# MAINTENANCE CENTER OPERATION
# SERIAL ALARM REPORTING
# FREQUENCY DIVERSITY
# DR 6/11-135
# ALARM ANALYSIS AND DISPATCH PROCEDURES

CONTENTS PAGE



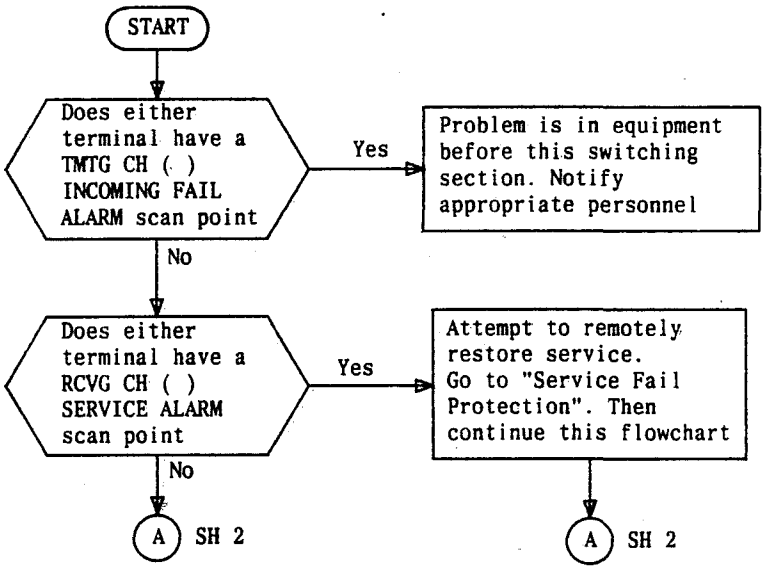
## GENERAL

The procedures in this section help determine where to send the technician to repair a failure.

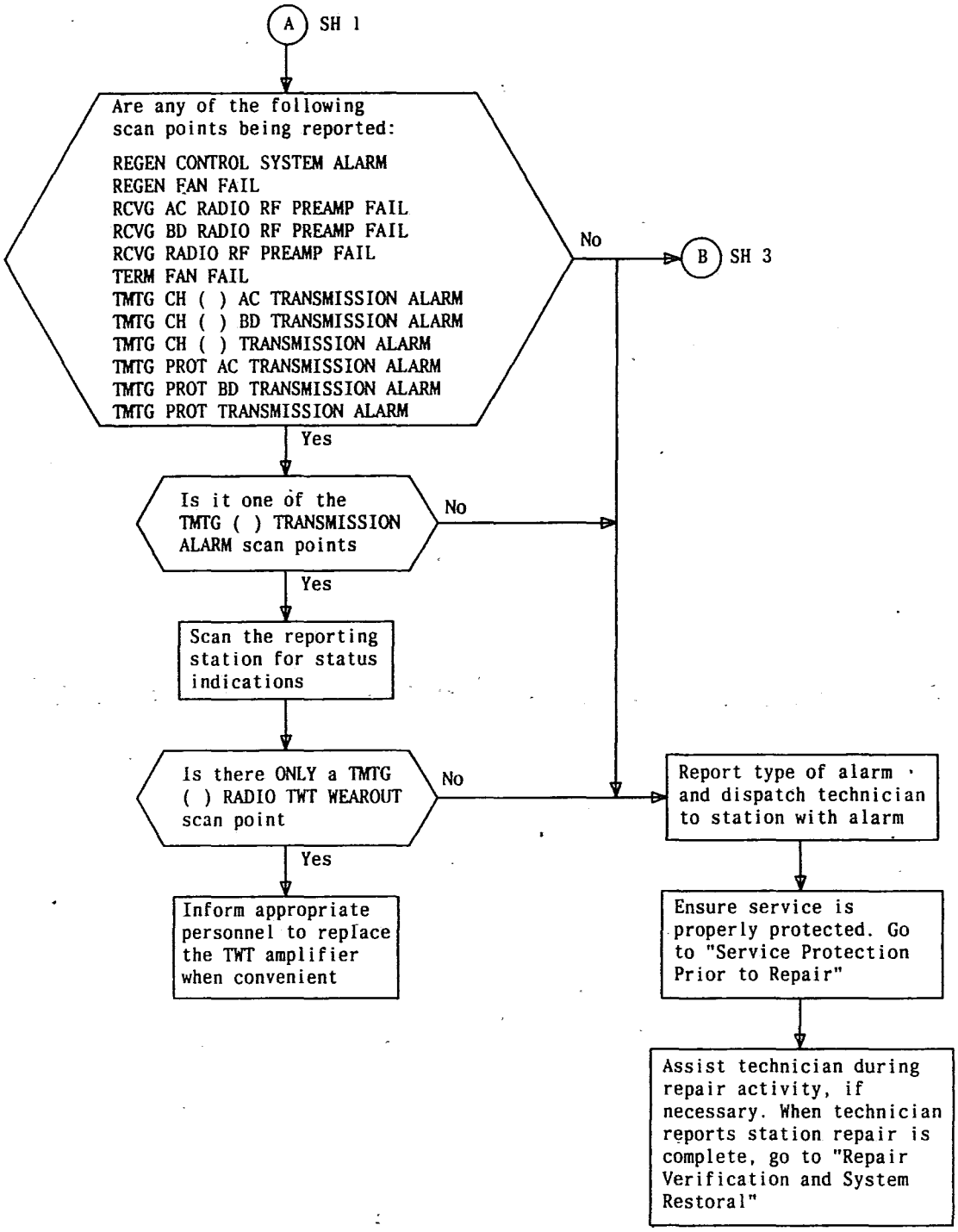
The flowchart is the starting point for isolating alarm conditions reported by remote telemetry from a frequency diversity DR 6/11-135 switching section.

