OPERATION AND MAINTENANCE
HOT STANDBY
DR 6/11-135A AND 135EC
RECEIVER SUBROUTINES

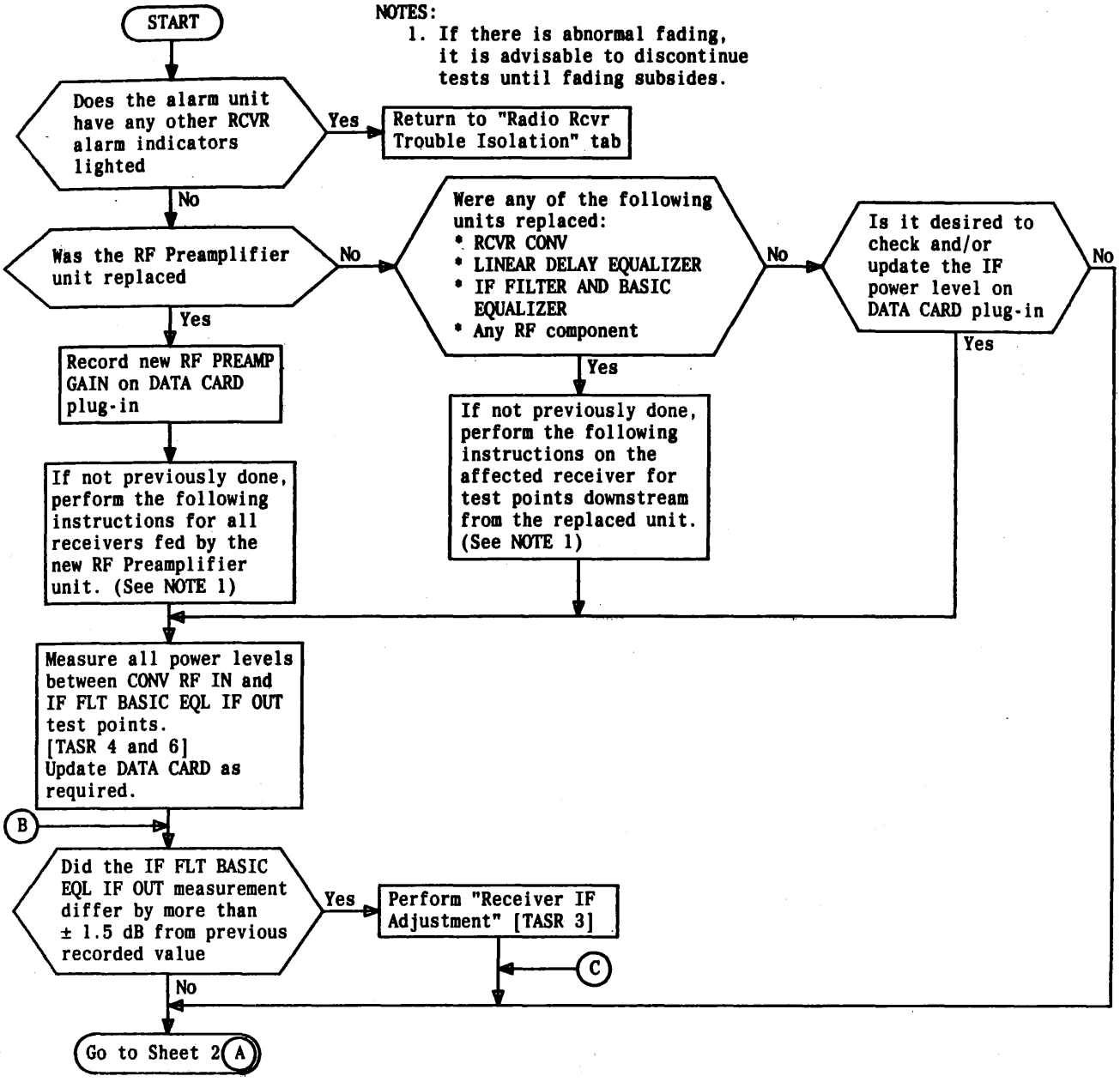
CONTENTS PAGE

This section contains the subroutines (SR) referenced from the receiver trouble-clearing main routines (MR), main subroutines (MSR), and receiver test and adjustment subroutines (TASR).

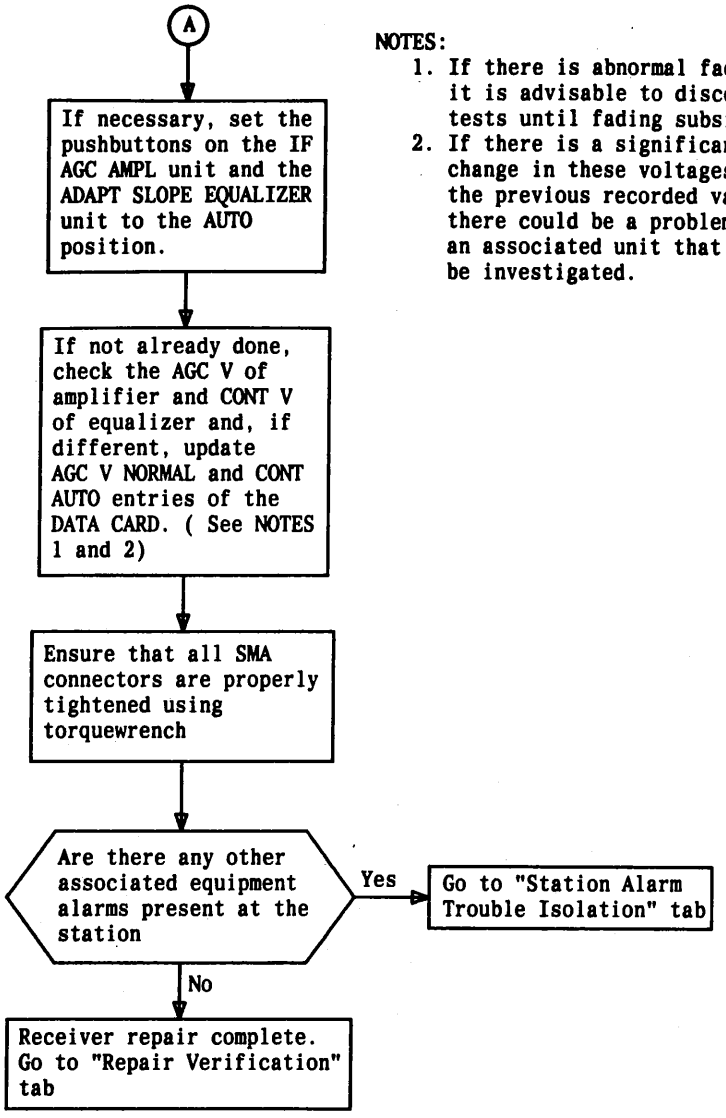
This practice is reissued to change subroutines SR 1 through SR 11. The practice is used in binders 421-105-001, 421-105-001AC, 421-105-002AC, 421-105-003AC, 421-105-004AC, 421-105-080, 421-105-090, 421-105-100, 421-106-001, 421-106-001AC, 421-106-002AC, 421-106-003AC, 421-106-004AC, 421-106-020, 421-106-030, and 421-106-060.

CAUTION: THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

PREREQUISITE: A radio receiver alarm condition was just cleared.



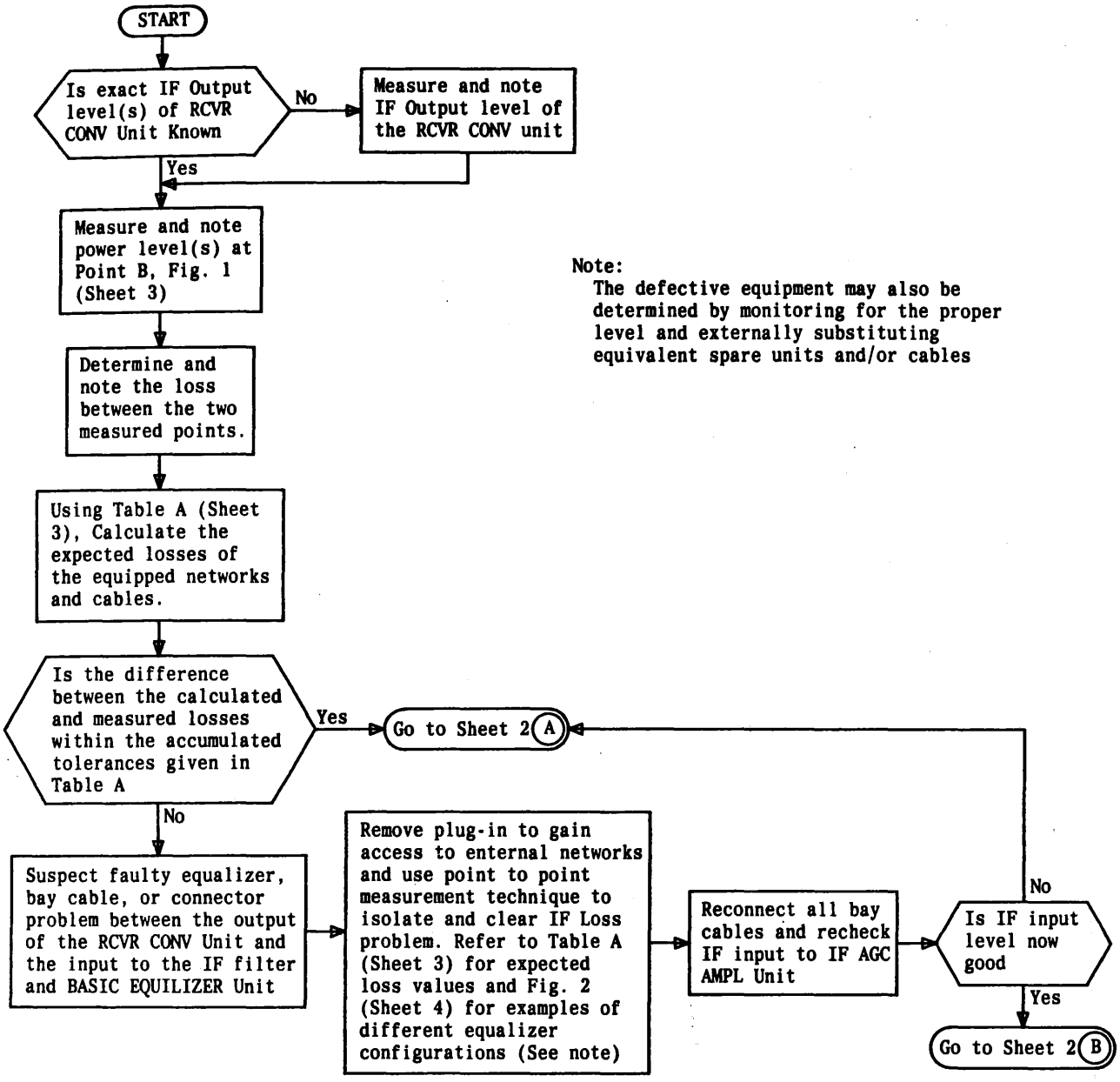
SR 1—Condition Receiver/Update Data Card Prior to Repair Verification (Sheet 1 of 2)



