

## DISCUSSING THE KW-2000B

### NOTES AND COMMENTS ON AN ALL-BAND TRANSCEIVER DESIGNED FOR U.K. AMATEUR REQUIREMENTS

A SHORT time ago, the writer found himself in a position where he had to move out of his warm, comfortable, private, shack and share the functions of station, workroom and bedroom in another room—which, for various reasons, had to be the smallest of the three bedrooms. Space was then the problem. This resulted in a second decision, namely, that the separate transmitter, receivers and linear, plus the ancillary items and trailing wires, would just have to go, and be replaced by something both more compact and much tidier.

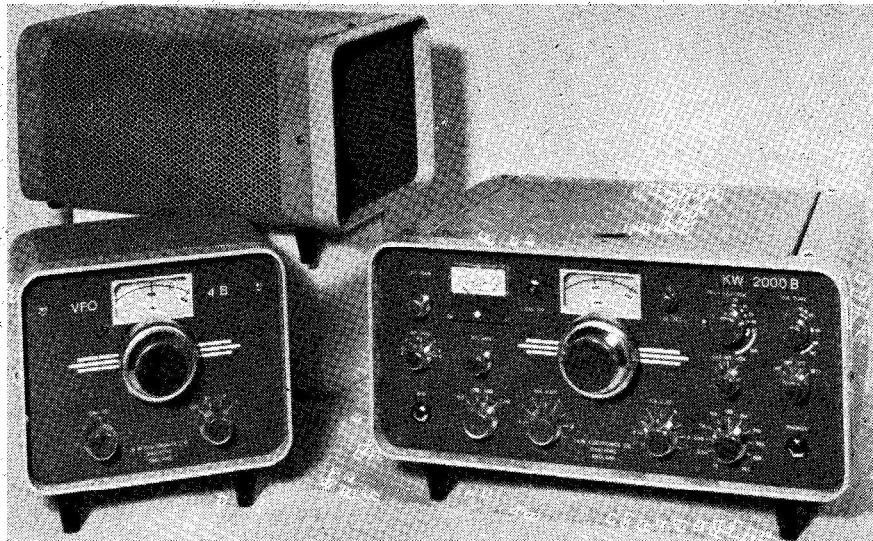
The old rig was disposed of though the Readers' Small Adv. pages in this *Magazine*—not, it must be remarked, without some pangs, particularly in the case of the KW-77 receiver, undoubtedly the finest tool of its kind to come the way of your correspondent in many years.

The new rig would have to be a transceiver, incorporating full split-frequency working facilities, not to mention having either Top Band or being of such a nature that Top Band could easily be organised into it. Furthermore, it must be suitable for CW operation. It came down in

the end to the selection of a KW-2000B, with its attendant AC/PSU and outboard VFO-4B unit. This choice left room for the later acquisition of a linear should this be felt necessary as a result of the writer reverting to the habits of a few years ago and operating mainly SSB. At the same time, the flexibility afforded by the VFO-4B to the basic KW-2000B meant that, in effect, one had two receivers always available with which to marshal one's thoughts in the pile-ups, at the flip of a switch and without the necessity for unplugging headphones and transferring from one receiver, or any aerial switching. Not only this but, as was soon realised, in addition one had, in effect, two transmitters instantly available on the same switch—not to mention being able to forget the complications of a separate transmitter and receiver by operating, when conditions permitted, fully transceive on either the internal VFO, or the one in the VFO-4B.

#### The Transceiver Proper

This, of course, is the transceiver KW-2000B itself. Although it is externally considerably changed from its



