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n Binkley, N4ZZ, Nashville, TN

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THE RADIO AMATEUR'S JOURNAL

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TM-732A

- Dual band in a mini-single band radio size
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- DTMF remote control via microphone or another transceiver
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- 2 plus 1 multi-band capability in a portable package
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- Detachable front panel for remote contro (requires PG-4K or PG-4L kit)
- Separate Volume/Squelch controls for each band
- Multiple scan modes
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- Cross band repeater function (TM-741A/TM-641A requires modification)

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  TX 438-449.995 MHz

- TH-28A: 2.5W, TH-48A: 2W. Both models 5W output with PB-14, PB-17, or ext. 12VDC
- 40 Full function memory channels, expandable to 240 with optional ME-1

TH-78A

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- Alpha numeric memory channel display. Specify memories by call sign, name, etc.
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The Radio Amateur's Journal

ON THE COVER: This resident of the music city of Nashville, Tennessee makes a different kind of music. Don Binkley, N4ZZ, operates both CW and phone in the pileups and in the contests with this neat setup. (Photo by Larry Mulvehill, WB2ZPI)

JULY 1992 **VOL. 48, NO. 7**

FEATURES

DEPARTMENTS

ZERO BIAS EDITORIAL

Recently, while walking through the fleamarket at the Rochester Hamfest I overheard a conversation between one amateur looking to sell some computer accessories and another looking to buy. The gist of the seller's conversation was the relative speeds of various models and how fast they become outmoded and replaced by even faster machines. Listening to his spiel one would tend to anxiously believe that if you went to a computer emporium at 9:00 AM and bought an X86 machine, by 4:00 PM that same store would be featuring an (X + 2)86 machine which would be infinitely better than the piece of junk you just bought that morning. It would appear that the usable life of a computer is not quite the time it takes to drive it home.

Also at Rochester were several commercial dealers selling CD ROM add-ons and a wide variety of compact discs featuring what looked like the sum-total of human knowledge. Everything seemed to promote a sense of speed, compactness, and urgency. It's sort of like a carrot dangling in front of you and if you can only go a little bit faster you can catch it and wonderful things will happen.

Not being a biologist, I'm not sure what the average person's somesthetic response rate is or how fast the human brain can physiologically respond to and assimilate all of this information. The criteria seems to be the ability or potential to do something rather than the actuality itself. The almost daily leaps in technology are satisfying in and of themselves as they increase the potential to do something faster. It looks like a subtle variation on form versus substance.

Change used to be a gradual thing whereby people eased themselves into something new. When SSB invaded amateur radio there were virtually armed camps and factions against these Donald Duck sounding stations. The mode was unique for enough time that *CQ* even published a monthly column on SSB activity. Things sped up dramatically when computers were introduced and computer articles started showing up in amateur journals. Page after page was devoted to reproducing programs to run simple tasks. The time span needed for acceptance was substantially shorter than for SSB, although many readers fought the connection between amateur radio and computers and saw these entities as mutually exclusive.

Computer generated RTTY changed the nature of that mode almost instantaneously and grossly affected those companies manufacturing traditional RTTY gear. In hindsight, packet, AMTOR, WEFAX, and the like were logical extensions of computer use and multi-mode TNCs seemed to make most people happy. It was probably around this time that things started to accelerate. It wasn't so much that amateur radio was experiencing the advent of new and exciting modes to explore, but rather technology refocused on two simple words: *speed* and *more*—faster machines and definitely more memory. We were digitally able to manipulate and control every miniscule aspect and function of our stations at incredible speeds, far greater than our brains could handle.

In years past the concept of faster was handled by the introduction of either VOX or QSK, and more simply it meant kicking the amplifier up a bit. The only atavistic holdover we retain and cherish is CW. Prior to the introduction of a no-code license, CW was the bane of and anathema to amateur radio growth. We as a group rejoice in the rite of inflicting hurdles and plateaus on our brains so that we may become proficient in the art of CW at what amounts to sluggish speeds. Our little jiffy speedy computer can probably send, receive, and decode CW at rates several hundred times faster than the human brain is capable of. The limiting factor is the pitifully slow brain which has to take in and digest the information plus formulate a response. However, in a CW contest where the exchange of data is limited, consider the possibility of your machine "talking" to mine and running up huge totals while we're mowing the grass. Suddenly there's great beauty and symmetry in *speed* and *more*.

If we substitute the word *computer* for *television*, Marshall McLuhan's "The medium is the message" could mean that the computer itself becomes far more important than anything that can actually be done on it. After all of these years in amateur radio in which I've seen such remarkable changes in technology and equipment, it just seems as though we're taking a break and in a sense have stopped moving ahead.

The computer has allowed us to refine and optimize existing technology down to infinitesimal detail. It's fairly simple and commonplace to reconfigure an antenna design to maximize any aspect you want. However, the basic design remains the basic design. The computer will come up with an infinite variety of Yagis, except the first one.

Perhaps the people who champion the CW requirements for an amateur license are actually doing us a favor in the long run without realizing it. It's the one aspect of the exam that requires some facility in brain power. You have to take in, interpret, and answer questions. It requires both memorization and thinking at various speeds, plus the ability to tactilely present a differentiated response to closely worded answers. There is no doubt that the computer can do it faster and better and for longer periods of time, but the beauty of retaining it is that it forces us in one small area at least to think and remember.

The computer has been one of the biggest and best things to happen in amateur radio. As with television, though, I would rather not see the computer become the message. If all we need increased speed and memory for is to run bigger and bigger programs so that we in a sense have to remember less and less, then we are doing a disservice to ourselves and our education. The computer is a wonderful tool that should stretch our imagination and *ability* in real life situations.

August

Antenna time is coming up again as we prepare for next month's Antenna Special issue. It's more than okay. In fact, it's suggested that you whip out your computer and start to optimize all the metal you have up, as the CQ WW DX Contest will be coming up soon. Is your coax old enough to vote? Maybe it's time to change cables and connectors. You might be surprised to learn that your favorite band isn't dead after all, and your rig really does put out what the manual says.

This is also a good time to try out a few new ideas and perhaps experiment with trying out a new band or mode. It also might be prudent to check out what's supporting the old antenna and how it held up over the winter. A little preventive maintenance goes a long way. If you don't already have one, the most important item to add to your antenna system this year is a good quality safety belt. I don't mean just buy one and have it on display in your shack. I mean buy one and *use it* all the time. Safety at all times should be more than a goal. It can add years to your life.

We've got some interesting articles and product reviews coming up in August guaranteed to perk up your amateur radio fun. For the diehard antenna traditionalists who feel they must wait until the dead of winter replete with snow and ice before they venture out to the antenna farm, let me suggest that you use August to order your new tundra clothing from one of the popular clothing catalogs.

If you're not going to be busy the whole month working on antennas or ordering mukluks, you might want to see what the rest of us are doing at the Huntsville Hamfest or the ARRL National in Los Angeles. If you have to rationalize it, you can always say you're only going to pick up some antenna stuff.

73, Alan, K2EEK

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CQCQCQ

Editor, *CQ*:

I have been licensed with the call letters of K8NFJ for the past 31 years and for many of those years had those call letters on my Michigan license. During that time very few people asked what the letters stood for.

Three years ago I purchased from the state the vanity plate with the letters CQCQCQ and since that time I have had hundreds of people ask me what the letters meant.

At any rate I thought you would like to have a look at the way I advertise your publication six times every time I drive out of the drive.

Harry Bodbyl, K8NFJ
Wyoming, MI

Look in the Junk Box

Editor, *CQ*:

I've been operating QRP for some time now. Since part of QRP fun is reading about it (and we need all the information we can get), the two columns by Dave Ingram, K4TWJ (February and March 1992 "World of Ideas") were much appreciated. I'll be looking forward to more of the same.

I am using an old Argonaut 505, but the "Five of a Kind" rig mentioned in his column reminded me how easy it is to get some kind of a signal going if one isn't looking for too many bells and whistles. *Somewhere* in the junk box is a handful of 2N2222s, and there isn't much else needed. It's little features like this one that make *CQ* a pleasure to read each month.

Julian Jablin, W9IWI
Skokie, IL

Pirate Station in Israel

Editor, *CQ*:

During the month of February 1992 a pirate amateur radio station was caught by the Israeli Ministry of Communications. It involved a person by the name of Harrod Thomas "Tom" Graham operating under the callsign of OD5NG.

Tom, OD5NG, had been operating his clandestine radio station for a number of years, acquired various awards as well as gave credit to amateurs around the world for working successfully the country of Lebanon. He was mostly active on RTTY, Amtor, and Packet. He was operating from within Israeli territory. Because of short-skip conditions and the fact that he did not use phone "voice" contacts, he was not heard by the local amateurs.

He violated a trust that we all assume of one another—that the individual is honest and is actually where he says he is. He violated another trust: he was permitted entry in a closed BBS forwarding only net, because he supposedly had no access to a VHF BBS. He used various HF BBSes as his home-BBS for his own personal use and caused considerable delays in HF forwarding due to his actions.

He is NOT a licensed amateur anywhere in the world. The fraud he perpetrated on the amateur community certainly brings him no honors. Shortly after being caught he left the country and is now back in South Africa. He will certainly try to get back on the air again, with or without a license, from his present location.

Joseph Obstfeld, 4X6KJ
President, Israel Amateur Radio Club

JRC

JRL-2000F

Fully Automatic MOSFET HF LINEAR AMPLIFIER

- 1 kW No-Tune Power Amplifier
- 48 MOSFETs Single Ended Push-Pull (SEPP) Design
- Built-In Automatic Antenna Tuner
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CIRCLE 170 ON READER SERVICE CARD

ANNOUNCEMENTS

• **Kuwait ARS Call For Help**–Due to damage to equipment, furniture, and the building itself caused by the Iraqi invasion of Kuwait, the Kuwait Amateur Radio Society has been trying to return the station to its former state. They are still facing difficulties in providing sufficient equipment and materials. Donations in the form of equipment including antennas, transceivers, and the like would be appreciated. Contact the Kuwait ARS, P.O. Box 5240, Safat 13053, Kuwait (phone 5333762; FAX 965-5311188).

• **These special events will be held in July:**

U.S./Canada Special Event, Amateurs affiliated with the American sunbathing Assn., The Naturist Society, and the Federation of Canadian Naturists will have a series of special event stations on July 11–12 across the U.S. and Canada. Each of the 12 sites will operate single transmitter, 40–2 meters, from 10 AM to 3 PM local time. For certificate send QSL and 9 × 12 SASE to AE3D, P.O. Box 5407, Laurel, MD 20707-5407.

N2HOQ, from 326th anniversary of Piscataway, New Jersey; 0000–0526Z July 4; RTTY only on various HF bands for these first 326 minutes of the holiday. For certificate, send QSL and 9 × 12 SASE or two IRCs to Geoff Malta, N2HOQ, P.O. Box 312, Piscataway, NJ 08855.

KY2F, from Central New York International Air Show, Oswego County Airport, Fulton, NY; Oswego County ARES; 1200-*n*-2100Z July 11 and 12; middle of General 80–10 meters phone, Novice 10 meters, 147.75/.15 MHz, packet 145.05 MHz. For certificate send QSL and large SASE to Fred Swiatlowski, KY2F, P.O. Box 5227, Oswego, NY 13126.

K2BSA/1, from Boy Scout Camporee, Camp Sequassen, Winsred, CT; Alumni Assn.; July 1–11; lower portion of 10–80 General sub-band, Novice 10 meters. For QSL send QSL and SASE to Allan Schwartz, KA1CFA, 18 Russo Drive, Hamden, CT 06518.

W2CWW, from 70th anniversary of Staten Island ARA, Staten Island, NY; 1200Z July 18 to 1500Z July 19; lower 25 kHz of General 80–15 meters phone, Novice 10 meters. For certificate send QSL and 9 × 12 SASE to Staten Island ARA, P.O. Box 140495, Staten Island, NY 10314–0018.

WB2ELW & VE3NKH, from 65th anniversary of Peace Bridge and Friendship Festival, Buffalo, NY, and Fort Erie, Ontario; South Towns ARC and Niagara South ARC; July 4–5; lower 25 kHz of General phone subbands, CW General subbands, Novice 10 meters phone and CW, and callsign repeaters (WB2ELW 147.09 MHz, VE3NKH 147.165 MHz, each + 600 kHz transmit). For certificate: US amateurs send QSL and SASE to John Leiten, WB2ELW, 6120 McKinley Parkway, Hamburg, NY 14075; Canadian amateurs send QSL and SASE to John Gilmour, VE3NKH, 158 High St., Fort Erie, Ontario, Canada L2A 3R1.

KA3NSX, from 6th year of Oil Creek & Titusville Railroad, Titusville, PA; Oil Creek Valley Radio Society; 1300–2100Z July 18 and 1300–1700Z July 19; CW Novice portion of 15 and 40 meters, SSB Novice portion of 10 and General portion of 15, 20, 40 meters. For QSL (canceled from only operating railway post office car), send QSL and #10 SASE to Mike Dziubkowski, N3GCY, P.O. Box 22, Titusville, PA 16354.

AA4UF, from Third Annual Induction of the International Motor Sports Hall of Fame, Falladega, Alabama; Talladega RAC; July 18 from 1300–2300Z on 14.270 MHz (plus or minus QRM) in the 20 meter phone band and middle of the 10 meter Novice phone band. For certificate send QSL and two units of postage to: TRAC, P.O. Box 626, Talladega, AL 35160.

N4VHA/1J5, from commemoration of first Trans-Atlantic Telephone call and DXpedition to Georgia Coast—IOTA NA058, Jekyll Island; RC of Athens, Georgia; 2200Z July 3 to 0400Z July 4, 1200Z July 4 to 0400Z July 5, 1200Z July 5 to 0400Z July 6; phone IOTA freqs. of 28.460, 21.260, 14.260, and 7.260 and 3.860; CW 28.160, 21.160, 14.060, 7.060, 3.060 (plus or minus QRM).

5-land, from dedication of Crittenden County Veterans Memorial, West Memphis, GA; Driven Elements ARG *(no call given)*; 1500–2200Z July 4; 28.475 and 14.270 SSB and 7.120 CW. For QSL and certificate send QSL and 9 × 12 SASE to DEARG, 1023 Lehr St., West Memphis, AR 72301.

WH6F, from 50th anniversary of 100th battalion, Schofield Barracks, Hawaii; Army MARS; 1900Z July 4 to 1900Z July 5; all bands and modes, including Novice subbands, in lower portion of each subband. For QSL send QSL and SASE to Joe Hao, WH6F, 3251 Pakanu St., Honolulu, HI 96822.

KH6SP, from nation's 216th birthday, Pearl Harbor, Hawaii; Joint Military Services ARC; 0000Z July 1 to 2359Z July 7; lower portion of General subbands and Novice bands. For QSL send QSL and SASE or 2 IRCs to WV7T/KH6, Mike Anderson, c/o 106 Ford Island, Honolulu, HI 96818. (QSO contact number must be included on QSL.)

KL7HKX, from Support Center Kodiak Alaska 20th anniversary, Kodiak, AK; US Coast Guard ARC; July 1–31 *(no times given)*; General bands phone, CW, RTTY. For QSL send SASE and QSL to KL7HKX, US Coast Guard ARC, P.O. Box 190421 USCG, Kodiak, AK 99619-0421, or to QSL Manager KL7AF. (Contacts with this station can also provide a 10 × 10 and IOTA number for Alaska.)

W8AL, from Pro Football Hall of Fame Greatest Weekend, Canton, OH; 2200–0200Z July 27–31, and 1700–2300Z August 1–2; SSB 28.350, 21.350, 14.270, 7.270; CW 28.150, 21.060, 14.060, 7.060; plus RTTY, packet, AMTOR, and 2 meter FM. For certificate send QSL and 9 × 12 SASE with 2 units first-class postage to Randy Phelps, KD8JN, 1226 Delverne Ave. SW, Canton, OH 44710-1306.

K8EPV, from 67th Port Huron to Macinac Island Yacht Race, Port Huron, MI; Eastern Michigan ARC; 1400Z July 18 to 0200Z July 19, and 1400Z July 19 to 0200Z July 20; CW 3.710, 7.110, 21.110; SSB 3.910, 7.210, 14.210, 21.310, 28.393. For certificate send QSL and 9 × 12 SASE to K8EPV, 1640 Henry St., Port Huron, MI 48060.

(continued on p.134)

10, 12, 15, 17, 20, 30 & 40 Meters

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R7

Look all you want–you won't find another multiband vertical with the quality, features and performance of the Cushcraft R7. The R7 is a combination of exceptional half-wave performance and user friendly features such as compact size, no moving parts or ground radials and mount-anywhere convenience.

R7 puts the fun back into ham radio. It can be assembled and on the air in less than an hour. Its convenient size and lack of radials make it easy to locate for home, vacation or portable stations. Mount it anywhere from ground level to tower top.

JOIN THOUSANDS OF SATISFIED OWNERS.

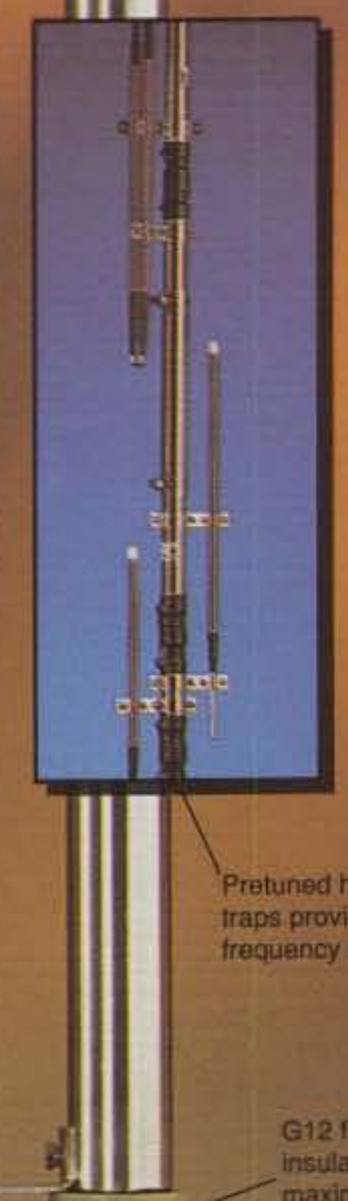
"Tropical storm Zelda struck Kwajalein on Thanksgiving Day . . . Harbor Control clocked gusts at 87 knots (100 mph) . . . As the beams blew down, my R7 vertical stayed up. I maintained communications for the entire storm." V73CT

"My first QSO was ZA1A in Albania with my R7." NE8Z / HC1MD

"Metalwork, machining and traps well made . . . Assembly was straight forward and easy." WX6W

SPECIFICATIONS

Frequency, MHz	28, 24, 21, 18, 14, 10, 7
Gain, dBi	3
Electrical Wavelength	Half-wave
SWR 2:1 Bandwidth	10m-2 MHz / 12m-100 KHz 15m-450 KHz / 17m-100 KHz 20m-250 KHz / 30m-25 KHz 40m-75 KHz
Power Rating, Watts PEP	1800
Radiation Angle, degrees	16
Frequency Selection	Automatic
Horizontal Radiation Pattern, degrees	360
Height, ft (m)	22.5 (6.9)
Mast Size Range, in (cm)	1.5-1.75 (3.8-4.4)
Wind Load, ft² (m²)	2.25 (.21)
Weight, lb (kg)	12.3 (5.6)
Counterpoise Radials Supplied	7
Wind Survival, mph (kph)	80 (128)



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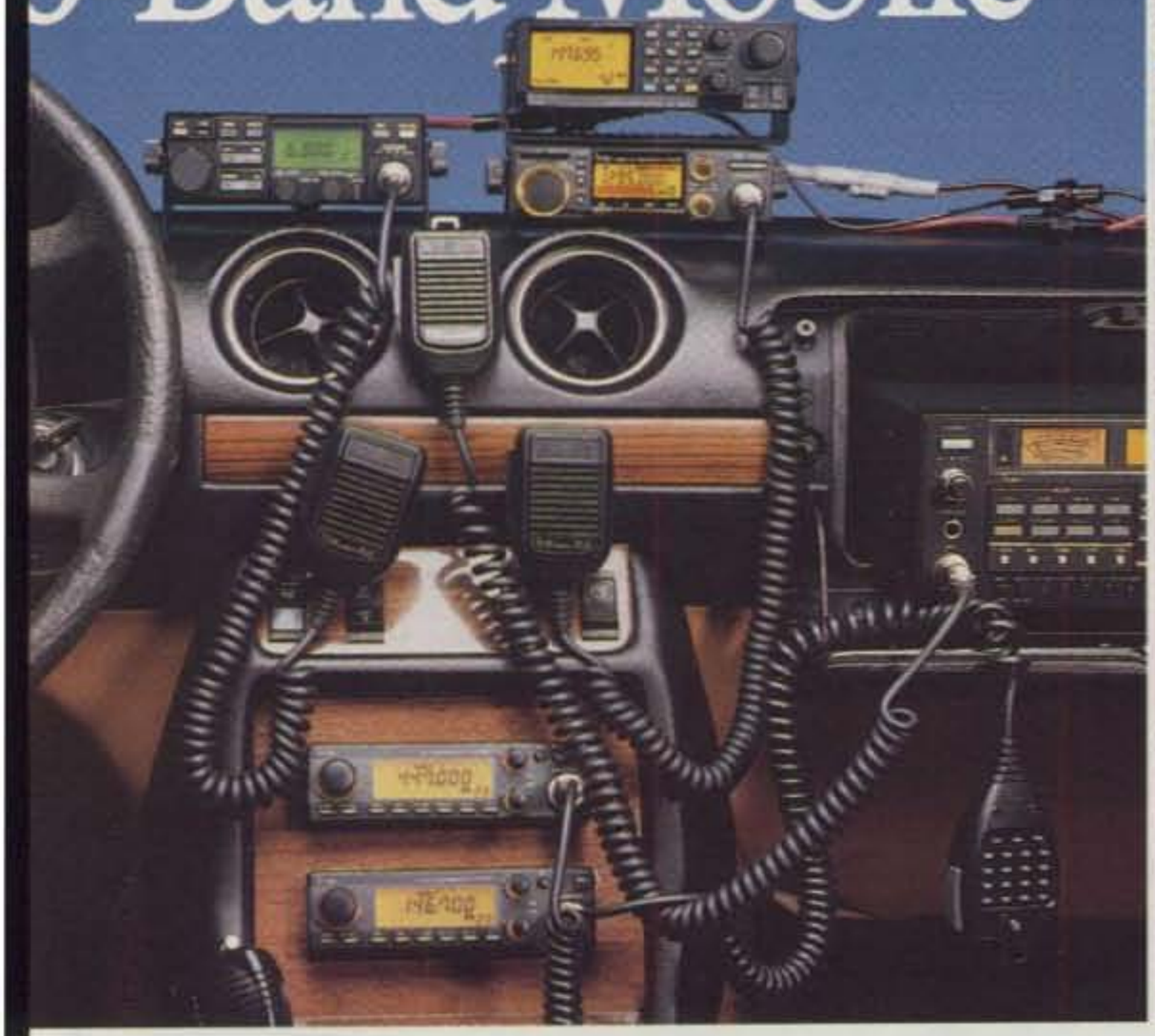
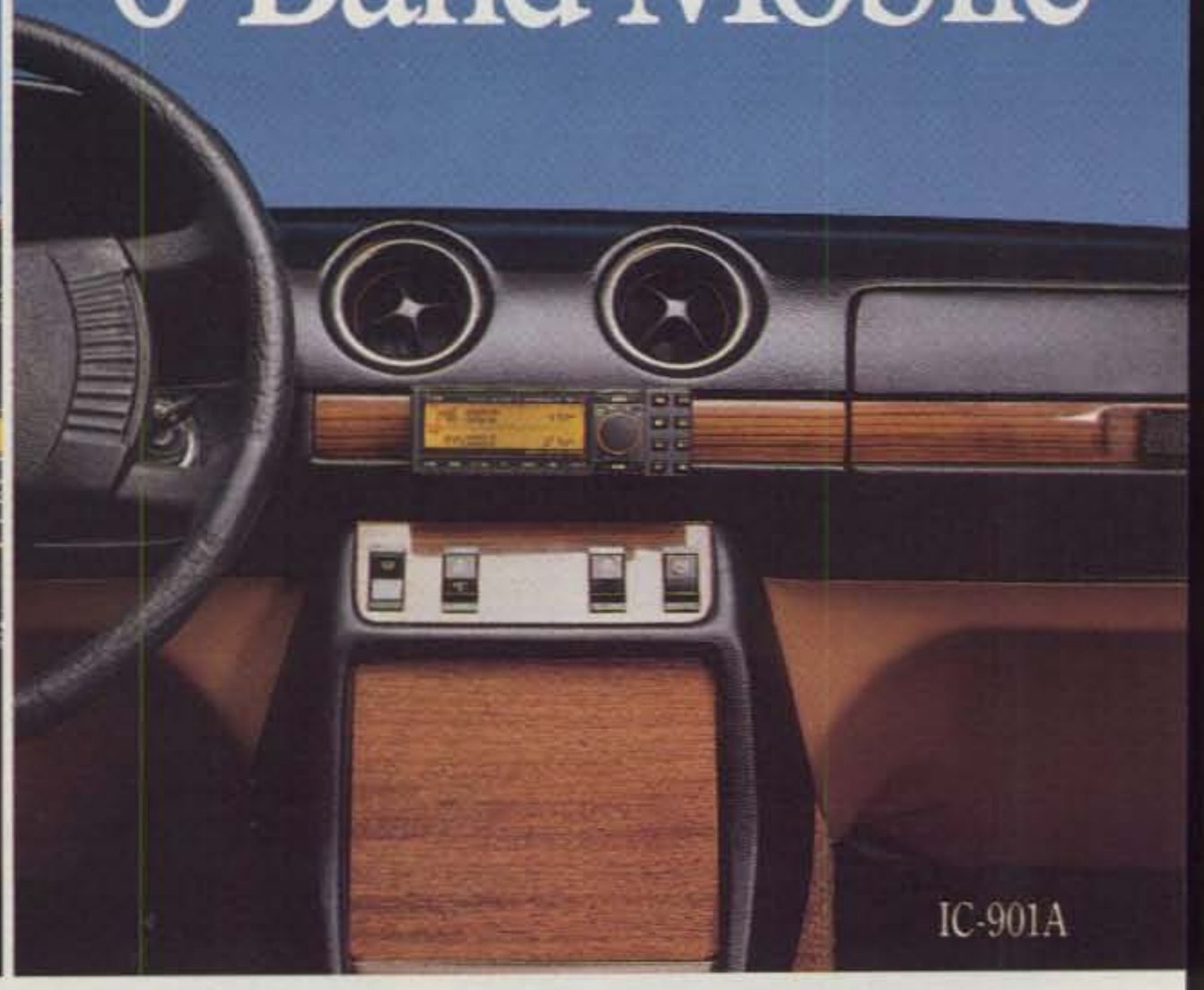


Today's 6-Band Mobile



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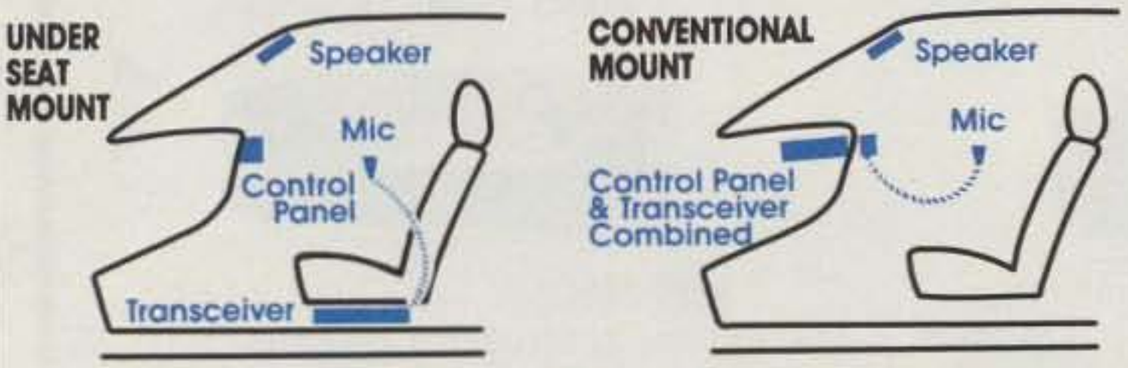

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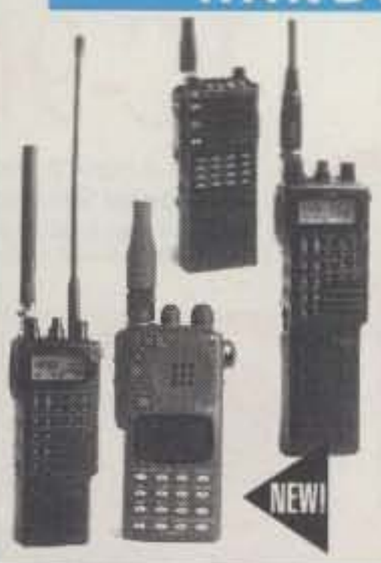

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Results of The 1991 CQ WW RTTY DX Contest

BY ROY GOULD*, KT1N

"Never have so many CQs been transmitted for so few QSOs." ...*ZS6BCR*. Well, that just about sums up how the conditions were during the 5th running of this contest. The number of entries was down, but the activity seemed to be as high as it has been. I think with the conditions as bad as they were, many did not send in their logs.

The time-off periods seem to bring the most comments from you. I am going to leave the rules as they are for this year's contest, but I am going to ask three or four of you who participate on a regular basis to look at the rules for this contest with me, and maybe we will make some changes for the 1993 single operator class.

Once again Walter, DJ6QT, came on with a special prefix, this time from Maderia Islands as CT3M to take the plaque for single operator all band with 941 QSOs. Giving chase was Dave at the keys at 9I1US with 864 contacts to win the African plaque.

John, ON4UN, came back to the RTTY contest scene this year after an 8 year absence to give chase also. John's goal was to break the record, but the conditions were just not there. John finished with 746 Qs to take third place in the world and the plaque for Europe.

VE7VT operating as CK7C came in fourth in the world and won the North American plaque with 734,704 points and 915 QSOs. W2UP gave chase, but could not counter with the number of QSOs needed to offset the Qs that CK7C had with the USA. However, he did win the USA with 751 contacts and 636,615 points. The majority of the logs in this class come from the USA each year, and even more so this year due to the conditions.

Barry, W3FV's effort (with 625 contacts) to win the USA came up short on multipliers, as did N4CC with 674 QSOs. Neither could overcome the multiplier edge to catch up under terrible conditions. WF5T, N6GG, and N9ITX were also in the hunt, but will have to wait until next year.

No one seemed to be able to get a DX run going as in previous years. At times, especially on Sunday during the solar storm, it was like an RTTY WAS Party. So to the many US operators who hung in there making the contest what it was this year, thanks.

In the Assisted category the entries were up slightly with only nine entries all from the USA and Canada. AA4M/6 took first place and the plaque for the world with 640 contacts and 291,580 points. Second and third were W9KDX and N4ROL.

The only Canadian entry was VE7IRA, who of course won Canada.

Multi-Operator Class

A real battle took place for top honors and the plaque for the single transmitter class. Eddie, G0AZT, and Don, AA5AU, traveled to Antigua as V2/G0AZT, but could not overcome the country multipliers of UZ9CWA to take top honors even with a score of 1,680,607 points. They had 350 more QSOs and more QSO points, but the boys from Asia came up with more band countries and zones to win the plaque with 1,793,925 points. A key band for them was 40 meters, where they had 53 countries in 21 zones! A great effort by both groups. Coming in third and not far behind was a group from Kaliningrad using the call UW2F. Their 1,524,978 was a great score and took third place in the world.

Hal, WA7EGA, won North America with 899,990 points, followed by VE7ZZZ with 755,895.

In Europe LZ2KIM came up with 761,374 points, with YT3T close behind with 670,179. In the multi-multi class there were only two entries, with W3LPL taking the honors at 1,968,600 points with 1,707 QSOs. The other entry was LY2WW from Lithuania with 927,710 points. Ed Bruns,

*P.O. Box DX, Stow, MA 01775

Luis, ZP5JCY, made 599 QSOs on 10 meters to claim second place in the world.

John, ON4UN, tried the CQ WW RTTY Contest for the first time, coming in third in the world.

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W3EKT, headed up the effort at W3LPL and created a number of additional RTTY contest operators as well as put the station through its paces key down in preparation for the CQ WW SSB and CW Contests. What a setup: four 200 foot towers, three 100 foot towers, and completely separate operating rooms for each band.

Single Band

Ten meters was again the band to be on for the most activity, with ZS6BCR taking top score with 307,746 points. Fifteen meter honors were won by 4M5RY with 242,858 points, and 20 meters went to EA1QK with 78,645. On 40 meters HJ4QIM edged out KB8LUJ, a first entry into contesting with a score of 21,634. The only entry for 80 meters was YT3HM.

Continental Winners

In Europe John, ON4UN, took the plaque. Africa went to Dave, 9L1US, who gave many a new one on RTTY. Asia was won by JR2CFD, and Oceania was taken by VK2BEX in his first try ever in an RTTY contest. South America was once again claimed by Raul, HK1LDG, and North America was won by Alan, VE7VT, operating CK7C.

DX Happenings

Many exciting DX stations were on, many for the first time in the contest. Our thanks to them for giving out a new one to the deserving under some terrible conditions. These include 9L1US, JT1T, BZ4SAA, UL7MU from Kazakh, HS0ZAA from Thailand, UC2ADX from Byelorussia, and 4K2OIL from Franz Josef Land.

Summary

Once again thanks to all who participated and took the time to send along kind words and photos. I can always use more photos, so next time have someone take a photo of you and include it with your log.

Speaking of logs, they continue to be a problem. If everyone used the correct summary form I could have the logs finished a lot quicker. It is very time consuming to sort out a number of the logs. Over the next few months we will look at perhaps making some changes in the rules as I stated earlier. Send along comments and suggestions if you like.

Plaques are still open to sponsors. Ask your club to help out. The more plaques, the more participants.

Special thanks once again to Roland, N1FTD, and George, KB2VO, for their assistance, and to Dale Sinner, W6IWO, of the *RTTY Journal*.

In closing, I leave you with a fitting comment from W5NBI: "Lord, please don't let the computer crash. . . . Lord, please don't let the computer crash again. . . . Oh, Lord, please not again! Lord, are you there?"

73, Roy, KT1N

Comments From NA

Poor condx really hurt the score; lack of European multipliers; WF1B should have "RTTY Sainthood." *(It is some software!—ed.)* . . . *AA4M/6*. Ten was really open . . . *AA4TH*. WF1B's software is hot stuff. Sorry I didn't have more time . . . *AI7B*. Worked twice as hard as last year for half the contacts! Still a great contest . . . *AL7NK*. Bands were quiet, but all were friendly . . . *CK7C*. Good US/VE activity, but Europe was down . . . *K6WZ*. Good mix of contest excitement and low anxiety fun . . . *K7MYH/0*. Hardest 421 contacts I have ever made . . . *KA5YSY*. It's fun trying to break pile-ups by punching a key . . . *KB2SE*.

Forty meters was great; lots of DX, but the intentional interference by packet stations is awful . . . *KB8LUJ*. This was a warm up for CQ SSB Contest, but I got hooked . . . *KC2X*. Well organized and hardly a nasty op . . . *KC4MOP*. All hand logging, a lot of work, how abt a category for hand loggers? . . . *KC7UP*. Fun, fun, fun, but where were the new ones? . . . *KD2YG*. Not as many Europeans, but still good . . . *KD3KW*. Keep up the good work. . . *KD4MM*. I am in Conn on a temporary basis; I want my beam back . . . *KE0KB/1*. Ten not as good as last year; no Europe opening from west coast . . . *KF6HI*.

Worked some new states, some new countries, and passed my Extra on Saturday! . . . *KI5GX*. Not only my first contest, but my first ever RTTY contacts . . . *KK4RV*. No filters and a vertical; had a ball . . . *N0MQB*. My score could have been higher if I could only break the habit of looking for a new one . . . *N2FF*. Been on RTTY 10 weeks; tnx to contest I now have 90 countries and 47 states . . . *N2HOQ*. I sure wish K1EA would support CQ WW RTTY; this log took hours! . . . *N4CC*. My favorite contest; now if I could only get my husband to fast for the weekend . . . *N4LIH*. No DX from 9-land; had to rely on stateside . . . *N9ITX*. Great thrill working so much DX with low power and modest antennas. . . . *NJ1H*.

First time as a 7 MHz entry. Slow during the day, though. Where was Neveda? . . . *NQ6C*. Condx so so. Better log next year . . . *VE2JR*. Thanks for your efforts . . . *VE3FJB*. Contest continues to grow in popularity despite poor condx . . . *VE6KRR*. Biggest thrill was being called by 4K2OIL off the back of the beam . . . *VE6ZX*. Biggest thrill was catching 4K2OIL on 40 meters . . . *VE7BTO*. Although DX condx were almost nonexistent, still a fun contest. Used WF1B's software, which was very impressive. Congratulations to Ray . . . *VE7KD*. We were ready to beat

TOP SCORES

SINGLE OPERATOR WORLD

ALL BAND

CT3M	1,075,584
9L1US	866,880
ON4UN	788,322
CK7C	734,704
HK1LDG	639,556
W2UP	636,615
HA6PX	601,965
W3FV	578,578
LZ2TU	561,798
HI8A	522,821

3.5 MHz

YT3HM	2184

7.0 MHz

HJ4QIM	21,634
KB8LUJ	18,722
NQ6C	15,840
NT3B	8,176
KD3KW	7,540

14 MHz

EA1QK	78,645
UW9CX	76,923
W5NBI	62,370
I2KFW	54,944
FF6KAW	44,200

21 MHz

4M5RY	242,858
KA5YSY	97,408
LZ1BG	95,235
KJ6LD	68,440
IV3KCB	55,883

28 MHz

ZS6BCR	307,746
ZP5JCY	235,884
YV6A	146,856
SM0HTO	64,974
EA3GCV	44,928

SINGLE OPERATOR ASSISTED

AA4M/6	291,580	WA4DAZ	111,860
W9KDX	191,142	N3HHE	94,612
N4ROL	150,000		

MULTI-OP SINGLE TRANSMITTER

UZ9CWA	1,793,925	WA7EGA	899,000
V2/G0AZT	1,680,607	VE7ZZZ	755,895
UW2F	1,524,978		

MULTI-OP MULTI-TRANSMITTER

W3LPL	1,968,600	LY2WW	927,710

last year's score, but Mother Nature was not! . . . *VE7ZZZ*.

Enjoyed the contest in spite of losing the beam and spending all day Saturday at a wedding . . . *W1BYH*. WF1B's software is fabulous! . . . *W2UP*. My first RTTY Contest, but not my last! . . . *W3FTG*. Not nearly as much DX this year; zones and countries way down . . . *W3FV*. First ever RTTY Contest; it was GREAT . . . *W6DBV*. Fuse blew in P.S. early Sunday; lost 30 minutes of DX on 15 . . . *W7ZAC*. Heard a 6W6 just before the contest, but never saw him again all weekend . . . *WA4DAZ*. Wish I had last year's condx with this year's station . . . *WA6SDU*. Thrill to work ON4UN, author of the great antenna and DX book . . . *WA8FLF*.

Can you consider simplifying the multiplier procedure? . . . *WA9AQE*. Brings excitement back to ham radio . . . *WA9YII*. First time, real fun . . . *WB2DZH*. Tnx to AA5AU going to V2-land, gave me a chance in W5! . . . *WF5T*. I'll be back next year . . . *WF7B*. Poor condx, no filters and manual logging and duping, but Great Fun . . . *WK0F*.

Comments From DX

WF1B's software squelchs the cries to change the exchange to fit CT . . . *9L1US*. Tried to work USA, but had TVI . . . *9M2AX*. I had hoped to break the record, but condx were not with us . . . *CT3M*. Sorry I could not be on longer . . . *CU3LF*. After winning from Florida in 88 it was nice to see so many of my stateside friends . . . *DL1BFZ*. My first RTTY Contest; better next year . . . *DL6RAI*. Propagation was very bad, but still worked four new ones . . . *EA7TV*. Amazing, 40 W to a dipole and called by TY1, HS0, HL, V85 . . . *FF6KAW*. I worked a JT for my last RTTY Zone . . . *G0ARF*. Forty meters was FB; sri I slept so long . . . *HA6PX*.

Happy to give HB0 to my many friends . . . *HB0/HB9NL*. First day very bad condx; second was very good from here . . . *JE2UFF*. My first CQ RTTY Contest; just got back on RTTY after an 8 year absence . . . *ON4UN*. Sri, no time this year; see you in 92 . . . *SM4CMG*. My first RTTY contact was in the contest . . . *SP4EEZ*. Impressed with 40 meters—53 countries in 21 zones! . . . *UZ9CWA*. My first RTTY contest ever . . . *VK2BEX*. Nothing like last year's score, but better next year I hope . . . *VK3EBP*. For once the equipment worked OK, but I was QRL! . . . *VU2SJV*.

Station Operators Multi-Op Single Transmitter

JT1T: JT1CD & J75AA. **JJ3YBB:** JA3FHL, JA3PJL, JH3FQF, JH3UHG, JE3TXA. **UZ9CWA:** UA9CGA, UV9CAF, UA9VR, UZ9CU, UA9CFV. **YT3T:** YU3HR & YU3BQ. **UB4LWC:** UB4LRQ, UB4LSB, UB5-077-2354. **SP3PLD:** SP3IBM & SP3SSB. **UO4OWQ:** UO5OLW, RO4OR, UO5OJL, UO4OYC, UO5OPE, UO5OT, UO5OHD. **UW2F:** UA2FF, UA2FJ, UA2FM, RA2/UL7PCZ. **DL0GK:** DL9YAJ, DL2DBS, DF7XE, DG8YGE, DF3QB, DL2WP, DJ6VP. **FF6MN:** FD1OYC, F6IIE. **FF6KRJ:** F5CW, F6GWO, F6IJR, FC1IEN. **UZ6LWZ** & UA6-150-1401, UA6-150-1403, UA6-150-1476. **OK3RJB:** OK3TCL, OK3TVA, OK3TFU. **LZ2KIM:** LZ2MP, K. Kossev, Z. Ossikorska. **EA6ZP** & EA6PZ. **OE3XCW:** OE3PUW, OE3MDC, OE1GAS, OE3CHC. **WA5FAC/4** & AB4U. **KA3DSX** & KA3HNM. **WA7EGA** & K7GS, WS7I, WV7Y, WB7AVD. **NY2U** & N2DCM. **N6RZ** & N6TU, W6YJG. **K4MF** & N4ONQ. **N5NMX** & N5NMW, KB5NFZ. **WN1G** & NX1T. **WF1B** & WD1N. **W4AQL:** N7FYT, N9HZQ, WD4DWN, K0DI, WA2EHN, N4RMM, KC4WBN. **KY1F** & KA1RJJ, W1WCQ.

NF1J & WA1MBK, K1CE. **W8BI:** W8DN, N9AG, N8BJQ. **VE7ZZZ:** VE7AV, VE7BKO, VE7DRS, VE7EAP, VE7EME, VE7EQN, VE7RBL, VE7SK, VE7FZ, VE7SSS. **VE3UR** & VE3NIT. **V2/G0AZT** & AA5AU. **NL7DU** & AL7KT. **PY2NY** & PY3HF.

Station Operators Multi-Op Multi-Transmitter

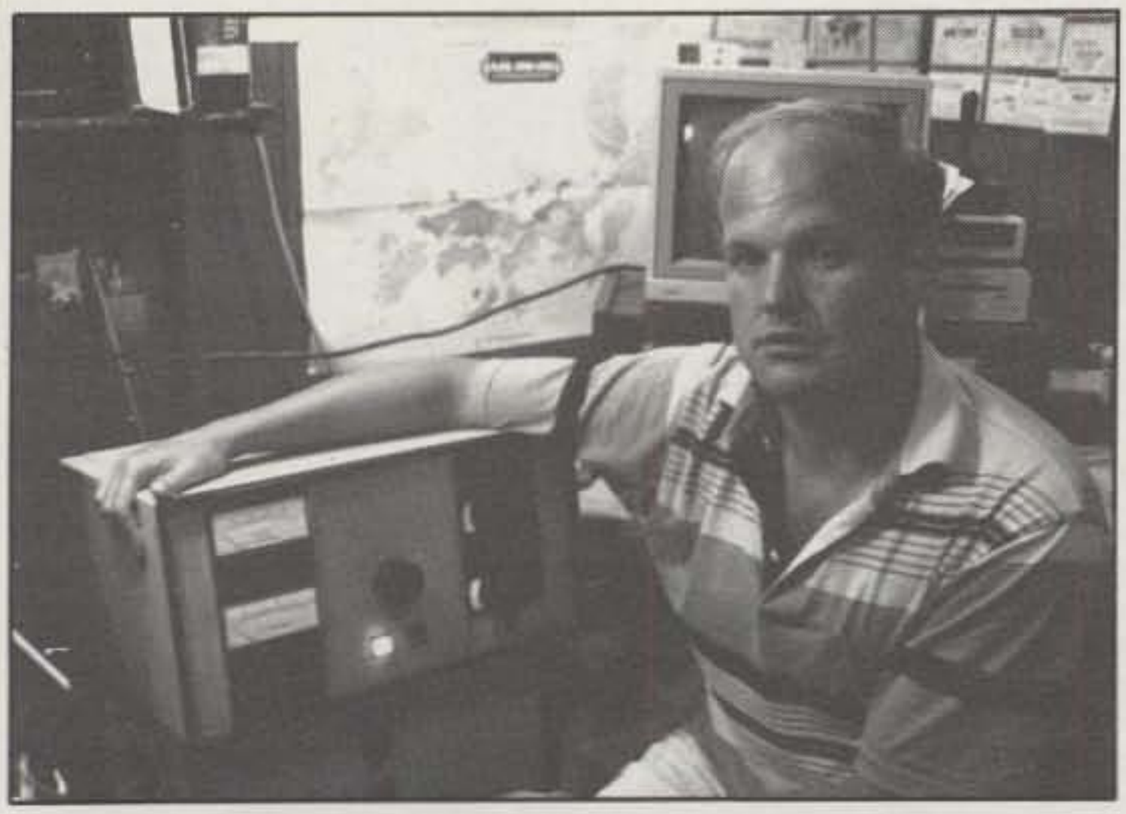
W3LPL & W3EKT, KF3P, N3UN, KA3VYN, K4GMH, WA8MAZ. **LY2W:** LY2BIJ, LY2BKW, LY2BMW, SWL Eimas.

Number groups after call letters denote following: Classification (SOB = Single Op All Band, SOA = Single Op Assisted All Band, MOS = Multi-Op Single Transmitter, MOM = Multi-Op Multi-Transmitter), Final Score, Number of QSOs, Points, Zones, Countries, States, and Canadian Provinces. Winners are listed in boldface.

SINGLE OPERATOR NORTH AMERICA

UNITED STATES

CALL	CL	SCORE	QSOs	POINTS	ZONES	COUNTRIES	US/VE
W2UP	**SOB**	**636,615**	**751**	**1505**	**79**	**179**	**165**
W3FV	**"**	**578,578**	**625**	**1547**	**65**	**157**	**152**
N4CC	**"**	**455,896**	**674**	**1163**	**73**	**148**	**171**
WF5T	**SOB**	**380,904**	**686**	**1076**	**73**	**112**	**169**
N6GG	**"**	**359,600**	**526**	**1160**	**64**	**97**	**149**
N9ITX	"	331,899	602	1047	56	113	148
AA4M/6	**SOA**	**291,580**	**640**	**956**	**61**	**85**	**159**
N2DL	SOB	273,735	431	869	63	139	113
WF7B	"	254,752	467	838	57	115	132
WB8YJF	"	228,344	452	782	58	108	126
N2FF	"	216,976	391	764	62	118	104
K6WZ	"	213,213	557	781	45	71	157
W9KDX	**SOA**	**191,142**	**456**	**738**	**44**	**87**	**128**
KB3PW	SOB	174,246	324	771	44	88	94
WA6SDU	"	168,912	380	612	60	78	138
KA4RRU	"	168,600	324	600	61	112	108
W1BYH	"	162,606	312	661	55	75	116
N4ROL	**SOA**	**150,000**	**372**	**600**	**46**	**74**	**130**
KD2YG	SOB	140,208	274	552	56	106	92
KB3PW	"	134,325	324	597	44	87	94
KK4DK	"	131,157	293	531	51	92	104
KD4MM	"	130,095	328	531	46	95	104
KB4GID	"	128,691	271	543	49	72	116
N1FTD	"	127,125	283	565	45	102	78
W4TOY	"	123,648	356	552	51	77	96
W9KE	"	118,424	321	524	49	84	93
WA4DAZ	SOA	111,860	287	476	49	76	110
WW8Q	SOB	111,320	319	506	43	71	106
N4LIH	SOB	110,075	289	425	39	136	84
KA5YSY	**21**	**97,408**	**421**	**761**	**23**	**57**	**48**
W9FFC/2	SOB	95,013	225	459	46	89	72
N3HHE	SOA	94,612	223	436	49	88	80
N2HOQ	SOB	94,176	258	436	47	77	92
KK6PD	"	88,264	434	748	51	67	0
WA4MCZ	"	86,862	215	467	43	88	55
WA6UFY	"	85,455	274	405	45	53	113
AI7B	"	84,630	262	403	48	50	112
N0IOS	"	77,330	303	407	39	47	104
WB2DZH	"	73,260	228	396	39	66	80
NJ1H	"	69,504	255	384	39	53	89
WB0NSA	"	68,464	300	389	34	40	102
KJ6LD	21	68,440	341	590	48	46	22
W6DBV	SOB	66,468	234	348	40	42	109
KB3TS	"	65,960	175	388	43	82	45
WK0F	"	63,902	236	359	40	58	80
W5NBI	**14**	**62,370**	**400**	**594**	**20**	**33**	**52**
WA1IML	SOA	60,214	172	374	43	66	52
W3KV	SOB	58,990	149	347	44	87	39
W7TWL	"	56,724	206	326	38	46	90
KB8IJN	"	56,248	232	356	35	46	77
K5ARH	"	53,940	218	310	36	44	94
WA8FLF	"	53,328	161	303	45	66	65
WA0QIT	"	53,100	199	300	38	56	83
W7ZAC	"	52,800	220	320	32	36	97
KA8WAS	"	46,368	166	288	24	37	100
KC7UP	"	45,540	211	276	31	37	97
K5MA	"	45,448	147	299	42	61	49
W2KHQ	"	43,865	143	283	43	62	50
W4IF	"	43,364	116	293	46	84	18
KE4BM	"	42,560	184	266	36	44	80
K7PB	"	41,340	136	265	52	58	46
WA4VQD	"	41,182	273	349	18	26	74
KC3ST	"	39,424	157	256	37	48	69
WG3I	"	38,720	157	242	36	47	77
							(Opr. G4FRE)
W1VXV	"	38,514	132	262	34	61	52
KE0KB/1	14	36,562	233	362	17	40	44
KB2SE	SOB	35,280	133	252	39	52	49
WA5JWU	SOB	30,628	172	247	31	34	59
KC1RG	"	30,250	120	242	34	54	37
KI5GX	"	29,212	158	218	28	26	80
WI7D	"	29,029	142	203	30	32	81
K2VV	"	28,910	116	295	26	54	18
WA8MEM	"	27,930	97	210	40	63	30
WD4JNS	"	27,720	114	231	29	43	48
N3II	"	27,664	120	208	32	46	55
K7SDW	"	25,228	149	212	27	16	76
K7PB	"	23,391	136	207	52	50	11
W2FCR	21	22,440	130	264	16	43	26



Mike, N9ITX, sixth place single operator in the US.

Juan Jose, EA8AKQ, second place in Africa.

AA4TH	**28**	**20,470**	**120**	**230**	**20**	**37**	**32**
WN1E	SOB	20,280	124	169	25	27	68
WA1MPB	"	19,950	91	210	31	46	18
KB8LUJ	**7**	**18,722**	**207**	**253**	**11**	**15**	**48**
KA9DZM	SOB	18,480	105	168	32	35	43
KF0EF	"	17,066	115	161	22	22	62
NQ6C	7	15,840	192	240	11	11	44
N0MQB	SOB	15,484	124	158	21	12	65
WB8CKI	"	14,734	95	139	27	29	50
W6SX	SOB	14,260	99	155	25	16	51
K4KIY	21	14,089	128	193	18	20	35
WA2HFI/0	SOB	14,070	106	134	22	20	63
KF6HI	28	14,016	133	192	16	22	35
W8PBX	SOB	13,172	97	148	16	25	48
W4VQ	28	12,191	74	167	19	33	21
KC2X	14	11,856	105	156	14	24	38
N5TCQ	SOB	11,832	100	136	16	19	52
KI4MI	21	11,635	82	179	11	35	19
KA1JFP	14	11,023	124	151	7	24	42
K7MYH/0	SOB	10,500	96	125	17	16	51
AB4LX	21	10,206	95	162	16	15	32
WA0WHT	SOB	10,148	63	118	26	33	27
KC4MOP	"	9,744	68	112	26	24	37
W3CPB	"	9,360	59	120	26	27	25
KE9CU	"	8,892	77	114	19	21	38
KN3P	28	8,555	62	145	10	34	15
NT3B	7	8,176	129	146	12	4	40
WA9YII	SOB	7,704	64	107	24	18	30
KD3KW	7	7,540	105	130	11	14	33
N5PQE	21	7,497	72	119	15	11	37
KB8GQT	SOB	7,420	59	106	22	26	22
W4KQS	14	7,378	76	119	13	19	30
KD7H	SOB	6,848	75	107	19	22	23
WA9AQE	SOA	6,486	42	94	26	31	12
W3FTG	"	6,319	52	89	20	24	27
KD2BW	SOB	5,162	48	89	17	19	22
W2HCA	"	4,977	46	79	21	17	25
WB9B	7	4,725	85	105	6	7	32
K8CV	SOB	4,400	38	80	19	23	13
KB9CRJ	7	3,315	75	85	5	4	30
K0VW	SOB	3,304	47	56	14	11	34
KI7T	7	2,964	63	76	7	8	24
KK4RV	SOB	1,880	29	47	16	12	12
KJ6HO	21	1,628	32	44	8	7	22
N7IXI	14	759	21	33	6	6	11
N9CCI	7	624	25	26	4	2	18
			ALASKA				
AL7NK	**SOB**	**138,288**	**356**	**804**	**29**	**45**	**98**
			CANADA				
CK7C	**SOB**	**734,704**	**915**	**1954**	**79**	**103**	**194**
						(Opr. VE7VT)	
VE7KD	"	264,616	493	1067	44	64	140
VE6ZX	"	166,559	394	863	35	46	112
VE3FJB	"	143,220	282	651	52	86	82
VE4AIY	"	128,674	334	707	38	48	96
VE6KRR	"	110,591	302	611	35	37	109
VE7BTO	"	91,670	247	515	42	48	88
VE7IRA	**SOA**	**83,803**	**224**	**463**	**36**	**44**	**101**
VE2JR	SOB	44,088	136	334	35	60	37
VE5SF	"	33,402	145	293	26	25	63
VE7IN	**14**	**26,228**	**150**	**316**	**17**	**23**	**43**
VE3JAN	14	22,695	115	255	16	35	38
			DOMINCAN REPUBLIC				
HI8A	**SOB**	**522,821**	**795**	**1703**	**55**	**83**	**169**
						(Opr. JA5QDH)	
			PANAMA				
HP1KZ	**SOB**	**4,048**	**43**	**88**	**12**	**9**	**25**
			PUERTO RICO				
WP4IIW	**SOB**	**10,736**	**80**	**176**	**14**	**8**	**39**
			SINT MAARTEN				
PJ8UQ	**14**	**14,950**	**100**	**230**	**16**	**29**	**20**
			TURKS & CAICOS				
VP5JM	**SOB**	**479,449**	**781**	**1823**	**38**	**98**	**127**
			AFRICA				
			CANARY ISLANDS				
EA8AKQ	**SOB**	**266,508**	**360**	**1346**	**44**	**99**	**55**
EA8AZM	"	78,375	222	627	26	49	50
			MADERIA ISLANDS				
CT3M	**SOB**	**1075,584**	**941**	**2801**	**82**	**213**	**89**
						(Opr. DJ6QT)	
			MELLIA				
EA9MY	**SOB**	**196,800**	**341**	**1025**	**34**	**136**	**22**
			MOROCCO				
CN8NS	**14**	**17,629**	**97**	**289**	**14**	**32**	**15**
			REPUBLIC OF SOUTH AFRICA				
ZS6BCR	**28**	**307,746**	**742**	**2214**	**26**	**71**	**42**
			SIERRA LEONE				
9L1US	**SOB**	**866,880**	**864**	**2580**	**63**	**156**	**117**
			ASIA				
			ASIATIC RUSSIA				
UW9CX	**14**	**76,923**	**281**	**777**	**24**	**52**	**23**
RA9UK	**SOB**	**59,817**	**206**	**471**	**43**	**84**	**0**
UA9MBO	**21**	**4,020**	**52**	**134**	**8**	**22**	**0**
			CHINA				
BZ4SAA	**SOB**	**107,819**	**300**	**787**	**39**	**69**	**29**
			INDIA				
VU2SJV	**SOB**	**184,864**	**306**	**848**	**60**	**147**	**11**
			ISRAEL				
4X6UO	**SOB**	**141,764**	**303**	**854**	**41**	**93**	**32**

JAPAN

JR2CFD	**SOB**	**392,814**	**418**	**1251**	**86**	**164**	**64**
JH1QDB	"	**237,804**	**327**	**894**	**75**	**131**	**60**
JA2IVY	"	94,688	193	538	54	95	27
JR1IJV	**28**	**37,536**	**142**	**391**	**26**	**41**	**29**
JE2UFF	**14**	**31,506**	**128**	**354**	**26**	**52**	**11**
JH7QXJ	14	20,636	99	268	25	40	12
JA2DOU	SOB	15,000	83	200	26	39	10
JA7NJN/1	"	8,352	46	116	28	37	7
JA8EAT	**7**	**5,945**	**55**	**145**	**13**	**19**	**9**
JA3BSH	SOB	4,278	34	93	19	24	3
JS1OYN	"	4,067	34	83	22	24	3

MALAYSIA

9M2AX	**SOB**	**22,387**	**166**	**367**	**24**	**36**	**1**

THAILAND

HSØZAA	**SOB**	**74,420**	**264**	**610**	**40**	**70**	**12**
						(Opr. W2ZWW)	

EUROPE

AZORE ISLANDS

CU3LF	**SOB**	**34,814**	**146**	**338**	**24**	**55**	**24**

BALEARIC ISLANDS

EA6ZS	**SOB**	**1,128**	**23**	**47**	**6**	**18**	**0**

BELGIUM

ON4UN	**SOB**	**788,322**	**746**	**1961**	**92**	**209**	**101**

BULGARIA

LZ2TU	**SOB**	**561,798**	**635**	**1587**	**76**	**197**	**81**
LZ1BG	**21**	**95,235**	**360**	**907**	**24**	**54**	**27**
LZ1BJ	SOB	13,203	71	163	24	54	3

BYELORUSSIA

UC2ADX	**SOB**	**15,625**	**194**	**125**	**33**	**73**	**19**
RC2AZ	**14**	**4,640**	**60**	**116**	**7**	**21**	**12**

CZECHOSLOVAKIA

OK1AJN	**SOB**	**85,928**	**207**	**467**	**49**	**114**	**21**

DENMARK

OZ1FGS	**SOB**	**138,170**	**266**	**674**	**55**	**115**	**35**
OZ7XE	**14**	**10,665**	**113**	**237**	**11**	**33**	**1**

ENGLAND

GØARF	**SOB**	**317,124**	**450**	**1149**	**66**	**135**	**75**
G4MKO	"	67,646	195	454	35	83	31
G3XVF	"	51,060	147	345	37	91	20
G4XDD	"	25,194	106	247	31	61	10

ESTONIA

ES7FU	**SOB**	**12,376**	**91**	**221**	**15**	**41**	**0**
ES7JW	**28**	**3,441**	**53**	**93**	**12**	**23**	**2**

EUROPEAN RUSSIA

UA1OJ	**SOB**	**155,136**	**363**	**808**	**52**	**134**	**6**
UA3TN	"	80,444	215	476	46	116	7
RA3DX	**14**	**33,866**	**188**	**413**	**19**	**55**	**8**
UW3AT	SOB	16,685	138	235	22	49	0

FINLAND

OF2BP	**SOB**	**367,934**	**518**	**1282**	**70**	**166**	**51**
OH2LU	"	151,496	285	653	61	156	15
OH5MN/2	"	1,728	30	36	18	30	0

FRANCE

F6EKX	**SOB**	**172,224**	**329**	**832**	**45**	**97**	**65**
F2AR	SOB	66,755	163	395	48	93	28
FF6KAW	**14**	**44,200**	**182**	**425**	**29**	**55**	**20**
F6FGY	**21**	**24,386**	**106**	**274**	**20**	**45**	**24**

FRANZ JOSEF LAND

4K2OIL	**SOB**	**48,952**	**164**	**422**	**29**	**63**	**24**

GERMANY

DL4MCF	**SOB**	**242,182**	**337**	**838**	**72**	**176**	**41**
DL6RAI	"	211,932	319	812	65	141	55
Y32WF	"	93,780	197	521	50	91	39
DF9IZ/P	"	61,374	170	386	46	89	24
DJ2YE	"	54,756	155	351	43	113	0
Y26GA	"	33,759	175	341	20	76	3
DL9MBZ	**14**	**22,119**	**142**	**303**	**15**	**46**	**12**
DK3GI	SOB	19,012	75	196	35	49	13
DL1BFZ	14	11,716	89	202	15	38	5
DA1SC	**21**	**10,384**	**69**	**176**	**16**	**31**	**12**
DK5KJ	SOB	3,542	35	77	16	27	3
DF6EX	14	2,964	34	78	10	25	3
Y27TN/A	14	2,208	29	69	10	19	3
DJ4KW	14	2,145	30	65	10	20	3
DLØER	SOB	2,014	23	53	14	21	3
DK3GI	**28**	**1,311**	**22**	**57**	**11**	**12**	**0**
DL7MAE	SOB	814	13	37	9	13	0
Y21NM	SOB	350	8	25	6	8	0

GREECE

SV1BDO	**SOB**	**24,592**	**97**	**232**	**31**	**62**	**13**

HUNGARY

HA6PX	**SOB**	**601,965**	**685**	**1715**	**78**	**185**	**88**
HA8EK	"	205,904	320	757	87	142	43
HA5CP	"	191,772	307	761	71	148	33
HAØIV	"	80,371	189	449	53	105	21
HA6ZQ	**21**	**18,392**	**100**	**242**	**17**	**41**	**18**
HA5AEZ	SOB	11,880	68	165	25	44	3

ITALY

I2SVA	**SOB**	**407,220**	**486**	**1234**	**69**	**188**	**73**
I2DMI	"	404,922	479	1302	96	129	86
I2TQU	"	254,687	425	991	64	134	59
IK1HSR	"	87,690	229	474	59	126	0
I4XQG	"	58,562	136	329	46	104	28
IV3KCB	**21**	**55,833**	**202**	**503**	**21**	**65**	**25**
I2KFW	**14**	**54,944**	**231**	**544**	**21**	**58**	**22**
IOØKHP	SOB	28,980	101	230	40	73	13
IK1HXN	**28**	**25,384**	**143**	**334**	**23**	**53**	**0**
IK2IKW	SOB	15,840	65	160	39	54	6
IK2ODI	"	3,936	36	82	21	27	0
I2FUM	**7**	**1,860**	**29**	**62**	**7**	**21**	**2**

LIECHTENSTEIN

HBØ /HB9NL	**SOB**	**264,729**	**433**	**1117**	**52**	**125**	**60**

LUXEMBOURG

LX1TO	**SOB**	**57,375**	**157**	**375**	**39**	**84**	**30**

MOLDAVIA

RO4OA	**SOB**	**238,055**	**404**	**1013**	**67**	**134**	**34**
UO4OF	**21**	**1,012**	**20**	**46**	**7**	**15**	**0**

NETHERLANDS

PA3EWP	**SOB**	**27,104**	**102**	**242**	**36**	**70**	**6**
PAØYN	SOB	10,650	59	142	29	40	6

NORWAY

LA7AJ	**SOB**	**29,640**	**88**	**228**	**51**	**77**	**2**

POLAND

SP3SUN	**SOB**	**255,136**	**407**	**952**	**71**	**164**	**33**
SP3XR	"	78,218	231	518	48	96	7
SP4EEZ	"	34,080	126	284	38	73	9
SP6CYV	"	26,790	139	285	29	60	5
SP2UUU	**21**	**21,597**	**123**	**313**	**15**	**39**	**15**
SP9TCE	SOB	12,744	80	177	24	45	3
SP7FQI	SOB	4,708	50	107	12	29	3
SP9BCH	**14**	**2,720**	**66**	**80**	**11**	**23**	**0**
SP2FN	21	1,944	33	81	8	14	2

PORTUGAL

CT1DIZ	**SOB**	**122,322**	**308**	**703**	**45**	**106**	**23**

ROMANIA

YO6JN	**SOB**	**171,189**	**350**	**827**	**54**	**127**	**26**
YO5BAT	**21**	**11,918**	**86**	**202**	**18**	**34**	**7**

SICILY

IT9OCP	**SOB**	**178,978**	**322**	**821**	**44**	**110**	**64**

SPAIN

EA7TV	**SOB**	**156,032**	**324**	**736**	**42**	**100**	**70**
EA7EL	SOB	115,092	219	556	48	106	53
EA1QK	**14**	**78,645**	**291**	**749**	**19**	**50**	**36**
EA3GCV	**28**	**44,928**	**180**	**468**	**19**	**52**	**25**
EA7CWA	SOB	2,627	29	71	14	23	0
EC2AXM	**21**	**756**	**18**	**36**	**4**	**17**	**0**
EA1EZA	28	238	7	17	6	7	1

SWEDEN

SM5FUG	**SOB**	**340,827**	**450**	**1103**	**75**	**176**	**58**
SMØHTO	**28**	**64,974**	**267**	**637**	**27**	**55**	**20**

HF Equipment

		Regular	SALE
IC-781 Xcvr/ps/tuner/scope	●	$6395.00	4899

IC-765 Xcvr/ps/keyer/tuner	●	$2800.00	2239

IC-751A 9-band xcvr/SW rx	●	$1440.00	1159
PS-35 Internal power supply		228.00	209.95
FL-63A 250 Hz CW filter (Ist IF)		59.00	
FL-52A 500 Hz CW filter (2nd IF)		115.00	109.95
FL-53A 250 Hz CW filter (2nd IF)		115.00	109.95
FL-70 2.8 kHz wide SSB filter		59.00	
IC-735 HF xcvr/SW rcvr/mic	●	1064.00	859.95
PS-55 External power supply		228.00	209.95
AT-150 Automatic antenna tuner		446.67	389.95
FL-32A 500 Hz CW filter		69.00	
EX-243 Electronic keyer unit		64.67	
UT-30 Tone encoder		18.67	

IC-725 HF xcvr/SW rcvr/mic	D●	$893.00	719.95
AH-3 Automatic antenna tuner		488.33	429.95
IC-726 10-band xcvr w/6m.	●	1283.00	1059

HF Accessories:

		Regular	SALE
IC-2KL HF solid state amp w/ps	●	$2079.00	1679
IC-4KL HF 1 kw amp w/ps	●	7275.00	5599
EX-627 Automatic antenna selector		314.67	279.95
PS-15 20A external power supply		183.00	169.95
PS-30 Systems p/s w/cord, 6 pin plug		363.00	299.95
SP-3 External speaker		65.00	
SP-7 Small external speaker		52.00	
CR-64 High stab. ref. xtal; 751A, etc		79.00	
SM-6 Desk microphone		47.93	
SM-8 Desk mic; two cables, scan		89.00	
AT-500 500w 9 band auto ant tuner		589.00	529.95
AH-2 8-band tuner w/mount & whip		780.00	689.95

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VHF/UHF Base Transceivers

		Regular	SALE
IC-275H 100w 2m FM/SSB/CW	●	$1455.00	1179
IC-475H 100w 440 FM/SSB/CW	●	1665.00	1359
IC-575A 25w 6/10m xcvr/ps	●	1455.00	1159
IC-575H 25w 100w 6/10m xcvr	●	1564.00	1289
IC-1275A 10w 1.2GHz FM/SSB/CW	●	1923.00	1559

VHF/UHF FM Transceivers

		Regular	SALE
IC-229A 25w 2m FM/TTP mic	●	$392.00	319.95
IC-229H 50w 2m FM/TTP mic	●	425.00	349.95
IC-38A 25w 220 MHz FM xcvr	●	409.00	339.95
IC-449A 35w 440FM xcvr/TTP	●	473.00	389.95
IC-1201 10w 1.2GHz FM/SSB/CW	●	831.00	709.95

Dual band FM Transceivers

		Regular	SALE
IC-2410A 25w 2m/440 FM/TTP mic	●	$889.00	729.95
IC-2410H 45w 2m/35w 440 FM/TTP	●	932.00	769.95
IC-3220A 25w 2m/440 FM/TTP mic	●	685.00	569.95
IC-3220H 45w 2m/ 35w 440 FM/TTP	●	727.00	589.95
IC-2500A 35w 440/10w 1.2GHz FM	●	1039.00	829.95

Multi-band FM Transceiver

		Regular	SALE
IC-901 50w 2m/35w 440 FM xcvr	●	$1039.00	829.95
UX-R91A Broad band receiver unit		405.00	349.95
UX-19A 10w 10m unit		311.00	269.95
UX-59A 10w 6m unit.		363.00	329.95
UX-S92A 2m SSB/CW module.		623.00	549.95
UX-39A 25w 220MHz unit		363.00	329.95
UX-129A 10w 1.2GHz unit		571.00	499.95
UX-49A 440MHz module for IC-900		363.00	319.95
IC-970A 25w 2m/430MHz xcvr/ps	●	2409.00	1939
IC-970H 45w 2m/430 MHz xcvr	●	2567.00	2099
UX-R96 50-905 MHz receive unit		405.00	349.95
UX-97 1.2GHz band unit		1039.00	869.95

VHF/UHF Mobile Antenna

	Regular	SALE
AH-32 2m/440 Dual Band mobile ant	$39.33	
Larsen PO-K Roof mount	23.00	
Larsen PO-MM Magnetic mount	28.75	

VHF/UHF Repeaters

		Regular	SALE
RP-1520 2m 25w repeater	●	$2319.00	1909
RP-2210 220MHz 25w repeater	●	1715.00	1409
RP-4020 440MHz 25w repeater.	●	2392.00	1959
RP-4020/50W 440MHz 50w repeater	●	2599.00	2149
RP-1220 1.2GHz 10w repeater	●	2703.00	2229

We stock the entire ICOM line, but due to space limitations some items are not listed in this ad,

Handhelds

		Regular	SALE
IC-P2AT NEW! 2m HT		$421.00	349.95
IC-P3AT NEW! 220MHz HT		421.00	349.95
IC-P4AT NEW! 440 MHz HT		467.00	389.95
IC-2A 1.5w 2m HT • *Closeout*			199.95
IC-2AT 1.5w 2m HT/TTP		247.00	219.95
IC-02AT/High Power 2m	●	333.00	279.95
IC-03AT 2.5w 220 HT/TTP	●	319.00	259.95
IC-2SA 2m HT	●	345.00	279.95
IC-2SAT 2m/TTP	●	372.00	309.95
IC-2SRA 2m/25-905 rx	●	600.00	499.95
IC-24AT 2m/440MHz/TTP	●	492.00	409.95
IC-3SAT 220MHz HT/TTP	●	351.00	289.95
IC-4SAT 440MHz HT/TTP	●	351.00	289.95
IC-4SRA 440/25-905 rx.	●	600.00	499.95
IC-2GAT 2m HT/TTP	●	372.00	309.95
IC-4GAT 440MHz/TTP	●	372.00	309.95
IC-12GAT 1.2GHz/TTP	●	381.00	319.95
IC-W2A 2m/440 HT	●	627.00	519.95

Aircraft band handhelds

	Regular	SALE
A-2 5W PEP synth aircraft HT	$ 525.00	429.95
A-20 aircraft HT w/VOR • *Closeout*	625.00	469.95
A-21 Navicom Plus Aircraft HT	660.00	499.95

For info/prices on HT accessories • CALL

Shortwave Receivers

		Regular	SALE
R-1 100kHz-1.3GHz AM/FM pocket	●	$533.00	449.95
R-71A 100kHz-30MHz rcvr	●	1019.00	829.95
RC-11 Infrared remote controller		71.00	
FL-32A 500 Hz CW filter		69.00	
FL-63A 250 Hz CW filter (Ist IF)		59.00	
FL-44A SSB filter (2nd IF)		178.00	169.95
EX-257 FM unit		49.00	
EX-310 Voice synthesizer		59.00	
CR-64 High stablity oscillator xtal		79.00	
R-72 30kHz-30MHz SW receiver	●	972.00	

Accessories for R-1/R-72/R-100/R-9000 CALL

R-100 100kHz-1.856GHz AM/FM, 12v	●	707.00	579.95
R-7000 25MHz-2GHz receiver	●	1221.00	969.00
RC-12 Infrared remote controller		71.00	
EX-310 Voice synthesizer		59.00	
TV-R7000 ATV unit		139.00	129.95
SP-3 External speaker		65.00	
CK-70 (EX-299) 12V DC option		13.00	
R-9000 100kHz-2GHz all mode rec	●	$5677.00	4599

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The ops at UZ9CWA (front to back): Andy, UZ9CU; Mike, UV9CAF; Alex, UA9CR; and Serge, UA9CGA. First place in the world, multi-operator single transmitter.