SR 1—Condition Receiver/Update Data Card Prior to Repair Verification (Sheet 2 of 2)

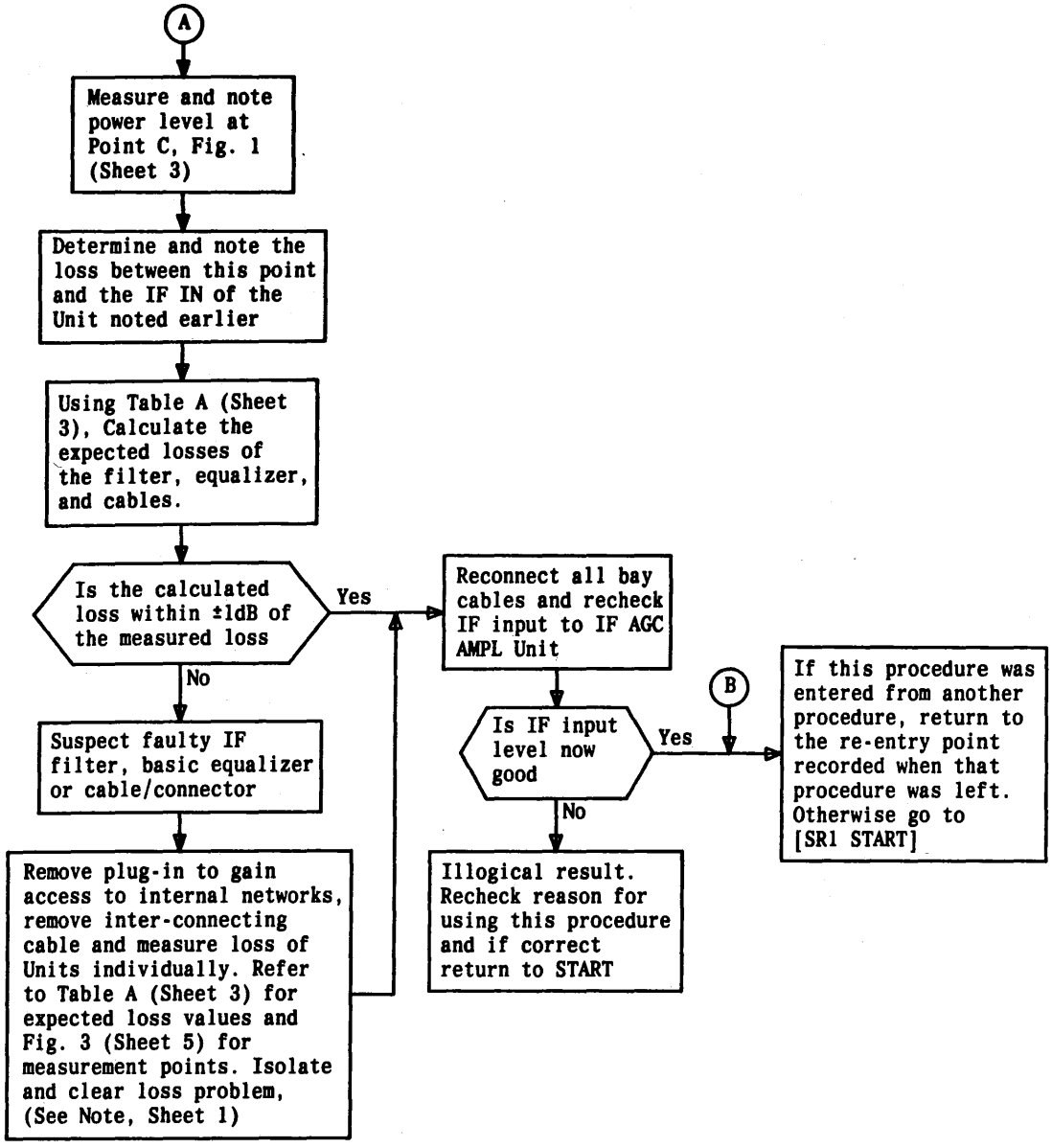
CAUTION: This procedure is service affecting unless the proper manual switching operation has been performed.

Prerequisite: DOWN CONV IF Output is within ±3dB of DATA CARD value.
IF AGC AMPL IF input is bad.



Note:
The defective equipment may also be determined by monitoring for the proper level and externally substituting equivalent spare units and/or cables

SR 2—Resolving IF EQL/FLTR Loss Problem (Sheet 1 of 2)



SR 2—Resolving IF EQL/FLTR Loss Problem (Sheet 2 of 2)

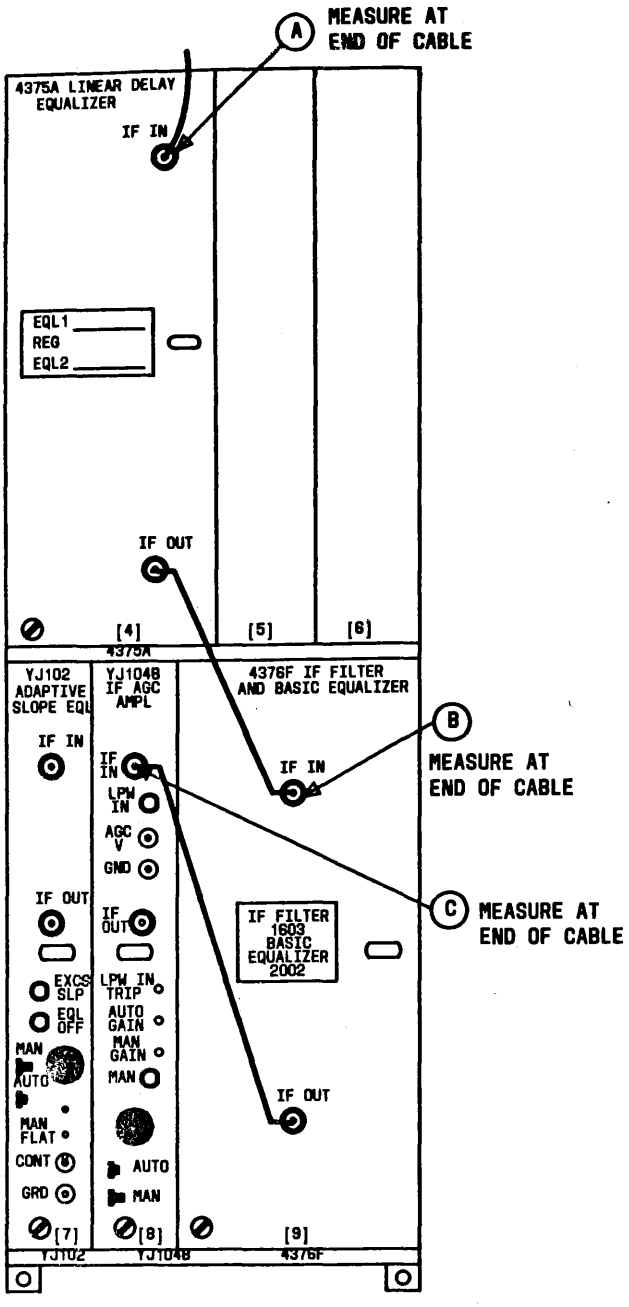


Fig. 1—Receiver Shelf

TABLE A TYPICAL IF UNIT LOSSES	
CODE	INSERTION LOSS (dB) at 70 MHz (±0.5dB)
LINEAR DELAY EQUALIZER (±0.5 dB)	
2001A	1.1
2001B	1.1
2001C	1.7
2001D	1.2
2001E	1.7
2001F	1.4
2001G	1.4
2001H	0.38
2001J	1.5
2001K	0.43
2001L	1.5
2001M	0.57
2001N	3.2
2001P	0.7
BASIC EQUALIZER (±0.5 dB)	
2002C	4.4
2002D	4.1
2002G	5.6
IF FILTER (±0.5 dB)	
1603B	7.0
CABLES	(dB per 100 ft)
KS-19224,L2	6.0 ±.6
731B	3.0 ±.3
728B	2.2 ±.22

