

# CQ Reviews: Elecraft's New KX1 CW Transceiver Kit

No doubt about it, friends, QRP is the hottest special interest in amateur radio today! Just step back and look at the escalating worldwide interest in low-power communications, the numerous on-the-air QRP contests, QSO parties, and all the dazzling QRP gear, and you, too, will agree. It is maximum enjoyment at minimum cost. You can go first class with a brand-new attention-grabbing QRP transceiver plus antenna and accessories and still have money left over for other pursuits. Now that feat is hard to beat in today's world!

Ready to add an exciting new dimension with real go-anywhere, do-anything flexibility to your amateur radio life? Get rolling with QRP and start enjoying the good life!

As further encouragement to do more with less, this month's column takes an up-close look at Elecraft's captivating new KX1 transceiver kit. This multi-feature and coat-pocket-size rig is quite reasonably priced, a great little performer, and also surprisingly easy to assemble, even if you only have a few minutes of spare time a day. I did it, and my spare time is tighter than my monthly budget! I also took the new KX1 on a QRP road trip you should find interesting, so read on as we discuss Elecraft's new kit.

## The New KX1

Wayne Burdick, N6KR, and Eric Swartz, WA6HHQ, of Elecraft have done it again. They have developed and packaged another outstanding CW transceiver kit, and it is loaded for big-time radio action! The new KX1 sports top-mounted controls for easy campsite, laptop, or handheld use. It is quite small (the size of a QSL card and only 1.2 inches thick) and fully self-contained. The little transceiver covers 40 and 20 meters plus receives adjacent-to-band frequency ranges and tunes the 49- and 22-meter international short-wave broadcast bands. An optional module adds 30-meter operation and enhances reception from 8 to 12 MHz. Power output is approximately 4 watts of band-blasting RF with a 13.5-volt DC supply or 2 watts when using internal batteries (six AA alka-



*Photo 1— Equipped with all its options, Elecraft's new KX1 is a three-band CW transceiver with built-in battery pack, automatic antenna tuner, electronic keyer and paddle, LED, plus Morse code readouts and even a logging light. The little rig is microprocessor controlled with a superb receiver, 4-watt transmitter, and silky smooth break-in operation. (Photo courtesy Elecraft)*

lines). Current drain is very trail-friendly at 32 ma receive and less than 700 ma on transmit at full power and about half that current at 2 watts, so battery life is exceptionally good. An optional CW paddle and internally mounted automatic antenna tuner further enhance stand-alone operations with the KX1. The tuner is a gem. It matches coax-fed antennas such as dipoles and verticals, and it also works with random longwires (really—longwires). It uses latching relays to hold settings without "keep alive" current. The optional paddle, which can be attached quickly, makes the KX1 a complete "grab and go" station you can carry anywhere in a coat pocket. Now this is QRP in style!

The KX1 really shines in the special-features department. It has a direct digital synthesized (DDS) VFO with microprocessor control, LED readout, three tuning rates, RIT, three-pole crystal filter, three frequency memories per band, and built-in electronic keyer with two message memories plus a beacon or auto-CQ mode. Receive bandwidth is panel-adjustable from approximately 2.0 kHz to a hair-splitting 300 Hz, and CW T/R delay time is selectable from 900 ms right down to zero. I think there is also a rocket launcher in there; I just have not found it yet.

Particularly attractive is the KX1's on-board microprocessor with a 16-function menu set that

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lets you customize the KX1 to fit your personal preferences. As an example, you can set the LED readout to bright or dim or to switch off after a selected time. You can also set the sidetone level and pitch, T/R delay, CW message record and play, beacon repeat interval, and low-battery-level warning point, plus switch the auto antenna tuner and Morse readout announcer on/off via the menu. If that is not enough, the microprocessor also has a second 100-count troubleshooting menu set that reads out a code when there is a problem, and the KX1's manual explains how to read the code and find the problem.

### Building the KX1

It is difficult to believe this is a kit transceiver (it is elaborate!) or that it is easy to build, but both the rig and its manual are so well planned and laid out that anyone who can follow hand-holding, step-by-step instructions can do it. At the chance of sounding dumb, I would say if you have the time and patience to put together a couple of jigsaw puzzles, even if it is only a few pieces a day, you can build a KX1. All the components—even the controls, connectors, and readout—just mount in clearly marked holes on the main PC board. There are no wires to run, cross, or get confused. You can't miss. Dislike winding toroids? No problem. Check with Mychael Morohovich, AA3WF, at 412-481-2349 or e-mail him at <toroidguy@earthlink.net>. Mychael winds and sells toroid sets for the KX1, K1, and K2, and I can say firsthand that they are well worth the cost! I would estimate total KX1 assembly time as around 20 hours, and you gain substantial "hands on" experience working with new millennium circuitry in the process. While on a "special-frills roll," incidentally, check out the stick-on tuning-knob spinners from Wayne Smith at <K8FF@fingerdimple.com>. (See photos for more on constructing the kit.)