SM4RGD	**21**	**4,320**	**51**	**108**	**14**	**25**	**1**
SM4CMG	**14**	**3,096**	**27**	**72**	**15**	**22**	**6**
SM5PPS	28	110	6	11	4	6	0
			SWITZERLAND				
HE7DCQ	**SOB**	**419,512**	**529**	**1279**	**80**	**189**	**59**
HB9CEY	"	74,160	181	412	85	79	16
HE7FMB	"	57,681	165	377	44	92	17
			UKRAINE				
UB4HQ	**SOB**	**265,825**	**460**	**1085**	**65**	**153**	**27**
UB4AR	**14**	**4,968**	**65**	**138**	**6**	**30**	**0**
			YUGOSLAVIA				
YU3MJ	**SOB**	**40,430**	**135**	**311**	**39**	**73**	**18**
YT3HM	**3.5**	**2,184**	**42**	**84**	**5**	**21**	**0**

OCEANIA

			AUSTRALIA				
VK2BEX	**SOB**	**175,778**	**331**	**982**	**46**	**75**	**58**
VK3EBP	**14**	**18,576**	**88**	**258**	**21**	**36**	**15**
VK8BE	14	1,092	26	78	8	6	0
			HAWAII				
AH6IX	**28**	**7,140**	**57**	**170**	**10**	**10**	**22**

SOUTH AMERICA

			ARGENTINA				
LU9DO	**SOB**	**32,630**	**101**	**251**	**44**	**60**	**26**

CHILE							
CE3BFZ	**SOB**	**25,092**	**104**	**306**	**29**	**35**	**18**
COLOMBIA							
HK1LDG	**SOB**	**639,556**	**769**	**2276**	**51**	**93**	**137**
HJ4QIM	**7**	**21,634**	**129**	**373**	**8**	**11**	**39**
HK4EGW	**14**	**19,320**	**96**	**276**	**16**	**24**	**30**
PARAGUAY							
ZP5JCY	**28**	**235,884**	**599**	**1787**	**23**	**57**	**52**
ZP6CW	**21**	**770**	**20**	**55**	**6**	**7**	**1**
VENEZUELA							
4M5RY	**21**	**242,858**	**533**	**1577**	**27**	**79**	**48**
YV6A	**28**	**146,856**	**425**	**1266**	**19**	**43**	**54**
						(Opr. YV6PM)	

MULTI-OPERATOR SINGLE TRANSMITTER

ASIA

ASIATIC RUSSIA							
UZ9CWA	**MOS**	**1793,925**	**1205**	**3417**	**118**	**313**	**94**
JAPAN							
JJ3YBB	**MOS**	**184,756**	**307**	**884**	**58**	**116**	**35**
KAZAKH							
UL7MU	**MOS**	**24,055**	**104**	**283**	**30**	**53**	**2**
MONGOLIA							
JT1T	**MOS**	**50,688**	**240**	**576**	**28**	**55**	**5**

EUROPE

AUSTRIA							
OE3XCW	**MOS**	**581,571**	**622**	**1611**	**82**	**195**	**84**
BALEARIC ISLANDS							
EA6ZP	**MOS**	**387,346**	**553**	**1322**	**57**	**159**	**77**
BULGARIA							
LZ2KIM	**MOS**	**761,374**	**829**	**1913**	**83**	**225**	**90**
CZECHOSLOVAKIA							
OK3RJB	**MOS**	**141,904**	**298**	**724**	**52**	**96**	**48**
EUROPEAN RUSSIA							
UZ6LWZ	**MOS**	**62,592**	**220**	**489**	**42**	**86**	**0**
FRANCE							
FF6MN	**MOS**	**89,775**	**282**	**513**	**54**	**121**	**0**
FF6KRJ	''	50,318	144	362	39	72	28
GERMANY							
DL0GK	**MOS**	**557,418**	**614**	**1523**	**86**	**205**	**75**
KALININGRAD							
UW2F	**MOS**	**1,524,978**	**1172**	**3087**	**108**	**275**	**111**
MOLDAVIA							
UO4OWQ	**MOS**	**162,450**	**423**	**950**	**38**	**114**	**19**
POLAND							
SP3PLD	**MOS**	**102,564**	**217**	**518**	**57**	**121**	**20**
UKRAINE							
UB4LWC	**MOS**	**100,464**	**265**	**598**	**49**	**111**	**8**
YUGOSLAVIA							
YT3T	**MOS**	**670,179**	**703**	**1759**	**77**	**211**	**93**

NORTH AMERICA

ALASKA							
NL7DU	**MOS**	**37,905**	**157**	**361**	**26**	**15**	**64**
ANTIGUA & BARBUDA							
V2/G0AZT	**MOS**	**1,680,607**	**1577**	**3743**	**78**	**180**	**191**
CANADA							
VE7ZZZ	**MOS**	**755,895**	**1014**	**2191**	**61**	**110**	**174**
VE3UR	MOS	71,478	195	418	35	53	83
UNITED STATES							
WA7EGA	**MOS**	**899,000**	**1147**	**1798**	**91**	**192**	**217**
W4AQL	''	492,415	816	1279	78	135	172
KY1F	''	443,300	750	1364	55	111	159
N6RZ	''	363,240	639	1009	73	111	176
WF1B	''	283,927	499	863	58	122	149
N5NMX	''	99,225	289	441	49	67	109
K4MF	''	89,024	228	428	44	76	88
W8BI	''	87,730	269	566	34	72	49
WN1G	''	86,319	271	417	42	68	97
WA5FAC/4	''	32,634	115	259	37	56	33
NF1J	''	12,384	73	144	26	15	45
NY2U	''	11,650	101	233	21	24	5
KA3DSX	''	1,440	31	36	9	9	22

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CHECK LOGS: I2HWI, EA3GDH, UA3DLD, VE7DTA, UB5CDV, CT1CKP, EA3GGR, SM6BSK, SM5EIT, EA3GCT, HK6HFY, I2HEO, C6AAA.

CQ REVIEWS:

The Ten-Tec Delta II Transceiver

BY LEW McCOY*, W1ICP

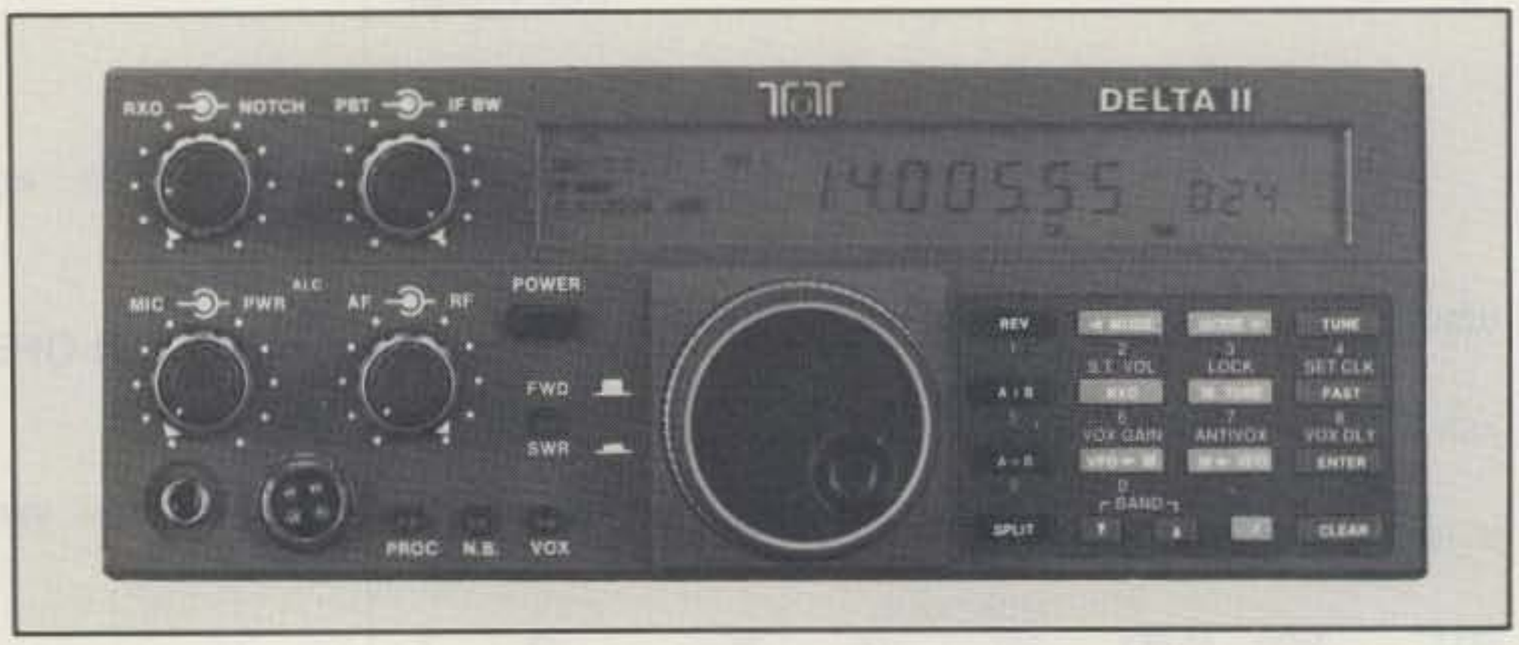
One of the eagerly awaited transceivers has been the Ten-Tec Delta II. Basically, this American-made unit is a 100 watt output, solid-state transceiver that covers the 160 through 10 meter bands as a transmitter, with a receiver that goes from 100 kHz to 29.999 MHz.

Living in New Mexico has certain advantages. Some of the finest testing labs in the world are here, and naturally they have many amateurs working in the labs. I have two or three extremely knowledgeable amateur friends who work in these labs, so I took a chance and lent them the Delta II to put it through its paces. Before going further, I have to note that there have been reviews on this unit in other publications. One in particular was not very kind. In fact, I would have called it a nit-picking review.

After receiving the Delta II, I did several months of operating with the transceiver. The first thing that surprised me was the number of unsolicited reports received concerning the transmitter audio quality. In a few cases I told the contacted station what I was using, but in 90 percent of the cases I did not. In nearly every contact the other station praised my audio quality as to its crispness and ability to get through. Needless to say, this impressed the heck out of me because it isn't something an amateur encounters in the normal course of events.

Let's first look at the specs. The transceiver measures 3.75 inches high, 9.75 inches wide, and 14 inches deep. Frequency control is a microprocessor-controlled phase locked loop with 10 Hz resolution. The frequency readout is a 7-digit backlit LCD, and the dial also displays time (built-in clock), memories (32 simplex and 16 duplex), modes, and a bar-type S meter. If I were going to complain, frankly I would have preferred the old-fashioned type meter, but then I am old-fashioned about some things.

In the good old days (whenever that was) I use to talk about backlash, drift, stability, selectivity, and so on. These faults are something not worth mentioning anymore, but transceiver manufacturers still like to put them in their specs—in this case, frequency stability, worst case, one part per million per degree centigrade at 29.999 MHz(!). Frequency stability is plus or minus 100 Hz (cycles) at 25 degrees centigrade. In simple English, this means when you turn the transceiver on from a cold start, there is no discernible drift.



Front view of the Ten-Tec Delta II transceiver.

Transmitter Specifications

The output impedance is 50 ohms, and the transceiver will tolerate an SWR of 2 to 1 before the circuitry starts to shut down the output to protect the final amplifier. Power required is 1 ampere on receive and 20 amperes on transmit at 13.8 volts DC. The power supply is not built in. Total weight of the transceiver is 12 pounds 7 ounces.

The transmitter is capable of upper sideband, lower sideband, CW, RTTY (AFSK), and FM. TR switching is VOX or PTT. There is an internally generated sidetone for CW work which can be adjusted for volume from the front-panel keypad. Carrier suppression for sideband is specified as 50 dB typical, and unwanted sideband suppression is more than 45 dB with a 1.5 kHz tone. All spurious is more than 45 dB down below peak power output. The meter reads switchable forward power, SWR, and is also the S meter.

Receiver Specifications

Table I (from the instruction manual) shows the specs for sensitivity and selectivity. Selectivity is achieved by the use of an adjustable 8-pole ladder-type filter that is adjusted from the front panel for a bandwidth of 2.5 kHz to 500 Hz. Needless to say, this patented circuit eliminates the need for additional filters so common (and expensive) for most transceivers. More about this later. The intermediate frequencies used: the first IF is 45 MHz, the second is 6.144 MHz, and the third is 450 kHz (FM). Image rejection is better than 80 dB and IF rejection is 70 dB.

The S meter is switched when the transceiver goes from transmit to receive, and the meter is calibrated at S9 with 50 microvolts signal input. The noise floor is rated at minus 129 dBm (0.25 uV for plus 10 dB s/n in SSB). The pass-band tuning is plus or minus 2.5 kHz, digitally controlled, and the notch filter is 250 to 2.2 kHz 50 dB notch typical. Receiver offset is plus or minus 1.27 kHz (plus or minus 2.54 kHz when FAST is enabled). Audio output is 1.5 watts at 4 ohms. In my tests I found that the Delta II met or exceeded all the manufacturer specifications. One problem, if one were to consider it a problem, is that the squelch level is not controlled from the panel, but is an adjustment that is made internally. However, I would consider this a small complaint.

The manual that is provided with the Delta II certainly deserves some praise. It is an approximately 90-page book, complete in every detail. The first chapter discusses installation, and chapter 2 goes into operating instructions. Chapter 3 is operating hints, while chapter 4 covers circuits and technical details. It is extremely well written, complete with circuit board photographs plus circuitry. In fact, a knowledge-

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	Normal	Normal Shifted
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AM	50 Hz	500 Hz
	Fast	Fast Shifted
CW/USB/LSB/FSK	50 Hz	100 Hz
FM	500 Hz	500 Hz
AM	50 Hz	500 Hz

Table I- This table from the manual shows the various tuning rates and speed shifts as the tuning rate automatically changes.

able amateur could conceivably do his own trouble-shooting from the manual. However, this brings up an important point.

It has been my custom to ask manufacturers about service—what can the buyer expect, turn around time, etc. I would be less than honest if I didn't state that many manufacturers tend to stretch the truth. I have heard many, many complaints about equipment service provided by manufacturers and dealers. However, Ten-Tec states that five working days is normal turn around time. In talking to amateurs who own Ten-Tec equipment and have had service, I hear nothing but praise. A couple of other points are certainly worth touching on. The radio uses circuit boards that are screwed on or simply mounted on a subchassis. All connections are via cables. I have been informed by Ten-Tec that in the case where you *know* which board has a problem, they encourage you to call or write so they can send a replacement board. Ten-Tec *does not* void warranties if you go inside the radio. In any case, this information is certainly worth passing on.

When I received my review unit, I naturally hastened to put it on the air—with a woeful lack of the manual study. To be honest, I was anxious to try out the variable crystal ladder filter. The idea of having variable selectivity was intriguing, to say the least. In the CW and SSB modes the receiver selectivity is established by the Variable Bandwidth Crystal Filter. Fig. 1, from the service manual, is the circuit of the filter. Each variable bandwidth filter unit is a varactor tuned 4-pole ladder filter. Two of these units are connected in cascade with an amplifier between to provide 8 poles of variable bandwidth. The receiver selectivity is continuously variable from 500 to 2500 Hz bandwidth (–6 dB) with a constant 8-pole response.

Referring to fig. 1, all crystals and varactor diodes are identical. C1, C2, D1, and L1 form a variable impedance matching network which transforms the natural impedance of the filter end section to 50 ohms for all bandwidths. Varactor diodes D2, D3, and D4 form the shunt capacitors of the ladder network. Factory-set potentiometers R1 through R5 select the proper portion of the bandwidth control voltage for each varactor diode and compensate for the small parts tolerances and manufacturing variations.

In use, I found that the filter took a little time to get used to, particularly in going from SSB to CW. I happened to work another amateur who had just purchased a Delta II. He told me that it was his experience up to that point that the filter, when used in the sharpest position on CW, knocked the receiver gain down slightly. I found that the filter took getting used to; it took a little time to become familiar with proper settings. I know he is reading this review, so I will take this opportunity to pass on to him that I didn't find the gain going down, once I had the pass-band tuning and the IF bandwidth set properly. I would rate this new method of selectivity very highly. I now find it very easy to knock out QRM, and to me the system is a real plus.

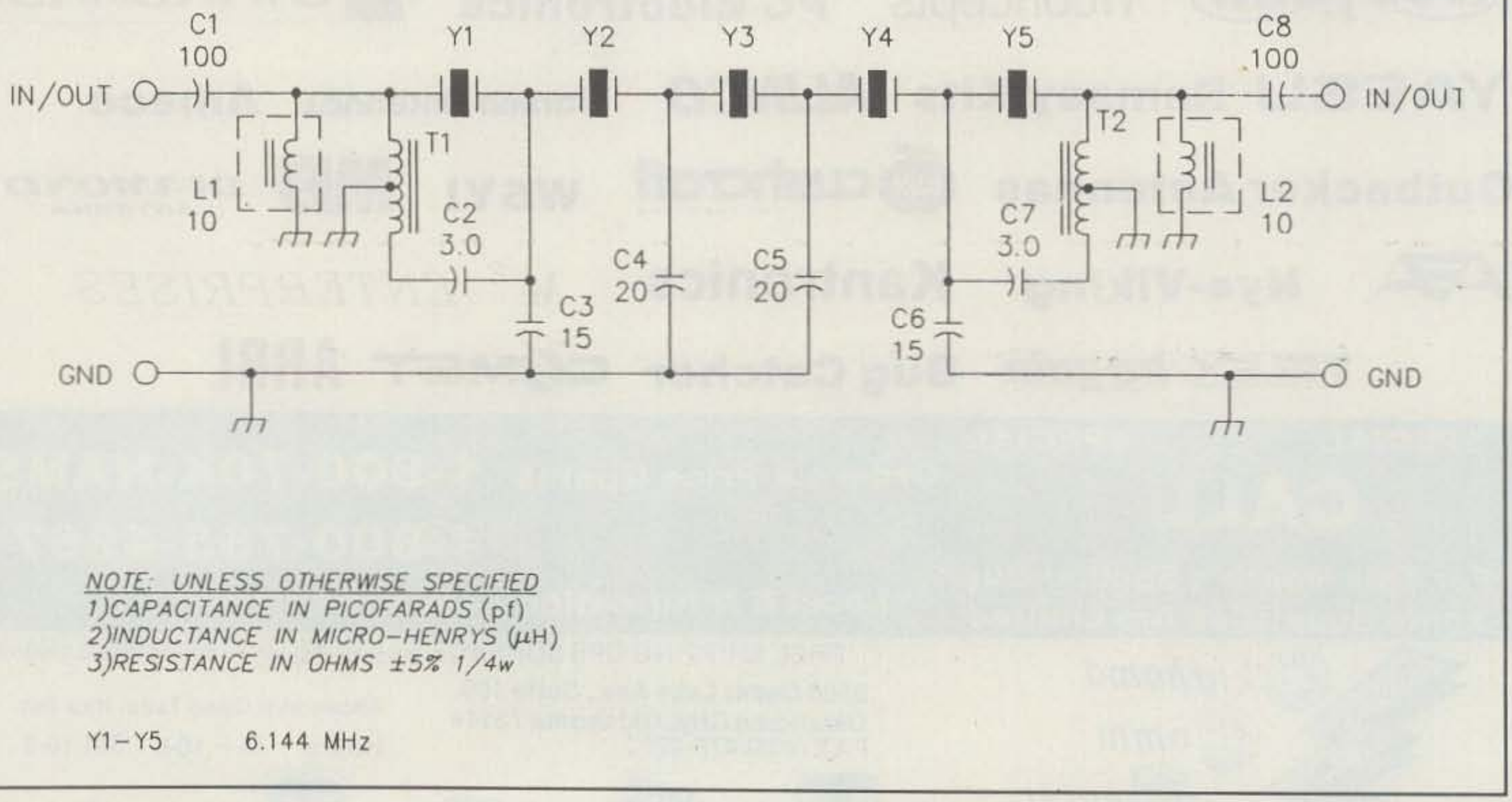
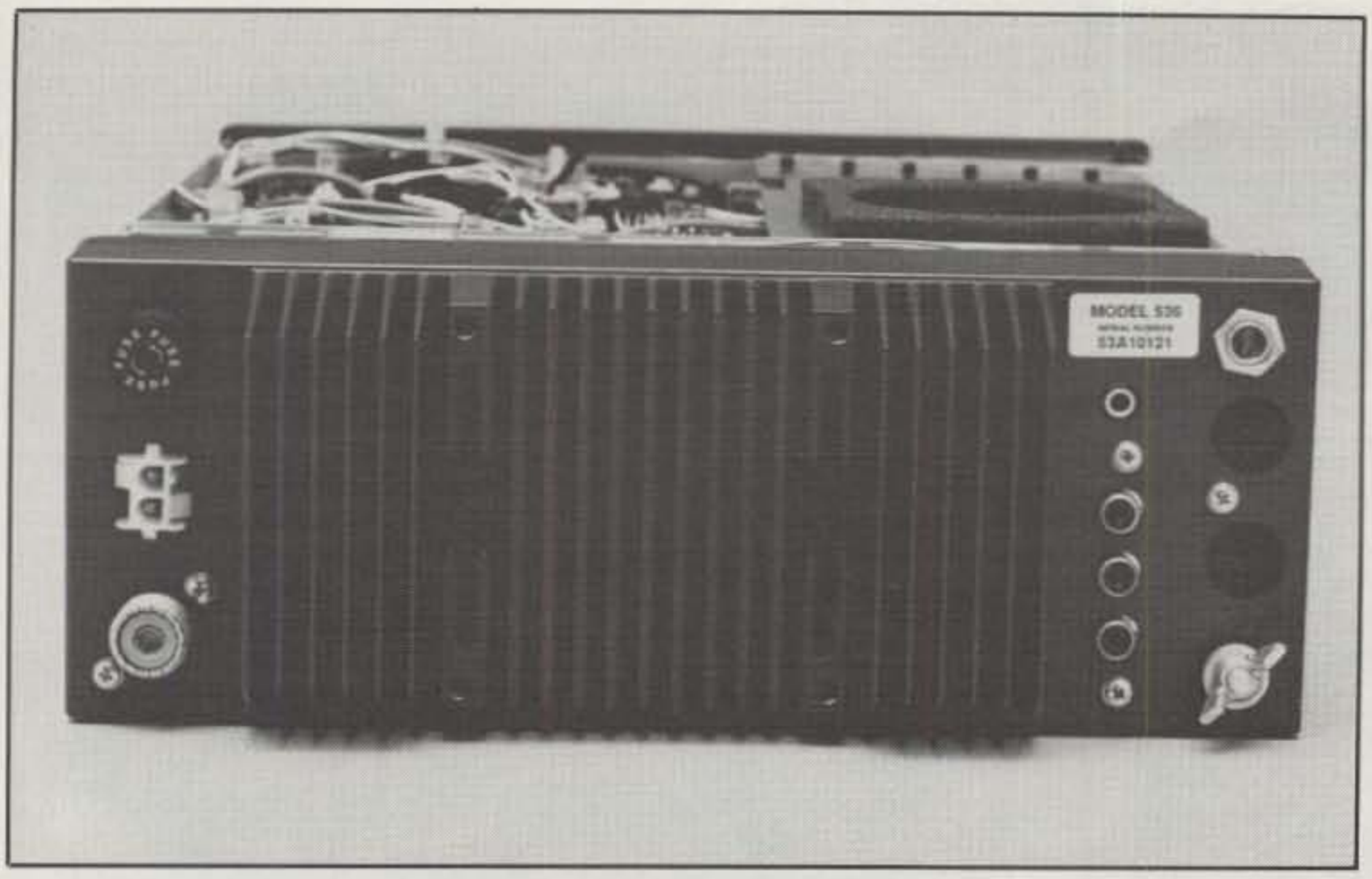


Fig. 1- The circuit diagram of the Jones variable bandwidth crystal filter, which is the heart of the receiver selectivity.



Rear view of the Delta II.

Memories

There are 48 total memories available—32 simplex and 18 duplex. These are available and installed via a front-panel keypad. The keypad has 16 dual control push buttons. This brings us to the most important function of any receiver—tuning it. There are several methods of tuning the receiver, the main tuning knob being the primary method, particularly within a band. The tuning knob is adjustable, so you may select the desired amount of drag or tension. This is a feature not found in many transceivers.

Except for AM and FM modes, the tuning increment is in 10 Hz steps, and each revolution of the tuning knob provides approximately 5 kHz of travel. But again Ten-Tec has introduced a neat feature. If you rotate the tuning knob faster, the tuning rate increases. Table I from the manual shows you this increase. Even faster tuning rates can be selected from the keypad, which increases the tuning steps to 50 kHz and provides about 25 kHz per revolution. Still another tuning feature is that in mobile operation, once a desired frequency is selected, a keypad sequence provides a LOCK so that even if the tuning knob is bumped, the frequency holds.

Still another method of tuning is available for moving within a band rapidly or shifting bands. This is available from either of two UP or DOWN buttons. These keys move the tuning rate to 100 kHz steps or in 1 MHz steps, or by bands, if desired. Still another tuning method is via the keypad by entering the desired frequency through the numbers 0 through 9. You can see why I give the Delta II such a high rating. Ten-Tec gave a lot of thought to the way American amateurs operate and designed these valuable features into the transceiver.

As would be expected, receiver offset tuning is also available via the RXO button on the keypad. The transceiver can be tuned either above or below the transmit frequency by up to 1.27 kHz or 2.54 kHz in the fast tuning mode.

The mode is selected via two buttons **Mode** < >. These buttons scroll through FM, AM, LSB, USB, and CW. The mode in use is displayed on the LCD readout. Still another neat feature is receiving CW and being zero beat with the station you are working.

In CW receive there is a factory-programmed offset of 700 Hz programmed into the VFO. This causes the received signal at the displayed frequency to generate a 700 Hz note for the operator to copy. To help the operator judge when the received signal has been tuned to 700 Hz, the built-in sidetone oscillator has also been preset to 700 Hz. Pushing the **Rev** button momentarily keys the sidetone oscillator and allows the operator to match the received signal tones to the pitch of the sidetone. Pretty neat, hey?

There is also a **Tune** button that provides an easy way to generate a CW key down condition. The transmitter will output a carrier that is controlled by the PWR control.

The transceiver has two VFOs. These can be used separately or in a split mode. The A/B button toggles the control of the transceiver between A and B VFOs. Each VFO works independently. Changes made to one VFO do not affect the other. Split operation gives the user the freedom of receiving and transmitting on different frequencies. (Even the mode of operation can be different between receive and transmit.) To enable split operation you push the **Split** button and the hidden VFO will then control the transmitter frequency and mode. It is simple to preview the hidden transmitter by pushing the **Rev** button. This calls up the hidden VFO so that the operator can monitor or change frequencies.

Still another neat feature is the scratch pad. You push the **VFO** >button twice. This puts the frequency into "quick" memory and marks the spot if you want to return to that spot on the band frequently.

I am not going to go through the storing of frequencies, etc., in detail, as those steps are conventional. However, there is a **Memory Tune** button worth mentioning. When activated, this button recalls the memory locations one at a time via the main tuning knob. Also, there is a **Memory Scan** tuning button that will scan the memories.

There are several keypad functions not found in many transceivers. For example, the sidetone level is set by pushing the function button **F** and **RXO**. This will key the sidetone and let you adjust the level by using the up and down keys. Similar keypad methods are used to set the VOX and ANTIVOX.

Another feature is a built-in 24 hour clock that uses a 32 kHz watch crystal and is powered from a lithium battery. The keypad is used to set the clock.

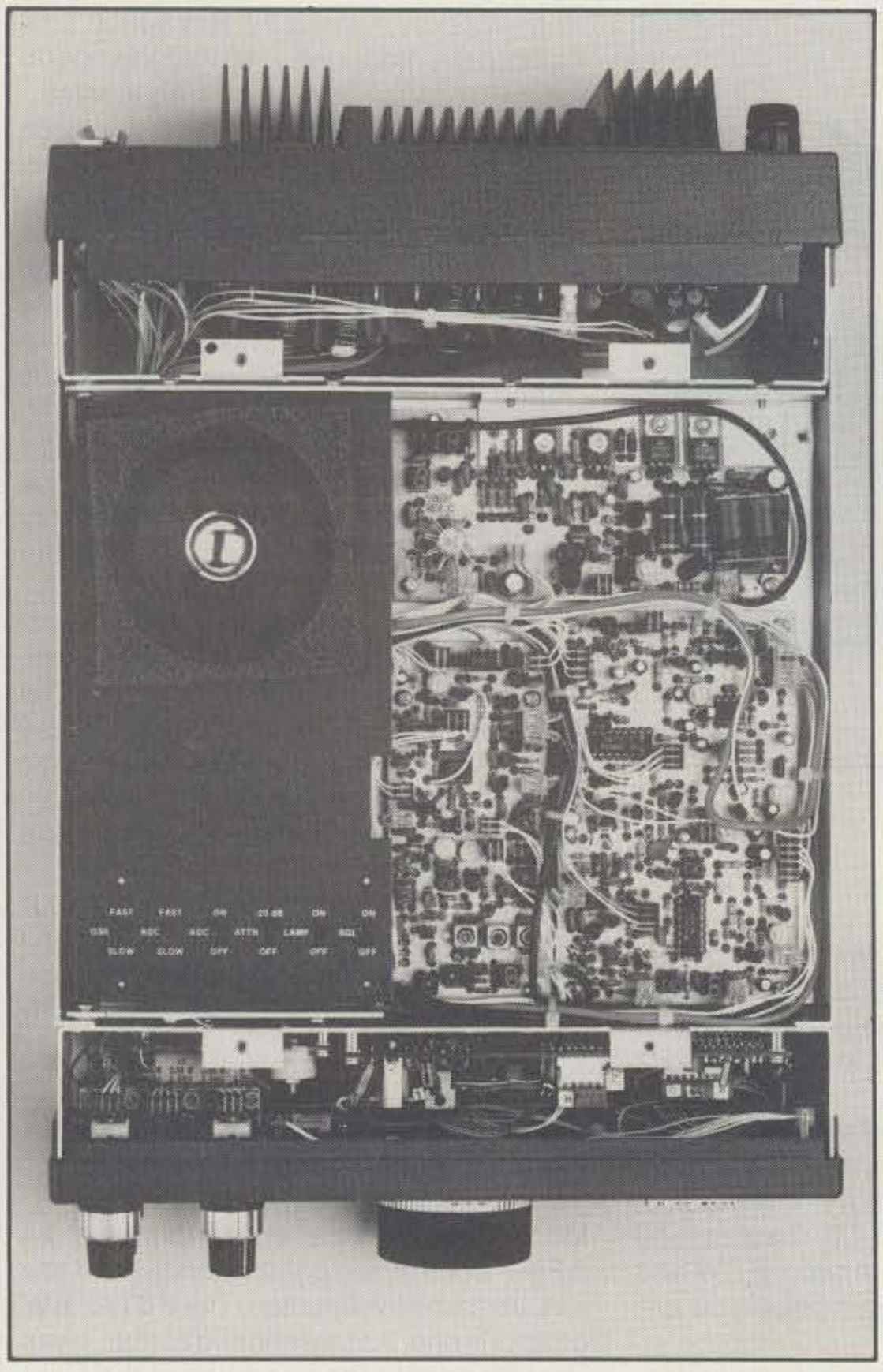
Front-Panel Controls

Many of the front-panel controls, such as **AF/RF** control, are conventional, but a few require some explanation. The **PBT/IF BW** control is one. As I mentioned earlier, I was impressed with the operation of the eight pole filter. The **IF BW** control sets the IF bandwidth from approximately 500 Hz (fully counterclockwise) to 2500 Hz (fully clockwise). In the LSB mode, rotation of the **IF BW** control will continually reduce the high-frequency response. The audio frequency response will be approximately 200 to 700 Hz. When the transceiver is in the USB mode, rotation of the control will continually reduce the low-frequency response.

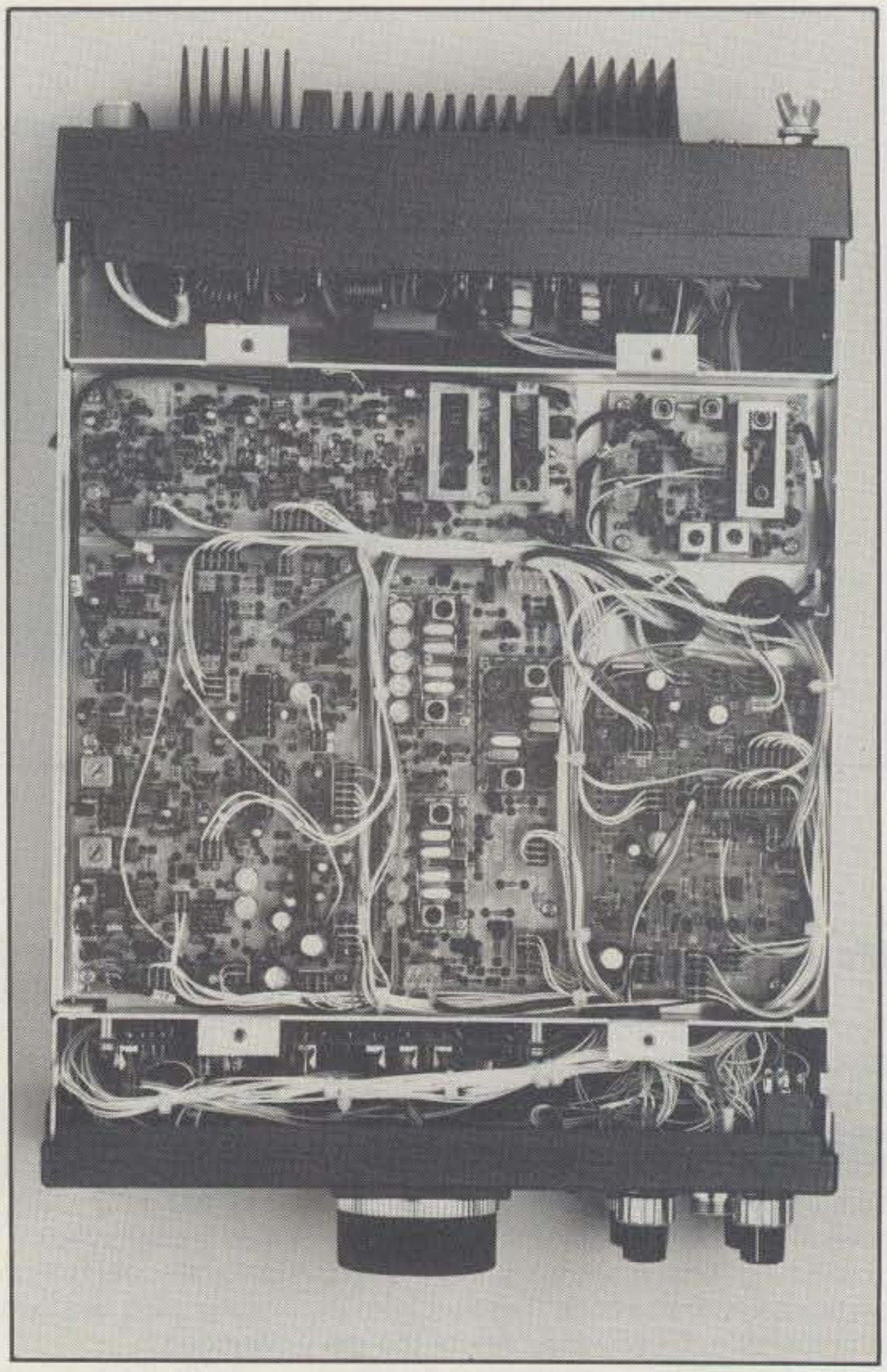
The position of any filter bandwidth in any mode with respect to the BFO may be set by the **PBT** control. For instance, if there is any high-frequency interference, such as splatter, when you are on LSB, you can remove the interference by either rotating the **PBT** control slightly counterclockwise or by rotating the **IF BW** control slightly counterclockwise. As I stated at the outset, this control takes a little getting used to, but it certainly is a beauty once you become familiar with it.

The **RXO Notch** control adjusts the center frequency of the audio notch across the passband. The notch depth is at least 50 dB and will of course reduce carrier interference by this amount or more.

There is a **MIC/PWR** control—conventional—and a **PROC** switch for activating the speech processor. As I stated at the be-



The Delta II as seen from the top with the cabinet removed—lots of components.



This is the bottom of the transceiver.

ginning, I was very impressed with my audio quality reports and made many tests with the processor in and out. Listeners, without exception, lauded the quality.

There is the **FWD/SWR** meter switch which selects the function of the bar graph meter during transmit. In the **FWD** position the meter indicates output power with full scale equal to 100 watts output. In the **SWR** position the bar graph indicates reflected power.

The VOX switch selects either the **VOX** (voice operated relay) or **PTT** (push-to-talk) mode for keying the transmitter. The **Noise Blanker** is another switch for putting the blanker in or out. I tested this in a mobile setup on 10 meters and it proved very effective for eliminating ignition noise.

There are some top-panel switches such as the QSK **Fast/Slow.** This switch controls how quickly the receive audio recovers after a transmit condition. The **Fast** setting gives full QSK break-in operation. The **Slow** setting keeps the receiver muted for approximately one second after key up. Another top-panel switch is the **AGC Fast/Slow On/Off**. Still another switch is the **ATTN –20 dB On/Off**. This switch will permit attenuator use when in the presence of strong signals. There is also a **Lamp** switch for back light for LCD display. Last is the **SQL On/Off**, which controls the squelch—only active in the FM mode.

On the back panel are antenna connector (SO-239), fuse, key jack, auxiliary DC, ground post, and a J-3 serial interface port. A Model 305 Level Converter is required to interface the Delta II to an RS-232 computer port.

Conclusions

I could have run a block diagram or circuit diagram in this review, but the transceiver is too extensive and such material would be difficult to see or read. As you can gather from this review, I was impressed with the Delta II. It is a very fine transceiver, and I certainly wouldn't hesitate recommending it. Equipment these days has become very, very complicated. I can guarantee it takes more than an Extra Class amateur to service any of these new transceivers. It is easy for a manufacturer to say that they will service a piece of equipment in five working days, but in all honesty, I have found this really an exception, not a rule. Not with Ten-Tec.

Ten-Tec has a one-year warranty guarantee on their equipment—for the original purchaser. They also have a department for customer service that is a real pleasure to deal with. The transceiver requires 12.5 volts at 20 amperes. Ten-Tec has a matching power supply, the Model 936, which sells for $199. This supply offers a secondary level of protection to the transceiver. The power supply will shut itself down when the current demand exceeds a predetermined safety level. Another option worth considering is the Model 303 fan kit, which sells for $25. The thermostatically controlled fan comes on during prolonged key down operation when heat builds up.

The Delta II is in the $1400 price class and is made by Ten-Tec Inc., Highway 411 East, Sevierville, TN 37862. CQ

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WB2AQC combines family vacation with his favorite hobby. George shares his travel experiences with us and introduces us to some of the amateurs of Puerto Rico.

Puerto Rico

Sun, Fun, and Amateur Radio

BY GEORGE PATAKI*, WB2AQC

The Commonwealth of Puerto Rico is a small tropical island about 100 by 35 miles (165 by 56 km) located east of Hispaniola (Haiti and the Dominican Republic) between the Atlantic Ocean at the north and the Caribbean Sea at the south. Its population is over 3.3 million. The official language is Spanish, but english is widely spoken.

Visiting the Island

Over the years I've been to Puerto Rico several times, despite the fact that I prefer to travel to different places instead of returning repeatedly to the same area. In my family there are four licensed radio amateurs: my wife Eva, WA2BAV; our daughter Diane, KB2KLV; our son Tom, KB2KRN; and myself, WB2AQC; and we all like to travel.

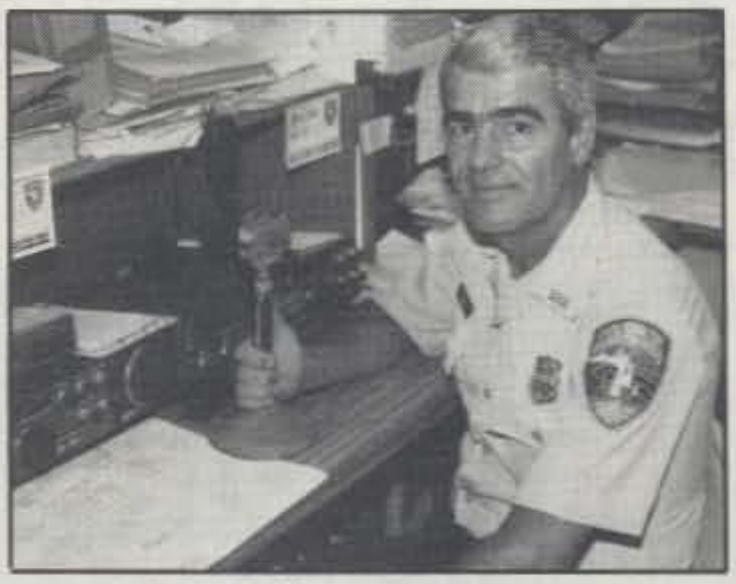
At first, San Juan, the capital city, was only the starting point for island-hoping tours. Between the landing of our plane and the departure of our cruise ship there was just about enough time to see a small part of the picturesque Viejo San Juan. It was enough to make us decide to return for a longer stay.

Later when we came back we explored most of the points of interest highlighted in travel books. We took long walks through the narrow streets of the old city, visited art galleries, boutiques, and gift shops; went to see historical sites such as San Felipe del Morro, San Cristobal and San Jeronimo fortresses; places of worship such as the San Jose, the second oldest church in the Western Hemisphere, and the San Juan Cathedral, which holds the remains of Juan Ponce de Leon, the famous explorer. Several small but interesting museums attracted our curiosity: the Museum of the Seas, the Museum of Latin American Prints, the Pharmacy Museum, the Pablo Casals Museum, the Book Museum, the Indian Museum, and several others, all located close to one another. The Fine Arts Museum, during all the years we went to Puerto Rico, was always "temporary closed for renovation." The numerous arts and crafts galleries, however, were there as compensation for art lovers. Many beaches usable year-round attract numerous visitors from the continental United States, Canada, Europe, etc.

All of the above and many more are the main points of interest in Old San Juan. It is said "New York City is not the United States," meaning that while there is much to see and do in the Big Apple, there is much more to experience in the rest of the country. Similarly, it can be paraphrased "Old San Juan is not Puerto Rico." Even the greater metropolitan area, including Santurce, Miramar, Hato Rey, Rio Piedras, the hotel districts of Condado and Isla Verde, and all the surrounding towns and barrios are different from the old city, and to a certain extent from each other. The rest of the island is also different from the capital city and is well worth visiting.

We took several tours, visiting other cities as well as the countryside. One tour took us to Ponce, located on the southern side of the island, on the shores of the Caribbean Sea. This town houses the richest art museum in the area with over 1500 paintings and sculptures, from classics to contemporary art. Another tour went around the island on a coastal route through Bayamon, Arecibo, Aguadilla, Mayaguez, La Parguera, Ponce. Then crossing north through the Cordilliera Mountains, via Caguas, we returned to San Juan. An interesting trip was through El Yunque rain forest to Luquillo Beach. Several times we went snorkeling around Icacos and Palominitos Islands, off the coast of Fajardo, on the eastern tip of Puerto Rico.

I mentioned above just a few of the things one can see and do on this island



Angel, WP4FHR, at the rig located in his office at the police station.

Here's Jose, WP4IIW, waving to us from the tower in his backyard.

*84-47 Kendrick Place, Jamaica, NY 11432

Here are four out of the seven members of the Cruz family who are licensed amateurs. Seated is Victor, KP4NM, and standing left to right are Ivette, NP4VP, Genaro, WP4HLQ, and Alejita, NP4TQ.

not to create publicity, but to show that it has more attractions than just amateur radio. I have enjoyed all of these, but I have to say that I had more fun visiting local amateurs, operating their stations, and having long discussions about rare DX.

Hamming in Puerto Rico

At home in New York I operate 10 through 80 meters. I do not use my 2 meter FM HT because I really don't want to talk to somebody living 10 blocks away from me. I am more interested in adding a new country to my DXCC, getting a new oblast, or just inquiring if it is raining on the plains of Spain. There is nothing wrong with ragchewing on the 2 meter band, just as there is nothing wrong with broccoli, but I don't like either one. We, Georges, can say that.

When I travel, however, I always take my 2 meter rig with me. I used it on a cross-country bus trip through Canada; in a country that used to be the Soviet Union; and in Puerto Rico. I used it from hotel rooms, near swimming pools, parking lots, roof tops, outdoor restaurants, park benches, walking on the streets, in marketplaces, on sky trams, inside shielded inter-city commuter buses and open sightseeing buses, on ferry boats, snorkeling boats, on uninhabited islands, etc. What I won't do at home, I overdo while traveling.

This happy amateur is Jorge, KP4GC.

As a visiting amateur radio operator, while using my 2 meter rig I got in touch with many local amateurs, met and visited a number of them, and many have visited me.

From the 12th floor open corridor of my hotel I had a wide view of all of San Juan, and even farther south I could see the mountains. Thus, it was an ideal position for hamming. I made many QSOs this way; some of the amateurs I contacted were driving by, just a few blocks from my location, while the repeaters we were using were far away. Those who had time and found parking in the congested area of Condado stopped by to see me. Jose, WP4INK, and his wife Elba, WP4XK; another Jose, KP4NU/M, with his wife and baby; and many others paid friendly visits. Thanks to the large number of repeaters I talked to people located in various points throughout the island. One day while sitting near the hotel's swimming pool with my daughter Diane, KB2KLV, we talked with Tony, KP4QU/MM, who was relaxing on his 40 foot sailboat, on the Caribbean Sea, southeast of Puerto Rico.

In a similar way I met Victor, KP4NM, of Bayamon. He was driving his van when we had our first QSO. Later that evening he came to my hotel with a couple of amateurs and we talked for half the night. The next day he took my daughter Diane and me to his house. I was boasting that in my family there are four radio amateurs. I found out, however, that in Victor's family there are seven licensed amateurs: his wife Alejita, NP4TQ; daughters Ivette, NP4VP, and Ileana, WP4EK; as well as sons Ivan, NP4UD, Miguel, WP4FAC, Genaro, WP4HLQ, and himself, KP4NM. They have a very good station with plenty of equipment and a three-element Yagi. I operated his station, working many of my European friends. Victor's 2 meter rig is almost constantly on, so while he is on the road, his wife Alejita can track down his every movement.

While in Puerto Rico my daughter Diane was studying to upgrade her license. Victor took her to a VE session where she passed the test. Now she has an Advanced license.

Victor, KP4NM, took me to a friend of his, Angel, WP4FHR, who is a police officer in charge of community relations. Angel has two complete stations, one in his house the other in his office at the police station where he can monitor what is going on, and if necessary he can intervene in any overheated discussion. During my latest trip to KP4-land Angel and his "Atlantic Group" organized a Christmas party for the members and their families. Victor and I were invited, and I made a slide presentation "Visiting the Soviet Amateurs" based on my recent visit to various U-republics. In the meantime I got the idea that with all the photos I was taking, I could make a similar slide presentation "Visiting the Puerto Rican Amateurs" to be shown in various radio clubs in and around New York City.

At the Christmas party I met a lot of amateurs, but I always had difficulties with their names. According to Spanish custom most of them have in addition to their first name, one or two middle names, their father and mother's names, and sometimes even some extra names showing the family's origin. Once I met a man named Don Francisco Antonio Manuel Hernandez de Santa Cruz, but luckily everybody called him Paco. Married women carry also their husband's name. One was called Dona Maria Magdalena Gonzalez de Fernandez y Rodriguez; fortunately she was called Mimi.

Victor, KP4NM, took me to Guaynabo to see Ramon, KP4FW, a war veteran who left an arm and leg in Korea. Despite his handicap, Ramon is an excellent specialist in electronics. He repairs all kinds of amateur radio equipment, runs and maintains a repeater in his home, and climbs up and down his very tall towers holding his communication antennas.

We also visited Giovani, WP4IWI, in Bayamon, the second largest city in Puerto Rico. Giovani used to be a policeman, but

No, it's not a fiddler on the roof, it's Raul, KP4QL, checking out his antenna farm.

due to a shooting accident in the line of duty, he is confined to a wheelchair. Special devices are attached to his rig so he can operate it with his very limited mobility. He is active in nets and his friends visit him often.

At the Atlantic Group Christmas party I met Jose, WP4IIW, whom I knew from previous visits to the island. He is studying Telecommunications (radio and TV) at the Sagrado Corazon Catholic University. Jose received his Novice license in May 1989, and by the end of the following year he had earned his Extra class ticket. He is one of the relatively few Puerto Rican amateurs operating on CW, and he answers all QSL cards he receives. He is always involved in various technical projects, and when I visited him he was doubling the height of his tower, which supports a four-element tribander. I reminded him of the old amateur radio saying "If your antenna did not fall down during the last storm, it was not high enough." During my stay in San Juan I kept in touch with Jose, and he took me to several of his radio operator friends.

The first to visit was Willy, KP4DJ, in Rio Piedras. Willy is of Austrian descent; he was first licensed in 1928 as a "Class B" operator. He likes CW and regularly copies and distributes the ARRL DX bulletins to all those who are not that good in telegraphy. The vast majority of the Puerto Rican amateurs use voice communications: FM on the 2 meter band and SSB on the lower frequencies. They may study the Morse code to pass a higher class examination, but soon after the dihs and the dahs are forgotten much faster than they were ever learned. Willy co-founded in 1939 the still very active Puerto Rico Amateur Radio Club, and for many years he has been the "Elmer" to countless numbers of young amateurs.

With Jose I went to see Luis, WP4EPC, also in Rio Piedras. Luis is the ARRL section manager for Puerto Rico and is involved in many diferent activities; his services rendered to the community by passing messages during the disaster caused by hurricane Hugo were appreciated and recognized with numerous certificates. He is one of the net controllers for the 28.450 MHz net of the Puerto Rican Amateur Radio Club, Sundays at 1300 UTC. He is on packet, works in contests, etc.

While in the neighborhood in Rio Piedras, we visited Ernesto, KP4AAA, who was first licensed in 1949. His tall tower and big antenna dominate the quiet street with low, one-story houses. Ernesto was a customs inspector and retired after 47 years of service. He enjoys experimenting with antennas and ragchewing on 15 and 20 meter SSB. Ernesto does have QSL cards, as every amateur I visited has. I emphasize this because the general feeling in the amateur radio fraternity is that amateurs in this region, despite their firm promises to confirm their QSOs, don't even have cards. I testify under oath that virtually every KP4, NP4, and WP4 amateur who works on lower frequencies does have QSL cards. They may not part with them easily, but they certainly have cards. In one instance, when I asked a WP4 amateur if he has QSL cards he answered indignantly to such a question, "Of course I have QSL cards. What do yo think I am? A CB operator?" Then he looked for 15 minutes all over his house until he found a package, unopened, just as it came from the printer. He wanted to give me one for a previously unconfirmed QSO, but he ruined three of

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them until he filled one out right. All he needed was a little practice.

Next to visit, also in Rio Piedras, was Ernesto, KP4EIH, better known as Ernie. He started in amateur radio in 1974. Ernie used to work in several other countries such as Haiti and the Dominican Republic and operate from there. He is an avid QRP CW operator, homebrewer, and antenna experimenter. He is active in the AMSAT Puerto Rico group and acts as its net manager. He operates CW on Oscar 13 with a 27-element antenna in the AP-link and 11 elements in the down-link and is the editor of the AMSAT-PR newsletter *The Transponder*. He also works DX via tropo and T.E. propagation on 2 and 6 meters. Ernie is on Packet Radio NTS traffic handling via the World Wide Uplink Network.

Jose, Ernie, and I went to see Raul, KP4QL, the vice-president of the Puerto Rico Amateur Radio Club. He has his callsign, in big letters, affixed right on the front wall of his house. His wife, Teresa, is WP4JFY. His large tower and his big antenna dominate the block in his residential neighborhood in Trujillo Alto. Raul edits the club's newsletter, *Onda Terrestre*, is active in MARS, and is often on the 10 meter band giving out his 10-10 number.

The last one to visit was Jorge, KP4GC, in Trujillo Alto, located southeast of San Juan. Jorge, or George in English, has an Extra class license and works DX on the lower frequencies, but can be found also on the 2 meter band.

There are over 7,000 licensed amateurs in Puerto Rico, and more than half of them have Novice licenses. There are about 2,000 Technicians, and only about 1,300 have General, Advanced, or Extra licenses. The very large number of Technicians, many of the codeless class, requires a large number of repeaters, which makes 2 meter traffic possible all over the island. On Sunday morning at 9 AM, on 147.090+, one of the several radio clubs had an "on-the-air" meeting with QTCs in Spanish and English, and in about half an hour I counted over 80 check-ins.

My 2 meter rig proved to be very useful when I had to meet an amateur in a dynamic crowd of about 80,000 people gathered at the Bacardi arts and crafts fair, near Catano. We kept in touch on the radio, and we managed to find each other by describing our location and the larger and more visible landmarks.

Conclusion

The next time you visit Puerto Rico, take along a portable 2 meter rig; it will be your passport, to open many doors and make many new friends. Whatever you do, wherever you go, you can always be in touch with a friendly voice guiding you and giving you useful information. You will personally meet many of the local amateurs, and you will experience much more than the average tourist usually does.

Once I went to the island during the rainy season, and one morning a light drizzle spoiled my enthusiasm. I didn't like it, but I remembered an old local saying: "If you don't like the weather, just wait five minutes." I didn't like it, so I waited the recommended five minutes. The rain changed from a light drizzle to a shower. I did not like that either and waited another five minutes. Then it started to pour and I liked that even less, so I waited another five minutes and a heavy tropical rain storm developed. Eventually, after another five minutes, the clouds disappeared, the sun came out, and everything was beautiful until a couple of hours later when it started to drizzle again.

Here are a couple of tips: public transportation is bad by US standards; I often waited 30–45 minutes for a bus to take me from Condado to Old San Juan, or back. It costs only 25 cents, but you have to have a lot of patience waiting for them. There are plenty of taxis, but for the same distance they charge about $5.00.

A taxi from the airport to Old San Juan costs $15.00, but you can take the T1 bus, if you're not carrying too much luggage, all the way to the bus terminal near the piers (for cruise ships) for only 25 cents.

In New York I often witnessed reckless driving performed by newcomers from the islands due to their liberal interpretations of the traffic rules. In Puerto Rico, however, I saw excellent drivers. They squeeze quickly between rows of parked cars on one side and heavy oncoming traffic on the other side, separated only by 1–2 inches. I was wondering about this contradiction until I figured it out: probably they export all their bad drivers to New York—"Let the gringos worry about them."

Hotels are expensive, especially those advertised in travel brochures or recommended by travel agents. When I travel with my family I have to go to better accommodations. Hotel La Concha in the heart of Condado has on one side a nice sandy beach on the Atlantic Ocean, and on the other side a huge swimming pool. The rooms are air conditioned, and equipped with telephones, radios,a nd color TVs, but they cost over $100 per night. For a fee one can even rent a small refrigerator. A caution: Making a local call from your room adds 70 cents to your bill, while the same call costs only 10 cents from any public phone, including those in the hotel lobby.

I do recommend a vacation in Puerto Rico, taking a hand-held along, and meeting some of the local amateurs. *Vaya con Dios.* CQ

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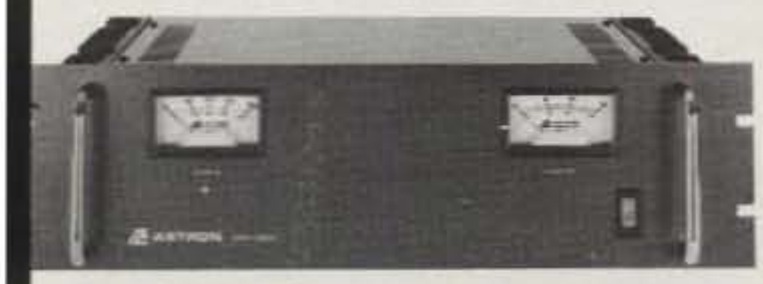
RS-5L	4	5	3½ x 6⅛ x 7¼	7



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RM-35A	25	35	5¼ × 19 × 12½	38
RM-50A	37	50	5¼ × 19 × 12½	50
RM-60A	50	55	7 × 19 × 12½	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5¼ × 19 × 8¼	16
RM-35M	25	35	5¼ × 19 × 12½	38
RM-50M	37	50	5¼ × 19 × 12½	50
RM-60M	50	55	7 × 19 × 12½	60

RS-A SERIES

MODEL RS-7A

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-3A		•	2.5	3	3 × 4¾ × 5¾	4
RS-4A	•	•	3	4	3¾ × 6½ × 9	5
RS-5A		•	4	5	3½ × 6⅛ × 7¼	7
RS-7A	•	•	5	7	3¾ × 6½ × 9	9
RS-7B	•	•	5	7	4 × 7½ × 10¾	10
RS-10A	•	•	7.5	10	4 × 7½ × 10¾	11
RS-12A	•	•	9	12	4½ × 8 × 9	13
RS-12B		•	9	12	4 × 7½ × 10¾	13
RS-20A	•	•	16	20	5 × 9 × 10½	18
RS-35A	•	•	25	35	5 × 11 × 11	27
RS-50A	•		37	50	6 × 13¾ × 11	46

RS-M SERIES

MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4½ × 8 × 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 × 9 × 10½	18
RS-35M	25	35	5 × 11 × 11	27
RS-50M	37	50	6 × 13¾ × 11	46

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VS-12M	9	5	2	12	4½ × 8 × 9	13
VS-20M	16	9	4	20	5 × 9 × 10½	20
VS-35M	25	15	7	35	5 × 11 × 11	29
VS-50M	37	22	10	50	6 × 13¾ × 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5¼ × 19 × 12½	38
VRM-50M	37	22	10	50	5¼ × 19 × 12½	50

RS-S SERIES

MODEL RS-12S

• Built in speaker

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* Amps	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-7S	•	•	5	7	4 × 7½ × 10¾	10
RS-10S	•	•	7.5	10	4 × 7½ × 10¾	12
RS-12S	•	•	9	12	4½ × 8 × 9	13
RS-20S	•	•	16	20	5 × 9 × 10½	18

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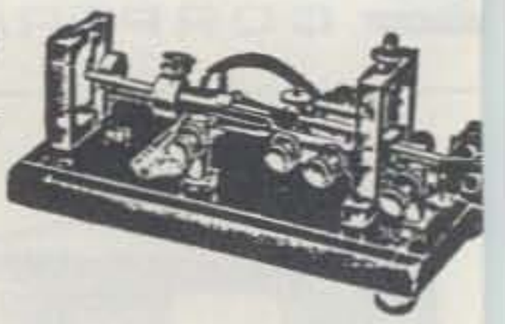
W9IWI takes a page out of history and introduces us to Mahlon Loomis, a name with which we may not be familiar.



Mahlon Loomis

He Changed "Telegraphy" to "Wireless"

BY JULIAN N. JABLIN*, W9IWI

An old Scottish telegrapher explained his work this way: "If ye had a dachshund long enough to reach from Glasgow to Edinburgh, and pinched his tail in Glasgow, he'd bark in Edinburgh. That's the telegraph." He went on: "If ye take away the dog, that's wireless."

Mahlon Loomis was the experimenter who "took away the dog."

Another Scotsman, James Clerk Maxwell, in 1864 developed a theory of electromagnetic radiation which suggested that wireless was possible. Two years later Loomis took Maxwell's idea out of the realm of theory and showed that it could be done. And all of this was 35 years before Marconi spanned the Atlantic with his famous "S."

Mahlon Loomis was a dentist by profession and an experimenter by passion. Born in upper New York State in 1826, he had good family background for science. His father, Nathan, was a mathematician, educator, and astronomer, co-founder of the *American Ephemeris and Nautical Almanac*. Young Mahlon was educated first at a private school conducted by his father, then at a district school in Virginia, where the family had moved. In 1848 he went to Cleveland to study dentistry. After moving around in the northeast, practicing and teaching dentistry, he set up a dental office in Washington, D.C. in 1860, and about that time began to experiment with electricity.

In those early days the "electrical fluid" was credited with an amazing number of properties. Loomis, for example, thought that it was possible to force plant growth with electricity, and buried metal plates connected to batteries near plant roots to test his theories.

He became interested in the idea of "stealing" current from the upper atmosphere, which he visualized as a "vast sea of electricity." This was obvious during lightning storms, but Loomis reasoned that there was electricity in the air at all times. Using kites with metal strings he actually collected power for a 400 mile telegraph line. At this point he began to seriously consider "taking away the dog."

By then it was practice to string a single wire between telegraph stations, using a ground return for the signal. Loomis believed that the return need not be through the earth; it could be through the atmosphere. Further, there was no need for battery power; he had already demonstrated that he could tap the reservoir of electricity in the air. Step by step he went about proving his hypotheses.

In 1866 Loomis was ready for the critical test. He positioned himself on Bear's Den Mountain in Virginia and set up his assistant at Furnace Mountain, 18 miles away. At each site a kite with a copper mesh stretched across its belly was tethered to the ground with 600 feet of wire. A galvanometer was inserted at the ground end of each kite wire. At one galvanometer the circuit to earth was completed. The other galvanometer was left "floating." The grounded galvanometer immediately showed a flow of current between kite and ground.

When Loomis "keyed" the other galvanometer, making and breaking its connection to ground, the needle on instrument #1 showed a reduced deflection on make, indicating a smaller current flow, and showing that the voltage of the entire charged atmosphere had been reduced.

It was, indeed, wireless telegraphy—and batteryless telegraphy to boot. If some sort of detector had been invented by then (the first coherer was still four years off), Loomis could have done more than simply note changes in the electrical field. As it was, he happened upon two basic factors which made his system more effective. Perhaps sensing that some sort of symmetry was desirable, he flew both of his kites at the same 600 foot altitude, thereby "tuning" his antennas—the wire kite strings. By connecting the copper mesh screens on his kites to the wires, he was "top loading" his antennas, a very common practice in later years to improve antenna performance.

In 1868 Loomis formally demonstrated his system before members of Congress and leading U.S. scientists. He received a U.S. patent four years later, not for his specific devies, but for "An Improvement in Telegraphing." It appeared that Loomis was on his way toward success.

The road ahead was very rocky, however. Seeking funds for further development, he interested a group of Boston capitalists almost to the point of backing him. The Wall Street crisis of September 24, 1869 (known ever since as Black Friday) changed their minds. He was about to get financing in Chicago, but his supporters there were wiped out by the Chicago Fire of 1871. He petitioned Congress for help, and the "Loomis Aerial Telegraph Bill" proposing a grant of $50,000 was introduced by Senator Charles Sumner. After much debate and delay the bill was finally passed in 1873 by both houses and signed by President Grant. Congress, in a fine demonstration of taking action by taking no action, failed to provide the funds which had been voted, and eventually Loomis gave up.

He eventually went back to dentistry after some years as a minerologist for a mining company. He died in Terra Alta, West Virginia in 1886, convinced at the age of 60 that his life had been a failure.

Experts in the history of electronics, however, agree that Mahlon Loomis pioneered in the field of wireless telegraphy and can with justice be considered the father of radio. Numerous books and historical monographs terms him "the inventory of radio," or "the wireless pioneer," or "the discoverer of radio." Congress in 1965 adopted a resolution introduced by Senator Harry Byrd which said, in part: "The Congress recognizes, on behalf of the American people, the foresight, ingenuity, and outstanding achievement of Dr. Mahlon Loomis in being the first person to invent and demonstrate a system of wireless communication."

It was too little and too late. CQ

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CQ REVIEWS:

The Ameritron AL-811 HF Linear Amplifier

BY JOHN J. SCHULTZ*, W4FA

The front-panel layout of the AL-811 is simply spacious and functional. The "Load" and "Plate" controls are nicely positioned in relation to the dual meters which one would normally keep an eye on while adjusting the controls. Rocker switches provide for switching one meter to read plate voltage or plate current (the right meter is dedicated to read grid current), to place the linear in an "operate" or "standby" mode, and to simply turn the amplifier on/off. A red LED confirms the operate/standby status.

Does the original 811A tube mean anything to you? If so, you must have been in amateur radio for many years. In my 40+ years in amateur radio I've seen many linear amplifier designs using various power tubes come and go. But, on the tube side, I've never seen a "survivor" like the classic 811A. The 811A is a simple triode that is physically rugged, has moderate air-flow cooling requirements because of its relatively large surface glass envelope, tolerates quite a bit of electrical abuse, etc. Perhaps just as important, it is a power tube that is readily available at a reasonable cost in almost any part of the world. Besides the 811A's originally produced in the US, I've come across 811A's produced in Eastern Europe and the Far East. It's an interesting testimony to a tube that was originally designed for use in AM transmitters whereas so many classic tubes of the AM era have now faded into total obscurity.

Someone, somehow in the early 50's discovered that the 811A performed extremely well in a grounded-grid linear amplifier configuration. The tube not only survived but flourished in various commercial and amateur radio linear amplifier designs (e.g., the classic Collins 30L-1). Recently, however, the popularity of the 811A seemed to be fading away again (although I still have some notes and calculations on a five-tube 811A design I once planned to build as a 1.5 KW HF output amplifier). Therefore, I was extremely interested in the Ameritron AL-811 linear because it featured three 811A's in a basic grounded-grid, zero-bias amplifier circuit and claimed to produce up to 600 watts PEP of output power.

As it turns out, the Ameritron design is both simple and modern. The amplifier does not have any fancy features, but neither does it have any of the electrical or mechanical complications of more "sophisticated" designs. It plugs into a 120 VAC outlet and provides an instant-on power boost in a relatively compact and economically priced package. I don't think this amplifier will appeal to operators desiring 1.5 KW of key-down output power for hours on end. But if you need a significant power boost for casual operating or to chase DX, the AL-811 is worth looking into.

302 Glasgow Lane, Greenville, NC 27858

Specifications

Table I lists the electrical and physical specifications for the AL-811. Table II shows in more detail the exact frequency coverage of the amplifier. The AL-811X is just the AL-811 with coverage above 15 meters. Turning the AL-811 into the AL-811X simply requires the cutting of one internal lead—absolutely no soldering or parts modifications are required.

The amplifier comes wired for a 120 VAC primary but it can easily be rewired for a 240 VAC primary. In fact, it has a quite neat power transformer arrangement such that the input can be tailored for any of the following AC line voltages: 110, 115, 120, 230, 235, or 240 volts. Does it matter if the input is set for 110 or 120 VAC, for example? It depends on how close you want to come to obtaining the full designed-in power output from the amplifier, as I'll discuss a bit later.

Overall, the specifications are quite reasonable, although I did have to double-check that I was reading the power output figures correctly considering that the amplifier uses three 811A tubes.

Circuitry

Fig. 1 shows a schematic for the AL-811. Most of the circuitry is what one would call "conventional," but there are some interesting innovations. The power transformer (upper right), for instance, has both three primary and three secondary windings. The primary windings contain the usual dual 110/220 volt windings, but there

Frequency Coverage

Domestic model (AL-811): 160, 80, 40, 30, 20, 17, and 15 meters
Export model(AL-811X): 160, 80, 40, 30, 20, 17, 15, 12, and 10 meters

Input

Circuit type: Pi-network, slug tuned coils
Maximum VSWR at resonance: 1.3:1
Minimum 2:1 VSWR bandwidth: 15%
Maximum drive power permissible: 85 watts
Typical drive for rated output: 55 watts

Output

Circuit type: Pi-network
½ hour carrier: 400 watts
30 second carrier: 550 watts
½ hour PEP two tone: 600 watts or better
30 seconds PEP two tone: 600 watts or better
Efficiency: typically 70% or better

ALC

Negative going, 0–20V, adjustable, phono jack

Power Supply

Circuit type: full-wave bridge
No load voltage: 1700 V
Full load voltage: 1500 V
Full load current: 550 mA
Regulation: 12%
Maximum draw at rated output: 8 A(120V)
AC Input: 120V, 50/60 Hz (AL-811)
240V, 50/60 Hz (AL-811X)

Metering

Multimeter: reads HV and plate current
Grid meter: reads PA grid current

Connectors

Relay: keys amplifier when grounded. Sources + 12 VDC open circuit and supplies 100 mA when grounded. A built-in back-pulse canceling diode protects the exciter.
RF input: SO-239 50 ohm input
RF out: 50 ohms with full power into any SWR below 3:1
Power: NEMA 5-15P 120V grounded style

Physical

Dimensions: 16″ D × 13¾″ W × 8″ H
Weight: 30 lbs.

Table I– Technical Specifications for the AL-811.

s also a separate buck/boost winding to ccommodate small voltage steps in the 10/220 volt range. The three secondary indings are for a control voltage (relay nd pilot lamps), filament voltage, and high oltage.

The high-voltage supply uses a full-wave ectifier circuit (not a doubler) and the effective output capacitance is slightly over 0 mF. So it's a rather "stiff" supply. Metering in return leads to the supply provides for monitoring grid current, plate current, and high voltage.

On the RF side, the input circuitry consists of separate Pi-networks for each band. The plate output circuitry is a straightforward bandswitched Pi-network.

The external connections are about as basic as possible—just RF in/out, transmit/receive relay switching, and an ALC connection. Switching the relay involves a current flow of about 100 ma, although an open circuit voltage of only 12 VDC is involved. Most transceivers will easily accommodate those parameters, but in a very few cases the 100 ma requirement may require a buffer relay.

Construction

The AL-811's is simply, quite rugged, and extremely service-friendly. A look at the internal photograph of the unit basically "says it all." The heavy-duty power transformer is directly fastened to the base of the enclosure. The tube sockets are also likewise fastened via spacers. Two large PC boards contain most of the RF components and power supply components. A shield separates the input and output circuits. Although one could perhaps note the construction as being a bit simple, I found it to be very well thought out. I think I would have used a small sub-chassis for the tube sockets, but I'm not sure if it would provide anything more than a cosmetic effect.

The quality of the components used is excellent. The output Pi-network utilizes only air-wound inductors, for example, and not any toroid core inductors even down to 160 meters! The hardware is all very well secured with lockwashers. The 811A tubes are mounted vertically, which is a distinct advantage. Not only are they easy to replace when so mounted, but they are likely to last much longer. Many currently produced 811A's have weak filament/grid structures. When mounted horizontally (as in the old Collins 30L-1) they will often short out internally. That certainly was my experience with an old 30-L1 linear I used to to operate.

One can adjust the slug-tuned coils in the Pi-network input circuit from access holes on the rear panel without having to remove the top cover of the amplifier. Normally, one would not have any need to make such an adjustment, but it's a thoughtful touch in case one really wants to "fine tune" the input for a particular frequency range.

STANDARD FREQUENCY COVERAGE

AL-811		AL-811X	
160 meters	1.8–2.0 MHz	160 meters	1.8–2.0 MHz
80 meters	3.3–4.4 MHz	80 meters	3.3–4.4 MHz
40 meters	6.3–8.3 MHz	40 meters	6.3–8.3 MHz
30/20 meters	9.5–15.5 MHz	30/20 meters	9.5–15.5 MHz
17/15 meters	15.5–21.5 MHz	17/15 meters	15.5–21.5 MHz
		12/10 meters	24–29 MHz

able II– Frequency coverages. The AL-811X is basically just the AL-811 with coverage eleased for 10/12 meters, although the real AL-811X export model also has the power transformer primary factory-set for 240 VAC, 50/60 Hz.