*The KW-2000B complete with PSU and auxiliary VFO.*

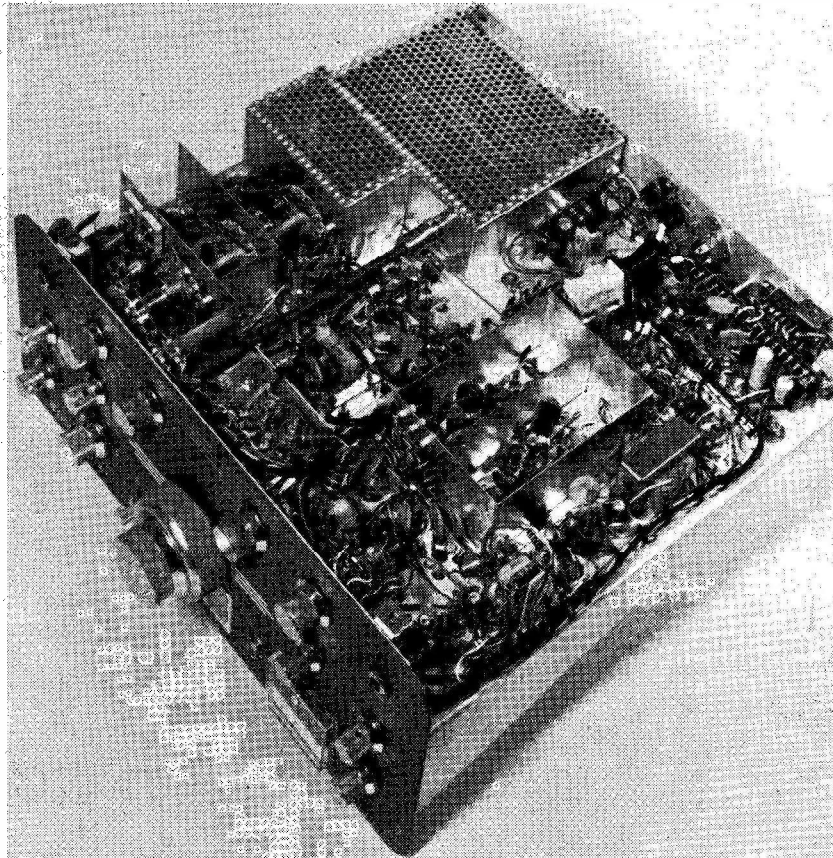
earlier KW-2000 and KW-2000A forebears, there is in the circuitry a strong family resemblance; and in styling it is somewhat of a throwback to the earlier generation of KW "separates" for SSB working.

Apart from the new styling, the most noticeable thing about the front panel is the new and improved dial and two-speed drive on the tuning; the extra size of these two has also resulted in the use of a smaller meter and some re-arrangement of the controls. There are no concentric controls on this rig apart from the two-speed tuning drive. The finish is now in three shades of grey—a dark, matt surfaced front panel of about the depth of colour known in the Services as "Dark Admiralty Grey," being surrounded by a sort of bezel, part of the cabinet, in a very light shade of grey, while the main part of the cabinet is of a colour approaching "Light Admiralty Grey." This, with the panel markings in white, and aluminium knobs, gives a handsome, workmanlike and practical finish.

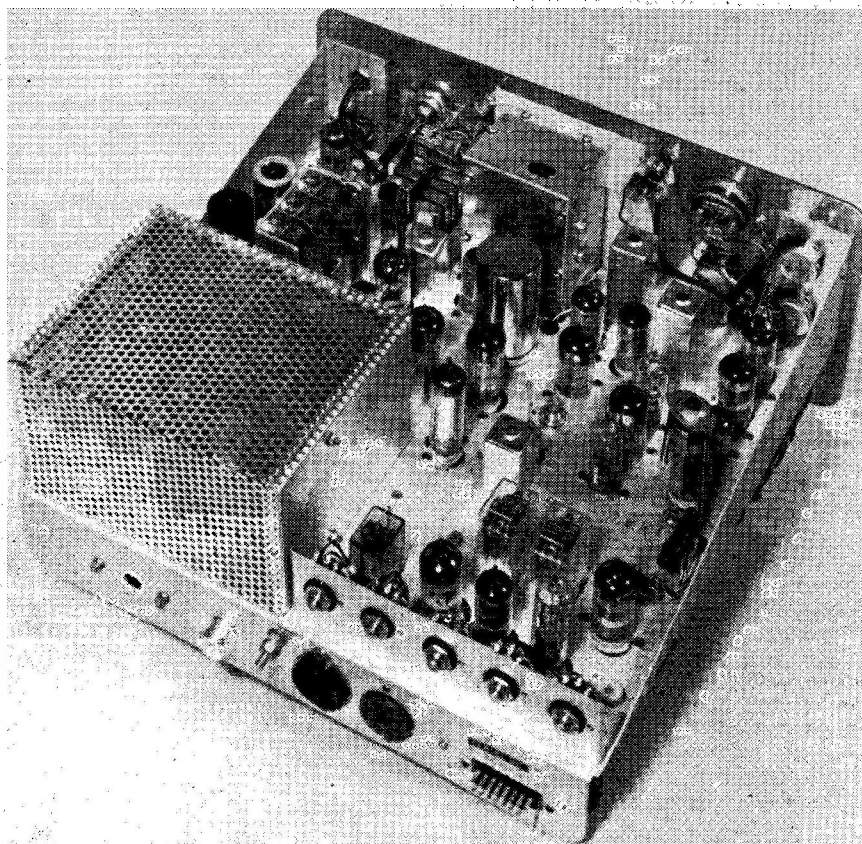
Lifting the cabinet lid (or better still removing the unit from the cabinet) gives an immediate indication of the standard of the workmanship that goes into the

