fications to the software for the original receiver from [2, 3, 8]. From the table of orbit times for individual satellites and frequencies at which they transmit, it is apparent that the receiver must scan the band from 137 - 141MHz and stop only at signals with modulation by a tone of 2400Hz and not at incidental interference. We have chosen a simple algorithm; the receiver performs a test after switching on and stops at the first channel having a signal modulated by tone of 2400Hz. When the satellite disappears behind the horizon the signal modulated by a tone gets lost in the noise and the receiver begins scanning again. It stops at the next signal with 2400Hz tone modulation. The tone decoding is reliably accomplished by the integrated circuit NE(SE)567 (IC7). As soon as a signal appears on the input of the tone decoder, it is compared with the frequency of the internal oscillator. When a tone is detected the output, pin 8, of IC7 is set to the a low level and diode D1 is lit. The frequency of internal oscillator is set roughly by the capacitor C55 and accurately to the value of 2400Hz by the trimming resistor R25. The logic signal on pin 8 of IC7 is connected via the jumper JP3 to the input of the microprocessor SQ OUT which controls mode of automatic searching for signals in the received bandwidth (SCAN). The jumper JP3 can be used to select control of automatic scanning for signals either on the basis of presence of 2400Hz tone, or by active squelch.

### 3.6 Squelch

A side effect of receiving weak FM signals or operation of the receiver beyond the tuned station is an unpleasant noise in loudspeaker. That is why squelch (SQL) forms an integral part of any FM receiver. It interrupts the low-frequency signal to the amplifier at absence of sufficient level of input signal.

The DC component of LF signal from the pin 10 (MetDriv) of IC1 is fed through R4 to the potentiometer P1, which is used to set the sensitivity threshold of the squelch. When the slider of potentiometer P1 is in the extreme left position the squelch is disabled. Turning the potentiometer clockwise increases the level at which the squelch switches off. Pin 11 of IC1 is carrier detect which is used to control the squelch switch having a voltage of approximately 0V for a signal without noise or a voltage of approximately 2.8V for no signal, or a signal with increased noise level. This is inverted by transistor T2 and fed to pin 8 of the loudspeaker amplifier IC2 that mutes the signal path when the squelch is active

When the squelch is switched off the collector of the transistor T2 and pin 8 of IC2 have voltage of 1.25V, and the low-frequency is not muted. When at constant signal is received at the antenna and the potentiometer P1 is turned clockwise, we will reach a state where the squelch activated i.e. a voltage 0V appears at the collector T2 and the low-frequency path is muted. When signal voltage on the receivers input increases slightly the squelch deactivates and opens the low-frequency path.

The squelch signal has been used also for automatic scanning of signals. We have added transistor T3, which inverts the squelch signal which can be connected to the input P3.0 (SQ OUT) of the microprocessor IC3. The processor program then takes care of the rest (see the chapter Setting-Up Of The Receiver for more details).

Note: If you do not like the small hysteresis of squelch, connect pins 10 and 11 of IC1 using a resistor of 2 - 5M (R30) and connect a ceramic 100nF capacitor (C61, preferably SMD) between pin 11 and GND. Another option to soften the squelch rise time is to use an electrolytic capacitor C60.