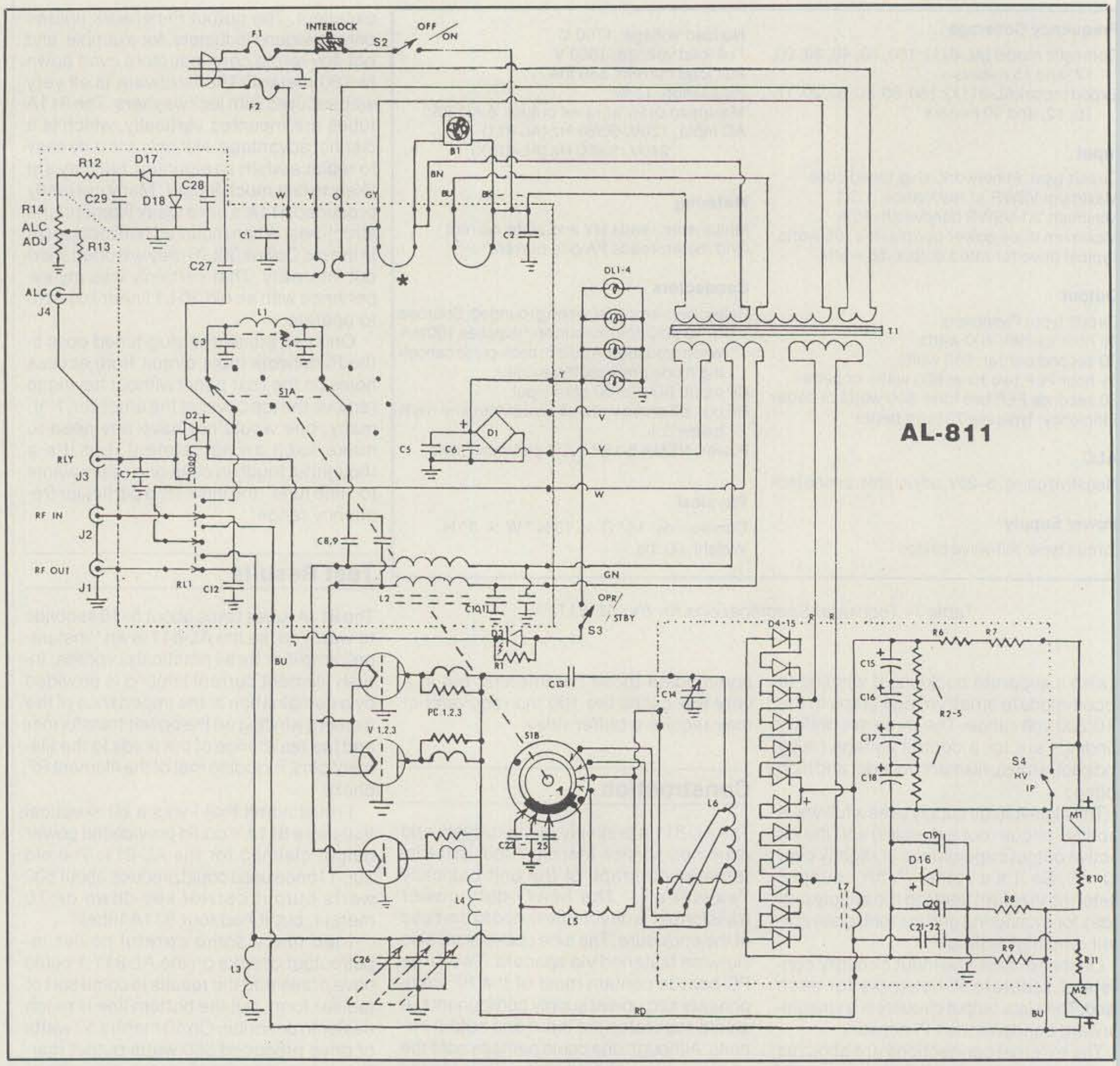
Test Results

The 811A tubes takes about 5–10 seconds to warm up, so the AL-811 is an "instant-on" amplifier for all practical purposes. Inrush filament current limiting is provided by a combination of the impedance of the filament winding on the power transformer and the resistance of the leads to the filament pins, including that of the filament RF choke.

I must admit that I was a bit skeptical that three 811A's could provide the power output claimed for the AL-811. The old 30L-1 I once used could produce about 500 watts output carrier key-down on 10 meters, but it had four 811A tubes!

I did make some careful power input/output checks on the AL-811. I could have presented the results in some sort of tabular form, but the bottom line is much easier to describe. On 10 meters 52 watts of drive produced 560 watts output (carrier, key-down). On 15 meters 55 watts of drive produced 580 watts output. On 20 meters and on all lower frequency bands about 55 watts of drive produced 600 watts of carrier output. The input SWR across each band never exceeded 1:1.3.

I think that the very good power output figures for the AL-811 relate back to its "stiff" power supply. Although I can't remember exactly, it seems to me that the high-voltage regulation on the 30L1 amplifier was significantly less. The fact that one can tailor the AL-811 to slightly different line voltages via the buck/boost winding on the power transformer also plays a role. I did experiment with this feature a bit and, indeed, changing the primary to more closely accommodate a 110 VAC line rather than a 120 VAC line did produce 50–75 watts more power output from the amplifier. Of course, 50-75 more watts of power output is not a great deal,



AL-811

Fig. 1– Circuit diagram for the AL-811/AL-811X. As explained in the text, the primary of the power transformer (T1) not only has the usual dual 110 VAC windings but also a special buck-boosting winding. The amplifier is shown wired for a 120 VAC line voltage.

but why not enjoy it if it can be so easily achieved.

Third-order IMD products appeared to be about –32 dB or better, which is quite acceptable. I didn't make any temperature measurements, but the exhaust air flow always remained cool, while the top of the enclosure became only slightly warm to the touch. The air flow is designed to exhaust from a side vent next to the tubes and is drawn in via a fan on the rear panel behind the power transformer. With the top cover tightly in place, I would imagine there is some air flow around all the components in the amplifier. The input fan is a very good quality impedance-protected muffin type.

Operating Results

The amplifier is certainly easy enough to tune-up with the aid of the dual metering system. Both meters are clearly "red-lined" at the limit points for plate and grid current. However, an external meter to indicate power output is necessary. Tune-up is basically done to achieve maximum power output while the panel meters indicate that the tubes are operating within safe limits.

The loading control couples directly to its associated capacitor. The plate tuning control is coupled via a vernier drive and is very easy to adjust. The manual suggests typical settings for the controls, and if one keeps a log on the control settings, it's very easy to reset them as one goes from band to band. One might also want to note the approximate drive level being used on each band. There is no sense in overdriving a linear beyond the point where the output power no longer increases. It's true some excess drive will appear in the output of the amplifier, but the danger of driving a linear amplifier into non-linear operation with resultant splatter just is not worth the miniscule signal gain.

I never found fan noise to be a problem with the AL-811. One can hear the fan moving air, but I would certainly rate the noise

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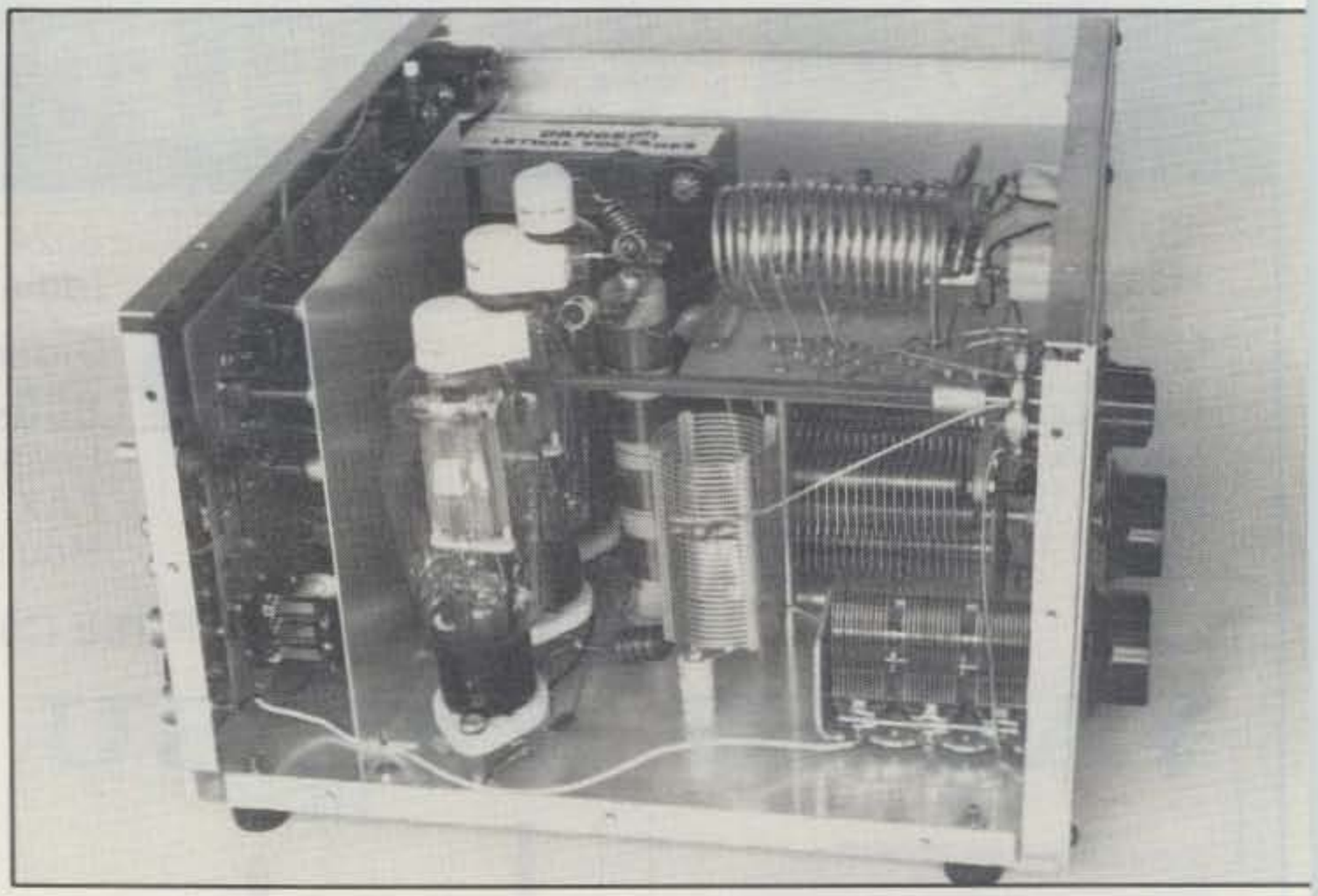
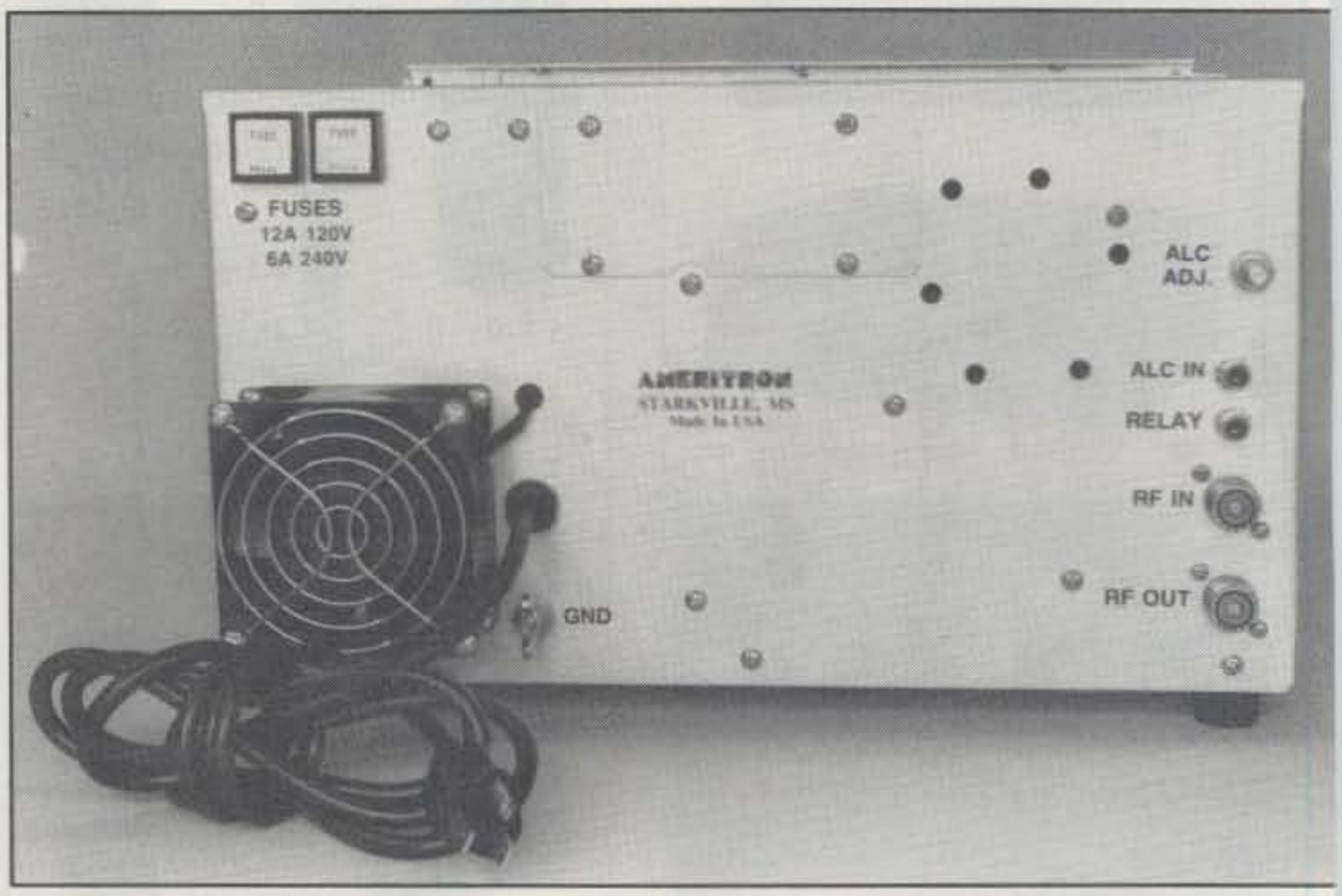


A look inside the Al-811 shows the three 811A tubes, the tuned input circuitry to the left of the tubes (behind a shield plate), and then the power supply transformer and components to the rear. It's a good functional layout and every component can be accessed relatively easily if service work is ever necessary.

level to be extremely low. It's generally comparable to that associated with any of the solid-state transceivers that have internal cooling fans.

As usual, I asked a number of stations for comparative reports running "barefoot" and using the AL-811. "Barefoot" meant 70–80 watts output from an exciter as compared to 500–600 watts output from the AL-811 on SSB. Increasing a station's power *output* by a factor of seven definitely does make a difference. Most stations reported a signal increase of from 1 to 2 "S" units, which was logical considering the theoretical change in signal strength and the varying calibration of the "S" meters on different transceivers.

I didn't try the amplifier on modes such as RTTY or SSTV, but judging from the heat build-up after extended periods of SSB



The rear panel of the AL-811 is strictly functional. Two SO-239 connectors provide for RF in/out connection and phono connectors provide for antenna relay switching and external ALC. The air input fan is obvious in the lower left corner. The ALC adjustment is to the upper right. An ALC connection back to a transceiver is not absolutely necessary if the transceiver's output can be reduced such that the AL-811 is not overdriven.

operation, the specifications shown in Table I appear to be very reasonable.

Manual

The manual for the AL-811 is quite straightforward and clear. It provides typical installation information and detailed tune-up instructions. A schematic and parts list are included, but not PC board layouts. The latter are really not necessary, however. The amplifier is really so straight-forward in design that one can easily trace out any part of its circuitry. Field servicing of the amplifier should be extremely easy, if ever necessary, even for a person only moderately experienced in repairing equipment.

Why Three Instead of Four Tubes!

Several amateurs I spoke with about the AL-811 wondered why it didn't utilize four instead of three 811A tubes. What's the "magic" of an even number of power tubes especially when they are parallel connected? Well, of course, there is no "magic." Many of us simply relate too much to the old days of push-pull amplifiers. Even one of the most expensive linears on the market today utilizes three power tubes in parallel. As long as the various electrical parameters can be achieved, there is simply no reason why any even or odd number of power tubes cannot be connected in parallel. The most unusual combination I can recall was the Galaxy linear which had ten 6HF5 tubes in parallel. The output capacitance was so high, however, that a "trick" tuning arrangement for a Pi-network circuit had to be used to get resonance on 10/15 meters. But it did work.

Summary

Sweep-tube linears, I think, have their place, but even some of the once inexpensive sweep tubes now cost more than "real" RF amplifier tubes like the 811A. So if you are interest in a basic, all-band linear amplifier with three "real" RF tubes in it, the AL-811 deserves serious consideration. The 811's in the AL-811 are being worked close to their design specifications. But the 811A has proved to be an extremely rugged tube. In fact, I was warned that the 811A's in the review unit I was using had already seen severe duty on them from factory test periods and still they performed beyond specifications. One can find new 811A's available costing from $11.00 to $25.00 and, of course, for just a few dollars at "ye olde flea market." Unlike the old Collins 30L-1 linear the Al-811 does not require the more expensive 811A's which are designed for horizontal mounting. I'm not suggesting that the 811A's in the AL-811 are going to be short-lived. I'm only suggesting that if you do replace a tube in the AL-811, you unscrew 16 sheet metal screws to remove the top cover of the amplifier, plug in a new tube, and will still have enough pocket money left over to take the XYL (or OM) out to a modest dinner.

Considering that the AL-811 comes completely assembled, is well constructed, and will happily operate from a 120 VAC line, it represents excellent convenience and value if you are in the market for a medium-power HF amplifier.

Price Class

The AL-811 is priced at $649.00 and is manufactured by Ameritron, 921 Louisville Rd., Starkville, MS 39759. A limited warranty covers a one year period. One has to send in a warranty registration card, and if it's accompanied by a copy of a valid amateur radio license, Ameritron will supply information on the very simple modification to enable 10/12 meter operation of the amplifier. Technical information/assistance is available at (601) 323-8211. CQ

Announcing

The 1992 CQ World-Wide RTTY DX Contest

Starts 0000 UTC Saturday
Ends 2400 UTC Sunday
September 26-27, 1992

I. **Announcing:** The Sixth Annual *CQ* WW RTTY DX Contest, co-sponsored by *The RTTY Journal*.

II. **Objective:** For amateurs around the world to contact other amateurs in as many *CQ* zones and countries as possible using the digital modes.

III. **Contest Period:** 0000 UTC September 26 to 2400 UTC September 27, 1992. The total contest period is 48 hours, but no more than 30 hours of operation are permitted for single operator stations. The 18 hours of *off* time can be taken any time during the contest period, but *off* periods may *not* be less than three (3) hours in length. All *on* and *off* periods *must* be clearly noted in the log and summary sheets.

(a) Multi-operator and multi-multi stations may operate the entire 48 hour period.

(b) A single operator *may* operate more than the 30 hours, but only the *first* 30 hours will count toward the official score. (This allows rarer DX to give their multiplier to more stations.)

IV. **Operator Classes**

1. **Single Operator, All Band and Single Band.** One person performs all operating and logging functions. Use of spotting nets, DX Alert Packet Systems, telephone, etc., is *not* permitted.

2. **Single Operator Assisted, All Band Only.** One person performs all operating and logging functions. However, the use of DX spotting nets or any other form of DX alerting assistance *is* allowed. The operator can change bands at any time. Single operator stations are allowed only one transmitted signal at any given time.

3. **Multi-Operator, Single Transmitter.** All band entry only. More than one person operates, logs, checks for duplicates, use of a spotting net, etc.

a. Only one (1) transmitter and one (1) band permitted during the same time period (defined as ten [10] minutes). Once the station has begun operation on a given band, it *must* remain on that band for 10 minutes; listening time counts as operating time.

Exception: One—and only one—other band may be used during the same time period if—and only if—the station worked is a new multiplier. Logs found in violation of the ten (10) minute rule will be automatically reclassified as multi-multi to reflect their actual status.

4. **Multi-Operator, Multi-Transmitter.** All band entry only. No limit to the number of transmitters, but only one (1) signal per band permitted.

a. All transmitters must be located within a 500 meter diameter or within the property limits of the station licensee's address, whichever is greater. The antennas must be physically connected by wires to the transmitter.

V. **Entry Categories:** Single Operator entries may enter either (A) All Band or (B) Single Band. Single Operator Assisted and Multi-Operator entries can only enter all band only.

VI. **Modes:** Contacts may be made using Baudot, ASCII, AMTOR (FEC & ARQ) Packet. (No unattended operation or contacts through gateways or digipeaters.)

VII. **Bands:** 80, 40, 20, 15, and 10 meters.

VIII. **Valid Contacts:** A given station may be contacted only *once* per band regardless of the digital *mode* employed. Additional contacts are allowed with the same station on each of the other bands as well.

IX. **Exchange:** Stations within the 48 Continental United States and the 13 Canadian areas must transmit RST, State or VE area, and *CQ* zone number. All other stations must transmit RST and *CQ* zone number.

X. **Countries:** The ARRL and WAE DX Country lists will be used. **Note: The USA and Canada count as country multipliers.** Example: The first US State and Canadian area you work not only count as a multiplier for the state or area, but also count as a country multiplier for each band.

XI. **QSO Points:** One (1) QSO point for contacts within your own country. Two (2) QSO points for contacts outside your own country but within your own continent. Three (3) QSO points for contacts outside your own continent.

XII. **Multiplier Points:** One (1) multiplier point for each US state (48) and each Canadian area (13) on each band. One (1) multiplier point for each DX country in the ARRL and/or WAE lists on each band. *Note:* KL7 and KH6 are country multipliers *only* and *not* state multipliers. One (1) multiplier point for each *CQ* zone worked on each band. A maximum of 40 per band.

Note: Canadian areas are VO1, VO2, VE1 N.B., VE1 N.S., VE1 P.E.I., VE2, VE3, VE4, VE5, VE6, VE7, VE8 N.W.T., and VY Yukon.

XIII. **Final Score:** Total QSO points times the total multipliers equals the total claimed score.

XIV. **Contest Entries and Logging Instructions:** *CQ* WW

RTTY DX logs and forms should be used to facilitate scoring and checking. All logs **must**:

1. Show times in UTC.
2. All sent and received exchanges are to be logged (call-sign, RST, Zone, Country, State/VE, points claimed).
3. Indicate State/VE area, Zone, and Country Multiplier only the *first time* it is worked on *each band*.
4. Use a separate log sheet for *each band*.
5. A check list of duplicate contacts for *each band* (dupe sheet).
6. A *multiplier* check sheet for each band.
7. An overall *summary sheet* showing total QSOs, Points, Zones, countries, and States/VE areas worked.
8. Each entry must be accompanied by a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.

Contest forms are available from *CQ, The RTTY Journal,* and the Contest Director. *The RTTY Journal*'s address is 9085 La Casita Avenue, Fountain Valley, CA 92708. Please include a large SASE with 2 units of US first-class postage or IRCs.

XV. **Disqualification:** Operating in an unsportsmanlike manner, manipulating scores or times to achieve a score advantage, or failure to omit duplicate contacts which would reduce the overall score more than 2% are grounds for disqualification. The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers *during* the contest is unsportsmanlike and the entry is subject to disqualification. Actions and decisions of the Contest Committee are official and final.

XVI. **Awards:** Plaques will be awarded to the first-place finishers in each of the operator classes. Certificates will be awarded to second and third. Certificates will be awarded to the first-place finishers in each DX country.

XVII. **Deadline:** All entries must be postmarked **no later** than December 1, 1992. An extension may be given if requested. Logs should be mailed to: Roy Gould, KT1N, *CQ* WW RTTY DX Contest Director, P.O. Box DX, Stow, MA 01775, USA.

XVIII. **Plaques (Donors):**

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South America—Association of DX-EX, Ecuador
Europe—HAL Communications Corp.
Oceania—*The RTTY Journal*
Asia—N5JJ Memorial
Africa—Roy, KT1N and Roland, N1FTD

Single Operator, Single Band
14 MHz—Kunihiko Fujii, JH1QDB
21 MHz—Denis, WD4KXB and Mike, KA4RRU
28 MHz—Barbara, SP2FF and Chris, SP2UUU

Single Operator Assisted
World—CQ Magazine
Continents—Open

Multi-Operator Single Transmitter
World—AEA, Advanced Electronic Applications, Inc.
Continents—Open

Multi-Operator, Multi-Transmitter
World—CQ Magazine
Continents—Open

There are many plaques looking for sponsors—single band, a specific country, multi-op by continent, etc. If you are interested, contact the Contest Director.

CQ REVIEWS:

The ARE Silencer External Speaker And DTMF Decoder

BY DAVE INGRAM*, K4TWJ

How many times have you listened for a particular friend or (amateur) family member on an area's main VHF or UHF repeater and been distracted from your normal routine by ongoing conversations? Maybe you enjoy weekend camping and appreciate the security of an FM handheld, but need some type of tone paging for silent monitoring or receiving priority calls in an emergency. Alternately, we all recognize the scenario of hamfest monitoring in a motel room when all the popular direct frequencies are active and we wish to receive only calls from specific friends or group members.

Is there a quick and easy solution to these needs? You bet. It's the new Silencer produced by Amateur Radio Engineers, Inc. of Redmond, Washington. It is actually two units in one—an external speaker for home or mobile use and a DTMF decoder.

The ARE-10, or Silencer, plugs into the external speaker jack of any home, mobile, or handheld FM transceiver and sits quietly until a calling station "punches up" your programmable two-, three-, or four-digit DTMF code. The Silencer's speaker is then activated for approximately 10 seconds so you can hear the other station, and a front-panel LED illuminates to signify an incoming call. The speaker then mutes, but the LED remains illuminated until reset by the front-panel switch. This feature gives you a visual indication of missed calls when away from the rig or when its volume is set at a low level. Neat! Once you use this little DTMF decoder you will wonder how you survived without it!

The Silencer is enclosed in a very impressive-looking black cabinet measuring 4½"H × 3"W × 3"D. Its light-gray lower front section has a call-indicating LED and three-position switch. The switch's up position selects general listening/non-decode operation, the center position activates the decode function, and the lower position is a momentary reset for the decoder. Two

The ARE Silencer gives you two features in one: an external speaker for home or mobile use, and a DTMF decoder.

small, and approximately one foot long, cables emerge from the speaker's rear panel. One cable is fitted with a 3.5 mm phone plug for connection to a transceiver's speaker socket. The other cable has insulated and stripped wire ends for connection to a 12 volt DC source. I should also add that voltage requirements for the Silencer are quite lenient. I found it worked very well when powered by a standard 9 volt battery for outdoor monitoring with my FM handheld.

As factory supplied, the Silencer is programmed to decode a four-digit DTMF code. Moving jumpers and changing DIP switch settings located behind the back panel lets you change DTMF codes as desired. The unit can also be set for decoding only two or three (rather than four) digits for easier access, if preferred. The switches and jumpers are well marked and easy to read, so setting up your own special code is a cinch. Likewise, connecting and using the Silencer couldn't be easier. Just apply power, plug it into a rig's speaker jack, and flip the front switch to "Decode." Since the critter sits death-quiet, however, there is a natural tendency to flip it into Monitor mode for assurance everything is working! Once beyond that point, a "silenced" FM rig becomes pleasantly undistracting for long-term monitoring, such as when the OM or XYL is motoring home from work at night and the amateur spouse is "keeping an ear" while attempting chores. The serenity and peace of mind with silent monitoring is truly refreshing.

Big-time FM aficionados are surely asking what the difference is between ARE's Silencer and the DTMF paging systems built in or available as an option for new deluxe model transceivers and handhelds. Functionally, the two systems are alike, and since both use standard DTMF tones, they are fully compatible. Many amateurs use older or basic-style FM transceivers, however, and this is where the externally-added ARE Silencer stands tall. Anyone with a regular DTMF-equipped FM transceiver can page you.

Personally speaking, I found the ARE Silencer a real gem. Most of my time is spent writing, and as much as I love hamming, even a rig playing at low volume is distracting (tempting!). The Silencer gives me a good option. I can tell my friends and expected out-of-town visitors my four-digit code and continue writing like crazy until they tone-page me.

Finally, the Silencer's speaker seemed to have a natural resonance around 700 Hz, so I connected it to my CW rig and it worked like a champ for minimizing QRM. That secondary function may not seem earth shattering, but it sure minimizes "extra box counts" when packing for vacation!

All aspects considered, I found the ARE Silencer a handy item with dozens of applications (including selective calling). It is the ideal mate for continuous repeater (or simplex) monitoring with "plain Jane" FM rigs.

The group at Amateur Radio Engineering also deserves congratulations on their production of a high-quality product. Workmanship is superb, and the unit is backed with a one-year warranty.

Check out the Silencer. You'll like it. It is priced at $99.95 retail. For more information, contact Amateur Radio Engineering, P.O. Box 169-D, Redmond, WA 98073 (telephone 206-882-2837). CQ

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811A tubes resist premature failure in o ways.

First, they're constructed with widely aced elements that minimize the chance elements touching and causing a short — en if the plate gets hot enough to melt.

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Indirectly heated oxide cathode tubes ke the $400 3CX800A7) can be rendered stantly useless if their electron emitting er is stripped off because of a severe cur- nt overload due to mistuning.

The Ameritron AL-811 is excellent for the wcomer because it's tough enough to thstand momentary mistuning. And the bes are so inexpensive that you can place one for mere pocket change.

The Ameritron advantage: extra heavy duty power supply that gives you peak performance year after year

The heart of the AL-811 power supply is heavy duty power transformer with a gh silicon steel core weighing a hefty 17 unds.

A full wave bridge using 52.5 ufd of total pacitance (four 210 ufd, 470 volt pacitors) produces 1500 volts under full d and 1700 volts no load. That's cellent high voltage regulation!

Full height computer grade filter capaci- s with screw terminals are used — not ort stubby, light duty soldered-in "high hnology" capacitors that can't dissipate e heat generated by high current.

The rectifier diodes are rated for a massive surge current of 200 amps. They won't blow even if you accidentally short the high voltage supply.

Wire wound, 7 watt, 50 K ohm equalizing resistors safely protect each filter capacitor — not 2 watt, 100 K ohm carbon composition resistors that can open and cause your filter capacitors to explode or fail.

The Ameritron AL-811 power supply is built tough so you get peak performance year after year.

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A Pi-Network *tuned input* provides a 50 ohm load for your rig. Even fussy solid state rigs can deliver their full drive to AL-811.

Low loss slug tuned coils — tunable from the rear panel — let you optimize performance. High quality low drift silver mica capacitors maintain proper tuning.

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A powerful 20 CFM computer grade blower — not an open frame phonograph motor — draws in cool air to pressurized the cabinet and efficiently cool your 811A tubes for extra long life.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC indicator, dual meters, QSK compatibility with QSK-5 plus much more.

Output tank: optimum Q on each band

The low loss pi-network output tank of the AL-811 has been carefully designed for optimum Q on each band and built with quality RF components.

The result is peak performance over each band, wide impedance matching range and exceptionally smooth tuning with efficiencies close to 70%. Even a 3:1 SWR load won't damage the tubes or tank components.

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Quiet pressurized ventilation keeps your tubes safely cooled

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We use them and talk about them, but rarely get involved with them. WA2YSJ presents an over-view on duplexers and repeaters and how they work.

Duplexers and Repeaters
Some Basic Information

BY ROBERT A. LEHNING*, WA2YSJ

All across the country there are many amateur repeater stations operating on 2 meters, 220 and 440 MHz, and to some extent on 1.2 GHz. Several modes of operating such as FM, ATV, and packet (digital) have also become very popular. Many amateur radio operators use these repeaters but do not really understand the basics of duplexers or the role a duplexer plays in repeater operation.

Basic Repeaters

It is common knowledge that if you "hit" a repeater with a low-level signal such as a mobile or handheld radio transmits, the repeater retransmits the information at a higher power level over a greater area. This is commonly referred to as the **range** of the repeater, the area within which you can activate the repeater with the transmitted signal. Antenna patterns can be adjusted so that a repeater range can cover a certain area or direction only, but a majority of repeater ranges are intended to be omnidirectional (see fig. 1).

The repeater does this receiving on one frequency and retransmitting on another frequency. This occurs simultaneously and is called **duplex** operation. The frequency separation between the TX (transmit) and the RX (receive) is sometimes referred to as the **split** or **repeater pair** of frequencies. For example, on 2 meters the split is .6 MHz (600 kHz). The TX can be the low frequency and the RX the high, or vice versa. At 220 MHz the split is 1.6 MHz, and at 440 MHz it is 5.0 MHz. At 1.2 GHz the frequency separation can be 12 MHz or 20 MHz, depending on the area of the country where the repeater will be in operation. Therefore, it follows that if the repeater receives on a high frequency and transmits on a low frequency, the mobile or handheld radio will conversely transmit high and receive low. If you reverse the repeater, then the mobile or handheld radios must also be reversed to match it.

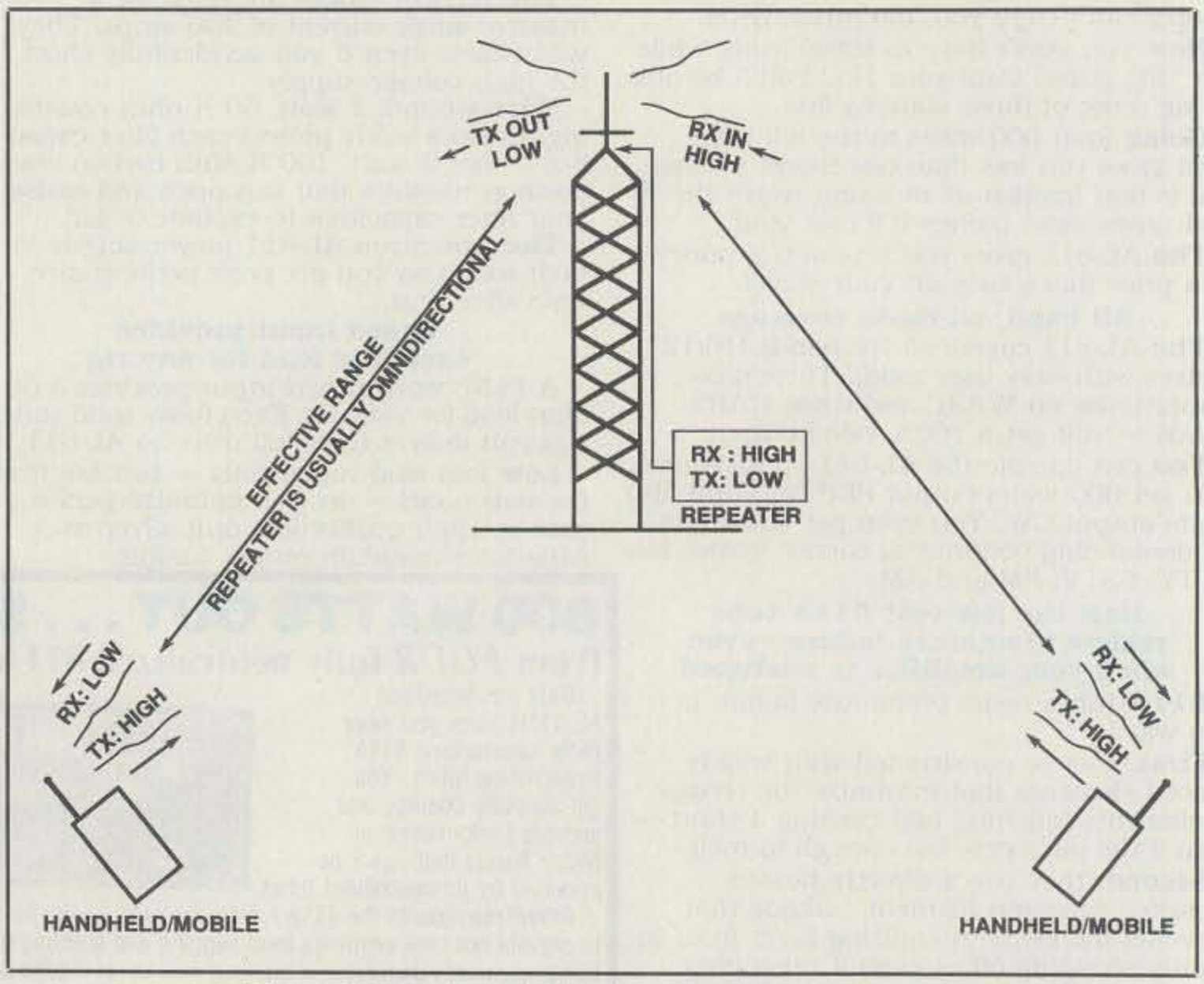

Fig. 1– Typical omnidirectional repeater installation.

Many repeaters both receive and transmit with a single antenna rather than operating with separate TX and RX antennas (see fig. 2). This is where the duplexer is employed.

The duplexer enables the repeater to transmit and receive simultaneously on a single antenna and feedline without interference to each function by providing the necessary "isolation" between the TX and the RX frequencies. This isolation is measured in deciBels (dB). If separate TX and RX antennas were to be used, they would have to be physically spaced a certain distance apart, either vertically or horizontally, to provide the necessary isolation (see figs. 3 and 4). This is usually referred to as **space isolation.**

For example, a 2 meter repeater using separate TX and RX antennas would require about 10 feet of vertical space isolation as compared to about 30 feet of horizontal space isolation to gain 30 dB of isolation between the transmit and the receive. Most repeaters require more isolation than this, so it is apparent that more space isolation would be required for the

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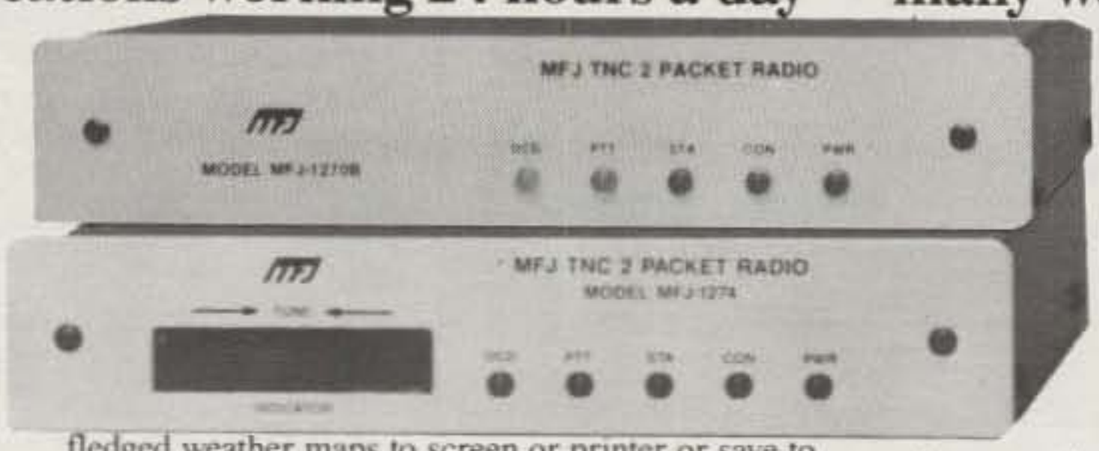

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Icom 8 pin radios	MFJ-5084	MFJ-5084X	MFJ-5084Z	MFJ-5084Y[4] MFJ-5084YH[4]
Kenwood/Alinco 8 pin radios	MFJ-5086	MFJ-5086X	MFJ-5086Z	MFJ-5086Y[4] MFJ-5086YH[4]

does not include IC-W2A 2 does not include 2500 3 does not include 25A & 25SA 4 Y models connect VHF port of KAM. YH models connect HF port of KAM

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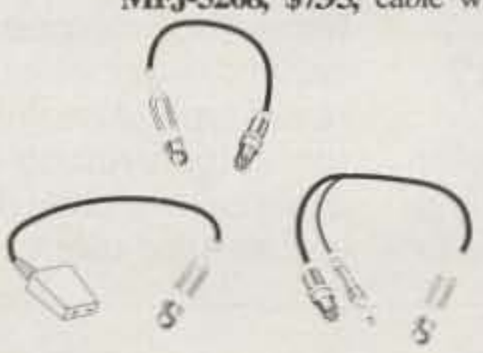

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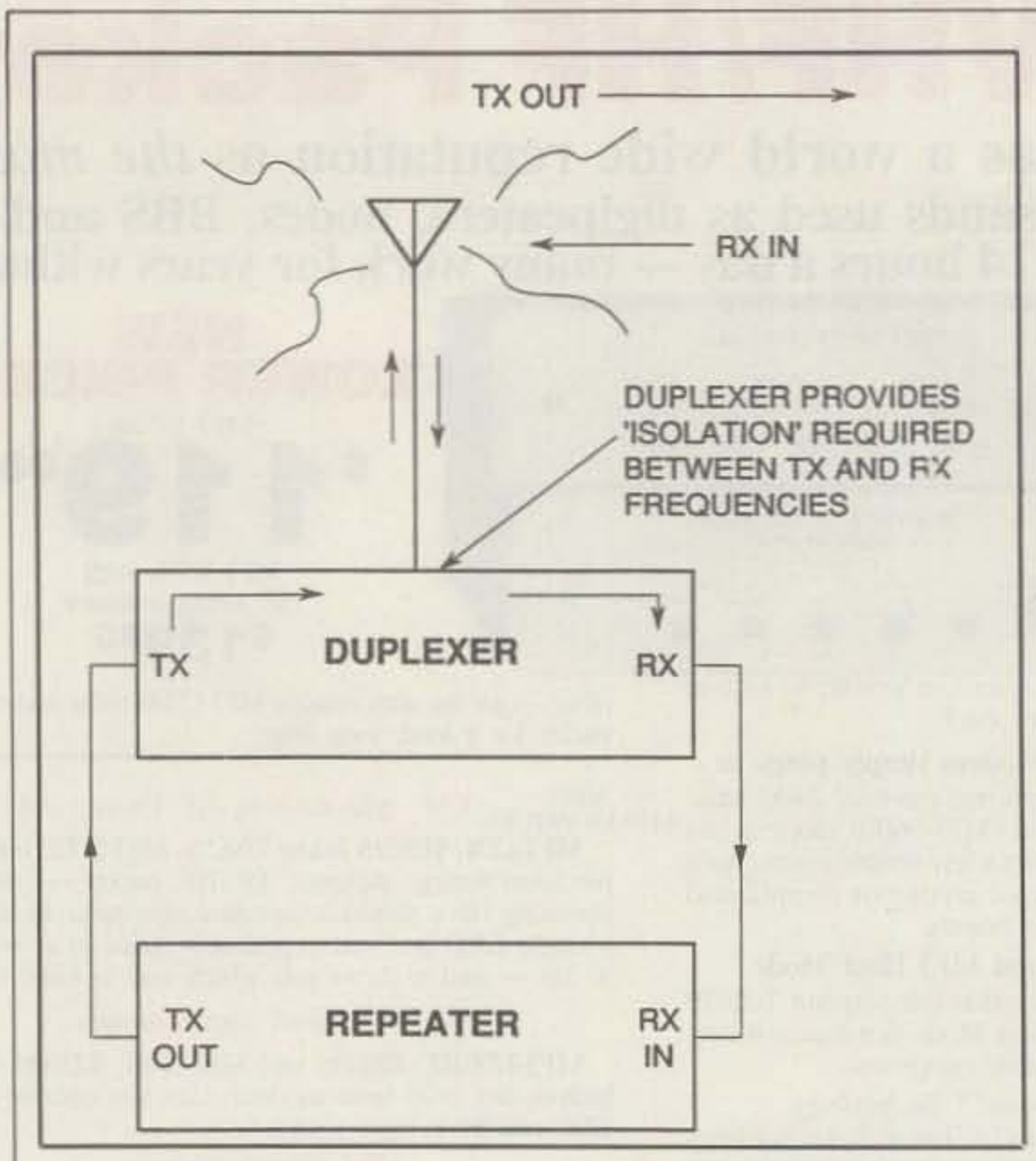
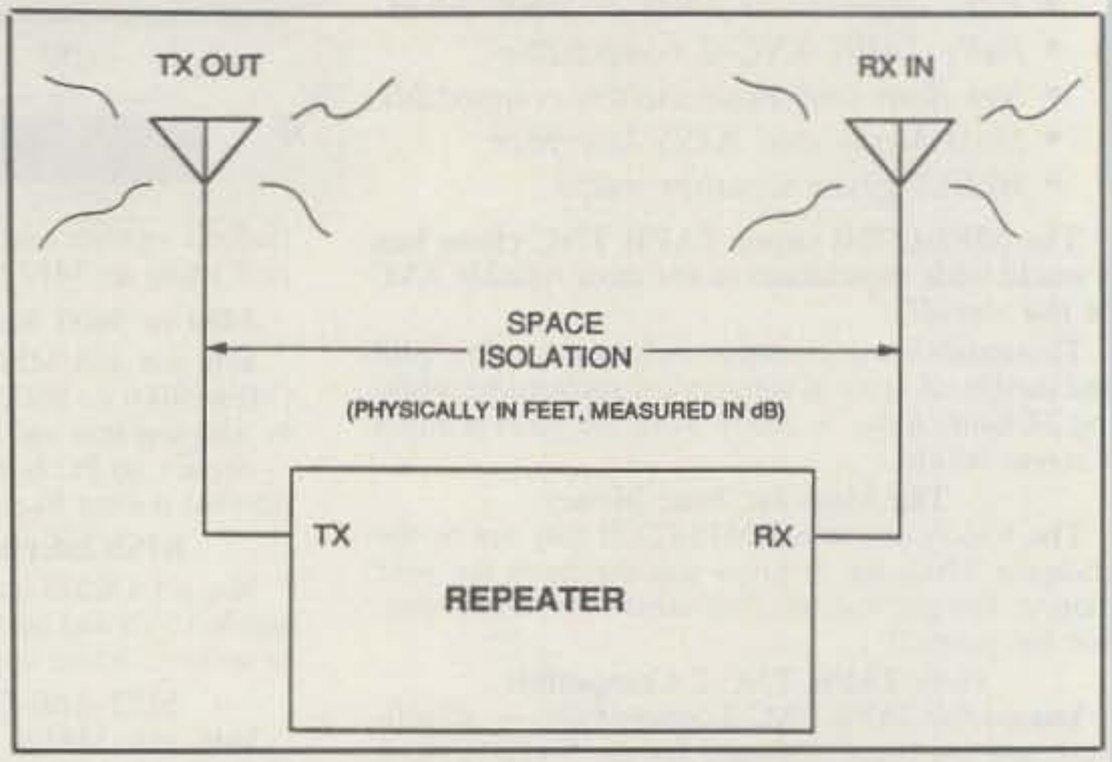


Fig. 2– A duplexer provides isolation between receive and transmit frequencies so that a single antenna and feedline can be used.

Fig. 3– Without the use of a duplexer, separate antennas for transmit and receive would be required. These antennas would have to be spaced far enough apart so as to provide suitable space isolation.



two-antenna approach. Two antennas take up valuable space on a tower, space that may not be available, and require two feedlines. A single antenna and feedline for a repeater is much more economical and saves tower space, particularly at a crowded antenna site. Antenna sites are generally located at the highest point of terrain in a given area and are usually shared by several radio services and users. Some duplexer designs can provide the repeater with protection from interference from other radios at the site and protect other radios at the site from its own transmitter.

This filtering action of the cavities in the duplexer can also be used to control receiver desensitization **(desense)**, which is one of the common problems that can be encountered on a repeater. Receiver desense can be defined as on-channel noise or a strong off-channel signal that degrades the receiver sensitivity. On-channel noise can be coming from the repeater or passing through the duplexer from some other source. An off-channel signal can be close in frequency and physically located somewhere else (another site), or it can be located in close physical proximity to the receiver, but not necessarily close in frequency. Either situation will restrict the receiver's capability to detect (pick up) a weak signal, such as a low-level signal from a mobile or handheld radio.

How Does A Duplexer Work?

There are several duplexer designs being used in repeaters today, but by far the most common is the **pass/reject** or "pseudo-bandpass") type of duplexer. For this reason we will consider the pass/reject type of duplexer in this description of duplexer operation.

Imagine, if you will, a transmitted signal being received by a repeater antenna (see fig. 5). This signal travels down the feedline to the duplexer and looks at the cavities. The cavities tuned to the TX side of the repeater are set to block, or reject, this received signal. Therefore, the signal will pass through the cavities on the RX side of the duplexer which are tuned to accept, or pass, the RX frequency of the repeater. They will pass this frequency and tend to reject, or attenuate, most everything else.

At the same time the repeater transmitter is retransmitting the information on another frequency on the same feedline and antenna. This transmitted signal leaves the repeater transmitter and then travels along the interconnecting cable to the duplexer. This signal will look at the cavities and pass through the cavities tuned to pass the TX frequency of the repeater. The cavities on the RX side of the duplexer are set to block, or reject, this transmitted signal. The signal passes through the TX cavities, travels up the feedline, and is radiated by the antenna. Thus, the duplexer "isolates" the TX from the RX and vice versa, enabling the repeater to receive and transmit simultaneously without interference to each function. Resonant cavities which are used in the pass/reject type of duplexer can be a valuable tool in controlling spurious emissions, desense, and other problems that a repeater can experience.

Quality duplexers are designed and built to perform within certain ranges of power, temperature, and frequency separation. The materials used in the manufacture of duplexers usually control the power rating and temperature range of the duplexer. The physical size of a duplexer is most often determined by the frequency at which the duplexer is to be used.

Temperature stability is a very important factor to be considered. The frequencies to which the TX and RX sides of the duplexer are tuned cannot change due to something moving when it heats up and expands or cools down and shrinks. Detuning of a duplexer in this manner, in the worst case, can render a repeater inoperative. Materials with a low coefficient of thermal expansion are therefore used in critical areas such as the cavity main tuning control.

The components used in the RF circuits of the duplexers—such as capacitors, coupling loops, connectors, and cable—also have to stand up to the amount of power going through the duplexer. This is another source of heat.

The reverse side of the temperature stability problem is seen when the duplexer and repeater are housed in an unheated shack during the winter months. The duplexer must be stable in the cold also. Most manufacturers will usually provide the necessary data and specifications to enable the proper duplexer to be chosen for the particular application.

Some Common Sense

There seems to be a common misconcep-

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The MFJ-989C is not for everyone.

However, if you make the investment, you'll get the finest 3 KW tuner money can buy. Here's why.

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You get two *massive* 250 pf transmitting variable capacitors with detailed logging scales. They can handle *amps* of RF current and withstand 6000 RF volts because the plates are smoothed and polished and have extra wide spacing.

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A precision roller inductor lets you tune your SWR down to the absolute minimum. A 3-digit turns counter plus a spinner knob gives you exact inductance control.

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You won't have arcing problems with this roller inductor. That's because firm springs put considerable pressure on a plated contact wheel for excellent electrical contact.

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You get a lighted *peak* and average reading Cross-Needle SWR/Wattmeter with 200 and 2000 watt ranges. Its new directional coupler gives you accurate SWR and power readings over the entire 1.8 through 30 MHz range.

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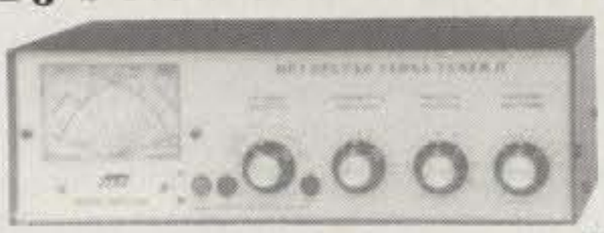

MFJ-948 **$129.95**

If you don't need a dummy load but want *all* the other features of the MFJ-949D, choose the MFJ-948 for $129.95.

The MFJ-948 features a **peak** reading **lighted** Cross-Needle meter with a built-in lamp switch, one year **unconditional** guarantee and is made here in the USA.

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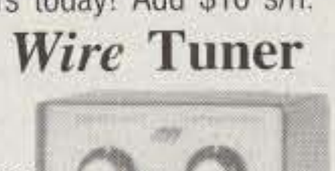

Operate all bands anywhere with any transceiver with the MFJ-16010. It lets you turn a random wire into a transmitting antenna. 1.8-30 MHz. 200 watts PEP. Ultra small 2"x3"x4".

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CIRCLE 155 ON READER SERVICE CARD

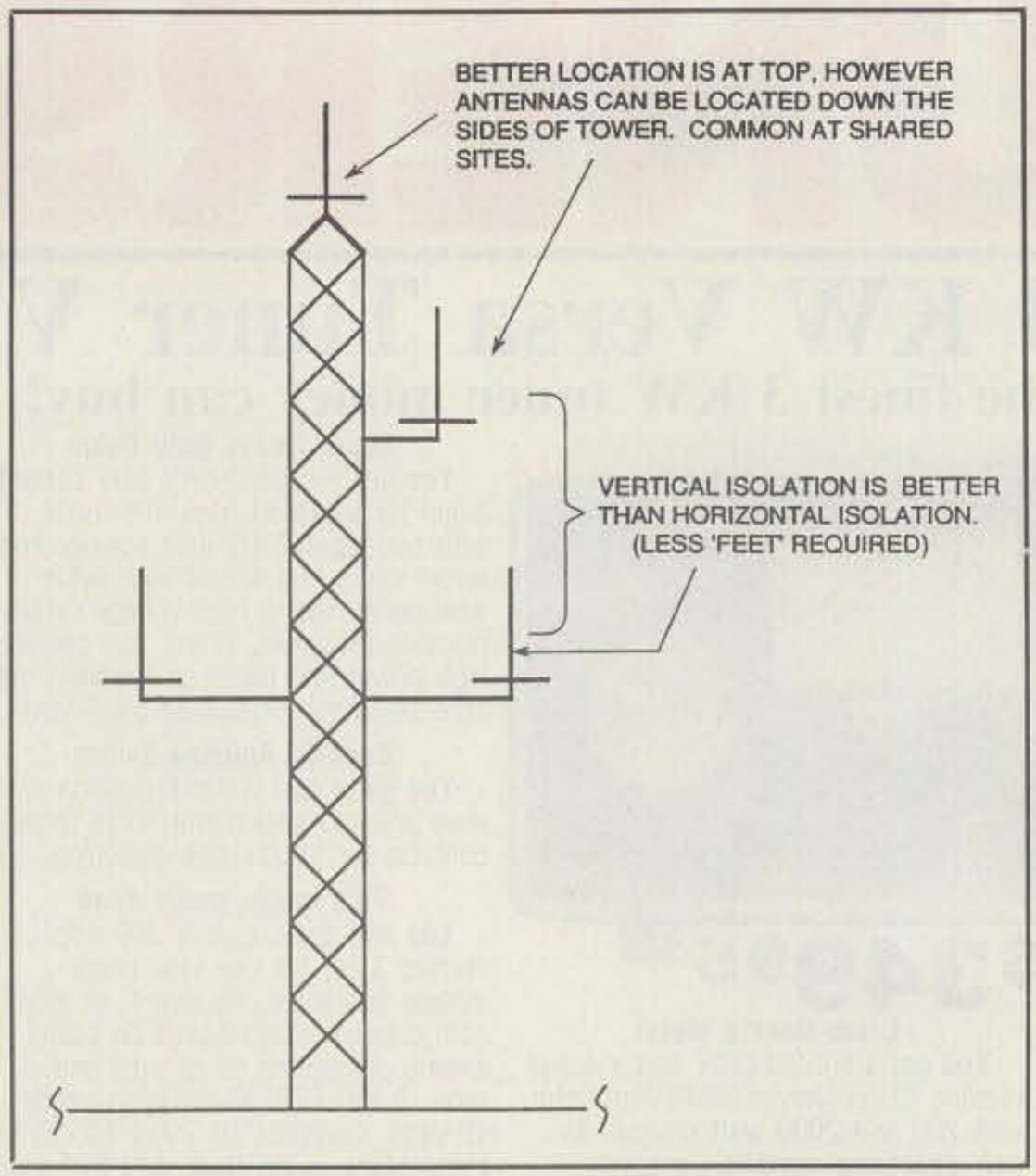

Fig. 4– At shared or crowded sites some space isolation may be required between the antenna of one repeater and the antenna of another.

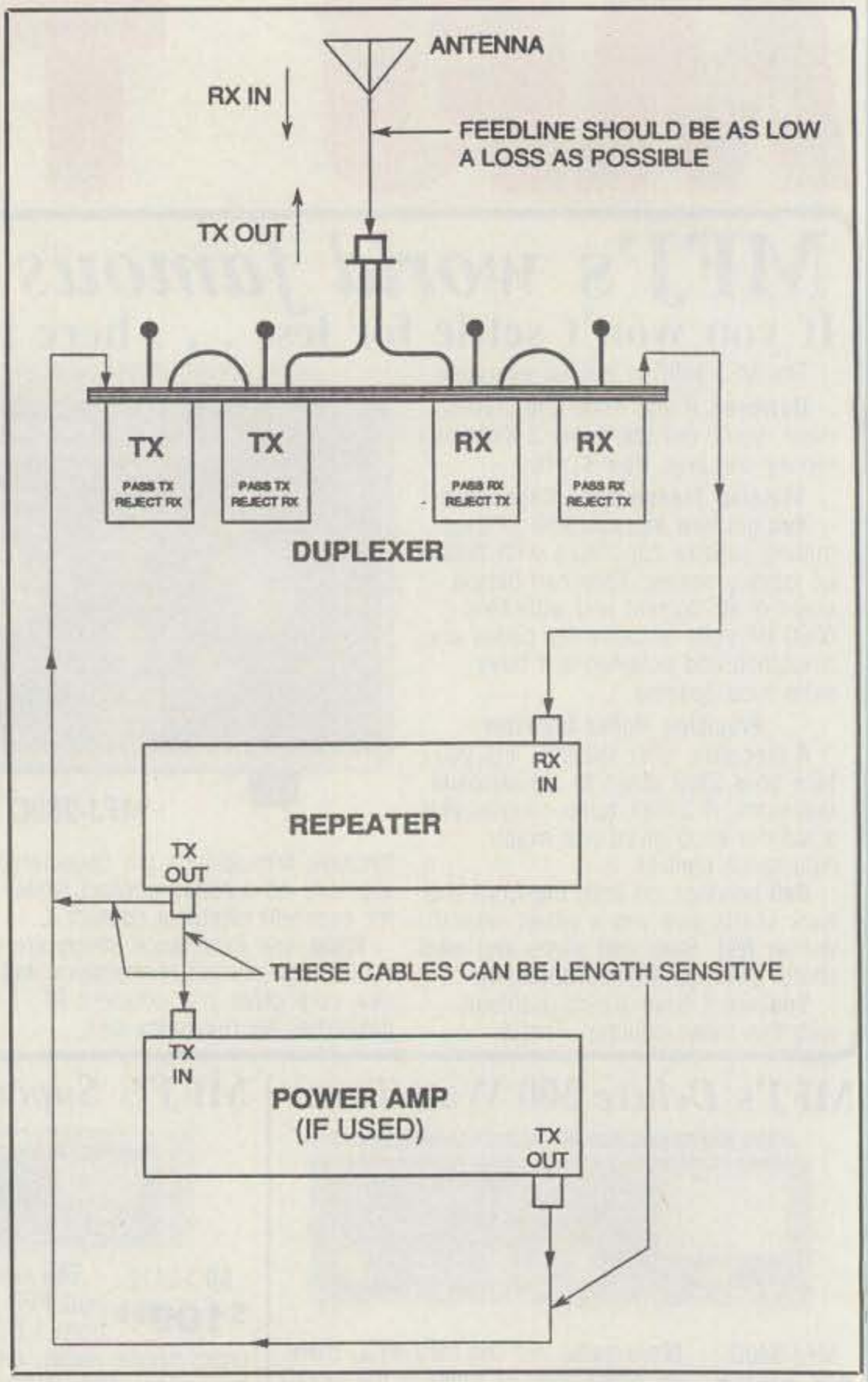

Fig. 5– Flow diagram showing the use of a duplexer and repeater at a typical site.

tion that a duplexer can be the cause or source of all the many problems that can plague a repeater. In reality there are things that can affect the operation of a repeater. Granted, there can be troubles with a duplexer, such as detuning during shipment or damage due to lightning or vandalism, but accidental detuning is perhaps the most common problem. There have been many instances of noise passing through a duplexer, making it appear that the duplexer is at fault. A majority of the time, however, problems usually can be traced to some other source. A duplexer is not an active device and does not require much maintenance once it is installed and in operation.

There exists, the world over, a strong urge to "tweak" a duplexer after it is installed and the repeater is up and running. This "tweaking" can be the cause of some of the problems a repeater can experience. "Tweaking" can be equated with "detuning" if it is "tweaked" far enough. There usually will be some initial adjustment when the duplexer is first installed. However, once this is done and the repeater is operational, "tweaking" should be kept to a minimum or discouraged altogether.

Another area where problems can exist or be created is in the coaxial cable and connectors used to interconnect the antenna, duplexer, and repeater. It doesn't pay to scrimp on cable and connectors. Quality cable, hardline or whatever, is expensive. But when you consider repeater "down time" due to connector or cable problems, it pays in the long run. Cheap connectors and cheap cable make for cheap performance and reliability. Since connector joints are a prime source for noise on a repeater, quality connectors properly assembled onto quality cable can minimize this possibility.

Keeping this in mind, the interconnecting "patch" cables are another important factor to be considered in the operation of a repeater. Specific cables for interconnecting the duplexer, the repeater, power amp, etc., should be made with quality connectors and cable that is of the specified impedance of the repeater system. Some of these cables may be length sensitive, such as the cable running from the repeater transmitter to the duplexer. You can't just plug in a random length of 75 ohm cable into a 50 ohm system and expect that system to work properly. The use of conector adaptors and splices in the cable are not considered "good practice" either. Double-shielded (double-braid) coaxial cable is a recommended choice when considering interconnecting cables and, in some cases, even the feedline.

Some thought is also required when routing cables at a repeater site. If cables are run close together—i.e., in a "bundle"—coupling may occur between the cables. For example, the cable that connects the antenna to the duplexer is run parallel to, and in the same "bundle" with, the cable connecting the duplexer and the receiver in the repeater. When the transmitter is keyed, "desense" occurs in the receiver. This is caused by a strong RF field being generated by the transmitter coupling into the cable running to the receiver and overloading the receiver. This is a good argument favoring double-shielded cable.

Crowding at repeater sites is sometimes unavoidable and special care should be taken in the routing of cables under such

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- Gain: 10dB (λ/4 ratio)
- Impedance: 50Ω MP (PL-259)
- VSWR: less than 1.5
- Max. power: 100W FM
- 1.42m, 533g (with package)

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- Impedance: 50Ω MP (PL-259)
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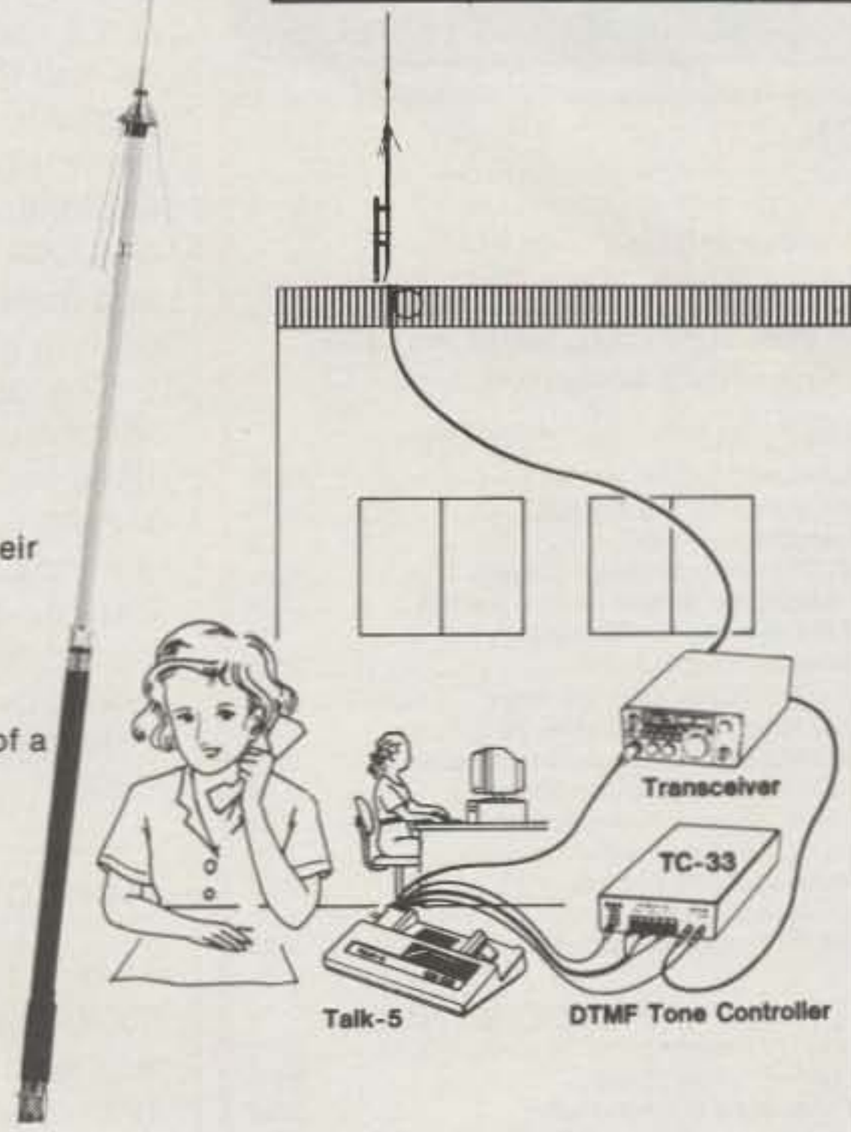

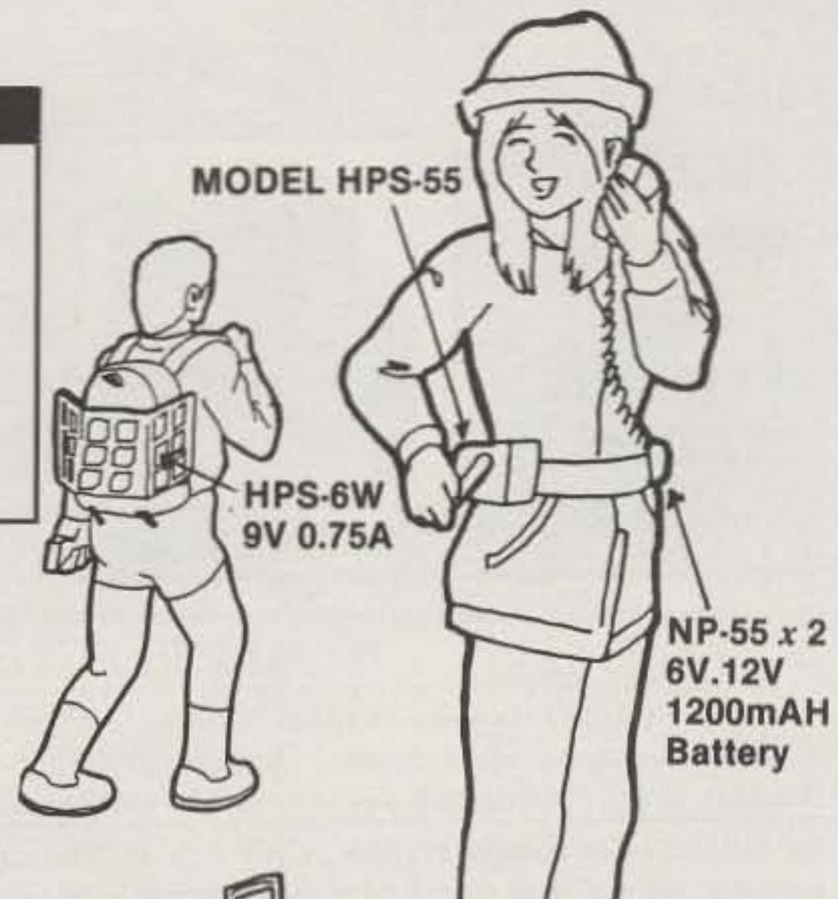

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CIRCLE 157 ON READER SERVICE CARD

circumstances. Even the routing of feedlines or placement of the antenna on the tower can cause problems. At shared or crowded sites some "space isolation" may be required between the antenna of one repeater and the antenna of another (see fig. 5). In some adverse cases a little extra filtering may be required on a receiver or offending transmitter. Each case is usually unique, and sometimes they can drive a person crazy trying to analyze the problem and formulate the cure.

Once the repeater is up and operational, drawing up and sticking to a monthly or quarterly inspection schedule is a very good idea. Periodic inspection of the site can provide valuable information on equipment status. Inspection of the cable, the tower and antenna, and the grounding system can usually detect potential problems. This can provide enough time to prevent a major problem with the repeater, causing it to provide poor or inadequate coverage, or even to be off the air for an extended period of time. Brief, intermittent periods of "down time" for inspection and repair are much more acceptable than days, weeks, or even months on end! Co-ordination and co-operation with other services at a site can also go a long way to help prevent or resolve any problems that may arise. As the old saying goes, "An ounce of prevention is worth a pound of cure."

Lightning Protection

It cannot be stressed enough that a good grounding and lightning-protection system should be employed for just about any amateur installation, including a repeater.

Most repeater sites are located at higher elevations that are more prone to being struck by lightning. A tower or antenna, reaching into the sky, on top of a mountain, hill, or house, makes an excellent lightning rod. Lightning can damage or destroy just about anything at a repeater site, including towers, buildings, and equipment. A duplexer doesn't have many parts, but it is just as susceptible to lightning damage as anything else at the site.

A good electrical ground is the basic requirement, and grounding the tower and equipment is the first place to start. Tower manufacturers can usually provide suggested grounding schemes for towers and equipment shelters. There may be local building and zoning codes that have to be followed. There are several manufacturers of lightning protection equipment who can provide a wealth of information about lightning protection. Lightning protection cannot stop a lightning strike, but it can usually minimize the amount of damage that can result from one. Nature can be very unpredictable and sometimes any measure taken can be almost useless. It is best to provide some form of lightning protection even if the possibility of a lightning strike doesn't exist or is minimal. Some protection is better than none for any installation, if only for peace of mind.

In Closing

There are several manufacturers and quite a few varieties of duplexers and repeaters available on the market today for amateur use. Most offer excellent warranty and repair/retuning services for their products.

A good rule of thumb is to choose a duplexer that has specifications to matching the repeaters' specifications of power, frequency separation, and temperature range. Isolation requirements between the TX and RX frequencies are an important factor to weigh. Some duplexer designs provide more isolation than others. Some duplexer designs also suffer more insertion loss than others. Sufficient research and question asking can usually result in getting the right equipment for the job.

The same thinking should be applied to the antenna and feedline system to be used with the repeater. A good quality duplexer, connected to a good repeater and antenna, installed and maintained properly can provide many amateurs with reliable communications and enjoyment of their hobby over long periods of time with little or no aggravation and a minimum of down time.

Acknowledgements

I would like to think Mr. Elliott Johnson of TX RX Systems, Inc. for his quiet insistence and helpful suggestions in attempting to present some basic and, I hope, pertinent information about a subject that doesn't seem to get much press. I would also like to thank Barbara George and Sydney Harrison for their able assistance on the CAD machine to produce some legible illustrations.

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RG-8X	1.2	3.5	5.8

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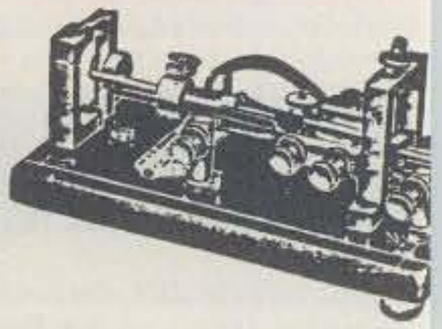


"A Rush Box! What's That?"

BY RICHARD A. GENAILLE*, W4UW

If you are old enough to know what this is, then you might get a little choked up thinking about the one you had. If you don't know what it is, then read on and you'll find out what it is and why the old timers get emotional when it is mentioned!

I was introduced to a "rush box" over 50 years ago when I was a kid of 17 and avidly reading *Popular Science* magazine. By the age of 17 I was already into crystal sets, 3-tube regenerative receivers, and the like, had gotten the radio fever, and was looking for bigger and better radios. One day I spotted an article in *Popular Science* that described a 5 meter transmitter/receiver some fellow had built and which used batteries and was carried around in the basket of his bicycle! I knew that to operate a transmitter you had to have a license, but I wasn't going to transmit, just receive! (I can hear the OTs saying, "Oh, sure.")

The gathering of parts was feverishly pursued until I had enough junk to put together this 5 meter jewel. After all the hole cutting, wiring, and acquiring a small power supply to substitute for the batteries, I was all set for the "smoke test." After a few minutes of warm up I heard this horrible hiss coming from the small loudspeaker, and my heart went down into my stomach or below. Five meters wasn't too populated where I lived in those days, but if it had been I would have found out what my trouble was. After about three days of checking and rechecking my wiring and pulling my hair out, I finally gave up. About the fourth day I turned the thing on, hoping not to hear any hiss, but there it was. I tuned around a little, and all of a sudden I hit a spot on the dial where there was absolutely no hiss. I wondered what it was. Then I heard a radio playing and what sounded like someone keeping time with the music by manipulating drumsticks on a table. After a few minutes of this, someone started to speak and clearly and distinctly I heard a voice say this was W2— testing! I was ecstatic! After a few days of listening and doing some sleuthing I finally found out who the fellow was and surprised him with a visit.

