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Regular readers will know that I am a bit of a Xiegu fan. I already own the G90 and X5105 radios and have also reviewed the G1M. I was delighted, therefore, when Alan at Sinotel asked if I would like to review the latest offering.

It was nice to see that when the rig arrived, Xiegu have updated their packaging, giving a more professional appearance, and there was a proper printed manual to get you started. The rig comes with a fist microphone, allowing quite a few operations to be performed from it, a USB-to-USB C cable, a dedicated mains charger (but the two-pin European variety and no adapter) and a power cord.

The rig itself, **Fig. 1**, is of a very similar size and weight to the existing X5105 and has a well-made feel about it. Covering 160m – 6m, the rig is capable of between 0.1 and 5W from its internal 3,000mAh battery, or 10W from an external supply. It is not clear what voltage is required from an external supply to achieve 10W, but I managed to get this with just over 10V, which is very handy – rigs such as the IC-705 require a full 13.8V for maximum power, which can be a disadvantage in some cases, such as mobile use for example.

First Impressions

Powering up (and down) takes a few seconds as the software does its thing, and when I first powered the rig up I was very impressed by the

The Xiegu X6100

Daimon Tilley G4USI gets his hands on the latest offering from Xiegu.

bright, clear and colourful screen, which is easy to read and displays all the information you need in one go. Actually, I was really pleased to see the display was quite readable even in direct sunlight. The second thing that struck me was the quality of the received audio, which is far superior to the X5105, probably in part to a larger speaker, but very noticeable indeed and drives to a very good volume without distortion.

The layout is similar to the X5105 in a broad sense, but there are some new buttons as well as common ones having changed position. Two new additions are a proper rotary knob used for volume, squelch and RF Gain (alternated by pressing the button) and a multi-function knob for choosing menu settings. I also like the change to the VFO control, which is now also a proper knob and, as a really nice improvement, the encoder has no detents and turns freely without clicks. In fact, you can even 'spin the dial' and it will freewheel a little, which makes spinning through the bands very nice indeed and quite quick too.

Of course, the waterfall display is yet another addition with the nice big screen, **Fig. 2**, and I find this clear and nicely done, with a little silhouetting done on the panadapter section to show a good few seconds of band activity his-



tory. The bandwidth displayed can be changed between either 50 or 100kHz and the main screen also shows an audio scope, which is useful, as well as SWR level, but this is not perfected yet on my version. More on this later.

Key features are now accessed via a dedicated button to the left-hand side, and these are as follows: a 'GEN' key, brings up a General menu list across the bottom of the screen, with two menu options for radio settings, one for display, one for system and one for memories. Each of these is accessed by a small button underneath the relevant option on the display (there is no touchscreen facility.)

An 'APP' key gives access to the digimodes Modem (CW, BPSK and RTTY can be both de-

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Fig. 1: Front view.

Fig. 2: The nice clear display.

Fig. 3: Top view of battery pack.

Fig. 4: The 3D-printed battery pack.

Fig. 5: High SWR reading on 30m.



coded and sent), the SWR Scanning function and Voice Call Messages.

The 'Key' button allows amendment of CW keyer functionality, the 'MSG' button, CW message functionality, 'DFN' gives access to Noise Reduction and Noise Blanker settings, and finally, 'DFL' gives access to three separate Filters.

Working through some of these functions again, in the 'APP' mode, when using the MODEM function I noticed that the CW decoding was reasonable, maybe a slight improvement on the X5105/G90, and in this mode the small audio scope on the display shows two red vertical lines at about 700 and 1,000Hz. I found that the 700Hz line works well as the CW Zero-In indicator. It would be nice to see these lines present on the scope in normal use. It was simple to adjust CW decoding speed from this screen, but to access the CW memories from this screen it is necessary to press the 'MSG' button as well.

I have to say that I was disappointed by the SWR scanning function, which did not appear to work very well or to be accurate. I think that this, in turn, limits the ability of the internal ATU. On one nice day I was operating from the patio using a long wire and 5m counterpoise. The X5105 tuned the wire on 40m beautifully, but the X6100 just plain refused to tune it at all on that band. I cannot believe that the ATU has changed much from the X5105/G90, so suspected this was a firmware issue, which I hope will be resolved. Indeed, when I took the rig out to my fields, I was able to tune up my cattle livestock trailer and over a half-mile of electric fence (switched off of course!) so I think that the SWR/Tune facility is a bit 'flukey' on my firmware version. A little more on this at the end of the article.

On the positive side, the digital noise reduction was excellent and I found that this did not greatly degrade the audio quality. The digital filters are also excellent and you can set the three defaults for different modes, setting high and low cut-offs, and allowing IF shift. They are really simple to use and very effective. I particularly like the fact that selecting the filters puts them as a large overlay on top of the waterfall making them very easy to read and adjust.

