

“PULSE* 120” – SG-1A

ELECTRONIC PRIVATE AUTOMATIC BRANCH EXCHANGE

GENERAL MAINTENANCE INFORMATION

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1. GENERAL		3.01 Accurate fault reporting assists fault diagnosis and aids in the selection of likely replacement apparatus before the employee arrives at the customer premises.
1.01 This Section describes the maintenance technique used for determining faults in the PULSE 120 Electronic Private Automatic Branch Exchange (EPABX). Faults are classified and cleared by replacing apparatus and performing operational tests in a sequence prescribed by the fault clearing flowcharts (see Sections 553-5011-503 through 553-5011-516).		
1.02 The following sections are relevant to the efficient performance of maintenance activities in EPABX:		
553-5011-501 Circuit Operations and Cabling		

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SECTION 553-5011-500

3.02 Both the initial complaint and console fault indication lamps will class the fault as one or more of the following:

- (a) power failure
- (b) control logic fault
- (c) station line fault
- (d) trunk fault
- (e) attendant console fault
- (f) optional feature fault

For fault clearing purposes, the reported faults are classified even further within these general groups.

(a) **Power Failure:** Indications of power failure are:

- a lit (FA) lamp on the attendant console and fuse alarm lamp on power shelf no. 2, indicate a blown distribution fuse
- a lit (ET) lamp on attendant console and major alarm lamp on power shelf no. 2, indicate a defective power supply or a blown main fuse
- Light Emitting Diode (LED) indications on power shelf no. 2 and monitor circuit packs.
- meter readings at specified test points deviating from the voltage operating limits
- a failure of system features
- energized central office (CO) alarm circuits.

(b) **Control Logic Fault:** The system control logic faults are localized by performing tests from the maintenance test unit circuit pack.

(c) **Station Line Fault:** A station line fault could affect a single station line, a ten's group, all the station lines on a shelf, or the complete system. The single station line fault

could affect the companion station line on the same circuit pack, i.e., station lines 10 and 11. A station line fault is classified as:

- (1) a tone fault, absence of tones and incorrect types of tone
- (2) a ringing fault, including absence of ringing and uninterrupted ringing
- (3) a transmission fault, including noisy transmission, crosstalk and absence of transmission
- (4) a dialing fault, including both the inability to dial out and the selection of wrong numbers
- (5) a station receiver off-hook fault which causes the permanent signal (PS) lamp on the attendant console to be illuminated.

(d) **Trunk Fault:** A trunk fault is classified as:

- (1) an outgoing trunk selection fault
- (2) a transmission fault
- (3) an incoming trunk fault
- (4) a trunk option fault.

(e) **Attendant Console Fault:** An attendant fault is classified as:

- (1) an operation fault
- (2) a transmission fault
- (3) a mechanical fault
- (4) a busy lamp field fault.

(e) **Optional Feature Fault:** An optional feature fault includes all faults with the individual and system station, trunk and attendant optional features. It also includes traffic measurement faults.

3.03 Classified faults *must* be related to the correct fault clearing procedure as described in Section 553-5011-503, which is the starting point for *all* fault clearing operations.

3.04 The flow chart technique, used in Section 553-5011-503 through 553-5011-516, defines step-by-step fault-clearing activities related by questions which must be answered by YES or NO.

3.05 The steps in the fault-clearing sequence are defined by four types of statements each type being enclosed in an identifying symbol (Fig. 1).

3.06 Sequences are defined by connecting the symbols with arrows, as shown in Fig. 2, which describes the use of the fault classification flowchart (Section 553-5011-503).

4. MAINTENANCE TEST UNIT

4.01 A maintenance test QPJ97-type circuit pack is used in conjunction with an NE-QSE4-type handset, or equivalent, to perform control logic tests on station lines and trunks during fault locating procedures. Test points on the front of the QPJ97-type type circuit pack permit the completion of call processing tests through the control logic only. Logic tests are performed to and from station line numbers (2)39 and (3)46. The transmission tests are performed from station line (2)39 speech-test points on the front end panel of line shelf no. 1. Calls from the speech-test points of station line (2)46 on the front end panel of line shelf no. 1 will not be monitored by the QPJ97-type circuit pack.