This flowchart and the procedures referenced from this flowchart are based on the following assumptions:

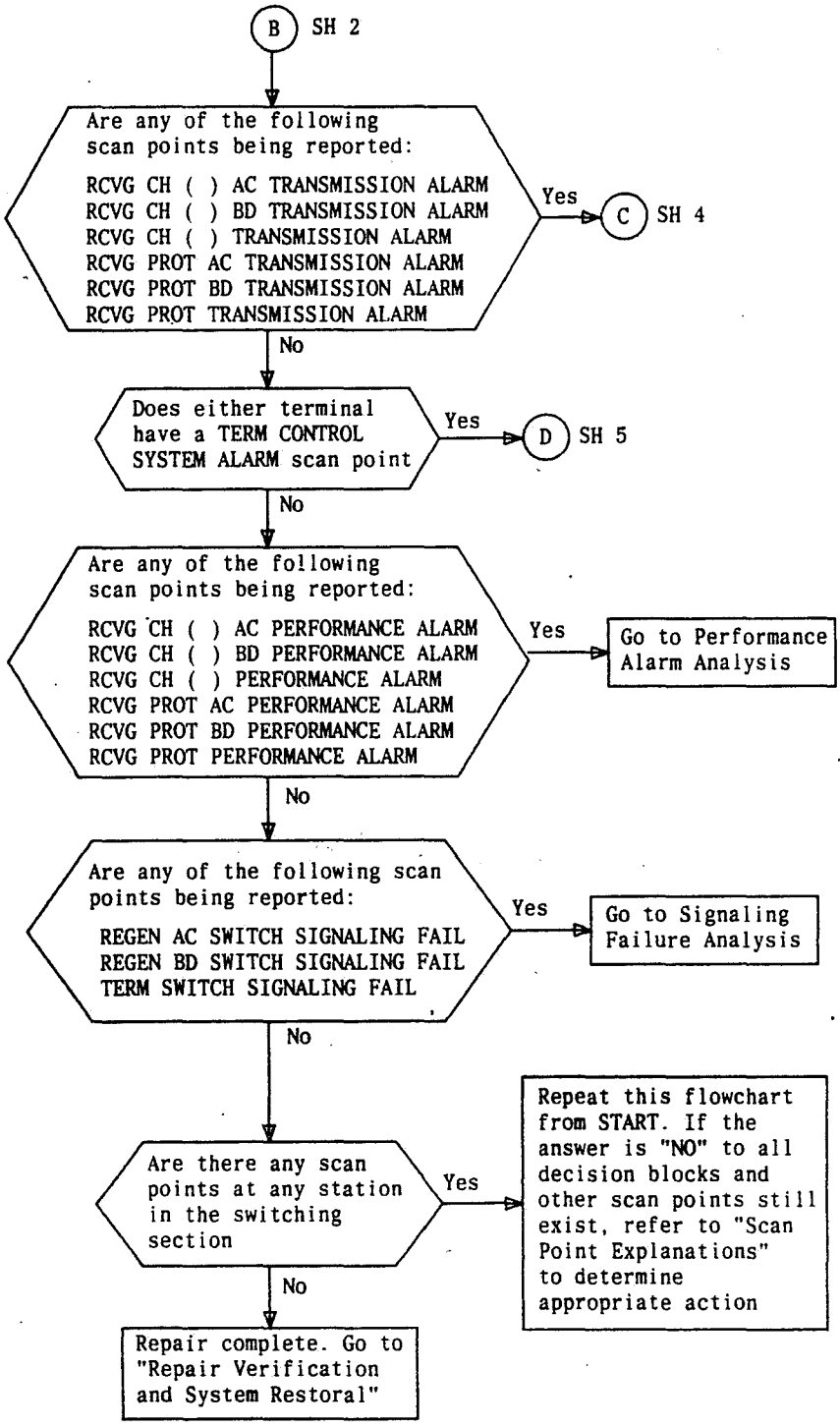
- One or more scan points are being reported from the DR 6/11-135 system.
- Scan point reporting is available from all equipment in the switching section.
- A single failure is the cause of the reported alarms, although the RCVG CH ( ) SERVICE ALARM, often caused by a double failure, is analyzed.
- System troubles are isolated in ONLY one direction of transmission at a time.



