# DR 6/11-135A and 135EC 1×N Frequency Diversity Operation and Maintenance Start Here

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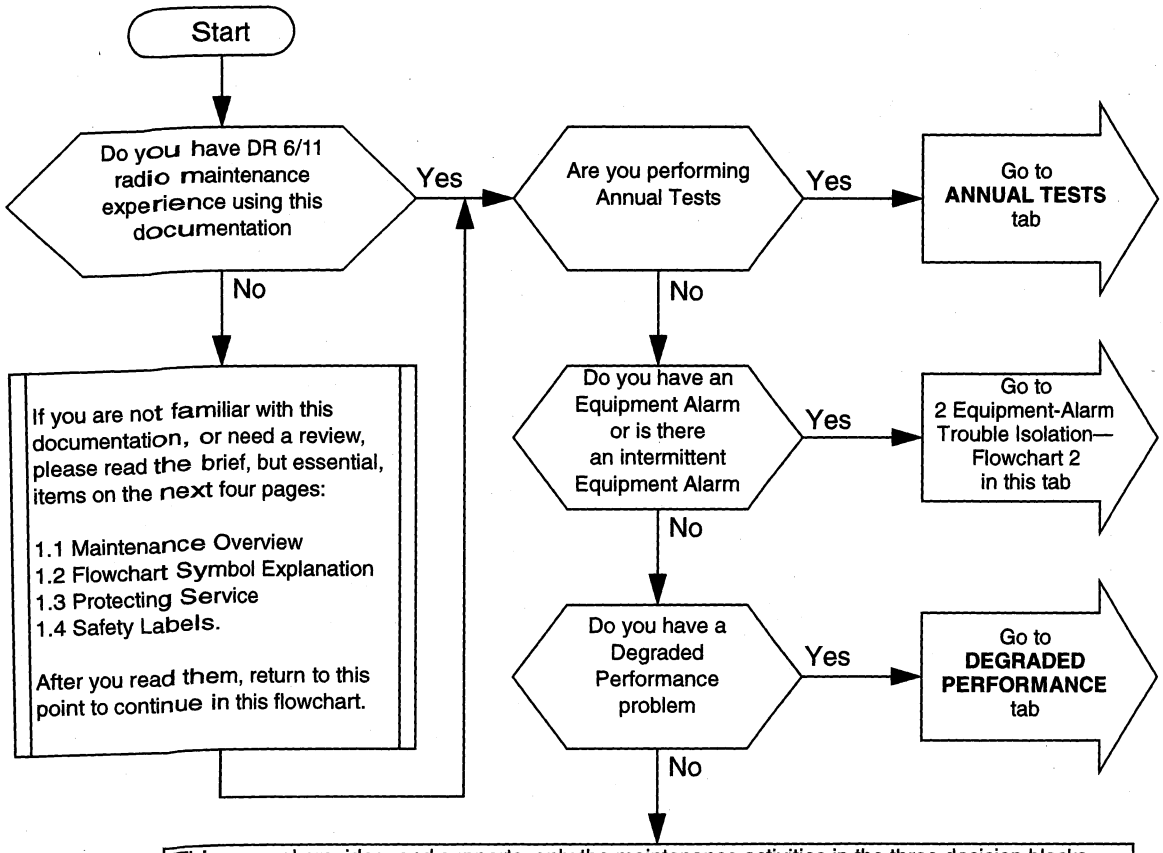
# 1 Start Here

Flowchart 1 is the starting point for **any** DR 6/11 maintenance activity.




This manual provides, and supports, only the maintenance activities in the three decision blocks.

Manual switching operations can be found in the **OPERATIONS** tab.

For alarm and performance reporting problems, refer to 3 Station Alarm-Reporting Path (this tab).

Additional information is provided in the MAINTENANCE SUPPORT Manual and includes:

- Bay and circuit pack descriptions
- Equipment identification
- Controls, jacks, indications, and options
- Special replacement procedures
- Special tests (DADE, EDD, Fade Margin, etc.).

For Order Wire and user service channels (W, X, Y, and Z), refer to 7.5 SERVICE CHANNEL.

Reference:
940-300-140,
System Description and Application Engineering—
**SYSTEM DESCRIPTION** tab

**Flowchart 1. Start Here**

## 1.1 Maintenance Overview

There are only two reasons to perform DR 6/11 radio maintenance:

a. Annual tests

b. Trouble isolation.

Annual tests must be performed annually to meet performance objectives and Federal Communications Commission (FCC) compliance.

Trouble is further divided into either of two types:

a. **Equipment alarms** are troubles reported by the Transport Servicing Center (TSC) in which a piece of equipment has failed or an operating level is out of range. At the equipment location, the COM ALARM indicator light has lighted to indicate the presence of an Equipment Alarm in the station. An indicator on a CHAN CONTR will light to identify the failed equipment and the affected channel. To clear an equipment alarm, you will follow a flowchart path to isolate the problem, replace or adjust the defective equipment, and perform any tests needed to bring the channel to optimum performance.

b. **Degraded performance**, also reported by the TSC, refers to error performance indications that performance has exceeded one or more specified thresholds. At this level of performance, service is now, or soon may be, impaired. In most cases, the TSC will be able to identify the radio hop with the Performance Trouble. You may request assistance from the TSC and/or the Technical Support Group (TSG) in determining whether the trouble is most likely to be at the transmit end or the receive end of the suspected hop.