Note: See Section 553-5011-502 for a description of the QPJ97 type circuit pack.

5. FAULT CLEARING PROCEDURE

5.01 Before clearing any fault, ensure that the fault is within the PULSE 120 EPABX and not with the associated external equipment.

5.02 Faults in the EPABX are cleared by replacement of circuit packs, shelves or individual components as specified in the classified fault clearing flowcharts.

5.03 The flowcharts are sequentially arranged to permit rapid localization of faults within the EPABX. All fault clearing procedures *must* start with the fault classification flowchart (see Section 553-5011-503) which is arranged in the recommended fault locating sequence.

Note: Any deviation from this fault locating sequence may result in failure to locate the fault.

5.04 The recommended general sequence for locating faults in the EPABX is:

- (a) power
- (b) control logic
- (c) station line
- (d) trunk
- (e) attendant console.

Checks and tests, as indicated in the flowcharts, must be performed to determine if more than one fault is present in the system. If more than one fault is present the recommended specific fault clearing sequence is:

- (a) power
- (b) control logic
- (c) station line tones
- (d) station line ringing
- (e) trunk – outgoing selection
- (f) station line transmission
- (g) attendant console operation
- (h) attendant console transmission
- (i) trunk incoming
- (j) trunk transmission.

Remaining faults are cleared in any sequence.

