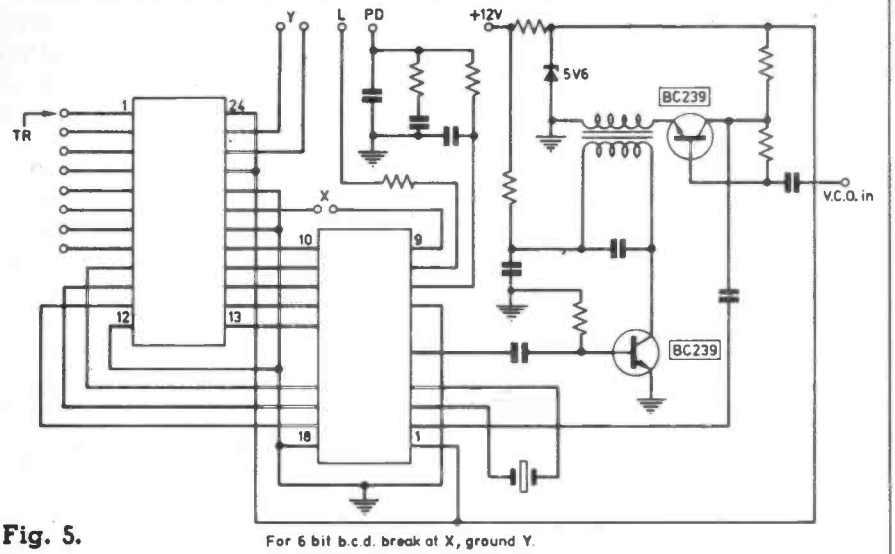

Fig. 5.

ing a count range similar to the ones discussed previously.

From the discussions so far it would appear that the majority of sets around could be converted to operate on 29MHz FM.

The use of the 10.240MHz crystal as the reference oscillator permits a variety of functions.

a) The division by 2^{10} gives 10kHz since 2^{10} is 1024.

b) Division by two and multiplication by three gives 15.36MHz which is a handy offset frequency, also multiplication by two gives 20.480MHz, also a handy offset frequency.

c) The technique adopted in nearly all the units is to operate the VCO at either (input frequency + 10.695MHz) or (input frequency minus 10.695MHz), 10.695MHz being the value chosen for the first IF. By mixing this 10.695MHz with 10.240 in the second oscillator the standard 455kHz IF is produced.

Referring back to our original comment on (b) above, the device chosen for the alternative synthesiser was a Motorola device MC145106. This operation of this device is shown diagramatically in **Fig.8.** The particular device used has an effective counting range of 10^9 ($2^0 - 2^8$) or some 512+ in binary steps. The technique finally adopted is to count in units of two, ie. 2, 4, 6, etc. and to utilise the 5kHz split so that each step is 10kHz (ie. 2 x 5kHz). However by switching internally the device can count in even pairs, ie. 2, 4, 6, 8 etc., or in odd pairs, 1, 3, 5, 7 etc. This technique allows for the with the 10.240 frequency to achieve the required output in the T/R switching.

ie. VCO + 455kHz + 10.240MHz = TX frequency

In practical terms the VCO output is fed to a simple transistor mixer which is hard switched by the 15.36MHz derived as shown in the circuit diagram for the board, **Fig.4.**

The two devices shown at the input to the dividers are Schmitt triggers, which assist in preventing random noise from operating the counters, by squaring the shape of the input pulses. In the case of conversion to MPT1320 the 5kHz technique permits a frequency shift of a straight 64 in count (27.605 — 26.965) and then 5kHz correction of the 27.605 to bring it to 27.600. A

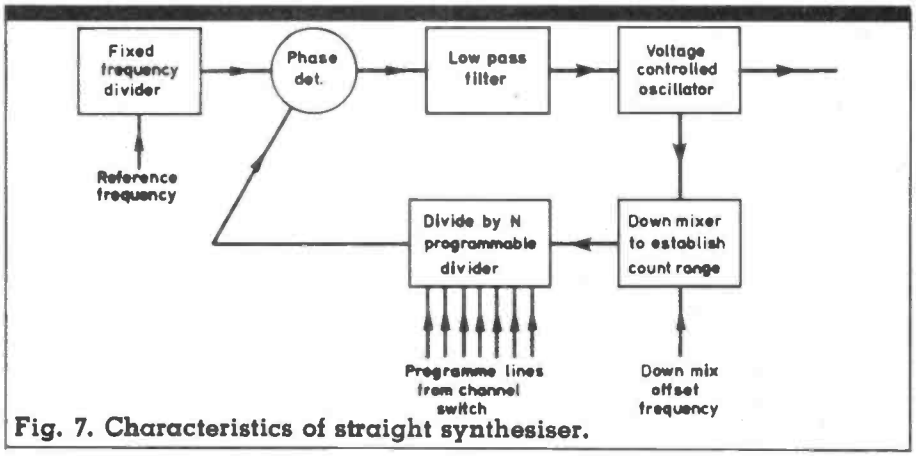

Fig. 7. Characteristics of straight synthesiser.

455kHz receiver IF. This is now derived by programming the device to read 91 steps which at 5kHz intervals is 455kHz and then mixing this slight tweak to the 10.240 crystal then brings the resultant frequency to within 1-200 cycles of 27.60125. Similar techniques will permit the

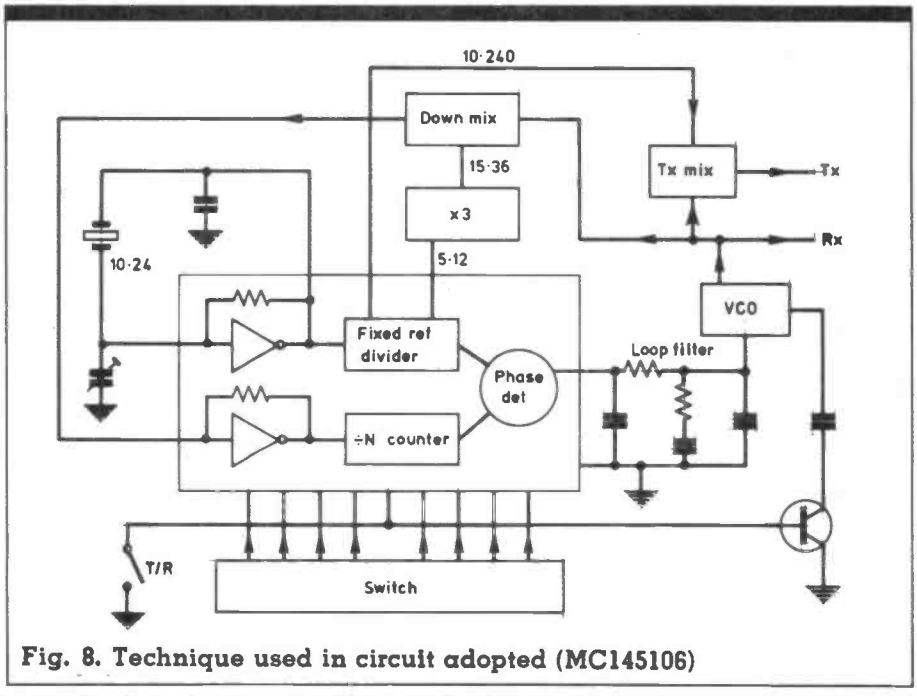

Fig. 8. Technique used in circuit adopted (MC145106)