Flowchart 1, Start Here, is the starting point for any DR 6/11 maintenance.
In that flowchart, you will be directed to one of these three maintenance paths:

a. Annual Tests

b. Equipment-Alarm Trouble Isolation

c. Degraded-Performance Trouble Isolation.

The equipment bays, shelves, and individual units are identified in the Maintenance Support Manual. The plug-in circuit packs are identified by labels on the faceplate latch lever and the shelf. To assist in identification, these labels are color-coded as follows:

- Control plug-in—green
- Service channel plug-in—yellow
- Power unit plug-in—white
- Transmit plug-in—red
- Receive plug-in—blue.

## 1.2 Flowchart Symbol Explanation

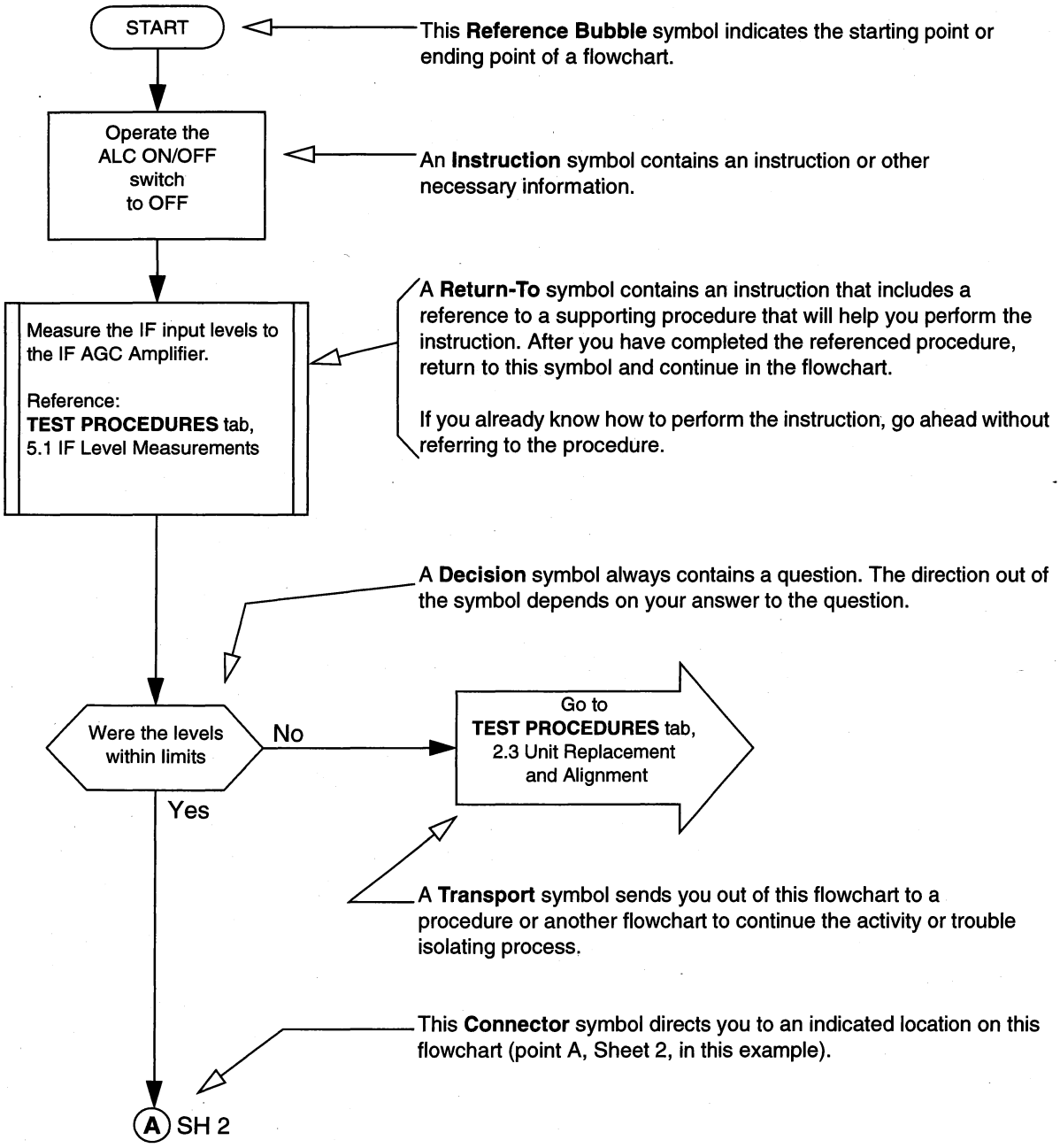



**Figure 1. Flowchart Symbol Explanation**

## 1.3 Protecting Service

During any maintenance activity, preventing any impairment of a customer's service must always be a consideration.

Although some tests and procedures may be performed on an in-service channel, you must always remain alert to any activity that might affect service on that, or an adjacent, channel.

Before you perform any out-of-service procedure, you must arrange for service on that channel to be protected by initiating a request to the Transport Servicing Center (TSC) for a channel release. In most cases, the TSC will perform any necessary switching or lockout operations.

Although there are exceptions, service protection generally consists of one of the following:

a. For maintenance on a Regular Channel, service must be **manually** switched to the Protection Channel. There are two types of switches.