Circuit-wise, the KX1's single-conversion receiver consists of an NE612 "front end" mixer, a crystal filter, another NE612 as a BFO and product detector, and an LM-386N audio amplifier. Dual JFETs are included for receiver muting, and a transistor circuit handles AGC. The transmitter consists of three transistor stages driving a hefty 2SC2166 to 4 watts output. As previously mentioned, a microprocessor-controlled DDS VFO drives both receive and transmitter sections. The KX1's manual is such a great tool for teaching new and seasoned amateurs alike how

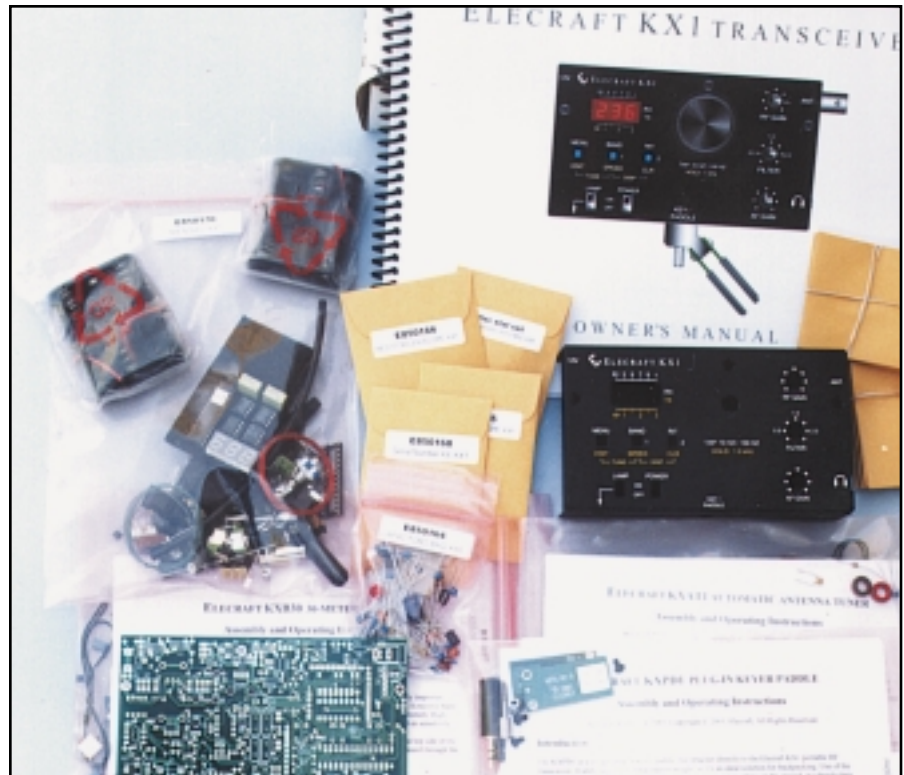


Photo 2— The full Elecraft KX1 kit as received, unpacked, and ready for assembly. Various components such as resistors, capacitors, and inductors are packaged in separate envelopes, while larger items such as transistors and ICs are in static-safe bags. The optional 30-meter board, antenna tuner, and paddle are also in separate bags.