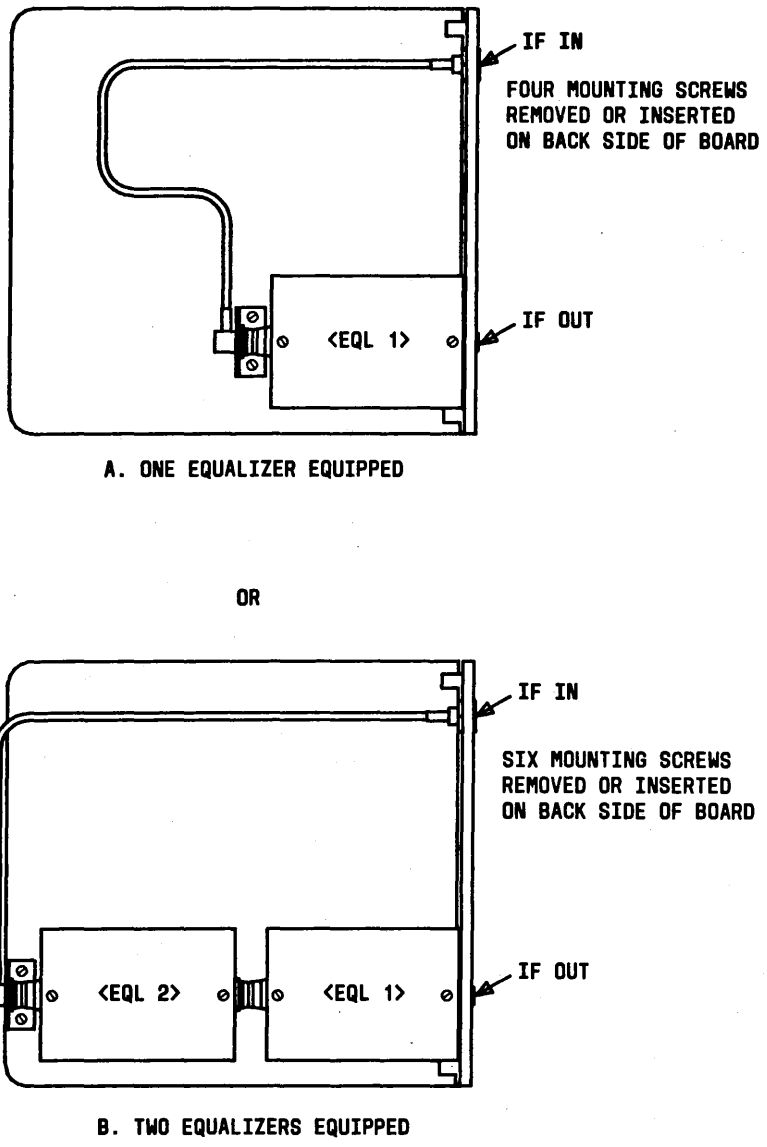


Fig. 2—Hot Standby Receiver Linear Delay Equalizer, Side View

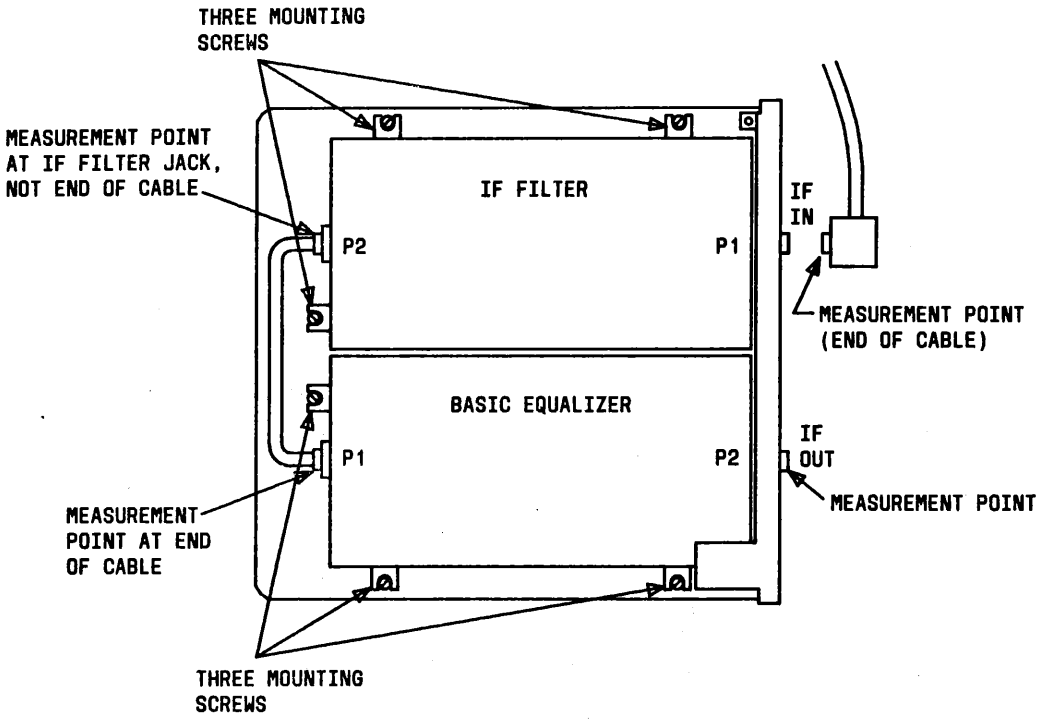
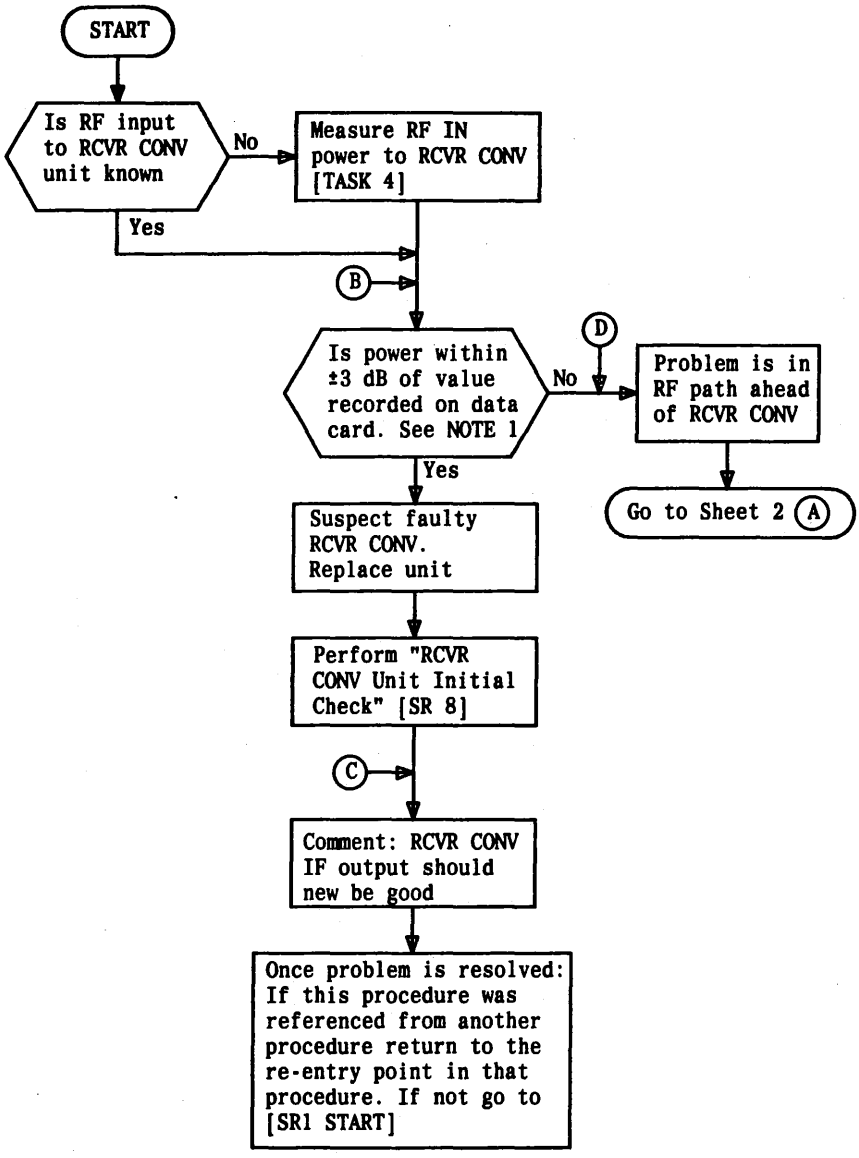


Fig. 3—IF Filter and Basic Equalizer, Side View

CAUTION: This procedure is service-affecting unless the proper switching operation has been performed.

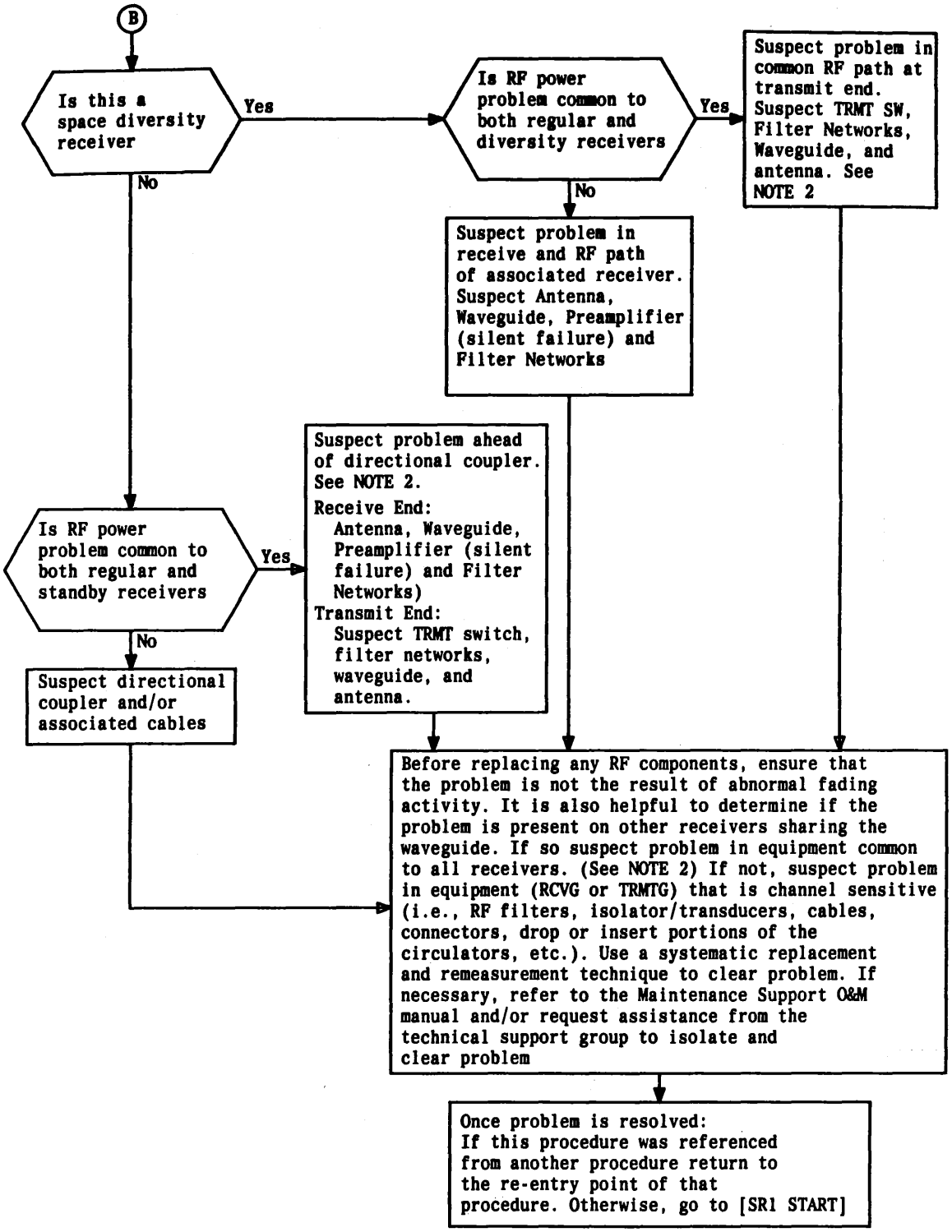
Note 1:
If the RF input signal to the RCVR CONV is undergoing an abnormal fading condition (>4.0 dB fluctuations), defer measurement to a more stable time. Otherwise, it will be necessary to visually average and evaluate results relative to requirement on this basis.

