FURTHER MODIFICATIONS TO THE ICOM ICB1050

STEPHEN IBBS, G4LBW

SINCE the February issue of *Short Wave Magazine* appeared, many CB shops have been inundated with amateurs seeking the remaining ICB1050's, to convert to 10m. The original conversion enabled channels 9-34 to be used (35 being the band edge, and, because of a programming error inherent in the modification, channels 1-8 were simply repetitions of other channels).

After much consideration, and talks with the financial manager of the marriage, G4TCD, she agreed to the purchase of a unit. (I suspect because she has just passed the Morse test so will be able to use it!). It was soon working, after noting one or two errors in the article, and contacts heard showed that interest was developing rapidly. When the receive offset mod. was published in the April issue it started me thinking about a more substantial rearrangement of the data lines to gain more channels, *i.e.* to move the top few channels into the band and consequently all the others down, and to generate new frequencies for channels 1-8 as well as retaining the receive offset facility. This article is the result, and is offered for readers wishing to extend their 10m. FM capability. The 10m. band plan, however, should be noted, and priority given to other users as appropriate. This is particularly important in the satellite band.

It is necessary to understand how the programming works, and to do this we will consider channel 40. The switch actually counts from 40 (channel 1) to 79, so channel 40 represents a binary output from the switch wires of 1001111 *(i.e.* 79). The original article showed that if 250 was presented to the synthesizer, 29.70 MHz would be produced (the band-edge frequency). With only 79 coming from the switch, we need to add binary 171, which is 10101011 to obtain this frequency. The easiest way of doing this is to use two 4008 4-bit adders, which will add together two sets of binary inputs, in our case 171 and 79, to give the desired binary output of 250, which is 011111010. This is very simple to achieve, *but* a complication arises when we want to include the possibility of 100 kHz receiver shift to listen to the American repeaters. We need 181 (10 channnels at 10 kHz spacing = 100 kHz) to be added for receive, and 171 for transmit. The binary codes for 181 and 171 are reproduced below, and each data line has been given a letter.

Rx (180)	10110101
Tx (170)	10101011
	hgfedcba

It can be seen that to change from 171 to 181, *c* and *e* need to switch from 0 to 1, and *b* and *d* from 1 to 0. Fortunately the April *S.W.M.* issue revealed that a pin on the mic. socket goes low on receive, and so this is used to control two inverters of a 4001 (or 4011) to achieve the necessary level-switching. As pins 1, 2, go low, pins 3, 12, 13 go high (taking *c* and *e* high), forcing pin 11 low (taking with it *b* and *d*). On transmit the reverse occurs, ensuring that 171 is once more loaded, rather that 181. The line from pins 1 and 2 goes *via* a switch as recommended, to disable the receive offset function as required. In my case I used the Hi/Lo switch (Hi indicating receive 100kHz high) and this involved removing the yellow wire from the switch and discarding, removing the orange wire and attaching it to the red (+ve) lead on the volume control. The Hi/Lo switch is in fact a two-pole switch, so the red wire still remaining was left on one pole, and will eventually light a small LED to indicate that the offset is in operation. The wire thus goes from pins 1, 2 to the spare pole, and thence to pin 3 of the mic. socket, which has had the capacitor plus wire transferred to pin 2.

If readers have already modified their data lines as per the February article, these now need to be undone . . . *i.e.* remove the shorting links and the 10k resistor, then unsolder all the wires from pins 11-17, and clear the hole by pin 10. A PCB was made, and a design is given in Fig. 2. Mount all the components, and use *Veropins* for the necessary connections. Do not forget the two wire links. This board is eventually bolted to the side of the case, behind the channel switch, using two L-shaped brackets. The wires from the channel switch are connected as shown, colour by colour. 8-way ribbon cable then connects the outputs to pins 10-17 of the 145106. Make the connection from the 4001 to the Hi/Lo switch as indicated above, and attach two leads for supply and earth. For ease I soldered these to the actual pins of the 145106

Rx	
12dB SINAD sensitivity:	<0.2μV
Squelch open level:	1μV
Squelch close level:	<0.3μV
Image rejection:	∽60dB
Tx	
Output spectrum, 2nd harmonic:	– 60dB
Spurii ± 1MHz of wanted output:	– 50dB
29.600 MHz VCO control voltage:	Rx, 1V Tx, 2.12V

Performance figures for a modified Icom ICB1050.