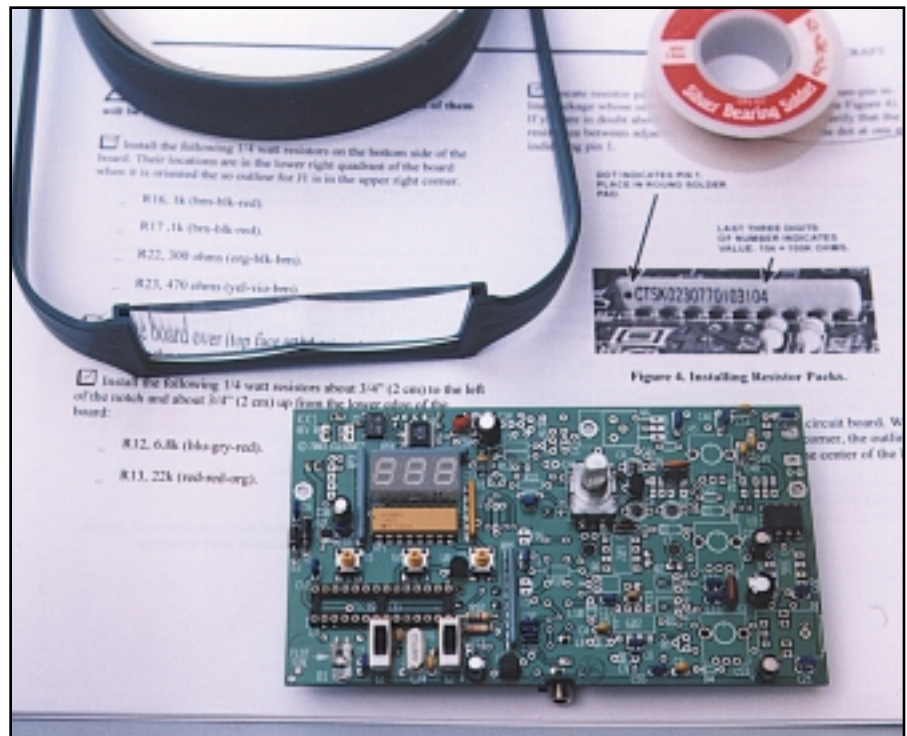
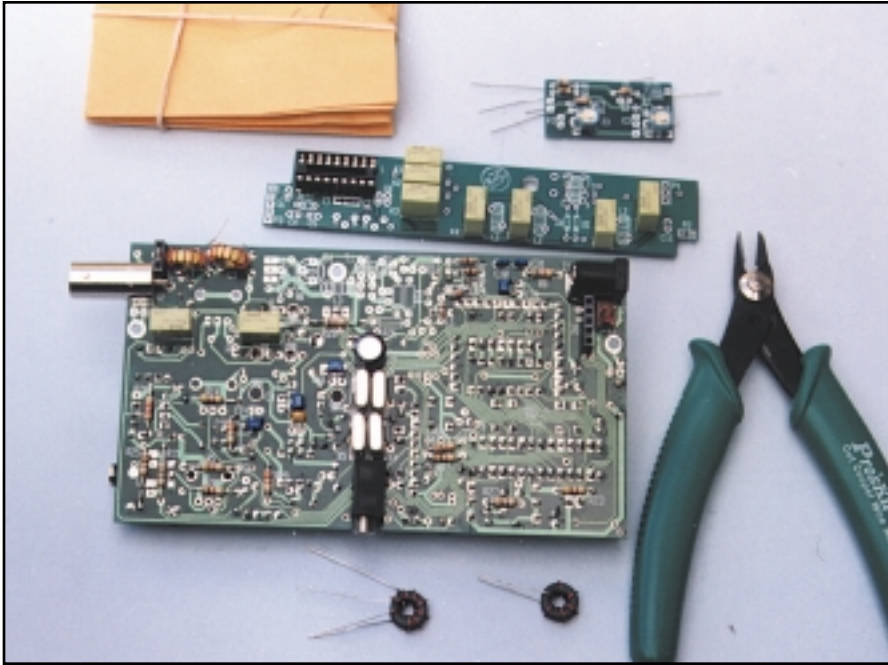


Photo 3— Assembly begins as various parts, switches, and LED display begin filling holes on the main PC board. The keys to building a kit rig such as the KX1 are a steady hand, small soldering iron, thin solder, patience, and a good magnifying visor (I use an inexpensive one from "Nancy's Notions," 1-800-833-0690).





*Photo 4— This “reverse view” shows how small parts mount on both sides of the main PC board. The receiver has now been assembled, and the transmitter section is half completed. Assembly has also begun on the optional automatic antenna tuner (long, narrow board) and 30-meter mod (small board). Two pre-wound toroids from AA3WF have been installed, two are ready to be installed, and four for the tuner are in envelopes.*

to work with modern micro parts and PC boards that, thanks to Elecraft, it is the highlight of next month’s “How It Works” column. Watch for it!

