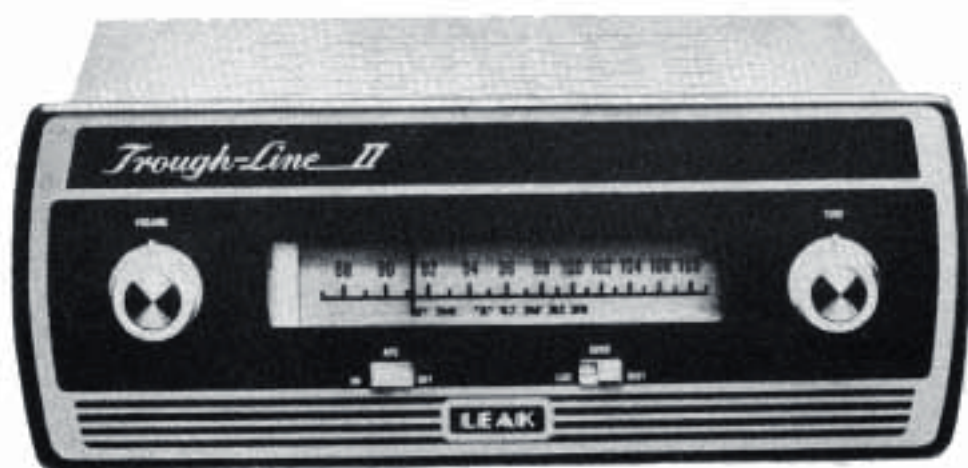


*New* E.M. TUNER



by **LEAK**

*... the first name in High Fidelity since 1934*

## Why F.M.?

It is not possible to obtain very high quality from the signals broadcast by medium-wave and long-wave amplitude-modulated (A.M.) transmitters. At their very best, the signals from such stations will not approach the quality obtainable from a good L.P. record with a first-class pickup.

On the other hand, the quality from short-wave frequency-modulated (F.M.) transmitters is better than the best record, provided that the programme is "live" and that good land-lines are used between studio and transmitter, and provided that a first-class F.M. tuner is used.

## The Problems

To produce an F.M. tuner, that can be classified as first class, the requirements are as follows

1. To prevent frequency drift (station going off tune). We have encountered some makes of F.M. tuners in which the tuning drift is so severe that the station will disappear as the set warms up unless the tuning knob is continually adjusted. This means that such a set has a total drift of over 100 kc/s this being many times the maximum permissible drift which should be less than 10 kc/s.
2. To reduce re-radiation and so prevent mutual interference between the F.M. tuner and any TV set in the same house. Some designs interfere so seriously with neighbouring TV reception that we foresee the possibility of legislation to prevent the use of some common forms of circuitry.
3. To design a tuner sufficiently sensitive to operate throughout the transmission areas.
4. To ensure that the listener can tune in the station accurately.
5. To overcome the necessity of using an external filament transformer or an external power supply unit.
6. To reduce tuner unit distortion to a minimum and to eliminate interference by unwanted signals.

## The Complete Solution



Trough-Line II F.M. Tuner

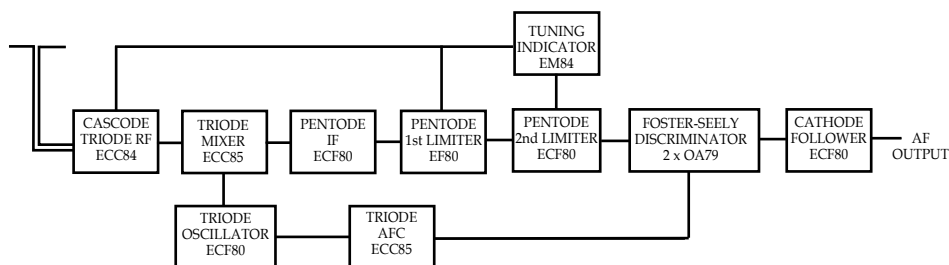
## How these problems were solved in the Trough-Line F.M. Tuner

