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CQ



CQ World-Wide DX Contest SSB Results For 1994

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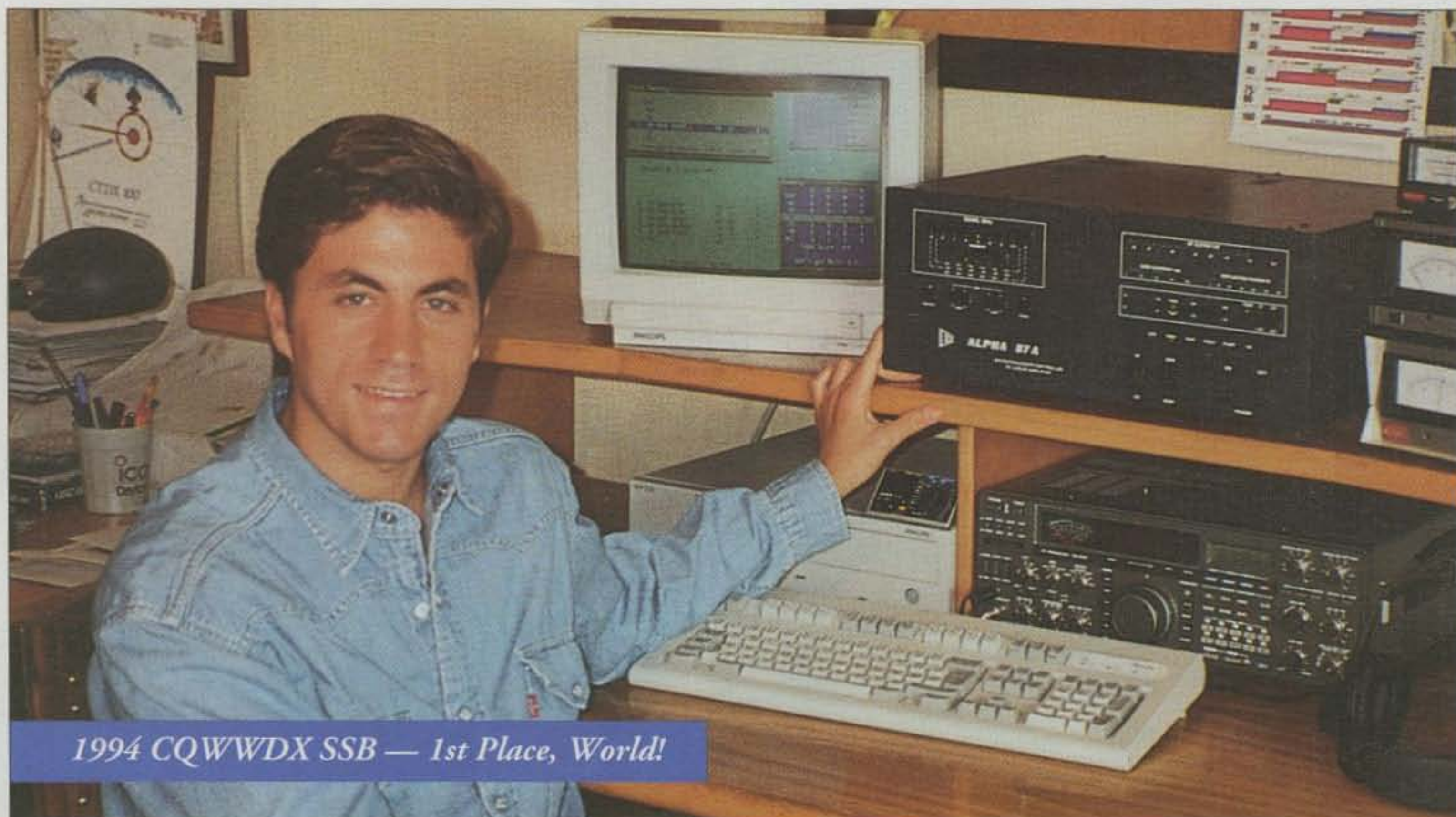
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The Radio Amateur's Journal

ON THE COVER: As you read this month's contest results, you'll be reminded of one of contesting's long-time competitors, Randy Thompson, K5ZD. Randy's recently constructed Uxbridge, MA station brought him the #2 USA finish in last year's CQ WW DX Contest. (Photo by Larry Mulvehill, WB2ZPI.)



SEPTEMBER 1995

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ZERO BIAS

AN EDITORIAL

If you're the kind of amateur who's sort of laid back and phlegmatic, the idea of contests and contest results is at best annoying. "Valuable" spectrum space and magazine space are taken up with a seemingly meaningless activity that deprives you of your individual rights, whatever they may be. The first tendency is to look at the "contest" or operating event as a thing, a totality, designed specifically to irritate you, and not look at it as the sum of its parts—the "parts" being people.

Take a moment and think about driving your car. Some days you drive to work, or visit a friend or relative. Other days you simply might go shopping, or if the weather is nice, you might go to the beach. When you get on the highway, you notice a few other cars heading in the same direction. At some point the number of cars begins to increase, and your mind automatically switches over from individual cars to the concept of traffic. Depending on the time of day, day of the week, and/or holiday weekend, your ability to freely and rapidly go from A to B can be severely restricted by traffic—namely, a great number of individual vehicles. Everyone seems to get the same idea at the same time. At no time does any licensed driver ever consider the remotest possibility of every other licensed driver being on the road at the same time. Sound familiar?

Now let's take this analogy a step further and imagine that it's Hiram Percy Maxim's birthday, and as such it now represents a national holiday, appropriately and formally moved to and celebrated on a Monday. Everybody—those who intend to seriously party on down, those who simply want to have a leisurely day, and those who just have the day off and want to kill a few hours—gets in the car and heads off to the beach. In no time at all they're all stuck in traffic (an overabundance of individual vehicles). Some yell and scream, some honk their horns, some try to create a new lane by driving on the road's shoulder, and some wish they'd never left home. Most, however, still keep the goal in sight—the day off to celebrate (any way you want to) Hiram's birthday. You can't blame Hiram for the traffic mess that's keeping you from having what you consider to be your deserved good time, nor can you blame the people who created the Monday holiday. It's sort of pointless to get angry with all the other drivers who want to have a good time too; they're just as entitled to use the highway any time they want. Contrary to some people's opinion, none of us really owns any high-

way or even a small portion of one. I don't think that having one's own toll booth is in the future.

For a number of contests, as well as most three-day holidays, the actual sponsor or celebrative occasion is probably not nearly as important as the simple fact that it is a relief from work, school, or chores, and free time to enjoy something different. Unlike driving on a highway, amateur radio is far more restrictive as to where we legally can "drive." Depending on the class of license, we could be on a major highway, an HOV lane, a service road, or even whatever comes after secondary roads. Most of our licensed "drivers" are restricted from using major highways simply by license class. It would be an awesome thought to consider the possibility of everyone upgrading to the same class of license and getting on the air (highway) at the same time and on the same band. Theoretically it's possible.

There is one giant flaw in this argument or analogy, and it is solely based on stereotype. In spite of increased and increasing numbers of women, most amateurs are male. Most males, when driving, will never stop to ask directions or to find out exactly where they are in relation to where they want to go. However, during just about every contest or DX pileup there is no shortage of males who want to know what's going on, who's involved, where they are, and what's the best route—a slight anomaly, probably based on genetics. The "asking" gene is activated, while at the same time the "listening" gene is deactivated. More than likely it also requires different motor skills.

Most of us have the good sense to realize that amateur radio, like traffic, has a pattern. We know that in the morning and early evening we're likely to face rush-hour traffic going to and from work. We also know that for most of the in between periods we could make the same trip in about half the time. It's a few hours in the morning and a few hours in the evening, roughly five days a week. The majority of the time, excluding holidays, it's clear sailing wherever we want to go. If we analyze contests and contest periods (all of them), it turns out to be pretty much the same thing. About 71 to 72% of the time it's clear sailing, wherever we want to go. If there were 52 major contests, one on each and every weekend of the year, occupying every part of every band, and you weren't interested in any of them, you'd still have 261 days to do something else.

Most of us also have the good sense to realize that if we're caught in traffic or faced with a contest going on, there's got to be a way to use the time to enjoy ourselves. While driving, I've seen people play musical instruments, shave, sing, operate mobile, listen to the radio or tapes, and in recent times, there are more and more people using cellular phones.

There are countless ways you can be part of any contest activity, from simply helping someone increase his score with your contact, to an all-out effort on your part. Most of us fall short of an all-out effort, but it's fun to make a lot of contacts, work new places, and fulfill some of the requirements for achievement awards. It's fun to get caught up in the passion and fervor of what's going on, and you may even be surprised at how competitive you can become. I know that with over 200,000 amateurs taking part in the CQ WW alone, it seems as though everyone is on the same band and frequency (yours). But think about it for a minute. Even that number is a small percentage of the total number of amateurs in the world. Try then to imagine an event or occurrence whereby every licensed amateur in the world goes on the air at the same time, each of us demanding our own respective bit of sanctified spectrum.

I guess we all have the option of treating increased traffic on the amateur bands just the way we handle increased traffic on the highways. We can either rant and rave, honk our horns, and try to get around by creating "new" lanes or cutting people off, or we simply can think of ways to use that time in a productive, positive manner. We can either get aggravated or have a good time. We can either get on the air or not, the same option we have every day. I know that as for me, one of the over 200,000 who took part in last year's WW, I had a good time and enjoyed myself. I didn't analyze it to death, nor did I seek out some esoteric philosophical meaning. I just went with it and tried to do the best I could with the amount of time I had to spend on it. Don't get me wrong, I do like to look at the results to see how well I did compared to others and who beat me out (just about everybody). I like to think about what I could do this year—perhaps just one more piece of equipment, or anything different that could boost my total. I probably won't do any of the things I've thought about, except get in and do my best. Hope to see you there.

73, Alan, K2EEK

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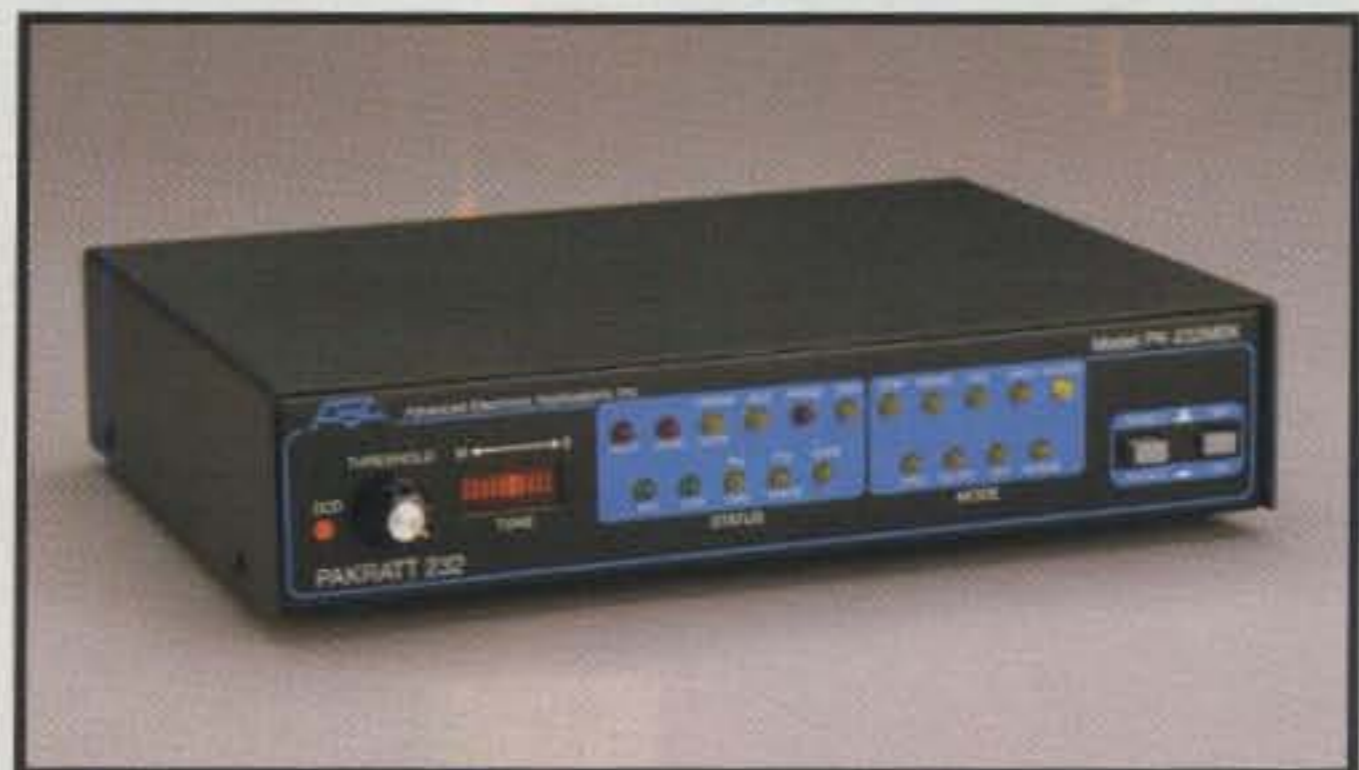


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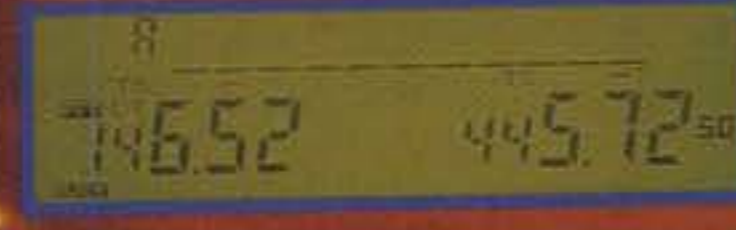
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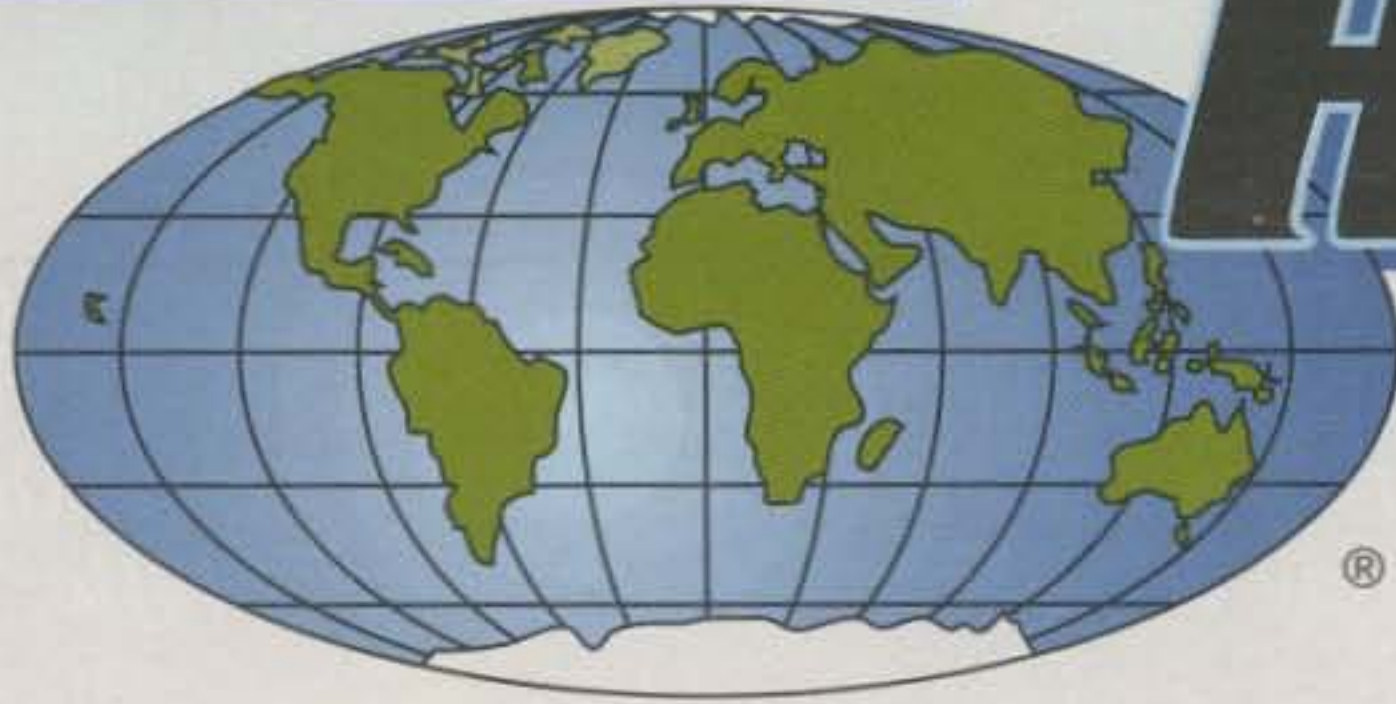
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Results of the 1994 CQ World-Wide DX SSB Contest

BY BOB COX*, K3EST

From all over the world men and women temporarily suspended the routines of their lives to take part in a world-wide party—a party where everyone is invited and where you might talk to a king and an elementary school student in the same five minutes. This is a party without boundaries and without prejudices. As W6QD, who founded the CQ WW, said in 1939, "It is our contention that an advancing wave-front cannot recognize a political boundary even when it sees one." The essence of the CQ WW is that it is a contest in which there is lots of DX. Dozens of contesters and DXers fan out across the world to put rare and semi-rare countries on the air. Going overseas from your home QTH makes the fishing much more interesting for yourself and others.

There are so many participants in the CQ WW Contest that it is hard to know whom to acknowledge. Every now and again a few of the boys think that too much publicity is given to the high point entrants. There are a couple of ways of looking at it. In all hobbies, the person who scores the highest number of points or comes out ahead naturally attracts the most attention. We would be sadly neglectful if we did not recognize it. On the other hand, we all know it is not the high-scoring fellows who give us so many of those much sought after multipliers or QSOs and make the contest a success. The majority of entrants, for many individual reasons, are just out to have fun. This contest was dominated by greatly varying band conditions. A solar storm early in the contest—before the morning European runs to the US—put a real damper on 10 and 15 meters.

*1816 Poplar Lane, Davis, CA 95616

Conditions to the east to JA were more consistent. It is amazing how some Europeans can put in a serious effort and work almost no W's on any band but 20.

All Band

The top ten all band scores were scattered all over the world. After renting AI6V's QTH, Jose, CT1BOH, spent a lot of time making his preparations to assault the #1 position. He arrived on Aruba and helped John, P40W, construct his station before concentrating on the big event. As time drew close he thought about Pekka, OH1RY, over at EA8AH. Pekka was operating from the QTH put together by OH2MM, OH2BH, and himself. When it was all over, Jose had made the second highest SSB score in the history of the contest—not bad in a sunspot minimum. He dominated the whole top ten field. EA8AH finished second.

Another traveling OH, OH6DO traveled from VS6 down to 8R1K and placed third. The top ten shows two stations from Cyprus. This seems like a great place to finish in the results. P39P was only 17 years old at the time of the contest and won the high-scoring youth trophy. Falling just outside the top ten box were XX9TZ operated by OH2BH and WR6R/KH6. Both did outstanding jobs from propagationally challenging areas.

The battle in the US was between John, K1AR, and Randy, K5ZD/1. John took top honors for the seventh time, ending up with about 50% of his previous year's top score. Randy edged out John in QSOs, but lost the multiplier battle. Third place went to Bill, KM9P, at the mic of N4RJ down in Georgia. Special mention

goes to the seventh place finish of Steve, N2IC/Ø, way out in far west of zone 4, and to K5MR and W9RE. All broke into the top ten from a non-east-coast QTH.

Operating from a hilltop in northeast Slovenia, overlooking Austria, Drago, S59A, took top European honors over Steve, GW4BLE, at the western end of zone 14. Third place went to Ville, OHØMM (OH2MM), who was busy watching the auroras out his window.

The low power category continues to attract the most entrants. Making many happy, Felipe, NP4Z, spoke his way past D3X, FM5DN, and VP2EJ to win the world trophy. For single operator, low power it was Tony, K2SG, way out in front with more than 900K. Tony had a tough struggle last year, but this year the second-place score was down over 500K. Come on, guys; give this wide-open category a try. You just might win! The low power battle in Europe was located on the Iberian peninsula. Angel, EA7CEZ, was the clear winner over EA1FBU, CT1ENQ, and EA3GHQ, respectively.

World Single Band

As one would suspect, 28 MHz was dominated by South American stations. PQØMM came out on top by barely edging out well-known contesteer LU6ETB. Did you know that Tokyo was due went from Buenos Aires? While piling up his frequent flyer miles, N6TJ got on the air from ZD8Z. What happened next was what contesting is all about. The countries and QSOs just kept coming and coming. When it was over, Jim had set a new world record for 21 MHz. He had just had a super radio experience. Wow! A similar event was occurring



The IR1A team.



The multi-single team from Greece, SV1AFA. (Left to right) sitting SV1CIB and SV1SN; standing SV1CIF, SV1CDN, and SV1CQG.

TROPHY WINNERS AND DONORS

SINGLE OPERATOR

**World All Band
P4ØE**
(Opr. Jose Carlos Cardoso Nunes,
CT1BOH)

Donor: Dave Rosen, K2GM
WA2RAU Memorial

**World Low Power
Felipe J. Hernandez, NP4Z**
Donor: Slovenian Contest Club

**World Assisted
P4ØW (Opr. John Crovelli, W2GD)**
Donor: Snake River Contest Club

**World QRP
Anthony Arnold, NP2Q**
Donor: Doc Sayre, N7AVK

**U.S.A.
John Dorr, K1AR**
Donor: Potomac Valley Radio Club
KC8C Memorial

**U.S.A Low Power
Anthony A. De Biasi, K2SG**
Donor: North Coast Contesters

**Canada
VE2TJA (Opr. John A. Ross IV, WB2K)**
Donor: Niagara Frontier Int'l DX Assn.
VE3WT Memorial

**Caribbean/C.A.
Leonce Richer, FM5DN**
Donor: Alex M. Kasevich, VP2MM/W4

**Europe
Drago Turin, S59A**
Donor: Potomac Valley Radio Club
W4BVV Memorial

**Europe Low Power
Angel Martinez Claus, EA7CEZ**
Donor: Scott Jones, WR3G & Tim Duffy,
K3LR

**Africa
EA8AH**
(Opr. Pekka Kolehmainen, OH1RY)
Donor: Gordon Marshall, W6RR

**Asia
H2ØA (Opr. Ivo Pezer, 5B4ADA)**
Donor: Japan CQ Publishing Company Ltd.

**Japan
Toshihiko Inoue, JH4UHW**
Donor: Japan Crazy Contesters Club

**Oceania
Olli Rissanen, OHØXX/DU1**
Donor: Northern California DX Club

**South America
8R1K (Opr. Marko Myllymaki, AB6NJ)**
Donor: Yankee Clipper Contest Club

**SINGLE OPERATOR, SINGLE BAND
World—28 MHz
Sergio Lima de Almeida, PQØMM**
Donor: Joel Chalmers, KG6DX

**World—21 MHz
ZD8Z (Opr. Jim Neiger, N6TJ)**
Donor: French 21170 DX Net/LNDX
FY5AN Memorial

**World—14 MHz
PYØFM**
(Opr. Peter Zoch Sprengle, PY5EG)
Donor: North Jersey DX Assn.
K2HLB Memorial

**World—7 MHz
PJ9U (Opr. Seppo Sisatto, OH1VR)**
Donor: Fred Laun, K3ZO
K7ZZ Memorial

**World—3.8 MHz
VP2EC (Opr. Gordon Fogg, N5AU)**
Donor: Fred Capossela, K6SSS

**USA—28 MHz
Charles Dietz, KE5FI**
Donor: Donald Thomas, N6DT

**USA—21 MHz
K4JPD (Opr. Neal Sulmeyer, AE6E)**
Donor: CQ Magazine

**USA—14 MHz
KM1H (Opr. Robert Shohet, KQ2M)**
Donor: Southern California DX Club

**USA—7 MHz
Glenn Rattmann, K6NA**
Donor: Stanley Cohen, WD8QDQ

**USA—3.8 MHz
Robert Ferrero, W6RJ**
Donor: Arnold Tamchin, W2HCW

**USA—1.8 MHz
Jeffrey Briggs, K1ZM/2**
Donor: J. Bruce Siff, W2GBX

**Carib./C.A.
KP2A (Opr. Robert Hayes, KW8N)**
Donor: Snake River Contest Club

**Europe—28 MHz
II4A (Opr. Luca Viapiano, IK4GNH)**
Donor: Chod Harris, VP2ML

**Europe—21 MHz
IQ4C**
(Opr. Fabio Ernesto Schettino, I4UFH)
Donor: CQ Magazine

**Europe—14 MHz
Guiseppe La Parola, IT9BLB**
Donor: A.G. Anderson, GM3BCL

**Europe—7 MHz
Tine Brajnik, S5ØA**
Donor: Roger Burt, N4ZC

**Japan—28 MHz
Masaki Okano, JH4UYB**
Donor: Take Yokoyama, JL1BLW

**Japan—21 MHz
Kazuhiko Endou, JAØQNJ**
Donor: DX Family Foundation

MULTI-OPERATOR, SINGLE TRANSMITTER

**World
HC8A (Ops.: HC1OT, KK6QM, N6KT,
W6QHS, WN4KKN)**
Donor: Southern California DX Club
W6AM Memorial

**U.S.A.
KC1XX (Ops.: KC1XX, AD1C, KM3T,
K1EA, WA6OTU, KD1EA)**
Donor: Carolina DX Association

**Europe
IQ4A (Ops.: I4VEQ, I4IND, I4LCK, I4TJE,
I4IKW, I4PVP, I4EAT, I4AVG, IK4DCT,
IK4QJH, IK4EWK, IK4XQH, IK4CZF,
IK2NCJ, IW4ANU)**
Donor: Bob Cox, K3EST

**Carib./C.A.
VP2E (Ops.: K1DG, KA1XN)**
Donor: Eric Scace, K3NA

**Oceania
V7X**
(Ops.: KH6M, KL7Y, KH6HH, AH6IO, AH8H)
Donor: Junichi Tanaka, JH4RHF

**MULTI-OPERATOR, MULTI-TRANSMITTER
World
PJ1B (Ops.: K2SB, K2SS, K3EST, KB2XZ,
N3ED, N7ZZ, W3UM, WA3LRO)**
Donor: Dave & Barbara Leeson, W6QHS &
KK6QM

**U.S.A.
W3LPL (Ops.: KA1GD, K1RZ, WR3E,
W3EKT, N3GB, KZ3H, N3KTV, AI3M,
KF3P, K3RA, N3RR, KP4XS)**
Donor: Paul Hellenberg, KS9K

**Europe
EM2I (Ops.: UR3IKY, UR5IOK, UT1IA,
UT2IA, UT2IB, UT2ID, UT2II, UT2IJ, UT2IM,
UT2IO, UT2IZ, UY3IM)**
Donor: Finnish Amateur Radio League

**Japan
JH5ZJS (Ops.: JA5BJC, JA5CJZ, JA5FDJ,
JA5JCC, JA5THU, JH5FXP, JR5PDX)**
Donor: Ryozo Goto, JH3JYS

**CONTEST EXPEDITIONS
World Single Operator
XX9TZ (Opr. Martti Laine, OH2BH)**
Donor: National Capitol DX Assn.
W2GHK Memorial

**World Multi-Operator
9G5TL (Ops.: AA7NO, KF7AY,
WY7K, NZ7E, WA7LNU, K5VT)**
Donor: The German CDXG & SDXG
DJ3NG & DJ4EI Memorial

**SPECIAL SINGLE OPERATOR AWARD
World—All Band Under 21 Years Old
P39P (Opr. Stavros Tsiakkouris, 5B4AFM)**
Donor: Ham Radio Bookstore

**World—All Band High YL
Heather Hall, PJ8CW**
Donor: Yutaka Tanaka, JH3DPB

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- Independent tuning knobs
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- Impressive audio output
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- Simultaneous receive on both bands
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All features are operational in both the single unit and remote configuration (separation kit included).

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REMOTEABLE
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IC-W31A TRADITIONAL SINGLE UNIT OPERATION — 1/3 slimmer than its IC-Z1A cousin. Great looks match its outstanding performance.

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BIG PERFORMANCE

CIRCLE 3 ON READER SERVICE CARD



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BAND-BY BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

WORLD TOP SINGLE OPERATOR, ALL BAND

| Station | 160 | 80 | 40 | 20 | 15 | 10 |
|-----------|-----------|-----------|------------|-------------|-------------|-------------|
| P40E | 102/11/29 | 502/18/61 | 1329/24/93 | 2026/33/109 | 1960/27/109 | 2031/25/102 |
| E8AH | 36/9/27 | 471/22/74 | 623/26/84 | 1752/31/109 | 1947/31/109 | 1228/22/82 |
| 8R1K | 84/9/19 | 296/13/54 | 717/21/78 | 1340/25/99 | 1456/27/105 | 950/25/101 |
| H20A | 37/8/24 | 155/11/53 | 379/23/80 | 973/31/108 | 932/27/97 | 2046/27/101 |
| FR5DX | 5/4/3 | 165/20/36 | 531/33/91 | 1287/34/126 | 840/29/98 | 1006/27/97 |
| OH,XX/DU1 | 1/1/1 | 92/15/22 | 499/27/59 | 749/34/82 | 1704/34/95 | 1296/27/77 |
| HK1HHX | 4/2/4 | 323/14/36 | 1023/18/70 | 1429/21/95 | 767/21/81 | 883/18/54 |
| P39P | 2/2/2 | 14/5/12 | 488/15/59 | 1093/30/93 | 1205/23/79 | 1412/20/61 |
| 5N0GC | 1/1/1 | 28/11/16 | 126/16/29 | 1311/27/99 | 1221/28/107 | 837/25/87 |
| CE3F | 2/3/3 | 56/17/25 | 311/25/67 | 926/31/90 | 944/28/91 | 988/24/84 |

USA TOP SINGLE OPERATOR, ALL BAND

| Station | 160 | 80 | 40 | 20 | 15 | 10 |
|---------|----------|-----------|-----------|-------------|------------|-----------|
| K1AR | 24/10/15 | 246/23/73 | 194/25/81 | 997/37/146 | 434/24/113 | 87/16/40 |
| K5ZD/1 | 39/13/25 | 245/21/71 | 197/21/70 | 1079/33/132 | 351/24/101 | 105/15/44 |
| N4RJ | 28/11/20 | 111/16/55 | 198/27/76 | 584/28/117 | 663/27/119 | 121/20/49 |
| K3ZO | 14/6/13 | 178/22/69 | 198/26/77 | 808/36/127 | 378/22/100 | 41/10/25 |
| N6BV/1 | 18/4/11 | 295/22/79 | 161/21/75 | 781/25/113 | 304/21/87 | 77/14/33 |
| N6AR/4 | 23/9/18 | 98/18/57 | 166/29/81 | 373/30/112 | 505/28/117 | 135/20/57 |
| N2IC/0 | 23/9/18 | 103/20/47 | 200/29/63 | 825/34/117 | 211/27/69 | 88/15/36 |
| K5MR | 34/9/19 | 84/20/46 | 199/27/65 | 434/33/92 | 613/30/107 | 80/9/30 |
| W9RE | 24/9/16 | 122/20/55 | 143/23/71 | 551/33/115 | 348/25/102 | 98/11/37 |
| N2LT | 25/8/17 | 99/20/60 | 100/24/60 | 523/31/119 | 392/24/109 | 86/16/47 |

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

| | | | | | | |
|-------|-----------|-----------|-------------|-------------|-------------|-------------|
| HC8A | 89/11/20 | 650/23/70 | 977/28/93 | 2072/38/153 | 2582/26/135 | 2109/25/102 |
| VP2E | 156/11/25 | 570/18/54 | 951/25/85 | 201628/93 | 2670/26/113 | 1657/22/82 |
| VP5Y | 72/7/16 | 590/22/78 | 911/24/88 | 1596/31/112 | 2160/30/122 | 694/26/105 |
| IQ4A | 72/9/55 | 161/24/98 | 955/35/128 | 1609/38/153 | 1487/37/170 | 180/31/137 |
| 9G5TL | 7/3/5 | 57/15/24 | 338/22/65 | 2171/36/136 | 1592/32/137 | 983/31/119 |
| 6D2X | 142/9/18 | 700/21/57 | 1394/31/100 | 1989/36/120 | 1696/31/125 | 224/23/76 |

USA MULTI-OPERATOR SINGLE TRANSMITTER

| | | | | | | |
|-------|----------|-----------|------------|-------------|------------|-----------|
| KC1XX | 30/12/23 | 425/23/91 | 215/28/96 | 890/36/159 | 401/25/126 | 89/17/58 |
| K4ISV | 27/12/25 | 153/23/76 | 161/29/97 | 1174/39/153 | 482/29/131 | 87/18/53 |
| N2NU | 38/13/32 | 277/23/81 | 182/30/108 | 964/37/157 | 377/27/126 | 70/18/69 |
| K1NG | 32/13/28 | 198/24/79 | 204/29/100 | 794/37/163 | 305/23/130 | 277/20/75 |
| K5XI | 29/10/20 | 100/22/55 | 255/29/85 | 676/36/145 | 626/32/130 | 120/20/66 |
| N3RS | 27/12/23 | 197/23/81 | 281/28/99 | 727/36/155 | 306/26/133 | 99/18/62 |

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

| | | | | | | |
|-------|-----------|-------------|-------------|-------------|-------------|-------------|
| PJ1B | 401/14/40 | 1528/26/104 | 1989/29/120 | 4477/38/168 | 4012/32/148 | 3220/30/126 |
| J6DX | 422/11/33 | 1325/21/96 | 1811/25/117 | 3999/36/143 | 4278/32/146 | 2188/29/122 |
| EA9UK | 248/9/49 | 727/21/83 | 1556/31/118 | 2883/38/149 | 1287/29/107 | 1760/27/111 |
| V26B | 60/14/50 | 767/18/73 | 1408/20/95 | 2965/27/112 | 3009/29/131 | 2213/26/106 |
| LU4FM | 17/8/12 | 185/17/48 | 518/31/69 | 1994/36/133 | 2730/33/133 | 2499/27/117 |
| ZF2JL | 379/9/28 | 1070/20/70 | 1748/22/65 | 3552/34/132 | 2385/26/107 | 971/25/101 |

USA MULTI-OPERATOR MULTI-TRANSMITTER

| | | | | | | |
|-------|-----------|------------|------------|-------------|------------|-----------|
| W3LPL | 203/17/42 | 754/26/105 | 403/30/114 | 1638/39/175 | 772/28/146 | 472/20/82 |
| N2RM | 61/17/36 | 668/27/102 | 495/29/117 | 1591/37/170 | 917/27/153 | 381/19/70 |
| K3LR | 120/19/40 | 562/25/86 | 476/31/115 | 1238/39/165 | 453/27/126 | 272/18/67 |
| W4MYA | 116/13/31 | 312/24/84 | 432/29/107 | 953/37/162 | 611/28/138 | 203/21/67 |
| KY1H | 311/13/32 | 586/23/77 | 360/27/89 | 1133/37/156 | 375/27/117 | 263/16/58 |
| N4ZC | 22/8/13 | 398/25/92 | 232/31/101 | 623/36/139 | 466/27/122 | 186/19/69 |



LY2BG assisted by his daughter, Milda.



