ICD 08241

Amateur Radio

CQ

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NOVEMBER 1998

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View from K1CA, Derry, NH

THE RADIO AMATEUR'S JOURNAL

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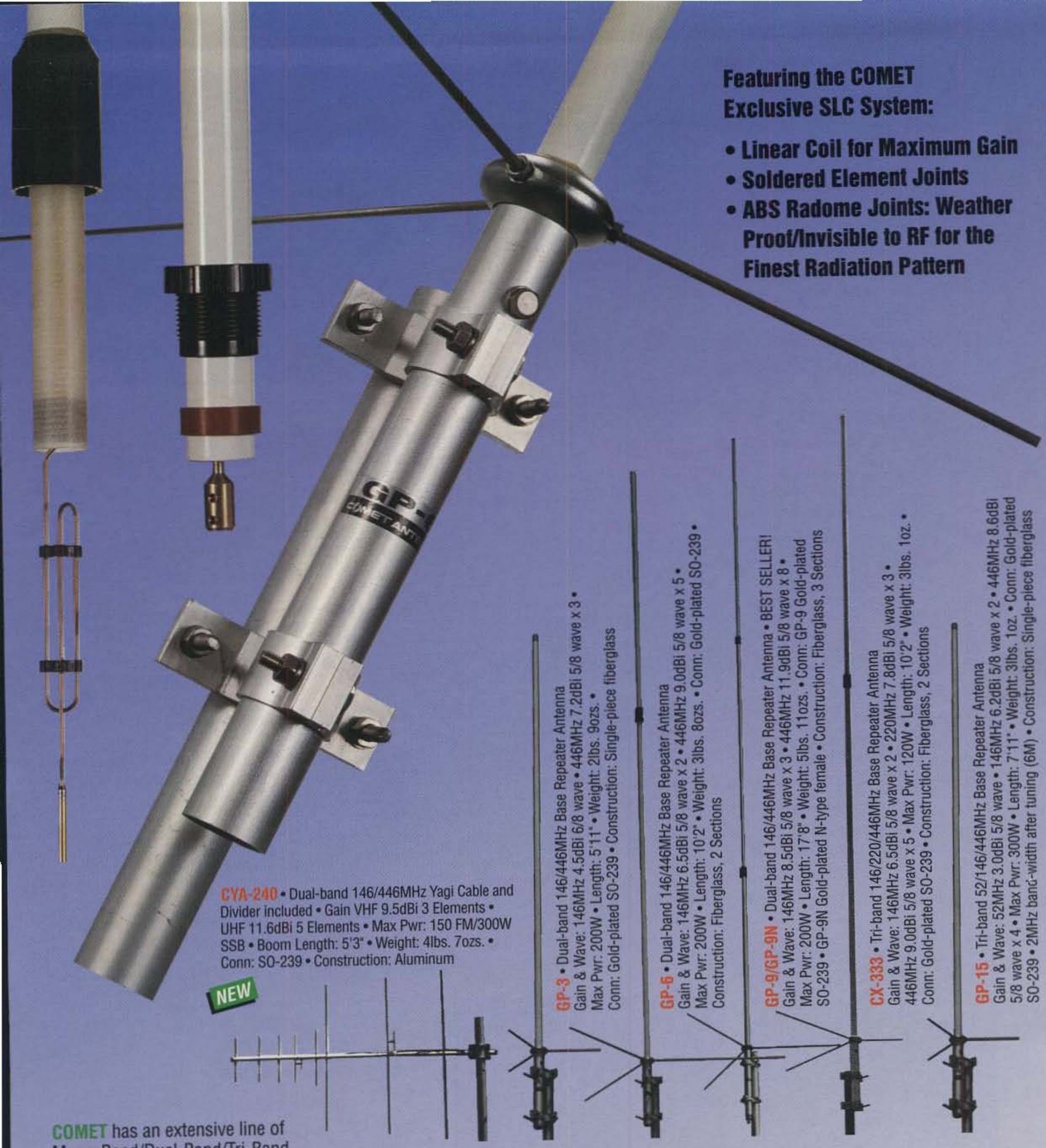

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Max Pwr: 200W • Length: 10'2" • Weight: 3lbs. 8ozs. • Conn: Gold-plated SO-239 •
Construction: Fiberglass, 3 Sections

GP-9/GP-9N • Dual-band 146/446MHz Base Repeater Antenna • BEST SELLER!
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SO-239 • GP-9N Gold-plated N-type female • Construction: Fiberglass, 3 Sections

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446MHz 9.0dBi 5/8 wave x 5 • Max Pwr: 120W • Length: 10'2" • Weight: 3lbs. 1oz. •
Conn: Gold-plated SO-239 • Construction: Fiberglass, 2 Sections

GP-15 • Tri-band 52/146/446MHz Base Repeater Antenna
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SO-239 • 2MHz band-width after tuning (6M) • Construction: Single-piece fiberglass

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For a complete catalog of **COMET** Antenna products call or visit your local dealer. Or, contact **NCG Company** at 800/962-2611. Use **COMET** products, and enjoy amateur radio to it's fullest!

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CQ Amateur Radio

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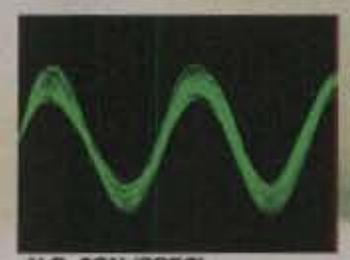
ON THE COVER: 600 feet above sea level in Derry, New Hampshire is the site of the rather dramatically situated QTH of K1CA. The location presents a clear shot to Europe. Twelve towers supporting a wide variety of antennas for 40 through 2 meters, as well as a phased vertical array for 80 and a 160 meter Inverted Vee at 160 ft., make contesting interesting for the guest operators who periodically converge on Derry to test their skills on a world-class station. Although we credit this photo shoot to Larry Mulvehill, for this particular shot the finger on the shutter atop the 165 ft. tower belonged to Paul Terwilliger, K1TI, who is also the principal architect of the station and antenna system. For some unknown reason, Larry was a bit reluctant to carry the camera to the top and "pull the trigger" himself! (Photo by Larry Mulvehill, WB2ZPI)

A Breath of DSP Fresh Air

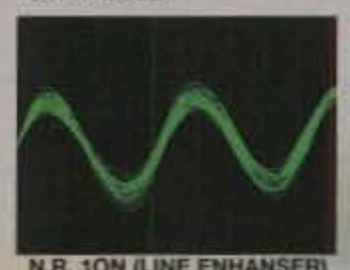
Kenwood was the first to offer DSP in the legendary TS-950SDX. Now you can enjoy the affordable benefits of Advanced Digital Signal Processing with the all new TS-570D/S(G)

Let the fresh air and sun shine in on your new HF experience.

N.R. OFF SINAD=6dB



N.R. 2ON (SPEC)
SINAD=25dB



N.R. 1ON (LINE ENHANSER)
SINAD=18dB

Advanced Technology Upgrade

TS-570D(G) HF TRANSCEIVER/TS-570S(G) HF + 6M TRANSCEIVER

Kenwood has not been standing still since the introduction of the TS-570D/S HF Transceiver last year. Now you can command even more of Kenwood's advanced DSP technology with the G model.

The **DSP** filters and extracts signals with digital technology that is unmatchable with standard analog circuits. It provides **CD-class transmit and receive audio quality** that can be shaped to your needs, and two powerful noise reduction systems: **Line Enhancer Method** for SSB/AM modes, and **Speech Processing by Auto Correlation** (SPAC) for CW mode. DSP also enables the **CW-Auto Tune** feature that automatically zero-beats CW signals.

The **Extensive Memory Functions** provide a bank of 100 memory positions split into 90 standard channels for general operation and 10 for programmable VFO, programmable scan and long-term memory. Memory contents can be scrolled, copied or locked out. In addition there are **5 quick memories** for storing frequencies and modes on the fly, perfect for the busy DX contester.

The powerful **Menu System** incorporates **46 menu features** and an **on-line guide** for instant reference. The **large amber backlit LCD display** provides 4 light levels for clear readability under any lighting conditions.

The TS-570D/S has no shortcomings in the construction and performance area. The **continuous-duty 100 watt transmitter** incorporates a large heavy-duty heat sink with integrated cooling fan for non-stop operation even under extreme environmental conditions. The **wide-band receiver** is rock-stable from 500 kHz through 30 MHz with **dual pre-amps** and **dual bandpass filters** for exceptional selectivity and sensitivity.

With the features and performance of a high-end radio integrated into an affordable mobile-size package, the TS-570D/S is the perfect choice for the field or to build a full station around at home.

***FREE** operating manual via FTP site*
ftp://ftp.kenwood.net

- Beat cancel
- 2 position antenna switch
- CW auto tune adjust (a world's first)
- Channel scan, program band scan, memory scan with channel lock-out and group channel scan, all with TO (time operated) or CO (carrier operated) resume modes
- Compact 10-5/8 inch by 3-3/4 inch front panel size for any travel or installation requirement
- Preset auto antenna tuner with 18 sub-bands
- Variable electronic keyer (0 and 100 wpm)
- Packet and FSK features
- RCP-2 software for PC-based display and memory configurations available via the Internet
- Full functionality on 6M (TS-570S) including DSP, 100 watts output and preset Auto Antenna Tuner
- QRP output adjustable from 5 to 100 watts

TS-570D/S (G) new features

■ TX sound quality monitor with 9-step monitor volume for absolute control over voice quality ■ NR1 (SSB) is operator controllable in 9-step increments, or automatically tracks input signal strength ■ New CW DSP Filters (80 Hz, 150 Hz and 500 Hz) give you a total of 11 user-selectable filters ■ NR1 and NR2 settings can now re-configure automatically when changing mode groups (SSB/AM/FM to CW/FSK) ■ Manual weight feature (with built-in electronic keyer) for adjusting the relative length of dots and dashes in 16 steps between 1:2.5 and 1:4.0 ■ Equalize receive signals, and use different settings for both TX and RX ■ "One-touch" DSP filter wide mode allows 'resurfacing' to check the band conditions when operating in narrow mode ■ Dual selectable Beat Cancel (BC) works against intermittent beat interference (except in CW mode) ■ CW auto tune mode links only with the RIT frequency without changing the transmit frequency.

Advance Technology Upgrade is available in new production models and for pre-existing TS-570D/S; contact you dealer for details.

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2M 440mHz

- 150 Mem. Channels
- 1.5W standard
- 5W option
- Alpha-numeric display
- Compact & back lit keypad

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FT-847

Ultimate Base Station, HF, VHF, UHF

- 100w HF/6M, 50w 2M/430 mHz
- DSP • Full Duplex Cross-band
- 1200/9600 Baud Packet Ready

NEW!

Call for Low Price!

FT-3000M

- 2M 70W Mobile • Wide Band RX
- AM Aircraft RX • Dual Watch
- 9600 Baud Compatible • Alpha Numeric Display

Call For Low Pricing!

FT-1000MP HF Transceiver

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- Enhanced Digital Signal Processing
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- Collins SSB filter built-in
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Call Now For Low Pricing!

VX-1R

2M/440 Sub-Mini HT

- 290 Memory Channels
- .5W output
- Receives 76-999mHz plus AM BCB (Cell Band Blocked)
- Lithium Ion Battery

NEW!

Call Now For Your Low Price!

FT-920 HF+6M Transceiver

- 100w 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

NEW!

Call For Low Pricing!

FT-100 HF/6M/2M/70CM Transceiver

- Compact Transceiver w/detachable front panel
- Rx 100kHz to 970mHz (cell blocked)
- Tx 100W 160-6M, 50w 2M, 20W 70CM
- Built-in DSP, Vox, CW keyer
- 300 Memories

Call Now For Low Pricing!

FT-50RD

2M/440mHz Compact HT

- DVR, Decode, Paging Built-in
- Alpha numeric display
- Wide Band receive
- Battery Saver
- 112 Memories
- Mil-Spec
- HiSpeed scanning

NEW!

Call For Your Low Pricing!

FT-8100R 2M/440 Mobile

NEW!

- Ultra Compact • 50w/35w 2m/440
- 110 memories • Wide Band RX
- Backlit mic • Remotable front panel w/opt. YSK-8100

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http://www.hamradio.com

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Rapid Deliveries From The Store Nearest To You!

Are you prepared for the year 2000 solar maximum? Here is a solar activity and space weather primer that will prove useful and reliable for all of us well into the new millenium.

Getting Primed For the Solar Maximum

BY CARY OLER*

Over the next two years, the number of annual significant major solar flares is expected to increase by a factor of about 8 (from 5 per year to about 40 per year), and the number of minor solar flares capable of producing moderate to strong short-wave fadeouts is expected to increase by a factor of more than 13 (from approximately 40 per year to about 530 per year). With so much activity anticipated, now is a good time to begin reviewing the effects this activity can have on radio propagation.

Solar Flares

The immediate effects of solar flares come from the x-rays that are emitted. X-rays are capable of penetrating to the D-region of the ionosphere.[1] There they ionize the D-region, which increases the electron density, and this in turn increases the absorption of HF radio signals due to the high electron collision frequency that exists in the D-region.[2] The absorption of radio waves on HF frequencies during solar flares is known as Short-Wave Fadeouts (or SWFs). They can affect frequencies well below 5 or 10 MHz for weaker events or frequencies higher than 20 MHz for significant solar-flare events. SWFs are only observed during the day, since it is impossible for x-rays from the Sun to reach the D-region at night. The magnitude or importance of an SWF is related to the intensity of the ionizing x-ray radiation. More intense x-ray radiation produces stronger SWFs.

Solar x-rays are rated according to the intensity (or power) of x-ray radiation that is observed over a period of time. Since solar x-rays tend to vary exponentially, a logarithmic scale is used to quantify them into five primary *classes* that are identified by the letters A, B, C, M, and X as shown in Table I.

To better define the precise x-ray level that a particular solar x-ray event achieves, a multiplicative factor is appended to the x-ray class. This factor varies from 1.00 to 9.99. For example, a class C5.43 x-ray event means that solar x-rays reached a level of 5.43×10^{-6} Wm^{-2}. The x-ray monitors on the GOES spacecraft are sensitive to two wavelengths: 1 to 8 Angstroms and 0.5 to 4.0 Angstroms. It is the 1 to 8 Angstrom band that is used to rate the x-ray magnitude of solar flares.

*Solar Terrestrial Dispatch, P.O. Box 357, Stirling, Alberta, T0K 2E0 Canada
e-mail: <Oler@Solar.Uleth.Ca>*

X-Ray Flux Classification in watts per square meter (Wm^{-2})

A		$\Phi <$	10^{-7}	Common during the solar minimum.
B	10^{-7}	$\leq \Phi <$	10^{-6}	Associated with small flares and hotter regions.
C	10^{-6}	$\leq \Phi <$	10^{-5}	Small flares and hot regions.
M	10^{-5}	$\leq \Phi <$	10^{-4}	Larger and potentially influential solar flares.
X	10^{-4}	$\leq \Phi$		Very large and influential solar flares.

Table I– Since solar x-rays tend to vary exponentially, a logarithmic scale is used to quantify them into five primary classes as shown above.

In general, all M-class or greater x-ray solar flares are capable of producing SWFs. The duration of the SWF is heavily dependent upon the length of time x-rays stay above M-class levels. Fig. 1 is a plot showing the x-rays from the Sun during a small M-class solar flare. The top-most traces represent the 1 to 8 Angstrom band and are the ones used to quantify x-ray flares. The bottom traces are for the 0.5 to 4.0 Angstrom band. The arrowed section of fig. 1 identifies the area that roughly defines the duration of the associated SWF. In this example, x-rays remained at or above M-class levels for about 15 minutes, which is long enough to produce a mild SWF of about 15 to 30 minutes in duration. Since x-rays peaked at the M1.0 level, only minor radio absorption would have been noticed on most daylit radio circuits. Frequencies below about 10 MHz would have been the most heavily impacted.

Fig. 2 shows a much larger solar flare that erupted on 23 April 1998. This event reached a class X1.26 x-ray level and was associated with a severe short-wave fadeout on daylit HF circuits. The SWF associated with this flare was much longer than the preceding example shown in fig. 1, as the arrowed section illustrates. This SWF lasted for almost 4 full hours

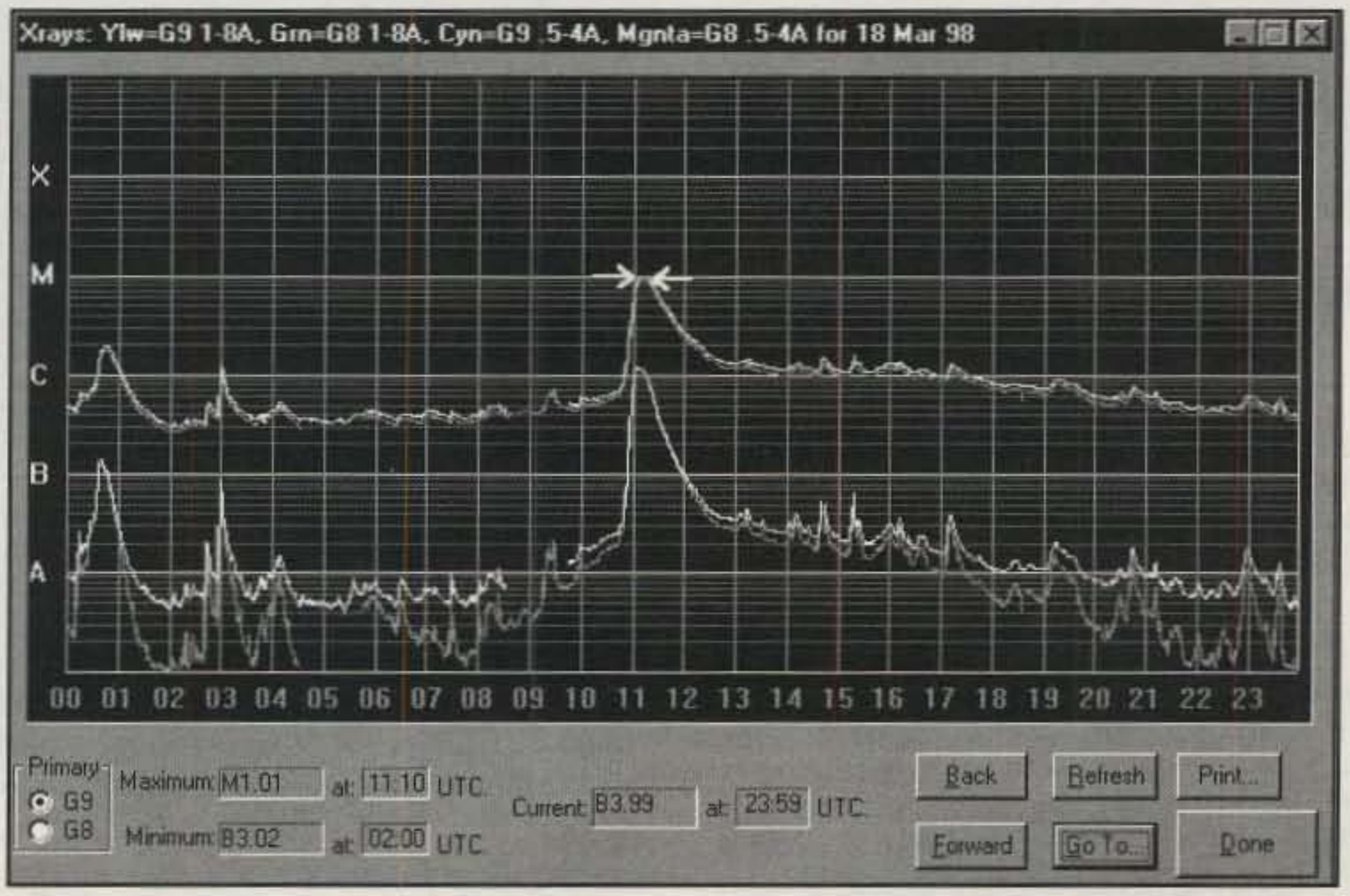


Fig. 1– A minor M-class x-ray flare on 18 March 1998 that produced a weak short-wave fadeout on sunlit radio paths. (Produced by the SWARM software.)

2m Mobile **FT-2500M**

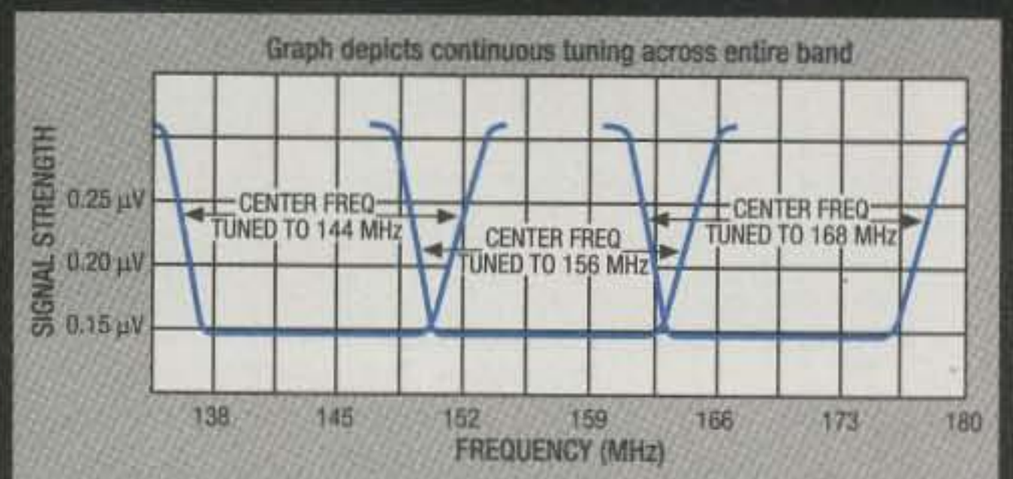
Advanced Track Tuning, Mil Spec, true FM. All in one radio!

Outside, you can easily see why the FT-2500M stands up to the shock and vibration like no other. We engineered the first mobile radio to meet the rigid standards set by the U.S. Military back in the '80s, and that same critical design is in the FT-2500M. From the simplified front panel, rubber coated knobs, durable pebbled finish coating, and huge Omni-Glow™ display to the one-piece die-cast chassis, the FT-2500M can take whatever you throw at it!

Inside, the electrical circuitry meets standards so uncompromising the FT-2500M can respond like no other radio. Built-in 3-Stage Advance Track Tuning (ATT), automatically retunes from 140 to 174 MHz permitting consistent receiver sensitivity across the entire band.

But there's more. Like alpha-numeric display capability! Lets you program a frequency or a 4-character name on any of the 31 memories. With three selectable power output levels and up to 50 watt power output, the FT-2500M extra large heat sink means forced air cooling is not necessary. And, as a bonus, Yaesu's exclusive backlit DTMF mic comes with every FT-2500M.

Experts say the FT-2500M is the only commercial-grade amateur radio available. So, for tough manufacturing standards, inside and out, with true FM clarity, and outstanding performance, the FT-2500M is your mobile.



3-Stage Advance Track Tuning (ATT) – The exclusive 3-Stage Advance Track tuning front end automatically adjusts band width sensitivity across the entire receiver range, while maintaining selectivity specifications. ATT significantly reduces interference from inter-modulation and front end overload.

Specifications

- **Frequency Coverage:**
  FT-2500M
  RX: 140-174 MHz
  TX: 144-148 MHz
- Rugged Military Spec Design
- Advanced Track Tuning (ATT)
- Selectable Alpha-Numeric Display
- Omni-Glow™ Display, largest available
- Power Output:
  FT-2500M 50/20/5 Watts
- Flip Up Front Control Panel hides seldom used buttons
- Backlit DTMF Mic
- 31 Memory Channels
- CTCSS Encode Built-in
- Automatic Power Off (APO)*
- Time-Out Timer (TOT)*
- Manual* or Automatic Backlighting Adjustment
- **Accessories:**

FP-1023	23 Amp HD Power Supply
FRC-6	DTMF Paging Unit
FTS-17A	CTCSS Decode Unit
SP-4	External Mobile Speaker w/ Audio Filters

*FT-2500M

YAESU

Performance without compromise.℠

"Just look inside. Military spec really means something to Yaesu!"

"A QST review says 'the FT-2500M exhibited superior 10 MHz offset IMD dynamic range of 103 db!'"

"This Advanced Track Tuning practically eliminates intermod!"

"Yaesu did it again."

US MILITARY APPROVED MIL-SPEC 810

LIMITED TIME! SUPER NEW LOWER PRICES! FT-2500M FT-3000M

FT-3000M

High-Powered 2-m FM Transceiver
Feature-rich, 70 full watts of TX power, and built to the tough performance standards you've come to expect from Yaesu.
FEATURES • Frequency Coverage Wide Band Receive-- RX:110-180 MHz, 300-520 MHz, 800-999 MHz* TX:144-148 MHz • AM Aircraft Receive • MIL-STD 810 Rating • Interactive Programming • High Power Output: 70 Watts, plus 50, 25 and 10 Watts • Quick-Touch™ Dual Concentric Control Knob • Twin Cooling Fans • ADMS-2 Windows™ Programmable • Digital Coded Squelch (DCS) • 81 Memory Channels • Auto Range Transpond System™ (ARTS™) • 1200/9600 Baud Packet Compatible • Smart-Search™ • Alphanumeric Display • Dual Watch • Full line of accessories
*800 MHz Cellular blocked

Ultra Compact Dual Band Handheld **FT-50RD**

One tough little dual bander!

Features

- Frequency Coverage
  Wide Band Receive
  RX: 76-200 MHz, 300-540 MHz, 590-999 MHz*
  TX: 144-148 MHz, 430-450 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Digital Coded Squelch (DCS)
- 112 Memory Channels
- 12V DC Direct Input
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  Transmit Battery Saver (TBS)
- Time Out Timer (TOT)
- 2.5 and 5 Watt Versions Available
- Built-in Digital Voice Recording System (DVRS)
- Full line of accessories

NOW WITH BUILT-IN DELUXE KEYPAD

LIMITED TIME! SUPER NEW LOWER PRICES! FT-50RD FT-10/40R

US MILITARY APPROVED MIL-SPEC 810

"You notice how loud this HT's audio is?"

"Yeah, it's Mil Spec tough like a commercial HT."

"Easy to operate, small, great price!"

"Yaesu did it again!"

The foremost in top-performing, durable, dual band handhelds now includes the FTT-12 DTMF keypad with CTCSS enc/dec, DCS enc/dec, DVRS and paging/coded squelch. Manufactured to rigid commercial grade standards, the FT-50RD is the only amateur dual band HT to achieve a MIL-STD 810 rating. Already a winner; the deluxe keypad makes this stand-out HT even better! Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50RD withstands shock and vibration, so throw it in with your gear!

Exclusive features set the FT-50RD apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to that frequency. Digital Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50RD is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50RD, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion where ever you go, the FT-50RD is one tough little dual bander with all the features you want!

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For the latest Yaesu news; hottest products, visit us on the Internet! http://www.yaesu.com

FT-10/40R
Ultra Compact Handhelds
VHF or UHF. Similar to FT-50RD including MIL-STD 810, and other exclusive features.

K_p	0o	0+	1–	1o	1+	2–	2o	2+	3–	3o	3+	4–	4o	4+
a_p	000	002	003	004	005	006	007	009	012	015	018	022	027	032
K_p	5–	5o	5+	6–	6o	6+	7–	7o	7+	8–	8o	8+	9–	9o
a_p	039	048	056	067	080	094	111	132	154	179	207	236	300	400

Table V– This table is used for converting between the expanded (28-scale) K_p values and their associated a_p values.

magnetic storm. Values between 50 and 99 represent a major geomagnetic storm, while any daily A-index value greater than or equal to 100 is considered a severe geomagnetic storm.

In addition, using the eight a_k values, it is possible to determine the maximum magnitude of geomagnetic activity during one of the a_k intervals by multiplying the a_k value by a station-specific factor. This conversion factor can be found by dividing the lower limit for a K-index of 9 by 250. For example, at Boulder, Colorado, the lower limit for a K-index of 9 is a maximum magnetic field deviation of 500 nT, which means the station-specific multiplication factor for Boulder would be 2.0 (500/250). Therefore, since a K-index of 5 at Boulder is associated with an a_k-index of 48, which has an equivalent amplitude of $48 \times 2 = 96$ nT, the maximum deviation of the magnetic field at Boulder during a K-index of 5 would be near 96 nT.

A_p-index

The A_p-index is derived from the K_p-indices in the same way that the daily A-index is derived from the individual K-indices for a particular station. Each of the K_p-indices are converted into equivalent a_p values using a lookup table. The eight a_p values are then averaged together to produce the A_p value. The A_p is the planetary (global) A-index.

Table V is used for converting between the expanded (28-scale) K_p values and their associated a_p values.

The Space Environment Center, together with the U.S. Air Force, obtains realtime geomagnetic K-index data from approximately 25 or more magnetic observatories worldwide. Most of these stations are then used to formulate *estimated* planetary geomagnetic A- and K-indices. These values are *not* final values, but are preliminary values based on a small subset of available data. The final values are not determined until a month or two later when all of the observations made by magnetic observatories worldwide send their final results into the main data center for processing. Final values are published in scientific journals such as the *Journal of Geophysical Research*.

The difference between the K_p-index and the A_p-index is that the former is based on a logarithmic-type scale, while the latter is scaled almost linearly.

AE- and Q-indices

The AE-, or Auroral Electrojet, index[13] measures the electrical currents that flow within the ionosphere inside the auroral ovals. The auroral electrojet is responsible for producing the largest magnetic field deviations in the higher latitudes. The AE-index therefore is most closely associated with auroral activity and has been used as an indicator of the intensity of auroral activity. This index is derived using magnetic data from stations located inside the auroral zone. Only the H (horizontal) component of the Earth's magnetic field is used in measuring the AE-index. Daily magnetograms of the maximum and minimum deviations of the H component are superposed, which permits the upper and lower envelopes of the deviations to be determined. The upper envelope (AU) is then subtracted from the lower envelope (AL) to obtain the AE index as follows: AE = AU – AL (in nT).

The index AO is defined as the average of the AU- and AL-indices and is computed using the simple expression: AO = (AU + AL) / 2.

Since geomagnetic and auroral activity change very rapidly in the auroral zone, a higher time cadence of observations is required in order to fully measure the dynamics of geomagnetic activity in these regions. As a result, the AE-index is measured in time-intervals of about 2.5 minutes, not hours as are the A- and K-indices.

The Q-index used to be a popular measure of the auroral electrojet, but it is an older method and has some deficiencies, such as the fact that it is scaled in time intervals of 15 minutes, not the higher resolution of 2.5 minutes associated with the AE-index. The AE-index largely has superseded the Q-index.

aa-index

The *aa*-index was developed in the 1970s by Mayaud[14] in an attempt to extend the time coverage of geomagnetic activity to years prior to 1932. This index is derived using only two *antipodal middle latitude* geomagnetic stations. In the 1970s, Mayaud personally scaled 100 years (1868 to 1967) of magnetic records from Greenwich, England and Melbourne, Australia and their successor stations to obtain 3-hourly K-indices which he then transformed into amplitude (a_k) values in nT. The mean of these a_k values for these two stations was then defined as the aa-index.

Daily, monthly, and annual means of the *aa*-index tabulated by Mayaud for the years from 1868 to 1967 represent the longest span of collected homogeneous magnetic data currently available. For the years from 1932 onward where the K_p-index has been tabulated using data from a global network of stations, it has been found that the *aa*-index is compatible and may therefore be used with equal confidence.

When geomagnetic information is required for periods of time prior to 1932, the *aa*-index is a good and reliable source and should be treated in a similar manner to the daily A-indices.

Dst-index

The Dst-index was originally developed by Sugiura[15] in 1964 during the International Geophysical Year to describe variations in a ring of electrical current that encircles the equatorial region of the Earth, known as the Ring Current. It is derived from the variations in the H component of the Earth's magnetic field at magnetic observatories that are selected for equal longitude spacing and low latitude. The Dst therefore describes geomagnetic activity that is due to the ring current alone. The derivation of the Dst-index has changed over the years so that the older data may not be directly comparable to the newer data.

The Dst-index is very capable of detecting the main phases of geomagnetic disturbances. In fact, the overall intensity of a geomagnetic disturbance is often determined by referencing the Dst-index. Normally, the Dst-index hovers around the zero nT mark during quiet conditions. During a geomagnetic storm, the Dst-index becomes negative and the extent to which it swings negative is a measure of the intensity of the geomagnetic storm. Fig. 8 illustrates this behavior for the March 1989 severe geomagnetic storm. The main phase of the severe geomagnetic storm is visible in the deep trough of the Dst plot on 13 and 14 March 1989. One of the best sources of Dst-indices is the World Data Center at Kyoto, Japan. A test Dst service on the Internet from Kyoto can be found at: <http://swdcdb.kugi.kyoto-u.ac.jp:80/dstdir/ dst1/quick.html>.

C-, Ci-, Cp-, and C9-indices

The C-index was established in 1906 and represented a qualitative method of estimating the magnitude of geomagnetic activity. An observer would simply rate the level of geomagnetic activity during a day as either 0 (quiet), 1 (moderately disturbed), or 2 (greatly disturbed).[16] The daily C values from each of the reporting magnetic observatories would then be averaged together to the nearest tenth to yield the "international daily character figure," known as the Ci-index. The Ci-index therefore varies from 0.0 to 2.0.

The main problem with this index is its qualitativeness, which varies from one observer to the next according to the experience of each observer. The Cp-index resolves the problem associated with the C- and Ci-indices by computing the planetary C-index (Cp) based upon the K_p-indices for a given day. Since the K_p-indices are based on actual measurements of magnetic field fluctuations, the Cp-index is a quantitative measurement. It is defined using the same semi-logarithmic type of scale that is used for the K_p-index, except the limits of the Cp-index vary from 0.0 to 2.5 in steps of one tenth as opposed to ranging from 0 to 9.

The C9-index takes the Cp data and converts it from a value that varies between 0.0 and 2.5 to a value that varies between 0 and 9.

Conclusions

There are numerous sources of information on the Internet that can help amateurs learn more, but perhaps the most significant is the online Internet Space Weather and Radio Propagation Forecasting Course, which teaches in substantial detail the secrets of analyzing and predicting space weather and radio propagation conditions. Details can be found on the Internet at: <http://solar.uleth.ca/solar/www/course.html>. For do-it-yourselfers, begin exploring the Internet. Free e-mail subscriptions to alerts, warnings, and daily summaries of activity can be found at several sites, including the e-mail site: <majordomo@sec.noaa.gov> and web site: <http://solar.uleth.ca/solar/www/sublists.html>.

With solar activity beginning to rapidly in-

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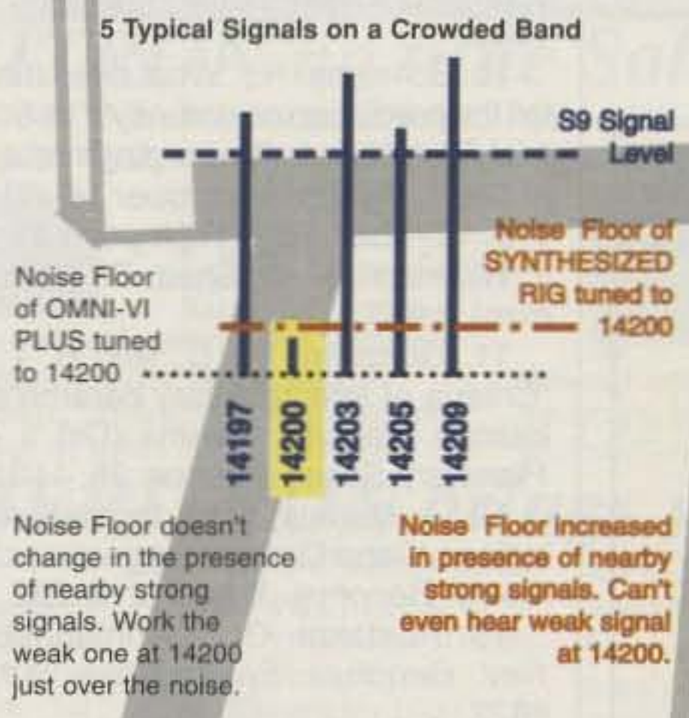

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CQ REVIEWS

The SGC SG-231 Smartuner

BY PAUL CARR*, N4PC

With ever increasing population and the increased restrictions within subdivisions and apartment complexes, it is becoming more difficult to obtain a good antenna installation. If you add to this scenario the fact that you might want to work several bands in the HF to lower VHF spectrum, then the problem is multiplied several times.

The SGC corporation may have just the answer to your dilemma. The SG-231 Smartuner is a microprocessor-controlled automatic antenna coupler that can provide millions of settings for requirements from 1 MHz to 60 MHz. Once the proper matching conditions are determined, the settings are stored in non-volatile memory for almost instant recall.

Meet the Smartuner

The SGC-231 is a fully automatic antenna coupler for 3 to 100 watts with a range of 1 to 60 MHz. It uses a microprocessor-controlled pi or L network to match almost any load to your rig with a resulting SWR of 1.4:1 or better. Tuning results are stored in a non-volatile memory to produce almost instantaneous recall. It requires a 12 volt DC power source at about 900 ma.

The unit is an antenna coupler that is mounted at the antenna as opposed to the transceiver location. There are some exceptions to this rule, but more about that later. As long as a suitable antenna length is maintained (7 feet for 3.5–60 MHz, or 23 feet for 1–60 MHz) in conjunction with an efficient ground or counterpoise, the Smartuner will provide very efficient transfer of RF energy to the antenna. Remember, when energy is generated by a transmitter, it will be radiated by the antenna or dissipated as heat. By installing the Smartuner at the antenna, the coaxial feed line will see a minimum mismatched condition, and losses in the feeder will be diminished greatly. This ensures every possible watt of power is radiated to the world.

The SGC-231 Smartuner, a microprocessor-controlled automatic antenna coupler.

In the World of Restrictive Antenna Covenants

In the world of amateur radio, we find ourselves facing progressively more antenna restrictions. Well, we could succumb to the pressures and take up bridge, or we could look for alternative ways to satisfy our longings for communications. With the increase in propagation conditions, I suggest the latter. Within the instruction manual there are several stealth-type antennas suggested—for example, a heavy- gauge wire taped to the inside of a PVC pipe, with the pipe is made into a flag pole. (Who could refuse a home owner the right to install a flag pole on his/her property? That would be totally unpatriotic!) The only thing remaining to turn this into an antenna is to bury several radials and mount the antenna coupler at the base of the flag pole. When you connect the coax and the control cable, you are in business.

Another opportunity for a stealth antenna is to run a heavy-gauge wire adjacent to a masonry chimney. Again, mount the Smartuner at the base of the chimney, bury the radials and control cable, and tune in the world.

If your house has a non-metallic roof, don't forget the possibly of suspending a wire underneath the eaves. When this wire is extended to the ground, you have an inverted "L." Small TV-type stand-off insulators can supply the physical support needed for the wire. Mount the Smartuner, add the radials, bury the feed line and control cable, and call CQ. In each case, if the Smartuner is adjacent to a metallic water line, be sure to connect the radials and Smartuner to this facility. Remember, the better the ground system, the more efficient your antenna system. Do not connect the ground system to a gas line!

What About Mobile Installations?

There are several types of mobile installations that may be of interest to you. The most common, of course, is the use of one of the modern transceivers in the family car. There are two things that warrant careful consideration: the length of the antenna and the vehicle ground. For operation from 3.5 MHz through 60 MHz, the minimum length of the antenna must be 7 feet. To extend

*97 West Point Road, Jacksonville, AL 36265

the coverage down to 1 MHz, the antenna length must be extended to 23 feet. In both cases, an efficient ground must be implemented.

Also under the category of mobile installations, we must consider the world of sailboats and recreational vehicles. There are several examples in the instruction manual covering these applications. Insulated back stays become a natural choice for an antenna on a sailboat. Two examples are given for implementation for the boating public. The first is for a non-grounded keel; the backstay and metallic mast form the antenna system. The second example shows an insulated backstay for the antenna, and a metallic keel as the ground system. If you have spent a lot of time on the air, chances are you have worked someone on a sailboat. I am always surprised at the signal strength of these stations. It is very difficult to find a better ground reference than salt water!

I could continue with examples of different installations, but on to the actual test results.

Installation and Test Results

I made my initial tests with one of my QRP transceivers and my 40 meter Double Extended Zepp (total length of 178 feet fed with a random length of balanced line). Implementation was very simple. It only required connecting a 12 volt source to the SGC-231, connecting the output of the antenna into the tuner, and connecting the antenna and ground to the output of the Smartuner. When the unit was supplied a source of RF energy, it tuned the system automatically. The Smartuner tuned the system almost immediately (less than 3 seconds initially) to an acceptable SWR. I checked the Smartuner on all amateur bands from 160 through 6 meters. The Smartuner performed flawlessly throughout the spectrum. On 17 meters, I was pleased to make many contacts with several stations in the northwest. That was not bad for 5 watts on single sideband!

For my next test, I moved from my ham shack to my patio to simulate emergency conditions. Again, I operated QRP, but this time the antenna was a 23 foot length of wire connected to the output of the Smartuner. I ran a 100 foot length of wire along the ground and connected it to a screwdriver pushed into the ground. The Smartuner again worked extremely well, even under these simulated emergency conditions. I did not work as many stations under these conditions, but I did not expect the same results. The test did prove that the Smartuner will perform well, even under marginal conditions.

The Instruction Manual

Sometimes you buy a piece of equipment, and after reviewing the instruction manual you are left with many unanswered questions. I am happy to report that this is not the case here. The manual is very clearly written. There are many well detailed sketches showing possible antenna installations. This is one of the better manuals that I have seen recently.

Overall Impression

I was very pleased with the test results that I obtained. I feel that this technology can provide the amateur radio operator with covenant restrictions a way out of his or her dilemma. With the hints provided in the manual and the potential user's imagination, there is a solution for every antenna problem.

The SGC-231 Smartuner is available from SGC, The SGC Building, 13737 S.E. 26th Street, P. O. Box 3526, Bellevue, WA 98009 (1-800-259-7331).The SGC-231 has a retail selling price of $595. ■

What's in a word? As K4EJQ points out, using the word "aerial" instead of "antenna" can bring some additional benefits to the bottom line.

"The Aerial Here Is . . ."

A Remotely Tuned 160 Meter Inverted-L Antenna

BY J. G. "BUNKY" BOTTS*, K4EJQ

While the solar cycle was nearing its minimum, nighttime operation was pretty much limited to the bands below 40 meters. Another band to operate at night really looked attractive to this dyed-in-the-wool ragchewer. In fact, it looked so attractive that I only hesitated briefly when the man at the local electrical supply house told me the price of a large spool of No. 10 stranded, insulated wire. Copper wire isn't cheap anymore!

A friend of mine, Gary, W4CBX, came by the house one day, and seeing the large spool of wire, he asked what I was up to. I told him about my plans to erect a half-wave dipole for 160 meters.

"What you need to do is put up an inverted-L like I'm using," he said. "In fact, if you put up an inverted-L, I'll supply the remotely controlled tuning unit so you can optimize the antenna's SWR across the entire band and not be limited to only a small portion of the band."

"You're on!" I said, knowing a good deal when I hear one. Gary has a reputation of building some very nifty stuff over at his "Beaver Creek Labs" workshop.