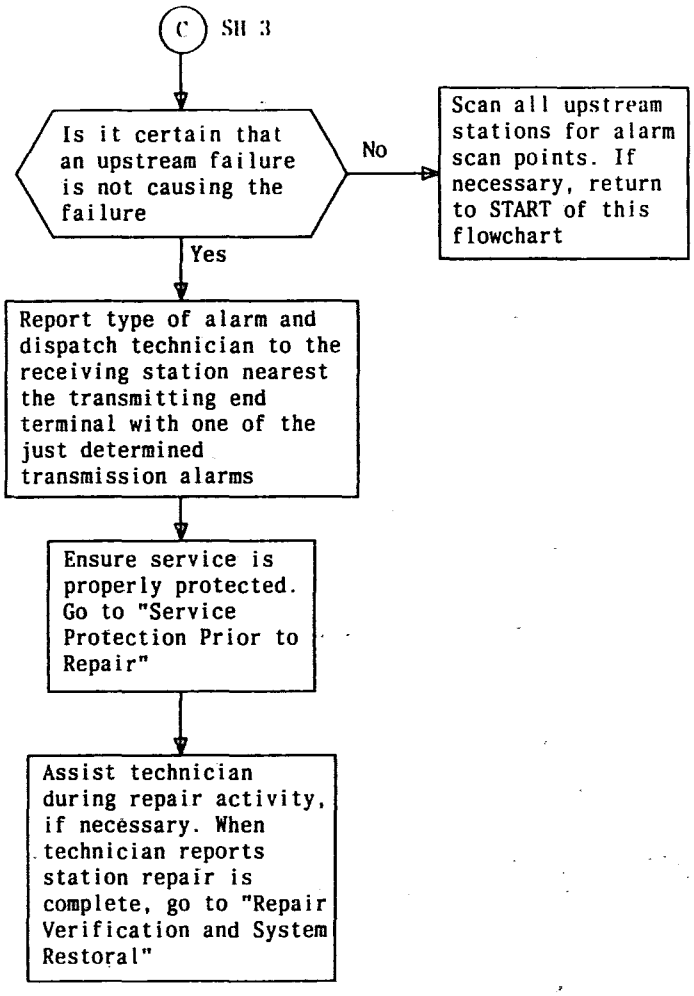

**Alarm Analysis and Dispatch Decision Flowchart (Sheet 1 of 5)**



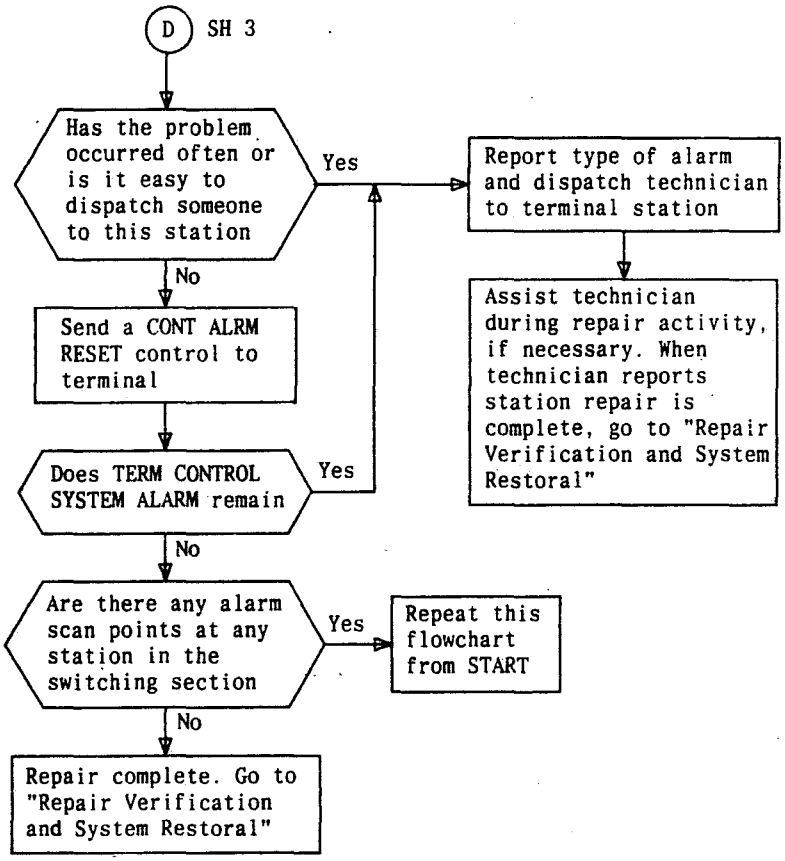

**Alarm Analysis and Dispatch Decision Flowchart**
**(Sheet 2 of 5)**




**Alarm Analysis and Dispatch Decision Flowchart**
**(Sheet 3 of 5)**




**Alarm Analysis and Dispatch Decision Flowchart**
**(Sheet 4 of 5)**




**Alarm Analysis and Dispatch Decision Flowchart**
**(Sheet 5 of 5)**

## SERVICE FAIL PROTECTION

A RCVG CH ( ) SERVICE ALARM is the result of a regular channel transmission failure that was not protected by the automatic protection switching equipment. This condition can be caused by manual operations that inhibit protection channel availability, atmospheric conditions, or double equipment failure within the switching section.

## MANUAL OPERATIONS

The protection channel will not be available to protect a regular channel failure if any of the following manual operations are in effect.

- Manual line or span switch of a different regular channel to protection as indicated by a RCVG CH ( ) MANUAL SWITCH scan point
- Manual lockout of the protection channel as indicated by a RCVG PROT MANUAL LOCKOUT scan point
- Manual lockout of a regular channel as indicated by a RCVG CH ( ) MANUAL LOCKOUT scan point
- Manual access switch as indicated by a RCVG PROT ACCESS SWITCH scan point.

Determine the reason for any of these manual operations. Then, if allowed, make the protection channel available by sending the appropriate remote RESET control to the receiving terminal station.

## ATMOSPHERIC CONDITIONS

Simultaneous fading on more than one channel can affect the signal transmission enough to cause a service alarm. This condition is likely if the service alarm clears and then reappears a number of times within a few minutes. Judgment is required to determine if the service alarm is the result of atmospheric conditions or equipment related trouble. Give fading a chance to subside before continuing.