KW-2000B, not to mention the good electrical and mechanical design. Chassis surfaces and brackets are all matt finished and all the valveholders sit in elongated holes which allow ventilating air to circulate upwards from below. Underneath, one notes that the screens fitted here and there do not look like afterthoughts, with the possible exception of the one shielding the input terminals of the mechanical filter from the output pins—and this one is admittedly in a very awkward place for fitting.

The wiring is not strictly in accord with EQD standards but it is, one would think, just as good in its own way. Components which join together without benefit of a tag to sit on are invariably wired by use of the "Jenkins' spring" technique; the soldering is very good and says a lot for the standard of training of K.W. operatives. Layout is such that servicing or repair should be reasonably easy, bearing in mind that anyhow a transceiver is a mighty complex "box-o'-tricks." Wiring is liberally colour-coded to aid any future maintenance or modification. This is emphatically a user's instrument, in the best sense of the term, designed and built to be operated,



*Under-chassis view of the standard KW-2000B Transceiver showing general construction.*



*Inside the K.W. Electronics KW-2000B  
Transceiver.*

serviced and maybe even modified, as easily as is possible.

On the score of performance, countless satisfied users bear testimony. The transceiver under review is no exception. Sensitivity is a whisker up on the quoted figure on all bands, the stability is impressive once the initial few minutes of warm-up are through and the audio is clean and crisp-sounding. AGC is in operation at all times, which could be a bit of a nuisance on occasion, although it has to be admitted that your reviewer, who was a bit worried about this at first, has not, to date, lost anything on account of not being able to disable the AGC.

The transmitting function is as good. SSB reports invariably praise the speech quality and, always provided the microphone is unplugged and care taken not to run the mic. gain control too high, the CW note is extremely good, and nets the added "x" on the report quite frequently.

However, it must be emphasised that in *any* rig which uses an AF drive to give CW from a basic sideband circuit, there is always the risk that an excess of audio drive will result in a string of "whiskers" either side of the fundamental. To keep this risk as small as possible,

the KW-2000B uses the *high* AF side for transmitting and for sidetone of 1500 Hz approximately, so that any overloading at the front-end of the audio chain giving harmonics is balanced by the fact that the second and higher AF harmonics cannot get through the mechanical filter.

Netting on SSB, of course, is child's play—one just tunes into the other guy and goes over to "transmit." Netting on CW tends to be a little more difficult at first, mainly because one cannot produce a netting signal as such. The ploy here is to centre the transceiver, and tune the chap till his signal in the receiver is just the same in pitch as the sidetone. One then uses the IRT facility (or the VFO-4B) to receive him at a lower beat-note if so desired, leaving the transmitter part still netted. As an aid to such netting, the sidetone note will be heard in the speaker or phones when the key is down, even though the rig is switched to "receive." Incidentally, the fact that the sidetone can be heard on either speaker or headphones when the latter are plugged in means that one can work CW with full monitoring.

As regards function control, the KW-2000B has an

Ext-Int-Vox switch as a front-panel control, receiving at the left and sending in the centre position. One can also control the transmitter by applying a short from a microphone pressel-switch or, alternatively, a short applied to two of the pins on the octal socket at the rear will perform the same function. Vox is available by turning the front-panel switch to this mode—and if the Vox position is used on CW, with the “delay” pot, turned fully counter-clockwise, one has key-controlled change-over, almost as good as true break-in working.