   — Line (errorless)

   — Span (causes DS3 impairment while switch is being activated or deactivated).

   The type of switch required is dependent on the trouble condition or the equipment needing protection.

**CAUTION:**
*To prevent service interruptions while performing maintenance procedures, over-ride any automatic switch with a manual switch of the same type.*

b. For maintenance on a Protection Channel, that channel must be manually locked out to keep service off of it.

For specific information as to the type of Service Protection needed for any test, and how to provide it, refer to the **SERVICE PROTECTION** tab.

## 1.4 Safety Labels

Safety labels are strategically-placed symbols and messages that will alert you to potential risks. There are three types of safety labels in descending order of priority are as follows:

1. **DANGER** indicates the presence of a hazard that **will** cause death or severe personal injury if the hazard is not avoided.
2. **WARNING** indicates the presence of a hazard that **can** cause death or severe personal injury if the hazard is not avoided.
3. **CAUTION** indicates the presence of a hazard that **will** or **can** cause minor personal injury or property damage if the hazard is not avoided.

Within the **CAUTION** safety label, the term "property damage" refers also to possible service interruption or impairment.

Safety labels at the start of a procedure apply to activities within that procedure. CAUTION safety labels may also precede a service-threatening step. Here are some examples of safety labels that apply to radio maintenance activities:

**WARNING:**
*RF radiation greater than 1 milliwatt may cause bodily harm. Do not open any radio transmitter RF connection until the IF drive signal has been removed.*

**CAUTION:**
*This is an Out-of-Service procedure. Service will be interrupted or impaired unless you apply Service Protection measures.*

**CAUTION:**
*Service will be interrupted or impaired if you operate the ALC ON/OFF switch or make an adjustment on an in-service radio bay.*

**CAUTION:**
*Electrostatic Discharge (ESD) may damage plug-in units. To prevent ESD damage, follow these recommended methods of removing, replacing, handling, and storing circuit packs:*

a. Transport plug-in units in an antistatic container.
b. Wear a ground wrist strap when you handle any plug-in not in a container.
c. Keep all static materials such as plastic, tape, paper, and plastic foam away from plug-in units.
d. Place plug-in units on a conductive mat or in a conductive container when not in use.
e. Treat a failed plug-in with the same precautions as a new unit.

# 2 Equipment-Alarm Trouble Isolation

Flowchart 2 is the first step in the equipment-alarm trouble isolation process. In this flowchart, a lighted COM ALARM lamp verifies the presence of an equipment alarm at this station.

Lighted indications on a Channel Controller (CHAN CONTR) will lead you to the affected channel and to the "equipment group" (radio receiver, terminal/regenerator, or radio transmitter) that has the alarmed equipment unit.

You must follow the flowchart path so you will, in the unlikely occurrence of a multiple failure, isolate the troubles in the correct sequence.

When you leave this flowchart, you will go to one of the three equipment groups:

- Radio Transmitter
- Radio Receiver
- Terminal/Regenerator.

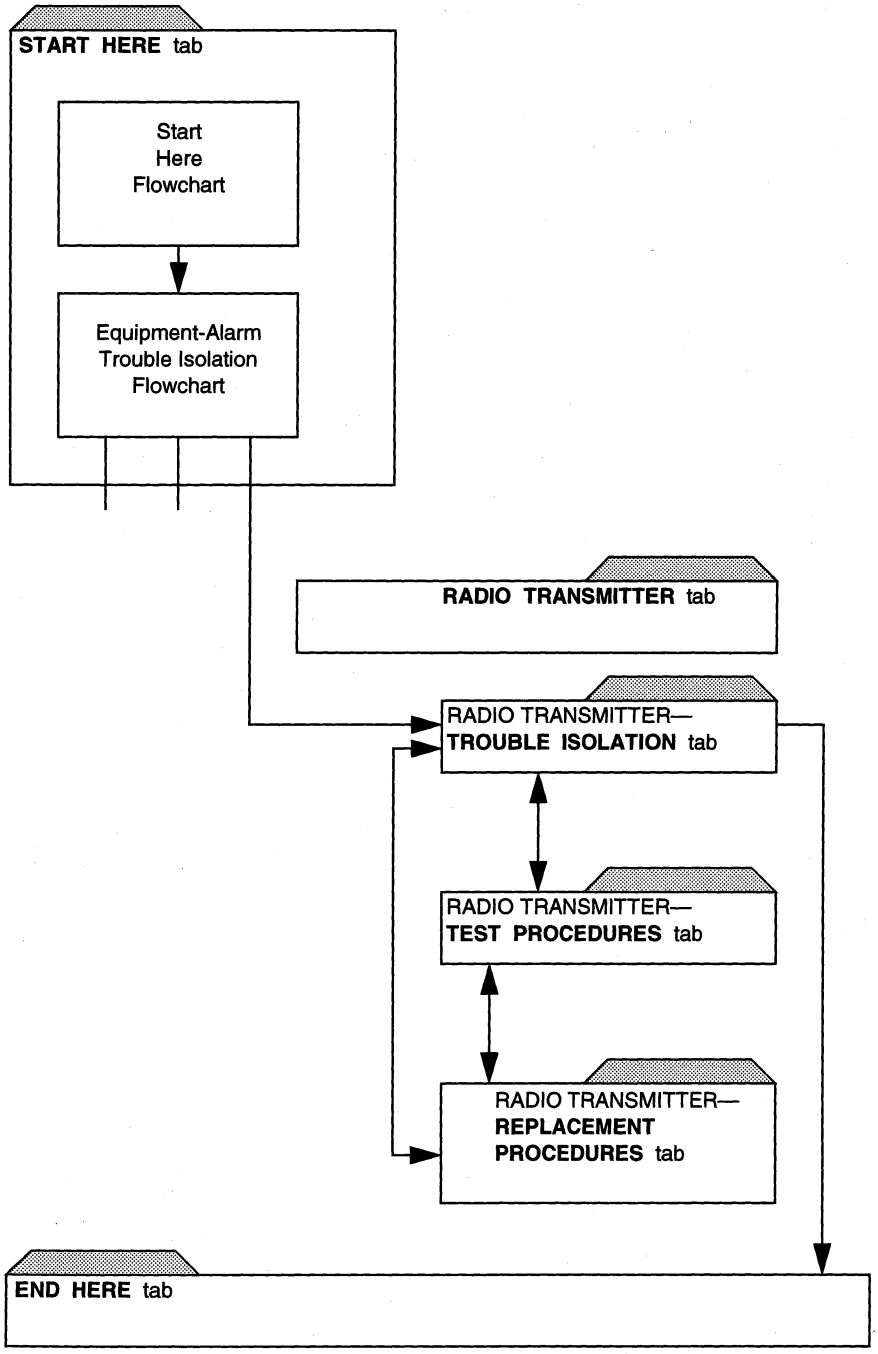
In each of the three equipment groups are three sections, with these tabs:

