

**OPERATION AND MAINTENANCE
MAINTENANCE SUPPORT
1×N FREQUENCY DIVERSITY
DR 6/11-135A AND 135EC
RADIO DESCRIPTION**

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1. GENERAL

A DR 6/11 Digital Radio frame can contain up to four vertical radio T/R (transmitter/receiver) pairs. The waveguide can be arranged to grow from left to right or right to left in a radio frame. This practice uses block diagrams to describe the DR 6/11 radios in terms of the radio transmitter, radio receiver, common alarm unit, and DC power distribution.

The following symbols are used in the block diagrams.

- = NOMINAL POWER IN DBM
- = WAVEGUIDE
- C1 ○ = UT-141A COAXIAL CABLE UNIFORM TUBE
- C2 ○ = KS-19224, L2 COAXIAL CABLE
- C3 ○ = 731B COAXIAL CABLE

1.1 UPDATE INFORMATION

This practice is reissued to include reference to the new 4400 Series RECEIVER DOWN CONVR & MWV GEN units. The practice is used in binders 421-101-001 and 421-101-060.

2. DR 6-30-135 DIGITAL RADIO

2.1 TRANSMITTING

The 70-MHz, 64-QAM (quadrature amplitude modulation) signal from a digital terminal or regenerator transmitter is mixed with a locally generated oscillator signal (RF microwave generator) in the 6-GHz band. The sum or difference signal is then selected and amplified to a specified high power level and transmitted to the next station.

Figure 1 shows a block diagram of a 6-GHz radio transmitter with the TWT (traveling wave tube) option. Figure 2 shows the 6-GHz radio transmitter with the solid-state amplifier option.