Two nights later Gary dropped by with the completed tuning unit built in a steel, waterproof, 9 mm ammunition box. The box contained a reversible DC motor and gear reduction drive which tuned a 400 pF variable capacitor that would be in series with the inverted-L antenna. The capacitor had about 0.020 inch plate spacing which would handle 500 watts output. The tuner was connected to the transmitter through RG-8 (RG-213) 50 ohm coaxial cable. Gary's parting words were to get the vertical portion of the L as high as pos-

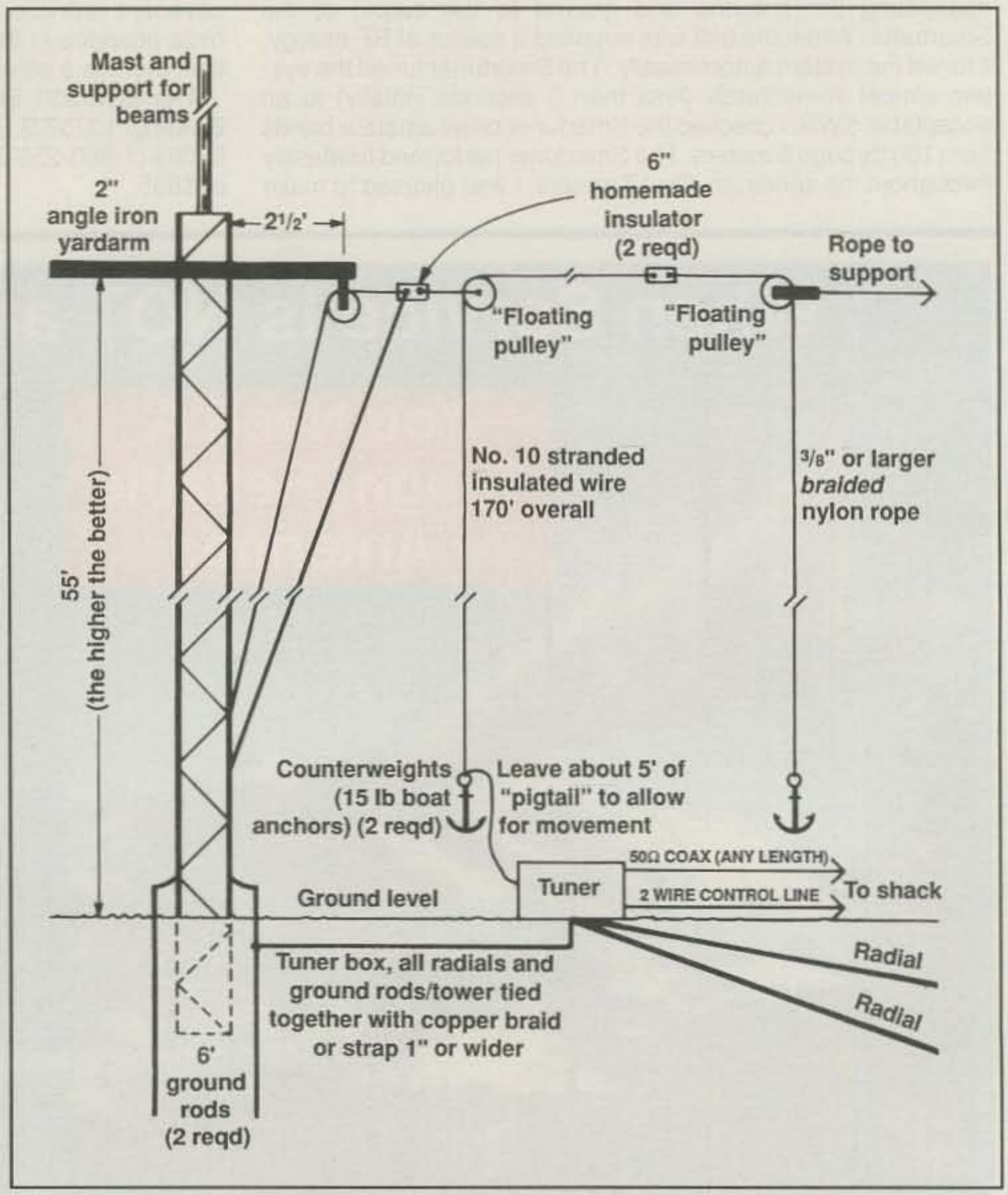
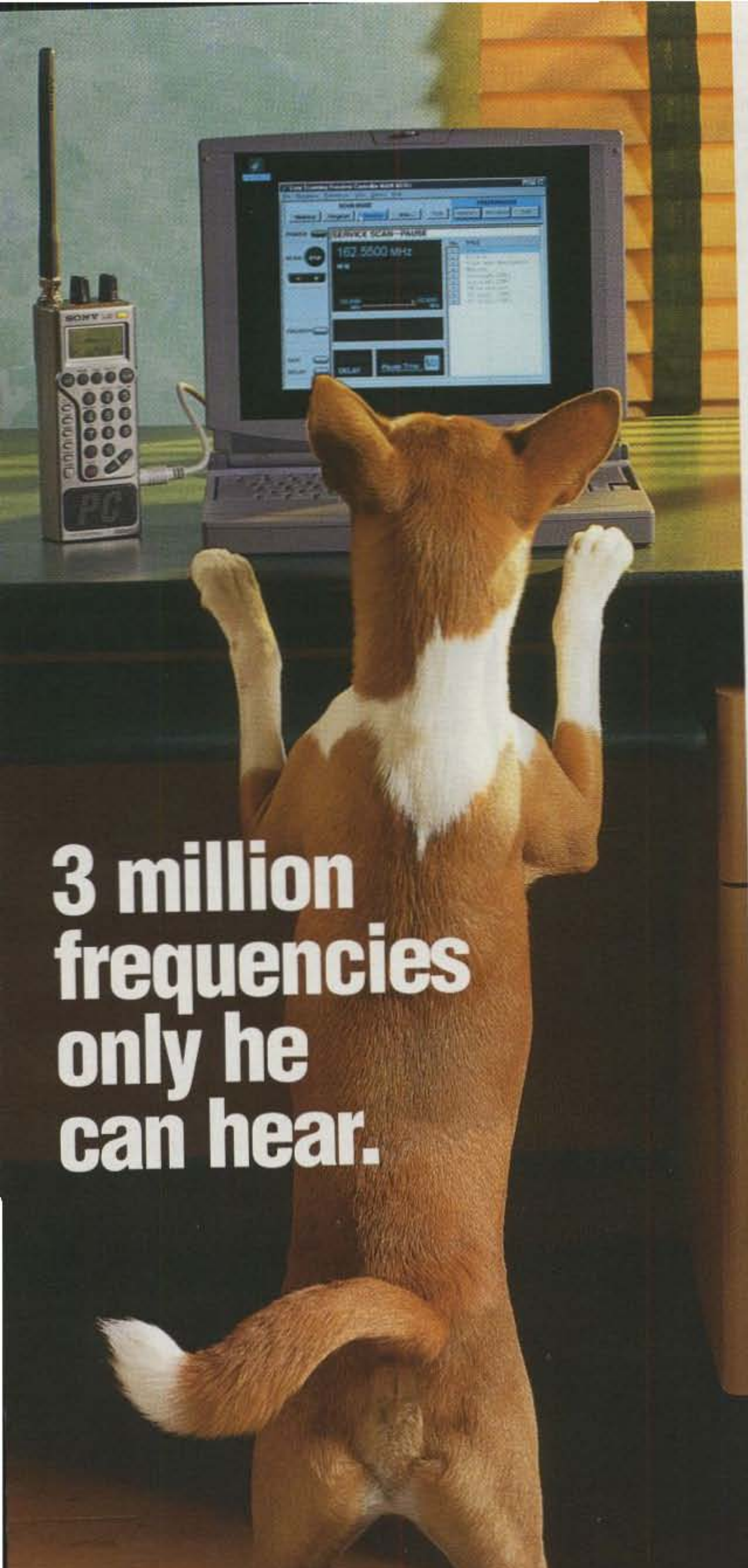


Fig. 1– Overall view of the inverted-L showing installation techniques. With a slight modification, it will also work quite well on 30 meters.

*220 Hillsboro Rd., Blountville, TN 37617



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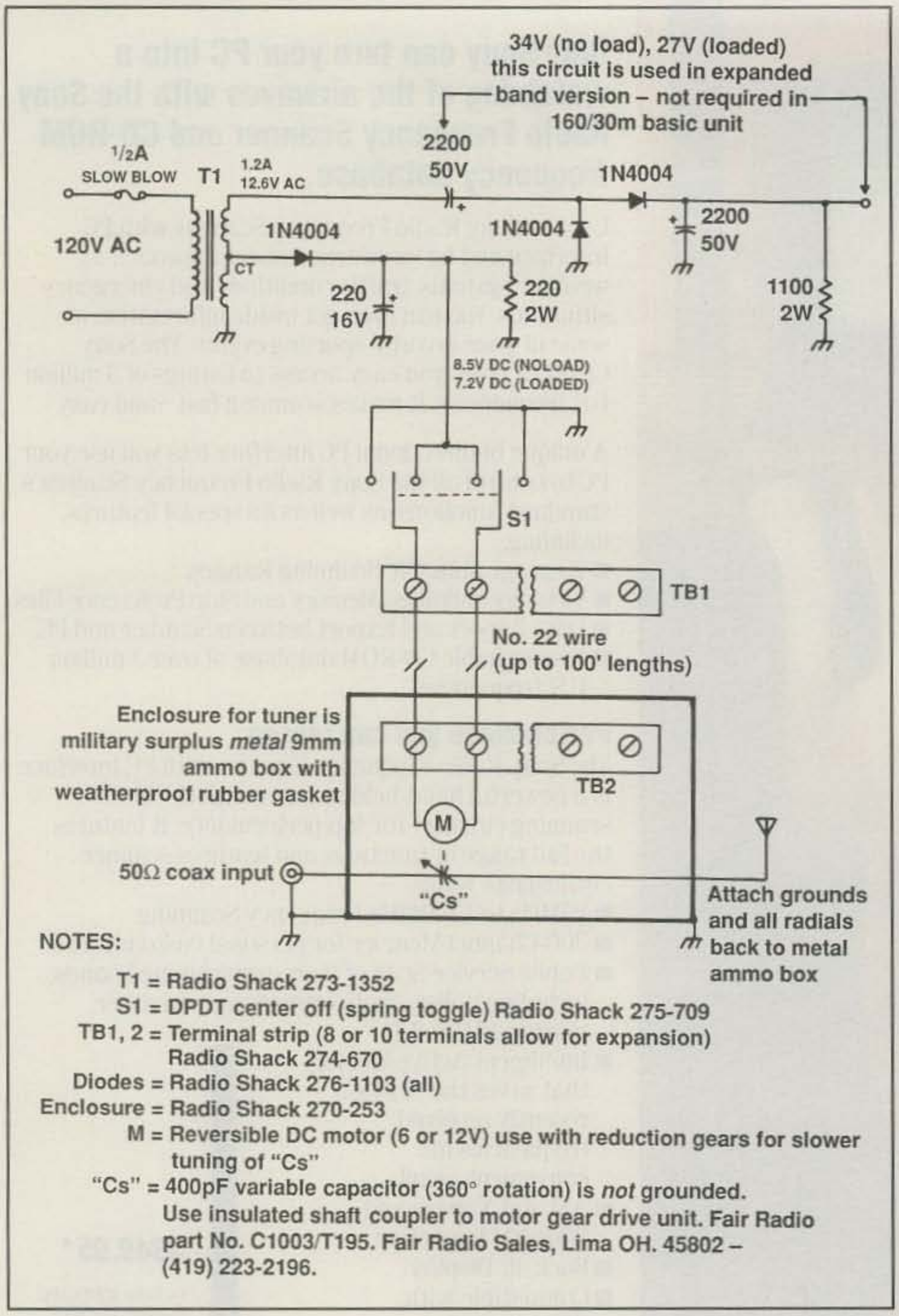

Fig. 2– Schematic diagram of the remote tuning assembly and power supply.

sible." Now it was time for me to either "put up (a wire) or shut up!"

Erecting the "Aerial"

I used a fishing rod and reel to cast 15 lb. test monofilament line up into the highest branches of the tree—perhaps 55 feet above the ground. With this I pulled up a 3/8 inch diameter braided nylon rope with a pulley attached in a "closed loop" scheme. I could pull the pulley up into the highest part of the tree or back down again if something were to go wrong during the raising process. Once in place, I could raise or lower the entire antenna using the pulleys. Counterweights were to be used in conjunction with the pulleys to maintain wire tension without having to resort to leaving lots of slack in the antenna to offset the tree swaying in the wind. This same pulley, rope (or antenna wire), and counterweight system was used on the other end of the antenna, too (see fig. 1).

On the tower end of the antenna I installed a 6 foot piece of 2 inch angle iron across one face of the tower spaced to provide two yardarms, each about 2 1/4 feet long, at the 55 foot level just below the top. (In retrospect, a somewhat longer piece of angle iron could be used to provide greater offset from the side of the tower, as there is some interaction between the vertical part of the antenna wire and the tower. The use of a tree or other nonmetallic support would eliminate this problem.) The second yardarm could be used later as an additional antenna support or part of this system's expansion.

The wire and pulley arrangement was attached to the yardarm with a large eyebolt and another pulley to allow raising and lowering the "floating pulley" at this end of the antenna. The radiator was a single piece of No. 10 stranded and insulated wire 165 feet long with a homemade 6 inch fiberglass rod insulator attached to the tree end. The other end of the insulator was attached to the rope through the pulley in the tree and back down to the counterweight on the ground.The other end of the 165 foot radiator was run through the "floating" pulley at the tower end and brought back to the base of the tower and attached to its counterweight. I left a "pigtail" about 5 feet or so to run from the counterweight over to the tuner. This allows the counterweight to move up and down freely when the tree sways in the wind. A second homemade 6 inch fiberglass insulator was used to further insulate the "floating pulley" and radiator from the metal yardarm. The counterweights used in this arrangement were pre-owned No. 15 boat anchors salvaged from one of TVA's area lakes.

The Control Unit

The control unit was built in a 4 inch wide by 6 inch deep by 2 inch high metal "project box." The enclosure, as well as the electronic components used in it, were purchased from a well-stocked local RadioShack store. The diagram for the "basic" control unit appears in fig. 2. This is the controller of the series tuning capacitor "Cs" that allows you to adjust for minimum SWR. As the system was expanded, all additional parts were able to fit within the same enclosure and use the existing power supply. The controller was connected to the remote tuning unit via a 12-wire cable, which allows for expansion of the system later. If only "basic" control is required, this may be accomplished with a single pair o wires, No. 22 or larger if lengths will exceed 100 feet or more.

About Radials

The inverted-L, like a 1/4-wavelength vertical, requires a radial and ground system for efficient operation. This is especially true at 160 meters, where the rule-of-thumb is "the more the better." My original antenna had only three 165 foot radials plus a pair of 6 foot ground rods to provide some measure of grounding for the 55 foot self-supporting tower and top-mounted VHF communications antennas. As I expanded this system, I added radials for

the other bands used. I was able to tie the radials into other antennas' ground systems as well as to the *metal* cold-water pipe where it entered the house. I used whatever wire I had on hand to construct the radials. Some were buried a few inches, while others were laid out above ground in the woods that border my backyard. I prefer insulated wire, as it has a longer life span when exposed to the elements above or below ground. It's nice to go back years later and find shiny copper under that insulation, especially if you are trying to add to the radial system with a minimum of fuss.

Initial Adjustments

After getting the inverted-L up, the radials installed, the tuner and controller built and tested, and coax and control cable run out to the tuner's location, I was ready for the "smoke test." I connected the radials and grounding rod *together and to the tuner box*. Initially, I set the series capacitor to half-meshed. I inserted my SWR bridge between the output of the transmitter (transceiver) and the coax feedline.

Testing "on the air" on 160 meters is best done during the day when there is little or no activity. Using reduced power, I tuned up somewhere near mid-band. Observing the SWR bridge in the reflected mode, I tuned the series capacitor using the control unit for minimum indicated SWR. When you are doing this, you should be able to obtain an SWR of 2:1 or less across at least 100 kHz of the 160 meter band. If not, you may have to add to or prune the length of the radiator to resonate it in the desired portion of the band. If you are running out of tuning range with the capacitor fully meshed, you need to lengthen the radiator; with the capacitor fully unmeshed, you need to shorten the radiator. With a little experimentation you should be able to find a length that will allow tuning of the desired portion (if not all) of the band within the tuning range of the series capacitor.

You may also discover that during periods of heavy rains the resonant frequency of the antenna will change somewhat (probably lower). I suspect this is due, for the most part, to the fact that we are trying to operate with less than the most efficient ground and/or radial system on a band that requires a good system for efficient operation.

Performance

In a period of five months using 100 watts on CW, I worked 48 states and several countries. From what I could tell, I was "holding my own" with stations using somewhat more sophisticated antennas and power. The real joy was finding not one, but *two* new bands on which to "chew the fat."

This antenna with about a 5 foot increase in radiator length to 170 feet works *both* 30 meters and 160 meters nicely. No changes to the tuning unit were required, although later I did add some radials for 30 meters. It outperformed my 40 foot high inverted-V for 30 meters by a noticeable margin. During the first full year of operation on 30 meters with this antenna, *during the sunspot cycle minimum*, I worked more than 150 countries, all continents, and all states using 100 watts. As an extra bonus, the system works quite nicely on the 17 meter band, although I have not had much opportunity to use it there.

For those readers who have remained with me to this point, I have a valuable tidbit. Use it for your own benefit and certainly share it with your fellow amateurs. Many years ago a wizened old timer told me that "any type of radiator, if referred to as an 'aerial' rather than an 'antenna,' will perform 3 dB better." Try it; you'll see! ■

It is said that real radio not only glows in the dark, it hums, sputters, and bears the faint scent of cosmoline and jungle preservative. These amateurs enjoy preserving and sharing history.

The Military Radio Collectors Group

BY HANK BROWN*, W6DJX

There was a range of mint Command sets available at the Saturday swap meet.

Some really neat stuff awaited the discriminating collector.

It's hard to say how many vertical interest groups there are within amateur radio, but it's probably safe to say a few hundred. One of those groups is a loose confederation of amateurs whose shared passion is the collecting and using of military radio equipment. This past May, this group, known as MRCG (Military Radio Collectors Group), met for their third annual two-day funfest of swap meet, lecturers, displays, and barbecue.

The event started on Friday afternoon, naturally enough at the NCO Club at Camp San Luis Obispo, where field operations and overnight camping arrangements had been made. A number of AN/GRC-9 and PRC-47's were used to provide communications with the group. Saturday morning the swap meet started, drawing a large number of buyers and sellers. Everything from manuals, to parts, to complete systems was available, some still in their original packaging.

Andy Miller, KD6TKX, put together an excellent program of speakers and demonstrations that included the ART-13, WS #19, Military Moral radios, and an interesting report on the work going on to restore the *USS Pampanito,* which is a WW II submarine now in San Francisco. The submarine has most of the original communications equipment on-board and operational.

Dave Ragsdale, KF6BOM, provided a terrific barbecue of steak and chicken, which was followed by discussion of equipment restoration. There was a phenomenal display of equipment, most of which was operational during the two days from fixed and mobile locations. The static displays featured gear from many countries and even included a WW I spark transmitter.

The MRCG is basically a group without dues, charter, elected officers, or any other type of formal organization. All of the

A complete WS-19 operating on 12 VDC ready to go.

*4141 West L-2, Lancaster, CA 93536

Shown in the upper left is a pair of TBX-5 transceivers with a TBY to the right. In front of them is a Japanese 30–40 MHz field set.

expenses incurred for the two-day event are paid for by the attendees simply by passing the hat. Hank Brown, W6DJX, will be in charge of organizing the fourth annual event, to be held on May 1, 1999. If you would like to attend or take part in the event, you can contact Hank at the address shown at the beginning of this article, or you can call him at 805-943-2027. If you want to see what you missed this year, Bob Heusser, W6TUY, video taped the event. He has a VHS tape which runs 2 to 3 hours and is available for $10.00 postpaid. Finally, the group has their own web site, which will also give you more information: <http://www.milradio.net>. ■

Most of us only clean up or dress up our shack under duress. There's something about sprawl and cable that attracts just about all of us. However, when the edict comes down, we can and do clean up our act and simplify. N4PC shows us a prime example of how it's done.

Good Things Can Come In Small Packages

BY PAUL CARR*, N4PC

Please allow me to reminisce for a moment. In 1964, my XYL and I were living in government quarters in Heidelberg, Germany. I had no complaints about the housing that we were provided, but the challenge was how to assemble my amateur station in a manner that would be functional and aesthetically pleasing to the family. The equipment that I had at the time consisted of a transceiver, the associated power supply and speaker, an SWR bridge, and an antenna rotor control. I wanted to place all the equipment in the living room of our apartment so I could share my evenings with my XYL. Although the space was adequate, we ruled out placing a writing table in the corner of the living room. The question remained: how to assemble the equipment in a functional manner and avoid clutter.

One day while studying the situation, I noticed an end table that was part of our furniture. It was the proper height to sit adjacent to my easy chair. The transceiver and power supply/speaker would fit nicely on top of the table, and the rotor control and SWR bridge could occupy the shelf underneath. There was also enough room for my log book and key on the shelf. The table and chair were placed close to an electrical outlet and near a window. The rotor control cable and coax could be hidden by a curtain so that the visual impact was minimized. Two holes were drilled in the window casing to route the cables outside, and they were also hidden by the curtain. This arrangement met with family approval and provided many enjoyable contacts from Germany.

Nary a cable in sight. A cabinet designed for home entertainment equipment was pressed into service for amateur radio. After all, home entertainment can mean a lot of different things.

Present Requirements

After the arrangement that I had in Germany, I have always had at least receive capabilities adjacent to my chair in the family room. I find that it is a convenient way to keep up with what is going on the bands. Presently, my main operating position is in my basement. Initially, I only had receive facilities in the family room, but after I purchased a small transceiver designed for mobile operation, it found its way onto a bookshelf near my chair. I then

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decided that it would be nice to have transmit capabilities; this increased the power supply and antenna requirements. As you can see, things were no longer as neat as my family and I would have liked. Here was my challenge—to clean up the mess!

One day when walking through the electronics section of a department store, I noticed an equipment cabinet that was designed for a combination TV and VCR. The television was to be placed on top of the cabinet, and the video cassette recorder could be placed directly underneath. There was also a storage compartment for recorded cassettes or other equipment beneath the shelf. The best part was that this compartment was behind closed doors. It looked like the cabinet was very sturdy, and the wheels of my brain began to turn. I took a piece of paper from my pocket and noted the dimensions of the unit. It looked as if I had found what I needed. I headed home to draw a preliminary diagram to determine if my equipment would fit in this cabinet.

The first thing that I needed to do was to decide what equipment I was going to use at this location. When this list was completed, the physical size of the equipment was determined, and these measurements were compared with my notes. I determined that I could get the equipment into the cabinet, so back to the department store I went, checkbook in hand.

I returned to my workshop with a package marked "assembly required." When I inspected the components, I could see at a glance the equipment would require more ventilation and I would also need some holes in the shelf and four 2 1/2 inch holes in the bottom. In both cases the holes were near the back of the cabinet. I also wanted additional rigidity for the unit, so I replaced the fiber board that was supplied for the back with 1/4 inch plywood. I also cut ventilation holes in this plywood.

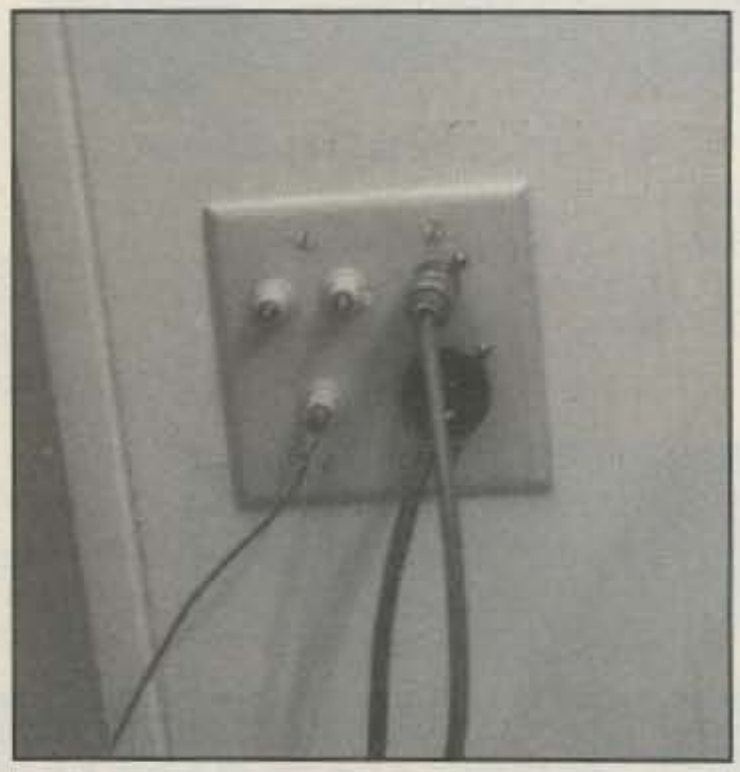
I chose the area that was designed for the VCR to place the equipment that needed ready access: the transceiver, rotor control, an SWR bridge/watt meter, remote antenna switch, and a speaker. I made a new shelf to divide this area into two compartments. The shelf did not extend all the way to the back of the compartment to provide for ventilation and a passage to route cables through. By placing the first two pieces of equipment on the new shelf, I found the height was correct and there was no stress on my arm while tuning. The less frequently used controls could be operated very easily also.

I placed the transmatch and power supply on the bottom shelf of the closed compartment. I noticed that the height of both units was the same, and again the wheels of my brain began to turn. After careful measurement, I decided that I could also house a small linear atop the power supply and transmatch. I cut a piece of plywood to serve as a shelf and installed this on top of the transmatch and power supply. This made a convenient support for the small linear. I use the linear infrequently, but when the going gets rough, it does come in handy.

With the cabinet doors open, it's easy to see how much gear can comfortably fit inside, and neatly, too.

What About Those Messy Wires?

Cables—coax, rotor control cables, ground wires, etc.—always present a challenge. I am fortunate inasmuch as I have a basement under most of my house,



Topping off the installation are the quick connections to the important stuff hidden downstairs. Simple electrical supply hardware makes a very neat appearance.

with the exception of the family room, and I have access there through a cellar. Since I had my antennas and control cables terminated in my primary operating location in the basement, it was only necessary to extend these facilities through the basement and cellar to the family room.

I mounted a double-size electrical box in the wall of the den and terminated the coax and rotor control cable in this box. The coax was terminated with an SO-239 socket, and the rotor control cable was terminated with an octal tube socket. The ground wire was terminated on a ceramic feed-through connector. Two additional feed-through connectors were provided for future requirements—if they ever develop. All these were mounted on a blank electrical cover that I obtained at local hardware store.

I must admit that the remote antenna switch did not exist initially. It was added later to eliminate the necessity of going to the basement to change antennas. The type that I chose was a four-position unit. This switch uses the coax to supply the DC voltages as well as the RF. This was the most beneficial modification that I made to the original installation.

Final Configuration

I moved the modified equipment cabinet into the family room adjacent to my favorite chair. I did not put the back on the unit until it was in place and the cables were connected and properly dressed. I then made a "dry run" to see that everything was working properly and all of the equipment was in its optimum configuration. Needless to say, I spent a couple of hours "test driving" my new creation. The unit met both my family's approval and my operating requirement. It is really nice to be able to lean back in my recliner and have the world at my fingertips.

Afterthoughts

I offer this article as a concept only. You may find some of the ideas presented here to be beneficial if you should try a similar approach. Your final configuration will depend on your equipment and your operating requirements. Don't be afraid to try a different approach. You may find just what you have been looking for.

I have always heard that a confession is good for the soul, so I have a confession to make. Remember those two holes that I drilled through the window casement? That could have proven to be a problem when I was attempting to clear my government quarters. Well, I solved the problem very easily. Since the casement was painted white, I filled the holes with white toothpaste. The toothpaste dried hard and the holes went unnoticed. I feel better now. Until next time . . .

CQ SHOWCASE

TechAmerica℠ On-Line Catalog

TechAmerica℠ serves technology companies, research facilities, and engineering schools, specializing in value-priced electronic parts and components, test and measurement products, electronic kits, technical books, wire, cable, connectors, and adapters. Their new on-line catalog allows customers to view and order from more than 18,000 different electronic parts, components, and publications at <www.techam.com>.

TechAmerica℠ has also released its new 1998-99 catalog, available by calling 1-800-442-7221 or by visiting the website. Catalogs are available at no cost for commercial customers. For more information, contact TechAmerica℠ at 300 West Third Street, Suite 300, Fort Worth, TX 76102-2905, or circle number 102 on the reader service card.

Kachina 505RC Remote-Control System

Kachina's 505RC Remote-Control System allows every function of Kachina's 505DSP Computer-Controlled Transceiver (except QSK) to be accessed over normal dial-up telephone lines, permitting

apartment dwellers or those with local regulations restricting antennas to install a transceiver in a suitable antenna location. The control site can be anywhere with access to a telephone line. The system may also be use to allow several users to share a single transceiver, such as a club station. The remote-control unit interleaves control data with digitized audio which is passed through the telephone network using standard V.34, Hayes-compatible, external modems. The system supports the remote control of up to two serial accessories, such as an antenna rotor control and an HF data modem.

The 505RC will function over connections with carrier rates down to 14.4 kbps. The audio bandwidth is proportional to the

connection speed. One one computer is required, at the control site, and no modification of existing 505DSPs is required. The 505RCs are priced at $298 each. A complete package, including two RCUs and two external V.34 modems, plus cables (all the equipment necessary to remotely control one radio) is available for $895. (Special pricing is available to clubs who may be interested in obtaining a 505DSP transceiver and several 505RCs for use as member control sites. Contact National Sales Manager Aubrey Stewart, W6ODG, 520-634-7828.)

For more information, contact Kachina Communications, Inc., P.O. Box 1949, Cottonwood, AZ 86326 (phone 520-634-7828; e-mail <sales@kachina-az.com>), or circle number 101 on the reader service card.

C&S Electronics Model NRS1500 Noise Reduction System

The NRS1500 Noise Reduction System from C&S Electronics assumes a signal below a predetermined amplitude is noise. It also senses and attenuates noise by measuring the frequency content of the audio signal and then filters noise that occurs above the highest signal frequency. Combining both of these techniques can achieve 25 dB noise reduction by using "single-ended" operation, which eliminates the need for the encode decode process. The user-switchable Volume Compression is useful for fast automatic leveling. Instead of attempting to attenuate all large-amplitude signals, the selectable volume leveling circuit attenuates the audio signal when the overall signal amplitude has increased for a considerable amount of time (less than one second).

The NRS1500 is 8" × 10" × 4" and is priced at $189. For more information, contact C&S Electronics, P.O. Box 2142, Norwalk, CT 06852-2142 (telephone 203-866-3208; fax 203-854-5036; e-mail <candselect@worldnet.att.net>), or circle number 106 on the reader service card.

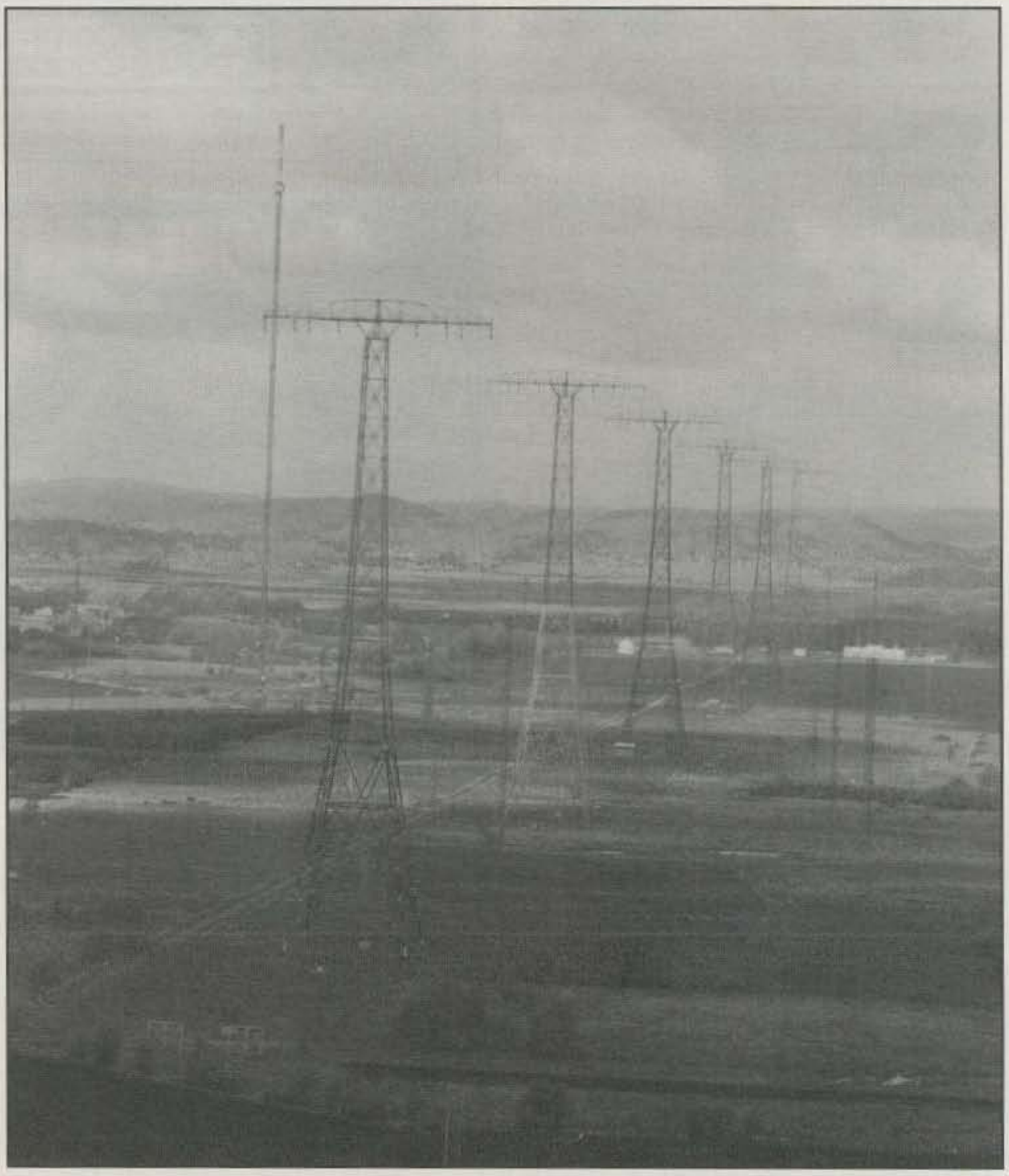
BY KARL T. THURBER, JR., W8FX

THE DIGITAL DIPOLE

FROM SOFTWARE THROUGH ANTENNAS FOR THE SHACK

November Nocturne '98

This time, as we move toward the winter months, we start out with notes on some antennas of interest, and move our way through the bookshelf and some letters we've received. Let's dig right in.



Talk about big! The radio towers associated with the still functioning Grimeton, Sweden Alexanderson Alternator still are usable. The VLF antenna system has six 127 meter high towers, which are spaced 380 meters. On the top of each tower is a 50 meter long T-arm to carry the 12 wires feeding the six vertical antennas. (For more information, see text near the end of this month's column; photo courtesy Telia AB, Sweden.)

Antenna Notes

KB6KQ Loop Antennas. Have you ever considered using a loop antenna on the "VHF Plus" bands, the bands 50 MHz and above? Loop antennas long have been popular on VHF and UHF ranges, especially for local, mobile, and weak-signal work. Norm Pedersen, KB6KQ, offers several single-band loop antennas covering 6 and 2 meters, as well as the 222 and 432 MHz bands. All of these antennas are priced at $50 postpaid, with the exception of the 432 MHz loop, which is $95 pp.

Recently, with DX and other activity picking up on 10 meters, Norm introduced a new 10 meter version at $114 pp. A stacking harness to accommodate two antennas is $40 pp, and custom masting also is available. The loops feature all-aluminum construction, small size, and horizontal polarization. The omnidirectional antennas come pretuned, and they're adaptable to either mobile or base station operation.

A one-page flyer is available from Norm, and it lists a number of references to the antennas you can check out in *CQ*, *QST*, and *Nuts & Volts* magazines. For more information, contact Norm Pedersen at KB6KQ Antennas, 70 Arrowhead Drive, Carson City, NV 89706 (telephone 702-885-7885; e-mail: <KB6KQNORM @aol.com>).

New Goodies from Array Solutions. In recent columns, we noted that the developer of the popular WXØB StackMatch, Jay Terleski, had formed his own company, Array Solutions, to market the products which he formerly sold through another firm. As you probably know from reading the column, Jay offers the WXØB StackMatch, used to stack, match, and power-split to two or three HF beam antennas, either monoband or multiband, mounted on a single tower. A StackMatch for Verticals also is available, as are a Mini-StackMatch (using the same wideband transformer, but without relay switching) and a line of high-power (5 kW), 4:1 and 1:1 baluns especially for HF triband beam replacement use.

In recent correspondence, Jay advised that he also has extended the capability of the StackMatch product line with the new high-bandwidth 6 meter StackMatch. It makes use of microstrip technology, careful relay selection, and a new broadband transformer design. It effectively gives the VHF DXer and contester the flexibility to choose all combinations of two or three stacked 6 meter beams. Jay reports that the SWR range for a 1:1 match into two or three dummy loads typically is from 1.8 to 135 MHz, with a power rating of 2 kW CW. All other specifications and installation instructions are the same as for the regular WXØB StackMatch.

Also, Jay notes his introduction of the SixPak, a six-antenna, two-radio config-

289 Poplar Drive, Millbrook, AL 36054-1674

urable antenna-to-radio switch. The SixPak basically is a six-antenna relay matrix that you can configure to connect to one or two radios to provide a very high degree of RF isolation between radios and antennas. You also can configure it as a "6 × 1" matrix for use as a remote antenna switch. The SixPak uses microstrip design and 12 custom, high-power RF open frame relays. Jay notes that each relay is "four relay contacts away from the other radio."

You can control the SixPak by a single manual dual rotary switchbox, or you can wire two of the devices in parallel. The SixPak can be mounted inside the hamshack to accept six antenna feedlines, or it can be mounted on the tower in an included water-resistant box. The SixPak also can be ordered with only six relays and one feedline, to make an efficient and reliable six-way remote antenna switch.

For more information and pricing, contact Array Solutions, 350 Gloria Road, Sunnyvale, TX 75182 (972- 203-8810; e-mail: <wx0b@arraysolutions.com>; web: <http://www.arraysolutions.com>).

New from Larsen Electronics. Larsen Electronics is well known as a premium quality antenna supplier for business, industry, and amateur applications. One of the firm's newest wideband antennas suitable for amateur use is the NMO WB 406C, which is designed for UHF use over the range 406–512 MHz. It offers a claimed average 3.5 dB gain and a rather remarkable 60 MHz bandwidth at 2:1 VSWR. The antenna is available in a standard Larsen 3/4 inch NMO-type mount.

Manufactured of premium materials, including resin polymer plastic shells that are UV and chemical resistant, the WB 406C is designed for outstanding performance and comes with Larsen's famed three-year "No Nonsense Warranty™," under which it offers to repair or replace, without charge, any Larsen antenna that fails within that period. The warranty is in line with the 33-year-old company's commitment to what it calls "golden rule service" spelled out by founder Jim Larsen (K7GE, W7DZL).

Also available is Larsen's new, 34-page Amateur Antennas Catalog, which includes the full range of amateur mobile, portable, and base-station antennas; coax and connectors; and accessories. A number of specialized antennas are listed and described, covering the range 27–1300 MHz. Technical details are provided which profile the company's whips, bases and shells, and coaxial cable sets. A short technical guide and a description of the various antenna series designations are included.

The free catalog is available from Larsen Electronics, Inc., 3611 N.E. 112th Avenue, Vancouver, WA 98682 (phone 1-800-426-1656; e-mail: <larsen@larsenet.com>; web: <http://www.larsenet.com>).

Top Ten Devices Update. Whatever your favorite amateur radio pastime, whether it be casual DXing or serious contesting, eliminating the need to manually select the right antenna can increase your on-the-air convenience and enjoyment of the hobby, while protecting your radio transceiver and linear amplifier from damage from being connected to the wrong antenna.

As you probably are well aware, transmitting into the wrong band using a trapped antenna may destroy the traps and damage your in-shack equipment as well, in what has been dubbed by Top Ten Devices, Inc. (TTD) proprietors Dave Hawes, N3RD, and George Cutsogeorge, W2VJN, as the "wrong band syndrome." As we reported in the October 1996 column, their firm, TTD, has addressed these needs and issues with their Band Decoders and Relay Boxes to offer automatic control of your antenna selection.

In that we reported in some detail the products offered and their theory of operation, we won't rehash that profile. But we will mention that the TTD products are designed with the computer-controlled contesting station and its "serious contester and DXer" operator (using ICOM, Yaesu, and Kenwood gear) in mind. The firm presently offers A/B Station Selector Relays ($72 each), Automatic Band Decod-

ers ($115 each), Six Way Relay Boxes ($115 each), and Tower Mounted Six Way Relay Boxes ($145 each).

The TTD product literature also notes recent development of a competitive product to go head-to-head with the Ameritron RCS-4 remote antenna relay, which uses the coax line for control. The twist is that it's fully compatible with the Band Decoder to make automation easy. It is directly compatible with the RCS-4, making an upgrade for automating of an existing RCS-4 installation easy, as Top Ten Devices will sell the control unit and relay both as a package and separately. (In case you're not familiar with the Ameritron RCS-4, we described it in the January 1991 column, and it previously was comprehensively reviewed by Bill Clarke, WA4BLC, in the July 1990 *73 Amateur Radio* magazine.)

TTD also offers various band reject coaxial stubs and other products. Too, they're an affiliate of International Radio (INRAD), which supplies high-performance quartz crystal filters (they're on the Web at <http://www.QTH.com/inrad>).

For more details and specifications, contact Top Ten Devices, Inc., 143 Camp Council Road, Phoenixville, PA 19460 (phone 610-935-2684; e-mail: <n3rd@ix.netcom.com>; web: <http://www.QTH.com/topten>). Their web page has complete specs, photographs, application notes, and more.

From the Bookshelf

Antenna Books from Radio Amateur Callbook. We've mentioned on several occasions that noted antenna expert and prolific *CQ* contributor Bill Orr, W6SAI, has for years enjoyed a well-deserved reputation as an HF antenna guru. He's the author of hundreds of antenna articles and columns, as well as several books. Bill was our predecessor as *CQ*'s "Antennas" column editor until February 1980, when he moved to *Ham Radio* magazine to continue his column there. Although recently he has cut back on his writing commitments, Bill for some time has been back on and off in *CQ* with his entertaining "Radio Fundamentals" column.

Bill's several antenna "how-to" books have seen some change in publishers over the years. We're happy to see that now eight of his highly respected, classic handbooks are offered by the Radio Amateur Callbook organization. The Orr books include *VHF Amateur Radio; The Beam Antenna Handbook; Cubical Quad Antennas, 3rd Ed.; Simple, Low-Cost Wire Antennas for Radio Amateurs; The Radio Amateur Antenna Handbook; Interference Handbook; Vertical Antennas;* and *The Truth About CB Antennas.* Each book is $13.95, plus $5 s/h per shipment.