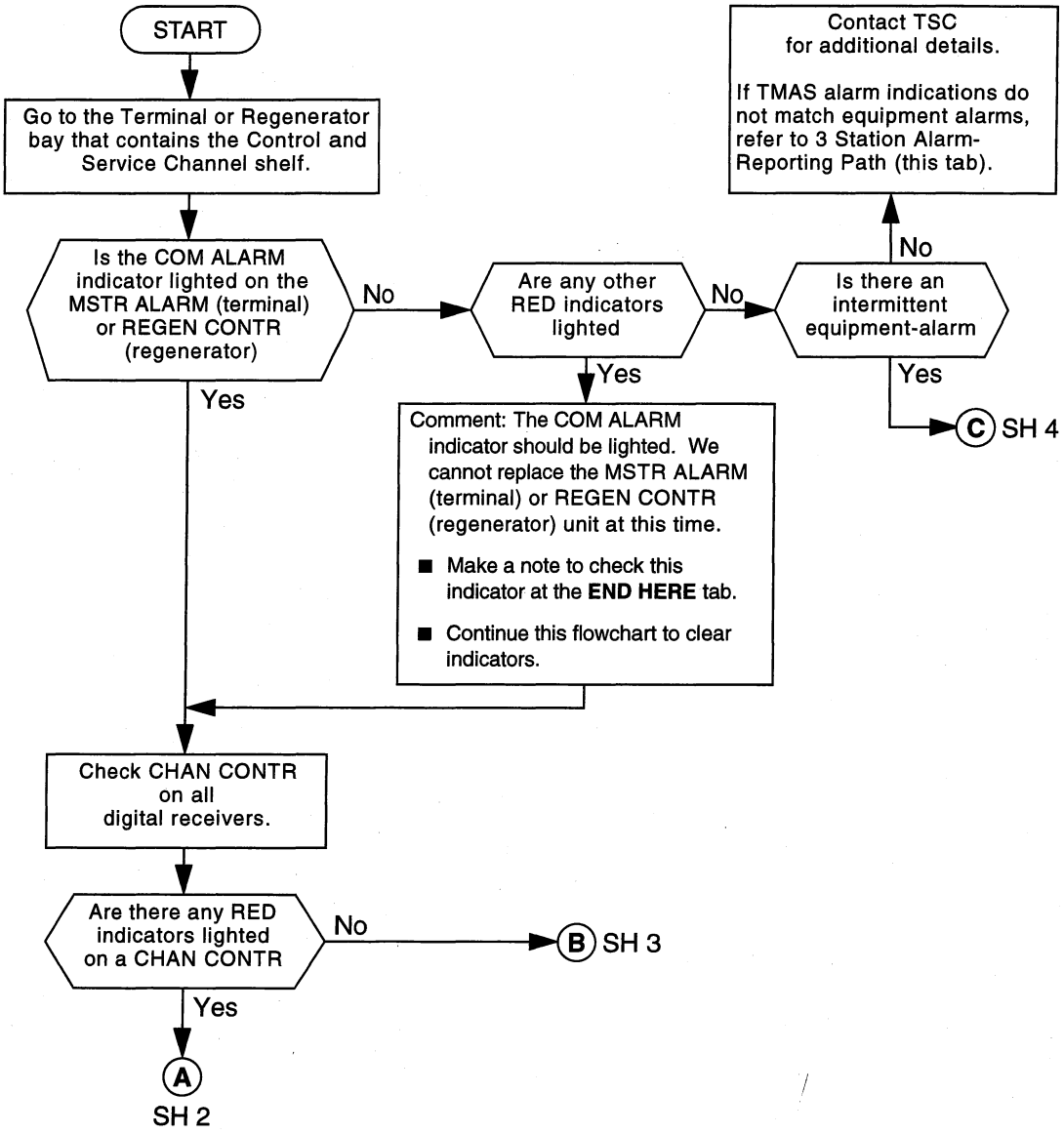
- Trouble Isolation
- Test Procedures
- Replacement Procedures.

