

K9YA Telegraph

Robert F. Heytow Memorial Radio Club

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QRP Power Meter

NorCal's Digital Meter Kit

Philip Cala-Lazar, K9PL

Fun to build, looks good, works great—that's a succinct description of the NorCal QRP Power/SWR meter (<http://www.norcalqrp.org/>). As an HF (includes 6-meters with reduced accuracy) inline power and SWR meter, it

measures from 0.1 watt to 9.9 watts—power output and SWR are displayed on the digital display and reflected power on the analog meter. But there's more, the meter provides four digital display modes: 1. forward power, reflected power and SWR; 2. bar graph of forward and reflected power, with right-facing large triangles depicting one watt and small triangles, .1 watt. Reflected power is depicted with left-facing large and small triangles; 3. SSB peak power; and 4. forward power and SWR via Morse annunciator (10-wpm).

The Morse feature repeats its readings, with sampling updates, until exiting the mode and completing the most recent sequence. Battery voltage is shown upon power up. Readings over 7.9 volts rates "Battery OK," below that voltage earns "Check Battery." According to the kit's Assembly & Operating Manual the meter is good down to 7.5 volts.

Building the kit occupied about four pleasant hours and incurred no hitches, including the most involved construction step, the winding and installation of T1, a Stockton bridge. The Stockton bridge is used to sample forward and reflected power. When using Assembly & Operating Manual, Revision 1C, a couple of heads-up: Page 6, pay heed, as noted in the text, to the correct orientation of diodes D3 and D4. Page 13, installed as directed, the 9-volt battery will be a real hassle to replace. Rather, examine the bottom photo

on <http://www.norcalqrp.org/ncpowermeter.htm>, it illustrates an alternative method, using Velcro®, for mounting the 9-volt battery. It makes the battery much more accessible.

The NorCal Power/SWR meter is one of those win-win amateur radio products that's a joy to build, looks good, performs as it's supposed to and is a useful addition to the QRP operator's armory. Using a dedicated QRP meter with my Hendricks DC40A, PFR-3 and Wilderness Radio NorCal 40A I no longer have to

make an educated guesstimate about output power and SWR as I did with my big boy meters. Besides, it looks great on the shack desk and packs away nicely for portable operation.

Specifications (from NorCal documentation):

Frequency: 160m to 10m (useful to 6-meters with reduced accuracy)

Power: 0.1 watt to 9.9 watts

Accuracy: within +/- 10% for 0.5W to 9.9W

Insertion loss: 0.1dB typical

Power: 9V battery, less than 20mA

Size: 4 1/4"W X 3"H X 4 1/8"D

"...a joy to build"

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Experiencing Elecraft

Chuck Guenther, N1OC



Elecraft KX1

Since 2005, I've had the pleasure of assembling and operating three of Elecraft's radio kits: the KX1 trail radio, the 10 watt version of the K2, and the 100 watt version of the K3. However, I wasn't always interested in kit building. I was first licensed in 1959, during the heyday of Heathkits. Although my elmer and cousin Jack, KØSSN, built an AR-3 receiver, DX-20 and DX-40 transmitters, plus the VF-1 VFO, I never

assembled a Heathkit, not even a VTVM or grid-dip meter. Although I recall spending some time with Jack as he assembled his kits, and being very impressed with the quality and accuracy of the Heath manuals, I remained an "appliance operator."

Even after acquiring a B.S. in electrical engineering and several years of experience in analog circuit design, I remained skittish about spending money and time on radio kits. I preferred to spend my hobby time simply operating—chasing DX, handling traffic and dabbling in contests.

Then, during the mid 1980's, my son John, AAØBP, and I attempted to build a Ten Tec antenna tuner kit. The project did not go well. The assembly manual was poorly written and devoid of illustrations. Its author evidently never heard the old axiom, "a picture is worth a thousand words." Jack bailed us out by finishing the kit for us. All my prejudices concerning kit building were confirmed by this experience.

Finally, in 2005, the appeal of the Elecraft KX1 "trail friendly" radio was irresistible. My wife and I enjoy hiking, canoeing and rafting in remote wilderness. Why not carry along an HF radio station on some of these adventures, I thought. This was my entrance to QRP radio operating, and building some of the world's best amateur radio transceivers. Ultimately, for a number of reasons, I decided I was more interested in a "table friendly" QRP radio, so I traded the

KX1 and moved on to build a ten watt version of the K2. Later, when I read the specifications for the new K3, I decided it would become my "big radio," replacing a trusty Ten Tec Omni 6.



