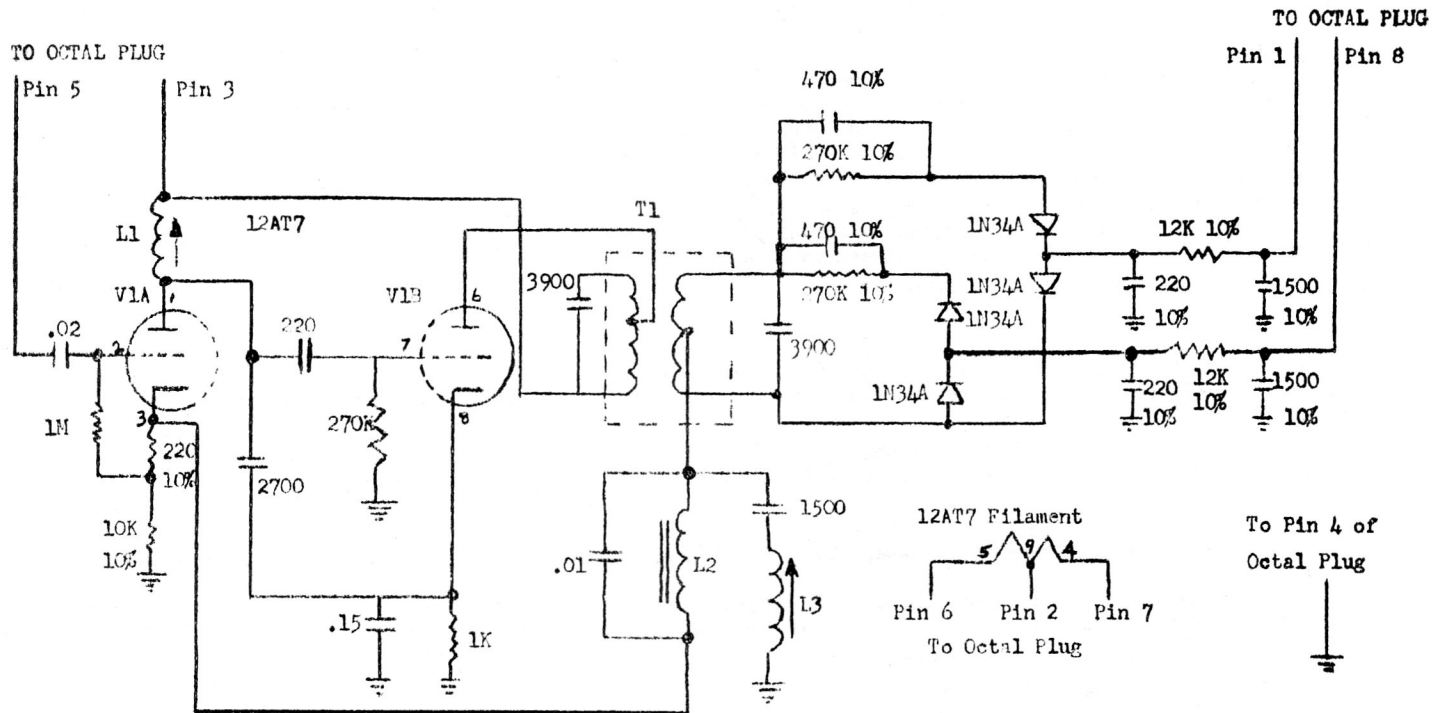




FM STEREO ADAPTER
MODEL FS-22



THE FS22 FM STEREO MULTIPLEX CONVERTER

GENERAL DESCRIPTION

The FS22 Multiplex Converter is a plug-in modular concept of stereo conversion.

All normally used connections are led out to pins in a standard octal plug. Small components, interconnecting wiring etc. are housed within the main body of the unit, with only the 12AT7 tube, the 3BK6 transformer and one section of the SCA filter protruding above the top deck of the chassis. No voltage points are accessible from the outside of the unit in compliance with the codes of the appropriate regulating authorities; i.e. C.S.A., U.L. etc.

Essentially the circuit comprises a locked 19KC oscillator, a 38KC doubler, a two section SCA filter, two pairs of diode demodulators and the appropriate de-emphasis networks.

The unit produces separation of 20 db minimum in the frequency range 1KC to 8KC. Residual 38KC is kept to a minimum such that direct stereo tape recording can be achieved without beat frequencies being produced against tape bias frequencies of the tape recorders being used.