For a flyer describing the complete range of books, contact Radio Amateur Callbook, 1695 Oak Street, P.O. Box 2013, Lakewood, NJ 08701 (telephone 732-905-2961; e-mail: <103424.2142@compuserve.com>).

Sonoran Publishing Books. A number of interesting titles, most of which have historical radio and collectible overtones, are published by Sonoran Publishing, LLC. These interesting and very informative books include *70 Years of Radio Tubes and Valves, 2nd Ed.*, by John W. Stokes; *Crystal Clear* (all about crystal sets and crystal detectors), by Maurice L. Sievers; *Radio Manufacturers of the 1920's*, by Alan Douglas; *The Radio Collector's Directory and Price Guide, 1921–1965, 2nd Ed.*, by Robert E. Grinder; *Radio-Craft: 50 Years of Radio*, by Hugo Gernsback; and *Tubedata*, by Ake Holm.

A colorful flyer showing the firm's numerous publications is available from Sonoran Publishing, LLC, 116 N. Roosevelt, Suite 121, Chandler, AZ 85226 (phone 602-961-5176; web: <http://members.aol.com/snrnpub>).

Note: Sonoran Publishing sells only through their dealers, which include Antique Electronic Supply, Antique Radio Classified, Universal Radio, Inc., and several others.

Update on *Six Meters: A Guide to the Magic Band.* In June we profiled Ken Neubeck, WB2AMU's *Six Meters: A Guide to the Magic Band*. As we noted then, Ken's book is an excellent guide to 6 meters, a borderline band which often is known as "The Magic Band" because of the wide variety of both HF- and VHF-style propagation that's seen there. Indeed, it's the only band with a reasonable occurrence of practically all propagation modes sometime during the 11-year sunspot cycle. The book's 11 chapters include information on various types of propagation, antennas, mobile and mountaintopping operation, television interference (TVI), esoteric operating modes, and the band's likely future.

We also mentioned that as a 1994 book, it wasn't really new. Well, in writing up the column, we overlooked the fact that the book was revised in March 1998, so it is, indeed, up to date and as such profiles the band's new popularity as radio conditions improve significantly with the current sunspot cycle's rise.

Ken recently contacted us to note that in the 1998 revision, he made an effort to add as much relevant and current information as possible in keeping pace with the continued growth of the band, adding about 16 more pages in the process. Included is a new chapter that discusses 6 meter operation on the international scene, including a section about 6 meters in Europe. Also, there are expanded mobiling and equipment chapters that include a good deal of updated information.

The large-format (8½" × 11"), 96-page

book is $12 plus $2 s/h from Worldradio Books, 2120 28th St., P.O. Box 189490, Sacramento, CA 9581; (phone 916-457-3655; e-mail: <kb6hp@ns.net>; web: <http://www.wr6wr.com>). Ken's book has its own page; you'll find it at <http://www.wr6wr.com/Books/SixMeters.html>.

New JAN Crystals Catalog. It's true that as we approach the millennium, crystals may not be quite as important to radio amateurs as they once were. In the 1950s and 1960s, you might recall, so-called "rock-bound" Novices looked forward to tossing out their "rocks" (crystals) and opting for variable frequency oscillator (VFO) control and, of course, higher power.

Today, the widespread use of inexpensive frequency synthesis techniques has reduced the scope of the "ham band crystal" business. Crystals are still used for a variety of other purposes, though, including frequency control in precision clocks, computers, and other microprocessor-equipped devices, transceivers, receivers, scanners, pagers, frequency standards, and other equipment.

One of the most comprehensive sources of supply of precision crystals is JAN Crystals, which has been in the quartz rock business for decades, and which aptly calls itself "your reliable source for a world of crystal-clear communication." Their latest catalog shows a number of different type crystal cuts and mounts for almost every purpose.

JAN also offers an "analysis of working crystals" service. If you have an "oddball" or unidentified crystal in your equipment, and you need a replacement for it but don't know the necessary specifications to properly order it, JAN's engineers and technicians will analyze the working crystal to determine the proper specs for $10.

A free catalog is available from JAN Crystals, 2341 Crystal Drive, P.O. Box 60017, Fort Myers, FL 33906-6017 (1-800-526-9825).

Letters

Once again, we're just about out of space. Before wrapping it up this month, however, we'd like to acknowledge just a few of the folks who have written, faxed, e-mailed, phoned, or otherwise corresponded with your columnist over the past several months. A tip of the hat goes to correspondents Les Cobb, W6TEE; Ralph L. Smith, WØLDF; John L. Wentz, W8HFK; Jim Tabor, KU5S; and Barry Wiseman, N6CSW.

In addition, one of the more interesting letters we received was from H.C. "Clay" Sherrod, K5OSQ. Clay read in our December 1997 column about the powerful VLF Alexanderson Alternators, which caused him to recall a trip he made to a U.S. Navy VLF site in Yosami, Japan (just north of Osaka) in 1966.

Clay found that a modern VLF transmitter was in use, but the original alternator installed by Telefunken was still on-site. He found that it was installed in 1929 for point-to-point service from Tokyo to Berlin. The alternator generated its voltage at a frequency of 5100+ Hz and fed a "tripler coil," which in turn fed the antenna. There were eight 250 meter self-supporting towers configured as a rectangle to support the antenna. Ken recalls that keying was accomplished by switching between the antenna and a dummy load!

At the Yosami site none of the personnel spoke English, and he spoke no Japanese. They communicated the entire day by physically referring to the original installation drawings, which still were available and in use to maintain the antenna system. It was a slow but very satisfying process, confirming to Clay that "engineering is indeed a common language."

In case you missed the December 1997 column, it described the Alexanderson Alternator, a rudimentary wireless transmitter that was developed in the early 1900s by Ernst F.W. Alexanderson (1878–1975) for worldwide communications. Following his engineering studies in Sweden and Germany, Alexanderson went to America in 1901 and became an employee of General Electric. There, he developed a number of electrical inventions, not the least of which was his alternator. The Alexanderson Alternator itself was a large, electromechanical HF sender with a high-speed rotor connected directly to the antenna (see photo). GE and RCA built 20 units in all for worldwide coverage, one of which was located on Long Island, New York. Today only the site at Grimeton, in Sweden, exists. It cranked up in 1924 on 16.7 kHz using the callsign SAQ.

We described the Alexanderson Alternator in some detail in our two-part article "Longer Than Longwave," which appeared in the January and February 1998 issues of *CQ*. Check it out, too.

Wrap-Up

That's all for this time, gang. Next time, more Digital Dipole topics of current interest. See you then.

Overheard: In amateur radio and just about any other endeavor, no question is stupid if you're the one asking it.

73, Karl, W8FX

If you use handheld ham or business-band radios, you'll never really fully appreciate how important it is to stay in touch until you reach the edge of your radio's coverage area and your communication begins to fade

Shown with transceiver

Our new simplex repeater controller dramatically improves the range of your existing handheld radios.* It digitally records any transmissions, then keys a transmitter and plays them back, adding a courtesy beep. All you need to make it work is an extra handheld transceiver positioned high in a central location and 4 "AAA" batteries or our AC or DC adapter.

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* Compatible with RadioShack amateur radio HTs and many ICOM, Motorola, Standard and Yaesu-brand transceivers with industry-standard jacks for external mic and speaker.

CIRCLE 115 ON READER SERVICE CARD

MATH'S NOTES

BY IRWIN MATH, WA2NDM

WHAT'S NEW AND HOW TO USE IT

Operating LEDs from AC Power Sources

Everyone is familiar with the procedure for operating LEDs from DC, which simply entails the choice of a suitable dropping resistor. Occasionally, however, it is desirable to operate the LED directly from an AC source. This month we will look at a couple of ways to do this.

Fig. 1 is the circuit of the classic DC method. The value of the dropping resistor is calculated by the formula:

$$R = \frac{Vcc - 1.5}{I}$$

where I (capital letter I) is equal to the desired LED current, VCC is equal to the value of the supply voltage, and 1.5 is chosen as the typical LED voltage drop. For the purists, you can substitute the true value of the drop if you have the data sheet for the actual LED you plan to use. Since this type of operation usually entails a 5 volt or other low-voltage power supply, dissipation in the dropping resistor usually is not a problem and is rarely even considered. AC operation is another story.

In the case of AC operation, the voltages most often available are on the order of 6.3 volts, 12 volts, or the AC line. Here, as we soon will see, dissipation can be quite a problem with conventional means. The simplest AC operating circuit is shown in fig. 2, which is really just a slight variation of fig. 1. In this circuit a rectifier diode is used to convert the AC into positive half-cycles. The value of the dropping resistor is now calculated using the same formula, but replacing Vcc with the average positive voltage, which is equal to 0.9 times the RMS voltage divided by 2 (since we are only using the positive half cycle). This works, but results in fairly high dissipation in the dropping resistor when used with higher voltages such as the AC line. In fact, trying to run a 10 milliampere LED directly from a 6.3 volt AC transformer secondary line results in the need for a 295 ohm 2.95 watt resistor! If you find this hard to believe, look at the math:

c/o CQ magazine

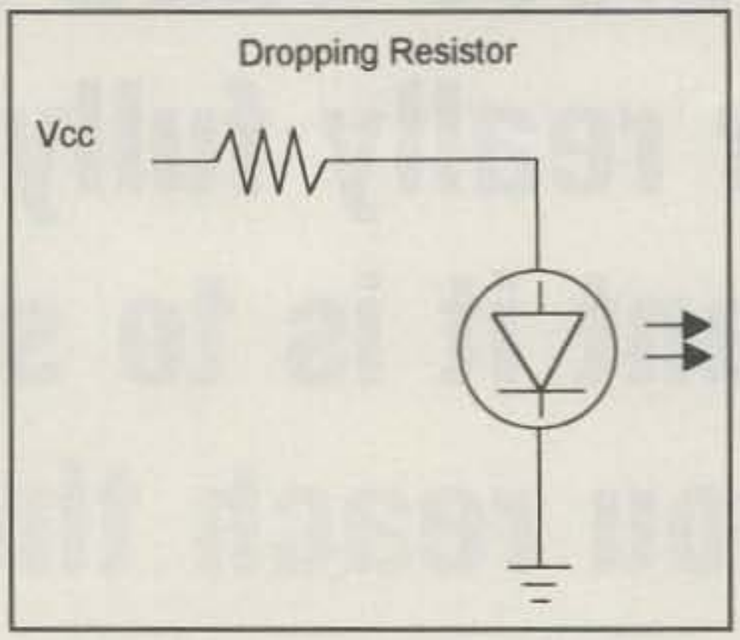

Fig. 1– Standard DC circuit for LEDs.

$6.3 \times 0.9 = 5.67$ V average

$5.67/2 = 2.84$ V

$\frac{2.84 - 1.5}{.01} = 134$ ohm resistor

$134 \times .01 = 1.34$ watts dissipation

For higher values of AC the situation is much worse. A 12 volt AC supply requires a 3.9 watt resistor (390 ohms), a 24 volt AC supply requires a 9.3 watt resistor (930 ohms), and the 120 volt AC line needs a 5.25K 52 watt "heater." Note that we have omitted the rectifier diode drop in these calculations since it really does not result in a significant savings in dissipation. Obviously, when working with AC there has to be a better method.

Fig. 3 is an approach that was described in an application note from Siemens. In this case a capacitor is used as a dropping element instead of a resistor, and a diode is then used to shunt negative half-cycles across the LED. Since the current and voltage are 180 degrees out of phase in a capacitor, the dissipation in an "ideal" capacitor theoretically is zero. In the real world, with good-quality capacitors, the dissipation is never really zero, but can be a tiny fraction of that in the series dropping resistor. Now to determine values.

Current through the capacitor is determined by dividing the AC supply voltage by the reactance of the capacitor at 60 Hz. Since the voltage drop across the LED is a small part of the total voltage drop in the circuit, the capacitor's current is also very close to the current through the LED. Therefore:

$$Ic\ (average) = \frac{0.9 \times Vrms}{Xc}$$

Since the LED "sees" only half of this, the formula becomes:

$$I\ led\ (average) = \frac{0.45 \times Vrms}{Xc}$$

where

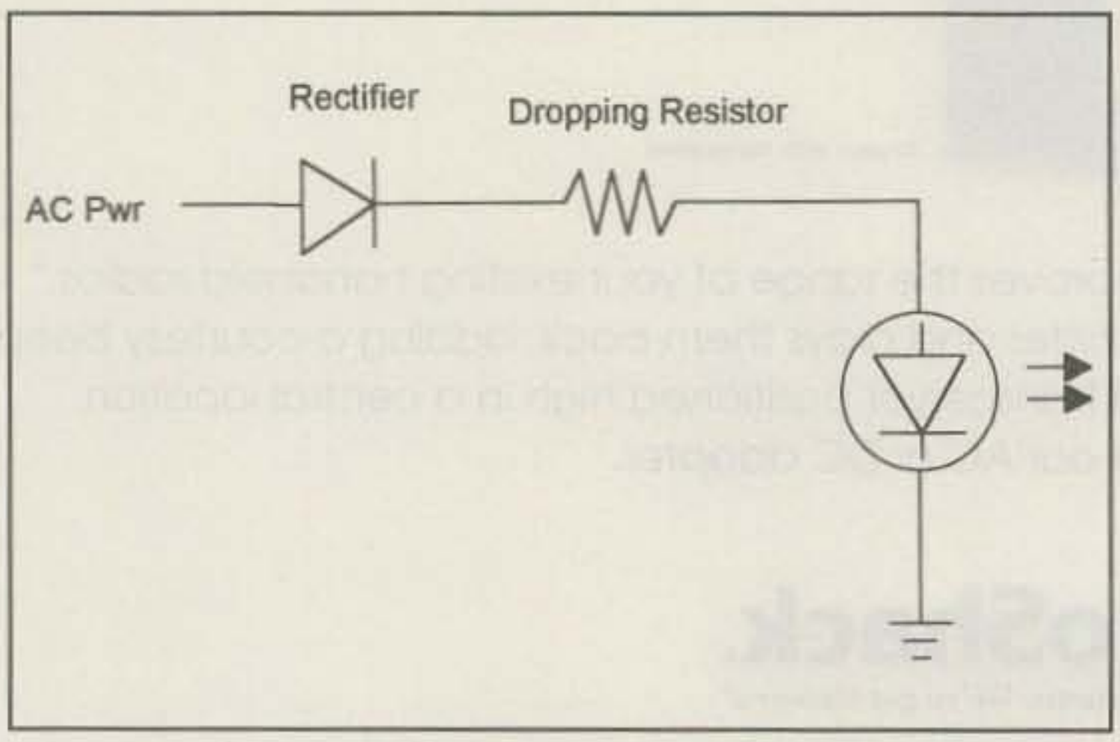

Fig. 2– Preliminary AC circuit for LEDs.

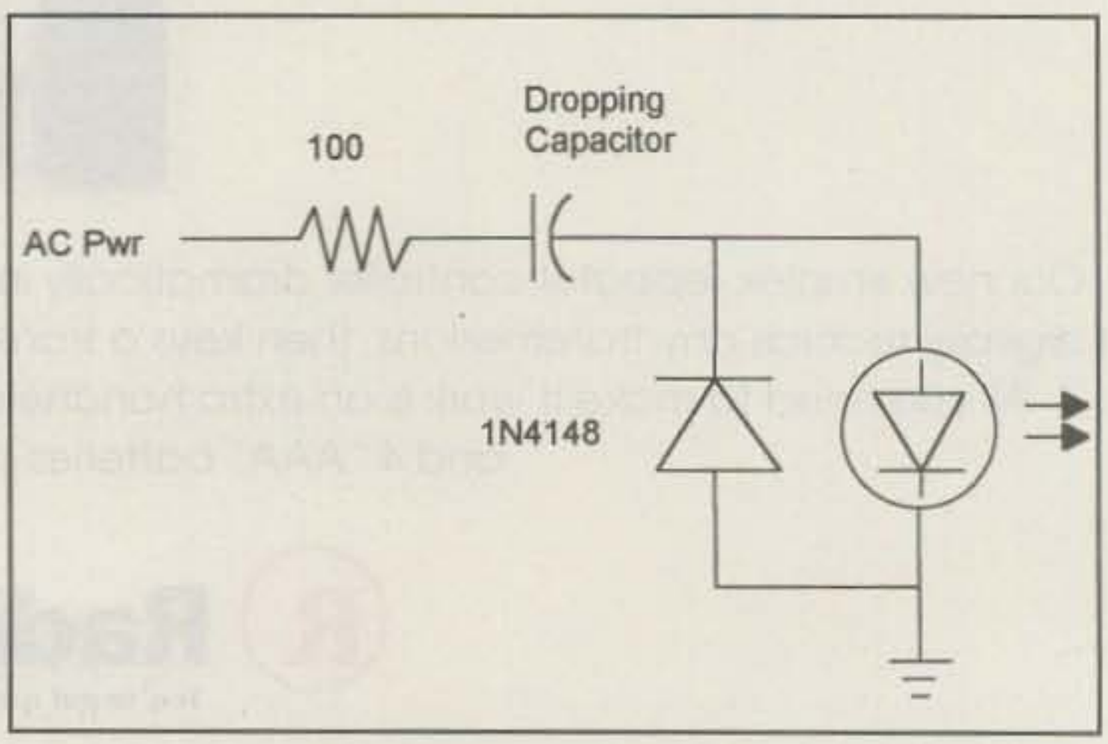

Fig. 3– Recommended AC circuit for LEDs.

$$Xc = \frac{1}{6.28 \times 60 \times C}$$

For those who do not wish to do the math, all of this works out to the following capacitor values for approximately 10 milliamperes of LED current:

6.3 volts AC, 47 µF 25 volt rating
12 volts AC, 4.7 µF 35 volt rating
120 volts AC, 0.47 µF 350 volt rating

Other current levels can be scaled as desired.

Note that the 100 ohm series resistor is used to limit current surges. Also note that the voltage breakdown of the capacitors should be several times more than the peak-to-peak values of the AC supply. The capacitor values should be considered as approximate, since these components themselves usually have a wide tolerance. You can always experiment with values around those indicated above until you get the degree of illumination you wish from the LED. In any event, be sure to use the highest quality capacitors you can find, and observe extreme caution when working directly with the AC line. In conclusion, do not choose capacitor values indiscriminately. An exploding electrolytic not only can scare you, it can shoot hot foil and plastic all over the place!

73, Irwin, WA2NDM

BY DAVE INGRAM, K4TWJ

WORLD OF IDEAS

A LOOK AT THE WORLD AROUND US

Vintage Tubes and Classic Rigs—Part II

Say last month's column rekindled your interest in homebrewing classic rigs and you're ready for yet another lighthearted romp down memory lane? Well, friends, you've tuned to the right place, as more delights from eras past are in the spotlight again this month. You can build one or both of these gems mainly as a showpiece (what a terrific way to display some special tubes!), or combine one with a favorite old-time receiver for occasional use on the air today. It's your choice, and it's heartwarming fun all the way. Enjoy!

Thanks to Robert Root, WD6DPU, our emphasis this time is on Eitel McCullough, that legendary U.S. manufacturer of high-power transmitting tubes well known and used in stations around the world. Over the years, Eimac has produced many of our favorite tubes—the 35T, 3-65, 75TL, 100TH, 304TL, the familiar 4-400 and 4-1000, and today's popular workhorse, the 3-500Z. Eimacs have traditionally been recognized for their near-optimum vacuum, long filament life, and overall rugged construction, plus their eye-catching envelope shapes and internal structures. Artwork, every one! We are thus proud to recognize their "gone but not forgotten" 35T and 75TL in this month's column. We have a long way to go and a short time to get there, so let's get started!

Tube Talk

Consider me a romantic, if you wish, but in this author's humble opinion, vacuum tubes are like YLs: Each one is unique and beautiful in its own special way. Yes, and Eimac's 35T shown in fig. 1 is a prime example of that fact. Just look at its tall and slender envelope, trim little 4-pin base, and fine-groomed top-plate pin. Simply irresistible! The tube's internal structure also resembles a 3-65 or 4-400. Pardon the soapbox distraction. Life in the ham lane is just so exciting! Now back to our story and views.

Jones and The 35T

During the approximate time transmitter circuitry was shifting from self-excited to crystal-controlled oscillators, Eimac introduced their new 35T triode vacuum tube spotlighted in fig. 1. The little tube was readily accepted by the amateur radio community and quickly integrated into various types of HF and VHF equipment. Details on several "35T rigs" for homebrew enthusiasts also appeared in *ARRL Handbook*s during the 1930s and 1940s. Typically, a pair of 35Ts was used in a push-pull RF power amplifier with 1000 to 1500 volts DC at up to 200 ma as a plate supply. When driven by a 15 or 20 watt exciter, output from a dual 35T amplifier could yield between 150 and 180 watts output. Big-time radio for sure!

One of the more creative applications for a single 35T, however, was presented in the famous Jones Radio Handbook of yesteryear (exact date unknown) and was brought to my attention by Robert Root, WD6DPU. The tube was mated with a handful of parts to produce a crystal-oscillator-type transmitter capable of delivering between 15 and 60 watts output. Bear in mind this was during the time crystal oscillators were dubbed QRP rigs because of their low output power rating. Jones and the 35T changed that viewpoint—noticeably.

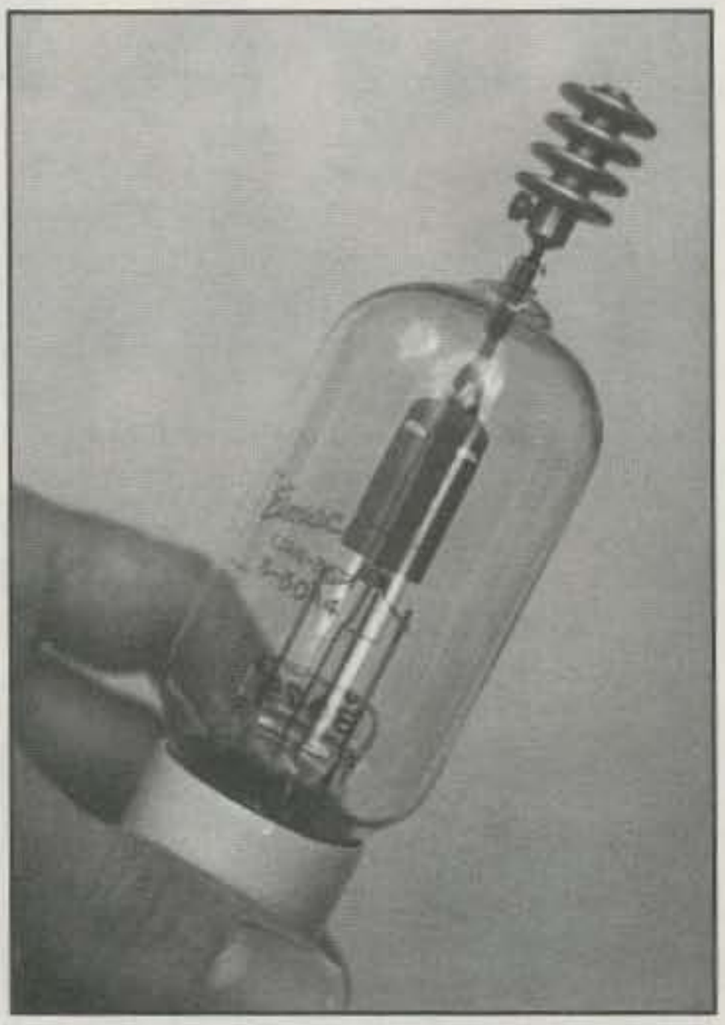

Fig. 1– The eye-catching and attention-grabbing Eimac 35T tube. This little gem stands 4.7 inches tall, is 1.7 inches in diameter, and has a 4-pin base the size of a UX-210 or 245. The tube is also double numbered as 3-50A4. (See profile of this classic in text.)

The 35T transmitter's circuit diagram is shown in fig. 2, and as you can see, it is the height of simplicity. Some clever circuit ideas are included in this mild- mannered design. Cathode bias with a center-tap filament-resistor type arrangement, for example, is used in lieu of conventional grid leak bias (which could result in excess grid current and a fractured crystal at this high power level). As an additional safety measure or "backup plan," hearty (round) Bliley crystals capable of withstanding high current were also used in original versions of this transmitter. Bliley crystals on desired frequencies are scarce today, but there is a good alternative. Limit the 35T's plate potential to between 400 and 500 volts so power is not over 20 or 25 watts input and use regular FT-243 crystals. Everyone will admire the rich tonal quality of your transmitted signal. It stands out like a shiny new car (or immaculately maintained classic car) on a crowded freeway! You'll love it!

Continuing with more circuit details, I should point out that all components are heavy-duty rated, not modern-day wimps. Forget trying economical HC-6 or microprocessor-type mini-crystals in this rig. 35Ts eat them for lunch! Ditto small disk capacitors. I recommend the classic "domino type" capacitors from famous old manufacturers such as Sangamo and Micamold. They have screw mounting holes, look really classy, and are sealed to retain their value for many years. These capacitors may be difficult to find, but they are worth the pursuit. A close-up view of these capacitors—"spares" from my box of "vintage parts"—is shown in fig. 3 for reference.

As the rig's diagram indicates, a 10 MHy RF choke is used in the tube's grid circuit. You can substitute an easier-to-find 2.5 MHy choke to get started. Continue hunting for a 10 MHy choke for both quality and authenticity, however. It helps produce a really beautiful CW note.

The filament resistor is an adjustable 50 ohm 10 or 20 watt wire-wound item with its slider positioned in the middle, so 25 ohms is measured to either side terminal. If preferred, you can substitute two 25 ohm 10 or 20 watt fixed resistors here. Although the filament is bypassed on both sides with .01 mFd capacitors, I suggest rectifying the tube's 5 volt/3.5 amp supply for DC. Many direct-heated tubes seem prone to hum, and I prefer leaving noth-

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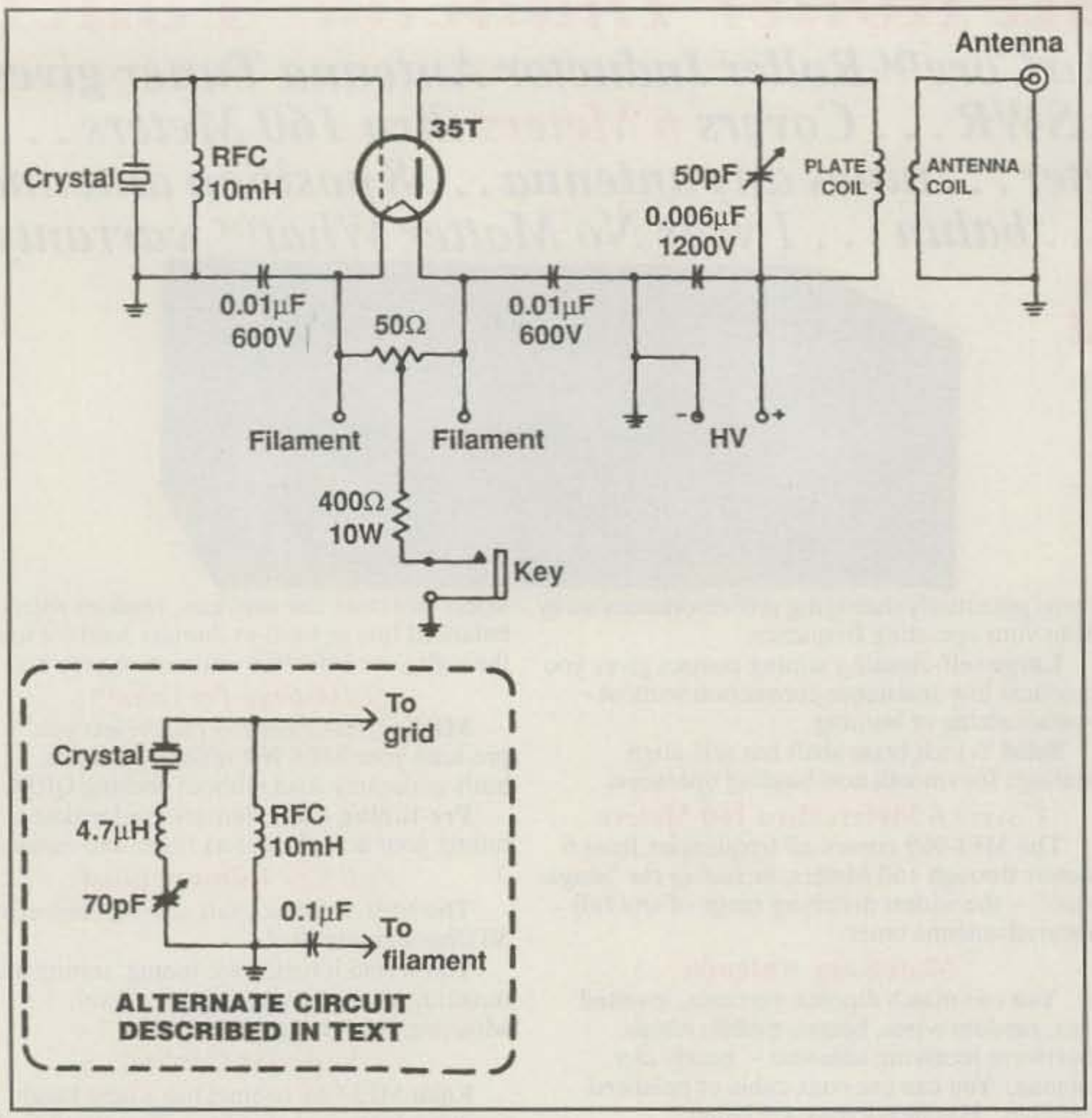

Fig. 2– Circuit diagram of the 35T transmitter. (Discussion and fine points in text.)

ing to chance. Can't find a 5 volt transformer? Considering using a variac or rheostat in series with a hefty 6.3 volt transformer. It works well.

Details on the transmitter's plate coil are included in fig. 4. Double-silk-covered wire used to wind the 160 meter coil is a mite rare today, so feel free to substitute regular enamel-coated wire. You can use a regular plug-in form or a horizontally-positioned coil as desired. If you cannot find a 50 pFd variable capacitor for plate tuning, substituting a 100 pFd capacitor should be okay; the "dip" will just be sharper. Alternately, you might try the old "mod trick" of pulling every other plate from a single-section 365 pFd capacitor—and get a "freebie" with a respectable voltage rating to boot.

After you get this transmitter perking with an admirable output signal (note I said "after"), you might like to add a warping circuit to shift the crystal's frequency a few kHz. In light of that fact, I included my personal "mod" for this frill as an inset in fig. 2. I used a small T-50-2 toroid with approximately 25 turns of No. 26 or 28 enameled wire as an inductor, because it could be hidden in the crystal socket/tube socket's base. An alternate choice is one of the large (2 or 3 inch long) Ohmite inductors. Values for the inductor and its related variable capacitor are approximate, so feel free to "dink." You will know when you add too much warping. The circuit will lose frequency stability or stop oscillating.

A view of my own 35T replica transmitter during assembly is shown in fig. 5. Since this treat was popular when homebrewing was shifting from breadboards to metal chassis, and since I had a beautifully finished (although small) wood base held back for a special project, I assembled mine open-air style. Space was too limited for including a plate current or output meter, so I use an externally-connected SWR/wattmeter for a tuning aid.

A dipole or vertical antenna works fine with this little transmitter, and tune-up simply involves adjusting the tank capacitor for minimum plate current or maximum output power. Then you can use the warping circuit's capacitor to zero beat other "near frequency" signals. If output power seems low, incidentally, try adding a wide-spaced 365 pFd (or any value between 150 and 400 pFd) variable capacitor in parallel with the antenna coil. Then adjust antenna loading and plate tuning "pi-net style" until "maxed out." Finally, be careful(!) to avoid exposed high voltage and have fun running a genuine classic rig on the air today. Truly, this is "radio for the rest of us"!

A "Wild Woody" RF Amp!

Remember the Reinartz two-tube receiver with spider-web coils built by WD6DPU

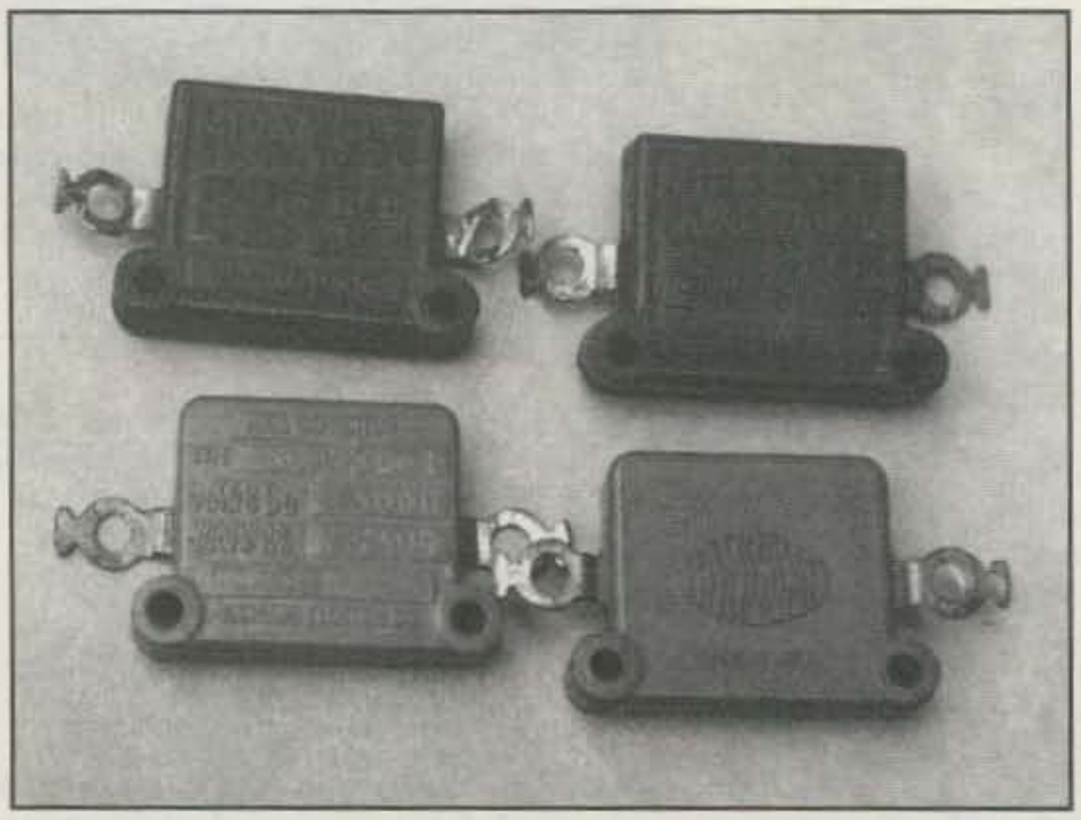

Fig. 3– Close-up view of some vintage Sangamo and Micamold capacitors like those used in the 35T transmitter. Items are marked in both test voltage (5000) and working voltage (2500) and look great!

Fig. 4– Plate/antenna coil data for 35T transmitter.

Band	Plate Coil	Antenna Coil
160 m	70 turns No. 24 DSC, 2" long	20T
80 m	34 turns No. 18 enamel, 2" long	14T
40 m	16 turns No. 18 enamel, 1½" long	7T
30 m	12 turns No. 18 enamel, 1½" long	6T
20 m	8 turns No. 18 enamel, 1½" long	4T

Note: Antenna coil wound over plate coil using No. 18 or 20 plastic or Teflon-coated wire.

and featured in last month's column? Views of more heartthrobs Robert assembled with painstaking perfection arrived the following month and begged to be included in Part II this month. These goodies are more "show and tell" items than actual "build 'em projects" (I will probably end up eating those words!), but they are heartwarming beauties from any point of view.

First, your attention (and magnifying glass) is directed to the classic dual- tube and open-air power RF amplifier shown in figs. 6 and 7. Possibly you remember seeing a homebrew amplifier similar to this in the "good old days." Whether it was as meticulously crafted as this 1998 reproduction, however, is a completely different matter. Check out those genuine National Velvet Vernier dials, those perfectly polished E. F. Johnson breadboard tube sockets, those authentic Weston meters!

Closer study reveals split-section National variable capacitors for input and output tuning (behind Velvet Vernier dials), Bud plug-in plate coil with swing link, and crossed capacitor wires for Ballentine neutralization. A pair of like-new Eimac 75TLs plus a multi-tap filament transformer for substituting other tube types is included in the amplifier. Meters monitor filament voltage, input power (in RF amps), grid current, plate current, and output power (again in RF amps). Parasitic suppressors are included in both grid and plate leads for cleanliness. Robert did

Fig. 5– My own 35T replica transmitter during assembly. I should have used a larger baseboard, but this one was beautifully finished and gave it a sort of "busy look" like a classic Bike Racer bug. Antenna loading capacitor and wattmeter for tuning are external to transmitter. Now this critter really looks like a rig!

Fig. 6– Romance recaptured! This twin 75TL tube RF amplifier truly brings back the era of wildly banging meters, blue flashing rectifiers, power-a-plenty, and DX galore. (Photo courtesy proud owner Robert Root, WD6DPU) →

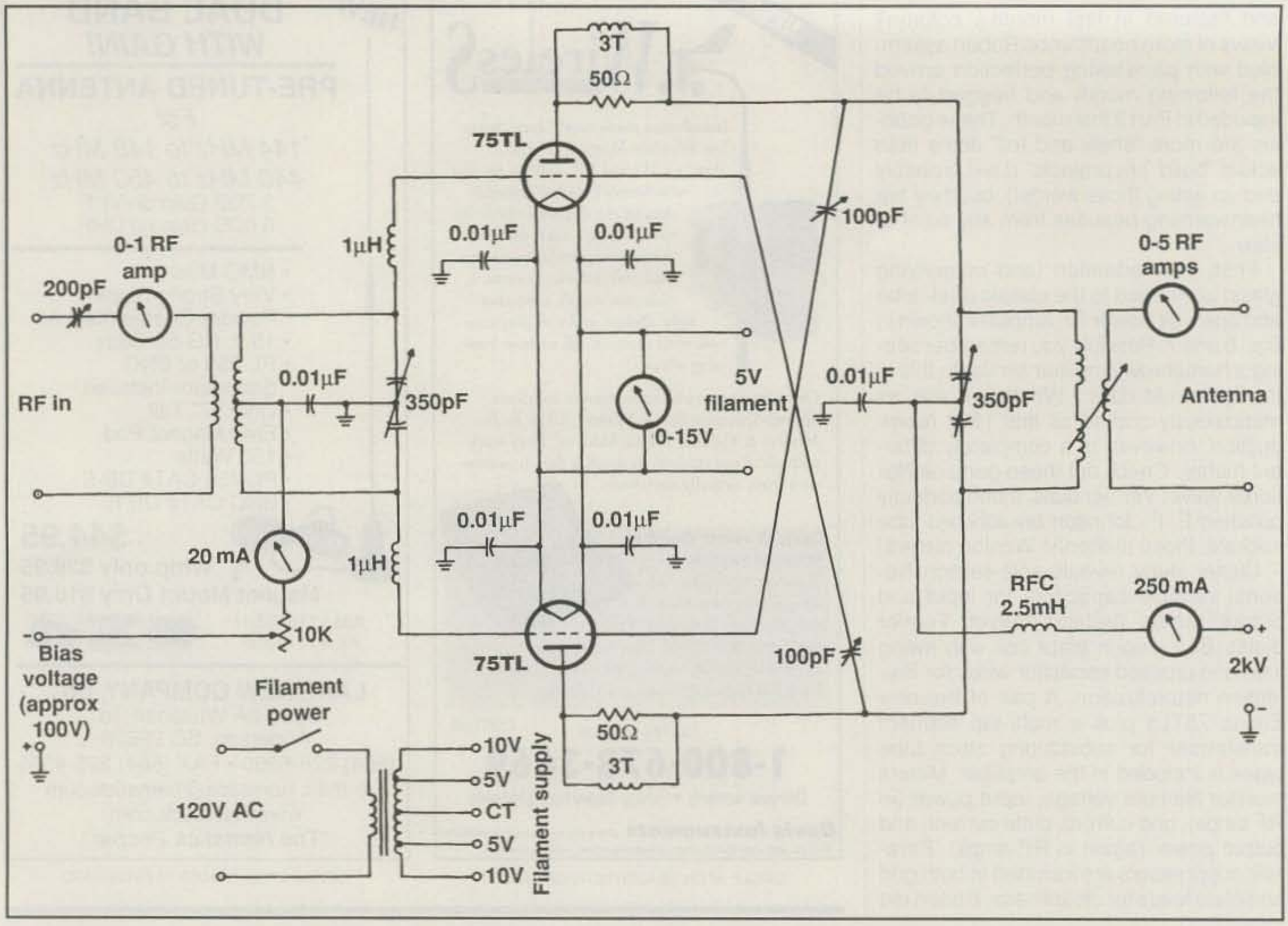

Fig. 7– Circuit diagram of twin 75TL amplifier. Unit is totally classic with push-pull input and output sections, Ballentine neutralization, series-fed plate circuit, and more.

not include extensive details on this wood-framed 700 watt beauty, but I would guess its signal is squeaky clean—even though it lacks a metal cover. Now this is real "glow in the dark radio"!

More Views!

Yet another Robert Root masterpiece is shown in fig. 8. This one was modeled after a 1930-style TNT transmitter both Bill Orr, W6SAI, and I featured in past columns, and it is exact to the finest detail. Notice the round envelope-type 210 tube, the domino-type Micamold capacitors, Frost tube socket, and brown "beehive" stand-off insulators. Notice, also, the perfectly formed hook-up wire with terminal lugs at tube socket, cotton-covered wire on grid coil, and highly glazed wood base with feet. Every home station needs a showpiece like this sitting on a windowsill or filling a vacant corner! As you will recall, self-excited transmitters such as this TNT can operate on any frequency in their tank circuit's range—in or out of an amateur band.