Again, similarly to the X5105, a number of buttons are placed on the top side of the rig. This is understandable to make space for the screen and knobs, but it does have the disadvantage of having to keep tilting the rig forwards to identify the correct button to press. Having said that, you do get used to the buttons' location, and should it be used regularly you could do it by touch alone, I am sure. All buttons are nicely backlit, making it great for evening and night-time use. The buttons on the top are for the inbuilt PTT, Band changes, Mode changes, switching between VFO A/B, selecting the ATU, Memories, AGC and VFO Tune rate.

In Use

Having familiarised myself with the basic functionality, my first CW QSO was a good 25 minute chat and it was a pleasant experience. CW filters of 500, 250 and 150Hz are available and although there was some ringing, I found these effective with good skirts. It is important to note that to make the most of CW functionality, including the CW Zero-In line and CW memories, it is best to operate this from the Modem setting. SSB was similarly easy to use and I received several good audio reports.

I decided to then try digimodes and found setting up with the PC to be very easy indeed, using OmniRig and instructions provided on the Sintel website. The rig creates two COM ports on the PC, which are used with OmniRig. The only other need is to tell your digi software the Line In and Line Out to be used. Only the single USB-A to USB-C cable is required, and this car-

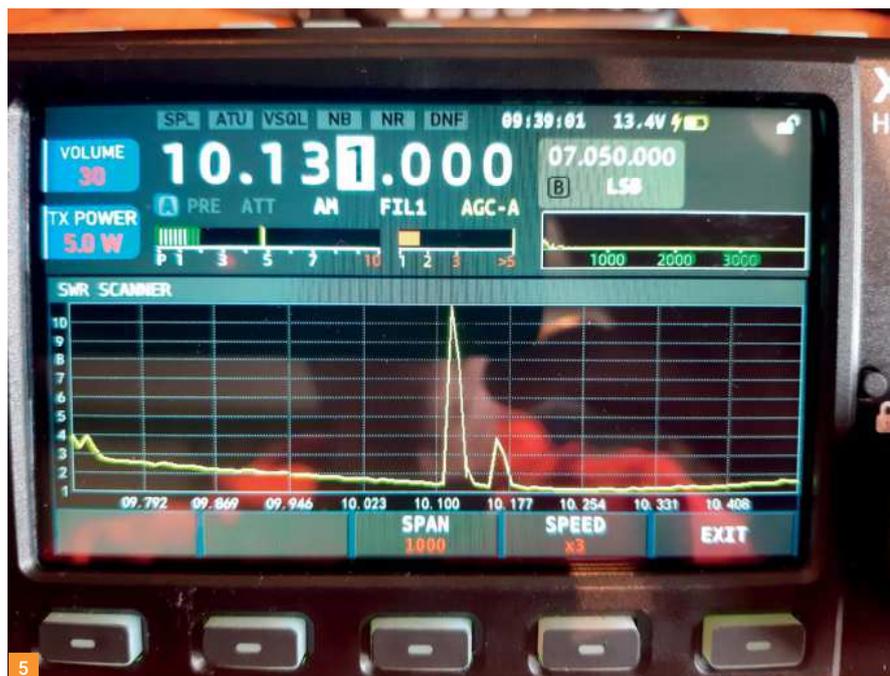
ries the audio as well as CAT commands – a big improvement, especially when using the rig portable. I managed to get operational without needing any amendments to the X6100 settings except for choosing USB-DIG mode and went on to make a number of FT8 and FT4 contacts. I then turned to WSPR on both 80 and 40m, which I left to band-hop overnight. No drift was reported and this is in line with the manufacturer's claims of a one part per million high stability TCXO.

AM broadcast reception was also a pleasant experience and the audio continued to impress me for a rig of this size. The waterfall display also added to the BC reception experience.

Firmware

Let us turn our attention to Firmware. In my experience it takes Xiegu quite a little while to get to the point where the user can be satisfied that all functions perform well. This rig is no exception. The good news is that they nearly always get there in the end. If you are thinking of buying this rig, beware that we are not yet in that position, more needs to be done. My demo model shipped with the 1.1.2 firmware. Since that time, versions 1.1.3 and 1.1.4 have been released. I have chosen not to try to upgrade the firmware on this rig because the X6100 community tell me that while these later firmware updates fixed some problems, they created others! I understand that one of the things improved has been the SWR scanning functionality, and indeed this might allow me to tune my patio long wire. However, as an example, it is reported that while fixing this issue, it broke the CW decoding functionality. This is a feature with Xiegu updates, several improvements along with a number of unintended consequences!

Other functions not really working satisfactorily at the moment are Wi-Fi and Bluetooth. While I understand you can connect the rig to Wi-Fi, it currently serves no useful purpose. Where Bluetooth is concerned, I am able to



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discover a number of devices and can connect to my phone, but again it provides no current functionality. I seem unable to connect to a Bluetooth speaker, although I know others who have – perhaps they are using a different Firmware version? A number of users have also been successful in connecting a Bluetooth keyboard and mouse, for RTTY etc. These Firmware issues do tend to get fixed in the end though, and I believe that in the next 12 months or so we will end up with stable and reliable firmware allowing full functionality.