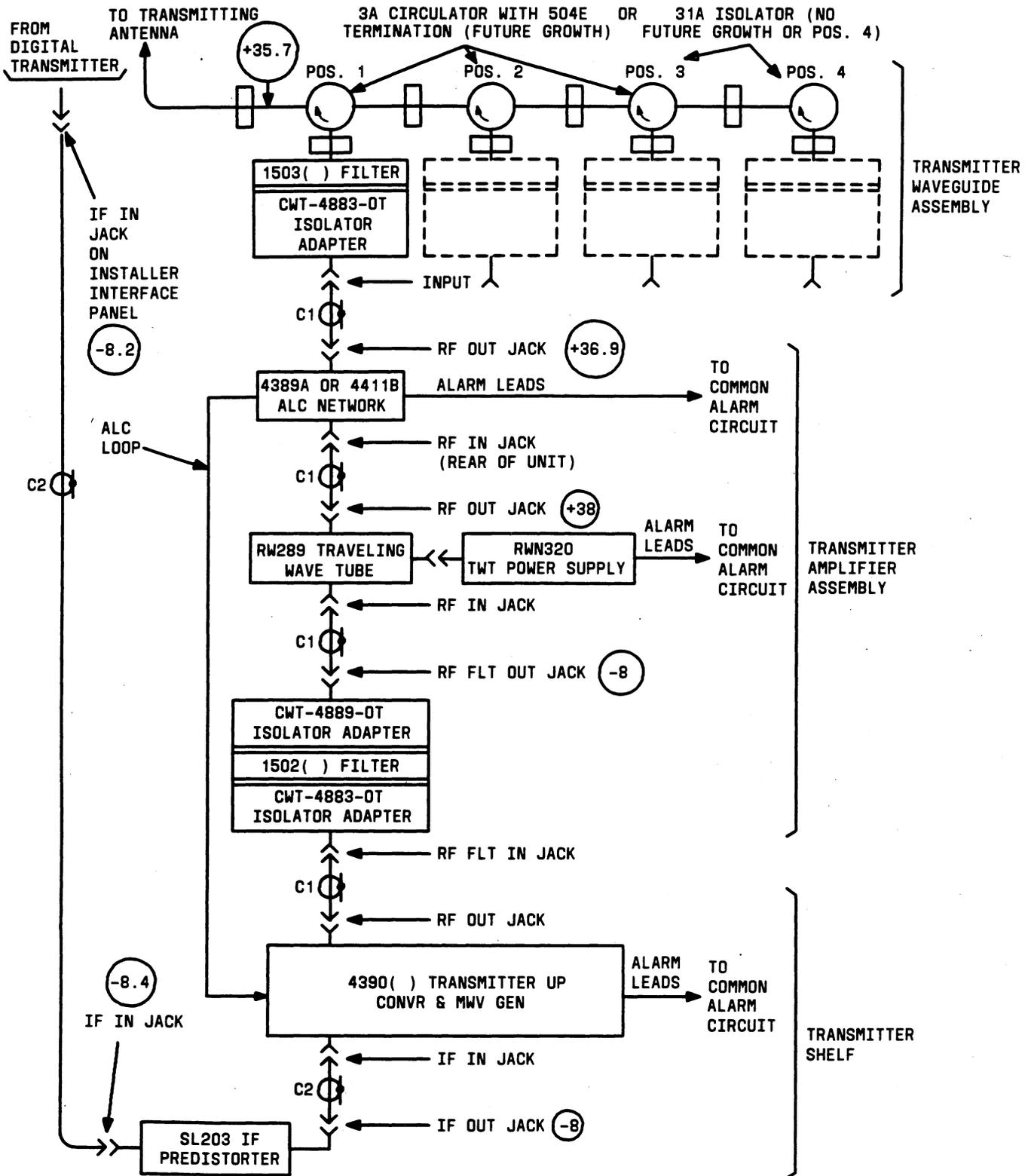


Figure 1-6-GHz Radio Transmitter with TWT Option

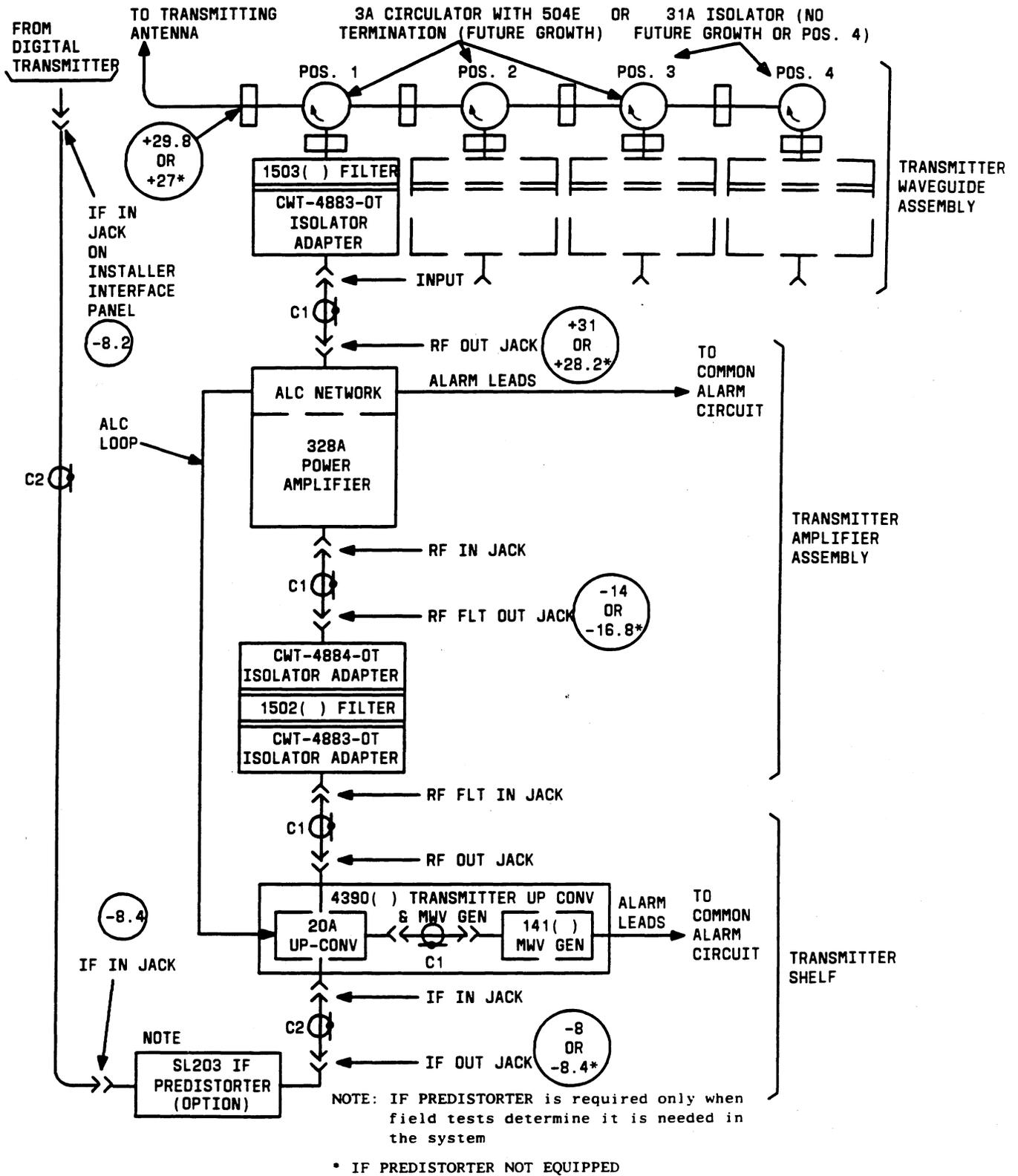


