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Kantronics KAM Plus Multimode TNC with G-TOR

Nye Viking MB-V-A Antenna Tuner

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Editor, *QST*

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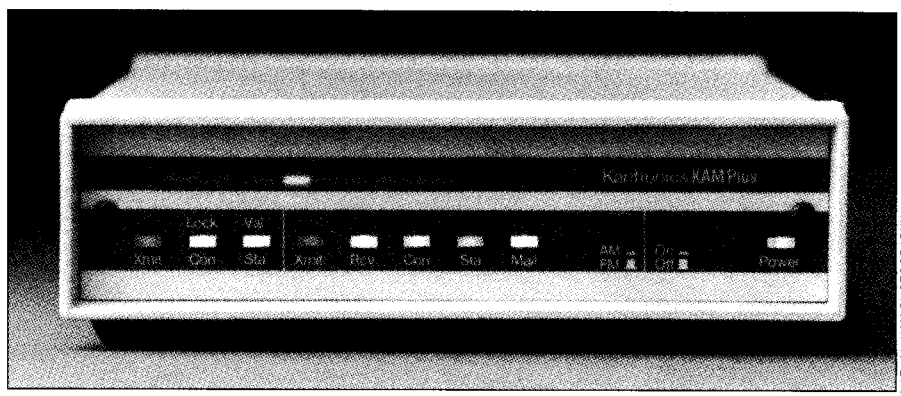


NATHAN HAM PHOTOGRAPHY

The Kantronics KAM is well known to hams who enjoy the digital modes. It was the first multimode TNC to offer *simultaneous* dual-port capability, allowing users to operate VHF packet and an HF digital mode of their choice at the same time. Through the use of the KAM's gateway feature, it's possible to link the two ports. For example, you can use HF packet to connect to someone's KAM and access one of their local bulletin boards on VHF. The dual-port feature is also handy for digital DX enthusiasts. You can monitor your local *PacketCluster* on the VHF port while you prowl the HF bands looking for DX on RTTY, AMTOR or whatever.

The first KAM offered packet (HF and VHF), Baudot RTTY, ASCII RTTY, CW, AMTOR and WEFAX/NAVTEX (receive only). Later versions expanded the size of the mailbox memory and added PacTOR. The KAM soon reached the point where further evolution required more changes than could be accommodated by an EPROM replacement without an expansion board.

Enter the KAM Plus

The KAM Plus *looks* much the same as the KAM, but there are substantial differences:

Memory: The original KAM featured 32 kbytes of memory. You could add an expansion board and boost it to a maximum of 128 kbytes. The KAM Plus is *supplied* with 128 kbytes of memory, which can be expanded to 512 kbytes.

Enhanced sensitivity: The KAM Plus demodulator is more responsive to weak signals.

Mail Waiting LED: A separate front-panel LED was added to indicate when a message is waiting in your KAM Plus mailbox.

G-TOR: And probably the most important new feature is G-TOR, a new digital operating mode pioneered by Kantronics, which is said to have an average throughput 2.5 times greater than PacTOR.

G-TOR

G-TOR made its official debut on March 1, 1994. KAM Plus units equipped with G-TOR began shipping soon thereafter. Owners of earlier KAM Plus TNCs can upgrade to G-TOR by simply purchasing and installing a version 7.0P EPROM chip.

Hams who own older KAMs can also add G-TOR, but they must purchase the version 7.0E enhancement board. If you already own a KAM with an enhancement board, all you need is a 7.0E EPROM.

G-TOR is an acronym for *G*olay-coded *T*eleprinting *O*ver *R*adio. Golay coding is the error-correction system created by M. J. E. Golay and used by the *Voyager* spacecraft. Sending billions of bytes of data across the Solar System required a scheme to ensure that the information could be recovered despite errors caused by interference, noise, and so on. Kantronics chose Golay coding to help solve some of the difficulties of digital communication on the HF bands.