KX1: The Ultimate Portable QRP CW Station

This was my first major Elecraft project completed (with my wife's kind indulgence) at our dining room table. My initial purchase included the KXAT1 antenna tuner (an essential option for portable work), and the KXPD1 keyer paddle. The invoice date of shipment of my kit was Oct. 31, 2005 and I received it just a couple of days later. I availed myself of help in the form of the pre-wound and tinned toroids from Mychael, AA3WF. As I was waiting for the toroids to arrive, I did wind L1 and L2 myself and installed them.

In addition to the superbly written instruction manual, I got lots of helpful hints and suggestions from archived messages on the Elecraft reflector, plus the reviews on eHam. One person mentioned that installing the left battery case was the most difficult assembly step (keeping the three wires from crossing over each other). I used very small pieces of duct tape to hold the wires in their proper place on the bottom of the battery case as the case was being installed. After tightening the battery case screws (easy on the torque!) I then pulled the wires through the tape.

I skipped over the wattmeter and dummy load tests and got on the air with it November 10, and worked the first station I called (K5BQ) on 40-meters, using my MA8040V vertical antenna. My DC power source was a Radio Shack 3-12 V. @ 1000 mA adaptor (Catalog No. 273-1680).



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As I was assembling the KXPD1 keyer paddle, I thought I was going to hate it. It gives nothing back in terms of touch. Yet, when put it on the air, I found I could send very well with it using the iambic mode B setting.

During the 2005 CQ WW CW contest weekend I shamelessly leveraged some of the best contest stations in the world to manage 47 QSO's using my new Elecraft toy running about 4 watts to an MA8040V vertical. I used the auto tuner to match the antenna on 20m, and I snagged TF3CW, 5Z1A, PZ5C and TZ5A. The latter two were new band countries, which I really didn't expect during this QRP experiment. Prior to the contest, I made a two-way QRP with FP/K8DD, who was running a K2 at 5 watts to phased verticals on 40 meters. The receiver did quite well during the contest; even on 40-meters where signals were ear popping strong. Of course, it's not as selective as my Omni 6 (which has three cascaded crystal filters for CW), but it worked for me. I never lost a QSO due to QRM.

During the Winter DX season 2005/2006, I managed to work all continents on 40-meters with the KX1. I packed the radio in a Pelican 1120 case and took it along on trips to Baltimore and California, where I operated from hotel rooms with a wire antenna dropped out the windows. I managed one QSO on the California trip, from Royal Gorge's

Rainbow Lodge (cross-country ski resort), with W6JL near San Diego.

In early March 2006, I participated as a field tester for Elecraft's new KXB3080 module to add 80m and 30m bands to the KX1. I learned firsthand how much work goes into developing and debugging an Elecraft assembly manual! My first 80m QSO with the KX1, running about three watts to a Butternut HF-2V antenna was with HI3/OK2ZU (Dominican Republic).

Shortly afterward, I traded KX1 s/n 1287 with another ham. I've had some regrets about the trade ever since.

K2: Custom, Compact Radio

One of the appeals of the Elecraft K2 radio is the ability to customize it with options such as the SSB module, 100 watt amplifier, analog and digital audio filters, noise blanker, modules for 60m and 160m, computer I/O interface, etc. Thus you can buy and build the radio with just the features you want, and change it later. I chose the QRP CW K2 with the 160m



Elecraft K2 Under Construction

CONTINUED - ELECRAFT ON PAGE 8



Side-by-Side Comparison of the Elecraft K3 (left) and K2 (right)



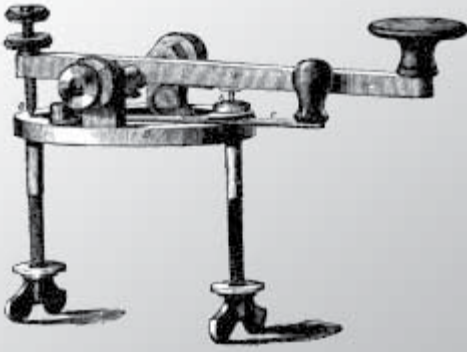
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Vintage Telegraphy

ca. 1882

Paul Huff, N8XMS



Western Union Pattern Key

I have an antique book in my library that was published in 1882 by Gay Brothers & Co., of New York City. I have not been able to find any modern reference to this company so I assume that they are no longer in business. The title of the book is *Gay's Standard Encyclopaedia and Self Educator*.