PREREQUISITE: IF output level of RCVR CONV unit is bad



SR 3—Resolving RF-to-IF Loss Problem (Sheet 1 of 2)

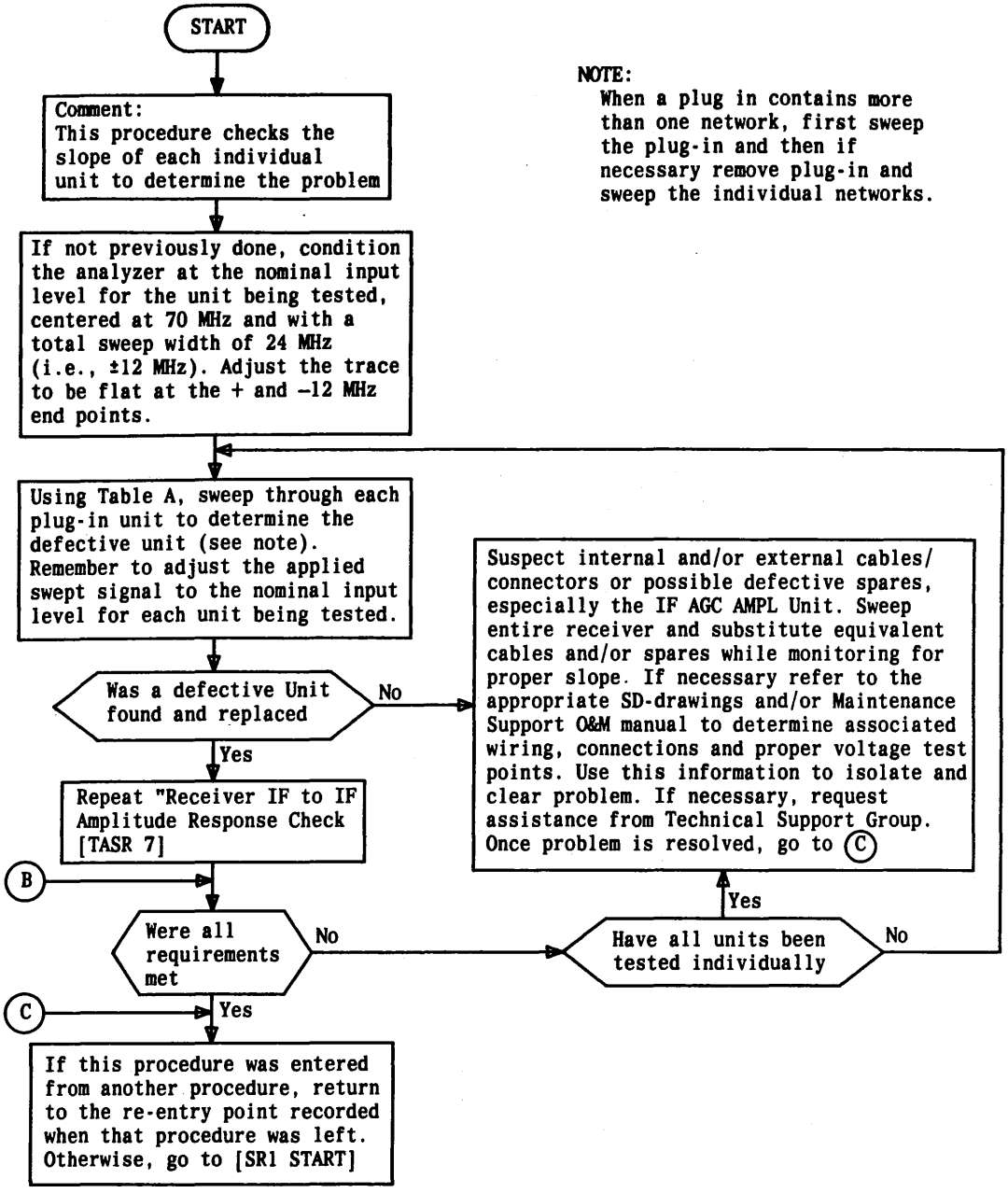
NOTE 2:
See "Common Equipment Failure" information in "Service Protection" tab for additional diagnostic aid in isolating RF problems which are known to be common to both receivers.



SR 3—Resolving RF-to-IF Loss Problem (Sheet 2 of 2)

CAUTION: This procedure is service-affecting unless the proper switching operation has been performed.

PREREQUISITE: Received IF to IF Slope measurement did not meet requirement



NOTE:
When a plug in contains more than one network, first sweep the plug-in and then if necessary remove plug-in and sweep the individual networks.

SR 4—Resolving IF Slope Problem (Sheet 1 of 2)

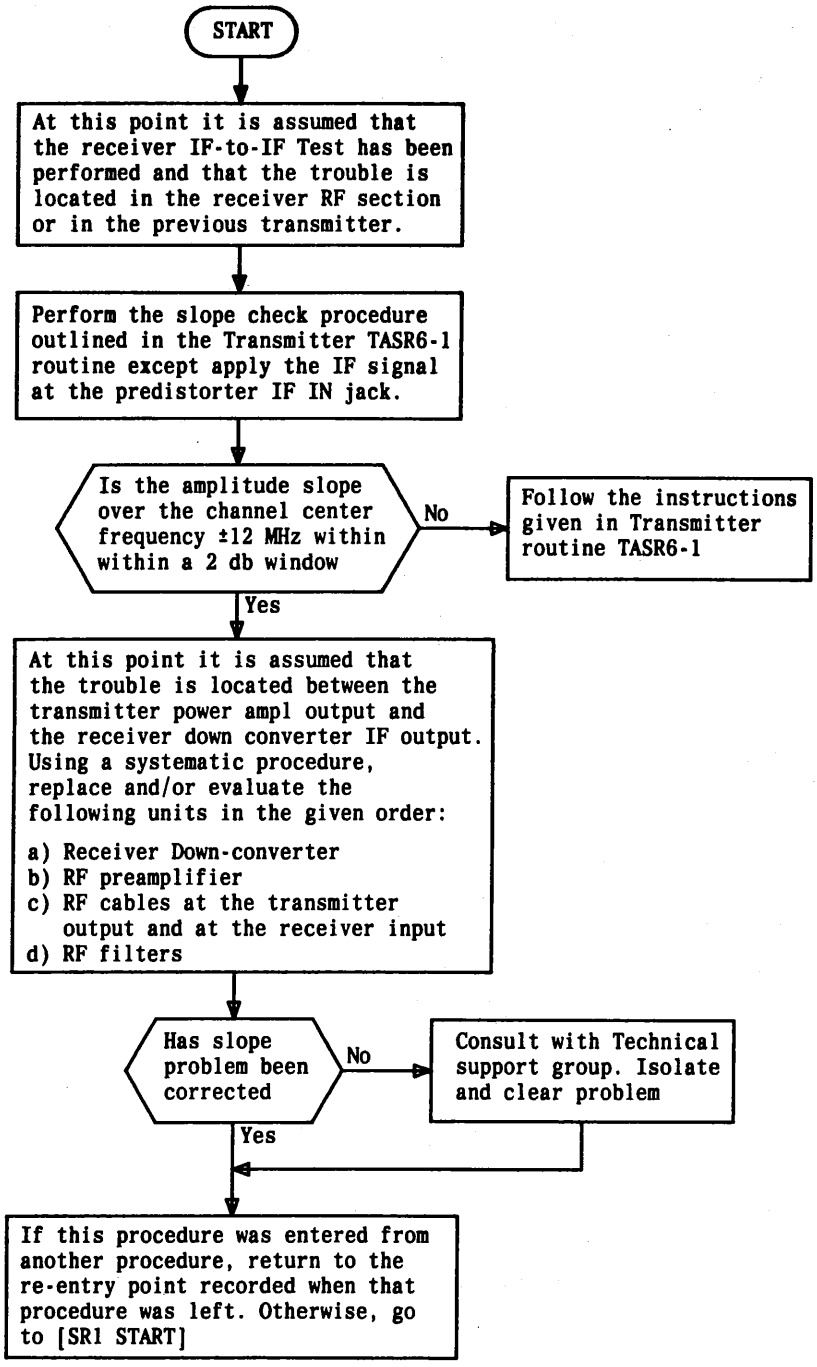
TABLE A TYPICAL IF UNIT SLOPE	
CODE	SLOPE (dB) at 70 ±12 MHz
LINEAR DELAY EQUALIZER	
2001A	<0.1
2001B	<0.1
2001C	<0.1
2001D	<0.1
2001E	<0.1
2001F	<0.1
2001G	<0.1
2001H	<0.1
2001J	<0.1
2001K	<0.1
2001L	<0.1
2001M	<0.1
2001N	<0.2
2001P	<0.1
BASIC EQUALIZER	
2002C	<0.2
2002D	<0.2
2002G	<0.2
IF FILTER	
1603B	<0.2
IF AGC AMPL *	
YJ104B	<0.2

* Operate the AUTO/MAN pushbutton to MAN when testing unit.

SR 4—Resolving IF Slope Problem (Sheet 2 of 2)

CAUTION: This procedure is service-affecting unless the proper manual switching operation has been performed.

