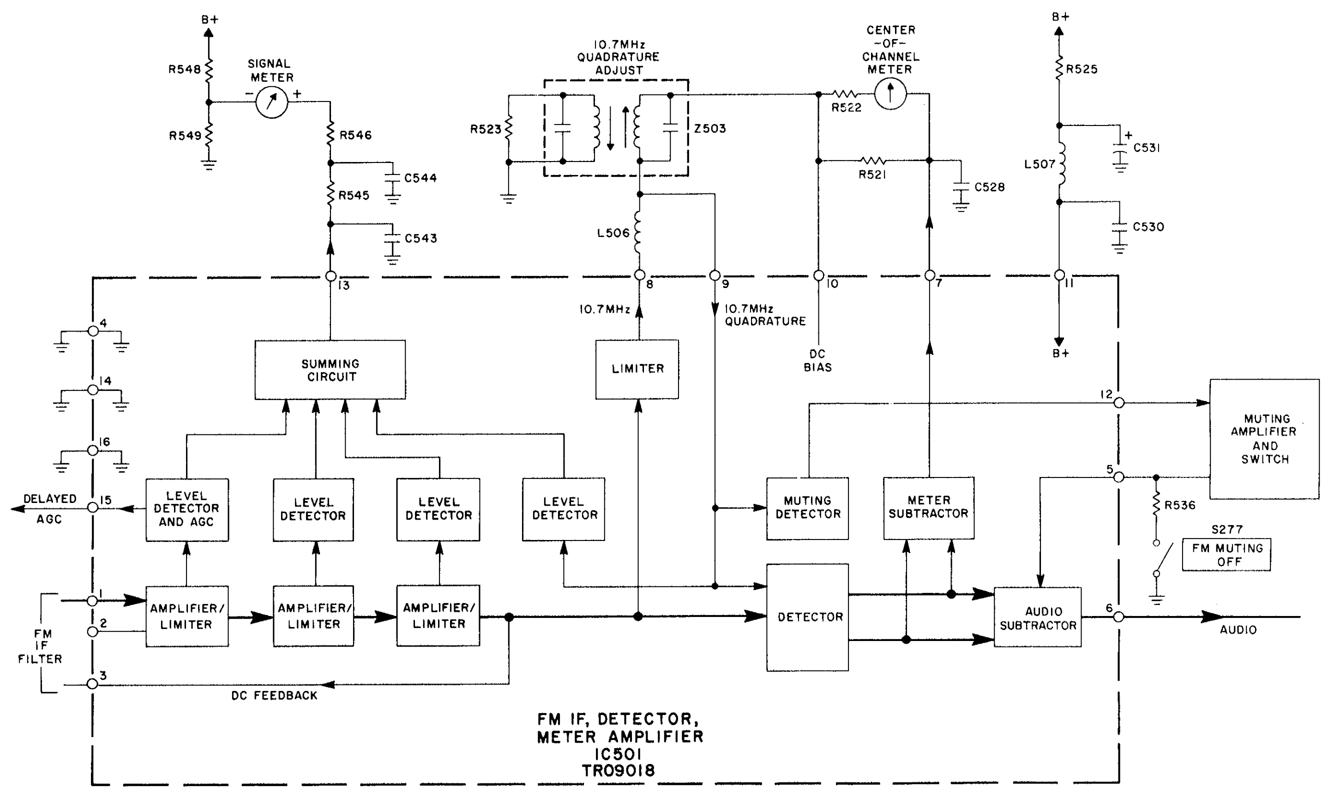


IF IC

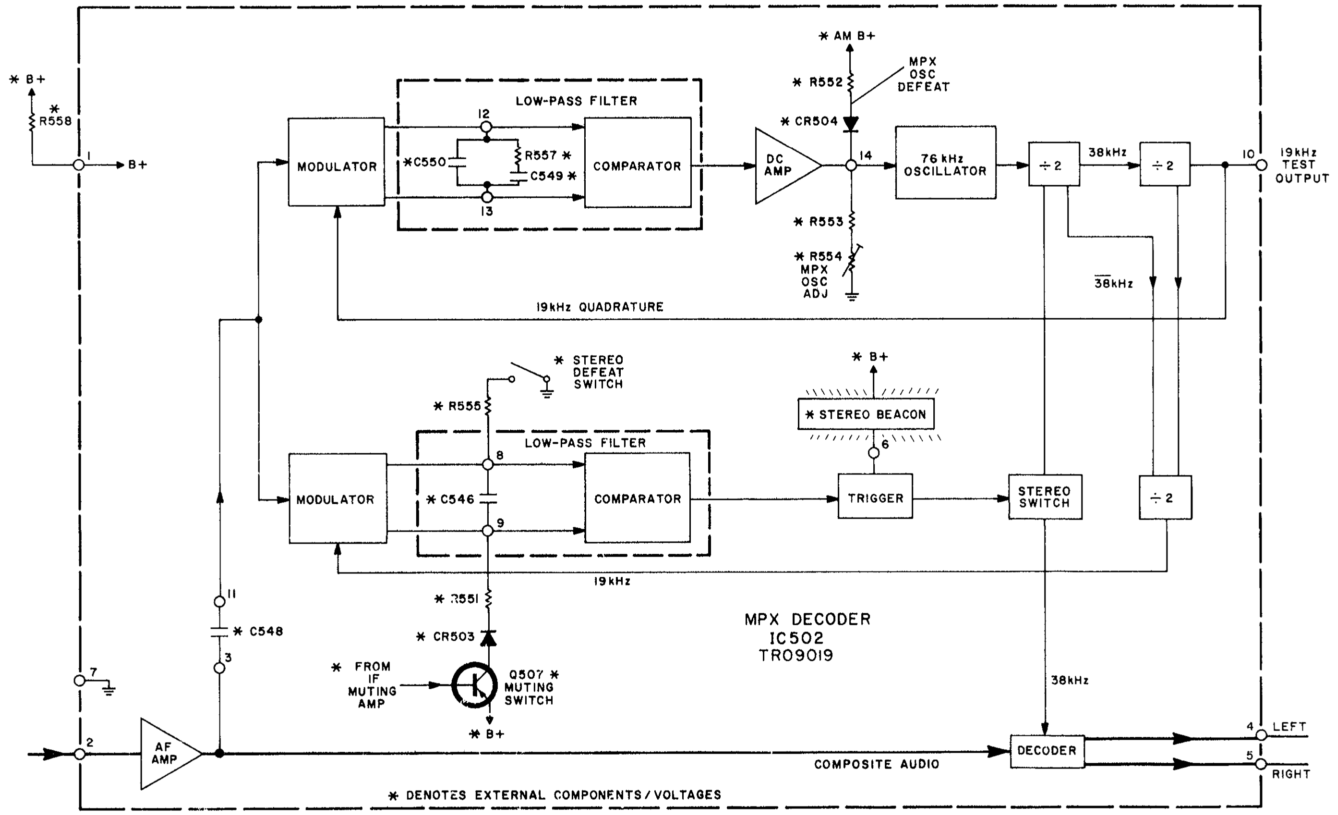
The input from the IF filter is processed through three stages of amplification and limiting. The output of the third limiter is applied to a fourth limiter, and a balanced detector. The push-pull output from the detector is combined differentially in each of the two subtractor stages to produce separate outputs for the audio and the center-of-channel meter.

The output from the fourth limiter is applied through L506 to the tuned circuit consisting of Z503 and R523. At the exact center of the IF passband (nominally 10.7MHz), Z503 is preset to provide a 10.7MHz quadrature (90° out-of-phase) signal to the detector. The phase of the signal from the tuned circuit changes proportionally with changes in the frequency of the IF signal. With no audio modulation, the inputs to the detector are in quadrature and the outputs of the detector are balanced. No differential signals appear at the outputs of the subtractor stages. When the frequency of the IF signal deviates from 10.7MHz (as a result of audio modulation or station detuning), the detector outputs unbalance and differential DC signals appear at pins 6 and 7. The center-of-channel meter, which responds to DC unbalances of the detector does not respond to AC components.

