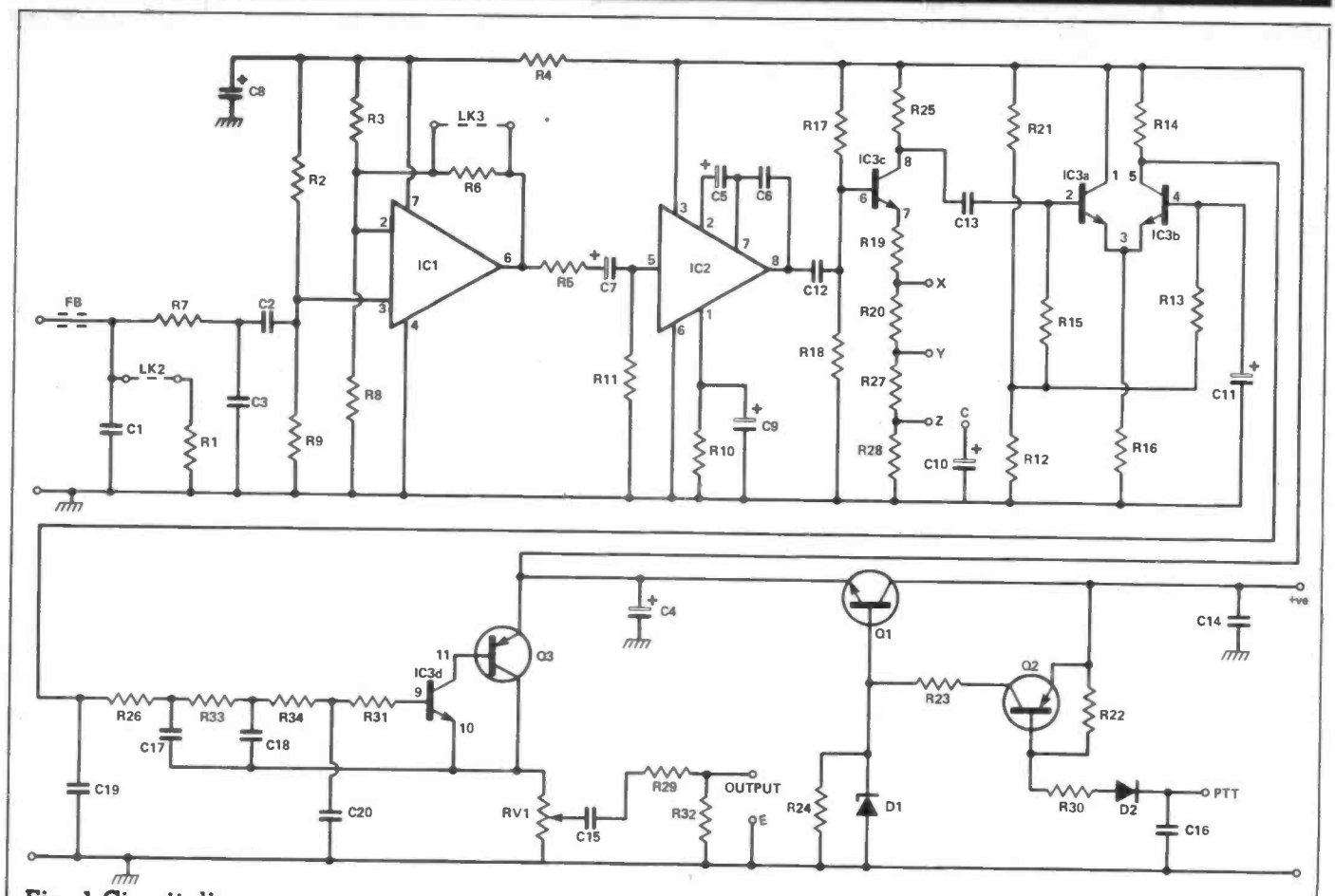

Fig. 1 Circuit diagram.

two senses: the first being that it automatically adjusts its gain to suit your speech level and distance from the microphone, so giving a constant clipping level irrespective of whether you shout or whisper. The second automatic feature is the on/off switching, whereby the unit consumes virtually zero power until the PTT button on the microphone is pressed. This enables the unit to be battery powered if you wish, while reducing the possibility of it being left on and draining that expensive battery.

It is designed to accept high or low impedance microphones by the simple addition or removal of one wire link on the PCB. The pre-amp gain can be raised by approximately 10dB, in a similar manner, in case you wish to use a low output microphone.

The output level is adjusted by a preset resistor and should drive most rigs without any problem. If a higher output level is required, then up to approximately 3 volts peak-to-peak is available by simply changing one resistor. In fact I use this circuit to modulate my homebrew 2m FM rig. By a change of R29, I use the output to drive the modulating varactor diode directly.

Four switch-selectable clipping levels are provided, increasing from just very slight clipping up to maximum in approximately 6dB steps. The unit could not be simpler to set up, you only have to adjust RV1 to give the correct drive level to your rig. There are no other adjustments to make. In operation, you simply switch in the amount of clipping you require, push the PTT and speak into the microphone, the rest is done automatically.

Circuit description

To keep down the size of the unit and make for easy, repeatable, construction, the processor uses three integrated circuits and only three discreet transistors (**Fig. 1**). IC1, a TL071 FET-input low noise opamp, is the microphone input stage and has a gain of approximately 10dB if link LK3 is omitted. With LK3 in place the gain is unity and the IC simply acts as an impedance matching device. The input to IC1 is filtered to remove any RF that might make its way down the microphone lead, by a ferrite bead, C1, R7 and C3. The TL071 is pin-compatible with the popular 741 opamp but it is far superior in terms of noise and slew rate performance. The extra expense is well worthwhile in many applications. The output of ICI is fed via R5 and C7 to the input of IC2. IC2 is a Plessey SL6270 'VOGAD' chip (VOGAD stands for Voice Operated Gain Adjusting Device), and is the simplest way I know of achieving 60dB of audio AGC. C6 determines the high frequency roll-off whilst R10 and C9 set the AGC recovery time-constant. This chip is relatively expensive, but is well worth it in terms of simplicity and reliability of operation, compared with 'discreet' circuitry. The output of IC2 should remain at about a constant 90mV RMS for all input speech levels. This constant amplitude signal is then applied to the input of a common emitter amplifier which uses part of IC3, a CA3046 transistor array. The CA3046 contains five well matched transistors in one dual-in-line package. C10 is switched in to bypass one or more of this amplifier's emitter resistors, which