CIRCUIT DESCRIPTION

Referring to the schematic diagram, it will be seen that the first section of the 12AT7 (V1A) is basically a cathode follower. This minimizes loading of the preamp circuits and provides a low impedance feed to the SCA filter and de-modulator circuits.

The plate load of this tube is the 19KC oscillator coil. A dual function is achieved, in that maximum 19KC synchronizing coupling is obtained, together with the coil acting as a 19KC acceptor circuit. The grid and cathode electrodes of the second half of the tube (V1B) (19KC Oscillator) produce the required feedback with the ratio of the 2700 mmf. and the .15 mf. capacitors establishing the percentage feed back.

T1 primary and secondary windings are tuned to the second harmonic of 19KC and the centre tap of the secondary receives the composite signal via the SCA filter consisting of L2 and a .01 mf. high stability capacitor and L3 and a 1500 mmf. high stability capacitor. L3 is a tunable coil whereas L2 is fixed. Both L2 and L3 are resonated to 67.5KC (SCA centre frequency) and produce 40 db of rejection at this frequency.

The two pairs of diodes in the demodulator circuit may be considered as switches, which conduct when the phase of the 38KC appearing across the secondary winding is in the appropriate direction. Diode bias is provided for each pair of diodes by the parallel combination of the 270K resistor in shunt with the 470 mmf. capacitor. A bias is thus derived which will sample the correct angular proportion of the switching frequency necessary for detector efficiency, at the same time limiting the total loading of T1 secondary and thereby preventing distortion of the 38KC envelope. The 200 mmf. capacitors act as memory units, integrating the pulse type intelligence fed from the diodes. The 12K and 1500 mmf. capacitors complete the de-emphasis network.

ALIGNMENT PROCEDURE1. S.C.A. Rejection Filter

- A. Remove the outside case.
- B. Immobilize the oscillator by short circuiting pin 7 of the 12AT7 to ground.
- C. Connect an accurate audio generator set for 67.5KC to the input capacitor of V1A.
- D. Connect an AC V.T.V.M. to the centre tap of T1 secondary.
- E. Adjust the core of L3 (grey impregnated top of chassis coil) for minimum signal on the V.T.V.M.
- F. Remove the short circuit from pin 7 of the 12AT7.

OSCILLATOR AND 38KC TRANSFORMER INITIAL ADJUSTMENT2. Oscillator

- A. Short circuit signal input pin to ground.
- B. Using lissajous technique, connect "Y" scope input to the diode junction at T1 secondary.
- C. Connect "X" axis of scope to a standard 19KC oscillator.
- D. Adjust L1 (Oscillator) core for figure "8" lissajous figure.
- E. Leaving set-up as is, switch scope to repetitive sweep and adjust primary and secondary cores of T1 for maximum.

Note: The correct peak in each case, is the peak nearest the fully unscrewed position of the core. In a badly mis-aligned converter, it is advisable to fully unscrew both cores and then screw in, in each case until the peak is obtained, cross checking between cores until a true maximum is reached.

- F. Remove short from input and replace cover.

3. Separation Adjustment

- A. Be sure unit is pre-heated for at least 10 minutes.
- B. Using a multiplex modulator, obtain a correctly phased and proportioned left channel composite signal of 200 mv R.M.S.

Note: Due to the complex nature of this waveform, a normal R.M.S. A.C. V.T.V.M. will automatically multiply true composite R.M.S. values by a factor of two. If in doubt, use an oscilloscope, read peak to peak and calculate R.M.S.

Feed this signal to input of converter.

- C. Connect oscilloscope (repetitive sweep) to right channel output and adjust oscillator for minimum residual output.
- D. Increase modulator to 2V (true R.M.S.) left composite and adjust primary and secondary of T1 for minimum.
- E. Repeat C and D steps using high and low input levels respectively until optimum separation is obtained.

This completes the alignment procedure.

FIELD ADJUSTMENTS

This type of adjustment is seldom adviseable without equipment and never on a badly mis-aligned converter.

TOUCH-UP TECHNIQUE

In this case, the oscillator only may be adjusted such as to produce minimum unwanted signal, on an FM stereo broadcast that is known to be broadcasting on one channel only.

SPECIAL NOTE

In any application where the FS22 converter is used, the B + must be obtained from a capacitor of not less than 50 mf. and if voltage dropping resistors are used, the B + pin of the converter must be decoupled by a 50 mf. capacitor. This applies equally to any bench tests.

TOP VIEW