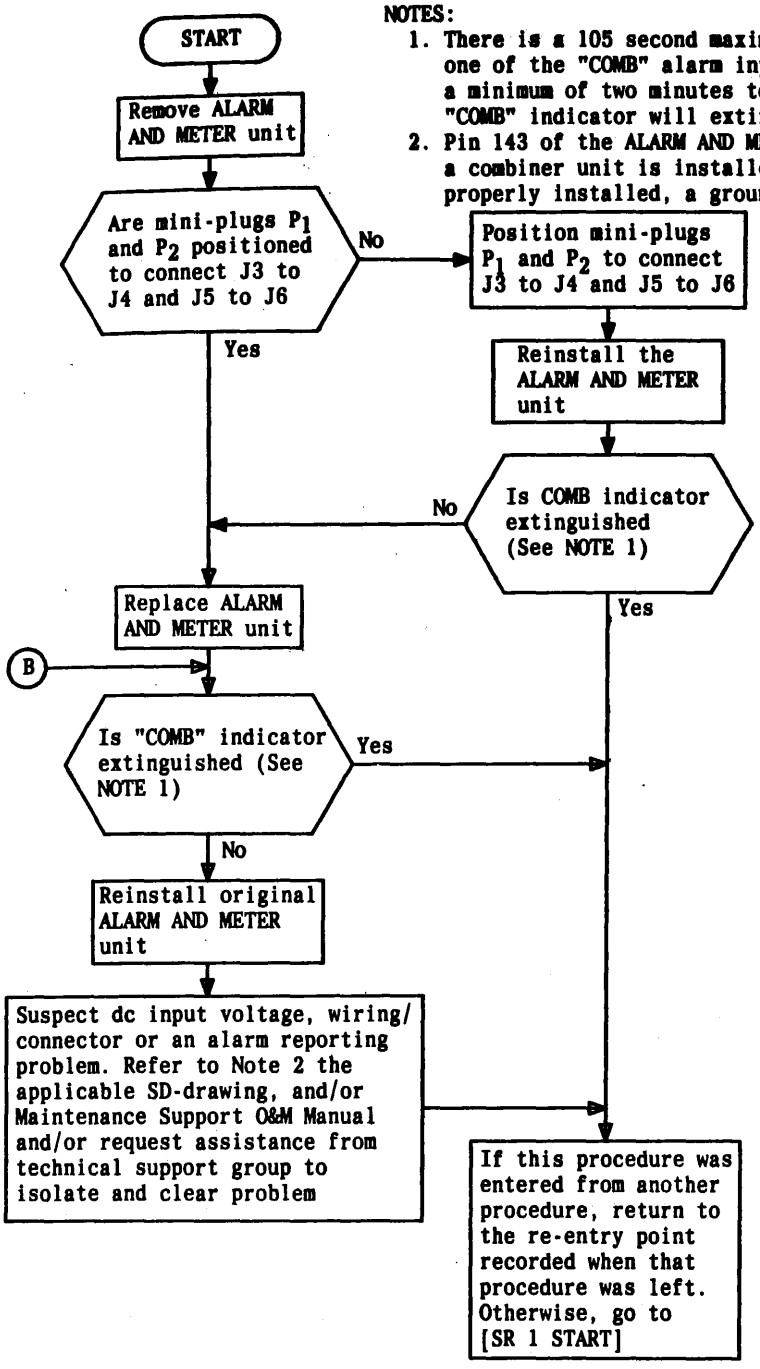
PREREQUISITE: Excessive IF slope exists at the RCVR CONV-IF OUT jack



SR 5—Resolving RF Slope Problem

PREREQUISITE: COMB indicator lighted on ALARM/ALARM and METER unit when IF COMBINER Unit is not equipped in receiver

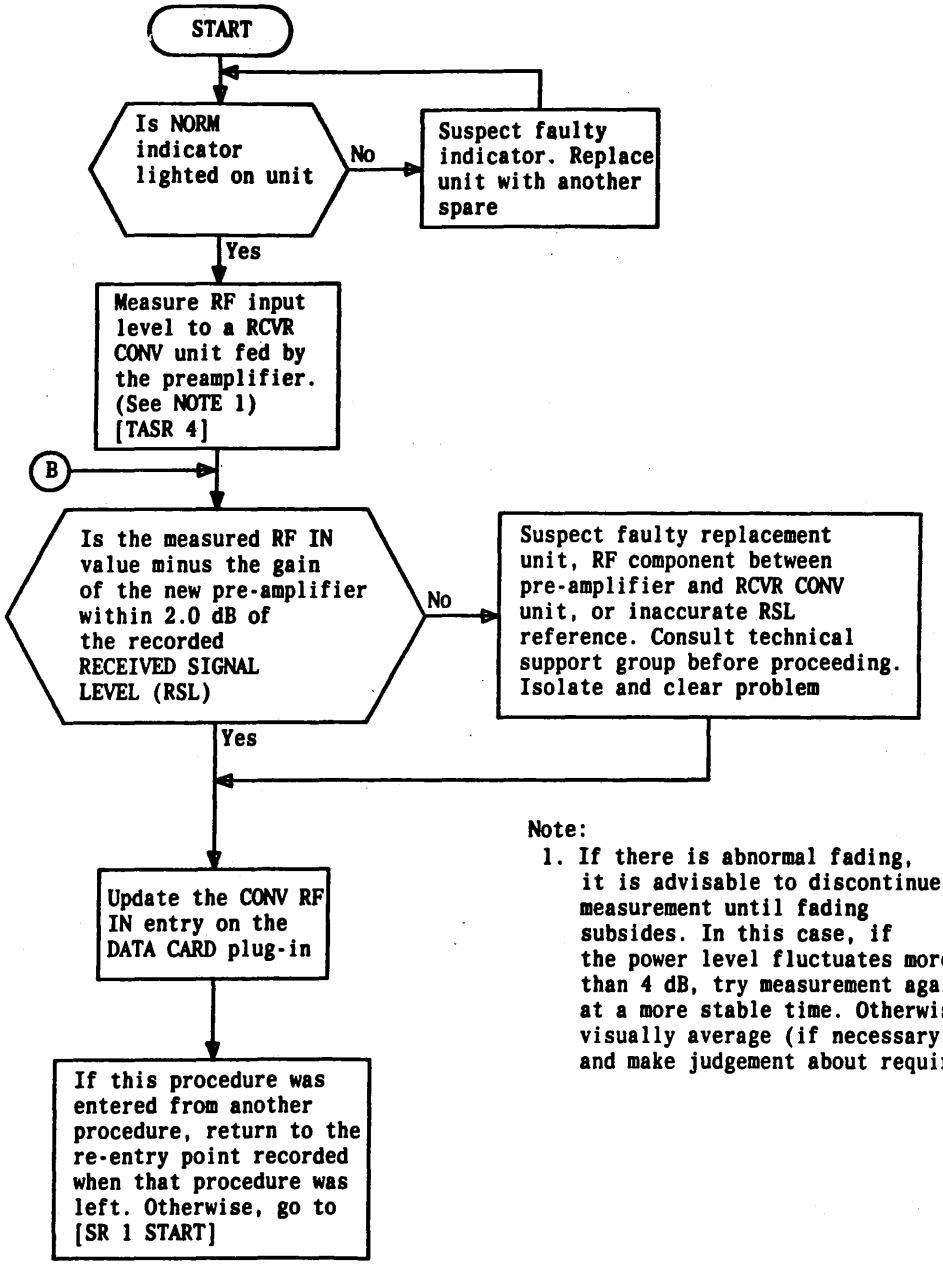
NOTES:
1. There is a 105 second maximum delay associated with one of the "COMB" alarm inputs. Therefore, wait a minimum of two minutes to determine if the "COMB" indicator will extinguish.
2. Pin 143 of the ALARM AND METER unit is used to sense if a combiner unit is installed. If miniplugs P1 and P2 are properly installed, a ground on Pin 143 will cause an alarm.



SR 6—Resolving Combiner Indicator Problem

CAUTION: This procedure is service affecting unless the proper manual protection switching operation has been performed.

PREREQUISITES: 1. New RF Pre-amplifier just installed.
2. The dc input voltages to RF Preamplifier are good (+15V and −15V ±0.4V)

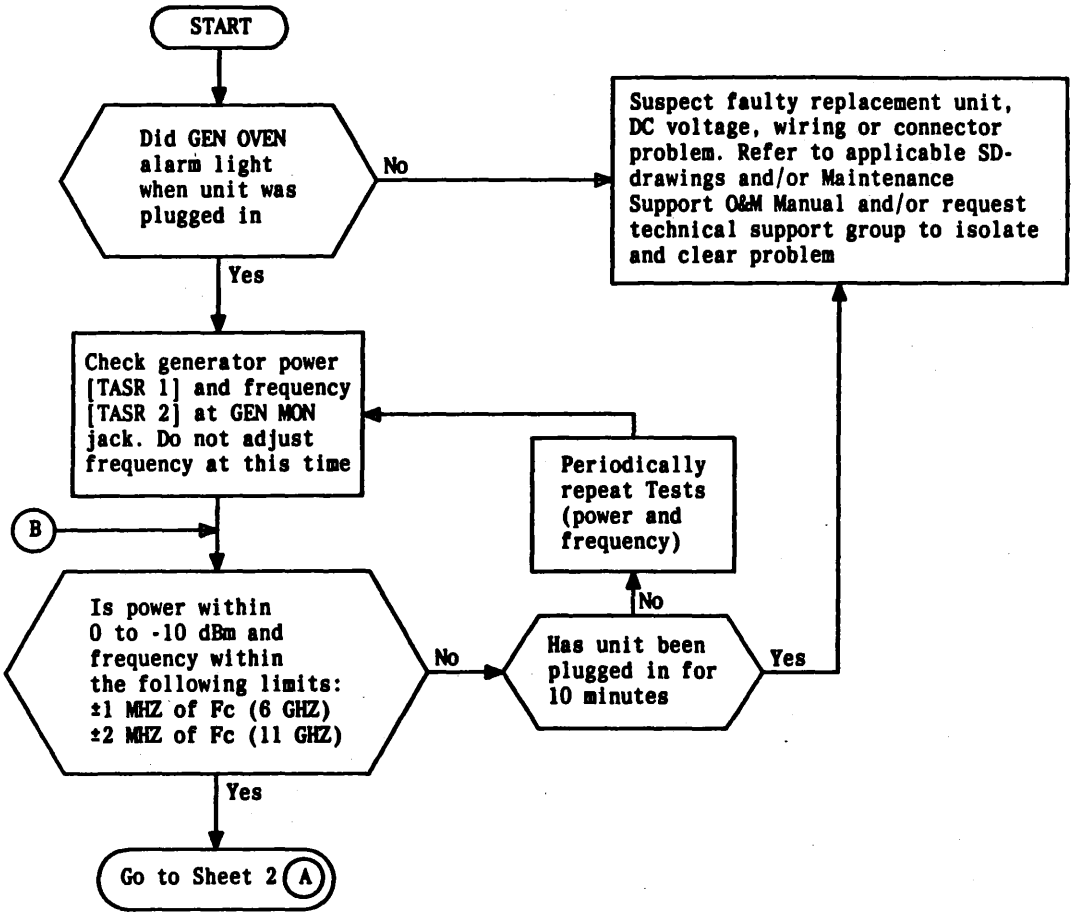


Note:
1. If there is abnormal fading, it is advisable to discontinue measurement until fading subsides. In this case, if the power level fluctuates more than 4 dB, try measurement again at a more stable time. Otherwise visually average (if necessary) and make judgement about requirement.