Battery Life

One compromise made with all this new functionality is battery life. Xiegu have switched to an 8.2V, 3,000mAH battery. Combined with the enhanced functions and the lovely large colour screen, this does mean that battery life is a bit of an issue for portable work. I decided to test this out in two ways.

First, I turned the screen down to the lowest brightness, found an SSB contest station on 20m, and just left it to receive at a moderate volume, I did not transmit at all. I was sat alongside the radio for the entire time and the battery went from fully charged to flat in 2 hours and 50 minutes. By contrast, the X5105 lasted for 6 hours and 30 minutes.

I then decided to try a typical portable operating style. Once again, having gone from fully charged, I transmitted a total of 21 short CW CQ calls using the built-in memory keyer and had nine QSOs. Eight of these QSOs were of the brief contest type report in the CWOps activity sessions, with one more of a standard style QSO. I managed two hours of operating before the battery went flat. That is a bit short for my

personal liking but might suit the odd ad-hoc portable spell. It would be a shame to have to cut your foray short though, so an additional external battery source would probably be sensible.

And therein lies my own dilemma. Make no mistake, this is a superior rig in nearly every respect to the X5105 for only an additional £50. It is excellent value for money, and when the firmware is fixed and stable in all respects it would make an excellent field radio, but the only things stopping me trading my X5105 for one are the battery life and the current SWR/ATU issues. For me the beauty of these two rigs is that they are true HF shack in a box rigs. The combination of internal battery, internal ATU and even an internal microphone and PTT button makes the X5105 my 'grab and go' radio of choice, but if I have to take another battery pack to be sure my trip is not caught short, would that work for me? At the moment, the honest answer is I just don't think so.

Interestingly though, I recently came across a Facebook feed of **Ralf Dollmann DL1BAX**, who has used a 3D printer to build a piggy-back style Li-Ion 18650 battery case. The case itself was designed by N7DDC and bolts to the rear of the rig. It actually makes the body shape look almost identical to the IC-705 and provides front facing rack-type handles. Using six 18650 cells in a three series, two parallel combination (3S2P), this gives around 12V and allows the full 10W to be run too. Ralf is using 3,500mAH batteries for a total capacity of 7,000mAH, more than twice the capacity of the internal battery. Based on my experiments this should give a good six hours or more of CW usage using a combination of the built-in battery

and this pack – much more like it. The other bonus of this pack is that it truly becomes part of the radio so, although adding both bulk and weight, it is still just the one unit to grab. I have included some photographs of Ralf's build here, with his permission, **Figs. 3 and 4**. The design files for the 3D printed case are available on Thingiverse.com, and the weight of the radio increases from just under 1kg to 1.25kg with the fitted battery pack.

Summary

To summarise, this is a great rig, which just needs some more firmware tweaking to be perfect. I am sure that will happen in the next 12 months or so and some of the additional features such as Bluetooth and WiFi will become more than just marketing gimmicks and be really useful. Once again Xiegu have hit the sweet spot, producing a great little radio that is a match for other, more expensive radios in the same market segment.

Last Minute Postscript

Just before the deadline for this article, I decided to give the latest Firmware a whirl. I downloaded the latest version from the Sinotel website along with the instructions. Updating was pretty straightforward, but you do need a micro-SD card. On successful completion of the upgrade, I went straight outside to my patio long-wire. You will recall that my G90 and X5105 both tune this beautifully on 40m. I was hoping the firmware upgrade had fixed the SWR/ATU issue on the X6100 and it would now tune it. No such luck, it stubbornly refused to tune it below 3:1. Returning to the shack, I connected the rig to the three antennas I use on HF and which, only yesterday I had checked with the NanoVNA. Unfortunately, the SWR scanning issue does not appear fixed. Just as an example, my 132-foot-long End Fed Half Wave for 80m returns a pretty flat SWR across the entire 30m band. Not according to the X6100, which, at times, was showing an SWR of over 10:1 at about 10.110MHz (see screenshot, **Fig. 5**). Even more bizarre is that the reading was not consistent between all of the sweeps, with the rig reporting very different 'high' spots on the band at differing times. The X5105 properly reported an almost 1:1 SWR. I assume (hope) that this erroneous SWR metering is driving the ATU issue I noticed and that it will eventually be resolved. As reported by others, the CW decoder just does not work at all on this current firmware release, although I don't personally make use of that functionality in any event.

My thanks to Alan at Sinotel for the loan of this review model. The X6100 costs £549.98 and is available from Sinotel (although the website reports 'sold out' at press time):

www.sinotel.co.uk **PW**

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