

K2 Transceiver

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Last year, my XYL and I turned the big 4-O. We decided that the ideal 4-O gift would be to pack the kids up and go for a trip to the U.S.

I had the opportunity to meet some of the lads from the internet I have "chatted" with for some time, the kids could go to Disneyland, and the XYL... well... would enjoy both.

So in the August of '98 it was off to NorCal and plenty of QRP/QRPp chit-chat... oh, and yeah - Mickey Mouse (the little rodent). Forgetting about the Disney thing, we arrived in San Francisco close to the home of NorCal, one of the most active gatherings of QRP enthusiasts in the world. QRP-Bob (Bob Dyer KD6VIO from Wilderness Radio) picked me up at the station and took me to a swap meet before the Norcal meeting. Believe me, I have never seen a swap meet like it. The things that were for sale were just unbelievable. Computer gear, test gear, antennae, bits and pieces like I have never seen before. If only I had a 40-foot container instead of the Qantas issue carry bag.

From the swap meet we went to the NorCal meeting, the highlight of the whole trip (for me anyway). NorCal meet at a hamburger store outside Livermore CA. The "meeting" is more a gathering of like-minded QRPers than a club meeting, very informal. There are NO minutes of the previous meeting or the formal guff that seems to drive most radio clubs. It is just a gathering of QRP enthusiasts, sharing their latest project or idea. Some of the more notable rigs to claim their roots from NorCal are the NorCal-40 and 40A, the Sierra, the 38 Special, the NorCal-20, and the St. Louis Special antenna.

Most of the people I had either read about or "spoken" to over the Internet were at the gathering. QRP-Bob introduced me to a lot of the members present, all of who had various projects on hand for show and tell. One of the operators present at the meeting was none other than Eric Swartz WA6HHQ from Elecraft. Elecraft is a small company created by Eric and Wayne (Wayne Burdick

N6KR) located in Aptos CA. Eric had the new prototype rig (99.99% complete) called the K2 on hand for members to pock and prod. I was of course interested. First impressions count for a fair amount in my book, and this rig looked like the rig to take over from my QRP-Plus. Eric took about half an hour to go through the technical aspects of the rig, and I was sold.

Elecraft were after field testers to build the kit who had facilities in place to report assembly progress and any technical/building problems that may arise back to Elecraft over the Internet. The idea being that most home-brewers would tinker, and perhaps come up with better ideas on some aspects of building process. Solutions might arise to problems that the less experienced builder might experience. In short, field testers would have to study all aspects of construction and report areas of concern and possible improvements. Total testers

required for the "field test" would be 100, from around the U.S., Europe, Asia and NOW VK. (You little ripper!!!) I promptly ordered my rig and volunteered to be a field tester.

The K2 as a kit built rig, would definitely be one of those kits where you "READ" the manual before starting anything. It is a full-featured rig, with state of the art electronic components and printed circuit boards. The basic rig is CW only, however, options include SSB adaptor, Auto ATU (20W), Aux I/O (host computer interface), 160M option plus receiver antenna switch, Noise Blanker and internal rechargeable battery (2.5 or 3.0 AH from memory). Everything you need for serious QRP operation.

Now back in VK, I could only wait for the kit to arrive. An Internet reflector was set up by Elecraft for the field testers to chat amongst themselves or directly to Eric and Wayne about what they could expect from the K2 and their respective wish lists for a rig of this type.

Early March 1999 the kit arrived. I had planned all sorts of photos to be taken during the assembly, but as soon as I opened the box I was off, soldering iron in hand and itching to get it on air. (Officially there was not a race to complete the rig, but no one wanted to be last hi hi).

The kit arrived complete with all components, printed circuit boards (screen-printed, double sided with plated through holes) and hardware including alignment tools and special assembly tools. Special parts were separately bagged for easy identification. The assembly instructions are well laid out in a spiral bound manual, (purpose designed for small workbenches) and is probably the best assembly manual for this type kit I have ever seen. (Wayne obviously prides himself on the quality of the manual).

