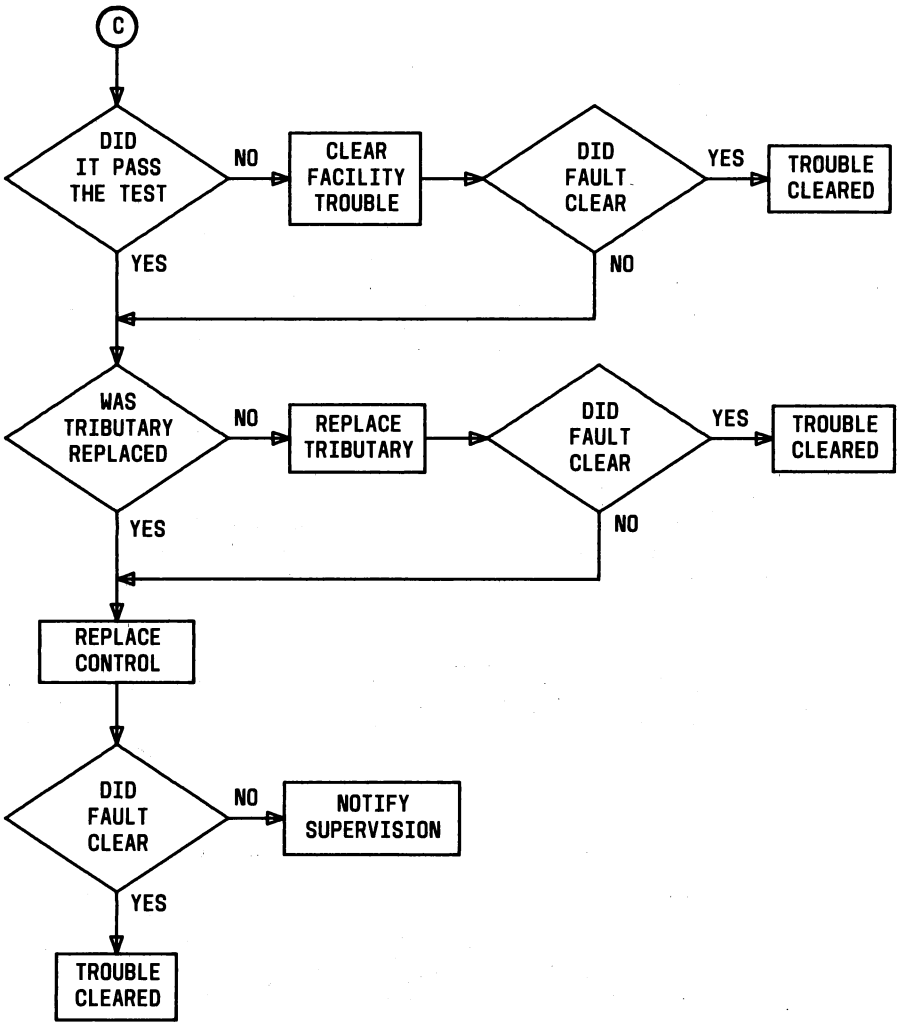


Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 4 of 6)

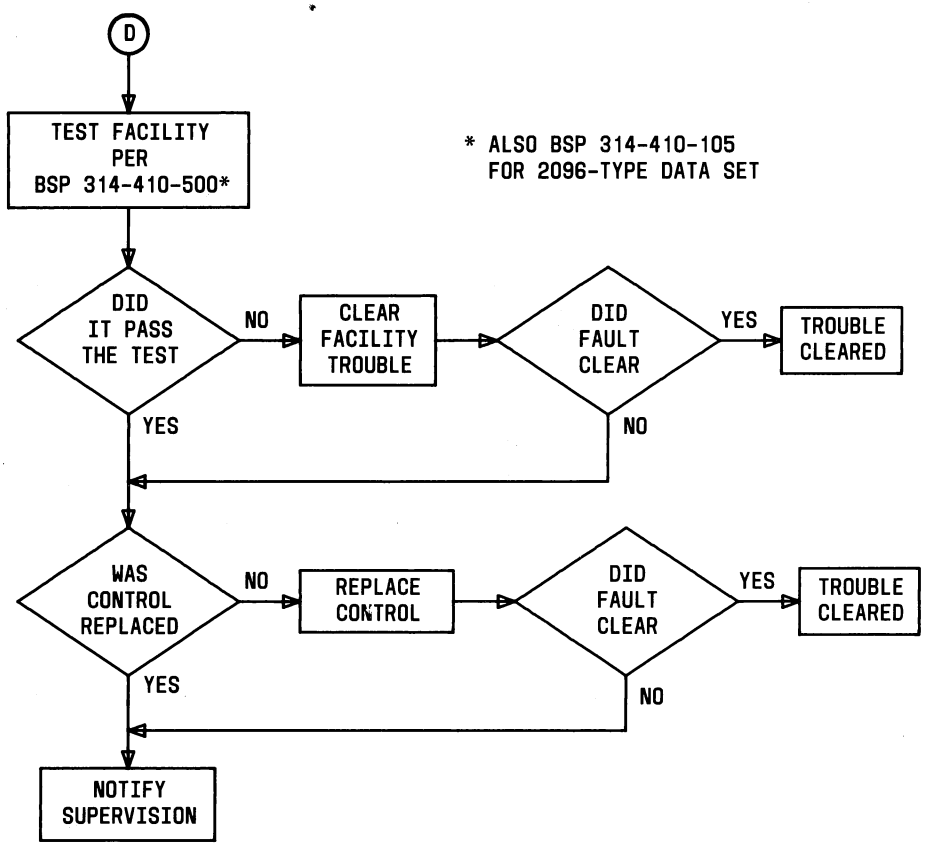


Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 5 of 6)

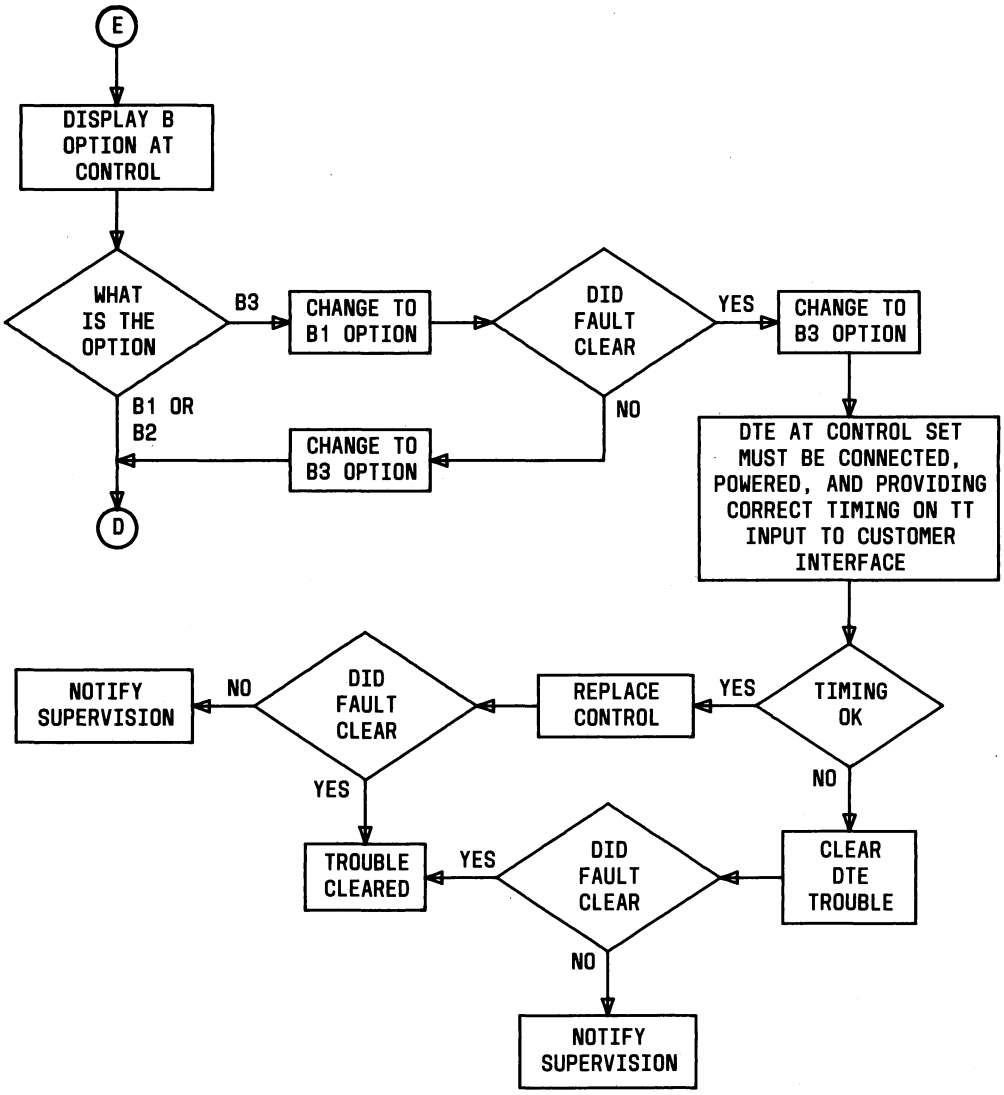


Fig. 14—Display Reads FAXX at Control Data Set—Multipoint (Sheet 6 of 6)