To create G-TOR, Kantronics combined the Golay coding system with full-frame data interleaving, on-demand Huffman compression, run-length encoding, variable data rate (100, 200 or 300 bit/s) and 16-bit CRC error detection. If you want the gory details of the protocol, I refer you to "G-TOR: A Hybrid ARQ Protocol for Narrow Bandwidth HF Data Communication" by Glenn Prescott, WBØSKX; Phil Anderson, WØXI; Mike Huslig; and Karl Medcalf, WK5M, in the May 1994 issue of *QEX*. For potential KAM Plus buyers, and those who want to upgrade their existing units, the most important question is, does G-TOR work?

The answer is an unqualified "yes." After I had received the KAM Plus used for this review, I worked Karl Medcalf, WK5M, on 20 meters. Propagation conditions between my home in Connecticut and his station in Kansas were good, but interference was considerable. We established a PacTOR link first and Karl sent a long ASCII file. Then we connected on G-TOR and Karl sent the same file again. Despite interference and occasional fading, G-TOR lived up to its promise. I received the file at an average data rate more than 2.5 times faster than PacTOR.

A week later I had a contact with ARRL Senior Technical Editor Larry Wolfgang, WR1B, on 20 meters late in the evening. Interference was nil, but our signals were extremely weak and noise levels were high. Larry and I swapped an ASCII file using AMTOR, PacTOR and G-TOR. AMTOR turned in a poor performance and PacTOR was only slightly better. G-TOR, however, was stunning! I could barely hear Larry's signal most of the time, yet we managed to exchange the file at almost 90 bit/s—roughly three times faster than our best PacTOR rate. (More detailed information from our tests appears in a sidebar that accompanies the May *QEX* article.)

G-TOR is easy to operate. If you're familiar with AMTOR or PacTOR operating, G-TOR is essentially the same. When you're in the G-TOR mode, you use AMTOR FEC to call CQ. This allows your transmission to be copied by as many stations as possible. If someone wants to talk to you, they respond in G-TOR using your full call sign.

Once the G-TOR link is established, the station that called you is the ISS, or *information sending station*. It's up to him to speak first. While he is transmitting, you're the *information receiving station*, or IRS. You flip these IRS/ISS roles back and forth by sending an "over" code. Like PacTOR, G-TOR can transfer ASCII or binary information.

You can monitor the G-TOR data rate by glancing at the front panel of the KAM Plus. When the **STA** LED is off, the rate is 100 bit/s. A flashing **STA** indicates 200 bit/s and a steady **STA** means that you're perking along at 300 bit/s. The data rates change automatically based on the quality of the link. Links always begin at 100 bit/s. If the number of correctly received frames ex-

ceeds a preset value, the receiving station will request a speed increase to 200 or 300 bit/s. If the link deteriorates, the data rate will automatically ratchet downward. You can also set the data rate manually.

The G-TOR mode supports the KAM Plus mailbox. If you set the ARQBBS command ON, any connecting station will receive the mailbox prompt.

It's important to note that you cannot monitor a G-TOR conversation with the KAM as easily as you can AMTOR or PacTOR. There is no "listen" mode in the KAM (or any other multimode TNC) for G-TOR. (You can't even determine the call signs of linked G-TOR stations.)

Kantronics provides a solution with their new *G-MON* software. By using *G-MON*, you can eavesdrop on G-TOR links with *any* KAM that has WEFAX capability. You can also use *G-MON* with the WEFAX function of other Kantronics TNCs such as the KPC-2 and KPC-3 to monitor G-TOR activity. (It may also be possible to use *G-MON* with other TNC brands that provide WEFAX, but I was unable to test this.) According to Kantronics, *G-MON* is provided with new KAM Plus units, enhancement boards and all G-TOR EPROM upgrades. You can also download *G-MON* separately from the Kantronics BBS (tel 913-842-4678).