The title page of the book further describes the volume as: *A HOUSEHOLD LIBRARY OF FACTS AND*

INSTRUCTION PERTAINING TO POPULAR, SOCIAL, PRACTICAL, POLITICAL, STATISTICAL, DOMESTIC, MEDICAL, PHYSICAL, ARCHITECTURAL, RHETORICAL, DRAMATIC, LITERARY, CLASSIC, AND RECREATIVE EDUCATION, Embracing Medicine, Architecture, Inter-

national Commerce, Commercial Law, Parliamentary Law, Penmanship and Bookkeeping, Composition and Correspondence, Dictionary of Synonyms, Language, Elocution and Oratory, Telegraphy, Photography, Constitution of the United States, Poetry, Language of Flowers, Home Life and Happiness, Etiquette and Conduct of Life, Courtship and Marriage, Home Amusements, Parlor Magic, Games, Household Receipts and Cookery; forming a complete Social and Business Manual, and Compendium of Useful Information.

Yes, that really is a single sentence, and what follows are 636 pages of text and illustrations that attempt to help *the millions of busy toilers who are desirous of securing that self culture which will prepare them to meet the responsible duties of life*. The authors are a prestigious group and include Col. Dexter R. Write, Speaker of the Conn. House of Representatives; Geo. A. Butler, Cashier at Nat. Tradesmen's Bank; Prof. R. C. Loveridge, Yale Business College; R. G. Russell, Architect; Rev. Dr. Dennen; Prof. Hoffman; C. Purdy Lindsley, M.D.; and Rev. J. H. Beale, A.M.



TELEGRAPHIC DEPARTMENT.



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K9YA Telegraph

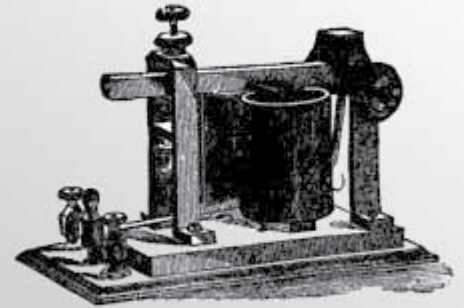
If you look very carefully at that long title page description you will see, buried between oratory and photography, the subject of telegraphy. Telegraphy was the cutting edge of business technology in 1882. The book states that as of 1880 there were 120,000 miles of public business telegraph lines in the country, and this did not include the railway, government, and private lines that also existed. It also states that the explosive growth of this technology, which *practically annihilates both space and time, opens a channel of employment... second to none.*

Interestingly, young ladies were especially encouraged to consider this profession. With the typical gender bias of the day, the text states that, *There is at present, perhaps, no branch of business where a lady can so readily qualify herself for a permanent paying situation as by becoming a practical telegraph operator. A great many offices on all the leading lines in this country are already filled by lady operators; and it has been practically demonstrated that in this department they can discharge the duties of the position with perfect acceptability.*

The actual amount of telegraphy instruction given in the encyclopaedia is very minimal and primarily consists of a listing of the code (American Morse), some illustrations of telegraph equipment, a brief history of telegraphy and the recommendation that

numerous schools exist where one can learn to be a telegraph operator. The list of the American Morse symbols actually contains several errors! For example, American Morse for *Y* is supposed to be dit-dit-space-dit-dit, but there is no indication in the print for the extra spacing in the middle of this sequence. It is simply listed as dit-dit-dit-dit, making it identical to *H*. Similar problems exist with the listings for *C* and *O*, but both *R* and *Z* do include the correct internal spacing indications.

Of course, today, almost 130 years after the publication of this book, commercial telegraphy is completely extinct and indeed has been for a very long time. Even the military use of Morse code is almost nonexistent. But the continued popularity of CW on our ham bands is a testament to the usefulness of this fine mode of communication that continues to *annihilate both space and time*, as it historically links us to the landline brass pounders who possibly got their start by reading this interesting book. ■



Sounder

Ham Origins

These are Your Stories

Kyle W. Jeske, N4NSS/NNNØEGS - NAVYMARS



My elmer, WA9HFB, Ed, is now SK. He was a 6-Meter ham. I remember the nights I went over to his shack for those elusive openings. His Hallicrafters receiver was equipped with Ameco converters. The best was his homebrew AM transmitter in a three-foot rack.

I was young and I let the experience slip by, high school, girls, etc., took over my interest. It took the Navy to teach me the code.

I became a ham as WA9USD in 1966. I was home on leave from the U.S. Navy with only a day left when my ticket came in the mail. I made a few QSOs with great excitement. My first set was a Knight Kit T60 with the Knight Kit R-55 receiver. The antenna was a 130-foot wire that looked like a Windom. I switched the wire feed line between the receiver and transmitter by using an alligator clip attached to a screwdriver. The screwdriver was stuck into the center hole of the coax connectors in each rig.