From Flowchart 2, you will be referred to the Trouble Isolation flowchart in the appropriate equipment group. The Trouble Isolation flowchart will direct you to Test Procedures and Replacement Procedures as required.

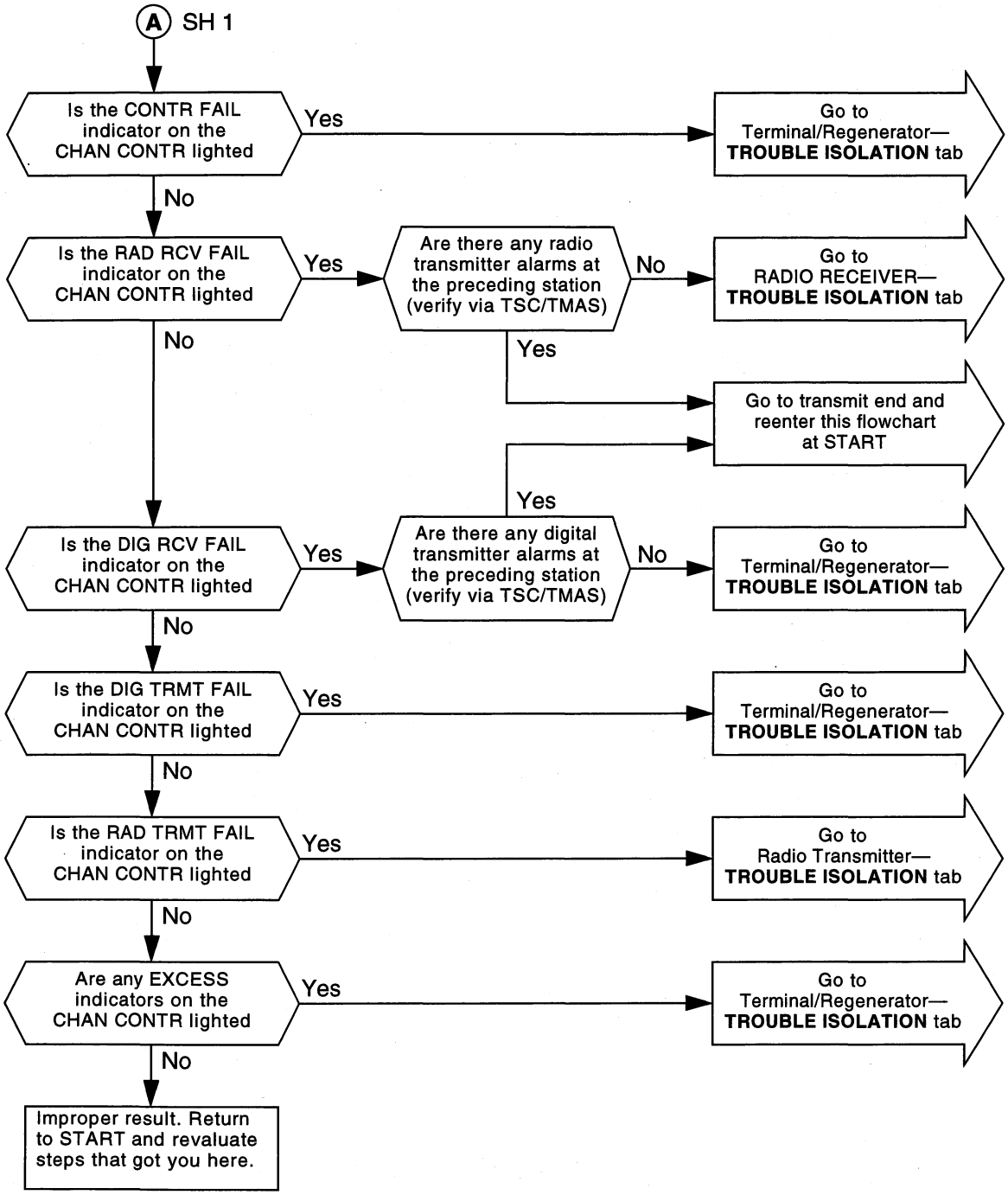
Normally, you will not leave the equipment group until the trouble has been cleared and any required tests performed. At that time, you will be referred to the **END HERE** tab for final checks.

Below is an illustration of one equipment group, the Radio Transmitter, and its three internal associated sections. The Radio Receiver and Terminal/Regenerator groups are structured accordingly.