G-MON is essentially a terminal program. By placing the KAM Plus in the *GSCAN* mode, you can monitor data frames being exchanged between two linked G-TOR stations. Your computer is doing quite a bit of processing under *G-MON*, so you must run the software on a reasonably fast machine—preferably a 286 or faster PC. Using *G-MON*, I was able to eavesdrop on several G-TOR conversations. There is no error correction under *G-MON*, so I did receive a number of mutilated frames. Even so, I was able to follow the conversations and identify the stations most of the time. Kantronics also offers *GOFF* and *GMONITOR*. *GMONITOR* includes error correction.

Speaking of software, if you presently own a KAM with an older version of *HostMaster* (as I did at the beginning of the review), you'll discover that it won't function completely with the version 7.0 firmware in the new KAM Plus. RTTY, AMTOR, packet and CW will operate, but PacTOR and G-TOR will be unavailable. In late March, Kantronics released a new version of *HostMaster II+* with G-TOR support (version 3.2). I finished the review with this version. It makes G-TOR operating *much* easier and I recommend it—especially if you want to take full advantage of the KAM's dual-port features. The attractive display, pop-up windows, and convenient "hot-keys" make this software package a virtual must for the KAM Plus.

G-TOR can be used with any HF SSB transceiver that's able to switch from transmit to receive (and vice versa) in less than 100 ms. This puts G-TOR operation well within the capabilities of modern rigs—and many older radios, too. WR1B successfully used a 1978-vintage Kenwood TS-820 transceiver during our G-TOR tests. His KAM Plus would not key the TS-820's PTT line, but Larry solved that problem by simply adding a reed relay.

Radioteletype

The improved sensitivity of the KAM Plus was apparent during Baudot RTTY operation. I found that I was able to copy signals in noisy conditions that may have challenged my older KAM. The KAM Plus demodulator filters are sharp, as evidenced by the exceptional performance in the face of intense interference. This is not to say that I had 100% copy, but I usually printed enough text to follow the conversation.

I was relieved to see that Kantronics retained the KAM's LED bargraph display in the KAM Plus. It's still among the best tuning indicators available in multimode TNCs. When you tune a digital signal correctly, the LED segments on the extreme right- and left-hand edges of the display glow brightly. When you look at that display, there's no doubt that you're on the right frequency.

AMTOR and PacTOR

The *HostMaster II+* software package really shines when you use AMTOR and PacTOR (and G-TOR, for that matter). I enjoyed the convenience of sending the "over" command by tapping a single key. Sending files, creating logs and capturing data is equally easy.

The KAM Plus was a joy to operate during several weekend AMTOR sessions on 20 meters. I had little difficulty carrying on conversations with DX and stateside stations. I also explored the bands on PacTOR, connecting to bulletin boards and making many live contacts.

When it comes to weak-signal PacTOR performance, there is some debate about how received signals are best processed and converted to data. The KAM Plus, like many multimode TNCs, does it almost entirely in firmware. If the strength of a received bit is above or below a predetermined threshold, it is "rounded" up to a 1 or down to a 0. The threshold is set in the KAM Plus firmware and does not change. This approach is quick, relatively easy and cost effective.

In the original German design, the received signals are best processed through a hardware analog-to-digital converter. Not only are the signals converted to data bits, a value corresponding to the *strength* of each bit signal is stored in memory. When the time comes to decide whether a received bit is really a 1 or a 0, the strength of the signal is taken into account. The bottom line is that this approach stands a somewhat better chance of making the correct decision about a true value of a bit. Better decision making may mean better performance under marginal conditions. This technique is somewhat more difficult to implement efficiently in a multimode TNC.

So does this mean that the KAM Plus lacks acceptable weak-signal performance in PacTOR? Not that I could tell. Although PacTOR throughput during my tests with WR1B was poor, our signals were *very* marginal. Perhaps the hardware analog-to-digital approach would have yielded better performance—I don't know. For the average ham operating in average conditions, however, I believe the KAM Plus would be more than adequate. And even under poor conditions, it seemed to hold its own very well.