The XF4M team (left to right): RA3AUU, XE1VIC, OH2LVG, UA3AB, XE1ILH, XE1IIR, and NT2X.

of these programs, here is the generic form of what we want—a continuous chronological list of calls you worked on a particular band. Save the file as a DOS (ASCII) file. Label the file properly: HS0AC.20. Every potential top-scoring station **must** submit a computer disk with their log. This means that if you think you were third high in Europe on 40 meters, you must submit a disk. If you fail to send a disk you will receive a letter requesting that you comply with the rule. If you have no computer and did not submit a log created or checked by a computer in

any way, you do not have to submit a disk. What this means is that we are considering countries where computers are not common or available (a shrinking number). Also, this means that a committee member must type your log onto a disk. We do not like to do this. It wastes our time and introduces our typing errors. Almost everyone can find a computer to use for log checking. Disks **must** be accompanied by a paper log satisfying all logging instructions.

When you submit your paper log, please **put the SSB and CW logs in separate envelopes.**

On the summary sheet put the QSO total, point total, and separate your multipliers into total countries and total zones. When you submit your disk, please indicate your call and mode on the disk. **Do not put both SSB and CW on the same disk.** And finally, name your files properly. Use your own callsign plus the extension. For example: 9G5TL.bin, V51T.dat or ZA1A.qdf. To recap: Name the file correctly; don't put SSB and CW on the same disk; don't mail SSB and CW in the same envelope; your paper log should not be continuous, but band-

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| Zone | Call | Score | Zone | Call | Score |
|------|----------|------------|------|-----------|------------|
| 1 | KL7/N7DF | 65,065 | 21 | A71CW | 1,417,232 |
| 2 | VE2TJA | 1,392,960 | 22 | VU2TRI | 586,460 |
| 3 | N7AVK | 1,342,752 | 23 | JT1BR | 6,912 |
| 4 | N2IC/Ø | 1,916,640 | 24 | XX9TZ | 4,049,082 |
| 5 | K1AR | 3,400,317 | 25 | JH4UHW | 1,880,307 |
| 6 | XE1L | 1,245,111 | 26 | XU7VK | 601,506 |
| 7 | V31JU | 1,453,576 | 27 | DU1/OHØXX | 6,043,500 |
| 8 | VP2EJ | 3,358,929 | 28 | YB6INU | 1,094,300 |
| 9 | P4ØE | 15,048,757 | 29 | VK8BE | 2,616 |
| 10 | HC7SK | 705,812 | 30 | VK5GN | 2,066,038 |
| 11 | PYØFM | 3,202,242 | 31 | WR6R/KH6 | 3,832,300 |
| 12 | CE3F | 4,554,992 | 32 | 5W1MM | 2,065,661 |
| 13 | LRØN | 2,197,420 | 33 | EA8AH | 11,400,712 |
| 14 | GW4BLE | 3,677,808 | 34 | No Entry | |
| 15 | S59A | 3,771,714 | 35 | 5NØGC | 4,636,284 |
| 16 | UX6H | 1,931,904 | 36 | D3X | 3,708,666 |
| 17 | UN2O | 1,819,033 | 37 | 7Q7ZZ | 382,000 |
| 18 | UAØWY | 1,311,087 | 38 | ZS94E | 1,663,200 |
| 19 | RAØFU | 923,712 | 39 | FR5DX | 6,576,421 |
| 20 | H2ØA | 7,618,670 | 40 | No Entry | |



The YY3A team (left to right): YV3BKC, YV3FNI, YV3CFE, YV3FNE, YV5MMA/3, and YV3BXH.

by-band. Each band must be kept separately. If you operate on three bands, you must submit three separate band logs. **Do not run the bands all together.**

All entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets. What is a cross-check sheet (dupe sheet)? A dupe sheet is an alphabetical list of calls you worked on a band. You need it for easy reference for QSL cards, for example. If you are not using a computer, you need one to prevent duplicate QSOs. We need it to easily check to see if you worked a particular call. The term "dupe sheet" arose out of the early days of contesting. You asked yourself, "Is the station a dupe?" So of course you looked at your "dupe sheet." The term is confusing. When we said we required a dupe sheet, many stations sent us a list of their dupes! This makes perfect sense, but it was not what we wanted.

Thanks

Congratulations to the newest members of the CQ Contest Hall of Fame: N6AA, N6TJ, S50A, and K1EA.

It's time to thank the guys who checked your logs. These committee members put in a lot of work to make sure that the winners are correct. Thanks to: K1DG, N2AA, W2RQ, KR2Q, N3ED, W3ZZ, W9RE, WA8YVR, KRØY, K6NA, K3EST/6, and W7EJ. Welcome to the following new committee members who also checked your logs: WR3G, K3UA, KZ2S, KR2J, and N6ZZ. Once again thanks to computer guru N6TR for writing the checking program; N6AA, creator of an accurate master data bank and consultant; K3ZO, special consultant; and K1AR, keeper of the certificate and trophy lists. The following DX advisors helped in many ways in committee discussions and provided disks and advice: CT1BOH, JE1CKA, ON6TT, S50A, I2UIY, DL6RAI, OH2KI, OH2MM, G3SXW, UA9BA, SM3SGP, OH2BH, OK2FD, and PY5EG.

Congratulation to all the participants and winners! CU in the next CQ WW.

73, Bob, K3EST

DX QRM

When no propagation on 75 meters towards US, my stateside looking sloper has nothing to do! . . . UA3AGW. The first US stations worked by us was not until Sunday when 10 meters seemed to be up . . . GØNXL. We had a severe shortage of ops! Still we made DXCC on three bands . . . GB2AA. Luckily, the homebrew 4 el Yagi did the job for me, otherwise results would have been below last year . . . VG2DR. Our apologies to those calling on 160 we could hear through the QRM. Ten meters was amazing, 6+ hours of Europe each day . . . J6DX. It was a very good test. I think the best . . . EA3EVR. My first contest. It was super! I still wonder where everybody hides during non-contest season . . . EC5ABY. Single 28 and only 12 US QSOs! . . . EA8AKN.

Incredible cndx on 10 meters. Worked BY, DU, VS6, HSØ, 5R8, and many more . . . EA3CB. We enjoyed the sparks from one of our amplifiers! . . . ED4RCT. Good propagation on 75 meters but my QRP is very small power—Hi . . . UN9LCV. What a big fun after 10 year break. I will be back for a lot of CQ contests . . . F2BF. Murphy stayed with me the whole weekend and wrote a book about antenna problems! It was great to find FR5DX booming in on 20 meters Saturday night . . . XE1/AA6RX. It was a lot of fun looking for countries . . . XE1MD. Great time from KG4 land. Would have loved an amp on 160 . . . KG4JO. A good contest with patchy propagation . . . OZ2ZZZ. Good cndx at day, not very good at night. Nothing from US, but good to Caribbean and SA . . . IN3UG.

Enjoyed working the good mults in the very first contest of my life . . . HAØUZ. Really excited to find the 80 meter dipole erected in gale force wind/rain gave excellent results . . . GW4BVJ/P. Antenna broken by ghosts! . . . LU4MEE. The WW DX is the best contest for me in the World . . . DL9LAI. This year's CQWW was a fun event for the whole club. There still is no one around who takes care of food better than Ron, DL9WIZ . . . DLØMCG. For some of us this CQWW was the first attempt at HF contesting and we thoroughly enjoyed it! . . . DLØTD. First (!) foreign licenses in EX-land . . . EX9HQ. Thanks to CT1BOH for helping me build a station from the ground up. Cndx from South America were superb! . . . P4ØW (Opr. W2GD).

Had to begin almost 20 hrs late due to blackouts, but had a lot of fun anyway . . . YV4DSB. Had lots of fun. Next year will be much better . . . C6AFV. I had to stop after 24 hrs to travel to YJ8 because of a family illness (Hope all is well, Daniel—ed.) . . . FK8FU. I did DXCC in 20 hrs . . . 9A3ZG. I lost sum data from computer. The contest was very good . . . V44NK. First time in contest. Was a great sensation, and I'll be back next year or maybe on WW CW . . . PY2XW. Really disappointing to listen to PJ9U running W's at his sunrise on 40 without listening for DX! . . . VS6BG. Surprising good cndx on 10 and 15 meters. Never more an all band effort without a Yagi on 40 meters! . . . S59A. Really enjoyed low power contesting. My neighbors also—Hi! . . . S57U.

I'm ARS since 1937 and age is 81 . . . CT1QF. It was very fun my first WW, next time I will repeat . . . EA5EKI. With my 83 yrs, I could not follow the whole contest; it was nevertheless great fun . . . DL3ME.

TEAM CONTESTING

- DON'T STAY AT HOME: 41,362,844.** By 8R1K (OH6DO), EA8AH (OH1RY), P4ØE (CT1BOH), OHØMM (OH2MM), ZD8Z (N6TJ).
- YCCC CAPTAINS: 11,776,288.** By K1AR, N6BV/1, K5ZD/1, K1KI, W2SC.
- GEOGRAPHICALLY DISADVANTAGED: 6,397,228.** By N4RJ (KM9P), K4VX (WX3N), N2IC/Ø, WJ2O/VE2.
- THE NORTH-SOUTH CONSORTIUM: 5,525,009.** By AA4S, AB4RU, N2LT, W3BGN.
- TEAM MONOBANDER: 2,966,164.** By GMØECO, K3ZJ/8, IT9BLB, S56A.
- 444 DXERS/FRANKFORD RC: 3,408,102.** By VE2TJA (WB2K), K2SG, AA2U, KD2NT, K2AZ.
- TuPY GANG #01: 1,288,467.** By PY2KP, PY2OU, PY2BW, PT2AW.
- TuPY GANG #02: 1,141,965.** By PY2NY, PY2XW, PY2XB, PY2TI.
- BRITISH COLUMBIA DX CLUB: 1,017,149.** By VE7CC (VG7CC), VE7IN, VE7SZ (VE7NTT), VE7VR.
- BAREFOOT BOYS: 752,517.** By KØEJ, VE6GK, KB1GW.
- TuPY GANG #03: 566,997.** By PY2APQ, PY2OZF, PY2PD, PY2DUN.
- ELETTRA MARCONI: 305,338.** By I5NXD, IK5MEQ, IT9ESZ, IK2QCF, IØKHP.
- EQUIPO DE CONCURSO: 303,659.** By EA1EXU, EA1FBO, EA1EED.

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CQWW is the greatest contest and I enjoyed it very much... JL7PVR/1. Age 79 and hip surgery = limited operation. I still enjoy contesting a lot... VE3ST. As always a thoroughly enjoyable contest! Ten meters been quiet for weeks. The contest livened it up, though!... EA6ZY. The only opening to the states lasted only 90 minutes... OH6NIO. Although I didn't burn the airwaves, I enjoyed the propagation on 10 meters. Two new countries... NH6YK. Oh, God, how much people want my country. The contest is a real experience to work other countries... HR1ERL.

First time in any contest. Really enjoyed it. Look out '95—Hi!... GW0NPL. Contest #1279... OH7NW (Congratulations, Matti—ed.). Cndx were very fine on 10 meters, but QRP is very hard... RV1CC. It was a nice contest, my first time in a contest... CT1DXA. Never thought making 1meg pts. My first CQWW... CT1ENQ. It was very difficult to get QSO with Europe with QRM 20 dB over 9, I will be back... VK3AKK. I'm very glad to have this result. There was so QRM from Eu... TA2DS. Crazy SWR in Pro 67B, failure in tuner switch, alarm clock lost 2nd. Winner is Murphy, not I2CMA!... I2CMA. I was surprised many BY stns in every contest recently... JA2IZA. Halloween brought weird propagation to this island... AH6JR.

Propagation much better on 21 than expected. Will be nice when Eu PX's settle down! As usual lots of fun—a great contest!... VK2ARJ. The contest is a good opportunity to meet new friends, to make people come closer, and to give a word of peace in the world... IK4LZH. I drove a car 8 hours on Friday and arrive at my QTH at Tierra del Fuego at 21Z. I am very weary, but I am happy with my results... XQ8ABF. I decided to see if it is true that you can work 100 DXCC countries in a single contest weekend. On Saturday at 19Z I logged country 101 and started to relax... ZS6IR/PA. Come on cycle 23!... NL7DU. I am oldest call holder in Korea. The KARL celebrated its 40th anniversary last April... HL5AP. Frustrating to hear all the double mults on 75 who couldn't hear me (9K, OK, S5, etc.). I must compliment the JA's for their efficiency in the pile-ups... N6VI/KH6.

By the end of test our three first-time contesters were already planning a MS for the WPX. Maybe "contesters created" should count as multipliers... P20WW. Fantastic aurora on Sat night. Worked all VE prov at 5Z on 10 meters!... VA3SK. It was so hot I couldn't stop sweating. I had to wrap rubber bands around pencils to prevent slipping... PZ5DX. Not bad for two ops collecting social security and a third op catching up fast!... VP5R. Plenty of sigs but few QSOs. Seemed like prop. was not reciprocal... VE9ST. Never heard so much activity. If possible, I'll be there full time next year... PA3DWJ. A lot of fun! Surprised to work so many on 10 meters! It is a pity 160 did not open yet... BY1QH.

I worked NA on all but could not get a single NA on 10 meters!... SV3AQR. Unbelievable aurora both Friday and Saturday nites. Highlight was listening to JJ3YBB op calling CQ to a square dance cadence the last hour... VE6JAV. Managed to work two new countries. This has to be my favorite contest!... VE8KM. I am a brand new ham and this is my first test. It's been very exciting... IK3XZX. Ginger tea water made me duty during this enjoyable contest... YC3SPS. Boy did we miss stateside QSOs! Propagation on 10 meters was great! We thought we were the only ones assembling a station in the rain, so it's nice to see that F6BEE had same situation... EI7M. This was the first DX experience for all three ops. We really had a blast. Only 100 yards from airport runway. When planes took off, we could not hear at all... PJ8Z.

Just hear what CQWW test does to bad conditions!... PA3ELD. I broke dream 100K barrier on 10 meters! I'll never stop trying 10 even if sunspot is zero. Thank you for the best contest ever!... SP5DDJ. XYL said, "You spend 3 months preparing for the contest, 10 months waiting for results, and 48 hours complaining about propagation. Is it worth it?" YOU BETCHA!!... VK3PU.

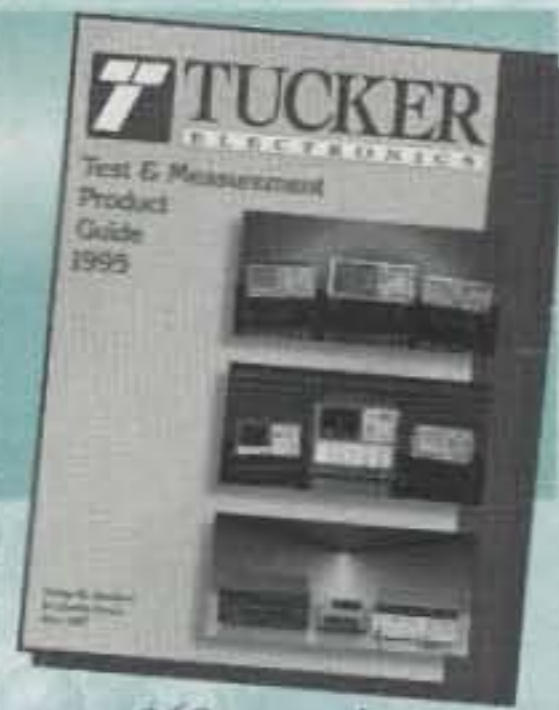
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- 7** QRM SUPPRESSION • Other interference rejection features include Passband Shift (PBS), dual noise blanker, 3-step RF attenuation, IF notch filter, selectable AGC and all-mode squelch.
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- 9** DDS PHASE LOCK LOOP SYSTEM • A single-crystal Direct Digital Synthesis system is utilized for very low phase noise.
- 10** CW FEATURES • Full break-in operation, variable CW pitch. built in electronic keyer up to 60 wpm.
- 11** DUAL VFOs • Two separate VFOs for split-frequency operation. Memory registers store most recent VFO frequency, mode, bandwidth and other important parameters for each band.
- 12** 200 MEMORIES • Memory capacity of 200 channels, each of which store frequency, mode, AGC and bandwidth.
- 13** COMPUTER INTERFACE • Built-in RS-232C interface for advanced computer applications.
- 14** ERGONOMIC LAYOUT • Front panel features easy to read color LCD display and thoughtful placement of controls for ease of operation.
- 15** HEAVY-DUTY POWER SUPPLY • Built-in switching power supply and "silent" cooling system designed for continuous transmission at maximum output.



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CIRCLE 151 ON READER SERVICE CARD

tage . . . N8II. The cndx were so bad that the only thing worse would be pulling your own teeth! Still it was fun . . . K9SD. Happiness is not having your computer bump GMT by an hour morning. Great test as usual! . . . K8GL. Cndx bad on Saturday but came alive on Sunday. I didn't get the Worked All Neighbors award! . . . AB6YL. My first contest. Used my rig more this weekend than the whole time I've been a ham . . . KE3GE. The new 75 meter fixed quad at 110 ft. worked like gangbusters. Because of QRN I worked zero JA on any band! . . . N6BV/1. Never thought I would love contesting. My first and the bug has bitten . . . N4XSE.

Nice European/African opening on 10 was a pleasant surprise; once again a great contest . . . K1NG. My second contest. Getting hooked on contests . . . N2QWR. Contest was loads of fun and great experience for a new ham . . . KB2RAS. Patience is 5 watts, a dipole, and a vertical on 40 meters SSB . . . W8QZA/6. I want to thank the 23 LU's who were 37% of my Saturday QSOs! . . . WB6MZQ. Things looked real good on Friday night. On Saturday cndx were terrible. Even the always loud ZD8Z was barely audible. It picked up on Sunday somewhat. No Europe! . . . KC6X. It was great to hear South America so active—especially the LU's . . . N6IC. Just enough propagation to keep me happy . . . W6OK. Worked my first JA (JH5ZJS), WOW! . . . KB3AGZ.

We came; we saw; we almost heard. Mother Nature 1—rest of us 0 . . . KC7EM. Biggest thrill hearing and wrking BY1QH . . . WA3DMH. Licensed 29 years. This my first contest! . . . WA4JUK. It's tough when one third of your two stack is connected out of phase. Hello Murphy? . . . AA2DU/1. So where was the rest of Europe? Got EA and CT Okay. What a difference a year makes! . . . KJ9C. Saturday was a double wash out—poor cndx and in-laws. Spent some time with in-laws, finally saying, "Hi, ummm, there is a radio contest on now and I, well, gotta go" . . . KB1GW. After 5 sinus surgeries and brain surgery, it's a joy to be able to do a full contest again . . . W9ZRX. This is my first real entry in a contest. I'm 12 years old and in the 7th grade. I wonder how many youngsters are working contests? I'd love to hear from them to swap operating tips! . . . KD6EWT. (Sohrab, if you are on internet you can join <CQ-YOUTH-REQUEST@dumpty.go.jp>—ed.)

This was my first attempt at a CQWW and WOW, was it fun! . . . KD6LLA/2. QRN killed me, big pile-ups but could not pull them through . . . W4PZV (Opr. WA4SVO). Turkey vulture landed on 5-ele 15 meter beam and broke coax fittings on driven ele! So I used a 40 meter dipole on 15 . . . W7CB/6. The solar gods frowned, but I hung in there to the wonderful end! . . . K7ABV. God bless the DX who heard my pitiful signal . . . WS1A. Needed to empty one of the CL-33 traps. It was full of crispy bees! . . . K1JKS. We worked 87 zones, 245 DXCC, 7 TVs, 3 stereos, 1 pacemaker, 14 telephones and 1 baby room monitor! . . . N9VHW. Crummy cndx, but still got plenty of DX with several new countries. Love this contest! . . . WB4OMM. Enjoyed search and pounce DXing for a change. It's been a few years . . . K3WW.

K3's had terrible prop when 1's were running Europe . . . K3ANS. My first ever contest after hamming for 55 years! It was all I expected . . . W7HUY. First contest. Had a great time. Dad (KA8D) and I took turns. Age here is 15 . . . KB8TLF. I was able to hear lots of Europeans who could not hear me. I am now a true believer in one-way skip . . . KA1GTR. I always enjoy this contest, no matter how many contacts I make . . . AJ9K. I fell off my chair when ZD8Z came back after an hour of calling! . . . KE6UP.

STATION OPERATORS Multi-Op Single Transmitter

3Z0KPN: SP3GXU, SP3SFN. **4G2X:** 4F2MD, 4F2IR, DU2RK, DU2BBH, DU2AYL, DU2BAD, DY2BRL. **4U9U:** F50WB, F6EXV, PA3DZN. **5X1HR:** 5Z4DU, 5Z4FO, W5AHC. **5Z4RS:** 5Z4BJ, VE1BLG. **6D2X:** K5TSQ, N5RZ, NA5C, W5VX, W5VZL. **6E2T:** XE2ZZ, XE2CM, XE2SJB, N6AZE, KD6QK, N6KI, W6UQF. **9A5D:** 9A2FK, 9A2TL, 9A3DU, 9A3VM, 9A4CB, 9A4DU, 9A4SG, Gogo. **9G5TL:** AA7NO, KF7AY, WY7K, NZ7E, WA7LW, K5VT. **9K2Z2 & 9K2MU, 9K2WA, 9K2ZC. AA1K/3 & K3WJV, N3FDL. AA4NC & WA5DGX. AA5UO & K5GH. AA8U & K8MJZ, KF8QE, K6BCW, K7BK, N8CC, K8CEK, K8AQM, WX3M, KB8ECG, W8MBB. AK3Z & K2PH. BY4BCN:** N3NGC, others. **BY4RSA:** BZ4RC, BZ4REA, BZ4RBV, BZ4RDA, BZ4RDQ. **BY4SZ:** Zhang Yan Jun, Fu Bin, Wang Xin, Lillua Xing, Chen Qiang, Chen Mei, Hu Qi.

BY5RT: Club. **C56DX:** C53HG, G0KLF, G0MRF, G0OHV, G0ONA, G0RHB, **CT3EE & DL3DXX, DL7UTA. CT5P:** CT1BOP, CT1DIZ, CT1AHU, CT1EGW, CT4NH. **CT8T:** CT1A0Z, CT1CJ, CT1CLR, CT1DWW, CT1ESV. **DF0AT:** DF6ON, DF6OV, DJ8CR, DL9NC. **DF0HQ:** DL1AUZ, DL1DTL, DL30I, DL5ANT, DL5AOM, DL5ATD, DL5AXX. **DF7RX & DK2OY, DK6WL. DK0BP:** DL6CPG, DL5FCV, DL2SEN, DL1SDA. **DK0EE:** DL1MFL, DL4MCF, DL4MDO, DL4MEH. **DK0PR:** DL4XP, DL5XF, DL5XT. **DK0UB:** DL1EFD, DL1EKA, DJ0MW. **DK5EZ & DK4TP, DK8EY, DL4EBA, DL3EBX, DL9JT. DL0DR:** DK7IH, DF1IAO, DK8IP, DF2IX, DL5IAI. **DL0DR:** DL4DRA, LY2DM. **DL0ER:** DF5EM, DL6ECA, DL6EX, DL8EAD. **DL0IU:** DJ3AK, DJ5BA, DL1LBW, DL1OCB, DL2HBX, DL4AAZ. **DL0MCG:** DG2ABP, DG60BX, DH10AH, DL60BX, DL80BC, DL9WIZ. **DL0TD:** DG1SDO, DG2FEF, DG4NAV, DG6IR, DH5IAE, DJ7IK, DL1FDV, DL1FDV, DL2ZBN, DL8AAU, DL80BC.

DL0WW: DF3CB, DJ4LK, DJ5JK, DK2GZ, DK9IP, DL1IAO, DL5IAR. **DL2ARD & DL1APW, DL1JQJ. EA2AM & EA2BSJ, EA2AU, EA2AW, EA2CGA, EA2CDA, EC2AAR, EC2ABU. EA3KU & EA3AJR, EA3AKY, EA3ALV, EA3AQC, EA3CWK, EA3DJL, EA3EJL, EA3FER, EA3GFA. EA3MT & EA3CJ, EA3BDW, EA3FIR, EA3GEI, EA3GFK, EA3GFT, EA3GHB. EA4DAT & EA4AJA, EA4BCR, EA4BHK, EA4BIN, EA4XA, EC4CCE. EA4RCU:** EA4AD, EA4AV, EA4BD, EA4BPJ, EA4BT, EA4COT. **EA5CA & EA5AN, EA5AT, EA5OB, EA5SW. EA5DCL & EA5VN. EA5RKV:** EA5EER, EA5EYW, EA5FID, EA5GRB, EA5SM. **EA5ZI & EA5GKE. EA6ARM:** EA6MS, EA6MQ, EA6KZ, EA6YP, EA6ACZ. **EA8RG & DL1YAW, DL4YBM, DL1YDI, DF8XC, EA8APP. EA90B & EA5BY, EA3GBU, EA3NY. ED1WWE:** EA1CJJ, EA1FCS, EA1FCR, EA1EZX, EA1FDI, EA1FAV, EA1FFH, EC1CFQ, EA1CMF, EA1EPB.

ED5WDS: EA5SJ, EA5WX, EA5EVC, EA5FYT. **EI7M:** Club. **EW1WC:** EU4-002, EU4-411, EW1YN. **EX0HQ:** DF8WS, DL4MFM. **F5KZ:** F5PXQ, F5PYQ, F10XX, David. **F5KSE:** Club. **F6KCS:** F5JCB, F5PRH. **F6KLO:** F6CQU, FA1IPH. **FJ5AB & F6GOX, FS4PL, K2IBW, K2MME, N2HIG, AA2SZ. G3FJE & G4L00, G1JKF, G0BVV, G8ATD, G4VXT, G4YRF, G3EUS, G4OXD. GB2AA:** G3GAF, G3UHU, G4TNB. **GM4DMZ:** GM3WJ, GM4YX, GM4TX, GM4FF. **GS0AEE/P:** GM4NNC, GM4TJ, GM0AVB, GM0RJK, GM7LOR, GM7POK, GM1ZJ. **GU3HFN:** GU4WRP, GU0SUP, GU6RW, GU4YBW, GU4EON, GU6EFB, GU0ELF. **GW8GT:** GW3KYA, GW0MAW, GW3NWS, GW6ZUQ, G4IFB, G4VXE, G3SUH. **GX0FUN:** G4WJS, G4VWX, G4TYZ, G0BON. **HA1KRR:** HA1DRR, HA1ZN, HA1ZZ, HA1XU, HA1XU, HA1DC. **HB9CC:** HB9AUT, HB9BCK, HB9BFH, HB9CJX, HB9KOG. **HB9H:** HB9CIP, HB9CXZ, HB9DDO, HB9DGX, HB9CAT, HB9BLQ, HB9FAP, HB9SUL, HB9STL, HB9SFD.

HC8A: HC1OT, K6QOM, N6KT, W6QHS, WN4KKK. **H65M:** HASMY, HA5WA, HA5EH, HA5OF, HA5BCC, HA5BVD. **H66Y:** HA6DX, HA6OB, HA6OI, HA6OO, HA5BSW, HA7PO. **HL80:** Club. **HP1XVH & DL8SEP:** HP1DTR. **HV4NAC:** IK0FVC, I0JBL. **HZ1HZ & W9QQ. I2ZZZ & I2MWH, IK2DUU, IK2OWX, IK2PTR, IK2UEC, IK2VDS, IK2XZD, IK4MED, IW4BW, IW2DOF, IW2JOS. I3VFJ:** I3QKQ, I3KCSX, IK3DVX, IW3FT. **I12I:** IK2L0L, I2PUG, IK2MLY, IK2HKL. **I4M:** I4GVZ, I4MES, I4HLQ, I4FAQ, I4LAI, I4CFV. **I17I:** IK7RW, IK7JR, IK7YCE, IK7EES. **IK2UCK & IK2BUI, IK2SGF, IK2SNI, IW2HFO. I05A:** I5NSR, I5OYY, I5NXH, I5JHW, I5KFW, I5SNW, I5KMS, I5PWC, I5SEK. **I04A:** I4VEQ, I4IND, I4LCK, I4TJE, I4IKW, I4PVP, I4EAT, I4AVG, I4DCT, I4QJH, I4EWH, I4XQH, I4CZF, I4NCJ, I4ANU. **I04T:** I4HVR, I4SXJ, I4JEK, I4FAL, I4MNY, I4IFL, I4EFW, I4MXW, I4DCT, I4DLA.

I09K: IT9KWF, IT9JOF, IT9EWG, IT9THD. **IR1A:** IK1PG, IK1QFM, IK1HSR, IK1HXN, IK1TZO, IK1VDN, IW1DGL. **IR2W:** IK2EGL, IK2OHG, IK2PZC, UA3DPX, I2EOW, I2VXJ. **IT9EQO & IT9NJE, IT9CHU, IT9LFR, IT9QOP, IT9ZEO, IT9EQO, IT9PKO. IU2D:** IK2EKY, IK2IKT, IK2FEO, I2TZK, IK2GAU, IK2DPR, IK2QOB, IK2MMF, K2ILH, IK2RJK. **IU2X:** IK2GSN, IK2GZU, IK2WAD, IK2SAU, IK2SGO, IK2GXX, IK2FYH, IK2BCP, I2CZQ, IW2JWG, SWL Severino. **IU3X:** IV3JVJ, IV3SCR, IV3NTA. **IU4U:** I4AUM, I4FYF, I4GAD, I4GAS. **J0BYAK:** JK2PVL, JF0TJU, JE0ETP, JR9QDC, 7M1FQD, JH0USD, JI7TDR, JF1USQ, 7M2UKR, Satoh, Kozawa. **JA1ZEQ:** JL2TYH, 7N2FCZ. **JA3YBF:** JL1PEI, JF3HXJ, JG3JHI, JJ3BDG, JJ3FOW, JA9TOZ. **JA6YCL:** JF4CZL, J6JWJ, J6MYW, J6K00. **JA7YFB:** JM1HBO, JL20GZ, JF5LOE, JG7TVQ, JK7GD, JH9XZG, JI0GWQ, Nobutaka. **JA8YBY:** J01DFG, JP10QY, JR8GOU, JR8WJS, JI8UCI, JI8CKS, JE9KVQ.