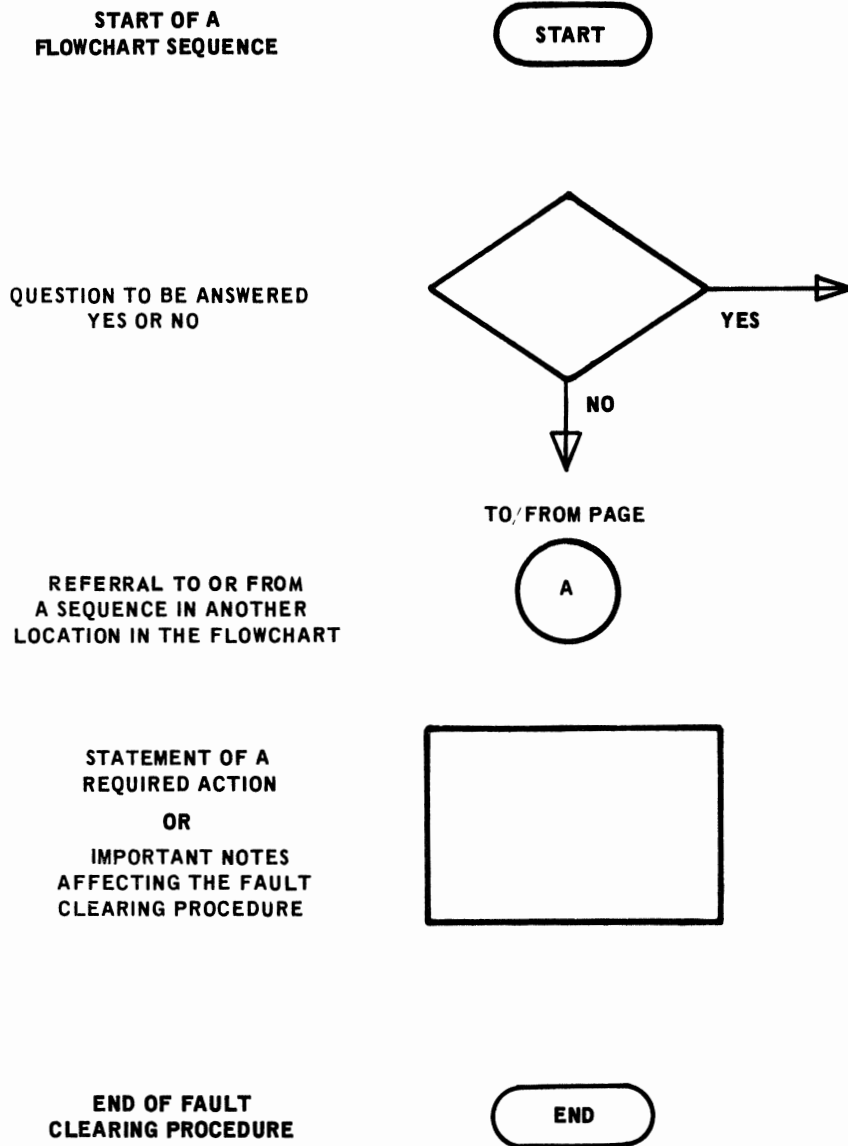


Fig. 1 – Flowchart Identification Symbols

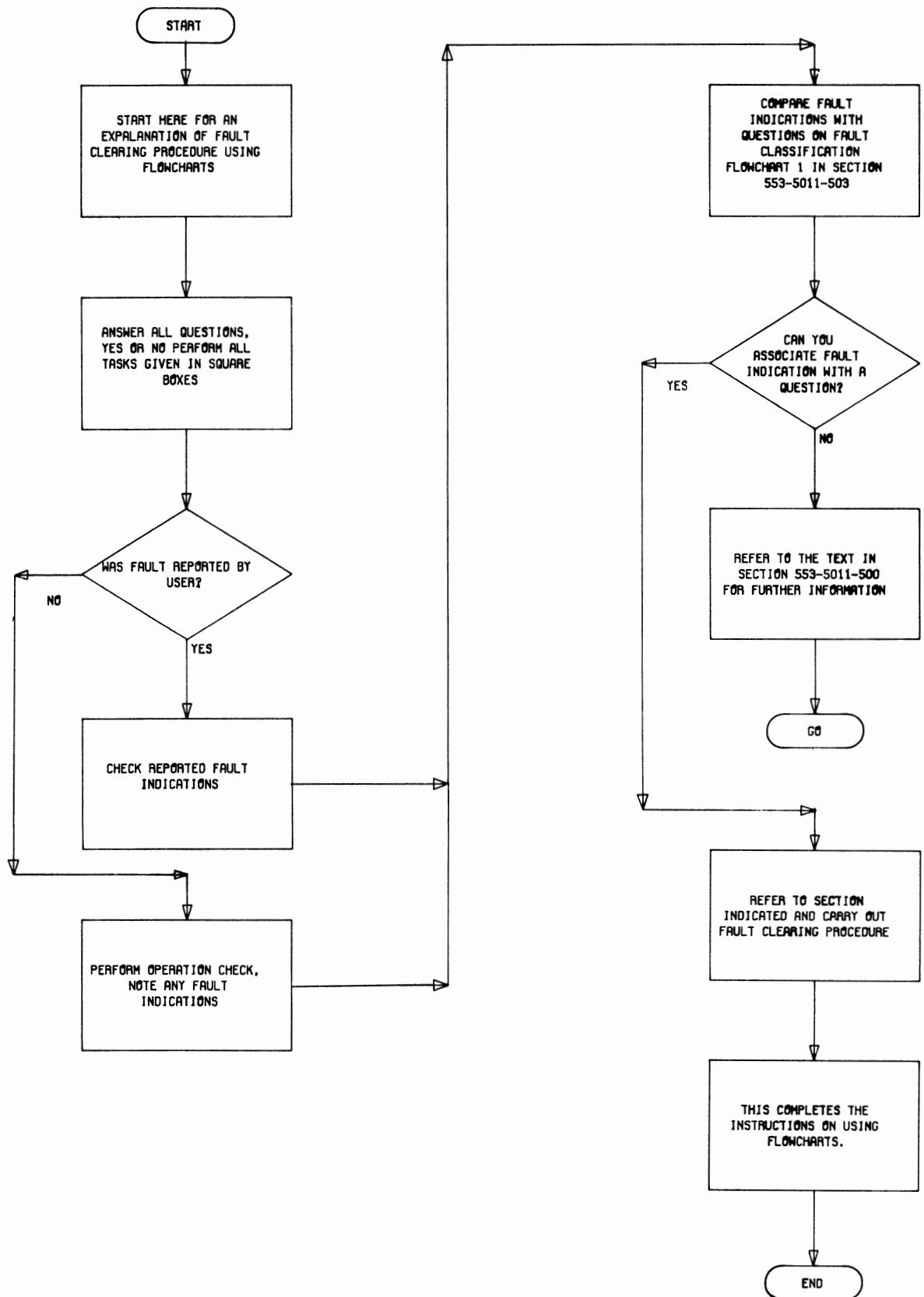


Fig. 2 – Use of Fault Classification Flowchart

SECTION 553-5011-500

5.05 When a fault clearing procedure prescribes a component substitution, operational checks must be performed on all features provided by the replaced item. After a shelf has been replaced the following checks must be made.

(a) **Power Shelf.**

- Perform power supply voltage test (see Chart 1 of Section 553-5011-503 for description).
- Perform logic test A (see Chart 1 of Section 553-5011-504 for description).
- Check all station line and attendant console features.
- Check Power Fail Transfer (PFT) feature.

(b) **Control Shelf.**

- Perform logic test A (see Chart 1 of Section 553-5011-504 for description).
- Check all station line and attendant console features.
- Check all station line Class-of-Service (COS) restrictions provided by the shelf.
- Check all trunk selection and COS restrictions.

(c) **Option Shelf.**

- Check all station line COS features and restrictions provided by the shelf.
- Check all code restrictions.

(d) **Trunk Shelf.**

- Check all trunks on the shelf.

(e) **Line Shelf.**

- Check all station lines on the shelf.

- Check station to station calling in different ten's group and to attendant console.

5.06 See Section 553-5011-202 for shelf substitution instructions.

5.07 These precautions must be observed when handling circuit packs:

- Avoid dropping the circuit pack.
- Hold circuit pack by handle, avoid handling components.
- Avoid any field repairs to circuit pack.
- Store circuit pack in a dust-free area. Dust particles will scratch the contacts on the circuit pack when it is inserted in the connector.
- Store circuit pack in a dry area at room temperature. Excessive heat will cause the circuit pack to warp.
- Avoid unnecessary insertion and removal of circuit pack in the connector. Contact life is reduced by repeated insertions.