CW

I've said in past articles that multimode TNCs don't make very good CW decoders. I still believe this is true, but the KAM Plus makes a valiant effort to prove me wrong! It showed a remarkable ability to copy CW—if it's sent well. In several instances, I used the KAM Plus to copy DX stations who were zipping along at 40 wpm. If the ham at the key had a good fist, the KAM Plus would print about 80% of the text. If interference is a problem, it's easy to adjust the KAM's CW filter bandwidth for a narrower response. I sent some CW from the keyboard and the KAM Plus decoded it adequately.

Packet

The expanded mailbox in the KAM Plus is a major asset for packet operating. As mentioned previously, you can expand the memory to 512 kbytes. That's a great deal of storage capacity for a mailbox. For example, most of the personal messages I receive at my local PBBS average 1 to 2 kbytes in length. At 512 k, my KAM Plus could hold *hundreds* of these messages. You can increase storage capacity somewhat by turning off the PBHEADER command. This will effectively strip off header information from messages received from a full-service PBBS. And whenever a message is waiting for you, the convenient front-panel LED lets you know. This seems like a small feature, but it is an improvement over the KAM.

The KAM Plus includes the ability to forward mail to and from a PBBS. Remote SysOp functions are available as well. Like most Kantronics packet products, the KAM Plus features the versatile *KA-Node*. A KA-Node is similar to a NET/ROM or TheNet node in that it relays packets without requiring end-to-end acknowledgments. Unlike its high-powered cousins, however, a KA-Node does not maintain routing lists or, as a result, include automatic routing capability.

WEFAX and NAVTEX

NAVTEX transmissions are really AMTOR FEC. The difference is how the messages are formatted and displayed.

Most NAVTEX stations are located along coastal areas where they serve maritime traffic. The stations transmit navigational warnings, meteorological warnings, ice reports and search and rescue information on 518 kHz LSB.

In the NAVTEX format, a message received with less than a certain number of errors is considered valid and is not printed again—even if it's sent several times. The messages are stored in sequence, available for easy reading at any time.

W1AW uses the NAVTEX format (known as *AMTEX*) for AMTOR FEC bulletins. As with all NAVTEX messages, you can choose the message classes you wish to see (satellite or DX bulletins, for example). The KAM Plus will only print those messages within the categories you choose.

The KAM Plus will also receive HF WEFAX transmissions, although you need specialized software (such as Kantronics' *SuperFax II*) to decode the incoming data. WEFAX stations transmit weather maps and satellite images. The KAM Plus with *SuperFax II* software will copy weather maps (black-and-white line art), but it cannot be used to view gray-scale photo images.

Summary

The KAM Plus retains the features that made the KAM one of the most popular multimode TNCs, and it includes several improvements. The addition of G-TOR sweetens the package substantially.

Kantronics has stated that they will license G-TOR technology to other TNC manufacturers. If enough hams and manufacturers jump aboard the G-TOR bandwagon, the future of this mode is bright. G-TOR offers a substantial improvement in HF digital communications at a price that many amateurs can afford. Will it succeed in head-to-head competition with CLOVER, PacTOR and PacTOR II? The market will ultimately decide.

(KAM Plus and G-TOR are registered trademarks of Kantronics.—*Ed.*)

Manufacturer: Kantronics Company, 1202 E 23rd St, Lawrence, KS 66046, tel 913-842-7745. Manufacturer's suggested retail price: KAM Plus: $339.95; *HostMaster II+* (version 3.2): $69.95; *HostMaster Mac* (version 2.0): $69.95; *SuperFax II*: $49.95; G-TOR 7.0E EPROM (for KAMs with enhancement boards), $34.95; Version 7.0E enhancement board (for nonupgraded KAMs), $89.95.