My KX1 worked like a champ right from turn-on. Even before I could check out and tweak the receiver on 30-meter

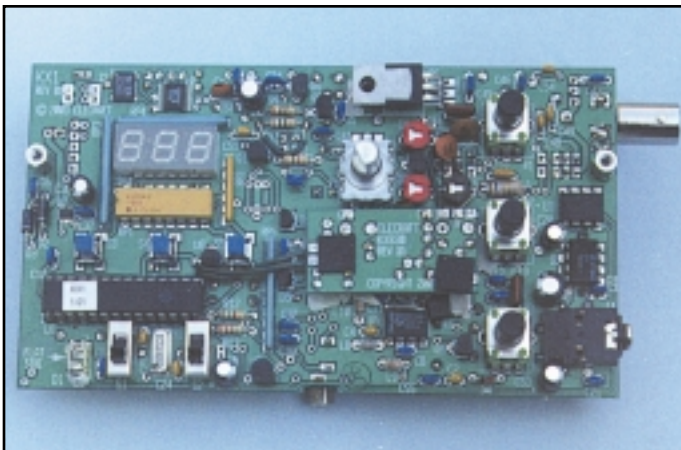
band noise, I heard a YV calling CQ. I called him and received an immediate reply. I was still dinking with keyer speed settings and connecting a wattmeter to measure output when a KL7 started “QRZing” me, so I worked him, too (tweaking? Who needs it?!). I then

switched to 20 meters and, by Jove, there was a YU completing a CQ. Yep, I worked him too. The little KX1 is a killer!

After the fun and games calmed down slightly (new rigs are so exciting!), I discovered several cool treats not mentioned in magazine ads. High-speed diodes are used for T/R switching, for example, so the previously mentioned T/R delay only affects receiver mute time. I also noticed the extended receive coverage was perfect for checking signal propagation reports from WWV on 10.0 MHz at 18 minutes after each hour and for monitoring east coast aviation weather data from New York Central on 10.051 MHz.

Another neat surprise was the “Morse Frequency Readout.” You just tap the Band button once to read the frequency in Morse code and tap it again to switch bands (and read the new frequency). If you depress the Band button for one second, the keyer’s speed is “read” in Morse, and speed changes (made by the main tuning knob) then also “read” in Morse. Tap the RIT button and you hear “R” and “O” for on and off. Tap the Menu button, scroll with the main tuning knob, and all menu selections “read out” on the LED and also in Morse. Those of us with visual impairments will find this feature essential.

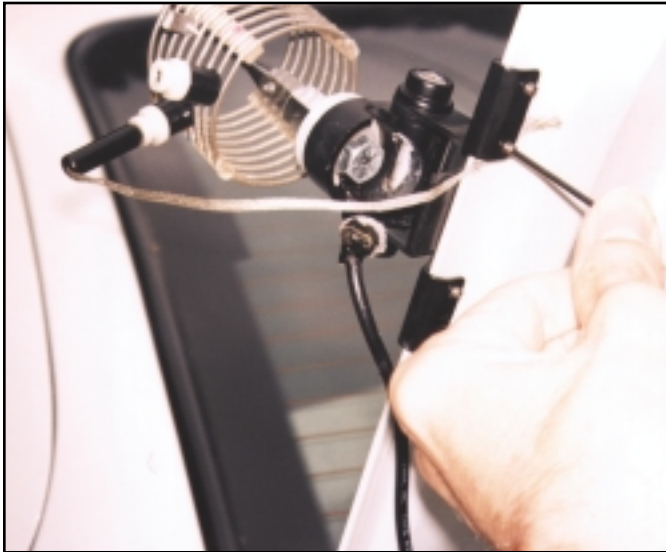
We could continue for several more pages, but describing all of the KX1’s assets in this column’s limited space is nigh impossible. We thus encourage you to check with Elecraft at 831-662-8345 or <[www.elecraft.com](http://www.elecraft.com)> for more



*Photo 5— Top view of the fully assembled KX1 ready for installation in the case. The LED display is in middle left, the main tuning encoder (dial) is in middle right, and the three controls are vertical on the right. The RF output transistor is above the tuning encoder, the 30-meter board is mounted upside down below the encoder, and the automatic antenna tuner is mounted on the back side of the main board. The kit goes together very well.*



*Photo 6— Our “minimalist” gear laid out for the QRP road trip. Items include the Elecraft KX1 with optional case-mount paddle, external “Parkwood” paddle from WB9LPU ([wb9lpu@earthlink.net](mailto:wb9lpu@earthlink.net)), MFJ AC power supply, Maldol pull-up antenna with clip-on counterpoise, and self-supporting “Buddipole” antenna. Mobile antennas are not shown.*