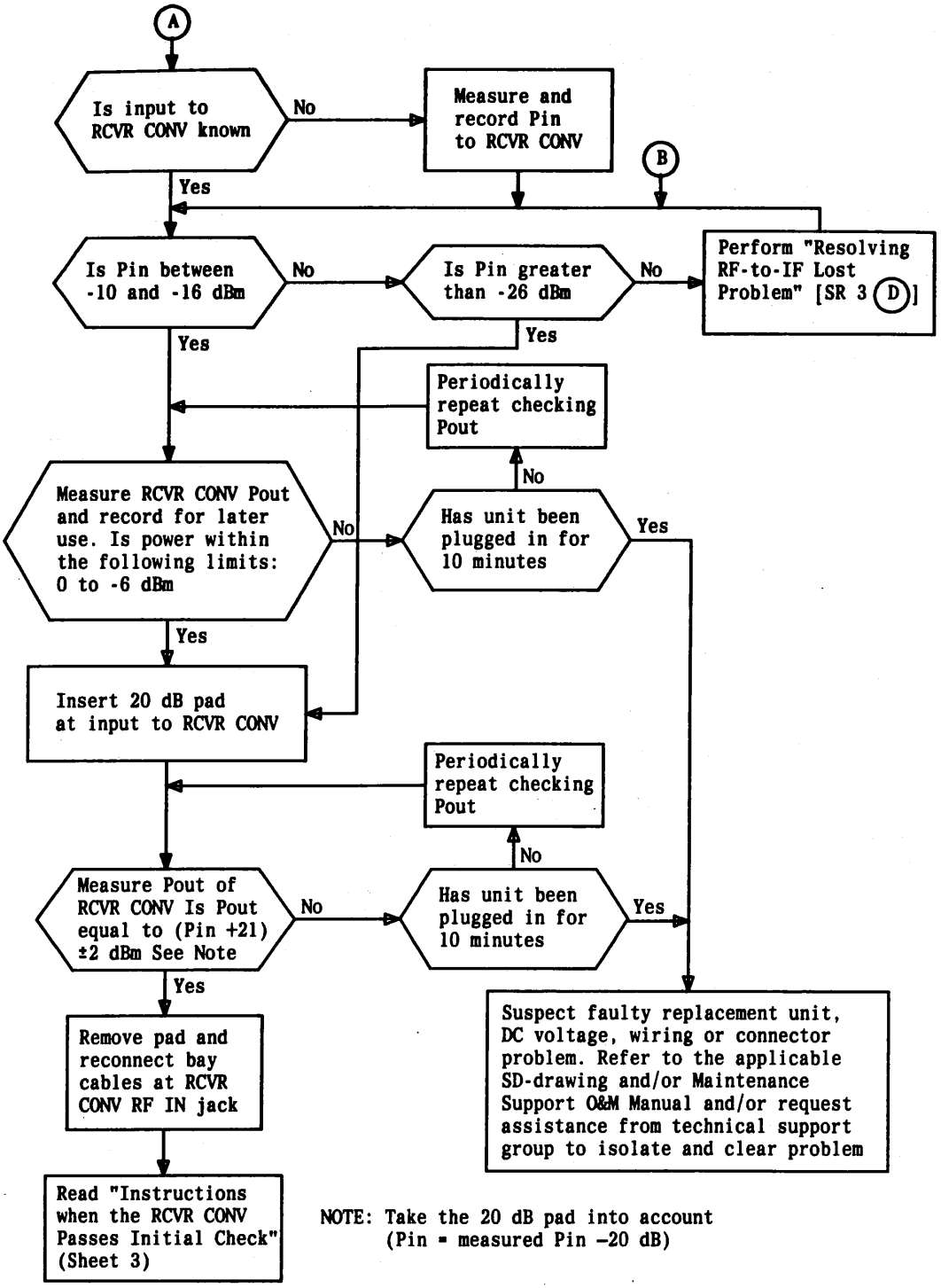
SR 7—RF Preamp Unit Initial Check

CAUTION: THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

PREREQUISITE: RCVR CONV unit just installed



SR 8—RCVR CONV Unit Initial Check (Sheet 1 of 3)



SR 8—RCVR CONV Unit Initial Check (Sheet 2 of 3)

INSTRUCTIONS

NEW DOWN CONV UNIT PASSES INITIAL CHECK REQUIREMENTS

Procedure Was Referenced From Another Trouble Procedure

The status of the replaced unit at this point is usually adequate to continue most receiver troubleshooting routines. This is especially true for those routines involving receiver IF level or gain problems. Routines requiring temperature stabilization of the microwave generator oven of the down-converter unit (when the GEN OVEN indicator is still lighted) should be delayed until the GEN OVEN indicator goes off (see Final Generator Check). If this unit was replaced because of directions in another procedure, return to the instruction that called for the replacement (see ***Note 1***). Generally, this will help to speed up troubleshooting receiver alarms involving suspected down-converter problems (see Final Generator Check).

Note 1: Before returning to the referencing procedure, note the time that the down-converter unit was replaced and then periodically check the GEN OVEN alarm indicator to ensure that it goes off within the normal time period (see ***Note 2***). If the alarm indicator does not go off, dc voltage and/or wiring problems related to the down-converter unit may exist or the replacement unit is defective. Isolate and clear this problem before proceeding further with receiver tests. Follow the instructions given in the " GEN OVEN Alarm" tab.

Note 2: Normally, if the spare down-converter unit and microwave generator module were stored at down-converter room temperature, the GEN OVEN indicator should go off within about 20 minutes. If the replacement units were stored in a cold environment, the time for the indicator to go off could be as long as 45 minutes.

Procedure Is Used Without Reference From Another Trouble Procedure

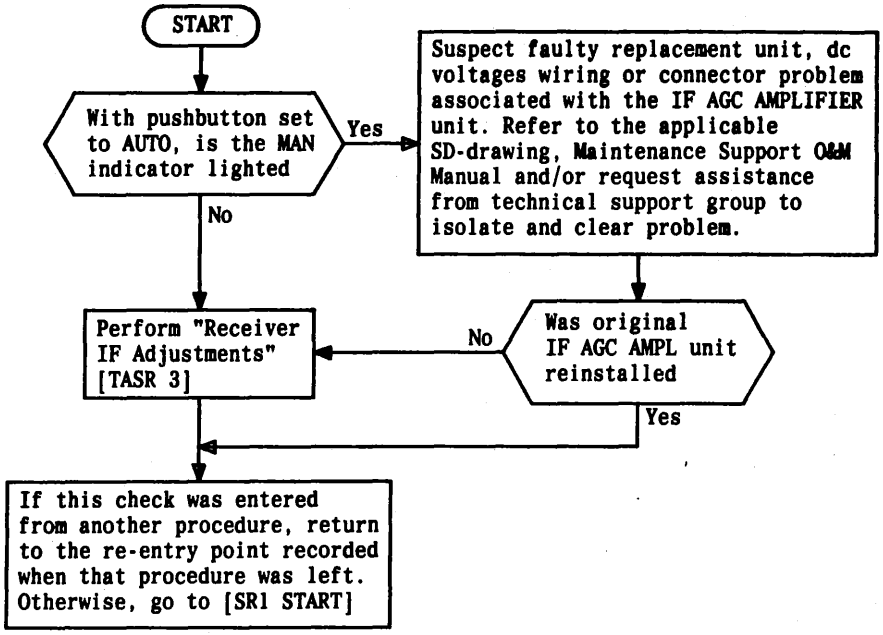
Wait for the GEN OVEN alarm to clear before proceeding further (see ***Notes 1 and 2***). At that point, or any time after, when the generator frequency is within ±350 kHz of the center frequency for 6-GHz systems or ±700 kHz for 11-GHz systems, troubleshooting receiver IF level related problems may normally continue. IF amplifier adjustments may also be made when these conditions are satisfied. Other tests, such as adaptive slope equalizer adjustments and checks, should generally be deferred until after the final microwave generator frequency check and adjustments.

Final Generator Check

For either of the above cases, the frequency and power of the microwave generator in the down-converter should be checked and, if necessary, adjusted about 1 hour after the GEN OVEN alarm indicator goes off. Do not try this sooner than 1 hour since, in general, the oscillator should stabilize at its proper frequency with little or no adjustment. It is best to follow the After Replacement instructions given in the " GEN OVEN Alarm" tab when this procedure is used without being directed from another routine.

CAUTION: THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

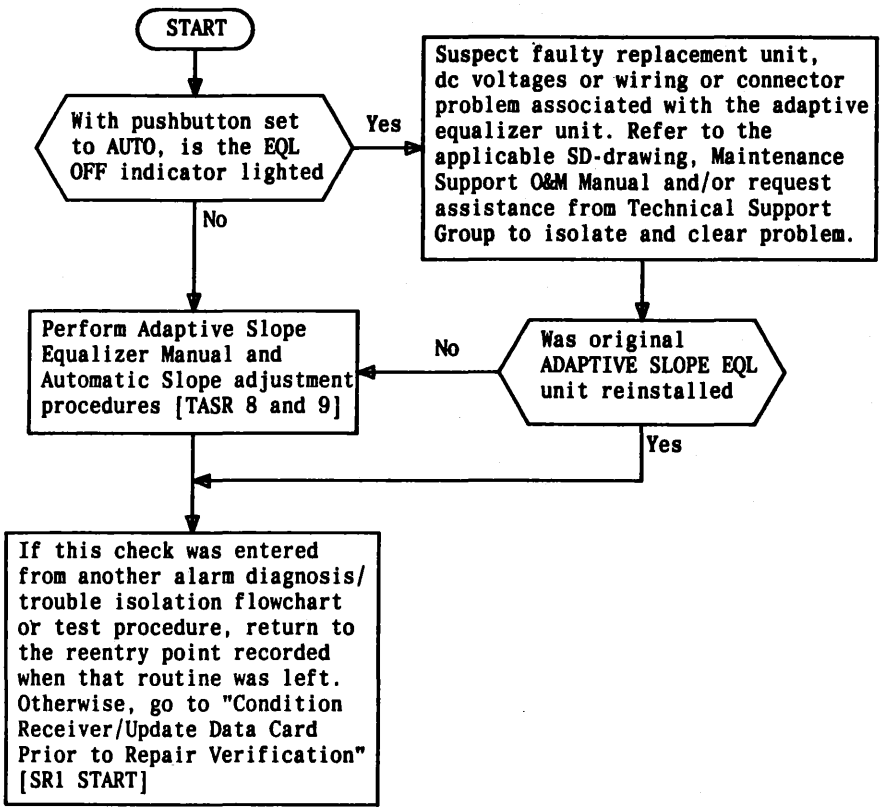
PREREQUISITE: If AGC AMPL unit just installed.