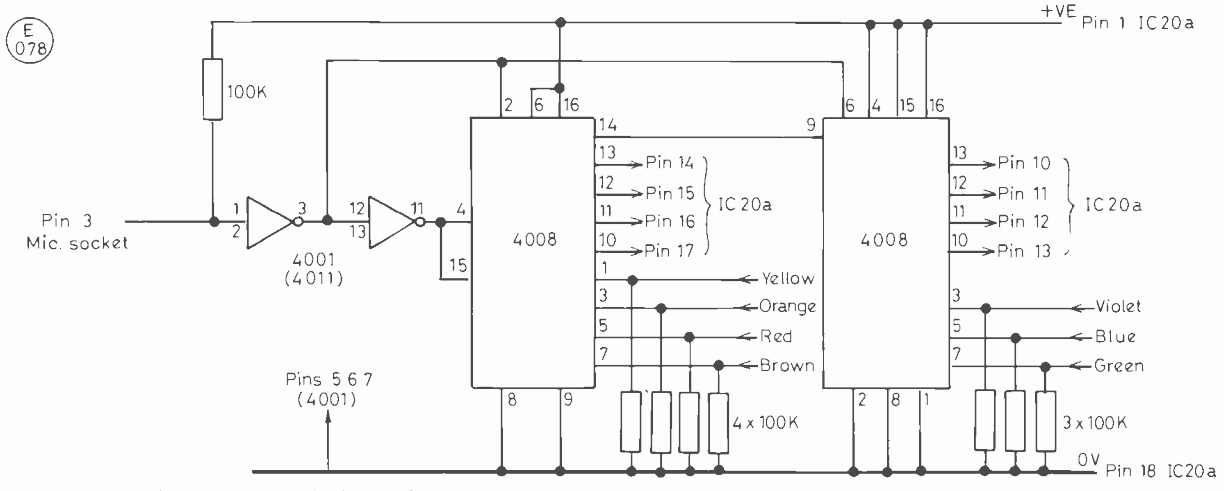


Fig. 1 FULL CHANNEL AND RECEIVE OFFSET OPTION FOR ICB1050

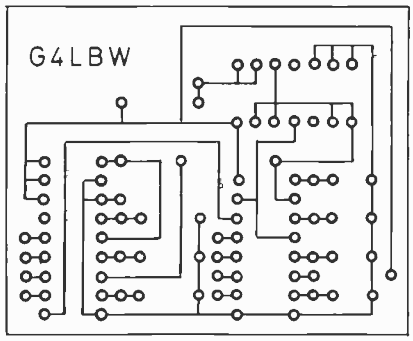


Fig. 2(a) COPPER SIDE

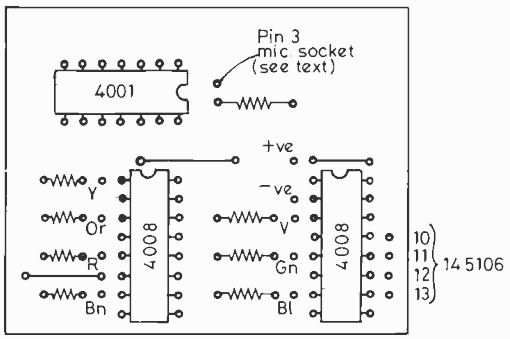


Fig. 2(b) COMPONENT SIDE

(pin 1 for + ve, pin 18 for earth). *N.B.* The + ve required is *not* the same as the 13.8v. supply to the rig as a whole, and so should *not* be connected, for example, to the supply pin on the volume control.