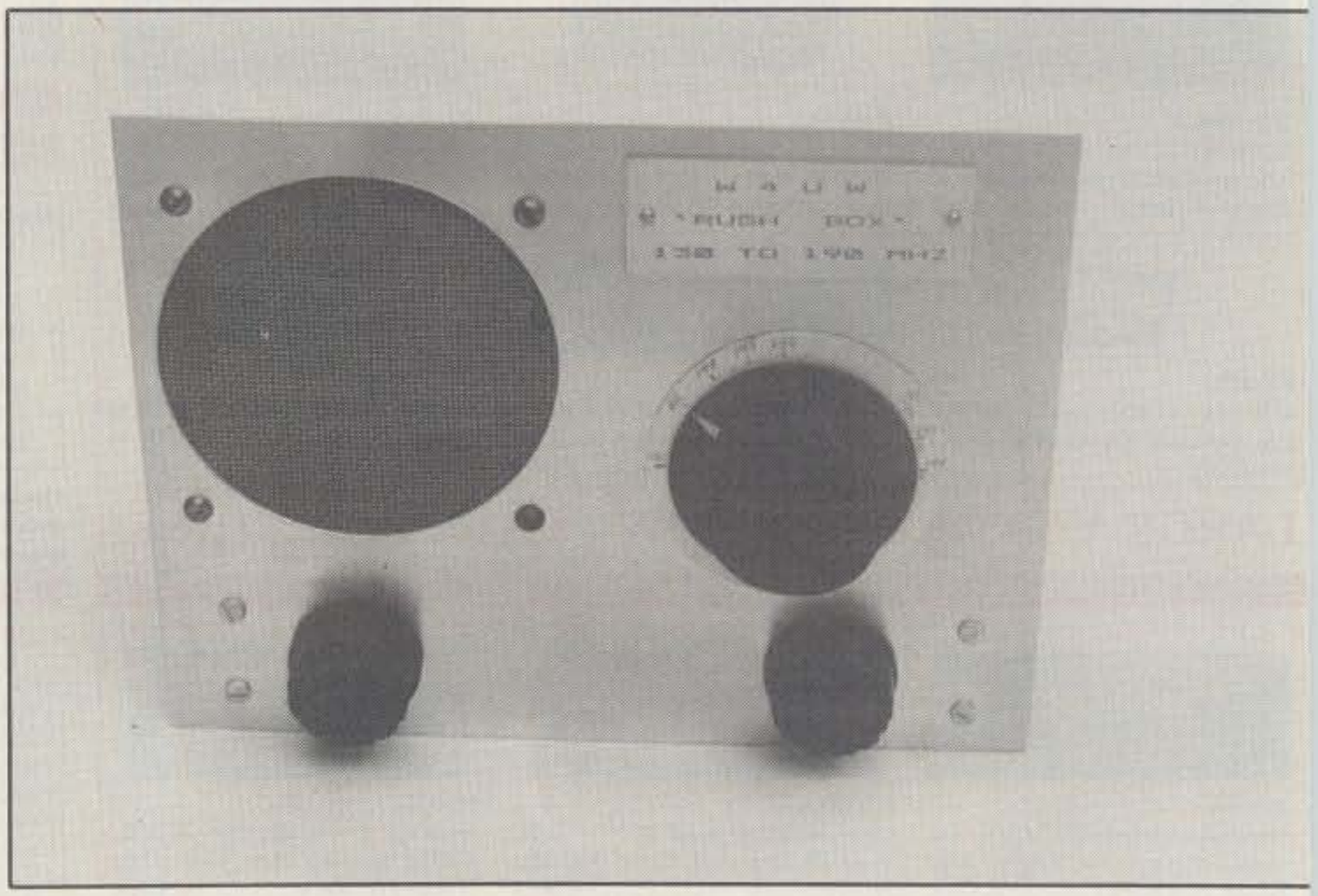


Photo 1– The W4UW Rush Box. The tuning dial is at the upper right just over the regeneration control. The volume control is below the speaker grillwork.

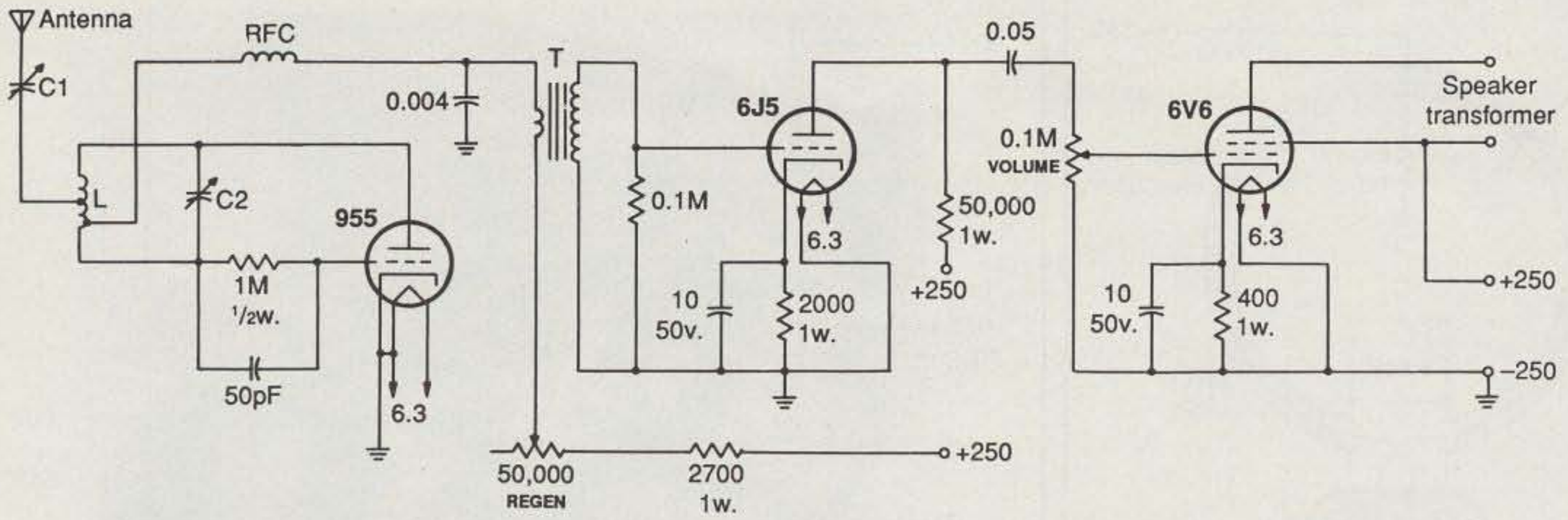
I eventually learned from my new friend that what I had constructed was a super-regenerative receiver and that the hiss indicated the device was functioning properly. I also learned that most of the guys who had them referred to them as rush boxes because of the hiss or rushing sound they made when not tuned to a carrier. I don't believe the article mentioned the hissing, or maybe I missed it.

Sometime later a group of budding amateurs in the physics class of our high school and I formed a radio club. We had meetings at lunch time and practiced code and studied the amateur license guide. Some of us got reckless and decided that we would do what was necessary to use the rush boxes as transceivers as shown in the magazine article. It was quite simple. The super-regenerative receiver hiss is caused by the way the detector tube goes in and out of oscillation at a super audible rate. By changing the grid resistor one can get what used to be the detector to oscillate and now transmit a signal. This is not to say that a simple super-regenerative detector doesn't put out a signal. It does, but more on this later. By switching in a change of grid resistor and making a simple switching change in the audio amplifier input and output the rush box then became a modulating oscillator. And you thought that transceivers were something new!

The guys in the physics class who had the transceivers divided the town into two call areas. We removed a turn or two from the detector/oscillator coil and thought we were far enough away from 5 meters so that we could operate and not be caught. One day one of the regular, licensed amateurs on 5 meters happened to mention listening to a bunch of kids fooling around just above 5 meters, and if they continued someone would "fix their wagons." That did it. You never saw anything dismantled as fast as those clandestine transceivers.

The urge to listen in on 5 meters was still there, however. One day while browsing around the famous "radio row" called Cortlandt Street in downtown New York City, I saw a sign in the window of a shop called Eagle Radio. They were selling a kit for a receiver called the "Minuteman Receiver" (and you thought that kits were something new, too). This little gem used a super-re-

*719 Quarterstaff Rd., Winston-Salem, NC 27104



C1—10 pF trimmer
C2—1 to 15 pF air variable
L—4 turns, 16 AWG tinned wire, ⅜" inside diam., ⅝" long. RFC tap 1½ turns from grid end. Antenna tap 2¼ turns from grid end. In lieu of antenna tapping, a 2-turn coupling coil can be used to feed a balanced feed antenna. Use insulated wire for coil and intermesh with L as required.
RFC—Ohmite Z50 choke or one 2 uH choke
T—Interstage audio transformer

Note: Receiver Operation

1. Set trimmer C1 to minimum. Too tight antenna coupling may keep receiver detector from super-regenerating.
2. Set Volume control at about mid-position.
3. Starting from the "off" position, gradually advance Regeneration control until "hiss" is heard from speaker. Regeneration may have to be adjusted across the band of coverage.
4. Tighten up C1 for greater antenna coupling and readjust Regeneration control to maintain "hiss."
5. Tune for signals. A good, strong carrier will cause "hiss" to quit completely. Adjust volume and regeneration as required.
6. Check frequency coverage with a grid dip meter or your 2 meter rig.
7. Super-regenerative detectors are extremely high in sensitivity, good in linearity, poor in selectivity (broad as a barn door), and medium in ability to handle large input signals without overloading!

Fig. 1– Circuit of VHF super-regenerative receiver (Rush Box).

enerative detector and had plug-in coils o you could receive 10, 5, and 2½ meters. id it hiss nicely! One night on 10 meters copied a ZL who was coming in so loud hat I thought I had heard wrong. I have ince had the nostalgia virus and have con- tructed a new Minuteman, which I will escribe.

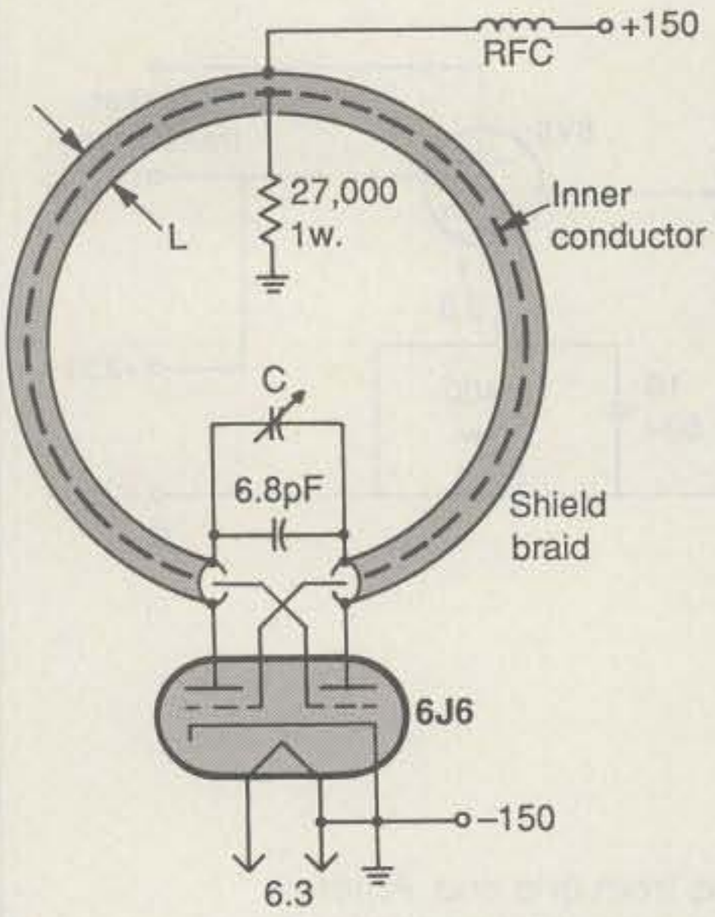
You may want to try your hand at build- ng a rush box from the junk that you have round. In one of Dave Ingram, K4TWJ's rticles in *CQ* in March 1989 I noticed a chematic for a single-tube transmitter hat made use of a Double M circuit that e described as being a cross between a Hartley oscillator and a TNT oscillator. This ircuit had the grid coil inserted into the late coil. I used one of those on 2½ neters, but somehow we called it a "uni- y coupled oscillator." Anyway, along with nformation on building a rush box I will also ell you how you can build a simple one- ube oscillator for 2 meters so you can sten to it on your rush box.

The W4UW rush box is shown in photo . Controls on the right are tuning (above) and regeneration (below). The volume control is on the right below the speaker. Photo 2 shows the layout of components for the rush box, including the type 955 acorn triode tube and its socket. An octal-based 6J5 could be used with good results, as could other triodes that will operate in the VHF region. I happened to have the tube and socket in the junk box. Why I was saving them I can't really say. Maybe I knew that someday I would want to build another rush box! The unity-coupled oscillator is shown in photo 3. The additional tubes on the oscillator chassis are used in a simple modulator circuit. The audio control and mic jack are to the right on the front of the chassis.

With the components used, the rush box tunes from about 130 through 190 MHz. This covers several of the aircraft frequencies between 130 and 140 MHz where they are still using amplitude modulation, the 2 meter amateur band, alot of miscellaneous stuff above 2 meters, and TV channels 7 through 9. The rush box does not receive narrow-band FM, so all you can hear on 2 meters are carriers from individual 2 meter transmitters or repeaters. If you tune carefully around the channel 7 through 9 area, you can hear the TV station audio. Oh yes, the rush box doesn't do too well on SSB either.

The oscillator can be tuned across the 2 meter band for test and demonstration purposes. The unique thing about the oscillator is the coil, which is nothing more than a piece of RG-8 coax. As you will notice later in the schematic, the shield connects to the plates and the inner conductor is the grid coil, a VHF version of the Double M circuit that Dave Ingram described in his article. The oscillator I built many years ago used a piece of softdrawn copper tubing for the plate coil, while the grid coil was ordinary hookup wire threaded through the tubing.

The two units were used recently at a local radio club meeting to demonstrate how it was in the old days. Everyone seemed to have tears in their eyes—the old guys from thinking about the past and the new guys from laughing so hard!



C—1 to 15 pF air variable.
L—15″ length of RG-8U formed into a 4″ by 5″ oval (approx.) or 5″ diameter circle (not easy with RG-8U). One could also use the same length of soft drawn copper tubing ¼″ in diameter and insert a small diameter insulated wire inside of the tubing for the grid coil. A small slot is cut through the shield of the coax for access to the inner conductor for soldering the grid resistor lead. (This is almost like a surgical procedure. With tubing you just file an opening large enough to fish the grid wire through the hole to attach the grid resistor.)
RFC—Ohmite Z50 choke or one 2 uH choke.

Note: Receiver Operation

1. Check the frequency to which the L/C is tuned by using a grid dip meter. If you want to find the carrier on your 2 meter receiver adjust C until you get a dip somewhere in the 2 meter band.
2. Take a 4″ diameter loop of insulated wire and solder a pilot light bayonet socket, with #47 bulb, to loop ends.
3. Place loop dummy load about 1½″ over coil L.
4. Apply voltages to oscillator. If your 6J6 is good and your wiring is correct, you should see the pilot light glow.
5. A simple modulator can easily be constructed for demonstration purposes, but 2 meter operation with this rig is not recommended.

Fig. 2– Circuit of VHF unity coupled oscillator.

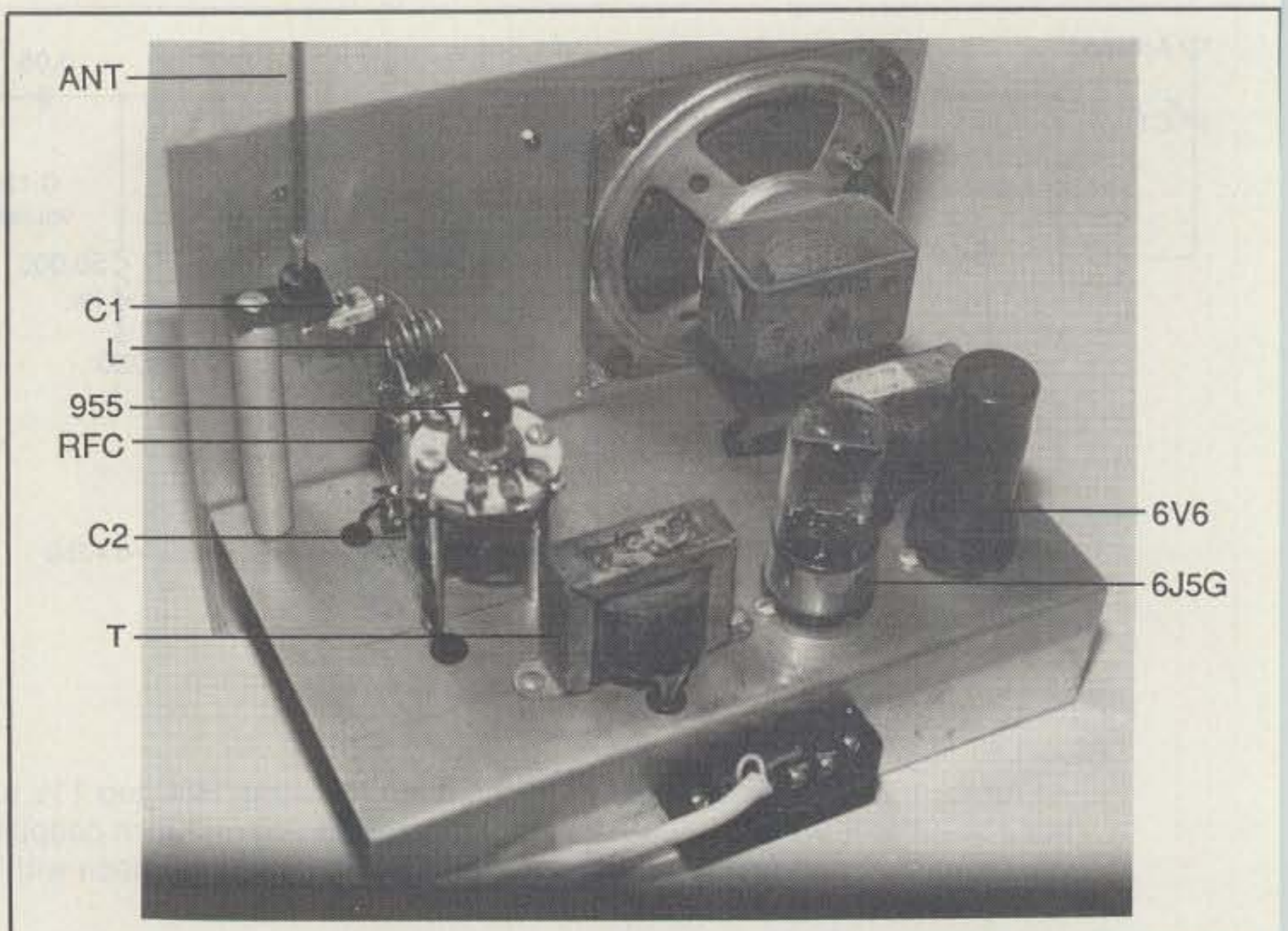


Photo 2– Interior view showing parts layout.

The schematics for the rush box and unity coupled oscillator are shown in figs. 1 and 2, respectively. The oscillator puts out enough power to dimly light a #47 pilot light bulb. **Bear in mind that the rush box radiates quite well.** A 47 inch piece of stiff wire for an antenna works just fine for the receiver. I would not recommend using the receiver to tune around 2 meters too much because someone might get upset. On the workbench, about 30 feet away from my ICOM-271H, the rush box lays a signal on the ICOM that hits +60 dB on the S meter. Funny thing is that the noise sounds like the normal background noise except that when you turn the rush box off, the S meter goes back to S1 from +60 dB. Wouldn't that give one of the locals something to wonder about?

I don't have cable (yet), and if I tune the rush box to one of the TV channels, all I can see on my TV screen is white. Does it ever wipe out the picture! Don't tune TV channels 7 through 9 with the rush box if you live in an area where everyone is still on antennas, because if you do your neighbors will be down on you like fleas on a dog! Other than those caveats, you can use your imagination as to what you want to do after you build the rush box and/or the unity coupled oscillator. "Caveat constructor" or let the builder beware!

All kidding aside, you can have a lot of fun building the rush box even if only to show it to your amateur friends. It is something that you can build with all the old tubes and parts you've been saving. CQ

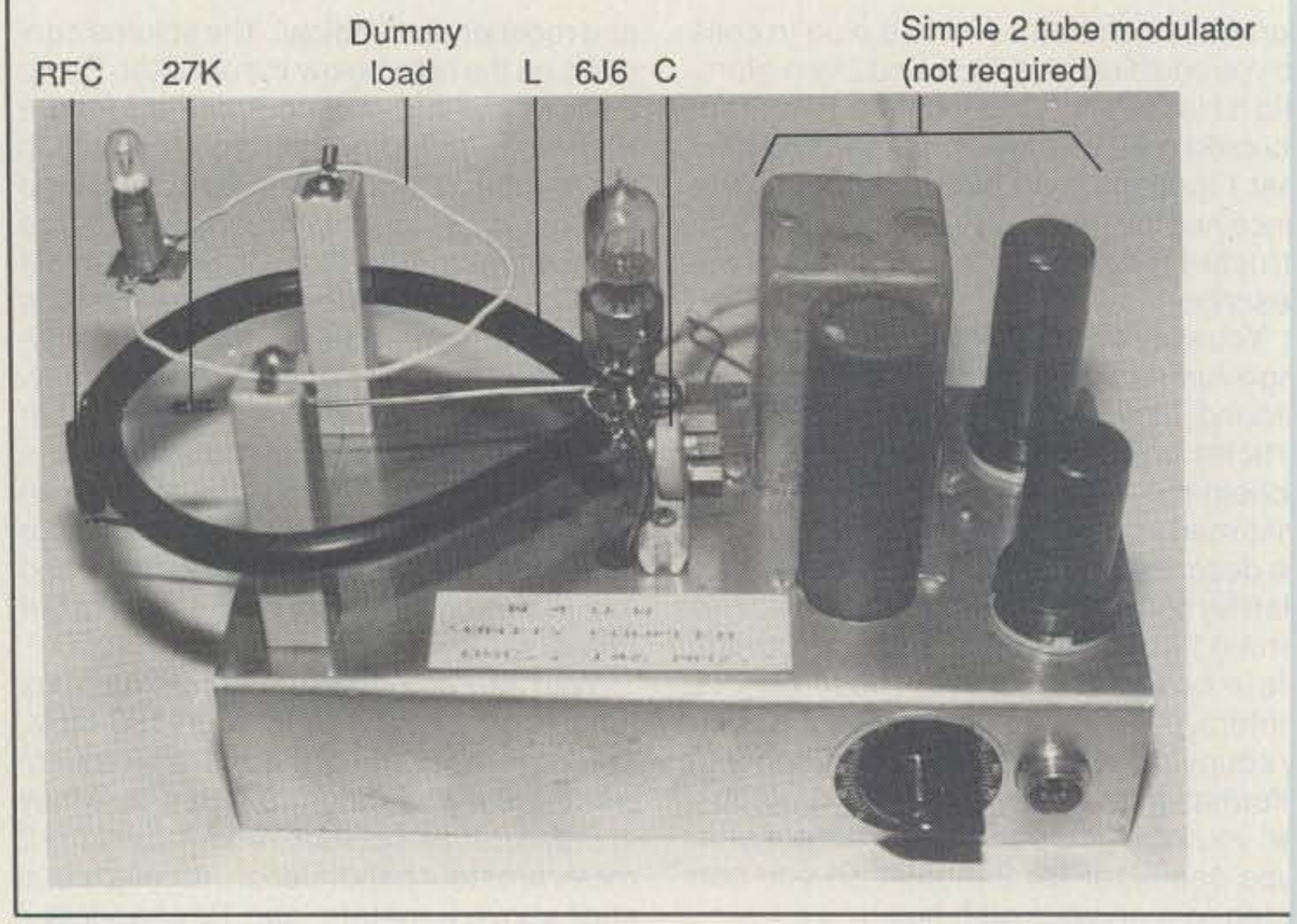


Photo 3– Major parts layout for the unity coupled oscillator. The components at the right side of the chassis comprise a two-tube modulator which is not described in this article.

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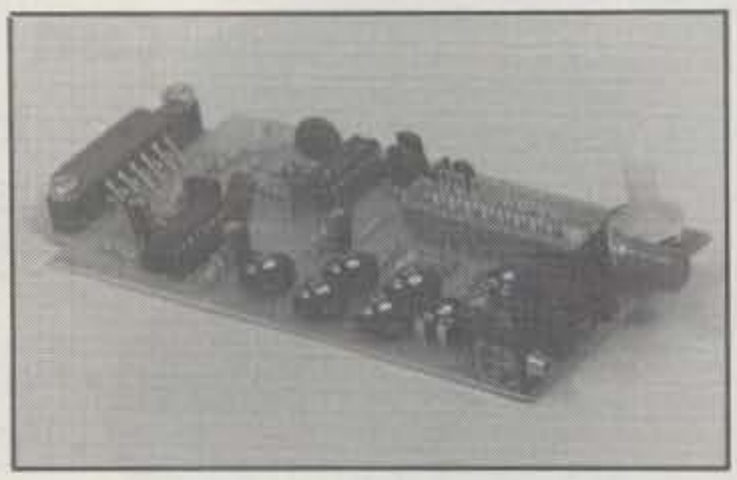
CQ SHOWCASE

Sanelli Technology OSC-100 Code Practice Oscillator

Sanelli Technology has released a new code practice oscillator, the OSC-100. The OSC-100 outputs an extremely pure CW tone to an external speaker, maker says. It features separate volume and tone controls, jacks for an external 9 volt adapter, external code key, and external speaker. It will also operate from a 9 volt battery which is installed via the battery door. It is suited for individual or group code practice sessions. The OSC-100 is enclosed in a durable black plastic case that fits in the palm of your hand. The faceplate resists wear and is cleanable.

The OSC-100 is priced at $39.95 plus $5.00 shipping and handling. For more information, contact Sanelli Technology, P.O. Box 416, Kiowa, CO 80117-0416 (303-621-2534), or circle number 103 on the reader service card.



The MFJ-1271 TNC

MFJ Enterprises has announced the MFJ-1271 TNC, priced at $49.95. If you have a Commodore 64/128 computer and VHF handheld or HF SSB transceiver, the MFJ-1271 is the only additional item you will need for joining in on packet. It plugs into the Commodore's rear cassette port and works both VHF packet at 1200 baud and HF packet at 300 baud. It has a adjustable threshold control to reduce noise susceptibility and increase QSO/connect success, especially on the HF bands. A DCD LED is included to indicate when you are receiving signals properly.

The MFJ-1271 also sports remote packet operation, mailbox-like message forwarding and Net/ROM emulation, and more. It uses MFJ's Digicom/64 public software available as MFJ-1293 for $5.00. The unit comes with MFJ's one full year unconditional guarantee. For more information or to order, contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (601-323-5869; FAX 601-323-6551) or circle number 107 on the reader service card.

P.C. Electronics TC70-10 ATV Transceiver

P.C. Electronics has introduced their new 10 watt TC70-10 70 cm ATV Transceiver. Any code-free Tech or higher licensee can have his or her own ATV station with the TC70-10, camcorder,

(continued on p. 142)

AWARDS

BY DOROTHY JOHNSON, WB9RCY

NEWS OF CERTIFICATE AND AWARD COLLECTING

The Story of the Month for July is:

Angelo Ferrari, I2PHN USA-CA All Counties #659, 20M SSB Mobile, 4-24-90

"I was born the 15th of June 1936 in a small village in northern Italy. In a village like that, where snow covers the rooftops from November until April, very few things happen. Among my few memories there is an electric plant where Wermacht veterans were on duty and where my grandfather worked. I used to bring him his lunch daily and felt at home with the electricity.

"My curiosity was aroused by a Zeppelin hanging over the main square. One day our teacher took us to the owner's house to explain some physics to us, and that day I found out what that Zeppelin was for. The owner was I1AHB, and the moment I entered his shack I was incurably infected with the amateur radio virus.

"Participation in the radio hobby was only a dream for me for many years. When I was 18 we moved to my actual QTH, and with a commercial radio set and a converter I devoted my spare moments to listening to the 20 and 40 meter bands. I finally started my apprenticeship with a homemade receiver based on a BC 453 bought on the surplus market. Being a SWL until 1960, I specialized in my major interests such as awards, contests, DXing, and generally everything that was difficult to achieve.

"Finally, on July 11, 1960 I got my license. My first transmitter was a G212 with an 807 tube, and my antennas were dipoles and a ground plane. I continued with this setup until 1965, when I built an SSB transmitter and a small linear amplifier with two 811 tubes, which brought a dramatic change in QSO quality. I still remember a memorable QSO with BR1USA in May 1966.

"I accumulated a lot of QSOs and QSLs thanks to the contests, and I devoted my time to DXCC, WPX, IOTA, and Counties awards. My 5-band DXCC is dated 1975, and notwithstanding 15 years of activity, when I tallied my counties in the record book, I felt very much down—only 415. The u-turn came in April 1978, when I2PJA informed me of what was happening on 14336 and told me that in two months time

333 South Lincoln Avenue, Mundelein, IL 60060

Angelo Ferrari, I2PHN, USA-CA All Counties #659, and number one to Italy, in his FB station.

he had collected 150 new counties. I turned to that frequency that very day! My first timid QSO on the net was when WB9RCY was net control. The 'big adventure' had begun, and it would last for the next twelve years. It was pleasant and somehow strange to hear more and more frequently, 'Go Angelo' among all the Bills, Johns, Martins, Toms, etc.

"Neither Tony, I2PJA, nor I every understood why there was always confusion between our two callsigns. Maybe it was very unusual to have the constant presence of two Italian hams, both with callsigns beginning with I2P. Anyway, at that time the activity was frantic—an average of three hours a day on 14.336 MHz. Results were most encouraging. My USA-CA 2500 is dated 7-21-82.

"It began getting harder—during 1983 only 42 new ones, and none in '85 and '86 with low solar activity. There was a slow rise in '87, but I had little time to spare. I had changed my work and was very busy making computer cables. At the end of '89 my score was minus 12 with very little hope for the future, since four of those were in Idaho and two each in South Dakota and Texas. However, my lucky star started to shine. It was Christmas morning when I met Gene, N3ANV, coming through with a 59 + 30 dB signal. It came natural to me to say 'Merry Christmas,' and since my signal was also good we started talking. I informed him that I still needed 12 counties, and he offered me his help, stating that even ON4UN was given some help. I told him I was only I2PHN, and he laughed.

"Gene started to write, call, and ask for skeds, an exhausting job. Every Sunday at 2100Z we were on 14.340 MHz. Sometimes there was a new one; sometimes we just kept calling with no reply. Once it was late at night when the phone rang. It was Gene calling to say that there was a friend waiting for me at 14336 and I should not miss him.

"In March only 5 counties were missing. I had two skeds: KØGDS for the last two counties in South Dakota around the 25th or 26th of March, and K7IOO at the end of the month for two in Idaho. Presidio was still a problem without a solution.

"The sked with KØGDS was perfect, now it was three to go. I started following K7IOO when he moved from the coast of Washington down to Oregon. It took three days before he reached the California border. I went to bed thinking that tomorrow would not be the day. During the night the phone rang. It was Gene saying 'WA9QNI/m is in Presidio, Texas. A few minutes later I6FLD and I managed to work

USA-CA Special Honor Roll

Steven Tuma, K9AGB
USA-CA All Counties #749
Mixed, 3-5-92

Larry Lowe, KE9CA
USA-CA All Counties #750
All SSB, 3-5-92

Kenneth A. See, HR1KAS
USA-CA All Counties #751
All SSB, 3-5-92

Don McCorcle, K5AAY
USA-CA All Counties #752
All SSB Mobile, 3-6-92

Robert Gregory, NWØF
USA-CA All Counties #753
All 20M SSB Mobile, 3-9-92

Kenneth Barkley, WD9HEB
USA-CA All Counties #754
All SSB, 3-11-92

Edward Hexter, AC4MP
USA-CA All Counties #755
Mixed, 3-13-92

William W. Inkrote, K2NJ
USA-CA All Counties #756
Mixed, 3-13-92

Edward Palagyi, KN4Y
USA-CA All Counties #757
All CW, 3-17-92

D.H. Allerston, G5PQ
USA-CA All Counties #758
Mixed, 3-20-92

George L. Roberts, Jr., KB3GN
USA-CA All Counties #759
All SSB, 3-25-92

Royal Lindsay Purdy, WD9HAW
USA-CA All Counties #760
All SSB, 3-25-92

USA-CA Honor Roll

3000

K9AGB	776
KE9CA	777
HR1KAS	778
K5AAY	779
NW0F	780
WD9HEB	781
AC4MP	782
K2NJ	783
KN4Y	784
KB3GN	785
WD9HAW	786

2500

K9AGB	856
KE9CA	857
HR1KAS	858
K5AAY	859
NW0F	860
WD9HEB	861
AC4MP	862
K2NJ	863
KB1AF	864
KN4Y	865
KB3GN	866
WD9HAW	867

2000

K9AGB	933
KE9CA	934
HR1KAS	935
K5AAY	936
NW0F	937
KC2YW	938
WD9HEB	939
AC4MP	940
K2NJ	941
KB3GN	942
WD9HAW	943

1500

K9AGB	1020
KE9CA	1021
HR1KAS	1022
K5AAY	1023
NW0F	1024
WD9HEB	1025
AC4MP	1026
K2NJ	1027
KB3GN	1028
WD9HAW	1029

1000

K9AGB	1221
KE9CA	1222
HR1KAS	1223
K5AAY	1224
NW0F	1225
WD9HEB	1226
AC4MP	1227
K2NJ	1228
KB3GN	1229
WD9HAW	1230

500

K0TLM	2579
UL7DA	2580
K9AGB	2581
I2EOW	2582
KE9CA	2583
K5AAY	2584
ZS6AOO	2585
NW0F	2586
WD9HEB	2587
KC4NDM	2588
AC4MP	2589
K2NJ	2590
KA5TQF	2591
N7JPF	2592
IT9ZGY	2593
KB3GN	2594
WD9HAW	2595
4N3AA	2596

The total number of counties for credit for the United States of America County Award is 3076. The basic award fee for subscribers to *CQ* is $4.00. For non-subscribers it is $10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Communications, 76 North Broadway, Hicksville, NY 11801 USA for $2.00. To qualify for the special subscriber rate please send a recent *CQ* mailing label with your application. To be eligible for the USA-CA, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 15, 1991. A complete copy of the rules may be obtained by sending an SASE to Dorothy Johnson, WB9RCY, USA-CA Custodian, 333 South Lincoln Avenue, Mundelein, IL 60060 USA. DX stations must include extra postage for airmail reply.

this one, too. The most was done, so we waited for Bill, K7IOO.

"Finally it was the 2nd of April. The night before I had left Bill at the Oregon-Idaho border, and I reckoned it was time to listen. It was 1300Z, and just before switching on the radio I received phone calls from N4ANV and N7BKW to inform me that Bill was in Boise and was waiting for me. I called on 20 meters, but there was no propagation and I asked to move to 15 meters. I tuned my SB220 and could clearly hear Bill calling me—55 reports both ways. I told him I would not move from the frequency until the end. I could hear him working other stations while he was crossing El more county, and he told me when he was five miles from Camas. Finally, Bil shouted, 'I am in Camas.' Three hours had passed. I was so excited! I called and i was 57 both ways! My last county was i the log!

"KD7AF, who was listening, called me and said, 'Congratulations, Angelo. It i over!' On April 20th all the QSLs were i my hands. Three days later the complete application was on Dorothy's desk (shipped by DHL). Tuesday night, the 24t of April, Gene called me on the phone an congratulated me. Through K9DCJ he wa able to give me my USA-CA All Countie number and confirm that I was the firs Italian to complete All Counties.

"Without Gene's help all this would no have been possible. He asked me to com on the air and I didn't know what time was. He realized then that I was still aslee while talking. It was two o'clock in th morning in Italy. I rushed to the shack an had my first QSO with him. Almost 40 othe friends then followed. 'Congratulation Angelo!' was everyone's greeting.

"A special thanks goes to N4ANV an all those who helped as mobile operato or net controls. Thanks also to WB9QN who was my guide during the first six year and a thought to the friends who left an are no longer with us. Last but not leas thanks to my wife Rosy, who never con plained and patiently tolerated all the i conveniences that I caused her, giving m the help to go ahead. 'The 'Big Adventur was finally over.—73, Angelo, I2PHN"

Awards Issued

Steven Tuma, K9AGB, filed his complet ly filled record book and received USA-C All Counties #749, USA-CA 3000 #77 USA-CA 2500 #856, USA-CA 2000 #93 USA-CA 1500 #1020, USA-CA 1000 #122 and USA-CA 500 #2581, Mixed, date 3-5-92.

Larry Lowe, KE9CA, did it all in or stride, claiming USA-CA All Counties #75 USA-CA 3000 #777, USA-CA 2500 #85 USA-CA 2000 #934, USA-CA 1500 #102 USA-CA 1000 #1222, and USA-CA 5(#2583, All SSB, dated 3-5-92.

Kenneth A. See, HR1KAS, completed of his paperwork and claimed USA-CA Counties #751, USA-CA 3000 #778, US CA 2500 #858, USA-CA 2000 #935, US CA 1500 #1022, and USA-CA 1000 #122 All SSB, dated 3-5-92.

Don McCorcle, K5AAY, submitted h completed collection of county confirm tions and received USA-CA All Counti #752, USA-CA 3000 #779, USA-CA 25(#859, USA-CA 2000 #936, USA-CA 15(#1023, USA-CA 1000 #1224, and USA-C 500 #2584, All SSB Mobile, dated 3-6-9

Robert Gregory, NW0F, received a f ly endorsed certificate for USA-CA

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Counties #753, USA-CA 3000 #780, USA-CA 2500 #860, USA-CA 2000 #937, USA-CA 1500 #1024, USA-CA 1000 #1225, and USA-CA 500 #2586, All 20M SSB Mobile, dated 3-9-92.

Kenneth Barkley, WD9HEB, qualified for and received USA-CA All Counties #754, USA-CA 3000 #781, USA-CA 2500 #861, USA-CA 2000 #939, USA-CA 1500 #1025, USA-CA 1000 #1226, and USA-CA 500 #2587, All SSB, dated 3-11-92.

Edward Hexter, AC4MP, filed his good application for USA-CA All Counties #755, USA-CA 3000 #782, USA-CA 2500 #862, USA-CA 2000 #940, USA-CA 1500 #1026, USA-CA 1000 #1227, and USA-CA 500 #2589, Mixed, dated 3-13-92.

William W. Inkrote, K2NJ, registered a clean sweep by claiming USA-CA All Counties #756, USA-CA 3000 #783, USA-CA 2500 #863, USA-CA 2000 #941, USA-CA 1500 #1027, USA-CA 1000 #1228, and USA-CA 500 #2590, Mixed, dated 3-13-92.

Edward Palagyi, KN4Y, took the final steps in his quest and received USA-CA All Counties #757, USA-CA 3000 #784, and USA-CA 2500 #865, All CW, dated 3-17-92.

D.H. Allerston, G5PQ, put the finishing touches on his good record and qualified for USA-CA All Counties #758, Mixed, dated 3-20-92.

George L. Roberts, Jr., KB3GN, logged a full set of county contacts and claimed USA-CA All Counties #759, USA-CA 3000 #785, USA-CA 2500 #866, USA-CA 2000 #942, USA-CA 1500 #1028, USA-CA 1000 #1229, and USA-CA 500 #2594, All SSB, dated 3-25-92.

Royal Lindsay Purdy, WD9HAW, submitted his completed record of all county contacts and received USA-CA All Counties #760, USA-CA 3000 #786, USA-CA 2500 #867, USA-CA 2000 #943, USA-CA 1500 #1029, USA-CA 1000 #1230, and USA-CA 500 #2595, All SSB, dated 3-25-92.

Wendy D. Kincaid, KB1AF, added an endorsement to her good record by claiming USA-CA 2500 #864, Mixed, dated 3-16-92.

Douglas Cropper, KC2YW, enhanced his record by claiming USA-CA 2000 #938, All SSB, dated 3-9-92.

USA-CA 500 certificates went to:

Thomas L. Bishop, KØTLM, USA-CA 500 #2579, All 6M SSB, 3-2-92.

Lev A. Kuznetsov, UL7DA, USA-CA 500 #2580, All SSB, 3-4-92.

Steven Tuma, K9AGB, USA-CA 500 #2581, Mixed, 3-5-92.

Erminio Pandacchi, I2EOW, USA-CA 500 #2582, All SSB, 3-5-92.

Larry Lowe, KE9CA, USA-CA 500 #2583, All SSB, 3-5-92.

Don McCorcle, K5AAY, USA-CA 500 #2584, All SSB Mobile, 3-6-92.

J.M.C. de Almeida ZS6AOO, USA-CA 500 #2585, All SSB, 3-7-92.

Robert Gregory, NWØF, USA-CA 500 #2586, All 20M SSB Mobile, 3-9-92.

Kenneth Barkley, WD9HEB, USA-CA 500 #2587, All SSB, 3-11-92.

Patricia O'Neill, KC4NDM, USA-CA 500 #2588, All 20M SSB Mobile, 3-13-92.

Edward Hexter, AC4MP, USA-CA 500 #2589, Mixed, 3-13-92.

William W. Inkrote, K2NJ, USA-CA 500 #2590, Mixed, 3-13-92.

David Charles Zulawski, KA5TQF, USA-CA 500 #2591, All SSB, 3-13-92.

Paul Nelson, N7JPF, USA-CA 500 #2592, Mixed, 3-20-92.

Pietro Marino, IT9ZGY, USA-CA 500 #2593, Mixed, 3-24-92.

George L. Roberts, KB3GN, USA-CA 500 #2594, All SSB, 3-25-92.

Royal Lindsay Purdy, WD9HAW, USA-CA 500 #2595, All SSB, 3-25-92.

Miran Voncina, 4N3AA, USA-CA 500 #2596, Mixed, 3-26-92.

Awards Available

Italian Naval "Old Rhythmers" Club Award. The INORC Award, issued by the INORC, is intended mainly to foster the use of CW among radio amateurs. It is available on the basis of CW operation only (HRD). It is a full-color print measuring 32 × 41 cm (vertical hanging). It shows the Italian Crusier *Carlo Alberto* (1896), the first war ship fully rigged with a radio station. It sailed from Naples in July 1902, reaching the Atlantic and the North Sea just for a radio campaign during which United States and Canadian coastal stations were contacted (two way). Guglielmo Marconi, Lt. Commander of the Italian Royal Navy, conducted those experiments.

This award is available to all licensed amateurs and SWLs with proof of having worked 20 INORC stations as follows: 10 with an "I" prefix and 10 with a prefix other

Old Rhythmer's Award offered by the Italian Naval Old Rhythmer's Club.

than "I," according to the following lists. Any band is valid (also mixed). No cards need be submitted. Submit a log abstract with the QSOs in detail. Contacts after January 1, 1985 are creditable. The award is mailed under safe cover to avoid bending.

DX applicants send a fee of $12. No IRCs are accepted. Europeans send 15.000 Lira or 20 DM or 7.00 pounds sterling. Send applications and fees to the IN-ORC award manager, Alberto Frattini, I1QOD, Via San Domenico 69, I-17027 Pietra Ligure (SV), Italy.

"I" members are: I1BAY, I1BQE, I1BWI, I1DNX, I1EZA, I1FEQ, I1FLC, I1MQ, I1NVU, I1NXO, I1OEC, I1ONZ, I1OOK, I1OYI, I1PRY, I1QHK, I1QOD, I1KTB, I1XHV, I1YRL, I1YXN, I1ZB, I1ZEU, I1ZRV, I1ZYR, IK1ATK, IK1AUS, IK1BAE, IK1CCS, IK1QBT, IK1QQU, IK1CLP, IK1HDB, IK1HJS, IK1HLG, IK1OAT; I2AV, I2DMK, I2GHD, I2NYN, I2OEB, I2RLX, I2VTW, IK2ATU, IK2FIQ, IK2JMG, IK2NUX, IK2OQC; I3DBD, I3GLP, I3MLD, I3PSV, I3SLB, I3VXO, I3ZJV, IK3AWP, IK3ELC, IK3HZS, IK3OCB, IK3OGI, IV3HWF, IV3TRK, IV3WFU; I4AND, I4CQO, I4HJ, I4INB, I4XXX, I4YTE, I4ZFY, IK4HLO, IK4NPA; I5FYI, I5KVT, I5NQK, I5OBQ, I5PIW, I5TBH, IA5MAG, IK5AWG; I6AEN, I6BQI, I6LWK, I6VDB, IK6IJF, IK6JAL, IK6OYP; I7CUB, I7FML, I7JPY, I7KHF, I7LMR, I7MDG, I7NMC, I7OHP, I7OXH, I7OYT, I7PHH, I7QHE, I7UOZ, I7UVX, IK7ACS, IK7IBC, IK7IDL, IK7WWL; I8CPA, I8CXU, I8FXT, I8JOV, I8QHK, I8QOO, I8SCY, I8TQX, I8WWV, IC8CQF, IK8ACR, IK8AFK; IT9AGA, IT9AQ, IT9BBG, IT9GNO, IT9GXE, IT9HVV, IT9JDB, IT9JSK, IT9NJE, IT9PBR, IT9PLM, IT9QQL, IT9USV, IT9VDQ, IT9VPP, IT9VXZ, IT9WEY, IT9XNM, IT9ZGY; I0EBE, I0EGE, I0FFO, I0HTR, I0KT, I0IRS, I0JGL, I0OAL, I0PAB, I0SNA, I0TKK, I0UYI, I0VPK, I0ZMI, I0ZYA, IK0ETP, IK0HTR, IK0JFS, IK0OFM, IK0PEE, IK0AAE. The "Marconian" station IY1TTM may also be credited.

Other than "I" stations are: 3A2GL, 3A2JV, 4X1FC, 4Z4OX, BV2A, DJ1PV, DJ2HN, DJ6SI, DK4HD, DL0MF, DL1GE, DL1LAW, DL1ZQ, DL7DO, DL8JE, DL8KAZ, EA7CAC, FE1JUD, G3LIK, GI3MT, HB9ASZ, HB9BYO, JY3HZ, KA4IFF, KA8IAB, KJ1T, IS0DRD, IS0IGV, IS0NNO, IS0XBL, LA7XB holding also EA5GGV, N8GDO, OE6PN, OE8NIK, PA3CIB, PA3FPB, PA3DSM, RA1AMW, SM1CNS, SM7BDB, SM7WI, SV1HX, SV1NA, UY5OQ, VE3NMS, W8KJP. Contacts cannot be repeated.

Worked All North Dakota Counties Award. The Theodore Roosevelt Amateur Radio Club sponsors the Worked All North Dakota Counties Award. It is available to all licensed amateurs and SWLs and is issued to them as individuals. All contacts must be confirmed by QSL, and such QSLs must be in one's possession. QSOs via repeaters, satellites, moon bounce, and phone patches are not valid.

Worked All North Dakota Counties Award (8½" × 11", in color) offered by the Theodore Roosevelt Radio Club.

The fee for the award is $2.00 (cash please). A self-addressed, stamped #10 envelope to Steve Allar, 1701 6th Ave. NE, Beulah, ND 58523 will get you an official application form and complete rules.

Kentucky Bicentennial Award. 1992 is the bicentennial year for the commonwealth of Kentucky. To celebrate this special occasion the Western Kentucky DX Association offers the Bicentennial Award to stations contacting Kentucky amateurs during 1992. Any amateur band or mode may be employed. U.S. stations need QSOs with 10 different Kentucky stations this year, while DX stations need QSOs with only 5 different Kentucky stations. The award is also available to SWLs.

Several "special event" stations will also be celebrating the Bicentennial during 1992. For example, the Simpson County celebration on June 6th. To apply for the award, send GCR list and US $1.00 or 2 IRCs to Western Kentucky DX Association, P.O. Box 73, Alvaton, KY 42122 USA.

Kentucky Bicentennial Award available from the Western Kentucky DX Assn.

Of Interest To County Hunters

Peter Jennings, VE3SUN/W6, sent word that they have added the county to the information displayed by their HamBase callsign look-up program. Now you can type a callsign and have the county of residence appear on your computer screen in less than a second for any of the 540,000 US hams in the database (provided they filed their 610 since they last moved). For more details get in touch with j•Com, 6630 Hwy 9 #103, Felton, CA 95018 (1-408-335-9120, FAX 335-9121).

Until next month . . .

73, Dorothy, WB9RCY

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YH-2 Headset for VOX Operation

FBA-12 AA 6-Cell Holder

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Following are items that should be of interest to old timers and newcomers to amateur radio alike.

624 Kits. Pat Bunn, N4LTA, is an avid electronics experimenter. He founded the 624 Kits Company for the benefit of amateurs who like to use homebrew equipment on the air. All of his kits include printed circuit boards. Except as may be otherwise stated, all required parts are included. Only high-quality parts are used in 624 Kits.

624 Kits include an audio frequency amplifier, audio frequency filter, control board for receiver and transmitter, converter, power supply, two receivers, transceiver, three transmitters, transmitter-receiver, two variable frequency oscillators, and a VFO doubler. Kit prices range from $12 through $44.

A set of data sheets can be requested from 624 Kits, 171 Springlake Drive, Spartanburg, SC 29302. Please remember to provide a business-size (#10), self-addressed, stamped envelope with such a request. Pat's telephone number is 803-583-1304.

A vintage 1945 photo of the H.M.A.S. Diamantina. The RNARS station VK4RAN is operated from her radio room.

WW II Merchant Marine Radio Operators Reunion

Bob Clough, K6RS, is the chairman of the 1992 reunion, which will be held August 28–30 at the Ramada Renaissance Hotel in Long Beach, California. This group primarily consists of men who graduated from the U.S. Maritime Service Radio School at Gallups Island in Boston harbor; however, other merchant marine radio officers (current and past) are also allowed to join the Gallups Island Radio Association (GIRA).

Many ex-merchant marine radio operators are amateur radio operators. If you know such a person, please let him know about this reunion. It is very difficult to reach such people.

Additional information can be requested from Bob. His address is 1324 Buckingham Drive, Thousand Oaks, CA 91360 (telephone 805-495-0106).

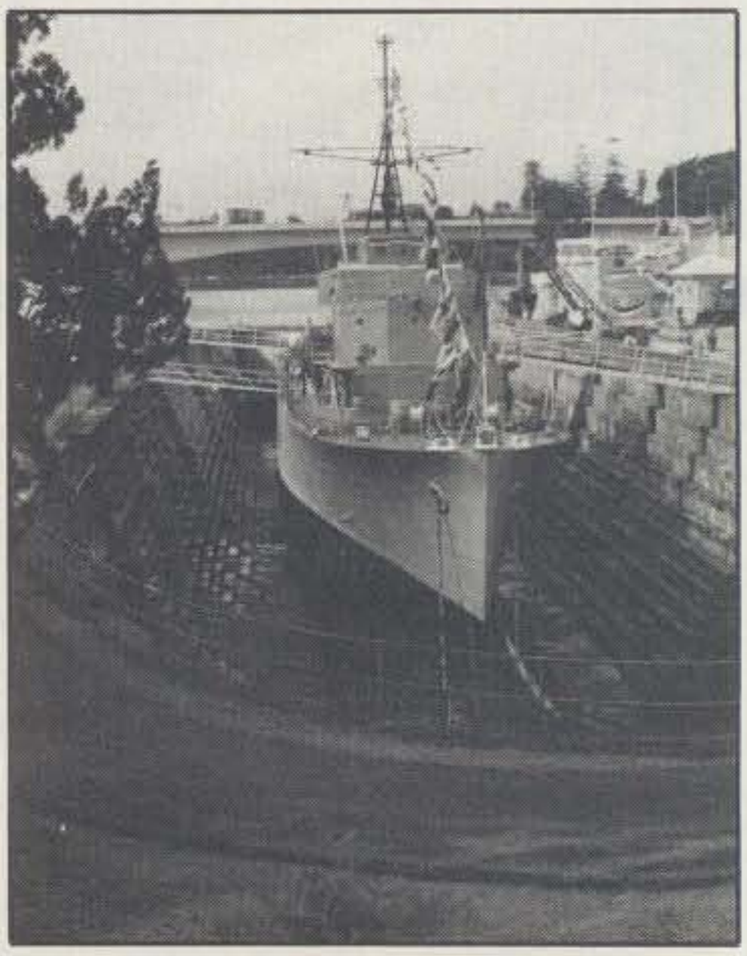
Liberty Ship Available

The *S.S. Jeremiah O'Brien* is the last Liberty ship that was built during World War II. It is docked in San Francisco at the Fort Mason Center. This ship is operational, and it makes an annual cruise of the San Francisco and Oakland areas each May. My wife (Marie, W6JEP) and I enjoyed one of these cruises a couple of years ago. This ship is regularly available for groups of up to 300 people. A group of local amateur radio operators occasionally man the ship's radio shack. This ship provides a unique setting for special amateur radio club meetings. If you are interested in these opportunities, you can contact Marci Hooper, *S.S. Jeremiah O'Brien*, Fort Mason Center, Building A, San Francisco, CA 94123-1382. (telephone 415-441-3101).

VK4RAN

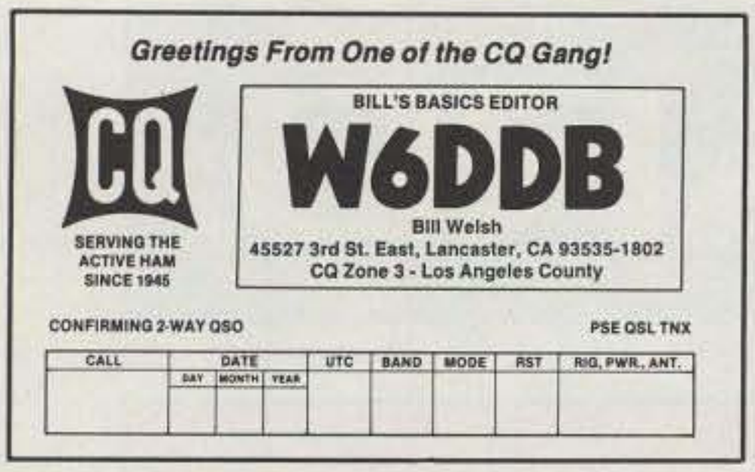
H.M.A.S. Diamantina is one of eight river class frigate sister ships. She was named after a river in the Queensland section of Australia. This ship was primarily used in anti-submarine warfare.

The Royal Naval Amateur Radio Service (RNARS) station VK4RAN is operated from her radio room. VK4RAN is usually on the air 0000-0800 UTC Wednesdays and Saturdays on 14052 kHz. If you contact VK4RAN and mail a QSL direct to them, their QSL will be returned to you by direct mail, rather than being routed via the bureau. The VK4RAN address is c/o the Queensland Maritime Museum Associa-



The H.M.A.S. Diamantina during EXPO 88.

45527 Third Street East, Lancaster, CA 93535-1802



QSL card of your editor, W6DDB.

tion, P.O. Box 3098, South Brisbane, Queensland 4101, Australia.

W6DDB Contacts

I haunt the Novice bands. I have worked 1000 to 2000 Novice band contacts each year since they were established during 1951. I can usually be heard on (or near) 21,144 or 28,144 kHz. I do not use 40 and 80 meters as much as I use 10 and 15 meters, but I do work a few hundred 40 and 80 meter contacts each year. My Novice band voice operation is not extensive, but I have worked a few hundred of them mobile during the last couple of years.

I am good for a QSL. If you are listed correctly in the current *Callbook* (or supplement), my QSL is mailed the same day. If you have upgraded recently, your name and address may be listed under a previous callsign. If necessary, send your name and address; this can be done during the contact or by mail. I do not need to receive a QSL to send one.

No one sends too poorly or too slowly to have a contact with W6DDB. I am particularly pleased to have a contact with a raw beginner. I would rather be the first contact for a new amateur than to work the rarest DX station in the world. When I finish making a call to all stations (CQ), I listen for the weakest stumbling signal among any group that answers my call. I seldom work a single contact and then go off the air; I usually stay on the air several hours working many stations. I hope to meet you on the air!

FAIRS, Ltd.

The goal of the Foundation for Amateur International Radio Service (FAIRS) is to build global friendships between peoples and nations. FAIRS creates goodwill by providing equipment, training, and volunteers. Exchange visits and assistance are also provided by FAIRS. Amateurs share the bond of a common interest with other amateurs in every country. FAIRS uses this bond to promote friendships throughout the world.

FAIRS does not have a fixed dues schedule for individuals, but an annual rate of $10 is suggested. However, a membership card is sent to anyone who requests it, whether or not a dues payment is enclosed with a request. Corporate and sponsored memberships are also available.

Group support is vitally important to the success of FAIRS. Many companies are updating equipment, replacing older IBM personal computers, which FAIRS can immediately put to good use in foreign countries.

The officers and directors of FAIRS do not get paid; they are all volunteers. All donations and dues payments apply directly to promoting friendship via amateur radio.

The FAIRS address is P.O. Box 341, Floyd, VA 24091. Their telephone number is 703-745-4023, and their FAX number is 703-382-2935.

The goal of FAIRS is to build friendships between peoples and nations through amateur radio.

FAIRS needs accessories, equipment, and electronic parts, plus the various kinds of expertise amateurs can provide.

Seven 20 minute video tapes have been made from the film footage that was shot during the May 1991 FAIRS visit to the old Soviet Union. If you want to borrow one of these tapes, request details from FAIRS. These tapes are available to both individuals and groups. FAIRS members give talks to interested groups.

Telephone Device

EDE markets a call identifier device which allows the user to see the telephone number of each person who calls your number. Their model 125C stores the numbers of the 14 most recent callers. Their Tempo model stores the numbers of the previous 99 callers.

These devices enable you to see the caller's telephone number and decide whether or not she/he wants to answer the call. If you receive prank, nuisance, or obscene calls, these devices show the telephone numbers of such callers. Each call identifier is powered by a single 9 volt (transistor) battery. These units can be wall or desk mounted and can be used with a telephone answering machine, which provides the numbers of callers who fail to identify themselves.

The EDE address is 266 Pepper Tree Drive, Buffalo, NY 14228 (telephone 716-691-3476, FAX 716-691-0604). Their catalog costs $5.00; it is filled with advertisements of surveillance and countersurveillance electronic equipment.

KC6OMY

The Kennedy High School Ham Radio Club is promoted by Craig Brammer, KC6OMY. The East Bay Amateur Radio Club has helped get 16 students licensed, with 15 more attending training sessions. The East Bay Club also donated the transceiver being used at the school. Accessories and equipment are needed to get these new amateurs on the air. If you have anything you may be willing to donate to these young people, please write to 4300 Cutting Boulevard, Richmond, CA 94804.

MFJ Helps Link Soviet States Together

MFJ donated MFJ-1278 Multimode Data Controllers to help link the Soviet states together. They will be used to set up an amateur emergency network based in the R3A station inside the Russian Parliament Building. Rick Palm of the ARRL coordinated shipment of the controllers to Russia.

MFJ Catalog

The 1992 MFJ Amateur Radio Catalog provides 20 pages of amateur radio goodies.

STANDARD®

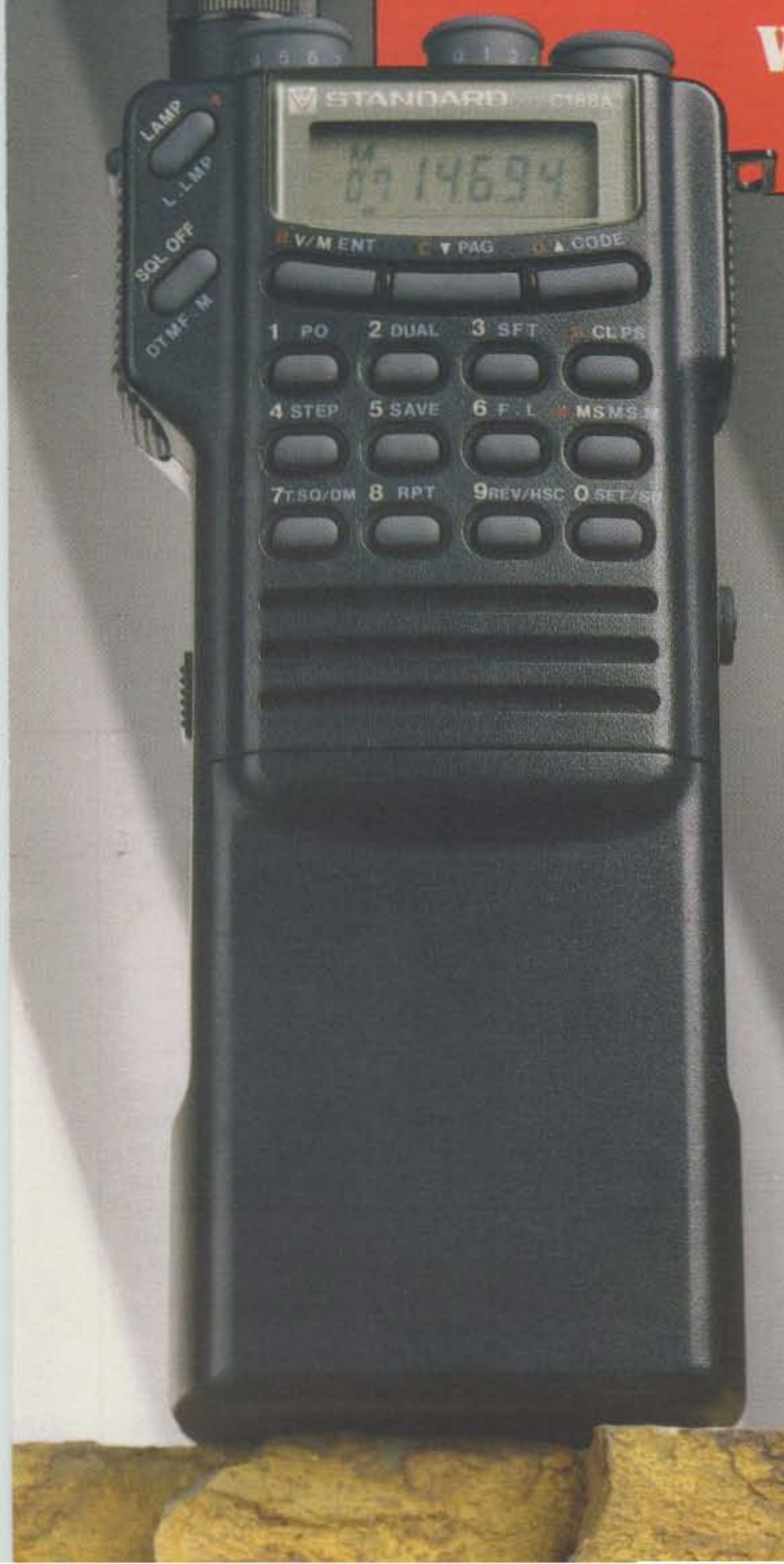
WORLD'S SMALLEST FULL-KEYBOARD HANDHELD

•

REPLACEABLE MEMORY CHIP
40 to 200 channels

•

WIDE BAND RECEIVE COVERAGE



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For more information on this and other STANDARD products, contact your nearest dealer or call STANDARD Amateur Radio Products at (312) 763-0081.

Specifications, price and features are subject to change without obligation or notice. All products carry a ONE YEAR limited warranty.

STANDARD Amateur Radio Products, Inc.
P.O. Box 48480
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STANDARD

CIRCLE 138 ON READER SERVICE CARI

SR STANDARD®

C558A TWIN BAND 2 METER / 70 CM HANDHELD

THE WORLD'S "STANDARD" OF EXCELLENCE

INTERCHANGEABLE 40-200 CHANNEL MEMORY CHIP

23 MENU AIDS FOR EASY PROGRAMMING

- MAKE NO MISTAKE THIS IS THE MOST ADVANCED HAND-HELD IN THE HAM MARKET
- REPEATER CROSSBAND MODE
- BUILT IN CTCSS ENCODE/DECODE
- WIDE BAND RECEIVE
- INTERCHANGEABLE BATTERIES AND ACCESSORIES WITH THE C228A, C528A AND C628A
- FULL DUPLEX OPERATION
- VERSATILE SCANNING MODES ALLOWS YOU TO LOCATE THE ACTION QUICKLY
- TRUE TWIN BAND HANDHELD WITH SEPARATE VOLUME AND SQUELCH CONTROLS
- RECEIVE SENSITIVITY IS UNBEATABLE, 0.158 uV FOR 12 dB SINAD
- LOWEST POWER REQUIREMENT FOR MAXIMUM BATTERY LIFE
- DIRECT FREQUENCY INPUT FROM THE KEY-BOARD

For more information on this and other STANDARD products, contact your nearest dealer or call STANDARD Amateur Radio products at (312) 763-0081.

Specifications, price and features are subject to change without obligation or notice. All products carry a ONE YEAR limited warranty.

SR STANDARD

STANDARD Amateur Radio
Products, Inc.
P.O. Box 48480
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Several new items are shown in this year's catalog; these include a 20 meter QRP transceiver, six antennas, two antenna tuners, three SWR analyzers, two mini-speaker/microphones, a low-pass filter, a multiple DC power outlet, a frequency counter, an SWR/wattmeter, Contest Connie™ software, a packet TNC, and a multimode computer interface.

Ameritron products are included in this catalog, including their new inrush current protectors and T/R switch.

A free catalog can be requested by writing to MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762 (601-323-5869).

Surplus Accessories and Equipment Catalog

A good source of surplus military electronic equipment and accessories is Fair Radio Sales Company, Inc., 1016 East Eureka Street, P.O. Box 1105, Lima, OH 45802. The current catalog lists telegraph keys, linear amplifiers, antennas, antenna couplers, receivers, wattmeters, coaxial relays, transceivers, microphones, dummy loads, headsets, RF connectors, coaxial cable, books, transmitters, test equipment, and thousands of parts. If you are interested in any of these items, you can request a catalog from Fair Radio.

MFJ's 1992 catalog has 20 pages o amateur radio items, including Ameritron products.

Wireless Trader

Volume one, number one of this publication was issued during April of this year. The cover price is $1.00 per issue. A one year subscription costs $16.95, prepaid. The "Wireless Trader" is published twice each month, and it is sent by first-class mail. Advertisements can be submitted by voice mail any time of the day or night. The voice mail box number is 404-908-7327. Event announcements are printed free. Business-card ads are accepted at the annual rate of $50. For-sale and wanted ads

Here is 8-year old John Kabir Lueb N2PMP, of Syracuse, New York. He is third-grade student at the John T. Rober Elementary School. He shares a static with his father (John, N2PMQ), who is ju tifiably proud of him.

are grouped together for miscellaneous, parts, radios, television, and test equipment.

The initial issue of the "Wireless Trader" contains a lot of ads related to antique radio. The address is 4290 Bells Ferry Road, Suite 106-36, Kennesaw, GA 30144. The publisher is Bill Howard, N4MU.

Route 66 Map

Route 66 was completed during 1926, and its 66th anniversary is being celebrated this year. I recently drove over an unrepaired portion of this historic route, and I learned why it still fascinates people. As the old song states, "It winds from Chicago to L.A." Rand McNally has published a special map to commemorate this occasion. It includes 66 things to see and do along route 66. This map is 34 inches wide and 25.5 inches high. It traces the history of road maps from their 1913 beginning to the present time. Neither the roads nor the maps were numbered before 1917. Road maps were not printed in color until 1930.

A few of the unusual things one can do along route 66 are: explore the cave in which the James gang is believed to have hidden out; feed wild burros in front of Gable's and Lombard's honeymoon haven; get a close-up view of a real crater; ride to and from the Grand Canyon aboard an antique steam engine train; see concrete totem poles; sleep in a wigwam; and visit a ranch where Cadillacs seem to sprout out of the ground.

It is interesting to note that this route number was originally going to be 60, since route numbers ending in a zero indicated first-class east-west routes. At Kentucky's insistence, 60 was reassigned to a route which traversed that state, and the previous route 60 became route 62 during the first part of 1926. The states through which the new route passed were unhappy to lose the coveted 60 designation, and they did not like 62; they accepted 66 in April of 1926. Route 66 was named the Will Rogers Highway during 1952.

If you want a copy of this 66th anniversary map, enclose $2 with your request and mail them to Rand McNally Route 66 Map, P.O. Box 7600, Chicago, IL 60680.

If you live near route 66 and you operate mobile, I hope you will make some people happy by letting them work you on route 66. I am sure that the operators on both ends of such contacts will enjoy themselves.

International Microelectronics Catalog

This 32-page catalog lists thousands of essential electronic parts. Their address is P.O. Box 170415, Arlington, TX 76003 (telephone 1-817-561-2244; FAX 1-817-561-5824).

Some of the parts listed in this catalog are battery holder/snaps, cables, capacitors, connectors, crystals, enclosures (boxes), fans, fuses/holders, integrated circuits/sockets, knobs, LEDs, microphone cartridges, plugs/jacks, potentiometers, relays, resistors, RF chokes, speakers, switches, terminals/hardware, transformers (audio/power), and transistors.

The Ham's Book of Knowledge

Edmund Schneider, AA7AN, has written a 240-page (8.5 by 11 inches) book which is interesting and useful. A nice feature of this book is the fact that it is bound in a plastic comb binder. This feature enables you to leave the book open to any page without having to hold it open.

The antenna and feedline section is 24 pages long. Thirty pages cover awards and certificates, including some very unusual ones.

The beam headings section covers 45 pages. It provides information about states and countries. This data includes the continent, *CQ* and ITU zones, long- and short-path headings (plus distances in kilometers and miles), population, population per square mile and per square kilometer, prefix, QSL via ARRL (okay or not), third-party traffic (okay or not), and UTC time difference.

Formulas and measurements are de-

St. Stanislaus is located in Bay St. Louis, Mississippi. A recent check revealed that 31 of their 8th through 11th grade students are licensed amateurs. The accompanying picture shows 11 of these amateurs.

tailed on 38 pages. Lightning, plus safety and protection, are covered on 18 pages. An alphabetical listing of more than 400 manufacturers and dealers occupies 28 pages. Each of two worldwide countries lists uses 23 pages; one is in callsign prefix sequence, and the other list is in alphabetical sequence of country names. An 8-page index makes it easy to locate desired information.

If you want more information about this book, or if you want to order it, the address to use is In-Phase Publications, 4665 East Palo Brea Lane, Cave Creek, AZ 85331-5822 (telephone 602-585-6121; FAX 602-585-6120). The present price is $25.95 per book being sent to domestic (U.S.A.) addresses, which includes shipping and handling costs.

TAB Books

The *Radio Amateur's Digital Communications Handbook* has 80 illustrations included on its 224 pages. It was written by Jonathan L. Mayo, KR3T, of State College, PA. It sells at about $15 and $23 for paperback and hardbound versions, respectively. It includes ASCII, Baudot, and Morse code charts.

The *Practical Antenna Handbook* was written by Joseph J. Carr. It sells at about $22 and $33 for paperback and hardbound versions, respectively.

Pirate Radio Stations: Tuning in to Underground Broadcasts was written by Andrew Yoder. The title tells what it is about. Copies sell at $13 and $20 for paperback and hardbound versions, respectively.

These books are available in many stores. The TAB/McGraw-Hill address is Blue Ridge Summit, PA 17294-0850.

Electronics Catalog

DAK Industries, Incorporated markets a very interesting assortment of electronic devices and equipment. Home and office

tems fill all 64 pages of their current catalog. Their address is 8200 Remmet Avenue, Canoga Park, CA 91304 (1-818-888-8220).

The ARRL Radio Amateur's Handbook

t is interesting to note that 112,000 copies f the *Handbook* were sold between 1926 nd 1930. That amount is more than three mes the number of U.S.A. amateur radio tations that were licensed by the end of 930. This *Handbook* remains a superb ource of theory and operating informaon. If you want a list of the League's pubcations, you can mail your request to the RRL, 225 Main Street, Newington, CT 6111.

The K1BV DX Awards Directory

his directory has been mentioned in preious columns written by this author, and merits being introduced to new amateurs who have not been reading this column for long time.

Ted Melinosky, K1BV, publishes a book which provides the requirements that are elated to obtaining 1729 operating awards om 117 DXCC countries. Award hunting ps are included in Ted's directory. Shortave listener eligibility is listed in this anual.

Additional details can be requested by riting to Ted at 525 Foster Street, South Vindsor, CT 06074-2936. The price per dectory sent to Canadian and American mateurs is $17.50.

The Weekly Ham Trader

Mike Sanders, KS0F, publishes "The Weekly Ham Trader," which has been ailed first class to subscribers every Friay (except holidays) since 20 July 1990. riday holidays just cause a minor shift in he mailing day. Domestic (U.S.A.) subcription prices are $13 for 6 months and 25 for one year. The advertising rate is 20 ents per word. The address of "The Weekly Ham Trader" is P.O. Box 1159, Arold, MO 63010.

QSL Managers Lists

Xpedition stations and other rare DX staons usually have a QSL manager handle he flood of QSL cards that their operations itiate. These QSL managers are listed in mateur radio publications, but such lists re necessarily brief. This item mentions wo good sources of such data.

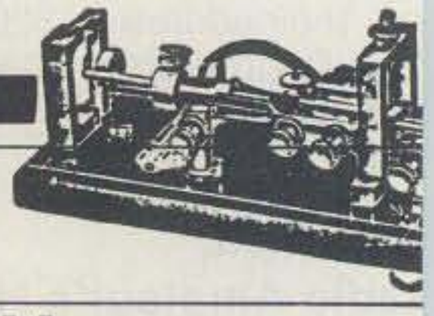
The W6GO/K6HHD QSL Manager LIst a monthly newspaper size publication of ore than 5000 domestic (U.S.A.) and foreign (DX) managers. It is continuously updated and I have found it to be very helpful. A single issue costs $2.50 mailed to U.S.A. amateurs. A 12-issue subscription costs U.S.A. amateurs $12.50. The address of Jay and Jan O'Brien is P.O. Box 700, Rio Linda, CA 95673.

Theuberger Verlag, Y24HO, offers the QSL-Routes Edition 1992 at $15 each to U.S.A. amateurs, which includes airmail delivery costs. The mailing address is Oberwasserstrasse 12, 0-1080 Berlin, Germany. This paperback has about 44,000 QSL managers and 5,000 addresses packed on 256 pages.