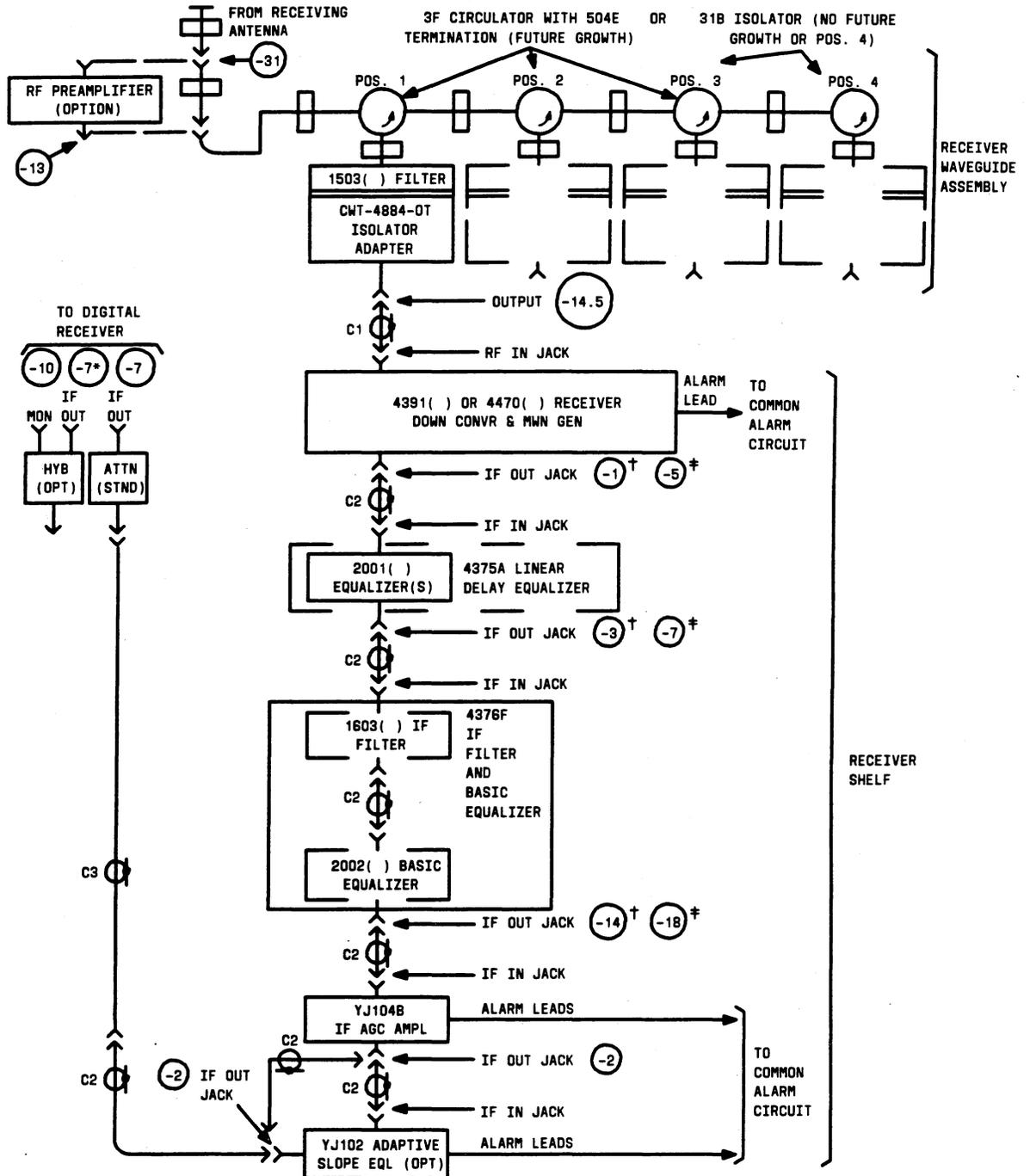
Figure 2-6-GHz Radio Transmitter with Solid-State Option