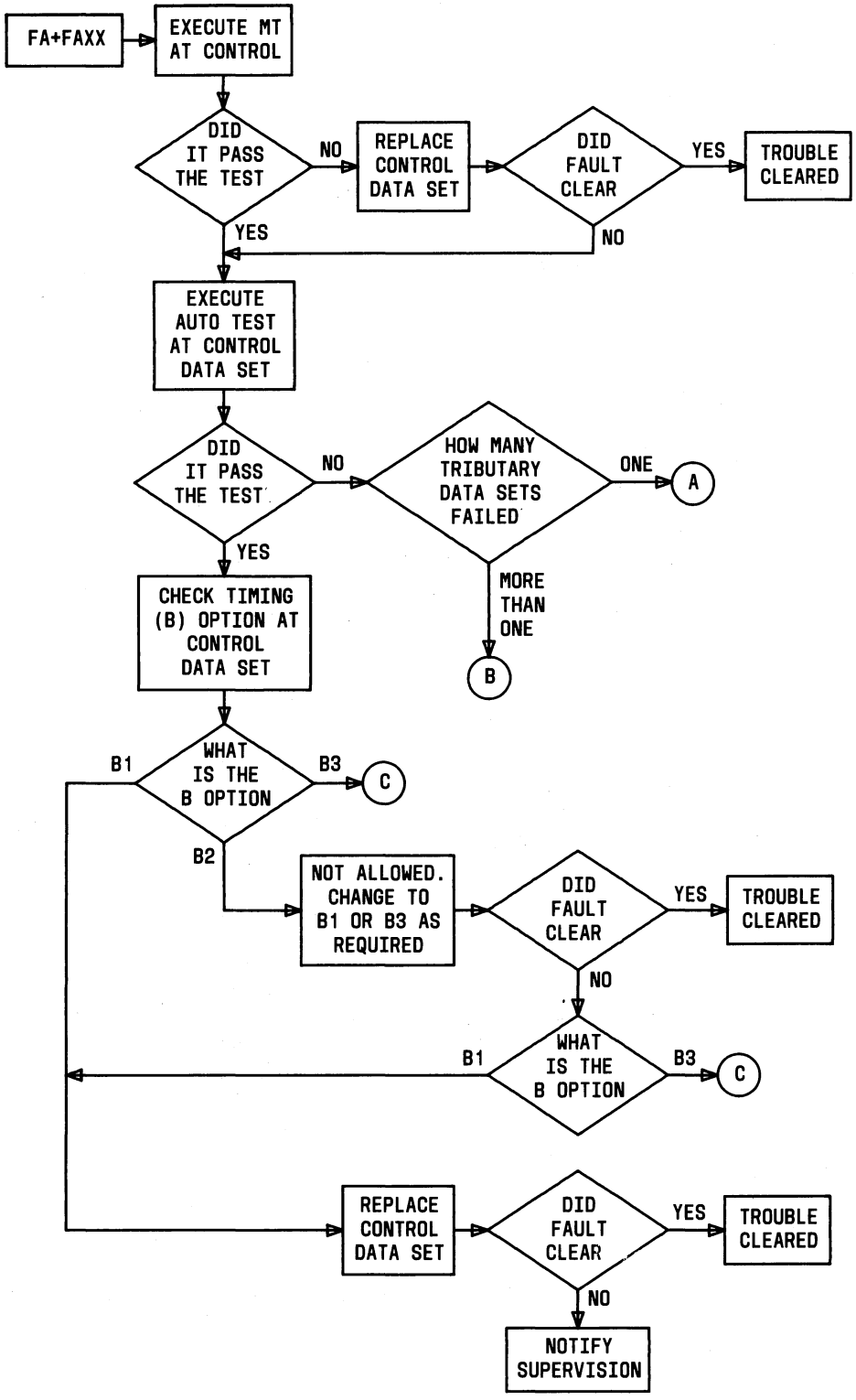


Fig. 15—Display Reads FA+FAXX at Control Data Set—Multipoint (Sheet 1 of 4)

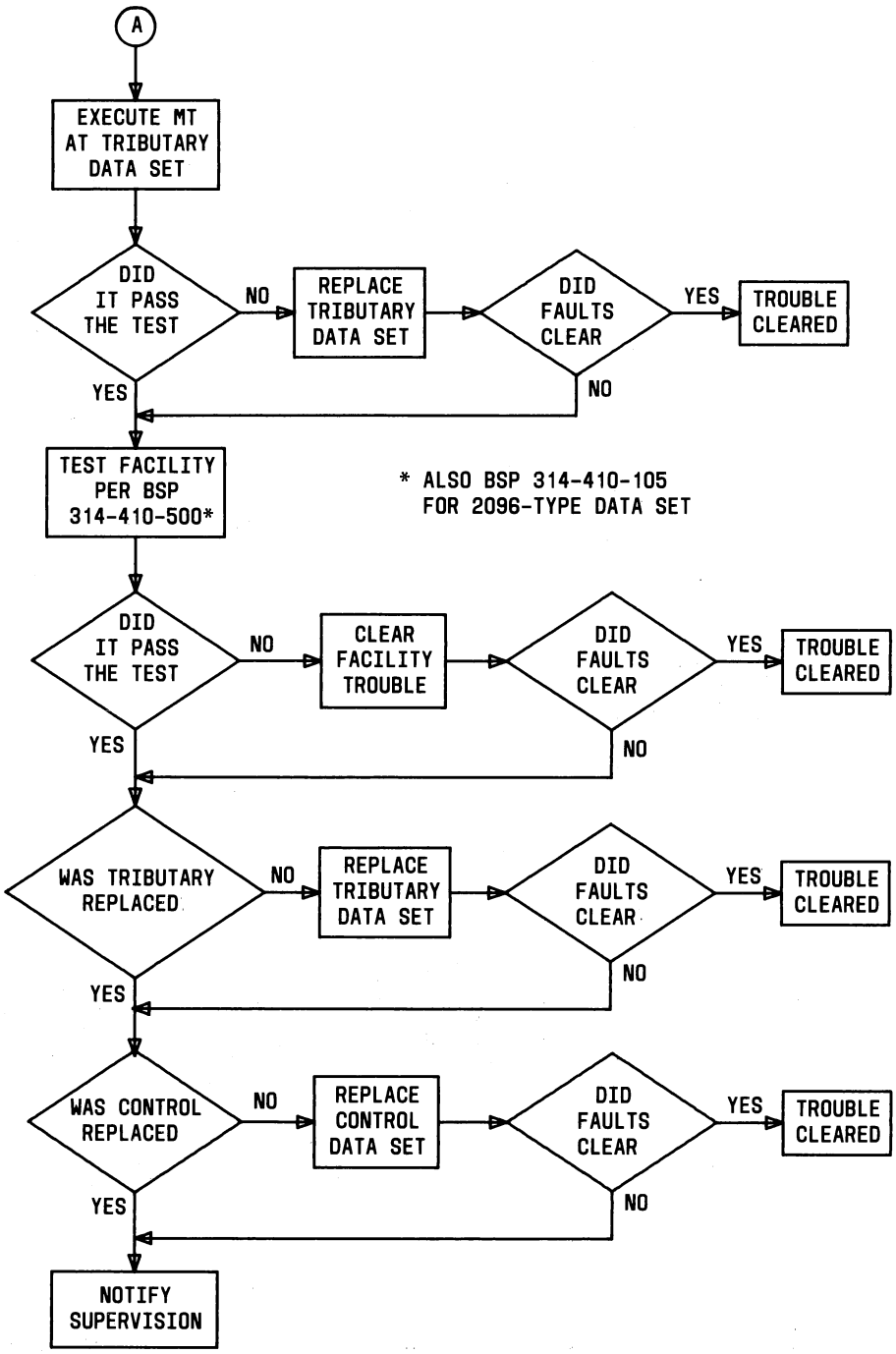


Fig. 15—Display Reads FA+FAXX at Control Data Set—Multipoint (Sheet 2 of 4)

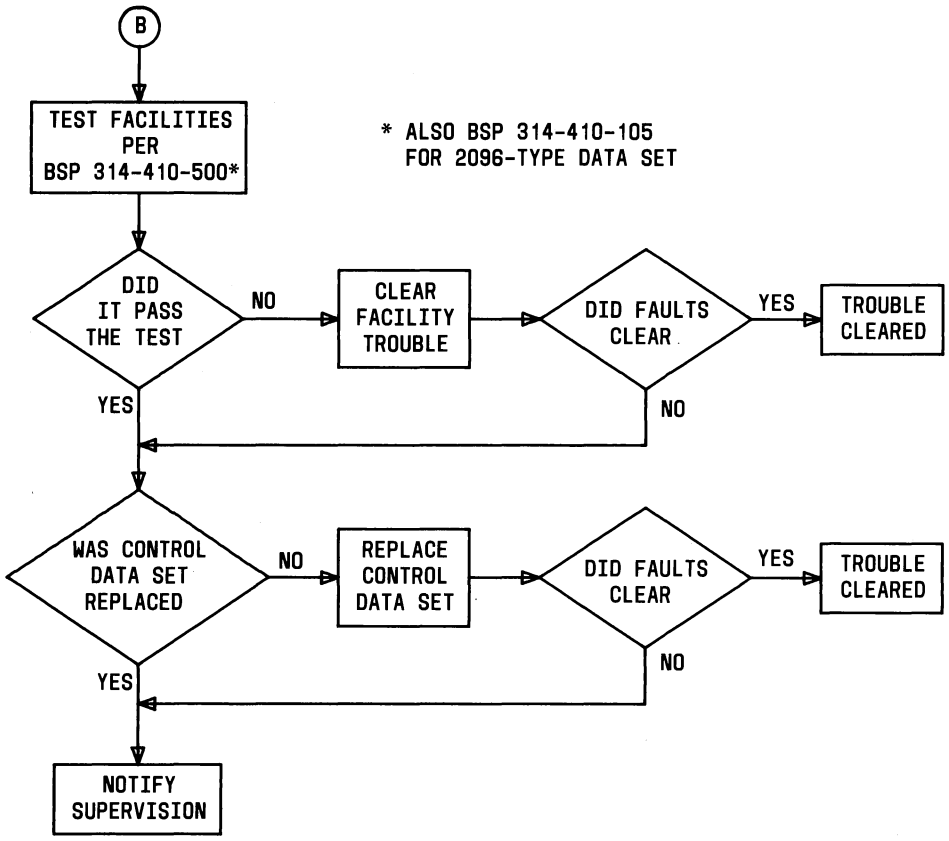


Fig. 15—Display Reads FA+FAXX at Control Data Set—Multipoint (Sheet 3 of 4)