Yes, I was really new at this ham radio stuff! The real thrill is the mystique of radio... you know what I mean. ■



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The Silent Key

Jerry Spring, VE6CNU

Oh, I am the Silent Key
Once young, curious and strong
Driven to tinker, craft and persist
Through my own inexperience and help from others.

They called me a ham
They called me a troublemaker
Neighbors complaining about this and that
And where are they now? Did I outlast them all?

From humble beginnings
Things that glowed when they worked
Things that clattered, chirped and whistled
Out of the bird's nest of spare parts came life itself.

Out of the ether
Came waves of hope, waves of promise
A card in the mail proving we really connected
The greatest network of friends the world has ever known.

Then down the tower comes
Gear swallowed up by eager locals
Smiling faces, planning to live forever
Irreverent of those whose shoulders they stand upon.

How little they know
That my essence still lives!
My energy blocking or guiding
Their desperate calls to the rare ones they so desire.

For I *am* now the radio
Energy transformed
Free to go wherever I please
And make the ultimate contacts.



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The Wet String Caper

Doc, W1IIN, was Always Up to a Challenge

Rod Newkirk, VA3ZBB/W9BRD

After our usual Connecticut Wireless Association meeting at W1NJM some of us wound up at the shack of W1IIN, domicile of Doc Hayes. No special occasion, just a chance to enjoy his entertaining hospitality. Besides, he wanted to show off his latest homebrew, a random-wire antenna tuner. Doc was a neat and precise builder.

It was in the spring of '48, I recall, a solar maximum with fabulous radio conditions and plenty of sunspots. Doc's receiver was loaded with solid signals on 40 CW. I remarked that conditions were so good you needed only a wet string for an antenna. Doc, who once swallowed goldfish at college on a dare, accepted the challenge. "Let's try it," he muttered, swinging his ample 6' 7" frame into action.

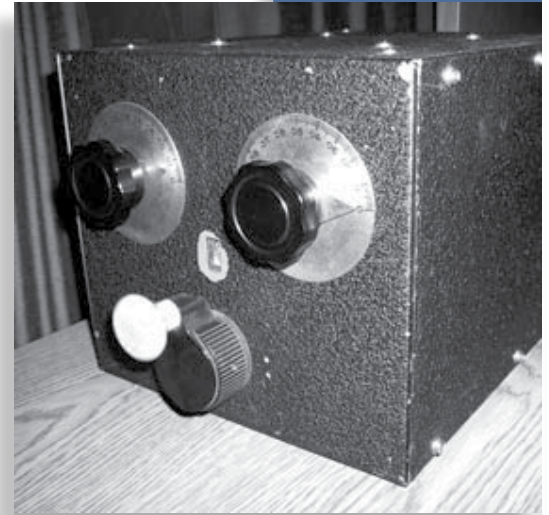
We were about to don our coats and head for home when Doc dashed into his kitchen for a ball of twine. He snipped off about forty feet and soaked it in a bucket of water. He strung it through the house with a rubber band and thumbtack at the far end. His XYL wasn't too happy to see it anchored by knickknacks on the fireplace mantel but she was a good sport in the interest of science.

Doc tied the string to his new antenna tuner and tried to load it. Nothing happened. "Not even a decent dummy load," remarked John Cann, W1RWS. The thing just would not load Doc's 40-watt 807. "Impurities," spoke up W1TX who worked for the local power company. "West Hartford's tap water is too good. We need impurities." Doc remembered some high school chemistry, dumped a box of table salt into the water, scrunched the string into the brine and zigzagged it through the house again. By this time we were all interested enough to forget about our coats.

When Doc tied the salty string to his antenna coupler signals in the receiver popped up several S-points. It was working! We let out a spontaneous hooray of approval as W1IIN loaded about

forty watts into the thing. A couple of CQs brought response from a WA2. Mrs. Hayes let out a small shriek when she saw steam rising from the string in concert with Doc's straight-keying. The string was rapidly drying out and Doc had to ride the tuner to keep it peaked.