JA9YAA: JG2KKG, JN2QCV, JA9GAD, JH9KVF. **JA9YBA:** JR0ELG, JF0EGG, JR9QNJ, JE9RPC, Nada. **JE6ZIH:** JR6GK, JF6DEA, JI6BRB, JI6QEA, JG4KEZ. **JG2ZQZ:** JA2BY, JA2AXB, JA2BIV, JA2JF, JA2NDQ, JH2MYN, JE2HCJ, JG2TSL, JI2KAR, JQ2B8C. **JM1YCN:** JL1SIF, JM1UWB, JP1AEO, 7K1EWD, 7L1DQK, 7L1ETO, 7M1WGZ, 7N1WY, JS2XHN, Ishii. **JR7YCM:** JH7NPF, JR7JPC, JR7WFC, JR7WQR, JF7KMW. **K0PP/7 & KE7X, N7NG, W7LR, W7SE. K1CLN & KB1XQ. K1GW & K1HI. K1NG & K1G, WF1B, WA1G, WA1ML, KD1NG, NB1U. K1TWF & W01N. K2OWE & N2NRD. K2OY & KD4DR. K2TR & K2XZ, K2WR, K2ONP, NJ1F, WA4VAD. K3CP & KU3K, KU3X. K3DI & WD4IEH. K3ZNV & W03A. K4ISV & KB4HU, K4UVH, WB4FLB, WA4QOV, N1GL, KQ4DO. K5XJ & K5RC, WSASP, K5GA, NSRP, K5YVT. **K8AZ & K8NZ, WT8C, NX8R, K8BL, W8KIC, W9OCF, KD8TA, N8LXS, N8ATR.****

K8DXF & N1QPO, KB8RSA, WZ8T. K8PYD & Others. K9UWA & KR9U, KR9V, KC9LA, K9LA, N9ZH. KB1H & K21M, AA1CE, K1DW, KA1ZNZ, WA1HYN, WB1AIU. KB5RUG & KA5QWN, KC5JPU, KC0EI & KB0ISS, KB0VB, K0VXU, KE5BR, WK0G. KC1SS & AA1GC. KC1XX & AD1C, KM3T, K1EA, WA6OTU, KD1EA. KD4YAR & KD4HX. KD6LLA/2 & N2WSY. KF2ET & KE2NL, KD2RD. KF8Y & KB8AUX, K8BIOD, KE8W. KG4JO: WI2T, N4NOZ. KG6AR & KF6TC, WB9UXR. KL7/NO7F & KL7EI. KQ4HC & KQ4EW. KQ4ZP & KQ4JQA, KM6DH. KS9K & K9GS, NB9C, WE9V, WB9TY, W9XT, WW1M. **KS9K & K9GS, NB9C, WE9V, WB9TY, W9XT, WW1M. L4D: LU1EYW, LU7DP, LU5EWD, LU4DFH, LU4EQP, LW2DSD, LW2EY, LW1EQG, LW5EJ, LW4EJ, LW5DQA. **L4DX:** LU5DU, LU8EYE, LW1DQK, LW1EXU, LW2ELR, LW3EUQ, LW7EIC, LW9EVF, Bernardino, Gabriel, Dalmiro.**

L5P: LU7PAK, LU1PAU, LU1PIT, LU1PHC, LU7PBT. **LA1K:** LA2VJA, LA3JA, LA4OFA, LA5GIA, LA6MGA, LA7HIA, LA9NGA, LA9RGA, LA9DIA, LA9QIA. **LA4C:** Club. **LP4H:** LU1HM, LU1HOO, LU3HJU, LU3HIP. **LT1H:** LU1HLH, LU8HSO, LU6PH. **LU1VV & LU1VK, LU2VD, LU4VZ, LU5VC, LU6DH, LU7VCH, LU7DID, LU8VCC, LU9VY. LU4AA:** LU2D8G, LU4AHV, LU6BEG, LU7AQX, LU8AQE, LU8AQX, LU9AQD, LW5EUH. **LU6FAZ & LU1FNH, LU7FEU, LU7FJD, LU9FHF. LV0A:** LU1ARL, LU2AQQ, LU2DKT, LU7DW, LU8EWD. **LX/DL4VBS/p & DF1VH. LX4B:** LX1TI, LX1RA, LX1KQ. **LY1BXB:** LY10Q, LY2BOS, LY3BHY, LY-R-1289. **LY3MR:** LY2BKF, LY-R-1220, LY2B8F, LY3NFW, LY1FFI. **LZ1KNP:** LZ2SF, LZ1N-143. **LZ5Z:** LZ3DU, Emil, Vetc. **LZ9A:** LZ1JY, LZ1UK, LZ2CC, LZ2CD, LZ2DF, LZ2HE, LZ2II, LZ2JE, LZ2PO, LZ2PT, LZ2TT, LZ2UJ, LZ2WM, LZ3SM, Ilyu, Vasko.

N1AU & KC1F. N1HRA & K1GOX, N1RUF, KA1VMG, N1PUW, N1SXL, N2MM & WB2R, WN3K, AA2NS, KE3GA. N2NU & K2WI, N24K, WW2Y. N2SS & K3GYS, W2GMA, N3C. N3GKY/DU2 & KQ4TS/DU2, KQ4LKY/DU2. N3RS & N3RD, KY2T, N3NA. N5HRG & K9MK. N5OLS & AA5BL. N6AW & KJ6GC, K7JYE, W6HT. N6NG & K6AUC, K6ILG. N7UJJ & KC7EFP, KC7CER. N8ATR & WB8K, W8XD, WA8BIN, N8DMM. N9VHW & W09F,

Pocket Morse Code Trainer

Learn Code Faster & Easier
Better than code tapes
Take it anywhere to practice
Ideal for beginners to advance
Light weight & compact

The Standard Pocket Morse Code Trainer

- * Selectable code rates from 3 wpm to 31 wpm
- * Plays standard or Farnsworth
- * Size 1" x 3.8" x 2.4"
- * Runs 40 hrs on one 9 volt battery



- 1) Plays continuous fresh random code (Selectable letter groups, ie A-Z, 0-9, & more)
- 2) Random code practice test (Check your answers against the answer key)
- 3) Interactive training (Excellent for beginners to help learn the code)

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In addition to the same features as The Standard Pocket Morse Code Trainer, the deluxe has three additional modes of operations

- 4) Continuous newly generated QSO (The QSOs are similar to the General exam)
- 5) Practices Code exams just like the real code exam. (Include answer key to check accuracy)
- 6) Continuous random words (randomly plays different words)

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It has all the above features plus a LCD display which shows the characters that are playing, an internal amplified speaker, a stereo head set & a mono ear piece.

The ultimate & deluxe pocket morse code trainer has more power than most PC morse code software programs, yet can still fit in your shirt pocket

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TOP SCORES

WORLD

SINGLE OPERATOR HIGH POWER All Band

| | |
|-----------|------------|
| P40E | 15,048,757 |
| EA8AH | 11,400,712 |
| 8R1K | 8,169,408 |
| H20A | 7,618,670 |
| FR5DX | 6,576,421 |
| DU1/OH0XX | 6,043,500 |
| HK1HHX | 5,694,080 |
| P39P | 4,829,243 |
| 5N0GC | 4,636,284 |
| CE3F | 4,554,992 |

28 MHz

| | |
|--------|-----------|
| PQ0MM | 1,586,288 |
| LU6ETB | 1,537,008 |
| XR3A | 825,110 |
| HC7SK | 705,812 |
| LU9MBY | 687,939 |
| ZV5A | 613,664 |

21 MHz

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|------------|-----------|
| ZD8Z | 3,481,925 |
| PZ5DX | 1,031,316 |
| KH6/WB6OKK | 810,662 |
| IQ4C | 808,288 |
| YZ1AU | 802,692 |
| ZP6XR | 798,966 |

14 MHz

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|-------|-----------|
| PY0FM | 3,202,242 |
| KP2A | 2,255,250 |
| CT3DL | 1,894,165 |
| V26AS | 1,589,650 |
| YW1A | 1,498,500 |
| P43A | 1,341,920 |

7 MHz

| | |
|--------|-----------|
| PJ9U | 1,120,995 |
| TI1C | 1,108,140 |
| 9M8R | 1,077,440 |
| S50A | 680,732 |
| HG1S | 502,128 |
| XQ8ABF | 482,400 |

3.7 MHz

| | |
|------------|---------|
| VP2EC | 478,674 |
| IG9/IV3TAN | 320,235 |
| YW5P | 247,835 |
| 9A1CRT | 205,308 |
| FS/KH8AL | 200,788 |
| UN2L | 189,699 |

1.8 MHz

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|--------|--------|
| IR4T | 67,811 |
| PA3DFT | 64,296 |
| F6EZV | 61,460 |

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|----------|--------|
| LY1DR | 56,644 |
| DL/JA2FJ | 44,870 |
| S52CD | 41,160 |

LOW POWER All Band

| | |
|------------|-----------|
| NP4Z | 4,907,448 |
| D3X | 3,708,666 |
| FM5DN | 3,404,064 |
| VP2EJ | 3,358,929 |
| LR0N | 2,197,420 |
| EA7CEZ | 2,121,693 |
| 9X5/VE3MJQ | 2,099,791 |
| 5U7Y | 1,595,713 |
| LU8ADX | 1,574,280 |
| V31JU | 1,453,576 |

28 MHz

| | |
|--------|---------|
| LU3MAM | 608,125 |
| 4X1VF | 595,500 |
| EA8AKN | 557,091 |
| LW2DBM | 542,340 |
| EA8IN | 489,818 |
| LU4FCZ | 463,478 |

21 MHz

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|--------|---------|
| EA8CAL | 464,942 |
|--------|---------|

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|--------|---------|
| UA4LCQ | 420,444 |
| ZP5XYE | 400,520 |
| YC3SPS | 372,240 |
| II6I | 355,586 |
| 9A5Y | 331,584 |

14 MHz

| | |
|--------|-----------|
| 5L2PP | 1,989,144 |
| PP5JD | 692,335 |
| XE3RKK | 441,378 |
| L20U | 424,190 |
| YV4DSB | 415,811 |
| S58FA | 402,936 |

7 MHz

| | |
|-------|---------|
| CT3BD | 222,360 |
| T99W | 104,784 |
| RW9AB | 90,712 |
| RA3WA | 65,751 |
| UT0U | 61,410 |
| S51QZ | 47,488 |

3.7 MHz

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|-------|--------|
| CM3ZD | 91,212 |
| T94NE | 84,372 |
| IQ5Q | 60,716 |
| S51NM | 55,692 |

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|--------|--------|
| OK1FPS | 47,982 |
| LZ1DM | 46,020 |

1.8 MHz

| | |
|--------|--------|
| HA8EK | 36,780 |
| OZ3SK | 28,334 |
| DF9LJ | 12,818 |
| UR7CA | 11,070 |
| SP5CJQ | 9,810 |
| DL5MFL | 8,096 |

QRP All Band

| | |
|--------|---------|
| NP2Q | 733,164 |
| EA3AX | 247,280 |
| AA2U | 186,826 |
| YU70KN | 154,971 |
| EA1GT | 152,656 |
| OK1DKS | 147,800 |
| N1AFC | 121,800 |
| N4PYD | 117,300 |
| YU1LM | 114,924 |
| EA6SK | 114,075 |

ASSISTED All Band

| | |
|------|------------|
| P40W | 11,224,877 |
| TM2V | 2,969,375 |

| | |
|--------|-----------|
| IR8A | 2,731,908 |
| OM5A | 1,966,860 |
| N3AD | 1,915,305 |
| ZS94F | 1,890,350 |
| K5NA/2 | 1,879,548 |
| SM3JLA | 1,873,400 |
| DL6ET | 1,825,084 |
| K3WW | 1,818,000 |

MULTI-OPERATOR SINGLE TRANSMITTER

| | |
|-------|------------|
| HC8A | 17,946,512 |
| VP2E | 11,284,488 |
| IQ4A | 9,589,200 |
| VP5Y | 9,455,605 |
| 9G5TL | 9,438,750 |
| 6D2X | 8,625,804 |

MULTI-OPERATOR MULTI-TRANSMITTER

| | |
|-------|------------|
| PJ1B | 40,278,000 |
| J6DX | 29,076,783 |
| EA9UK | 19,422,748 |
| V26B | 17,925,972 |
| LU4FM | 15,128,576 |
| ZF2JI | 14,341,716 |

EUROPE

SINGLE OPERATOR HIGH POWER All Band

| | |
|--------|-----------|
| S59A | 3,771,714 |
| GW4BLE | 3,677,808 |
| OH0MM | 3,262,042 |
| S53EA | 3,244,956 |
| DJ4PT | 2,812,117 |
| YU7AV | 2,747,305 |
| EA4KD | 2,641,353 |
| GI0KOW | 2,302,140 |
| F6FGZ | 2,231,000 |
| OH5NQ | 2,156,400 |

28 MHz

| | |
|--------|---------|
| II4A | 235,790 |
| S51AY | 228,161 |
| I8RIZ | 222,456 |
| YU1CV | 193,408 |
| Z32JA | 133,630 |
| SP5DDJ | 111,792 |

21 MHz

| | |
|-------|---------|
| IQ4C | 808,288 |
| YZ1AU | 802,692 |
| S50K | 785,312 |
| TM5G | 715,644 |

| | |
|-------|---------|
| YT9C | 674,560 |
| S58AB | 644,004 |

14 MHz

| | |
|--------|-----------|
| IT9BLB | 1,339,083 |
| 9A7A | 1,148,928 |
| S53M | 955,098 |
| 9A1A | 850,332 |
| EA5GRC | 811,944 |
| SP6YAS | 810,414 |

7 MHz

| | |
|-------|---------|
| S50A | 680,732 |
| HG1S | 502,128 |
| S57AL | 461,332 |
| YT7A | 413,316 |
| S59WA | 412,432 |
| OM5M | 294,372 |

3.7 MHz

| | |
|--------|---------|
| 9A1CRT | 205,308 |
| OM3KII | 175,716 |
| G3NLY | 164,372 |
| S57O | 153,545 |
| EM0F | 146,202 |
| S50C | 141,800 |

| | |
|----------|--------|
| IR4T | 67,811 |
| PA3DFT | 64,296 |
| F6EZV | 61,460 |
| LY1DR | 56,644 |
| DL/JA2FJ | 44,870 |
| S52CD | 41,160 |

LOW POWER All Band

| | |
|--------|-----------|
| EA7CEZ | 2,121,693 |
| EA1FBU | 1,081,262 |
| CT1ENQ | 1,054,578 |
| EA3GHQ | 1,011,275 |
| LX1KC | 1,011,275 |
| EA6ZZ | 997,787 |
| S59ZA | 935,406 |
| EA3BOX | 831,096 |
| S56A | 750,469 |
| EA3AI | 679,328 |

28 MHz

| | |
|--------|---------|
| OM5FA | 234,465 |
| S50R | 214,491 |
| HA0UZ | 191,400 |
| EA7FTR | 129,428 |
| CT1ERK | 96,516 |
| LZ2RS | 95,238 |

| | |
|--------|---------|
| UA4LCQ | 420,444 |
| II6I | 355,586 |
| 9A5Y | 331,584 |
| GI4SNA | 305,383 |
| S51QA | 271,627 |
| S57J | 233,616 |

14 MHz

| | |
|--------|---------|
| S58FA | 402,936 |
| GI0UJG | 348,588 |
| S52OT | 269,080 |
| UR4LUG | 208,240 |
| RN3QO | 195,849 |
| S57U | 187,330 |

7 MHz

| | |
|--------|---------|
| T99W | 104,784 |
| RA3WA | 65,751 |
| UT0U | 61,410 |
| S51QZ | 47,488 |
| IK5WWF | 44,897 |
| F5BEG | 38,016 |

3.7 MHz

| | |
|-------|--------|
| T94NE | 84,372 |
| IQ5Q | 60,716 |
| S51NM | 55,692 |

| | |
|--------|--------|
| OK1FPS | 47,982 |
| LZ1DM | 46,020 |
| UR7TZ | 34,980 |

1.8 MHz

| | |
|--------|--------|
| HA8EK | 36,780 |
| OZ3SK | 28,334 |
| DF9LJ | 12,818 |
| UR7CA | 11,070 |
| SP5CJQ | 9,810 |
| DL5MFL | 8,096 |

QRP All Band

| | |
|--------|---------|
| EA3AX | 247,280 |
| YU70KN | 154,971 |
| EA1GT | 152,656 |
| OK1DKS | 147,800 |
| YU1LM | 114,924 |
| EA6SK | 114,075 |
| SP8EEX | 111,800 |
| OH5NHI | 106,106 |
| UT1WA | 96,426 |
| UR3MP | 74,104 |

ASSISTED All Band

| | |
|------|-----------|
| TM2V | 2,969,375 |
|------|-----------|

| | |
|--------|-----------|
| IR8A | 2,731,908 |
| OM5A | 1,966,860 |
| SM3JLA | 1,873,400 |
| DL6ET | 1,825,084 |
| DJ2YA | 1,792,464 |
| DL3KDV | 1,751,520 |
| OH6WZ | 1,536,712 |
| OH1AA | 1,467,975 |
| EA3BT | 1,167,234 |

MULTI-OPERATOR SINGLE TRANSMITTER

| | |
|-------|-----------|
| IQ4A | 9,589,200 |
| CT5P | 7,454,250 |
| OT4T | 7,408,370 |
| TK5EL | 6,981,478 |
| LZ9A | 6,965,805 |
| TM1C | 6,620,096 |

MULTI-OPERATOR MULTI-TRANSMITTER

| | |
|--------|------------|
| EM2I | 11,631,675 |
| G0KPW | 11,128,343 |
| HG73DX | 10,594,944 |
| UU5J | 9,979,003 |
| OT4A | 9,378,342 |
| IR3R | 9,128,847 |

USA

All Band

| | |
|--------|-----------|
| K1AR | 3,400,317 |
| K5ZD/1 | 3,254,700 |
| N4RJ | 2,671,885 |
| K3ZO | 2,397,434 |
| N6BV/1 | 2,216,445 |
| N6AR/4 | 2,016,000 |
| N2IC/0 | 1,916,640 |
| K5MR | 1,865,210 |
| W9RE | 1,819,323 |
| N2LT | 1,809,370 |

28 MHz

| | |
|--------|--------|
| KE5FI | 97,300 |
| KC2X/4 | 83,167 |
| N4BP | 66,833 |
| W4YV | 60,120 |
| K9LA | 25,288 |
| KC4YM | 21,808 |

21 MHz

| | |
|--------|---------|
| K4JPD | 368,596 |
| N4CT | 211,133 |
| K3ZJ/8 | 193,732 |
| WA2QNW | 100,793 |
| K8OQL | 98,651 |
| WB5UDX | 87,136 |

| | |
|--------|---------|
| KM1H | 866,598 |
| K2ZJ | 379,674 |
| W5WMMU | 312,417 |
| K9JF/7 | 303,167 |
| K6HNZ | 292,446 |
| K8GL | 239,316 |

7 MHz

| | |
|-------|---------|
| K6NA | 233,105 |
| KC7EM | 187,758 |
| N6RO | 150,876 |
| W3GH | 147,015 |
| K9RN | 145,676 |
| KV0Q | 142,177 |

3.7 MHz

| | |
|--------|---------|
| W6RJ | 184,926 |
| WE3C | 122,087 |
| KO1F | 111,090 |
| W9LT/8 | 98,882 |
| W4PZV | 75,319 |
| WA4CTA | 62,500 |

1.8 MHz

| | |
|--------|--------|
| K1ZM/2 | 13,970 |
|--------|--------|

| | |
|-------|-------|
| W2VO | 5,160 |
| N7DD | 4,407 |
| W2FCR | 3,159 |
| K0CS | 2,820 |
| WT8N | 2,304 |

LOW POWER All Band

| | |
|---------|---------|
| K2SG | 921,714 |
| KD2NT | 523,450 |
| AA4GA | 508,014 |
| K7GM/4 | 495,216 |
| K0EJ/4 | 486,304 |
| KQ3V | 459,680 |
| WS1A | 414,990 |
| N6WLV/8 | 399,336 |
| KR4GJ | 395,568 |
| K2AZ | 383,152 |

28 MHz

| | |
|----------|--------|
| KD4LAN | 57,288 |
| KC3PZ | 38,718 |
| K9LA | 25,288 |
| N5OKR/3 | 22,814 |
| WB2BZR/3 | 20,069 |

| | |
|--------|---------|
| KO9Y | 100,894 |
| NI5M | 99,876 |
| AA5ZQ | 56,240 |
| NW7Q/0 | 48,960 |
| KE2WE | |

N4PC comes up with another winning wire antenna. All you need besides a few components are a couple of tall trees.

The H Double-Bay Antenna

BY PAUL CARR*, N4PC

“What in the world is that?” my neighbor asked. I smiled. “It’s my new 17 meter antenna,” I replied. “I’ve never seen anything like that before. Will it work?” he questioned. “Well, the computer program says that it will, and that program has never lied to me before. I’ll let you know by sundown.” He left shaking his head. Did it work? You bet it did, and here is how you can build one.

Design Philosophy

This antenna design is in response to calls I have received over the years. A common request is for a short antenna that will produce gain. I have been a fan of closed-loop antennas for many years, and I also know that two wavelengths of wire will produce gain if they are placed in the right configuration. I also wanted a horizontally polarized and 50 ohm feedpoint impedance. Could all these requirements be designed into a single antenna? Well, it was time for a computer study.

If we look at a folded dipole and examine the impedances at various points, we will find that the impedance varies from almost zero ohms at the narrow end to about 300 ohms if it is fed as a conventional folded dipole. If the folded dipole is reconfigured into a square, the impedance is about 125 ohms. (The single quad loop is an example of this.) Somewhere between these two extremes is a 50-ohm impedance.

I tried a rectangular configuration with the short side on the bottom. I found when the rectangle was twice as tall as it was wide, the feedpoint impedance was about 50 ohms. The computer program also showed about 1.8 dBd of free-space gain in this configuration. The next thing to do was to increase the gain and maintain the 50 ohm feedpoint impedance.

The solution was simple. I placed a second full-wave loop on top of the existing loop. It was necessary for the loops to share a common horizontal side in the center of the rectangle to maintain a proper phase relationship for the current. It was also necessary to decrease the length of the horizontal wires and increase the length of the vertical wires. When the final configuration was determined, the feedpoint impedance was about 50 ohms and the predicted free-space gain was about 4 dBd.

Predicted Results

I modeled the antenna with the top wire at 60 feet. The predicted pattern was the familiar figure 8 that we expect from a bi-directional

*97 West Point Rd., Jacksonville, FL 36265

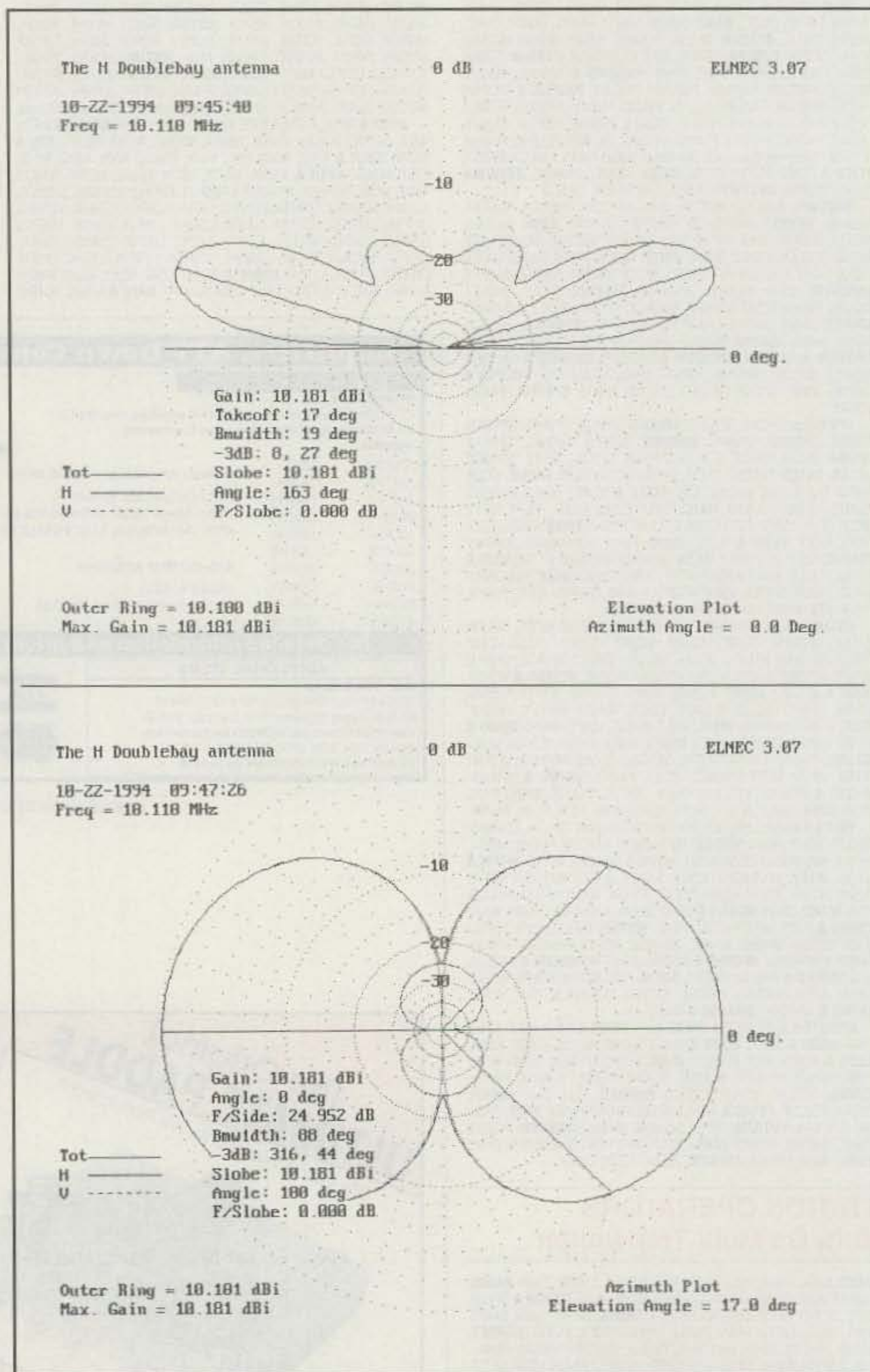


Fig. 1- (A) The vertical pattern for the H Double-Bay antenna. Notice that most of the energy stays low. (B) The horizontal pattern resembles the familiar figure-8.

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Plus 17 & 12

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20-15-10, plus 17-12

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(2el 80/75 & 2el 40, 38' radius)
80/75, 40 fun even w/ low power
C-3 @ 53'
(N6BT, city lot)

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- ◆ The C-3 has deep side nulls and a fine pattern; F/B 14-18 dB; fed with a single 50 ohm coax; 19.8' turning radius.
- ◆ The element-to-boom brackets are pre-aligned on the boom, so every element is straight and will not move.
- ◆ The C-4 maintains the same turning radius, weighs about 40 pounds, with separate feedline so that the C-3 remains intact.
- ◆ Force 12 has more than 60 HF antennas from 3 el 80/75 mtr yagis to 6 mtr beams. The **MAGNUM 2 / 2** shown above is a 2el 80/75 and 2el 40 mtr on a single boom with two feedlines. The **MAGNUM 2 / 2** uses EF-180B (66.5') elements on 80/75 and EF-140 (44.5') elements on 40. At about 14 sqft, the **MAGNUM 2 / 2** is the answer to gain on both bands. Other 80/40 available.
- ◆ Force 12 now offers magnetic transmitting / receiving loops for 40 and 80/75, perfect for limited space and NVIS use: the **MTR-66** (6'x6') and the **MTR-618** (6'x18'), both made with 2" tubing. These mount vertically on the ground, deck, balcony, etc.
- ◆ Force 12 has verticals for 40, 80/75 and 160 mtrs. Add to this the several 20-40 yagis, the 40-30-20 yagi and multiple band antennas like the 5BA (20-10) and the 4BA (17-10). Force 12 offers a pair of 50 ohm 1:1 baluns; fully tested and vacuum impregnated for reliability. The B-1 is rated at 3KW and the B-1/C commercial version with N-connector, rated at 25KW.

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antenna (see fig. 1). At this height the vertical take-off angle is 17 degrees. It is also interesting to note that there is very little energy in the overhead component. The signal is pushed toward the horizon where it will do the most good.

Construction

Following are the details of construction should you decide to build your own.

Begin construction by cutting three pieces of pressure-treated wood into strips $3/4" \times 1-1/2" \times 6'6"$ (see fig. 2). These pieces of wood provide the necessary support for the horizontal wires (l). Next drill holes 2 inches from each end of the strips. This determines the final length of the horizontal wires, which is 6 ft. 2 in. The length of the horizontal wires ensures the feedpoint impedance is 50 ohms (fig. 2).

Now cut a single piece of wire to a length of 94 ft. This provides enough wire for the perimeter of the rectangle plus sufficient surplus length for final SWR adjustment. Fold the wire in half to locate the center of the wire. This allows you to locate the center of the wire in the center of the top horizontal spreader. Route the free ends of the wire through the pre-drilled holes in the horizontal spreaders. Align the center of the wire on the center of the top horizontal spreader and secure the wire to the spreader with tape or nylon cable ties so that it will stay in place during the remainder of the construction process.

Place the antenna on the ground and secure the top spreader by placing a couple of screwdrivers in the ground to act as stops so you can stretch the wire taut. Move the bottom spreader along the wire until the top wire and

the bottom wire of the rectangle are spaced 40 ft. 4 in. apart. This measurement is for 12-gauge bare wire, and if you are using something different, your final measurements will vary slightly. Again, I have included enough surplus wire for any necessary final adjustments. Secure the wire to the bottom spreader as you did to the top spreader. Check to see that the horizontal wires and the vertical wires are perpendicular by measuring the diagonals of the rectangle. If the diagonals are not equal, make the necessary adjustments.

Next measure down 20 ft. 2 in. on each vertical wire. This locates the attachment point for the center horizontal wire. Cut a length of wire 6 ft. 4 in. Position the middle wooden spreader so that it will be above the middle horizontal wire when the antenna is in final position. Solder the wire to the center of each vertical wire. The final horizontal length should be 6 ft. 2 in. Move the wooden spreader so that it will rest on top of the wire when the antenna is in its final position. Route the bottom horizontal wires toward the center of the bottom spreader and tape them in position for subsequent feedline attachment.

In my case I supported my antenna with a rope bridge attached to the top spreader. I used a single loop in the bridge so the antenna could pivot about that point. This allows me to rotate the antenna (more about this later). I attached the bridge to the center of a rope and routed the ends of the rope over two convenient tree branches. I raised the antenna until it was a convenient height to reach from a step-ladder. I made the final adjustments by using an MFJ 259 SWR Analyzer. If you do not have such a piece of test equipment, attach a feedline and use your station equipment for final adjust-

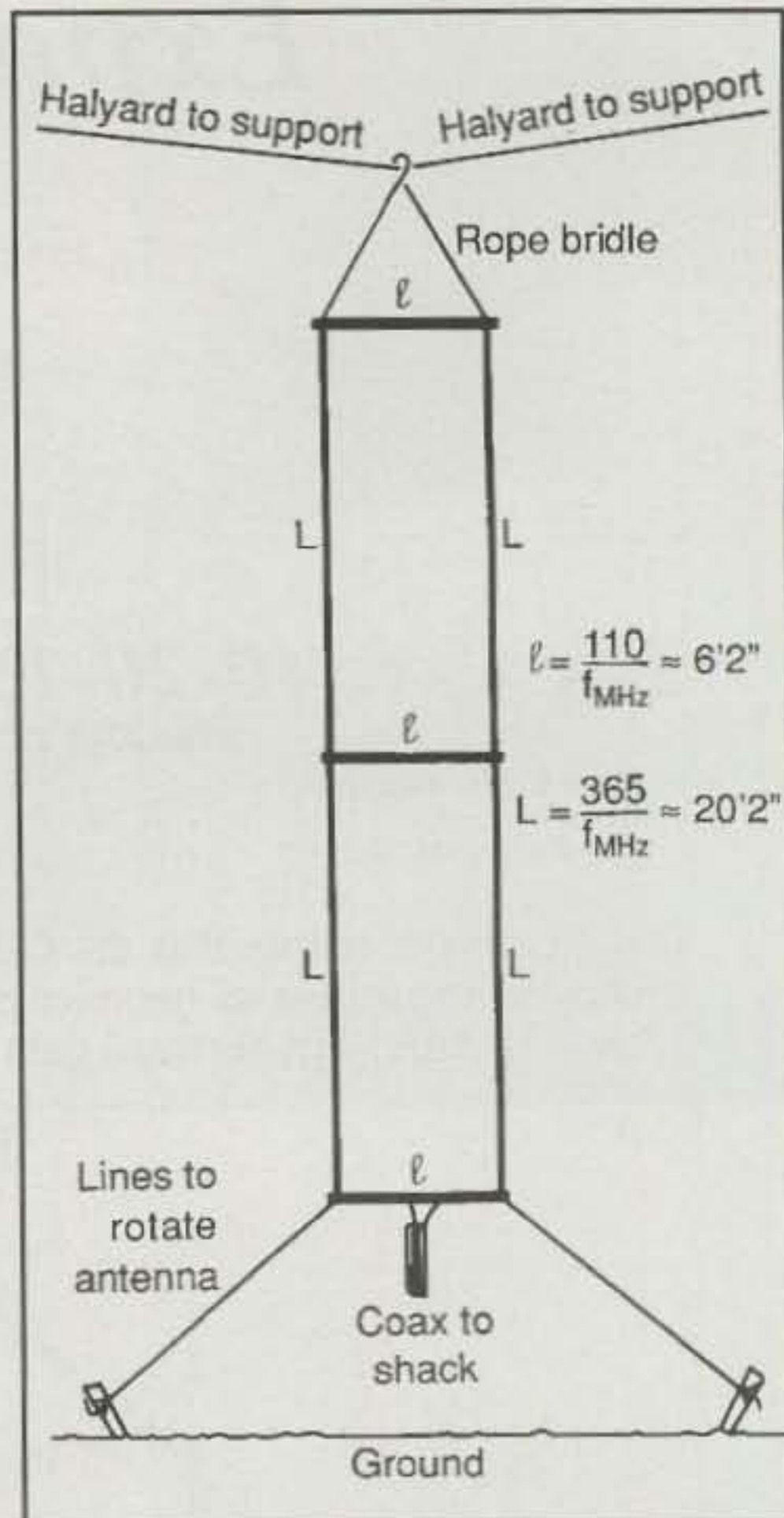


Fig. 2- Construction details for the H Double-Bay antenna.