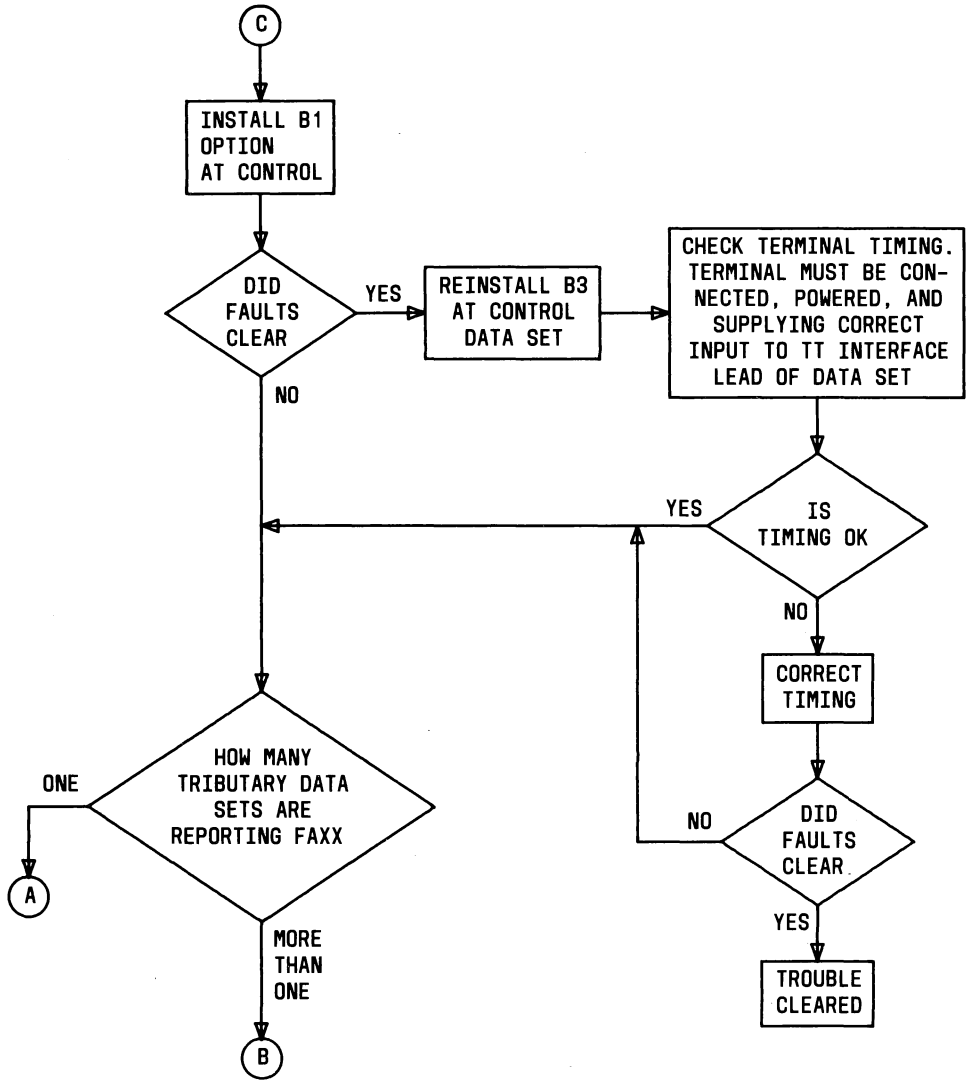


Fig. 15—Display Reads FA+FAXX at Control Data Set—Multipoint (Sheet 4 of 4)

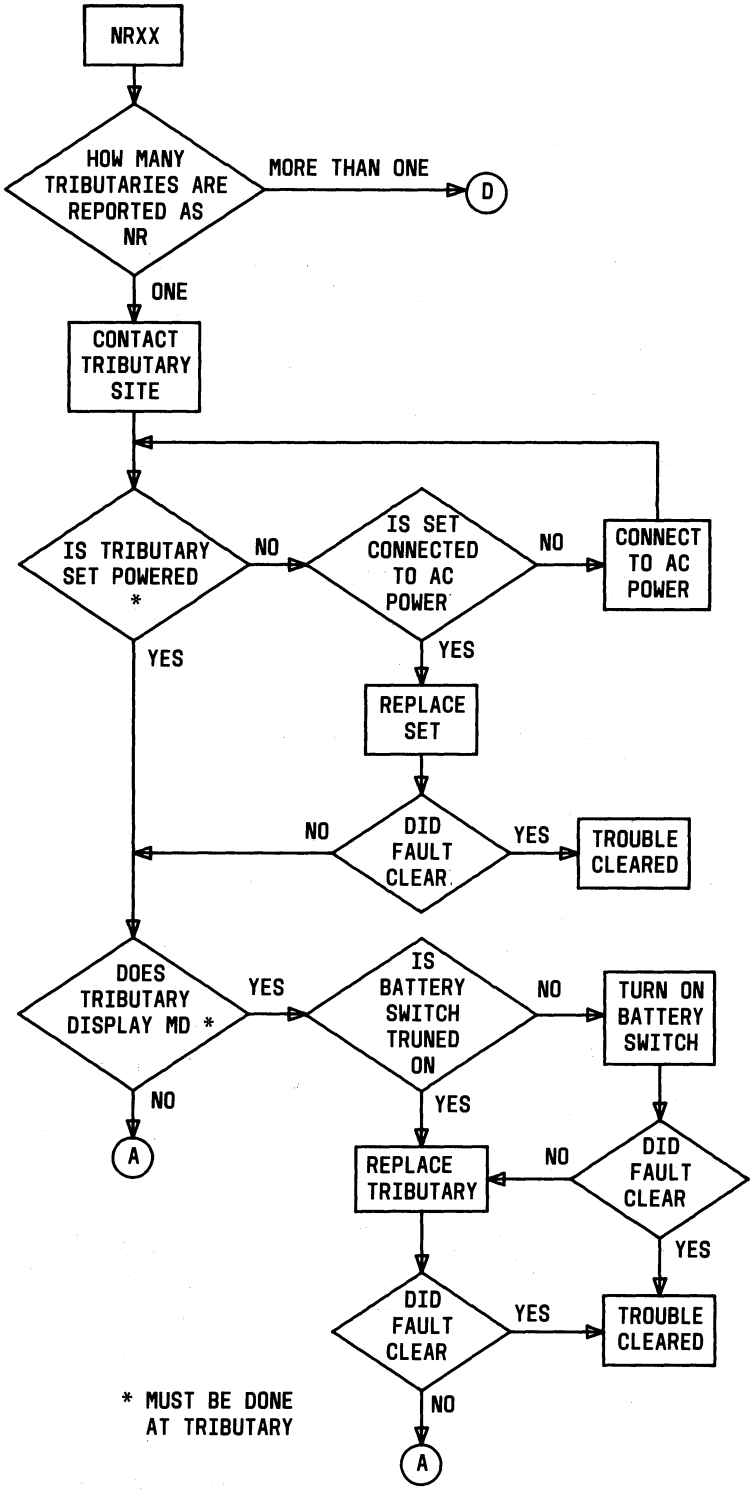


Fig. 16—Display Reads NRXX at Control Data Set—Multipoint (Sheet 1 of 5)