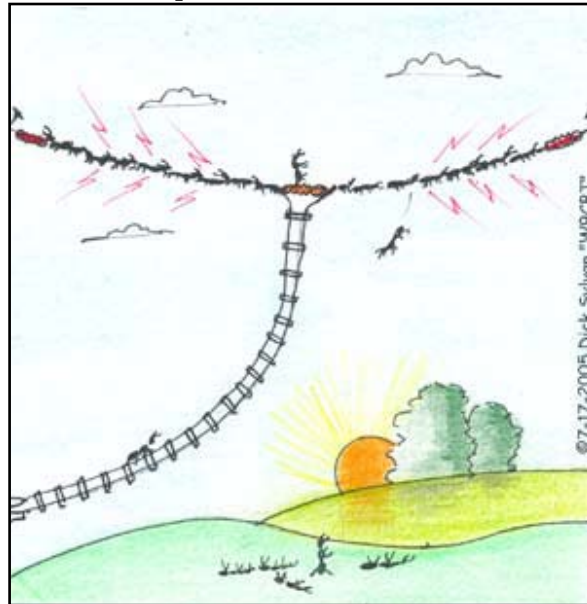
The WA2 didn't seem too impressed when informed that we were using wet string for an antenna. Maybe he thought his leg was being pulled. The stunt worked for about twenty minutes until the salt solution evaporated and loading ceased, Doc said he had a couple of ideas on how to keep the string wet, but we had seen enough. We had the wet string DX record. Doc's gracious XYL was glad, no doubt, to see our backs. Her shelf of knickknacks was safe again. ■



*Homebrew Antenna Tuner
(AA5TB photo)*

Ham Quips

DICK SYLVAN, W9CBT



**THIS IS REALLY A GREAT ANT-TENNA
AS LONG AS WE DON'T RUN OUT OF ANTS**



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module, internal battery, noise blanker and DSP options.

My K2 (s/n 5853) was shipped November 15, 2006 and was first on the air December 4.

Assembly of the radio and integrating the various options was enhanced by using the inexpensive third-party "Rework Eliminators," developed by WB2ART and KI4GGX. (See: <http://www.unpcbs.com>) The Rework Eliminators make addition and removal of the various K2 options as seamless and painless as possible. Using the rework eliminators, the disassembly and desoldering required to add K2 options is minimized.

I developed my own BFO calibration procedure for the K2 and shared it in a message to the Elecraft Reflector dated January 21, 2007. I set up my K2 for 400 Hz pitch, with the four selectable crystal filter bandwidths set for 700, 400, 300 and 150 Hz. The DSP works wonderfully, with NR set at default and audio filters centered on the 400 Hz pitch. I compared the K2 with my Omni 6, Option 1 with its internal DSP NR, cascaded 250 Hz filters preceded by the INRAD 600 Hz CW roofing filter, and finally augmented by an MFJ 784B DSP audio filter with additional NR. The K2 is at least as effective as the Omni 6 and MFJ combo! Hard to believe, but A/B testing on 80-meters December 7, 2006 showed at least as good copy on KH8Q with the K2. (I eventually worked the KH8 with the Omni and 800 watt amp, but I kept wanting to go back to the K2 for receive.)



K3: DX'ers Dream Radio

I was in the QRP forum at the 2007 Dayton Hamvention, among those literally oohing and aahing the K-3. I stopped at the Elecraft booth and got a K3 button. I visited the Elecraft website nearly every day since then. A couple times, I even went so far as to bring up the shopping cart. On January 21, 2008, I took a deep breath and pressed the order button for a K3/100 kit and two CW roofing filters. I received the kit June 12, and had s/n 1061 on the air and debugged by June 17. (This is a no solder kit, with only mechanical assembly and mating electrical connectors required. Due to the radio's complexity, the assembly is not a trivial task, however.)

It's the best radio I've ever owned, and it is all that I expected over the four-month wait period!

Things I especially like about the radio are:

32-bit floating-point IF DSP, enhanced by narrow analog roofing filters

Low-pitch CW capability (down to 300 Hz in 10 Hz increments)

User programmable IF gain compensation (1 dB increments) for crystal filter insertion loss

User programmable AGC characteristics

NB and NR functions that really work

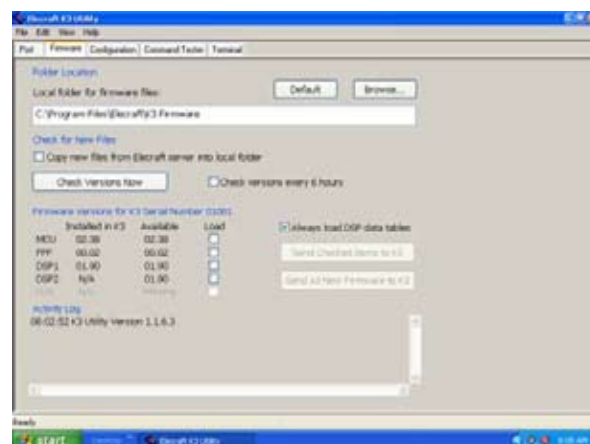
Affordability—savings by building kit, deferring 2nd receiver option

Firmware upgrades managed by K3 Utility program (see screen shots)

I'm looking forward to the 2008/2009 low band DX season with my new Elecraft station! ■



K3 Utility Crystal Filter Screen



K3 Utility FW Screen