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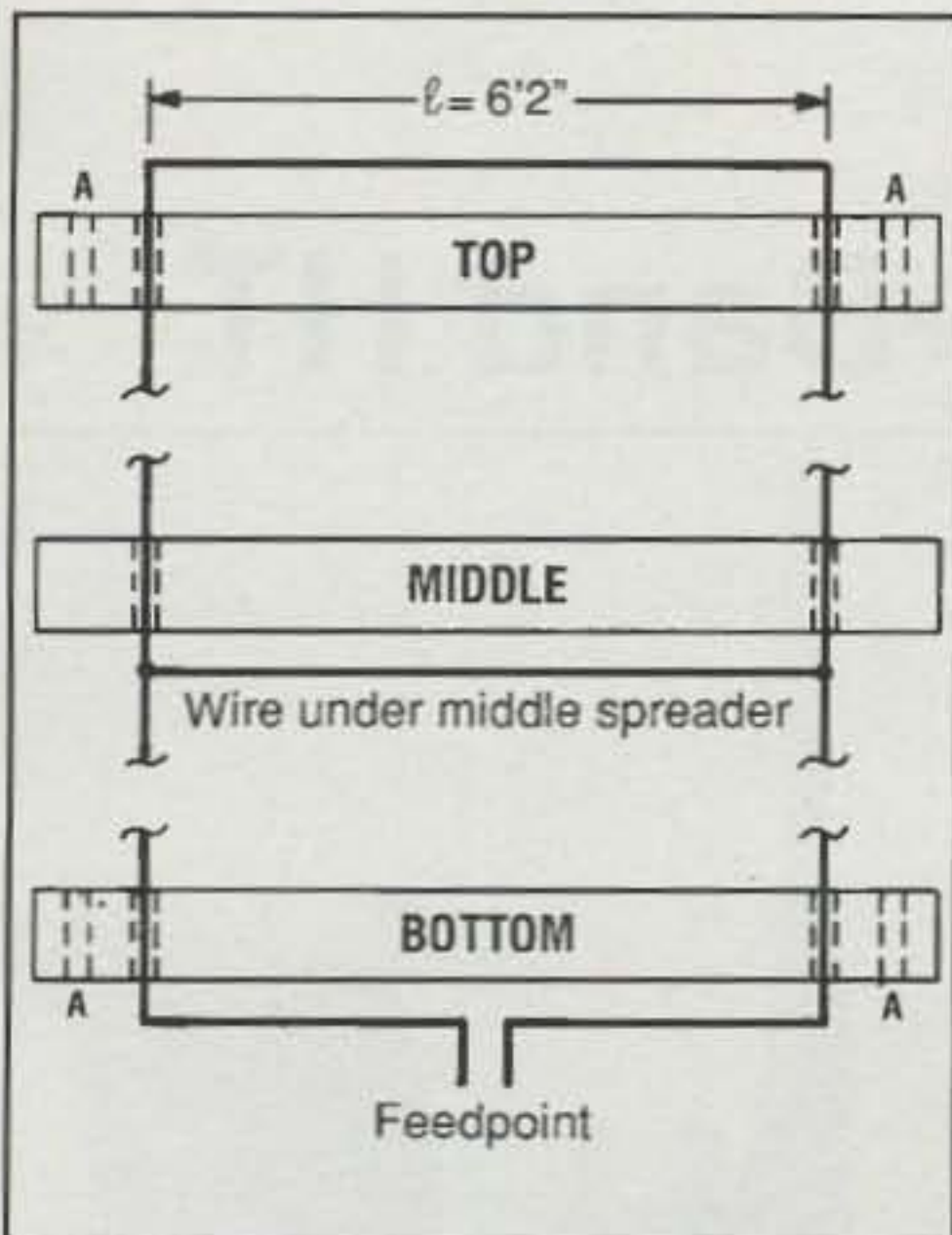


Fig. 3- Wire-stringing details.

ments. Final SWR should be very close to 1:1.

After you are satisfied with your SWR results, lower the antenna and be sure everything is secure. Now attach a line of string to each end of the bottom horizontal spreader. This line should be long enough to reach the ground at an angle when the antenna is in its final position. By properly positioning the line and attaching it to a convenient point, you can rotate the antenna to give full compass coverage. (No extra charge for this rotor.) Believe me, the antenna is much easier to build and tune than it is to write about.

Alternate Materials

I used wooden spreaders because they were available. I see no reason why you could not use 1 inch schedule-40 PVC plastic water pipe. A single 20 foot length would provide the necessary material for the spreaders.

Just a word about the wire type. The amount of wire required will depend on gauge, and it will also depend on whether the wire is insulated. If the wire is insulated, less wire will be required due to the capacity effect of the material. You can adjust the loop to resonance by changing the amount of wire in the bottom section of the loop. I don't think the performance will be adversely affected.

Preliminary Results

I could tell that my rig was happy because it was looking into a 50 ohm load. But so what? It would be happy looking into a 50 ohm resistor. How does it work? I must say that I have been pleasantly surprised. The antenna gives a good account of itself. I must admit, I was surprised when I broke a pileup and worked Zimbabwe on the second call. By the way, my report was 57 and I was running 100 watts output. Yes, it works!

Afterthoughts

Perhaps the antenna is a bit of a novelty, but I

don't think so. Maybe you can think of another way to use it. For example, there is no reason why the antenna could not be fed from the top if you happen to be a person who lives in a high-rise apartment and needs a stealth antenna. Just try to keep the antenna as far away from the metal structures as possible. Don't be afraid to dream up new applications for the antenna.

If you are thinking about using this design on other bands, the bandwidth between the 2:1 SWR points seems to be about 1.3%. This probably is due to the long rectangular configuration. This should present no problems on

17 and 12 meters, but if you intend to use it on 15 and 10 meters, you should keep these limitations in mind.

Acknowledgments

I would like to thank my friend Lew McCoy, W1ICP, for naming the antenna for me. He is always ready with sound advice and plenty of encouragement.

If there are questions I have not answered, feel free to call me in the evenings at 205-435-3642. Try this little antenna. I think you will be pleasantly surprised. ■

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• 3-1/2 Digit LCD readout with unit indicator

3-3/4 Digit Multimeter BK-390 \$139.00
• 0.1% DCV accy
• Analog bar graph
• Auto/manual ranging
• 4,000 count LCD display
• Capacitance meas.
• Temperature probe

Digital Multimeter Kit with Training Course By Elenco M-2665K \$49.95
• Extra large display • Ideal school project
M-2661 (Assembled) \$55.00

Frequency Counter F-1225 \$225.00
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Elenco GF-8026
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KIT XK-550K \$139.95
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CQ REVIEWS:

The ICOM IC-Z1A Dual-Band HT

BY LEW McCOY*, W1ICP

I am not quite sure I understand the marketing policies of the Japanese amateur radio transceiver manufacturers. They continually introduce new units at a rather rapid pace. What is important here, however, is that the latest models have more and more features.

ICOM has long had a very good reputation with American amateurs, and they have continued to make outstanding gear. Certainly the IC-Z1A dual-band HT is no exception. It is really a beautiful, tiny piece of gear. Let's look at the unit's basic features.

The transceiver, or handheld, operates on both VHF and UHF with power output of 5 watts, 0.5 watt, 1.5 watts, or 15 milliwatts(!). Frequency coverage on 2 meters is 144 to 148 MHz, and on UHF it is 440 to 450 MHz. The receiver covers 136 to 174 MHz in the 2 meter position. Modulation is conventional variable frequency, and fre-

quency deviation is ± 5 kHz. Spurious emissions are down 60 dB, and I could not detect any spurs in my testing. Sensitivity is less than 0.16 for 12 dB SINAD. Table I lists the specifications of the Z1A as they appear in the manual. Incidentally, the manual that comes with the unit is completely detailed and illustrated, consisting of 50+ pages. There are step-by-step, illustrated tuning methods given in the book.

I hate the term "bells and whistles," but that is the cliché that best describes this rig. There are a total of 20 pushbutton switches on the front of the unit. Nearly all of these are dual control via a side-mounted function switch. Rather than go into a long line-by-line description of these controls, I have included the two pages from the manual that actually show the switches and their functions. There are a couple of points about these functions that bear mentioning.

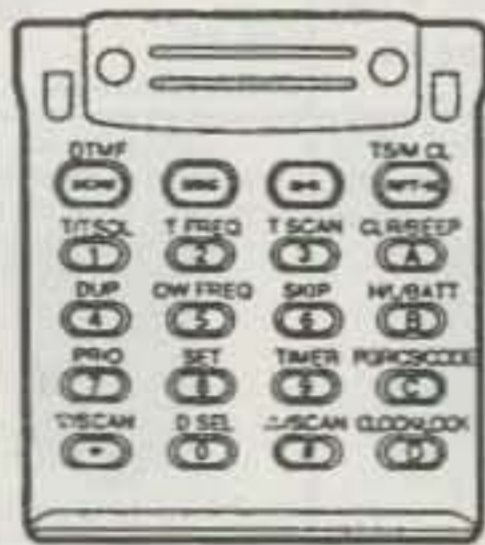
There is a subaudible tone system that comes with the unit, and the tones can be programmed into memory, call channel,



The ICOM IC-Z1A dual-band HT.

*Technical Editor, CQ, 1500 W. Idaho St., Silver City, NM 88061

Keypad and detachable panel



| KEY | FUNCTION | SECONDARY FUNCTION (After [FUNC]) |
|-------------|---|--|
| T/SQ (1) | • Input the appropriate digit for frequency selection while in VFO mode (p. 13) or for a memory channel while in memory mode (p. 24). | • Turns subaudible tone encoder ON/OFF (IC-Z1A only). • Activates the following functions when an optional tone squelch unit is installed: subaudible tone encoder, pocket beep, tone squelch, non-tone operation. (pgs. 20, 48). |
| T FREQ (2) | | Selects tone frequency setting mode. (p. 21) Eur., Italy, U.K. versions: optional tone squelch unit necessary. |
| T SCAN (3) | | Activates tone scan during optional tone squelch operation. (pgs. 23, 48) |
| DUP (4) | • Transmit the appropriate DTMF code while transmitting. (p. 38) | Selects the duplex direction in this sequence: - duplex → + duplex → simplex. (p. 20) |
| OW FREQ (5) | | Selects offset frequency writing mode. (p. 21) |
| SKIP (6) | | Sets the selected memory channel as a skip memory channel in memory mode. (p. 33) |
| PRI (7) | | Starts the priority watch. (p. 34) |
| SET (8) | | Enters set mode. (pgs. 53, 54) |
| TIMER (9) | | Enters timer mode. (p. 36) |
| D SEL (0) | | Selects the dial select step. (p. 14) |
| ▽/SCAN (*) | • Change freq. (p. 13) • Start full/mem scan. | Starts/stops programmed scan or memory skip scan. (p. 30) |
| △/SCAN (#) | • Adjust volume. (p. 16) | |

Fig. 1— This page from the manual shows the keys and their functions.


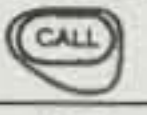
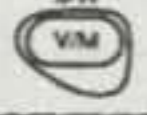


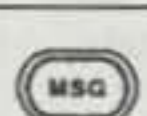
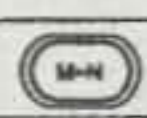

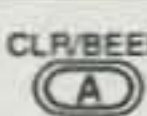


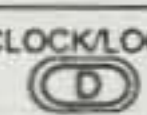
| KEY | FUNCTION | SECONDARY FUNCTION (After [FUNC]) |
|---|---|--|
|  | Turns power ON and OFF when pushed for 1 sec. (p. ii) | The same as the primary function at left. |
|  | Selects the call channel. (p. 29) | Activates the AF mute function. (p. 16) |
|  | Toggles between VFO and memory mode. (p. 12) | Writes VFO contents into a memory. (p. 25) Transfers a memory to VFO mode. (p. 28) |
|  | Toggles the main band between VHF and UHF. (p. 12) | Toggles between V by V and U by U functions. (p. 17) Turns the sub band OFF when pushed and held. (p. 17) |
|  | • Opens the squelch. (p. 16) • Sends a DTMF code when pushed during Tx. (p. 38) | Displays the DTMF memory. (p. 38) |
|  | • Toggles between Tx/Rx messages when pushed. (p. 53) • Sends a message when pushed during Tx. (p. 45) | Turns the message receive function ON and OFF. (p. 44) |
|  | Toggles between freq. and name indication. (p. 27) | Selects memory name writing mode. (p. 27) |
|  | Calls up a repeater memory. (p. 22) | • Sets a tuning step in VFO mode. (p. 14) • Clears a memory channel in memory mode. |
|  | • Turns OFF some functions. (p. 13) • Clears frequency input before entry. | Toggles the beep function ON and OFF. (p. 15) |
|  | Selects output power. (p. 18) | Displays the battery condition. (p. 49) |
|  | Selects pager, code squelch or non-code squelch operation. (pgs. 39-46) | Selects code setting mode. (p. 41) |
|  | Toggles the clock display ON and OFF. (p. 35) | Selects one of the key lock functions. (p. 15) |

Fig. 2- Continuation of the descriptions of the keyboard controls.

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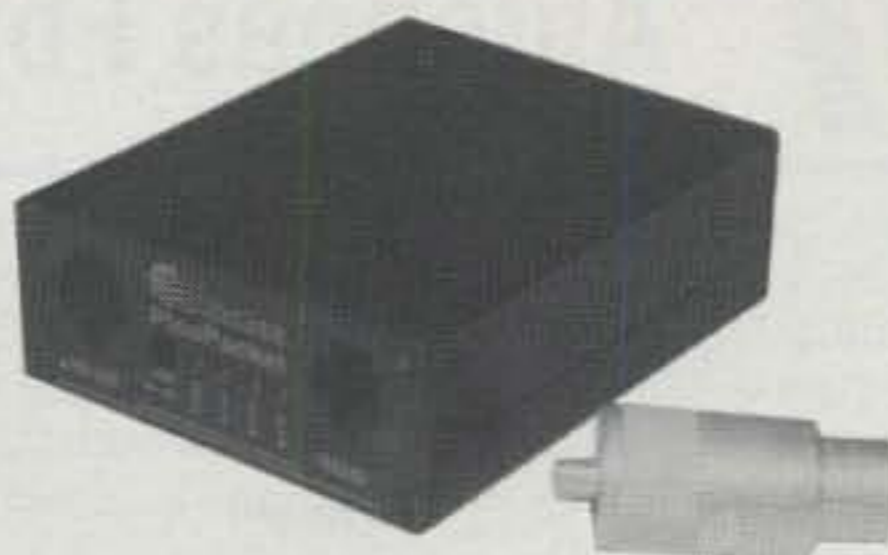
Personal Message System with all the state-of-the-art features.

APRS (Automatic Packet Reporting System) compatible GPS support built-in. Works with either the standard single serial port or the optional second serial port.

Terminal programs for both DOS and Windows included.

Cables. RJ-45 serial cable with adapter to DE-9S. RJ-45 radio cable has real wire-solders easily to radio connectors.

Upgradeable. EPROM and RAM are socketed for ease in upgrading firmware and increasing memory.



Instruction manual, schematic, Quick Command listing, and power cord included.

Optional RAM. 128k, or 512k.

Battery Pack model. The case of the battery pack model fits a quick-change 6VDC slide-on/slide-off battery pack which allows continuous operation. The PicoPacket contains a built-in battery charging circuit.

Full-time GPS port (2nd serial port) allows both a GPS and computer to be attached to the PicoPacket. The GPS port also provides a real-time clock and 128k RAM.

Built-in GPS receiver. The GPS model has a built-in Trimble SVeeSix-CM3 GPS receiver. Total size only 2 x 2.5 x 3.25 inches. Active external GPS antenna provided.

Companion GPS receiver. A Trimble SVeeSix-CM3 receiver fits in a separate case the same size as the Pico and attaches via an audio stereo cable. GPS antenna provided.

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- PicoPacket w/32k RAM - \$129
- PicoPacket w/128k RAM - \$149
- PicoPacket with 2nd serial port, 128k RAM, Real Time Clock - \$189
- PicoPacket Battery pack model with 32k RAM - \$189
- PicoPacket Battery pack model with 128k RAM - \$209
- PicoPacket Battery pack model with second serial port, 128k, RTC - \$249
- PicoPacket/GPS. Same as model directly above plus internal GPS receiver and GPS antenna - \$629
- Companion GPS receiver w/active antenna, data cable - \$399
- Extra battery pack - \$45

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| | | VHF | | UHF | |
|---|---|---|----------------------------|----------------------------|--|
| | | U.S.A | Tx: 144-148 Rx: 136-174 | Tx: 440-450 Rx: 400-470 | |
| Frequency coverage (MHz) | Italy | Tx: 144-148 Rx: 136-174 | Tx: 430-440 Rx: 400-470 | | |
| | Eur, U.K., Thailand | 144-146 | 430-440 | | |
| | Australia | 144-148 | 430-440 | | |
| | Korea | 144-146 | 435.075-440 | | |
| | Taiwan | 145-146 | 430-432 | | |
| | Asia | Tx: 144-148 Rx: 140-150 | 430-440 | | |
| | (Guaranteed range of VHF is 144 to 148 MHz) | | | | |
| Mode | | FM (F3E) | | | |
| Frequency stability | | ± 5 ppm (0°C to +50°C; +32°F to +122°F) | | | |
| Tuning steps | | 5, 10, 12.5, 15, 20, 25, 30 or 50 kHz | | | |
| Antenna impedance | | 50 Ω (nominal) | | | |
| Usable battery pack/case | | BP-170, BP-171, BP-172, BP-173 | | | |
| External DC power | | 4.5 to 16 V DC (negative ground) | | | |
| Current drain (at 13.5 V, typical) | Tx | High | 1.3 A | 1.5 A | |
| | | Low | 500 mA | 600 mA | |
| | 1 band Rx | Rated audio | 160 mA | 170 mA | |
| | | Power saved | 23 mA (average) | 25 mA (average) | |
| | 2 bands Rx | Rated audio | 210 mA | | |
| | | Power saved | 34 mA (average) | | |
| Usable temperature range | | -10°C to +60°C (+14°F to +140°F) | | | |
| Dimensions (with BP-171) (projections not included) | | 57(W)x125(H)x36(D) mm; 2.2(W)x4.9(H)x1.4(D) in | | | |
| Weight (with BP-171 and antenna) | | 380 g; 13.4 oz. | | | |

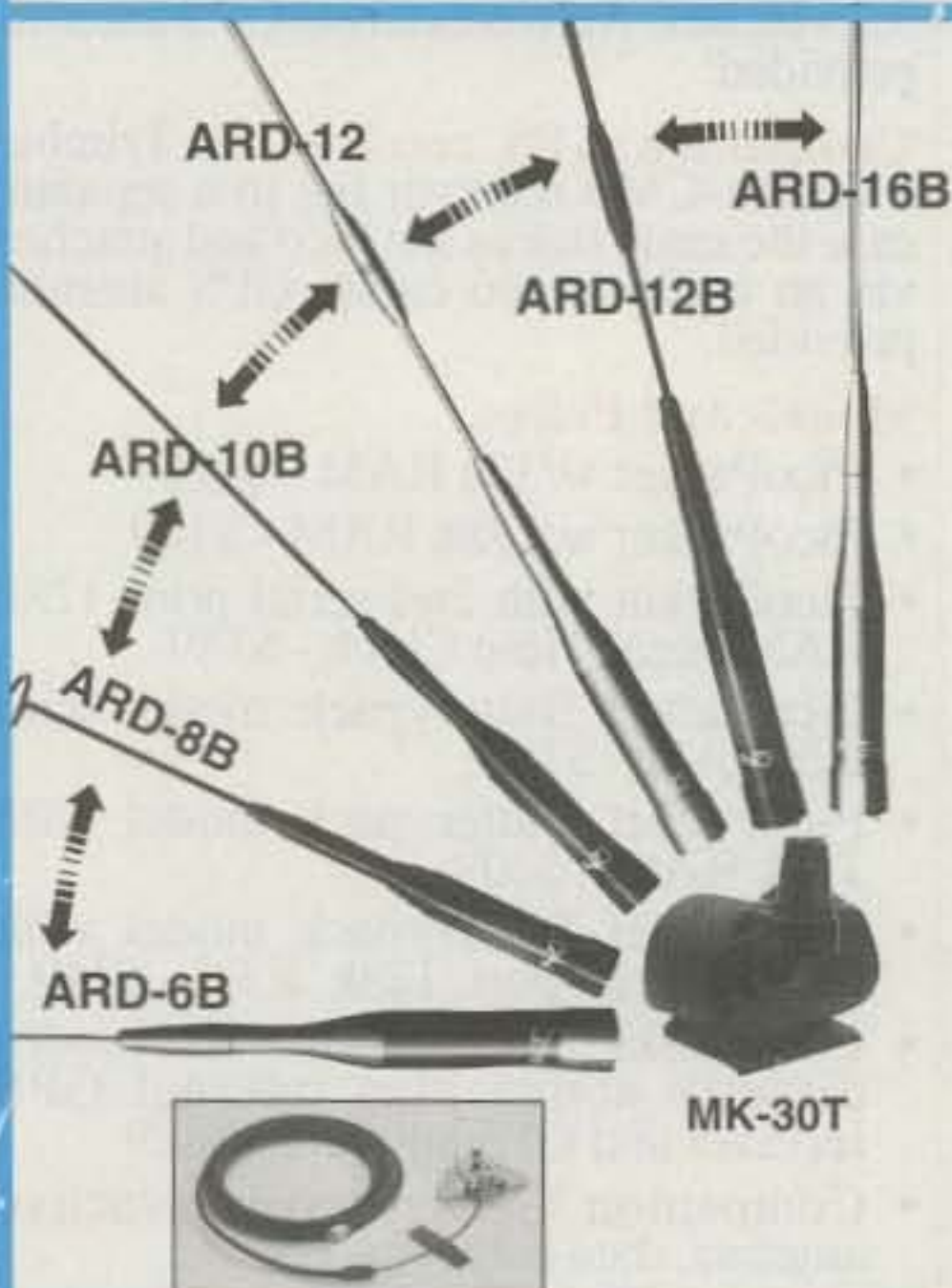
| | | VHF | | UHF |
|------------------------|-------------------------------------|--|----------|----------|
| | | 5 W, 0.5 W, 15 mW (selectable) | | |
| TRANSMITTER | Output power* (at 13.5 V) | 5 W, 0.5 W, 15 mW (selectable) | | |
| | Modulation system | Variable reactance frequency modulation | | |
| | Max. freq. deviation* | ±5.0 kHz | | |
| | Microphone impedance | 2 kΩ | | |
| RECEIVER | Receive system | Double conversion superheterodyne | | |
| | Intermediate frequencies | 1st | 43.1 MHz | 35.8 MHz |
| | | 2nd | 455 kHz | |
| | Sensitivity* (12 dB SINAD) | Less than 0.16 μV (Less than 0.32 μV for V/V and U/U) | | |
| | Squelch sensitivity | Less than 0.16 μV (at threshold) | | |
| | Selectivity | More than 15 kHz/-6 dB Less than 30 kHz/-60 dB | | |
| | Spurious and image rejection ratio* | More than 60 dB (More than 45 dB at IF/2) | | |
| | Audio output power* (at 13.5 V) | More than 180 mW (at 10% distortion with an 8 Ω load) | | |
| Audio output impedance | 8 Ω | | | |

*Specifications guaranteed at a transceiver temperature of +25°C (+77°F).

All stated specifications are subject to change without notice or obligation.

Table I- This table, taken from the manual, provides all the specifications for the handheld.

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| Model | Height | Signal Gain (dbs) | Power(max) |
|-----------|--------|-------------------|------------|
| ARD5B | 19.3" | 2m:/70cm:3.8 | 120w |
| ARD6/6B | 26.5" | 2m:2.6/70cm:4.9 | 100w |
| ARD10/10B | 34.4" | 2m:3.0/70cm:5.5 | 120w |
| ARD11/11B | 41.5" | 2m:3.7/70cm:6.1 | 120w |
| ARD12/12B | 48.2" | 2m:4.3/70cm:6.8 | 150w |
| ARD16/16B | 64.8" | 2m:5.0/70cm:7.7 | 150w |

Selection Guide: Taller models give max range, shorter models are good choices for use in cities and parking decks. Models with /B are black finish.

MK-30 MOTORIZED TILT-OVER MOUNT

The mobileer's dream! Ideal mate for ARDs, but also works great with other antennas up to 56" tall. Neat motorized unit quick-installs on trunk lid. Remote up/down switch fits under dash. Permits one-touch tilting for low overhangs. **NOTHING ELSE LIKE IT.** MK-30T/Trunk lid, R/Roof gutter, H/Hatchback, K/Auto Rack. Also available AM-01B manual tilt-over mount.

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or VFO mode. The same is true of DTMF codes. (I might add that these modes are only included in the US models; they are an option in the foreign models.) In a very early production run amounting to about 150 units, the unit would only encode, and if you wanted to decode you had to purchase the UT-93 Tone Squelch Unit option (\$55). Subsequent units come complete with the UT-93 module installed by the factory.

This handheld has a detachable panel that contains the speaker/mic combination plus other controls. There is a cable that is long enough so that the main unit can be stored in a pocket, out of the way. It makes for an extremely convenient operating method.

One thing I haven't mentioned is the handheld's size. It is relatively small—shirt-pocket size. The dimensions are 2.2 inches wide, 5 inches high (with battery pack), and 1.5 inches deep. Oh, yes: The weight of the unit is 13.8 ounces. If I have any objection to the unit, it would be the size of the push buttons and their panel. With large fingers it isn't exactly easy to use. However, there is no doubt that the overall small size is attractive.

The unit comes with the BP-157 battery pack (at least this is true of the unit I received for review). This battery pack puts out 7.2 volts, rated at 900 maH. The operating time from a fully charged battery is 6 hours 40 minutes on VHF, and 6 hours 10 minutes on UHF. These are estimated numbers using one minute on and off for the ratings.

The bells and whistles that have become a "must" in repeater operation, and operation in general, are the memory storage capabilities and the memory functions. The transceiver has 46 memory channels, plus three pairs of scan-edge channels for each band. The following information can be programmed into each memory channel: operating frequency, duplex direction, offset frequency, subaudible tone frequency, subaudible tone encoder ON/OFF, tone squelch ON/OFF, and skip information. The "skip information" bears explaining. It is possible to program a given channel to be "skipped" if one is in the scan mode.

As I said, the panel is small, as are the push buttons. I found that I was using a pencil with an eraser end to push the buttons and program the rig. (However, I have very large hands.) In my opinion, the unit is a very good radio and I enjoyed using it and testing it. In particular I like the detachable control panel and speaker/microphone.

The price of the unit, which includes power supply and battery, is \$715. The transceiver is manufactured by ICOM Inc. of Japan and is marketed by ICOM America, 2380-116th Ave. NE, Bellevue, WA 98004. ■

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CAROLINA Beam 80 Special 80-10, 50' long \$109.95

SuperLoop™ - Super performance is yours with the SuperLoop, version 3. If you need a serious signal on all bands, especially 80, 40 & 20, you need this antenna. The SuperLoop automatically switches between fullwave, multiwave, and Bi-square configurations for maximum gain on each band. Use with a transmatch for full 80-10 m coverage. 112' long, 30' high, easy installation. 1.5 KW, feed with 50 ohm coax. \$89.95

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| | | | | |
|--|------------------------------------|---------|-----------------------|---------|
| B1-2K | 1:1 2 KW | 80-10m | General Purpose | \$18.95 |
| B1-5K | 1:1 5 KW | 160-10m | Precision | \$29.95 |
| Y1-5K | 1:1 5 KW | 160-10m | The YagiBalun™ | \$29.95 |
| B4-1.5K | 4:1 1.5KW | 80-10m | General Purpose | \$22.95 |
| B4-2KX | 4:1 2 KW | 160-10m | 4:1 Current Balun | \$39.95 |
| RemoteBalun™ High Pwr. Current-type 160-10m \$47.95 | | | | |
| Line Isolators, 50 Ohms, High power | | | | |
| 4K-LI | 4 KW | 160-10m | SO-239 in, SO-239 out | \$19.95 |
| 4KRF-LI | 4 KW | 160-10m | PL-259 in, SO-239 out | \$25.95 |
| 4KV-LI | Vertical Antenna Isolator, 160-10m | | | \$27.95 |

Antenna Wire and Parts

| | | |
|---------|---|-------------------|
| PL-259 | Silver-Teflon, USA | \$1.29 or \$25/25 |
| PL-259 | Gold-Teflon, USA | \$1.49 or \$30/25 |
| N/9913 | For 9913, 9086, Flexi, etc. | \$3.25 |
| N/9913S | As above but silver & Teflon | \$4.25 |
| N-200 | Silver-Teflon, install like PL-259 | \$3.25 |
| CQ-8X | 95% shield, Type IIA non-contaminating | 23¢ |
| CQ-8XMM | Solid dielectric, tinned, 95%, Type IIA | 27¢ |
| CQ-1003 | RG-8X, loss like RG-312, double shield | 32¢ |
| CQ-213 | Enhanced RG-213, 96%+ braid | 40¢ |

RG-8X 95%, Premium 16¢
RG-213 95%, Mil-type 35¢
CQ-Flexi Flexible, 9913-type 59¢

| | | |
|------------|-----------------------------------|-----|
| R1 Rotator | 8 conductor (2 x #18, 6 x #24) | 20¢ |
| R2 Rotator | 8 conductor (2 x #16, 6 x #18) | 37¢ |
| R4 Rotator | 8 conductor (2 x #14, 6 x #18) | 48¢ |
| #14 HD | Stranded, 7 x 22 hard-drawn | 8¢ |
| #14 CW19 | 19-strand, copper-clad, tinned | 10¢ |
| #13 CW | 19-strand, copper-clad, insulated | 16¢ |
| 450 Ladder | Stranded #16 cond., poly, windows | 19¢ |
| 450 Ladder | Stranded #18 cond., poly, windows | 15¢ |

Coax and cable must be in 50-foot multiples for sale prices

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NEW PRO

YAESU FT-51R Dual-Band Handheld

Q Why does "windows" best describe this radio?

A As the radio is used, each operating function of the FT-51R menu is shown in the lower part of the radio display in a User Help menu. Operating information for a particular function automatically scrolls across the display in a continuous sentence string much like it does on a computer, thus the term "windows" seemed analogous to the familiar computer term. The User Help message displays the setting, name, a brief description and exit instructions. It's a big help if you get lost. Just hold in the VFO key while turning the radio on and the FT-51R will revert to the automatic User Help menu, then you can start over. The User Help menu is automatic, but you can turn it off. No competitor radio has these helpful functions!

Q What's the benefit of the Alpha-Numeric labeling capability in the FT-51R memory system?

A The FT-51R allows you to label your memories with identifying names, like "WX-1" or "SIMPLEX." It's a creative way to personalize and identify a memory channel, and makes the FT-51R uniquely yours. No other HT has 8-character alpha-numeric labeling.



Q Why is there no Volume Control knob?

A Actually there are two ways to control Volume and Squelch on the FT-51R. Since many customers prefer the simplicity of Up and Down Push Button volume/squelch control to avoid confusion with the top panel, you'll find them just above the upper left hand corner of the display. They're illuminated at night, too, along with the keypad. However, you can program volume and squelch to the main tuning dial on top of the transceiver. Just another way to demonstrate the versatile operation of the FT-51R.

Q How does the new Spectrum Scope help in daily operation?

A Spectrum Scope visually identifies activity on the band near your current operating frequency, and displays relative signal strength on three channels below, and on four channels above. The total frequency spread depends on what channel steps – 5 kHz, 10 kHz, etc. – have been selected. In the Memory mode, Spectrum Scope shows activity on the current memory channel plus the three memories below and four memories above, in numerical order. And, it doesn't matter if you're working V/V, U/U or V&U. The flexible Spectrum Scope can be used manually or automatically. Find new frequencies faster with Yaesu's exclusive Spectrum Scope.

Q Is the FT-51R really the smartest dual-band radio with the largest keypad?

A Yes! The keypad on the FT-51R was designed for fast, accurate operation, with special care given to the size of the keys and keypad spacing. Operation of the FT-51R is easy and unerring because the keys were shaped precisely for optimum fingerpad contact, and spaced to prevent accidental depression of adjacent keys. The FT-51R is fourth generation in both dual band HT technology, and electronic miniaturization. Since Yaesu pioneered these engineering areas, they were able to even further reduce the radio size, permitting expansion of the critical keypad area.

Q Do I have to modify the FT-51R to get expanded receive?

A No! Expanded receive is accessible right out of the box from the front panel of the FT-51R. No need to open the radio and tinker with "mods." 110-180 MHz, 420-470 MHz; "AM" Aircraft, Public Service, Marine, Weather; the FT-51R operates just like a scanner. Further, since the FT-51R has an "Auto Mute" feature, which gives the "Main" channel priority, you can monitor the weather channel on VHF without missing a call on UHF.