2.2 RECEIVING

The received 6-GHz signal is translated to a 70-MHz IF signal (two 6-GHz signals to two 70-MHz IF signals if space diversity option). The signal(s) is then corrected to produce a 70-MHz output signal with constant power and minimum linear distortion for output to the digital terminal receiver or regenerator.

Figure 3 shows a block diagram of a 6-GHz radio receiver.

Figure 4 shows a block diagram of a 6-GHz radio receiver with space diversity option.



* -3.5 DBM IS REQUIRED WHEN I.F. INTERCONNECT DISTANCE IS >50 FT.
 † REQUIRED POWER LEVEL FOR RECEIVER EQUIPPED WITH 4391() DOWN CONVR
 ‡ REQUIRED POWER LEVEL FOR RECEIVER EQUIPPED WITH 4470() DOWN CONVR

Figure 3-6-GHz Radio Receiver

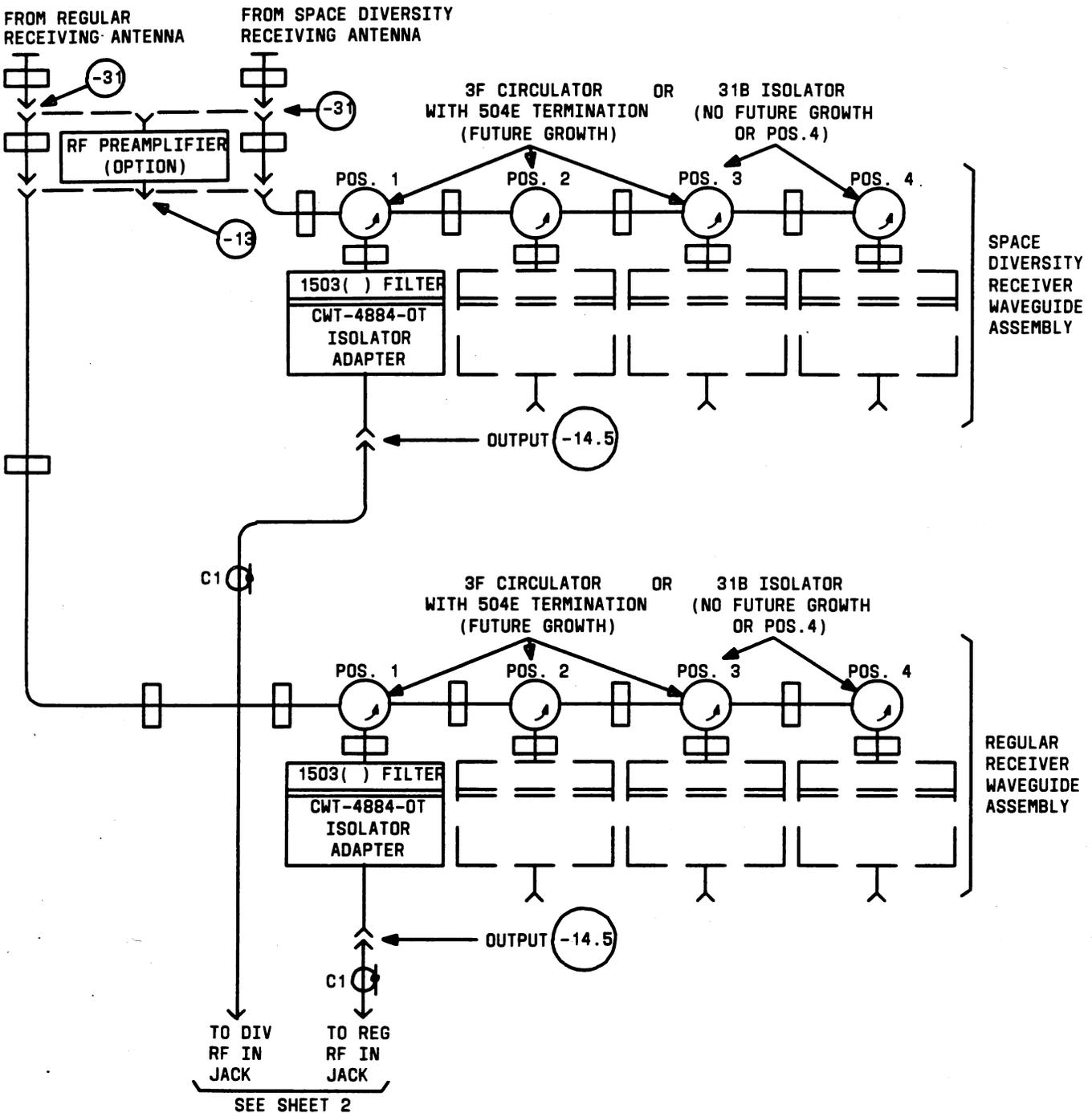
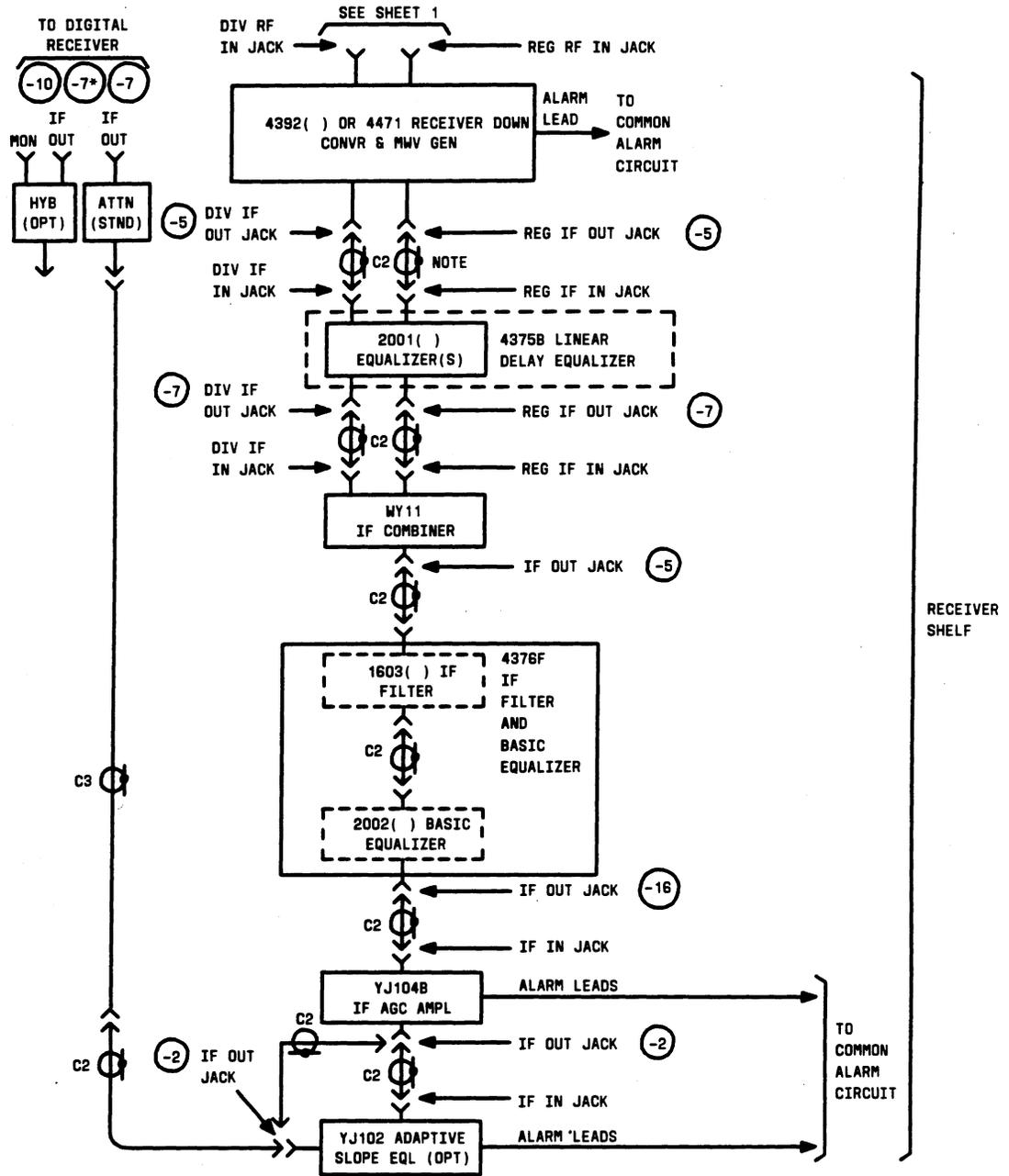