The manual is written in the step-by-step,

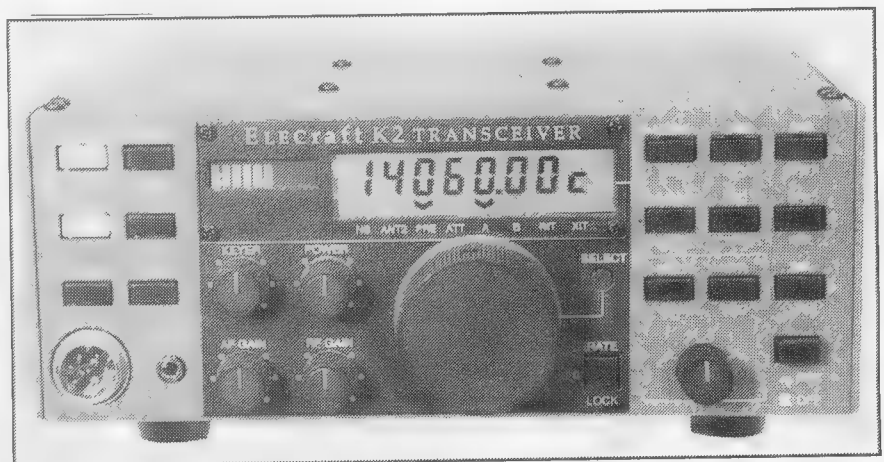


Photo 1

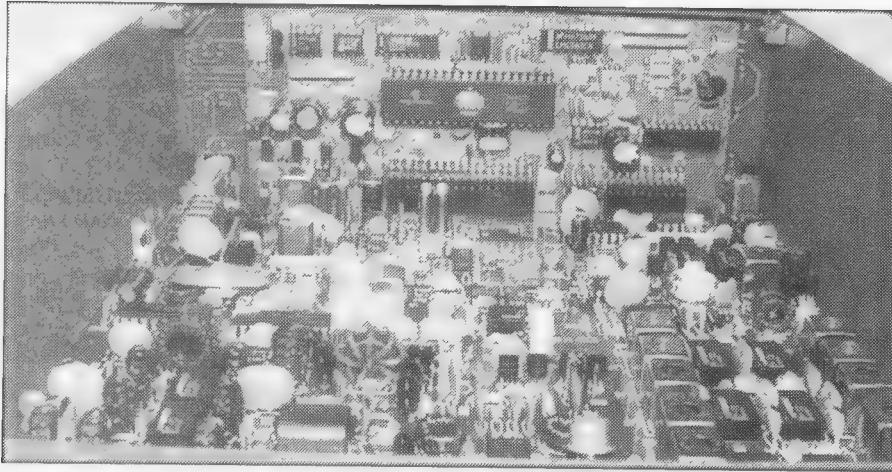


Photo 2

tick as you go approach, which in my opinion is great. It means that you can get to bed at a reasonable time after an evening of building, and the next day, pick up from where you finished the night before. The manual can also be down-loaded from the Elecraft web site, in Word for Windows format.

I found this particularly useful for finding components that did not appear to have a home. It saved hours of wading through the manual, all I had to do is turn on my computer, search for the component number, and up popped all the info required.

The kit is basically divided into six assembly stages.

- Control Board assembly
- Front Panel assembly
- RF Board assembly and test, part 1 (control circuits)
- RF Board assembly and test, part 2 (receiver and synthesizer)
- RF Board assembly and test, Part 3 (transmitter)
- Final assembly (enclosure, speaker etc)

The control board (the first of the three circuit boards to be assembled) is the "brain" of the K2. It monitors all signals during receive and transmit, and handles display and control functions via the front panel board. The microprocessor, analog and digital control circuits, automatic gain control, and audio amplifier are located on the control board. It took approximately 3 to 4 hours to assemble this board. As the first circuit board to be assembled, I took care to "get in sync" with the manual, and the general ideas behind the construction of the K2.