The muting detector monitors the envelope signal-to-noise ratio across the tuned circuit and feeds the detected noise to the muting amplifier and switch. Excessive noise in the signal causes a control voltage to be applied to the audio subtractor circuit which mutes the audio. When S277 is closed, audio muting is defeated by shunting the control voltage to ground through R536.

Level detectors monitor the IF signal levels at the three amplifier/limiter stages and at the tuned circuit. Each limiter, beginning with the last, saturates progressively as the input level increases. Rectified signals from the level detectors are summed and applied as a linear-log voltage to the signal meter.

An AGC voltage for the RF amplifier is obtained from the first level detector. This AGC voltage is delayed until the IF signal in the first amplifier approaches limiting.



MPX IC

When the receiver is tuned to a stereo broadcast the composite audio fed to pin 2 consists of sum-and-difference signal information (L+R and L–R), and a 19kHz pilot tone. The L+R information is in the form of normal audio. The L–R information is Amplitude Modulated on a suppressed 38kHz subcarrier. (At the transmitter, the subcarrier is derived from the pilot tone through a frequency-doubler.) In order to extract the L–R information, it is necessary to regenerate the 38kHz subcarrier and apply it, together with the composite signal, to the decoder. Left and Right channel information is then decoded by addition and subtraction of the L+R and L–R information.