SR 9—IF AGC AMPL Unit Initial Check

CAUTION: THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

PREREQUISITE: IF ADAPTIVE SLOPE EQL unit just installed.

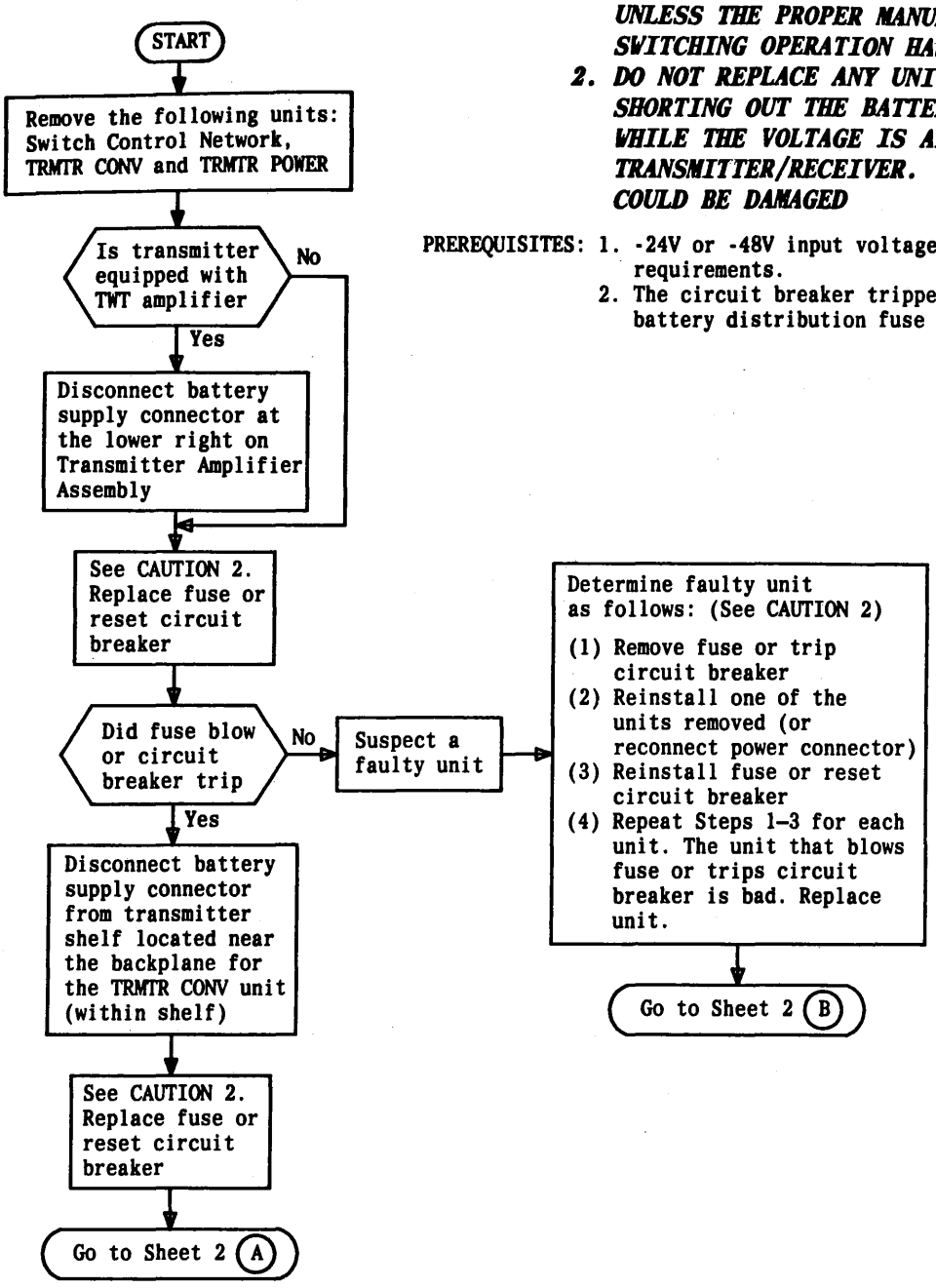


SR 10—Adaptive Slope Equalizer Unit Initial Check

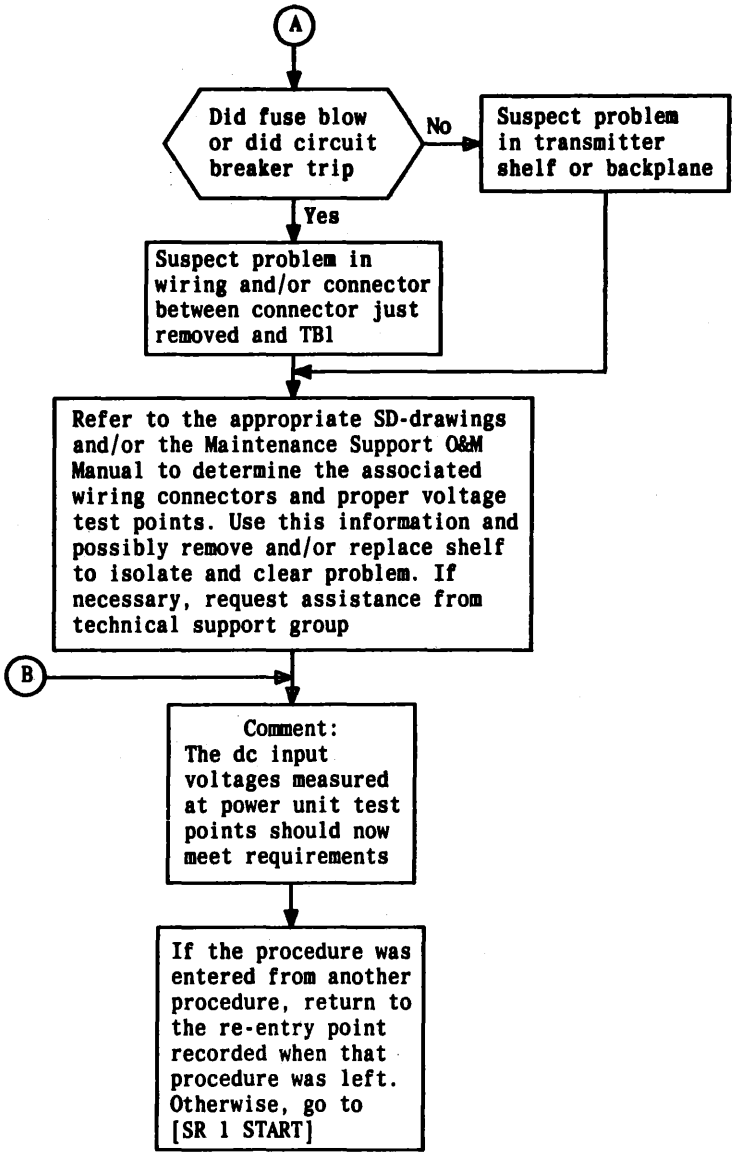
CAUTIONS: 1. THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

2. DO NOT REPLACE ANY UNIT SUSPECTED OF SHORTING OUT THE BATTERY SUPPLY VOLTAGE WHILE THE VOLTAGE IS APPLIED TO THE TRANSMITTER/RECEIVER. THE CONNECTOR COULD BE DAMAGED

PREREQUISITES: 1. -24V or -48V input voltage does not meet requirements.
2. The circuit breaker tripped/fuse blown at battery distribution fuse bay.



SR 11—Resolving Transmitter Shelf DC Input Problems (Sheet 1 of 2)

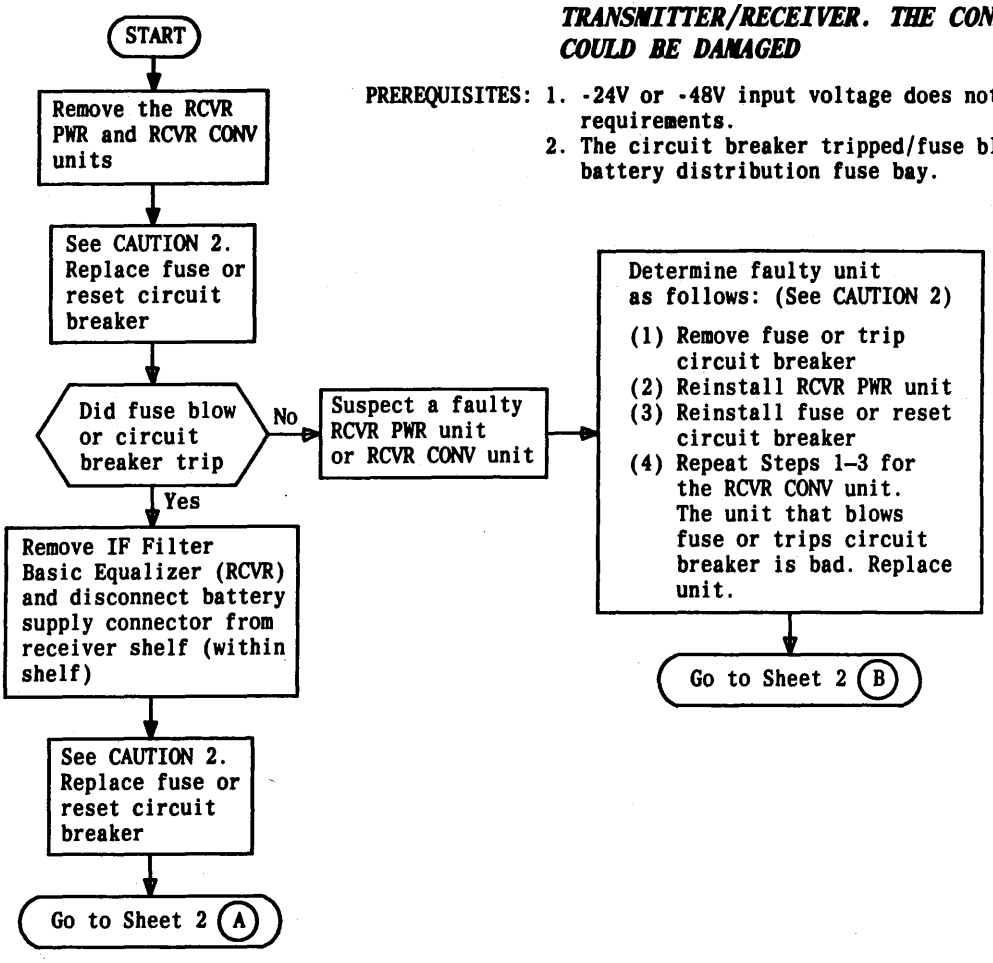


SR 11—Resolving Transmitter Shelf DC Input Problems (Sheet 2 of 2)