*Photo 7— The main key to successful QRP mobiling is using the vehicle's metal frame as a solid ground. Here we scraped off 1/4 inch of paint so one of the mount's screws connects to ground. We then added a base matching coil and connected its ground strap to the mount's screws. A VOM check confirmed solid grounding.*

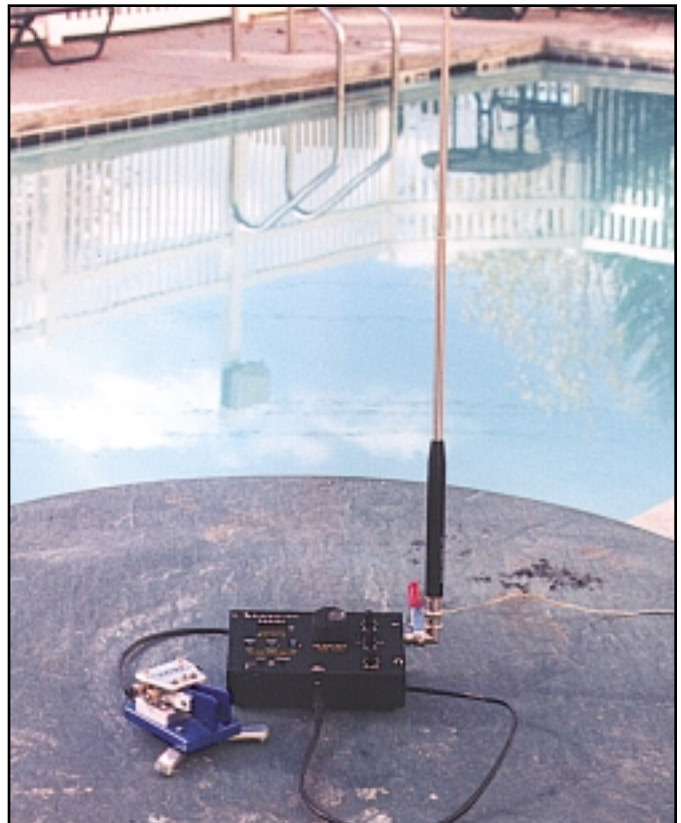


*Photo 8— "Instant mobiling" in a rental car is easy. Just put the transceiver in your lap, let the XYL drive, and use a small earbud for good copy over road noise and screeching tires. Notice the separate ground strap clipped to the antenna plug; it routes directly to a body bolt under the seat and makes a big difference in performance.*

details or to purchase your own KX1. There is no better way to really get into QRP than with a brand-new dedicated QRP rig. Go for it!

### QRP Road Trip

After "getting going" with the KX1, and with some folks still questioning if QRP really works out under totally unpredictable circumstances, we recently put our low-power show to the test. The results were most interesting. In addition to proving QRP's worth during good and adverse conditions



*Photo 9— Poolside portable setup. Just plop down the rig, stretch out the counterpoise strap, and you are on the air in less than a minute. Try that with a big 100-watt rig. By the time you set up a power supply and run an antenna cable, I will have worked all the DX and gone parasailing!*

alike, the secondary purpose of our short road trip was to check out the retirement possibilities and medical facilities in Panama City, Florida and Dothan, Alabama. Since we were traveling in a rental car, staying in motels, and moving at warp speed, hamming on the fly with minimum time for rig setup was vital.

Typical of unexpected circumstances, we were never in one spot long enough to string up a wire antenna or even quickly assemble the multiband "Buddipole" antenna we carried for use on the beach. Our main on-the-air time was mobiling from the car with the KX1 and 7-foot Hamsticks and operating "pool-side portable" with the KX1 and a Maldol pull-up antenna (handicaps some non-QRPer's would consider overwhelming). The results? While sporadically operating 20 meters during daylight hours, I worked stations from coast to coast with an approximate 75-percent reply to all calls—even to our own CQs. Results on 30 meters at night were even better, with 85-percent return to calls, many including good DX QSOs. Judging from past experiences under similar circumstances, I doubt that I would have been any more if I had used a 50- or 100-watt rig. The only good one that slipped away was a VK at daybreak on 30 meters. We were traveling in a fog and had to stop for food and fuel before I could call him. The fate of that call will always be a mystery, but one fact is certain: A little QRP goes a long way!

On that cheerful note, we must once again sign off for another month. Keep on working the world with low power, and I will be listening for you week nights on 30 meters.

73, Dave, K4TWJ