It is normal to work rare DX stations, even if you are not an avid DX operator. If one wants to get these cards, it is essential to request them promptly from the associated QSL managers. The preceding lists are worthwhile investments for active amateurs.

Radio FUNdamentals

BY BILL ORR, W6SA



THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Milestones of Amateur Radio—A Personal Voyage

The World's Most Popular Amateur Transmitter

Collins? Drake? Ten-Tec? Kenwood? ICOM? Yaesu? Swan? BC-610? Guess again.

The year was 1933. The world seemed to be coming out of the deep depression it had been in since 1929. There was a boom in amateur radio in that greater numbers of licenses were being issued yearly. International DX was beginning to be commonplace. Things were looking up.

In that time-frame the amateur psyche, based upon years of economic depression and a tradition of home-built equipment, was beginning to change. No longer did old timers look down their noses at the young amateur who bought a shortwave receiver instead of building his own. In fact, many of the old timers boasted a new Hammarlund Comet Pro or a National SW3 in their shack.

The store-bought transmitter, on the

48 Campbell Lane, Menlo Park, CA 94025

Complete "Gross" station reconstructed by John Rollins, W1YG. Jerry Gross, W2AAE, had a big amateur radio store on "Radio Row" in New York City. Station monitor at left, shortwave receiver center, and CW version of the "46 job" at right. Antenna tuner is mounted on wall.

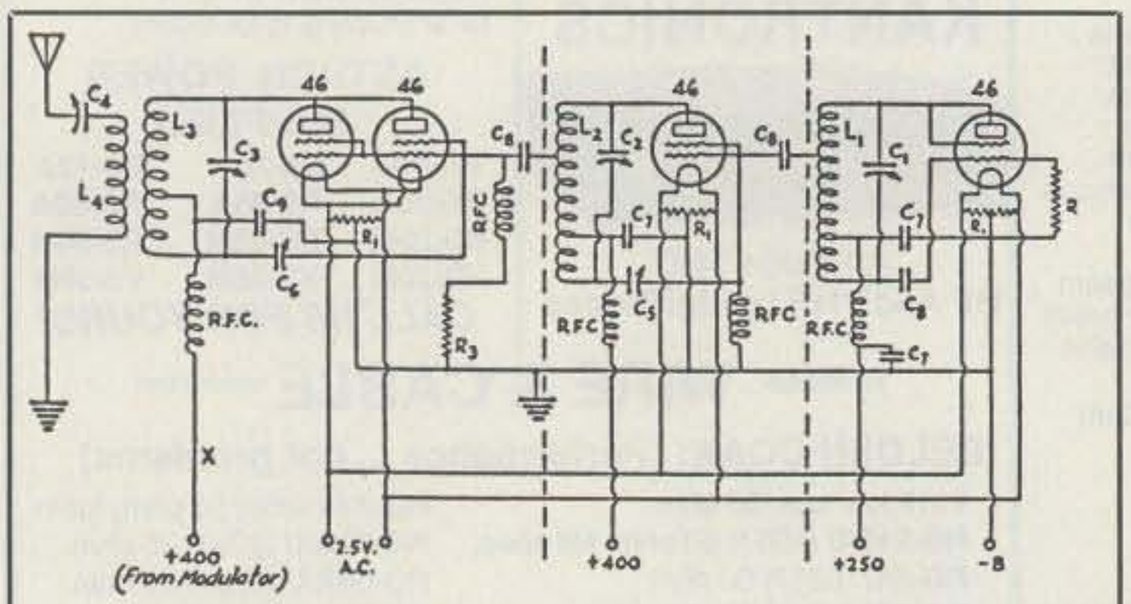
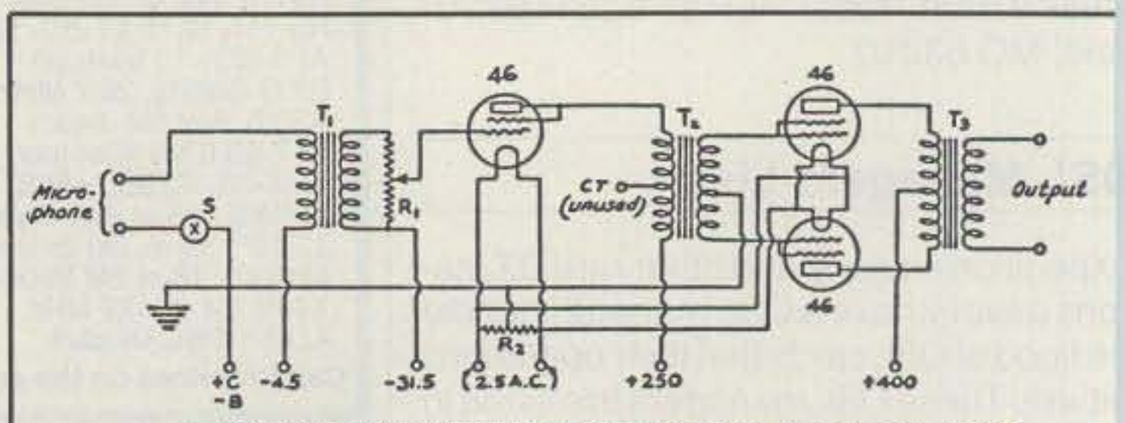


Fig. 1– The RF section of the "46 job." Parallel-connected 46s in final amplifier suffered from parasitic oscillations in many cases. Self-excited oscillator was unstable. Isolation between stages was poor. Bottom line: It worked!

Fig. 2– Modulator for the "46 job." Audio gain was marginal, and operator usually had to yell into single-button carbon microphone.

— WIRING DIAGRAM OF THE RADIO-FREQUENCY END

C_1 — 500-μμfd. variable condenser.
C_2, C_3, C_4 — 250-μμfd. variable condensers.
C_5 — 100-μμfd. midget condenser.
C_6 — 50-μμfd. midget condenser.
C_7 — 005-μfd. fixed condensers.
C_8 — 250-μμfd. fixed condensers.
C_9 — 001-μfd. fixed condenser.
R_1 — 20-ohm center-tapped resistor.
R_2 — 50,000-ohm, 1-watt resistor.
R_3 — 1000-ohm, 2-watt resistor.
RFC — Radio-frequency chokes, Silver-Marshall Type 275 or equivalent.
L_1 — 17 turns of No. 12 enamelled wire, spaced to occupy 2½ inches on 2½-inch diameter form, tapped at 5th turn from grid end. Buffer excitation tap at 10th turn from plate end.
L_2 — Plate portion: 30 turns No. 18 enamelled, spaced to occupy 1½ inches on 2½-inch diameter form, tapped at 23rd turn from plate end for excitation to following stage. Neutralizing portion: 12 turns same spaced to occupy ¾-inch on same form, ½-inch away from plate portion.
L_3 — 38 turns of No. 14 enamelled wire, spaced to occupy 3½ inches on 2½-inch diameter form, tapped at center.
L_4 — 30 turns of No. 18 enamelled wire on 1½-inch diameter form; no spacing between turns.
Key or keying relay may be placed at X for c.w. transmission.



— WIRING DIAGRAM OF THE CLASS B MODULATOR

T_1 — Single-button microphone transformer.
T_2 — Class B input transformer; turns ratio, total primary to total secondary, 1 to 1.
T_3 — Class B output transformer; if secondary is not tapped the turns ratio from total primary to secondary should be 1 to 0.79.
R_1 — 500,000-ohm potentiometer.
R_2 — 20-ohm center-tapped resistor.
S — Single-pole single-throw switch.

New Model DR-599T

Here's the radio that goes where no radio has gone before. This is truly the most advanced twin-bander available today.

Hi-tech features and ergonomic design put the DR-599T in a league of its own. From the Remote control microphone to the contoured fingertip buttons, the DR-599T looks and feels like a smooth operator.

Space limitations are not a problem for the DR-599T. The detachable control head allows the transceiver body to be hidden from view while the sleek control head can be neatly mounted on a dash or visor. (Optional separation kit required).

This DR-599T has full duplex cross band operation and cross band repeater functions with real-world power and excellent sensitivity. Airband receive is also possible with a simple modification.

The standard features include 3 power output selections, ARM, ABX, Bell, Reverse, Mute, and Auto Dialer functions. Also, with the optional EJ-8U DTMF Decoder board installed, the DR-599T can be remotely operated from another transceiver.

Check out the affordable technology of the 90's.
Check out ALINCO.

ALINCO ELECTRONICS INC.

ALINCO ELECTRONICS INC.
438 Amapola Avenue, Unit 130, Torrance, CA 90501
Tel. (310) 618-8616 Fax (310) 618-8758

Two Year Limited Warranty.
Specifications and features are subject to change without notice or obligation.

Effective Boom Length (inches) (A)	Element Diameters (inches) 1.2500 (B)	1.0000 (C)	0.7500 (D)
0.000	72.0000	66.0000	74.5437
200.000	72.0000	66.0000	63.0000
382.000	72.0000	66.0000	61.1222
647.000	72.0000	66.0000	49.7729
1001.000	72.0000	66.0000	49.1741
1355.000	72.0000	66.0000	48.0068
1709.000	72.0000	66.0000	47.5130
2063.000	72.0000	66.0000	47.5101
2417.000	72.0000	66.0000	47.9200
2771.000	72.0000	66.0000	48.3252
3125.000	72.0000	66.0000	38.2622
3479.000	72.0000	66.0000	34.2108
3833.000	72.0000	66.0000	42.2868

Notes:
(A) = Spacing from reflector element in inches.
(B) = One half of center section measured from boom out.
(C) = All sections same length.
(D) = Tip section; adjust each tip section for proper length.

Table I– Half-element lengths of W6TSW array. Elements are made of 1.25, 1.0, and 0.75 inch diameter tubing. Correction factor of about 5 inches is applied to account for taper.

other hand, was something else. First of all, there weren't many such transmitters available. A few kits were on the market for low-power CW rigs, but most amateurs thought a fellow who didn't build his own transmitter was a complete "lid." Even the affluent amateur who had somebody else build him a custom-designed transmitter was looked upon with scorn—especially by the upcoming amateurs, mostly young high-school lads who had more bravado than money.

Perhaps it was envy. Who could afford to spend, say, $60 for a 50 watt transmitter kit? Or $9.95 for an off-brand 203A transmitting tube? Especially on an allowance of 50 cents a week!

The "46 Job"

By early 1933 the word had spread around amateur radio like wildfire. In the July and August 1932 issues of *QST* magazine there was a sure-fire circuit of a 50 watt, 160 meter phone rig that could be built for a few dollars! And most of the parts were available on the local "radio row," even in the smaller towns!

Only a few of the newly licensed amateurs could afford $2.50 for a year's subscription to *QST*. Individual issues of particular interest were picked up for 25 cents at the local newsstand or cigar store by the lucky amateurs who had a little extra cash. Most did without.

Alas, the popular *QST* issues disappeared quickly. The only recourse was to find a pencilled or mimeograph copy of the circuit from an amateur who had built the little transmitter.

So it was in the spring of 1934 when I got on the air with a 4 watt phone transmitter and found my operating radius was restricted to about 2 miles. I then decided to build the "46 job" that all the prominent 160 meter operators were using.

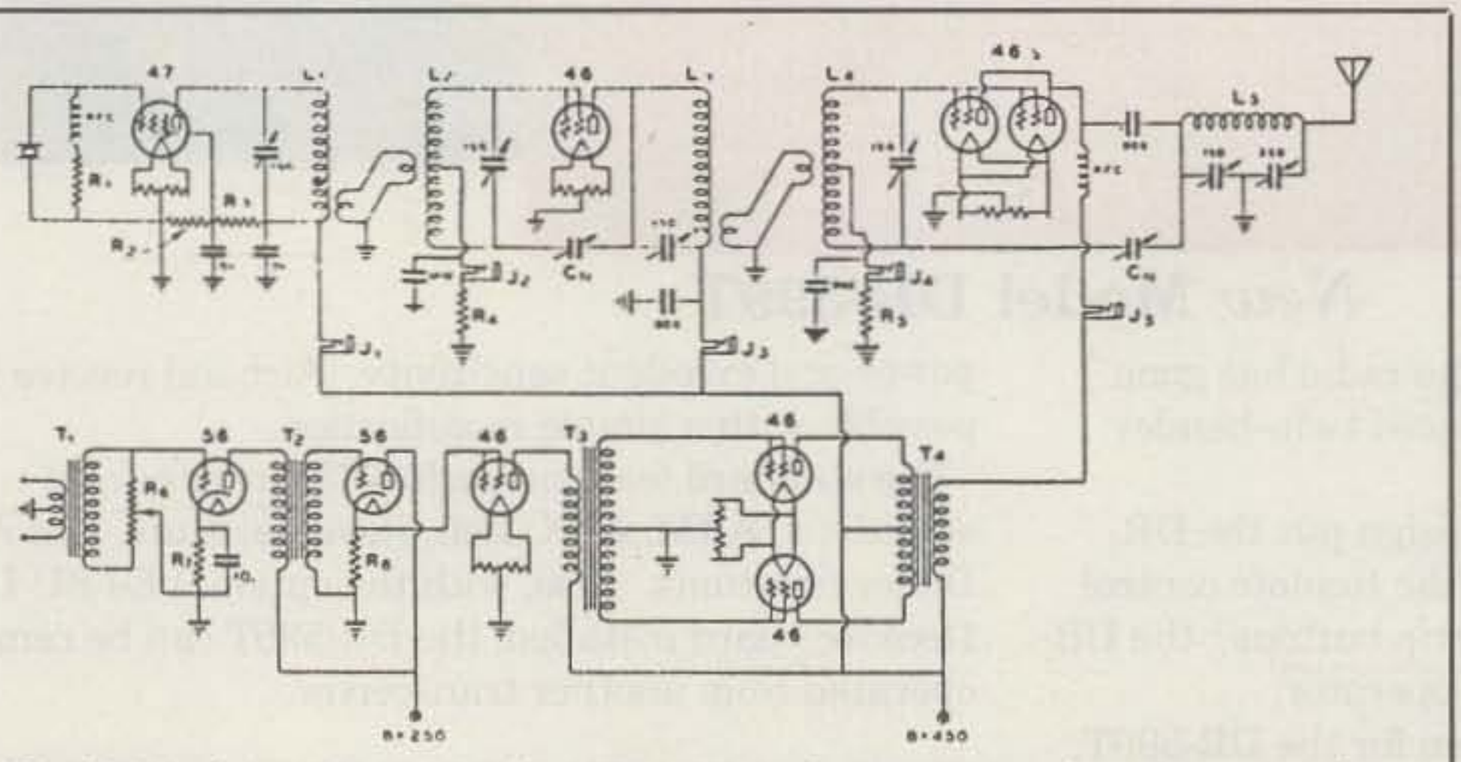
After floundering around a spell, I got a well-worn copy of the circuit from "Chick," W2GYH, in the next town (figs. 1 and 2). Chick told me that I must substitute a 47 crystal-controlled oscillator for the 46 self-excited oscillator to make the rig up to date. He thoughtfully included the necessary circuit modification.

Armed with the schematic, I took the subway to lower New York City and "radio row," the area bounded by Cortland, Vesey, and Dey streets. Twenty-five cents was quickly spent for an old battery receiver. That provided most of the parts for the transmitter. Fifty-nine cents apiece bought new, boxed RCA 46 tubes. (I was chagrined later to learn I could have bought three lesser-known brand tubes for a dollar if I had poked around a bit more.) The power transformer cost a staggering $2.85. Another $1.50 for the filter capacitors. A few sockets and resistors came to $1.05. Before I knew it, I had spent $8.00 plus subway fare!

It wasn't until I had built the RF section of the transmitter on a breadboard that I faced the problem of getting a 160 meter crystal. Three dollars and fifty cents? No way! I finally found a benevolent local amateur who would let me finish a rough quartz blank on his crystal grinder for 25 cents, plus the cost of the holder (15 cents).

The next purchase was a set of modulation transformers. The cost of these jewels consumed countless hours of after school work and weekend jobs around the neighborhood. A second trip to radio row and $3.85 bought these expensive items. Finally, a single-button carbon microphone was purchased from a friend for 50 cents. (I had a guilty feeling that it had been "liberated" from a telephone booth.)

Ruefully, I totaled up all I had spent. All told, including miscellaneous small components, it came to an astronomical $16.00! I was broke, but on the air with the big boys!



R1—30,000 ohms. R2—10,000 ohms. R3—20,000 ohms. R4—200 ohms. R5—1000 ohms. R6—500,000 ohms. R7—2500 ohms. R8—100,000 ohms. T1—Mike-to-Grid Transformer. T2—One Plate-to-One Grid Audio Transformer. T3—Class B Input Transformer, 2½-to-1 step-down. T4—Class B Output Transformer from 46s to 4,000 ohms. L1, L2, L3, L4, L5—See Coil Winding Tables for Link Coupled Stages.

Fig. 3– Later version of the "46 job." More audio gain and better circuit isolation provided good results. Pi-network output stage was novel innovation. Amplifier stage still suffered parasitic oscillations.

The World's Most Popular Transmitting Tube

I soon found out that I was in friendly territory. Nearly every station I worked on 160 meters was running the "46 job." Informa-

ion on how to make the little transmitter perform at its best was exchanged back and forth. Conventional wisdom: don't buy RCA tubes. National Union 46s were better! Don't run more than 25 mills grid current per tube. Keep the plate voltage under 500. And so on.

The "46 job" was popular on the higher frequency bands, too. As I expanded my horizon to 80, 40, and 20 meters, I found the same transmitter line-up on the air. Today, looking back through a dusty box of QSL cards of the pre-World War I period, by far the majority of stations I worked used the 46 tube in one fashion or another. The popular line-up was a 47 crystal oscillator, a 46 buffer, and two 46's in parallel running 40 to 50 watts input. If the builder knew his onions, used good components, and didn't "push" the tubes too hard, they would work as high as 20 meters! In fact, some fearless souls even got them to function, after a fashion, on 10 meters.

Soon commercial transmitters came on the market using the popular 46 tubes. Collins Radio Co. had the 32B rig for $125. Gross Radio had the CB-25 (see photo) for $95. Well-heeled amateurs could afford these 50 watt phone/CW rigs.

By late 1934 an improved circuit for the "46 job" was available (fig. 3). Popularized by the *Radio Handbook*, a west-coast publication, the new rig found great popularity in the 6th and 7th call area districts. Many ills of the original transmitter were cured by this up-to-date version, which even included a pi-network output circuit.

The Slow Death of the 46

This was an ironic situation. RCA had developed the 46 tube in 1930 as the answer to the supposed demand for high-power audio in the home-entertainment receiver. Two 46's would deliver up to 25 watts audio signal as a class B amplifier, using another 46 as a driver. Unfortunately, just as the 46 hit the market, new broadcast receiver designs were swinging away from brute-force audio to "high fidelity" designs that required simple, low-cost, low-distortion class A amplifiers, using the 45 triode or the new 42 pentode tube. These tubes did not require a 500 volt heavy-duty power supply required by the class B connected 46s. For all intents and purposes, the 46 was "dead in the water."

The ubiquitous 46 survived, however, as an amateur transmitting tube. It was a medium-size glass bottle with a 5-pin base. With the two grids tied together, it worked as a high-mu triode, requiring no bias. It was cheap, and a single tube could deliver nearly 15 watts in RF service. In summary, it was "user friendly."

Untold thousands of 46's were used by radio amateurs (and even by small commercial transmitter manufacturers) until the 6L6G and the 807 (a genuine 20 watt transmitting tetrode) appeared on the

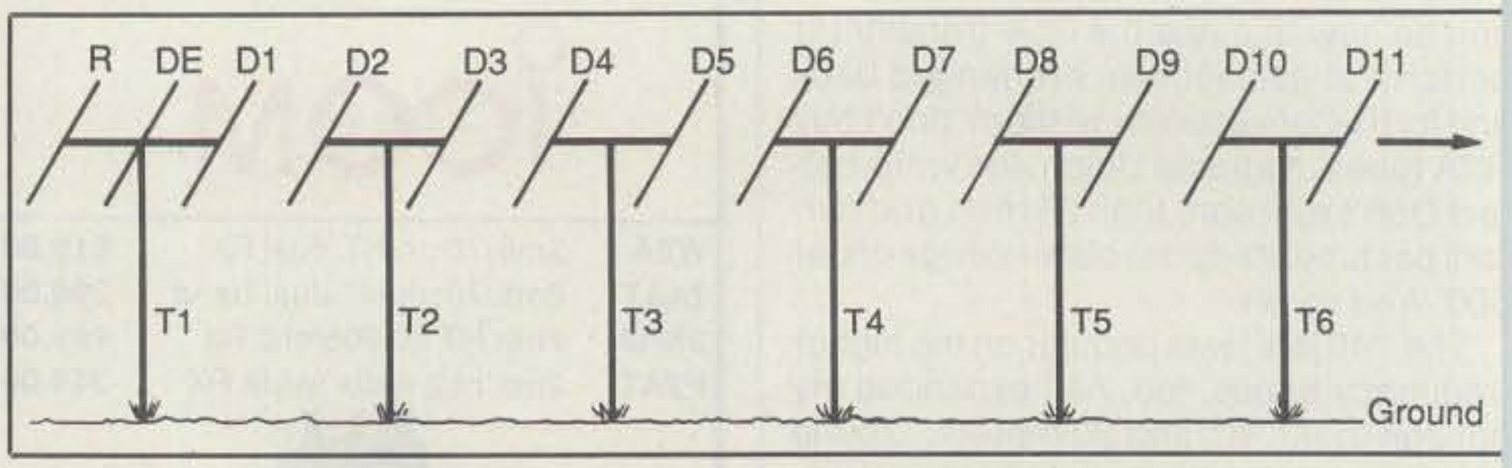


Fig. 4– Physical layout of W6TSW 13-element, 14 MHz Yagi. Six towers were used, with beam fixed on Europe.

scene in the fall of 1936. Amateurs quickly lost interest in the 46. Thus, it appears that the 46 dominated the amateur market as a low-cost transmitting tube during the 1932–36 period. It continued to be used by some until late 1941, when amateur radio was closed down "for the duration." Today the 46 is found only in the junk box or in a collector's family of pre-war tubes. A pity.

Build A "46 Job"?

Why not? Old-time radio enthusiasts can easily find the necessary parts and tubes to build a "46 job." I had one a few years ago, working on 160 meters. It really was a lot of fun, and I quickly found an AM net where the attributes of the little transmitter were appreciated. It would be just the thing for the Antique Wireless Association yearly contest for old-time stations! (Write to John Ward, KE2ST, Box 7, E. Bloomfield, NY 14443 with SASE for info on the contest.)

The 20 Meter "Channel Master" Yagi Beam

Now that computer-assisted designs fo Yagi arrays are at hand, a large beam ca be built with the reasonable assumptio that it will work when the user finally get it atop his tower. As the DX competition in creases on 20 meters, more and mor large arrays are showing up on the banc Who knows? Maybe someday, when you ship comes in or you win the state lottery you might be the possessor of a 5 acr "spread," a 100 foot tower, and the desir to build a "channel master" Yagi that wi make you "top man" on the frequency Even if you have no such desire, the follow ing beam design should be of interest, a least from the theoretical point of view!

Built by W6TSW and friends, the 13-ele ment, 20 meter Yagi was 319 feet long an boasted 11 director elements. The bear was fixed on Europe and the constructio was novel (fig. 4). Six boomlets wer

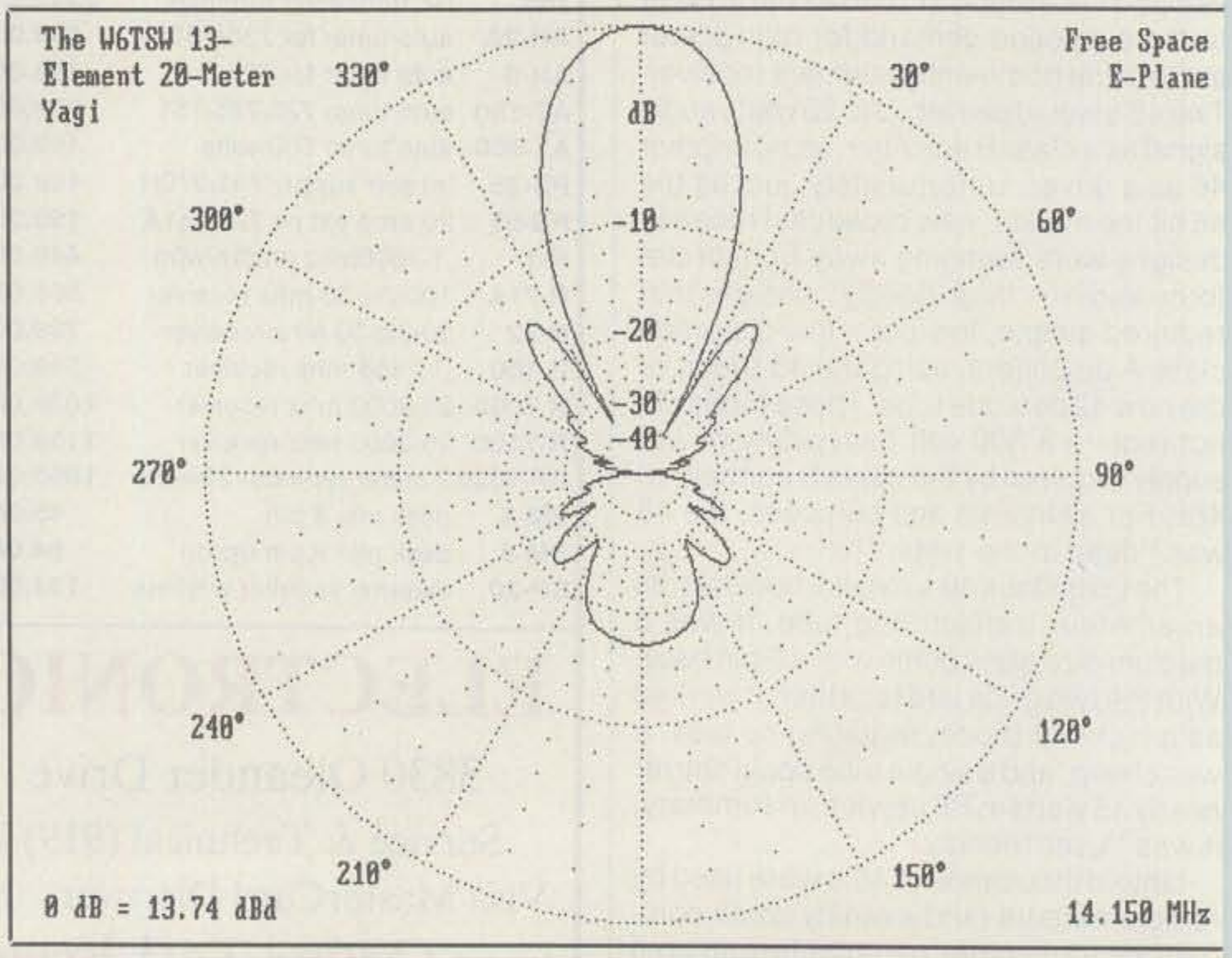


Fig. 5– Polar plot of W6TSW array derived on K6STI Yagi Optimizer program. Front-to back ratio is about 18 dB. Forward gain is 13.74 dBd at band center.

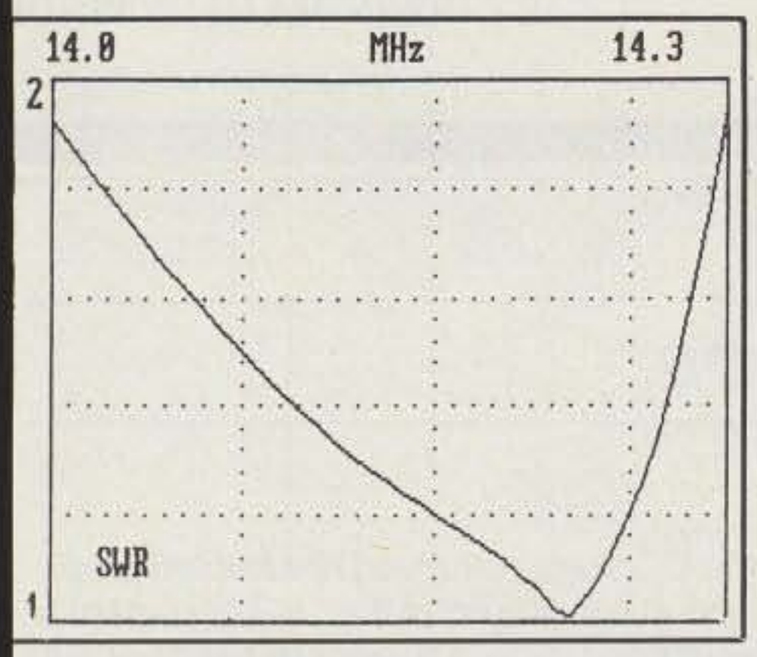


Fig. 6– SWR curve of W6TSW 13-element array is better than 2-to-1 across the band when properly matched.

mounted on six towers and the whole array was erected on a mountaintop southeast of Los Angeles. It is believed to be the largest single-Yagi HF array in the world.

The design was optimized using the YO computer program of K6STI. At the design frequency of 14.2 MHz forward gain is 13.74 dBd with a front-to-back ratio of 16.58 dB. Input impedance is about 16 ohms. The free-space plot of the array is shown in fig. 5. The –3 dB reference points of the forward lobe indicate a beamwidth of about 30 degrees. The SWR response is shown in fig. 6.

Element lengths and spacings are shown in Table I. The first column is spacing, as measured forward from the reflector. The second column lists the half-length of the center section of each element, made of 1.25 inch diameter tubing. The third column shows the length of the next element section, made of 1 inch tubing. The fourth column lists the tip sections, made of 0.75 inch diameter tubing.

No doubt someone will duplicate this design. I bet it will be a Finnish amateur, as OH-land is the land of really big Yagi beams!

Shop Talk

With reference to my remarks about lightning protection, Richard Little, KY9L, who worked for Motorola in the design of surge-tolerant radios and surge-attenuating circuits, suggests that my readers refer to his article in the September 1989 issue of *Ham Radio* magazine for a comprehensive overview of the subject. I concur and heartily recommend this as important readiing for every amateur.

Bob, KA9PRF, writes me that he had plenty of trouble with his transceiver until he replaced his imported 6146Bs with General Electric tubes. As soon as he gave heave-ho to the imported bottles, all his problems vanished.

Bill Howard (call unknown) alerts me to the fact that there is a new "yellow sheet" available. It is a classified ad publication, very nicely done, which caters to buying and selling old-time radios and components. Do you want a Colin B. Kennedy model 281? It's listed in the "Wireless Trader," as are a Philco 511, a Freshman Masterpiece V, and other goodies. Or if you want to sell a horn speaker or a Scott Philharmonic, list them in the sales section. More info by writing: "Wireless Trader," 4290 Bells Ferry Road, Suite 106-36, Kennesaw, GA 30144.

Wanted! I need a Drake 3300-LP lowpass, 50 ohm, TVI filter for some tests. If you have one for sale, contact me at my *Callbook* address or via the *CQ* editorial office listed at the front of this magazine.

George, W1OLP, writes me that the telephone RFI filter I recommended in the April 1991 column can be built within a "Modular Surface Mount" box (No. 495341) made by Master Electrician Inc. and sold through Tru-Value Hardware stores. The attachment cord can be made by cutting the end off a phone-to-wall cord, using a special cutting tool (Radio Shack 279-388). The capacitors are .0047 uF, 300 volt (Radio Shack 272-130). The cord is tied to the block by drilling four small holes in it and lacing the cord down with dental tape or floss. Use the red and green line wires. Snip off the yellow and black leads unless you have multiple lines, call holding, etc. If you do, you'll probably have to pass these leads through a separate filter.

Finally, I received a letter from Lloyd, W9YCB, telling me that when he was a young lad in high school his science teacher challenged the kids to make a "Back to Basics" radio receiver using an old headset, a tin can, a blob of lead, some sulphur matches, and various hand tools. Lloyd did it. The mixture of lead and suphur approximated galena for a detector. The ends of the tin can made a variable capacitor separated by a piece of paper. The body of the can was cut into a long, narrow strip with metal snips to make the coil and the antenna. Try it! See if you are as smart as the old timers were!

The Dead Band Quiz

The great majority of my readers are really heads-up when it comes to these quizzes. Here's another one to tease your little gray cells.

You know your primary line voltage is 117 volts RMS. What is the peak voltage, the peak-to-peak voltage, and the average voltage based on this value? Ha. Gotcha!

New members of the "Quizmasters Club" who know their way around the playing field are: KB0HIB for his monumental knowledge of the movie *High Road to China*. Other experts on this picture are P29MB and KD0YZ.

Don, N6IXP, knew the *Twilight Zone* episode which included amateur radio was called "Static," starring Dean Jagger; the first public message sent via telegraph was "What hath God wrought?"; and the two callsigns mentioned in the radio version of *War of the Worlds* were 2X2L and 8X3R. Others knowledgeable about the *War of the Worlds* were KM7U, N4JMO, and WB5BKL.

Replies are starting to come in about "Moscow Rules." KA6A, WD4CNZ, N3GWW, W3HHG, and WA4JTI (no doubt all employees of the Circus or Moscow Center) knew the quote was from *Smiley's People* by John LeCarre. "Max" was the code name for George Smiley; Vladimir, the old Red Army General (code name "Gregory"), delivered the message to Mostyn, the young lad who was at the Circus the night the call arrived.

"Moscow Rules" refers to a complex method by which spies communicate clandestinely (use of pay phones, chalk marks at prearranged locations, dead drops, etc.).

Thanks to the following who wrote me personal letters. I really appreciate them: WH6EQ, KH6GI, W9NVD, WD6BUK, Les Hannibal, N8LMB, KC8FS, and W9YCB.

See you next month. Bye, bye. Buy Bonds!

73, Bill, W6SAI

MATH'S NOTES

BY IRWIN MATH, WA2NDM

WHAT'S NEW AND HOW TO USE IT

Digital Data Transmissions

With the increasing use of computer control in our amateur equipment as well as the increasing use of microprocessors and their relatives in all sorts of peripheral devices, it is important to be familiar with the various data communications standards and techniques that might be encountered in our experimenting. As a result, we will spend a little time this month looking at some of the more common digital data transmission schemes around, and next month, we will get to the actual standards and transmission circuitry.

To begin, I would like to clear up a little matter about which people seem to have a great deal of confusion—the difference between frequency and data bit-rate and data baud rate.

The best way to do this is to refer to the two signals shown in fig. 1. The upper square wave represents a frequency of, let's say, 10 kHz. This means that 10,000 complete cycles occur each second, each cycle consisting of one positive half-cycle and one negative half-cycle. So much for conventional "frequency." The lower signal, in the data transmission world, represents a stream of logic bits which can be either "ones" or "zeros." Since the lower signal has the same time base as the upper one, in our example, you can easily see that 20,000 bits can be represented each second, one for each half-cycle. As a result, **the maximum rate of a signal is always twice the equivalent frequency of that signal.** In actuality, the data signal need not be "square," but could consist of several "ones" followed by several "zeros," in which case the equivalent frequency would be even lower. With regard to baud rate, it is defined as simply the number of transitions per second. One change per second equals 1 baud; 300 changes per second equals 300 baud; 9600 changes per second equals 9600 baud. It doesn't matter if each transition represents ones or zeros. It also doesn't matter if each transition represents 1, 2, or 8 bits. Since our digital signal of fig. 1 changes 20,000 time per second, it has a baud rate of 20,000 baud.

There are two main schemes used to transmit digital data. These are "NRZ," or non-return to zero, and "RZ," or return to zero. The first can be thought of as a DC-coupled method in that the output can remain either high or low indefinitely. It does not have to return to zero. The second can be thought of as AC coupled in that the signal must always return to zero. In this case, "logic 0" is 0 and "logic one" is a pulse that goes from zero to one, but then must fall back to zero after some predetermined time. Fig. 2 shows how a digital signal would be transmitted in both the "NRZ" and "RZ" formats.

In general, the "NRZ" format is used for short-distance transmissions. Preserving the DC state requires DC-coupled amplifiers at some point in the "NRZ" transmission system, and these are hard to build with high gain, wide bandwidth, and DC stability. "RZ" signals, on the other hand, can easily be conveyed by AC-coupled, zero-drift amplifiers, so this format is usually used where data is to be transmitted over long distances. Ordinary Morse Code can be thought of as "RZ," since the space between "dots" and "dashes" can be zero with no loss in data.

Both "NRZ" and "RZ" suffer from one common problem: the fact that either can remain in the zero state for long periods of time if a string of zeros is being sent or if no data is being sent at all. As a result, a transmission system that fails will not be detected unless a "keep alive" signal is transmitted in between the data. In addition, data synchronized to a clock, such as the output of a multiplexer, will lose its reference, since two or more logic "zeros" in a row will appear the same as a failed system. To address this situation, a number of clever transmission methods have been developed. Fig. 3 shows two of these—FSK and PWM.

FSK, or Frequency Shift Keying, employs two different frequencies. The first frequency signifies a logic 1 condition, while the second frequency signifies logic 0. Since one of the frequencies is always being transmitted regardless of the logic state, the receiver recognizes a loss of

c/o CQ magazine

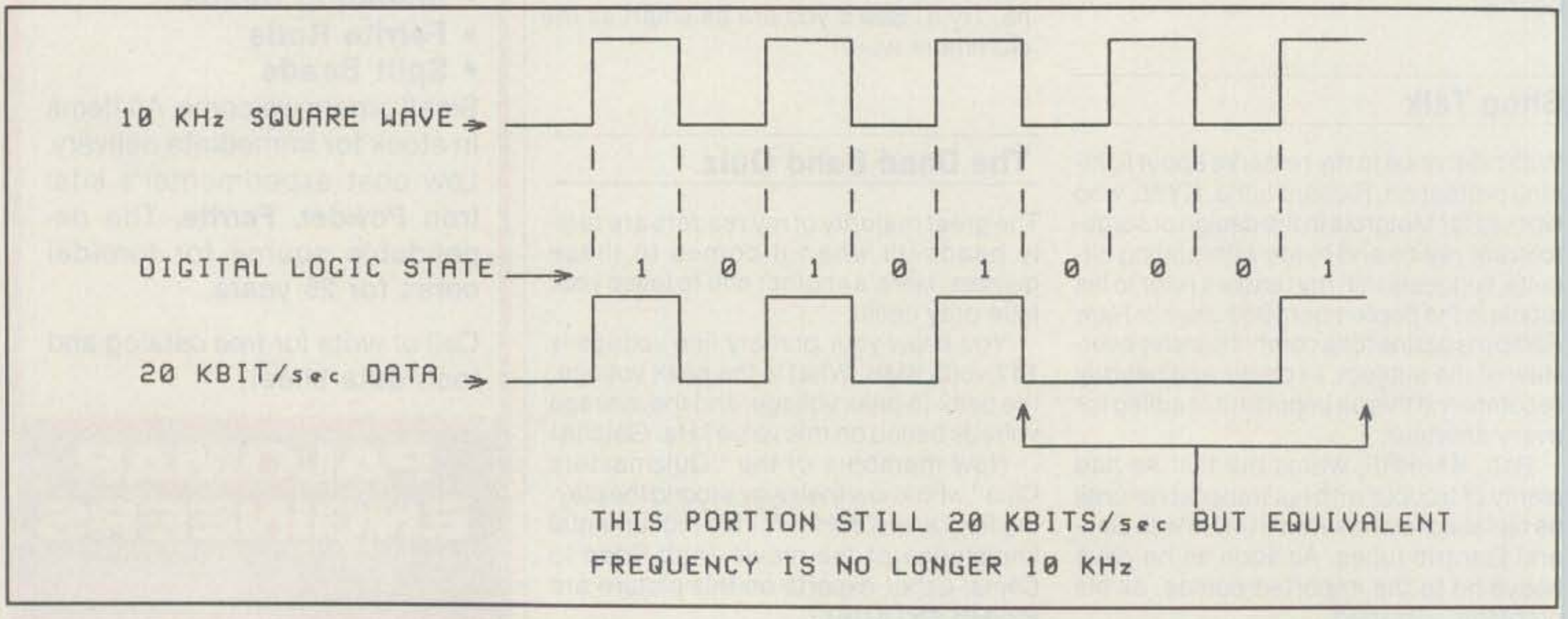


Fig. 1– Comparison of frequency and bit-rate.

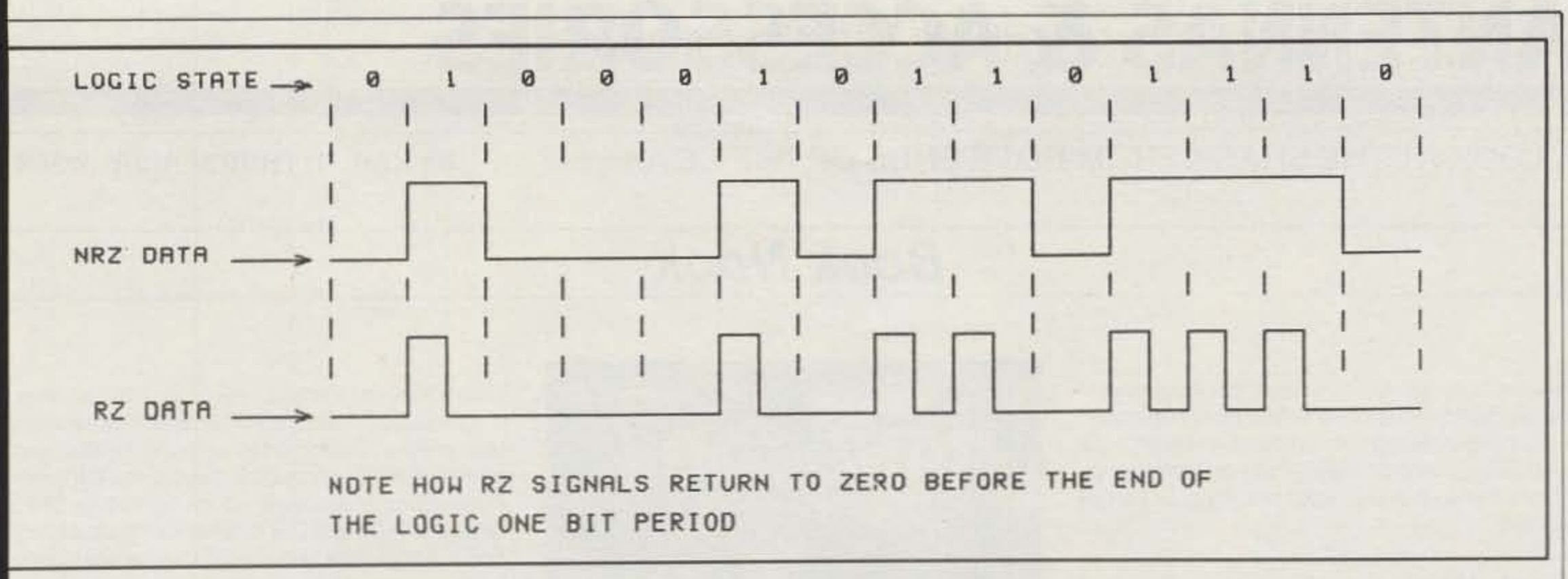


Fig. 2– Comparison of "NRZ" and "RZ" data formats.

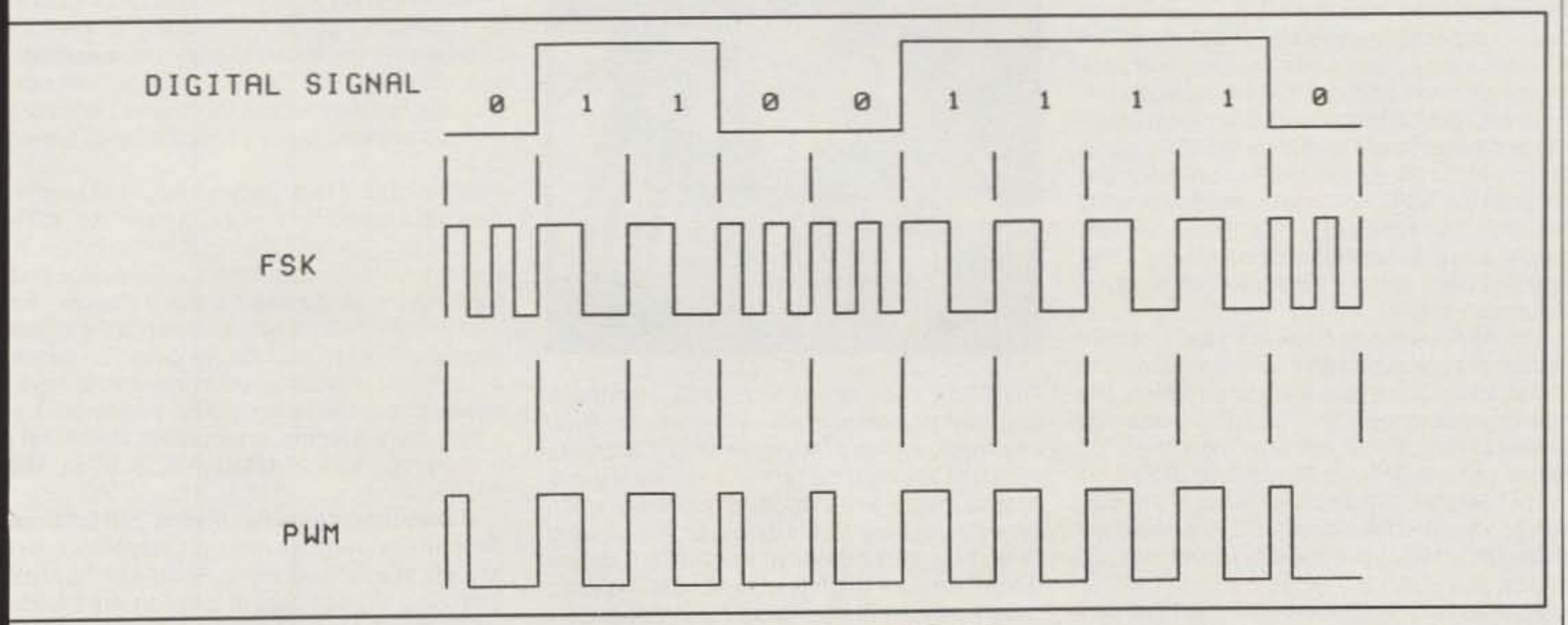


Fig. 3– Comparison of FSK and PWM.

ta (or "carrier" as it is often called) immediately. If it were necessary to send a ock, the individual cycles of the transmitd frequencies could be used. Telephone odems and FAX machines all use FSK ansmission with the two frequencies be- in the audio range.

The second method is by Pulse Width odulation, or PWM. As can be seen from e diagram, logic 1 is represented by a de pulse and logic 0 by a narrow pulse. clock transmission is necessary, the ading edge of each pulse can easily be nployed for that purpose. The "no data" ndition of this system can be either logic ate since "keep alive" pulses are always esent.

There are numerous other methods that e used for digital transmission, including ique data + clock encoding formats. All rive to accomplish the same results—curate data transmission with minimum ror.

Next month we will look at a few of the ore common actual data transmission andards and some of the circuitry that n be used to implement them.

73, Irwin, WA2NDM

ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Book Nook

Last time we got together, we figuratively cleaned off the hard disk with a look at the software programs we checked out over the past few months. This time we'll focus on some books of interest to the well-read amateur. Let's get started.

Book Nook

Antenna Books from the ARRL. The ARRL offers a number of "must have" publications that can form the core of a good hamshack reference library. Of the hundreds of ARRL publications, there are about a dozen books oriented to antennas and transmission lines, plus the *ARRL Handbook,* which has some chapters on antennas. Three of the ARRL antenna books that provide the broadest repository of antenna design, theory, and practice information are the *ARRL Antenna Book* and the *Antenna Compendium,* Volumes 1 and 2.

The *ARRL Antenna Book* is an authoritative source of information on modern antenna and transmission line theory and construction. The newest version, the 1991 16th Edition, edited by Gerald L. Hall, K1TD, contains more than 700 pages and nearly 1000 illustrations in an 8½" × 11" format. (Thumbing through my own copies, I see that the oldest *ARRL Antenna Book* I have is the 1960 9th Edition. It was a mere 320 pages, size 6½" × 9½".)

Special focus in the new edition is on antenna fundamentals, propagation, transmission lines, Yagis, quads, and wire antennas. Included are antennas for portable, mobile, limited space, VHF/UHF/microwave, and space communications. Commendably, the first chapter, entitled "Safety First," shows how to design and install antennas with safety in mind. The 16th Edition is priced at $20—up considerably from the $2.50 9th Edition, but with a lot more value between its covers. The book contains an index and a glossary of terms.

The *Antenna Compendium* is available in two volumes. Volume 1 (176 pages, $10) was issued in 1985 and Volume 2 (208 pages, $12) was published in 1989. The two volumes provide a vehicle for publishing some of the deserving antenna articles that "overflow" *QST*. Thus, all of the articles are of previously unpublished material. The two volumes contain a wealth of specialized, off-the-beaten-track articles on a variety of antenna, balun, computer modeling, matching network, propagation, measurement, and other topics.

For example, Volume 1 has construction articles on interesting and exotic designs such as gossamer quad, spiderweb, subsurface, and X-beam antennas. Volume 2 includes an attic tribander, controlled current distribution (CCD) antenna, balloon and kite supported antennas, and half-loops. Also available for Volume 2 is an optional IBM PC compatible disk ($10) that contains the several BASIC program files contained in the book.

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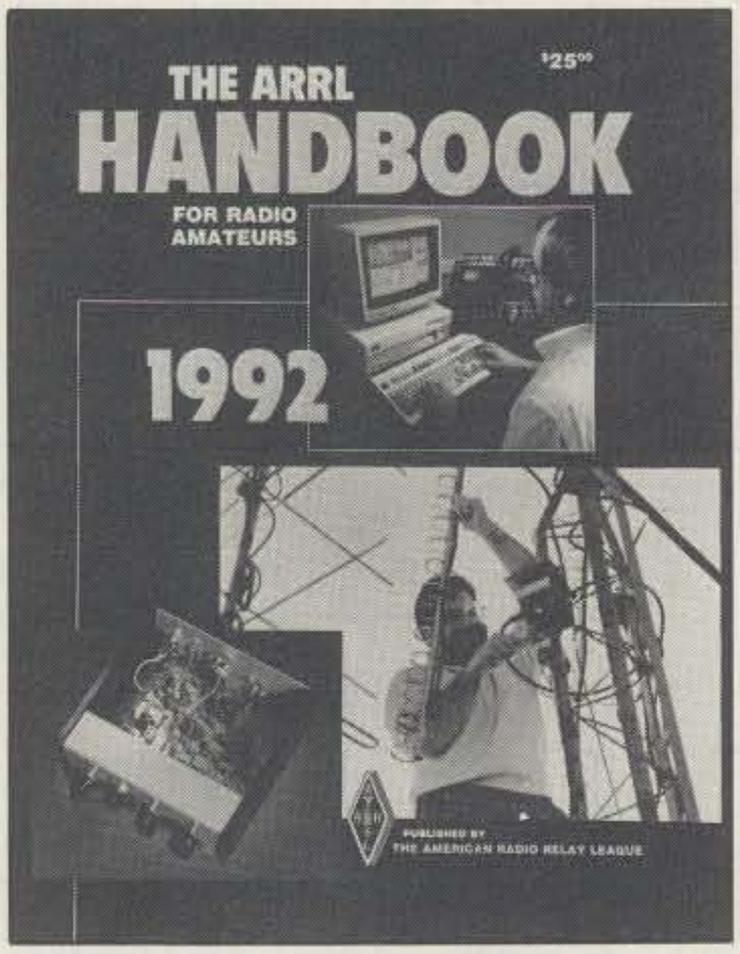

The 69th Edition of The 1992 ARRL Handbook *is an almost indispensable reference for radio amateurs, with its 1200 pages and 2100 charts and illustrations. It's a reference guide, a guide to radio theory, and a repository of construction projects. Antenna topics, however, are covered in much greater detail in the* ARRL Antenna Book, *which I highly recommend. (Photo courtesy American Radio Relay League)*

I should also mention *The 1992 ARRL Handbook,* which probably is the most comprehensive and definitive amateur radio sourcebook available. The 69th Edition, which has 1200 pages and 2100 charts and illustrations, costs $25. Its 39 chapters are divided into six sections: Introduction, Radio Principles, Modulation Methods, Transmission, Construction and Maintenance, and On the Air. While antennas are not covered nearly as thoroughly as in the *ARRL Antenna Book*, one *Handbook* chapter is devoted to antenna fundamentals (22 pages), another to transmission lines (15 pages), and a third (37 pages) to antenna construction projects. The book is well-indexed.

For more information, contact the American Radio Relay League at 225 Main St., Newington, CT 06111.

Two from MFJ. *CQ* columnist and prolific author Dave Ingram, K4TWJ, has compiled a rather complete "hands-on" guide to mobiling, *The Modern Amateur's Mobile Handbook*. At 103 pages, the Ingram book is intended as a comprehensive guide for newcomers and veteran mobileers alike. It's $12.95.

In the book's 11 chapters, Dave shows how to successfully install an HF or VHF transceiver in various vehicles, mount and tune antennas, reduce RFI, develop a solid ground system, and check operating results to assure top performance. Special emphasis is on operating QRP, QRO, FM, HF, and CW mobile; using repeaters and autopatches; working with antenna tuning aids; and selecting accessories.

Dave's book fills a real need, since it's highly readable and is virtually a one-stop sourcebook and operating guide for mobiling. If I would change anything about the book for the next edition, I'd scale back the car care and maintenance section (some hams *like* to drive clunkers!) and add an index to make specific topics easier to find.

While most of us already have our 1992 calendars, MFJ is also distributing Dave's "K4TWJ's Classics of Amateur Radio 1992 Calendar." It displays the major hamfests, special events, and contests by month; there's also a "pinup" for each month. Presumably a similar calendar will be available each year. (Sorry, guys. The calendar pinups are radio collectibles—exotic keys, bawdy bugs, and tempestuous transmitters.)

For more information, contact MFJ Enterprises, Inc., Box 494, Mississippi State, MS 39762.

Communications Receivers, 2nd Edition. Several years ago we reviewed Ray Moore, ex-K1DBR's *Communications Receivers*. Ray has amassed a great deal of data on American-made, general-coverage superheterodyne communications receivers built during the vacuum-tube era, from 1932 to 1981. Ray's original book was chock full of performance features, general commentary, and photos of and about the receivers themselves and the companies that manufactured them.

The book was a fairly complete guide to American communications receivers. It covered the famous manufacturers, such as R. M. E., National, Hammarlund, Collins, Morrow, and many others—along with fairly obscure companies such as Patterson, Federated Purchaser, and Guthman.

Marty Wiese of RSM Communications recently sent me a copy of the new 2nd Edition (the 1st edition sold out two printings). The new edition shows a picture of practically every receiver described: there are photos of 375 receivers made by 58 companies. Including variations on the 375 illustrated receivers, over 700 receivers are covered, including every known vacuum-tube communications receiver produced in the United States. (It must be a complete book, as there was my first receiver, a 1954 vintage Hallicrafters S-40B, on page 42!)

A similar book on transmitters is under consideration. For the present, RSM also offers three specialized receiver monographs. These describe the Hallicrafters Skyrider Diversity DD-1 ($4.95), Hallicrafters Skyrider S-1 ($2), and Echophone Commercial EC-2 ($2) receivers. The 115-page *Communications Receivers* book

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is in 8½" × 11" format and printed on high-quality coated paper. It's $17.95 plus $2.50 postage and handling from RSM Communications, P.O. Box 218, Norwood, MA 02062.

Buying a Used Shortwave Receiver. At the other end of the receiver spectrum is Fred Osterman's booklet, *Buying a Used Shortwave Receiver*. Fred's concise 20-pager is aimed at the SWL who's looking for a good, used solid-state (as opposed to vacuum-tube) receiver.

Fred provides important technical and price data on non-current models. He also discusses the relative merits of purchasing receivers privately, at hamfests, or from radio stores. Fred also offers a six-point receiver performance checklist to facilitate quick and accurate receiver evaluation.

One of the most useful features of the book is its table of pricing information and an overall rating score for 50 popular communications receivers and 20 best-selling digital portables. Technical information and photos are supplied for the 25 most popular receivers.

The booklet is available for $3.95 plus $1.00 shipping from Universal Radio Research, 1280 Aida Drive, Reynoldsburg, OH 43068.

New Catalog and Books from Universal Electronics. A few months back Tom Harrington, W8OMV, sent me Universal Electronics' book catalog, which shows a number of new entries of special value to amateurs.

Of most interest to me is *The Easy Wire Antenna Handbook*, by Dave Ingram, K4TWJ. The new book (112 pages, $9.95) is aimed at constructing many types of traditional (and inexpensive) skywires. The focus is on user-oriented (rather than technical) details and measurements. The eight-chapter book includes information on transmission lines, basic and gain-type antennas, hidden and disguised radiators, antenna tuners, baluns, SWR meters, and noise bridges. It also covers a variety of commercial wire antennas and accessories. All antenna dimensions are provided, and the book is indexed.

Two new Universal Electronics publications by Tom Harrington are of use to readers with specialized interests. One such book is *World Press Services Frequencies*, 5th Edition (84 pages, $8.95). It's a comprehensive manual covering shortwave radioteletype news monitoring that contains three different master lists of expected transmission frequencies and times. A fascinating book, especially if you are TV satellite dish equipped, is *The Hidden Signals on Satellite TV*, 3rd Edition (238 pages, $19.95). It's said to be the first book that deals entirely with the non-video communications services that are "hidden" in many domestic satellites. The book discusses these services, including radio network channels, press transmissions, business services, satellite networks, stock market services, and more.

For a catalog, contact Universal Electronics, Inc., 4555 Groves Road, Suite 13, Columbus, OH 43232.

The POCKET REF Series. In the April 1990 column we briefly noted the $9.95 *POCKET REF*, a tiny (3.2" × 5.4" × 0.6") but fact-packed, shirt-pocket handbook of tables, maps, formulas, constants, and conversions. The 480-page book included a wealth of information in the electrical, automotive, physical science, mining, welding, and other fields.

Recently, Sequoia Publishing issued a companion reference, *POCKET PCRef*. It's a similar-size, 320-page, shirt-pocket reference on IBM PCs and compatibles. Authored by Thomas J. Glover and Millie M. Young, the new book contains a large MS-DOS command reference section, a PC industry phone listing with 2000 main and technical support telephone numbers, and keyboard scan codes. There's also configuration information on more than 1200 hard disk drives, memory maps, printer control codes, modem commands, decimal-to-hex conversions, PC error codes, port and cable pinouts, and more. It's priced at $14.95 plus $2.00 shipping.

I found both books to be excellent references, although I admit to keeping them in my desk rather than in my shirt pocket, despite their portability. *Hint:* If you carry the books around with you, also consider carrying a small card lens pocket magnifier (available for $1.00 or so in office supply houses and stationery stores) to help read the very small print!

For more information, contact Sequoia Publishing, Inc., 12533 W. Grand Dr., Morrison, CO 80465.

National 800/900 Telephone Service Code Book. Long-distance technology has made major strides in the past decade. This largely is the result of many companies other than AT&T providing long-distance and related services.

Did you know that the first three numbers following the "800" in toll-free telephone numbers are actually codes that identify the long-distance carrier handling the call? And were you aware that the first three digits after the "900" in 900-service toll numbers also reveal the identity of the carrier? Besides these codes, there also are Carrier Identification Codes (CICs), three-digit dial-up numbers for directly accessing the telephone facilities and services of all long-distance carriers and many private firms.

Ken Sperry, a California-based surveillance and security technician who specializes in landline communications, spells it all out in his unique reference guide, the *National 800/900 Telephone Service Code Book*. All of the hidden codes—more than 1600 in all—are provided in the 79-page book. It also has descriptive text that explains the 800 and 900 services and how CICs are used to access the facilities of long-distance carriers and others. Telephone "phreaks" and hackers naturally delight in having this information, but the knowledge also can be put to good professional use, add to one's hobby interest in communications, or just let one know just who operates these sophisticated communications systems. I found Ken's book fascinating.

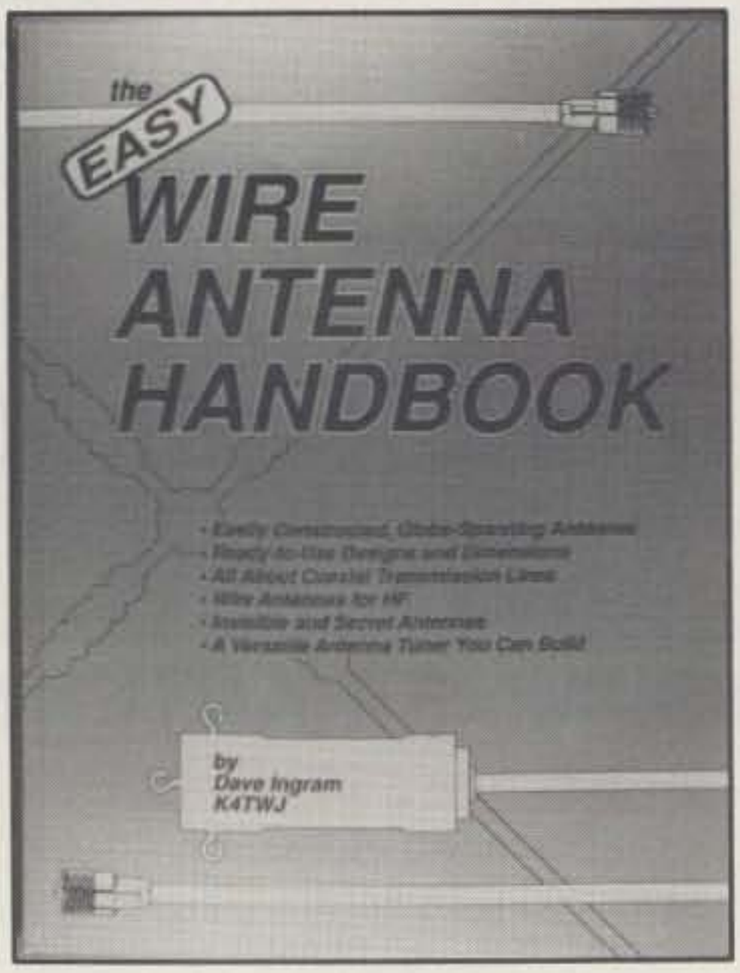
The Sperry book is priced at $9.95 plus $3.50 shipping from CRB Research Books, Inc., P.O. Box 56, Commack, NY 11725.

PC Tools V7.0 at Work. In a recent column I reviewed the latest release of Central Point Software's IBM PC utility, PC Tools V7.1. I must admit to being somewhat overwhelmed by the half-dozen or so user manuals that document the program. Thus, it would have been a real help to have had Jonathan Kamin's y*PC Tools V7.0 at Work* available at the time, especially since V7.1 is quite similar to the earlier release, V7.0.

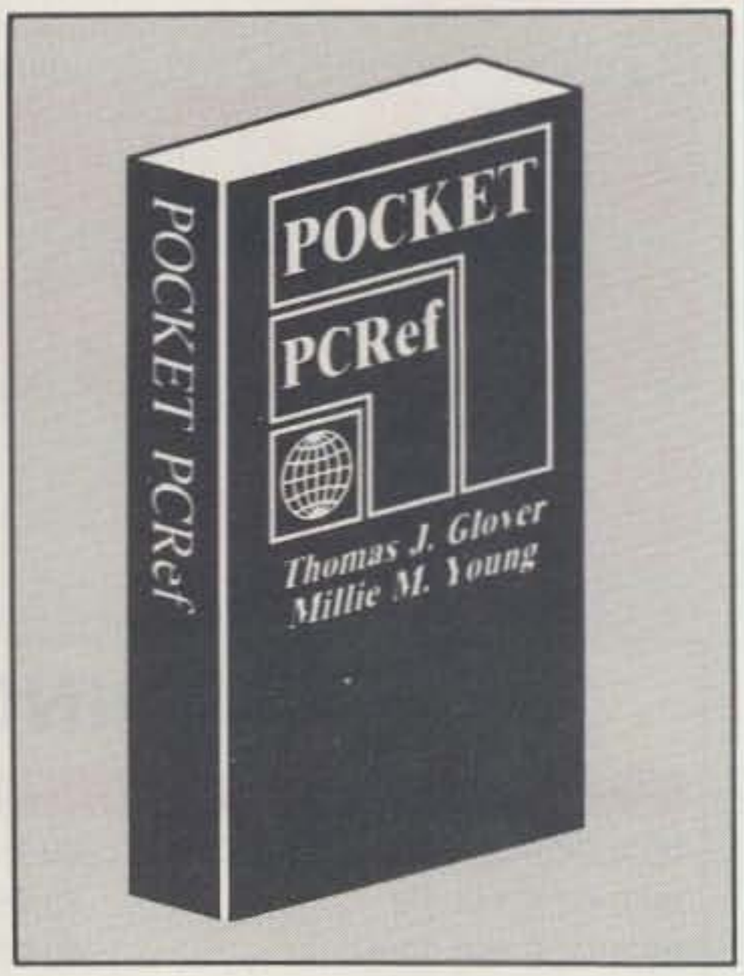
The 554-page book probably is the only one you'll need to learn and master PC Tools, whether you're a beginner or an experienced user. Kamin demonstrates, in an easy-to-learn and lively style, the essential elements of all the utility programs and the techniques for using them. Some of the book's features include practical ideas on using PC Tools; "what you'll learn" objectives for each chapter; "notes" throughout the book to guide the reader and help avoid pitfalls; meaningful examples of each program feature; and novel "fact finder" tabs you can pull out to custom-index the book to your particular needs. Most of all, I found the book definitely *not* to be merely a rewritten condensation of the PC Tools documentation.

When I prepared this column, only the V7.0 book was available, but by the time this appears in print, the updated *PC Tools 7.1 at Work* should be available in most bookstores.

For information or a catalog, contact the



Here's The Easy Wire Antenna Handbook *by fellow CQ columnist Dave Ingram, K4TWJ. In it Dave covers many types of wire antennas, transmission lines, antenna tuners and transmatches, and commercial wire antennas and accessories. Dimensions are provided for all antennas so that no formulas need be used.*
(Photo courtesy Universal Electronics)



POCKET PCRef *is the second book in the POCKET REF series, a handy, shirt-pocket-size reference book on IBM PCs and compatibles. If you're a PC hobbyist, hacker, or general user, you'll find a wealth of hard-to-find computer information within its small (3.2" × 5.4") covers. The book has 320 pages and is priced at $14.95.*
(Photo courtesy Sequoia Publishing)

The National 800/900 Telephone Service Code Book *is definitely not an amateur radio book, but this CRB communications publication satisfies a great deal of one's curiosity about the coding structure of 800 and 900 numbers, including the Carrier Identification Codes (CICs) of the long-distance carriers and others. (Photo courtesy CRB Research Books)*

Addison-Wesley Publishing Company, Jacob Way, Reading, MA 01867.

New Larsen Electronics Antennas Catalog. Larsen electronics has issued a full-color, illustrated catalog of its extensive line of mobile, portable, and base station antennas and accessories. While the "hot" antennas now are cellular telephone mobile models, several series of amateur radio antennas are shown in the new catalog. A separate amateur catalog is available. Larsen Electronics also publishes *Antenna News* for professional and business users.

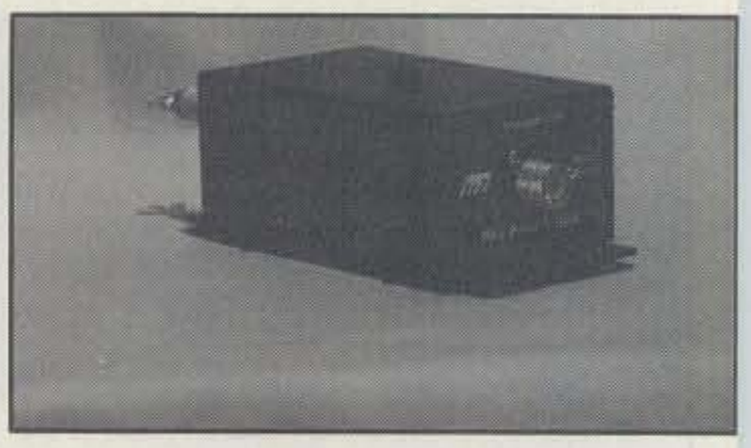
One of their newest amateur radio antennas is the KG 2/70 dual-band glass-mount mobile antenna. Only 36 inches long and featuring an open coil whip, the antenna mounts easily on an auto's front, rear, or side windows. The open-coil design allows the antenna to withstand the rigors of garage doors or other low obstacles while staying vertical at road speeds. The black, polyurethane-coated whip is tapered to reduce wind load. Claimed gain is 2.5 dBd on 2 meters and 4.5 dBd on 70 cm.

For a catalog, contact Larsen Electronics, Inc., P.O. Box 1799, Vancouver, WA 98668.

New Vectronics Catalog. Paul Hrivnak, VE3UP, has since 1975 fielded a variety of products for the amateur market through his Ontario-based firm. Paul notes in his latest catalog that being located across the border doesn't adversely affect his ability to serve the U.S. market. Almost 85% of his products are produced using American-made components, "keeping our support behind North American suppliers," to use Paul's words.

The latest Vectronics catalog shows a variety of antenna-related accessories. These include the QSK-1 Vacuum Relay Switch Module, capable of switching up to 1500 watts RF; the 1.8–30 MHz VC-300 DLP and VC-300 Antenna

While nothing truly can prevent lightning strikes, here's a new product that's designed to at least reduce the chances of lightning striking your tower or mast. Electron Processing's LRU-1 Lightning Reducer helps to prevent the build-up of high cloud-to-tower voltages which are responsible for lightning strikes. (Photo courtesy Electron Processing)



The MFJ-912 W9INN Balun Box, intended to be installed outdoors, allows you to use coax from a wide-range T-network tuner. It performs about the same functions as an internal balun, but is located remotely from the tuner. Thus, it allows you to make use of ladderline without bringing the sometimes difficult-to-route line into the hamshack. (Photo courtesy MFJ Enterprises)

Tuners, the former with a built-in dummy load; the PM-30 HF SWR/Power Meter, usable to 60 MHz; several dummy loads, available in models handling up to 1500 watts and functional to 4 GHz; high-pass and low-pass filters; and various RF amplifier components (chokes, chimneys, plate caps, and tube sockets).

One of the newest products is the HFT-1500 3KW PEP HF Antenna Tuner. It features a continuously variable roller inductor with a mechanical counter and digital bar graph, for 1.8 to 30 MHz. A companion HF linear power amplifier, the HF-600 QSK, also is available.

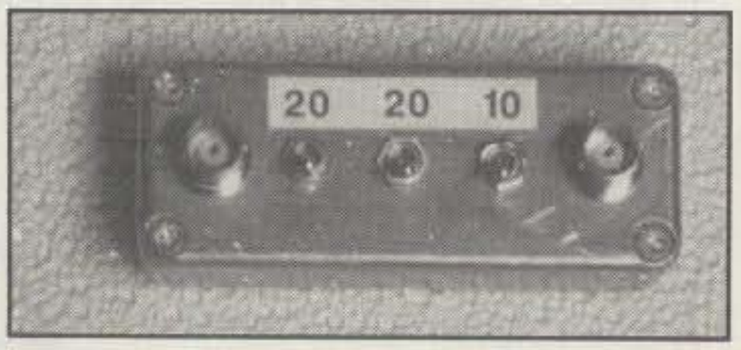
For a catalog and spec sheets, contact Vectronics Corporation, Inc., 31 Estate Drive, Scarborough ON M1H 2Z2.

New Stuff

Two Goodies from Electron Processing. Two new products from Electron Processing caught my eye recently.

One of these is the LRU-1 Lightning Reducer. This $40 device helps prevent the buildup of high cloud-to-tower voltages responsible for lightning strikes. Static charges are discharged gradually into the air via the hundreds of pointed discharge spikes on the LRU-1 before the charges can build up enough voltage to produce lightning. Installation of several LRU-1s and proper grounding of your tower can significantly reduce the chance of lightning striking your tower. Each LRU-1 consists of a 6 inch diameter discharge head mounted on a 12 inch long bracket with a U-bolt for mounting on masts or tower legs to 2 inches in diameter. Mounting brackets for larger masts are available.

A second new product is of interest to "fox hunters." Transmitter hunting can be fun, but one of the practical problems is reducing the received signal to a "meterable" level when close to the transmitter; this can be done easily with the SGR-1 Attenuator Box. The SGR-1 is a three-section, 50 ohm attenuator that allows you to switch in or out up to 50 dB of attenuation in 10 dB increments, using three toggle switches. Two female BNC connectors are provided. The SGR-1 is priced at $50. Other uses for the attenuator include making accurate comparisons of strong signals, tracing interference sources, and aiding in receiver alignment.



Electron Processing's SGR-1 Attenuator Box is a useful tool for transmitter hunting; it reduces strong received signals to a "meterable" level. With the three-section attenuator you can switch in or out up to 50 dB of attenuation, in 10 dB increments, using three toggle switches. (Photo courtesy Electron Processing)

For more information, and an interesting application note on lightning damage elimination, contact Electron Processing, Inc., P.O. Box 68, Cedar, MI 19621.