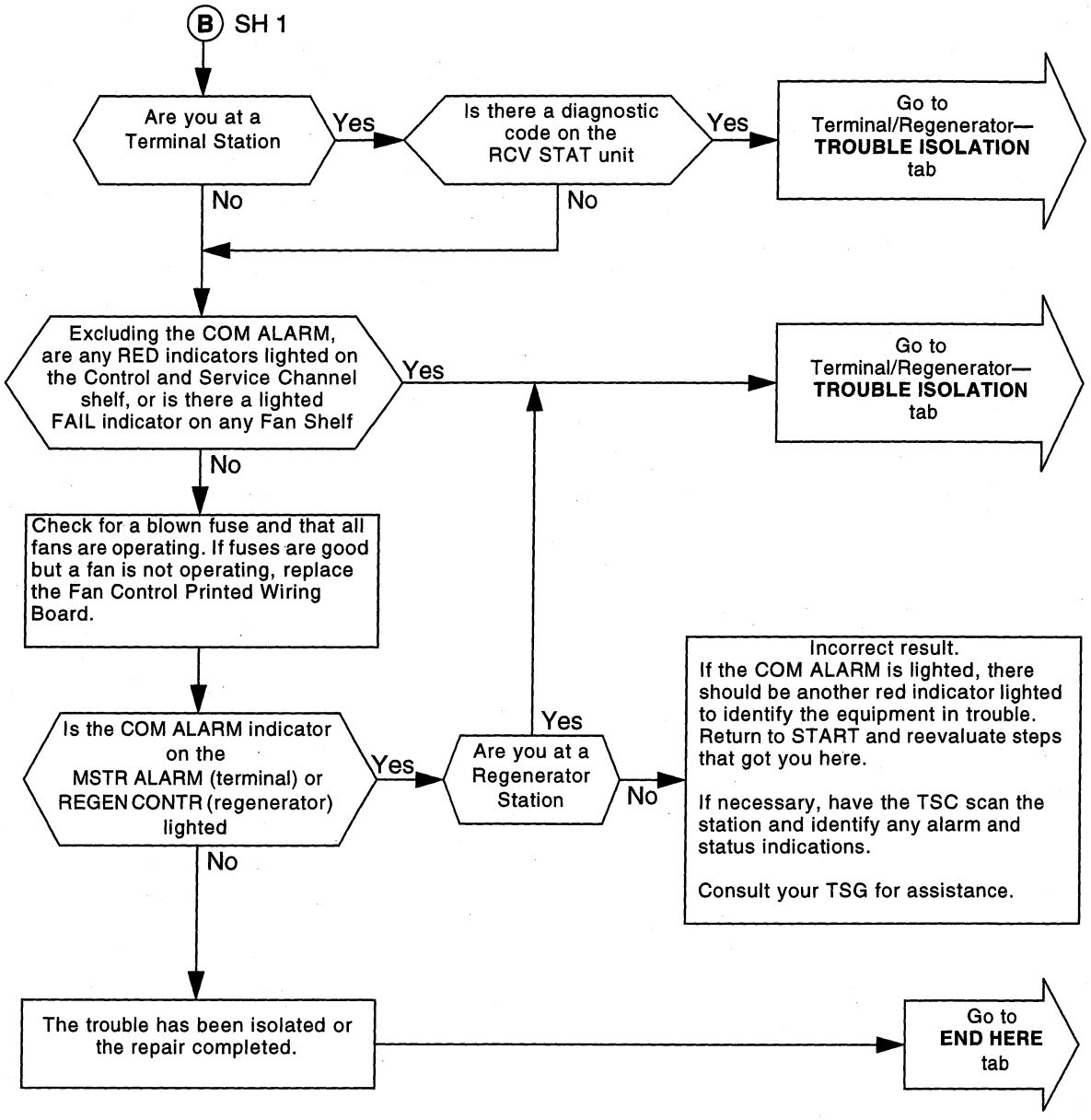





**Flowchart 2. Equipment-Alarm Trouble Isolation (Sheet 1 of 4)**

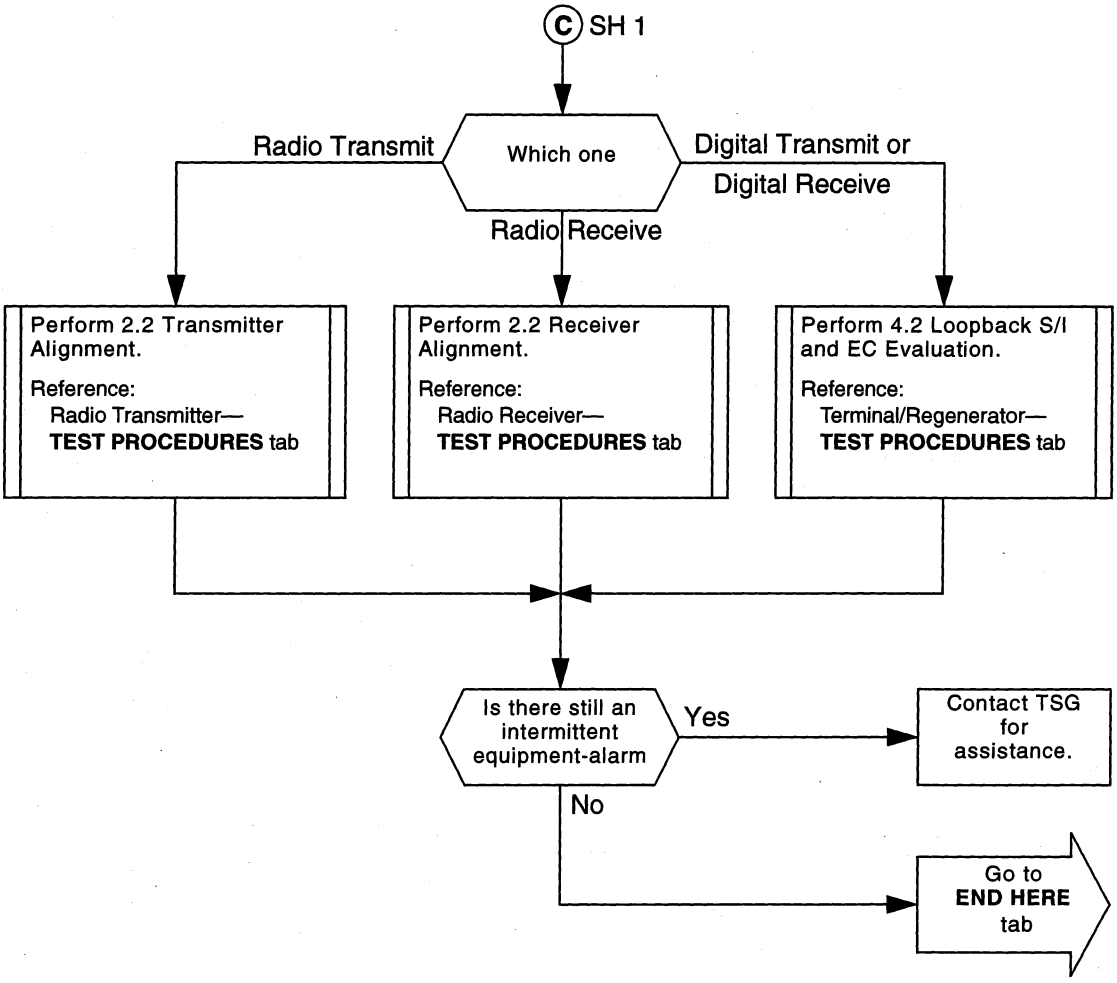



**Flowchart 2. Equipment-Alarm Trouble Isolation (Sheet 2 of 4)**




**Flowchart 2. Equipment-Alarm Trouble Isolation (Sheet 3 of 4)**

**Prerequisite:** Intermittent equipment-alarm




**Flowchart 2. Equipment-Alarm Trouble Isolation (Sheet 4 of 4)**

# 3 Station Alarm-Reporting Path

Alarm-reporting signal paths are illustrated in Figure 2 (Terminal) and Figure 3 (Regenerator). These diagrams show how alarms are combined and processed in the Channel Controllers and the signal paths through local equipment before transmission to the TSC.

If local alarm indications do not match TSC-reported conditions, these figures may help you isolate the problem.

The following tools may be useful in isolating a performance or alarm reporting problem.

- GTP SIM program with PC and interface adapter
- HP* 4951 Protocol Analyzer.

Contact TSC and TSG for ideas and suggestions. Sometimes, only a simple reset is needed.

*Registered trademark of Hewlett-Packard Company.