These are just some of the most commonly asked questions Yaesu has received since the introduction of the unique FT-51R. For more information, a complete "Question & Answer" Guide is yours for the asking. Just write, FT-51R "Q&A," Yaesu U.S.A., 17210 Edwards Rd., Cerritos, CA 90703, or call (310) 404-2700 Ext. 228.

DUCT Q&A

Q Does the FT-51R display current battery voltage?

A Actual battery voltage can be monitored at any time in the bottom half of the FT-51R display "window".



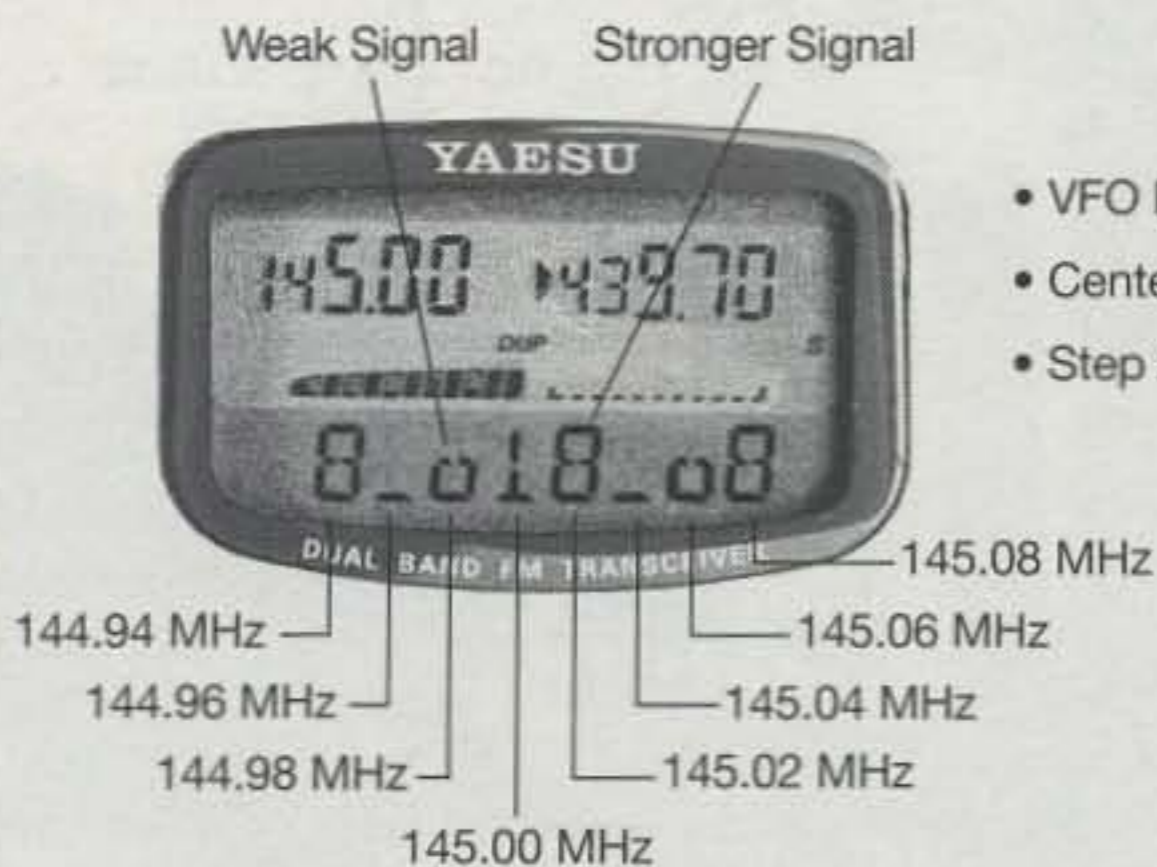
alerting you to any necessary re-charge requirement. This is a great feature, and not one found on any other radio. For example, when using the FNB-31 battery the display will show "4.8" as your current battery voltage.

Q What are my choices to power-up the FT-51R during mobile operation?

A Yaesu gives you three adapter options including the new E-DC-12 Mobile DC Adapter which slides on the bottom of the HT. The E-DC-12 provides direct DC power, and trickle charges the battery simultaneously.

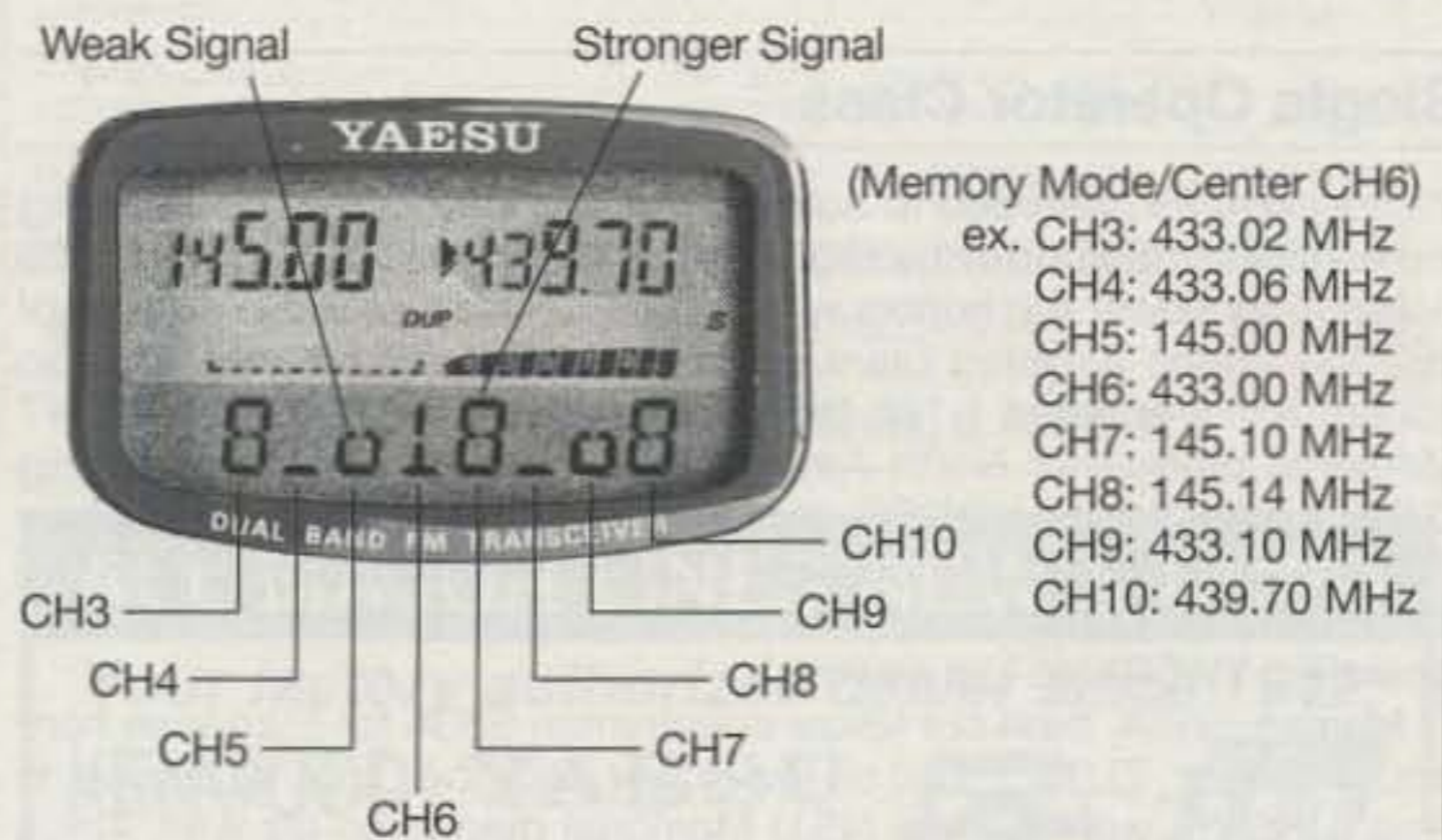


Spectrum Scope Display Indication 1



- VFO Mode
- Center 145.00 MHz
- Step 20 kHz

Spectrum Scope Display Indication 2



Q Is the FT-51R the first PC programmable dual-band HT?

A Yes, the FT-51R is programmable with the optional Advanced Data Management System (ADMS-1) for Windows™ software. Specifically, you can program (or clone) all information including frequencies, alpha-numeric names, etc. in about 3 seconds. The FT-51R is the only HT which permits you to access your pre-programmed files of repeaters in any city where you may travel.



Options

Rechargeable Battery Packs

- FNB-31 Ni-Cd 4.8V, 600 mAh (1.5 Watt)
- FNB-33 Ni-Cd 4.8V, 1200 mAh (1.5 Watt)
- FNB-38 Ni-Cd 9.6V, 600 mAh (5 Watt)

Dry Cell Battery Case

- FBA-14 4 x AA Size (1.5 Watt)

Mobile Rapid Charger

- CD-2 (for charging use only)

DC Power Adapters

- E-DC-12 Mobile DC Power Adapter (w/ Trickle Charge)

- PA-10A Drop-in Mobile DC Power Adapter (w/Trickle Charge)

Desktop Rapid Chargers

- NC-50 Dual Sequential (requires CA-10 Charger Adapter)
- CA-10 Charger Adapter (Includes set of 2)

VOX Headset

- VC-22

Soft Vinyl Cases

- CSC-66 for FBA-14 or FNB-33/38

- CSC-67 for FNB-31

Microphones

- MH-12A2B Speaker/Mic
- MH-19A2B Mini Earpiece Mic
- MH-29A2B Display Speaker/Mic
- MH-32A2B Mini Speaker/Mic

PC Software

- ADMS-1 Windows™ Programmable Software



PLAQUE WINNERS

World Single Operator, High Power: Patrick Cardozo, HH2PK. Advanced Electronic Applications, Inc. (AEA) Award.
World Single Operator, Low Power: Station 9K2ZZ. Eastern Washington Amateur Radio Group Award.
World Multi-Operator, Single Transmitter, High Power: Club Station RK9CWA. Advanced Electronic Applications, Inc. (AEA) Award.
World Multi-Operator, Single Transmitter, Low Power: Club Station Z30M. HAL Communications, Inc. Award.
World Multi-Operator, Multi Transmitter: Station K1NG (K1NG, K1IG, AB5KD, K5ZD/1 & K1IU). CQ Magazine Award.
North America, Multi-Operator, Single Transmitter: Station WU3V (WU3V, WU3U, W5WMU, W5VSZ, KI5XP, N5MEG, N5KQQ & WX5L). The GØAZT Award.
World Single Operator Assisted.: Roland Mensch, DK3GI. CQ Magazine Award.

Continents, Single Operator All Band:

North America: Dr. Steve Tobe, CJ3XO (VE3XO). The TG9VT Memorial.
North America, Low Power: Jody Millsbaugh, VP5JM. American Digital Radio Society Award.
South America: Pasquale Casale, YW5RY (YV5KAJ). The Contest Committee.
Europe: Marijan Miletic, S56A. HAL Communications, Inc. Award.
Oceania: Peter Watson, ZL3GQ. The Digital Journal Award.
Asia: Alex Lebedev, UN8PYL (UN7PCZ). The N5JJ Memorial.
Africa: Dave Heil, A22MN. The Contest Committee.

High Score, United States: Neal Sulmeyer, AE6E, Op. at K4JPD. The RTTY by WF1B Award.

High Score, United States, Low Power: Don Hill, AA5AU. Geoff Malta Award.

World Single Operator, 3.5 MHz: Station 9A1A (9A2RA). Reggie Corey, KA1UQU Award.

World Single Operator, 7 MHz: Hermann Samson, DJ2BW. The Contest Committee Award.

World Single Operator, 14 MHz: Zelimir Klasan, 9A2DQ. Kunihiro Fujii, JH1QDB Award.

World Single Operator, 21 MHz: Ronald A. Hall Sr., KP2N. Denis, WD4KXB, and Mike, KA4RRU, Award.

World Single Operator, 28 MHz: No Entry.

in Asia. United States High Power Plaque goes to Neal, AE6E, operating K4JPD, and Low Power United States was won by Don, AA5AU.

Single Band

With no activity on 28 MHz nor a legitimate entry (12 hours required for award), I moved that plaque sponsor to another band for this year. On 21 MHz Ron, KP2N, took top honors. Fourteen MHz went to Zelimir, 9A2DQ; 7.0 MHz winner was Hermann, DJ2BW; and 3.5 MHz was won by 9A1A.

Multi-Operator Class

Well, the news here of course is another group of East Coasters decided to challenge the gang at W3LPL for the Multi-Multi plaque. After the dust cleared and the stories of the one that got away were all told, the crew at K1NG bested the crew of W3LPL by just over 200,000 points. I am sure there is a challenge brewing for the 1995 contest, with Dayton being where the bet is paid off.

In the Single Transmitter class the group from station RK9CWA turned in an impressive 2.5M+ points, or the second highest score in the contest, to win the AEA sponsored plaque. The Low Power HAL plaque went to club station Z30M.

A Bit of QRM

Once again I would like to share with all of you some of your comments. "Got into the contest by accident; was checking my new software" ... 9K2ZZ. "I like the no rest rule" ... AA5AU. "Thirty-two new countries" ... DL7VOG. "I like the 48 hour rule" ... KB4GID. "Bring back the rest periods" ... KK4DK. "Missed the new rule, operated 27 hours. Oh, well" ... VY2SS. "See you next year, maybe from Mt. Athos" ... SV1BDO. "Finally getting the hang of this thing" ... WA6SDM.

Summary

Once again, thanks to the gang at CQ for their help, and to you, the operators, for participating. September 23-24, 1995 will be our eighth contest. See you then!

73, Roy, KT1N



Pasquale, YV5KAJ, operating YW5RY, first place South America, third place in the world, Low Power.

Multi-Op Station Operators

W3LPL: W3EKT, K4GMH, KF3P, N3KTV, K3NA, N3UN, WR3E. **K1NG:** K1IG, WF1B, AB5KD, K5ZD/1, K1IU. **WN1E:** KD1SM, N1MGO, KA1YHW. **WU3V:** WU3U, W5WMU, W5VSZ, KI5XP, N5MEG, N5KQQ, WX5L. **PI4CC:** PA0VHA, PA3BQS, PA3EPD, PB0AIU, PB0ALB, PE1MZR. **RK4LWZ:** RA4LCC, UA4-164-606, UA4-164-503. **RU1A:** RW1AC, RV1AW, UA1ANC, UA1-169-2475. **RK3DXW:** Vlad, Andrey, Dimitriy, ER2CQ, KB2NOD, RX3ABN, UA3DJY. **EM2I:** UT2IO, UT2IM, UT3IB, UT2II, UT2IZ. **W4OVU & KR4GJ.** **JJ3YBB:** JA3FHL, JA3LHL, JA3PJL, JE3TXA, JH1ORL, JH3FQF, JI1ERV. **N1JAC/SV2 & SV2BFN.** **EA3BT & EC3ACG.** **RK9CWA:** RW9CF, UA9CGA, UA9CFV, UA9CR & Igor. **JA9YAV & JA9-3017.**

S50C: S53CC, S53MM, S53BB, S55OO. **9A5D:** 9A2FK, 9A2TL, 9A3VM, 9A4CB, 9A7AFL, 9A4SG. **RW2F:** RA2FA, UA2FB, UA2FF, UA2FX, UA2FZ. **W7DK:** WA7UQV & WB7AUJ. **F6EKX & F4NPE.** **DL0GK:** DL1DCL, DL2DBS, DH5DAN, DL6YEW, DF8QB. **HG1S & Ops.** **JA1ZCG:** JO1BMV, JO1RUR, JR0JFM. **LY40MR:** LY2BKF, LY3NFW, LY1FFI. **TA2KK:** TA2II, TA2FT, TA2IJ, TA2CMM, TA2GC, TA2IV. **IK2TWC & IK1TZO.** **GW8GT:** GW5NF, GW4JBQ, GW0MAW, G4CVE, G4IFB, GW6ZUQ. **DF0LI:** DL7UFR & DL7URH. **OH3NE:** OH1KAG, OH3CV, OH3FM, OH3KLG, OH3KSS, OH3KYR, OH3LCI, OH3LIU, OH3LQK, OH3MEP, OH3MFP, OH3MFT, PH3MMH, OH3MYD, OH3NLP, OH3TM.

N5NMX: N5NMX, NX6Y, KB7MHG. **KB8ECG:** KB8ECG, K8AQM, KG8CO, KG8CW, KG8EF, NV8Z. **VE3FJB:** VE3VSM, VE3TUJ, VE3MKX, VE3ABG, VE3JIM, VE3OY, VE3NDA, VA3CW. **3Z0RY:** SP4BOS, SP4CHY, SP4TKK. **VK6GOM:** VK6GOM, VK6APW, VK6ZH. **PI4COM:** PA3BBP, PA3BWD, PA3ERC, PA3EWP, PA3GBQ. **VE7ZZZ:** VE7SK, VE7VX, VE7EME, VE7RBL, VE7DBS, VE7PTT, VE7GGG. **Z30M:** Z31GX, Z32RY, Z32XX, Z32RC, Bobby. **VE3UR:** VE3LIB, VE3JPT. **KN4DG/KH2 & KC4TUX.** **LX4B:** LX1JL, LX1TI, LX1KQ. **IK2CFH:** I2EOW, I2VXJ, IK2EGL, IK2MPV, IK2OYD, IK2PZC, IK2CFH. **9A2A:** 9A3NU, 9A2AF, 9A2FM, 9A4NM. **N4XWC & KA5GET.** **S57XX & S57BZD.**

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with this roller inductor. Firm springs put high 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 readings from 1.8 to 30 MHz.

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You get a super heavy duty current balun for balanced lines. It has two giant 2 1/2 inch powder iron toroid cores and is wound with Teflon® wire connected to high voltage ceramic feedthru insulators. It lets you operate high power into balanced feedlines without core saturation or voltage breakdown.

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MFJ-949E **\$139⁹⁵** More hams use the MFJ-949E than any other antenna tuner in the world! Why? Because you get proven reliability, the ability to match just about anything and a one year unconditional guarantee.

You get a lighted peak and average reading Cross-Needle SWR/wattmeter, antenna switch, 4:1 balun for balanced lines, 1.8-30 MHz coverage and a full size dummy load that easily handles 300 watts of abusive tune-up power.

New 8 position antenna switch lets you pre-tune into dummy load to minimize QRM.

The inductor switch is designed for high RF voltages and currents--it's not a plastic switch made for small signals and wired with tiny gauge wire.

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MFJ's versatile 1.5 KW Tuner



MFJ-962C **\$249⁹⁵** Use your barefoot rig now and have the capacity to add a 1.5 KW PEP amplifier later! Lighted Cross-Needle SWR/Wattmeter. 6 position antenna switch, Teflon® wound balun, ceramic feedthru insulators for balanced lines. 1.8-30 MHz. 10 3/4 x 4 1/2 x 14 7/8 in.

MFJ's portable/QRP Tuner

Tunes coax, balanced lines, random wire 1.8-30 MHz. Cross-Needle Meter. SWR, 30/300 or 6 watt QRP ranges. 6x6 1/2 x 2 1/2 in.

MFJ's super value Tuner



MFJ-941E **\$109⁹⁵** The new MFJ-941E gives you a 300 watt PEP tuner with lighted Cross-Needle Meter. Covers 1.8-30 MHz.

Antenna switch selects 2 coax lines (direct or thru tuner), random wire, balanced line or external dummy load. 4:1 balun. 1000 volt capacitors.

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MFJ-986 **\$299⁹⁵** The MFJ-986 Differential-T™ 2 knob tuner uses a differential capacitor to make tuning foolproof and easier than ever. It ends constant re-tuning with broadband coverage and gives you minimum SWR at only one best setting. 3 KW PEP. 1.8-30 MHz.

Roller inductor makes tuning smooth and easy. Turns counter lets you quickly re-tune to frequency.

Lighted Cross-Needle Meter reads SWR/forward/reflected/peak/average power in 2 ranges. Current balun reduces feedline radiation and forces equal currents into unbalanced antennas.

MFJ's mobile Tuner



MFJ-945D **\$99⁹⁵** Don't leave home without this mobile tuner! Let the MFJ-945D extend your antenna bandwidth so you don't have to stop, go outside and adjust your mobile whip.

Small 8x2x6 inches uses little room. Lighted Cross-Needle SWR/Wattmeter with lamp switch. 1.8-30 MHz. 300 watts PEP. Mobile mount. MFJ-20, \$4.95.

MFJ's 6 Meter Tuners

The MFJ-906 has lighted cross-needle SWR/Wattmeter, bypass switch. Handles 100W FM, 200W SSB. For coax fed antennas. MFJ-903, same as MFJ-906, less SWR/Wattmeter, bypass switch.

MFJ's smallest Versa Tuner

The MFJ-901B is our smallest -- 5x2x6 inches -- (and most afford-able) 200 watt PEP tuner -- when both your space and your budget is limited. Great for matching solid state rigs to linear amps.

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MFJ-921 or MFJ-924 **\$69⁹⁵** MFJ-921 covers 2 Meters/220 MHz. MFJ-924 covers 440 MHz. SWR/Wattmeter. 8x2 1/2 x 3 in. Simple 2-knob tuning for mobile or base.

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You won't believe your eyes when you see *solid* copy from signals completely buried in QRM!

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You'll discover a whole new world of ham radio. You'll communicate in ways you never knew existed.

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You'll have fun joining worldwide packet networks and exchanging color SSTV pictures with your buddies.

You'll marvel at *full color* FAX news photos as they come to life on your screen, and you'll see weather changes on highly detailed weather maps in all 16 gray levels.

You'll eavesdrop on late breaking news as it happens on RTTY.

You'll enjoy error-free HF QSOs on

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Fully TAPR TNC-2 compatible, free 110 VAC power supply, mailbox expandable to 512K, WeFAX mode prints weather maps, KISS interface, Host mode, RAM/ROM each expandable to 512K, up to 19.2K terminal baud rate, monitor amplifier, external reset, *enhanced* DCD for HF.

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MFJ-1270CQ, \$229.95, MFJ-1270C w/9600 baud G3RUH modem.

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- 110V Wall Charger included. Charge rate: 6-8 hours from complete discharge.
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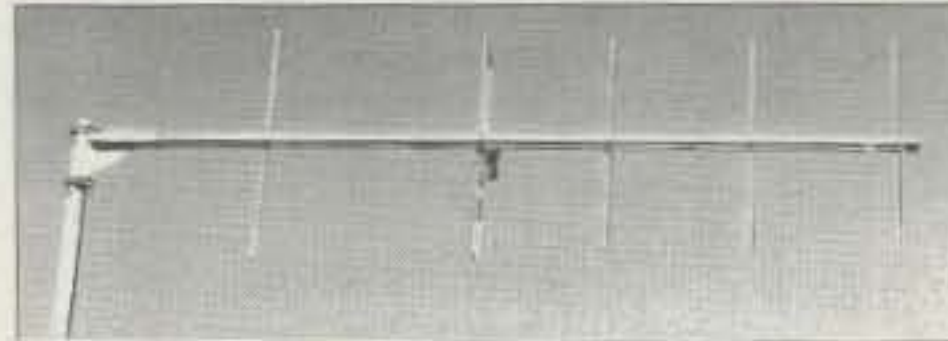
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| 1110 RG8X 95% shield (mini 8) | .15 |
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| mil spec NCV jkt | 1.85 |
| 1140 RG214/U dbl silver shield mil spec | 1.50 |
| 1705 RG142B/U dbl silver shield, teflon ins | .14 |
| 1450 RG174/U 50 ohm | .14 |
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| PL259TS PL259 teflon ins/silver plated | 1.59 |
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| UG83B N jack to PL259 adapter, teflon | 6.50 |
| UG146A SO239 to N plug adapter, teflon | 6.50 |
| UG255 SO239 to BNC plug adapter | 4.75 |
| SO239AM UHF chassis mt receptacle, Amphenol | 1.10 |
| UG88C BNC plug | |
| RG58,223,142 | 1.55 |

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|--------------|----------|---------------|------------|-----------|
| W5YM | SOL | 37,323 | 155 | 143 |
| (Opr. N5UWY) | | | | |
| WA1IML | SOA | 33,333 | 131 | 123 |
| N4XWC | MOL | 32,452 | 125 | 133 |
| K3KO | 14 | 32,136 | 151 | 78 |
| WD4TDB | SOL | 30,030 | 123 | 130 |
| KB2POP | SOL | 29,760 | 180 | 80 |
| N2LBZ | SOL | 28,509 | 125 | 129 |
| NZ3I | 14 | 26,208 | 168 | 84 |
| K10W | SOA | 24,804 | 106 | 117 |
| KC4UH | SOA | 24,087 | 93 | 111 |
| W8VLK | SOL | 22,800 | 98 | 100 |
| AA1CB | SOL | 22,572 | 112 | 114 |
| W8ML | SOH | 21,112 | 94 | 104 |
| K5CZD | SOL | 20,930 | 106 | 115 |
| N1NQD | SOL | 20,700 | 109 | 115 |
| WJ7R | 14 | 20,140 | 115 | 76 |
| K4ZTL | SOH | 19,899 | 95 | 99 |
| KE9CU | SOL | 19,838 | 113 | 104 |
| K5KLA | 7 | 19,404 | 148 | 84 |
| KA1DKG | SOL | 18,200 | 119 | 100 |
| KB9AIT | SOL | 17,557 | 101 | 97 |
| KG6I | SOL | 17,368 | 98 | 104 |
| K7WUW | 7 | 16,188 | 165 | 76 |
| W4KQS | SOL | 14,766 | 89 | 107 |
| N4SAS | 14 | 14,129 | 88 | 71 |
| W9ILY | SOL | 11,808 | 69 | 72 |
| KR4XM | SOL | 10,824 | 85 | 66 |
| W4JLS | SOL | 10,560 | 94 | 88 |
| N7GVV | 14 | 10,530 | 90 | 65 |
| N8FEH | SOL | 10,108 | 66 | 75 |
| WJ7S | 21 | 9,943 | 93 | 61 |
| WD4KXB | 3.5 | 9,853 | 135 | 59 |
| KG5IT | SOL | 9,790 | 79 | 89 |
| KE2JR | 14 | 9,610 | 63 | 62 |
| N4QN/1 | SOH | 9,568 | 60 | 92 |
| WW8E | SOL | 8,064 | 75 | 72 |
| KS4S | SOL | 6,912 | 61 | 72 |
| KA8OUT | SOL | 6,380 | 49 | 58 |
| KA4HMV | SOL | 4,558 | 49 | 43 |
| W2UP | 3.5 | 4,100 | 51 | 41 |
| K8OSF | SOL | 3,816 | 42 | 53 |
| KB1KM | SOL | 3,168 | 36 | 44 |
| N2ALE/6 | SOL | 2,703 | 41 | 51 |
| W7DK | MOH | 2,392 | 37 | 52 |
| KB7OLZ | 14 | 891 | 24 | 27 |
| K15IB | 14 | 740 | 34 | 20 |
| WA2VYA | SOL | 420 | 10 | 15 |
| N2ZHR | SOA | 3 | 1 | 3 |

OCEANIA

AUSTRALIA

| | | | | |
|--------|-----|---------|-----|-----|
| VK6HD | SOL | 288,756 | 426 | 234 |
| VK6GOM | MOH | 170,262 | 367 | 162 |
| VK5GN | SOL | 82,062 | 201 | 141 |
| VK3DXI | SOL | 48,450 | 168 | 102 |
| VK8BE | 14 | 768 | 16 | 16 |
| VK2BQS | 14 | 702 | 16 | 18 |

GUAM

| | | | | | |
|-------|------|-----|--------|-----|----|
| KN4DG | /KH2 | MOL | 61,512 | 243 | 88 |
|-------|------|-----|--------|-----|----|

NEW ZEALAND

| | | | | |
|--------|-----|---------|-----|-----|
| ZL3GQ | SOL | 737,741 | 802 | 313 |
| ZL2AM | SOL | 147,060 | 296 | 172 |
| ZL2JON | SOL | 38,190 | 120 | 114 |

PHILIPPINES

| | | | | |
|--------|-----|--------|-----|----|
| 4F3GD | SOL | 17,480 | 132 | 46 |
| DU1SAN | 14 | 7,360 | 68 | 40 |

REPUBLIC OF BELAU

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|-------|-----|---------|-----|-----|
| KC6VW | SOH | 152,760 | 452 | 114 |
|-------|-----|---------|-----|-----|

WESTERN SAMOA

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|---------------|-----|---------|-----|-----|
| 5W1MM | SOH | 191,100 | 459 | 140 |
| (Opr. JR6FIP) | | | | |

SOUTH AMERICA

ARGENTINA

| | | | | |
|--------|-----|---------|-----|-----|
| LU8KC | 21 | 198,738 | 551 | 122 |
| LU9DBK | SOH | 148,008 | 298 | 168 |

CHILE

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|--------|----|--------|-----|----|
| CE8SFG | 21 | 72,864 | 269 | 92 |
|--------|----|--------|-----|----|

ECUADOR

| | | | | |
|-------|---|-------|----|----|
| HD3FW | 7 | 5,031 | 44 | 39 |
|-------|---|-------|----|----|

PARAGUAY

| | | | | |
|-------|-----|---------|-----|-----|
| ZP5XH | SOL | 150,072 | 325 | 156 |
|-------|-----|---------|-----|-----|

VENEZUELA

| | | | | |
|---------------|-----|---------|-----|-----|
| YW5RY | SOL | 772,540 | 744 | 361 |
| (Opr. YV5KAJ) | | | | |
| YV5NFL | 14 | 174,736 | 439 | 134 |
| YV6ERA | SOH | 117,280 | 252 | 160 |

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A LOOK AT THE WORLD AROUND US

Spicing Up Life: *Red-Hot* Radio Returns

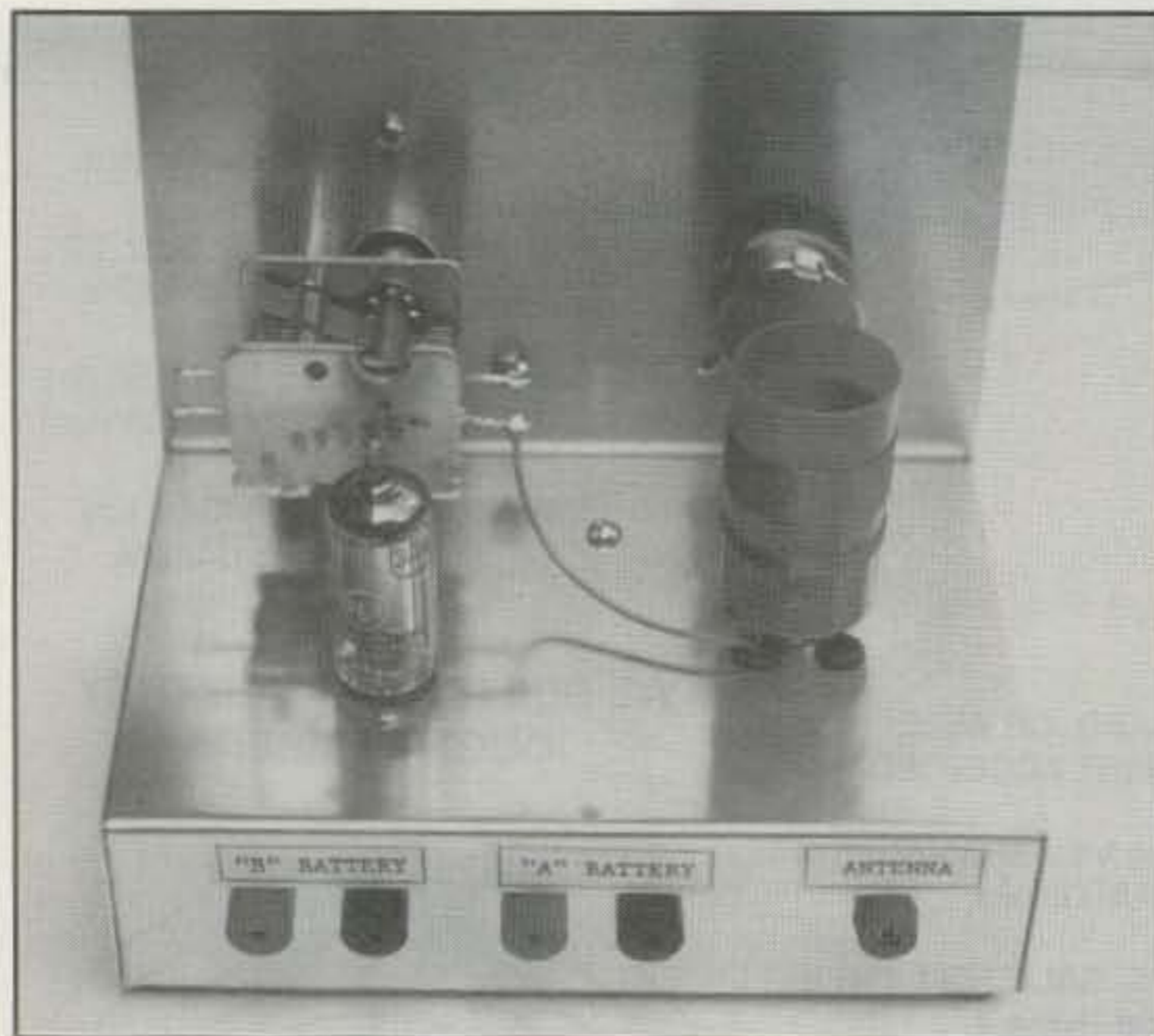
Okay, fellow QRPers and big-time fans of the fabulous '50s, get ready to relive those exciting days of yesteryear with a genuine glow-in-the-dark mini-station built just for fun. We are embarking on a lighthearted trip back in time to feature a super-simple receiver and transmitter guaranteed to put some real pizzazz in your hamming life and to bring a tear of joy to your eye in the process. This setup is so hot, in fact, I could not resist nicknaming it "Red Hot Radio" in honor of that famous product Tabasco® brand pepper sauce that has sizzled pallets nationwide for over 125 years. Yes, and both receiver and transmitter are complete with pill-bottle-wound coils, authentic-era vacuum tubes, and minimum high voltage for good, safe fun. Not only can this rig work DX like a little trooper, it can uncover how your hamming expertise has improved over the years—and how the operator rather than the rig makes the big difference.