Figure 4-6-GHz Radio Receiver with Space Diversity Option (Sheet 1 of 2)



NOTE: THE DADE CABLING IS INSTALLED IN THE REGULAR OR DIVERSITY PATH AS REQUIRED.

* -3.5 dBm IS REQUIRED WHEN I.F. INTERCONNECT DISTANCE IS >50 FT.

Figure 4-6-GHz Radio Receiver with Space Diversity Option (Sheet 2 of 2)

3. DR 11-40-135 DIGITAL RADIO

3.1 TRANSMITTING

The 70-MHz, 64-QAM signal from a digital terminal or regenerator transmitter is mixed with a locally generated oscillator signal (RF microwave generator) in the 11-GHz band. The sum or difference signal is then selected and amplified to a specified high power level and transmitted to the next station.

Figure 5 shows a block diagram of an 11-GHz radio transmitter.

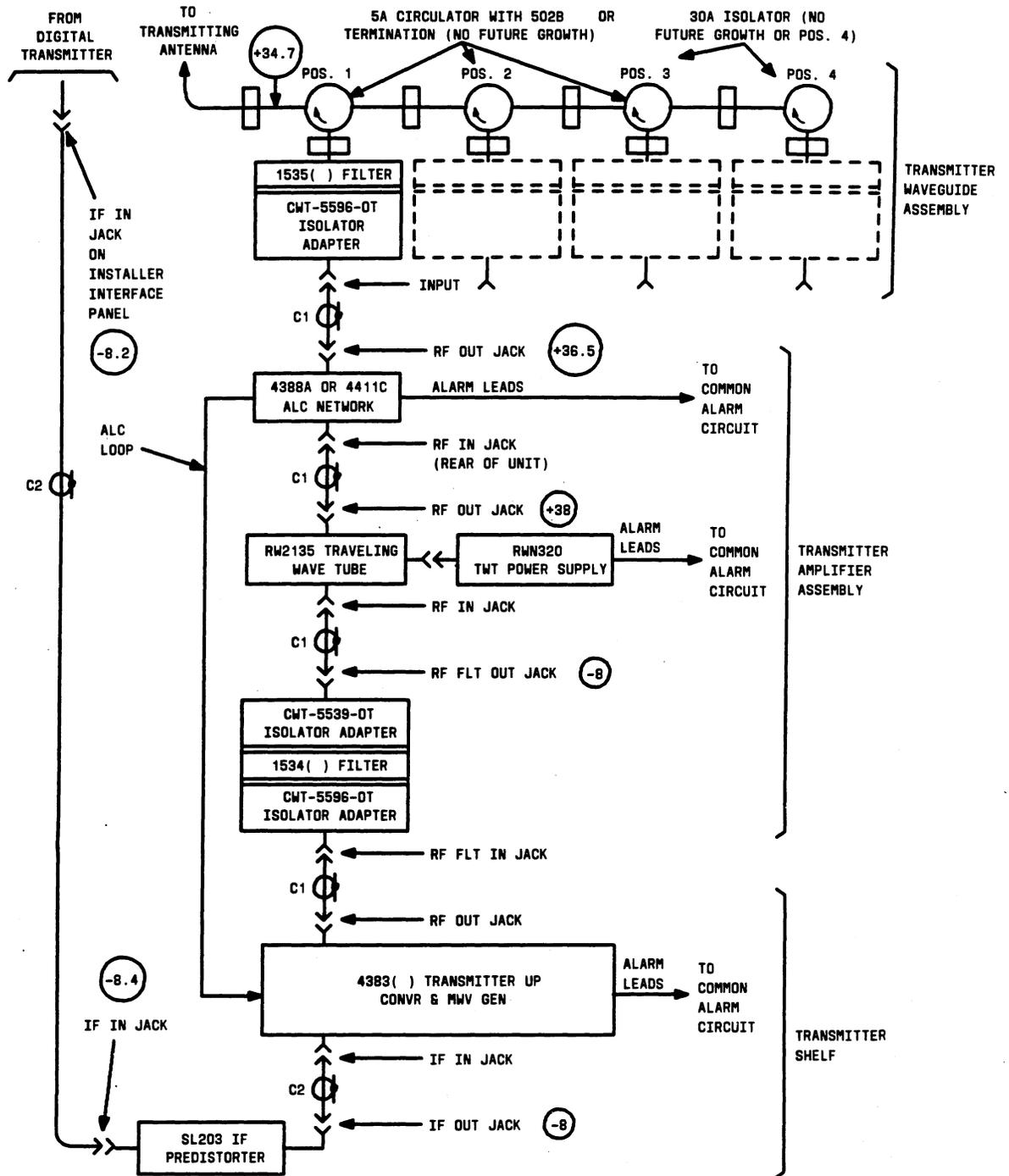


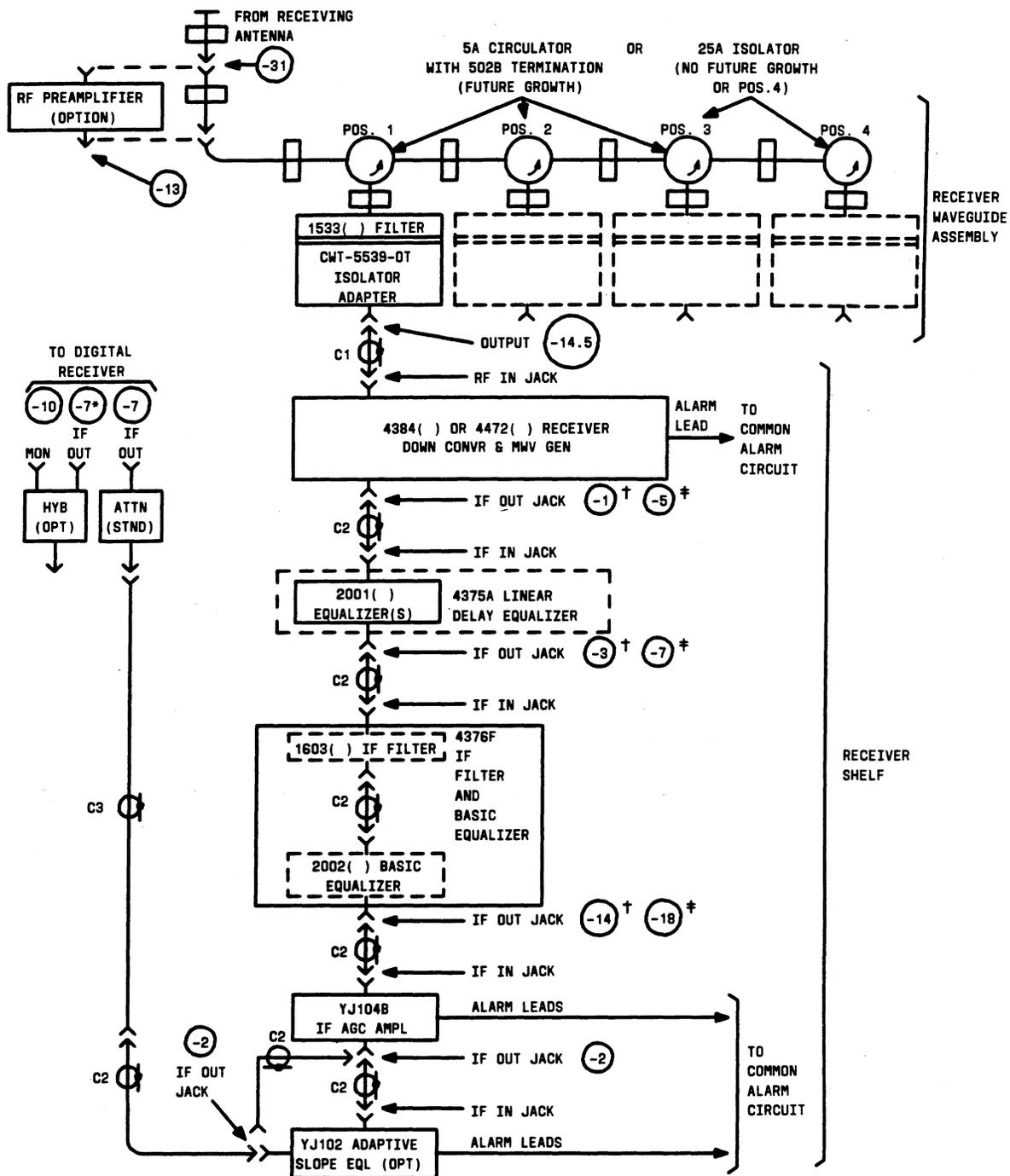
Figure 5-11-GHz Radio Transmitter

3.2 RECEIVING

The received 11-GHz signal is translated to a 70-MHz IF signal (two 11-GHz signals to two 70-MHz IF signals if space diversity option). The signal(s) is then corrected to produce a 70-MHz output signal with constant power and minimum linear distortion for output to the digital terminal receiver or regenerator.

Figure 6 shows a block diagram of an 11-GHz radio receiver.

Figure 7 shows a block diagram of an 11-GHz radio receiver with space diversity option.