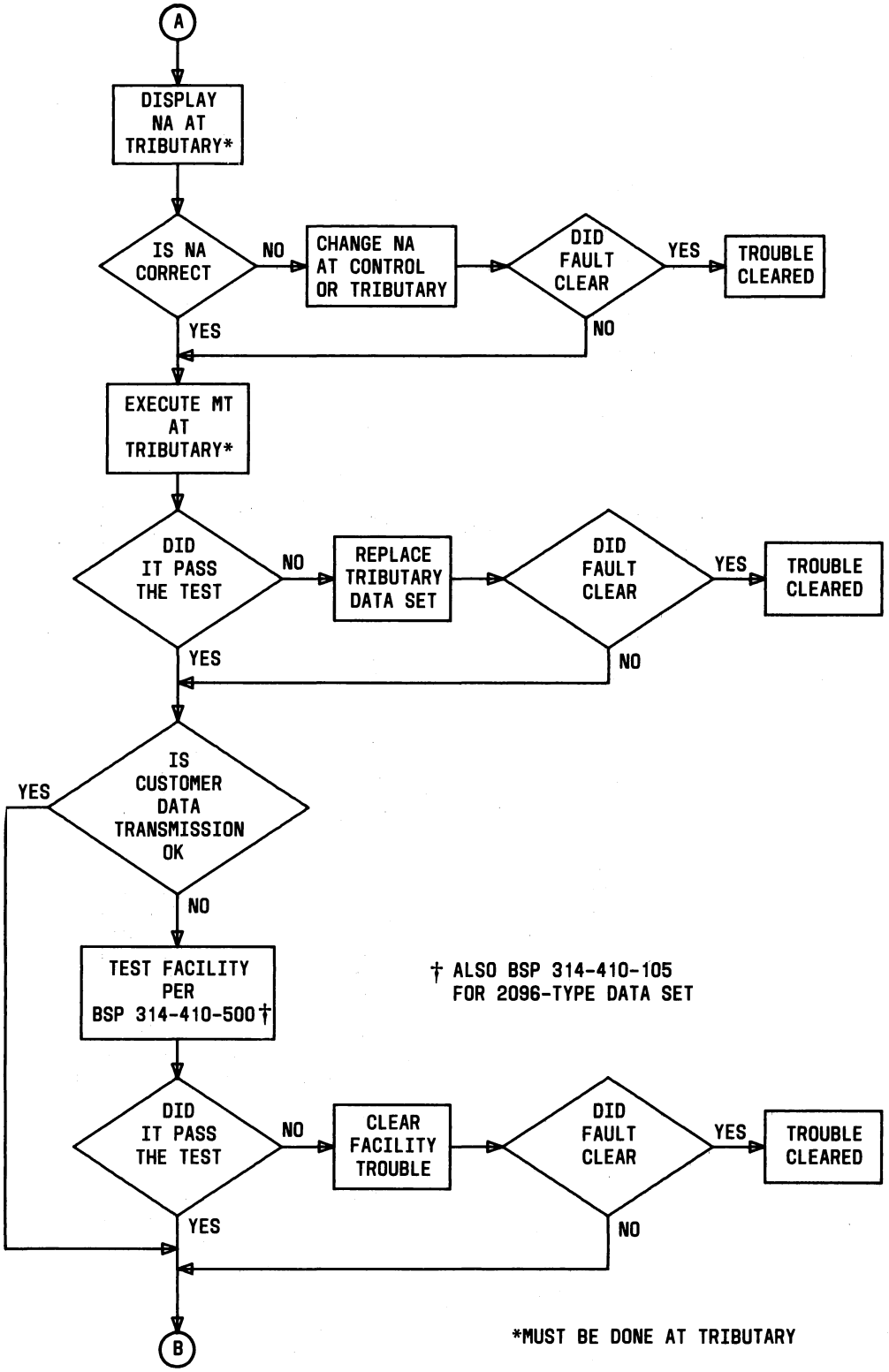


Fig. 16—Display Reads NRXX at Control Data Set—Multipoint (Sheet 2 of 5)

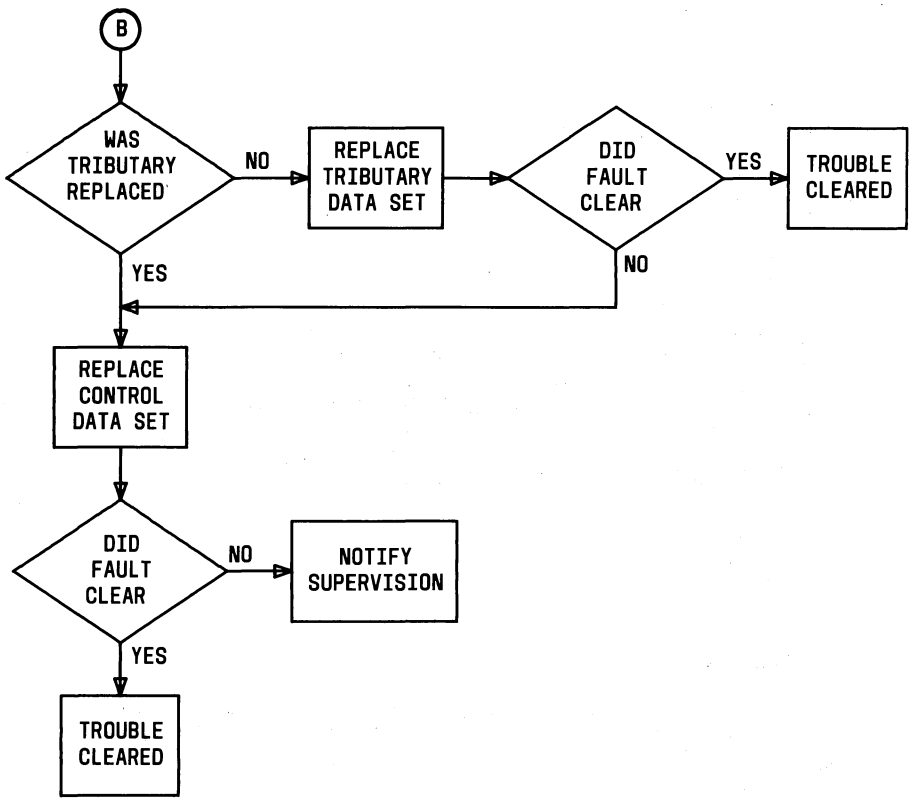


Fig. 16—Display Reads NRXX at Control Data Set—Multipoint (Sheet 3 of 5)

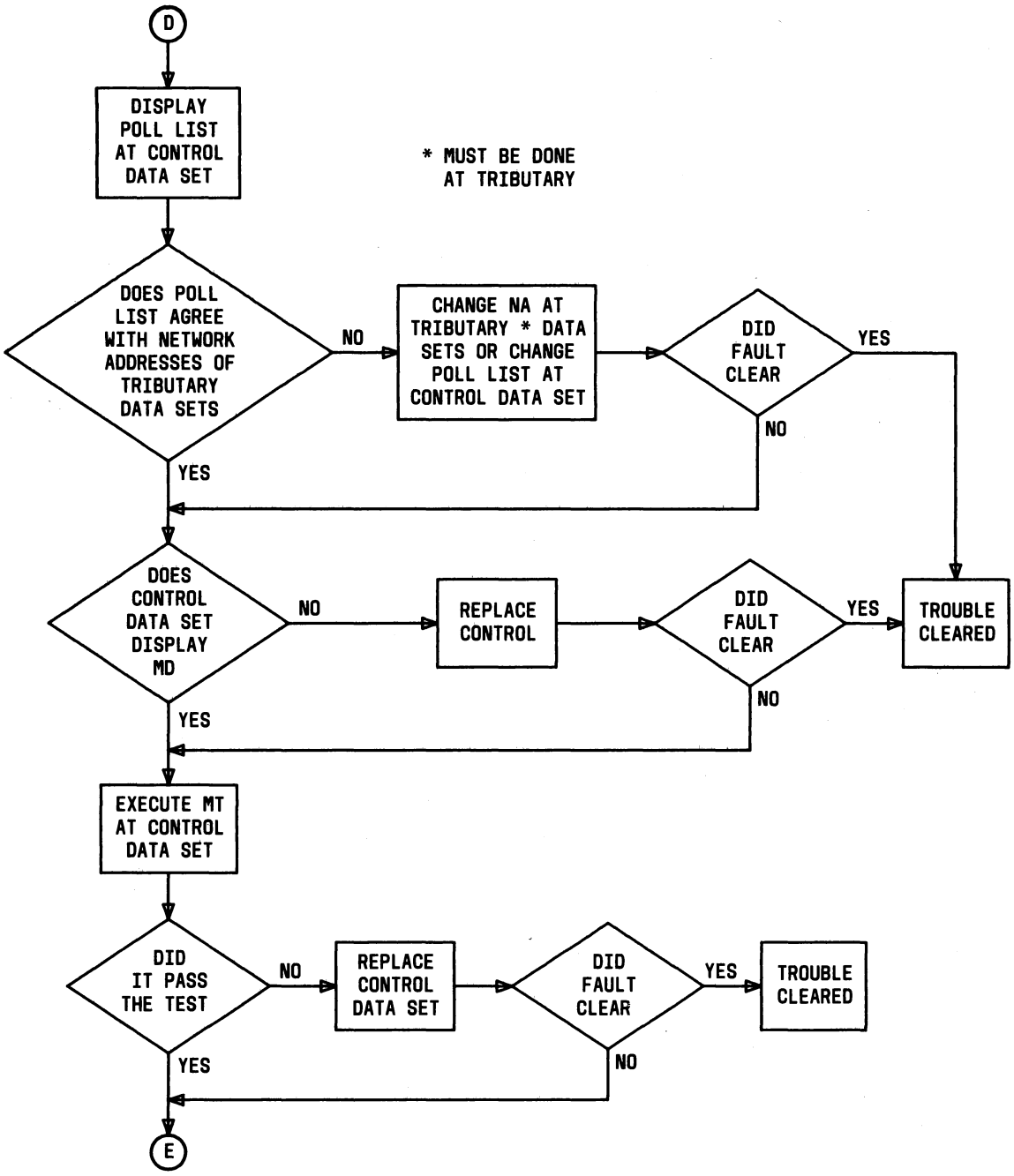


Fig. 16—Display Reads NRXX at Control Data Set—Multipoint (Sheet 4 of 5)