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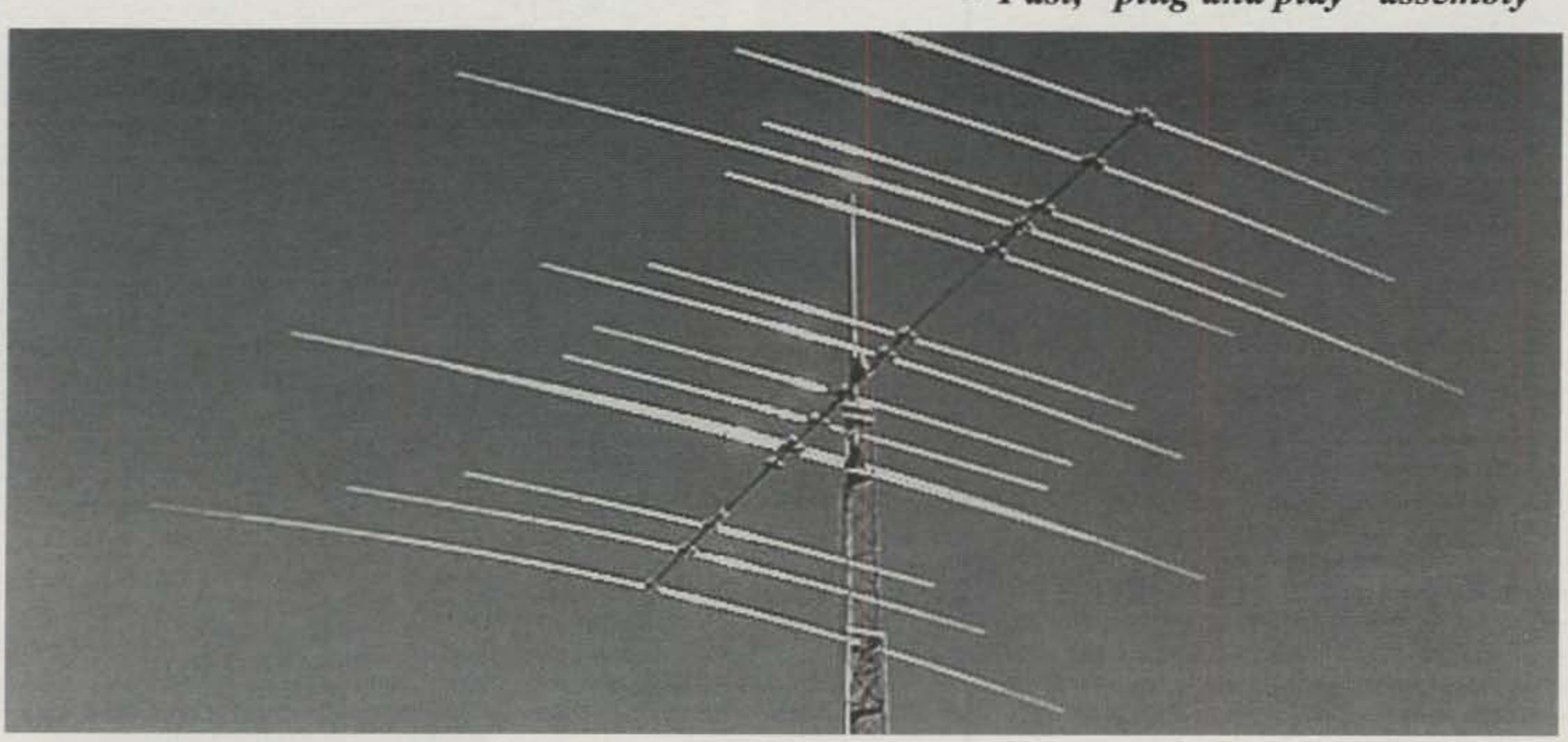

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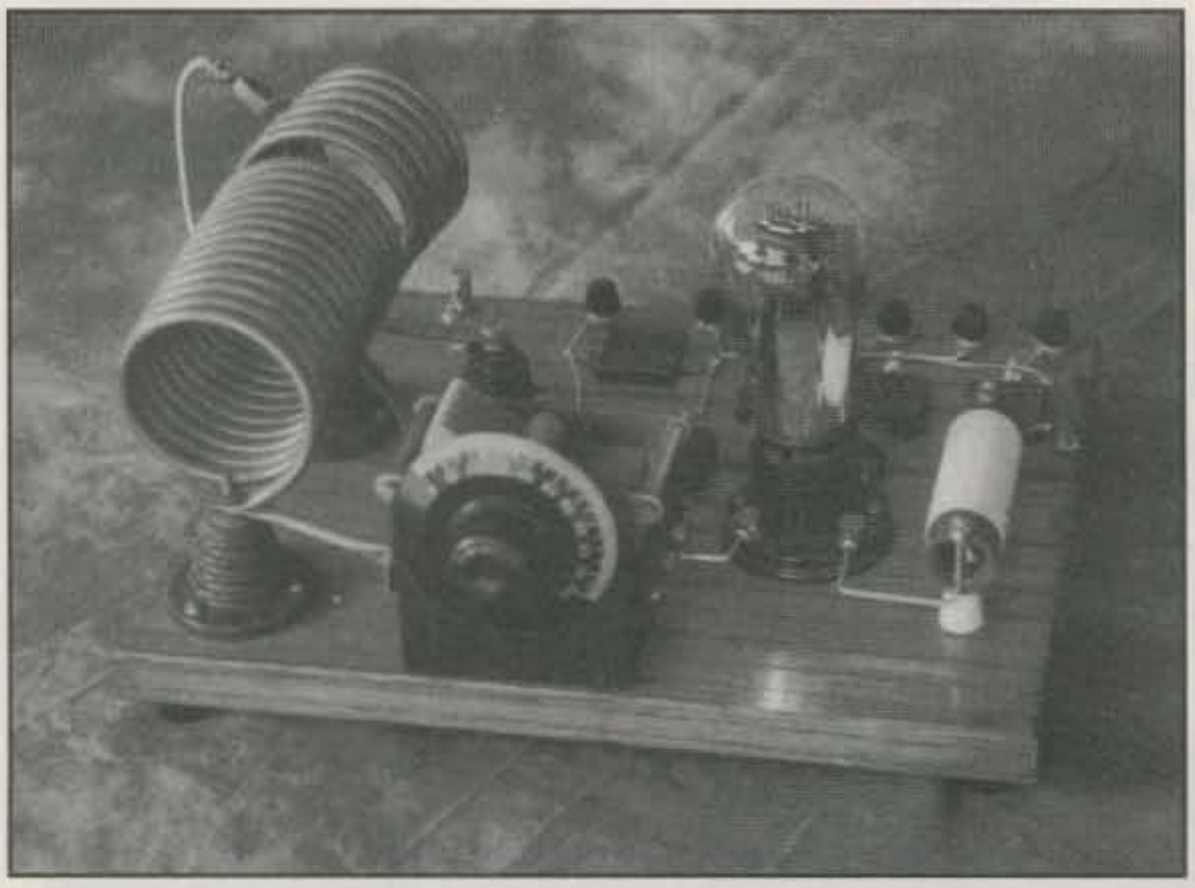

Fig. 8– 1998 replica of famous 1930-style TNT transmitter as built by Robert Root, WD6DPU. Look closely at this open-air marvel and you will see a special warmth, beauty, and personality that are noticeably lacking in modern closed-cabinet and digitally-tuned rigs.

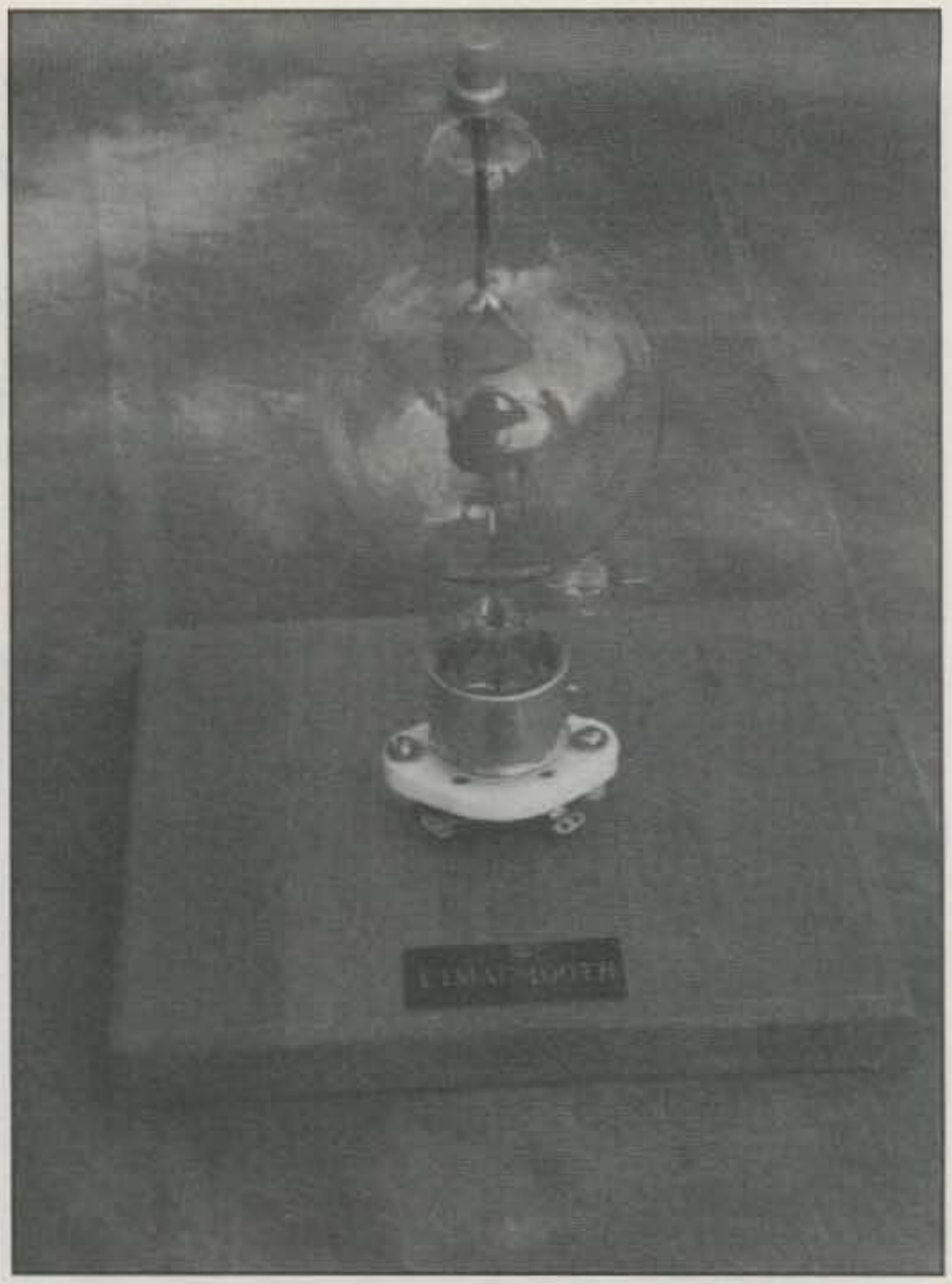

Fig. 9– How do you store a special old-time tube yet give it well-deserved recognition? By making it a trophy or desk conversation item, naturally! Include a nameplate on its base, and watch visiting amateurs turn green with envy! →

today demands genuine old-time radio expertise. Room does not permit including that lengthy story herein, so the little transmitter's circuit diagram is not shown to keep you out of trouble. I am sure competent old timers can draw the circuit by memory.

Finally, Robert shows us how he stores extra tubes for his Wild Woody RF Amplifier (fig. 9). A polished wood base with maybe a layer of bottom felt, a shiny clean socket, a trophy-type nameplate, and *viola*—a beyond-comparison conversation piece. Clever!

Robert continues building his tube and replica rig collection, so we may hear more/see more views from him in the future. Presently, he is hunting a unique WE-205D "tennis ball tube" like that shown in fig. 10. If you have one at a fair price, drop a note to Robert at 7603 Fostoria St., Downey, CA 90241.

We are down to the wire and out of space, gang. Keep on working 30, QRP'n, listen for me around 0230 GMT (I will be the weak one running QRP.), and watch for more hot topic columns coming in the months straight ahead. 73, and may the force of good signals be with you!

Dave, K4TWJ

Fig. 10– Okay, friends and fans of QRP, check out this low-power dream triode of yesteryear. It is a unique WE-205D "tennis ball" tube, and it makes a neat "switch hitter" for UX-199s or 210s in old-style Hartleys or TNTs. Magnificent!

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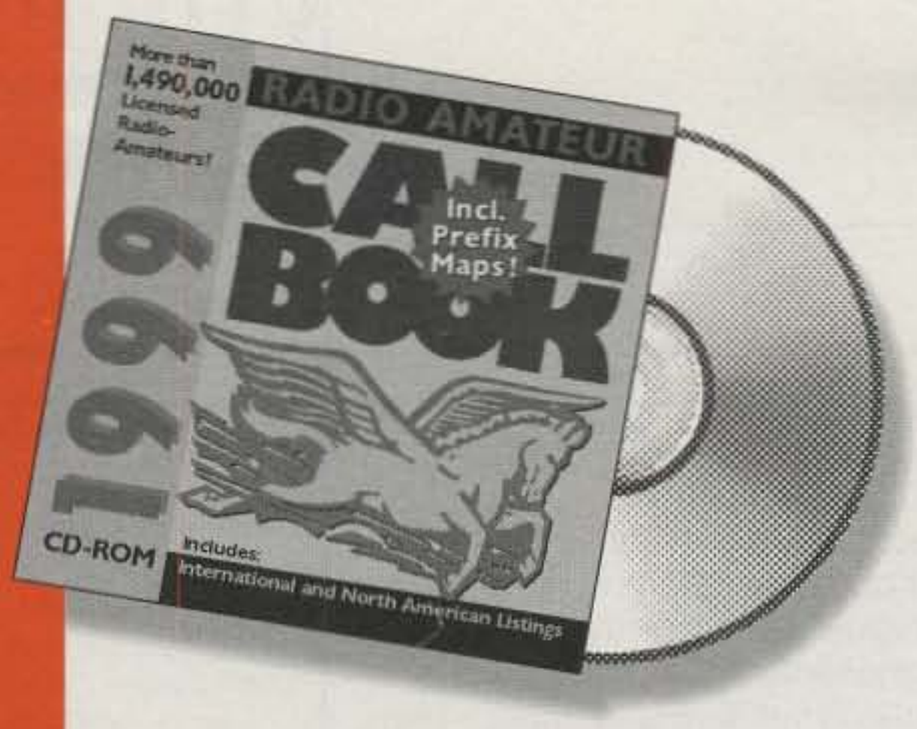

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CIRCLE 145 ON READER SERVICE CARD

BY JOE LYNCH, N6CL

VHF PLUS

ALL ABOUT THE WORLD ABOVE HF

The Leonids—Past and Present

It was a pebble that got Chicken Little worried about the possibility of the sky falling. In 1833 it was the reoccurring *Leonids* meteor storm that got many worried that the end of the world was near. Yet in neither Chicken Little nor the end of the world prognosticators' case did a predicted end come. What did come, however, out of the latter was a better understanding of the predictability of the recurrence of meteor showers.

As it turns out from history, the *Leonids* meteor shower seems to have been the Rosetta Stone, or the key to understanding how meteor showers occur. Because of its relatively predictable reoccurrence (every 33 or so years), astronomers have been able to study it and thereby make the tie-in with a particular comet.

The first recorded evidence of the Earth passing through the debris of a comet was late in the ninth century. In 868 A.D. the Earth passed through the path of the then unknown comet Tempel-Tuttle. It took approximately another 34 years before the Earth again passed through the comet's orbit. Debris from this comet caused a meteor storm which the Chinese recorded in 902.

It would be another almost 900 years before any other major meteor storms were observed by someone connected with the western world. Germans Humboldt and Bompland, then living in Cumana, Venezuela, observed the meteor storm of 1799 and wrote about it. From their investigation, they heard of contemporary reports of a similar meteor storm occurring 33 years earlier.

During the ensuing 34 years enough international investigation was done so that there was an anticipation of some sort of storm. Those observing were not disappointed when in 1833 a major storm occurred which was observed in widespread locations throughout North America. A well-known quote by Agnes Clerke aptly describes what happened the night of November 12–13:

"[A] tempest of falling stars broke over the Earth. . . . The sky was scored on every direction with shining tracks and illuminated with majestic fireballs. At Boston, the frequency of meteors was estimated to be about half that of flakes of snow in an average snowstorm."

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Internet <jlynch@post.cis.smu.edu>
Compuserve<72124.2734@compuserv.com>

VHF Plus Calendar

Nov. 1	Moderate EME conditions.
Nov. 3	Full Moon.
Nov. 4	Moon perigee.
Nov. 7	Highest Moon declination.
Nov. 8	Moderate EME conditions.
Nov. 10	Last quarter Moon.
Nov. 15	Poor EME conditions because of the *Leonids* meteor shower.
Nov. 17	*Leonids* meteor shower predicted peak.
Nov. 18	New Moon.
Nov. 19	Moon apogee.
Nov. 22	Lowest Moon declination. Very poor EME conditions.
Nov. 26	First quarter Moon.
Nov. 29	Moderate EME conditions.

Clerke estimated that in excess of 240,000 meteors fell during the nine-hour storm. Others reported that the lights from the fireballs of the storm were so intense that they were awakened from their sleep. The meteor storm was visible across the North American continent. Contemporary Native American writings refer to the event as "the night the stars fell."

It is not surprising that so many panicked at what they saw. During this period in religious history in the U.S. there was a fledgling but growing movement that interpreted *The Bible* as indicating that Judgement Day was very near. The meteor storm of that November night lent itself as a most probable and predictable event which was part of that doomsday fever.

Thanks to the work of Denison Olmsted, who analyzed what happened during that night in light of what had happened a year earlier in Europe, it was concluded that what had occurred was a meteor storm, and that the storm had been caused by some sort of cloud of debris that the Earth had encountered and the Earth could encounter it again the following year. Just what the cloud of debris was or what caused it, however, Olmsted did not know.

One of the pieces of data that Olmsted discovered was the storm's approximate position in the night sky. At about the same time, A. C. Twining and W. E. Aiken independently determined a more precise location, that of being in the same proximity of the constellation *Leo*. This gave rise to the naming of the storm after its associated constellation. Hence, the name *Leonids* became associated with it.

The following year there again was a storm. However, it was nowhere near the intensity of the one in 1833.

In the ensuing years data related to the storm of 1833 continued to be published. Finally, in 1837 Heinrich Olbers analyzed the data and concluded that the *Leonids* had a periodicity of approximately 33 to 34 years. From his conclusions, he predicted a return of the storm in 1867.

It was the work of Hubert Newton, however, that really solidified the periodicity of the *Leonids* meteor shower. In the years 1863–1864 Newton examined meteor shower and storm reports from around the world of the previous 2000 years. From his examinations, he concluded that those meteor showers or storms that were observed in the years 585, 902, 931, 934, 1002, 1202, 1366, 1582, 1602, and 1698 had a periodicity relationship with the storms that occurred in 1799 and 1833. From his studies, he concluded that the *Leonids* had a period of approximately 33.25 years. Furthermore, he predicted that the next return would actually occur on November 13– 14, 1866, a year earlier than Olbers.

In 1866 two important events occurred. First, Ernst Tempel in France and Horace Tuttle in the U.S. independently discovered a comet. Tempel first observed it on December 19, 1865. Tuttle spotted it on January 6, 1866. The comet was named after both of them because of their having both observed it, even though Tuttles' discovery occurred a few weeks after that of Tempel. The calculated orbit of the comet was slightly greater than 33 years. As mentioned above, it also was that year, based on the previous 33-year interval, that Newton predicted another storm would occur. Eventually, the coincidental relationship of the orbit of the Tempel-Tuttle comet and the reoccurrence of the *Leonids* meteor storm were compared by Dr. C. F. W. Peters, Giovanni Schiaparelli, and von Oppolzer independently of each other with their conclusions indicating that the two were related. Their conclusions led to the establishment of the connection between meteor showers and comets.

It is important to note here that two other comet sightings presumably have ties to the Tempel-Tuttle comet. The first of these occurred in 1366. This observation was made by both Chinese and Japanese observers. In 1699 a G. Kirch in Germany observed a comet on October 26. However, there seems to be no other observations of that comet sighting left from his-

torical records. Even so, some of the predictors believe that these two sightings (1366 and 1699) were prior observations of the Tempel-Tuttle comet.The second event was the reoccurrence of the *Leonids* meteor storm as predicted by Newton. While light from the Moon interfered with good observation of the storm, enough data was acquired to indicate that the prediction was a success. From this event and analyzing the data, in 1867 Theodor von Oppolzer more precisely calculated the period to be 33.17 years. Furthermore, Urbain Le Verrier calculated another period for the *Leonids*.

In 1899 another storm was anticipated and an increase in *Leonids* activity did occur. However, the activity was disappointingly low. Charles Olivier called the lack of activity "the worst blow ever suffered by astronomy in the eyes of the public." It was later determined that the stream came under the gravitational influence of both Jupiter and Saturn, in 1868 and 1870, respectively, thereby diverting its distance away from Earth in 1899 to more than double of what it was in 1866. Even so, the rates for the annual showers continued increasing, reaching a near storm level in 1901. The activity was most visible in the Midwest and Western U.S. that year. Observers at Carlton College in Minnesota put the count to about six to seven per minute, and Mr. E. L. Larkin, perched on Echo Mountain, California, counted around five per minute at the shower's peak. *Leonids* showers occurred the following two years. However, in 1902 Moon light obscured visibility of the shower. Yet in 1903, European observers John Henry in Ireland and Alphonso King in England noted levels approaching an estimated 200 per hour.

From the *Leonids* seemingly increasingly reliable predictability, in 1932 yet another storm was anticipated. However, this time in North America weather obscured the viewing of the storm. It was thought by some that because no observations were made here, a storm did not occur. Indeed, observations were made in other parts of the world. Data from these observations indicated that there possibly were two peaks. P. A. Curry at the Helwan observatory noted a rate approximating over 100 at his observed peak around 4:00 AM local time. Several hours later (now in daylight in Egypt) J. P. M. Prentice observed rates approaching over 200 per hour. Yet while a storm was not observed in 1932, predictors looked forward to the years of 1965–66.

In 1965 the *Leonids* count increased dramatically over the previous year. Even so, a number of amateur radio operators got excellent results from the *Leonids* shower of 1965. It was from these observations that predictors were fairly confident of a decent shower level the following year. But because of the previous perturbation of the stream by Jupiter and Saturn, no one was willing to go out on a limb and predict a storm.

Continued good press prompted more interest. Encouraged by predictions in the November 1966 issues of *Sky and Telescope*, *Natural History*, and *QST* magazines, amateurs stood by for what they thought might be a better than average night for the 1966 *Leonids* shower.

Amateurs who were on the air at that time and visual observers in the western parts of the U.S. were not disappointed. Visual observations compared the count to that of the 1833 storm. However, there really was no way to tie the levels of the two together because of the lack of comparable data.

Indeed, it was far more than "better than average!" The headline for Sam Harris, W1FZJ's "World Above 50 Mc." column in the January 1967 *QST* was "November Leonids—Shower of a Lifetime." Sam recounted, "Hundreds of contacts were made by calling CQ, or by breaking stations when their skeds were completed,

as most were in the first minute or two of prearranged calls."

Reports of visual observations were sent to *Sky and Telescope* from all over the country. One report came from Shelby Ennis, W4WNH (now W8WN). Shelby wrote, "For us in Kentucky, the 1966 *Leonids* will be rated much better as a 'radio' shower than as a 'visual' shower due at least in part to the very sharp peak coming after dawn." However, in areas where dawn hadn't come, particularly in the west, the display was awesome. Reports of 2000 meteors per minute weren't uncommon. It was a night (or early morning) to remember for amateur radio operators and amateur astronomers alike.

Now, 32 years later, we have already entered the next cycle of the *Leonids* storm. Reports of the 1994 *Leonids* meteor shower indicated a dramatic increase over the previous year. Some reports compared the rates to the *Perseids* shower earlier that year. Reports of 1995, 1996, and last year's showers indicated continued increased activity.

Additionally, the Dutch Meteor Society reported that a team of its observers recorded a period of an increase in faint meteors riding on top of the shower during the overall peak for a period of between one and two hours. These observations put the EZHR (estimated zenith hourly rate) at about twice the number as the rest of the shower overall. Based on these observations, and the recovery of the Tempel-Tuttle comet on March 10, 1997, predictors have indicated that a storm is possible both this year and probably next!

For us in North America, however, the predicted activity will not reach storm levels. Glenn E. Peterson and David K. Lynch (no relation to your author) have predicted that the peak will occur around 2040 UTC, will last 1–2 hours, and will be most visible in central to east Asia.

While this leaves us here in North America out of the major part of the action, it certainly does not leave us out of making plenty of QSOs during the time of the peak activity of the *Leonids*. Peterson and Lynch indicate that increased *Leonids* activity will occur during the days of November 13–20. These two researchers are particularly interested in the peak because of their interest in its effects on orbiting satellites. Early this past summer they testified before a congressional committee on the effects, reporting that while some satellites may sustain minor damage from the shower, most of their concern centered around plasma-forming ionization that might take place around the satellite, which could cause problematic disruption of the electronics on board it. They will be hosting a conference next spring to discuss observations that took place during this year's activities.

Working the Meteors In a Storm

The *Leonids* may or may not reach storm levels. As Peterson and Lynch and several others have indicated, if a storm occurs, it will not be visible here in North America. Nevertheless, the ZHR rate may be such that sustained QSOs can take place during the 1–2 hours of the peak. If this is the case, then schedules are a waste of time. You should concentrate entirely on random QSOs.

Now here is the dilemma: If you park on the calling frequency expecting to make randoms by way of your being there, you can fairly well forget it. The big guns will be there in force. With all this probable QRM, it is unlikely that many—including the big guns—will make much headway. It is much better to spread out off the calling frequency. I would suggest being on 2 meters spreading out at least 50 kHz above and below 144.200 MHz. If you are a big gun, find a frequency sufficiently off the calling frequency and call and call and call. I guarantee that others will find you. Your QSO rate will be much higher and more free of QRM than if you try to compete with your fellow big guns on the calling frequency.

This year and possibly next will be those once-in-a-lifetime events that you do not want to miss. If you are camped out on a calling frequency hoping to "duke it out" there, you will miss those opportunities. Furthermore, you will also keep those lesser guns from having the opportunity of working you!

Making Contacts Via Meteor Scatter

Oftentimes contacts made during the 1966 *Leonids* storm and other storms are "nearly normal" in that the operators were able to copy each other for periods of 2 to 3 minutes at a time. Contacts attempted via meteor scatter are much different in structure.

The days surrounding the peak of the *Leonids* will give ample opportunities to make contact via prearranged schedules. If you are interested in this form of communications, here is how you do it:

For most meteor contacts made via meteor scatter, a structured schedule is set between two stations who wish to talk to each other. If you set such a schedule, you'll probably run for half an hour. You'll transmit for 15 seconds and listen for 15 seconds. The westward station transmits first. Some operators break at the end of 7 seconds and listen briefly for the other station. Be sure to clarify operating procedures with the other station before beginning your sked. The initial exchange includes the other station's callsign and your callsign, without either of you saying "this is."

For example, if I, in Oklahoma, grid locator EM15, were running with Ken Ramirez, N4UK, in EM84, I would start by saying "N4UK N6CL" over and over again for 15 seconds. I would then listen for Ken to repeat "N6CL N4UK" over and over again during his 15 seconds of transmission time.

After one of us has heard "complete callsigns," the receiving station starts transmitting a signal report. So when I have heard both my call and Ken's call (in no particular order), I start repeating "S-2" during my 15 second segment, interspersing our callsigns—just in case Ken has yet to hear complete callsigns.

The signal report of "S-2," rather than the traditional "59," is a way of telling the listener the length of the burns being heard. The letter "S" stands for the word "signal" and the number 1, 2, or 3, stands for the length of the burn. Number 1 stands for "pings," number 2 stands for burns long enough to make a contact, and number 3 stands for very long burns—at least 15 to 30 seconds in length. Therefore, a signal report of "S-2" means that the sending station is hearing the receiving station on burns long enough to make a contact. As a matter of convenience, most operators stick with "S-2"—much like HF operators stick with "59."

Assuming Ken has heard both calls and the signal report "S-2," he'll start saying "Roger, S-2," over and over again during his 15 seconds. Once I have heard "Roger, S-2," I reply with "Roger" over and over again. Once Ken has heard my "Rogers," the QSO is considered complete. As an option, Ken can come back and say "Roger, 73" repeatedly during his sequence. However, it's not necessary to complete the contact.

Occasionally, the sequence can be broken. For example, when I ran with Ted Goldthorpe, WA4VCC (now W4VHF), during the 1992 *Perseids* meteor shower, I heard him give callsigns during the last 3 to 4 seconds of his 15-second segment. I immediately said, "WA4VCC N6CL. WA4VCC N6CL. S-2, S-2, break." Hearing me, Ted came back and said, "Roger, S-2. Roger, S-2, break." Continuing to hear him, I replied, "Roger, roger, roger, break." Hearing my "Rogers," Ted responded, "Roger, 73. Roger, 73. Break." I then replied "73, 73." At that point, we both considered the contact more than complete just three minutes into the half-hour schedule.

Band Conditions

What band conditions can you expect during meteor showers? Unfortunately, it's not entirely possible to predict band conditions with certainty, especially considering what propagation modes may be present at that time (sporadic-E, tropo, etc.). However, some generalizations can

be made based on past experiences. On 12 meters, it will seem as if the band is open everywhere (on short skip) during the hour or so long peak. On 10 meters, conditions will be much the same. If the storm is very intense, the same conditions that exist on 10 meters may also be present on 6 meters. On 2 meters, stations may have propagation over a given path for up to a minute or so. On 135 cm, propagation may exist for up to 5 seconds, or more. Propagation on 70 cm may exist for a fraction of a second up to a couple of seconds.

Leonids Home Pages

The most extensive home page that I have found is the following: <http://web99.arc.nasa.gov/~leonid>. There are many others that you may find. Just set your search engine on "leonids meteor shower" and cruise. You may also check out Sky Publishing's home page <http://www.skypub.com/news> for their latest information.

Books on Meteors

Meteors, by Neil Bone, is an excellent book released by Sky Publishing Corporation as part of their *Sky and Telescope Observer's Guides* series. For the radio amateur, this book provides a great deal of insight into what a meteor is, and how the meteor and Earth collide to create the visual (and, in our case, the electronic) observations we experience. The book gives a brief history of meteor studies and contains a season-by-season calendar of annual meteor showers and their characteristics. A few paragraphs are devoted to the amateur radio operator's interest in meteor scatter propagation.

The *International Meteor Organization's Handbook for Visual Meteor Observations,* edited by Paul Roggemans and also published by Sky Publishing Corporation, covers meteor showers extensively. Included are historical anecdotes of both major and minor showers. I use this book almost every month when preparing this column .

For a copy of *Meteors,* send $18.95, plus $2 shipping and handling to Sky Publishing Corporation, P.O. Box 9111, Belmont, Massachusetts 02178-9918. For a copy of the *Handbook,* send $18.95, plus $2 shipping and handling to the above address. For your convenience, charge-card orders are accepted via the company's toll-free number, 800-253-0245, from 9 AM to 4:30 PM Eastern time, Monday through Friday.

SVHF Society Conference Call For Papers

The Southeastern VHF Society will host its third annual conference April 9–10, 1999 in Atlanta, Georgia. This announcement is a first call for presentations to be made at the 1999 conference and papers to be published in the conference proceedings (submissions due by mid- February). Contact program chairman Bob Lear, K4SZ, at P.O. Box 1269, Dahlonega, GA 30533 (telephone 706-864-6229, e-mail <k4sz@stc.net>). In addition to the technical program, there will be preamp noise-figure testing, antenna gain measurements, a fleamarket, banquet, and door prizes. Further details will be announced here in this column and on their web site, <http://www.svhfs.org/svhfs/>.

A Future for EME?

The following is from Andrea Ghilardi, IK5QLO, via the Moonnet reflector. It presents some interesting observations and proposals: "This ideas come from some thought expressed by Frank NC1I in the last ["432 EME Newsletter" published by Al Katz, K2UYH] about the low activity on the 70 cm EME band, even a big gun like him (48 Yagis) get frustrated after having called CQ for a long time without any or very few replies.

"Are we facing a crisis?

"Well in reality the whole amateur radio world is under attack by the rising of new kinds of communications media, Internet, cellular, Lpd, etc. The younger generation is fascinated by the digital revolution, and considers 'radio' just another mean of transmitting data. Time goes by, and if we look at ourselves EMEers what we see? EME is now a low-tech activity, like the building of tube audio amplifiers, except perhaps for the wolf pack of the few uWave EMEers. Basically the setup of a station is the same of 20 years ago, only thanks to the work of few courageous, we had improvements in antenna design and components (GaAsFETs, DSP). EME is still a very good self-teaching way of life, but its way is going further from the nowadays trend of technological progress. We see an increasing number of 144 MHz EME stations, many coming from the HF and VHF DX rows, but this is due to the presence of some holy men who dedicated their life to the mission (we know who they are). In my opinion there are some possibly ways of boosting the EME trend:

"1. attracting beginners to our activity

"2. bringing back our technology near the up to date.

"The main problem for the one who wants to start the EME activity is the size of the antenna. The major part of us poor boys live in urban and suburban areas, where antenna size regulations and/or neighbors' attitude is getting worse every year. Moreover also taking forceis the concept of 'Electromagnetical pollution,' and some OMs already had a visit from the health bureau officials. Here now we have a law, and many people start to feel 'menaced' by 'big' antennas.

"We Need Smaller Antennas: This can

be done by optimizing the ones we had, and with the right choice of the frequency to use. I think that perhaps the maximum acceptable size would be a 2 meter dish for the uWave bands and 4 Yagis on the 2–4 mts size range for the 2m/70 cm band. See the excellent job done by F/G8MBI with his cross polarization Yagis. Maybe the 2.4 GHz band if found a common segment would be the right choice.

"We Need to Use Less Power: The use of [digital signal processing] should be applied to reach a two-way low-speed digital communication. There is an interesting work in course by IW5BHY that is receiving signals in the range of –30 dB below the noise applied to the VLF band (has been discussed at the Italian EME conference). We should also concentrate on solid-state designs of PA for every band, now surplus power modules for 100–150W output in the 400–500 MHz region are becoming available at a very low price, and what about the DAB transistors for the 23 cm?

"We Need to Regain Interest for The Moon: A lunar microwave beacon transmitting data and/or images to receive with a simple setup would increase the interest for the deep space ham activity. The main IARU leagues would every year offer funds/prizes to the people or groups who would work on these innovative projects, as is happening with the OSCAR project.

"These are of course my own personal opinions. I'd like to stimulate a discussion on the matter. I hope I made myself understood. Please excuse my so-so language. EME is FUN. Let's keep on doing it the right way. 73 de Andrea IK5QLO."

And Finally . . .

I mentioned above that this month may present a once-in-a-lifetime opportunity for us weak-signal VHF operators. I hope that we work at making it possible for others to also enjoy this opportunity. We can do this by way of educating others to the opportunity and recruiting them into our ranks. We can also do so by way of our on-air activity. We must be courteous and helpful to our fellow amateurs—especially to the new ones within our ranks. Please don't try to hog all of the QSOs. There will be plenty for all. From testimony of my friends who worked the last *Leonids* storm, there was plenty of time to make plenty of contacts—and even ragchew with friends during some of the QSOs.

I hope to see plenty of reports of many completed QSOs. Additionally, I also hope to see plenty of reports of new operators having made their first meteor QSOs. Thanks for doing your part to make it happen.

Until next month . . .

73, Joe, N6CL

BY BUCK ROGERS, K4ABT

PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

It's Not Rocket Science; It's Packet Radio

Packet has again launched amateur radio into the next era of computer-to-computer communications, and with a *quantum* leap. There are many new amateurs entering the hobby with the express purpose of using the computer and packet radio to link with the Internet.

As we are seeing, many of these new packet operators have learned that you don't need an expensive Internet Service Provider (ISP) to enjoy Internet communications. I know many amateurs who enjoy e-mail and other features of the Internet via packet radio. They don't have to pay the $20 to $50 a month for an ISP Internet connection.

Much of the e-mail I receive comes to me from the growing number of amateurs who have access to their local packet BBS. In turn, the local packet BBS has what is referred to as an "Internet gateway." To see if your local BBS has an Internet gateway link, try sending a message to me at: <k4abt@packetradio.com>. If the message reaches my Internet mail server, I will then attempt a reply to you—that is, to the address that is indicated for a return path to your packet BBS and to your callsign. This will enable you to understand why there is a renewed interest and rapid growth in the digital, and especially packet, mode(s).

As a result of this rapid growth, many of the new amateurs are finding other uses for their packet stations. In addition to packet's access to Internet gateways, they've discovered a large variety of other packet applications that exist, including keyboard-to-keyboard (wireless) networks, via nodes, APRS (GPS) networks, DX spotting nets, BBSes, DX spotting clusters, and much more enjoyment centered around the use of packet radio.

With many of these packet systems, the user can connect to distant stations in other cities, states, and countries using low-powered transceivers. There is no need for super-powered transceivers that run 50 to 100 watts.

For The Newcomer To Packet Radio

Packet radio is a mode of communications which makes use of a "store-and-forward" technique called AX.25 protocol. This format provides error-free through-put of both ASCII and binary text or data between stations that are connected using the AX.25 protocol.

When the prospective packeteer attends a hamfest, one of the items he or she will be looking for is an economical (second) transceiver that can be dedicated exclusively to packet operation. Usually this is a transceiver that will function exclusively in the digital, or packet, modes at the home QTH.

One such transceiver is the MFJ-8621. This unit fills a multitude of requirements for the prospective packet user. There are savings to the consumer, since the 8621 comes without a mobile mounting bracket, microphone, or other accessories that are not needed in a packet environment. Although the MFJ-8621 runs less than 10 (5 to 7) watts, don't let this fool you. The 8621 combined with a good antenna will make the trip to area packet stations, local network nodes, APRS links, and DX spotting nodes with ease. I know, as I use one attached to an Isopole at 40 feet and connect easily to nodes 40 miles away.

Interfacing The TNC

Only the connector for the TNC (terminal node controller) end is needed to put the packet station on the air. Many TNC manufacturers include the TNC connector as one of the supplied accessories.

Pin-out connections for the MFJ-8621 DataRadio I/O connector are listed below. These connections are already wired and soldered in the cable connector that comes with the MFJ-8621 DataRadio. For the record, if you plan to use the 8621 with an MFJ-1270 (B, C, or CQ turbo), the pin configuration is the same on both ends of the connector(s).

5 pin DIN No.	TNC Function
1	AFSK output
2	Shield
3	Push-To-Talk
4	Receive Audio
5	HF Squelch (N/A)

The MFJ-8621 is crystal controlled. Therefore, you should specify the frequency you wish to use when placing an order for an MFJ-8621.

One other note of interest about the MFJ-8621 is the multi-baud capability of the beast. It has internal strapping options that enable the user to set it for either 1200 or 9600 baud operation. The MFJ-1270 CQ Turbo and the MFJ-8621 that I use make a great combination for use at 9600 baud.

Important Note: If hum or noise is experienced on the transmitted packet signal, disconnect the shield connection at the TNC end of the cable.

As added support, this month I'm including a large number of drawings that illustrate examples of how your TNC can be interfaced to several types and models of transceivers.

For the operator who does not have the time or experience in soldering tiny connections, I am including the MFJ part number for each of the TNC-to-transceiver interface cables with this month's "Packet User's Notebook."

The price of most of the interface cables shown is around $15 (US). If the cable uses a 13-pin DIN, or for specialized TNC to accessory port radio connections, the price is closer to $20 (US).

Basic Packet Operation

Before beginning the setup procedures that we are about to discuss, I recommend that you read the operation section of the manual that comes with your TNC. For openers, here is a short "basics" section on the subject matter surrounding packet operation.

Using the interface configuration for your TNC, connect the transceiver to the TNC. Your TNC should already be interfaced to your Data Terminal Equipment (DTE). The DTE can consist of a "dumb"

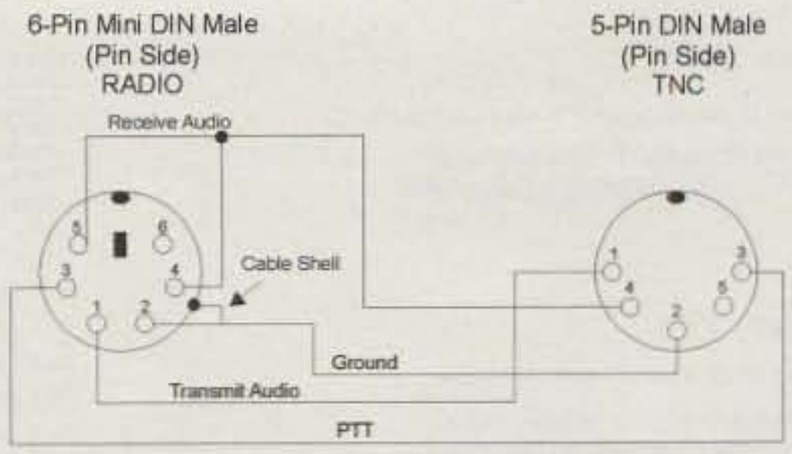
Hamfest '98

Hamfest '98, presented by the Alford Memorial Radio Club of Stone Mountain, Georgia, will be held November 7–8, 1998, at the Gwinnett County Fairgrounds, Lawrenceville, Georgia. Featured will be prizes, vendors, fleamarket, tailgating, RV area, contests, and forums. The Southeastern Emergency Digital Association Networks Conference will be held on Saturday afternoon, November 7th, at 2 PM at the Lawrenceville Hamfest location. Talk-in on W4BOC repeaters: 146.760- (PL 107.2), 145.45-, 44.25 (PL 131.8). For hamfest information, e-mail<hamfest@radio.org> or call 770-410-3989.

211 Luenburg Drive, Evington, VA 24550
e-mail: K4ABT@PacketRadio.com

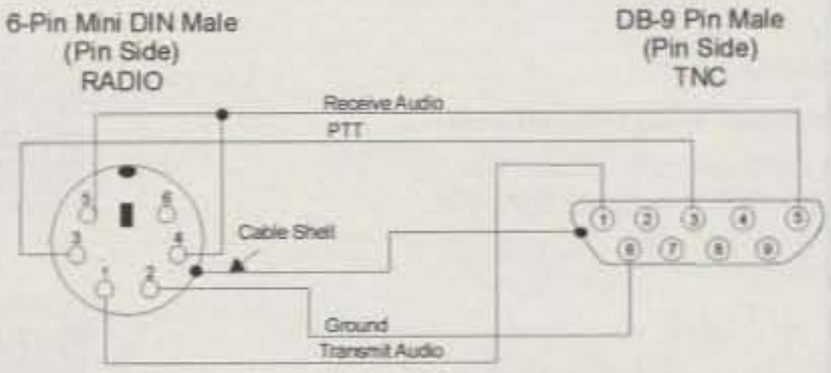
Model MFJ-5060

This cable is for Kenwood, Yaesu, and Azden radios with 6-pin Mini DIN Data Ports.
This cable could be compatible with other radios with the same Data port configuration.
Please check your Kenwood, Yaesu, or Azden radio manual.
This cable is for MFJ TNCs and other TNC2 compatibles with 5-pin DIN ports.



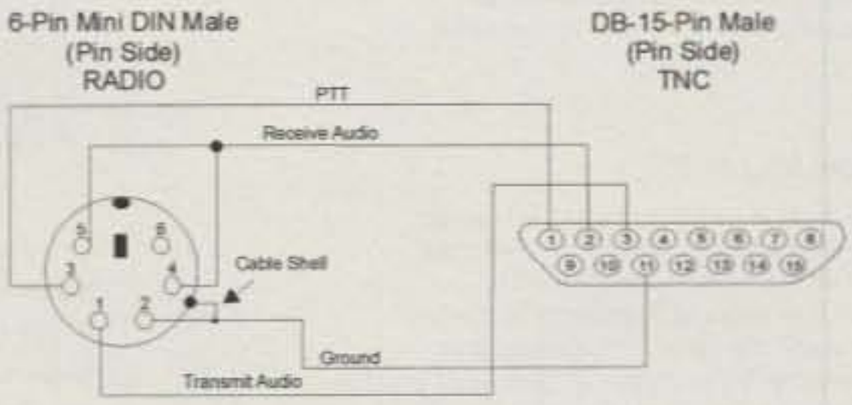
Model MFJ-5060YV

This cable is for Kenwood, Yaesu, and Azden radios with 6-pin Mini DIN Data Ports.
This cable could be compatible with other radios with the same Data port configuration.
Please check your Kenwood, Yaesu, or Azden radio manual.
This cable is for the Kantronics KAM/KAM+ VHF, KPC-3, KPC4, and KPC-9612 1200 baud Port



Model MFJ-5060YQ

This cable is for Kenwood, Yaesu, and Azden radios with 6-pin Mini DIN Data Ports.
This cable could be compatible with other radios with the same Data port configuration.
Please check your Kenwood, Yaesu, or Azden radio manual.
This cable is for the Kantronics KPC-9612 9600 baud port ONLY.