* -3.5 dBm IS REQUIRED WHEN I.F. INTERCONNECT DISTANCE IS >50 FT.
 † RECEIVER POWER LEVEL FOR RECEIVER EQUIPPED WITH 4384() DOWN CONVR
 ‡ RECEIVER POWER LEVEL FOR RECEIVER EQUIPPED WITH 4472() DOWN CONVR

Figure 6-11-GHz Radio Receiver

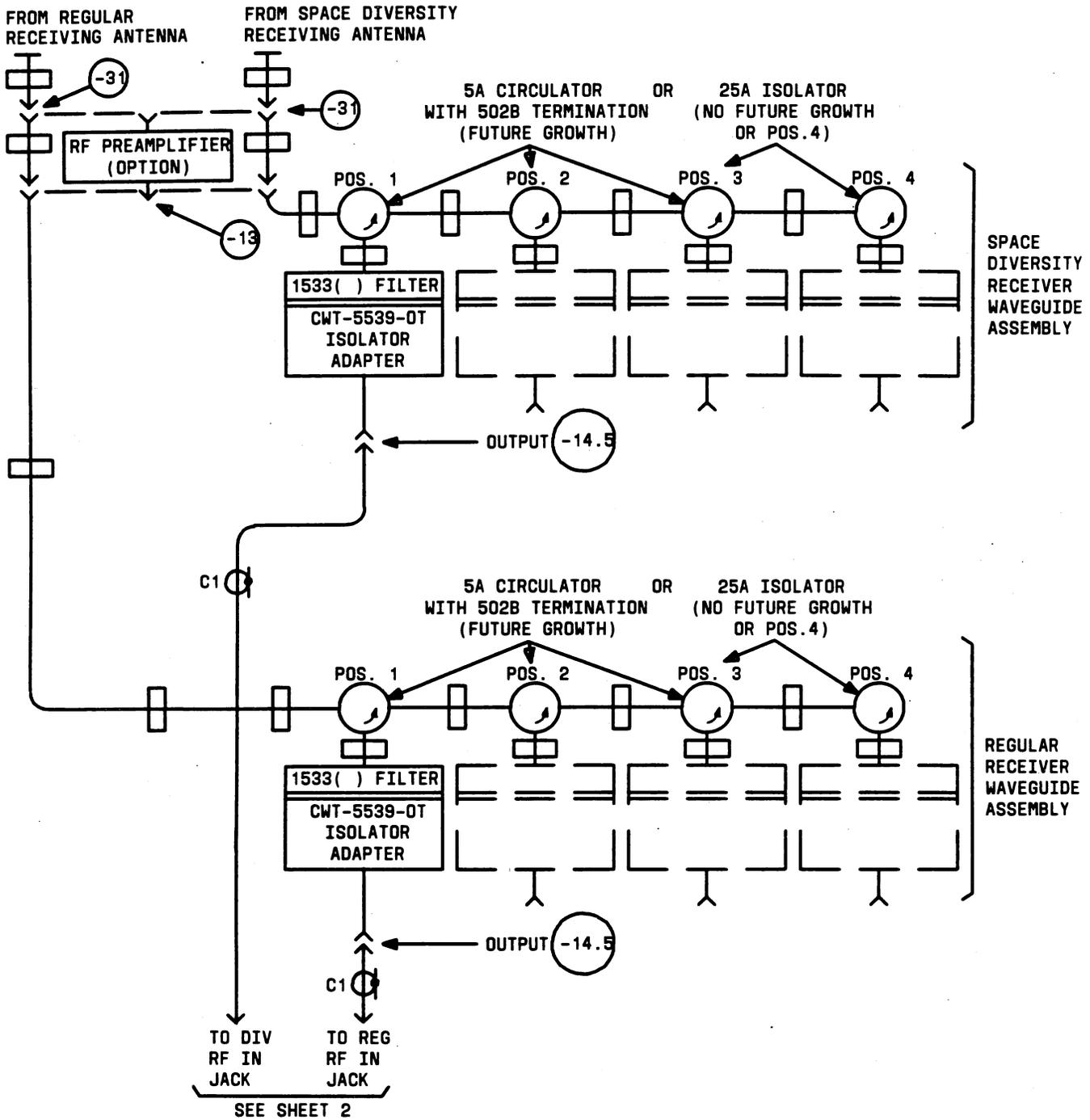


Figure 7-11-GHz Radio Receiver with Space Diversity Option (Sheet 1 of 2)

4. COMMON ALARM UNIT

The alarm unit is common to the transmitter and receiver and is located in position 3 of the transmitter shelf. The alarm unit collects and displays the status of various circuits associated with the radio transmitter and radio receiver. The status outputs are then sent to the associated digital terminal or regenerator CHAN CONTR unit.

Figure 8 shows the radio alarm reporting signal path.