The top line of the block diagram shows the 38kHz subcarrier regeneration loop. The 76kHz oscillator output is processed through two frequency divider stages to furnish 38kHz and 19kHz outputs. The 19kHz output is a quadrature (90° out-of-phase) signal which is applied to the modulator. When the composite input signal contains a 19kHz pilot tone (stereo broadcast) the 19kHz quadrature signal is phase-compared to the pilot signal and the resulting DC voltage fed through the DC amp to the oscillator, where it corrects the frequency. As a result, the oscillator is continuously phase-locked to the pilot signal. The setting of R554 determines the frequency of the free-running oscillator. With the oscillator phase-locked to the pilot, the 38kHz output from the first divider is in the correct phase for decoding a stereo signal. The regenerated 38kHz signal is fed to the decoder via a stereo switch. The stereo switch closes when a sufficiently large 19kHz pilot tone is detected in the second modulator-comparator circuit. A third frequency divider stage, which processes signals derived from the first two dividers, returns a 19kHz in-phase signal to the second modulator-comparator for pilot detection. The DC voltage derived from the second modulator-comparator circuit is applied to the trigger which activates the STEREO-BEACON indicator and the stereo switch.

The circuit is forced into the monophonic mode by grounding pin 8, or applying a positive DC voltage to pin 9. With very low-level, noisy FM signals, a negative voltage (derived from the IF muting amplifier) forward biases Q507, forcing the circuit into mono. During AM operation the positive DC voltage applied to pin 14 disables the 76kHz oscillator to eliminate interference with AM reception.

FM ALIGNMENT – AUDIO DISPLAY and FM MUTING OFF depressed, TONE CONTROLS and MASTER BALANCE to center. SPEAKERS to PHONES ONLY, MODE/MONITOR to STEREO, SELECTOR to FM, MASTER VOLUME to MIN.

Maintain generator output as low as possible for suitable indication.

ITEM	GENERATOR	DIAL SETTING	INDICATOR	PROCEDURE
Note: The FM IF circuit utilizes a non-tunable ceramic filter which establishes the IF bandpass. To insure symmetrical tuning and selectivity, the IF must be aligned precisely to the center of the filter bandpass, rather than to 10.7 MHz as in conventional LC circuits.				
1. IF ALIGNMENT	Connect 10.7 MHz sweep to pin 63, gnd to pin 5Y. Markers are not required.	Position of non-interference	Scope vert input to pin 57, gnd to pin 5K.	Adjust Z502 top and bottom slugs for max gain and best symmetry. Keep signal low enough for noise on response as shown in FM IF.
2. PRELIMINARY DETECTOR ALIGNMENT	10.7 MHz sweep to pin 63, gnd to pin 5Y. Adjust for S-curve display.	Position of non-interference	Scope vert input to pin 58, gnd to pin 5K, front panel center-of-channel meter M2.	Adjust Z503 top slug for max gain, best linearity, and zero deflection of M2. Adjust bottom slug for minimum gain and best linearity. See FM DETECTOR response. Note: Minimum THD test must be performed as part of detector alignment.
Note: 120-ohm composition resistors in series with each lead from the RF generator match the 50-ohm output to the 300-ohm input impedance. Generator output voltage is reduced to one-half at antenna terminals. Signal voltages specified in this table are generator output levels, not antenna voltages.				
3. FRONT END ALIGNMENT		Tuning knob fully CCW.		Center dial pointer on 0 and cement.
4.	FM generator to FM ANTenna terminals through 120-ohm resistors. Set to 90 MHz. Adjust output for approx 2 on M1.	Center of 90 MHz calibration mark on dial.	Front panel signal meter M1, center-of-channel meter M2.	Adjust L504, L503, Z501 for max deflection of M1, zero deflection of M2. Reduce generator output to keep M1 indication at approx 2.
5.	Set to 106 MHz	Center of 106 MHz calibration mark on dial.	Front panel signal meter M1, center-of-channel meter M2.	Adjust C514, C517, C504 for max deflection of M1, zero deflection of M2. Reduce generator output to keep M1 indication at approx 2. Repeat steps 4 and 5 for max signal and accurate dial calibration.
6. FINAL DETECTOR ALIGNMENT (MINIMUM THD)	Set to position of non-interference. Modulate with 400 Hz, ±75 kHz deviation.	Tune to generator.	Scope vert input to OUT TO RCDR FRONT LEFT jack.	Reduce generator output for noise visible on sine wave. Readjust generator frequency to center noise on positive and negative half cycles. See SYMMETRICAL TUNING response. Note: Do not change generator or receiver tuning; proceed with minimum THD adjustment.
7.	Increase generator output to 2 mV.		Front panel center-of-channel meter M2, AC VTVM and HD analyzer to OUT TO RCDR FRONT LEFT jack.	Adjust Z503 top slug for zero deflection of M2. Adjust bottom slug for minimum THD (0.2% typical). Readjust top slug for zero deflection of M2.
8. MUTING TEST	Reduce generator output to 4 uV. Modulate with 400 Hz, ±25 kHz deviation.	Tune to generator.	AC VTVM and scope vert input to OUT TO RCDR FRONT LEFT jack.	Release FM MUTING OFF pushbutton. Audio should disappear. Increase generator output to 16 uV. Audio should reappear on scope. (No adjustment.)