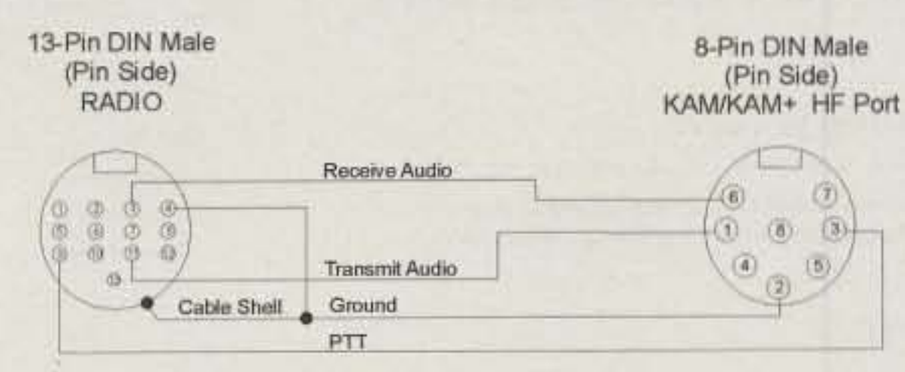


Model MFJ-5066

This cable is for Kenwood radios with 13-pin DIN accessory ports.
This cable could be compatible with other radios with the same port configuration.
Please check your Kenwood or other radio manual.
This cable is for MFJ TNCs and other TNC2 compatibles with 5-pin DIN ports.

Model MFJ-5066YH

This cable is for Kenwood radios with 13-pin DIN accessory ports.
This cable could be compatible with other radios with the same port configuration.
Please check your Kenwood or other radio manual.
This cable is for MFJ TNCs and other TNC2 compatibles with 5-pin DIN ports.



terminal, or a computer with the appropriate terminal software loaded.

I provide a Packet Radio Terminal program (BUXTERM.EXE) *free!* The terminal program is written for the PC and compatibles. To receive the program, send an MS/DOS formatted, 3.5 inch disk to: BUXTERM, 211 Luenburg Dr., Evington, VA 24550. Include a self-addressed, stamped (two 32-cent stamps affixed) return mailer for the disk and printed documentation. A 5" × 9" envelope works very well. Please understand that this offer is only good for residents of the United States, as overseas postage becomes a matter of saw-buck$.

Basic TNC Configuration

The TNC should be configured for the correct handshaking between the computer/terminal and the TNC. Most computers use "hardware" handshaking. If this is true in your situation, then set the TNC XFLOW to OFF. If you are using "software" handshaking, then set the XFLO to ON. It's as simple as that. If you are using "BUXTERM.EXE," then set the XFLOW OFF. BUXTERM implements (RTS/CTS) hardware handshaking.

To begin operation of your packet station, there are other TNC parameters which may need setting. As a rule, the TNC manufacturer will supply the TNC

with "DEFAULT" parameters which may (or may not) be acceptable. As you become familiar with your new station, and with the transceiver, you may determine that some adjustments of the TNC parameters are needed.

Before we go much further, you *must—must*—install your callsign in the TNC. At the command prompt (cmd:), enter your callsign in the following manner:

MYCALL [Your Call] <enter>

Note: Callsign installation may differ in some TNCs.

To begin, let's set a few TNC parameters: TXDelay 30 to 40 (300 to 400 milliseconds). TXD 35 is optimum for the transceiver. In most applications, you may find that even faster TXDelay times are acceptable. This is because the transceiver may have a very rapid receive-to-transmit transition period.

If you are using the MFJ-8621 Data-Radio at 9600 baud, then you can reduce the TXD to as little as 5 to 9. When Rick Littlefield, K1BQT, designed the 8621, he did us all a favor and used "pin diode" transmit/receive switching, thus enabling a very fast receive-to-transmit component.

Here are a few parameters that I use at 1200 baud. However, your TNC may have default parameters which will work okay without changing them.

FRack 4 (for 9600 bauds, use Frack of 1), SCReenl 0, MCOM ON
MCON OFF, DWait 16 to 33, MRPT ON

Other TNC parameters can be set to suit the user's system and mode of operation. It should be pointed out that these settings may also depend on the make and model of your terminal, and in some cases, the software.

Ensure that an antenna, for the packet band of operation, is attached to the transceiver.

Turn on the transceiver and switch to the packet frequency that you wish to use. It is very important that you check the transceiver "*shift*" or offset to be sure it is set to simplex. Most packet systems operate in the simplex mode. Thus, there are no offsets and no "shifts" used.

If you are unable to contact a local packet user's group or a fellow packeteer to assist you with your first contact, then try one of the national throughput frequencies such as 145.010 or 145.050 MHz. In the southeastern states there is a large network of nodes on 145.770 MHz.

Receiving Packet Signals

In tests that I've run on many TNCs, I find that setting the volume control pointing to the left, or set clockwise to 9 o'clock will provide ample receive audio for decoding data by most TNCs. In rare cases it may be necessary to move the volume to the 10 o'clock setting.

As you become familiar with the transceiver and TNC, you may observe that less receive audio is needed, or in a few instances your TNC may require slightly more (or less) receive audio. The squelch is set to a point where no noise (background hiss) is received through the speaker of the transceiver, or indicated by the DCD lamp on the TNC. Under normal operating conditions, we've noticed that a setting around 11 o'clock is sufficient to keep the noise subdued until a packet signal is present.

Another way to set the volume and squelch with the TNC is to make all the correct interface connections, and with the system on and in the receive operating mode, turn the volume up about one-fourth turn, or to about 10 o'clock. Open the squelch by turning it all the way counter-clockwise, until noise is heard.

While watching the DCD, or RCV, LED on the TNC, assuming the DCD lamp is illuminated, turn the volume control down until the DCD LED is no longer lit. Now slowly turn the volume control until it again illuminates. To be sure there is ample receive audio drive to the TNC, move the

Model MFJ-5106

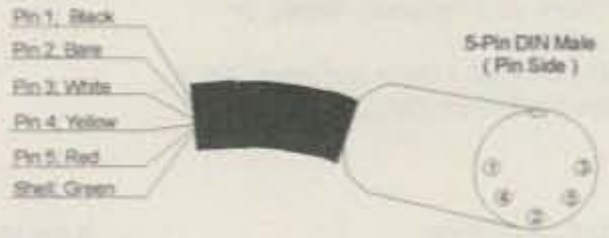
Pre-Wired Open ended 6-Pin Mini DIN cable

Always check continuity between wire colors and cable pins using an ohmmeter.

Model MFJ-5205

Pre-Wired open ended 5-pin DIN cable

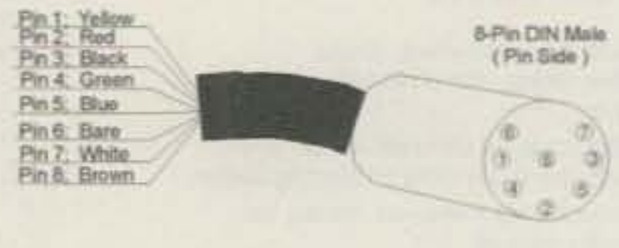
Always check continuity between wire colors and cable pins with an ohmmeter.



Model MFJ-5208

Pre-Wired open ended 8-pin DIN cable

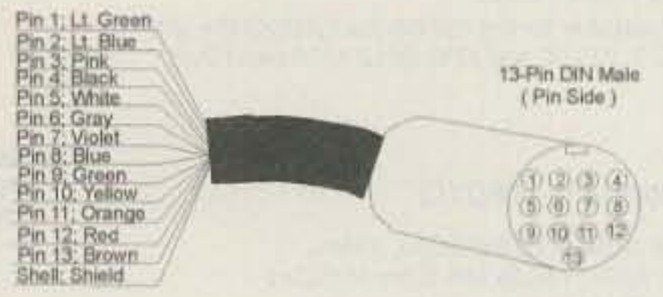
Always check continuity between wire colors and cable pins with an ohmmeter.



Model MFJ-5213

Pre-Wired open ended 13-pin DIN cable

Always check continuity between wire colors and cable pins with an ohmmeter.



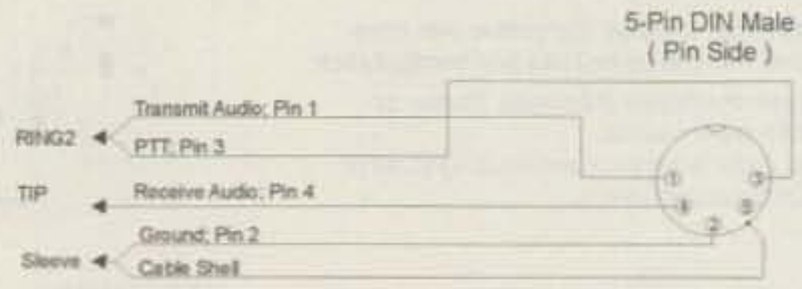
Model MFJ-5020

This cable is for Yaesu hand-held radios with the single pin microphone connector such as the FT-50R and FT-50RD.

This cable could be compatible with other radios with the same port configuration.

Please check your Yaesu or other radio manual.

This cable is for MFJ TNCs and other TNC2 compatibles with 5-pin DIN ports.



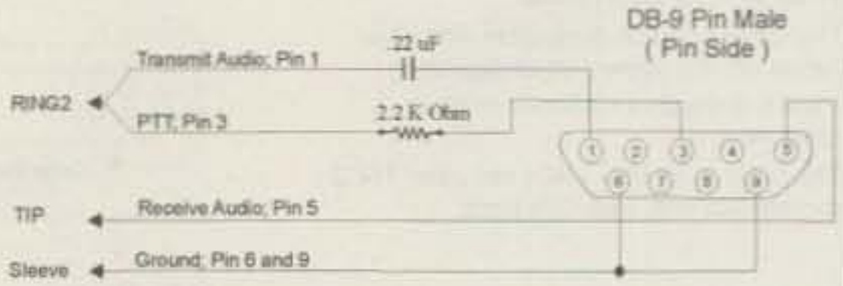
Model MFJ-5020YV

This cable is for Yaesu hand-held radios with the single pin microphone connector such as the FT-50R and FT-50RD.

This cable could be compatible with other radios with the same port configuration.

Please check your Yaesu or other radio manual.

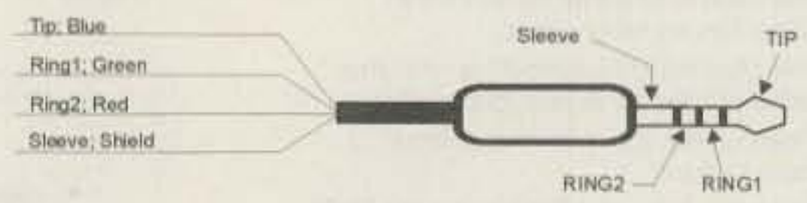
This cable is for the Kantronics KAM/KAM+ VHF, KPC-3, KPC4, and KPC-9612 1200 baud Port



Model MFJ-5220

Pre-wired open ended single pin mic cable

Always check continuity between wire colors and cable pins with an ohmmeter.

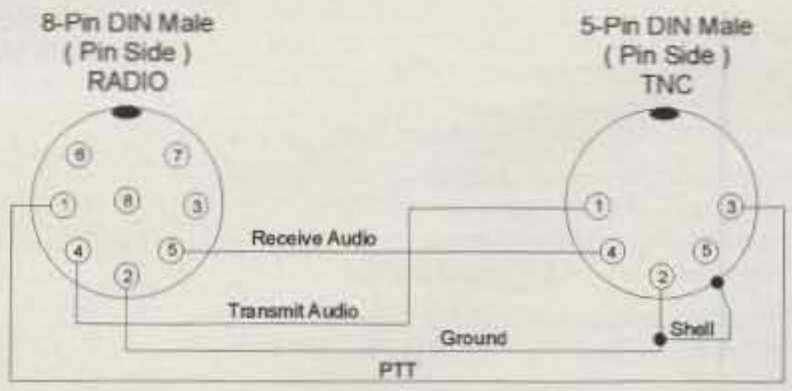


Model MFJ-5063

This cable is for the following ICOM Radios:
IC-725, 726, 728, 729, 735, 736, 737, 737A, 738, 756, 761, 765, 775DSP, 781

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 8-Pin DIN Accessory Port, NOT the MIC.

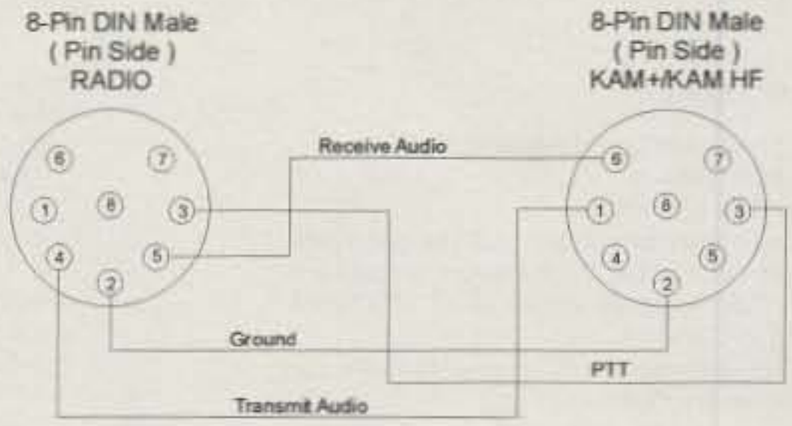


Model MFJ-5063YH

This cable is for the following ICOM Radios:
IC-725, 726, 728, 729, 735, 736, 737, 737A, 738, 756, 761, 765, 775DSP, 781

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 8-Pin DIN Accessory Port, NOT the MIC.

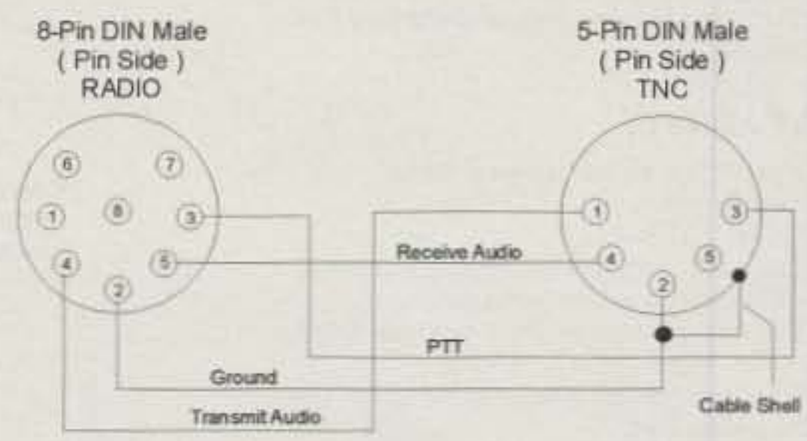


Model MFJ-5064

This cable is for the following ICOM VHF transceivers:
IC-275, 375, 475, 575, 1275, 820H, 821H

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 8-Pin DIN Accessory Port, NOT the MIC.



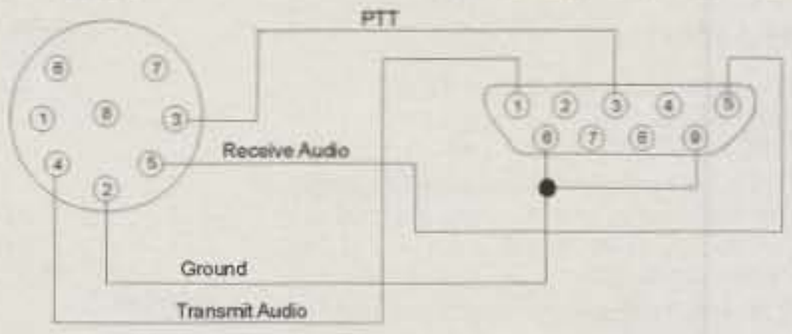
MFJ-5064YV

This cable is for the following ICOM VHF transceivers:
IC-275, 375, 475, 575, 1275, 820H, 821H

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 8-Pin DIN Accessory Port, NOT the MIC.

This cable is also compatible with the KPC-9612 1200 Baud Port.



volume control slightly, more clockwise. This will ensure that enough receive audio is present to provide best data decoding.

Too Much Audio is as Bad As Not Enough

Next turn the squelch up (clockwise) until the DCD LED extinguishes or goes off. As with the volume, close the squelch slightly more clockwise to be sure there is a solid squelch threshold.

If you are on a packet frequency (national calling frequency is 145.010 MHz) and there are packet signals present, your transceiver should be hearing the packet signals. If the terminal is connected and the TNC is properly configured, your station should be printing text on the screen.

Transmitting Packet

To operate (transmit) a packet station you should have a current amateur radio license that allows operating privileges within the spectrum to which your transceiver is tuned. Then, if the interface cables are properly wired and connected you are ready to establish contact with another packet station. It is wise to solicit the help of another person who is already operating in the packet modes. This way you will have someone who can listen for your signal and guide you into the operating frequencies that are used for packet in your area.

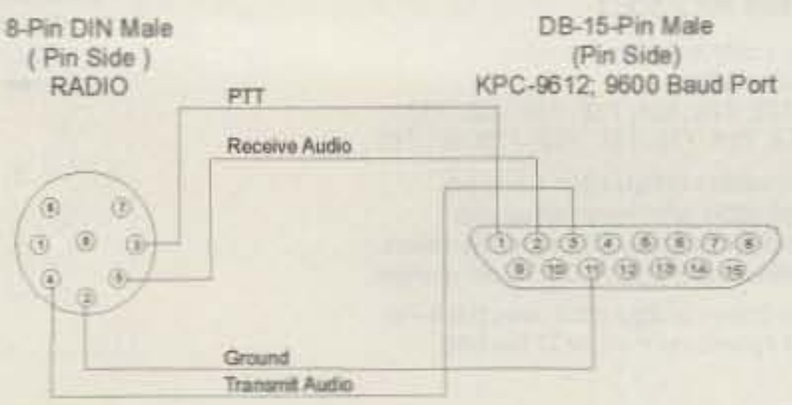
MFJ-5064YQ

This cable is for the following ICOM VHF transceivers:
IC-275. 375, 475, 575, 1275, 820H, 821H

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 8-Pin DIN Accessory Port, NOT the MIC.

This cable is compatible with the KPC-9612 9600 Baud Port only.



MFJ-5065

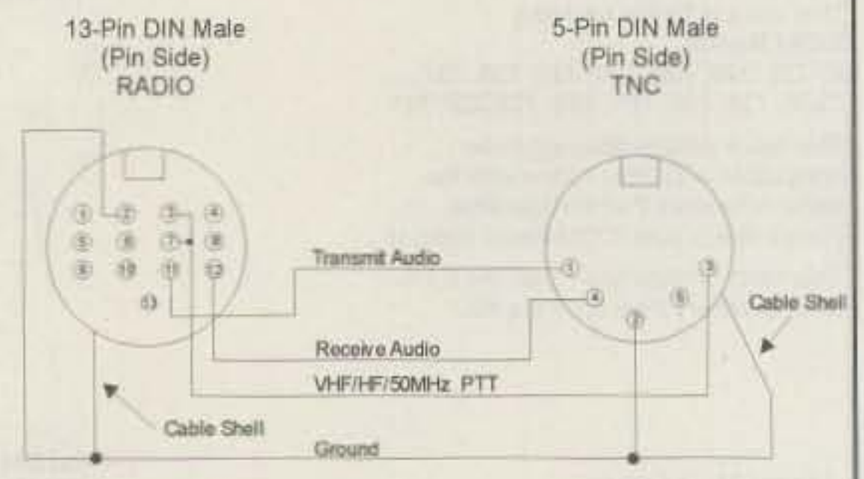
This cable is for the following ICOM transceivers:
IC-706, IC-706MKII

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 13-Pin DIN Accessory Port.

This cable is for MFJ TNC's, including the MFJ-1278 series.

This cable could be compatible with other TNC2 compatibles. Please check your TNC manual.



MFJ-5065YV

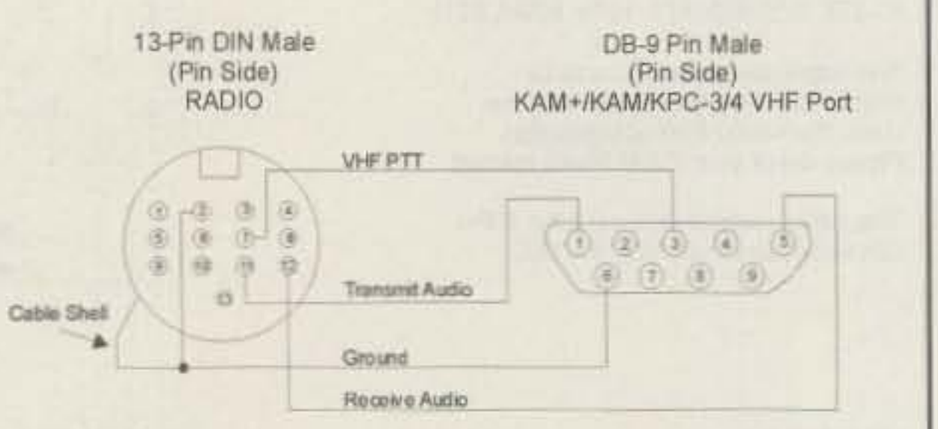
This cable is for the following ICOM transceivers:
IC-706, IC-706MKII

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 13-Pin DIN Accessory Port.

This cable is for the Kantronics KAM+/KAM, KPC3/4 VHF Port.

This cable is also for the KPC-9612 1200 Baud Port.



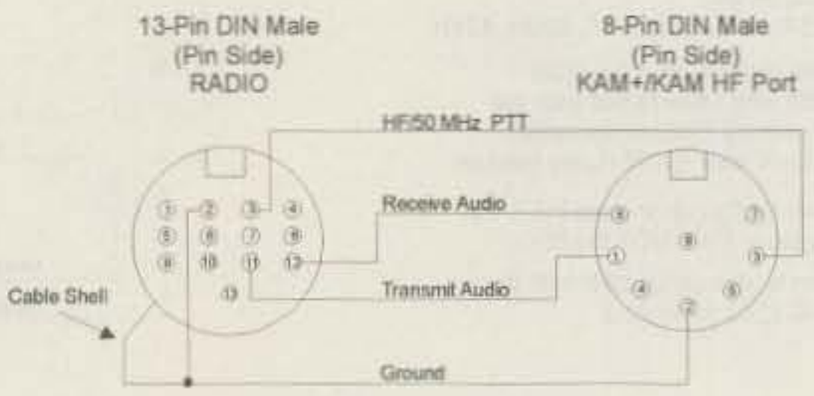
MFJ-5065YH

This cable is for the following ICOM transceivers:
IC-706, IC-706MKII

This cable configuration could be compatible with other radios with the same Accessory Port configuration. Please check your ICOM Radio manual.

This cable configuration uses the 13-Pin DIN Accessory Port.

This cable is for Kantronics KAM+/KAM HF Port.



Although the transceiver is engineered to make use of limiting circuits that are designed to prevent over modulation (deviation), there are some TNCs which may drive the transmit audio circuitry too hard. An indication that a problem such as this is present would be noticed when a connect attempt is made to a nearby packet station with no results. Often too much transmit deviation can cause the same problem as not enough transmit audio. The best audio level setting has been found to be in the range of 3.0 kHz to 4.0 kHz swing.

Without exception, all TNCs have provisions within their circuitry that allow the user to increase or decrease the AFSK (transmit audio) level(s) when necessary. It is advisable to have knowledge of which component inside the TNC controls the audio output, as it may be necessary to make an adjustment to the associated level control(s). Remember that this is the exception and not the rule; only about 15 percent of all TNCs will require any adjustment at all.

Having fun with packet radio is what it's all about. For more information and illustrations, visit the PacketRadio Networking home pages on the internet at: <http://www.PacketRadio.com>, <http://www.PacketRadio.org>,or <http://www. sedan.org>. Send e-mail to me at <k4abt@PacketRadio.com> or at <buck4abt@inmind.com>.

Until next month, Have Fun Packeting!
73 de BucK4ABT

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DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

The New Orleans International DX Convention

On Saturday, August 15 at the Royal Sonesta Hotel in New Orleans, Louisiana, Delta Division Director Rick Roderick, K5UR, delivered a short history of the DX Century Club and discussed its near-term future, under the DXCC 2000 program.

Rick turned the clock back more than 30 years, to 1966, when the ARRL tried to eliminate the Phone DXCC award. The result was the exact opposite of what the League wanted. Instead, the board of directors added the five-band DXCC award to the growing program. The DXCC desk consisted of Bob White, W1CW, and an assistant. In 1973 the League again tried to eliminate the Phone award. Again, the DXCC program expanded to include a CW-only award, beginning in 1975. In the next two years the DXCC program added awards for satellite contacts, RTTY, and 160 meters to the then-existing awards. By 1996 the DXCC desk included six full-time employees.

Of the 40,000 DXers who have earned a DXCC award, nearly 8000 appear on the annual list, having actively participated in the program during the previous year. The DXCC desk gets more than 16,000 applications (new and endorsements) each year, with some 570,000 QSL cards. These must be entered into the DXCC computer system, which already includes data from some 7,000,000 cards!

To put the program into perspective for the ARRL, the 4665 applicants from the United States, who must be members of the ARRL to participate, represent about 3% of the total ARRL membership. Thus, the DXCC program uses a disproportionately large fraction of ARRL resources while benefitting a relative handful of League members.

Rick then moved to the present—the implementation of the DXCC 2000 decisions. He reminded the convention-goers that the DXCC 2000 program has several objectives: broaden participation, make the program more equitable, produce criteria that are more easily understood, improve the process of adding and deleting "entities," and increase administrative efficiency. There are two aspects to the DXCC 2000 decisions: changing the rules and adding new awards. We have seen the first stage, with the new rules taking effect at the end of March. Three new DXCC "entities" were the result (see below). Rick suggested that we'll see a couple more New Ones from the changes in the rules.

Zorro, JH1AJT, operating as KG6SL from Saipan.

Meanwhile, the DXCC desk is working on the second part of DXCC 2000—new awards. The ARRL plans to add single-band awards for those bands not now with one, with the exception of 30 meters. Look for single-band DXCC awards for 20, 17, 15, and 12 meters. Also on the list is the DXCC 2000 challenge for band-countries from 160 meters to 6 meters, with a trophy to the leader each year. Finally, another one-shot DXCC certificate will be available for working 100 countries in the year 2000. Similar to the Golden Jubilee DXCC award, this one will not require QSL cards. For the avid certificate chaser, this means that there will be some 24 separate DXCCs to chase!

In the not-so-good news department, Rick said that DXCC program fees should cover 90% of the direct costs of the program. Look for significantly higher DXCC fees in the future. Other pending changes in the DXCC program include electronic submission of applications and improvements in the field-checking program. Lots of new DX excitement lies in the future.

Other presentations at the convention included Frank Smith, AHØW, on the **K7K** Kure Island operation; Silvano Amenta, KB5GL, on his Providencia Island **HKØ** operation; John Cantrell, WB4MBU, on **TT8JFC** from Chad; Temolu Islands **H40AA** by Bruce Butler, W6OSP; Palmyra and Kingman by astronaut Chuck Brady, N4BQW; North Cook **ZL1XXP** by Tom Harrell, N4XP; and **5A28** from Libya, by Recep Guersoy, OE2GRP. All this plus some technical talks, DXCC card checking by Bill Kennamer, K5FUV, and more made this NOIDXC a great experience.

As always, the banquet food was excellent—by far the best banquet food we have ever had. The dinner alone is worth the trip to this convention. Friday and Saturday evenings were capped with the hospitality suite sponsored by Carl Smith, N4AA, of DX Publications. The view from the balcony, overlooking Bourbon Street at its best, is a highlight of the NOIDXC experience. Laser pointers were put to good use.

One of the attendees at the NOIDXC was Paul, BV4FH, who commented on a return DXpedition to Pratas Island BV9P. He reported that a group was "close" to obtaining the proper authorization to operate from this highly sensitive location close to the China coast.

A highlight of the NOIDXC is the presentation of the DXer of the year. For 1998, the honoree is Frank Smith, OH2LVG/AHØW. Frank is the Consul of Finland to Arizona and works for Merrill Lynch. When Finland's then-ambassador to the US recommended that Frank look into shortwave radio as a means of keep-

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ing up with events in Finland, Frank went on to relearn the code, long forgotten from his days as a Scout. Frank got his US licence in 1987. Since then, Frank has been very busy in DX, both as an operator on numerous DXpeditions and also as a land-based organizer of DXpeditions and humanitarian efforts for amateurs.

Among Frank's operations are OHØAD, OF2C, OJØ/KF7FO, XF4M, 4J1FM, ZS9P, K7K, XW30, ZA1A, KH4, PJ7/8, and others. He founded the Midway-Kure DX Foundation, which provides equipment and financial support to other DXpeditions, including operations to KH1, KH5, KH5K, VK9, and ZK1. He was a director and now chairs Project Goodwill Albania, which has grown into a major support group of the Albanian Amateur Radio Association. The project was originally set up to project medical care for ZA1B, but more recently has been providing humanitarian assistance to the Albanian refugees in Kosova.

Frank is married to Kirsti (from Finland) and has three children. Besides amateur radio, Frank is interested in photography and classical piano. He holds 5BDXCC and is on the Honor Roll. Congratulations, Frank.

Following the presentation of the DXer of the Year award, Frank talked about the **XW30** DXpedition to Laos, including plans for a return operation to the Plain of Jars to escape the heavy QRM downtown. Frank mentioned future DX operations from Rodriguez Island 3B9 and Bhutan A51, perhaps as early as 1999.

Three New DXCC Entities

At the New Orleans International DX Convention, ARRL Membership Services Chairman Bill Kennamer, K5FUV, announced that Temotu Province H40 is the newest addition to the list of current DX Century Club "entities" (what we used to call DXCC countries). This addition to the DXCC list is effective with contacts made beginning 2359Z on March 31, 1998, the official start date of the new DXCC 2000 rules which permitted the addition of the new entity.

The Temotu province consists of the islands of Santa Cruz, Duff, Reef, and Vanikolo in the country of the Solomon Islands. The nearest island in Temotu lies more than 356 kilometers from the islands of the main group of the Solomons, thereby qualifying as a New Entity under the revised DXCC country criteria rules.

The DXCC desk will accept cards for Temotu Province, including the **H40AA** cards, beginning October 1, 1998. Cards for the entity received before that date will be returned without action. Thus, the addition of Temotu will not affect the 1998 annual listing, for which cards were due September 30.

Frank Smith, AHØW, operating from St. Martin PJ8.

The WPX Program

SSB

2683	UA1ZKF	2685	KKØDX
2684	PY5FB		

CW

2990	RWØLIA	2992	I1WQR
2991	WBØUFB	2993	IK6SNQ

Mixed

1817	K2YJL	1818	PY5FB

CW: 350 I1WQR. 400 I1WQR. 450 I1WQR. 500 I1WQR. 500 I1WQR. 600 I1WQR. 650 I1WQR. 700 I1WQR, WC4K. 750 I1WQR., WC4K, K5YAA. 800 I1WQR, K5YAA. 850 I1WQR, K5YAA. 900 I1WQR, K5YAA. 950 K5YAA. 1000 K5YAA. 1350 N1IA. 1400 N1IA. 1900 KD6WW. 1950 KD6WW. 2000 KD6WW. 2050 KD6WW. 2100 KD6WW. 2150 KD6WW. 2200 KD6WW. 2250 KD6WW. 2300 KD6WW.

SSB: 350 DL4VBA, PY5FB. 400 DL4VBA, PY5FB. 450 K5YAA, PY5FB. 500 K5YAA, PY5FB. 550 K5YAA. 600 K5YAA. 650 K5YAA. 700 K5YAA, TI7DBS. 750 K5YAA, TI7DBS. 800 K5YAA. 1550 I3ZSX. 1600 I3ZSX. 2150 KD6WW. 2200 KD6WW. 2250 KD6WW. 2300 KD6WW. 2350 KD6WW. 2400 KD6WW.

Mixed: 450 K2YJL, PY5FB. 500 IK1SLE, K2YJL, PY5FB. 550 IK1SLE, K2YJL, PY5FB. 600 IK1SLE, K2YJL, PY5FB. 650 IK1SLE, K2YJL, PY5FB. 700 IK1SLE, K2YJL, PY5FB. 750 IK1SLE, K2YJL, PY5FB. 800 IK1SLE, K2YJL, PY5FB. 850 IK1SLE, K2YJL, PY5FB. 900 IK1SLE, K2YJL, PY5FB. 950 IK1SLE, K2YJL, PY5FB, K5YAA. 1000 IK1SLE, K2YJL, K5YAA. 1050 IK1SLE, ON4CAS, K2YJL. 1100 IK1SLE, ON4CAS, K2YJL. 1150 IK1SLE. 1200 IK1SLE. 1250 IK1SLE. 1300 AA1KS. 1400 KØKG. 1450 HA9PP, KØKG. 1500 HA9PP. 1550 HA9PP. 1600 HA9PP. 1650 HA9PP. 1700 HA9PP. 1750 HA9PP. 1800 HA9PP. 1850 HA9PP. 1900 HA9PP. 1950 HA9PP. 2650 KD6WW. 2700 KD6WW. 2750 KD6WW. 2800 KD6WW. 2850 KD6WW. 2900 KD6WW, IK2ILH. 2950 KD6WW, IK2ILH. 3000 KD6WW. 3550 F2YT. 3700 N9AF. 3750 W1CU, N9AF. 3800 W1CU. 3850 W1CU. 3900 W1CU.

10 meters: JH5OXF, K2YJL.
15 meters: K5YAA.
20 meters: K5YAA, K2YJL.
40 meters: KD5WW, K5YAA, K2YJL.
80 meters: KD6WW, K5YAA.
160 meters: KD6WW, K5YAA.

Asia: IK1SLE, RWØLIE, K5YAA, K2YJL.
Africa: IK1SLE, K5YAA.

No. America: IK1SLE, WBØUFB, K5YAA. K2YJL, PY5FB.
So. America: K5YAA, K2YJL, PY5FB.
Europe: IK1SLE, K5YAA, K2YJL, PY5FB.
Oceania: K5YAA.

Award of Excellence Plaque Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP, KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, W8RSW, WA4QMQ, W8ILC, VE7DP, K9BG, W1BWS, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS. I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YTM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1POR, K9LJN, YBØTK, K9QFR, YU2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MS, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD. IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, S57J, EA8BM, DL1EY, KUØA, KØDEQ, VR2UW, 9A9R, UAØFZ, DJ3JSW, OE6CLD, HB9BIN, I7PXV, N1KC.

Award of Excellence Plaque Holders with 160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, K9BG, W1BWS, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF, N4NX, SMØDJZ, DK5AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR2QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N6JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA1CLV, KØIFL, WT3W, IN3NJB, S5ØA, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, VR2UW, DJ3JSW, OE6CLD, HB9BIN, N1KC.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101-9511 USA.

A month after the convention, the DXCC desk dropped the other shoe by announcing that the Marquesas and Austral islands FO have been added to the list of current DXCC entities, again effective with contacts made on 2359Z on March 31, 1998 and after. As with the Temotu cards, the DXCC desk will begin to accept cards for the two new DXCC entities on October 1, 1998 to avoid the annual deadline.

The start date for these two new DXCC entities reflects the new attitude toward controversial DXCC decisions. The petitioners for these new French Polynesia entities had argued for a earlier start date for the entities, hoping to include past operations from the islands to count for DXCC credit. The DX Advisory Committee and the Awards Committee rightly rejected this argument, noting that the "event date" as defined by the revised DXCC rules was the change in the definition of "parent country."

These additions to the DXCC entities list raise the number of current DXCC entities to 331, making the minimum to qualify for the Honor Roll 322. Those looking to add the Temotu province to existing DXCC data bases should note that the main islands in the group are near 166 degrees east longitude and 16 degrees south latitude, in CQ Zone 32.

DX Internet Reflector Ends

The long-running DX Internet reflector run by Lyndon, VE7TCP, has been closed, due to excessive "flaming" and off-topic messages. Lyndon built, maintained, and moderated the DX reflector for many years, providing a valuable, near-real-time method of spreading DX news worldwide. He also included special reflectors parallel to the DX reflector for DXpeditions, such as the Heard Island operation. While plagued by a very high noise level, ignorant users who replied to the list instead of to an individual, and the occasional obscene poster, the VE7TCP DX reflector was still the first choice of DXers looking for the most current DX news on the Internet.

Several other DX-related reflectors have tried to fill the gap left by the end of the VE7TCP DX reflector. The front runner in this list is the Internet DX Mailing List, sponsored by the North Jersey DX Association, the good people who have capably run the second-district incoming QSL bureau for as long as I can remember. To subscribe to the new DX reflector, just send an e-mail message to <listserv@jerseyscape.net>. The body of the message should say "subscribe DX-news." Unlike the VE7TCP reflector, the NJDXA reflector is *not* moderated. That is, anything posted to the list will be sent to all subscribers to the list, regardless of con-

CQ DX Honor Roll

The CQ DX Honor Roll recognizes those DXers who have submitted proof of confirmation with 275 or more ACTIVE countries for the mode indicated. The ARRL DXCC Countries List is used as the country standard. Honor Roll listing is automatic when submitting application or endorsement for 275 or more countries. Deleted countries do not count and are dropped from listing as they occur. Currently there are 327 countries. To remain on the CQ DX Honor Roll, annual updates are required. Honor Roll updates may be made at any time, in any number. Updates indicating "no change" will be accepted to meet the annual requirement. All updates must be accompanied by an SASE for confirmation. The fee for endorsement involving the issuance of a sticker is $1.00.

CW

K2TQC 327	K8PV 327	K4IQJ 326	W7OM 325	W4OEL 323	VE7CNE 320	K9DDO 312	I2EOW 307	KØHQW 299
K1MEM 327	W4QB 327	F3TH 326	WØHZ 325	W6SR 323	I4LCK 320	K4JLD 312	K8JJC 306	YU1AB 294
K2FL 327	K2OWE 327	EA2IA 326	IK2ILH 325	W7ULC 322	K6CU 319	W3II 312	CT1YH 305	G4MVA 294
K9BWQ 327	K6LEB 327	NC9T 326	K2JLA 325	KUØS 322	K2JF 319	K1VHS 311	K7JS 305	I2EOW 294
K2ENT 327	K9MM 327	N7RO 326	W7CNL 325	W1WAI 322	HA5NK 319	WA8YTM 311	W7IIT 305	W4UW 294
DL8CM 327	F3AT 327	KZ4V 326	DJ2PJ 324	4N7ZZ 322	VE7DX 318	N6AW 311	KE5PO 304	KB8O 292
WØIZ 327	PAØXPQ 327	9A2AA 325	N6AR 324	K5UO 322	G3KMQ 317	N5HB 311	G2FFO 303	F6HMJ 292
G4BWP 327	W6DN 327	OK1MP 325	IT9VDQ 324	KA5TQF 321	N4CH 317	LA7JO 311	IKØADY 302	LU3DSI 292
K6JG 327	K3UA 326	N4JF 325	W8XD 324	ON4QX 321	N4AH 315	OH3NM 310	K1FK 302	DJ1YH 288
I4EAT 327	N7FU 326	AA4KT 325	K8LJG 324	K9QVB 321	NØFW 315	OZ5UR 310	W6YQ 301	YU7FW 286
SM6CST 327	N4MM 326	K9IW 325	K4CN 324	HA5DA 321	AA2X 314	VE9RJ 309	N4OT 301	YC2OK 280
W2UE 327	IT9TQH 326	I5XIM 325	WB5MTV 323	KA7T 321	WB4UBD 314	9A2AJ 309	KH6CF 300	PY4WS 276
W2FXA 327	K4CEB 326	WA8DXA 325	IT9QDS 323	IT9ZGY 320	N1HN 313	HB9DDZ 307	YV5ANT 299	KF8UN 276
K4KG 327	WA4IUM 326	N5FW 325	N5FG 323	K1HDO 320				

SSB

K4MZU 327	K7JS 327	K8PV 326	WA4WTG 325	W2FGY 323	CT1EEB 321	N5HSF 317	CT1EEN 309	DJ2UU 291
K2TQC 327	DU9RG 327	K5TVC 326	WD8PUG 325	YV5CWO 323	OA4QV 321	KB1HC 317	EA5KY 308	4X6DK 291
K2FL 327	W6DN 327	NC9T 326	W2CC 325	I8KCI 323	OE6CLD 321	K6RO 317	EA3CB 308	WA3KKO 290
DJ9ZB 327	I4LCK 327	4N7ZZ 326	VE2WY 325	VE4AT 323	W5RUK 321	W6NW 315	TI2TEB 306	OE7KWT 290
EA2IA 327	IT9TQH 327	N4CH 326	AA4KT 325	KD5ZM 323	LU1JDL 320	KV2S 315	VE3DLR 306	N6CFQ 290
K2ENT 327	IT9TGO 327	K5UO 326	PT2TF 325	KA5TTC 323	KF8VW 320	WA9RCQ 315	W3YEY 306	IK2PZG 289
OZ5EV 327	WD8MGQ 327	W6SR 326	KM2P 325	KB2MY 323	G4ADD 320	N3ARK 315	XE1MDX 305	VK3IR 289
VE1YX 327	I1EEW 327	W9SS 325	N5FW 325	EA3BKI 323	I4WZK 320	K6BZ 315	DK5WQ 305	KF7VC 288
W6EUF 327	IØZV 327	WA4IUM 325	K9HDZ 325	VE2GHZ 323	I4SAT 320	K7TCL 315	EA5OL 305	OK1AWZ 287
K2JLA 327	VE3MR 327	WB1DQC 325	WA3HUP 325	N2VW 323	WE2L 320	I4CSP 315	WB2AQC 305	IK2DUW 287
N7RO 327	DL9OH 327	XE1AE 325	YV1CLM 325	OE7SE 323	EA3EQT 320	N6RJY 315	VE3CKP 304	EA5GMB 287
K6YRA 327	ZL1AGO 327	KA3HXO 325	N6AW 325	K8YVI 322	KØFP 320	NØAMI 315	K6CF 304	TU2QW 286
W6BCQ 327	SV1ADG 327	KF7SH 325	ZP5JCY 325	K9HQM 322	KE3A 320	DL3DXX 314	WB2NQT 303	WZ3E 286
K5OVC 327	LA7JO 327	YV5AIP 325	WB3DNA 325	KC5P 322	N4CSF 320	WB8ZRV 314	EA3CWK 303	NM5O 285
KZ2P 327	VE3XN 327	K9IW 325	I2EOW 325	WW1N 322	NI5D 320	OH5KL 313	EA3BT 303	EA1AYN 285
VE7DX 327	K9MM 327	WA4JTI 325	KE5PO 325	K4SBH 322	W6SHY 320	WDØDMN 313	YC2OK 303	IK2HBX 284
AA6BB 327	K7LAY 327	YV1AJ 325	K4JLD 325	W2JZK 322	N4HK 320	K9YY 313	KD4YT 302	VE7HAM 284
EA4DO 327	VK4LC 327	YV1KZ 325	W6SR 325	CE7ZK 322	ON5KL 319	K1VHS 313	CT1YH 302	KE6CF 283
ZL3NS 327	DL8CM 327	W9OKL 325	K1HDO 325	LU7HJM 322	WA4DAN 319	W9IL 313	N5QDE 302	KK4TR 283
K6JG 327	NØFW 327	9A2AA 325	W7FP 325	K5NP 322	KI3L 319	W1LQO 313	RA2YA 301	YC3OSE 282
K6GJ 327	I8KCI 327	DL6KG 325	K9PP 325	KB8O 322	XE1MD 319	WA2FKF 313	W2LZX 301	WN6J 281
SM6CST 327	XE1VIC 327	KØKG 325	YV5IVB 325	KD8IW 322	KB1JU 319	KD5ZD 312	N3RX 301	YU1TR 280
W3GG 327	PAØXPQ 327	OK1MP 325	I8ACB 324	YV1JV 322	PY2DBU 319	K4JDJ 312	YT7TY 300	KN4RI 280
I4EAT 327	KE4VU 327	WB3CQN 325	N6AR 324	VE4ROY 321	IØSGF 319	N5HB 312	WB6GFJ 299	WD9ACQ 280
W4UNP 327	W7BOK 327	I2QMU 325	W4UW 324	XE1CI 321	KF8UN 319	IN3ANE 311	VE3CKP 299	OA4EI 280
YU1AB 327	K3UA 326	N4JF 325	VE2PJ 324	LZ1HA 321	K9QVB 318	F1OZF 311	YV4VN 299	WØIKD 279
F9RM 327	K9BWQ 326	KB4HU 325	I8LEL 324	WA5HWB 321	AA4AH 318	EI6FR 311	KJ9N 299	EA3CWT 278
PY4OY 327	WØYDB 326	KC4MJ 325	IK1GPG 324	TI2JJP 321	KF5AR 318	YZ7AA 311	KB5WQ 295	VE2DRN 277
OZ3SK 327	W4QB 326	CX2CB 325	I1JQJ 324	WDØBNC 321	I8IYW 318	AE5DX 311	YT1AT 294	LU5EWO 278
XE1L 327	VE3MRS 326	TI2CC 325	VE7WJ 324	W8AXI 321	G4GED 318	GM4XLU 311	IT9VDQ 293	VE2DRN 277
4Z4DX 327	OE2EGL 326	IKØIOL 325	AI8S 324	W5XQ 321	WA8YTM 318	KA5RNH 310	KJ5LJ 293	9A9R 277
CX4HS 327	K8CSG 326	YU1HA 325	N5FG 324	KA5TOF 321	F6BFI 318	I2MQP 310	TI2LTA 292	K3LC 277
N4MM 327	K1UO 326	W4NKI 325	AC7DX 324	TI2HP 321	KX5V 318	HA6NF 310	KQ4WD 292	KC6AWX 276
OE3WWB 327	WB4UBD 326	KZ4V 325	KØHQW 324	KS2I 321	CE1YI 318	KF7RU 310	LU3HBO 292	F5NBX 275
IK1GPG 327	W2FXA 326	VE3GMT 325	K2JF 324	W7ULC 321	WA6DTG 317	AB4IQ 310	K2EEK 291	VE2AJT 275
W7OM 327	IK8CNT 326	W4EEE 325	KC8EU 323	W3AZD 321	ZL1BOQ 317	W4WX 310	W6WL 291	US1IDX 275
K4MQG 327	N4KG 326	KE4VU 325	VE4ACY 323	WØULU 321	EA1JG 317	EA5RJ 309	YB1RED 291	Z31JA 275

RTTY

K2ENT 323	NI4H 305	EA5FKI 284	YC2OK 280	W4QB 280	G4BWP 276	W4EEU 276	KE5PO 274	I1JQJ 273
WB4UBD 309	K3UA 294							

tent. This means the noise level on the NJDXA reflector is even higher than that of VE7TCP's list. Make sure your delete button is working well.