In either SSB or CW operating the main tuning dial is a delight, giving, if that is possible, almost too much bandspread, with very easy read-out. (The calibrator is now used to align electrically the VFO to the cursor, rather than physically moving the hair-line, as is the method on the older models.) The penalty of having this more sophisticated drive is paid for in two ways: first, in a rather smaller meter, on which the Top Band signal looks almost insignificant as to its anode current, albeit the meter is still clear enough to read. Secondly, the larger dial can result in the moving of the “PA Tune” knob on the front panel. However, this part, on which your reviewer had his doubts, proved in practice to be very smooth and free from backlash even though a bit “heavy” in feel as compared with the earlier models.

Electrically, the changes are minor. The VFO calibration has already been mentioned. ALC on the transmitter is now standard, and the valve line-up is a little different, with an extra stage appearing in the circuitry. The ALC and S-meter controls now extend from the back (see one of the photographs) rather than upwards under the lid. There is no provision for the fitting of a Q-Multiplier as a standard accessory for CW operation, although no difficulty would arise in this respect—none the less, in your reviewer’s personal opinion this is a retrograde step.

#### The Power Unit

This is basically the same as before, although the low-HT line capability has gone up to cater for changes in the circuitry. The PSU has a back-panel on which the Hi-Lo power switch, the fuse, and the adjusting pot, for the PA standing current are fitted. It runs cool, and it does the job—what more can one ask? The speaker is mounted within the AC/PSU and shows no signs of any nasty rattles—and the speaker leads are also brought out to the octal socket of the transceiver, in case you want to run the KW-2000B in the car as a mobile.

The good test for the PSU of any Sideband transmitter or transceiver is its ability to respond when on CW, for it is here that the loading factor on the high-voltage line is most difficult. Speech peaks are very short indeed at full output but CW dashes, particularly at low sending speeds—as when working a W6 with echo delay—can be periods of sustained output which will bring the HT voltage of a poorly-regulated PSU down with a bump. Such malfunctioning units lead to the erroneous conclusion that CW is not practicable with a Sideband rig. Nothing could be further from the truth, of course, if the pack is properly designed. This is one of the best of its kind, if the RF output waveform and on-the-air reports are taken as the criteria. Correctly driven in accordance with the manual instructions there is no trace of bloopiness even on slow dashes.

#### The VFO-4B

This small unit is styled to match the KW-2000B, and carries inside it a replica of the internal VFO of the latter, fitted with the same dial and drive. In addition there is a function switch, giving the following facilities: Off, when the transceiver is working normally; Rx, which brings the receive frequency under the control of the outboard unit with the transmitter remaining at the setting of the transceiver dial; Tx/Rx, when the internal VFO is out of use and the VFO-4B controls the lot; and Tx, when the outboard unit controls the transmitter and the normal VFO the receiver. Your conductor would confess to a wish to have an extra position at which *both* VFO’s are in operation on “receive,” giving simultaneous reception at two points in the band—a facility only given, to the writer’s knowledge, by the Hallicrafters SR-400 DX Adaptor, but which was, on the latter rig, found extremely useful at times.

A nice touch in connection with the K.W. VFO-4B unit is that the dial lights up only when it is in operation, this because while being powered by the KW-2000B it is controlled by its own switching and that of the 2000B. In other words if you have the VFO-4B switched to Rx the dial light is on while receiving and goes off as soon as the transmitter is switched, by Vox or otherwise, to Tx. The main-rig dial light is, of course, on as soon as the rig is switched up and remains alight all the time. The IRT facility of the main transceiver does not extend to the remote unit—but this is more or less redundant anyway when the outboard unit is coupled in. (It is only when operating the KW-2000B with the external VFO that one can appreciate the *finesse* involved in these operating facilities.)

As has been implied, the styling is to match the KW-2000B; but the case of the VFO-4B is of sheet, rather than the perforated material used for the KW-2000B and the AC/PSU. The frontal view is quite attractive, with the tuning dial flanked on the left by the Cal/Set knob and on the right by the function switch. Incidentally, an exercise was tried in calibrating both VFO’s at one end of a band segment and noting how well they “tracked” with each other when setting either entirely by scale. The correspondence is very good, closer indeed than the actual calibration of either dial. One could quote a frequency and expect to be within less than a kilocycle of the true frequency on either, as measured on a Hewlett-Packard counter. Backlash on these dials is quite negligible.