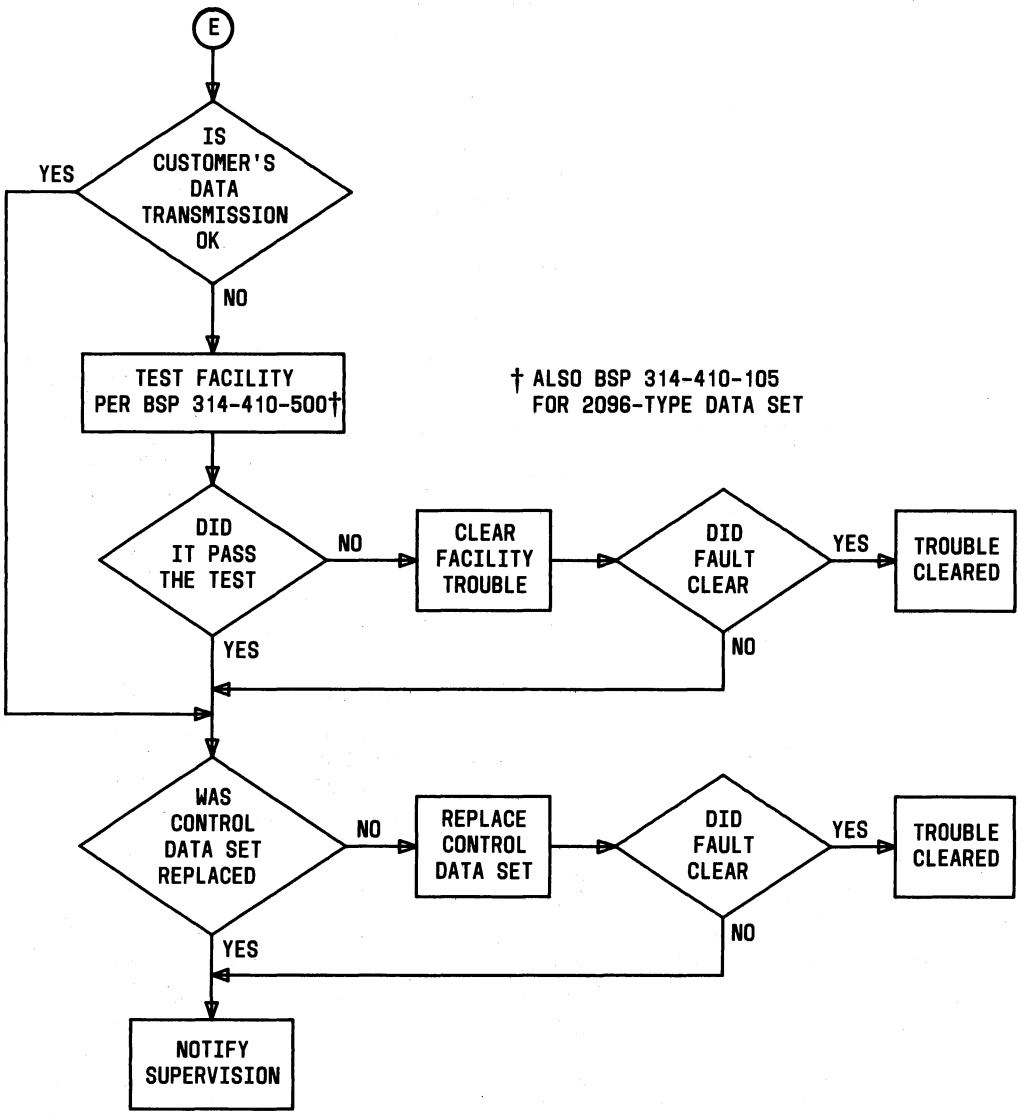


Fig. 16—Display Reads NRXX at Control Data Set—Multipoint (Sheet 5 of 5)

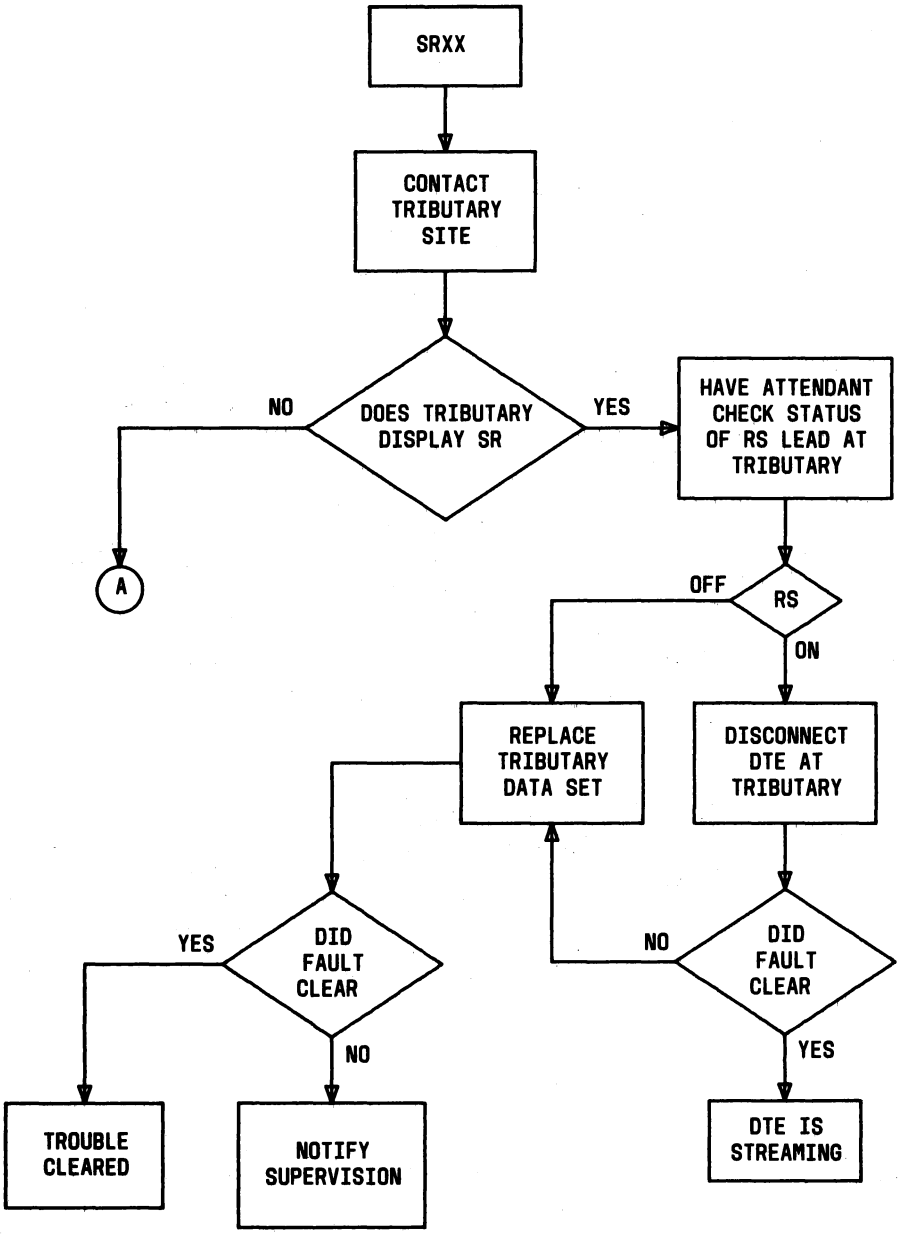


Fig. 17—Display Reads SRXX at Control Data Set—Multipoint (Sheet 1 of 2)

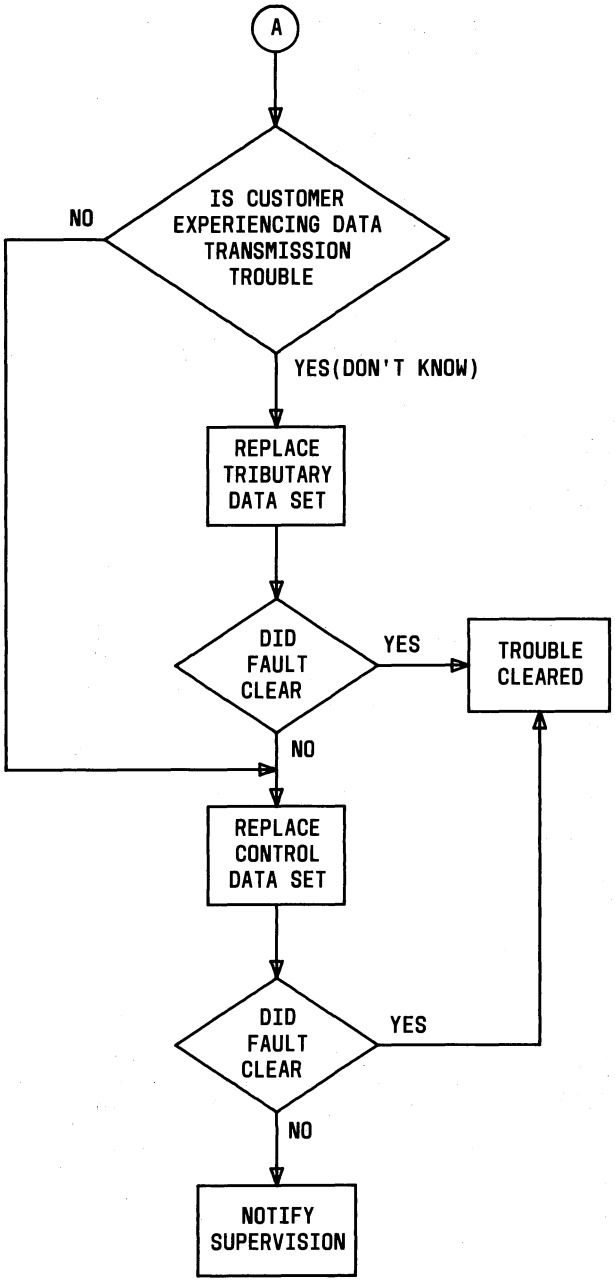


Fig. 17—Display SRXX at Control Data Set—Multipoint (Sheet 2 of 2)