Other places on the Internet to look for DX news are <qth.net>, <QSL.net>, and <rec.radio.amateur.dx>, the latter being a news group and not a reflector.

Club News

The Long Island DX Association has elected the following officers for the next year: president Martin Miller, NN2C; vice-president Pat Masterson, KE2LJ; secretary Ed Whitman, K2MFY; treasurer Russ Lusterman, AA2LC; directors Lou Dietrich, N2TU, Marv Fricklas, W2FGD, and Lenny Zuckerman, KB2HK.

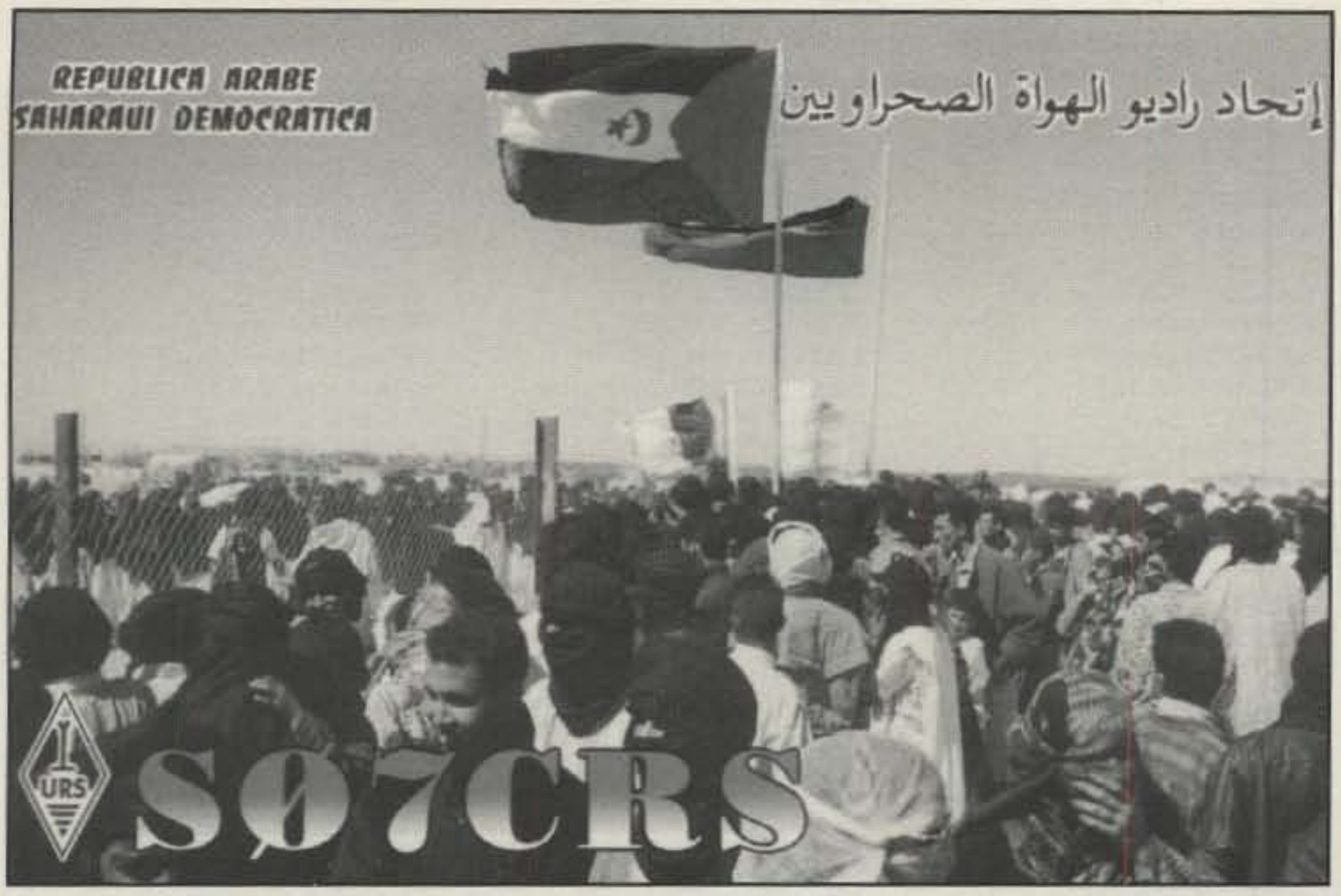
The San Diego DX Club announces the following officers for the next year: president Bud Semon, N7CW; vice-president Ed Andress, W6KUT; secretary/treasurer Harry Hodges, WA6YOO; directors Bruce Clark, KØYW, Cliff Smith, K6TWU, and Harvey Hiller, KD6QK.

The new officers for the Southeastern DX Club are president Mike Greenway, K4PI; vice-president Jim Worthington, AD4J; secretary Rick Glisson, N4XMX; treasurer Nancy Draheim, NK4U; and membership chairman Paul Pescitelli, K4UJ.

DX News and Events

Two factors contribute to the sudden increase in DX news this month. The first is the rapid progress of sunspot Cycle 23, which is in the middle of the steepest rising portion of the cycle. Solar flux figures are exceeding those of more than five years ago, during the declining phase of Cycle 22. This rapid, but enduring, increase in solar activity has produced openings on the higher bands, including 10 meters. DXers new to the chase since the last sunspot peak will be amazed at the clarity of DX on 10, 12, and 15 meters. The wide-open spaces (compared to 20 meters), the low levels of noise, and low absorption produce excellent signal-to-noise ratios, even with simple antennas and low-power gear. This is our first taste in this sunspot cycle of DXing at its best. Don't miss it.

The second reason the DX news section is overflowing is, of course, the CQ WW contests at the end of October (SSB) and November (CW). Contest DXpeditions and operations are planned months in advance and widely published to avoid



Yoshi Hayashi, JA1UT, project leader of the International Amateur Radio Volunteers, operated from Western Sahara SØ in April.

duplication of effort. Thus, those DX editors who work with deadlines months prior to publication have far more information than usual to edit. As always, however, check more timely versions of DX news for the most up-to-date information, as plans do change. With that caveat, here are some of the operations set for late October to the end of November.

The Voodoo Contest Group returns to Togo as **5V7A** again this CQ WW CW Contest. This experienced team is aiming for some 15,000 contacts during the contest, Nov. 28-29. Team members will also operate outside the contest using their personal calls, especially on the new bands and RTTY, from both Togo and neighboring Ghana. Operators with their name, Togo call, and Ghana call are as follows: G3SXW, Roger—5V7A, 9G5SX; G3VMW, Steve—5V7VM, 9G5SW; G3ZEM, Bob—5V7ZM, 9G5ZM; G4BWP, Fred—5V7??, 9G5??; G4FAM, Cris—5V7FA, 9G5CH; G4ZVJ, Andy—5V7VJ, 9G5VJ; GM3YTS, Rob—5V7RF, 9G5RF; K5VT, Vince—5V7VT, 9G5VT; K7GE, Jim—5V7JL, 9G5JL; KC7V, Mike—5V7MF, 9G5MF; KY7M, Lee—5V7??, 9G5??. QSL each of these individual calls to the operator's home call. QSL 5V7A

The HV4NAC operating team.

QSL INFORMATION

3A1PA to W4FRU
3D2PY to 7N2PYF
3W6DXI to DL4DBR
3W6UB to JA3UB
3W8JJ to JA3ART
5H3CS to KØOB
5T5WW to ON5NT
5WØBF to DL2BFH
5WØHP to DL1SDV
7Q7DX to EA4CEN
7XØWW to ON5NT
8Q7WX to K9PG
9H3II to DL4VCR
A35NQ to JL2ONQ
A35PC to JA2DPC
A35RS to ZL1RS
A35YH to JA2JW
BI5P to W3HC
BY2YA/1 to BV2KI
C21JH to VK2GJH
CE3/NE4Z to AJ4Y
CO8LF to EA5XX
CT1AXS to W3HNK
CX3CCC to CX2ABC
D68BW to DJ2BW
EA5ARC to EA5XX
ED5WPX to EA5XX
EG5TID to EA5XX
EI2VLP to DK7UY
EI4FVV/P to WØGLG
EK88L to IK2DUW
EV200AM to EW4MM
FM5JV to F5JMV
FOØYAM to JK1FNN
FS/K9AA to K9PG
FS/WX9E to K9PG
GB98RH to GØGDU
HLØT to KARL
HL5OC to HLØC
IG9/AC6WE to IV3TAN
II6M to IK6WQU
J37ZC to K9PG
J47LHA to SV7CO
J54RDS to SV5AZ
J68WX to K9PG
J79MY to K6MYC
J8/WX9E to K9PG
JY7YB to DL5MBY
KG4TO to N4TO
KG4WW to KX4WW
KHØ/AF4FN to JQ6NVE
KHØ/KD7CLP to JH6VLF
KHØ/WD7CLP to JH6VLF
KH2/N2NL to W2YC
KH2/N4UQM to WB4UBS
KH7/WX9E to K9PG
KL7/W6IXP to N6AWD
KL9/K9AA to K9PG
KP2/N2NL to W2YC
L59L to LU4AA
OHØ/SMØEEH to SM5HJZ
OHØ/SMØGNS to SM5HJZ
OHØ/SMØIEA to SM5HJZ
OHØ/SMØPHL to SM5HJZ
OHØ/SM5AJV to SM5HJZ
OHØ/SM5TXT to SM5HJZ
OI5N to OH5AE
OL5IFK to OK1KCY
OZ1JJD to OZ7DAL
PJ7/WX9E to K9PG
PR2YL to PP5LL
PS2S to PP5LL
PU5U to PP5LL
PW5L to PP5LL
SO1DX to DL2SD
SV1AFA/SV8 to SV1CIB
SV5RDS to SV5AZ
T77V to ISØQDV
T98VWR to DL2VWR
TZ6DX to K4DX
UAØLEC to W3HNK
V31CX to KA1VLP
V63KA to JH8BKL
V63MC to JH8BKL
VK2RSY to VK2PS
VK2WI to VK2PS
VK3MO to WA9BXB
VO1IMD to VO1HE
VO1SDX to VO1HE
VP8TTY to K4QD
VQ9AA to W8TT
VQ9AB to KI5SS
VQ9AG to KG5KD
VQ9AM to KA3WJA
VQ9AN to K1VJD
VQ9AR to NW3E
VQ9IE to WY8Q
VQ9QM to W4DM
VQ9XX to WB2CQG
VR2/WX9E to K9PG
WP2/WX9E to K9PG
WP3/WX9E to K9PG
XM3M to VE3VM
XU2DXI to DL4DBR
XX9YD to K8PYD
YB5QZ to W3HNK
YCØLOW to N2AU
YE1ZI to YBØTK
YV5/WX9E to K9PG
ZC4DG to A92FV
ZC4EPI to A92FV
ZK2RS to ZL1RS
ZW4SM to PY4SM

(The table of QSL managers is courtesy of John Shelton, K1XN, editor of The GOLIST, P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

direct or via the Scottish bureau to Tom Wylie, GM4FDM, 3 King's Crescent, Elderslie, Renfrewshire, PA5 9AD, Scotland. DXers may also request a bureau card by e-mail to <5v7a@voodudes.com>. The team also has a web site at the same address, with logs, propagation information, and much more.

Other CQ WW CW Contest operations include **J6DX** by the Southwest Ohio DX Association from St. Lucia. Some operators will stay for the ARRL 160 meter contest Dec. 5–6. Look for team activity Nov. 23–Dec. 7. NM7N, NØTT, and VK2ICV will operate from Lord Howe Island as **VK9LX** in the contest. Also watch for K5GN as **VP5GN; V26E** by AB2E; **WP2Z** by WD5N; **PJ9B** in a multi-multi effort; multi-op operations from Jamaica by K2KW and DL2OBF; and **ZF1A** as a multi-single with W5ASP and others.

The Cinco Nueve Contest Group will operate **VP2V/K7AR** in the CQ WW SSB Contest. Operators include K7AR, N7MQ, K9JF, N7NU, WJ7R, and W7YAQ. Look for them outside the contest Oct. 20–27.

A large German group plans to operate from the Maldives 8Q Oct. 18–Nov. 5. The male operators will sign **8Q7IO** and the young ladies will operate as **8Q7IQ**. They will be on all bands, 160–10 meters, on CW, SSB, and RTTY, including an entry in the CQ WW SSB Contest. QSL via DL7VRO. Web site is at <qsl.net/8Q7io>.

In non-contest news, Bruce Richards, WD4NGB, plans an operation from Eritrea E3 Nov. 3–18, using the callsign of **E31DX**. Bruce has corralled an all-star team of operators, including Vince, K5VT; Nellie, XE1CI; Zorro, JH1AJT; Bob, W6RJ; Bill, W4WX; Bob, W6KR; Joe, KO4RR; and Vance, N5VT. The group is aiming for three stations operated 24 hours a day on 160–10 meters, on CW, SSB, and RTTY. Donations for non-operator expenses are welcomed by Bruce at 533 Briarwood Dr., Clarksville, TN. Check out their web page at <qsl.net/eritrea>.

Also looking at Eritrea is Jacky, F2CW/ZL3CW, who is now working out of Nairobi, Kenya. Jacky will also be active from Uganda as **5X2CW**.

In other DX news, **VK9WG** is VK5GW on Willis Island. Graham was stationed on Willis in 1996 and Macquarie in 1997. QSL to his home address with a self-addressed envelope (SAE) and $1: Graham Whiteside, VK5GW, 33 Maud St., Unley, South Australia 5061. Graham will QSL upon his return to Australia in early 1999.

Herman, DJ2BW, will operate CW as **D68BW** from the Comoros Oct. 25–Nov. 7, on 160–10 meters. QSL via home call.

Uwe, DL2YAK, is active as **HC5UK** until Nov. 22. Look for him on 14140 kHz.

KH3/KH6HE is Alex, stationed on

CQ DX Awards Program

SSB

2256 .....WB2AQC

CW

978 .....IQ8QFK
979 .....IK8VRP
980 .....PA2SAM

SSB Endorsements

320 .....4N7ZZ/327
275 .....LU5EWO/278

RTTY Endorsements

275 .....K3UA/299

Total number of active countries is 328. The basic award fee for subscribers to *CQ* is $4. For non-subscribers, it is $10. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.

Johnston Island for the next year. Try 14240 kHz at 0500Z and 28450 kHz when 10 meters is open. QSL via home call.

VKØTS is Tom from Davis base, the Australian outpost on Antarctica. QSL route to be announced.

In other south polar news, Ricardo, **LU1ZI**, is operating from Argentina's Base Cientifica Jubany in the South Shetland Islands. QSL direct to the base at Correo Argentino El Palomar, via Base Marambio, 9411 Antarctica, Argentina.

Bruno, TK5PB, will operate **FH/** from Mayotte Island Nov. 12–25, from several different islands. QSL direct to Bruno, Le Magenta 1, 20169 Bonifacio, Corsica, France.

Roger, KF8OY, continues his travels with operations from Singapore 9V Oct. 30–Nov. 2, and as **S79OY** from the Seychelles Nov. 6–9. His earlier operations include **ZK1OOY** from the South Cooks Oct. 22–24, **YJ1OY** from Vanuatu Oct. 25–27, and from the Philippines Oct. 28–30. QSL home call.

Among the many Brazilian IOTA DXpeditions this season is **PT2VE** Oct. 22–26 from Santa Amaro Island (SA-071), on SSB and CW, 80–10 meters. QSL via the Brazilian bureau to direct to A. Demarinis, PY2YW, P.O. Box 65002, 01390-970 Sao Paulo SP, Brazil.

One of the more interesting DX events to occur this month is the largest meteor storm in 30 years. The *Leonid* meteoroid storm is expected to be a whopper, thanks to the remains of Tempel-Tuttle comet, which recently passed by the sun. A dense debris field from that encounter will intersect Earth's orbit mid-month, with a peak on Nov. 17. Scientists expect up to 1000 times the usual number of meteors per hour from this storm, and at unusually high speeds.

This should provide a spectacular display for meteor watchers and great meteor-scatter conditions on the VHF bands. However, given the expected density of the ionized paths behind these tiny rocks hitting the atmosphere, HF DXers should also see excellent propagation on 10 meters. Since meteor-scatter ion paths disappear within a few seconds, DXers must keep their meteor-scatter contacts very short. Persistence will also help, as it make take several individual meteors to complete a legal exchange. This is a great warm-up for making meteor-scatter contacts during the ARRL 10 Meter contest next month. Practice rapid, repeated exchanges. With the number of meteors predicted, it should be easy to make MS contacts and add yet another skill to your DX prowess.

QSL News

QSL the first Brazilian YL DXpedition of **PR2YL** and **PS2S** via manager Jay Lira, PP5LL, P.O. Box 08, CEP 88.010-970, Florianopolis-SC, Brazil. This operation is from Comprida Island (SA-024).

QSL **YB2ERL** (ex-YC2ERL) direct to Bambang Suryo Widodo, JL Permata Gading J-161A, Semarang 50176, Indonesia.

QSL the Greek special-event station **J47LHA** via manager SV7CO, P.O. Box 46, 68100 Alexandroupolis, Hellas, Greece.

QSL **J54RDS** and **SV5RDS** via SV5AZ at the following new address: Padelis Vassiliadis, P.O. Box 329, GR 85100, Rhodos, Greece.

QSL **L59L** via the Angentina bureau or via LU4AA.

QSL **7X4AN** direct at his new address: Boukhiar Mohamed, P.O. Box 30133, Barcelona 08080, Spain.

And Finally . . .

We said we'd have the WAZ charts back this month, but K1MEM has been ill. As of this writing, however, Jim is doing better and with some help is beginning to catch up on the WAZ applications and correspondence. By the time you read this, things should be pretty much up to date.

To all of you who have been waiting for the return of your cards and the processing of your paperwork to receive your WAZ awards and see your names here on the pages of *CQ*, we thank you for your patience. To Jim, we send our wishes for his continued recovery. 73, Chod, VP2ML

BY JOHN DORR, K1AR

CONTEST CALENDAR

NEWS/VIEWS OF ON-THE-AIR COMPETITION

CQ *1997 Contest Survey—Final Results*

November's Contest Tip Of the Month

As we enter into this year's fall contest season, do you know who's planning on a contest expedition? A little research through the current magazines/newsletters and the Internet can help you build a list of probable multipliers that should be prominently displayed in front of your operating position for the upcoming fall contests. Always remember that extraordinary pre-contest preparation can dramatically improve your final standing and has little to do with signal strength or location. To put it in ham terms—it's free!

Calendar of Events

Oct. 24-25	**CQ WW SSB DX Contest**
Ot. 31-Nv. 1	B.A.R.T.G. RTTY Sprint
Ot. 31-Nv. 1	Ten-Ten Int'l Net Fall CW QSO Party
Nov. 7-9	ARRL CW Sweepstakes
Nov. 7-8	Ukrainian DX Contest
Nov. 13-15	Japan Int'l DX Contest
Nov. 14-15	WAE RTTY Contest
Nov. 14-15	OK/OM DX Contest
Nov. 21-22	RSGB 1.8 Mhz Contest
Nov. 21-23	ARRL SSB Sweepstakes
Nov. 28-29	**CQ WW CW DX Contest**
Dec. 4-6	ARRL 160M Contest
Dec. 5-6	EA DX Contest
Dec. 12-13	ARRL 10M Contest
Dec. 19-20	Croatian DX Contest
Dec. 26-27	Stew Perry Topband Challenge
Dec. 27	RAC Canada Winter Contest

Well, it's been a bit of a struggle with time, but the final results of the 1997 CQ Contest Survey are finally here! As time to conduct in-depth analysis and long work hours do not mix, the compilation of the results was delayed a bit. However, the work has been well worth it, as you soon will discover.

Survey participation was somewhat lower than previous years. I'd like to put the blame on sunspot effects, but I don't think I can pull that one off anymore. This year there were 206 total responses, representing the U.S. and eight other countries. As you might expect, there were a greater number of anonymous responses for the 1997 survey topic than nearly any other category. A full 15% of the respondents did not indicate their callsign.

We continue to grow older, as indicated by the average age of the survey respondent. Each year I conduct these surveys I hope to see some other trend, but the facts are consistently reconfirmed: There's little new blood coming into contesting. Here are the painful facts: the average age of respondents has risen from 43.4 years in 1995 to 44.2 in 1996, and finally up to 45.3 in this year's survey.

In general, I'm happy to report that as a group, contesting seems to be on the proper ethical path. There were some areas of concern, as you will see below, particularly with use of packet spotting and some of the grayer areas of rule interpretation. And, as you probably can imagine, we do have a few bad apples among us—operators who, by their responses, just flat out cheat. Fortunately, most of you held to one key point: Contesting is about personal achievement. It makes no sense to cheat, because you're only cheating yourself. I believe this year's results bear out the fact that this is an overwhelming opinion held by most contesters.

Well, enough of the preliminaries; let's get on with the analysis!

2 Mitchell Pond Road, Windham, NH 03087
e-mail: K1AR@contesting.com

The Final Results

Question 1: In general, do you think leading contest operators use operating ethics similar to those of the "small guns"?

Yes: 142/70.3%
No: 60/29.7
Total Responses: 202

It's hard to interpret whether the sizable "no vote" to this question is, in part, based on a sour grapes attitude or a true belief. Several responses included commentary that claimed some of the scores they see in contesting simply are not being made with the same ethical code that small guns use. Key sound bites such as "impossible" or "not playing by my interpretation of the rules" stood out. The debate also seemed to center around what some define as ethics. For example, is aggressive operating crossing the ethical line? Something to consider indeed.

Question 2: ZD8XXX calls you in the last 10 minutes of the CQ WW for a double multiplier. You give him his report and he doesn't reply. . . Would you log him anyway?

Yes: 59/29.5%
No: 141/70.5%
Total Responses: 200

I have to admit that this one surprised me, especially with all the deserved attention to the quality of log checking in the CQ WW Contest. It does raise an interesting point, however. Does our ethical judgment get clouded in the heat of battle? Do we make poor decisions that we normally would never do otherwise—especially at the end of a contest? This is one of those gray areas in contesting to some. A good question to ask might be: Would I like to lose to someone else by this one contact? Applying that thinking to your own operating may be a good exercise.

Question 3: OHØAA is running Europe on 7045. Would you say to him "Listen for Stateside" on his transmit frequency?

Yes: 23/11.9%
No: 171/88.1%
Total Responses: 194

Okay, we've all done this at least once. (I know, there are a few out there who claim 40 meter virginity.) I was surprised, frankly, at the minimal number of *yes* votes. Any time I listen down on 40 meter sideband, it seems as if that's all you hear. And there are the perpetual policemen who need to add things such as "wrong VFO" or "What's his QSL information?"

Question 4: Do you consider yourself the type of operator who loosely interprets rules assuming that the log checkers will work out the details?

Yes: 12/5.9%
No: 190/94.1%
Total Responses: 202

This question was akin to how some people do their taxes. "I'll take the deduction and let the IRS figure it out." Whether you view recent changes to rulemaking to be good or bad news, the fact is that contest administrators are working loopholes out of the system, while growing dangerously close to requiring the need for legal advice for some entrants. This question really didn't provide the opportunity to see what people think the sport of interpretation really is, but at least it was comforting to know that most contesters submit their logs with a firm belief that they have done well by the rules.

Question 5: You have gone through your completed contest log and dis-

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SS-12	10	12	2.3 x 6 x 9	3.4
SS-18	15	18	2.3 x 6 x 9	3.6
SS-25	20	25	2 7/8 x 7 x 9 3/8	4.2
SS-30	25	30	3 3/4 x 7 x 9 5/8	5
SS-25M*	20	25	2 7/8 x 7 x 9 3/8	4.2
SS-30M*	25	30	3 3/4 x 7 x 9 5/8	5

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Call Area	# Responses	DX Country	# Responses
W1	12	F	6
W2	14	G	6
W3	6	KL7	4
W4	32	KP4	2
W5	10	PY	1
W6	26	V7	1
W7	14	VK	3
W8	8	ZL	3
W9	20		
WØ	8		
VE	4		
None	30		

USA/Canada responses: 150
DX responses: 26
None indicated: 30
Total responses: 206

Table I– Geographic response analysis.

Table II– Summary of results. →

Question	Total Responses	Yes	No	%Yes	%No
1	202	142	60	70.3	29.7
2	200	59	141	29.5	70.5
3	194	23	171	11.9	88.1
4	202	12	190	5.9	94.1
5	204	11	193	5.4	94.6
6	198	10	188	5.1	94.9
7	203	13	190	6.4	93.6
8	198	92	106	46.5	53.5
9	202	36	166	17.8	82.2
10	196	24	172	12.2	87.8
11	201	26	175	12.9	87.1
12	200	71	129	35.5	64.5
13	199	20	179	10.0	90.0
14	193	11	183	5.7	94.3
15	199	9	190	4.5	95.5
16	200	15	185	7.5	92.5
17	204	14	190	6.9	93.1
18	203	61	142	30.0	70.0
19	191	9	182	4.7	95.3
20	199	27	172	13.6	86.4

cover that you are only 798 points below a new category record. Would you add a few QSOs into the log to increase your score past the old record?

Yes: 11/5.4%
No: 193/94.6%
Total Responses: 204

Wow! Could it be that even 5% of us think this way? I refer you back to what so many of you said in response to this survey: "Take a long look at yourself, focusing on the personal gratification that comes from contesting." And a big thumbs up to the 95% of you who are doing the right thing!

Question 6: Do you have a different ethical standard in contests that are either smaller or known to employ poor log-checking techniques?

Yes: 10/5.1%
No: 188/94.9%
Total Responses: 198

You have to love consistency, and the answers to this question bear that out. It seems that if you buy into the assumption that most contesters are ethical by nature, then it doesn't matter which contest they use to deploy their ethics. Fortunately, there were no surprises here!

Question 7: You have just discovered TT8ZZ on 14133. Would you work him assuming no one will notice your QSO that far out of the band?

Yes: 13/6.4%
No: 190/93.6%
Total Responses: 203

I'm sure some of us have done this sort of thing while being sleep deprived on the Saturday night of a DX contest. I can honestly say that I can't recall a time when I've actually heard it happen. Have you? In any event, 13 respondents claim to be able to cross the line on this one. I'd be curious to hear from anyone on the DX side of the pond who has experienced this scenario.

Question 8: WB7XYZ, in Wyoming, just called you for a "clean sweep" in the ARRL SS Contest with only 4 minutes to go. Unfortunately, you copied everything but his check. Would you write in something in your log to keep the QSO?

Yes: 92/46.5%
No: 106/53.5%
Total Responses: 198

Well, this scenario falls into the "little white lie" category—or does it? Maybe we just can't stand the thought of not having that spiffy SS mug in our kitchen cabinets. Whatever the reason, nearly half of you would fall into the "yes" group here. This seemed rather profound to me. Does anyone else think so?

Question 9: Would you knowingly take over someone else's frequency (i.e., a weak backscatter signal on the band edge that has a slower rate than you could generate)?

Yes: 36/17.8%
No: 166/82.2%
Total Responses: 202

This question was as much focused on ethics per se, but it is an indicator of where our heads are with regard to fair play. At the risk of sounding "holier than thou," I'll be the first to admit that I've committed the sin mentioned above. Frankly, it happens sometimes in frustration over not being able to find a good running frequency. Some of you admitted that it's more of an ego thing or payback tactic for someone who crossed the line with you before. Now settle down, folks. All the contest adjudicators want us to do is play well with each other. And, I will admit that working guys is much more productive than fighting over frequencies. Wouldn't you agree?

Question 10: Have you ever used packet radio spotting and still claimed single operator?

Yes: 24/12.2%
No: 172/87.8%
Total Responses: 196

Based on some of the findings being uncovered by the CQ WW Contest Committee, the problem described by this question is probably even larger than the results indicate. However, even a 12% cheat rate is disturbing. I believe that more contest administrators have to focus on this area. Not so much from a rulemaking perspective, but from the adjudication view. Packet spotting has been contesting's friend and enemy at the same time. With responses like this one, the debate will rage on.

Question 11: You are tuning the bands and hear your friend running Europeans. Would you stop and ask him, "Hey, Joe, are there any good multipliers on the band" or "What frequency is he on"?

Yes: 26/12.9%
No: 175/87.1%
Total Responses: 201

Again, we're not probing at interpretation of rules per se, but at the ethical approach some of us use in on-air contest operating. Most leading operators will tell you that they don't have time to engage in activities such as those suggested by this question. A few respondents told me that they don't actively take this operating approach, but it does come up during the

course of on-air conversation. Still others referenced scenarios where unsolicited information is obtained while running.

Question 12: Would you allow a friend to hold your frequency while you run up the band to chase a new multiplier?
Yes: 71/35.5%
No: 129/64.5%
Total Responses: 200

Do we have more multi-operations in our contests than we think? I can see how the scenario may play out, especially from a smaller station. There is one attribute in contesting that is king: your run frequency. Based on the percentage of folks subscribing to the operating technique suggested by this question, many of you will go to great lengths to keep that frequency.

Question 13: You just passed 9Q5XX to 20 meters for a new multiplier. All you hear is a few mumbles that sound like him. Would you log him?
Yes: 20/10.0%
No: 179/90.0%
Total Responses: 199

The question raises the "heat of battle" scenario again. I'm confident that many of the individuals answering positively to this question would probably not do it consistently. In fact, several of you indicated that fact, stating that circumstances would dictate how you would react to the situation.

Question 14: You are in the process of analyzing your Multi-Single log for 10-minute rule violations and find one that results in a lost multiplier. Would you change the time in your log to allow the contact to count?
Yes: 11/5.7%
No: 183/94.3%
Total Responses: 194

Frankly, I thought the number of *yes* votes to this question would be higher. There is a sizable contest contingent that fundamentally disagrees with the notion of the 10-minute rule, stating it's out of date and has lived past its time. You may recall a column I wrote on this subject. I believe that computer logging has helped here. More and more contest participants are simply saving their contest files and e-mailing them to the adminstrators without any post-contest analysis. Contesting needs more of that!

Question 15: Have you written in a few calls in your log during a big run, assuming that no one will be able to find them?
Yes: 9/4.5%
No: 190/95.5%
Total Responses: 199

This is perhaps one of the ultimate sins in contesting. And, fortunately, very few of us do it. Are you surprised that anyone does?

Question 16: HA1XYZ just calls you on 20 meters for the fifth time. Would you change his call into a valid QSO out of frustration?
Yes: 15/7.5%
No: 185/92.5%
Total Responses: 200

Contesting can be wildly enjoyable and incredibly frustrating, often in the same weekend. We tend to react in different ways to frustrating scenarios such as the one offered in this question. There's a bothersome trend indicated by the responses to this question.

Question 17: If there was absolutely no way that a contest administrator could determine that you have cheated in a contest, would you add points to your score from invalid/made-up QSOs/multipliers?
Yes: 14/6.9%
No: 190/93.1%
Total Responses: 204

This question is getting at the issue of whether anyone is watching the contest store. It's a fact that the more logs are checked, the more careful participants are with their entries. We've seen that in spades with the CQ WW Contest. Over the years, this has been the case with other adjudicators as well. It's encouraging that most of us have committed to play by the rules under any scenario, however.

Question 18: Would you look at a friend's log after the contest to find callsigns or other log information that you can correct in your own log after the contest?
Yes: 61/30.0%
No: 142/70.0%
Total Responses: 203

Ah, the sport of post-contest analysis. It's become almost as interesting as the contest itself. In my opinion, the only way we will reduce this problem (and many of you did not indicate it is a problem!) is by shortening the length of time contest logs are due. Does anyone support a time frame such as two weeks (and less as computers finally become completely the norm)?

Question 19: Do you employ different operating ethics when operating in a Multi-Operator station than when you operate by yourself?
Yes: 9/4.7%
No: 182/95.3%
Total Responses: 191

Congratulations, contesters! You have standards and you stick to them wherever you operate from.

Question 20: Have you ever changed the time in your log to extend your operating time limit?

Yes: 27/13.6%
No: 172/86.4%
Total Responses: 199

Another disturbing trend has emerged from this question, but one which is easily checked by log checkers. You really have to wonder about this one—especially with computer logging.

Final Comments

Again, thank you for your commitment to the survey being reported on this month. I especially appreciate your patience as I got the results together. We'll be running another version in the months to come. If you have ideas for a theme, I'd like to hear from you.

Well, that's it for this month. As always, please remember to send your "Contest Calendar" submissions to me for the January issue no later than November 1st.

73, John, K1AR

Ukrainian DX Contest

1200Z Sat. to 1200Z Sun., Nov. 7–8

Sponsored by the Ukrainian Amateur Radio League and the Ukrainian Contest Club, amateurs around the world are invited to participate in the annual Ukrainian DX Contest on CW and SSB.

Classes: Operating categories include Single Op. All Band, Single Op. Single Band, Multi-Op. Multi-Band Single Transmitter, Multi-Op. Multi Band Multi-Transmitter, Single Op. All Band QRP (5W output), and SWL. A multi-single station can change bands after 10 minutes of operation. At the same time it is possible to make QSOs on another band provided they are new multipliers. It is also permitted for all categories to work stations on both CW and SSB provided it is not within a 10-minute period.

Frequencies: 160 through 10 meters (no WARC band activity).

Exchange: RS(T) and serial number starting from 001. Ukrainian stations will send their region after the signal report.

Scoring: QSOs within your own country count 1 point; QSOs within your own continent count 2 points; QSOs with another continent count 3 points; QSOs with Ukraine count 10 points. Multipliers are the sum of worked (heard) DXCC and WAE countries and Ukrainian regions per band. Final score is the total QSO points times the total number of multipliers.

Awards: First-place certificates will be awarded in each category for top-scoring stations in each country.

All entries must be postmarked not later than 30 days after the contest. Send your logs to: Ukrainian Contest Club HQ, P.O. Box 4850, Zaporozhye, 330118 Ukraine. Complete rules for next year's contest and a summary of results can be requested by SAE and two IRCs.

ARRL Sweepstakes

CW: Nov. 7–9 Phone: Nov. 21–23
2100Z Sat., to 0300Z Mon.

This is the 65th running of the Sweepstakes, making it the oldest domestic competition going.

Operation is limited to stations in ARRL sections. Operating periods are restricted to a maximum of 24 out of the 30 hour contest period. Times off may not be less than 30 minutes and must be clearly indicated in your log.

In order to minimize QRM to non-contesters it is recommended that operation be confirmed to certain portions of the bands. Check out the complete rules on the ARRL Web site.

There are several other regulations, including a cross-check sheet if you make 200 or more contacts. A large SASE (45 cents in postage) will get you the "SS Package" and Operating Aid #6 with enough log and summary sheets for an average outing.

Exchange: QSO number, power class, call, last two digits of year first licensed, and your ARRL section. Stations using 150 watts or less are classed "A," over 150 watts "B," and QRP "Q." The same station may be worked only once regardless of the band.

Scoring: Each completed QSO is worth 2 points. The multiplier is derived from the number of ARRL sections.

Awards: The usual certificates in each class and mode for single operator stations in each section and multi-operator stations in each division.

Last year's trophy program has been expanded. In addition, the ARRL will be offering SS pins to participants with 100 QSOs or more (check with the ARRL for current charges). Also, SS coffee mugs will be made available to participants achieving a "clean sweep" (again check with the ARRL for current charges).

Logs must be postmarked no later than 30 days after the contest and go to: ARRL Communications Dept., 225 Main Street, Newington, CT 06111.

Japan Int'l DX SSB Contest

2300Z Fri. to 2300Z Sun., Nov. 13–15

The object for this one is for amateurs around the world to work as many JA stations in as many JA prefectures as possible. It is sponsored by *Five-Nine* magazine. The maximum operating period is 30 hours (except for JAs, who can use the full 48 hour period) with off periods longer than 60 minutes. This is the all-band edition (others will follow in subsequent months).

Classes: Single Operator-High Power/Low Power/All Band/Single Band, Multi-Operator, Marine Mobile.

Exchange: JA-RST and prefecture number (1–50). Others RST and CQ Zone.

Scoring: 40, 20, 15 meters—1 point per QSO; 10 and 80 meters—2 points. Multipliers are total prefectures worked per band (DXCC countries for JA). Final score is total QSO points times multiplier.

Awards: Plaques and awards will be sent to the winners in each class around the world. A special contest award will be offered to anyone working all Japanese prefectures during the contest period.

All logs must be postmarked no later than December 31st and should be sent to: JIDX LFCW Contest, c/o *Five-Nine* magazine, P.O. Box 59, Kamata, Tokyo, 144 Japan. Contest results will be sent to anyone including one IRC and an SAE.

European RTTY Contest

0000Z Sat. to 2400Z Sun., Nov. 14–15

Rules for the WAEDC RTTY Contest are mostly the same as for the CW and Phone sections held in August and September. There is one main difference, however. To generate more activity and increase the QSO points, contacts with stations worldwide are permitted. QTC traffic, however, is not permitted within your own continent. Only 36 hours of operating time (out of 48 possible hours) are permitted for single operator stations. Off times may be taken in one, but not more than three, periods at any time during the contest and must be clearly noted in the log.

Exchange: RST plus a progressive QSO number.

Points: Each QSO and each QTC exchanged are worth one point. QTCs may be sent/received worldwide between continents (limit of 10).

Multiplier: Multipliers are determined from the DXCC list.

Bonus Multiplier: Multiply your multiplier on 80 meters by 4, on 40 meters by 3, and on 10/15/20 meters by 2.

Awards: Certificates will be awarded to the highest scorers in each country with a reasonable score. Continental leaders will receive a plaque. Certificates will also be awarded to stations with at least half the score of the continental leader.

It is suggested that you use the official DARC log forms. A large SASE (IRCs) to the address below will get you a supply.

Mailing deadline for all entries is December 15th to: WAEDC Contest Committee, Durerring 7, Postbox 1126, D-74370 Sersheim, Germany or via e-mail at <waedc@compuserve.com>.

CQ WW DX CW Contest

0000Z Sat. to 2400Z Sun., Nov. 28–29

Just a reminder, as if you needed one, that the CW section of *CQ*'s WW DX Contest is coming up the last weekend of this month. The SSB section of course is history. Complete rules were published in the September issue. The contest trophy list has been updated and is well covered in the rules.

All logs, both SSB and CW, must be sent to the *CQ* office: CQ World-Wide DX Contest, 25 Newbridge Road, Hicksville, NY 11801 USA.

Deadline for logs for the SSB section is December 1st, and January 15th for the upcoming CW section. **Be sure to indicate SSB or CW on your envelope.** This will avoid your log from being entered in the wrong section. For instructions on submitting logs via e-mail, see the rules in the September issue. ■

Holiday Gift Ideas

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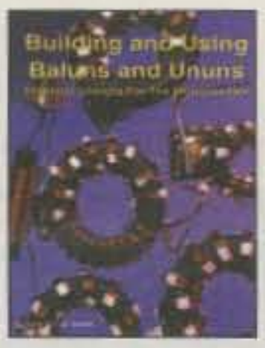
by Jerry Sevick, W2FMI



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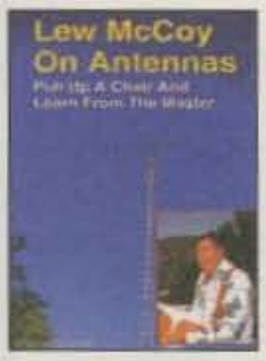

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by Doug Grant, K1DG

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BY TED MELINOSKY, K1BV

AWARDS

NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we begin with an award from Denmark, and continue with awards from Germany, the Ukraine, Kyrghystan, and Poland. As always, I'm looking to receive information on and samples of your club or organization's awards to be printed here on the pages of *CQ*. Here's your chance to get publicity on the pages of the largest awards column of any U.S. amateur publication. Please send your materials to my address, shown here on the first page of this column.