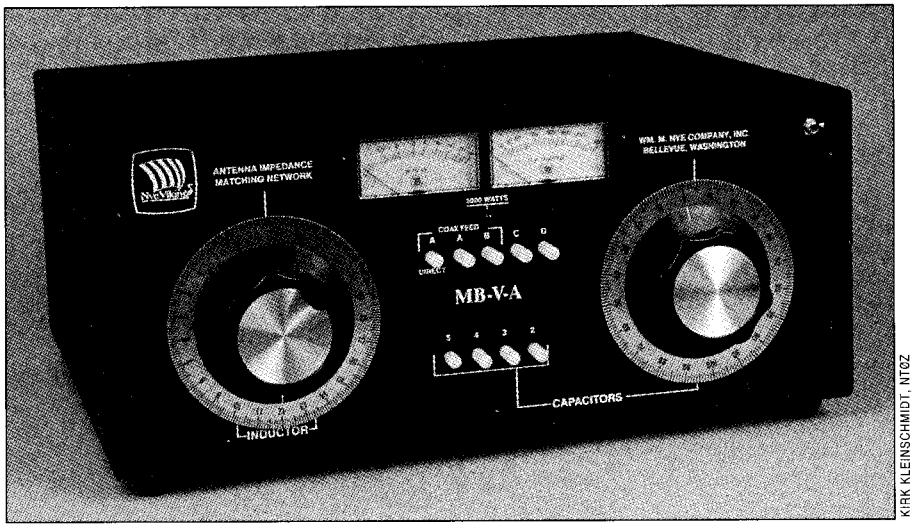
Nye Viking MB-V-A Antenna Tuner

Reviewed by Jim Cain, K1TN
QST *Senior Editor*

Among the radio items I don't ever want to be without are headphones, a keyer and an antenna tuner. Sometimes it seems I can't live with antenna tuners, but can't live without 'em, either.

Just when I get an antenna system built that presents 50 Ω (more or less) to my rig on every portion of every band, I put up something new that doesn't. Or we get another ice storm and Mother Nature fools my resonant antennas into thinking they've just grown—or shrunk—by 20%.

The Nye Viking MB-V-A (pronounced "M B Five A") is one of only a handful of units available today that aims to handle maximum legal amateur power—1500 W output.



KIRK KLEINSCHMIDT, NT6Z

Features

The Nye tuner uses a pi-network circuit. It can match antenna systems fed with coaxial cable or balanced feed line, or a single, random-length wire. All antennas (including unbalanced) are fed through a trifilar-wound, 3-kW, broadband toroidal balun. The pi network consists of a fixed 230-pF capacitor at the input, a large, silver-plated copper-ribbon roller inductor, and a two-section (70-pF each) 7-kV variable capacitor with a switchable bank of three additional 195-pF, high-voltage fixed capacitors at the output.

The front panel is straightforward. A large **INDUCTOR** spinner knob with a 25:1 vernier dial and 0-to-25 gradations turns the roller inductor. A matching (but nonspinner) **CAPACITORS** knob controls the variable capacitor (0-100-0). Four pushbutton switches, rated at 15 kV, select the fixed capacitors, and five more select antenna inputs: two coaxial, one balanced, and one random wire. Coax input **A** can be selected direct or tuned, while coax input **B** can be selected tuned, only.

Low-impedance loads (under 40 Ω or so, such as a random wire less than 1/4-wave-

Table 1
Nye Viking MB-V-A Antenna Tuner

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: 1.8 through 30 MHz.	As specified.
Maximum power: 1500 W continuous.	See text.
Wattmeter accuracy: Not specified.	See text.
Insertion loss: Not specified.	1.8 MHz, 0.1 dB; 14 MHz, 0.2 dB; 28 MHz, 0.5 dB

Color: Black
Size (height, width, depth): 6.75×14.5×12.25 inches.
Weight: 20 lb.

length long, according to the instruction book) can be plugged into either of the coax (SO-239) input jacks.

A unique arrangement in the MB-V-A is its metering circuit, which requires a 9-V battery. One meter reads SWR while the other indicates forward power in RMS watts. The wattmeter automatically switches from its low to high range when average forward power exceeds 300 W, and a red LED glows to indicate you're on the high-power scale. The meter circuit has an electronic switch that turns it on when it sniffs 10 W of power; the meters are turned off approximately one minute after RF has been removed, to conserve the battery. Both meters are back-lit by 12 V (ac or dc, which must be supplied to a rear panel phono jack); a front-panel switch turns the meter lights on and off.