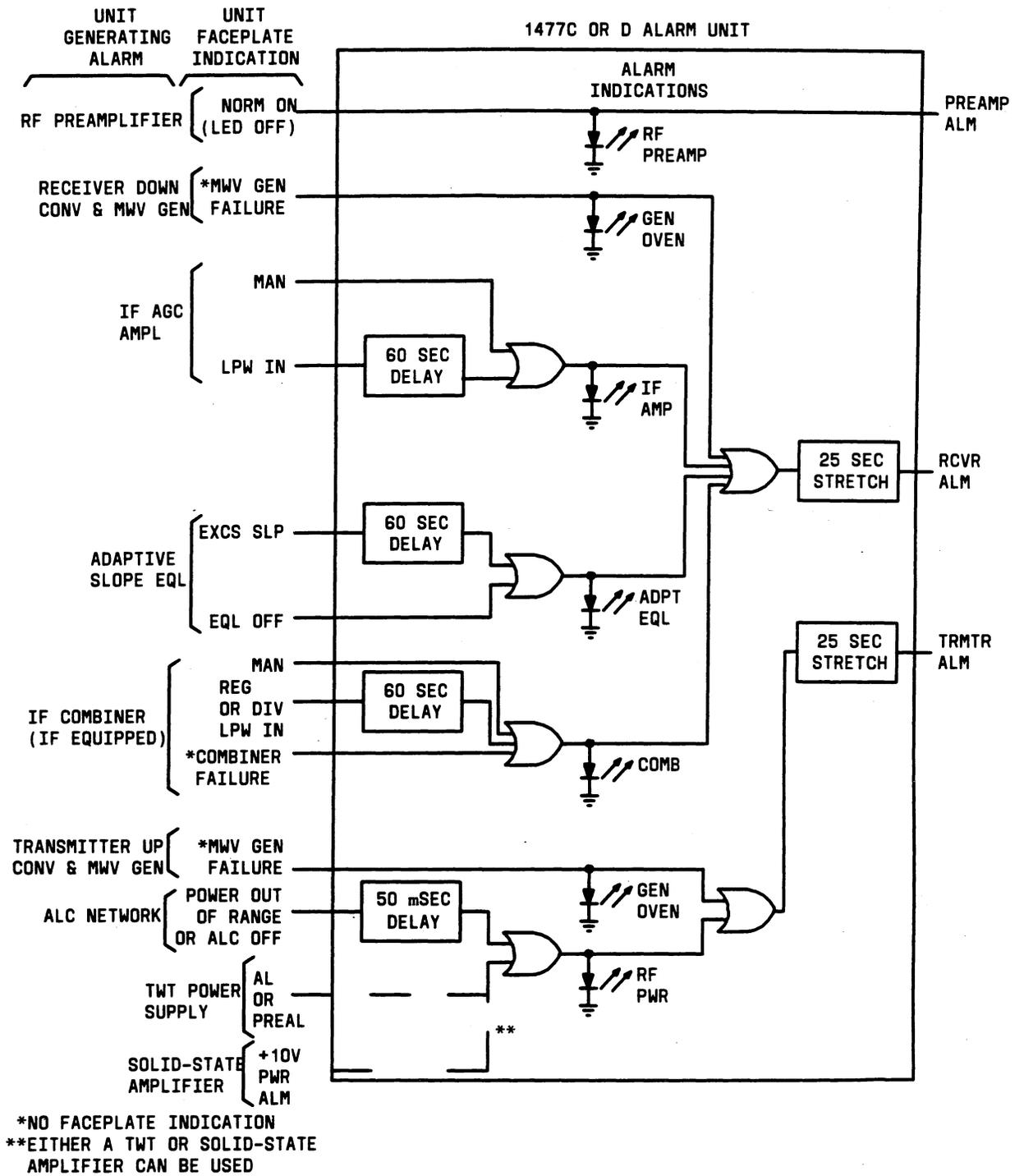


Figure 8-Radio Alarm Reporting Signal Path

5. POWER DISTRIBUTION

The radio transmitter and radio receiver are equipped with power conditioning units to provide the appropriate DC voltages to their respective units. Some units are powered directly by the -24 V or -48 V office power source.

Figures 9 and 10 show the radio transmitter power distribution. Figure 11 shows the radio receiver power distribution.