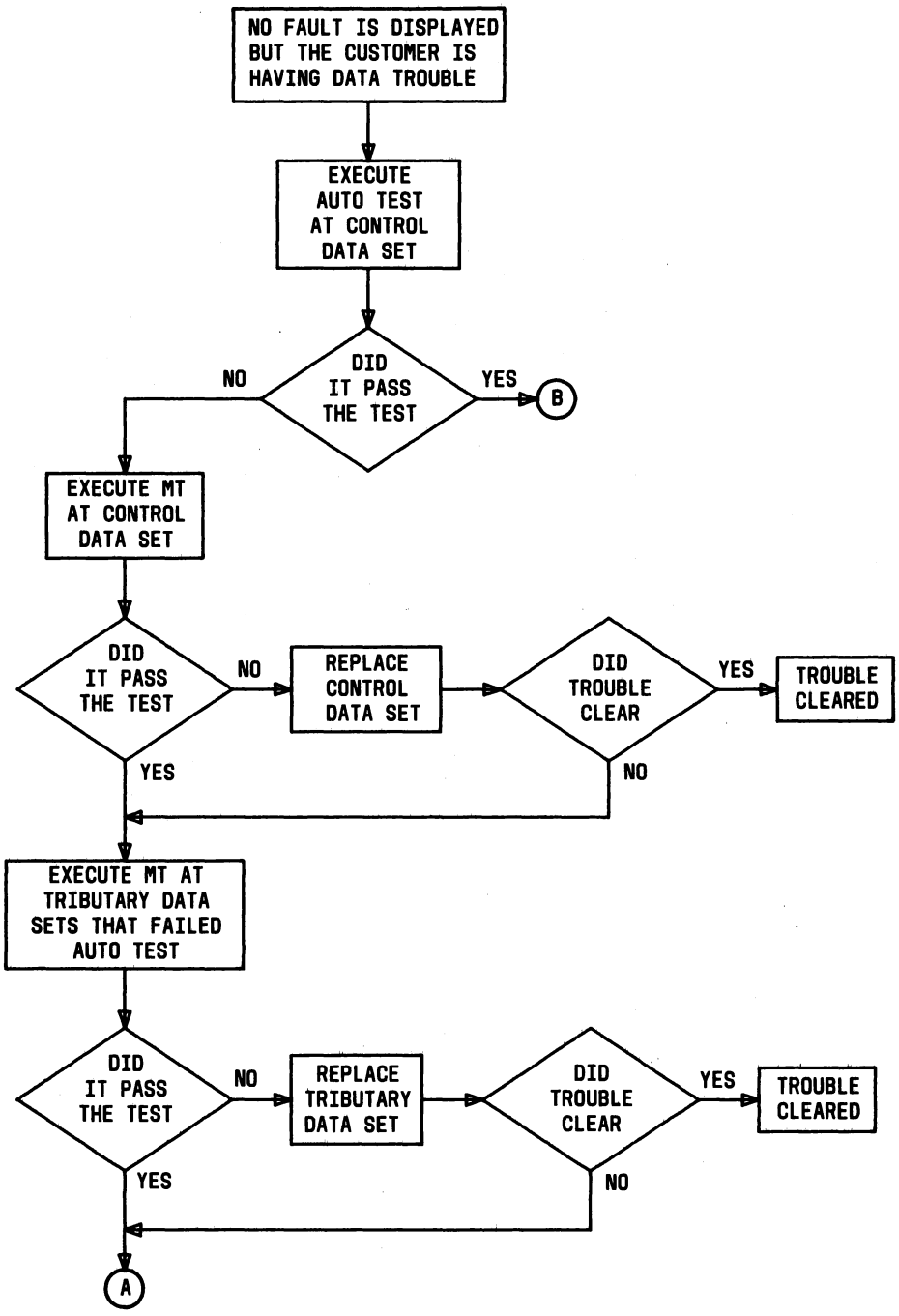


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 1 of 6)

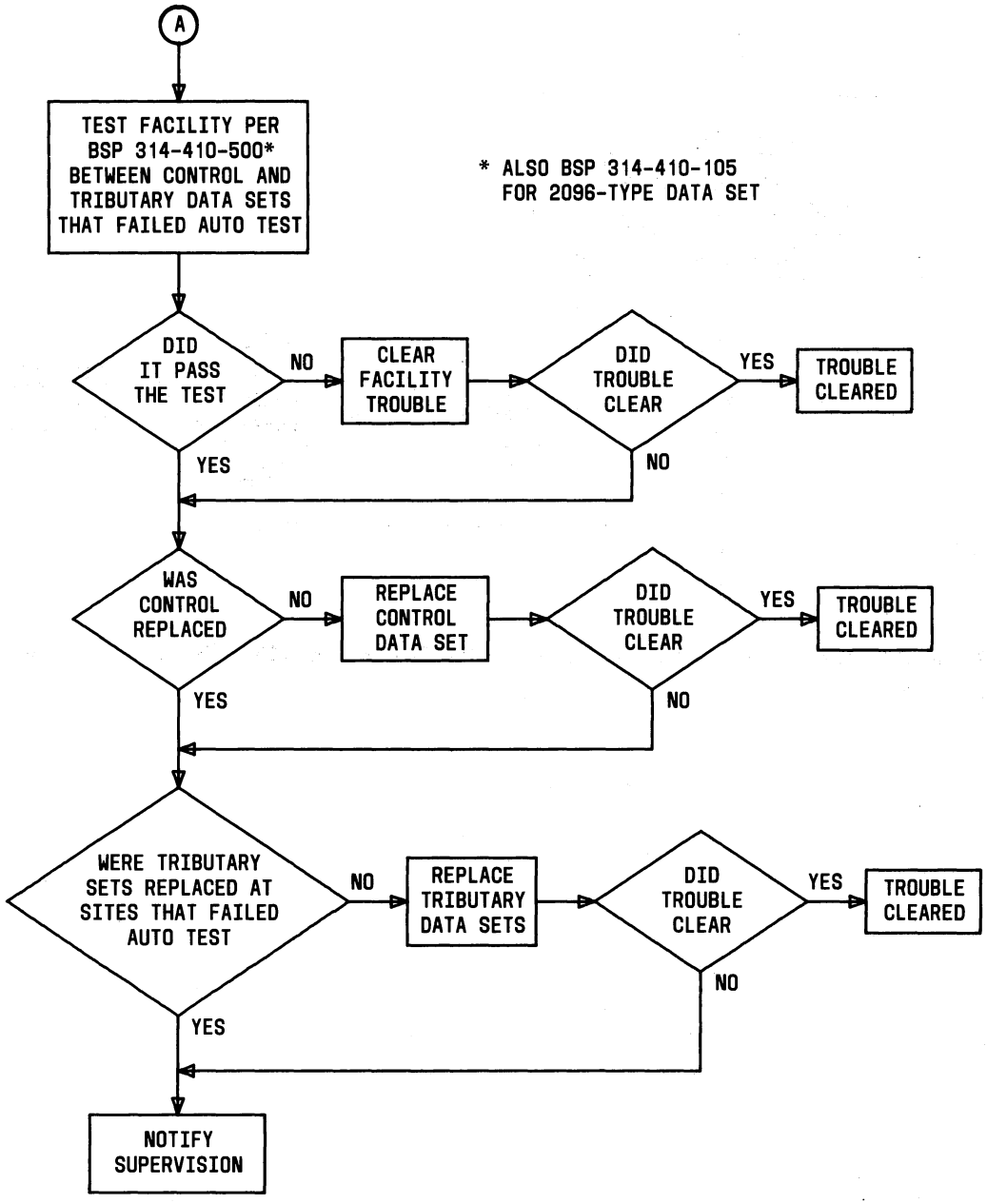


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 2 of 6)

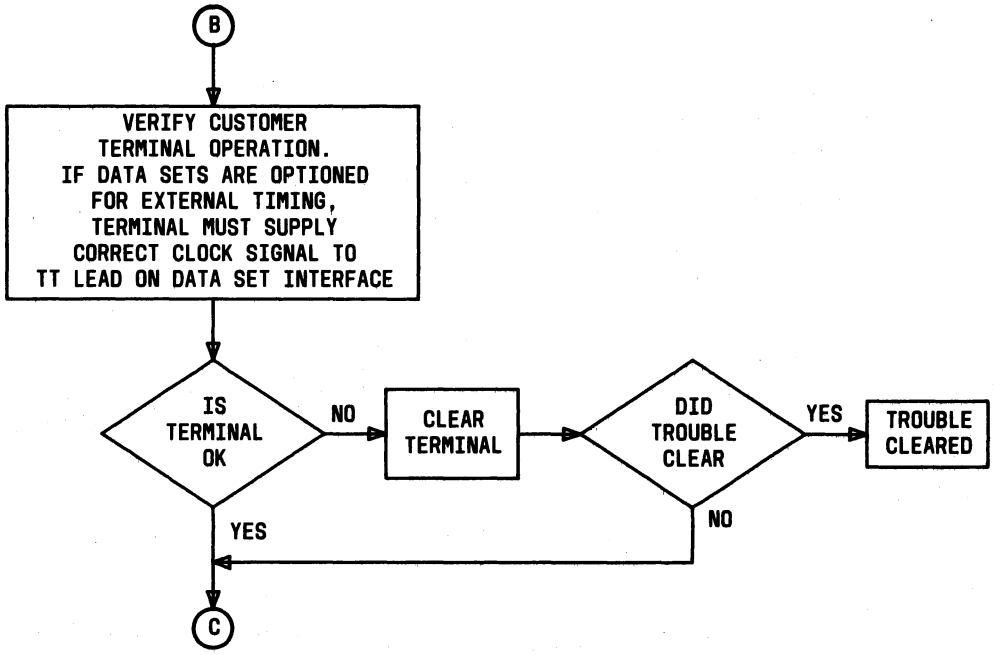


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 3 of 6)