MFJ-912 W9INN Balun Box. A compact new product from MFJ is the W9INN Balun Box. The new balun is designed to allow you to use coax from a wide-range transmatch (such as a T-network) to the balun box, mounted outdoors. The box converts the unbalanced coax to balanced transmission line, such as ladderline. The result is about the same as using an internal balun except that the balun is located remotely, away from the tuner. This eliminates the need to bring the ladderline into the hamshack.

Price is $39.95. For more information and specs, contact MFJ Electronics, Inc., P.O. Box 494, Mississippi State, MS 39762.

Software: PSQSL de W9XT. PSQSL is a specialized utility developed for the IBM PC and compatibles by Gary C. Sutcliffe, W9XT. It is a slick program to help you overcome one of the minor problems involved in using computerized logging and QSL programs.

PSQSL is designed for amateurs who do a great deal of QSLing though the ARRL Outgoing QSL Service. The ARRL requires that the cards you send through them be sorted by country—not fun if you're an active DXer or contester. Many amateurs use logging programs such as CT (K1EA/KC1EO), NA (K8CC), LOG-EQF (N3EQF), or other programs to generate stick-on labels for their QSLs. While these programs can save hours of work writing out QSL cards, hours of tedious sorting can remain after printing out the labels if you use the ARRL service.

What PSQSL does is take the QSL label files from the popular logging programs and combine them into a single, sorted (by DXCC country) label file that's ready for printing. Cards for countries not handled by the outgoing QSL service are separated from those which the service handles. You can also create labels by manually entering QSO information from the keyboard. In

```
* RESONANT CIRCUIT & INDUCTOR DESIGN *

1.  Calculate Inductor from Turns, Diameter and Coil Length

2.  Design Inductor from Known Inductance or LC Resonance

3.  Straight Round Wire Inductor

4.  Design Air Wound RF Choke / Self Resonant Inductor

5.  Design Ferrite Toroid Inductor

6.  Calculate Inductance from Inductive Reactance

7.  Design Short Loaded Dipole

8.  Calculate Capacitor Constructed with Double Sided PCB

9.  Company Information        10.  Quit
```

Fig. 1– Here's the main menu from Austin Antenna's new utility software package. With it you can calculate inductance from turns, diameter, wire size, and coil length. Straight wire inductors and ferrite toroids are covered, too. The program also has a routine to perform the inductance calculation for a short loaded dipole and to provide details for building capacitors from double-sided PC boards.

addition, PSQSL supports some common formats typically used by database programs, for those who use their own logging programs. Since the list of countries in the DXCC program, as well as prefixes and countries serviced by the ARRL, changes from time to time, Gary's program lets you update the file containing countries and prefixes.

PSQSL is shareware. Gary has sent copies to many shareware vendors and has uploaded the program to several BBS systems. You also can obtain an unregistered copy through Gary's engineering consulting company, Unified Microsystems, for $5. Registration is $10 (no disk), or $20 for a registered copy of the latest version complete with a printed manual.

For more information, contact Unified Microsystems, P.O. Box 133, Slinger, WI 53086.

Free Design Software. Austin Antenna has been in the antenna consulting and manufacturing business for more than 25 years. We most recently discussed their designs in last November's column. Now proprietor Richard Austin offers a "free" software package, Resonant Circuit and Inductor Design. It's intended to make easier the design of inductors, chokes, and ferrite toroids. As such, it's useful for the hobbyist and experimenter alike.

The menu-driven utility, which is designed for the IBM PC and compatibles, requires VGA or EGA display. Several worthwhile capabilities are included. You can calculate inductance from turns, diameter, wire size, and coil length, building inductors using wire on hand. Straight wire inductors and ferrite toroids are covered, too. The program also has a routine to perform the inductance calculation for a short loaded dipole. The software even provides design details for building capacitors made from double-sided printed circuit (PC) boards.

The Resonant Circuit and Inductor Design program is available from Austin Custom Antenna, 10 Main Street, Gonic, NH 03839. While the software itself is free, Austin asks $5 to cover the 5¼ inch (360K) floppy, copying, mailing, and handling costs. Fig. 1 shows the eight major functional capabilities of the program.

Short Bursts

The Origins of "Ham." It's interesting that we radio amateurs often call ourselves "hams," but rarely give any thought to the origin of the word. Just *where* does it come from? Are we descended from connoisseur pork-tasters? Are we porkers ourselves, frustrated actors and actresses, folks who live high off the hog, or what?

There's been little agreement on the origin of the word. Bill Johnston, WB5CBC, writing in the November 1976 *QST* ("From Whence Came Ham," p. 60) notes that in the 1800s, ham was a slang word used by seasoned railroad telegraphers to describe inexperienced telegraph operators. The word was used interchangeably with the word "plug," which means green or second best, in referring to horses. Is *this* where "ham" comes from?

Dennis Burgoyne, KE8EY, in a letter to the editor of *CompuServe Magazine* in the December 1990 issue, came up with a possible acronym-based origin of the word, one I hadn't heard before. Seems that an early-1900s magazine, *Home Amateur Mechanic*, featured articles on do-it-yourself projects. In one issue an article described the newfangled radio, a device you could build at home and which enabled you to converse with other radio owners. The home-built radio came to be referred to popularly as the "Home Amateur Mechanic" Radio, or HAM for short. People who built and used radios thus came to be known as HAM radio operators.

I'm not sure that we've solved a long-time mystery, but these two suggestions as to the possible sources of the word "ham" are interesting, if nothing else. One thing *is* for sure: I just *know* I'll get lots of mail on this one!

Still Another Call for Help. We need to mention this again. When writing about something that appeared in the column, please mention the date of the column to which you refer, if you know it, so that we can go directly to the issue. Be sure to enclose an SASE or IRCs (if overseas) for a personal reply.

Also, we enjoy checking out new amateur radio software and hope that readers will continue to submit their shareware, freeware, and commercially marketed programs so that we can pass on the information to *CQ* readers.

The volume of programs we receive, however, has increased so much that we're finding it difficult to handle all the programs. We've therefore had to take some measures to keep them under control. One step is to discontinue reviewing unfinished or beta test software; it's got to be complete and available to the ham public for us to cover it. Also, we have to discontinue giving feedback to the author other than through the printed column.

Note, too, that we're not equipped to use or review some types of specialized software, so the best we can do in such cases is simply to mention the software and how to obtain it. Presently all we can handle is IBM PC compatible software.

Also, we ask that when sending us software you include a copy of the *printed* (not just on-disk) documentation. It's also helpful to include copies of any advertising literature and/or spec sheets that go with the software; these help us in describing your product to readers. Clear, dark screen prints of main program screens can be helpful to illustrate the software.

Wrapping It Up

That's all for this time, guys and gals. Next time more Antennas and Accessories topics of current interest. See you then.

Overheard: Experience is something that you usually don't get until just after you need it.

73, Karl, W8FX

PACKET USER'S NOTEBOOK

BY BUCK ROGERS, K4ABT

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

The Ultimate "Time Machine"

Time. This is a topic to which we who have crossed the half-century hurdle can relate. But time is not measured in centuries, decades, years, months, weeks, days, hours, minutes, and seconds anymore. Frequency is a relative component part of space. A slice of time can be a baud, or a Hertz within this time domain that man with his gray matter (DNA) has been struggling to define since inhabiting this planet.

Time to many is measured in bits, bauds, Hertz/cycles, or in the latest jargon—MIPS. MIPS represents a measure of one million instructions of any set of commands, and/or data, that can be sent, received, or otherwise transferred from point "A" to point "B" in one second. The term "MIPS" relates to a "Million Instructions Per Second."

For a few moments return with us to those thrilling days of yesteryear when out of our past, and in a cloud of dust, comes the thundering roar of a '49 Ford being pursued by a '57 Chevrolet. The driver of the '49 Ford was Robert Mitchum, and if memory serves me well, Gene Barry was the revenuer in the '57 Chevy. After the dust cleared, there sat the revenuer with only the rear bumper of the '49 Ford captured in the "bumper-grabber" on the '57 Chevy. The '49 Ford was nowhere to be seen.

The movie *Thunder Road*, filmed in the mid-1950s, depicts a way of life in Tennessee and Kentucky for the period. These are times we revisit only in our memories. Tennessee and Kentucky have made quantum leaps, keeping pace with the rest of the world. To borrow a piece from a beautiful song that is sung by Ronnie Milsap, WB4KCG, we are no longer "lost in the fifties."

1584 Oxford Court, Gallatin, TN 37066

A New "Thunder Road" In Tennessee

This time the "white lightning" here in Tennessee is faster than that 1957 Ford transporter. For several months I've enjoyed sending and receiving files across a 9600 baud backbone. It is only two hops, but it has made the link from Gallatin to Nashville seem like "blue lightning" compared to the 2400 link that I was using at 223.58 MHz when I moved here a year ago.

Recently I had the pleasure of using a method of data transfer which rivals all other previous data transfer mediums I have experienced in this fun-filled hobby of packet radio.

One half of this ultimate time machine is Kantronics' new D4-10, a 430 MHz transceiver. It supports both wide- and narrowband switch-selectable filters to support both high-speed data and voice communications. The second half of this combo is the Kantronics Data Engine.

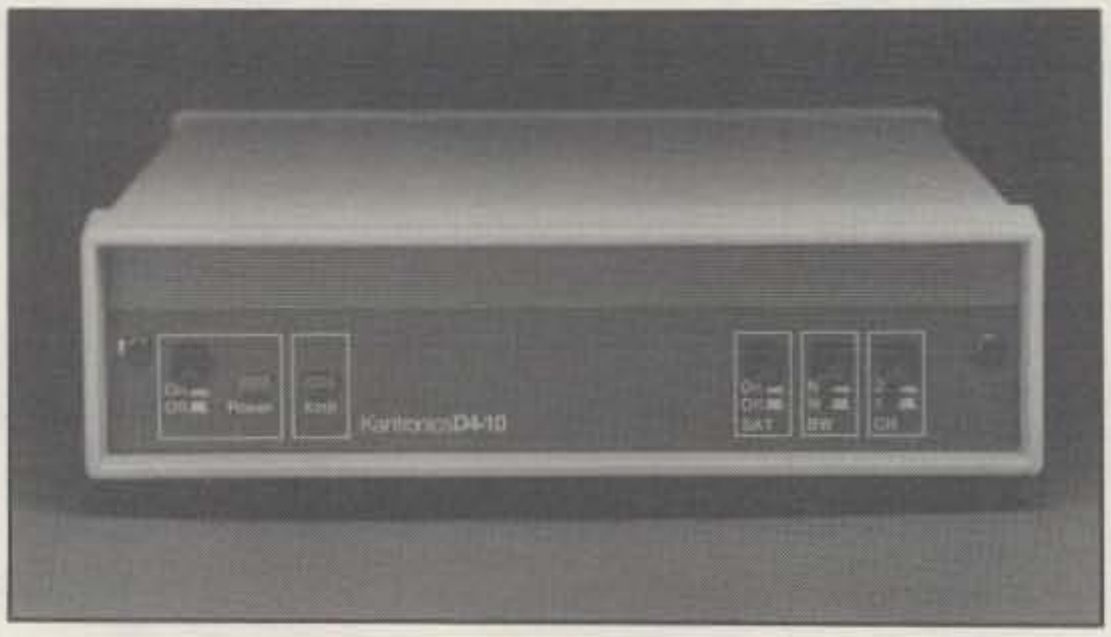
What is the speed of the data? Well, that is the user's choice. Coupled with the Kantronics dual-port Data Engine, with a CPU built around the 80196 (V40), we can travel from 1200 bauds to 19,200 bauds and beyond, depending on the modem that is installed onto one of two port headers inside the Data Engine.

The Data Engine can support two modems and can address each port separately, or it can be outfitted with modems that allow an access port for local user speeds while the other port is addressing the high-speed backbone link to rapidly move data across a large network. In a few words the sysop (and in many applications the user) can configure the Data Engine to his or her liking.

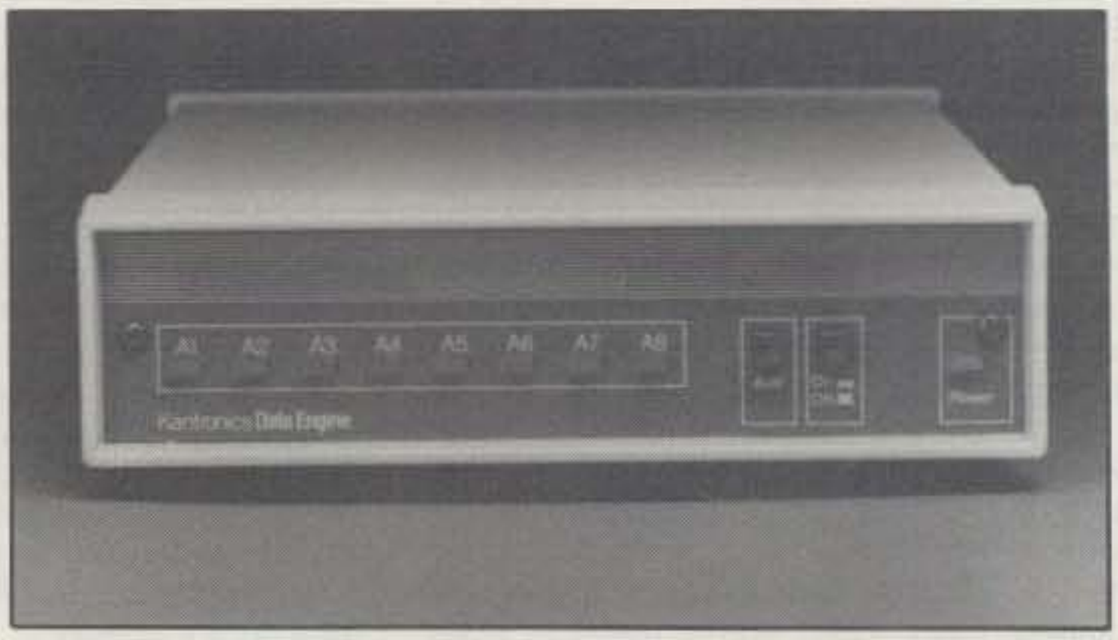
There are other systems which can handle similar high data rates, but they are built around a number of component blocks that heterodyne, mix, and double to reach the frequency and baud rate needed to handle the kind of traffic load required here. In addition, the cost is almost prohibitive when you consider putting one of the other systems on a mountaintop for a link, because we have to consider the added cost of a PC or compatible that is used as a controller.

With the Kantronics D4-10 and the Data Engine equipped with the 19,200 baud modem, we have a compact, simple-to-install and maintain link that consumes very low current and occupies less than one square foot of space. This is a networking tool that takes the headache out of putting our packet hobby into the 21st century.

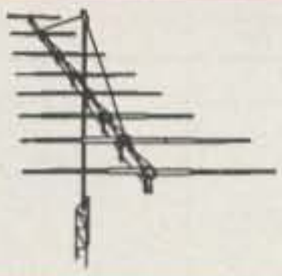
No question about it. We are entering a new era of packet communications. We sysops have long hoped for an economically priced package that would make our upgrade to the higher speeds less of a burden. When we speak of economy, we have to consider the large amount of data that can be handled on a backbone when utilizing a speed of 19,200 bauds per second. By that statement I mean we can move massive data loads across a metropolitan area for BBS forwarding (and for several BBSes) with ease. The addition of user traffic input to the backbone via the second or other Data Engine port/gateway,



The Kantronics D4-10, a 430 MHz transceiver.



The Kantronics dual-port Data Engine.



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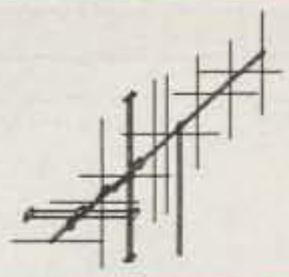

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40M4L	$ 959.00
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18M3	$ 249.00
15M6	$ 499.00
15M4	$ 369.00
10M7	$ 499.00
10M4	$ 269.00

70 CM

EB-432	$ 109.00
420-50-5	$ 79.00
420-50-11	$ 99.00
440-18	$ 109.00
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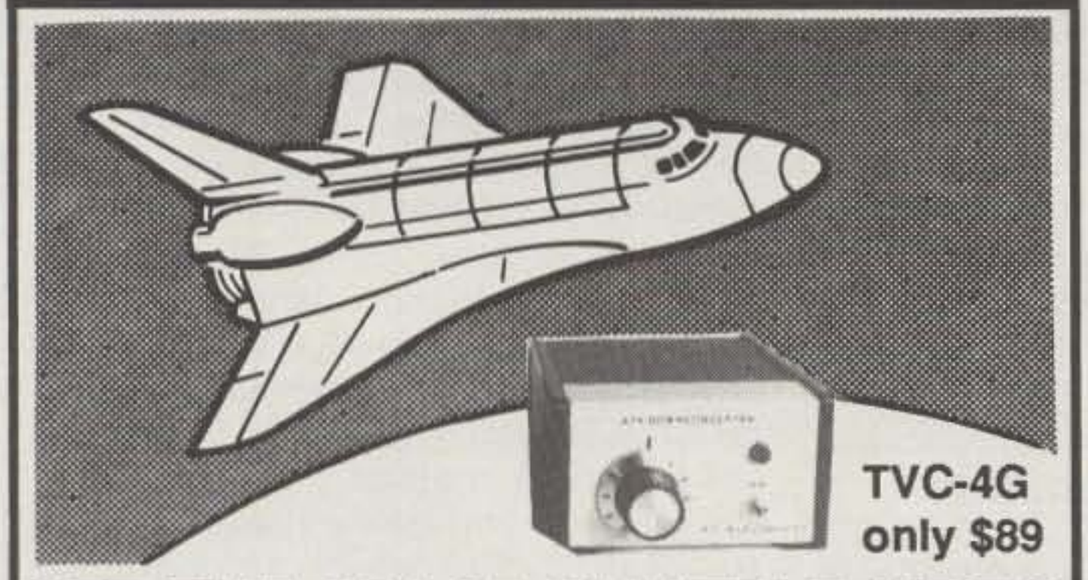

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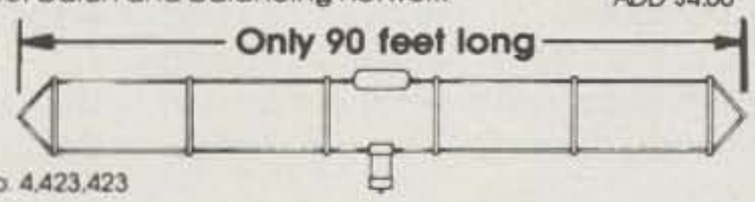

U.S. Patent No. 4,423,423

Model AC 1.8-30

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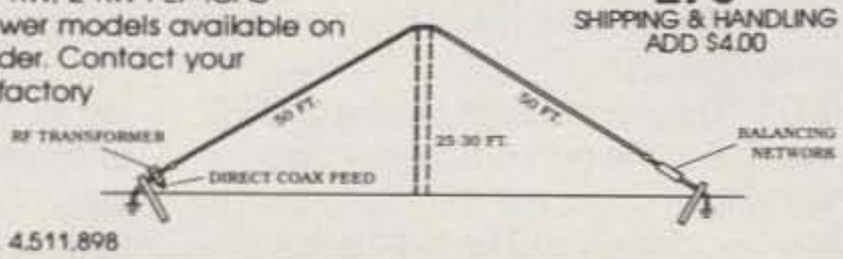
- SWR Max 2:1, 1.4:1 average from 1.8 to 30 MHz
- Can be installed in approximately 80 ft. space
- Ideal for commercial services for multi frequency operation without the need for antenna tuners or additional antennas
- Handles 1 KW, 2 KW PEP ICAS
- Higher power models available on special order. Contact your dealer or factory

NEW **ACS 1.8-30**
WITH #14 STRANDED STAINLESS STEEL WIRE
$273.00 SHIPPING & HANDLING ADD $4.00



U.S. Patent No. 4,511,898

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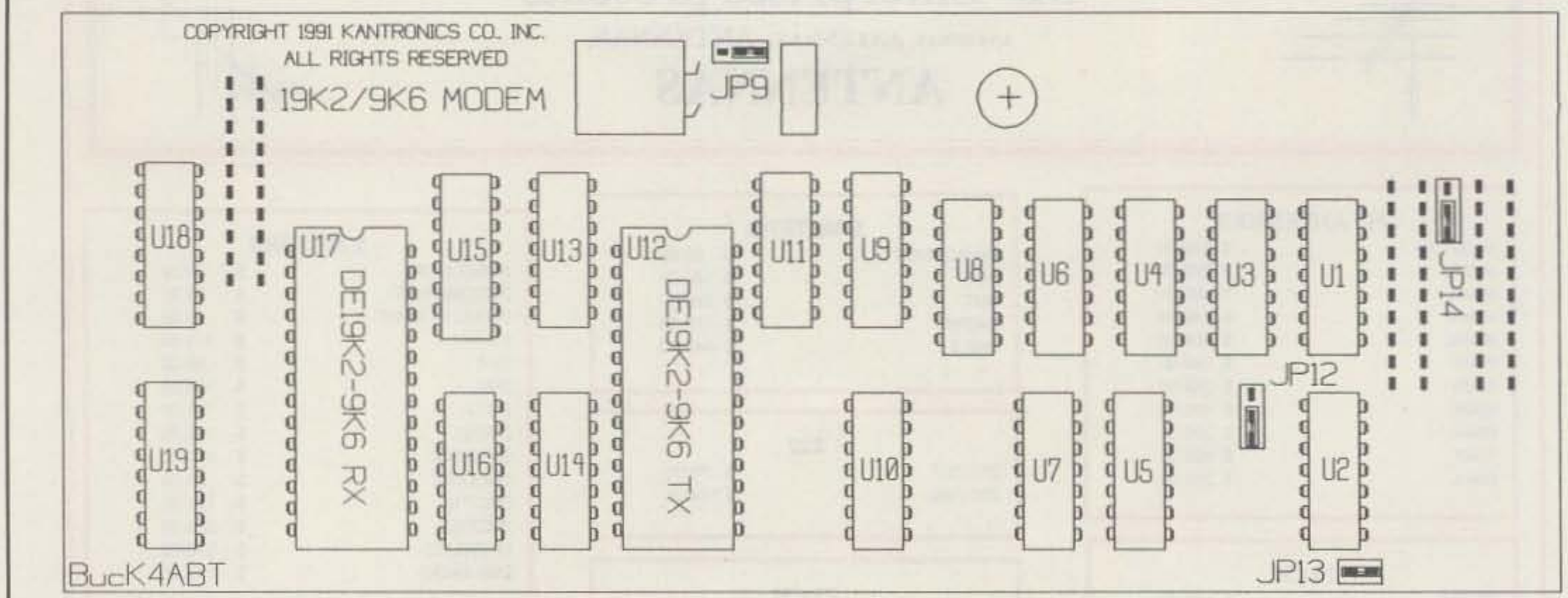

Fig. 1–The modem as shipped is configured for 9600 baud operation. Set jumpers JP9, JP12, JP13, and JP14 to the positions shown here. See the text for more detailed setup and configuration.

and accessed at 1200 bauds, is easily combined with the BBS traffic stream. The data-rate is so fast on the backbone that a user on the LAN side of the system should not notice any slow down at all in the throughput. Even with our AX.25 packet mode using half duplex, to see a data file exceeding 10,000 bytes in length passing from one station to another in less than 10 seconds is a thrill to behold. We may have arrived at a way to support our backbones and trunks for a long time to come.

We Are Having Fun

Putting it together was almost too easy, and putting the two stations into operation was just as easy. At no time in my packet career have I ever seen anything go together so smoothly. In one evening I had both ends of the 19,200 baud links up and running. It's easy to answer the question "Are we having fun yet?" Yes, we are having fun, yet!

The D4-10 is a product that carries its own weight when it comes to design features. It is performing well in this room, where an RF-rich VHF and UHF environment exists. The D4-10 handles a TXDelay of seven with room to spare, and it appears to be fairly linear with respect to the amplitude and phase.

The D4-10 supports both analog and TTL data input. For the purpose of our application, we will be using the TTL input port of the D4-10 transceiver. The D4-10 is a two-channel, crystal-controlled transceiver, and it is shipped with 430.55 MHz crystals installed in the channel one position.

The power output of both of our D4-10s was measured. Although the D4-10 is rated at 10 watts output, both units exhibited more than 12 watts output into the Alabama Amateur Electronics 440 MHz quads. The purpose of the 6-element 440 MHz quads is to traverse the 25 mile path from Gallatin to Nashville, Tennessee without adding an amplifier. It works!

With so much already written about the design theory of these systems, I'll not bore you with more coverage of the same material. Why invent the wheel again when it has already been invented? Let's use the already invented wheel in a real-world application.

As always in this column, this is not a review of the product. It is an explanation of how we make use of a new tool that is already designed and ready for use in an application which this column is all about —packet radio. Let's get busy.

Preliminary Requirements

Because the modem for this application is designed to operate at either 9600 or 19,200 bauds, it may be used with other transceivers that will only handle up to 9600 bauds. The manufacturer therefore ships the modem with the strapping options set to the 9600 baud staking pins.

Our plan was to use the Kantronics Data Engine packet controller and the D4-10 transceiver in the wide-band mode and at 19,200 bauds. For openers, remember to set the three push buttons on the right side of the front of the transceiver to the relaxed, or **Out**, position when using 19,200 bauds. Only the **On/Off** push button will be engaged or **In/On**.

If you are adding or installing the DE-19K2/9K6 modem, follow the instructions in the manual for easy installation of the modem. Make a note of the port on which you installed it, or better yet keep notes as you go. Once the modem is in place, the next step is to move the four strapping options that apply to 19,200 bauds to their respective staking pins. See fig. 1 for the location and position of the strapping options in the 19,200 baud position.

Begin by setting **JP9** for *center pin to pin "B."* "A" to center pin is the 9600 baud setting, and center pin to pin "B" is the 19,200 baud setting.

JP12 determines the mode of the receive data. It has a jumper from the *center pin to the "B" stake*. This is the TTL position. When the center pin (stake) is jumped to the "A" pin, the modem is set for analog receive data input.

JP13 is a two-stake jumper, and *it is strapped* when using 19,200 bauds. According to the modem manual this option is the DCD setting for 19,200 baud when the jumper is in place. However, when looking at the schematic, it appears to be part of an R/C filter network which in effect places two 100K resistors in parallel when the jumper is in place. It may be that when in place the jumper increases the DCD response time when operating at 19,200 bauds.

JP14 located near the modem headers is the counterpart to JP12. This option determines whether the transmit data is analog or digital (TTL). Set this option (jumper) between *center pin and the "B" pin.*

Building The Interconnect Cables

Before I get too far into the interfacing of the D4-10 and the Data Engine, I need to pass on a hint about the actual soldering to the wires inside the multi-conductor cables. After the outer covering was removed

and the bundle of wires inside was exposed, I discovered I did not need to strip the insulation away to make the ends of the wires bare.

By touching the end of the wires with the hot soldering iron, the insulation shrinks away from the end of the wire, exposing enough of the bare wire to apply solder and attach to the connector pin(s). Be careful not to overheat the wires, or you may expose more wire than desired or needed.

In fig. 2 I've drawn the DB-15 Data Engine connector to the DB-9 connector of the D4-10 transceiver input. The view is of the rear, or solder, side of the connectors as they appear when connected to the radio and Data Engine, looking at the rear of each unit.

Be sure to use the six-wire shielded cable that is supplied with the Data Engine. This is necessary to preserve the integrity of the Part 15, Sub-Part "J" of the FCC certification and to prevent ingress of external electro-static noise into the perishable data inside the lines.

For our 19,200 baud application only four of the six wires are used. The signals and the pin numbers for each connector are shown in Table I.

In fig. 3 I've drawn the interface cable for the Data Engine interconnection to the computer. The drawing applies to a normal configuration of the PC or compatible serial ports which employ the DB-25 or DB-9 connector(s). Table II supports the same connections. The colors may vary from those shown in Table II.

The 80486 machines which I use are capable of 38,400 baud. However, the terminal program I used would only handle up to 19,200 bauds terminal speed. Set your terminal program to at least 19,200 bauds if you plan to transfer files from computer to computer via the system we are discussing.

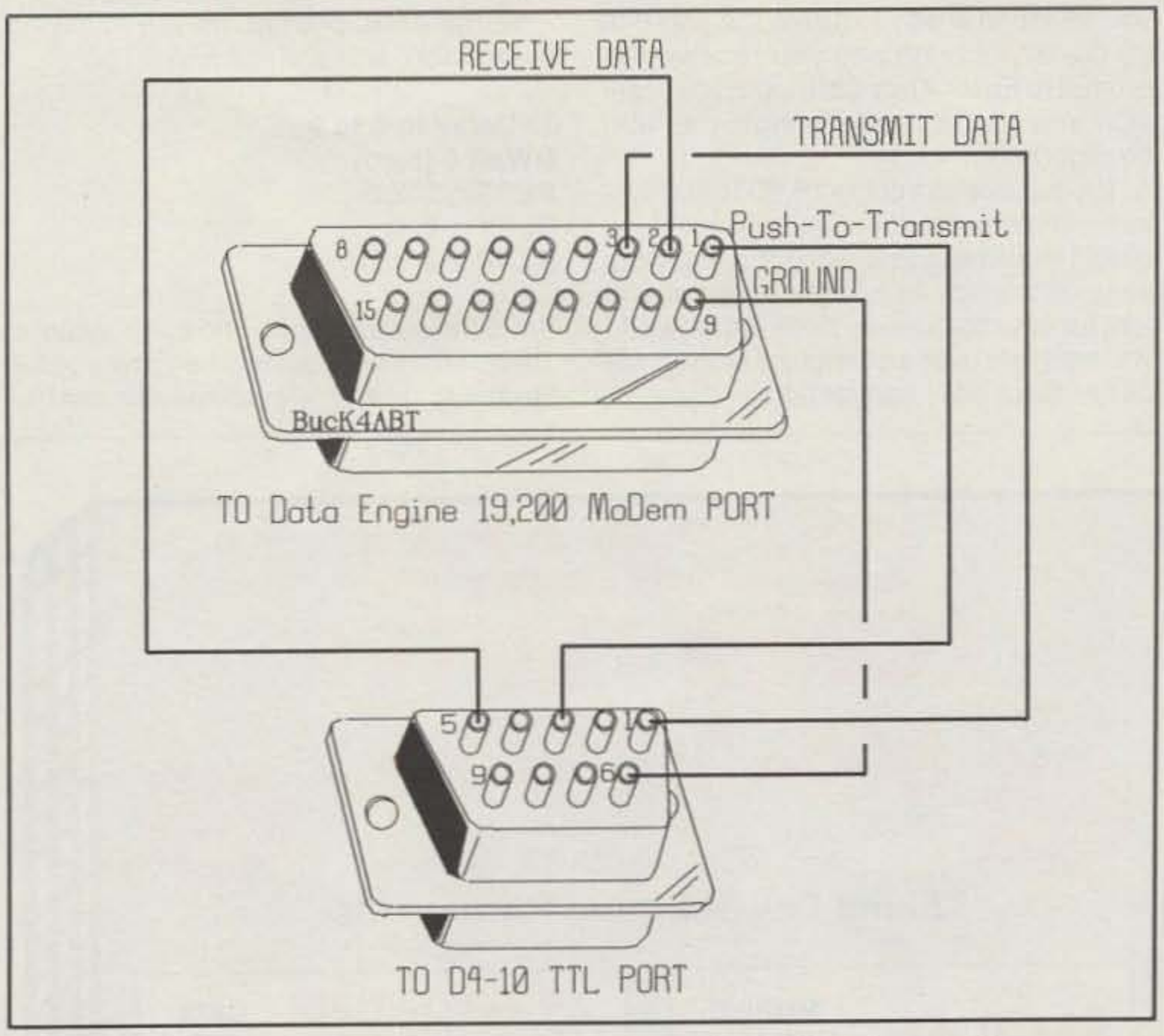

Fig. 2– The Kantronics Data Engine to D4-10 interface cable.

Final Configuration

To run tests of the 19,200 system prior to relocating one of the systems to the top of a tall building in downtown Nashville, I operated them into 15 watt dummy loads. Here is where I ran into the first and only obstacle of this project.

The RF output of the D4-10s is outfitted with BNC female connectors. All connectors from the dummy loads and my antennas are fitted with the standard UHF or PL-259 connectors. The project halted for an hour while I drove into Hendersonville to Radio Shack and purchased two SO-239 to BNC male adapters. Radio Shack calls them "RF Adapters" (Radio Shack part number 278-120). Attach the dummy load(s) and prepare for action!

Connect the Data Engine(s) to the computer(s) and turn it on. Be sure to set your terminal and comport parameters to communicate with the Data Engine. Once

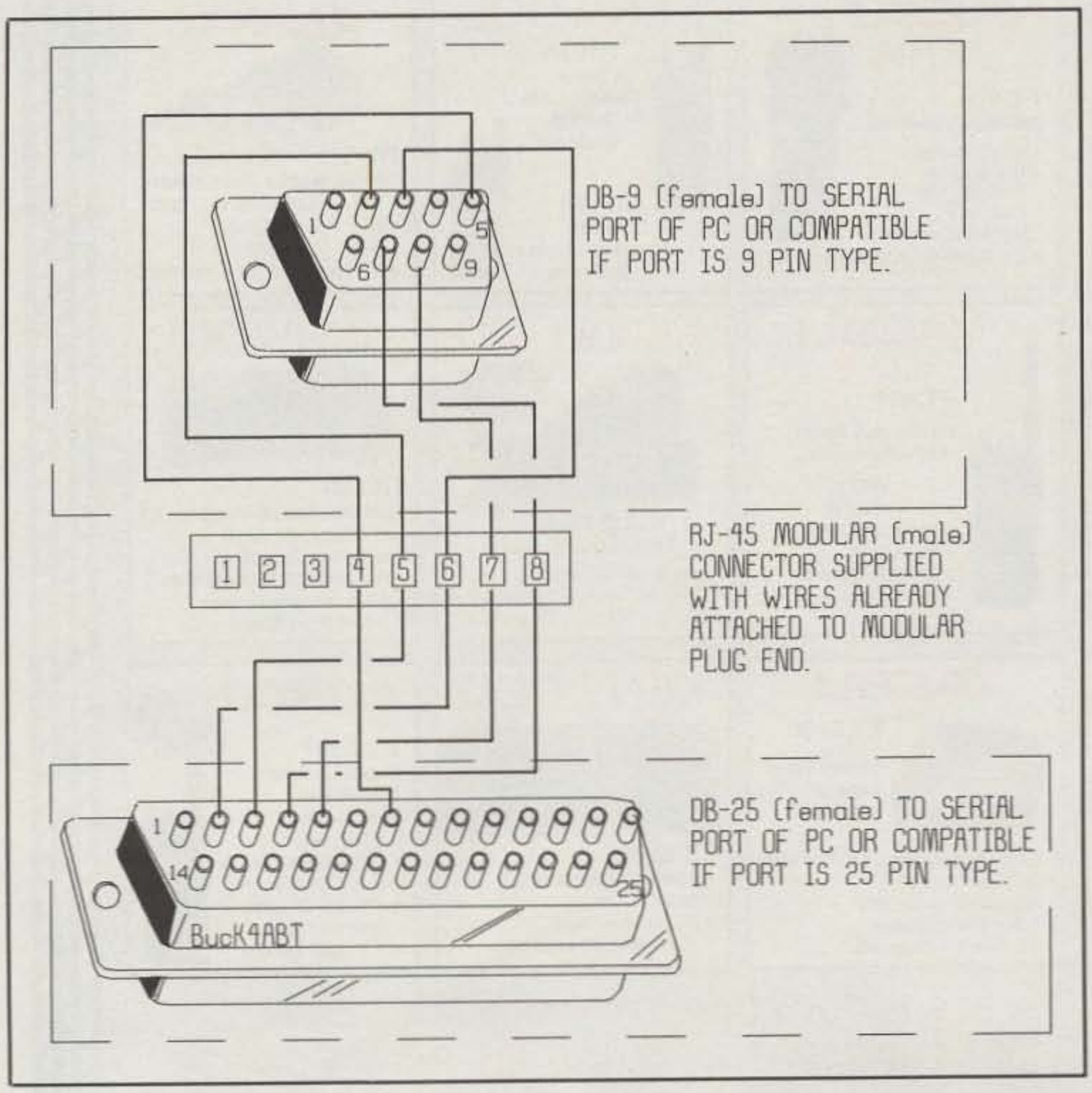

Fig. 3– Data Engine to computer interface cable. Note: Configuration is shown here for both DB-9 or DB-25 serial ports. See text and Table II for more information.

you've found a way to strike the asterisk (*) quickly enough and you receive the prompt to **Enter Your Call,** input your callsign and you're ready to start the final configuration.

The parameters of the 19,200 baud system can be set to the user's liking. However, I would suggest using the following settings to start. As you fine-tune the system for your backbone, trunk, or network, you may discover a configuration that will better favor your application.

At the **cmd:** prompt set the following parameters and commands:

TXDelay to 6 to 9
DWait 0 (zero)
PERSIST 200
SLOT 1-2
RESP 2-3

Set different callsigns into each system. Then make a connect and begin having fun "in the fast lane"—packet-wise, that is.

DE/DB-15	D4-10/DB-9
TD = 3	TD = 1
RD = 2	RD = 5
PTT = 1	PTT = 3
SG = 9	SG = 6

Table I– Interfacing the Data Engine "DE" to the D4-10 transceiver.

DE/RJ-45		DB-25	DB-9
1 DSR	(*Blue)	NC	NC
2 DCD	(*Orange)	NC	NC
3 DTR	(*Black)	NC	NC
4 SGnd	(*Red)	7	5
5 RD	(*Green)	3	2
6 TD	(*Yellow)	2	3
7 CTS	(*Brown)	5	8
8 RTS	(*Gray)	4	7

Table II– Interfacing the Data Engine to your computer.

Amaze yourself by transferring a few 100,000 byte files between the 19,200 baud stations. Don't turn away for more than a minute or two, or you've missed a 100 kilobyte file transfer.

If you are listening on the frequency, the next thing you are going wonder is is it really transmitting packet? Oh yes, there is a living, breathing animal in that box; if it hissing, it is there!

This system can be configured in several ways, so I've listed the various components of this system separately so you may order the configuration that suits your application or station requirements.

The Data Engine without a modem is $309.95. The Data Engine with the 1200 baud modem is $369.95. The 1200 baud modem to activate the second port is $79.95. If you prefer, you can make the other port a 2400 bps port; order model DE-2400 modem at $99.95. The 9600/19,200 baud modem is model DE-19K2/9K6 and is sold at $99.95. The D4-10 is shipped standard with 430.550 MHz crystals installed and is priced at $369.95.

For more information or to order this system contact Kantronics at 1202 E. 23rd Street, Lawrence, KS 66046. Their telephone order line is (913) 842-7745. BBS @ 300, 1200, 2400, N,8,1 is (913) 842-4678.

P.S.: In case you didn't know or have forgotten and this issue reaches you in time, I will be hosting The SouthNet Packet Conference and Hamfest in Albany, Georgia on June 19–20. I will also be hosting a packet forum on Saturday, July 18, at the Atlanta Hamfest (July 18–19), in the Biltmore Room of the hamfest site. A free book *Having Fun With Packet Radio* will be given to all who attend the forum. Plan on being there!

Having fun at 19,200 baud!

73 de BucK4ABT

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- HF log periodic arrays, broad-banded and DX/contest-worthy.

- Full range of 6 meter Yagis (the world's largest 6 meter amateur array – at AA6TT – uses eight DX Engineering 10 element Yagis).

- Heavy-duty phasing boxes for low-band vertical arrays and stacked Yagi systems, including the new Universal Phase Box for stacking and phasing tribanders and log periodic arrays.

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- All DX Engineering products are optimized for DX and contest performance and built for the most demanding environments. Give us a call and we'll recommend a system to replace the Brand X antennas which came apart in your last blizzard.

- The DX Engineering staff are all active DXers and contesters. Day in, day out, we use the products we sell!

FRANK W. COOPER W3NV

October 15, 1991

Mr. Bill Sattler
% DX Engineering, Inc.
618 Spaulding Ave.
Brownsville, Oregon 97327

Dear Bill:

I thought you might like to hear about the results I have been having with your two super beams! As your records will show I have your 20 meter six element beam on the 58' boom and the 24 foot boom 11 element log periodic for 10,12,15 and 17 meters.

The performance has been nothing but spectacular. Words cannot describe the super results i have had with these two beams. I have heard and worked everything on the bands with only my exciter running 100 watts! Have no need for my linears even when the pile-ups for the ZA'a and 3B7's were unbelievable the beams put me right through with the usual 5/9 plus reports!

I know location is important and most Florida spots are good but believe me the beams are doing a super job and it would be remiss not to write and tell you how pleased I am with my choice of antennas! Keep up the good work!

I might mention that I am quite surprised and pleased with the performance of the Log Periodic antenna. Never was too keen on that type of antenna but it sure does a super job and makes operating four bands just great. Your new 5 band log sounds great and I might have chosen that if it was available at the time of my purchases.

I am enclosing some better photos of the beams which I thought you might enjoy seeing. Thanks again for doing such a super engineering job on the antennas and it has made my dxing a real fun part of the hobby.

73 de W3NV

Frank W. Cooper

fwc/c
enc: photos
P.S. You should see my log!
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FAX NOTE: our old fax number is out-of-order. If you sent us a fax and did not receive a reply, please resend the fax to our new number above. DXE apologizes for any inconvenience.

VHF PLUS

BY JOE LYNCH, N6CL

ALL ABOUT THE WORLD ABOVE HF

Dayton Hamvention

As editor of this column, I was part of *CQ*'s contingent manning the *CQ* booth at Dayton this year. This was my first trip (whew!) to Dayton.

For me, the highlight of the trip was the VHF banquet Friday night at the Barnsider Restaurant. There were 94 of us in attendance. Bryan, WA8MZQ, and Hal, KC4YO, are to be commended for their hard work in order to bring together everyone at this excellent restaurant. Although the meeting was informal, door prizes were given away. These prizes included a SQLOOP antenna donated by Mike Stahl, K6MYC. Winners of the Zip Code Contest who were present received their certificates. I also put in a plug for the new CQ VHF WPX Contest. And the reception you gave my fiancee/ editor, Carol King, K5CPZ, and me was just great. It is something that made me feel proud, humble, and responsible all at the same time. I feel responsible toward you to continue to report on your activities on the VHF and above amateur radio bands. Thanks to you, this column is working.

The next day the VHF Forums took up most of the morning. The moderator was Joe Burke, WA8OGS. Dave Meier, N4NM, presented a forum entitled "VHF/UHF Beacons—Good Propagation Indicators." He spoke of his beacons on several bands and how to construct a simple beacon for VHF/UHF work. Tom Kirby, W1EJ, gave a plug for the Eastern VHF/UHF Conference that was to be held in May and talked about highlights of past Eastern VHF/UHF conferences.

Bill Tynan, W3XO, talked about his year-long "contest that is not a contest" entitled "The World Above 50 MHz—A New Contest." For more information on this non-contest see his column in the January issue of *QST*. He also spoke of the Central States VHF Conference that is scheduled for this month.

Roger Cox, WBØDGF, conducted a forum entitled "Microwave Yagi Antenna Design." He demonstrated a 903 MHz antenna that he had designed specifically for the Hamvention. Dave Halliday, KD5RO, gave a plug for the 1992 Microwave Update, scheduled for October 16–18, at the Holiday Inn Holidome, Rochester, New York (more coverage on this conference elsewhere in this column).

Finally, Dr. Bill Lonc, VE1SMU, conducted a forum entitled "Amateur Radio Astronomy at VHF/UHF." He showed slides of the many different antennas he has built over the years for amateur radio astronomy.

During the Hamvention I met with several of the other vendors who have products that we as VHF and above operators are interested in buying. I tried to encourage the continued development and manufacturing of products that will enhance our activities.

I survived my first trip to Dayton and am anxiously looking forward to next year. Maybe next year's dinner will completely overtake the Barnsider! Maybe we will have as many in attendance as the DXers at their dinner. Maybe now I am starting to get carried away. Nevertheless, I will be looking for you at Dayton next year.

P.O. Box 73, Oklahoma City, OK 73101

VHF Plus Calendar

June 30 to July 6	N6CW and K6STI to VP2E (see text for details)
July 1	Perigee
July 2–7	WA8NJR, WA8R, and WZ8D to EO60 and EO70 (see text for details)
July 5	VK5MC Europe: 1234 UTC; very good EME conditions
July 6	First quarter moon
July 11–12	**CQ WW VHF WPX Contest** (see rules in June issue)
July 12	Noisy-Sagitarius A; poor EME conditions
July 14	Full moon
July 16–19	CSVHF Conference, Kerrville, Texas
July 16 to Aug. 1	WA8MZQ to FN06, EN85, EN86, and EN96 (see text for details)
July 17	Apogee
July 18	VK5MC Europe: 2306 UTC
July 19	Moderate EME conditions
July 21	Moderate EME conditions
July 22	Last quarter moon
July 25	VK5MC NA: 1816 UTC, 144.012 (call .010-)
July 26	VK5MC NA: 1920 UTC; moderate EME conditions
July 29	New moon; noisy EME conditions

(Courtesy W4ZD and others)

On The Air

While the beginning of April furnished 6 meter ops with contacts with LU, PY, XE, 3D2AG, 3D2PO, ZK1, ZL, CE, TI, VK, HC, KH6, and HKØ, the end of the month furnished ops of the higher frequencies with some outstanding DX. Several stations in the central, mid-southern, and southern parts of the country reported enhanced conditions into Texas and Oklahoma on 2 meters and above on Thursday, 29 April, through Saturday, 2 May. Sam, K5SW, reported a contact with Chicago on 1296 MHz on Friday, as well as other contacts on 2 meters, 432 MHz, and 1296 MHz. Stations in Texas were working stations in Alabama and Florida on 2 meters and 432 MHz.

Al, WB5LUA, reported what appears to be a new terrestrial land record on 3456 MHz. On Friday morning at around 1400 UTC Al, in EM13, made contact with W9ZIH, in EN51, on 432 MHz. After determining that each had the equipment, they QSYed to 2304 MHz and completed a contact. Next they QSYed to 3456 and completed the possible record-breaking contact. The land distance, as Al has calculated it, is 746 miles. Following the successful contact on that band they moved to 1296 MHz and made yet another contact. The next day Al attempted to work W4WSR on 2304 MHz, a distance of 1080 miles. However, Al was heard by, but did not hear, the other station.

VHF+ DXpeditions

P43FM's 6 meter DXpedition—A Wrap Up. George, P43FM/PAØFM, sent me a final report of his activities while in Aruba over the winter. George activated his station on 19 November. However, his first 6 meter QSO did not occur until he worked Tom, N4EJW, on 21 November. It wasn't until 29 November that he had any significant opening to South America. The next day he worked a couple more stateside stations (WA4LOX and KE7CX). Then the band went dead until 20 December, when he started the morning by working Mike, VE1MQ. After that the dam broke. He ended up working several more stations in VE1 and VE3. The next day he had another opening that netted him 127 QSOs, starting with EA8/DJ3OS, followed by a couple of dozen European stations, and winding up with stations in U.S. call areas 1–5, 8, and 9. The next

Bryan Snyder, WA8MZQ, host of the informal VHF Dinner at the Barnsider Restaurant, Friday night, during the Dayton Hamvention.

Charlie, W0RRY, as KC6RR during the March OKDXA/OCC sponsored DXpedition to Belau. (Photo courtesy WV5S)

day netted George another couple of Europeans followed by a lengthy opening to the U.S.

On January 2nd George worked over 100 Europeans, followed by more contacts with Canada and the U.S. The next day he worked a few more Europeans. On the 4th he almost filled his logbook with the number of stations contacted in Europe and North America. On the 7th he had another short European opening, and then on the 8th the band once again opened to North America, giving George dozens of contacts in call districts W8-0.

February began with a QSO with OH3XA, followed by two contacts with Estonia. Then he filled up a log-book page with more contacts with Finland. The next two days gave George more North American contacts. On the 8th George worked more Europeans, including RA3TES and a number of OKs and YUs. On the 10th he worked more stations in North America and Costa, CU1EZ. Not until the 22nd did he have another QSO. However, he opened the day's activities by working I0AMU, followed by almost all the countries around the Mediterranean. As

There were 94 of you at the Barnsider Restaurant for the VHF Dinner on Friday night during the Dayton Hamvention.

his southern European opening was finishing, he started on another North American opening. At 1930 UTC, about an hour after his stateside opening was completed, he had a CW contact with ZL1ANJ. He wrapped up the day at 1937 UTC by working 5H3RA.

On 4 March George began the first of several days of openings to Japan. Between the 4th and the 8th he worked hundreds of Japanese stations and the guys at KC6RR several times. Finally, on the 15th George shut down his station to begin his trip back home.

The final total showed that he worked over 2500 stations in 65 countries, 48 states (missing KH6 and KL7), and all continents. George hopes to return to Aruba again this coming November, if finances permit. Because he is retired, his finances are limited. However, he is looking for a sponsor who will help absorb some of the expenses.

I, for one, really appreciated all the hard work George put forth on his very successful trip.

HKØ/W6JKV's DXpedition—A Wrap Up. During the first weeks of April Jim Treybig, W6JKV (along with Cal, KB6AFZ, for a couple of days at the beginning of the week) activated San Andres on 6 and 2 meters, the latter being on EME. Most of Jim's North American 6 meter contacts were by side scatter or back scatter, except for one good direct opening to southern California. The final tally showed that Jim worked 203 stations on 6 meters, with 107 of them in the U.S. He made 22 contacts with W4s, 39 contacts with W5s, 38 contacts with W6s, and 8 contacts with W7s. He made contacts with a total of 16 countries, with 25 contacts with VKs, 23 contacts with ZLs, 24 contacts with LUs, and 7 contacts with PYs. On the moon Jim had 21 successful contacts.

Since 1981 Jim has made 35 DXpeditions all over the world, averaging three a year. Jim has contributed much toward the propensity of DX on VHF. When you send for your QSL, include a short note of thanks. I am sure he will appreciate it.

The Gambia on 2 meters EME. ON1BCB, ON7EH, and Mark, ON5FF, teamed up to put C53GS on the air on 2 meter EME beginning 9 April. Their first sked was with RB5AL and it was a success. Following that contact they reported a pile-up on .030 that went on almost continuously until their shutdown on 15 April. They reported that many of the stations with whom they had skeds were worked prior to the sked time on random, thereby freeing up these times for more skeds. The antenna system they used was an 8 × 12 element K1FO array stacked 2 × 4. They reported making 120 contacts in 24 countries and 5 continents (lacking Oceania), with 60 percent of the QSOs made on random. The QSO breakdown is as follows: U.S., 37; VE, 3; DL & Y, 15; EA, 1; G, 6; GM, 2; GW, 1; HB9, 3; HG, 1; I, 10; KL7, 1; LA, 5; LU, 1; OH, 2; OK, 2;, ON, 2; OZ, 2; PA, 4; SM, 11; UA (Europe), 3; UA (Asia), 2; UB, 3; UG, 1; and UL, 1. Thanks to John, KØIFL, for the report on this DXpedition.

KC6RR—A Wrap Up. Charlie, WØRRY, operating as KC6RR, reported a total of 2729 contacts were made with 1588 different stations. In excess of 1000 of these contacts were with Japan. Also, around 135 contacts were made with stations in Australia. Additionally, contacts with stations in 21 other countries were made, including a contact with BT5WOS whose home call is JH4GJR. Unfortunately, no North American contacts were made on VHF. QSL via OKDXA, P.O. Box 88, Wellston, OK 74881.

HI8A Now QRT. After a long stay in the Dominican Republic, Aki Nagi, HI8A, returned to Japan at the end of March. He has made several thousand contacts on HF and VHF. If you need a card from him for his HI8A, HI500A, or HI160M operations, QSL to his home QTH: Akito Nagi, JA5DQH, P.O. Box 73, Ishii Tokushima, 779-32 Japan.

VP8SSI—A Wrap Up. The operation from South Sandwich Island, while producing some 30,000 QSOs on HF, was struck by Murphy on VHF. Reportedly some of the VHF equipment went into the ocean, and the 6 meter station was never used because it was frozen solid to the ground after being left there overnight. Now

wouldn't that make an interesting ad for some manufacturer.

G4SMC/8R1's Command Performance. The group that put this very successful operation on the air last fall was active again in April. They had some success working into Europe. However, no reports of stateside contacts had surfaced as of this writing.

DU1 on 432 MHz EME. Louis, KG6UH/DU1, had some very limited success in late April and during May on 432 EME. However, he is now QRT and has been transferred to Korea. Look for him possibly as early as this month on the VHF bands and later on 432 EME when he has time to re-establish his station. Thanks to Allen Katz, K2UYH, for the update on Louis.

3D2AG-Rotuma—A Wrap Up. While on Rotuma, Antoine, 3D2AG, was successful in working into Europe (9H), South and Central America (ZP, TI, YS, and XE), Oceana (VK and ZL), Asia (JA), and North America (W5, W6, and ZF). QSL via his home address: Antoine Nyeurt, Box 14633, Suva, Fiji Islands.

Guantanamo Bay. Doug, KG4DD, was active through the end of March. QSL via N5FTR. The DX Engineering company donated a 4-element beam which is still there, and KG4CO may be active until his departure this month.

DXpedition to UA2. Mike, UL7GCC, and Peter, PA3EUI, will operate from mid-July until sometime in August. They hope to activate several grid squares, beginning with KO04. The expected callsign for the operation is 4L2FM. QSLs should go to PA3EUI via his home address and not by the bureau. His address is Mr. Peter Vd Woude, Sparrendal 610, 3142LT Maassluis, Netherlands.

Turkey on 6 meters. Eric, F1JKK, who began his operation in late April, will be active for another couple of months as TA/F1JKK. QSL via F6FNU.

P29 on 6 meters. Pete, P29CW, is quite active on all HF bands and 6 meters. QSL to P.O. Box 461, Ukarumpa via Lae, Papua New Guinea. Also showing up from time to time are Paul, P29PL, and Gordon, P29ZGD. QSL P29PL via VK9NS.

St. Helena Possibly on 6 meters. Chuck, ZD7CRC, is now on the air. However, as of this writing, no reports of 6 meter contacts have surfaced. The tentative route for a QSL card is via Chuck Chalmers, ZD7CRC, P.O. Box 126, St. Helena, South Atlantic Ocean. As there is no airstrip, mail goes in via ship rather infrequently. Arrangements are being made to find a manager for Chuck, so be patient if you work him and are waiting for that card.

Belize. This should be an easy catch during sporadic-*E* season this summer now that Don, V31PC, is back on the air. QSL to: Don Owen-Lewis, P.O. Box 7, Punta Gorda, Belize. Do *not* QSL via the V31 bureau or via the ARRL's outgoing QSL bureau as there is no active bureau in Belize at present, and the ARRL will not forward cards to countries without active bureaus.

Honduras. This also should be an easy country to work this summer now that the SMIRK donated rig has arrived at the club station, HR1CRT.

VP2E to be on 6 meters. Terry, N6CW, and Brian, K6STI, plan to be active as VP2E/N6CW from 30 June through 6 July. Look for them on 50.123 MHz or the calling frequency of 28.885 MHz, when not on 6 meters. Operation on 2 meter EME may also be possible.

Rare Canadian Grids to be Activated. Bryan, WA8NJR, John, WZ8D, and WA8R, are planning a trip to EO60, and possibly EO70, between 2 July and 7 July. If time permits, trips to surrounding grids are possible. They plan operations on 6 meters through 1296 MHz. The one possible problem is all of them arranging their work schedules. Check the bands, as they are active operators and will be running some power on 6 and 2 meters (700 watts and 500 watts, respectively).

Another Four Rare VE Grids to be Activated. Bryan Snyder, WA8MZQ, will activate FN06, EN85, EN86, and EN96 on 6 and 2 meters during his fishing trip and family holiday this month. His schedule is as follows: July 16 through July 18 he will be on from FN06, primarily in the evenings; July 18 through August 1 he will activate the remaining grid squares depending on where he is in his travels. Watch for him around 1030 UTC for some 6 meter meteor work before and during his sunrise. He will also try to be on around 1500 UTC and 0100 UTC. On 6 meters look for him between 50.125 and 50.130 MHz. On 2 meters he will be found either on 144.200 MHz or 144.150 MHz. He will use 7.163 MHz as a liaison frequency and will check into the 3843 VHF Group Net on Monday nights in order to advise the net participants of his progress. Bryan mentioned that he is looking for stations in the states bordering the Great Lakes that will act as relay stations for him to help him complete some of the QSOs. Give him a call at 513-599-5335, or drop him a note at 4415 Holiday Lane, Bellefontaine, OH 43311, if you can help.

I used my SQLOOP antenna at the Dayton Hamvention by mounting it on the back of my rental car. This is a fun antenna! (See the text for more information on the SQLOOP antenna.)

Current Contests

CQ WW VHF WPX Contest. This is the month you have been waiting for. On July 11 at 1800 you will have the opportunity to participate in the new and improved version of the CQ WW VHF WPX Contest. Details and rules were published last month. Remember that this is an entirely different contest from the ones in the past. Therefore, you will need to send for new logs and summary sheets. Send an SASE to CQ Communications, 76 N. Broadway, Hicksville, NY 11801. Send the completed log sheets to me, your contest chairman, at the address on the first page of this column. I look forward to working you and compiling your scores in this contest.

Zip Code Contest Results. The Zip Code Contest, promoted in the March issue, resulted in nine entries. The scores were as follows: K8RZB, 7777; WZ8D/R, 2496; N4TWX, 2262; WA4GBE, 900; KM4XW, 754; WA8MZQ, 725; N4OYS, 425; AC4HG, 128; and WB4NPA, 35. Contest organizers are interested in improvements for next year's contest. If you have any suggestions, contact Byron Swainey, WA8NJR, 7523 Brookville Rd., Oxford, OH 45056.

Current Conferences

CSVHF Conference. The Central States VHF Conference is scheduled for the 16th through the 19th of this month at the Y. O. Hilton, Kerrville, Texas. Scheduled speakers include: Kent Britain, WA5VJB; Al Ward, WB5LUA; Bill Olson, W3HQT; Dave Chase, KY7B; Terry Wilkinson, WA7LYI; Paul Shuch, N6TY; Paul Wilson, W4HHK; Dave Meier, N4MW; Andy McAllister, WA5ZID; Jan King; Dick Jansson, WD4FAB; Tom Clark, W3IWI; Derwin King, W5LUU; Ray Soifer, W2RS; and Hank Kasper, K2GAL.

Parallel to the conference is the VHF Ionospheric Symposium. Speakers for the symposium include: Emil Pocock, W3EP; Bob Cooper, ZL4AAA; Steve Wagner, W7CI; Steve Gregory, VK3OT; Frank Stewart; and Norm Cohen, the latter two from SESC. The banquet speaker is scheduled to be Jim Treybig, W6JKV. As you have read, some of the big names in the VHF-plus world will be present. If you can possibly attend, you will be glad you did.

East Coast EME Meeting. A meeting of east coast EME enthusiasts is scheduled to take

place between August 14 and 16 at the Oxon Hill, Maryland Ramada Hotel. Tentative speaker list as of this writing includes Steve Powlishen, K1FO; Thorn Cockram, KU4F; Bill Lakatosh, AA4TJ; Rich Bradley, WB3DZC; Al Ward, WB5LUA; Mike Owen, W9IP; and Vic Michael, W3SDZ. Contact Willy Mank, W1ZX, Hwy 228, Box 144D, Waldorf, MD 20603, for more information. Contact the hotel at 301-630-4050 for special rates for the meeting.

Microwave Update '92 Conference. A call for papers has been issued by the sponsoring organization for this year's Microwave Update Conference. This year's conference is sponsored by the Rochester VHF Group, and it will be held at the Holiday Inn Holidome, Rochester, New York. If you have a paper to present, it will be included in the *Proceedings* published by the ARRL. You will receive a copy of the *Proceedings* as a part of your registration packet. For more information on submitting a paper or for registration information contact Dave Halliday, KD5RO, at 716-272-1585, or Frank Pollino, K2OS, at 716-594-0502. Tentative speakers as of this writing include Al Ward, WB5LUA; Jim Davey, WA8NLC; Rick Campbell, KK7B; Barry Malowanchuk, VE4MA; Bill Olson, W3HQT; and Kent Britain, WA5VJB.

VHF+ Products

The SQLOOP. A relatively new antenna for mobile use has made its appearance on the market. The SQLOOP (pronounced SK-loop), made by M2, is a compact antenna that is inside an 8″ × 10″ black box. When I first saw the antenna I immediately thought of Peggy Lee and her song "Is That All There Is?"

I took the antenna in the car when I recently made a trip to Lawton, Oklahoma. Listening to one of the local repeaters alerted me to a temperature inversion and enhanced tropo conditions. At that point in my journey I was 30 miles southwest of Oklahoma City. While running only 25 watts (Mike recommends that you run a brick, at least 150 watts), I decided to call CQ. I was answered by Howard, WD5DJT, in EM12 and by Pat, W5OZI, in EM00, a distance in excess of 350 miles! I still don't know who was more surprised, Pat or me. Obviously, these conditions were ideal and they did not last for very long.

For my trip to Dayton I packed the antenna and a homebrew mag mount. Using my TR-751 barefoot, I had some fun on sideband, working as far as Elizabethtown, Kentucky from Indianapolis. Also, because of inherent horizontal polarization of many antennas used in repeater systems, I was able to use the SQLOOP to operate through several different repeaters in the Indianapolis and Dayton areas.

Many of the ops I've told of these experiences also have SQLOOP antennas. Most of these guys report regular reliable communications in excess of 100 miles with the SQLOOP and a brick (you know, one of those 150 watt linears). The song I am now singing about the SQLOOP is the Monkeys' "Now I'm a Believer." The SQLOOP sells for around $60 from M2 or your local retail outlet. I plan a full-scale review of this remarkable antenna in a forthcoming issue of *CQ*.

10 GHz Kits. Charlie, G3WDG, has 10 GHz transmitter and receiver kits available. The kits consist of modules as follows: 2.5 GHz LO mod-

ule, less crystal, $105; 10 GHz, 50 mw transmit converter, $220; 10 GHz receive converter, $170; and 300 mw 10 GHz PA, $115. You may purchase the modules with a check drawn on U.S. dollars. For more information, contact Charlie at 314A Newton Road, Rushden, Northants, NN10 OSY, United Kingdom. You may also call him at 8-01144-933-411446. Thanks to Allen Katz, K2UYH, and the "432 and Above EME News" for information on the kits.

Lead, Follow, Or Get Out of The Way

Did you read Dave Sumner, K1ZZ's editorial entitled "Making the Most of the Microwaves"? It appeared in the May issue of *QST*. In case you did not, let me summarize it in a few sentences. Dave opened by setting the scene at an average club meeting and asking those present how many of them had operated on frequencies above 450 MHz. He continued by saying that the standard answer to the question would be "none of those present." He goes on asking questions around the theme "why not" and answering those "why nots" by saying that it is far easier than the excuses would lead one to believe. He makes a strong point for populating these amateur bands. He concludes by stressing how editorially the League and *QST* have been and will continue to support activities on these higher frequencies.

So why am I about to preach to the choir in this column? Because you are the leaders. You are the innovators. I read about your accomplishments in your club newsletters and your letters to me. I am proud to know you and to know of your achievements. With all the work you are doing (for example, a preamp for 24 GHz being developed by WB5LUA, longer and longer LASER attempts being made by the guys in Arizona, very stable LO's for 10 GHz being worked on by the guys in NTMS), you are in an excellent position to "lead." What about the rest of us—those of us who do not have the wherewithal to be the big leaders? We can be followers and small leaders, as well. Should we feel some sense of shame when many of us are not on frequencies above 450 MHz and the non-ham cellular telephone user is using a device that is operating above 800 MHz or, in some cases, 1800 MHz? I say *yes!*

What is there to stop us from developing our own cellular telephone system on 902 MHz? The technology is already there. For example, a number of clubs in a metro area could get together and set up the cells of transmitters for the user of the amateur cellular telephone from which to operate as he or she is driving around the area. Let's use the band or lose the band!

Kent Britain, WA5VJB, was asked to look into a crystal ball, and what he saw in the not too distant future was a dual-band hand-held radio. So what is so great about a dual-band hand-held? Well, nothing, except this one is designed to operate on 5.7 and 10 GHz, with the potential of 10,500 memories! (Hum . . . Makes all those repeater frequencies on 6 and 2 meters and 125 and 70 centimeters pale by comparison.) Kent says that the technology is already there for developing such a radio for a very economical price.

Let's talk about another band. ICOM has announced plans to equip their IC-970 with a board that will operate on 2.4 GHz. Again, the technology is there, ready for us to use and further develop. In this case a commercial manufacturer has already taken the lead to develop a product for amateur use.

Many of the exhibitors I saw at Dayton acknowledged that the future of amateur radio is on microwave. While HF is here to stay, microwave, with its vast amounts of spectrum, offers the best potential and challenge for the amateur radio operator of the future.

I have outlined just a couple of examples of use of these higher frequencies. I conclude that we can follow the leaders on to the higher frequencies. Further, I state that if we do not use these frequencies, we had better get out of the way, because commercial users will be right there waiting to grab them.

One More Thing. I read letters to the editor of another national amateur radio magazine that complain about having to learn the code to upgrade. So what! The Technician class licensees of 30 years ago were faced with a similiar dilemma. Some chose to upgrade by learning to copy the code at a faster rate of speed. Some chose to get out of amateur radio. Some chose to stay on the VHF + frequencies and be innovators. The present Technician class licensee has *all* amateur radio privileges on *all* amateur radio frequencies above 50 MHz. The criterion for respect from one's peers on the VHF + frequencies is either a demonstrated knowledge or a willingness to learn. Morse code is not an issue.

The operators on the VHF + frequencies welcome the knowledge and creativity that the new amateurs bring to the hobby. And I welcome correspondence from new amateurs of any class who are interested in discussing the microwaves. Your ideas, your creativity, and your development will make you the pioneers on the microwave frontiers. I look forward to reporting on them in future columns.

And Finally . . .

This month marks the completion of my first year as your columnist. How many of you remember the first column? If so, do you remember my writing about my Elmer, Herb Adams, K6BTO? Well, the other day my curiosity got the best of me. I had no idea whether Herb was still around, so I wrote to his son, Frank, AE6L (one of my long-ago high school buddies). In the letter I included a copy of the first column. I immediately got a reply from Frank. I found out that my letter arrived on Herb's 76th birthday! Frank informed me that he and his father are active on 10 GHz SSB and are members of the San Diego Microwave Group. It made my day to learn that I was able to express my appreciation of his influence on my amateur radio life.

This is all the room for all the news. My thanks go to Ted, G4UPS; Shel, NI6E; Allen, K2UYH; and John, KØIFL; and their fine newsletters, and to you for input to this column. Keep those letters coming and keep my phone ringing. You know the number: 405-528-N6CL (6625). Next month we take another look at the *Perseids*. If you like to play on the meteors, you might start listening the middle of this month. The *Perseids* is a long-running shower, and some feel that rocks from this shower start showing up as early as mid-July. Thanks again for all your input and support for your column this past year. Until next month . . .

73, Joe, N6CL

DX

BY CHOD HARRIS, VP2ML

NEWS OF COMMUNICATION AROUND THE WORLD

Father Moran, 9N1MM

Reverend Dr. Marshall Moran SJ died on April 14th this year in New Delhi, India, just six weeks before his 86th birthday. Better known as Father Moran 9N1 Mickey Mouse, he epitomized the true spirit of DX.

Father Moran's amateur radio career spanned three-quarters of a century, from hesitant (and unlicensed) beginnings in 1918 to his daily contacts from Nepal to within a few weeks of his demise.

Marshall Moran first became interested in radio at the age of 12 in 1918. He and a high-school friend assembled crystal receivers and soon graduated to 5 and 10 watt transmitters, using circuits from radio handbooks. As was typical of the era, neither budding amateur bothered with the formalities of a license.

Marshall moved with his family while he was still a teenager. Lacking a local amateur friend, he did what hams still do today: he walked up to the house under the largest antenna in the neighborhood and knocked on the door. The son of the physician who owned the house was busy wiring up an Armstrong super-regenerative receiver. Marshall was hooked on the better radio, and was soon working on his own rig. It worked the first time it was turned on.

Marshall's first receiver cost $90 in parts, a princely sum for the 1920s. However, in the true amateur spirit, the high-school student began a service constructing receivers for other well-to-do families in his neighborhood, charging $10 for his time. With this extra income Marshall bought and read every issue of *QST* and any other radio magazines he could find.

Again in common with many other amateurs, Marshall's amateur radio career faded into the background as he pursued advanced studies. He joined the Jesuit order following his graduation from Loyola University. He entered the Jesuit Seminary College, majoring in languages, and was ordained a Catholic priest. Marshall Moran became Reverend Dr. Moran SJ.

His first missionary post was in India in 1929, where he soon became principal of the St. Xavier school in Patna, in the eastern Indian province of Bihar. Ten years later, while working to establish a high school in Patna, Father Moran had a renowned visitor: Mahatma Gandhi. The great Gandhi's charm won over the devout Catholic,

Father Moran, 9N1MM, passed away in April at age 85.

and Father Moran agreed to help Gandhi in his quest for Indian independence.

During World War II Father Moran met many American pilots. He was fascinated by the aircraft and their daring pilots, but was particularly taken by the radio communications sets they used (mostly Hallicrafters SX28s). At the end of the war Father Moran requested some war surplus for his school. In the list along with a jeep and 400 beds was a request for an SX28. Father Moran was soon on the air as VU2ZX.

Again in the true amateur spirit, Father Moran tried different antennas, working many local stations. One day he reached W4DPI in Tennessee. "I was in awe," he recalled. Radio began to occupy a larger role in Father Moran's life.

Meanwhile, he continued to make friends in high places. During a train ride in 1946 he repaired the public-address system on the train so that then-candidate Jawaharlal Nehru could speak to the waiting crowds. This amateur ingenuity led to Father Moran driving then Prime Minister Nehru around Bahir in his war-surplus jeep a year later. Nehru later commented to King Triubhuvan of Nepal that Father Moran was his favorite driver!

In 1949 Father Moran visited Nepal to conduct examinations for entry into Patna University. Two years later he returned to Nepal on a permanent basis to establish the same type of school he had organized in India. At that time Nepal had little in the way of 20th century conveniences; Father Moran entered Katmandu on a ulinkath carried on the shoulders of eight porters.

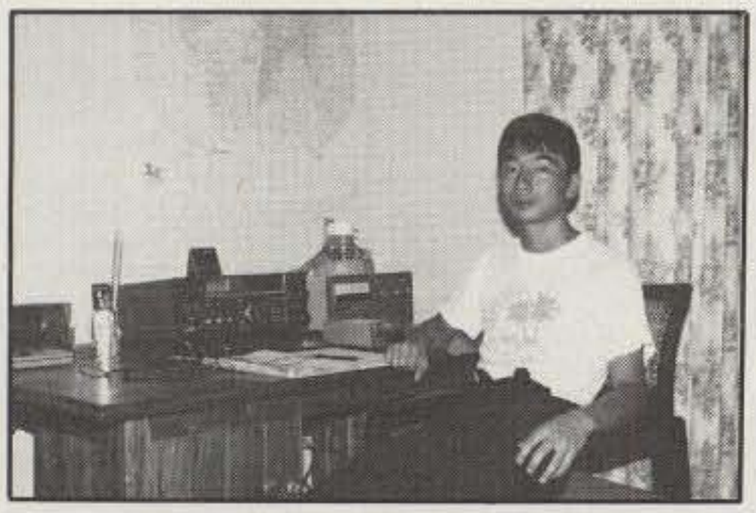
The King of Nepal donated an vacant summer palace to the Jesuits, and Father Moran established the St. Xavier school for boys at the foot of the Himalayas. This was to be Father Moran's home for the next 40 years.

Although he reluctantly gave up amateur radio when he moved to Nepal, he never lost the radio urge. He hesitated to ask for amateur radio operating permission. "They had no idea what amateur radio was," he reminisced, "and I didn't want the government to think I was some kind of agent, so I didn't do anything" about getting on the air.

Operating from a war zone? Rich, KI3V, operated as A92FN in the 1991 WPX test from Bahrain.

Jim, LA8THA, operated from remote Svalbard as JW8THA in February. He toasts his 100th country in only four days. (Thanks to KR4M for the photo)

P.O. Box 50, Fulton, CA 95439



Sri Lanka is very scarce on 160 meters, but Mitsuru Haraoka, JJ1VKL made many top-band DXers happy /4S7 from his temporary home. Note the extra fan to keep the amplifier cool in the tropical climate. (Thanks to W7TVF for the photo)

His big break came in 1960, when a handful of American engineers arrived in Nepal to set up a modern telephone and telecommunications service. As part of their contract with the Nepal government, the engineers all requested amateur radio callsigns and operating permission. Father Moran easily convinced the engineers to add his name and requested call to the list, and he soon thereafter received 9N1MM as Nepal amateur radio license number one. He renewed that license for the next 32 years.

The engineers—Sam Maso, 9N1SM, Tom Bell, 9N1TB, and Fred Vocal, 9N1FV—helped Father Moran obtain a Heathkit Cheyenne AM transceiver, similar to their own rigs. However, none of the engineers could spare the time to guide Father Moran through the intricacies of building the rig. Father Moran had no one else to whom to turn for electronics advice in Nepal; he was probably the most knowledgeable resident in the country!