## DOUBLE EQUIPMENT FAILURE

Double equipment failures that will cause a service alarm are as follows:

- A regular channel and the protection channel have a transmission failure simultaneously as indicated by both a RCVG CH ( ) TRANSMISSION ALARM or RCVG CH ( ) SWITCH SECTION FAIL or RCVG CH ( ) SWITCH SECTION PRFRMC scan point ***and*** a RCVG PROT TRANSMISSION ALARM or RCVG PROT SWITCH SECTION FAIL or RCVG PROT SWITCH SECTION PRFRMC scan point
- Two regular channels have a transmission failure simultaneously as indicated by the two channels reporting a combination of RCVG CH ( ) TRANSMISSION ALARM or RCVG CH ( ) SWITCH SECTION FAIL or RCVG CH ( ) SWITCH SECTION PRFRMC scan points
- A regular channel has a transmission failure and the switch signaling or switch control equipment has a failure as indicated by a RCVG CH ( ) TRANSMISSION ALARM or RCVG CH ( ) SWITCH FAIL or RCVG CH ( ) SWITCH SECTION PRFRMC scan point, accompanied by a TERM SWITCH SIGNALING ALARM or a TERM CONTROL SYSTEM ALARM scan point at either terminal station.

First try to restore service by sending a RCVG CH ( ) MANUAL SPAN SWITCH control for the appropriate channel to the receiving terminal station. If the service

alarm does not clear, service cannot be remotely restored. Use local procedures to determine which failure to repair first.

Whether or not service can be restored, continue the Alarm Analysis and Dispatch Decision flowchart to determine the location originating the failure.

## SERVICE PROTECTION PRIOR TO REPAIR

Some repair activity will cause interruption to a transmission path. In order to properly protect service, some remote operations may be necessary.

Once the technician is at the station and requests assistance, the following flowchart should be used to ensure service is properly protected. If necessary, refer to the " Route Diagrams" and " Remote System Operations" tabs to assist in determining the proper action to take.

## DISPATCH TO REGENERATOR STATION

When required, manual line switches and protection lockouts must be sent as remote controls to the terminal bays according to the transmission path on which repair must be done. Generally, switches to protection should be reinforced with manual line switch controls and a protection channel failure should be reinforced with a protection lockout control.

## DISPATCH TO TERMINAL STATION

A terminal station has the capability to perform manual operations. No remote service protection activity is required unless the technician requests assistance.

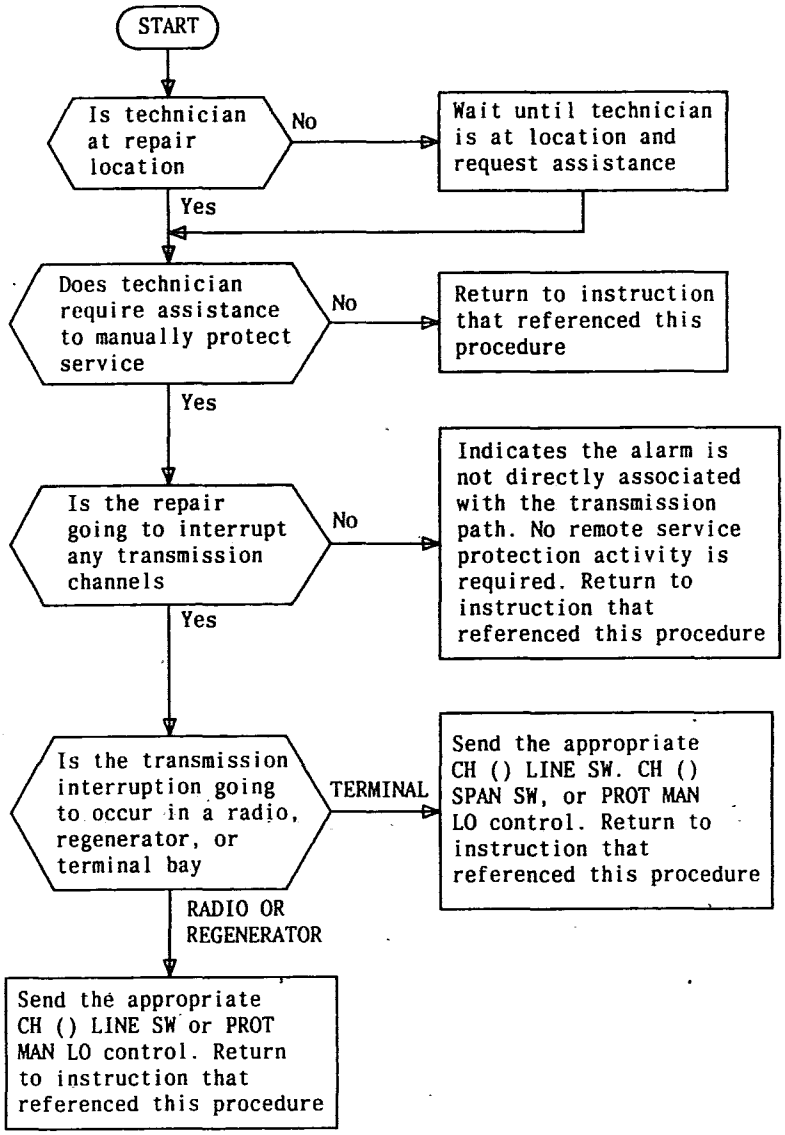
## PERFORMANCE ALARM ANALYSIS

Performance alarms are generated by intermittent bursts of errors or low error rate problems only. These problems may not cause any other alarms to be reported. Before attempting to clear a performance alarm, all other alarms in a switching section should be cleared. To avoid wasted time and effort, performance alarms should be analyzed on a switch section basis. Proper analysis will isolate the transmission performance to a particular hop of transmission circuits. As shown in Fig. 1, performance monitoring points are located at each digital receiver in a switch section.