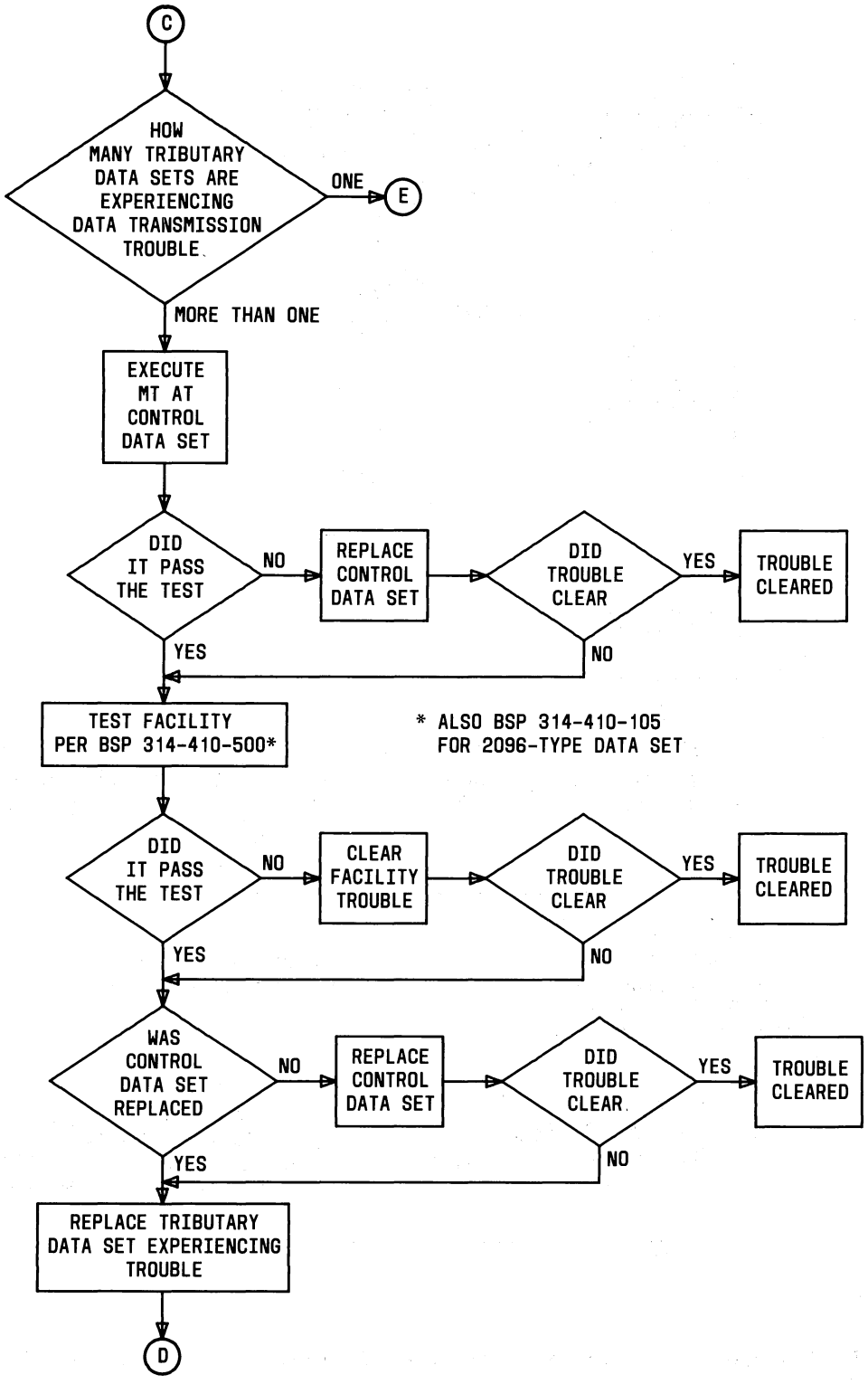


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 4 of 6)

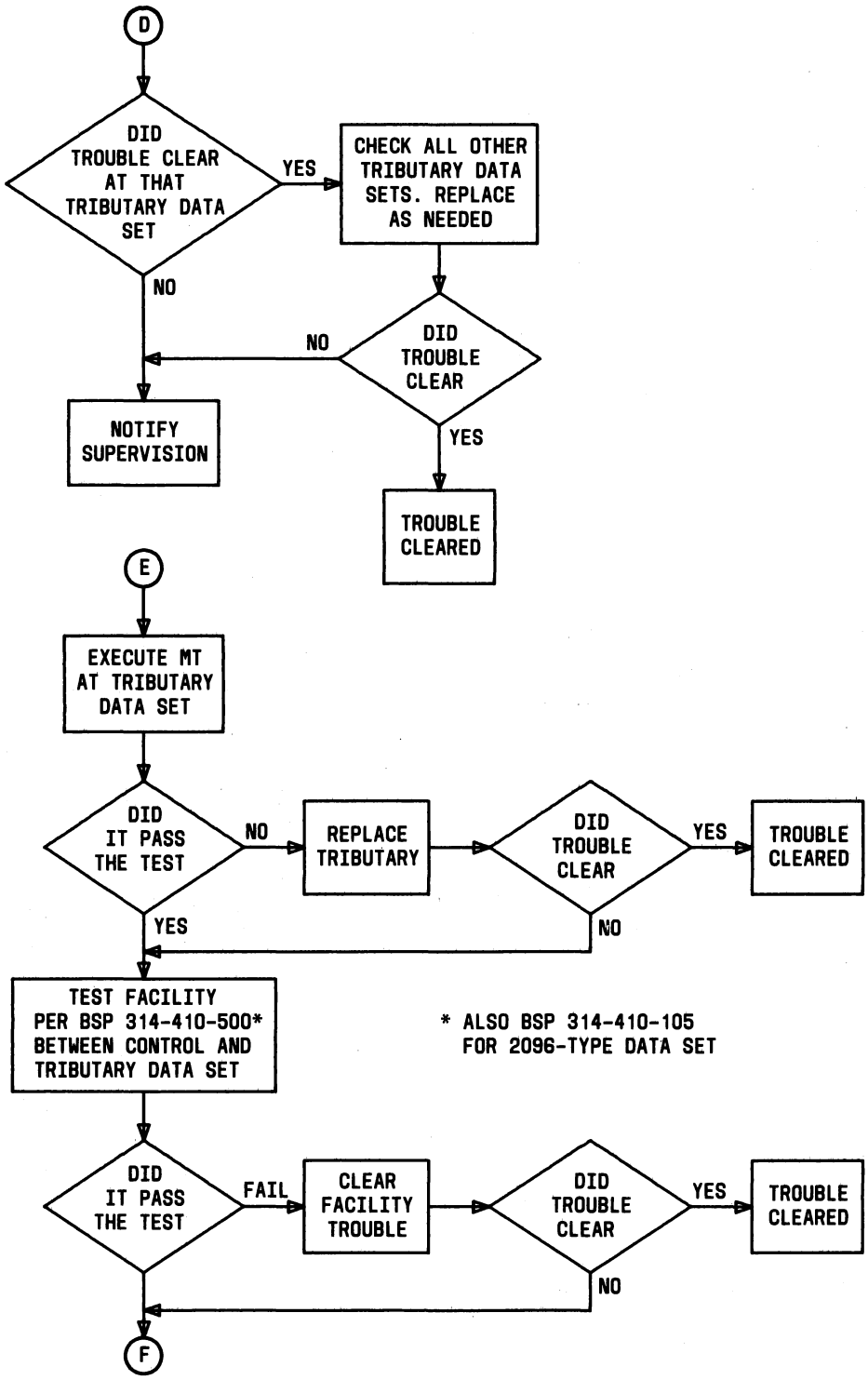


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 5 of 6)