Denmark's Great Belt Bridge Award. On June 14 1998 the Danish Great Belt Bridge was opened to vehicular traffic. To commemorate this engineering feat, the local radio clubs in Nyborg and Korsor will issue an award for making one contact with OZ2GBW (the EDR headquarters club in Nyborg) and one contact with OZ2GBE (EDR Korsor) during the period June 14, 1998 to December 31, 1998. They plan to be active on all HF and most VHF/UHF bands on CW, SSB, or FM. Apply for this award before December 31, 2000 with a log extract and fee of 25 Dkk, $US4, or 5 IRCs. Apply to: Great Belt Award Manager, Per Andersen, OZ6MI, Kirkegyden 4, DK-5800 Nyborg, Denmark.

Once you get into Island hunting, a whole new world of DX achievement opens up. Other than the IOTA series, which will be featured in a future column, several countries offer versions of the award, which include islands in the waters adjoining their borders. In general, specific country island awards will include islands not separately counted by IOTA. Following are the rules for the German Island Award.

The German Islands Award sponsored by the German Club DOK Y02.

German Islands Award. The German Club DOK Y02 sponsors this diploma for all amateurs and SWLs. This award gives an incentive for portable operations on German islands (see Table I). Contacts after 1 January 1994 are valid. Each authenticated island counts 1 point; oil rigs and lighthouses in the Sea count as islands and score 3 points each. DL's must earn 8 points and contact at least 6 islands, Europeans need 6 points and 4 islands, all others need 4 points and 2 islands. You must make at least one contact with an island in the North and East seas.

Endorsements:

1st class—DL need 16 points, at least 12 islands. EU need 12 points, at least 8 islands. DX need 8 points, at least 4 islands.

2nd class—DL need 24 points, at least 18 islands. EU need 18 points, at least 12 islands. DX need 12 points, at least 6 islands.

3rd class—DL need 32 points, at least 24 islands. EU need 24 points, at least 16 islands. DX need 16 points, at least 8 islands.

For endorsements, at least 25% of the islands must come from either the Northern Sea or the Baltic Sea. All bands and modes. The name of the German island must appear on the QSL. The award is free to any applicant who has activated one or more German islands.

SPECIAL HONOR ROLL

Sanford K. Smith, N7PIB
USA-CA All Counties #953
August 24 1998

HONOR ROLL

500

DK4SY 3032
KBØOPF.....3033
N7PIB.....3034

1000

KD9ZP.....1481
DK4SY 1482
KBØOPF.....1483
N6GL.....1484
WA2RZJ.....1485
N7PIB.....1486

1500

WA2RZJ 1234
N7PIB 1235

2000

N7PIB.....1134

2500

N7PIB.....1061

3000

N7PIB.....971

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $4.00. For nonsubscribers it is $10.00. To qualify for the special subscriber rate, please send a recent *CQ* mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from *CQ* Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated March 1, 1997. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

GERMAN ISLANDS

NORTH SEA

N-01 Borkum	N-10 Mellum	N-19 Langeness
N-02 Lutje Horn	N-11 Scharhorn	N-20 Oland
N-03 Juist	N-12 Neuwerk	N-21 Grode-Appelland
N-04 Memmert	N-13 Trischen	N-22 Hooge
N-05 Norderney	N-14 Helgoland	N-23 Pellworm
N-06 Baltrum	N-15 Dune	N-24 Nordstrand
N-07 Langeoog	N-16 Sylt	N-25 Nordstrandischmoor
N-08 Spiekeroog	N-17 Fohr	N-26 Minsener Oog
N-09 Wangerooge	N-18 Amrum	N-27 Oldoog
N-28 Lutje Oldoog	N-29 Suderoog	N-30 Sudfall
N-31 Habel	N-32 Jjapsand	N-33 Norderoog
N-34 Norderoogsand	N-35 Suderoogsand	

BALTIC SEA

O-01 Fehmarn	O-08 Vilm	O-15 Gormitz
O-02 Poel	O-09 Riems	O-16 Fahrinsel
O-03 Zingst	O-10 Koos	O-17 Heuwiese
O-04 Bock	O-11 Ruden	O-18 Libitz
O-05 Hiddensee	O-12 Greifswalder Oie	O-19 Ohe
O-06 Ummanz	O-13 Usedom (DL only)	O-20 Lotseninsel
O-07 Rugen	O-14 Danholm	O-21 Walfisch
O-22 Langenwerder	O-23 Grosse Kirr	O-24 Oie
O-25 Beuchel	O-26 Tollow	O-27 Riether Werder

CONTINENTAL ISLANDS

B-01 Reichenau	B-02 Mainau	B-03 Herreninsel

Table I– German islands accepted for the German Islands Award (see text).

65 Glebe Road, Spofford, NH 03462-4411
e-mail: k1bv@top.monad.net

Send GCR list and fee of DM10 for DL's; DM15 or $US10 for all others. IRCs not accepted. (Endorsement fees are DM3 for DL; others DM4 or $US3 each.) Apply to: Peter Seifert, DL2RMX, Postfach 24, D-16535 Hohen Neuendorf, Germany.

Worked DIG Members Ukraine Award.

Worked DIG Members Ukraine Award. The very active German Diploma Interest Group (DIG) has branches in several European countries, some of which sponsor their own awards. Contesters will notice many very familiar calls, increasing the chance that you've got the cards in your collection. That's the nice thing about contesting: A few hours of work after the contest spent sending cards to new stations will build up a pretty decent collection after a few years.

This award is issued by the DIG-Ukraine section for contacting DIG members in the Ukraine. SWL okay. All bands and modes. No date limits. Each station is valid one time, regardless which band or mode was used to contact it. Ukrainian stations need 30 points, other Europeans need 20 points, and all others need 10 points. Each DIG member in the Ukraine = 1 point. However, holders of any DIG Trophy (CW Plakette, UKW Plakette, DIG Trophy, or DIG Trophy 1000) = 2 points. Club station EM5DIG = 3 points. Applications from CIS should be sent to UY5AA, P.O. Box 8, Sumy, 244014 Ukraine, while *all* others may apply with GCR list and fee of DM10, $US9, or 10 IRCs to: Karl-Josef Mauel, DF8KY, Schulstrasse 34, D-53947 Nettersheim, Germany.

Member calls: UR3GN, UR3PDT, UR4LCB, UR4MEU, UR5EKO, UR5FA, UR5FHD, UR5LRS, UR7GG, UR7GW, UR9LD, URØMM, US1IDX, US1ITU, US3IZ, US5CCO, US5IIU, US7CQ, US7MM, US9KW, UT2IA, UT2IF, UT3LY, UTØFT, UTØMF, UU2JA, UX1CL, UX1VT, UX2MM, UX4CR, UX5UE, UX7FN, UX7UN, UXØBB, UY5AA, UY5AB, UY5AR, UY5AX, UY5KY.

Kyrghystan Award. There's something special about working 20 meters CW late on a frosty night with the beam aimed north on a band peppered with Siberia and rare Central Asian stations. Double your fun by making contacts for some very

The Kyrghystan Award.

tough awards, such as the following from Kyrghyzstan. Note the award manager is located in France.

Contact Kyrghyz stations on all bands and modes. Valid prefixes are EX1–EX8, and former prefixes UM1–0, RM1–0. Europeans need six contacts; all others need 4 contacts. Send GCR list and fee of $US10 or 13 IRCs to: Alfred Bourdon, F5OJO, 21 Rue Principale, F-57320 Cateau Rouge, France.

Awards from Poland. The following two awards are very handsome, colorful certificates sponsored by SP5PB. While the rules below show the minimum requirements, you may submit greater numbers of valid contacts for special endorsement. The general requirements for both are: Send a certified list and fee of $US7 ($US8 for airmail) or 14 (airmail 16) IRCs to: Piotr Brydak, SP5PB, Okolnik 9A m16, 00-368 Warszawa, Poland. SWL okay.

Poland All Baltic Islands Award. Contact islands located in the Baltic Sea. All islands will count, regardless of the size or population. The only requirement is that the land area be surrounded by salt water. The list should specify the island name. Europeans need 20; NA, Africa, and Asia need 10; SA and Oceanians need 5. Check your IOTA listing to get off to a good start.

Poland Maritime Mobile Award. Contact at least seven different Maritime Mobile stations from anywhere in the world.

Poland's All Baltic Islands Award.

Poland's Maritime Mobile Award.

Internet Site of the Month

The Polish National Society, PZK, has an Internet site at <http://www.pzk.org.pl/dyp_ang.htm>. Complete rules for the POLSKA, AC-15-Z. W-21-M, and SP-50 MHz award are found there. Reduced-size images allow for fast loading, and full-screen GIF images of around 300K may be viewed by clicking on the smaller ones.

73, Ted, K1BV

1998 CQ WW WPX Contest High-Claimed Scores

SSB

United States
Single Operator
All Band

KQ2M	7,656,000
KE3Q	7,236,255
K3MM	6,613,910
NB1B	6,042,960
WC4E	5,317,110
WB9Z	5,109,624
N5KO/6	4,313,436
KVØQ	4,300,500
K3ZO	4,087,136
K8WT	3,759,644
K4VUD	3,568,968
K7RI	2,950,263
*K1HTV	2,684,490
W9LT	2,327,238
N8II	2,051,712
K4JYO	1,930,203
N7TT	1,701,504
WØTM	1,639,494
WO9Z	1,409,584
*WA1LNP	1,406,082

28 MHz

KZ5MM	746,956
N4BP	382,470
NN5AA (K5NA)	269,100
W4WX	161,802
*W2BZR/3/T	79,715
W9WI	78,390
*WØAH	68,508
*KKØSS	54,936
*NA5TR	46,500
KF6JFG	41,679

21 MHz

KA2AEV	4,122,612
NW3Z	2,758,480
WS1M	1,328,319
K5XR (W5ASP)	1,134,364
WIØWA (WØETC)	922,982
K4SN	882,992
*N4MO	866,520
KØEJ	529,920
WW4RR (N4ZZ)	420,550
*WJ7S	396,552

14 MHz

W7FP	649,740
K7ZZ	636,521
KN6M	602,140
WBØO	524,605
N1CC	507,561
*AKØA	501,777
WB2OSM	369,754
*K2BQW	212,948
WA3DMH	194,967
KD8SQ	166,362

7 MHz

NE5D (K5RX)	931,856
KK9A	850,400
NC4NC	216,690
*KW4T	197,064
K2SZ	41,964

3.7 MHz

K1LZ	1,522,576
KE1Y	1,341,230

1.8 MHz

AA1BU	39,760
AA4MM	12,154

Low Power
Single Operator
All Band

K1HTV	2,684,490
WA1LNP	1,406,082
WS1A	1,218,816
WO4O	1,215,662
K6RO	1,188,770
ACØW	1,161,000
WO9S	808,411
W5MN	782,620
WW8DX (NE8Z)	565,095
W7YAQ	543,840

28 MHz

W2BZR/3/T	79,715
WØAH	68,508
KKØSS	54,936
NA5TR	46,500
KE4HXU	36,540

21 MHz

N4MO	866,520
WJ7S	396,552
WA7BNM	386,104
KW2O	326,109
N9SXT	201,500

14 MHz

AKØA	501,777
K2BQW	212,948
WG1Z	136,566
KL7NL/WZ4	134,724
WB2DVU	42,880

7 MHz

KW4T	197,064

DX
Single Operator
All Band

P4ØN (KW8N)	17,267,818
ZX5J (PP5JR)	15,204,800
C46A (5B4ADA)	13,191,645
EA8ZS (EA3NY)	11,715,960
V8JA (JH7PKU)	11,015,137
GIØKOW	10,670,220
VO1MP	10,603,271
VE3EJ	10,308,840
NH7A	9,872,170
S56MM (S5ØA)	9,042,636
OK1RI	8,892,801
VE7SZ (VE7NTT)	8,680,853
PT7BZ	7,752,140
IR2W (I2VXJ)	7,278,720
VP5E (K6HNZ)	7,014,429
DL6FBL	6,737,944
HH2PK	6,141,018
P43T	5,966,400
DJØFX	5,679,574
DL3TD	5,634,032

28 MHz

CT3BX	8,114,301
LU6ETB	7,732,480
PW2C (PY2KC)	6,002,045
ZPØM (ZP5XF)	5,868,162
CW8C (CX8CP)	4,940,433
LU3HY	4,313,140
LWØD (LU7DW)	4,194,282
*LU9HS	4,126,052
PY4OY	4,023,747
CV4Y	3,827,430

21 MHz

WP3R	10,484,000
H27X	6,063,888
KH8/N5OLS	6,057,364
9K2ZZ	5,694,960
CT98BOP	5,560,698
CT8T (CT1DVV)	4,348,923
TK5NN	4,113,408
IH9/OL5Y	3,923,166
*HC6CR	3,630,900
9A5Y	3,472,700

14 MHz

9J2A (JAØJHA)	8,210,813
5B4AGC	5,531,635
KL7RA	5,506,792
LU2NI	5,169,342
YW1A (YV1AVO)	4,818,752
SP2FAX	4,708,008
CS98NH	4,113,288
SL3ZV (SM3JLA)	4,006,242
OH1JD	3,738,846
OH8AA	3,596,677

7 MHz

H24LP (5B4LP)	4,191,668
YU7NU	2,226,900
HA9RE	1,834,860
RNØA (UAØAGI)	1,782,636
VE3CDX	1,468,872
9A6KOI	996,240
UR5LCV	741,488
*HA5BSW	739,286
CE8EIO	711,022
*FK8GM	651,468

3.7 MHz

IH9/OK1MM	1,416,074
OK2RZ	1,336,608
S57O	1,226,224
OL4U	1,042,272
OM2TW	1,018,820
*CY7A (VE7SV)	964,800
SP3KFH	915,768
HG6V (HA6GK)	708,372
*S5ØQ	627,570
VE3BY	555,550

1.8 MHz

LY6K	493,042
VE3BMV/1	488,530
SP7GIQ	390,580
S54E	310,024
OZ3SK	283,920
*YZ4IZ	183,768
IR1A	111,540
RA4NW	105,878
YU7AU	100,464
UA1AFZ	62,624

Low Power
Single Operator
All Band

VP5E (K6HNZ)	7,014,429
4M5E	3,126,992
UT4UO	2,727,208
Z38X (NO6X)	2,694,019
VE6JO	2,309,490
VA3DX	2,176,832
UA9CAW	2,168,656
S57DX	2,141,855
S53EA	2,041,000
7N3ULM	1,946,928
4XØF (4Z5FL)	1,686,326
TA3BN	1,680,265
9M2TO	1,585,480
VK4NM	1,580,065
UPØF (UN7FK)	1,564,640

28 MHz

LU9HS	4,126,052
LU4VZ	3,382,540
LU5FC	3,343,032
PU2RUX	2,973,278
LU4FCZ	2,257,344
LU7HH	1,928,124
LU7HN	1,705,233
ZW5W (PP5WN)	1,687,791
PY2MNL	1,685,567
PY2XE	1,625,687

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- **Built-in High Speed automatic antenna tuner - works thru 50mHz**
- **Auto Notch/Noise Reduction Control**

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CIRCLE 126 ON READER SERVICE CARD

21 MHz

HC6CR	3,630,900
4F4IX	2,949,120
PP5UA	2,865,702
UA4LCQ	1,786,190
DU3RCM	1,671,125
UN5PR	1,613,924
CN8NK	1,349,056
9A3B	1,266,510
JR3RIY	1,028,193
ED7FTR	985,545

14 MHz

3E1DX (HP1XVH)	2,492,949
IT9STX	2,432,232
II3T (IV3TAN)	2,405,395
LQ4I (LU4IC)	2,233,579
4N7B	1,938,145
9M6AAC (OH2YY)	1,890,025
UAØJH	1,508,874
J42Z (SV2CWY)	1,193,316
UU7JX	798,310
RZ9UC	700,344

7 MHz

HA5BSW	739,286
FK8GM	651,468
UT1T (UR7TZ)	450,216
IR7S (IK7YUA)	335,420
OH4KBC	323,536
YZ1V	182,360
UX3M (UR3MP)	163,072
T94DO	153,224
YV5DZQ	86,346
IV3RCH	80,676

3.7 MHz

CY7A (VE7SV)	964,800
S5ØQ	627,570
4N1A	443,920
HA3LN	411,190
TA3J	368,258
UX3MO	353,904
9A4RU	335,232
PA2SWL	291,500
S57CBS	276,040
S57IIO	256,520

1.8 MHz

YZ4IZ	183,768
YU1AST	20,520
VE7SV	10,472
UT1MW	9,576
EA1DVY	6,426

Tribander/Single Element
United States
All Band

W9IW (ES2RR)	2,794,738
AD1C	2,717,526
AI2C	2,375,753
K6ZX/8 (N6WLX)	2,171,402
N6ED	2,116,988
W6TK	1,791,390
W1CU	1,687,224
KI6CG	1,566,284
KMØL	1,384,725
*WD5K	1,374,688
KGØZI	1,352,295
K6BZ	1,251,488
WC1M	1,250,850
WA4TTI	1,096,983
KC6X	1,094,512

Low Power

WD5K	1,374,688
WN6K	990,756
NA2Q	861,670
KG2AU	634,005
WS7V	508,691
KAØWWT	312,684
WA5IYX	228,846
N8YYS	126,666
KD6DAE	123,648
KB3AGZ	99,640

21 MHz

N7RQ	124,976

14 MHz

NN5Z (K5PX)	139,815

DX
Single Operator
All Band

H44RY (OH1RY)	11,113,886
XQ8ABF	9,861,060
3DA5A (JM1CAX)	8,606,094
EA9AM (AI6V)	6,998,840
4N9BW	4,715,249
EM4U (UT4UZ)	4,549,860
LY1DS	4,345,244
*LU8HLI	3,989,776
S57AW	3,941,600
RN6BY	3,648,442
*3B8/DL6UAA	3,521,827
HA2SX	3,225,363
LY5W	3,167,118
CX7BY	3,126,774
OE1EMS	2,946,727

21 MHz

EA3QP	861,120
NH7C	425,592
OH3BU	312,624

Low Power
All Band

LU8HLI	3,989,776
3B8/DL6UAA	3,521,827
UAØSJ	1,873,755
S51F	1,312,360
JA7NVF	1,204,082
EA3ELZ	1,041,310
RAØFF	1,032,190
EA3CEG	1,025,100
OK2VWB	1,003,314
EA8BXQ	927,990

28 MHz

JAØRYN/7	28,301

Rookie
United States

KU4HZ	A	1,118,958
AA1SU	A	318,816
*KE4ZQZ	A	238,032
*KI8CS	A	188,163
*N3XQP	A	169,404
*K6KAY	28/T	57,054
*KF6GUH	28	29,281
*W8TTS	28	8,771
*KIØJZ	21	4,860

DX

*P43E	A	2,650,390
*F5BMK	A	356,728
VE1TRH	A	301,735
*YT1DZ	A	154,936
*LA8ZJA	A	131,118
*PY2ELG	28	85,860
*EA7ASZ	28	38,400
P43P	21	6,342,771
*EC7ACV	21	59,285

Band Restricted

*JA5EO	A	430,155
*EC3AGC	A	335,331
*EC6PG	A	71,968
*EC5AEB	A	60,588
*OH3JKV	A	39,370
*NH7CC	28	196,182
*FB1CMF	28	41,100
*KB4OGM/T	28	39,858
*EC5AHC	21	113,625
*JA9SCB/1	21	49,140
*EC1DMQ	21	48,300
*S57KAA	3.7	258,990

Assisted
United States

KC6ETY	A	2,840,960
NA2NA	A	2,114,640
WØGJ	A	1,763,450
W3BGN	A	1,547,340
W4MYA	A	1,412,014
K4MA	A	1,408,750
N5JR	A	1,363,450
*WW3S	A	1,296,554
W1NG	A	1,293,302
K7ZUM	A	1,265,220
K2UT	21	290,672
*WR3L	21	279,300
*W9HV	21	162,426
K6III	21	146,496

DX

DLØWW	A	4,826,142
EA3KU	A	4,578,060
JM4UQM	A	3,370,950
DF6QV	A	2,885,740
IN3ZNR	A	2,809,190
IO4A (IK4PVR)	A	2,780,163
GX4WSM	A	2,349,896
EA5AEY	A	2,289,671
OH9MM	A	2,063,901
*YU1NR	A	1,764,000
*LU5HVN	28	722,917
*JL4CVG	28	80,765
EA3EJI	21	608,572
JQ1NQT	21	222,159
TM7XX (F5MUX)	14	2,381,148
YT4I (YT4AI)	14	2,081,715
DL3NED	14	1,866,880
LY8X	14	1,635,093
*PP5JD	14	1,576,608
*YZ7ED	7	226,008
S55T	3.7	516,530
S57M	1.8	292,672
*YU1RA	1.8	36,414

QRP/p

NØKE	A	316,744
KB3TS	A	192,552
N7VY	A	179,800
N1TM	A	177,813
WA5OJI	A	150,252
WA6FGV	28	27,258
W9PNE	28	11,826
W4DEC	21	84,372
W6CN	14	88,560
W8QZA/6	7	15,368

DX

YU1KN	A	624,036
LU1VK	A	622,080
UX3HX	A	543,564
LY2FE	A	451,257
S59D	A	317,668
LU7VCH	28	504,075
LW3DWX	28	489,526
JA5GPJ	28	85,675
UAØZBK/RØ	21	412,304
VE7SBO	21	269,230
RA3RCL	21	139,598
OK2TBC	14	43,512
GWØVSW	14	9,660
9A2KO	7	97,513
SP4GFG	3.7	83,820
YU1KNO	3.7	26,136
UT5EER	1.8	30,757
VY2MGY/3	1.8	14,400
US7MQ	1.8	12,638

Multi-Operator
Single Transmitter
United States

KI1G	8,390,420
NE6N	5,951,044
KT4W	5,271,392
W7RM	4,996,708
WO8CC	4,570,680
KC7V	3,864,712
N4TO	3,864,035
NX5M	3,682,751
NK7U	3,656,774
NR6R	2,915,325
AA5NT	2,631,808
WA1RR	2,554,998
WV2LI	2,495,204
NA5B	2,489,410
KT6RA	2,002,692

DX

PY5EG	19,570,520
TS5I	17,128,880
LT1F	15,235,760
HG1S	12,988,560
IR4T	12,985,280
6V1C	12,588,990
AH2R	11,411,430
UPØL	11,008,740
KL2A	10,987,090
OG5F	10,957,300
M8T	9,461,772
UD6M	9,445,982
TM2V	9,333,120
9A7A	9,202,390
S58AB	8,839,176
OHØW	8,769,920
S53M	8,397,000
OH5LF	8,378,880
RM6A	8,323,679
J8ØR	8,158,326

Multi-Operator
Multi-Transmitter
United States

KO6N	12,166,398
KU8E	11,111,950
KS3F	9,299,288
AI4R	2,462,613
KB1H	2,377,050

DX

P3A	45,728,606
KP3P	37,427,990
OT8A	27,655,594
9A1A	26,852,380
KH7R	26,830,109
LU4FM	22,398,888
EA4URE	14,746,239
RK2FWA	12,414,204
VE6JY	10,857,532
RZ3Q	10,674,792

CW

United States
Single Operator
All Band

KQ2M 5,280,069
KE3Q 5,120,704
W4AN 4,751,670
K3MM 4,304,640
WR6AAA (N6IG) 4,209,872
NB1B 3,959,792
K3ZO 3,950,100
K7BV 3,177,540
K5ZD 3,161,876
WC4E 3,110,076
N3BB 2,778,552
W7GG 2,676,432
WK6LA (K6LZ) 2,535,456
AA3B 2,519,433
*KN4T 2,502,975
W3PP 2,490,390
W8AV 2,026,400
WV2LI (N2GA) 1,985,758
*K1HTV 1,892,324
KT3Y 1,822,689

28 MHz

NN5AA (K5NA) 68,800
N4BP 50,038
*K4EA 20,882
KF8TM 4,368

21 MHz

N6MU 469,200
K4OAQ 294,106
WW4RR (N4ZZ) 190,912
K6III 81,450
*KN4Y 60,960

14 MHz

N6TV 1,707,240
KØEJ 1,289,318
WØTM 1,070,380
K5ZM 784,553
W9WI 704,919

7 MHz

*WA8WV 374,528
*N2GM 214,830
KR1G 109,228
*N9ENA 28,296
*K4WW 14,760

3.5 MHz

K2TW 334,800
K1LZ 318,716
W3BGN 238,680
W1MK 110,088
N2GC 106,002

Low Power
All Band

KN4T 2,502,975
K1HTV 1,892,324
AA5B 1,629,067
WQ5L 1,418,772
K4RO 1,043,289
WD4AHZ 1,001,160
NW6S 842,370
WO9S 746,480
WA1LNP 713,388
W4YE 696,340

28 MHz

K4EA 20,882

21 MHz

KN4Y 60,960
NN9K 22,444
NP4IW/NN6 18,880
KØBCN 9,890

14 MHz

AE6Y 211,165
WA1S 133,560
KQ1V 129,033
K9QVB 120,064
W2/U5WF 92,736

7 MHz

WA8WV 374,528
N2GM 214,830
N9ENA 28,296
K4WW 14,760
KU6T 7,200

3.5 MHz

W4WS (N4VHK) 3,626

DX
All Band

3V8BB (YT1AD) 12,481,220
HC1OT (N5KO) 11,733,400
LT1F (LU5CW) 11,145,372
EA8ZS (EA3KU) 10,725,988
C46A (5B4ADA) 10,324,487
P49V (AI6V) 8,302,698
IQ9L (I2VXJ) 8,259,552
C4W (5B4WN) 7,775,758
A45XR (SP5EXA) 7,034,535
OT8T (DL2CC) 6,388,356
3DA5A (JM1CAX) 6,344,548
RN9AO 5,659,071
IR4T (IK2QEI) 5,076,773
RN9XA 5,055,804
S56MM (S50A) 5,016,725
VE3EJ 4,993,582
VO1MP 4,888,975
DL6FBL 4,840,537

28 MHz

PR5W 1,476,327
LU8DW 1,090,600
*PU2RUX 701,092
4X4DZ 658,560
9HØA 509,625
*PU1KDR 509,313
*ZV8O (PV8ONU) 424,320
CX5X (CX6VM) 398,200
YT1R 276,276
TK5NN 266,400

21 MHz

WP3A 3,216,796
*CP6AA 2,826,920
9A5Y 1,882,494
YZ9W (YZ1AU) 1,437,870
*XV7SW 1,377,496
S57O (S59A) 1,282,380
*YBØECT 1,245,308
II3T (IV3SHF) 1,142,760
*4Z5FW 1,074,678
*4X/OK1DTP 1,037,686

14 MHz

EA9LZ 5,708,498
FM5BH 4,642,866
VP5Z (W5ASP) 3,713,040
YM2ZW (OK2ZW) 3,090,750
HG3O (HA3UU) 3,000,387
YZ9A (YU1NW) 2,879,807
SP2FAX 2,789,352
*5B4/T93Y 2,618,420

GS2MP (G4FAM) 2,534,115
9A3MA 2,485,378

7 MHz

TI2C (TI2CF) 6,114,930
ZM1A (F2CW) 5,465,570
H24LP (5B4LP) 2,962,176
DL5AWI 1,993,860
YT4AY 1,843,688
YU7NU 1,838,484
T88X (JA6VZB) 1,600,104
S5ØR 1,522,374
G8G (GØNUP) 1,396,278
UN7LG 1,380,808

3.5 MHz

EU3FT 532,304
DL8WN 425,156
T91DNO 401,410
UN7LT 380,418
*HA4FV 336,582
*EU1CL 325,314
OH3NE 313,600
UYØZG 311,850
SP3CW 305,046
UA1OZ 265,740

1.8 MHz

IH9/OL5Y 355,570
SN3A 186,588
LY6K 177,650
S5ØC (S53MM) 159,490
9A4D 152,250
S57M 135,660
*HA8BE 120,960
*9A2OO 104,492
*YZ4IZ 97,788
*LZ2CJ 61,272

Low Power
All Band

5B4/T97M 4,389,784
VE7NTT 2,523,900
S57DX 2,133,495
7M1MCT 2,105,194
S59AA 2,038,168
C6AKA (DL7VOG) 2,017,115
TA4/DK5IM 1,972,355
S57J 1,861,738
L36E (LU7EE) 1,737,996
EA8ASJ 1,722,627
RSØF (UAØFZ) 1,685,690
S51F 1,661,600
EA7GTF 1,588,248
HA8MD 1,578,864
SP9XCN 1,574,620
VE6JO 1,533,060
EU1AZ 1,506,600
VE9DX 1,503,788
UA3ABJ 1,345,680
RAØFU 1,336,014

28 MHz

PU2RUX 701,092
PU1KDR 509,313
ZV8O 424,320
LU2DW 229,724
4Z5AX 218,160

21 MHz

CP6AA 2,826,920
XV7SW 1,377,496
YBØECT 1,245,308
4Z5FW 1,074,678
4X/OK1DTP 1,037,686
YB3ZBZ 835,989
PU2WIF 790,229
9A3B 642,108
UA4LM 503,070
YY4GLD 500,536

14 MHz

5B4/T93Y 2,618,420
CY7A (VE7SV) 2,328,720
VK2APK 1,927,042
RO3A (RV3ACA) 1,903,993
L5ØI (LU1ICX) 1,840,893
RJ9J (RA9JR) 1,797,458
S58AL 1,448,568
JF1SQC 1,247,816
EA3AR 970,717
JH3AIU 641,410

7 MHz

S54A 1,071,408
YZ1V (YU1AAV) 674,696
PA3AAV 646,560
F/OK1EE 642,968
OK2XTE 625,506
4N1A (YZ1DRA) 561,132
UR3PDT 544,992
LY3JY 536,452
UY8IF 517,132
T95A 503,820

3.5 MHz

HA4FV 336,582
EU1CL 325,314
J49IL (DJ5IL) 240,960
OK1SI 231,072
EV6M 141,768

1.8 MHz

HA8BE 120,960
9A2OO 104,492
YZ4IZ 97,788
LZ2CJ 61,272
YU1RA 56,170

Tribander/Single Element
United States

WV2LI (N2GA) 1,985,758
W9IW (ES2RR) 1,780,482
W1CU 1,234,116
K7VS 1,212,640
NU4Y 1,206,252
*WD4AHZ 1,001,160
KMØL 941,752
*NW6S 842,370
N8AA 800,800
K4BAI 793,592

DX

3V8BB (YT1AD) 12,481,220
C4W (5B4WN) 7,775,758
3DA5A (JM1CAX) 6,344,548
*5B4/T97M 4,389,784
4N9BW (YU7BW) 4,254,246
EM4U (UT4UZ) 3,475,695
S53R 3,214,720
7Z5OO (K3UOC) 3,012,856
HA2SX 2,864,315
YL3DW 2,816,940
LY5W (LY1DR) 2,270,898
LY2OX 2,198,010
DK9IP 2,132,284
*7M1MCT 2,105,194
JA1YNE (JP1OGL) 2,056,864
UX1UA 1,836,104
S52FB 1,681,160
*S51F 1,661,600
EU1FC 1,525,341
UY1HY 1,524,967

Low Power
United States

WD4AHZ 1,001,160
NW6S 842,370
W4YE 696,340
N2ED 601,500
K2QMF 471,734

DX

5B4/T97M 4,389,784
7M1MCT 2,105,194
S51F 1,661,600
9A9R 1,317,353
RAØFF 1,259,175
C6AHR (N8PR) 1,241,896
YU7AL 1,018,400
IKØYVV 884,709
S57AL 839,160
EA3ALV 822,296

Rookie
United States

*AB1BX ..... A 120,716
KØXQ ..... A 69,524
*KF6GUH ..... A 34,125

DX

*PY1KS ..... A 548,366
*IIØN ..... A 107,996
*UT5UGQ ..... A 88,320
*IZØANC ..... A 41,134
*PU1KDR 28 509,313
*PU2WIF 21 790,229
*RZ1AWD 14 508,260
*EA2BDS 14 157,360

Band Restricted

*FB1CMF ..... A 282,133
*EC5AEB ..... A 203,046
*JR5EHB ..... A 96,425

Assisted
United States

K3MM ..... A 4,304,640
W8AV ..... A 2,026,400
AB2E ..... A 1,798,720
K1TO ..... A 1,649,732
KT4W ..... A 1,233,024
N5JR ..... A 644,184
W1NG ..... A 509,754
K3KO ..... A 508,715
KC1F ..... A 353,158
KC6ETY 14 260,820

DX

GIØKOW (GIØNWG) ..... A 5,703,302
DK3GI ..... A 3,518,361
DL1IAO ..... A 3,318,798
ED5FV ..... A 3,039,456
IKØHBN ..... A 1,808,282
JG3KIV ..... A 1,770,516
DK7YY ..... A 1,471,008
Z39Z 7 1,305,984
JA9CWJ ..... A 1,268,960
FBC5NBX ..... A 1,228,500

QRP/p
United States

K1VUT ..... A 643,320
NØKE ..... A 582,120
WA2HZR ..... A 581,038
N7IR ..... A 346,620
W8DN ..... A 118,978
NX5M 28 3,619
W4PJ 28 3,456
W4DEC 21 19,488
K2CS 21 8,614
W6YJ 14 96,120
KU7Y 7 163,736
N1TM 7 67,596

DX

YU1EA ..... A 775,800
RW4WR ..... A 731,868
LY2FE ..... A 684,378
YU1LM ..... A 652,096
SM3CCT ..... A 418,320
LW3EBJ 28 63,648
4X1VF 28 30,800
LU6HI 21 516,360
U5MZ 21 89,995
OK2PYA 14 203,904
JH1GNU 14 177,840
SP4GFG 3.5 166,222

Multi-Operator
Single Transmitter
United States

KW2O 3,564,386
KVØQ 3,388,363
WU3V/5 2,918,496
WO8CC 2,722,278
KC7V 2,641,958
KO7X 2,157,265
N7TT 1,759,006
AB5SE 1,017,912
WG9L 807,519
WYØB 300,456

DX

H2ØA 14,693,916
NP4Z 13,230,000
ZX5J 12,337,056
IH9/OK5DX 11,723,418
V26TT 10,000,305
JY8B 8,640,832
HG1S 8,544,877
9M6AAT 8,071,635
6Y6A 7,977,606
UD6M 7,082,982
RM6A 6,922,986
9A7A 6,851,792
KH7R 6,787,596
TM9C 6,278,052
RK9CWW 6,133,400
OHØW 5,994,296
OG5F 5,853,474
LZ9A 5,447,232
JN4FEU 5,185,138
OH1AF 5,167,164

Multi-Operator
Multi-Transmitter
United States

WT2Q 7,517,715
KO6N 6,851,685
NJ4F 6,159,726
W4MYA 4,948,452
AJ4Y 3,419,616
WR3L 3,118,262

DX

P3A 33,778,864
AZ4F 20,929,300
9A1A 15,602,140
RW2F 12,538,880
EA4ML 11,879,184
LY5A 10,777,920
WL7E 9,916,764
JH5ZJS 7,896,595
LY7A 6,737,976
PA6WPX 6,197,749

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All Mode
Receiver

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2M/440 MHz
HT

***IC-W32A & IC-R10**
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BY FREDERICK O. MAIA, W5YI

WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

The Ten NPRM Questions The FCC Wants Answered!

As mentioned last month, the Federal Communications Commission has signaled their intention to restructure the Amateur Service. They issued a Notice of Proposed Rulemaking (NPRM) in mid-August. The driving force behind the proceeding was various petitions for Rulemaking filed by the American Radio Relay League. The public gets a chance to express its views until December 1st. If you have not already done so, you should let the FCC know how you feel about the points raised in the NPRM. At the end of each question, we will tell you *our* opinion. (You may not agree!)

There were a lot of minor errors in the original document. We questioned the FCC on them and were told that they were aware of them and they would be corrected in the version that is printed in the Federal Register. "The questions we want answered are correct in the original version," the FCC said. On August 31st, the FCC issued a lengthy errata which restated the new proposed rules.

It is our opinion that the errors crept in during the revision phase. The FCC staff originally submitted a straight Notice of Proposed Rulemaking which was later returned by the Commissioners for amendment. The result was what amounted to a combination NPRM and NOI, Notice of Inquiry—a request for comments on certain points.

Here is a list of the questions concerning the Amateur Service that the FCC wants answered.

1. Are six classes of licenses unnecessary?

The FCC believes that reducing the number of classes of operator licenses would relieve the VEs from the tasks of preparing and administering unnecessary examinations. It would also ease the Commission's burden of overseeing the system and maintaining a database of the current operator class for every amateur operator. In short, how many license classes do you believe should be in the U.S. Amateur Service, and why?

The FCC has proposed four—Technician, General, Advanced, and Extra. However, there is mounting support for only three—Technician, General, and Extra. The ARRL wants four (A, B, C, and D), which basically would coincide with Extra, Advanced, General, and Technician. The League wrote to the FCC about it just before the Commission issued the NPRM.

We agree with the three-class line-up. Call it A, B, and C; 1, 2, and 3; or Technician, General, and Extra. We would combine the Advanced and Extra classes, since there is so little difference (mostly thin segments of CW spectrum) between the two.

There is a two-fold advantage in leaving the license class names the same as they are now. First, the Commission would not have to reissue license documents with new names. Second, the FCC has proposed to allow currently held license classes to be indefinitely renewed. It would be unwieldy to have Class A, B, and C (or 1, 2, and 3) and then allow abolished licenses (such as the Novice, Technician Plus, and Advanced) to be indefinitely renewed. In any event, six license classes is way too many, we think.

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (telephone 817-461-6443 e-mail <fmaia@cwixmail.com>)

2. How important is the Novice class?

Very few people now take the examinations for the Novice class license. Over the past ten years the number of Novice operators has declined from 84,589 (in 1989) to 76,515 (in 1998). By contrast, the number of codeless Technicians has shot up from zero to 184,979 in just seven years.

The FCC " . . . believes that the no-code Technician class operator license has replaced the Novice class operator license as the entry-level license class of choice." There can be no doubt about that!

The FCC has " . . . tentatively concluded that the Novice class operator license no longer serves a significant, useful purpose and should be phased out with the current holders of Novice class operator licenses being grandfathered. No new Novice class licenses would be granted, but anyone currently holding a Novice license would be able to modify or renew it."

We agree. The Novice class should be abolished. There simply is no need for it anymore. When given a choice, applicants overwhelmingly prefer the no-code Technician path into amateur radio.

3. What should be the disposition of the Novice bands?

The question then becomes, if no new Novice licenses are issued, what happens to the Novice bands? Currently, other license classes can operate within the Novice bands, but only at a 200 watt reduced power level. Given the small number of new Novice licenses now being issued, if the FCC were to discontinue licensing new Novices, would it be appropriate to delete the frequency limitations on Novices and the power limitations on other classes of operators using the Novice frequencies?

The FCC suggested a possible answer might be that " . . . Novices would continue to be limited to 200 watts output power but could operate using the Morse code anywhere within the 80, 40, 15, and 10 meter bands."

We agree with the Commission. This is a good answer to the question!

4. Should the Technician Plus license class be phased out?

The only difference between the Technician and Technician Plus classes is that a Technician Plus operator has passed a five words per minute (wpm) Morse code examination while a Technician operator has not. The FCC believes that both operator classes predominantly use FM voice and digital packet communications on the amateur VHF and UHF bands. "Yet, the VEs are burdened with preparing and administering telegraphy examinations, and the Commission is burdened with processing the resulting applications and revising the database."

The FCC proposed " . . . that the Technician Plus class be phased out. Holders of an FCC-issued Technician class operator license granted before March 21, 1987 have previously passed the written examination required to qualify for a General class operator license."

"Other Technician Plus class operators could qualify for a General class operator license by passing written examination Element 3(B) which consists of 30 questions on the additional privileges of a General class operator license and the 13 or 20

wpm telegraphy examination," the FCC said. "We seek comments on this proposal."

It should be pointed out that according to the NPRM, the 5 wpm code examination would still be available, and any Technician who wanted to operate CW on the HF Novice bands could do so after passing Element 1A and obtaining a CSCE. A Certificate of Successful Completion of Examination is a form given out by the VE team verifying that the examinee has passed an amateur radio operator license examination.

5. Should Advanced class operators be permitted to be VEs for the General class?

Currently, an Advanced class operator cannot prepare or administer a telegraphy examination for an examinee for a General class license. Only an Amateur Extra class licensee can administer that examination. The ARRL asked the FCC to change the rules to permit Advanced class operators who are VEs to prepare and administer General class license examinations. The ARRL says that this is legal under the law and will help fulfill the need for more volunteer examiners.

The FCC agreed and said this " . . . will benefit potential amateur service licensees by having additional Volunteer Examiners available for the examinations." We also agree with the ARRL and FCC that the Advanced class VE should be permitted to examine applicants for the General class.

6. Should RACES station licenses be phased out?

No new RACES (Radio Amateur Civil Emergency Service) station licenses have been granted since July 14, 1980, when they were discontinued to conserve FCC manpower and resources. At the time, there were 611 RACES licensees. There are now only 249 RACES licensees. The FCC wants to phase out RACES station licenses by not renewing them.

By eliminating the RACES licenses, the FCC is taking a step which not only will conserve the Commission's financial resources, but will also eliminate licensing duplication. Emergency communications that are now transmitted by RACES stations can continue to be transmitted by all regular amateur radio stations.

The FCC said, "Our rules permit two types of stations to operate as part of RACES: (1) a licensed RACES station, and (2) any amateur station that has been properly registered with a civil defense organization. Thus, to engage in RACES communications, it is not necessary to have a RACES license with a separate and distinct callsign. We invite comments on this proposal."

We also see little reason to continue RACES licenses. They are really only a callsign which could be reclaimed under the FCC's Vanity Call Sign System if a trustee felt strongly about it.

7. How can the Amateur Auxiliary improve enforcement of the Amateur Service rules?

The Amateur Auxiliary is composed of amateur operators who are recruited and trained by the Commission for the purpose of detecting, on a voluntary and uncompensated basis, improper radio transmissions. This information is conveyed to the Commission. Advisory notices are issued to persons who apparently have violated the Amateur Service rules.

According to the FCC, the procedure suggested by the ARRL which would permit the volunteers to bring complaints of malicious interference directly to the Chief Administrative Law Judge (CALJ) is not legally possible.

The FCC said that "while we do not seek comment on ARRL's specific proposal, we do seek comment, consistent with the ARRL's underlying concerns, on other ideas for improving our enforcement processes as they relate to amateur radio. One possibility, for example, would be to encourage or require persons bringing complaints of interference to the Commission to include a draft order to show cause to initiate a revocation or cease and desist hearing proceeding. We also request additional

comments and suggestions on how we could better utilize the services of the Amateur Auxiliary, consistent with its statutory basis."

I don't know the answer to better enforcement of the Amateur Service airwaves. However, I do know that it is a serious problem. Perhaps some self-policing method could be developed for the amateur community to sit in judgment of offenders—sort of a judge and jury of our peers. But this may not be legal under the law. The FCC does not have the resources to handle the job themselves.

8. What changes should be made to the telegraphy examination requirements?

The FCC rules provide for three levels of skill in telegraphy, based upon the rate at which an applicant correctly receives a telegraphy message. The levels are 5, 13, and 20 wpm. The VEs determine the examinee's level of skill in sending and receiving text in international Morse code.