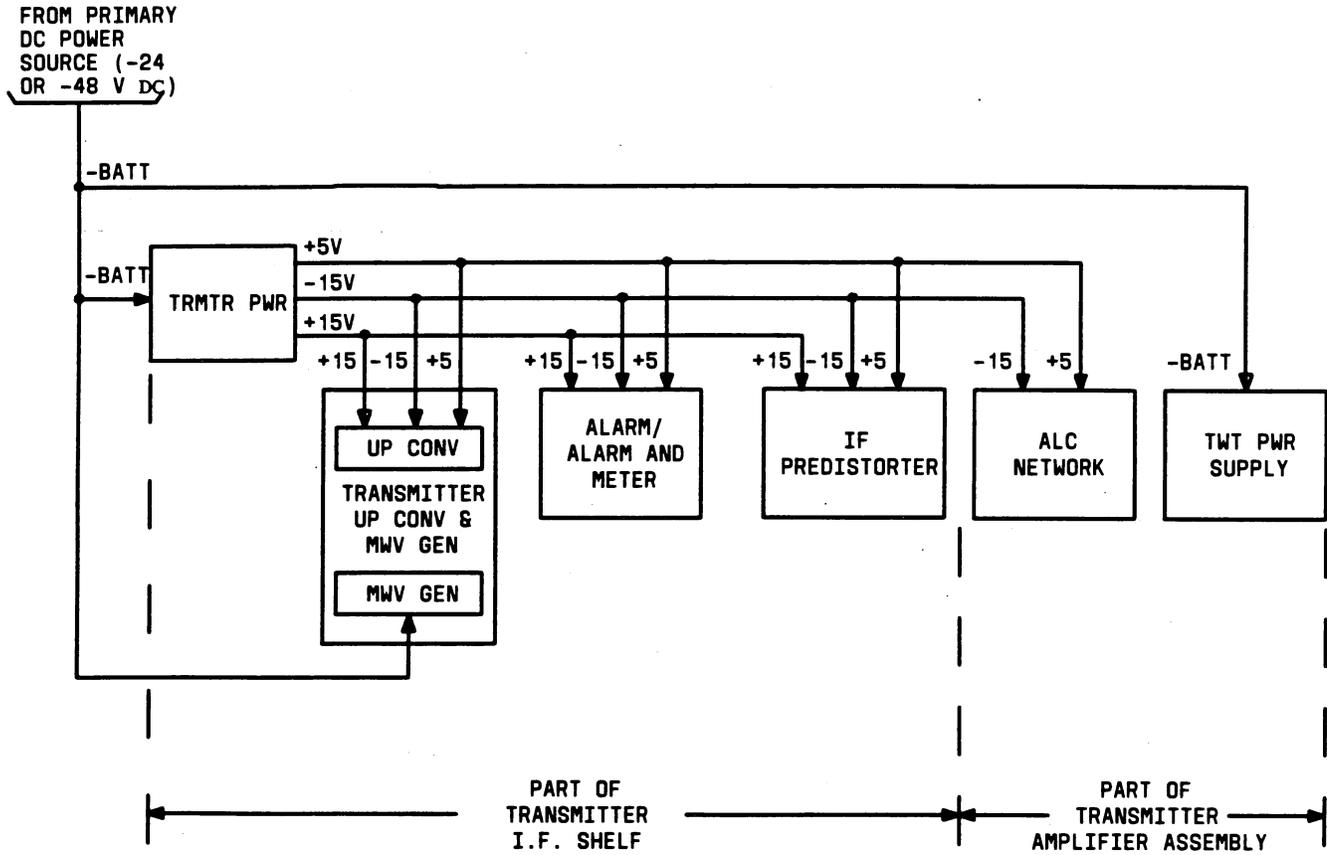
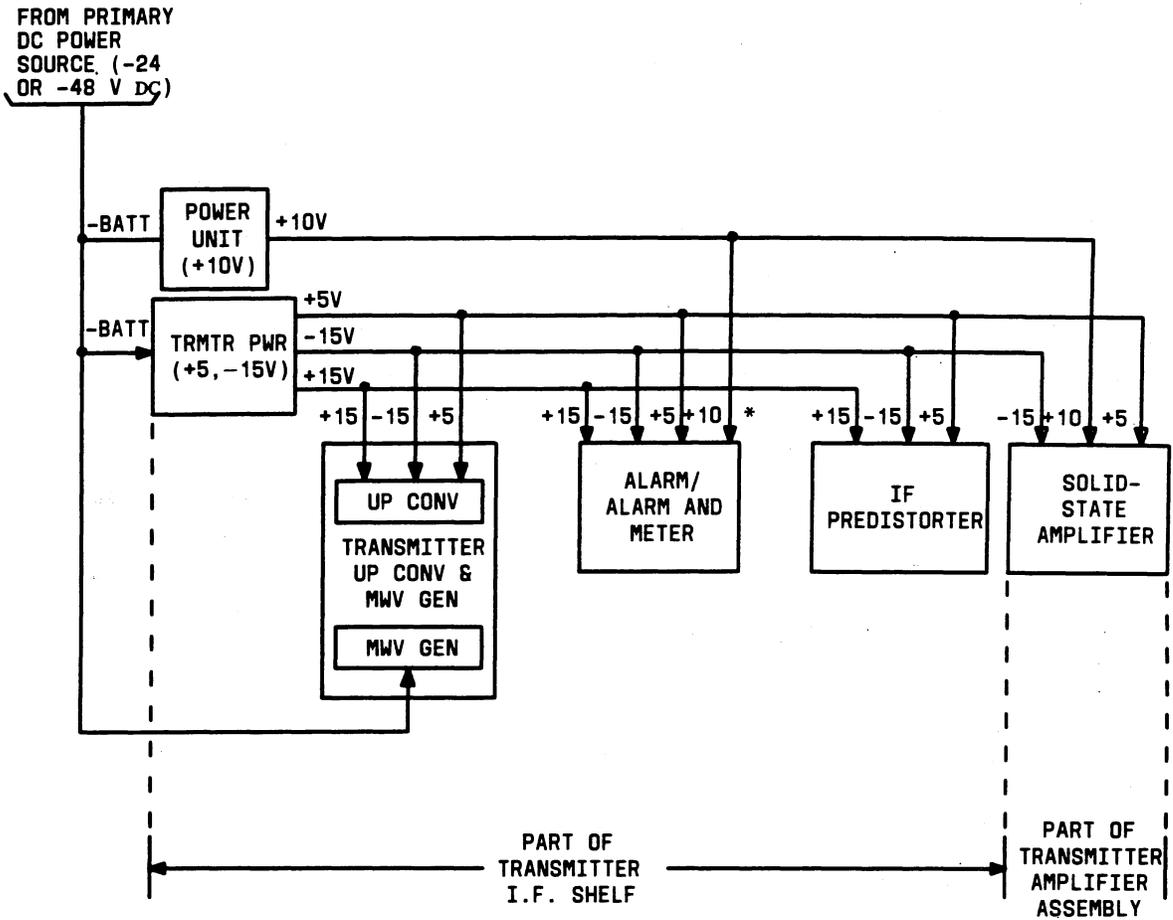
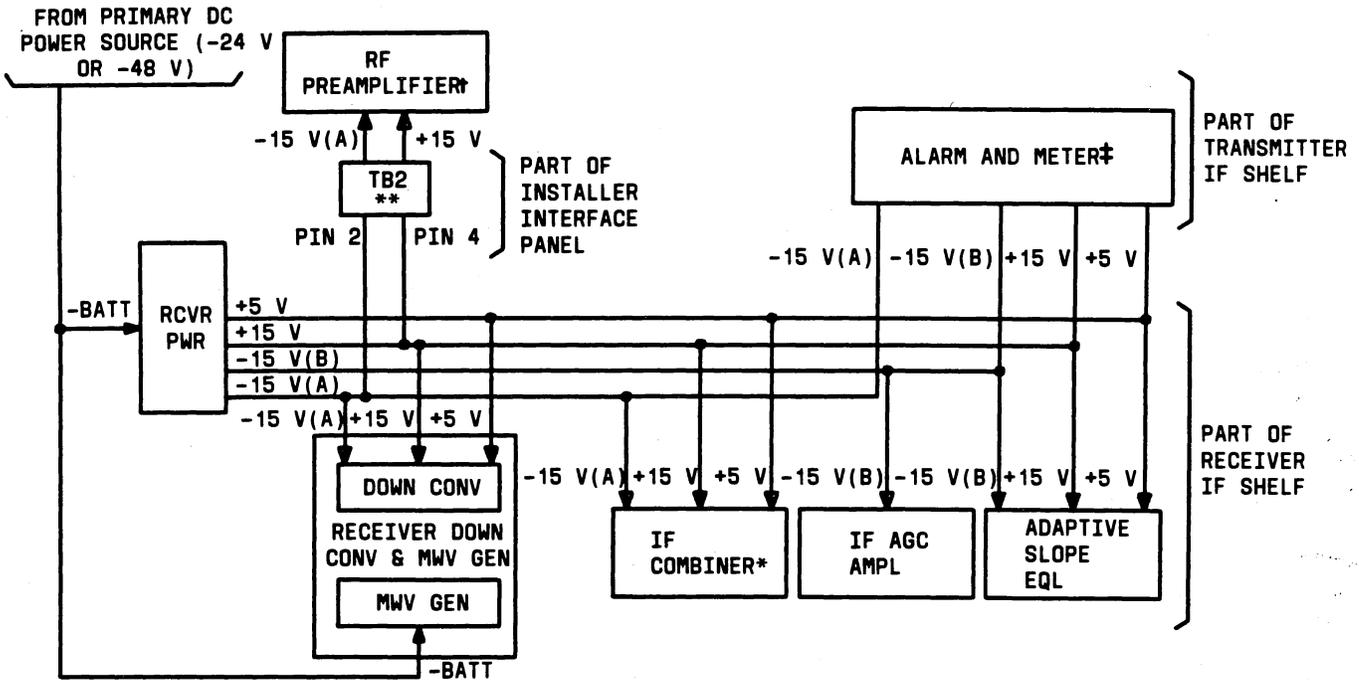


Figure 9—Radio Transmitter Power Distribution—TWT Amplifier Equipped



* +10V LEAD USED FOR MONITORING PURPOSES ONLY

Figure 10-Radio Transmitter Power Distribution—Solid-State Amplifier Equipped



* Equipped in space diversity receivers only

† The RF preamplifier (if equipped) is normally powered by the first and second receiver equipped in a radio frame

‡ ALARM AND METER unit powered from transmitter shelf. Receiver voltage leads provided for monitoring purposes only.

Figure 11-Radio Receiver Power Distribution