Undaunted, Father Moran carefully followed the legendary Heathkit step-by-step instructions, and soon had his rig on the air on 10, 15, and 20 meters. He was very active on the amateur bands after that day.

During the next 30 years Father Moran was on 20 meters most mornings, while his boys run through their daily calisthenics. He was often on again in the evenings, checking into the Seanet, which he helped found to promote amateur activity and intercommunication in Southeast Asia. He made about 300,000 amateur contacts, practically single-handedly driving Nepal down to the 70th spot on *The DX Magazine*'s Most Wanted countries list.

In addition to being one of the very few licensed amateurs in Nepal (and the only regularly active one), Father Moran also assisted essentially every visiting ham get on the air. He either loaned use of his own shack overlooking the Himalayas, or obtained a special operating permission for visitors such as Lloyd and Iris Colvin, the Japanese UNICEF ham club, and Rusty Epps, W6OAT.

The WPX Program

Mixed

1556	IN3NJB	1559	CT1EEB
1557	N4EED	1560	KØIFL
1558	EA1MV	1561	TF1MM

SSB

2306	IN3NJB	2312	IKØOHU
2307	EA1MV	2313	VE1RJ
2308	CT1EEB	2314	ON6DP
2309	PS7AB	2315	TF1MM
2310	WN9P	2316	WT3B
2311	LU1YU		

CW

2730	IN3NJB	2734	K2LUQ
2731	I5OQV	2735	TF1MM
2732	EA1MV	2736	NW1S
2733	OK3PJD	2737	HB9CVO

WPNX

270	N8MYC	271	KB2NEK

Endorsements

Mixed: 450 IN2NJB, N4EED, EA1MV, KØIFL, TF1MM. 500 IN3NJB, N4EED, EA1MV, KØIFL, TF1MM. 550 KD9HT, IN3NJB, N4EED, EA1MV, KØIFL, TF1MM. 600 KD9HT, IN3NJB, N4EED, EA1MV, KØIFL, TF1MM. 650 KD9HT, VE6BMX, IN3NJB, N4EED, EA1MV, IK3DRO, KØIFL, TF1MM. 700 KD9HT, IN3NJB, N4EED, EA1MV, KØIFL, TF1MM. 750 HF9HT, IN3NJB, EA1MV, KØIFL, TF1MM. 800 IN3NJB, EA1MV, KØIFL, TF1MM. 850 IN3NJB, EA1MV, KØIFL, TF1MM. 900 EA1MV, IN3NJB, KØIFL, TF1MM. 950 IN3NJB, I1-21171, KØIFL, TF1MM. 1000 IN3NJB, OE1-0140, I1-21171, KØIFL, TF1MM. 1050 IN3NJB, W3FDU, KØIFL, TF1MM. 1100 IN3NJB, KØIFL, TF1MM. 1150 IN3NJB, TF1MM. 1200 IN3NJB, TF1MM, JA7FFN. 1250 IN3NJB, WB2ABD. 1300 DF4ZL, WB2ABD, I2EAY. 1350 DF4ZL. 1750 WB2YQH. 2550 W2FXA. 2850 I2PJA. 2900 I2PJA.

SSB: 350 IN3NJB, EA1MV, PS7AB, WN9P, LU1YU, VE1RJ, ON6DP, TF1MM. 400 IN3NJB, EA1MV, PS7AB, WN9P, LU1YU, ON6DP, TF1MM. 450 IN3NJB, PS7AB, WN9P, LU1YU, N1IBQ, ON6DP, TF1MM. 500 IN3NJB, PS7AB, WN9P, LU1YU, ON6DP, TF1MM. 550 IN3NJB, PS7AB, I6KYL, WN9P, LU1YU, ON6DP, TF1MM. 600 IN3NJB, PS7AB, I6KYL, WN9P, LU1YU, ON6DP, TF1MM. 650 PS7AB, IK6KYL, LU1YU, ON6DP, TF1MM. 700 GW3SB, PS7AB, I6KYL, KWØU, LU1YU, ON6DP, TF1MM. 750 GW3SB, PS7AB, I6KYL, ON6DP, TF1MM. 800 GW3SB, K9HDZ, PS7AB, I6KYL, N9ICH, LU1YU, ON6DP, TF1MM. 850 GW3SB, K9HDZ, LU1YU, ON6DP, TF1MM. 900 GW3SB, LU1YU, ON6DP, TF1MM. 950 LU1YU, ON6DP, TF1MM. 1000 ON6DP, TF1MM. 1050 TF1MM. 1250 KF7RU. 1450 IK8GCS. 1500 IK8GCS. 1550 IK8GCS. 1600 IK8GCS. 1650 IK8GCS. 2350 I6ZJC. 2400 I6ZJC. 2450 I6ZJC. 2500 I6ZJC. 2750 F6DZU. 2800 F6DZU, I2PJA. 2850 F6DZU, I2PJA. 2900 F6DZU, I2PJA. 2950 F6DZU. 3000 F6DZU. 3050 F6DZU. 3100 F6DZU.

CW: 350 IN3NJB, NH6T, EA1MV, TF1MM, NW1S, NB9CVO. 400 IN3NJB, NH6T, EA1MV, TF1MM, NW1S, HB9CVO. 450 IN3NJB, EA1MV, TF1MM, HB9CVO. 500 IN3NJB, EA1MV, TF1MM, HB9CVO. 550 IN3NJB, EA1MV, K1CVF, TF1MM, HB9CVO. 600 IN3NJB, EA1MV, K1CVF, TF1MM. 650 IN3NJB, EA1MV, TF1MM. 700 IN3NJB, EA1MV. 750 IN3NJB, W4TYU. 800 IN3NJB. 850 IN3NJB. 900 IN3NJB, JG1LGM. 950 IN3NJB, W3FDU. 1000 IN3NJB. 1050 IN3NJB. 1100 IN3NJB. 1150 IK3GER. 1200 IK3GER, OK1DKR. 1250 VS6UW. 1300 VS6UW. 1350 VE1MF. 1400 VE1MF, I7PXV. 1450 VE1MF, I7PXV. 1500 VE1MF. 1600 KL7AF. 3100 N6JV.

10 Meters:	WN9P, ON6DP
15 Meters:	IN3NJB, ON6DP
20 Meters:	IN3NJB, ON6DP
40 Meters:	IN3NJB, WB2ABD
80 Meters:	IN3NJB, WB2ABD

Asia:	IN3NJB, I5OQV, W2FXA, DF7YN
Africa:	WB4FOT, W2FXA
No. Amer.:	IN3NJB, I5DQV, WN9P, ON6DP
So. Amer.:	HB9CVO
Europe:	IN3NJB, I5DQV, W2FXA, WN9P, ON6DP, HB9CVO
Oceania:	W2FXA

Award of Excellence Plaque Holders: I8YRK, W4CRW, SMØAJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DEØDXM, DK4SY, UR2**, AB9O, FM5WD, I2DMK, W4BQY, IØJX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, HI8LC, KA5W, KØJN, W4VQ, KF2O, K3UA, HA8XX, HA8UB, W8CNL, K7LJ, W1JR, F9RM, W5UR, WB8ZRL, SM3EVR, CT1FL, K2SHZ, UP1BZZ, W8RSW, WA4QMQ, EA7OH, K2POF, DJ4XA, IT9TQH, W8ILC, K2POA, N6JV, W2HG, ONL-4003, VE7DP, K9BG, W5AWT, KBØG, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YL/W4, NN4Q, KA3A, YBØTK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NXØI, W9NUF, N4NX, SMØDJZ, DK5AD, WB4RUA, DK5AD, WD9IIC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VE3FXR, N4MM.

Award of Excellence Plaque Holders with 160 Meter Endorsement: FM5WD, SMØDJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, HI8LC, KA5W, UR2**, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SMØAJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, KBØG, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YBØTK, W8ILC, W1BWS, VE7WJ, K9QFR, NN4Q, W4UW, K9QFR, NN4Q, W4UW, NXØI, G4BUE, LU3YL/W4, I4EAT, WB4RUA, VE7WJ, N4NX, DEØDXM, VE7IG, K9BG, I1EEW, AB9O.

Complete rules and application forms may be obtained by sending a business-size self-addressed, stamped envelope (foreign stations send extra postage if air-mail desired) to: "CQ WPX Awards," 880, CR13, Clovis, NM 88101-9511 USA.

He was an unabashed enthusiast for amateur radio. When the king of Spain visited his now-famous school, Father Moran proudly escorted the king through his shack. Not long after, King Juan Carlos became active on the amateur bands as EAØJC. The king even ordered Drake gear, as that is what Father Moran used.

Over the years Father Moran's shack benefitted from the generosity of many amateurs around the world. For example, when US amateurs commented that his signal was weaker than usual, Father Moran mentioned that his antenna rotor had failed. He had to climb the tower to turn the beam by hand. A new rotor arrived in Nepal soon thereafter. And when his 18-year-old Drake TR4 finally died, the R. L. Drake company gladly donated a new TR7 to his shack. Other groups provided microphones, antennas, etc. One item not seen in the 9N1MM shack was a CW key. According to long-time QSL manager K7EB, Father Moran never made a CW contact.

Father Moran's favorite part of amateur radio, aside from the on-the-air and personal contacts, was experimenting with antennas. He would use the school breaks to put up and test new wire arrays. In his 70s he built a log-periodic array over the

Christmas holiday to give him a better signal into Japan.

In addition to being the father of amateur radio in Nepal, he was also highly revered by the local Nepalese. He was on a first-name basis with the king, and may have been the second most important person in Nepal. Essentially all the powerful and educated men in Nepal attended St. Xavier for the start of their education. He was as much an inspiration to his students as he was been to amateur radio operators around the world.

Father Moran became a citizen of Nepal after five years in the country, and his triennial visits to the US were under his Nepal passport. While in the States he visited dozens of local radio clubs and "sang for his supper" as he called it, presenting a constantly changing slide show of Nepal and its people. The slight, mild-mannered man was a very popular speaker. He maintained an exhausting itinerary of speeches during his trips "home," even into his 80s. (Father Moran's true home was Nepal; he was buried on the grounds of his beloved school.)

Father Moran epitomized both the amateur code and the basis and purpose of amateur radio. He was considerate of all others, loyal to his hobby and his adopted country, friendly beyond most meanings of the word, progressive in his station, and well-balanced, as demonstrated by his school leadership. He showed how amateur radio can enhance international goodwill, be of major assistance in communications emergencies, and even help advance the radio art, through his inspiration and instruction of hundreds of future Nepalese engineers. Father Moran was a living symbol of all the good that can come from amateur radio and DX. His spirit, enthusiasm, and good cheer will long be missed.

Amateurs wishing to make a contribution to Father Moran's St. Xavier school may do so c/o Jesuit International Missions, 2059 N. Sedgwick, Chicago, IL 60614, attention Rev. R. G. Willmes S.J.

DX News

The ARRL DX Advisory Committee (DXAC) has voted unanimously *against* adding the Holy House HV0HH to the DXCC countries list. The argument that the Holy House was under the same authority as the Vatican in Rome wasn't enough to qualify the northern Italian landmark as a separate country.

The very first DXCC certificate for a field-checked DXCC application was presented at the Visalia International DX Convention in April. The recipient was Agim Muco, head of the Albanian PTT, who accepted the award on behalf of ZA1A. The award was unusual in another way: the QSLs cards for the award were all unsolicited! Mr. Muco also received a Worked All States award, again thanks to unsolicited QSLs. And to show how carefully DXers listen to the DX station, ZA1AUP received almost enough cards for another DXCC, CW only, of course. *(The promised DXAC run-down will be in the next issue; the above tribute to Father Moran 9N1MM bumped it back a month.)*

Meanwhile, the DXCC desk has accepted the Albanian stations licensed by the Ministry of Culture, Youth, and Sport, including ZA0RS, ZA-QA, and ZA-N calls. And one of the ZA1A operators was able to produce an amateur license signed by the PTT head, in addition to the signature of the head of the new Albanian Amateur Radio association. *(See the DX column in the April issue of CQ.)*

Finally, the ARRL Out-Going QSL Bureau reports that they won't send cards to the Seychelles S7 nor Rwanda 9X, as the QSL bureaus in those countries seem to have ceased functioning. QSL direct, or via a manager.

July DX Events

KB8RJ is going to St. Pierre and Miquelon FP during the last week in July. Look for FP/KB8RJ on the usual DX frequencies and the Islands On The Air frequencies. (The "usual DX frequencies" are 3505, 7005, and 25 kHz up from the bottom of the higher bands on CW, and 3795, 14195, 21295, and 28495 kHz on SSB. On the new bands, try near the bottom of the bands/

5 Band WAZ

As of Mar. 31, 1992, 336 stations have attained the 200 zone level.

New recipients of 5 Band WAZ Award with all 200 zones confirmed:

YU3AN

The top contenders for 5 Band WAZ are:

N4WW, 199	W0PGI, 199
SP9PT, 199	W2YY, 199
K6YRA, 199	W9WAQ, 199
PY7ZZ, 199	K6EID, 199
DL9WW, 199	IK8CNT, 199
K0CS, 199	W1JR, 199
KB0G, 199	W8SEY, 199
AA4KT, 199	I8IGS, 198
K7UR, 199	VE7AHA, 198
K9EL, 199	SM6AHS, 198
NA0Y, 199	K1ST, 198
VE7DX, 199	4X4DK, 198

776 Stations have attained the 150 zone level as of March 31, 1992.

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ × 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 De Marco Rd., Sudbury, MA 01776. Applicants should include sufficient postage for safe return of their QSL cards. The processing fee for all CQ awards is $4.00 for subscribers and $10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

The WAZ Program

Single Band WAZ

10 Meter SSB

422	W0YDB	425	W8AXI
423	NM5Y	426	FE1LQJ
424	I6KYL		

12 Meter SSB

2 . . . K6YRA

15 Meter SSB

413	JM2HBO	415	HL5FBT
414	DF4ZL	416	JA3XNI

17 Meter SSB

2 . . . K6YRA

20 Meter SSB

882	UA3AB	884	TI5RLI
883	YB1RED		

12 Meter CW

7 . . . K8MFO

20 Meter CW

417 . . . JN3SAC

40 Meter CW

153 . . . GM3YTS 154 . . . WA4JTI

12 Meter Mixed

9 . . . K8MFO

17 Meter Mixed

9 . . . KA1PE

RTTY

69—Mixed . . . K4FJ
5—15M . . . W8SEY
38—20M . . . W8SEY

All Phone

608 . . . GM4PVC

WNZ

45—10M SSB . . WB4UMQ
46—10M SSB . . KC4YNE
47—10M SSB . . . N1HEJ
48—10M SSB . . . N2LDU

All Band WAZ

SSB

3921	I6LTP	3930	KM4XV
3922	N5HZF	3931	AB4NS
3923	N6SFV	3932	FD1ETM
3924	N7KOS	3933	IK8JRD
3925	KC1KA	3934	EA7CD
3926	IK0JMS	3935	EA4BT
3927	N4XMD	3936	IV3JVJ
3928	JA1QKK	3937	WY5H
3929	GM4PVC	3938	SV3AGQ

CW/Phone

7193	4X4VF	7201	WK2H
7194	W7YS (CW)	7202	EA2CKP (CW)
7195	N7MLN	7203	IK0IHA
7196	JE3LHL	7204	N4GDJ
7197	JG1LBN (CW)	7205	W4OUN
7198	WR3C	7206	K9BQ
7199	WO2N	7207	JA8BB
7200	WD4O		

Applications and reprints of the latest rules may be obtained by sending a self-addressed stamped envelope (75 cents) size 4½ × 9½ to the WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Rd., Sudbury, MA 01776. Applicants forwarding QSL cards either direct to the WAZ manager or to a check point should include sufficient postage for safe return of their QSL cards. The processing fee for all *CQ* awards is $4.00 for subscribers and $10 for non-subscribers. Please make all checks payable to the Awards Manager. In order to qualify for the subscriber rate, please enclose your latest *CQ* mailing label with your application. Send any questions to K1MEM by mail and include an SASE (please do not telephone).

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. Total countries are now 323. 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

W9DWQ 323	DL1PM 322	K9BWQ 318	WA4IUM 314	IT9VDQ 308	WA8YTM 300	PA0XPQ 292
K2FL 323	W6PT 322	K8LJG 318	IT9ZGY 314	W9RY 307	W6YQ 300	KA7T 292
K2TQC 323	K9QVB 322	W9WAQ 317	KQ9W 314	K4CXY 307	KU0S 300	K2JLA 290
ON4QX 323	W4BQY 321	KD8V 317	I8WY 314	N4AH 307	NN4Q 299	W1WLW 288
K6LEB 323	K4XO 321	WA4JTI 317	WD9IIC 313	DJ2PJ 306	IT9VDQ 297	WA9RCQ 286
K9MM 323	K9AB 321	K2OWE 316	W7CNL 312	SM6CTQ 305	OH3NM 297	KP4P 283
YU1HA 323	K3UA 320	KZ4V 316	K9TI 312	I2QMU 305	K8LJG 296	AG9S 282
N4JF 323	OK1MP 320	AA5NK 316	IT9QDS 312	K2JF 303	K4JLD 296	W8URM 281
N6AR 323	W0SR 320	EA2IA 316	WA2HZR 312	N8MC 303	W8XD 296	N3DQN 280
K4CEB 323	DL8CM 320	WA8DXA 316	W0JLC 312	W3BBL 303	WD9IIX 295	W2LZX 279
N4KG 323	N6AV 319	K9IW 315	W4OEL 312	KB9XG 303	K1VHS 295	HB9AFI 278
SM6CST 323	SM3EVR 319	W1WAI 315	N7RO 311	I4EAT 302	VE7DX 295	KA2DIV 278
AA4KT 323	N2KW 319	KB8DB 315	IT9TQH 311	NY5L 302	G3KMQ 295	KA3R 277
N4MM 323	DL3RK 319	W0HZ 314	N7MC 311	K9DDO 302	NC9T 295	YV5ANT 276
W2UE 323	W0IZ 318	K8NA 314	F3TH 310	WA4DAN 302	WB5MTV 294	DF3FJ 276
K6JG 322	W7ULC 318	W1NG 314	WB4RUA 309	YU2TW 300	N5FW 293	K1HDO 276
K1MEM 322	K2ENT 318	I5XIM 314	W6DN 308	G2FFO 300	KA5TQF 292	4N7ZZ 275
W2FXA 322	N6CW 318					

SSB

K2FL 323	WA3HUP 323	YS1GMV 320	AG9S 316	K1HDO 311	W5XQ 303	I4UFH 289
VE1YX 323	W4NKI 323	EA1QF 320	K8ZZU 316	K4LR 311	KE5PO 303	W9TA 288
F9RM 323	WD8MGQ 323	NJ2C 320	DU9RG 316	N1ALR 311	W4BQY 302	YB2OK 288
DJ9ZB 323	K9HDZ 323	KS0Z 320	KF7SH 316	KF5AR 311	W2LZX 302	OK1AWZ 287
W9DWQ 323	K0GT 323	NJ0C 320	WD8PUG 316	KA5RNH 310	ZS6AOO 302	EA8TE 287
W0YDB 323	K4MQG 323	K9QVB 320	YT7DX 316	YV1CLM 310	XE1KS 302	PA0XPQ 286
K2TQC 323	KZ2P 323	KR9O 320	IK0IOL 316	IK1GPG 310	WB2JZK 302	N8BJQ 285
W4EEE 323	IT9ZGY 323	IT9TGO 320	KV2S 316	WD0DMN 310	WB4TGB 301	FD1OZF 285
W4DPS 323	OK1MP 323	VE2PJ 320	KB9OC 316	KA5TQF 310	N5FW 301	IK8BMW 284
W2SUA 323	WB1DQC 323	CX4HS 320	WA9RCQ 316	N6AHV 309	IK8GCS 301	NZ7D 284
K9MM 323	VE3GMT 322	KB5FU 320	KE4HX 315	I5EFO 309	VE6PW 301	KB5RF 284
YU1HA 323	I8AA 322	KB4HU 320	XE1AE 315	I1POR 309	N04J 301	KB9AIT 283
W2FXA 323	TI2CC 322	I2QMU 320	KB2HK 315	G4GED 309	LU7HJM 301	VE3IMO 283
OZ3SK 323	I4LCK 322	AA4AH 320	W0LSD 315	KP4P 309	XE1ZLW 301	XE1ILI 283
DL9OH 323	K8NA 322	KZ4V 320	AI8S 315	XE1MD 309	YU2TW 300	AB4UF 283
VE3MR 323	VE7WJ 322	G4GED 320	IK7DBB 315	WA8YTM 309	N4CRU 300	EI6FR 283
EA2IA 323	VE2WY 322	XE1CI 319	KC2FC 315	WD9IIX 308	WT4T 300	WA9BXB 282
K4MZU 323	YV5AIP 322	IT9TQH 319	YV5DFI 314	YV2EJU 308	KB2MY 300	WK3N 282
KM2P 323	W0SFU 322	K1UO 319	W9RY 314	N3ARK 308	WD0BNC 300	YB3CEV 282
VE3XN 323	KS2I 322	K9IW 319	K8CSG 314	W4BQY 308	KB8O 300	VE3NUP 281
K6WR 323	4Z4DX 322	W7FP 319	KU9Z 314	IN3ANE 308	W7KSK 300	VU2DVP 281
N4JF 323	I8KCI 322	KE4VU 319	PY4OY 314	K4LR 308	VE3FJE 300	TG9EP 281
VE3MRS 323	I0AMU 322	CX1TE 319	HR1KAS 314	KB7VD 308	WB4NDX 300	NX0I 280
K6YRA 323	W0SR 322	WB5TED 319	A92BE 314	W7ULC 308	K3NEE 300	YU1TR 280
YU1AB 323	KD8V 322	WB6OKK 319	K7EHI 314	N6AV 307	NW5K 299	PY2DBU 280
K6JG 323	I8XTX 322	W9JT 319	XE1OX 314	AI8M 307	WB6GFJ 299	N8HUR 280
YV1KZ 323	W7OM 322	IK8GCS 319	K9TI 314	WA2FKF 307	I8IGS 299	W5XO 279
I0ZV 323	VK4LC 322	IK8CNT 318	OH5KL 314	WD5P 307	VE4AT 299	K5AOL 279
N6AR 323	I8KCI 322	I4ZSQ 318	WE2L 314	TI2JJP 307	K5DUT 299	WN5K 279
W4JVU 323	K2JLA 322	G4CHP 318	W6MFC 314	F6BFI 306	RA3YA 299	WB8TLI 279
KB8DB 323	SV1ADG 322	W4UNP 318	I2EOW 313	WA2MID 306	I2ZGC 299	VU2CVP 278
EA4DO 323	K2JF 322	ZL1BIL 318	WB4PUD 313	XE1MDX 306	N1CWA 299	WA9BDX 277
W9SS 323	CT1FL 321	KA9ABC 318	W1NG 313	N0AMI 306	KB2FC 298	WP4AFA 277
WB4UBD 323	K9AB 321	KQ9W 318	KA6V 313	VK3JF 306	4N7ZZ 298	K4BYK 277
N4MM 323	N2KW 321	WB6PSY 318	AA6BB 313	K1VHS 306	SV8CS 298	WA5HWB 277
WA4JTI 323	I8YRK 321	ZS6LW 318	W1LQQ 313	N4KEL/M 306	WA0TKJ 298	WB0UFL 277
W9OKL 323	ON5KL 321	WB3CQN 318	W0ULU 313	N4KE 305	KF5DX 297	WN5MBS 277
W6EUF 323	TI2HP 321	OA4ED 318	KU9I 313	K3LUE 305	NP4CC 297	KG9N 277
OA4OS 323	IK8BQE 321	9H4G 318	W2FGY 312	NC9T 305	HP1JC 296	I8WYD 277
OZ5EV 323	VE7DX 321	WZ4I 318	K8CMO 312	WA6DTG 305	XE1OW 296	CE7ZK 277
W3AZD 323	K4CXY 321	W6NLG 318	KI3L 312	VE3DLR 305	W0IYR 294	KA9I 277
ZL3NS 323	WB3DNA 321	YV5CWO 317	TI2KD 312	YV5IVB 305	VE3XO 294	W4PTT 276
N7RO 323	KA3HXO 321	YV1AJ 317	K8NWD 312	NI5D 305	EA3KW 294	W8/DL2SCA 276
K4XO 323	W2CC 321	N4CRU 317	KC4MJ 312	EA1QF 304	W8URM 294	G4NXG/M 276
ZL1AGO 323	K9HQM 321	WA4WTG 317	K8YVI 312	K4RIG 304	IT9VDQ 293	WB4UHN 276
N4KG 323	OE2EGL 321	G4ADD 317	ZS6BBY 312	KB1JU 304	WD9IIC 293	KJ6HO 276
W4UW 323	WA4IUM 321	W6BCQ 317	W5LLU 312	KD5ZM 304	VE6PW 292	WA4PGM 275
K3UA 323	WA4DAN 320	XE1XM 317	N6CGB 312	IN3ANE 304	TI2LTA 292	NX4Y 275
DL6KG 323	WA4ECA 320	KB3OQ 317	K4JLD 312	ZL1BOQ 304	W3SOH 292	VE7HAM 275
K9BWQ 323	W6DN 320	SM6CST 317	WA9IVU 312	VE2GHZ 304	K9EC 292	HP6AYV 275
K5OVC 323	W3GG 320	N4WF 316	LA7JO 311	EA3EQT 304	KE7UL 291	TI2SD 275
K2ENT 323	I4EAT 320	K4PQV 316	I2MQP 311	I8IYW 304	WF9K 291	KJ6GC 275
WB1DQC 323	N6AHU 320	I8LEL 316	NN4Q 311	KA9TNZ 303	SV1JG 291	KA5YCM 275
AA4KT 323	AA5NK 320	KC8EU 316	IK2GNW 311	KB9LN 303	4X4JO 290	KI4FW 275
OE3WWB 323	NY5L 320	W6SN 316	K0HQW 311	KB0SY 303	I4CSP 290	WA4OPW 275

subbands. The IOTA frequencies are 14260, 21260, and 28460 kHz.)

Look for some special-event stations during the Summer Olympic Games, beginning in late June. AM25 and AO25 prefixes should be active, as well as other stations in Barcelona. There's also an Olympic contest on HF, July 18–19; see the "Contest Calendar" column for details.

Earlier in the month four UK DXers will operate from the island of Sri Lanka as **4S0UK** June 11 to July 4. Operators are Doug, G0LUH, Dave, G0MRF, Jan, G0OHW, and Paul, G0ONA. Most of the operation will be on 20, 15, 10, and 6 meters, with some 80, 40, and new-band activity. Mosly SSB, but some CW, RTTY, and AMTOR work as well. The initial notice didn't include a QSL route; that will be published as received.

Other UK amateurs will sign **GB2JPJ** to celebrate the 200th anniversary of the death of John Paul Jones, the father of the U.S. Navy. Try 3530, 7030, 14030, 21030, and 28030 kHz on CW, and 3775, 7075, 14240, 21240, and 28540 kHz on SSB, July 18-*n*-19. QSL via the RSGB bureau, or direct to P.O. Box 36, Prestwick, Scotland.

Another **4J1FS** operation from M-V Island in the Gulf of Finland is set for late July,

with Romeo 3W3RR/YA0RR/XY0RR, etc., participating. See the weekly DX newsletters for details.

And the Wiebaden (Germany) Amateur Radio Club will once again operate from Frankenstein's Castle, near Darmstadt, Germany, July 31 to August 2, as **DA1WA/p**. They'll be on all bands, 80–10 meters, CW, SSB, and digital modes. QSL to DJ0PU.

The Royal Omani ARS is planning a DX-pedition this month for Island Hunters. They plan to put two islands on the amateur radio map: Zanzibar (IOTA AF-032) and Pemba (IOTA AF-040). The Zanzibar operation (July 15–31) will use the callsign **5H0ROA** and the Pemba operation **5H0ROA/A.** They will be on the usual DX bands both SSB and CW. QSL via A47RS.

A group of Italian amateurs is planning a DXpedition to Tanzania, where they will operate from Kipengere village, near the Livingston Mountains. They will be at the Mission of Father Camillo, **5H3CC,** and use his call. The operation is scheduled to run from July 28 through August 28. It is suggested that a dollar be sent for direct delivery of a QSL card. All proceeds will be used to benefit the Mission. QSL via I1HAG. All bands including WARC, plus 6 meters, are planned.

DX Gatherings

The SouthEastern DX Club will hold its annual DX dinner in connection with the Atlanta Hamfest July 17–19. Contact the Atlanta Radio Club at Box 77171, Atlanta, GA 30357 for details.

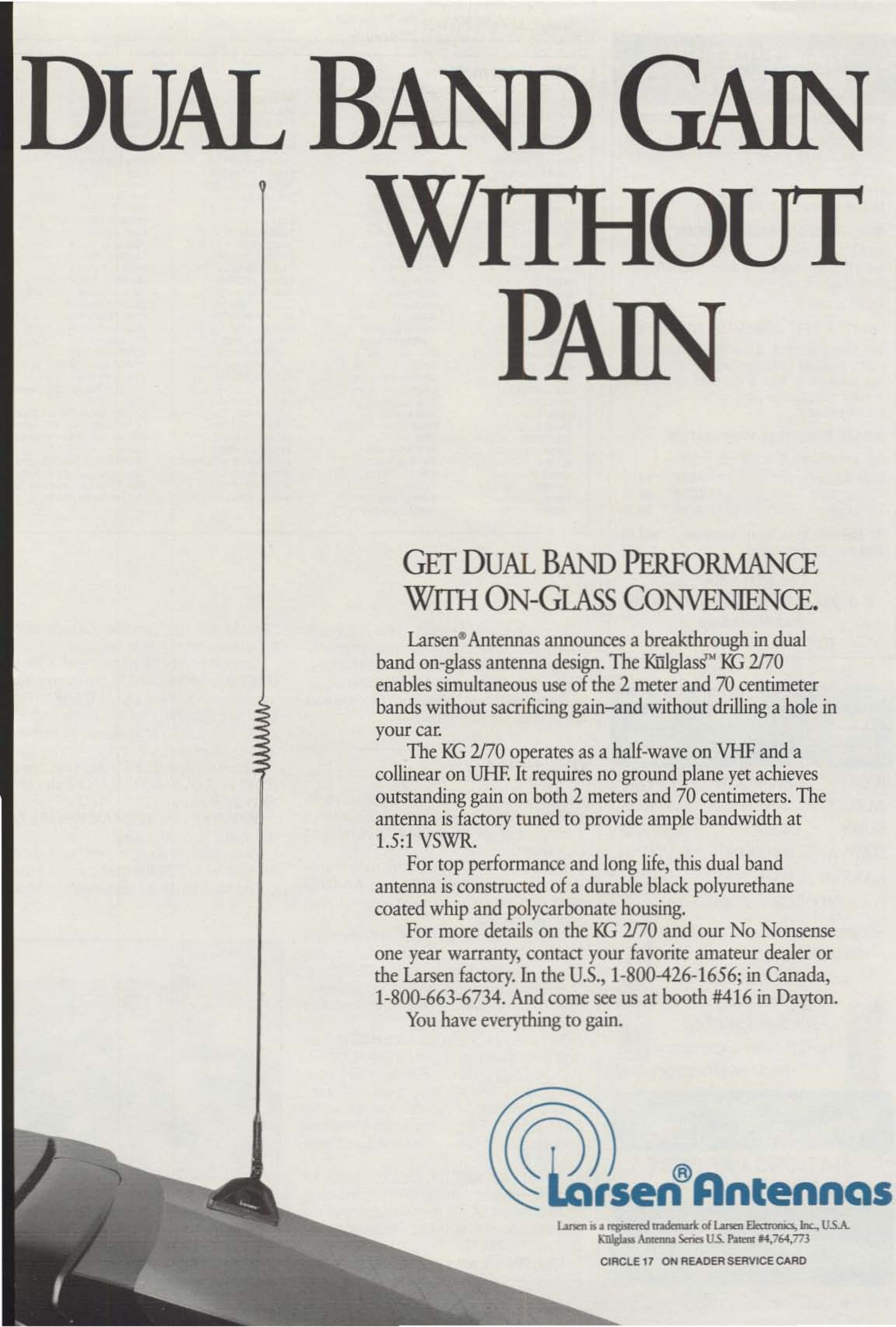
The annual Northwestern DX Convention is July 24–25, at the Renton Holiday Inn, near Seattle. Florence Shepard, W7LVI, is in charge of registration. Contact the hosting Western Washington DX Club at Box 224, Mercer Island, WA 98040.

The extremely active Oklahoma DX Club will have a DX program at the Ham Holiday in Oklahoma City, Oklahoma, July 25–26. For details contact the Central Oklahoma Radio Amateurs organization at Box 95942, Oklahoma City, OK 73143.

The first New Orleans International DX Convention will be held August 28–30, at the Royal Sonesta Hotel, on Bourbon Street, in the heart of the Historical French Quarter. Registration is $50 until 31 July, and includes the Saturday banquet ($60 at the door). MasterCard and Visa accepted until July 15. Send your check or credit-card information to Weston Strauch, W5VBX, 2238 Lake Oaks Parkway, New Orleans, LA 70122. Rooms at the Royal Sonesta are $105/night for two people; ask for the special New Orleans International DX Convention rate when you call them at 504-586-0300.

And the ARRL National Convention will be held at the Los Angeles Airport July 21–23. Your DX editor will be there; stop by and say hello.

DUAL BAND GAIN WITHOUT PAIN



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Larsen® Antennas announces a breakthrough in dual band on-glass antenna design. The Külglass™ KG 2/70 enables simultaneous use of the 2 meter and 70 centimeter bands without sacrificing gain–and without drilling a hole in your car.

The KG 2/70 operates as a half-wave on VHF and a collinear on UHF. It requires no ground plane yet achieves outstanding gain on both 2 meters and 70 centimeters. The antenna is factory tuned to provide ample bandwidth at 1.5:1 VSWR.

For top performance and long life, this dual band antenna is constructed of a durable black polyurethane coated whip and polycarbonate housing.

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Külglass Antenna Series U.S. Patent #4,764,773

CIRCLE 17 ON READER SERVICE CARD

QSL Information

3D2QB to SM3CER
3X8HNU to F6FNU
4I1X to DV1PX
4K4/UA6WCG to I8YRK
4T8DX to OA8DX
5H3RA to JA3PAU
5N8CEP to KI5NF
5R8GW to F6FNU
5T5CJ to W4BAA
5V7JG to F6AJA
6T2YD to F6AJA
7P8FE to OH3GZ
7Z2AB to AA0BC
8P9CW to OH3UU
8Q7YF to I4FYF
9K2HF to 9K2YA
9K2RC to OK1FTW
9K2WR to N6UXB
9Q5TE to SM0BFJ
9X5NH to DJ6EA
A22GH to G3KMK
AP/WA2WYR to KK6TX
AZ9F to LU9FHF
BV4CT to NO0C
C2A to CT1AHU
CM6LE to N4THW
CT2A to CT1AHU
CT3EU to G3PFS
CU3/KF2EF to KD4XN
EA9UK to EA9LZ
EL2PP to I5CZE
EZ9MA to UA9MA
FJ/N0IMH to N0IMH
FO0PT to DJ0FX
FO5VO to N6VO
FS4PL to FG4BG
FY5FO to F6BYZ
FY5FP to ON4ZD
HF0POL to SP9DWT
HL9AA to N2JNZ
HM5VR to OH1VR
HQ2DX to HR2JEP
HS0AC to G0CMM
HU1FT to DL7FT
HV3SJ to I0DUD
II0YQV to I0YQV
II6A to IK6CNM
IQ2ARI to IK2FEO
IQ6A to I6FLD
J37K to W8KKF
J68AX to OH3VV
JW0E to UB5MIA
JY9ZK to KA5ZMK
KC7QU/D2 to K8JP
LO3F to LU6FAZ
LY4W to LY2WW
LY7A to LY2ZO
OD5PL to HB9CRV
OD5VT to HB9CRV
OM5R to OK1ALW
OT2A to ON7LR
P49V to AI6V
PJ4/DK9FN to DK9FN
PR0R to PP5JR
PU4B to PY4BA
PW0W to PP5JR
PY0FZ to PY7ZZ
R1Z to UA1ZX
RH0Y to W5BWA
RO40A to SP9HWN
RU6B/RZ4HXX to OH7AB
RY0I to NA3O
RY2I to NA3O
RY7D to RB5DX
S2/WZ6C to W4FRU
S9AGD to SM0AGD
SV0IG/9 to IK0EFR
TK/F6GOX to F6GOX
TL8JL to K4UTE
TL8NG to WA1ECA
TM2P to F6BFH
TM4C to F6IFR
TM9R to F9RM
TU4SR to OH8SR
TX4B to F6AOJ
TZ6NU to F6FNU
UA4WGZ to AA4NU
UB3JA to UB4JJR
UD6DKW to Y42DA
UF6FAL to YU1XA
UI8TK to UI8AY
UI9GWA to DL1GWS
UJ8KA to UJ8JMM
UL7JC to K8BTH
UU6U to OH7AB
UX6B to OH7AB
V73CP to KX6BU
V85HG to JH7PKU
V85KX to G3JKX
VK9CL to F6IMS
VP2M/G3KMG to G3KMG
VP2MR to N5DXD
VP8SSI CW/RTTY to KA6V
VP8SSI SSB to AA6BB
VP9MN to WB2YQH
VQ9JY to KB7CDA
VQ9RS to ND0E
VR6FM to KI6YN
VS6GA to KG6ZQ
VS6WV to K0TLM
XA5T to XE2KB
XB9Z to KF7SH
XE1/JA1QXY to JA1HGY
XV7TH to SK7AX
XX9AS to N6LVY
XX9TQL to YASME
YQ4A to YO4KCA
YS1DRF to W2PD
YW5N to YV5ARV
ZA1TAJ to I2MQP
ZB2JI to G3VJE
ZD8OK to GW0FJT
ZF2NE/9 to W5ASP
ZF2QP to W8BLA
ZK1TB to W7TB
ZL8RS to ZL4DO
ZS5@@A to WA3HUP
ZZ9A to PY5CC
4E0DBT to P.O. Box 290 Manila 1008
7Z2AB to Dana Howard, 16022 NE 185th St., Holt, MO 64048
XQ0YAF to P.O. Box 4, Easter Island
YK1AO to P.O. Box 245, Oma Shabsigh, Damascus, Syria
ZD7CRC to P.O. Box 126, St Helena, South Atlantic

That's it for this month. This is a good time of year to work on antennas; use care, but get some new wires up for the new bands. With Sunspot Cycle 22 fading rapidly, DXers will have to be more flexible and adaptable. Good hunting!

QSL Notes

Peter James, VK3AWY, who operated as **VK9YJ** in March 1991 said all QSLs were in the mail by early February. If you haven't received your card, try again.

Will Roberts, AA4NC, says he will answer his own **AA4NC/KP1** and **AA4NC/WP1** Navassa Island cards; direct with postage, please.

The Union of Radio Clubs in France will forward QSLs to *any* French amateur, not to REF members only, as the REF does. This apparently includes F6FNU; whether F6FNU will answer such a card is another matter!

The correct QSL route for **5H3GM** is direct only: Gwyn Morgan, Ilo Area Office, P.O. Box 9212, Dar es Salaam, Tanzania. *Don't* send mail to Gwyn's UK address.

Leo Almazan, WA6LOS, has found his 1980–83 **DX2F** logs. Write him at his new address: 10731 Glendover Lane, San Diego, CA 92126.

John Duke, N5DRV, QSL manager for **TJ1PD**, reports that the USPS mistakenly routed much of his mail incorrectly. His *correct* address is: 1431 Pleasant Drive, Dallas, TX 75217.

Ray, **7P8SR**, asks for direct QSLs to Box 333, Maseru 100, Lesotho. He reports th IRCs have no value in Lesotho.

Contest Hall of Fame member Al Slate **G3FXB,** says he will QSL his own call a his special contact call of **GB8FX** dire only. If postage is provided, a fast respon is promised; if no postage, answer will via the bureau.

Peter Watson, **ZL3GQ**, says his *new a dress* is P.O. Box 11 071, Christchurc New Zealand.

VP2MIX is now **VP2MAX**; W0IJN is Q manager for both calls.

Buzz, N5FTR, says he can't get log inf mation from **ZS4PB** and cannot hand cards for him. Buzz continues to hand

The first Mr./Mrs. couple to both reach t top of the CQ Honor Roll (323 countri are Truus, VE3MRS, and Martin, VE3M Their dual operating position is as neat their callsigns. Congratulations to bot

CQ DX Awards Program

SSB

1947	PS7AB	1949	CT1EEB
1948	WK3Z	1950	WN9P

CW

852	DF6SS

SSB Endorsements

320	K9HDZ/323	310	KA5TQF/310
320	KØGT/323	300	NC9T/305
320	K4MQG/323	300	NO4J/301
320	KZ2P/323	300	KB8O/300
320	IT9ZGY/323	275	AB4UF/283
320	OK1MP/323	275	WB4UHN/276
320	WB1DQC/323	250	AB4NS/259
320	K2JF/322	200	PS7AB/239
320	W2CC/321	200	WN9P/219
320	IK8BQE/321	200	CT1EEB/202
320	KZ4V/320	200	WK3Z/201
320	G4GED/320	150	EA1IF/156
310	WA9RCQ/316	28 MHz	AB4NS
310	K4LR/311	28 MHz	EA1IF

CW Endorsements

320	W2UE/323	300	W6YQ/300
320	K1MEM/322	300	G2FFO/300
310	WA8DXA/316	300	KUØS/300
310	IT9ZGY/314	275	NC9T/295
310	N7RO/311	275	KA7T/292
310	N7MC/311	275	KA5TQF/292
300	IT9VDQ/308	275	WA9RCQ/286
300	N4AH/307	250	HA5NK/257
300	K2JF/303		

Total number of active countries is 323. 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 air-mail reply. Please make all checks payable to the awards manager.

ards for **KG4DD, P29BT, A41KJ, M8FH, 9M8LL,** and **Z21BA**.

QSL the contest call of **IU2M** via IK2SFZ.

QSL the contest call of **IØC** via Gian Fedrico Madruzza, IKØAZG, Via S.Vetturino 06126 Perugia, Italy.

JW5NM: Mathias Bjerrang, LA5NM, arts a two-year assignment at Longyear rport on Svalbard May 4. He will continue handle QSL cards for the many stations e helps. QSL to him at the airport: Box 98, Longyearcity, Svalbard island, Norway. Mail to his old address will automatically be forwarded every few weeks.

The **French DX Foundation** has a new ddress: c/o F6EEM/F6FYP, Les Melliers, 35320, France. Use this address for **N5A**, too.

The **ARRL Out-Going QSL Bureau** ys that it will no longer forward QSL rds to **Belize V3, Seychelles S7,** and **wanda 9X**. Correspondence addressed the Belize bureau has been returned arked undeliverable and unforwardable. e bureaus in the Seychelles and in vanda are no longer in operation. Amaurs wishing to confirm contacts with stans in these countries should QSL direct via a manager. Cards for these countries nt to the ARRL Out-Going QSL system will be returned to the sender via the ARRL In-Coming bureau system.

Mirek Rozbichi, VK2DXI, says he will handle his cards from **VP5VDE, SO5IXI, VK2DXI/9M2, VK2DXI/9M8, 9M8DX,** and his other operations. He currently awaits his **VU2DXI** license.

Pirates, Not Managers, And Corrections

The **XF4I** operation has been postponed until October; any QSOs made with XF4I were with a pirate.

Wayne Warden, W9GW, reminds DXers that he is *not* manager for **PZ1DV**.

QSL **TK5C** via F6AJA, not F6AJW as typoed elsewhere.

Postal Codes

F6AJA reminds DXers that many countries other than the USA use five-digit postal codes. Unless the country of destination is *clearly* marked on the envelope *below* the postal code, the increasing use of automatic scanning equipment will often direct mail to the wrong country. Make sure "USA" is the last item in your address on your self-addressed, stamped envelopes (SASEs). For mail leaving the US, the country of destination should be on the last line, in all capital letters.

Postal Rates and IRCs

The fluctuations of individual countries' currencies make it difficult for a DXer to know on a given day if a "green stamp" (US$1 bill) will pay for airmail return postage. (Yes, Virginia, the airmail postage rates for most countries are *much* higher than those in the US.) If in doubt, include one *new-style* (airmail postage) IRC instead of US$1. And note that the new IRC pays for the *cheapest* airmail rate to another country; it might not pay for airmail postage back to the USA. An extra old-style IRC will cover the extra.

73, Chod, VP2ML

CONTEST CALENDAR

BY JOHN DORR, K1A

NEWS/VIEWS OF ON-THE-AIR COMPETITION

The Post-Dayton Wrap-Up and Other Miscellany

Were you one of the 30,000+ attendees at the Dayton Hamvention this year? As always, this year's festivities were not to be missed. Imagine 50° rainy weather, thousands of guys wearing rubber duckies on their aluminum caps crammed into a crowded exhibit hall, dozens of people asking me about the delivery status of their 1990 CQ WW certificates, etc., etc. Yes, Dayton was great . . . as usual!

There were several highlights. For starters was the appearance of Willy Umanets, UW9AR (operator of UZ9AYA/UK9AAN fame and basic good guy). After talking on the radio for years, I finally met Willy in person for the first time during the WRTC in Seattle in 1990. Willy stood out in the crowd as he proudly sported a "KGB" inscribed T-shirt. This time he had upgrade his apparel, wearing a Georgia Tech variety—yet more evidence that the Cold War is over.

This was the first year that a genuine contest hospitality suite was sponsored on Thursday night thanks to the FRC and NCC (K3TUP and crew). In addition, there were the usual "other" suites on Friday and Saturday which kept the serious partygoers active well into the night (4 AM on Friday night). The last time I checked, K5ZD had taken the lead in the world-renowned Kansas City DX Suite CW callsign copying contest. And much to the chagrin of Stouffers Hotel management, the recently instituted "Stouffers Lobby Suite" was in full swing this year by 3 AM on Friday. Nothing like a 24-hour hotel kitchen cranking out pizzas at rates like those found on 21201 to keep the contest jabber going.

During the day I had the advantage of operating the "Dayton Contest" from the *CQ* magazine booth for much of the time. From that vantage point I was able to meet new people and see many old friends. As much as I can remember, I chatted with guys from CP, UA9, ZL, DL, 9K2, JA, VK, XE, LU, G, and so on—a truly international affair. The *CQ* QTH also gave us the ability to look down the isle and witness the never-ending pile-up near K1EA's booth.

This year's FRC Chinese dinner/meeting approached 100 crazy contester diners, spawning talk about a contester's banquet next year. Anyone interested in providing some organization resource?

The highlight of my Dayton buying spree this year was the purchase of a new 386/40 motherboard (net cost $265). If you haven't looked at the cost of upgrading your old 286 PC lately, now is the time. Having never disassembled a PC before, it only took me 30 minutes to successfully swap the boards. My 5000 QSO CT.bin files now come up in less than 8 seconds. Now if I could only figure out a way to make speedy PC clocks write my columns faster.

2 Baldwin Street, Windham, NH 03087

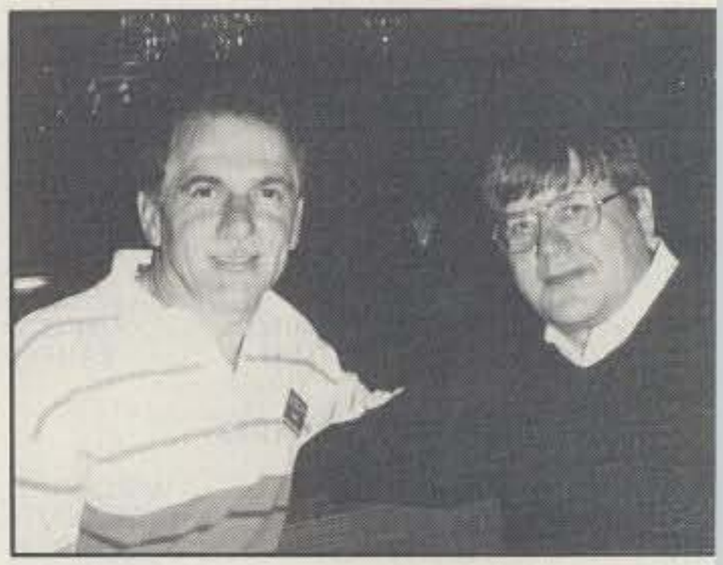
Calendar of Events

June	27-28	ARRL Field Day
July	1	Canada Day Contest
July	4-5	Venezuela SSB DX Contest
July	11-12	IARU HF World Championship
July	**11-12**	**CQ WW VHF WPX Contest**
July	18	Colombian Independence Day
July	18-19	Barcelona '92 Olympics HF
July	18-19	SEANET CW Contest
July	25-26	Venezuela CW DX Contest
Aug.	1-2	YO DX Contest
Aug.	1-2	North American CW QSO Party
Aug.	8-9	Maryland-D.C. QSO Party
Aug.	8-9	Worked All Europe CW Contest
Aug.	15-16	SARTG RTTY Contest
Aug.	15-16	North American SSB QSO Party
Aug.	15-17	New Jersey QSO Party
Aug.	15-17	SEANET SSB Contest
Sept.	5-6	Bulgarian DX Contest
Sept.	6	North American CW Sprint
Sept.	13	North American SSB Sprint
Sept.	**26-27**	**CQ WW RTTY Contest**
Oct.	**24-25**	**CQ WW SSB DX Contest**
Nov.	7-9	ARRL Sweepstakes CW Contest
Nov.	21-23	ARRL Sweepstakes SSB Contest
Nov.	**28-29**	**CQ WW CW DX Contest**

More on Single-Band WAZ In the CQ WW Contest

Well, as you might expect, based on my recent analysis of CQ WW participants working 40 Zones in one weekend (on a single band), I did miss a few. And to be fair, I don't blame you for coming out of the woodwork and telling me! There were two missing parties this time, each with a fascinating story.

The first was Dave Goodwin, VE2ZP, who worked them all on 20 meters in the CQ WW CW 1988. Dave was riding high that year, having just come off a fabulous performance on 20 meter SSB with a score



Some of contesting's finest—John K3TUP (left) and Martti, OH2BH—enjoying a quiet moment at Dayton.

of 1.2M and a new Canadian record. Need less to say, he was *ready* for CW. By the last hour of the CW contest Dave had just found his 39th Zone and was only missing Zone 22 to have worked them all. Having heard AT$$T running around calling guys on day one made the chase even more exciting. For the last hour Dave set his beam on VU (bisecting Europe and Japan from VE2) and prayed that one would call in. By 2350Z he had many more Europeans and JAs in the log, but no Zone 22.

At that point Dave "hit the road" and decided to spend the last 10 minutes searching and pouncing. It was at 2358 (not usually a high point for most contesters) that VE2ZP found a slow and weak 4S7. Dave called him, but someone else got through first. It was now 2359Z. With only one more chance left, Dave tried again only to hear the call VE2ZP come back as the clock tripped over to 0000Z. Dave says that he is normally a reserved person, but most of his neighborhood heard screams of jubilation that evening.

The second story was submitted by Dave Morgan, K6DDO, and belongs to the operators of W6RW in the 1957 CQ WW CW Contest. Dave, along with several others, was one of the operators who achieved WAZ on 20 meters that year. The occurrence of WAZ was probably the first of its kind in the CQ WW. During the early 1950s Soviet stations were not allowed to work the USA, making Zones 16/17/18/1 unavailable. In addition, Zone 23 was nearly impossible, as China was closed down in 1949. Mongolia was inactive at that time with the only known Zone 23 DX activity being AC4YN, RP, and NC, who did not wo

Zone	Date	Time	Callsign	Report Sent	Report Received
01	11-30	0213	KL7CDF	59903	57901
02	11-30	1006	VE8PB	57903	59902
03	12-01	0352	VE7EH	58903	59903
04	11-30	0257	K8DEK	59903	59904
05	11-30	0304	K4MJO	59903	59905
06	11-30	0727	XE1LM	59803	58906
07	11-30	1309	KZ5BB	57903	58907
08	11-30	0308	YV5FL	57903	57908
09	11-30	0204	FY7YI	57903	58909
10	11-30	2346	HC1HL	57903	57910
11	11-30	0305	PY4AO	59903	59911
12	11-30	0544	CE3AG	59903	59912
13	11-30	0211	LU5AQ	59903	59913
14	11-30	0421	EA7GF	57903	59914
15	11-30	0315	IT1TAI	55803	57915
16	11-30	0617	UA1DZ	57903	58916
17	11-30	0446	UA9DN	56903	58917
18	11-30	0651	UA0OM	57903	57918
19	11-30	1201	UA0QF	58903	59919
20	11-30	0258	SV0WR	58903	55920
21	11-30	1943	PD6AL	44903	55921
22	12-01	1447	VU2AJ	56903	56922
23	11-30	1655	JT1AA	55903	56923
24	11-30	1513	VS6DV	58903	58924
25	11-30	0559	JA1VX	59903	59925
26	11-30	1054	XZ2TH	55903	56926
27	11-30	0439	KG6FAE	59903	59927
28	11-30	0638	VK9XK	59903	58928
29	11-30	1152	VK6UF	57903	57929
30	11-30	1615	VK2DA	58903	58930
31	11-30	0209	KH6PM	59903	59931
32	11-30	0319	ZK1BS	57903	57932
33	11-30	0330	CN8IF	58903	58933
34	11-30	1434	5A5TE	56903	58934
35	11-30	0503	ZD4LM	57803	46935
36	11-30	0302	OQ5GU	58903	59936
37	11-30	0322	VQ3GC	58903	59937
38	11-30	0200	ZS5DE	57903	58938
39	11-30	1354	FB8ZZ	56903	57939
40	11-30	0324	TF3AB	59903	59940

Table I- The WAZ 20 meter log by K6DDO in the 1958 CQ WW CW.

contests. 1957 was the first year that Zone 23 truly became obtainable in contests as Ludwik, JT1AA, became QRV.

W6s have historically been unable to overcome the enormous advantage of Eastern North America, and 1957 was no exception. Amazingly, not only did the multi-multi team of W6RW defeat all other USA entries, but they attained a world-high score! Their final score was 1,171,088. This was the first time any station had ever broken the 1 million point mark in the CQ WW DX Contest.

On 20 meters the W6RW team worked 505 QSOs, 40 Zones, and 117 Countries (a paltry performance by today's standards).

By inspecting Table I, you will observe a number of interesting details. Many of the callsigns will look familiar to only a select few. You may also notice the large number of "non-599" reports on both sides of the exchange (54 of 80) as well as a few xx8 (bad tone) reports. When was the last time you can remember sending reports like that?

CQ Contest Hall of Fame

Among the many topics of conversation at Dayton this year was the *CQ* Contest Hall of Fame. To set the record straight, Table II confirms the current Hall of Fame members. Be sure to take special note of the most recent inductees, Len Chertok, W3GRF, and Gerry Mathis, W3GM. Both of these gentlemen are true legends by any definition.

In a subsequent column I will describe the process for induction in more detail. Needless to say, the manner of selecting contesters into this elite group (and keep the total numbers reasonable to preserve the program's significance) is a challenging task. If you have some creative ideas on this topic, I welcome your input.

Final Comments

Well, there is feedback and there is FEEDBACK! Without a doubt, I have not received so many comments as those which came from the "Contester's Women Speaking Out" feature in May *CQ*. It was especially fun to see some XYLs (and mostly the non-amateur type) come up to me in Dayton and say thank you. Of course, even I can take a hint. You can be sure that we'll come up with a sequel later this year.

Many of you have figured out by now that I use my compendium of CQ WW results (1948–present) as source material for some of my columns. While waiting for a connection in some airport recently, the thought occurred to me that others may be interested in owning their own copy. While not desirous of being personally involved with the mass copying business, I am willing to offer a copied set for interested parties. Please drop me a line if you want me

Contest Hall of Fame Member	Date Inducted
1. Hazzard "Buzz" Reeves, K2GL	September 1986
2. Katashi Nose, KH6IJ	April 1987
3. A. J. Slater, G3FXB	April 1988
4. Martti Laine, OH2BH	April 1989
5. Bernie W. Welch, W8IMZ	June 1989
6. Leonard Chertok, W3GRF	December 1991
7. W. Gerry Mathis, W3GM	December 1991

Table II- CQ Contest Hall of Fame members.

One of the best there ever was—Len, W3GRF (right) receiving his CQ Contest Hall of Fame award from Gene, W3ZZ.

to pursue this idea further. Pending the demand, I will investigate the reproduction/mailing costs and respond to you with more details as soon as possible.

Finally, one last reminder about the CQ WW VHF WPX Contest. This year's event is scheduled for July 11–12. Don't miss out on the renewal year for this exciting operating event. As always, please remember that the deadline for the October issue is August 1st. 73, John, K1AR

Venezuelan Contest

SSB: July 4–5 CW: July 25–26
0000Z Sat to 2400Z Sun.

This is the 31st annual contest celebrating Venezuela's independence. It's a world-wide-type contest. Therefore, do not confine your activity to working YVs only. Working other DX is encouraged.

Use all bands, 80–10 meters (no WARC bands).

There are four classes: single operator, single and all band, and multi-operator, single and multi-transmitter. (No limit to transmitters, but only one signal per band.)

Exchange: RS(T) and QSO number (i.e., 59-035).

Points: Contacts between stations in the same country, 1 point. Between stations in different countries but the same continent, 3 points. Between stations on different continents, 5 points.

Multiplier: One for each YV call area, and one for each different country worked on each band (including own).

Final Score: Total QSO points from all bands multiplied by the sum of the multiplier from each band.

Awards: A plaque to the highest scorer in each class and certificates to stations making more than 10% of the next highest score.

Use a separate log sheet for each band. Each YV call area (9), and each country (DXCC list) should be indicated in a separate column only the first time they are worked on each band.

Include a summary sheet showing the scoring, your name and address in block letters, and the usual signed declaration that all contest rules and regulations for amateur radio in the country of the contestant have been observed.

Include 2 IRCs or the equivalent to cover cost of mailing and processing of any awards.

Mailing deadline is September 30th for SSB entries and October 31st for CW. They go to: Radio Club Venezolano, Concurso Independencia, P.O. Box 2285, Caracas 1010-A, Venezuela.

IARU HF Championship

1200Z Sat. to 1200Z Sun., July 11–12

This is the seventh annual IARU World HF Championship. All six bands, 10 through 160 meters, and the full 24 hours may be used by both single and multi-operator stations. (No WARC bands.)

Categories: Single operator, CW only, phone only and mixed modes. Multi-operator, single transmitter, mixed mode only. Must remain on a band for at least 10 minutes at a time. (Exception: Only IARU member-society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode.)

Exchange: RS(T) and ITU zone. HQ stations: RS(T), and official society abbreviation.

Points: Contacts within own zone or with an HQ station, 1 point. Contacts within own continent but different zone, 3 points. Contacts with different continents, 5 points.

Multiplier: Total number of ITU zones plus IARU HQ stations worked on each band. (Note: HQ stations do not also count for zone multipliers.)

Final Score: Total QSO points from all bands times the sum of the multiplier from each band.

Awards: Certificates to the top scorers in each category, in each state, each ITU zone, and each DXCC country. In addition, achievement awards will be issued to those making at least 250 QSOs or having a multiplier of 50 or more.

Entries with more than 500 QSOs are required to include a dupe sheet with

their log. A three QSO reduction will be assessed for each duplicate QSO for which credit has been taken. Disqualification may occur if the overall score is reduced by 2% or more.

It is recommended that you check *QST* (April 1992 issue) for more detailed information. A large SASE with 2 units of first-class postage or 2 IRCs will get you official forms and an ITU zone/prefix/continent map.

Mailing deadline for entries is August 10th to: IARU Secretariat, Box AAA, Newington, CT 06111 USA.

Colombian Independence Contest

0000Z to 2400Z July 18

This is a world-wide-type contest. Use all bands, 3.5–28 MHz, phone or CW.

Classes: Single operator, single and all band; multi-operator, single transmitter; multi-operator, multi-transmitter.

Exchange: RS(T) plus serial no. (e.g., 59001).

Scoring: *For non-HKs*—QSOs with HKs 5 points; with other countries 3 points, with own country 1 point.

For HKs—QSOs with other continents 5 points; 3 points in same continent; HKs 1 point. QSOs with official L.C.R.A. stations are worth 10 points for all entrants.

Multiplier: Number of different countries and HK call areas worked on each band.

Final Score: Total QSO points times the sum of the multiplier from each band.

Awards: Certificates to each station showing a minimum of 100 contacts. Plaques to the overall winning HK and non-HK in each class and each mode; for HKs in each call area; and continental winners.

Use a separate log sheet for each band. Indicate the multiplier in a separate column only the first time it is worked on each band. A summary sheet showing the scoring and other essential information, and the usual signed declaration, is also requested.

Disqualification rules regarding taking credit for duplicate contacts, violation of rules and regulations, etc., will be strictly enforced.

Mailing deadline is August 31st to: Liga Colombiana de Radioaficionados, Colombian Independence Day Contest, Apartado 584, Bogota, Colombia.

SEANET Contest

CW: 0000Z Sat. to 2400Z Sun., July 18-19
SSB: 0000Z Sat. to 2400Z Sun., Aug. 15-16

This is an annual event sponsored by the Radio Amateur Society of Thailand (RAST). The objective is for amateurs worldwide to work stations in Southeast Asia.

Bands: 160-10 meters (no WARC bands).

Classes: Single operator (single band and all bands) and multi-single.

Exchange: RS(T) and serial number (e.g., 59001).

Multipliers: Multipliers are SEANET country prefixes: A4, A5, A6, A7, A9, AP, BV, BY/BZ, DU/DV/DX, EP, HL, HS, JA, JD1, JY, KH2, P29, S79, VK1-9, VQ9, VS6, VU, V85, XU, XV, XW, XX9, YB/YC/YE, ZK, ZL, ZM1-4, ZL6/ZM6, ZM9, 3B6/3B7, 3B8, 3B9, 4S7, 4X/4Z, 8Q7, 9K2, 9M2, 9M6/9M8, 9N1, 9V. Multipliers are calculated by total number of SEANET countries times three (times 2 for SEANET-SEANET contacts).

Scoring: QSOs with SEANET countries count 2 points on 20/15/10 meters; 5 points on 40/80 meters; 10 points on 160 meters. (SEANET-SEANET QSOs count 1, 3, 6 points, respectively.) Double the QSO points for contact in: DU, HS, YB, 9M2, 9M6/9M8, 9V, and V85. QSO in your own SEANET country do not count. Final score is total multiplier times QSO points.

No update was received by press time. I recommend you send your results to last year's contest manager. Entries must be received by October 31, 1992 and sent to: SEANET '92, Eshee Razak, 9M2FK, P.O. Box 13, 10700 Penang, Malaysia. Include 3 IRCs for a copy of the final results.

WASHINGTON READOUT

BY FREDERICK O. MAIA, W5YI

REGULATORY HAPPENINGS FROM THE WORLD OF AMATEUR RADIO

FCC Regulations—The Rules You Need To Know!

The Federal Communications Commission completely modernized the amateur service regulations in 1989, the first major update in nearly 40 years. Back in the early 1950s most amateur communications systems utilized high-frequency, hand-keyed Morse code and amplitude modulated voice. Much amateur radio gear was home-built, and there was great reliance upon the station control operator to manually perform numerous operating functions. The single-sideband mode and most communications above 50 MHz were still considered experimental.

Today we live in a dazzling world of amateur repeater, computer, television, and satellite communication. Analog has given way to digital, HF to VHF/UHF and higher frequencies, manual tuning to push-button automatic. The amateur continues his reputation of being at the forefront of communications technology.

Over the years, as new technologies became popular in the amateur service, rule additions and amendments were adopted by the FCC to accommodate them. The result was a patchwork quilt of rules surrounding an antiquated structure that was often confusing, particularly to a prospective licensee.

The Commission stated in a 1988 Notice of Proposed Rulemaking that they would be completely overhauling the government regulations controlling the Amateur Radio Service. The Commission's primary objective was to achieve a proper balance of rules and to provide a flexible regulatory environment to encourage the experimental nature of the amateur service while protecting the service from commercial exploitation. It also wanted to consolidate, clarify, and reduce the number of amateur radio rules.

The new rules are now compressed into about 25 percent less space and are easier to understand, and provisions are made for new future communications modes.

Why Have Rules?

Our hobby is completely governed by local, state, national, and international regulations. The worldwide body governing telecommunications is the International Telecommunication Union. The ITU, then known as the International Telegraph Union, was formed in 1865 by some 20 European nations. Their purpose was to expedite delivery of telegraphic messages across international boundaries. It was not uncommon in that era for operators to simply hand messages to their counterparts at their national border.

Today, the ITU numbers more than 150 member countries. The primary function of the ITU is the allocation of radio frequencies to prevent harmful interference. The ITU allocation plan divides the world into three geographical regions: ITU Region 1 (Africa, Europe, and Asia), Region 2 (North and South America), and Region 3 (the Middle East, India, Australia, and the South Pacific). Although somewhat similar, each region has its own frequency allocations.

The ITU classifies the various users of the spectrum into radio services according to the nature and purpose of their communications. According to the ITU, the Amateur Service exists for self-training, intercommunication, and technical investigations carried out by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

By design, every nation has its amateur service on basically the same frequencies. Most of the HF amateur bands are harmonically related to each other, since it was determined in the early days of radio that signals radiate on multiples of a fundamental frequency. Thus, the earliest HF band lineup was 160, 80, 40, 20, and 10 meters. Other HF bands were added once ways were found to suppress harmful harmonic interference. Amateur radio is, of course, the oldest radio service. The original radio pioneers were amateurs.

There are not many International Radio Regulations (IRR). Article 32, Section 1 mandates that:

1. Communications between amateurs of different countries are not permitted if one of the countries objects.

2. Communications between amateur stations of different countries must be in plain language and be limited to unimportant technical and casual remarks. The amateur service must not be used to replace public telecommunications.

3. The amateur service must not be used to transmit messages for third parties unless special arrangements have been made between the administrations of the countries concerned.

4. Any person seeking to become an amateur shall prove he/she can send correctly by hand and receive by ear, texts in Morse code signals. This requirement may be waived for stations operating exclusively on frequencies above 30 MHz.

5. Nations may determine the operational and technical qualifications of their amateur radio operators.

6. The maximum power levels of amateur stations shall be determined by the nations concerned by considering the technical qualifications of the operator and the conditions under which these stations are to operate.

7. All general ITU rules apply. In particular, the emitted frequency shall be a stable and as free from spurious emissions as the state of technical development for such stations permits.

8. Amateur stations shall transmit their callsigns at short intervals.

Amateur Radio in The United States

The Federal Communications Commission is charged with the responsibility of overseeing telecommunications within the U.S. and the administration of international communication agreements to which the U.S. is a party. The FCC is guided by the Communications Act of 1934. The Act primarily deals with transmitting stations, although there is a section that requires preserving the secrecy of certain received private communications.

Part 97 of the Commission's Rules and Regulations governing the Amateur Radio Service is a section of Title 47 CFR (Code of Federal Regulations). Overall, there are 50 titles which represent broad areas of federal regulation. Title 47 covers telecommunications law in the United States. To cite regulations, the government uses the title, part, and section number. Thus, 47 CFR §97.1 is the rule covering the Basis and Purpose of the Amateur Radio Service.

The ITU member nations collectively agree upon which segments or bands of the radio frequency spectrum will be apportioned to the various radio services. These allocations are influenced by the propagation characteristics of the radio spectrum. Governed by five Commission-

National Volunteer Examiner Coordinator, P.O. Box 565101, Dallas, TX 75356-5101 (817-461-6443)

ers, our FCC further determines how specific frequencies within these bands will be used by individual private sector stations.

The FCC Commissioners are appointed by the president and must be confirmed by the Senate. No more than three commissioners may be members of the same political party. The president designates one commissioner as chairman. The FCC staff is organized into bureaus, divisions, and branches. The Personal Radio Branch (which falls under the Special Services Division, a section of the Private Radio Bureau) oversees the Amateur Radio Service in the United States.

All government agencies, including the FCC, are also guided by another document, the Administrative Procedures Act, which defines how new laws must be adopted. It allows the public to actively participate in the rule-making process. The FCC does not regulate the radio operations of the federal government. That function is handled by another federal agency.

As an aid to identifying radio stations and enforcing radio laws, individual stations are assigned callsigns. By international agreement, the prefix characters in the callsign indicate the country in which the station is licensed to operate. The United States is assigned prefix letters AAA-ALZ, KAA-KZZ, NAA-NZZ, and WAA-WZZ. Our FCC only systematically assigns one- and two-letter prefixes to its amateur radio stations.

Part 97 Amateur Service Rules

The amateur service government regulations are structured into six subparts and two appendices. These are:

Subpart A: General Provisions, which contains those rules concerned with license and station location requirements.

Subpart B: Station Operation Standards, which is comprised of those standards that apply to all types of amateur station operation.

Subpart C: Special Operations, contains the requirements that apply to nonstandard operations such as beacons, repeaters, auxiliary operation, remote control of amateur stations and model craft, and AMSAT, the amateur-satellite service.

Subpart D: Technical Standards, containing the remaining technical principles.

Subpart E: Providing Emergency Communications, which contains the rules applicable to operations in distress and disaster situations, along with RACES, the Radio Amateur Civil Emergency Service.

Subpart F: Qualifying Examination Systems, which contains the requirements for the preparation, administration, and coordination of amateur radio operator examinations (i.e., the Novice testing program and the VEC System).

Appendix 1: Lists the geographic areas where the amateur service is regulated by the FCC and;

Appendix 2: Lists the volunteer-examiner coordinator regions.

What You Need To Know!

The entire Part 97 Rule book is not long. In fact, you can read all the rules in just a few hours. Every amateur should have a copy of the amateur service regulations in their possession. FCC Rule books may be purchased from The W5YI Group, Inc., for $2.95 postpaid (call 1-800-669-9594 if you have a VISA or MasterCard, and it will be shipped to you at once).

Here are some of the rules about which beginners in amateur radio—especially Codeless Technicians who are accounting for the most newcomers—should be particularly aware!

1. You must hold an FCC-issued amateur radio operator license before you may assume physical control of a ham station. Unlicensed persons may operate a ham station under the control of another amateur licensee. (§97.5, 97.7)

2. Any person (except a representative of a foreign government) who qualifies by examination may be a ham radio operator. You need not be a U.S. citizen. (§97.5f)

3. No amateur station antenna may be higher than 200 feet unless the licensee has received prior approval from the FCC. (§97.15)

4. The FCC will not grant any request for a specific callsign. (§97.17f)

5. Applicants for amateur service licenses must show an address on their application where they may receive mail by the U.S. Postal Service. The station location must be a place where a station may be physically located. A post office box, RFD number, or general delivery is unsuitable as a station location. (§97.21) There is no requirement that you reside at your mailing address or that you transmit from your station location.

6. Amateur station licenses are issued for a ten year term. (§97.23)

7. The FCC may modify a station license if it determines that such action will promote the public interest, convenience, and necessity. (§97.25)

8. A lost, mutilated, or destroyed amateur operator license may be replaced by writing FCC, P.O. Box 1020, Gettysburg, PA 17326. An explanation must be included. (§97.27)

9. All amateur stations must be operated in accordance with good engineering and good amateur practice. (§97.101)

10. Amateurs must cooperate in selecting transmitting channels and in making the most effective use of the amateur service frequencies. No frequency will be assigned for the exclusive use of any station. (§97.101b)

11. No amateur operator shall willfully or maliciously interfere with or cause interference to any radio communication or signal. (§97.101d)

12. The station licensee must make the station available for inspection upon request by an FCC representative. (§97.103c)

13. A station may only be operated in the manner and to the extent permitted by the privileges authorized for the class of operator license held by the control operator. (§97.105)

14. An amateur station may transmit the following types of two-way communications:

a. with other stations in the amateur service;

b. with a station in another FCC-regulated service while providing emergency communications. (§97.111)

15. No amateur station shall transmit business or commercial communications. (§97.113a)

16. No station shall transmit music, . . . obscene, indecent, or profane words, language or meaning, and/or false deceptive messages or signals. (§97.113e)

17. Each station . . . must transmit its assigned callsign on its transmitting channel at the end of each communication, and at least every 10 minutes during a communication. (§97.119)

18. When the control operator is using privileges on the basis of holding a CSCE, an indicator must be included after the callsign as follows:

KT for Technician Class operator;
AG for General Class operator;
AA for Advanced Class operator, or;
AE for Amateur Extra Class operator.

Exception: Codeless Technicians who upgrade to Technician Plus by passing a telegraphy examination are not required to append their callsign with an identifier since they will not be issued another operator license. (§97.119e)

19. Amateurs who cause interference to broadcast receivers of good engineering design may have their operating hours restricted. (§97.121)

20. An amateur station must use the minimum power necessary to carry out the desired communications. No station may transmit with a transmitter power exceeding 1.5 kW watts PEP. (§97.113) Transmitter power in certain Novice segments is further limited.

