The "JULIE" modification for reception of fast-scan tv

by RICHARD M. LANGNER, G8JLE* [1]

THE purpose of this article is to describe a simple yet effective modification that can be made to virtually any domestic television receiver so that the amateur 432–440MHz tv band can be received. The modification can only be used on the mechanical type tuner, modification details for the electronic type tuner having already been published by several authors [2]. Previously published modifications to mechanical tuners usually consist of adding either extra fixed capacitance or extra fixed inductance to the lecher lines. The disadvantage of these methods is that the high frequency end of the normal broadcast tv band is not tunable. All the tuners modified by the author, as described here, will tune all the broadcast band in addition to the amateur band, with little or no loss in sensitivity to the former.

The modification consists of adding extra specially-shaped vanes to the tuning capacitors in each tuning section. These extra vanes provide all the extra capacitance required when the tuning capacitors are almost fully closed. However, when the tuning capacitors are between three quarters of the way open and fully open (about tv channel 45–68) there is no overlapping of the new vanes, and it is this feature that enables the tv to tune these frequencies normally.

Modification details

Using tinsnips, cut out the extra vanes from thin tinplate. The author finds the tinplate from the sides of an old varactor tuner to be ideal for this job. Fashion these new vanes to the same dimensions as the existing static vanes, but leave a long tail as shown in Fig 1(a), then cut away the section marked (A) in Figs 1(a) and (b). Make four or five of these vanes and bend them as shown. Having removed the tuner lid, solder one vane to the end of each lecher line, making sure that the moving vanes have clearance throughout their travel. Most tuners require two extra vanes in the oscillator section, one on each side of the rotating vanes (See Fig 2).

Setting-up procedure

The method of alignment is simple. Tune in a uhf repeater or, preferably, an amateur tv transmission. (If neither is available, the third harmonic of a 144MHz transmission located close to the tv frequency should suffice for initial tests.) It is preferable that a weak signal be used so that the agc of the receiver does not operate. Adjust the tuner so that the vanes are almost fully closed.

Starting with the oscillator section, bend the new vanes towards or away from the original vanes until a signal is received. Check that it is the required signal by disconnecting the antenna or keying the transmitter on and off. Next, bend the other vanes in the other sections in a similar manner to achieve a picture with as little "snow" as possible. This is best done using an old knitting needle of the plastic variety, so that hand capacitance is minimized. Some tuners have brass slugs inside each capacitor support

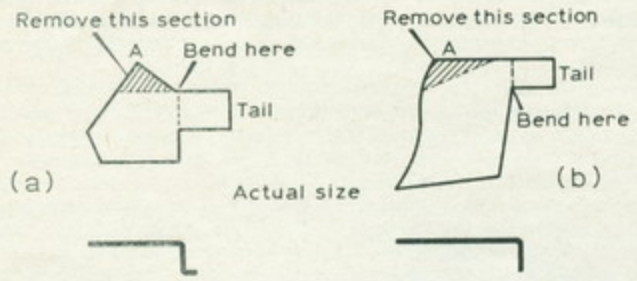

Fig 1. (a) The shape of the extra vane to fit one common tuner. (b) The shape of the extra vane to fit the tuner of the VL100 and other receivers

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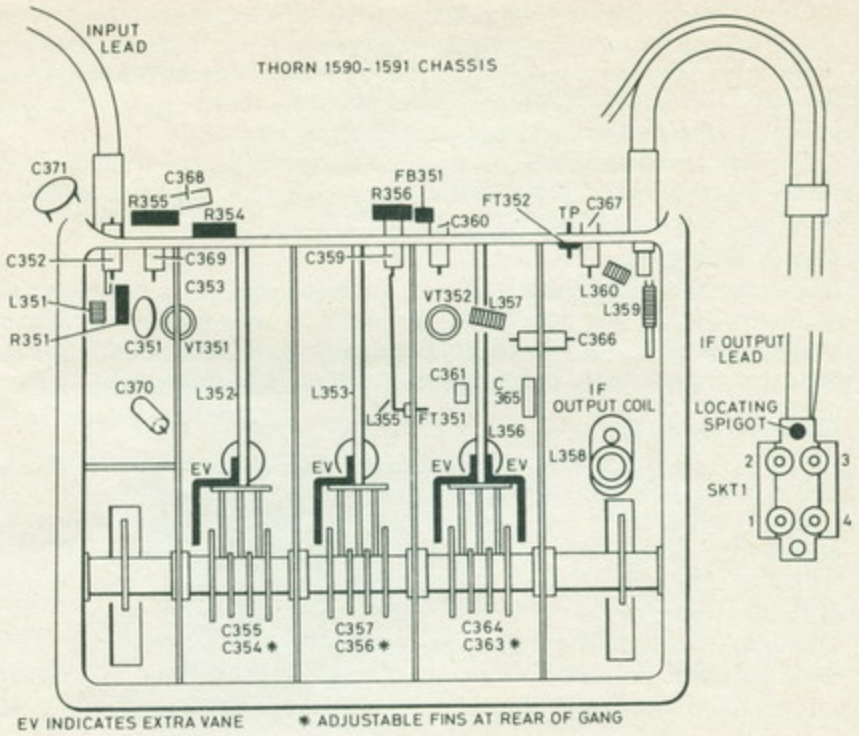

Fig 2. The extra vanes shown fitted to a Thorn 1590–1591 chassis

pillar; these can be left alone until no further improvement can be made with the procedure described above. However, the i.f. output coil should be adjusted for the best response. Replace the tuner lid.

Performance

The modification was carried out on G8IHP's 24in Ecko single-standard monochrome tv receiver, which is fitted with a tuner of Philips manufacture as standard. Results were quite good, and contacts between G8IHP and the author followed regularly. A contact between G8GQS and G8IHP resulted in a received picture quality of readability R1 over a path length of approximately 35 miles. R2 signals were obtained with the use of a preamplifier. Sets modified by the author include the Thorn 12in portable monochrome tv range known as the Ferguson Courier, Ultra Bermuda, Alba portable etc, all being first-time successes.

The latest addition to the author's tv receiving equipment is a Rigonda 6in portable (battery/mains) model VL100. These receivers became very popular a few years ago after being advertised on the back of cornflakes packets! There are still quite a few of these particular models around, and they are available quite cheaply on the second-hand market. Fig 1(b) shows the shape of the extra vanes for the VL100 and is drawn to actual size. The tuner used in this model is of British manufacture and requires only **one** extra vane in the oscillator section.

Other television receivers use the same model of tuner unit as the VL100, notably the full range of GEC (valve and hybrid) monochrome and colour chassis. Again the actual size drawing in Fig 1(b) can be used as a template, only one extra vane being required in the oscillator section.

Sound channel

Normal broadcast tv sound is 6MHz higher than the vision carrier frequency and is not used by amateurs, as this would cause part of the transmission to be out of band. Narrowband frequency modulation of the vision carrier can be used. This is sometimes convenient for the transmitting station, as some uhf transmitters are primarily driven by a 144MHz fm transceiver. However, the author finds that a talkback on the 144MHz band is quite common. Although there is no particular talkback/tv sound frequency, there is a calling channel using fm on 144·750MHz and using usb on 144·180MHz.

References

[1] The title of this article is based on both the author's callsign, G8JLE, and the name of his very patient yl Julie, to whom this article is dedicated.
[2] The *Amateur Television Handbook* published by the British Amateur Television Club contains a good detailed description of modifications to the Mullard ELC1043/05 electronic tuner.

Further information

Anyone requiring further information about this modification, or who would like to have an application form for membership of the British Amateur Television Club, should forward an sae to the author. □