The second circuit board to be assembled is the front panel. This board incorporates all the control and display devices that are used when operating the K2, including the

liquid crystal display, LED bar graph, push button switches, and potentiometers. (The user-interface elements are controlled by the microprocessor on the control board).

The final board to be assembled, and by far the most complex and densely populated, is the RF board. The majority of the receiver and transmitter circuits are located on the RF board, including filters, oscillators and RF amplifiers. The Control board and front panel plug into the RF board, and the enclosure chassis panels are designed to form a tight enclosure around the RF board, thereby securing the completed kit into a neat package.

Testing and alignment is performed at three stages during the assembly. In general, the most complex alignment stages are actually handled by the K2 itself. Routines within EEPROMS align the PLL, VCO/VFO, and the BFO. The user enters calibration commands via the menu button

located on the front panel, and the K2 takes care of everything else. Again, the alignment process is very well documented in the manual and there is very little possibility of messing things up.

If a problem arises, the K2 issues INFO codes via the LCD. The codes are expanded in the manual, indicating the possible problem area, and actions to be investigated as a fix. The entire alignment process took approximately 2 hours to complete the first time.

Once the rig was up and going, there is always the urge to experiment (fiddle) with different parameters, and I was no exception. I can now align the entire rig in about half an hour with no problems. Some parameters can be modified or adjusted while operating, which again is a great feature. It is obviously a great advantage that the constructor does not require fancy test gear to get the K2 on the air.

The proof is in the pudding as they say, and the K2 was put to work on 40 metres. Not bad at all with contacts to ZL and the east coast of the US, from 5 watts out into a G5RV. Next band to be tested was 20 metres. First try to F6 received a 559. The receiver is incredible, with an adjustable band pass filter cutting out unwanted QRM.

Keyer speed is fully adjustable from the front panel, from 8 WPM to 50 WPM. The keyer rate is displayed as soon as the knob is touched. Power output is also adjustable from 1.0W to 10W via a front panel control. Again the output power is displayed as soon as the knob is touched. Other parameters can also be displayed while operating. For example, if the DISPLAY button is pressed, the input voltage and current can be monitored. This feature is handy when

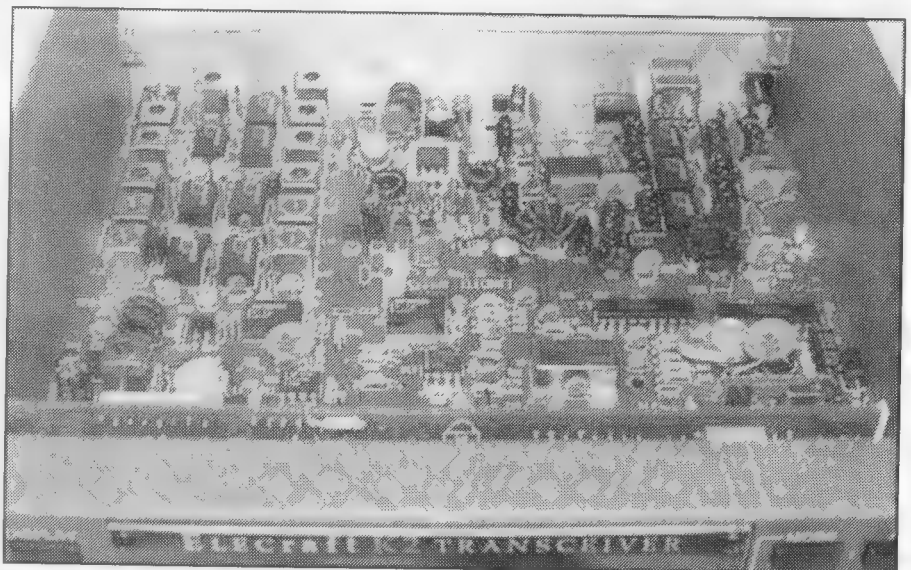


Photo 3

operating field day to monitor battery levels and VSWR levels during transmit. Various options can be turned off to conserve battery life while operating fields, without affecting the rig performance. For example, the S-Meter can be altered to a single LED display or even turned off, the LCD back light can be turned off, and if headphones are used in lieu of the internal speaker the overall power consumption on my unit goes down to about 200mA on receive.