1. The oscillator employs a trough-line as a tuning inductor. and we believe that. in this respect, the receiver is unique in the world today. This trough-line tuning inductor in conjunction with the application of Automatic Frequency Control results in tuning stability within 3 kc s from the instant of switching on.
2. The intermediate frequency was chosen as 12.5Mc/s in preference to the usual value of 10.7Mc/s and the oscillator operates on the high side of the signal frequency. Its output is injected into the coupling between the RF stage and the mixer. the network at this point being designed to attenuate second channel signals. This ensures that :-
  - a) the oscillator frequency never operates in Band II and cannot, therefore, cause interference with other receivers.
  - b) harmonics of the intermediate frequency, which are inevitably generated in the later stages of the IF amplifiers do not fall within Band II. With an IF lower than 12.5Mc/s such harmonics can be received as "dead" carriers.
  - c) Band I (TV) signals cannot cause "image" interference with F.M. transmissions.
3. The tuner's sensitivity is such that full limiting is obtained for an input of 2 micro-volts at the aerial terminals. So far as we know. this sensitivity is higher than that of any other receiver on the British market and first-class reproduction is therefore possible wherever the signal appreciably exceeds the noise level. A sensitivity switch is fitted so that in locations of very high signal strength it is possible to reduce the inter-station noise.
4. The tuner indicator is of the maximum closure type and only becomes operative when the AFC is switched "OFF". The listener, therefore, has to switch off the AFC when tuning in the wanted station: thereby ensuring that the tuning is accurate. Switching the AFC "ON" locks the station in tune and removes the HT supply from the tuning indicator. This is a desirable feature as it extends the life of the indicator for tuning purposes. To ensure ease of operation we have incorporated fly-wheel tuning.
5. Any sensitive low-distortion tuner such as the Trough-Line will draw some 60 mA of H.T. and 3 amps of filament current: these demands are outside the limits of the spare supply from any available power amplifier. We have removed the need for an external transformer or an external source of power supply
  - b) incorporating in this tuner its own power supply unit.
6. To give the highest possible quality we have not used the ratio detector. The discriminator is a Seely-Foster type, employing thermionic diodes. and the preceding stage has a limiter which eliminates amplitude-modulated signals. thereby rendering the receiver insensitive to ignition and other forms of impulse interference.



Frequency Range :	88 - 108 Mc/s
Drift :	3 kc/s maximum with AFC "ON". 15 kc/s maximum with AFC "OFF".
Sensitivity :	2 micro-volts at the aerial terminals for full limiting.
Aerial Impedance :	300 ohms, balanced with centre tap earthed (70 / 80 ohm unbalanced)
Audio Output :	Cathode follower output delivers approximately 1 volt and facilitates the use of long output leads with negligible high frequency attenuation.
Multiplex Output :	For connection to a multiplex adaptor to obtain stereophonic reproduction from stereo F.M. transmissions, when these are available.
A.C. Power :	200/250 volts. 50/60 c/s 45 watts. Alternative model 110/124 volts. 50/60 c/s 45 watts.
Valves :	2 x ECF80, ECC84, ECC85, EF80, EM84, EZ80, 2 x OA79. 1 festoon lamp 6V 2 watt.
Dimensions :	Front panel : 11 1/2" x 4 7/16" (29.2 x 11.2 cms.). Chassis : 10 1/2" x 3 3/4" x 7 3/4" (26.6 x 9.5 x 19.7 cms.). Cut-out : 10 5/8" x 3 7/8" (27 x 9.85 cms.).
Weight :	11 lbs. (5 kgs.).
Price :	£25-10-0d plus Purchase Tax £8-15-0d

BLOCK CIRCUIT DIAGRAM OF TROUGH-LINE II F.M. TUNER



H. J. LEAK & CO. LTD.

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