- Avoid touching circuit pack contacts. Handling leaves dirt and grease, causing apparatus failure and reduced contact life.
- Place circuit pack in a shipping container after removing it from the shelf.

5.08 When substitution of a circuit pack is required during the fault clearing procedure, the contacts on the new circuit pack must be cleaned before inserting it into the connector.

5.09 To clean contacts on circuit packs and connectors use a freon grease solvent (Freon T.F. Degreaser, type MS-180 is recommended. This solvent is manufactured by Miller Stephenson Chemical Co. Inc., 1001 East 1st St., Los Angeles, 1350 West Fullerton Ave., Chicago, 156 Front St. West, Toronto). The solvent is sprayed on the contacts and all residues are removed with a clean nylon brush.

5.10 When connector contacts are cleaned, a sheet of paper or cloth is placed beneath the connector to prevent the grease residues from falling onto other contacts in the EPABX.

Note: Do not use a wire brush or emery cloth to clean contacts.

5.11 If different or additional faults or both are created in the system by substituting a circuit pack, then tag and return the replacement as a defective unit.

5.12 If the fault is not cleared by substitution of a circuit pack, the original circuit pack must be reinserted in the connector.

5.13 When the fault clearing procedure is completed, make a visual check to ensure

that all circuit packs are well seated in their connector. Ensure that all screws are tight in connector plugs and jacks. See Section 553-5011-501 for the EPABX internal cable arrangement.

6. DISPOSAL OF DEFECTIVE APPARATUS

6.01 When shipping defective PULSE 120 EPABX apparatus for repair, the apparatus must be packed in a suitable container (see Section 553-5011-201 for description).

6.02 Information tags describing the nature of the defect are attached to the defective apparatus. A faulty circuit pack is tagged through the hole in the circuit board closest to the handle to avoid obstruction during repair testing procedures.