The performance alarm is basically a " history" indication. Keep in mind that the activity or problem that caused the alarm may have stopped for now. This can be determined as described below in the performance alarm verification paragraph. The dispatch descision should be made when the activity problem occurs often (within 15 minutes) ***or*** after consultation with the responsible maintenance personnel.

There are three steps to analyzing performance alarms:

- Locate the trouble
- Determine the performance problem
- Verify if performance problem currently exists (optional).




**Service Protection Prior to Repair Flowchart**

## TROUBLE LOCATION

Locate the most upstream performance alarm by checking any regenerative repeater stations upstream from the reported performance alarm. The most upstream alarm reported for the same channel indicates the hop with the problem; some failures will cause all performance monitors downstream from the problem to report.

## PERFORMANCE PROBLEM

Local operating procedures, if needed, can be used to determine the performance problem. Each performance alarm reported will be accompanied by either a PRFRMC ERROR RATE or a PRFRMC INTERMITTENT scan point indication. Checking for these status indications may provide useful information to the technician being sent to repair the troubles. Refer to the "Scan Point Explanations" tab for further details of the above scan points.

## PERFORMANCE ALARM VERIFICATION

To verify that the performance condition causing the alarm currently exists, use the performance test mode capability of the performance monitors. Send the appropriate CH ( ) P-TEST or PROT P-TEST remote command to the furthest upstream station with a performance alarm, and the 15-minute test mode will be activated. Any error rate or intermittent problem that exists will be immediately reported by telemetry indications. This procedure will determine if the problem currently exists and may be repeated as needed to judge if someone should be sent to repair the trouble. Refer to the " Remote System Operations" tab for additional operational details.

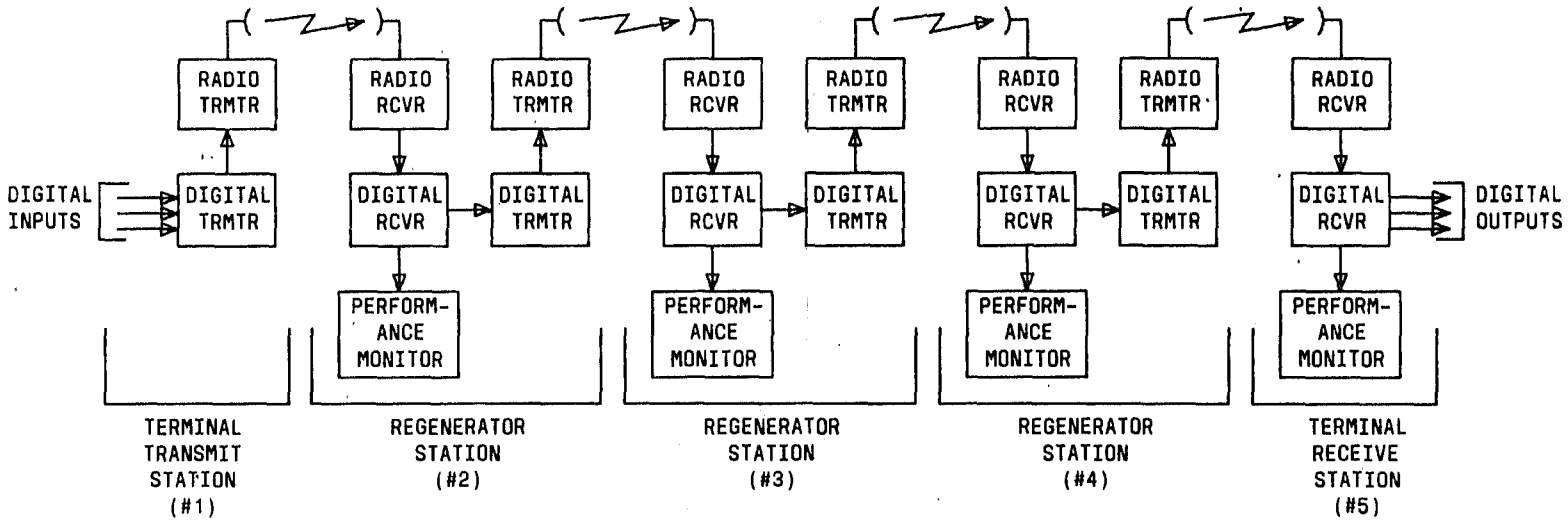



**Fig. 1—DR 6/11 Digital Radio Performance Monitoring Capabilities**

## SIGNALING FAILURE ANALYSIS

All other alarms in a switching section should be cleared before attempting to clear a switch signaling failure. If the protection channel is locked out, it should be reset and any manual patch to protection removed. To avoid wasted time and effort, the signaling failure should be analyzed and localized on the switch section basis. A signaling failure alarm is generated when the system signaling information cannot be received or interpreted by the regenerator or terminal control circuits. With proper analysis, the failure can normally be isolated to a particular hop. Once a hop is identified, the trouble is either in the control circuits or units in the service channel signaling transmission path at the transmitting station or the receiving station.

Analysis begins by scanning all stations in the switching section to determine the location of the switch signaling failure alarms. Then isolate the problem hop with help of the following examples.