The built-in wattmeter is quite accurate. At both the 100-W and 1500-W power levels, it gives readings within a few percent of our calibrated Bird wattmeter on most bands, rising to about 10% on 160, 80 and 40 meters. The SWR meter is fine for adjusting the transmatch; it's scaled in SWR, however, not in watts reflected.

The build quality of this unit is excellent: the parts *look* expensive. In particular, the pushbutton arrangements for antenna selection and, especially, those to switch in the fixed capacitors, take quite a push to engage. In fact, the unit is *just barely* heavy enough to stay put when the pushbuttons are depressed.

KIRK KLEINSCHMIDT, NT0Z

Observations

Judging from the circuit, I expected this box to accommodate just about any excuse for an antenna on 80 through 10 meters, and I wasn't disappointed. A 200-foot center-fed with 450-Ω balanced feed line (about 120 feet worth) worked on every amateur band from 3.5 to 29.7 MHz. I then twisted the ends of the feedline together and connected them to the single-wire input. No problem.

A more difficult test is a multiband coax-fed antenna. The only one I had available was an ancient multiband vertical that has been to you-know-where (and back), and looks it. To make matters worse, it was ground mounted temporarily with only six radials: a miserable situation.

In a nutshell, the Nye tuner enabled me to get some power to the vertical when I otherwise wouldn't have been able to. This was especially true on 80 meters and, to some extent, on 40. I even was able to fool the transmitter into thinking it was feeding a real antenna on 30 meters, when I didn't have a 30-meter trap on the vertical.

The Nye Viking instruction book's directions for initial set-up are fine. Using the receiver, first adjust the roller inductor, then the variable capacitor, for maximum received signal strength. Then feed in a little power. If the variable capacitor is at maximum (100), switch in the first fixed capacitor and try again. As with any antenna-tuning device, using a *received* signal only gets you in the ballpark, not onto the field. Nye cautions that the minimum amount of *fixed* capacitance should always be used for a proper match, and that too much total capacitance on the higher bands (15, 12 and 10 meters) can result in potentially damaging circulating currents (ie, *heat*).

The MB-V-A would not tune my 200-foot center-fed on 160 meters, not even with the feed line tied together as a random wire. Increasing the length of the antenna to a half-wave (270 feet) solved that problem. In fairness, the tuner's specs *do* say "limited coverage" on 160. Accommodating short antennas on 160 would require an even larger roller inductor or switching in a fixed inductance on that band.

According to the owner's manual, the tuner is capable of continuous operation at 1500 W. During ARRL Lab testing, the tuner met this specification easily on the lower HF bands, but on 10 and 12 meters, at 900 W output with a brick on the key for 11 minutes, things inside the MB-V-A were getting pretty warm. Given the measured insertion loss at 28 MHz, 1500 W to the tuner would produce 157 W dissipated, a potential problem. Nye indicated that they were aware that the unit could overheat on the upper HF bands. After some testing of their own, Nye determined that the unit is not capable of 1500-W continuous operation on 10 or 12 meters and said they would change the specification in a future printing of the owner's manual.

Follow-up Lab testing revealed that the unit is capable of 10- and 12-meter operation at 1500 W for conversational CW or SSB work, but it overheats after a few minutes if used for RTTY or other continuous-duty-cycle modes.

(It does occur to me that if you're running 1500 W output on 10 meters, you probably have a beam and don't need an antenna tuner. Even at its fairly exhalted price, this unit can't be expected to do everything.)

Patience is required to find the right settings for each band the first time. Once found and noted, two inconveniences still exist: wind and weather will usually mean finding new settings, and changing bands takes time (going from, say, 10 to 80 meters, requires traversing most of the length of the roller inductor). Needless to say, the first is true of *any* antenna tuner, while the second is the price extracted for having a lot of inductance at your command.

Conclusions

The bottom line is that, with a 270-foot center-fed dipole and the MB-V-A, I was able to get a healthy signal on the air on every HF band, and to keep my transmitter (and amplifier) happy. A good antenna tuner can put you on bands otherwise inaccessible when you have limited space for multiple skywires. With a 100-foot center-fed and the MB-V-A, you can be plenty loud on 80 through 10, and accommodate an amplifier if you like.