In 1990, in response to the sentiment of the amateur community, the FCC established a codeless Technician class operator license in order to attract technically inclined persons. The FCC stated that they "believed that telegraphers would be in less demand than electronics and communications experts.

"An entry-level opportunity was provided to otherwise qualified persons who found that telegraphy was a barrier to pursuing the purposes of the amateur service. Those purposes include encouragement and improvement of the amateur service by providing opportunities for advancing both communication and technical skills, and the expansion of the existing reservoir within the Amateur Radio Service of trained operators, technicians, and electronics experts.

"Manual telegraphy is now used less as a communications mode. Radiotelegraphy is just one facet of many diverse modes of radiocommunication that require a technologically literate licensee.

"The international Radio Regulations that apply to the Amateur Radio Service require that all amateurs licensed to operate below 30 MHz demonstrate their ability to ' . . . send correctly by hand and to receive correctly by ear, texts in Morse code signals.'

"The Radio Regulations do not specify any particular speed. We note that the 1995 World Radiocommunications Conference (WRC-95) resolved that Article S25, which includes the international amateur code requirement, be considered at the 1999 WRC. Subsequently, this consideration was delayed to the WRC scheduled for 2001."

Based in part on an ARRL survey, an ARRL committee proposed to reduce the General class code speed requirement from 13 to 10 wpm, and for all code examinations to specify one out of five minutes of copy.

"In view of changes in the technologies that amateurs use to communicate generally, and views with regard to the Morse code requirement specifically,

"(a) We seek comment on all aspects of the Morse code standards used in our examinations.

"(b) Do the three levels of 5, 13, and 20 wpm remain relevant to today's communications practices?

"(c) Should we continue to have three different levels, or should these be reduced to one or two, and if so, what should be the required speeds?

"(d) Were we to reduce the required Morse code elements, should we add elements to the written examination to ensure a working knowledge of the newer digital technologies, which, in part, are replacing the Morse code?

"(e) Or, should we consider specifying the method of examining for Morse code proficiency, such as requiring fill-in-the-blank or copying one out of five minutes sent, instead of allowing VEs to determine how to test for code speed?"

For what it's worth, here are my views on telegraphy testing in the Amateur Service. First, I am basically opposed to any CW examinations, period! Except for the international requirement, I fail to see why it should be required. Amateurs are not administered practical examinations in any other mode.

However, since it is a requirement, the slowest speed (5 wpm) should suffice. There is no evidence that Morse proficiency makes anyone a more desirable or motivated person, as some amateurs claim. And many other otherwise qualified people would be able to participate in HF amateur communications without having to learn a mode which they will not—and need not—use.

The ARRL is already on record as favoring 5 wpm for the General class, and 12 wpm for Advanced and Extra. I see no reason to require the faster speed.

9. Should the code speed be reduced to 5 wpm for everyone as a way to eliminate the need to grant waivers of the higher code speed requirements for the handicapped?

Yes, I think it should be. The ARRL wanted changed the rules that allow telegraphy examination credit for the higher telegraphy speeds to disabled applicants. The League felt that examinees should be required to attempt the higher speed telegraphy examination before examination credit is given pursuant to a doctor's certification. They also wanted Volunteer Examiner Coordinators (VECs) to be authorized to request medical information from the certifying physician pertaining to the examinee's disability and to review it before a waiver is allowed.

The FCC added, "It should be noted that these issues only remain relevant if we retain the higher telegraphy speeds requirement, since if the requirement were eliminated, a person with a disability would not have to apply for examination credit. We tentatively conclude that if we do maintain the requirement, neither of these proposals is an appropriate means to address potential abuses of the physician certification requirement. We believe that these proposals place an unfair burden on examinees with disabilities, and raise serious privacy and confidentiality concerns. We seek comment on ARRL's proposal and our tentative conclusion."

Once again, we believe that passing a 5 wpm telegraphy examination fulfills the international requirement. That should be all that is necessary. Furthermore, all Morse testing should be eliminated in the Amateur Service once it is legal to do so under ITU law. Amateur radio is a hobby the cornerstone of which is advancing the radio art.

10. What changes, if any, should be made to the written examinations?

There are currently five different written examinations prepared and administered to applicants for amateur operator licenses in order to demonstrate to the FCC that the applicant possesses the operational and technical qualifications required of an Amateur Service operator.

The written examination for each license class currently specifies nine or ten general topics and the number of questions for each topic that must be asked in an examination. Each written examination is prepared from a pool of multiple-choice questions and answers that is approved by the National Conference of VECs. Each question pool is updated on a four-year cycle, and all publishers and applicants have access to current questions. The VECs Question Pool Committee (QPC) without formal Commission involvement accomplishes this on a purely voluntary basis.

"Determining the components of written examinations was carried over into the VE system from those components used when the Commission previously prepared and administered the examinations. We seek comment on whether the written examination requirements should be modified to provide VEs and VECs additional flexibility in determining the specific contents of written examinations, on the specifics of what such flexibility should entail, and on the advantages and disadvantages to providing such flexibility."

In short, the FCC wants to know whether the general topics set forth in Section 97.503 adequately cover the needed information categories relevant to determining whether an applicant has the qualifications necessary to become an amateur licensee.

"For example, does the current list of topics adequately cover current technology and contemporary amateur operating practices? For those commenters who suggest addition or deletion of general topics, we ask them to include the rationale underlying such proposals. In addition, we ask commenters to discuss whether the required number of questions from each general topic should continue to be established by rule. For those commenters who suggest altering the number of questions, we ask that they discuss alternative numbers or percentages and the reasons therefore."

The FCC said they were particularly interested in comments from VEs and VECs regarding any changes they would recommend in the written examination requirements, as well as on the amateur examination process specifically, including how, if at all, they will affect the integrity of the examination and licensing process.

"For instance, we seek specific comment from VEs and VECs regarding how modifications to the written examination requirements would affect their ability to conduct examinations in an effective, efficient, and expeditious manner."

Your author is a member of the VECs Question Pool Committee. This is the group that develops and revises all of the examination questions. I personally feel that more emphasis should be placed on FCC regulations, and operating practices and procedures at the beginning (Technician) level. Beginners all use commercially made transceivers. On the other hand, more importance should be given to electronics and the technical phases of amateur radio at the higher license class level. These amateurs are more prone to build and maintain equipment.

Your Comments

The heading of your Comments or Reply Comments should look like the the example shown in fig. 1. It can be on your letterhead or plain paper.

Important: Be aware that effective with this proceeding, there is a new *electronic* procedure for filing comments on FCC rulemaking. Here's how this works.

Electronic filing of comments in FCC Rulemaking Proceedings and access to filings. Two years ago the FCC proposed to allow electronic comments to be filed in FCC Rulemaking proceedings using the Internet's World Wide Web and electronic mail. In making this recommendation, the Commission noted that an estimated 40 million people in the United States now have access to the Internet. Allowing parties to use the Internet and electronic mail to file comments in FCC proceedings makes it simpler for people to submit comments to the Commission and permits them to be quickly made available for review on-line.

Previous rules required the filing of multiple copies of formal comments to the Secretary. If comments are filed electronically, parties generally need only to submit one electronic copy, which is automatically distributed to the appropriate bureaus and offices, as well as the copy contractor, in electronic form.

Electronic Comment Filing System (ECFS). In order to implement the changes mandated by the Telecommunications Act of 1996 to serve the public more quickly and efficiently, the Commission is expanding the use of electronic filing in FCC pro-

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of _____

	WT Docket 98-143
1998 Biennial Review	RM-9148
—Amendment of Part 97	RM-9150
of the Commission's	RM-9196
Amateur Service rules	

To: Federal Communications Commission

COMMENTS OF:

I: INTRODUCTION

I [or your organization, association, or company—name and address] file these comments on [date] in the FCC's Notice of Proposed Rulemaking, WT Docket No. 98-143. (It is often best to start with a summary of your comments, then follow with the details, explanations, and other pertinent information.)

Tell the Commission who you are and your credentials (why you are qualified to comment on the document). Your comments should state your specific interest and clearly present your position and facts. The comments may be more than one page. Be sure your name and the Rulemaking or Docket number to which you are referring appear on each page.

Comments may be any length, but if they exceed ten pages, a table of contents and a summary at the beginning are required. Formal comments must be typed (double spaced) on 8½" × 11" paper with 1" margins. You may want to include one or more of the following section headings in your comments:

II. Number of Amateur Service License Classes
III. Importance and Disposition of the Novice Class
IV. Advanced Class VEs for the General Class
V: Phasing out RACES Station Callsigns
VI: Enforcement in the Amateur Radio Service
VII: Telegraphy Examination Requirements
VIII: Written Examination Requirements
IX: Conclusions

Be sure to sign and date the document as follows:

Respectfully submitted by:

[Signature]
Typed Name
Address
Date

Fig. 1– Format of heading and outline of your Comments or Reply Comments to be submitted to the FCC.

ceedings. As part of its commitment to take advantage of new information technologies, the FCC has implemented a new Electronic Comment Filing System (ECPS).

As of July 1998 electronic filing is now being permitted in most Notices of Proposed Rulemaking, Petitions for Rulemaking, Notices of Inquiry rulemaking, and Petitions for Reconsideration. The objective of electronic filing is to make it easier for the public to file comments and to access those filed by others. The public will no longer have to rely on paper copies accessible through the FCC reference room or copy contractor. Commenters, however, still have the option of filing comments on paper if they so desire. Electronically filed comments will receive the same treatment and consideration as comments filed on paper. The ECFS will also accept *ex parte* filings in these proceedings, including the summaries of oral *ex parte* presentations.

The new system is being monitored and evaluated to determine whether there is any need to make modifications and whether or not all future pleadings should only be accepted by electronic filing. In any event, ECFS is now the official system of record for the FCC.

How to use the ECFS. The Electronic Comment Filing System (ECFS) is currently available in proceedings specifically designated by the Commission. The Amateur Restructuring NPRM (WT Docket No. 98-143) has been so designated and is the first Amateur Service proceeding using the new electronic comment procedure.

The primary mechanism for electronic filing of formal comments is a World Wide Web page form through which parties may upload their comments directly into a database or input brief comments.

You can access the ECFS Home Page at URL: <http://www.fcc.gov/e-file/ecfs. html>. By accessing a hyperlink, the Web page allows commenters to use the same system to search for, view, download, and print comments filed in a proceeding.

NPRM Comment Date

Interested parties may file comments on WT Docket N. 98-143 on or before **December 1, 1998**. Reply comments are due by **January 15, 1999.**

Ideally, comments should be filed using the Commission's Electronic Filing System. The ECFS has been designed to accept filings created in all major word processing formats. For viewing and printing, the ECFS will automatically convert files into Adobe Acrobat Portable Document Format (PDF) so that users can access the formatted files even if they do not have the word processor used to create the document.

Sending in comments electronically to the FCC is a two-step process. The first step is to complete and send the cover sheet. The second step allows you to either send (attach) a file or a short message that you type directly into the form. You simply mouse click onto the hyperlink entitled "Send a File or Brief Comment" on the ECFS Home Page.

You may also submit an electronic comment by e-mail. The e-mail comment filing instructions are available by sending an e-mail to <ecfs@fcc.gov>. Include the following words in the body of the message, "get form [your e-mail address]." A sample form and directions will be sent in reply to your request.

The FCC prefers that the public utilize the ECFS system, but paper filings can continue. They should, however, be accompanied by computer diskettes. Parties who choose to file by paper must file an original and four copies of each filing. All filings must be sent to the Commission's Secretary, Magalie Roman Salas, Office of the Secretary, Federal Communications Commission, 1919 M Street NW, Room 222, Washington, D.C. 20554.

Parties who choose to file by paper should also submit their comments on a diskette to: Maurice J. DePont, Public Safety and Private Wireless Division, Wireless Telecommunications Bureau, Room 8332, 2025 M Street NW, Washington, D.C. 20554. Such a submission should be on a 3.5 inch diskette formatted in an IBM compatible format using WordPerfect 5.1 for Windows or compatible software.

The diskette should be accompanied by a cover letter and be clearly labeled with your name, proceeding (WT Docket No. 98-143), type of pleading (comment or reply comment), date of submission, and the name of the electronic file on the diskette.

Commenting on FCC Rulemaking that impacts your hobby is similar to voting. If you don't vote, you shouldn't complain about the outcome of the election. So get those comments written and submitted.

See you next month!

73, Fred, W5YI

BY GEORGE JACOBS, W3ASK

PROPAGATION

THE SCIENCE OF PREDICTING RADIO CONDITIONS

CQ WW CW Contest Weekend Mostly Low Normal

CQ WW SSB Contest Bulletin

Since this issue of *CQ* should reach most subscribers prior to the start of the CQ World-Wide SSB DX Contest weekend of October 24–25, here is an updated forecast made at press time for the general propagation conditions expected during the SSB contest weekend. Based on the 27- and 54-day recurrence tendencies of solar and geomagnetic conditions, it continues to look like High Normal HF conditions during most of the contest weekend, rising at times to Above Normal over paths to lower and equatorial latitudes. There could be periods of minor radio storminess dropping conditions to Low Normal on circuits passing through the auroral and polar regions.

Daily 10.7 cm solar flux levels are expected to soar well above the 140 mark during the contest weekend, with corresponding sunspot counts likely to exceed 100. The geomagnetic planetary A-index is expected to remain below 20 on October 24th, and drop below 10 on the 25th.

Barring any sudden solar flares or radio storms, the 1998 SSB Contest weekend could well be the best experienced over the past seven years, particularly on the 20, 15, and 10 meter bands.

To maximize scores be sure to check with the DX Propagation Charts discussed in last month's column.

The CW weekend of the 1998 CQ World-Wide DX Contest will take place on November 28–29. This year's contest is being held during a period of *rapidly rising* solar activity. Based on a long-range forecast made at the time of the writing this column, we are expecting mainly Low Normal conditions, but with some variability.

Some radio storminess is likely at the beginning of the contest weekend, dropping conditions to Below Normal for paths passing through the Earth's auroral zones. Conditions are expected to improve steadily throughout November 28th, with Low Normal expected to most areas of the world, increasing to High Normal for openings to equatorial regions. Improved conditions are likely for November 29th, with Low Normal expected world-wide, rising at times to High Normal or better. Solar flux levels in excess of 140 and corresponding sunspot counts in excess of 100 are expected during the CW contest weekend.

We will have a more up-to-date forecast as a bulletin at the beginning of next month's column. Check on-the-air conditions on November 1st and 2nd, which would be just one 27-day cycle prior to the CW contest weekend, for a more probable recurrence pattern.

Check the Last-Minute Forecast in this month's column for day-to-day conditions expected throughout the entire month of November.

Special DX Propagation Charts for use during the CW weekend appeared in last month's column, along with valuable tips and suggestions for increasing scores. Be sure to refer to that column if you plan to participate in the CW contest weekend. Additional tips are discussed here in this month's column.

11307 Clara Street, Silver Spring, MD 20902
e-mail: g.jacobs@ieee.org

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for November 1998

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 4-5, 18, 23	A	A	B	C
High Normal: 2-3, 6, 13, 21-22 24-25, 30	A	B	C	C-D
Low Normal: 1, 7-9, 11-12, 16-17, 19-20, 26-29	B	C-B	C-D	D-E
Below Normal: 10, 14	C	C-D	D-E	E
Disturbed: 15	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading and noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.

2. With the *propagation index,* use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of (3) will be fair-to-good (C-B) on Nov. 1st, good (B) on the 2nd and 3rd, excellent (A) on the 4th and 5th, etc. Signal quality should be fair-to-good (C-B) on Nov. 28th and 29th during the CQ WW DX CW Contest weekend.

Sunspot Cycle Progress

Dr. Pierre Cugnon, at the Royal Observatory of Belgium, the world's official keeper of sunspot indices, reports a monthly mean sunspot number of 66 for July 1998. This results in a 12-month running smoothed sunspot number, upon which the cycle is based, of 44 centered on January 1998. This is an increase of 5 since the previous month, as Cycle 23 begins to rise at a faster rate.

The highest daily value of sunspot count during July was recorded on the 4th with a count of 100. This was the first day that the new cycle reached the 100 mark. A low daily count of 26 was recorded on July 9th. A smoothed sunspot count of 104 is forecast for November 1998 by the National Geophysical Data Center at Boulder. The last time that solar activity reached or exceeded this level during a CQ DX Contest period was 1991.

A corresponding 10.7 cm monthly mean solar flux index of 118 was reported for July by the Dominion Radio Astrophysical Observatory at Penticton, B.C. This results in a smoothed solar flux value of 99 centered on January 1998. A smoothed level in the mid 120s is expected this November.

Updated Propagation Data

Updated propagation data is always useful to HF communicators, but it becomes invaluable during DX Contests. I reviewed the major sources of updated information in last month's column, including a number of web sites that provide real-time ionospheric, solar, and geomagnetic data. A single, more convenient source for updated HF propagation material may be found in my web page at <http://www.gjainc.com>. Links are provided to the NOAA, the Solar Terrestrial Dispatch, the Australian IPS, the Royal Observatory of Belgium, and the DX Listeners Club sites.

CW Contest Tips

Table I is an example of a multi-band contest plan for a western USA QTH (PST). It was devised from the DX Propagation Charts that appeared in last month's column. For each three-hour period throughout the day it shows the areas of the world and the amateur band in which propagation is expected to be optimum. Similar plans can be made for other time zones and for selected single bands.

Look for excellent DX conditions on 10, 15, and 20 meters during most of the daylight hours from shortly after sunrise until sunset.

From sundown to midnight DX honors

Time PST	Band Meters	Areas To Which DX Conditions Expected To Be Optimum
00–03	20	Southeast Asia, Far East, South Pacific & New Zealand, Australasia, Caribbean, Central America, Antarctica, Africa,* South America*
03–06 Central	20	South Pacific & New Zealand, Australasia, Caribbean, America, Southeast Asia,* Far East,* South America,* Antarctica*
06–09	20	Caribbean, Central America, South America, Southeast Asia, Far East, South Pacific & New Zealand, Australasia, Central and South Asia, Europe,* Eastern Mediterranean,* Middle East,* Antarctica*
09–12	15	Europe, Southeast Asia, Far East, South Pacific & New Zealand, Australasia, Caribbean, Central America, Western Africa, Eastern Mediterranean,* Middle East,* Eastern, Central & Southern Africa,* South America*
12–15	10	Africa, South Pacific & New Zealand, Australasia, Caribbean & Central America, South America
15–18	10	Central & South Asia, Southeast Asia, Far East, South Pacific & New Zealand, Australasia, Caribbean & Central America, South America
18–21	15	Southeast Asia, Far East, South Pacific & New Zealand, Caribbean & Central America, South America, Central & South Asia,* Australasia,* Antarctica*
21–00	20	Far East, South Pacific & New Zealand, Australasia, Caribbean & Central America, South America, Antarctica, Europe,* Africa,* Southeast Asia*

** Propagation index (2), all others (3) or (4).*

Table I– Sample multi-band contest operating schedule, western USA.

should be shared between 20 meters, for openings towards the south and west, and 40 meters, for openings towards the east, north, and south. Good DX openings to the same areas of the world as 40 meter openings should also be possible on 80 and 160 meters during this period.

Between midnight and sunrise the best DX band should be 40 meters, with 80 meters not far behind. Openings on both bands should be possible to most areas of the world, with conditions peaking towards the south and west. Some fairly good 20 meter openings are also expected during

The Royal Observatory of Belgium in Brussels was selected by W3ASK for his annual "salting of the ionosphere" in preparation for the 1998 CQ WW DX Contest. Dr. Pierre Cugnon (right) is Director of the Observatory's Sunspot Data Index Center, which is keeper of the world's sunspot records going back to the year 1700. (Photo by Bea)

HOW TO USE THE SHORT-SKIP CHARTS

1. In the Short-Skip Chart, the predicted times of openings can be found under the appropriate distance column of a particular meter band (10 through 160 meters) as shown in the left-hand column of the chart. For the Alaska and Hawaii Charts the predicted times of openings are found under the appropriate meter band column (15 through 80 meters) for a particular geographical region of the continental USA as shown in the left-hand column of the charts. An * indicates the best time to listen for 80 meter openings.

2. The propagation index is the number that appears in ( ) after the time of each predicted opening. On the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. In the Short-Skip Chart appropriate *standard* time is used at the path midpoint. For example on a circuit between Maine and Florida, the time shown would be EST, on a circuit between New York and Texas, the time at the midpoint would be CST, etc. Times shown in the Hawaii Chart are in HST. To convert to standard time in other USA time zones add 2 hours in the PST zone; 3 hours in the MST zone; 4 hours in the CST zone; and 5 hours in the EST zone. Add 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 PM in Los Angeles; 17 or 5 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *standard* time in other areas of the USA subtract 8 hours in the PST zone; 7 hours in the MST zone; 6 hours in the CST zone; and 5 hours in the EST zone. For example, at 20 GMT it is 15 or 3 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart
November & December 1998
Local Standard Time At
Path Mid-Piont (24-Hour Time)

Band	*Distance From Transmitter (Miles)*			
(Meters)	*50-250*	*250-750*	*750-1300*	*1300-2300*
10	Nil	Nil	07-09 (0-1)	07-08 (1)
			09-11 (0-2)	08-09 (1-2)
			11-15 (0-3)	09-11 (2-3)
			15-16 (0-2)	11-15 (3-4)
			16-18 (0-1)	15-16 (2-4)
				16-18 (1-4)
				18-19 (0-3)
				19-20 (0-2)
				20-21 (0-1)
15	Nil	08-10 (0-1)	07-08 (0-1)	07-08 (1)
		10-16 (0-3)	08-09 (1-3)	08-09 (3-2)
		16-17 (0-2)	09-10 (1-4)	09-19 (4)
		17-18 (0-1)	10-16 (3-4)	19-20 (3)
			16-17 (2-4)	20-21 (1-2)
			17-19 (1-4)	21-00 (0-1)
			19-20 (0-3)	
			20-21 (0-1)	
20	09-11 (0-1)	07-09 (0-2)	07-09 (2-3)	07-09 (3)
	11-15 (1-2)	09-11 (1-4)	09-18 (4)	09-12 (4)
	15-17 (0-1)	11-15 (2-4)	18-19 (3-4)	12-15 (4-3)
		15-17 (1-4)	19-20 (2-4)	15-21 (4)
		17-18 (0-4)	20-21 (1-4)	21-23 (3-4)
		18-19 (0-3)	21-23 (1-3)	23-02 (2-3)
		19-20 (0-2)	23-02 (1-2)	02-06 (1-2)
		20-07 (0-1)	02-07 (1)	06-07 (1)

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40	07-08 (0-2) 08-09 (1-3) 09-19 (4) 19-21 (2-3) 21-00 (1-2) 00-07 (0-1)	07-08 (2-4) 08-09 (3) 09-15 (4-3) 15-19 (4) 19-21 (3-4) 21-00 (2-4) 00-02 (1-3) 02-06 (1-2) 06-07 (1-3)	07-08 (4) 08-09 (3-2) 09-15 (3-1) 15-17 (4-2) 17-00 (4) 00-02 (3-4) 02-06 (2-4) 06-07 (3-4)	06-07 (4-3) 07-08 (4-2) 08-09 (2-1) 09-15 (1-0) 15-17 (2-0) 17-19 (4-3) 19-06 (4)
80	08-15 (4-3) 15-02 (4) 02-04 (3-4) 04-07 (2-3) 07-08 (3-4)	08-09 (3-2) 09-15 (3-1) 15-18 (4-3) 18-04 (4) 04-07 (3-4) 07-08 (4-3)	08-09 (2-1) 09-15 (1-0) 15-18 (3-1) 18-06 (4) 06-07 (4-3) 07-08 (3-1)	08-09 (1-0) 09-15 (0) 15-18 (1-0) 18-20 (4-1) 20-05 (4) 05-06 (4-3) 06-07 (3-1) 07-08 (1)
160	07-09 (3-2) 09-11 (2-0) 11-17 (1-0) 17-19 (3-2) 19-07 (4)	07-09 (2-1) 09-17 (0) 17-19 (2-1) 19-04 (4) 04-07 (3-2)	07-09 (1-0) 09-17 (0) 17-19 (1-0) 19-21 (4-2) 21-04 (4) 04-06 (2) 06-07 (2-1)	07-19 (0) 19-21 (2-1) 21-04 (4-3) 04-06 (2-1) 06-07 (1-0)

ALASKA
November & December 1998
Openings Given in GMT#

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	17-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-01 (1)	15-16 (1) 16-17 (2) 17-21 (3) 21-23 (4) 23-00 (3) 00-01 (2)	12-16 (1) 16-18 (2) 18-21 (1) 21-23 (2) 23-02 (3) 02-03 (2) 03-05 (1)	06-12 (1) 07-11 (1)*
Central USA	17-18 (1) 18-20 (2) 20-00 (3) 00-01 (2) 01-02 (1)	15-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-01 (3) 01-02 (2) 02-03 (1)	12-16 (1) 16-18 (2) 18-20 (1) 20-22 (2) 22-00 (3) 00-02 (4) 02-03 (3) 03-04 (2) 04-06 (1)	06-08 (1) 08-13 (2) 13-14 (1) 07-12 (1)*
Western USA	18-19 (1) 19-20 (2) 20-21 (3) 21-23 (4) 23-00 (3) 00-01 (2) 01-02 (1)	16-17 (1) 17-18 (2) 18-20 (3) 20-01 (4) 01-02 (3) 02-03 (2) 03-04 (1)	12-16 (1) 16-18 (2) 18-22 (3) 22-02 (4) 02-04 (3) 04-05 (2) 05-07 (1)	02-03 (1) 03-05 (2) 05-14 (3) 14-15 (2) 15-16 (1) 04-06 (1)* 06-14 (2)* 14-16 (1)*

HAWAII
November & December 1998
Openings Given in Hawaiian Standard Time#

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	06-07 (1) 07-08 (2) 08-13 (4) 13-14 (3) 14-15 (2) 15-16 (1)	06-07 (1) 07-09 (4) 09-12 (3) 12-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	12-14 (2) 14-17 (4) 17-21 (3) 21-00 (2) 00-06 (1) 06-08 (3) 08-09 (2) 09-12 (1)	17-18 (1) 18-20 (2) 20-22 (3) 02-03 (2) 03-04 (1) 19-20 (1)* 20-01 (2)* 01-03 (1)*
Central USA	06-07 (1) 07-08 (3) 08-15 (4) 15-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (4) 09-13 (3) 13-17 (4) 17-19 (3) 19-20 (2) 20-21 (1)	08-13 (2) 13-14 (3) 14-20 (4) 20-00 (3) 00-02 (2) 02-05 (1) 05-06 (2) 06-08 (3)	17-18 (1) 18-20 (2) 20-21 (3) 21-01 (4) 01-03 (3) 03-04 (2) 04-05 (1) 19-20 (1)* 20-22 (2)* 22-01 (3)* 01-03 (2)* 03-04 (1)*
Western USA	07-08 (1) 08-09 (2) 09-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-07 (1) 07-08 (2) 08-12 (3) 12-18 (4) 18-20 (3) 20-21 (2) 21-22 (1)	08-10 (4) 10-15 (3) 15-22 (4) 22-01 (3) 01-04 (2) 04-06 (1) 06-08 (3)	17-18 (1) 18-19 (2) 19-20 (3) 20-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 19-20 (1)* 20-21 (2)* 21-04 (3)* 04-05 (2)* 05-06 (1)*

#See explanation in "How To Use Short-Skip Charts" in the box at the beginning of this column.
* Indicates best time to listen for 80 meter openings. Openings on 160 meters are also likely to occur during those times when 80 meter openings are shown with a propagation index of (2) or higher.
For 12 meter openings interpolate between 10 and 15 meter openings.
For 17 meter openings interpolate between 15 and 20 meter openings.
For 30 meter openings interpolate between 40 and 20 meter openings.
Note: The Alaska and Hawaii Propagation Charts are intended for distances *greater* than 1300 miles. For shorter distances use the preceding Short-Skip Chart.

this period, mainly towards the south and west. Be sure also to check the 160 meter band for DX openings. Propagation patterns should be similar to those observed on 80 meters, but with somewhat weaker signals and higher noise levels.

Salting The Ionosphere—1998

It is entirely unscientific, and there is no logical explanation, but it does seem to work! Over the past eleven years or so, I have made it a point to pay homage somewhere in the world for good propagation conditions during the CQ World-Wide DX Contest periods. I usually select a place that has some mystique about it, and is connected, although possibly only remotely, with science or communications. I symbolically "salt the ionosphere" at such locations as a tribute to those natural forces which determine HF propagation conditions.

Last year, for example, I "salted the ionosphere" at Stonehenge in England, the astronomically clustered giant stones held sacred by the Druids. Much improved HF conditions were reported during the 1997 contest weekends. For this, we may have the Druids to thank!

After consultation with many experts—mythical, mystical, and otherwise—I selected the Royal Observatory of Belgium, located in Brussels, as my 1998 choice for "salting the ionosphere." The Observatory, among many other scientific endeavors, is the world's official keeper of sunspot data. The Sunspot Index Data Center (SIDC), headed by Dr. Pierre Cugnon, is located there. A network of as many as 100 observing stations report daily sunspot counts to Dr. Cugnon, from which he determines an official daily count, monthly means, yearly means, and the 12-month smoothed sunspot numbers, upon which a sunspot cycle is based. On file at the observatory is sunspot data going back to 1700.

Dr. Cugnon also is responsible for publishing a monthly "Sunspot Bulletin," which contains the latest official sunspot data and which is distributed to scientists and other users throughout the world, along with his predictions for the next 12 months. The daily mean solar flux at 600 MHz is also published in the "Sunspot Bulletin." In addition, on a regular basis Dr. Cugnon publishes other reports and scientific articles dealing with sunspot index analysis, the positions and evolution of sunspot groups, and the progress and prediction of the present Cycle 23. This column utilizes much basic data provided by Dr. Cugnon.

There is no place on Earth that is so closely related to sunspots as the Royal Observatory of Belgium. Since solar activity plays the dominant role in propagation, this is an appropriate choice for this year's "salting the ionosphere."

On a sunny morning in late August I paid a visit to Dr. Cugnon's office at the observatory, which is located in a wooded park area in the Uccle neighborhood of Brussels (see photo). He very graciously reviewed with me much of the present projects in which he is involved, including his latest estimate for the peak of Cycle 23. According to his mathematical analysis of sunspot cycle behavior, Dr. Cugnon is now calling for an intense peak, with a smoothed value in excess of 150. He estimates that this could occur as early as December 1999. This bodes extremely well for HF propagation conditions for the next several years.

Solar data archives as well as updated information can be found on the Royal Observatory of Belgium's web site at <http://www.oma.be>. On the home page, click "ORB." On the menu click "Sunspot Index Data Center" under "International Centers." Select the appropriate sunspot data from the menu.

After leaving Dr. Cugnon's office, I found a secluded spot in the park to conduct my annual "salting the ionosphere" ritual for good HF propagation conditions during the 1998 CQ World-Wide DX Contest weekends.

VHF Ionospheric Openings

Solar activity may now be at a high enough level to permit 6 meter DX openings during November. Conditions should peak towards Europe and in a generally easterly direction before noon. Openings should improve towards Africa shortly after noon and continue to swing in a clockwise direction during the early afternoon hours. Expect openings towards the Caribbean and Central and South American areas from late morning until shortly after noon. By late afternoon, start looking for openings towards the south and southwest. For the most part, 6 meter DX openings may be erratic, and the band may remain open for only short periods of time. The best days to look for 6 meter DX openings are those which are expected to be either High or Above Normal.

Some trans-equatorial (TE) type 6 meter propagation may also occur during November. The best time to check for such conditions is between approximately 8 and 11 PM local standard time. TE openings favor locations in the southern tier states, and generally take place to South American countries south of the equator. At best, TE openings are very erratic, with weak signals subject to intense flutter fading.

Two significant meteor showers are expected during November, which should result in some meteor-type ionospheric openings on the VHF bands. The *Taurids* shower, which should last for a day or two, is expected to peak on November 1st, with a peak meteor count of approximately 15 an hour. A second shower of about the same duration and intensity, called the *Leonids*, should reach peak intensity on November 14th.

November is usually a month of fairly intense and widespread auroral activity, which can result in short-skip propagation on the 6 and 2 meter bands for distances up to approximately 1200 miles. Auroral activity is often associated with periods of radio storminess, and is most likely to occur on those days shown as Below Normal or Disturbed in the Last-Minute Forecast, at the beginning of this column.

This month's column contains short-skip propagation data for use between distances of approximately 50 and 2300 miles, and between the states of Hawaii and Alaska and the continental areas of the United States.

Good luck in the CW section of the 1998 CQ World-Wide DX Contest, and be sure to let me know how these special contest propagation forecasts work out.

73, George, W3ASK

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CERTIFICATE for proven contacts with all ten American districts. SASE to W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

HALLICRAFTERS Service Manuals. Amateur and SWL Write for prices. Specify Model Numbers desired. Ardco Electronics, P.O. Box 95, Dept. C, Berwyn, IL 60402.

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IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

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AMERICAN HAM GEAR manufactured between 1930 & 1980 needed to illustrate *CQ* book and calendar projects. Photography can be done at your location. Contact Joe Veras, N4QB, P.O. Box 1041, Birmingham, AL 35201. Tel: 205-967-2384 days, 205-967-0639 evenings and weekends.

THE 59(9) DX REPORT: Weekly DX and Contest bulletin. SASE for sample. P.O. Box 73, Spring Brook, NY 14140.

TELEGRAPH COLLECTOR'S PRICE GUIDE: 250 pictures/prices. $12 postpaid. ARTIFAX BOOKS, Box 88, Maynard, MA 01754.

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ATTENTION SB-200 & SB-220 OWNERS: Restore and up-grade your tired old amplifier with our parts and kits. Power supply boards, soft keys, soft starts, new fans & motors, many more items. Write for details—**Please specify the model**. Harbach Electronics—WA4DRU, 2318 S. Country Club Rd., Melbourne, FL 32901-5809 (http://www.harbach.com).

DP-9 MULTIBAND DIPOLE ANTENNA has 9 full-size closely spaced antennas for 160–10, 240 ft. $189, DP-9S, 130 ft. $210. DP-8 for 80–10, 124 ft. $139, DP-8S, 70 ft. $159. DP-7 for 40–10, 65 ft. $110. Add $8 shipping. Other antennas in our Free Ham and Shareware Catalog. Dynamic Electronics, Box 896, Hartselle, AL 35650; 256-773-2758; fax 773-7295; <dei@whnt19.com>, <http://www.hsv.tis.net/~dei>.

FREE HAM RADIO GOSPEL TRACTS: Christian youth leaders needed for out-reach areas. Membership is free. Send #10 SASE with call letters for details. Ray Bohmer, W1REZ, P.O. Box 8, Harmony, ME 04942.

W7FG Vintage Manuals and Telephone filters! Most manuals in stock. SASE for Catalog. Telephone RFI Filters $12.95. VISA/MASTERCARD accepted. 402731 W. 2155 Dr., Bartlesville, OK 74006 (telephone 918-333-3754 or 800-807-6146; website **http://www.w7fg. com**).

ANTENNA HARDWARE – S.S. "U" bolts, Aluminum Saddles, Element and Boom Plates, S.S. Hose Clamps. Write for list to HARBACH ELECTRONICS – WA4DRU, 2318 S. Country Club Road, Melbourne, FL 32901-5809 (http://www.harbach.com).

WANTED: HAM EQUIPMENT AND RELATED ITEMS. Donate your excess gear—new, old, in any condition—to the Radio Club of Junior High School 22, the Nation's only full time non-profit organization working to get Ham Radio into schools around the country as a teaching tool using our EDUCOM—Education Thru Communication—program. Send your radio to school. Your donated material will be picked up ANYWHERE or shipping arranged, and this means a tax deduction to the full extent of the law for you as we are an IRS 501(c)(3) charity in our 18th year of service.Your gift will mean a whole new world of educational opportunity for children nationwide. Radios you can write off; kids you can't. Write, phone, or FAX the WB2JKJ "22 Crew" today: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Twenty-four hours call 516-674-4072; fax 516-674-9600; or e-mail <wb2jkj@juno. com>. Join us on the WB2JKJ Classroom Net, 7.238 MHz, 1200–1330 UTC daily and 21.395 MHz from 1400 to 2000 UTC.

SX88 Hallicrafters receiver wanted. Jim, W6OU, 714-528-5652.

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Advertiser's Index

(continued on page 107)

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FREE GUIDE "THE TEN MOST COMMON TOWER BUILDING MISTAKES": Written by well-known tower expert Steve Morris, K7LXC, this guide will help you avoid dangerous mistakes. TOWER TECH, Box 572, Woodinville, WA 98072; e-mail <UpTheTower@aol.com> or call 800-TOWERS8.

VP5 – Be DX: Newly constructed 2BR/2BA villa with rig and antennas overlooking north coast of beautiful Middle Caicos. Telephone 904-282-0158, or e-mail <islands@southeast.net>.

OVER 2500 DIFFERENT DX AWARDS from 122 DXCC countries listed. K1BV DX Awards Directory. Put your QSLs to work for you! $21 postpaid. Ted Melinosky, 65 Glebe Road, Spofford, NH 03462-4411. <http://top.monad.net/~k1bv>.

INTERNATIONAL DX CONVENTION, FRESNO, CA, Holiday Inn, Downtown Plaza, April 9–11, 1999. Room Reservations call 209-268-1000 M–F 9AM–5PM. <http://www.amateur-radio.org/ncdxc>.

HEARD ISLAND COMMEMORATIVE T-SHIRTS, same shirt as team is wearing on their QSL card. The proceeds benefit VKØIR DXpedition. Personal checks on U.S. banks okay. Please no credit cards. Sizes remaining: large, extra-large. Shirts are 100% cotton, U.S. made. $20 Priority Mail stateside, $25 DX Air Mail, postage included. Contact Tom Anderson, WW5L, 3505 Cliffwood Drive, Bedford, Texas 76021-2043 (telephone 817-498-2820; e-mail <WW5L@gte.net>).

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RAINBOW AMATEUR RADIO Association, the gay/lesbian ham club. Active nets, newsletter, uncensored listserv. Privacy respected. E-mail: <RARA@EN.COM> or Dept. A, P.O. Box 191, Chesterland, OH 44026-0191.

TURN DIGITAL VOLTMETER INTO RF EXPOSURE/FIELD STRENGTH METER: 160m – 23 cm complete kit $10.00 postpaid: Larry Riley, 7507 Ledgewood Drive, Fenton, Michigan 48430.

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CONTEST STATION OR JUST VACATION: Chalet in Colorado Rockies, 40 meter beam, 8-el log periodic, A3S tribander, slopers on 75/160. TS930SAT and Alpha. WØLSD, Ken, Box 156, Buena Vista, CO 81211 (719-395-6547). $0.55 stamp for color brochure. <diverken@chaffee.net>

WEATHER SATELLITE and MIR/Shuttle 2M antennas. Woodhouse Communication, P.O. Box 73, Plainwell, MI 49080. Voice 616-226-8873; fax 616-226-9073; e-mail <www.view2earth.com>.

Join the LAMBDA AMATEUR RADIO CLUB (LARC) since 1975, the only open and visible public-service oriented ham club for gay and lesbian hams. Monthly newsletter, HF skeds, internet listserv and IRC, hamfest meetings, chapters, DXpeditions. Write LARC, P.O. Box 56069, Philadelphia, PA 19130-6069 or e-mail <lambda-arc@geocities.com>; <http://www.geocities.com/WestHollywood/1686>.

CASH FOR COLLINS: Buy any Collins Equipment. Leo, KJ6HI, Phone/Fax 310-670-6969, <radioleo@earthlink.net>.

RF TRANSISTORS AND TUBES: 2SC2879, MRF454, MRF422, 2SC1969, 2SB754, SD1446, MRF247, 3-500ZG, 3CX3000A7, 4CX250B, 572B, 7580W/4CX250R. WESTGATE 800-213-4563.

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WANTED: High-capacity 12V solar panels for repeater. <KK4WW@fairs.org> or 1-540-763-2321.

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WANTED: OLD COMPUTERS Altair 8800 $1000, Altair 8000 $600, IMSAI $400, Heath EC-1 $500, Scelbi-8H $2500, Mark-8 $2500, Sol-20 $400. Call 607-625-5221; e-mail: <old_computers@yahoo.com>.

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Advertiser's Index *(cont'd)*

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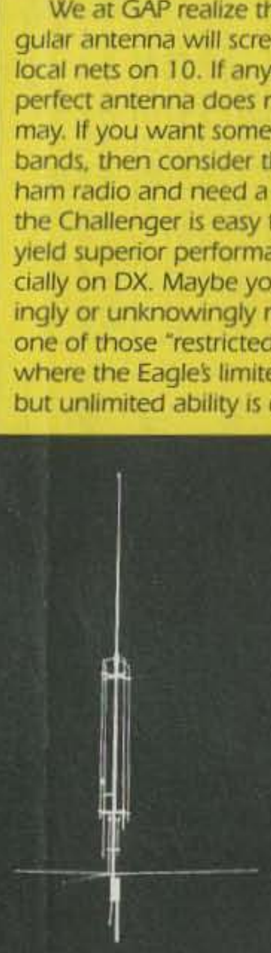


Eagle DX

Challenger DX

Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires **NO RADIALS**. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

The secret is out and people in the know say:

CQ–"The GAP consistently outperformed base-fed antennas. .and was quieter."

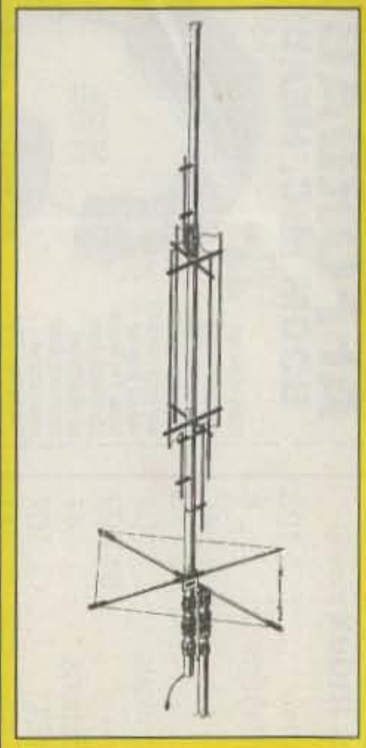
73–"This is a real DX antenna, much quieter than other verticals."

RF–"To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by S units, not just DB's."

Worldradio – "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if is fed in the center."

IEEE–"Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole): it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."

Latest Release: **TITAN DX**



This all purpose antenna is designed to operate 10m-80m, WARC bands included. It sits on a 1-1/4" pipe and can be mounted close to the ground or up on a roof. Its bandwidth and no tune feature make it an ideal antenna for the limited space environment as well as a terrific addition to the antenna farm.

MODEL	BANDS OF OPERATION											HT	WT	MOUNT	COUNTER-POISE	COST
	2m	6m	10m	12m	15m	17m	20m	30m	40m	80m	160m					
Challenger DX	■	■	■	■	■		■		■	■		31.5'	21 lbs	Drop In Ground Mount	3 Wires @ 25'	$259
Eagle DX			■	■	■	■	■		■			21.5'	19 lbs	1-1/4" pipe	80" Rigid	$269
Titan DX			■	■	■	■	■	■	■	■		25'	25 lbs	1-1/4" pipe	80" Rigid	$299
Voyager DX							■		■	■	■	45'	39 lbs	Hinged Base	3 Wires @ 57'	$399

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*Optional equipment required

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