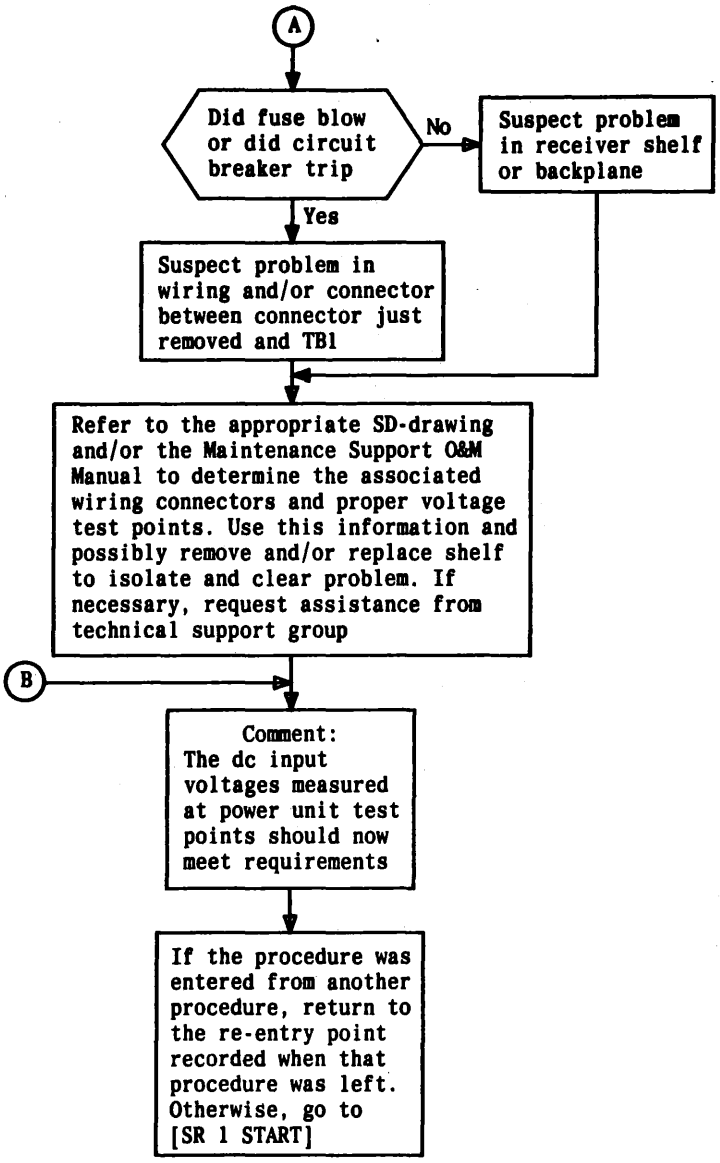
CAUTIONS: 1. THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

2. DO NOT REPLACE ANY UNIT SUSPECTED OF SHORTING OUT THE BATTERY SUPPLY VOLTAGE WHILE THE VOLTAGE IS APPLIED TO THE TRANSMITTER/RECEIVER. THE CONNECTOR COULD BE DAMAGED

PREREQUISITES: 1. -24V or -48V input voltage does not meet requirements.
2. The circuit breaker tripped/fuse blown at battery distribution fuse bay.



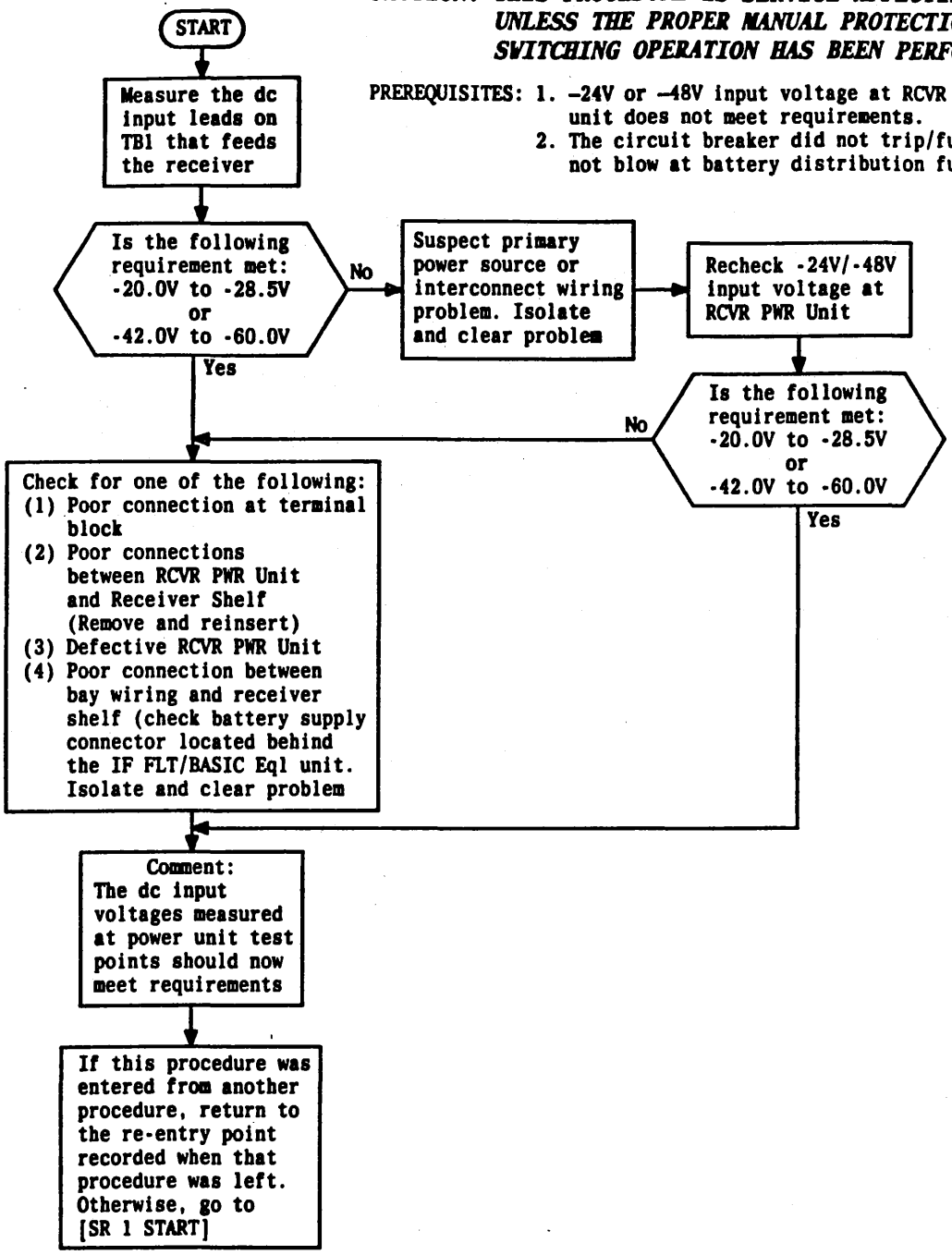
SR 12—Resolving Receiver Shelf DC Input Problems (Sheet 1 of 2)



SR 12—Resolving Receiver Shelf DC Input Problems (Sheet 2 of 2)

CAUTION: THIS PROCEDURE IS SERVICE AFFECTING UNLESS THE PROPER MANUAL PROTECTION SWITCHING OPERATION HAS BEEN PERFORMED.

PREREQUISITES: 1. –24V or –48V input voltage at RCVR PWR unit does not meet requirements.
2. The circuit breaker did not trip/fuse did not blow at battery distribution fuse bay.



SR 13—Resolving DC Input Problems When Circuit Breaker and Fuse Did Not Blow/Trip

SR 14—Alarm-Reporting Problem Diagnosis

Whenever an alarm is lighted on the centralized radio ALARM/ALARM AND METER unit, one or more indicators on the circuit reporting the alarm should also be lighted. (See alarm-reporting information under the "Station Alarm Trouble Isolation" tab in this manual). When an alarm exists and the associated indicators are not lighted on the reporting unit, a failure in the alarm-reporting circuits within the reporting unit or the ALARM/ALARM AND METER unit is most likely the cause. A dc voltage or an interconnecting circuit path problem may also result in such a situation.

The best way to isolate the problem is to check the alarm status signals coming to the radio T/R centralized ALARM/ALARM AND METER unit from the various alarm-reporting units mentioned above. This can be done by putting the radio alarm unit into an extender plug-in unit. While in an extender, the access necessary to determine the state of the associated alarm input signals is possible.

If the alarm status voltage at the ALARM/ALARM AND METER unit agrees with the faceplate alarm indicator on that unit, the alarm unit is most likely operating properly. The discrepancy is probably in the circuit reporting the false state or in the wiring path between it and the alarm unit. If the status voltage at the input to the alarm unit does not agree with the reporting unit indicator, the alarm-reporting discrepancy is probably due to a failure within the alarm unit.

The Maintenance Support O&M manual and the applicable SDs provide the connection and input pin status information necessary for this evaluation.

Once the alarm reporting discrepancy is resolved, return to the logic diagram that referenced this procedure.

ISSUING ORGANIZATION

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