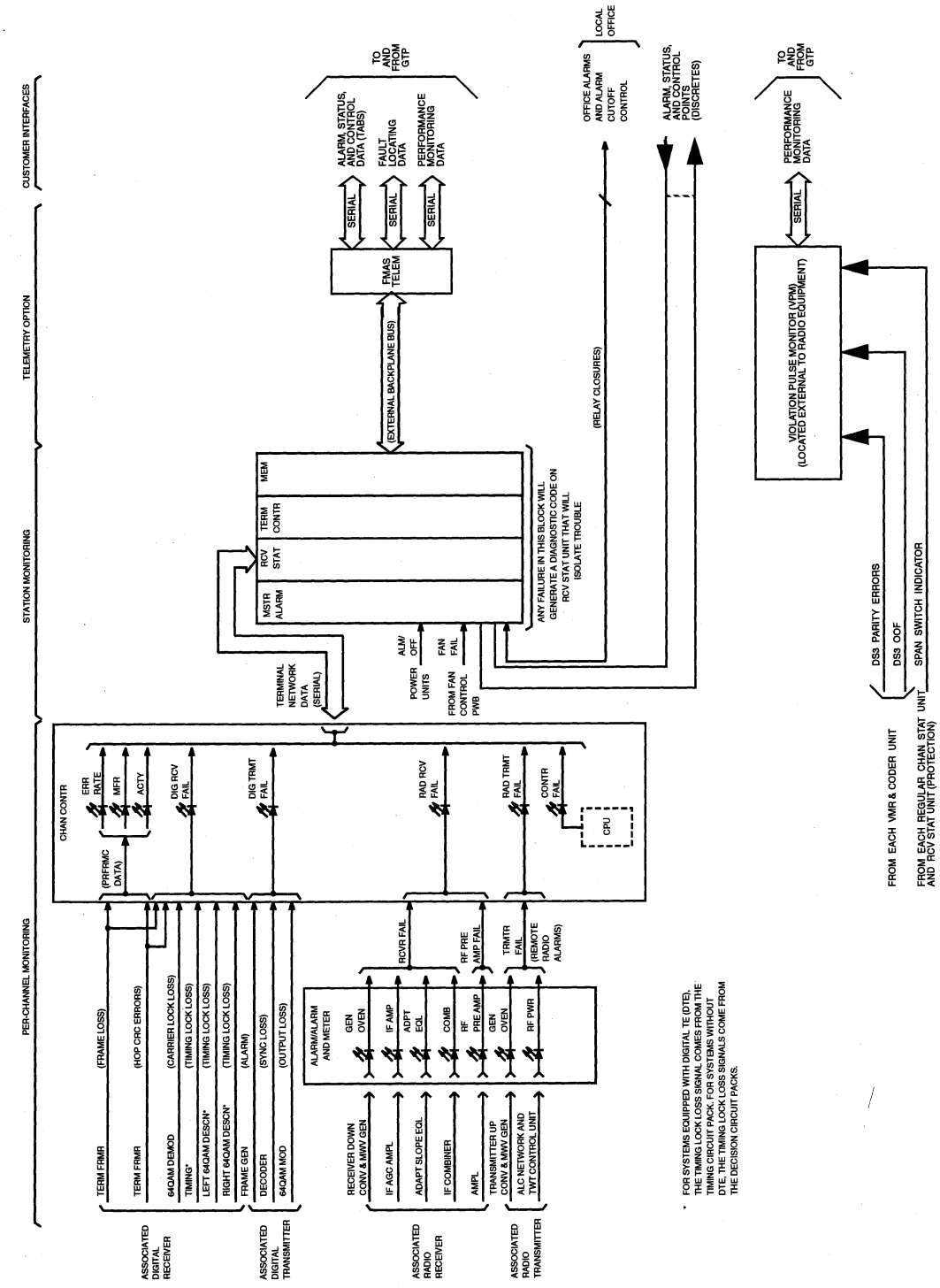



**Figure 2. Terminal Station Alarm-Reporting Path**

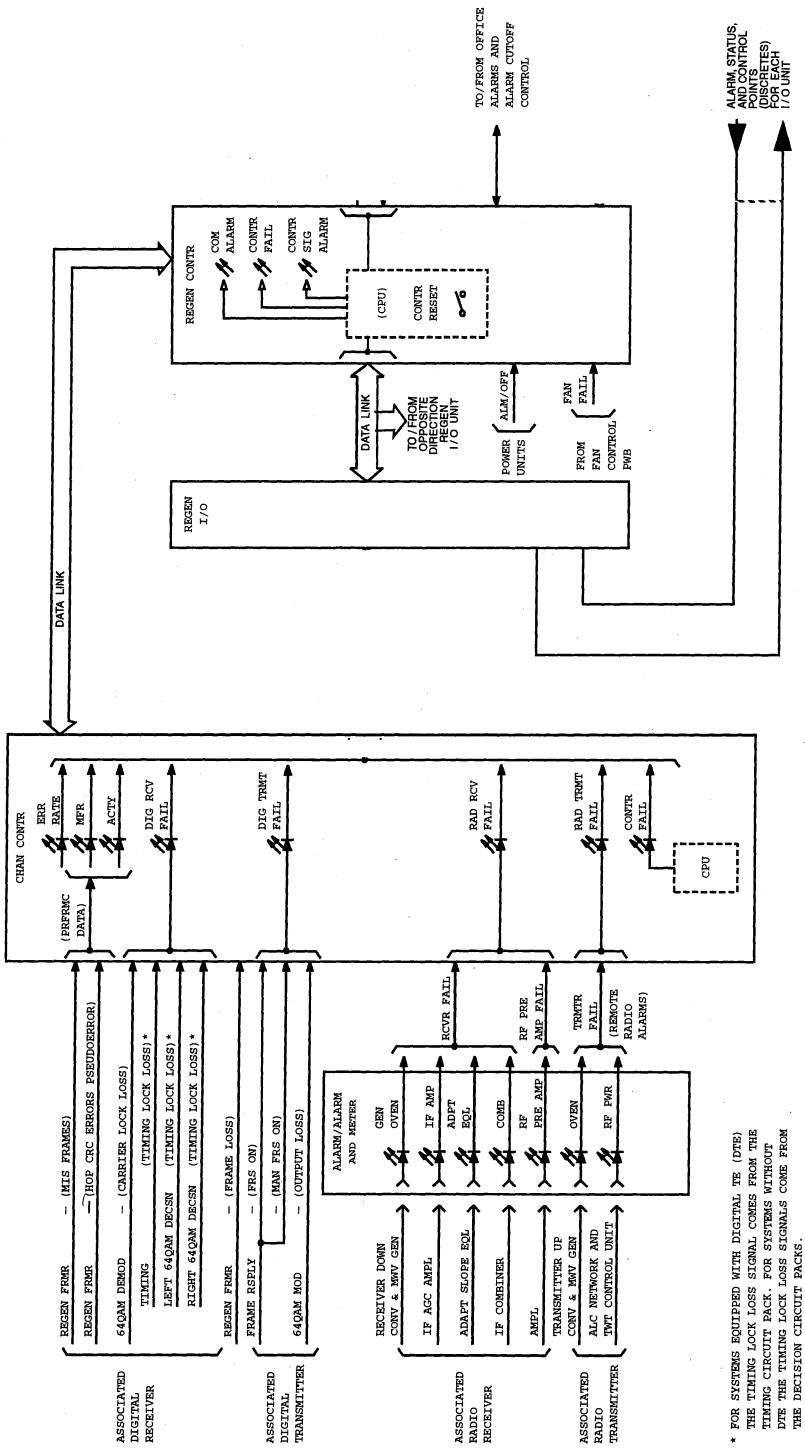



**Figure 3. Regenerator Station Alarm-Reporting Path**

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