Now is your golden opportunity to take a relaxing break from those modern digital dials,

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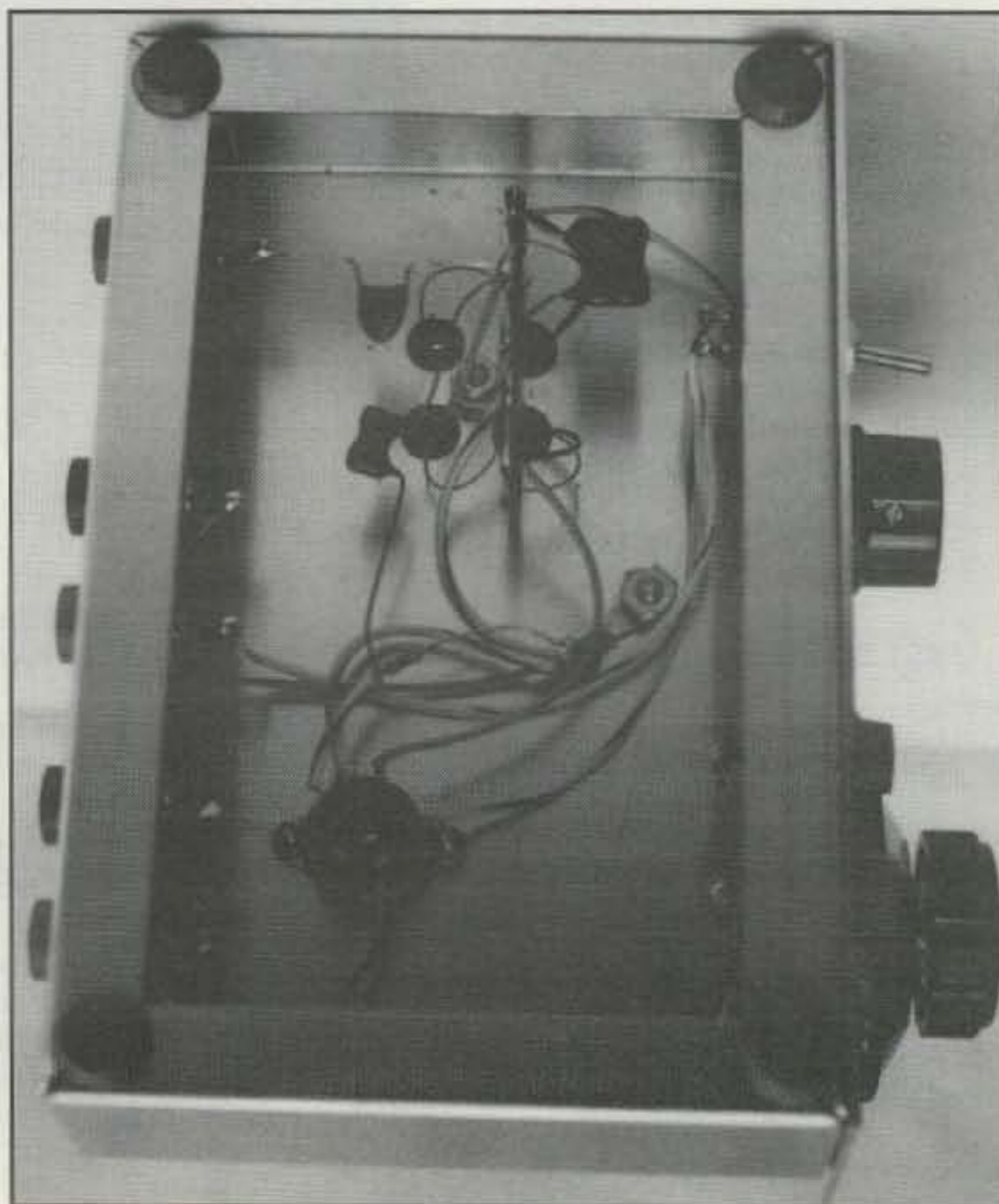


Fig. 1—Red-hot radio for sure! This zestful QRP setup consists of a one-tube regenerative receiver, Baldwin earphones, 500 milliwatt 1S4 transmitter, Speed-X key, and genuine Tabasco® sauce for flavor. Station is completely battery powered. (Thanks to Paul McIlhenney for permission to reference McIlhenney Company's famous Tabasco® brand pepper sauce.)



▲ Fig. 2—Rear view of the regenerative receiver showing layout and mounting of components. Pill-bottle coil form is raised above chassis by long screw with metal spacer.

Fig. 3—Under-chassis view of receiver. Wires from coil pass through rubber grommets. Single terminal strip attached to coil mounting screw simplifies wiring. →



electronic keyers, and narrow CW filters to experience some genuine old-time radio fun. Go for it!

The year was approximately 1955, and one of the most popular low-power or Novice rigs in use was a Hallicrafters S-38 receiver combined with a Heathkit AT-1 transmitter. Knight Kits' Ocean Hopper and Philmore's NT200 were low-budget (pittance?) substitutes, but even those classics of homebrew did not have the simple beauty of a basic one-tube receiver and transmitter assembled from scratch. Some of us did not fully appreciate the fun of homebrew QRP at that young time, however, as we were doing okay working cross-country using an Army-surplus BC-455 receiver and 6L6 transmitter. Little did we realize receiver sensitivity and selectivity were on par with a regenerative unit, and the 6L6 with 150 volts on the plate plus poor antenna coupling was stretching to pump out a good one or two watt signal. Looking back through today's eyes, this month's featured rigs really are little tigers in disguise. What's more, both units can be powered by a handful of readily available C cells and 9 volt batteries and used almost anywhere. Yes, and stations you contact really go wild when you describe this rig. Enthused? Great!

We wish to thank Arnold Sayre, W8WVM, for inspiring this project by building the receiver (his handiwork is incredible), and also Paul McIlhenny for allowing me to compare this setup to the spiciness of Tabasco® brand pepper sauce. Now let's get started with the '50s QRP resurrection!

Arnold's Pet

In recent years W8WVM and I have shared a common interest in building and using simple, low-power rigs from eras past. In fact, almost every time I featured a homebrewable job in this column, Arnold built a showpiece copy that put my original version to shame. This past fall Arnold changed our usual sequence and surprised me (delightfully) by building the little 3A4 regenerative receiver shown in figs. 1, 2, and 3. He also added an irresistible challenge: build a simple, one-tube transmitter to go with it, then work some rare DX with the combo. I will describe the resultant transmitter later in this column, but first let's focus on the receiver.

The original version of this jewel was described in *Boy's Life* magazine and in the ARRL's "How To Become A Radio Amateur" booklet during the early-to-mid 1950s. It covers 80 and 40 meters plus the international shortwave broadcast bands between 3.5 and 9 MHz (good for hamming and SWLing), and removing a few coil turns moves it up to 30 meters. Parts to build the radio are readily available and inexpensive (an ideal low-cost weekend project), and only 18 volts on the tube's plate is required for operation (a non-shocking tube radio!). An aluminum chassis, front panel, and vernier dial eliminate hand capacity and make the receiver as easy to tune as a classic S-38. Finally, Arnold made a couple of minor changes to the original receiver (such as substituting a pill bottle for a plug-in coil form and using a potentiometer rather than a variable capacitor for regeneration) to sim-

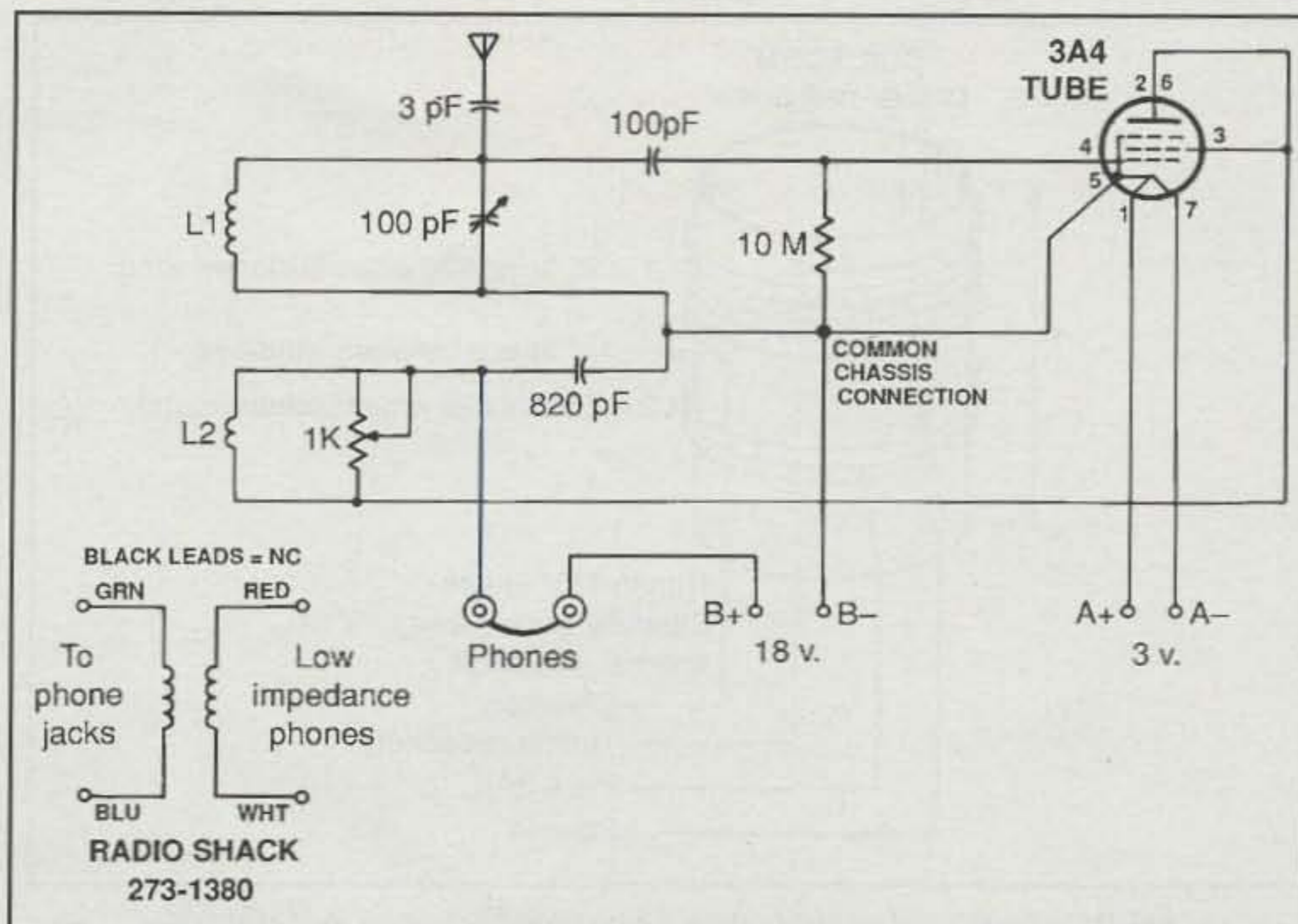


Fig. 4—Circuit diagram of 3A4 receiver. Low-voltage capacitors and 1/4 watt resistors are fine for this little gem. Pins on tube socket are numbered clockwise, when viewed from bottom, with "missing pin space" separating 1 (on left) and 7 (on right). (Courtesy of Arnold Sayre, W8WVM.)

plify assembly today. We will give more details as we continue.

The receiver's circuit diagram is shown in fig. 4, and fig. 5 is a shopping list with notes on where Arnold found his parts. Parts values and positions are not critical, and basic point-to-point wiring makes assembly a cinch. With the exception of flat-out wiring errors, it is nigh-impossible to stop this little gem from working.

Now here are some assembly tips to ensure your success right from first turn-on. Be sure

the chassis and panel are firmly bolted together to minimize hand capacity. If in doubt, add an extra screw and lock nut on each side. The main tuning capacitor is an Antique Electronic Supply item (CV-254) with two sections. However, only the smaller rear (90 pFd) section is used. A similar single-section 90 or 100 pFd capacitor could be substituted if desired. The receiver's range will only be altered slightly, and you can compensate for that by juggling (slightly!) coil turns. For best results use a pair

PARTS LIST

- 2 inch Vernier dial (Mouser 556-S50)
- Aluminum chassis (Allied Electronics 736-0205) 4" x 6" x 1 1/2"
- Front panel, aluminum (Small Parts Co.) 5" x 6" x 1 1/16" thick
- Variable capacitor (Antique Electronic Supply CV-254)
- 3A4 tube (Antique Electronic Supply)
- Tube socket (Antique Electronic Supply PS-201M)
- SPST Toggle Switch (Radio Shack 275-612)
- (5) Tip jacks—red (Mouser 164-401R)
- (2) Tip jacks—black (Mouser 164-401B)
- (5) Phone tips (Mouser 534-1600)
- Coil form (see text)
- 1000 ohm pot. (Mouser 31VA301)
- Knob for pot. (Radio Shack 274-416)
- 10 meg. resistor (Radio Shack 271-1365)
- 3 pF disc ceramic (Mouser)
- 100 pF dipped mica (Mouser)
- 820 pF dipped mica (Mouser)
- "A" battery two "D" cells
- "B" battery two 9 volt transistor battery
- 2000 ohm headphones (Antique Electronic Supply PA-466)
- Tie strip—5 lug type (Radio Shack 274-688)
- Magnet wire #26 enamel (Radio Shack 278-1345)
- (4) Grommets 1/4 inch (Radio Shack 64-3025)
- Insulated hook-up wire
- Miscellaneous hardware
- Optional: audio transformer (Radio Shack 273-1380)

Fig. 5—Quick-reference total parts list for receiver.

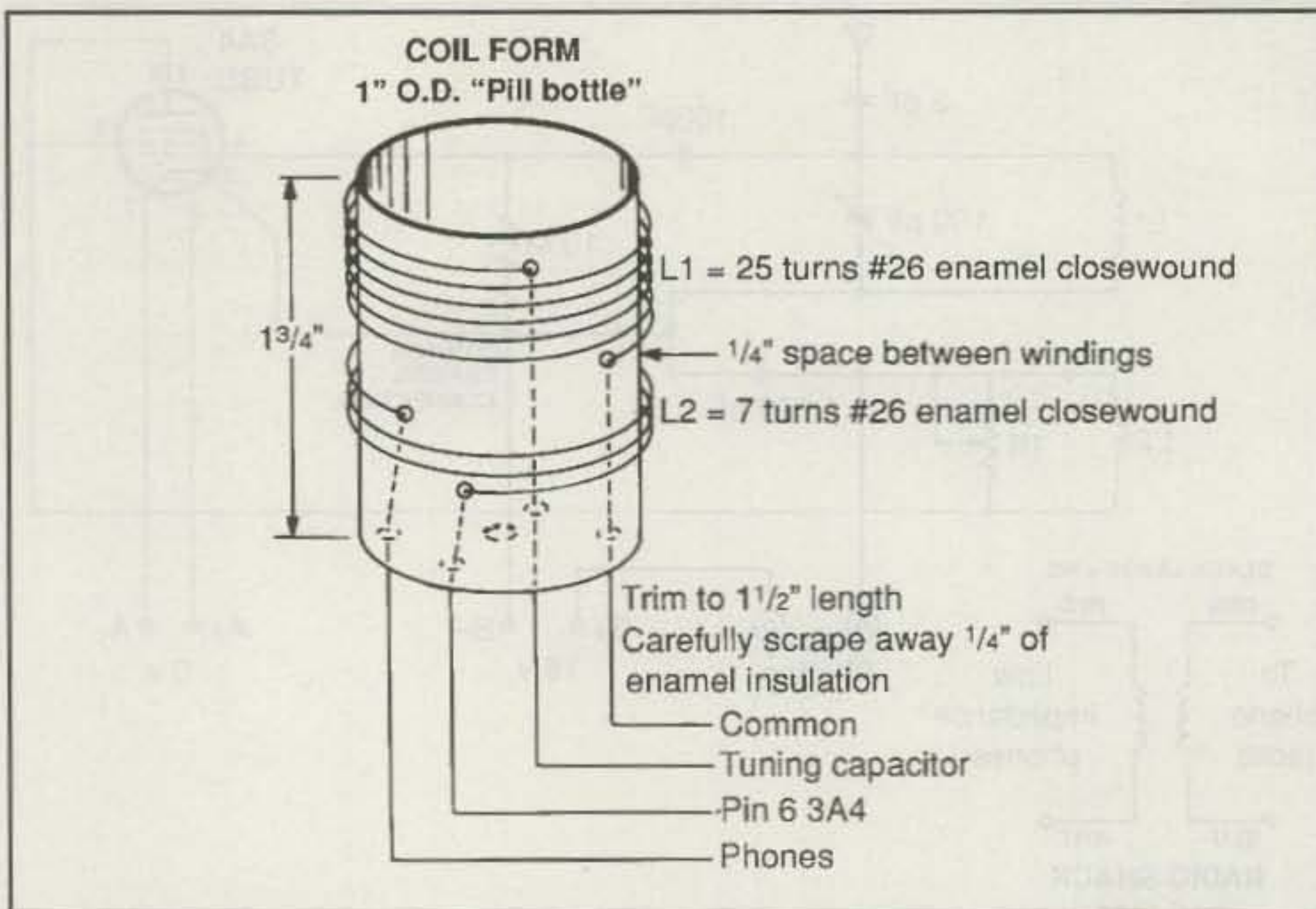


Fig. 6—Coil form and winding details for receiver, compliments of W8WVM.



Fig. 7—Rear view of 1S4 transmitter showing layout of main parts. Photo was shot before unit was completely assembled.

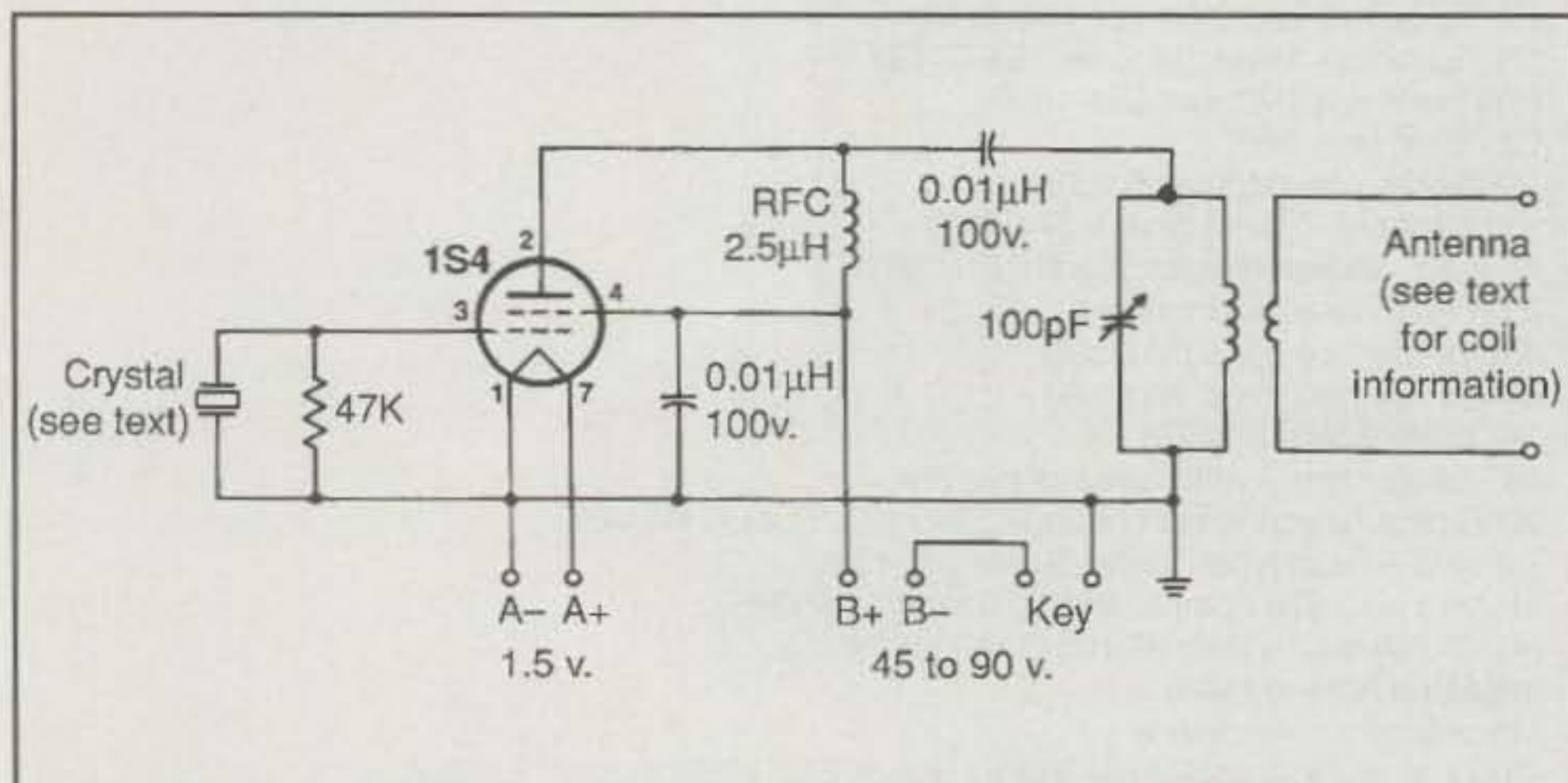


Fig. 8—Circuit diagram of 1S4 transmitter. Tube socket, coil form, capacitors, and resistor like those used in receiver can also be used in this low-power gem.

of old-style 2000 or 3000 ohm headphones (also available from Antique Radio Supply Company, 6221 S. Maple Avenue, Tempe, AZ 85283). As a slightly less efficient compromise, you can substitute a small Radio Shack 273-1380 transformer and connect a modern 8 ohm earphone to its secondary winding. The headphones act as the tube's plate load; that is why a high resistance is required.

The pill-bottle coil form is supported by a screw and metal spacer arrangement. Holes around the support spacer are fitted with grommets to pass coil wires below the chassis. Cut these coil wires precisely, pull them taut, and then solder them to the terminal strip for good receiver stability. Coil winding details are included in fig. 6. My band of preference is 30 meters, so I removed 4 turns from L1 to raise coverage up to 10.200 MHz. Notice, incidentally, L1 and (tickler) L2 are wound in the same direction. Follow that guide, and the little receiver should "gen" with no problem.

Initial setup of the receiver is a snap. Connect an antenna, earphones, and batteries (two series-wired "C" cells are fine for the filament, and two series-wired 9 volt batteries work dandy for the plate), and then increase the regeneration pot until a rushing noise is heard in the earphones. If you do not recognize 80 and 40 meter reception by randomly "tuning around," use a modern general-coverage rig to spot the receiver's regeneration signal. Then make a vernier dial calibration-to-frequency correlation chart for future reference. The receiver is surprisingly sensitive, so get psyched for some red-hot radio DXing!

Dave's Mighty Milliwatter

Finding just the right transmitter to complement Arnold's receiver proved to be a formidable challenge. 6V6's were passed by because the tube was too large and the required plate voltage was too high. 6AQ5's were considered, but they were still a tad taller than the (receiver's) 3A4, and their related circuits were a mite fancy. Then while digging through my old Novice books and notes, I found a long-lost diagram of the little 1S4 transmitter shown in figs. 1 and 7. The 1S4 (and its 3 volt brother, the 3S4) were used in audio output stages of many portable/battery-powered radios of the '50s. They work with 45, 67, or 90 volts on the plate, draw miniscule filament current, and are low priced. Perfect! I do not remember who gave me this circuit or if I originally found it in a magazine. The only hand-scratched reference on its sheet is "A QRP record-setter during the early '50s." Enough said. Resurrecting this little classic today is like finding and fixing up a Nash Metropolitan!

I really should have built the transmitter on a small aluminum chassis to match the receiver, but some beautifully finished wood strips Arnold sent me a year earlier begged for recognition. A quick placement check of ham-fest-obtained parts confirmed everything would fit perfectly with the wood frame's top strips spaced 5/8 inch apart, so assembly was begun and completed in a couple of hours (short-term projects are so nice!).

The transmitter's circuit diagram is shown in

Flash!

Thirty meters continues to be the ideal band for QRP, and your cooperation will ensure it stays that way. Last evening, for example, a QRPer tried call after call to reach a DX station through a (mild) pile-up. The DX station struggled, listening intently, while everyone actually paused. No luck. The DX operator asked the QRPer to stand by for better propagation while he worked a few others. Five minutes later the DX station recalled the QRPer, copied him while others again paused, and made a successful QSO. You could actually sense everyone on frequency giving a cheer for the QRPer. May such congeniality never fade!—K4TJW

fig. 8, and it is a basic crystal-oscillator unit with no complexities. There are less than a dozen parts in the whole transmitter. Old-style FT-243 or newer sealed-case crystals can be used without worry of fracture from high grid current. And another one inch pill bottle can even be used as a coil form. I purchased all the parts to build this delight (except the crystal) at a local hamfest—one-stop shopping—for a total cost of \$6.00. I should have picked a 3S4 so it could run off two C cells like the receiver, but I have always been partial to the 1S4, and the original record setter used a 1S4. The only crystal socket I could find would not accept large-pin FT-243 crystals, so I bought two banana jacks and parallel-wired them to the smaller socket. Using this arrangement, either type crystals can be plugged in and used without fumbles.

The plate/tank coil can be wound with number 18, 20, or 22 wire. Using a 70 or 100 pFd tuning capacitor, a coil of 25 to 28 turns works well for 40 meters or 20 to 22 turns works fine for 30 meters. After some experimenting, I found the best antenna pickup/coupling coil to be 6 or 7 turns of number 16 or 18 insulated wire wound over the center of the plate/tank coil. Experiment with your own unit for maximum output positioning.

Firing Up The Combo

Ah, now we arrive at the final and most exciting step—getting on the air. Connect the 50 ohm coax from your mile-high dipole to the transmitter's antenna coil (include an SWR bridge or field strength meter for tuning). Then connect to the receiver a single 50 or 100 foot long wire positioned away from, and at a right angle to, the dipole. Bingo! Full QSK operation! Now while monitoring the signal on a modern receiver (and without an antenna connected to that receiver), key the transmitter and adjust its plate tuning capacitor for maximum output consistent with best tone quality. Double check to ensure the 3A4 receiver is set on the same frequency (you can hear its regeneration on the receiver, too), then switch off your modern receiver and enjoy red-hot radio at its best.

Good luck, good QRP DXing, and let's QSO on 30 meters some night soon!

73, Dave, K4TJW



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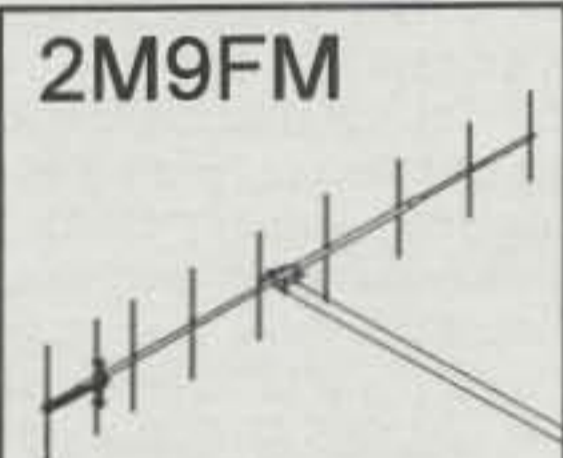
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September

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ANTENNAS & ACCESSORIES

A LOOK AT THE SHACK FROM BOTH ENDS OF THE COAX

BY KARL T. THURBER, JR., W8FX

Book Nook—Part II

Once more I've got a tall stack of books, magazines, and catalogs! With that in mind, we'll again depart somewhat from our usual format to first cover some of these interesting amateur radio, shortwave, electronics, and computer publications. Let's begin with some antenna books.

Book Nook: Reads For The Well-Read Amateur

ARRL Antenna Compendiums, Vols. 3 and 4. Many of us who have antennas as one of our favorite subjects were favorably impressed with the original 1985 Vol. 1 of the *ARRL Antenna Compendium* (176 pages, \$10), which contained 31 previously unpublished papers. Topics ranged literally from "A" (antennas) to "Z" (impedance matching). Vol. 1 had construction articles on exotic designs such as gossamer quad, spiderweb, subsurface, and X-beam antennas. We examined it in the August 1988 column, and it seems like ages ago!

Later, in August 1990, we looked at 1989's Vol. 2 (216 pages, \$14). Vol. 2 included neat articles on an attic tribander, the controlled current distribution (CCD) antenna, balloon- and kite-supported antennas, and half-loops. Also available for Vol. 2 was an optional companion IBM PC disk with several of the BASIC program files contained in the book.

The philosophy of the *Compendium* series is a good one, and results in a sort of "antenna feast" for the antenna buff. The volumes provide a vehicle for publishing deserving antenna articles that overflow the ARRL's journal, *QST*. The volumes contain a wealth of specialized articles on a variety of antenna, balun, computer modeling, matching network, propagation, measurement, and related topics, and they present a number of unusual antennas—many of which most of us never have heard.

In 1992 the ARRL issued the 240-page Vol. 3 at \$14, with 40 previously unpublished articles on antennas, transmission lines, modeling, and related subjects. It broke new ground with novel designs such as Allen's Log Periodic Loop Array (LPLA), Zavrel's Triband Triangle, and Cooke's Skeleton Discone, to name but a few. It's edited by the ARRL's Jerry Hall, K1TD. Programs for five of the articles are on an optional diskette (\$10).

Earlier this year the ARRL published the latest—and perhaps the best and most comprehensive volume—in the *Compendium* series, Vol. 4 (204 pages, \$20). The latest volume contains some 38 articles covering a wide range of topics. There are simple, practical antenna projects as well as heavily theoretical treatments of complex arrays. With sunspots low, a welcome inclusion is seven articles devoted to 80 and 160 meters. There's heavy empha-

sis on computer modeling, with six articles. Vol. 4 is edited by R. Dean Straw, N6BV.

Hand-in-hand with the increased emphasis placed on computer modeling, the new volume comes with an IBM-PC compatible 3.5 inch diskette. It includes a variety of computer programs and data to support the Vol. 4 articles, including source data files and resulting pattern plot files created by the authors to model their antennas. While full-blown modeling programs aren't included, there is a handy program on the disk, PLOT, by Brian Beezley, K6STI. You can use it to view the pattern plots.

These ARRL books can be ordered from CQ Communications (toll-free ordering 1-800-853-9797), or for more information contact the ARRL at 225 Main Street, Newington, CT 06111-1494 (203-666-1541).

Ten-Minute Guide to the Lotus Organizer. Do you need to "get organized"? Like *really* organized? After trying different approaches to organizing my calendar, appointments, meetings, ham activities, names and addresses, "to do" lists, future planning, reminders, and the like, I finally settled on the Lotus Organizer 2.0 program from Lotus Development Corp. to help me out.

Lotus Organizer is an electronic day planner, a specialized personal information management (PIM). For use with Microsoft Windows™, Lotus Organizer helps you keep your daily life organized by making use of your computer. You can print out pages to slip into most of the popular paper-based organizers, or if you really want to get fancy, you can even run the program on a notebook computer and take it with you wherever you go.

Problem was, I downloaded the program from CompuServe on an "almost-free" Lotus special promotion, and there was no printed documentation. Although the program's basic features were fairly easy to master, I needed a little more. That's when I discovered the *10 Minute Guide* series of Alpha Books.

Alpha Books has published a number of these guides for impatient, busy people and those who don't like to read user's manuals but who want fast results. The guides must be on the right track, because the publisher claims to have sold over two million of the books in the series. The guides are priced quite reasonably—\$10.99 for the 138-page *10 Minute Guide to Lotus Organizer 2.0*, by Robert Mullen.

Mullen's *Guide* obviously isn't complete, and it teaches you *only* what you need to know to become productive with the software, dispensing with most of the technical details. (Alpha Books also publishes the *The Complete Idiot's Guide to...* series of quickie how-to computer books.)

If you need a more comprehensive treatment of the Organizer, you can go to a more substantial text, such as *Que's Guide to Lotus Organizer 2 for Windows*, by Anderson, Marmel, et al. The Que book is an excellent refer-

ence and includes a number of proven tips, notes, cautions, and troubleshooting suggestions. It even includes information on using the Organizer on a network.

For more information on the Alpha or Que books, check them out at your local bookstore or contact the publisher, Macmillan Computer Publishing USA, 201 West 103rd St., Indianapolis, IN 46290 (1-800-858-7674).