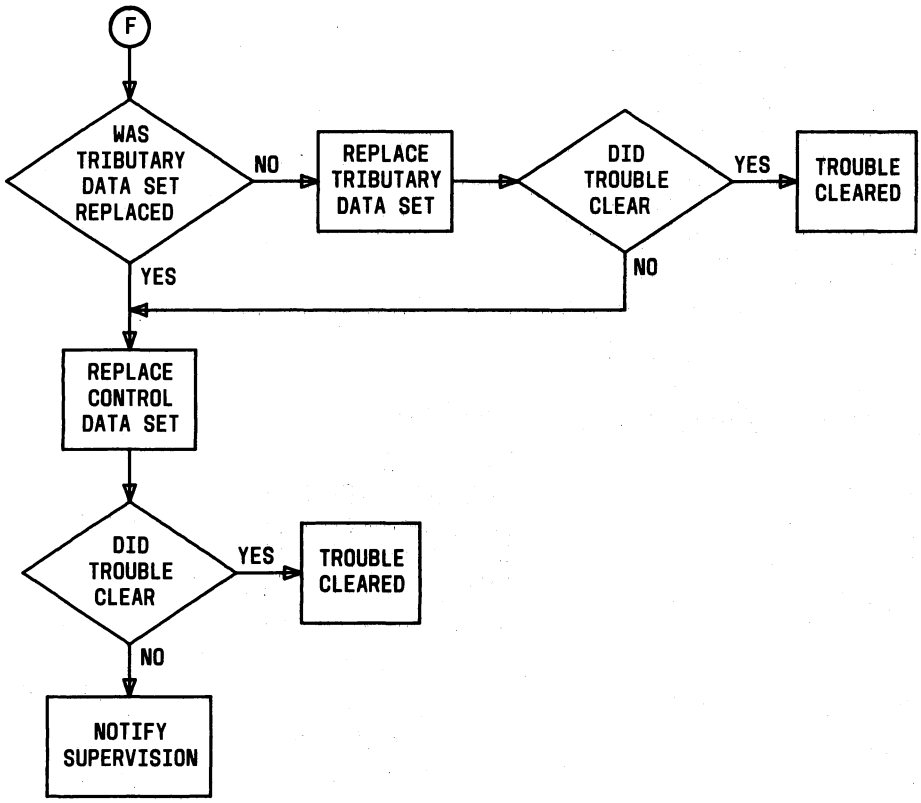


Fig. 18—No Fault is Displayed at the Data Set Display but the Customer has Data Transmission Trouble—Multipoint (Sheet 6 of 6)

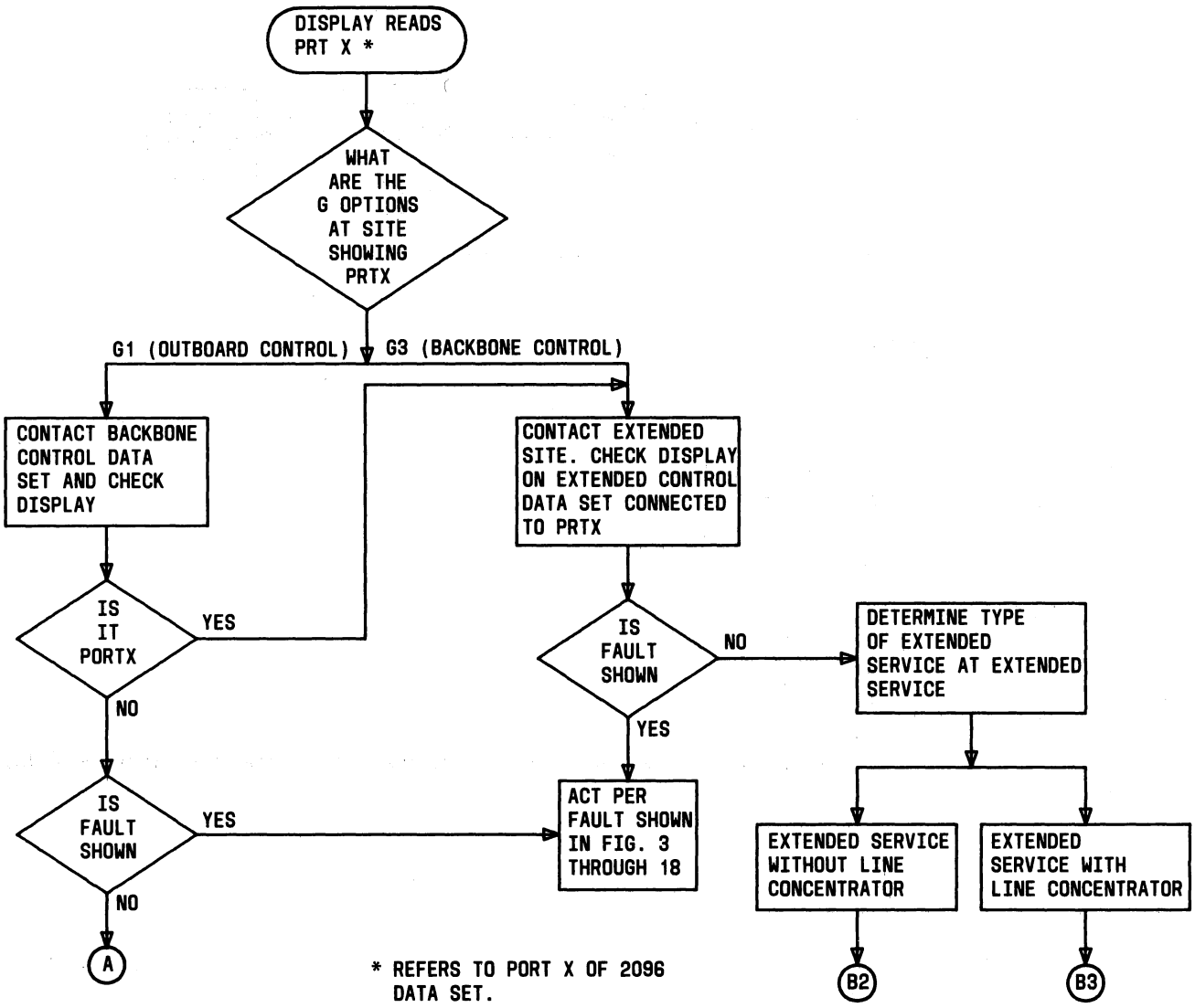


Fig. 19—Isolating Procedure at Control Data Set PRTX—Extended Service (Sheet 1 of 4)

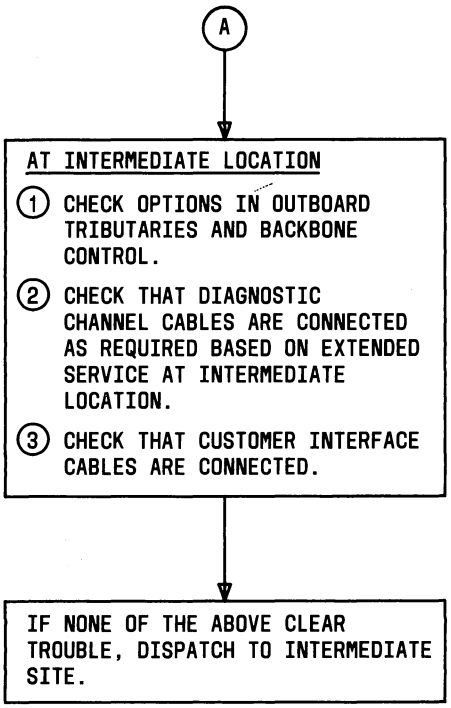


Fig. 19—Isolating Procedure at Control Data Set PRTX—Extended Service (Sheet 2 of 4)

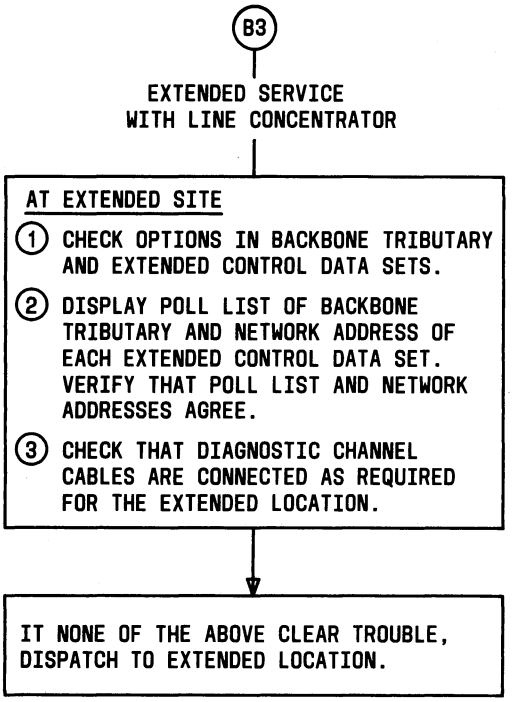


Fig. 19—Isolating Procedure at Control Data Set PRTX—Extended Service (Sheet 4 of 4)

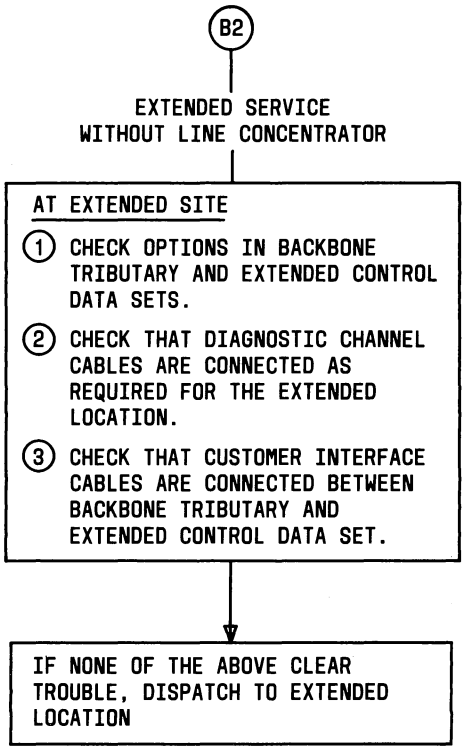


Fig. 19—Isolating Procedure at Control Data Set PRTX—Extended Service (Sheet 3 of 4)