Although the price of the Nye MB-V-A would buy an entry-level transceiver, this antenna tuner (which definitely is *not* entry level) should be looked upon as a lifetime proposition. You should never need another one.

(The MB-V-A was designed in 1982 by William Nye, W7DZ; Bill was celebrating his 82nd birthday as this review was going to press.—*Ed.*)

Manufacturer: William M. Nye Company Inc, 12031 Northrup Way 101, Bellevue, WA 98005. Manufacturer's suggested retail price: MB-V-A, $791; MB-IV-A1 (no balun or antenna switching circuitry), $638; MB-IV-A2 (includes balun but no antenna switching circuitry), $693; MB-V-B (eliminates the metering circuitry), $627. QST

New Books

HOW TO GET STARTED IN QRP

By Dave Ingram, K4TWJ

Published by the National Amateur Radio Assn, PO Box 598, Redmond, WA 98073; tel 800-468-2426 or 206-869-8052; fax 206-861-5780. First edition, 1992. 140 pp. Retail price $9.95, $2 s/h.

Reviewed by Jim Kearman, KR1S
QST *Assistant Technical Editor*

Drawing their name from the Q signal for "reduce power," QRP operators avidly plug away with 5-W output or less. Some hams shudder at the thought of running only 5 W on the bands from 1.8 to 30 MHz, but others refuse to run more. In fact, within the growing ranks of QRPers, the "milliwatt" cult is gaining ground. Milliwatters run less than 1-W output!

QRP clubs are springing up around the country and all over the world. There are more than enough QRPers in the northeastern and northwestern US to support QRP clubs in both areas. About a half dozen companies sell QRP transceiver kits. QRP is here to stay. The pleasure of operating with low power wasn't discovered recently, though. Although most hams of the 1930s were trying to squeeze every watt obtainable from the vacuum tubes of the day, some hams took pride in seeing how far they could work with as little power as possible.

The QRP idea never really went away, but it took the availability of low-cost transistors to restore it to prominence. In the 1970s, Adrian Weiss, WØRSP, published a book called *The Joy of QRP*, now long out of print. A combination of history, philosophy, construction projects and electronic theory, this book is still sought after by QRP enthusiasts. Since *The Joy of QRP* was published, many other books have been published on specialized areas of the hobby. No book, however, has covered the broad range of QRP or captured the excitement of low-power operating as well as Weiss's effort. Until now.

Dave Ingram, K4TWJ, has written an excellent introduction to QRP operating and equipment that even experienced QRPers will enjoy. QRP is something you either love or loathe. Dave's love for QRP radiates from every page. *How to Get Started in QRP* covers absolutely everything you need to know to start having fun with QRP. If you don't already own a QRP rig, Dave tells you how to adjust the power output of your existing HF transceiver. In the market for a kit? The products of several US kit manufacturers and dealers are highlighted, although a list of all current manufacturers and dealers would make the book more useful. Names and addresses are also scattered throughout the text. This makes it harder for the reader to find and harder for the publisher to update in future printings.

The book includes several simple construction projects, including one transmitter using an "acorn" tube. If you're old enough to know what that is, you must be reading this with bifocals in place! If I can dig up a type 955 tube, I just might build one. In keeping with this book's intention of being a newcomer's guide, none of these construction projects is particularly sophisticated. Instead, the emphasis is on transmitters and transceivers anyone can build, put on the air and use to make contacts. If you're used to equipment panels that resemble a space shuttle cockpit, the sheer simplicity of these rigs will be a refreshing change of pace.

QRP equipment lends itself to portable operation. Later chapters cover the care and charging of batteries, and alternative power sources, including cactuses and tomatoes. (Thanks for the hint, Dave. If I ever get stranded in the desert, I'll just plug into a cactus and call for help. Promise not to needle me if my signal sounds watery!) The pleasure of QRP shouldn't be restricted to HF operation. Another chapter covers VHF, UHF and microwave QRP. From antennas to satellites, just about anything of interest to a potential QRPer is introduced and explained in this book.