Resource Solutions Update. In the June 1994 column we noted a new publisher for the *Amateur Radio Mail Order Catalog and Resource Directory*: David Thompson, K4JRB, owner of Resource Solutions. I'm a big fan and user of the *Directory*, a comprehensive communications resource originally designed by founder John Hart, NØOCF, so that newcomers to amateur radio could have one source-book for everyone in the mail-order business.

We hadn't heard much from Dave in the past year or so, and had not seen a new edition beyond the 1994 4th edition, so we tweaked Dave for an update. The big news he conveyed was that he was in the process of preparing the 5th edition. He expects it to be available in September, about the time you read this column. He's making arrangements for the ARRL to publish and distribute the *Directory*, which will be published every 16 to 18 months rather than annually.

In case you haven't seen the *Directory*, it's categorized and alphabetized into a number of easy-to-find headings. Listings include the name, address, phone, and FAX number of the vendor, plus a description of products and services offered. There are plans afoot to change the format of the catalog slightly, as well as to include more advertising and listings.

With the trend toward disk, CD-ROM, and online-based catalogs and resource databases, Dave had planned to maintain accurate listings with a mid-year update on disk. Amateur radio community reaction to the planned disk was lukewarm, so he has put off plans to issue an electronic version. However, he still may place the text on either a disk or a CD-ROM in the future. The potential for economic electronic publication is there, Dave says, since you don't need to commit to several thousand copies to get a decent price as you do with printed copies.

Check with Dave for current pricing and availability of the 5th edition; some of the 4th edition catalogs still may be available at the closeout price of \$11 postpaid in the U.S. For more information, contact Resource Solutions, 6050 Peachtree Parkway, Suite 340-228, Norcross, GA 30092 (404-448-9836).

Hambrew: New Rate. In the September 1994 column we highlighted a new quarterly magazine for amateur radio builders and designers, *Hambrew*, first published in Autumn 1993. As we noted, its focus ranges from beginner-level kit-building projects to much more advanced RF design.

289 Poplar Drive, Millbrook, AL 36054

Some theory is offered, with kit reviews, schematics, etching patterns, "ugly-style" and cookbook-style projects, and more. Coverage includes diverse topics such as new products, transmitters, receivers, transceivers, QRP gear, filters, antennas, antenna tuners, accessories, and test equipment. Articles have included submissions by noted builders and authors Doug DeMaw, W1FB, Fred Bonavita, W5QJM, Bruce Williams, WA6IVC, and others prominent in the homebrew community.

The magazine is catching on, especially now that it has a cut rate that's about half of the old domestic subscription rate. Domestic subs now are just \$10 per year (\$15 in Canada/Mexico and \$21 international). Sample back issues are \$6 each (issues published after Fall 1994 are \$3.50 each).

For more information, contact Hambrew, P.O. Box 260083, Lakewood, CO 80226-0083 (303-989-5642).

Radioware Catalog Update. In several columns we noted the nicely illustrated catalog of antennas and accessories for amateur, SWL, and scanner hobbyists offered by Radioware Corporation. The Radioware catalogs include antennas for HF, VHF, and UHF; antenna wire, including Flex-Weave™ from Davis RF; antenna traps; baluns; filters; antenna relays and switches; transmission line; lightning protection devices; insulators; mobile mounts; and SSTV imaging hardware and software.

Recently, owner John Chipman, WA1KYH, wrote with some additional information on his company and what it offers. Radioware, he notes, is a fairly new company. It was started about 2½ years ago, and has printed three catalogs to date; the fourth should be available by the time you read this, and it's free. John also says he has a business relationship with Davis RF. Although the two companies are independent, Radioware has exclusive distribution rights for the Flex-Weave antenna wire for the hobbyist (amateur, SWL, and noncommercial) market.

John prides himself on his careful attention to customer support, with most products being shipped the same or the next day. He also opens up his 800 number for technical support as well as ordering. This nice policy is a rather rare practice that's quite expensive for a small vendor to offer.

For a catalog, contact Radioware Corporation, P.O. Box 1478, Westford, MA 01886-4978 (1-800-950-9273).

Antenna Notes

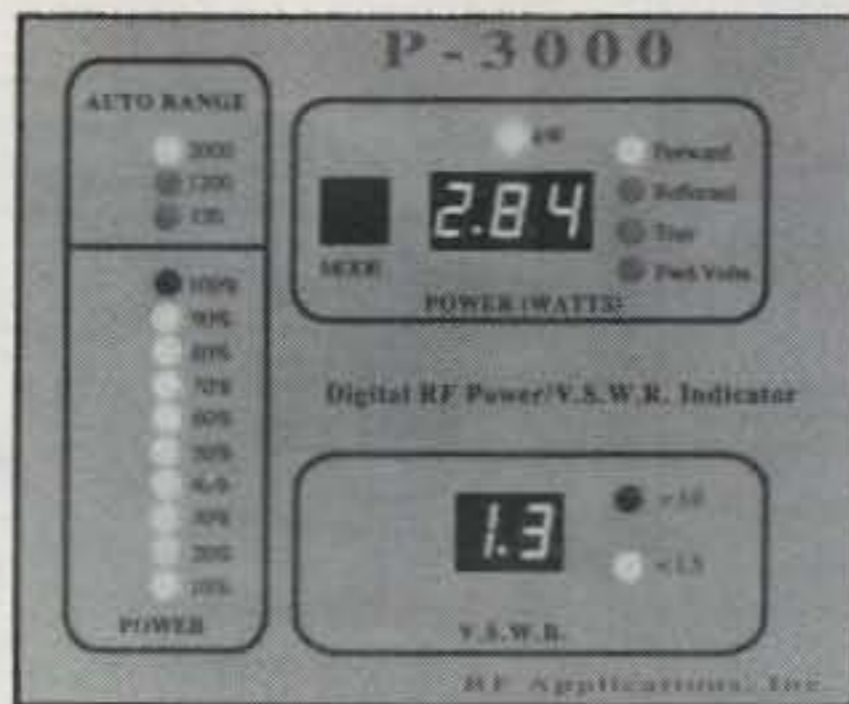
W1ICW on Coax-Seal®. In February we highlighted Coax-Seal, pointing out its advantages in solving the "connector sealing problem" experienced with outdoor antennas and transmission lines. As we noted, Coax-Seal is a hand-moldable resin suitable for sealing a variety of materials, including metals, plastics, and vinyls. The product produces a waterproof, long-lasting seal for coaxial cable, cable fittings, CATV hardware, antennas, feedlines, and microwave hardware.

J. Tex Kehley, W1ICW, wrote that he has had a good deal of experience with Coax-Seal and considers it to be an excellent sealing material. He makes these experienced-based suggestions in productively using the product:

"1. You should put a thin layer of vinyl (plastic) tape over the coax connection before adding the Coax-Seal. If you need to change

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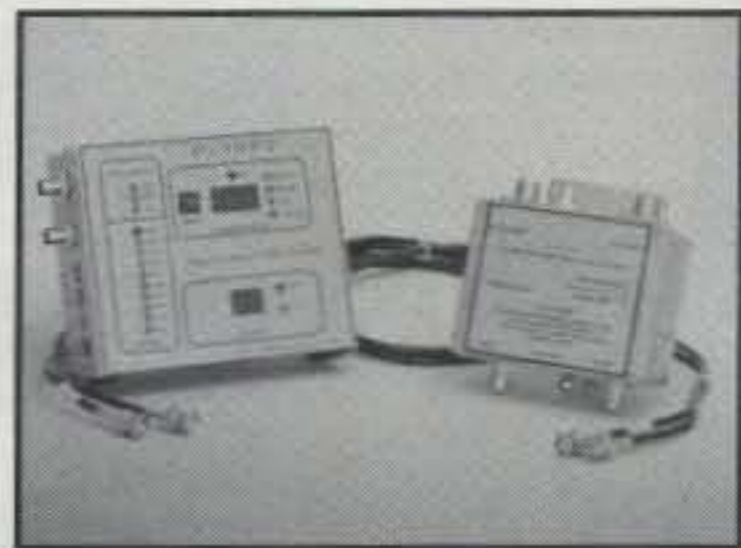
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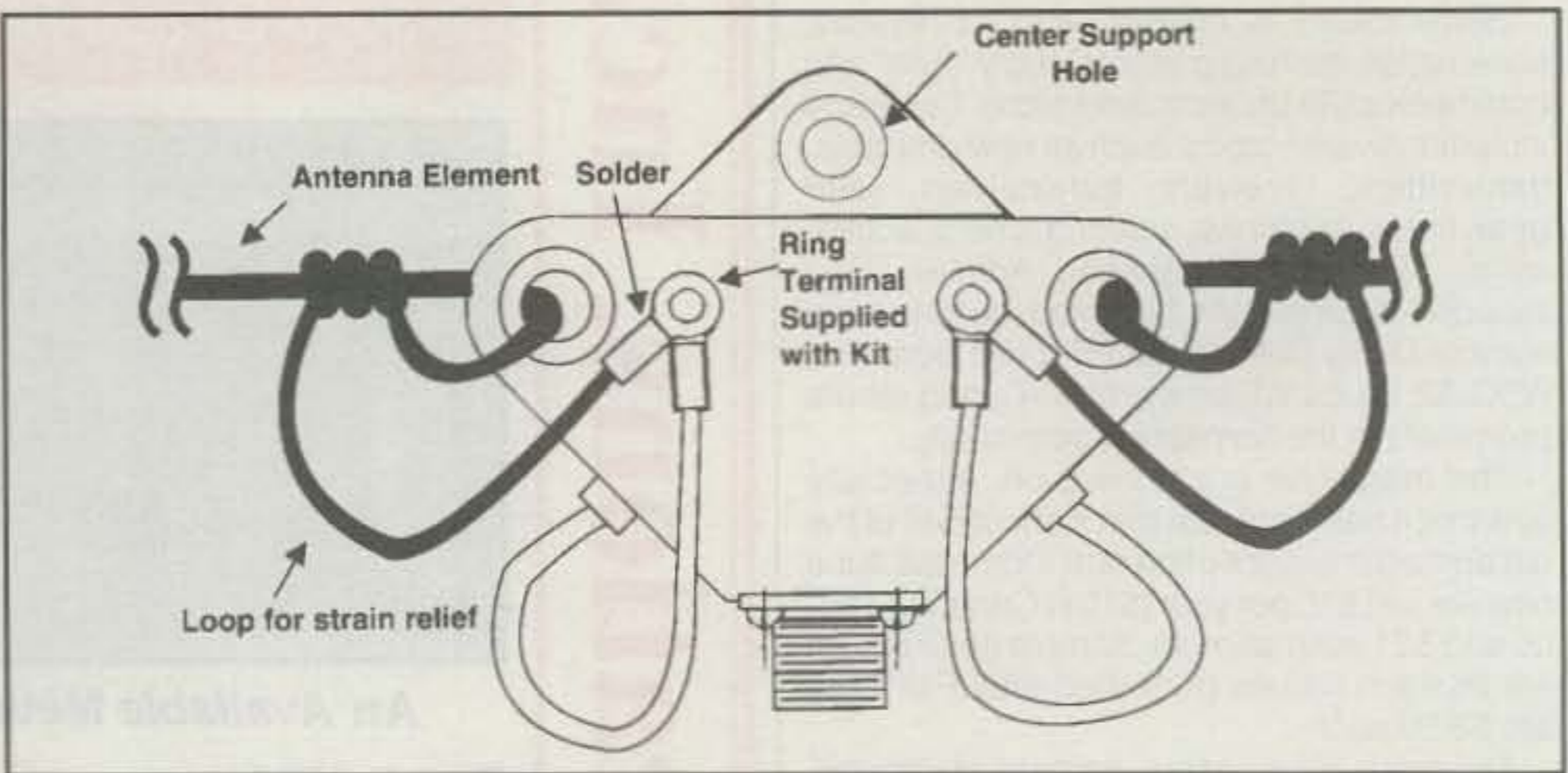


Fig. 1— The heart of Alpha Delta Communications' new DELTA-C Antenna Hardware Kit is the center insulator. The insulator, along with the rest of the kit components, is molded of a special plastic said to be virtually impervious to sunlight, weather, and RF effects. Included is the Model SEP Static Discharge Unit, which is installed on the back of the insulator. All hardware is #10 stainless steel, and internal connections are soldered.

the coax or move the coax to another antenna, you simply remove the Coax-Seal as best you can, find the end of the tape, and unroll it to find a bright, shiny connector underneath. Don't let the removed Coax-Seal get any grass or soil on it, as it can be rolled out in a thin strip, flattened, and reused.

"2. If you bury the coax connection, put [on] the first layer of tape, then the Coax-Seal, and a hefty cover of tape over all of that. An alternative is to put shrink wrap tubing [on] as the final overcoat. When you apply the heat for the shrink wrap, the heat will make the Coax-Seal fill any voids and air bubbles.

"3. Sometimes when I am redoing a joint, I have some Coax-Seal left over. I just roll it up in 3/4 or 1 in. balls and put it in a 35mm film can for future use."

Thanks for the suggestions, Tex. Note that Coax-Seal comes in two widths, 1/2 inch and 1 inch; both are furnished on rolls having a peel-away backing paper. The retail pack is 1/2 inch wide and is \$2.49 in 60 inch long rolls. Industrial packages are available in both widths in 12 ft. rolls. For a spec sheet, contact Universal Electronics, Inc., 4555 Groves Road, Columbus, OH 43232 (614-866-4605). A trial packet for four connectors is \$1 postpaid.

New Antenna Goodies from Alpha Delta Communications. In the April column we noted the relocation of Alpha Delta Communications from Tempe, Arizona to Manchester, Kentucky. We also summarized the firm's lightning and static discharge protection, RF switching, and amateur/SWL dipole and sloper antennas.

Since April, Alpha Delta has expanded its product line. It has added three new products: an antenna hardware kit, antenna end insulators, and an SWL antenna. The new products ran into some factory tooling problems, which delayed delivery, but these logistical problems should be over with by now.

The new Model DELTA-C Antenna Hardware Kit consists of a DELTA-C Center Insulator, two Model CIN End Insulators, and a Model SEP Static Discharge Cartridge. The kit components are molded of a highly durable plastic known as Deltalloy™, said to be virtually impervious to sunlight, weather, or RF ef-

fects. The parts have a hefty one-inch cross-section to safely sustain heavy wind and ice conditions (see fig. 1 and photo).

Included in the antenna hardware kit is the Model SEP Static Discharge Unit. It contains a ceramic gas tube which provides a discharge path for the high levels of static that can develop on antennas. Under normal conditions the unit will last years, but it's field replaceable.

The hardware kit also includes the new Model CIN End Insulators, which also are available separately. You can use these insulators to construct various types of wire antennas or use them in conjunction with the DELTA-C kit for antennas that require more than two end insulators. I was furnished a sample hardware kit and several insulators, and found the new products to be very attractive and rugged. A bonus is that their gray color makes the antenna less conspicuous when installed.

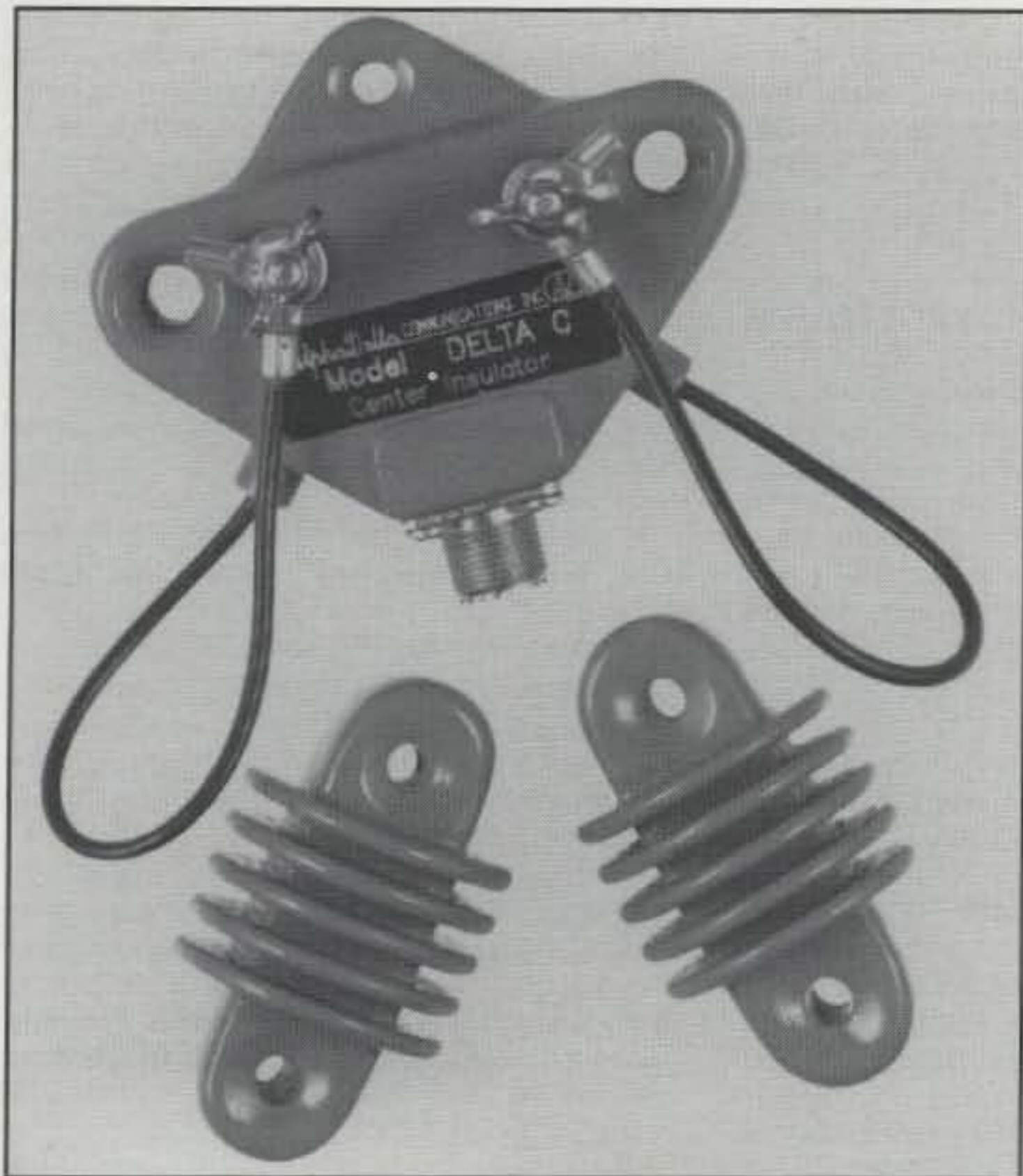
The new Model DX-Ultra SWL Antenna System is a high-performance, multi-element, 80 ft. dipole. The wire elements' design allows broadband operation on 1/2 and 3/4 wavelength multiples of various shortwave frequency ranges. The antenna is equipped with a pair of proprietary "iso-res" RF choke coils and parallel wire elements for good broadband performance; there are no lossy, narrowband traps.

The new SWL antenna is fully assembled and is equipped with the new DELTA-C hardware kit, described above, which includes the SEP static discharge cartridge and CIN end insulators. The antenna can be mounted as a dipole or as an inverted Vee.

For more details and current pricing, contact your dealer or Alpha Delta Communications, Inc., P.O. Box 620, Manchester, KY 40962 (606-598-2029).

Telex/Hy-Gain DCU-1 Pathfinder Digital Control Unit. Telex® recently introduced a state-of-the-art digital control unit, the DCU-1 Pathfinder (see photo), for Hy-Gain® rotators. It's designed specifically for use with the Ham IV and T2X Tailtwister, but it's also backwards compatible with any eight-wire Hy-Gain Rotor such as the Ham II or Ham III.

According to information from Telex Amateur Products National Sales Manager Steve Morris, K7LXC, the DCU-1 Pathfinder incorpo-



▲ Telex offers a new, state-of-the-art digital control unit, the DCU-1 Pathfinder, for Hy-Gain rotators. It's for the Ham IV and T2X Tailtwister, but is backwards compatible with any eight-wire Hy-Gain Rotator. The DCU-1 incorporates advanced features such as digital bearing readouts to one degree, motor slowdown, and an eight-second automatic brake delay. (Photo courtesy Telex Communications, Inc.)

◀ The Model DELTA-C Antenna Hardware Kit consists of a DELTA-C Center Insulator, two Model CIN End Insulators, and a Model SEP Static Discharge Cartridge, which is installed on the back of the center insulator. The components are molded of a highly durable plastic known as Deltalloy™, said to be virtually impervious to sunlight, weather, and RF effects. The parts have a one inch cross-section to safely sustain heavy wind and ice conditions. (Photo courtesy Alpha Delta Communications, Inc.)

rates a number of impressive features. These include digital bearing readouts to one degree, motor slowdown, and an eight-second automatic brake delay. It also has automatic calibration and selectable center of rotation.

The unit features six user-programmable

memory presets and RS-232 computer control capability. The six programmable presets allow you to preprogram your favorite beam headings—a highly desirable feature for contesting, DXing, and VHF/UHF work. You can reset the memories easily at any time.

The DCU-1's RS-232 computer capability allows rotator control from your PC; there's a serial port pass-through that lets you simultaneously connect your radio, TNC, modem, or other serial device to the serial port. A BASIC computer program for rotator control is included in

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the manual; for application software developers Telex offers a free package of information.

The DCU-1 Pathfinder by itself is \$519.60; various packages are available that include the T2X Tailtwister and Ham IV rotators. The DCU-1 and the rotators are available in both 110 and 120 VAC, 50/60 cycle versions.

For information, contact your Hy-Gain dealer or Telex Communications, Inc., 8601 E. Cornhusker Highway, P.O. Box 5579, Lincoln, NE 68505 (402-467-5321). A catalog of current Telex and Hy-Gain antennas, towers, and rotators is free upon request.

New from Antenna Mart for 1995. In several columns we featured antenna products from Bill Wall, KC4UZ, of Antenna Mart. Bill and Antenna Mart are well known for their Quads and other antennas and accessories. These include spreaders, booms, hubs, truss pipe kits, gamma matches, RF switches, masts, pulley adapters, gin poles, and other products of Quad-builder interest.

We also noted in a recent column that Antenna Mart had jointly developed (with R. Allen Bond, WB4GNT, of Max-Gain Systems, a major source of fiberglass products for amateur use) a rugged new Quad spreader. It's known as the "Type 6," for heavy-duty use. The new spreader reportedly is the first heavy-duty, UPS-shippable 40 meter spreader.

Other "new for 95" Antenna Mart products include the full-size AMQ-2, two-element 80 meter Quad; reduced size 40 and 80 meter Quads; a broadband kit for linear loaded 40 and 80 meter reduced-size Quads; heavy-duty hubs for 3 to 4 inch O.D. booms; 52 ft. 80 meter spreader rods; reduced-size spreader rods for 40 and 80 meters; and heavy-duty RF remote switches with 7 or 11 outlets.

Contact Antenna Mart, P.O. Box 699, Loganville, GA 30249 (404-466-4353). (For a fiberglass price list, details on Quad spreaders, and application notes, contact Max-Gain Systems, Inc., 221 Greencrest Court, Marietta, GA 30068-3825 [404-973-6251].)

Computer and Software Notes

SAT TRACKER® from EDC. Communication through amateur radio satellites and bouncing signals off the Moon are perennially "hot" areas in amateur radio. Since 1961, when the first Orbiting Satellite Carrying Amateur Radio (OSCAR) was launched, amateurs have communicated over great distances using VHF and UHF, wavelengths traditionally for short, line-of-sight paths. However, to effectively use satellites, you must precisely locate the satellite and know when it's within range. Many savvy operators slave their antenna rotators to their satellite tracking program for automatic antenna aiming.

Some commercial software products and rotators address this requirement. Distributed by Electronic Distributors Co., SAT TRACKER, a real-time system for computer control of antenna systems, does just this. It's a hardware/software combination that lets you track accurately all types of satellites and other objects (such as the Moon) from horizon to horizon. You can even track rapidly moving, low-orbit satellites such as the amateur radio Microsats and military LEO satellites.

The system uses a proprietary software driver that allows bidirectional parallel interface communications for maximum data transfer and control. You can use the package for mon-

itoring the orbital paths of multiple satellites, tracking the satellite of interest while running other DOS or Windows programs.

The SAT TRACKER system is said to be accurate to within 0.72 degrees in elevation and 1.44 degrees in azimuth. It's laptop-compatible for portable operation, requires no PC expansion slots or serial ports, and is compatible with a variety of other satellite-tracking software, including Instant Track™ and Real Track™. Running in the background as a TSR (terminate and stay resident) program, it's DOS and Windows™ 3.1 compatible and it works well with Yaesu and EMOTO AZ-EL rotators.

For pricing, contact Electronic Distributors Co., 325 Mill Street N.E., Vienna, VA 22180 (703-938-8105).

SquareNote for Windows. We've been an enthusiastic user of SquareNote™, a powerful but easy-to-use IBM PC personal information manager (PIM) for years. We wrote it up several times, most recently in December 1992 describing V4.1.

Realistically, in the "information superhighway age," just finding things is a very real problem for most of us. As we noted previously, we have found SquareNote to be excellent for tracking subjects in this column. For example, when a reader inquires about a particular subject, we can search for and instantly locate all issues in which we covered the subject.

We also can search by subject area or text to reply to readers who can't remember the exact issue in which a particular subject appeared (see fig. 2). SquareNote also is of use to those who maintain back issues of *CQ*, *73 Amateur Radio Today*, and *QST* and who would like to have a reliable way of locating important construction or technical articles.

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SquareNote lets you write, edit, store, retrieve, and maintain notes in much the same way as you would a stack of 3 x 5 inch index cards. But the program goes far beyond a box of low-tech paper index cards, offering considerably more functionality.

The program neatly organizes and precisely tracks text; it's a powerful, menu-driven, free-form database that can be an answer to one's messy desk, cluttered drawers, and stuffed briefcases. Devoting a few minutes a day to program maintenance, you can gain control over your notes, article clippings, correspondence, and other documents, locating papers or notes that you've referenced in the database in seconds.

Now SquareNote is available in a completely rewritten Windows Version 6. A host of new features make it particularly suitable for researchers and academics. Some of these features include drop-down menus; five Main Screen windows to give you much more information about each note; a bibliography feature; more powerful Boolean-style text search capabilities; numeric fields; the ability to create, name, and select large and complex note stacks; the availability of dozens of user-created macros; a pop-up calendar and calculator; extensive file import and export capabilities; and considerably more.

A new DOS-based version also is available (it uses the same file format), as is a Macintosh version for System 7.0 or higher. For new users the program is \$129 plus \$4 shipping; upgrades are \$53 postpaid. Specify which Version 6 edition you want: Windows, DOS, or Mac. (I checked out V6.1; by the time this appears, V6.2 should be available.)

Also, the publisher has available several related self-help and instructional programs that are SquareNote based. Among these is "Organize-Analyze-Write," which offers a variety of ideas and suggestions on improving your organizational, research, and writing capabilities—things with which almost all of us could use help. It includes a workbook, a small, DOS-based version of SquareNote suitable for a small laptop computer, and the instructional notes themselves. It's \$33 postpaid.

For more information, contact SQN, Inc., 60 East Chestnut Street #342, Chicago, IL 60611 (1-800-428-2032).

PROCOMM PLUS for Windows Maintenance Update. One of the most popular communications terminal programs, especially among radio amateurs, is PROCOMM PLUS, available in both DOS and Windows versions. In the January column we highlighted the new Windows Version 2.0 (\$179), which we found to be chock full of new and enhanced features. While the whole program is beautifully executed, we noted that the most important of the new features relate to the new FAX options. For the first time in PROCOMM, you can easily send, receive, and manage your own FAXes, either sending them directly from your application programs or using PROCOMM alone.

Recently, the publisher issued a free maintenance release, V2.11, which updates and enhances several of the program's capabilities, improving functionality and reliability. These include support for TCP/IP Telnet connections and FTP (File Transfer Protocol) file transfer and management, of special interest to those who use PROCOMM PLUS for the Internet.

The maintenance update also adds a new FAXVIEW toolbar and improved FAX send/

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| 1.78:1-HDU50 | 50Ω:28Ω & 12.5Ω | \$49.95 |
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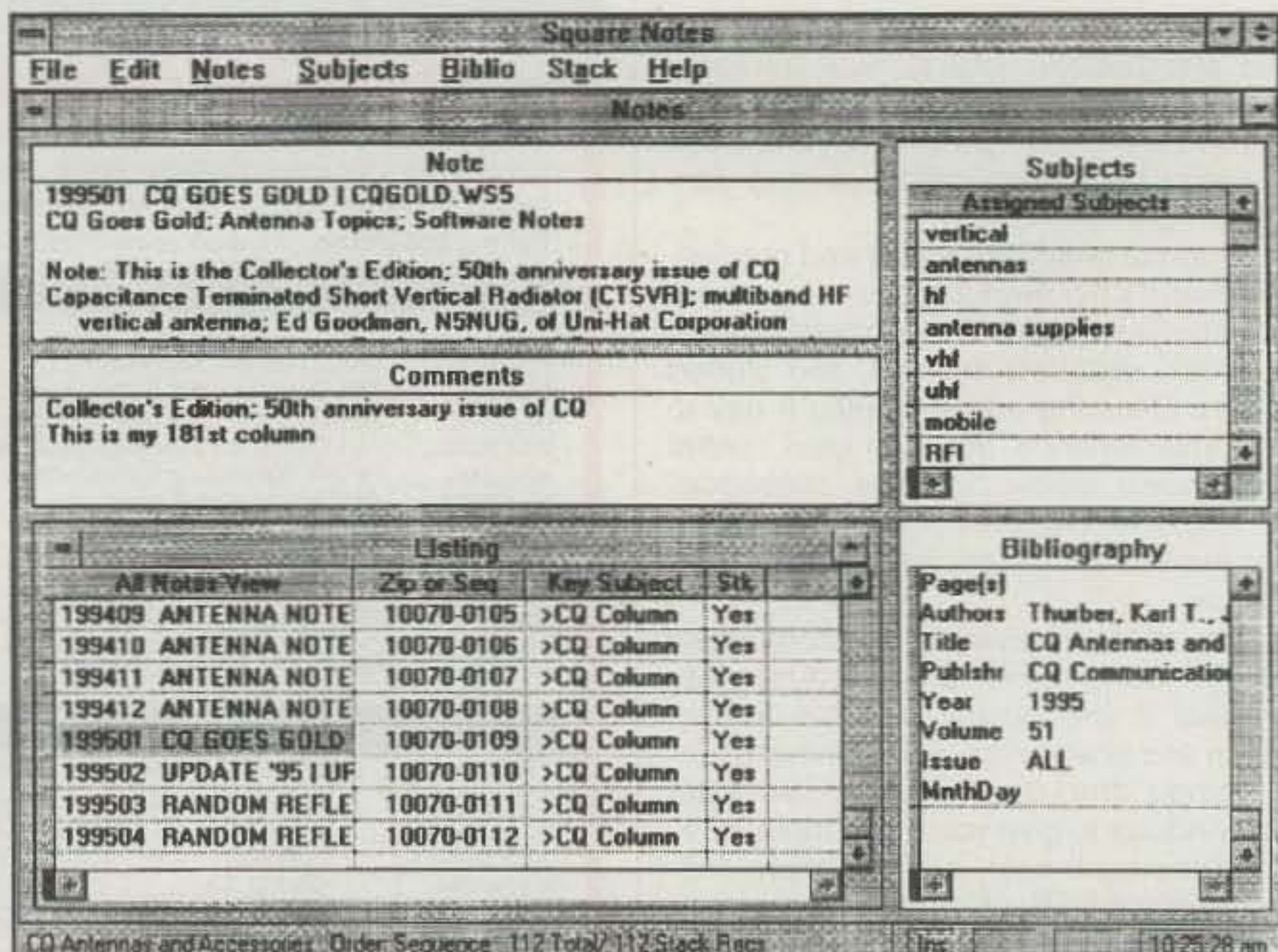


Fig. 2— SquareNote for Windows Version 6 is a powerful, menu-driven, free-form database that can be an answer to one's messy desk, cluttered drawers, and stuffed briefcases. The program lets you write, edit, store, retrieve, and maintain notes as you would a stack of 3 x 5 inch index cards. As you see from this main screen print, I use SquareNote to track the contents of each of my CQ columns to facilitate responding to reader inquiries.