21. Amateur stations may use any means of radiocommunication at their disposal to provide essential communication needs in connection with the immediate safety of human life and immediate protection of property when normal communication systems are not available. (§97.403)

22. Amateur stations in distress situations may be used by any means at their disposal to attract attention, make known their condition and location, and to obtain assistance. They may also so assist a station in distress. (§97.405)

There are, of course, many more rules in addition to the ones we have listed. CQ

PROPAGATION

BY GEORGE JACOBS, W3ASK

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Solar Cycle Progress

There are now signs that Cycle 21 may be moving off of dead center and beginning to decline slowly again towards an eventual minimum.

The Royal Observatory of Belgium, the world's official keeper of solar records, reports a mean sunspot number of 107 for March 1992. This was the lowest monthly level observed since June 1990. It results in a smoothed sunspot number of 145 centered on September 1991. This is a drop of two points from the previous month's level. The sunspot cycle is measured by the value of smoothed sunspot number, which is derived by averaging twelve con secutive monthly mean levels.

A smoothed sunspot number of 105 is forecast for July 1992.

The Dominion Radio Astrophysical Observatory of Canada reports a corresponding drop in 10.7 cm solar flux levels, with a mean value of 170 reported for March 1992. As with the sunspot count, this is the lowest monthly mean level observed since June 1990. The March level results in a smoothed value of 204 centered on September 1991. A smoothed level in the mid-180s is forecast for July 1992.

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for July 1992

	Expected Signal Quality			
Propagation Index	**(4)**	**(3)**	**(2)**	**(1)**
Above Normal: 2, 7, 16-17, 28-29	**A**	**A**	**B**	**C**
High Normal: 1, 3-4, 6, 8-9, 12, 15, 18, 26-27, 30	**A**	**B**	**C**	**C-D**
Low Normal: 5, 10-11, 13-14, 21-22, 25, 31	**B**	**C**	**D**	**D-E**
Below Normal: 19, 23-24	**C**	**C-D**	**D-E**	**E**
Disturbed: 20	**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 or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S6, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S3, and with considerable fading and noise.

E—No opening expected.

3 dB per S-unit.

HOW TO USE THIS FORECAST

1. Find *propagation index* associated with particular band opening from 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 band opening for any day of the month. For example, an opening shown in the charts with a *propagation index* of 3 will be good (B) on July 1st; excellent (A) on the 2nd; good again (B) on the 3rd and 4th; good-to-fair (B-C) on the 5th, etc.

1991 Solar Data

The Royal Observatory of Belgium has published the official sunspot numbers for 1991. The monthly mean numbers are summarized as follows:Jan. 136.9, Feb. 167.5, Mar. 141.9, Apr. 140.0, May 121.3, June 169.7, July 173.7, Aug. 176.3, Sep. 125.3, Oct. 144.1, Nov. 108.2, and Dec. 144.4. The highest daily count was reported on August 21, with a count of 300. This also happens to be the highest daily count observed to date in Cycle 22. The highest daily count on record for the nearly 250 years that sunspot data is available is 355, which was reported on both December 24 and 25, 1957. The lowest count observed during 1991 was 33, which occurred on April 24th.

Following is a summary of the yearly mean level of sunspot count for Cycle 22 from 1987 through 1991: 1987 29.4, 1988 100.2, 1989 157.6, 1990 142.6, and 1991 145.7. The mean count for 1991 was higher than reported for 1990, but somewhat lower than the cycle's peak year of 1989.

Fig. 1 is a mass plot of all recorded sunspot cycles since 1750. We are now in the 22nd cycle to be recorded. Only Cycles 19 and 21 exceeded the peak of Cycle 22. The plot is based on data made available by the National Geophysical Center, NOAA, in Boulder, Colorado.

In next month's column I shall discuss the date by which Cycle 22 is most likely to end. Don't panic: It may still be as much as seven years away. There is still going to be plenty of good propagation on the HF bands, even during the very minimum of the cycle!

July Propagation

With long hours of daylight and the sun high in the northern sky, HF propagation conditions are generally more stable during July than at any other time of the year.

Expect *20* and *17* meters to be the best bands for DX for a period of several hours following local sunrise. Openings should be possible to most areas of the world during this period. Absorption will limit DX openings severely on *20* meters during mid-day, but by the late afternoon signal levels should improve, and the band should open again for DX. Fairly good worldwide openings should be possible during the daylight hours on *15* meters, particularly towards southern and tropical areas. Peak conditions are expected during the late afternoon hours. Conditions, however, should be considerably below those observed during other seasons. Some fairly good DX openings may also be possible on *10* and *12* meters, mainly towards southern and tropical areas, during the late afternoon hours.

With the sun high in the northern sky during July, expect seasonal peak levels of solar absorption during the daylight hours. This means that all signals on all bands will be considerably weaker during the daytime. On the other hand, the intense ionization will cause a lingering effect into the evening hours, with higher frequencies available for DX openings.

As the sun begins to set, DX conditions should improve considerably. *Twenty* meters is expected to be the best band for DX openings during the hours of darkness. The band should open to most areas of the world, often with exceptionally high signal levels. Despite seasonally high static levels, good DX openings are forecast to many areas of the world on *30* and *40* meters during the hours of darkness and the sunrise period. While the high static levels are expected to hinder DX conditions on *80* meters, expect some fairly good openings during the hours of darkness. Not many DX openings are expected on *160* meters during July because of the intense solar absorption and the high static levels, but some may be possible to the Caribbean area during the hours of darkness. Be sure to also check the *15* meter band for DX openings towards the south and the west from after sundown to almost midnight.

Check last month's column for a comprehensive band-by-band DX propagation forecast for July. This month's column contains Short-Skip Charts for July and August 1992, and charts centered on Hawaii and Alaska.

11307 Clara Street, Silver Spring, MD 20902

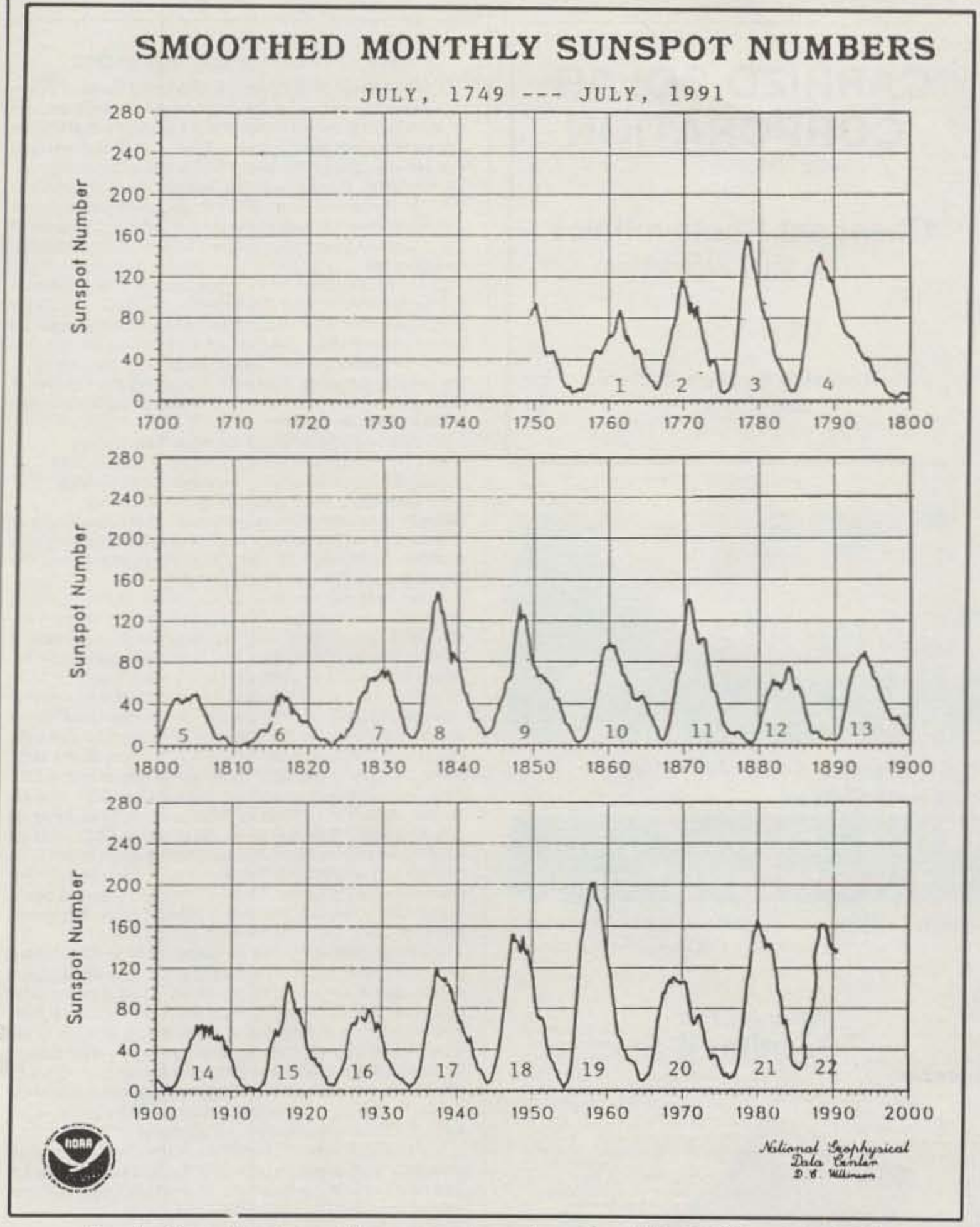


Fig. 1– Smoothed monthly sunspot numbers for July 1749 to July 1991.

Short-Skip Openings

July is generally the month in which sporadic-*E* ionization is most intense. This should result in a considerable increase in short-skip openings on almost all of the HF amateur bands, and on *6* and *2* meters as well.

Look for frequent short-skip openings on *10*, *12*, *15*, and *17* meters between distances of 500 and 1300 miles. During the afternoon hours, skip may extend to beyond 2300 miles as a result of *F*-layer reflection. Short-skip openings should range between 250 and 2300 miles on the *20* meter band. Peak conditions are most likely to occur during the late morning and again during the late afternoon and early evening hours, but openings cold be possible at just about any time. Daytime openings on *40* and *30* meters should range between approximately 100 and 600 miles, increasing to between 250 and 2300 miles after sundown. Look for openings up to about 300 miles on *80* meters during the daylight hours, extending out to the maximum short-skip (one-hop *F*-layer reflection) of 2300 miles during the hours of darkness. While no *160* meter ionospheric openings will be possible during the daylight hours of July, expect some openings between sunset and sunrise for distances up to approximately 1300 miles, and at times somewhat beyond this range. Seasonally high static levels will at times make reception difficult on *40*, *80*, and *160* meters.

VHF Ionospheric Openings

Seasonally peak short-skip conditions are expected on both the *6* and *2* meter bands as a result of sporadic-*E* ionization during July. Openings on *6* meters are expected in the 600–1300 mile range, but could extend well beyond these distances. During periods of intense sporadic-*E* ionization,

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 A.M.; 13 is 1 P.M., etc. On the Short-Skip Chart appropriate *daylight* time is used at the *path midpoint*. For example on a circuit between Maine and Florida, the time shown would be EDT, on a circuit between N.Y. and Texas, the time at the midpoint would be CDT, 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 PDT zone; 3 hours in the MDT zone; 4 hours in the CDT zone; and 5 hours in the EDT zone. *Add* 10 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 14 or 2 P.M. in Los Angeles; 17 or 5 P.M. in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *daylight* time in other areas of the USA *subtract* 8 hours in the PDT zone; 7 hours in the MDT zone; 6 hours in the CDT zone; and 5 hours in the EDT zone. For example, at 20 GMT it is 15 or 3 P.M. in N.Y.C.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts c.w. or 300 watts p.e.p. on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts c.w. or 1 kw p.e.p. 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
July & August 1992
Local Daylight Savings Time At Path Mid-Point (24-Hour Time System)

Band (Meters)	Distance From Transmiter (Miles)			
	50-250	250-750	750-1300	1300-2300
10	*Nil*	08-10 (0-1)* 10-14 (0-3)* 14-18 (0-1)* 18-22 (0-2)* 22-08 (0-1)*	08-10 (1)* 10-14 (3)* 14-18 (1-2)* 18-22 (2-3)* 22-08 (1)*	08-10 (1-0)* 10-14 (3-1)* 14-18 (2-1)* 18-20 (3-2) 20-22 (3-1)* 22-08 (1-0)*
15	*Nil*	08-10 (0-2)* 10-14 (0-3)* 14-18 (0-2)* 18-20 (0-3)* 20-22 (0-2)* 22-08 (0-1)*	08-10 (2)* 10-14 (3)* 14-18 (2)* 18-20 (3)* 20-22 (2)* 22-00 (1-2)* 00-08 (1)*	08-10 (2) 10-14 (3) 14-18 (2-3) 18-20 (3-4) 20-22 (2-3) 22-00 (2) 00-08 (1-0)
20	10-01 (0-1)*	07-10 (0-2)* 10-18 (1-4)* 18-22 (1-3)* 22-00 (1-2)* 00-07 (0-1)*	07-10 (2-4) 10-18 (4) 18-22 (3-4)* 22-00 (2-4)* 00-02 (1-3)* 02-07 (1-2)*	08-10 (4) 10-16 (4-3) 16-00 (4) 00-02 (3) 02-07(2) 07-08 (4-3)

CIRCLE 32 ON READER SERVICE CARD

the skip may also be considerably shorter than 600 miles. During most sporadic-*E* openings, signal levels are expected to be exceptionally strong. Be sure to check the *2* meter band during intense sporadic-*E* ionization. As a rule of thumb, when the skip on *6* meters is shorter than 600 miles, there is a good chance that *2* meters will open over the same path. *Two* meter openings are likely to range in distance between approximately 1000 and 1300 miles. Sporadic-*E* openings can take place at any time, but they are more likely to occur for a few hours before noon and again during the late afternoon hours.

The *Delta Aquarids* meteor shower, which is scheduled to take place during the last four days of July, should permit some meteor-reflection-type openings on the VHF bands. Approximately 20 meteors an hour are expected to enter the earth's atmosphere as the shower nears its peak on July 29th.

Some VHF ionospheric openings may also be possible during July when radio storms occur. Auroral ionization, often associated with radio storminess, can produce unusual openings on both *6* and *2* meters for distances up to approximately 1300 miles. Check the Last Minute Forecast at the beginning of this column for the days in July that are expected to be Below Normal or Disturbed.

VHF Ionospheric Propagation Symposium

The first VHF Ionospheric Propagation Symposium is scheduled to take place in Kerrville, Texas, July 16 through 19, 1992. The symposium will be devoted to the study, discussion, exchange, and dissemination of information relating to the ionospheric propagation of radio signals at 50 MHz and above. Because of the unusual level of worldwide activity associated with the high phase of the present sunspot cycle, original papers are expected to be presented on all forms of VHF ionospheric propagation, including *F*-layer, Trans-Equatorial Propagation, Sporadic-*E*, Scatter, Aurora, etc., on 50 MHz and above. Papers discussed at the symposium are expected to be published by the ARRL in the "Proceedings of the Central States VHF Society."

The symposium as well as the Central States Conference will be held at the YO Hilton Hotel in Kerrville, Texas, about an hour's drive from the San Antonio airport. In addition, a wild-west Texas style barbecue will be hosted by world-renown VHF propagation expert Bill Tynan, W3XO, on July 19th at his QTH on Tierra Linda Ranch, just outside of Kerrville.

For information on registration and attendance, contact Larry Hazelwood, W5NZS, P.O. Box 544337, Oklahoma City, OK 73154 (405-848-6400).

73, George, W3ASK

40	08-10 (2-4)* 10-15 (3-4) 15-20 (4) 20-22 (2-4) 22-00 (1-3) 00-08 (1-2)*	08-10 (4) 10-12 (4-3) 12-17 (4-2) 17-18 (4-3) 18-22 (4) 22-02 (3-4) 02-05 (2-4) 05-08 (2-3)	09-10 (4-1) 10-12 (3-1) 12-17 (2-1) 17-18 (3-1) 18-21 (4-3) 21-05 (4) 05-06 (3-4) 06-08 (3) 08-09 (4-2)	09-18 (1-0) 18-19 (3-0) 19-20 (3-1) 20-21 (3-2) 21-22 (4-3) 22-06 (4) 06-07 (3-2) 07-08 (3-1) 08-09 (2-0)
80	06-12 (4) 12-16 (4-3) 16-00 (4) 00-06 (3-4)	07-08 (4-2) 08-10 (4-1) 10-12 (4-0) 12-16 (3-0) 16-18 (4-1) 18-20 (4-2) 20-22 (4-3) 22-07 (4)	07-08 (2-1) 08-10 (1-0) 10-16 (0) 16-18 (1-0) 18-19 (2-0) 19-20 (2-1) 20-21 (3-1) 21-22 (3-2) 22-05 (4) 05-06 (4-3) 06-07 (4-2)	07-19 (0) 19-20 (1-0) 20-21 (1-0) 21-22 (2-1) 22-04 (4-3) 04-05 (4-2) 05-06 (3-1) 06-07 (2-1)
160	18-19 (0-1) 19-20 (1) 20-22 (3-2) 22-00 (4-3) 00-06 (4) 06-08 (3-2) 08-09 (1) 09-10 (1-0) 10-18 (0)	19-20 (1-0) 20-21 (2-0) 21-22 (2-1) 22-00 (3-2) 00-04 (4-2) 04-06 (4-3) 06-08 (2-1) 08-09 (0-1) 09-19 (0)	21-22 (1) 22-01 (2-1) 01-04 (2) 04-06 (3-2) 06-07 (1) 07-08 (1-0) 08-21 (0)	21-23 (1-0) 23-01 (1) 01-06 (2-1) 06-07 (1-0) 07-21 (0)

HAWAII
July & August 1992
Openings Given in Hawaiian Standard Time

TO:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	13-16 (1)	06-09 (1) 09-12 (2) 12-16 (3) 16-18 (2) 18-20 (1)	13-15 (1) 15-17 (2) 17-18 (3) 18-22 (4) 22-00 (3) 00-02 (2) 02-04 (3) 04-06 (2) 06-08 (1)	18-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)**
Central USA	12-14 (1) 14-16 (2) 16-17 (1)	05-06 (1) 06-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-20 (2) 20-21 (1)	06-08 (2) 08-14 (1) 14-16 (2) 16-18 (3) 18-00 (4) 00-02 (3) 02-04 (4) 04-06 (3)	20-21 (1) 21-22 (2) 22-01 (3) 01-02 (2) 02-03 (1) 20-22 (1)** 22-00 (2)** 00-02 (1)**
Western USA	10-12 (1) 12-14 (2) 14-18 (3) 18-20 (2) 20-21 (1)	06-07 (1) 07-08 (2) 08-10 (3) 10-18 (4) 18-20 (3) 20-22 (2) 22-00 (1)	05-08 (4) 08-10 (3) 10-13 (2) 13-15 (3) 15-22 (4) 22-00 (3) 00-05 (2)	18-19 (1) 19-20 (2) 20-02 (4) 02-04 (3) 04-05 (2) 05-06 (1) 19-20 (1)** 20-22 (2)** 22-02 (3)** 02-03 (2)** 03-04 (1)**

ALASKA
July & August 1992
Openings Given in GMT

TO:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Eastern USA	*Nil*	21-00 (1) 00-02 (2) 02-03 (1)	12-15 (1) 22-00 (1) 00-02 (2) 02-04 (3) 04-05 (2) 05-06 (1)	07-10 (1)
Central USA	*Nil*	20-00 (1) 00-03 (2) 03-05 (1)	13-16 (1) 22-00 (1) 00-03 (2) 03-06 (3) 06-07 (2) 07-09 (1)	08-12 (1)
Western USA	01-04 (1)	17-22 (1) 22-00 (2) 00-02 (3) 02-04 (4) 04-05 (2) 05-06 (1)	13-14 (1) 14-15 (2) 15-19 (3) 19-01 (2) 01-03 (3) 03-06 (4) 06-08 (3) 08-09 (2) 09-11 (1)	07-09 (1) 09-12 (2) 12-13 (1) 09-12 (1)**

*Indicates best times 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.

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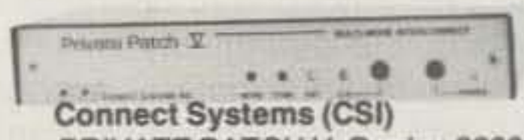

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Announcements *(from p. 8)*

K8QYL, from Festival of Flight, Wapakoneta, OH; Reservoir ARA; July 18 *(no times given)*; 80, 40, 20 General phone subbands. For certificate send QSL and 9 × 12 SASE to K8QYL, 18 S. Main, New Breman, OH 45869.

WB8GIF, from Statler Brothers Happy Birthday USA, Staunton, VA; July 4 *(no times given)*; General portion of 80–15 meter CW and phone bands and Novice 10 meters. For certificate send 9 × 12 SASE to VARA, P.O. Box 666, Staunton, VA 24401.

KB8IDW, from Goast Guard *Barque Eagle*, one of the tall ships celebrating Columbus's voyage, 4 month cruise (May 20 to Sept. 18) along the east coast of the US, operating times on underway days from 3 PM EST to midnight plus 8:30–9 listening for QRP CW stations on 7040; and 9–9:30 PM EST the evening before each port call KB8IDW will be listening on 3878. Operating freqs.: 3897, 7297, 14347, 21447, 28497; CW 7040, 10106, 21063, 28063. For QSL send QSL and SASE to QSL manager KB8IJN, 1848 John Brown Lane, Virginia Beach, VA 23464.

KD8FJ, from "Heritage of Our Country," Thompson, OH; July 4 starting at 1400Z; lower portion of 40 meter General phone band and 10 meter phone at 28.453. QSL with large SASE to KD8FJ, 386 Cedarbrook Dr., Painesville, OH 44077.

W8GVB, from dedication of Desert Storm monument, Marion, OH; 0000–2400Z July 4; CW 3.860, 7.130, 14.250, 28.125; phone 3.870, 7.230, 14.250, 28.450. For certificate send 9 × 12 SASE and QSL to Jack Fetter, KB8DP, 223 Homer St., Marion, OH 43302.

N8CEY, from Ohio Agricultural Research and Development Center "A Century of Science," Wooster, OH; 1200Z for 15 hours July 11, 12, 17, 18, 19; CW 3.550, 7.050, 10.125, 14.050, 21.050, 24.920, 28.150; phone 3.900, 7.275, 14.275, 21.350, 24.960, 28.350. For certificate send QSL and SASE to OARDC, Mike Brugger, N8CEY, 1680 Madison Ave., Wooster, OH 44691.

N9MCH, from Highground Veterans Memorial Park, west of Neillsville, Wisconsin; Clark County ARES; 1700–0500Z July 4; bottom portion of General 80–10 meter phone subbands. For certificate send QSL and 9 × 12 SASE (with 75 cents postage) to The High Ground, P.O. Box 457, Neillsville, WI 54456. (Extended QSOs encouraged to allow visitors to the memorial to speak with ham operators.)

W9ZL, from Experimental Aircraft Assn. Fly-In and Convention, Oshkosh, WI; Fox Cities ARC; daylight hours July 31 through Aug. 2; General portion of 10–40 meters, with special modes during the evenings. For certificate send QSL, contact number, and SASE to Wayne Pennings, WD9FLJ, 913 N. Mason St., Appleton, WI 54914.

K9ONA, from centennial of Village of La Grange Park, Illinois; Six Meter Club of Chicago; 1400–2359Z July 12; lower 25 kHz of General phone bands, Novice 10 meters, and K9ONA/R, 146.37/97. For QSL send SASE; for certificate send 9 × 12 SASE to K9ONA, Karl Weisshappel, 802 Barnsdale Rd., La Grange Park, IL 60525.

W0MME, from Independence Day activities, Mount Pleasant, IA; Mount Pleasant ARC; 1400–2000Z July 3; bottom 50 kHz of General 80–10 meter phone subbands and 40 meters Novice. For QSL send SASE to Dave Schneider, WD0ENR, RR3 Box 307A, Mount Pleasant, IA 52641-9803.

W0MME, from 20th Registers Great Bicycle Ride across Iowa, Mount Pleasant; Mount Pleasant ARC; 1400Z July 24 to 0300Z July 25; on 3.970, 7.263, 14.271, 80 and 40 Novice bands, plus 146.52 and repeaters on 147.39 and 444.95. For 8½ × 11 certificate send SASE to Dave Schneider, WD0ENR, RR3 Box 307A, Mount Pleasant, IA 52641-9803.

CI2M, from 350th anniversary of Montreal, Canada; Concordia University ARC; 1300–0100Z daily July 24 to Aug. 8; SSB 3.875, 7.250, 14.250, 21.350, 28.350 (plus or minus QRM), SSTV 14.230, packet 145.03, ATV 439.25, VHF 50.135, 147.045. For QSL send QSL with SASE or via VE2 bureau to: CI2M via VE2CUA, Concordia University ARC, c/o CUSA H-637, 1455 DeMaisonneuve West, Montreal, Quebec, Canada H3G 1M8.

CJ6CEXS, from 125th anniversary of Canada, Calgary Stampede, Calgary, Alta., Canada; July 2–12; talk-in on VE6RYC (146.850 minus 600). Special QSLs will be sent. There will also be an 8 × 10 full-color poster award for $5.00 US; any contact on any mode/band qualifies. QSL via VE6NAO, 8447 Silversprings Rd., Calgary, Alta., Canada T3B 4A6.

DA1WA/P, from Frankenstein Castle, near Darmstadt, Germany; Wiesbaden ARC; July 31 through Aug. 2 *(no times given)*; all bands 80–10 meters, CW, SSB, packet, and digital modes. For special QSL, send QSL with SAE and 2 or 3 IRCs or greenstamp to DJ0PU.

GB2JPJ, from 200th anniversary of death of John Paul Jones, Arbigland at Kirkbean, southwest Scotland; Ayr ARG and Maxwellton ARC; 0900Z July 18 to 1700Z July 19; CW 3.530, 7.030, 14.030, 21.030, 28.030; SSB 3.775, 7.075, 14.240, 21.240, 28.540, 144.280; 145.450 FM. QSL info via bureau or direct: P.O. Box 36, Prestwick, Scotland.

N0FVG, from high-altitude balloon cross-band repeater (ID N0FVG BALLOON REPEATER), Denver, CO; Rocky Mountain Radio League; 1400Z (flight duration around 4 hrs.) July 18; input freq. 446.000, output 147.555. All stations that check in will be sent a QSL for an SASE. For QSL send QSL and SASE to N0FVG, Warren Gretz, 3664 E. Lake Dr., Littleton, CO 80121.

VB2RICC, from First International Rallye of Camping and Caravaning, Bromont, Quebec, Canada; July 30 to Aug. 10 *(no times or frequencies given)*. Contact Rallye International de Camping et de Caravaning 1992, 4545 av. Pierre-de-Coubertin, C.P. 1000, Succursale M, Montreal, Quebec, Canada H1V 3R2.

VE4IHF/0, from Peace Garden, on border of Canada and U.S.; 9 AM to 5 PM July 10 and 11; on 3.937, 7.255, 14.255, 21.355, 28.355 (plus or minus QRM). Contact John A. Swanke, Box 304, Lakota, ND 58344.

XJ3S, from bicentennial of John Graves Simcoe, Ontario, Canada; Niagara Peninsula ARC; June 29 to July 12 *(no times given)*; 80–10 meters SSB, CW, RTTY. For QSL send QSL and SASE (US funds and postage okay) to VE3VM, Niagara Peninsula ARC, P.O. Box 692, St. Catharines, Ontario, Canada L2R 6Y3.

• **The following hamfests, etc., are slated for July:**

July 5, **Murgas ARC Radio, Electronics, Computer Fest,** northeastern Pennsylvania *(no site given)*. Contact K3SAE and KB3GB, RD 1 Box 214, Pittston, PA 18643 (717-388-6863).

July 10–11, **Amateur Fair '92,** Aldrich Arena, Maplewood, Minnesota. Contact Amateur Fair, P.O. Box 26331, St. Paul, MN 55126, or call 612-653-9999.

July 10–12, **International Hamfest,** Peace Garden on U.S./Canadian border, north of Dunseth, North Dakota or south of Boissevain, Manitoba. Contact Dave Snydal, 25 Queens Crescent, Brandon, Manitoba, Canada R7B 1G1.

July 11, **Straits Area ARC Hamfest,** 4-H Building, Emmet County Fairgrounds, Petosky, Michigan. Contact Tom Romanauski, N8KHE, 616-436-5033.

July 11, **Charleston II Summer Hamfest & Computer Expo,** Charleston Southern University Fieldhouse, Summerville (Charleston), South Carolina. Contact Bubba Johnson, N4CII, 5 Shoo Fly Circle, Givhans, SC 29472 (803-871-7741). (Handicapped accessible)

July 11, **South Milwaukee ARC Swapfest,** American Legion Post 434, Oak Creek, Wisconsin. Contact South Milwaukee ARC, P.O. Box 102, South Milwaukee, WI 53172-0102 (414-762-3235, ext. 58).

July 11–12, **Yellowstone RC Hamfair,** Metra Park, Billings, Montana. Contact Verlon, K7AEZ, 406-245-3930 (days), or Vince, KB7ADL, 406-252-8029 (evenings). (VE exams)

July 12, **LIMARC Hamfest,** New York Institute of Technology, Old Westbury, New York. Contact Neil Hartman, WE2V, 516-462-5549.

July 12, **DuPage ARC Hamfest & Computer Mart,** American Legion Post 80, Downers Grove, Illinois. Contact Edwin Weinstein, WD9AYR, 7511 Walnut Ave., Woodridge, IL 60517 (708-985-9256). (VE exams)

July 12, **Wood County ARC 1992 Ham-A-Rama,** Wood County Fairgrounds, Bowling Green, Ohio. Contact Wood County ARC, P.O. Box 534, Bowling Green, OH 43402 (419-352-3260). (VE exams)

July 12, **SCARC '92,** Sussex County Fairgrounds, Augusta, New Jersey. Contact Don Stickle, K2OX, 185 Weldon Rd., Lake Hopatcong, NJ 07849 (201-663-0677).

July 12, **North Hills ARC Hamfest,** Northland Public Library, Pittsburgh, Pennsylvania. Contact Don Jackson, N3LAZ, 8 Dale Ave., Bradford Woods, PA 15015 (412-935-3343). (Handicapped accessible)

July 16–18, **Mexican Amateur Radio League National Convention,** San Luis Potosi, Mexico. Contact Sergio Valdes Sada, XE2RJ, Calzada del Valle Pte. 499, Colonia del Valle, Garza Garcia, N.L. 66220 Mexico or via AA7FM/OH2LVG.

July 17–19, **Glacier-Waterton International Peacepark Hamfest,** Three Forks Campground, Essex, Montana. Contact Sheila Devitte, VE6NOW, 403-282-2171.

July 18, **Firecracker Hamfest,** Salisbury Civic Center, Salisbury, North Carolina. Contact Walter Bastow, N4KVF, 3045 High Rock Rd., Gold Hill, NC 28071. (VE exams 1:30 PM)

July 18, **Smoky Valley RC Hamfest,** Eisenhower

Park, Abilene, Kansas. Contact Bill Fenton, W0OIN, 913-238-7817.

July 18, **Ausable Valley ARC Hamfest,** Ausable High School, Ausable, Michigan. Call 517-826-5549 or 517-848-5996.

July 18, **Cary Mid-Summer Swapfest,** Cary Community Center, Cary, North Carolina. Contact Herb Lacey, N4UE, 1022 Medlin Dr., Cary, NC 27511. (VE exams 11 AM; preregistration by July 7; exam info AA4MY 919-847-8512)

July 19, **Genesee County RC Swap & Shop,** Dom Polski Hall, Flint, Michigan. Contact Tom, N8DYN, 313-743-3980.

July 19, **Zero Beaters ARC Hamfest,** Bernie H. Hillerman Park, Washington, Missouri. Contact Craig Brune, N0MFD, P.O. Box 24, Dutzow, MO 63342 (314-239-0060 days, 314-281-2784 eves and weekends).

July 25, **Coos County RC Hamfest,** Junior High School, North Bend, Oregon. Call 503-888-2317. (VE exams)

July 25, **PEARLFEST '92,** John F. Kennedy Elementary School, Brewster, New York. Contact Len Sanchez, N2KPM, 914-225-8229. (VE exams)

July 25–26, **Ham Holiday 1992 & State ARRL Convention,** Made in Oklahoma Building, Oklahoma State Fair Park, Oklahoma City, Oklahoma. Contact Ham Holiday, P.O. Box 95942, Oklahoma City, OK 73143-5942. (VE exams Saturday)

July 25, **Western Carolina ARS Hamfest,** Haywood County Fairground, west of Asheville, North Carolina. Contact Keith, KC4QIE, 704-254-9718. (VE exams, preregistration requested)

July 26, **Ashtabula County Hamfest & Computer Show,** Ashtabula Branch Kent State University, Ashtabula, Ohio. Contact Ken Stenback, AI8S, 722 Lyndon Ave., Ashtabula, OH 44004, or call 216-964-7316 evenings and weekends.

July 26, **BRATS Hamfest & Computerfest,** Maryland State Fairgrounds, Timonium, Maryland. Contact Franz Niedermeyer, N3HFS, 410-583-9147. (VE exams 10 AM; preregistration recommended; mail to John Creel, WB3GXW, 3208 Kilkenny St., Silver Spring, MD 20904)

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VIDEOCIPHER II: Satellite, Scanner, Cable, Amateur, Cellular, Repair Manuals, Modification Books & Software. Catalog $3.00. **TELECODE**, P.O. Box 6426-CQ, Yuma, AZ 85366-6426.

NEXT DAY QSLS: Order 1-800-926-7373. We ship next day. Sample $1.00. Box 50062C, Provo, UT 84605-0062.

QSL CARDS. Fast, quality service. Samples $1.00 (refundable with order). WordWise Services, 16 Kent Drive, Foxmeadow, Hockessin, DE 19707.

REVOLUTIONARY HYBRID AERIAL WIRE: 168 strand copper **FLEX-WEAVE™**, #14, ropewoven strong, Ultra Flexible, ties in knots, non-stretch, won't rust/kink like copper weld, $36.95 first 275 feet (minimum), $.13/ft. thereafter, includes shipping! Catalog $1.00. DAVIS RF Co., P.O. Box 230-C3, Carlisle, MA 01741; 508-369-1738 or ORDERS ONLY 1-800-484-4002, CODE 1356. COPPERWELD WIRE, TOP QUALITY, 40% conductivity, LOWEST COSTS. DAVIS RF Co., 1-508-369-1738.

ANTIQUE RADIO ENTHUSIASTS! Buy-Sell-Trade with "Wireless Trader." One year (24 issues). First class $16.95. Trader Publications, 4290 Bells Ferry, Suite 106-36 C, Kennesaw, GA 30144.

FOR SALE: Original instruction manual for Hammarlund Super-Pro Receiver (Series 200). Original service bulletin for Hallicrafters SX-43. Call Jon, WA2OJK, at 718-428-9070 evenings.

CONTESTERS, DX'rs: AERIAL SUPPLIES & VARIOUS Peripheral equipment, TOP QUALITY, IMMEDIATE SHIPMENT. DAVIS RF Co. Catalog: FAX or voice 508-369-1738.

The *World Ham Net Directory* lists special interest ham nets for DXers, missionaries, weather watchers, retired persons, and many other interests. $9.95 plus $2 shipping ($3 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Catalog $1.00, free with order.

Ready to explore VHF/UHF operating? Get Ed Noll's *Basic Guide to VHF/UHF Ham Radio*. Covers equipment, antennas, propagation, repeaters, contesting, band plans, and more. All the basics you need! Just $6.95 plus $2 shipping ($3 foreign) US funds from Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147. Catalog $1.00, free with order.

HAVE AM CAPABILITY? Join SPAM (Society for the Promotion of AM). For information and membership, send $1 and SASE to SPAM, WB6TRQ, Box 62, Potrero, CA 92063.

CABLE HACKERS BIBLE Volume 1. 275 pages covering all aspects of most cable systems. Schematics, fixes, theory . . . more. $43.95. Catalog $3.00. CODs 602-782-2316, FAX 602-343-2141. **TELECODE**, Box 6426-CQ, Yuma, AZ 85366-6426.

RTTY JOURNAL: Published ten times per year. Covering the digital modes of RTTY, AMTOR, FAX, PACKET, plus technical and other interesting articles about this fascinating phase of Ham radio. $15.00 per year USA, foreign slightly higher. RTTY JOURNAL, 9085 La Casita Ave., Fountain Valley, CA 92708.

WANTED: HAM EQUIPMENT AND OTHER PROPERTY. The Radio Club of Junior High School 22, NYC, Inc. is a nonprofit organization granted 501(C)(3) status by the IRS, incorporated with the goal of using the theme of Ham Radio to further and enhance the education of young people nationwide. Your property donation or financial support would be greatly appreciated and acknowledged with a receipt for your tax deductible contribution. Please look over whatever unwanted equipment you may have, and call us. We will pick up or arrange shipping. You will receive the tax deduction, but most important, the privilege of knowing that your gift really made a difference in the education and upbringing of a child. You are invited to check into the WB2JKJ CLASSROOM NET, 7 AM EST on 7.238 MHz or on 21.395 throughout the day. Hope to meet all of our friends at the Huntsville, Alabama Hamfest in August. We will be presenting a forum on EDUCOM. Write to us at: The RC of JHS 22, P.O. Box 1052, New York, NY 10002. Round-the-clock hotlines: Voice (516) 674-4072, FAX (516) 674-9600.

MAUI, HAWAII: B&B with a Ham, KH6SQ. For brochure send 75 cents for postage to P.O. Box 351, Pukalani, HI 96788.

CW? No Problem. You can increase your speed, no matter how many times you've failed before. **Results guaranteed** when you follow the instructions. PASS Publishing's **CW Mental-Block Buster** program helps you **explode mental blocks** that hold you back. Based on 40 years of research, the **CW Mental-Block Buster** uses guided meditation, dynamic visualizations and powerful affirmations to blast through mental blocks. **You can do code!** That means new bands, more contacts, more fun! (This is not a CW practice tape.) The **CW Mental-Block Buster** audio cassette and practice booklet are only $25.95 ppd. in the US (NY residents add $2.08 sales tax). (Quantity discounts available for classes.) VISA, MC, COD: 516-584-8164; FAX: 516-584-9409. PASS Publishing, P.O. Box 570, Stony Brook, NY 11790.

RADIO TRANSCRIPTION DISCS WANTED: W7FIZ, Box 724, Redmond, WA 98073-0724.

RCI-2950 OWNERS: New modification manual including Power Increase, Clarifier Modification, Modulation increase, Operating Hints, and More. Parts included. Only $20.00 ppd in U.S. (MO residents add $1.15 tax). Scott, P.O. Box 510408, St., Louis, MO 63151-0408 (314-846-0252). Money Orders, Cashiers Checks, or C.O.D.

CB-TO-10M CONVERSIONS: FM kits, frequency modification hardware, books, plans, high-performance CB accessories. Catalog $2. CBCI, Box 31500CQ, Phoenix, AZ 85046.

SATELLITE HACKERS BIBLE. Covering: Satellite Data Communications, RTTY, SCPC, WEFAX, Frequencies Lists, BMAC Receiver Schematics, AFSK/FSK Demodulators for RTTY/CW/FAX, SlowScan Receiver Schematics, Stock Market Quote Receiver Schematics, SuperGuide Schematics, SCA, Plus 144 IBM-PC Software files, and more! $56.95. CODs 1-602-782-2316, FAX 1-602-343-2141. **TELECODE**, Box 6426-CQ, Yuma, AZ 85366-6426.

VHF WEAK SIGNAL NEWSLETTER: Large SASE. Box 685, Holbrook, AZ 86025.

NEED POSTAGE HELP? Old mint U.S. postage for 90% of face value from collectors. Great for QSL results! SASE & check to KN4OD, Box 766, St. Marys, GA 31558.

XBEAM CALCULATIONS PROGRAM: SASE for information to M.L. COTE, 745 Nye Circle, Honolulu, Hawaii 96818.

SOLD OUT AT DAYTON—SOLD OUT AT DALLAS. If you saw our demonstration you know why. Solder PL259s a snap. Repair aluminum antennas. Now you can solder any two metals together without soldering experience. Our low-temperature Solder Pastes are stronger and more conductive than regular solder . . . and give you a hand free to hold your work. No more melting coax insulation or dielectric. Solder small wires with a match. **SOLDER-IT KIT INCLUDES:** Silver Bearing Solder Paste (for all electrical and most metals—2% silver content); Copper Bearing Solder Paste (for copper pipes and heavier gauges of metal); Aluminum Solder Paste (for aluminum and most other metals); Pot Metal Solder Paste (for zinc diecast, pewter, etc.); Refillable Butane Pencil Torch (Brushed aluminum, precision professional USA-made tool); storage pouch; warranty and instructions. SOLDER-IT KIT $59.00, PASTES ALONE $6.00 ea., TORCH ALONE $39.95. Add $2.00 shipping (Ohio add 6.5% also), and send check or money order to Solder-It Co., P.O. Box 20100, Cleveland, OH 44120. We ship in 48 hrs.

FINALLY HEAR THOSE UNREADABLE SIGNALS buried in noise, etc. REVOLUTIONARY JPS Co. DSP NIR-10 Audio Filter, DISCOUNTED: $379 delivered cont. US (vs. $400). Also, NF-60 DSP Notch Filter for MULTIPLE tones, DISCOUNTED: $139.50 delivered. DAVIS RF Co. ORDERS ONLY: 800-484-4002 CODE 1356. Info: 508-369-1738.

SAMS for HAMs: Photofacts of vintage HAM gear. We also buy used SAMS. A.G. Tannenbaum, WA2BTB, call 516-887-0057.

PILL BOTTLE ANTENNA TUNER! Really works!! Plans $3.00. DWM ENTERPRISES, 1709 N. West, #103, Jackson, MI 49202.

CABLE TEST CHIPS. Scientific-Atlanta 8550-321, 8500-310, 311, 320, 321 (specify), $33.95. 8580-338, $69.95, 8570/8590, $79.95. ZENITH ZF-1, $33.95. STARCOM 6, $33.95. STARCOM 7, $49.95. TOCOM 5503/07 VIP, $33.95. **TELECODE**, P.O. Box 6426-CQ, Yuma, AZ 85366-6426.

50% DISCOUNT. Stainless Steel Screws and Bolts. Small quantities, free catalog. Elwick, 230 Woods Lane, Somerdale, NJ 08083.

ALUMINUM HEAVY DUTY TUBING: 2"OD × .25" wall. Great for masts, booms, projects. SASE: WS9W/Doug, Box 384, Stoughton, WI 53589.

NEED SCHEMATIC/MANUAL Collins 180S1 Antenna Tuner. W. Dennis, Box 463, Sanbornville, NH 03872.

OPEN WIRE LINE: 450 ohm, high UV polyeth. Insulated copperweld, 100 ft. rolls, $20.00 DELIVERED cont. US. DAVIS RF Co. ORDERS ONLY: 800-484-4002 CODE 1356. Info: 508-369-1738.

BULGARIAN RADIO AMATEUR (LZ1BB) seeks help in obtaining an inexpensive or donated SSB Citizens Band (CB) transceiver. Write H.D. Popov, "Bratya Bakston," Blok 207-A, A-6, 1618 Sofia, Bulgaria.

WANTED: Drake R4C Digital with Sherwood Mods and CW filters or a good CW RCVR. Bill, WA2VLE, 516-281-6498 eves. EST.

TENNATEST*ANTENNA NOISE BRIDGE*NOTHING ELSE LIKE IT * OUT-PERFORMS OTHERS * Costs less. Compare 1–40 MHz $48; 1–150 MHz $72. Satisfaction guaranteed **ASK THE HAM WHO OWNS ONE** * Send stamp for details to TENNATEST, W8URR, 1025 Wildwood Road, Quincy, MI 49082.

LOW PRICES! On A&A Engineering kits & assemblies. Baycom modem kit $54.97, ARRL Books discounted, CRB Research books also. Call or Write for list. Wyatt Industries, P.O. Box 1305, Arroyo Grande, CA 93421-1305 (805-925-3102).

The SCANNER HACKERS BIBLE. 112 modifications. Includes: Pro-2004/5/6, Yaesu, Kenwood, Bearcat, ICOM, and others. Frequency Fixes, Modifications (Scan Rates, Interfaces, Programmable Channels, Improving Operation, etc.), Antenna Plans, Operation, Laws, Cellular Telephone Operation and Frequencies, Accessories, 10-Codes, and more. $33.45. CODs 1-602-782-2316 or FAX 1-602-343-2141. **TELECODE**, Box 6426-CQ, Yuma, AZ 85366-6426.

ARCHITECT AND OM would like to get in touch with OM architects of U.S. Please write to: Francesco Falanga, I7FFE, P.O.B. 243, 70059 TRANI, Italy.

WANTED: Heath HW-7 or HW-8. Prefer unmodified or unbuilt unit, but will consider others depending on condition. Call Phil at 214-699-8571 after 6:30 PM CDST.

LOOKING FOR D.F.C. (Digital Frequency Controller DFC-230) for Kenwood model TS-120 transceiver. P.O. Box 1709, La Jolla, CA 92037.

MANUALS AVAILABLE: Over the years I have collected most manuals for Hammarlund receiver line. Send SASE for list and price to: KD4AJ, 1968 Huntington Hall Ct., Atlanta, GA 30338.

WINDOWS 3.X ICONS AND WALLPAPER FOR HAMS. LSASE for details. N9AW, 5952 South Elaine Avenue, Cudahy, WI 53110.

WANTED: Service manual and bulletins, or copies, for Kenwood TV-506 transverter. Q.R. Galbraith, 4303 Kingsway, Farmington, NM 87402.

FOR SALE: Kenwood 599D Twins, Clean, $400.00. Drake TR3 w/PS. Very clean, $375.00 plus UPS. Robert E. Tollison, K4JIA, 1000 Co. Rd. 18, Mt. Hope, AL 35651 (205-974-8503).

FOR SALE: ALPHA-VOMAX Speech Processor for 4 pin connector. With supply and manual. $75 shipped. Art, K1VKO, 203-853-0587.

Electron Tubes over 1000, will swap for 80–10M, 500–600W linear. SASE for details. N1DSN, S. Spulock, 114 Rodney St., New Bedford, MA 02744.

WANTED: Very good working Zenith Oceanic brown case A600L and R600L. Gregory Sheppard, KA3DBG, 4402 Jupiter St., Rockville, MD 20853 (301-946-6460).

WANTED: Calender/clock "no slot" type for early Tandy 1000 or PC/XT. Dead clock battery OK. WQ4Z, George Griebe, 650 Chestnut, Parksville, KY 40464 (606-236-6510).

RECEIVER COLLECTOR is looking for a few good receivers to complete his collection. If you have a "ham" type receiver made in the 1950s or 1960s, please drop me a note on your QSL card indicating conditions and price. All inquiries will be answered. KD4AJ, 1968 Huntington Hall Court, Atlanta, GA 30338.

SWAN MARK II 2 KW Linear with new 3-500Z tubes, $700. Also Swan SW-240 transceiver with power supply & mike, $200. James Lowe, W6JVK, 1521 Scenic Drive, Pasadena, CA 91103 (818-793-7374).

TRAINS, RAILROAD and RAILFAN, X2200S, TSL back issues. LSASE for list. Want: Screw-base flashbulbs. T.N. Colbert, Burton, OH 44021.

FOR SALE: RTTY C-64 Gear. "AIRDISK" for C-64 RTTY, Morse, AMTOR with manual, brand new, $25 shipped. "HAMTEXT" plug-in cartridge for C-64 supplies program for RTTY, Morse, ASCII with manual. $25 shipped. Art, K1VKO, 203-853-0587.

FOR SALE New, Unused, in original cartons: Radio Shack DMP 130A dot matrix printer, PTC-64, C-64 printer controller. $160.00. K2EEK, CQ Magazine, 76 N. Broadway, Hicksville, NY 11801.

ANTENNA Design Software for PCs. SASE to Dr. Richard Formato, P.O. Box 611, Shrewsbury, MA 01545-8611.

WANTED: A PC8304 Stacor transformer or equivalent (750-0-750 V sec @ 265 ma) new or used. Clarence F. Benson, K6DHV, 18840 State Street, Corona, CA 91719.

ICOM RIG: Air time less than 8 hours—751A, PS30, AT500, SP3, SM8. Bill, K3CRC, 717-222-9390.

SELL: CW Sendin' Machine Memory Keyer. $50 + ship. WB2YQH 716-674-3060.

IC-745 transceiver with FM option and internal AC supply, two microphones, recently factory checked, very clean, $800. David Snavely, KA5B, 321 SW 58 Ave., Plantation, FL 33317 (305-584-5108).

WANTED: Mount and remote for TM201B #22, 50, 22B, 50B, or other screwbase flashbulbs. T.N. Colbert, General Delivery, Burton, OH 44021.

FOR SALE: R/S 10 meter transceiver, comes with mike and manual, $125.00. U-pay shipping. More info send SASE to P.O. Box 518, Whitehouse, FL 32220.

IMRA-International Mission Radio Assn. helps missioners—equipment loaned; weekday net, 14.280 MHz, 1:00–3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, Fletcher Street, Goshen, NY 10924.

Showcase

(from p. 62)

TV, 70 cm antenna, coax, and power supply. The rig is housed in a 7.5" × 7.5" × 2.7" black, die-cast aluminum box. The 10 watt version was the right power level for most for local simplex and repeater work—snow-free video up to 90 miles line of sight with 14 dBd beams. The new TC70-10 fills this need, but also has an internal variable sync tip power control (from 2 to up to 15 watts PEP) and sync stretcher to allow properly driving the Mirage D1010-ATVN or RF Concepts 4-110 to their full PEP (100 watts) output, without overdriving into sync or audio clipping, for the DXer. Separate volume controls are provided for a low impedance dynamic mic and line audio from a camcorder or VCR which enables voice over commenting while transmitting a home video tape. A video monitor output jack provides camera video for focus and lighting setup before transmitting, and true video RF detected at the final amp output in transmit for proper video gain adjustment.

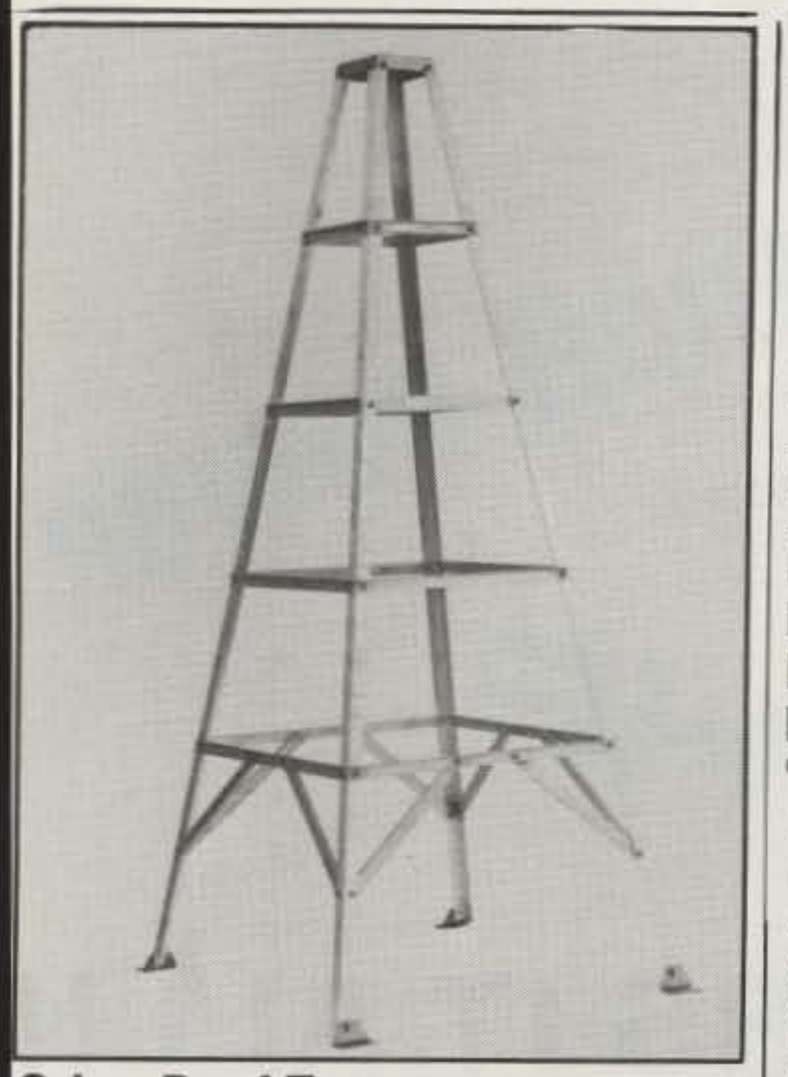
The unit comes tuned with one customer-specified transmit crystal and a socket and switch for an optional second crystal. For receiving, the low noise figure GaAsfet downconverter variable tunes the 420 to 450 MHz 70 cm amateur band down to your TV receivers channel 2, 3, or 4. Power supply requirement is 12 to 13.8 VDC at 3 amps. Price $499. For more information, contact P.C. Electronics, 2522 Paxson Lane, Arcadia, CA 91007 (818-447-4565; FAX 818-447-0489), or circle number 101 on the reader service card.

Soldering Kit and Pastes

This kit (Part SPK 8) utilizes exclusive solder paste technology and includes one each of a silver-bearing solder-paste syringe, an aluminum solder-paste syringe, a pot-metal solder-paste syringe for use on all zinc die-cast metals, and a copper-bearing solder-paste syringe which is ideal for brass fittings. The kit also includes an American-made refillable butane torch (2450 °F), a vinyl storage pouch, and complete detailed instructions.

Also available are aluminum solder paste (Part ALP 21), pot-metal solder paste (ZP 28), plumbers solder (CSP-41), SOLDER-IT silver-bearing solder paste (SP7), and a refillable butane pencil torch (BT50).

For more information, contact SOLDER-IT at P.O. Box 20100, Cleveland, OH 44120, or circle number 108 on the reader service card.



Orion Roof Towers

These roof towers allow easy mounting of a wide variety of antennas. They are of rugged, lightweight aluminum construction with stainless-steel hardware. The rotator mounts inside on a galvanized steel plate. Large feet adjust to the slope of the roof. The ORT-8 (8 feet) and ORT-4 (4 feet) models can be shipped by UPS. For more information, contact Orion Business International, Inc., 7560 N. Del Mar Ave., Fresno, CA 93711-6856 (209-432-4155; FAX 209-432-3059), or circle number 106 on the reader service card.

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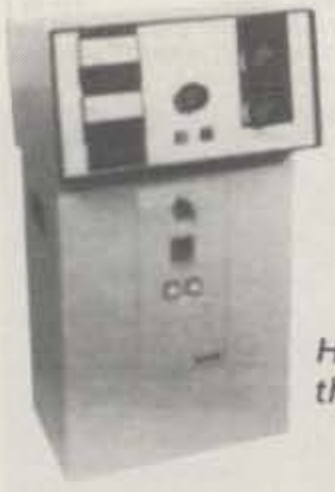
Choose a frequency between 30 and 500 MHz and you have a choice of amplifiers to meet your required output power. All of the models are available for the standard amateur 6 meter (50-54 MHz), 2 meter (144-148 MHz), and 70 cm (420-450 MHz) bands. Special versions are readily available for other frequency ranges. All of the amplifiers are biased for linear operation so that they operate for CW, FM, SSB, AM, Packet, ATV, NMR or pulse applications.

The 2006A, 2002A, and 2004A use a single Eimac 3CX800A7 ceramic triode offering up to 2000 watts for pulse operation, up to 1200 watts for SSB operation, and up to 400 watts for continuous applications.

The 3006A, 3002A, and 3004A use a single Eimac 8877 ceramic triode mated to a heavy duty power supply offering up to 4000 watts for pulse operation, 2000 watts for SSB operation, and 1000 watts for continuous applications.

All of the amplifiers above 100 MHz employ simple, reliable and elegant strip-line tank circuits which give unexcelled performance with a minimum number of components.

A complete line of lower power solid state amplifiers are also available.



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2K CLASSIC X	Export Console	**5K CLASSIC RF**	RF Deck only
2K CLASSIC X RF	RF Deck only	**3K PREMIER**	Console Amp. with 160 meters
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CIRCLE 167 ON READER SERVICE CARD

Advertiser's Index

(continued on page 147)

Kantronics **KAM & Hostmaster**

Simultaneous multi-mode terminal hardware & software for the PC, Mac and Commodore-64.

With Hostmaster terminal software running on your PC compatible, Macintosh or Commodore 64 computer, a Kantronics All Mode (KAM 5.0), your own HF/VHF transceivers, and just a few keystrokes, you can work any mode on HF and packet on VHF at the same time.

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New firmware features (terminal program independent) include AMTOR access to your personal mailbox, remote access for sysops and SEND PRIVATE, SEND BULLETIN, SEND TRAFFIC and enhanced mailbox commands. Blinking mail-waiting LED also provided, independent of software. Hostmaster features include:

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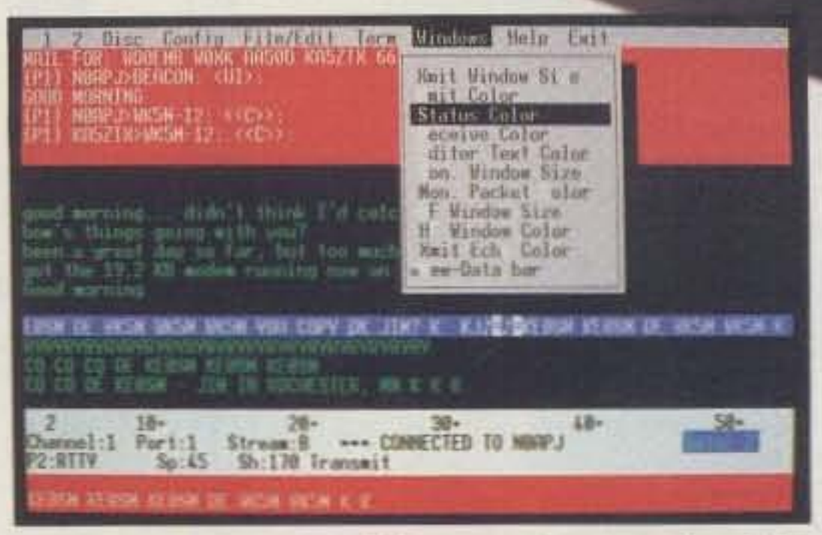
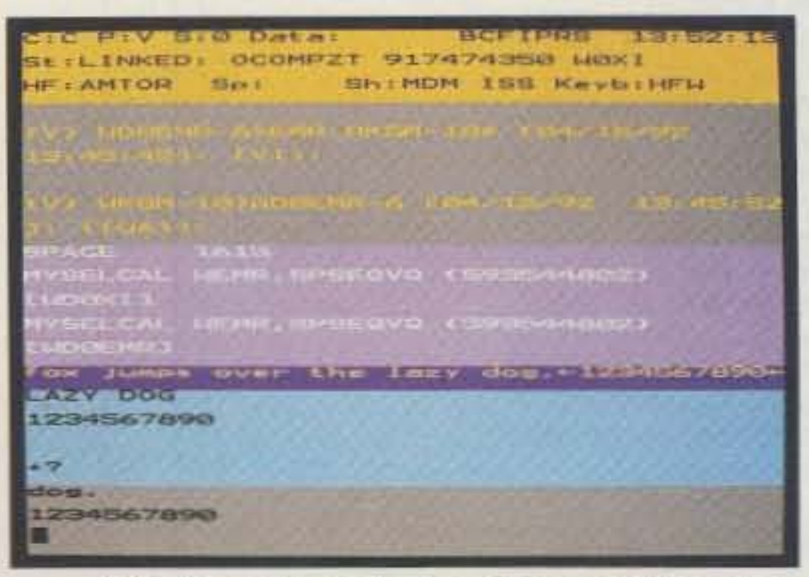
- menu display line
- packet monitor window
- separate packet connect window per channel
- xmit echo display line
- non-packet window (for KAM only)
- status display lines
- xmit buffer per channel
- file buffer per channel
- file transfers and file captures
- compatible with all Kantronics 5.0 firmware: KAM, KPCs and DataEngine 2.0.



Hostmaster on the PC

Hostmaster on the Mac



Hostmaster on the Commodore 64

Kantronics 1202 E. 23rd St, Lawrence, KS 66046 913.842.7745 TELCO BBS 913.842.4678 FAX 913.842.2021

Advertiser's Index (cont'd)

We'd like to see your company listed here too. Contact Arnie Sposato, N2IQO, at 516-681-2922 or FAX 516-681-2926 to work out an advertising program tailored to suit your needs.

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TWIN BAND HANDHELD
- Rx 130-173.995 MHz 400-519.995 MHz
- Up to 5 Watt Output
- Multiple Scanning Modes
- Direct Freq. Selection
- 40 Memory Channels
- Cross Band Full Duplex

CALL TODAY!

ASTRON

• SL-11A	$69	• RS35M	$162
• RS12A	$73	• VS35M	$179
• RS20A	$90	• RS50A	$205
• RS20M	$112	• RS50M	$225
• VS20M	$128	• RM50M	$259
• RS35A	$144	• VS50M	$237

CALL TODAY!

CAROL CABLE

(Columbia Cable)

4080 Rotor Cable	22¢/foot
4090 H.D. Rotor Cable	34¢
1108 RG8, Mini	21¢
1198 RG8, Super Flex	30¢
1180 9913 Type	41¢
1176 RG213, Mil Spec	36¢

10% DISCOUNT ON FULL ROLLS

ALLIANCE

HD-73
REPUTATION EARNED FROM QUALITY

ONLY $159.95
UPS PAID
- Dual-Speed Rotation
- Lifetime Factory Lubrication
- Aluminum Casings and Hardened Steel Drive Gears
- Easy to Install

Hy-Gain Rotors In Stock

MFJ

NEW!

MFJ-247
SWR ANALYZER w/LCD FREQUENCY COUNTER
- Reads SWR 160-10 Meters
- Use as 150 MHz Counter And As A Signal Generator

CALL FOR ALL YOUR FAVORITE MFJ ACCESSORIES

QUALITY SERVICE WITH "LOW" RADIO CENTER PRICES

CASH FOR QUALITY USED GEAR—SEND SASE FOR USED LIST

FT-5200/6200
Dual Band Mobiles

- **Frequency Range:**
  FT-5200
  2M: 140-174 MHz RX
  140-150 MHz TX
  70 cm: 430-450 MHz RX/TX
  FT-6200
  70 cm: 430-450 MHz RX/TX
  23 cm: 1240-1300 MHz RX/TX
- 32 Memories (16 per band)
  Odd splits on any memory
- CTCSS Encode Built-In
- Dual Receive with Balance Control
- Full Duplex Cross-Band Operation
- Built-In Antenna Duplexer
- Backlit DTMF Microphone
- Automatic 8 Level Display Dimmer
- Built-In Cross-Band Repeat
- **RF Output Power:**
  2M: 50/5 watt (high/low)
  70 cm: 35/5 watt (high/low)
  23 cm: 10/1 watt (high/low)
- **Accessories:**

FRC-4	DTMF Paging Unit
YSK-1L	20' Trunk Mounting Kit
FTS-22	CTCSS Dual Decoder
SP-7	External Speaker
DVS-3	Digital Voice Recorder Unit
MW-1	Wireless Microphone /Controller

"The FT-5200 is the smallest dual-band transceiver made, and I can mount it anyplace!"

"Yaesu did it again!"

What weighs 5 oz., lights up, snaps off and fits in your pocket?

Don't have the answer? Yaesu does. It's the exclusive removable front control panel of the FT-5200/6200 – the smallest, lowest priced dual-band mobile radios made.

With the use of the optional adjustable control panel bracket kit, you can conveniently mount the "smallest" control panel almost anyplace in your car and mount the transceiver body out of sight. When you leave your car, snap off the 5 oz. front control panel and take it with you. Now your rig's secure. For safer autopatch operation at night, you'll find another Yaesu exclusive – a back-lit DTMF mic. And there's also a built-in antenna duplexer and easy-to-read dual full-frequency liquid crystal display.

Now you have the answer, too. The FT-5200 – packed with features, affordably priced. Don't have one? Better contact your dealer today!

Here's another Yaesu exclusive! The MW-1 Wireless Mic with Remote Control.

YAESU

Performance without compromise.℠

FT-990 High-Tech Innovation

The advanced RF front end design similar to the FT-1000 allows for superior receiving performance. In addition to CW spot, IF notch, IF shift, independent mode and IF filter selection and Yaesu's exclusive DDS, the FT-990 features the industry's only dual digital SCF high performance filters providing unsurpassed receiver selectivity as never before obtained. And the CPU controlled RF FSP gives you that extra pile-up punch when you need it most. A high speed antenna tuner with memories and built-in switching power supply are included.

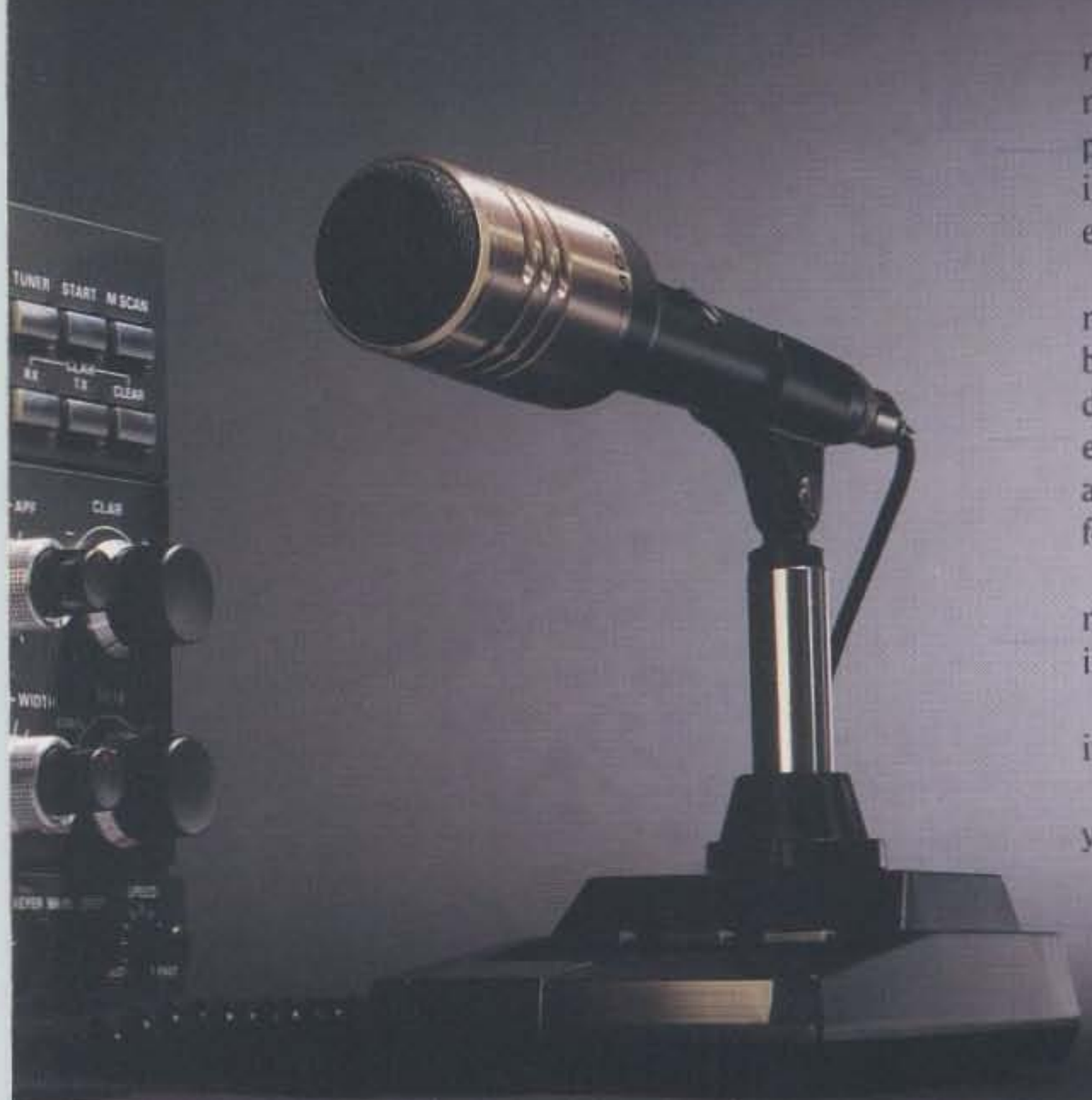
FT-890 Light Years Ahead

World's smallest premium high-performance mobile includes Yaesu's exclusive DDS, IF notch, IF shift, built-in iambic keyer, general coverage receiver and built-in high-speed antenna tuner with memories. Outstanding receiver front end with IPO (Intercept Point Optimization), selectable AGC and all-mode squelch. DFCS (Duct Flow Cooling System) for 100% duty cycle at 100 watts output for up to 30 minutes. A great Field Day or DX-pedition rig!

FT-747GX Small Wonder

Features include ultra-lightweight design, multiple scan functions, selectable noise blanker, 20 memories, all-mode squelch, separate drive and mic gain controls. The simplest full-featured 100 watt HF radio, with general coverage receiver at an affordable price.

know a world leader, know us.



Keeping our world leadership position in HF radio products means knowing what you need to make DX'ing more fun and challenging, then interpreting those needs into technical improvements and innovative features. We're hams too, so we know how exciting advanced engineering can be.

Being a world leader in HF technology doesn't mean anything to us though, unless there are real benefits to you. Like peak performance and unfailing durability – the very qualities that keep our HF equipment on top; the best benefits you can have – and our design goals since 1956 the year Yaesu was formed.

This lineup of radios exemplifies the achievement of those goals and over 35 years of manufacturing "the best of the best" amateur radio equipment.

You see, you do know a world leader – but more importantly, we know you.

Experience the best of the best today! Contact your nearest Yaesu dealer.

YAESU

*Performance without compromise.*SM

"The magazines judged the FT-1000 world's best in it's class. That's leadership!"

K. Karamanos
National Sales Manager
WD6DIH

"Leadership means innovation, and since we're hams too, we understand what you want."

C. Margelli
Customer Service Manager
K7JA

"We keep our HF leadership position by constantly improving our products."

M. Maruya
Executive Vice President
WA6F

FT-1000 Best of the Best

Unmatched performance, the ultimate DX and Contest radio. Unlimited simultaneous crossband dual receive, 200 watts power output, with heavy duty power supply. World's best receiver performance utilizing quadruple conversion, Yaesu's exclusive DDS, IF notch, IF shift, IF variable bandwidth, CW APF, independent mode and IF filter selection. Also, CW spot and built-in high speed antenna tuner with memories. Proven performance: The choice of the world's top DX'ers.

You may not think you but you

All of Yaesu's quality HF radios come available with a wide selection of accessories. Specifications subject to change without notice. Specifications guaranteed only within amateur bands.
Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details.

More for Less!

The First High Performance HF Under $1100.

ICOM Unveils the New IC-728!

The HF All-Band Transceiver offers the high-performance features previously available only on higher priced models. And we mean *features* — not just bells & whistles. The amazing IC-728 sells for under $1100, yet has more of what you buy a radio for — *to hear and be heard* — than any other transceiver in its class.

More Clarity!

All other radios in this price class use double conversion circuitry. ICOM uses more advanced **Triple Conversion** technology because it improves incoming signal quality and suppresses interference better. And a **Noise Blanker** reduces pulse-type noise interference instantly!

More Selectivity!

You won't find **PassBand Tuning** on some radios at twice the price! PBT is the most effective interference rejection system ever developed. It lets you narrow the IF passband width to cut out nearby signals and zero in on just the one you want to hear.

More Flexibility!

High-performance **AT-160 Antenna Tuner** (opt.) detaches for mobile operation.

More Punch!

ICOM's dynamic **Speech Compressor** increases the transmitter's output signal strength. This gives you the power to punch through when the bands are crowded or conditions are less than perfect.

More Speed!

Band Stacking Register automatically snaps you back to the last frequency and mode you were using — perfect for contesting, multibanders. **Direct Digital Synthesis,** gives you fast T/R switching for digital modes. **DDS** also improves your carrier-to-noise ratio by blocking interference, and it gives you the fast switching times you need for packet radio.

More Value!

We invite you to compare the IC-728 with any other HF. See how much you would pay for another transceiver with all of these performance features!

	ICOM IC-728		
Triple Conversion	✓		
Passband Tuning	✓		
DDS	✓		
Speech Compressor	✓		
Sugg. Retail Price*	$1,099		

* AT-160 Antenna Tuner is priced separately.

More Audio! Low-noise front-end technology means high sensitivity. A sharp IF and clear audio amplifier combine for excellent sound reproduction.

More Mobile! The IC-728 is more than a radio — it's a *system*. For example, the optional AT-160 ANTENNA TUNER can be "built-on" (it's not built-in), for optimal base station operation. Remove it, and you have a supercompact, light weight unit for mobile use, field days, etc. The bright LCD display is easy to see in vehicles (fluorescents aren't), and its superior noise blanker makes auto electrical noise a problem of the past!

And Even More! All-band, all-mode,† general coverage receiver, 26 memory channels, 3 types of scanning, plug-in (solderless) CW filters... plus the same superior quality and reliability you've come to expect with every ICOM transceiver.

† With optional IC-U17

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