These examples show typical conditions that may occur in a 3-hop switching section in one direction of transmission. The remote scan points are shown. The alarm center personnel should match the examples to the actual condition of the switching section and dispatch maintenance personnel to the recommended station with instructions to perform the local signaling fail alarm clearing procedure. Although only two regenerator stations are shown, the same conditions would be true for any regenerator-to-regenerator hop in a switching section. If only terminals are in the switching section, ignore the regenerators shown.

If none of the examples match the condition of the switching section, dispatch maintenance personnel to the station nearest the transmitting end with the switch signaling failure. The local trouble-clearing procedures will provide instructions to replace each associated unit until the problem is cleared.

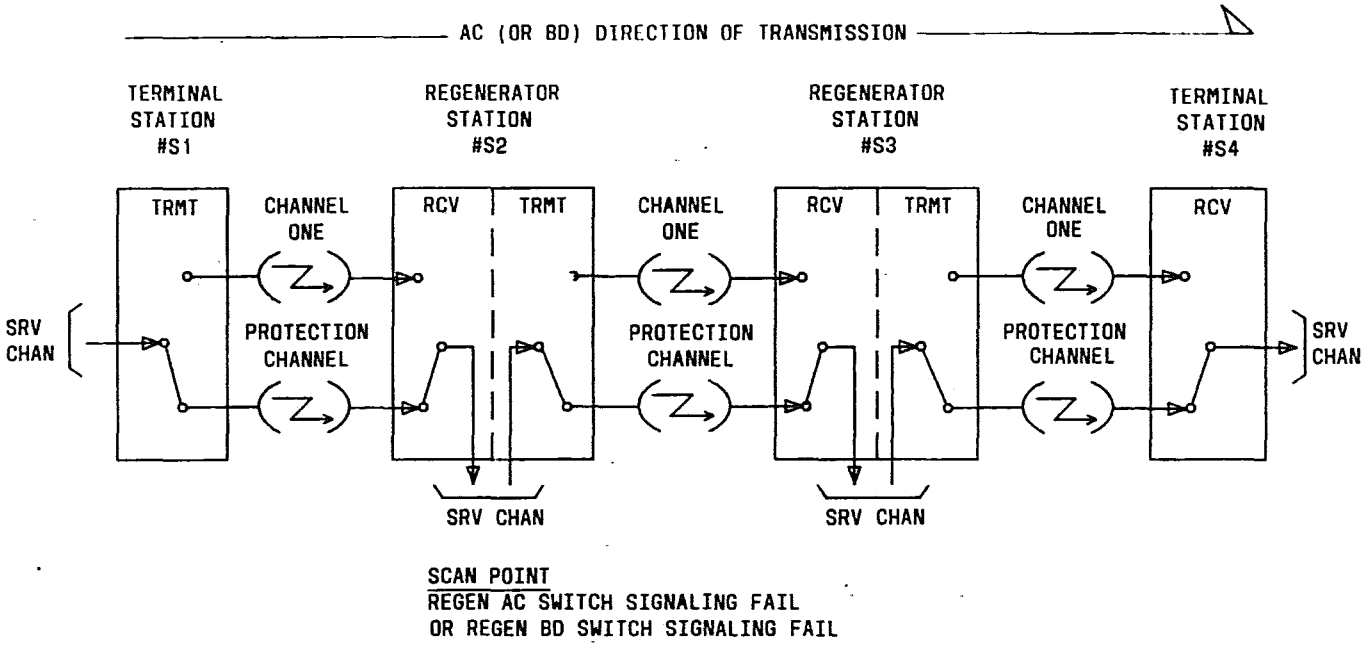



**Fig. 2—Service Channel Signaling Trouble Between Stations #S1 and #S2**

## EXAMPLE 1

Dispatch technician to regenerator station #S2. If local procedure does not clear alarm, send technician to terminal station #S1.