That's it! The rig should now transmit and receive from channel one, 29.31 MHz, to channel 40, 29.70 MHz, with the receive offset option available for all channels. Other modifications are constantly coming to light, and Dave, G4HUP, and Sam, G4DDK, kindly told me of some ideas whch may be of interest. The ceramic filter CF101 could well be upgraded by inserting the 2-pole crystal filter (10.695 MHz) which looks like a crystal with three leads, available from *Ambit;* this is non-polarised and can therefore be inserted either way round. Similarly receiver performance will be improved by replacing C103 with 33pF and C106 with 10pF, and then retuning.

I have also heard of a booklet of modifications being produced by Bury RS, and Malcolm Pritchard, G3VNQ, tells me that these are available at £1.25 including post/packing from the Bury RS, c/o Mosses Centre, Cecil Street, Bury. Some people I know experienced difficulty initially finding the 29.6 MHz on a nearby HF receiver (channel 30 now, not 25). Readers may find it easier to monitor the voltage on pin 7 of the 145106, whilst unscrewing the core; it should be approx 1v. on receive, and 2v. on transmit.

The specification of a random sample set as modified by Dave and Sam indicates the very respectable performance obtainable from these rigs. My next move is going to be adding a pre-amp, possibly the *Ambit* model, and then to don the dirty raincoat again to haunt the CB shops for a blown 'burner' that might be recoverable.

MAGAZINE REVIEW

"LUNAR LETTER MAGAZINE"

IN MONTHLY features such as "VHF Bands," it is not possible to cover the more esoteric aspects of VHF/UHF operation in any depth. Consequently there is scope for publications dealing with the more specialised subjects. Probably the better known European, specialist magazines are *VHF Communications* and *DUBUS Informationen,* both of which originate in Germany and have U.K. agents. From the U.S.A. comes the **Lunar Letter Magazine,** now in its second volume.

The **Lunar Letter Magazine** is a monthly journal of American A4 size, that is about half an inch wider than this page. It contains a varied and balanced selection of articles on the design and construction of equipment and on operating, plus a correspondence column and swap and sell feature. It deals with the entire spectrum from 50 MHz upwards and is really intended for the "real DX-ers" who indulge in *E-M-E* operation on the various bands.

The March issue was sent for perusal and this typical issue includes the following in its forty pages: an article on the so-called "Maidenhead Squares," the preferred world-wide locator system; Contests and Awards; Satellite news; a VHF Terrestrial report; a cheap and easy 144 MHz *E-M-E* antenna array; a digital readout antenna *AZ-EL* position indicator; a 10w. PA for 1,296 MHz in solid state; A 432 MHz PA using a 7650 valve; How to calculate feed horns and a description of the WA9KRT, 16 times 7-ele. *Quagi* array for 144 MHz *E-M-E.* Some 14 pages are devoted to 144, 432 and 1,296 MHz *E-M-E* news and other items cover locator "field" listings, a page from SM5AGM listing the IARU Region 1 VHF/UHF/SHF distance records, correspondence and the swap and sell feature.

The text is properly printed in two columns per page format with justified right hand margins. The photographs are screen printed of similar standard to those in *Short Wave Magazine.* The diagrams are rather amateurish, though, some of them being the authors' own rough drawings. No doubt the information is all there but the publishers really need the services of a part time draughtsman. Nevertheless, it is doubtful if this criticism would put off the kind of enthusiast to whom this interesting magazine is aimed.

The U.K. distributor is a keen 144 MHz *E-M-E* operator, Doug Parker, G4DZU. The annual dues are £11.00 and copies are air mailed direct to Doug, in bulk, and then immediately posted to subscribers over here. Unlike the better known American amateur radio magazines, the news is very topical and not some three months old. Cheques should be made out to D. Parker and sent to: 14 Moorside Crescent, Drighlington, Bradford, W. Yorks., BD11 1HS. *N.A.S.F.*