Connection of the three units to each other is by preformed cables. The VFO-4B has its own cable which plugs into a multi-way socket on the rear of current-production KW-2000B’s; older ones (and the earlier KW-2000 and KW-2000A models) can be fitted with a modification-kit to provide the additional connection for the VFO-4B.

The AC/PSU, or the DC one, goes in at another socket, and the key, external Tx/Rx switching and external contacts for a linear all appear at a third socket. The RF output is now by *Amphenol* UHF connector, which is the standard American TV connector—the advantage of this over the *Belling-Lee* one used on earlier models is mainly that it is a screw-in type. None of the connections can be mismated.

Arising from the fact that, in effect, the whole works is complete in itself, the equipment has been used away

from home several times for one purpose and another and it has been found that, given a resonant dipole and a mains supply, one could sit the rig on the back seat of the car, bring the units into the shack one at a time, plug in all round, tune up and be ready to go in less than seven minutes—ideal for a Club station, for instance, or the occasional /M foray.

#### On The Bands

This is where, when all the talk has been laid aside, the box is either made or broken. It has been used on all bands and in all modes, but mainly CW. It has performed more or less exactly as one would have expected, and your reviewer can honestly say his regrets are solely in the lack of built-in CW selectivity, and to the fact that his new station does not have a linear for Sideband working. Against that he can operate full-power CW and manage to pull them in; the SSB signal reports and tape-playbacks suggest the signal quality is even better than it was with the old Vespa. For Sidebanders the rig is as near perfection in the amateur context as makes no odds. The

CW performance could be bettered on the “receive” side by the addition of a Q-Multiplier and/or an AF filter, although these extras are not available from the firm. Signal strength exchanges are as would be expected at this power level, which means “competitive,” with a radiating system working correctly. And remember that any transceiver can only be as good as the aerial with which it is used when it comes to raising the DX that everyone else wants to work!

#### Conclusions

We like KW-2000B—your reviewer because it meets almost all his requirements and the XYL because it does not spoil her decor. What more can one say? Perhaps it is worth noting that more and more VE/W stations are coming up on the bands with K.W. gear—among all the choice they have over there of the well-advertised competitive equipment. Like the bigger K.W. Atlanta, the KW-2000B represents well-engineered British amateur-band gear, capable of holding its own in terms of design and performance against all comers.

## HOUSING AN ATU

### USING A PLASTIC CONTAINER

T. W. McSHEEHY (G3SJP)

THE successful production of a piece of home-made equipment is invariably accompanied by a feeling of achievement but in the majority of cases the original motivation was one of finance. Few radio amateurs can afford the commercial counterpart of their own rigs and they have Hobson's choice. Although it is possible to find many of the components in the proverbial junk box it usually proves more difficult to acquire a suitable cabinet or box to house the equipment. This problem is enhanced when the circuitry is particularly susceptible to the proximity of metal.

In fact, the author found himself in this position recently when deciding to build an ATU for 160 metres. There were many circuits in the literature but the one described by P. R. Cragg (G3UGK) in *SHORT WAVE MAGAZINE* for January, 1970, “Versatile ATU for Top Band,” seemed to be most suitable. The purpose of this note is to describe an effective method of housing the finished unit—see photograph.

The ATU is built into a plastic “lunch box” purchased from the local ironmonger's for 15p. The general layout can be seen in the picture, which shows the box

upside down. The lid of the box forms the base. The coil is glued inside the box with a contact adhesive and holes are drilled for the other components. Care is needed during the drilling process and it is advisable to use small diameter drills initially and gradually increase in drill size until the desired diameter hole is produced. An electric drill should *not* be used, because of making the plastic “goopy” round the drill tip. The inside of the box should be supported with a block of wood during the drilling process, preferably clamped to the wall of the box, to prevent distortion and subsequent fracture of the material. The plastic walls have proved to be surprisingly firm and no difficulties have been experienced in spite of switches which have a strong action.