Dave's writing style, honed over many years as a columnist for *CQ*, is upbeat and easy to read. Dave takes QRP seriously, but not himself. This *is* a hobby, after all! Someone had to write a worthy successor to *The Joy of QRP* and Dave has done it. If you're even a little bit interested in QRP, this book will stimulate you to try it. If you're already a QRPer, this book will renew your excitement and send you back to the rig or the workbench with renewed enthusiasm.

THE CODE BOOK: MORSE CODE INSTRUCTION MANUAL

By Robert W. Butt, N1KPR

Published By RWB/CG (Publishing), 8 Little Fawn Dr, Shelton, CT 06484; tel 203-924-1120. First edition, 1994. 8 1/2×11 inches, softcover, 43 pp, retail price $14.95 US, $19.95 foreign); optional 13-page 8 1/2×11-inch supplement ($5.75 US, $7.75 foreign). Send a self-addressed, stamped envelope (SASE) for information.

Reviewed By Brian Battles, WS1O
QST *Features Editor*

Some people enjoy Morse code, others don't. Many hams learn the code and fall in love with CW, perhaps never deigning to own a microphone. Others feel obliged to simply bear down and fight to learn code just well enough–and for long enough–to pass a license-upgrade exam, and then hope to never decipher a dit or dah for the rest of their lives. Amateurs and prospective hams have struggled to learn Morse code since the first radiotelegraph stations began to transmit. In the nine decades since people have been using code over the airwaves, hundreds of instructors and students have devised systems and "shortcuts" to try to make the learning easier...or at least, less of a chore.

No one yet has invented or discovered a truly "easy" way to learn Morse code without a minimum effort, but there are people who are good teachers and make the process of learning more effective and less painful. Bob Butt, N1KPR, has written a book that leads you by the hand through every step of the game to teach you excellent techniques for learning Morse code. Not only does he clearly describe ways to help you absorb your code practice more quickly, he also gives useful, concrete tips that can keep the student from wasting time or falling into common, frustrating traps.

Bob is an active ham and a true code aficionado. President of an engineering consulting firm in Connecticut, he belongs to more than a half-dozen Amateur Radio organizations, including the ARC of Shelton ARC, Stratford ARC, Shelton-Huntington ARC, and he's given talks on Samuel Morse, Morse code, and telegraph instruments of the past 150 years. He frequently travels with 20 to 30 vintage keys from his personal collection, and he's working on a book about Samuel F. B. Morse and the evolution of telegraphy, and one about the restoration and repair of antique telegraph instruments.

You'll still need to study the code yourself, from audio tapes, computer training software or on-air code practice sessions, but you won't have to do it alone blindly. Bob offers insightful suggestions, and his warm approach makes learning code appear to be a "friendlier" pursuit than many hams would expect. He explains the structure of Morse code, how the exams are given, what the questions will consist of and how to improve your chances of passing, no matter what your copying speed. He doesn't reveal any means of cheating, though! Like a good Elmer at your side, Bob explains objectively why you should be more likely to pass than fail. He offers specific instructions for the best study tactics and how to avoid picking up bad habits.

For a small softcover book, there's a lot of information here. As learning and operating aids, seven appendices include tables of Q signals, CW subbands, UTC time conversion, W1AW schedule and the International Phonetic Alphabet.

The 12-page *Supplement* adds tips on taking FCC Amateur Radio license exams, interesting tables and hints, and copying techniques, how to find "hidden" exam answers, overcoming mental block and more. Not only is this a handy tool to help you study, it's just the thing to read before you go to take your test.

There's no secret breakthrough here that will make every reader master 30-wpm code in a week. For hams who need a definite action plan and solid encouragement, this book is a fine complement to a set of tapes or a computer code-practice program. A beginner learning the code from scratch or an experienced ham working on an upgrade will find *The Code Book* to be the written reference of choice. QST