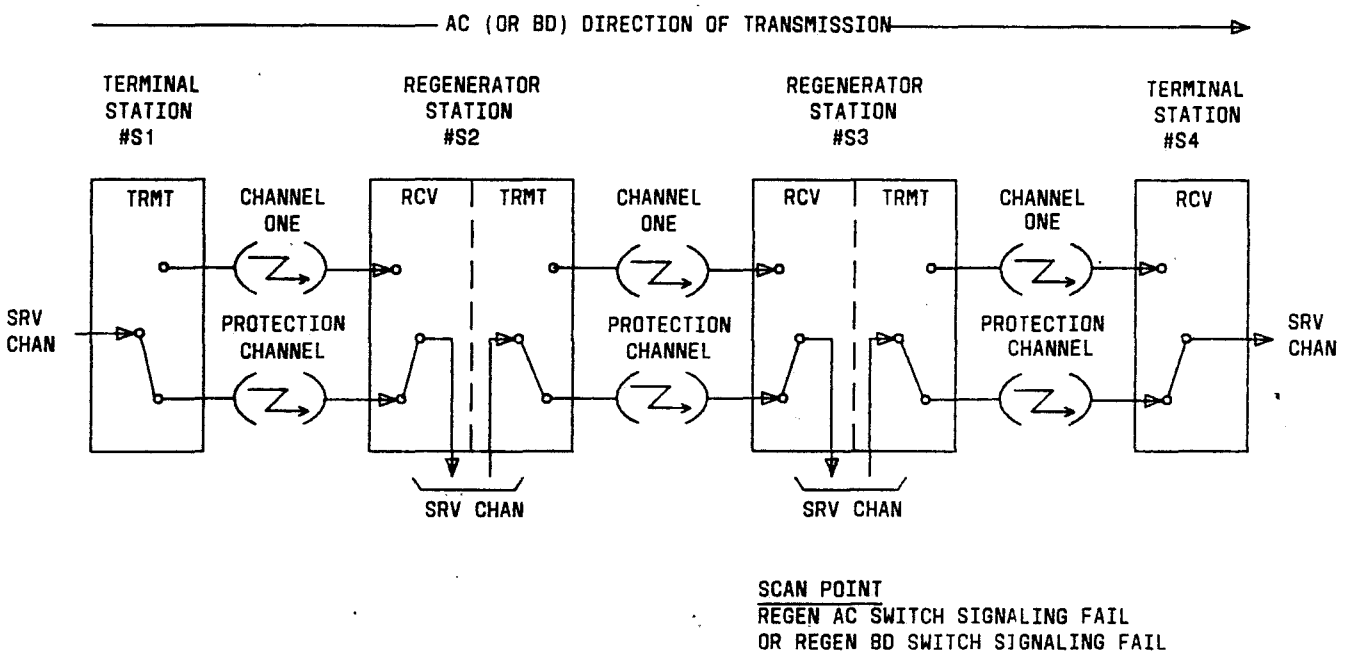



**Fig. 3—Service Channel Signaling Trouble Between Stations #S2 and #S3**

## EXAMPLE 2

Dispatch technician to regenerator station #S3. If local procedure does not clear alarm, send technician to regenerator station #S2.

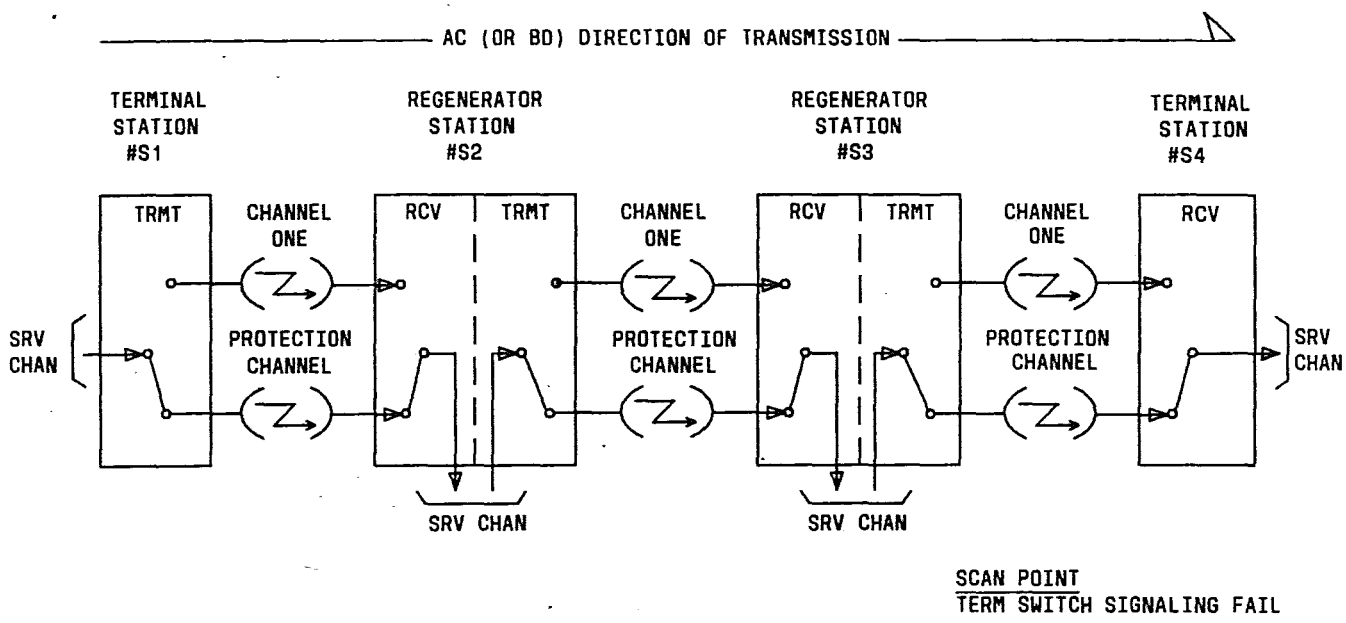



**Fig. 4—Service Channel Signaling Trouble Between Stations #S3 and #S4 or at Station #S1**

## EXAMPLE 3

Dispatch technician to terminal station #S4. If local procedure does not clear alarm, send technician to regenerator station #S3. If local procedure still does not clear alarm, send technician to terminal station #S1.