Other features can also be switched in during normal operation. Sidetone pitch and volume can be adjusted via menu function, or stored for easier recall via the PF1 or PF2 (program function) push buttons on the front panel. Scanning is "programmed" by storing the lower frequency in VFO-A and the high frequency in VFO-B. Pressing the RECALL push button, the K2 activates all operating parameters set as the scan range was stored, the receiver is squelched and starts searching for CW signals within the scan range. As CW signals are received the squelch is turned off, and the CW signal "exposed" for 30 seconds. If the signal sounds "interesting" a tap of any button or a tap on the paddle will stop the scan function. The only draw back that I can see is, if the CW signal is not of interest, the scan function has to be started again. (Pressing

the recall button, and starting at the lowest frequency in the stored range).

Apart from that, the K2 is everything you would expect, plus a bit more. As I'm not the world's best CW operator (I do enjoy it ... just not very good) I can hardly wait for the SSB option to be installed. To date, the only option to be released to the field testers is the Battery Option.

I have been told that the next option to be released is the 160-metre option, followed, hopefully by the SSB option some time late May 1999.

This kit is not a first time builder's kit, in fact, it is a reasonably complicated kit that demands a bit of experience and knowledge. The price tag, especially with the current exchange rate with the US, put this rig into the down on hands and knees begging the XYL category. Import Duty and Sales Tax may be tacked on as it enters the country, which once again, will require some breakfasts in bed and or vacuuming duties etc.

In summing up, the K2 is a superb little rig, and in my opinion the best QRP rig on the market. Elecraft after sales service is to say the least, exceptional. Both Wayne and Eric are very dedicated to this product. I was told on many occasions, that no field test will fail, meaning that they were both

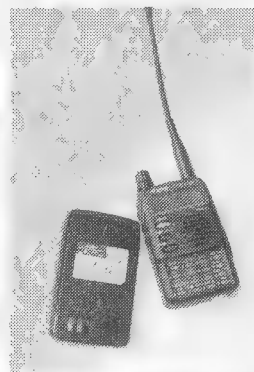
determined to see every kit complete and working to spec. I had problems with the VCO that was tracked down to a dead J310 FET. Within a week, two replacement FET's arrived. I also went a bit over the top with a TOKO variable inductor can, and accidentally shattered the ferrite core. Again Eric offered to send a replacement at no additional cost. Now if that's not customer support or what we would like customer support to be, I don't know what is.

If you are interested in more info on the K2 and have access to the Internet, have a look at the Elecraft home page at www.elecraft.com. or you can contact me via the callbook. Likewise, if you are interested in looking up Wilderness Radio, checkout Bob's web page at www.fix.net/~jparker/wilderness. Wilderness Radio sell the Norcal 40 and 40A, The Sierra and various other rigs that will be of interest.

Best 73 and Happy QRP'ing.

(Production Note:- Schematics were provided for inclusion but as they required 6 full pages it was decided to leave them out. They are however good quality schematics that are obviously professionally drawn and should indeed be easy to follow. Copies may be obtained from the Internet site mentioned in the article.)

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Radio and Communications

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The hand-held started life 60 years ago as a rather bulky piece of work with very limited capabilities. Not so these days! Pictured here is the latest Alinco, the DJ-V5, which boasts quite impressive capabilities. We check it out very thoroughly this month...

So what does our October issue hold in store for you? How about these...?

- **MAKING THE BEST OF YOUR LOCATION** — Antenna guru VK6VZ has some remarkable ideas...
- **THE LAST PICTURES FROM MIR** — The Mir station is deserted. Here are some final SSTV images.
- **REVIEW: BARRETT 550** — If you spend time in the bush, then we have the HF transceiver for you!
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