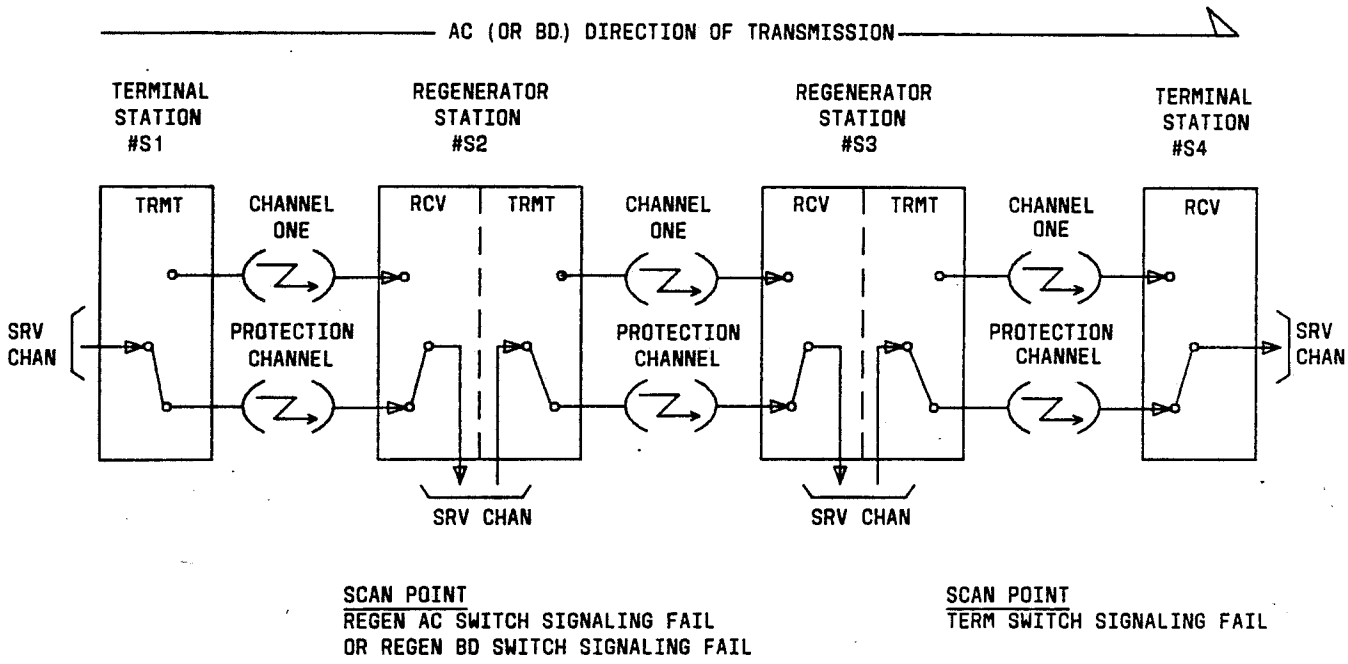



**Fig. 5—Service Channel Signaling Trouble Between Stations #S2 and #S3**

## EXAMPLE 4

Dispatch technician to regenerator station #S3. If local procedure does not clear alarm, send technician to regenerator station #S2.

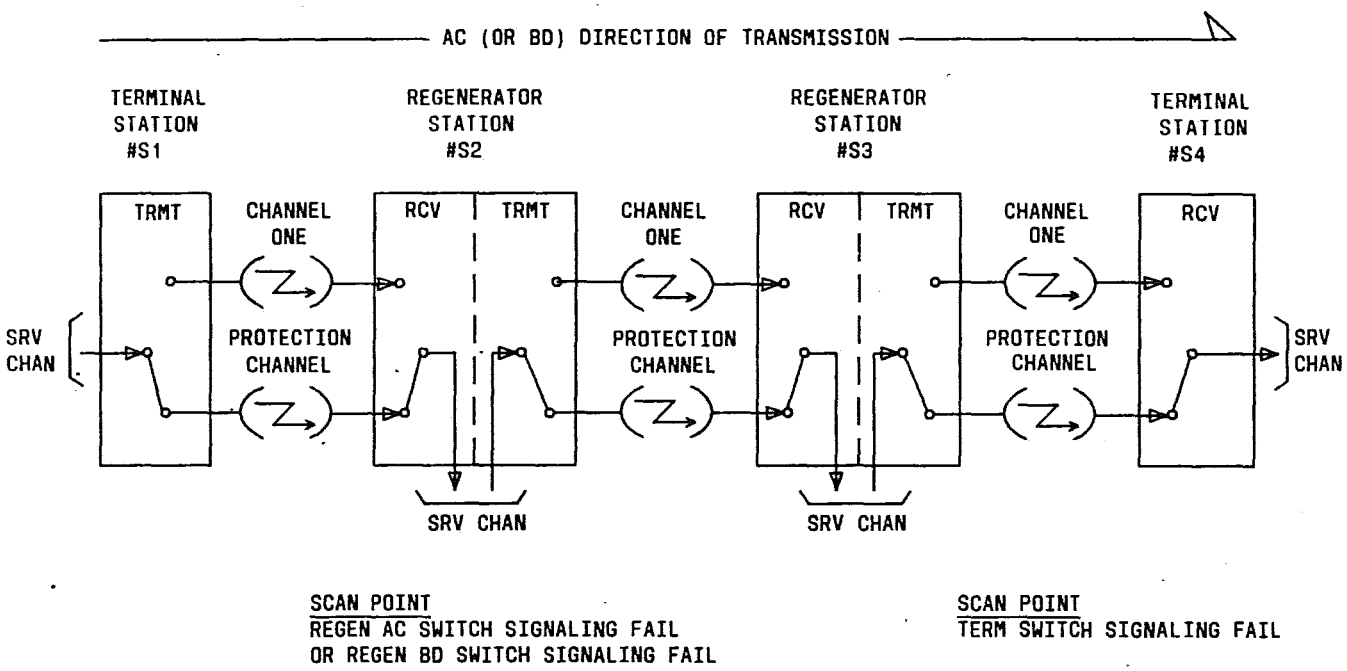



**Fig. 6—Service Channel Signaling Trouble at Station #S1**

## EXAMPLE 5

Dispatch technician to Station #S1.