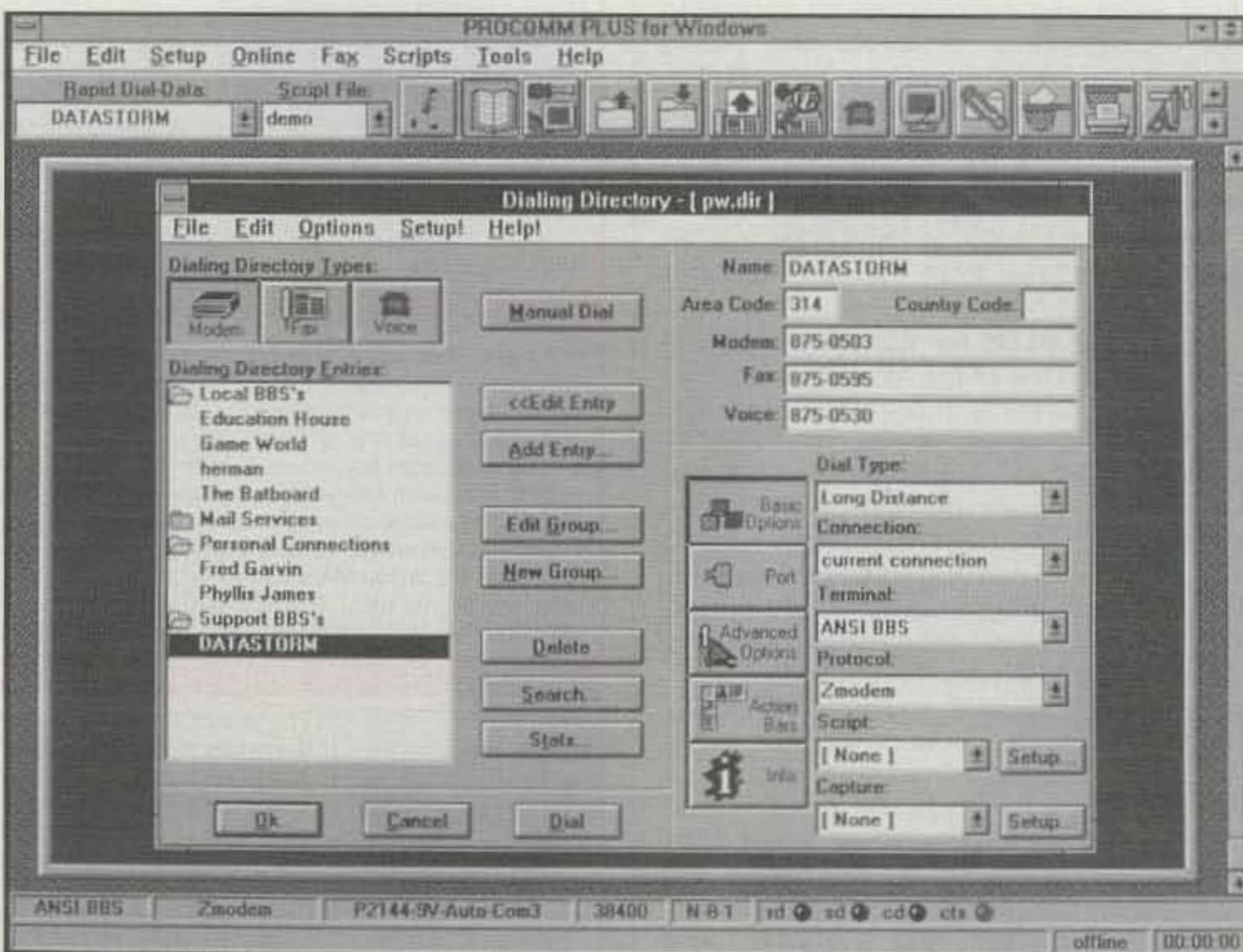
receive capabilities, and it offers support for the IBM OS/2 operating system Windows emulation. There also are dozens of smaller but important improvements to what already is an outstanding communications program.

If you're a PROCOMM PLUS for Windows V2.0 user, you can update for free to V2.11 in three ways. You can download the update from the DATASTORM BBS at (314) 875-0503, from CompuServe (GO DATASTORM), or from a

variety of popular Internet FTP sites. You also can order an update disk and printed supplement for \$7.50 shipping and handling directly from DATASTORM, P.O. Box 1471, Columbia, MO 65205-1471 (1-800-315-3282).

Looking Back Five

Now you know what the column looks like in



PROCOMM PLUS for Windows is one of the best communications terminals you can find. Here's the Dialing Directory, which stores all the information needed to call another PC, a FAX machine, or another person. When you select a directory entry, you are effectively "programming" PROCOMM PLUS with the specific values needed to make the connection. (Photo courtesy DATASTORM)

September 1995. But what were the hot topics in the column of September 1990?

The September 1990 column was entitled "Opening the Mailbag." In that column we caught up on a good-size stack of reader mail. We aired several letters from readers, including those discussing the relative merits of the multiband Zepp and the G5RV HF multiband antennas, rebuilding one's antenna system from the ravages of the Hurricane Hugo disaster, and coping with restrictive building and zoning codes.

We also described 2 meter/70 cm dual-band VHF/UHF amateur antennas from The Lakeview Company and COMTELCO Industries, mentioned the PROCOMM/Digitrex Discone, and noted the handcrafted G.A.M.

Electronics mobile and base antennas. We profiled Aluma Towers' line of all-aluminum towers and Will-Burt TMD pneumatic telescoping masts.

Software-wise, we discussed Roy Lewallen, W7EL's ELNEC antenna analysis and modeling program; a color SSTV program for the Atari ST computer from John Langner, WB2OSZ; the HotWire file transfer utility from DATASTORM; and budget-priced, so-called "zero-slot" local area networks (LANs) such as The \$25 Network offered by Information Modes.

If you find a topic we covered in this or a previous column to be of interest, please obtain the back issue directly from CQ's Hicksville, New York office, rather than requesting the arti-

cle from us. Most back issues are available from CQ for \$3.50 postpaid. (CQ also offers various "back issues specials" to complete your collection. Check their ad, or call them at 1-800-853-9797 to order back issues.)

Wrap-Up

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

Overheard: We've always said that there's no job so simple that it can't be done wrong.

73, Karl, W8FX

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| IC281H | 2M Mobile | \$488.95 | \$325.95 |
| IC-2000H | 2M Mobile | \$430.95 | \$299.95 |

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| DJ-180T | 2M HT | \$289.95 | \$199.95 |

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NEWS OF CERTIFICATE AND AWARD COLLECTING

This month we spotlight USA-CA award recipient #660:

Wayne Bollschweiler, WB7QID USA-CA #660

"I got involved in amateur radio some eighteen years ago. Actually, I followed my brother and nephew into the hobby. I figured that my brother wasn't any smarter than me and if he could do it, I could too.

"There were no amateurs in Uinta County at that time, so I had to do it all alone. I studied and practiced the code on my own, then went to Salt Lake City to take my tests. After pass-



Wayne Bollschweiler, WB7QID, USA-CA #660.

ing the Novice exam, I immediately tackled the General Class test and passed that as well. It was just ten days after my 58th birthday.

"I checked my logs 13 months after getting my General Class license and found that I was just 8 contacts away from DXCC and 13 away from 5BWAS. Six months later I received both those awards. I now have over 5000 QSL cards from around the world. One of my most treasured is from the infamous Peoples Agricultural Mission in Georgetown, Guyana.

"Besides amateur radio, I enjoy knitting scarves and doing counted cross-stitch pictures. Three of my cross-stitch efforts have won blue ribbons at the county fair, and two of those were judged to be reserve Grand Champions.

"Yes, amateur radio has been a source of much pleasure and satisfaction over the years. The eight years working toward the USA-CA All Counties Award have provided many pleasant highlights. Thank you, one and all, for helping to make it all possible. 73 and good luck."

USA-CA Awards Issued

USA-CA 500 Awards were issued to: William Kling, KI6PG, #2862; John M. Keeley, WU3H, #2863; John D. Peters, K1ER, #2864; Corinne Keyser, W7DIF, #2865; Fred L. Crawford, AB5SL, #2866; James Klingler, AA0MZ, #2867; and J. Barclay Porter, KE3C, #2868; Manfred Hermsdorf, DL1HSC, #2869.

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J. Barclay Porter, KE2C
USA-CA All Counties #872
June 28, 1995

Fred L. Crawford, AB5SL
USA-CA All Counties #873
July 5, 1995

USA-CA 1000 awards went to: William Kling, KI6PG, #1375; John M. Keeley, WU3H, #1376; John D. Peters, K1ER, #1377; Fred L. Crawford, AB5SL, #1378; and J. Barclay Porter, KE3C, #1379.

USA-CA 1500 awards were issued to: John M. Keeley, WU3H, #1149; John D. Peters, K1ER, #1150; Fred L. Crawford, AB5SL, #1151; and J. Barclay Porter, KE3C, #1152.

USA-CA 2000 awards went to: John M. Keeley, WU3H, #1055; John D. Peters, K1ER, #1056; Fred L. Crawford, AB5SL, #1057; and J. Barclay Porter, KE3C, #1058.

USA-CA 2500 certificates were issued to: John M. Keeley, WU3H, #890; John D. Peters, K1ER, #891; Fred L. Crawford, AB5SL, #892; and J. Barclay Porter, KE3C, #893.

Awards Available

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The Diploma de Portugal is offered by the Clube CB Costa Verde.

HONOR ROLL

| 500 | | 2000 | |
|--------|------|-------|------|
| KI6PG | 2862 | AB5SL | 1151 |
| WU3H | 2863 | KE2C | 1152 |
| K1ER | 2864 | | |
| W7DIF | 2865 | WU3H | 1055 |
| AB5SL | 2866 | K1ER | 1056 |
| AA0MZ | 2867 | AB5SL | 1057 |
| KE2C | 2868 | KE2C | 1058 |
| DL1HSC | 2869 | | |
| 1000 | | 2500 | |
| KI6PG | 1375 | WU3H | 978 |
| WU3H | 1376 | K1ER | 979 |
| K1ER | 1377 | AB5SL | 980 |
| AB5SL | 1378 | KE2C | 981 |
| KE2C | 1379 | | |
| 1500 | | 3000 | |
| WU3H | 1149 | WU3H | 890 |
| K1ER | 1150 | K1ER | 891 |
| | | AB5SL | 892 |
| | | KE2C | 893 |

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is \$4.00. For nonsubscribers it is \$10.00. Initial application must be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 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 Award, 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 Norm Van Raay, WA3RTY, USA-CA Award Manager, Box 76, Pleasant Mount, PA 18453-0076 USA. DX stations must include extra postage for airmail reply.

Diploma de Portugal (Portugal Award) is available to all radio amateurs and SWLs by the Clube CB Costa Verde.

Portugal is divided administratively into three geographical entities; 22 districts, which include 305 Councils, which in turn are divided into 4154 Parishes. To obtain this award each candidate must present evidence of contacts/receptions with at least 10 Portuguese Districts; which must include one district in Mainland Portugal, Azores Archipelago, and Madeira Archipelago. There are also endorsements for 100, 150, 200, 250, and all 305 Portuguese Councils.

The award is available for each candidate in each one of seven categories:

- CB—11 meters
- HF—10, 12, 15, 17, 20, 30, 40, 80, and 160 meters
- VHF—2 meters
- CW—Telegraphy All Bands
- Digital—RTTY, AMTOR, PACTOR, and Packet, all bands.
- Satellite—All Modes
- SWL—All Bands, All Modes

Photocopies of station logs or QSL cards are accepted as evidence of contacts, as long as they correctly mention date, frequency, and mode. For CB contacts only QSL presentation is mandatory and must be personalized with indication of the sender's address and clear mention of receiver.

Cost of the award is US \$4.00 for Clube CB Costa Verde members and US \$5.00 for non-members. Candidates who present evidence of contacts with all 305 Councils at their first

request will receive the award completely free of charge.

Requests for the award should be sent to: Clube CB Costa Verde, Ruling Committee for DX Activity, P.O. Box 4403 - 4007, Porto Portugal.



This is the Earth Friendly Technologies QRPp Low Power Award.

Earth Friendly Technologies QRPp (Low Power) Award. In March 1994 we featured information about this award. Through the courtesy of Roger J. Wendell, WB0JNR, we received a list of the first 36 recipients of this very worthwhile award.

| | | |
|-----|--------------|--|
| 001 | WB0JNR | Roger J. Wendell |
| 002 | NF0Z | Larry Feich |
| 003 | WA0CML | Jim Kjar |
| 004 | KB0JFH | Roger A. Wendell |
| 005 | AA7QC | Kendall S. Miller |
| 006 | W0HEP | Richard C. High |
| 007 | KE0NH | Wes Farnsworth |
| 008 | KB0ACE | Tami L. Wendell |
| 009 | KB0HPH | Jane Wodening (solar power 1/4w 80M CW) |
| 010 | KG0HV | Steven J. Meyers |
| 011 | KC6VWI/W4/AA | Roger Byron |
| 012 | WD0EHW | Melvin J. Seematter |
| 013 | AA5PV | T. R. Plunkett |
| 014 | WV7T-6 | Mike Anderson |
| 015 | AA9KG | Brian P. Helm |
| 016 | W0OLE | Robert W. Johnson |
| 017 | N8WZD | Sgt. Craig P. McVey |
| 018 | K8JJC | Paul H. Geerdes |
| 019 | AA9BO | Jack H. Reynolds |
| 020 | KF9IQ | John Strawbridge |
| 021 | N3KFG | John H. Meyers |
| 022 | AA9HK | Pete Zinkanm |
| 023 | WB7NKD | Morris Welchlin |
| 024 | SM0GKF | Rune Erikson |
| 025 | OD5OK | Najib F. Khalaf |
| 026 | KC5DXX | Jacob Hellbach |
| 027 | KA8SHZ | James E. D. Norton |
| 028 | EA4EED | Francisco Javier Sanchez Iglesias |
| 029 | KA0JJK | James Pope, Jr. |
| 030 | W5RVY | Jim Sheperd |
| 031 | EC1ACA | Francisco Eduardo Sendon Cervino |
| 032 | N2JNZ | George Osier |
| 033 | W9NIP | Bob Williams |
| 034 | AD4SM | William R. Tinsley |
| 035 | OK1DCE | Jeroslav Formanek |
| 036 | K0IPH | Dave Helisovsky |

Included with this list were some soapbox comments. One of the most noteworthy was from Jane Wodening, KB0HPH (LPA # 009). Her station consists of a Heathkit HW-8 that is set at about 1/4 watt. She lives in a "box canyon" in the Colorado Rockies near the city of Nederland. Her station, along with her entire home, is *completely* solar powered! Even with

these restrictive conditions Jane is very active and successful with QRPp.

On A Personal Note

I am getting ready to leave for the MARAC annual meeting in Hamburg, New York and am looking forward to many eyeball QSOs with the intrepid, peripatetic County Hunters over the weekend.

On Sunday, June 2 my YL (I don't care for the "X") spent a pleasant few hours at the Luzerne (Pennsylvania) County Hamfest. There were quite a few vendors with some excellent goodies.

We featured the WARC award in the July 1995 column and this month the Earth Friendly Technologies QRPp award. I'd like to continue this practice, so award managers send your award

lists and we'll include them as space permits.

Please note my E-mail address. We now have a local number through the Eastern Pennsylvania Information Exchange (EPIX). CompuServe is a long-distance call, so I'll probably be giving that up.

Finally, my YL and I decided to give up our business taking care of elderly folks. After 60 years (between us) health care is no longer the fun it was in the past. New regulations and funding cuts have made it very difficult to provide quality services. Plus, the cost of doing business is very high, particularly the insurance. The bright side is that my YL and I are able to get away together for the first time in over ten years. I've begun a campaign, with the YL, to obtain a mobile rig and antenna and give out a few counties. See you on 14.336—*maybe!*
73, Norm, WA3RTY

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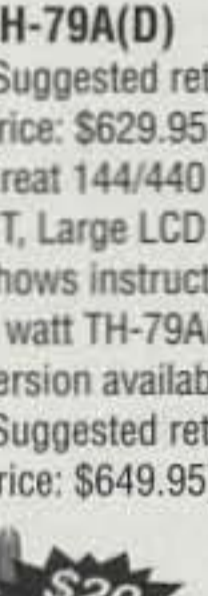
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PACKET USER'S NOTEBOOK

CONNECTING YOU AND PACKET RADIO IN THE REAL WORLD

BY BUCK ROGERS, K4ABT

Building and Implementing A Conference Node

This month we are going to revisit an old acquaintance, but with a new purpose in mind. With the recent increase in awareness of extreme weather conditions and weather-related disasters, a new interest in the conference node has been realized.

I cannot think of an area of the United States that has not been effected by some sort of adverse weather conditions over the past five years, and some of these occurrences have had severe effects on the inhabitants of the area. The very thought of this kind of tragedy is the reason why I and many other system node operators (SNOs) went to work to build the *Southeastern Emergency Digital Association Networks* (SEDAN, see fig. 1).

In recent months I've received a large number of letters from SNOs who say they would like to have access to or join the SEDAN, but they are too far away to have links into the SEDAN. These SNOs are expressing a desire to support the ARES and RACES efforts in their areas. The very fact that many SNOs are willing to extend the effort and expense to provide a means of communication during extreme and catastrophic weather conditions demands our assistance and at this point, my support. To these ends I have put together this month's "Packet User's Notebook."

Before the present-day DX spotting network software was developed, the conference (converse) node was the DX spotting medium. It also was used to conduct local packet "net" roll-calls. The conference node use faded away when it was no longer a novelty.

I recall the time in 1988 when I put one of these "quackers" on 145.010 MHz near Macon, Georgia. It was great—for the first 5 days. Then the fun went away, along with my popularity, as I and the same users who had enjoyed the fun it provided (for the first week) learned of its other behavior traits.

First and Foremost

NEVER place a conference node on a LAN frequency or a through-put (forwarding) frequency. To do so could cause the rest of the world to become your worst nightmare!

As a weather-watch, emergency, or disaster round-table node, the conference node excels. Outside these applications, the conference node could become a disaster in itself.

There Is A Solution

(Reference in this text is to Campbell county, an area that surrounds the cities of Evington and Lynchburg, Virginia.)

When placed at a good (high) location with

211 Luenburg Drive, Evington, VA 24550

emergency or backup power, and on an unused local area user frequency, the conference node can provide dependable coverage for weather watch, ARES, and other disaster-related emergencies.

In the Evington and Lynchburg, Virginia area we have access to the SEDAN X-1J4 network, and on another frequency we have installed a conference node with the call/SSID K4ABT-3 and the alias "QSO." When first connecting to conference node "QSO" the user is automatically connected into channel (0) zero of the node. Up to 256 connects are possible to each channel. There are 256 channels (0 through 255 equals 256) in the conference node. Therefore, the possible (impossible) number of connects is 256×256 , or 65,536 connects. *Don't even think about it!*

Once upon a time we tried to see "for real" how many stations could be connected to the conference node at one time and continue to have the node issue ACK frames to each station connected to the conference node. "Gridlock" occurred at 38 connects.

As I stated earlier, when first connecting with the conference node, the user is defaulted to Channel 0 (zero). Channel 0 is considered to be the *calling channel*.

A Local Packeteer Uses The "QSO" Conference Node

A normal node connect is made to "QSO," and immediately you can either press <enter> or issue a /H or /? for the "HELP" menu. If you are already familiar with the conference menu, then issue a /W. The /W will set the node into action to recognize your connect.

If you connect to the conference node and make no other entry, you may not receive any response. In fact, a timer in the node sees that no entry has been made, and at the end of approximately ten minutes you may become disconnected.

Here is how KD4HVZ would use the conference node in conjunction with the Campbell County Emergency operations. KD4HVZ issues a connect request to node QSO:

*** CONNECTED TO K4ABT-3 (QSO)

After connecting to the QSO conference node, KD4HVZ presses the <enter> key. He receives a menu similar to the one shown in fig. 2. The *** is the prompt for further input, so you might enter /W. (This is the command to retrieve "WHO" is connected into the conference node.)

Note: The first line of the menu indicates that commands may be abbreviated. Therefore, you may enter /W or /WL and obtain the same information as you will with /WHO.

The reply to Mike's /WL will appear similar to the listing in fig. 3.

KD4HVZ issues the "change channel" command:

/C 55

At K4ABT, WB4EDZ, and W4WWQ the following appears on their screens:

*** KD4HVZ signed on:

This message appears on the screens of all stations left on Channel 0.

*** KD4HVZ changed to channel 55:

Here is a typical QSL as seen by the Channel 55 users:

<K4ABT>: Hey Pete, I see Mike joined our QSO.

Pete sends a private message to Buck, K4ABT by typing:

/MSG K4ABT Rgr, Buck, don't forget to remind the guys about the LARC meeting Saturday night at the library.

Only K4ABT receives the message. It appears as follows:

<*W4WWQ* > Rgr, Buck, don't forget to remind the guys of the LARC meeting Saturday night at the library.

The asterisk inside the angles <*> tells Buck who the private message is from. In this case, the message is sent from W4WWQ to K4ABT. All messages sent using the (slash) symbol / are directed to the command interpreter within the conference node.

An Invitation Without "RSVP"

You may invite other users from other channels to join your round-table discussion on the channel you are on using the "/invite command" /I "CALL" <enter>.

Summary

With this short explanation I feel we have discovered how the conference node provides a solution in packet radio which heretofore has readily been available to the weather watch, ARES, and RACES support services.

The features of the conference node that I've covered here are only the beginning of the benefits that can be realized with this "user friendly" (but cautiously applied) conference/net node.

The conference node firmware enables a

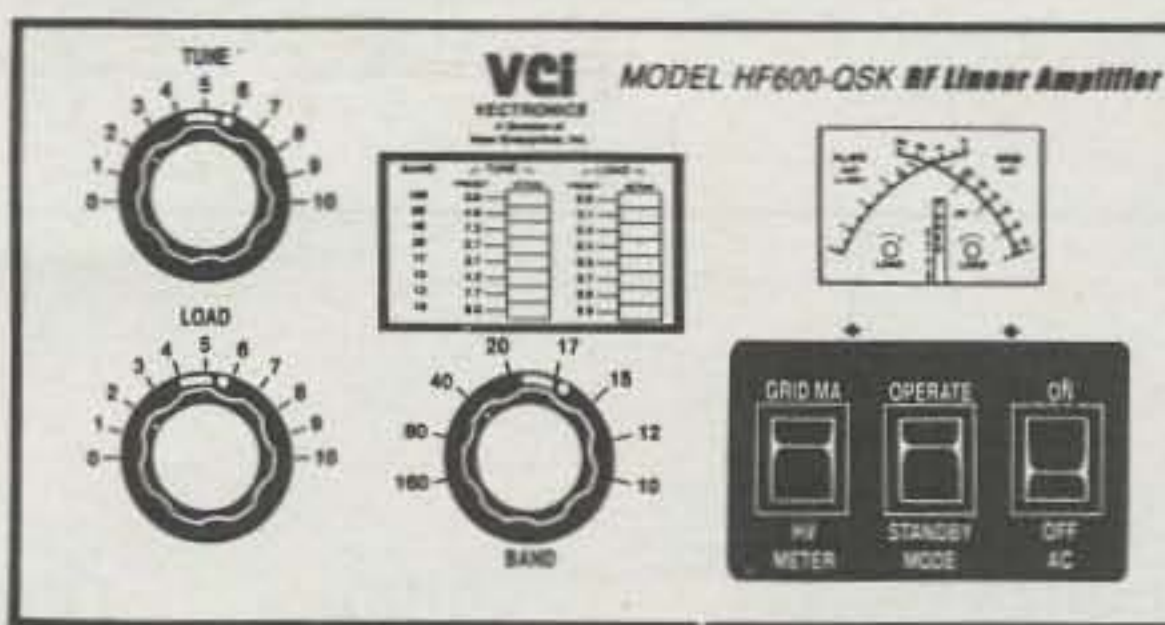
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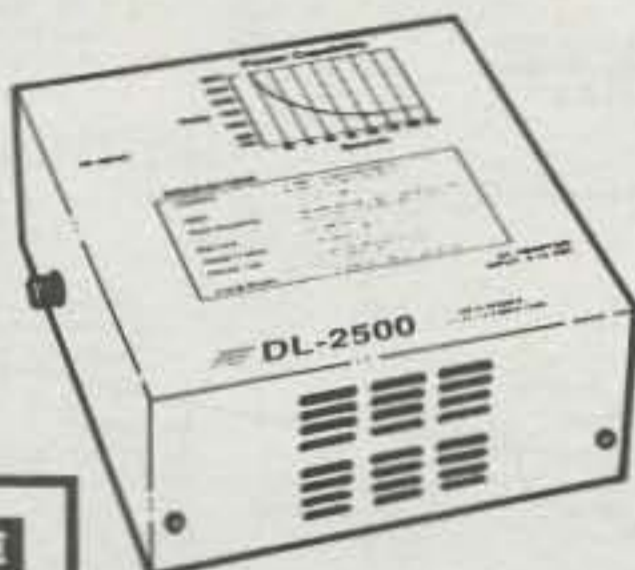
VC300DLP 300W Antenna Tuner

DL650M
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650 MHz, Dry
Dummy Load

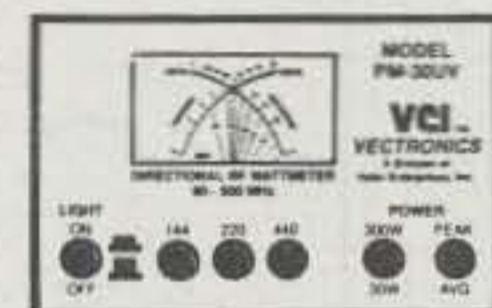
HPF1
High Pass
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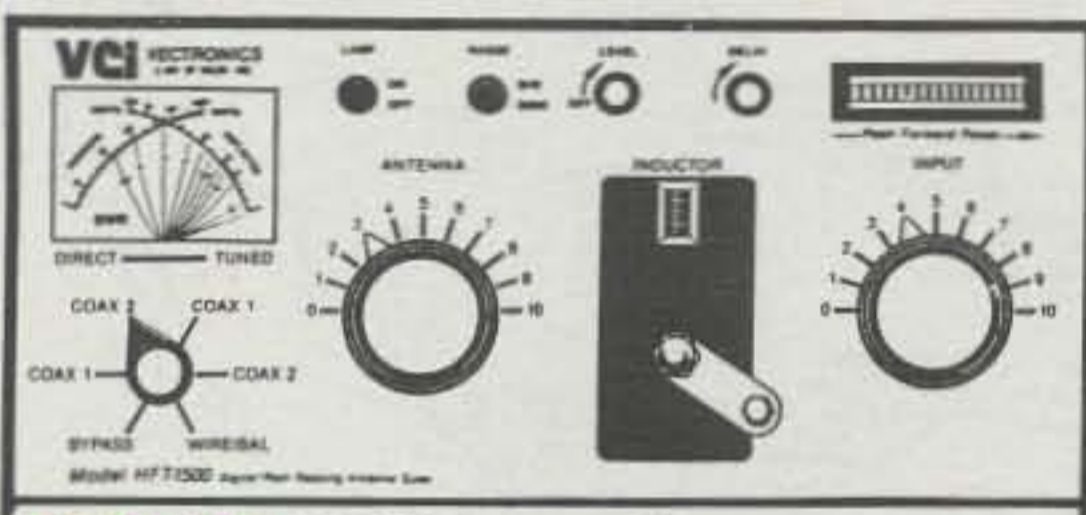
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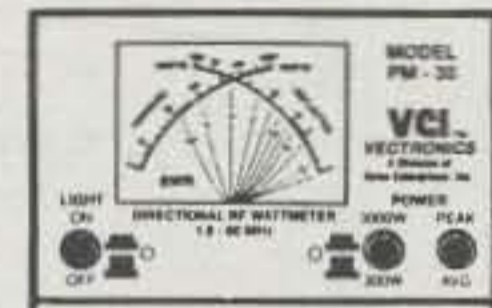


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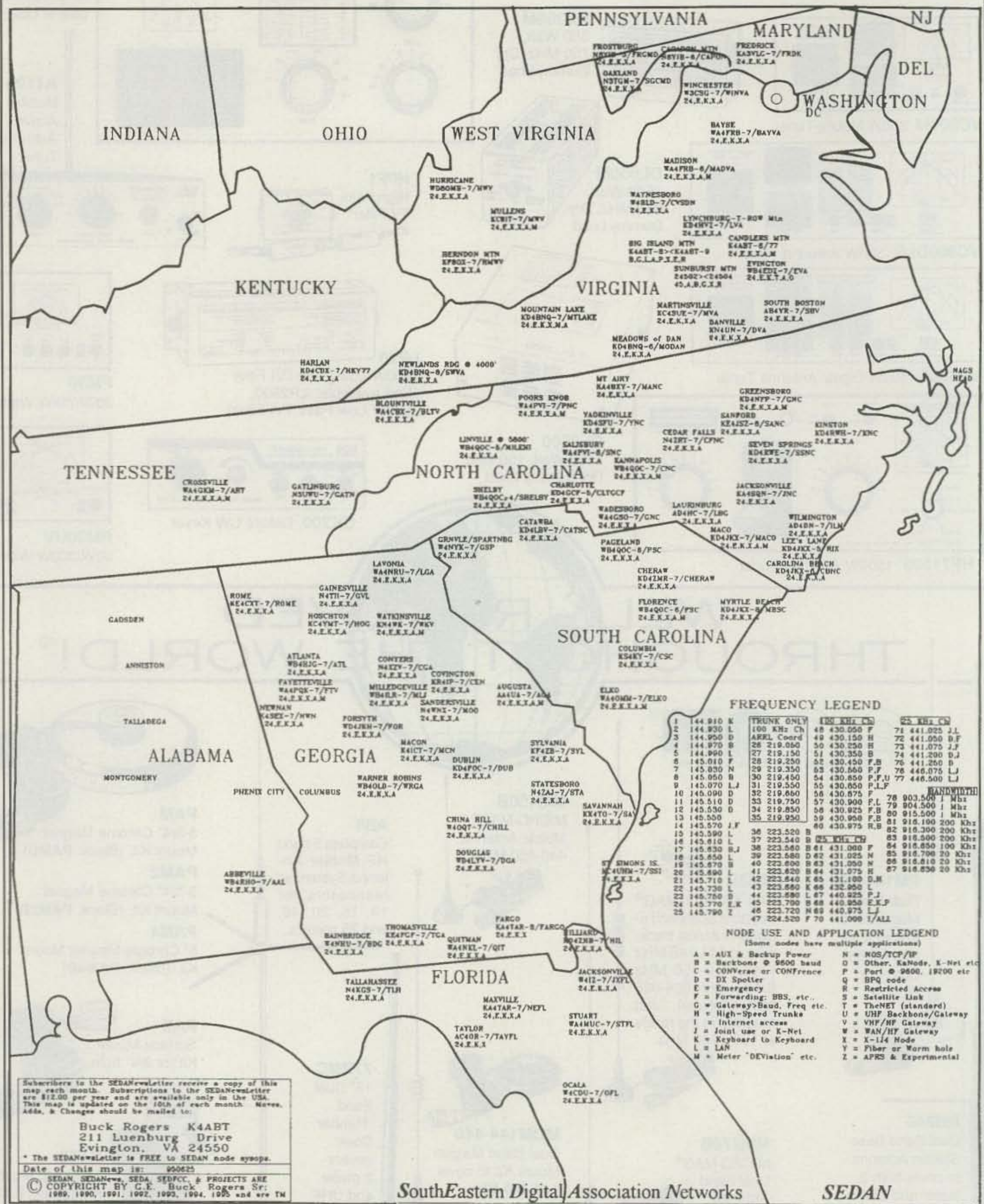


Fig. 1- The Southeastern Emergency Digital Association Networks (SEDAN) map. The SEDAN network protocol is AX.25 and is made up of X-1J4 and K-NET nodes. The nodes of the 9600 baud backbone and trunks are not shown because they are used as internode and long-haul links only, and are not user accessible.

Type/H or /? for help Commands can be abbreviated:

| | |
|---------------------|--|
| /HELP | Help |
| /EXIT | Terminate conference session |
| /BYE | Terminate conference session |
| /QUIT | Terminate conference session |
| /CHANNEL n | Switch to Channel n |
| /INVITE user | Invite (user call) to join your channel |
| /MSG user text | Send text to one user on the channel |
| /WHO (L)ong (S)hort | List all users and their channel numbers |

JOIN *SEDAN* the SouthEast Emergency Digital Association Networks

Fig. 2- After connecting to the QSO conference node, the user presses the <enter> key to receive the "HELP" menu shown above.

| User | Circuit | Channel | Queued | Receive | Transmit |
|--------|----------|---------|--------|---------|----------|
| KD4HVZ | KD4HVZ-7 | 0 | 2 | 74 | 27 |
| K4ABT | | 55 | | 278 | 362 |
| WB4EDZ | K4ABT-3 | 55 | 12 | 342 | 278 |
| WD4ELJ | | 0 | | | |
| W4WWQ | K4ABT-1 | 55 | 42 | 568 | 348 |

Fig. 3- When the user issues a /WL command to the conference node, a display similar to the above will be returned.

TNC2 or clone to act as a networking conference node. It appears on the network node tables in the same manner as other nodes and supports multiple on-line conferences between keyboard users. It can be connected to in the same manner as any network node.

Each user in the "QSO" conference (round-

table node) receives all packets from every user in the net or round-table, unless another station uses the /Message "call" to send a private message. In addition, each packet contains the callsign of the originating station. It is displayed on the screen of each station that is connected, using the same channel.

Another user can switch channels and all users on the channel will be informed that "station WD4ELJ has changed to channel #." If the channel to which station WD4ELJ moved is not occupied, an **INVITE** can be issued to other users. The invite can be to users on other channels as long as the correct callsign is used in the invite. The /I {call} will be sent only to the station that is identified in the {callsign}.

If the channel to which station WD4ELJ moved is occupied, other users already on the channel are notified, "WD4ELJ has joined us."

When connecting to the conference node for the first time, it would be good practice for the new user to use the /? or /H command to download, and print the conference command set for future reference and use.

Hardware Considerations

The 27256 EPROM fits into a TNC2 or clone (TNC-200, Tiny-2, MFJ-1270,B,C,/1274,B,C, PK-88, and DRSI DPK-2, etc.). An example of the EPROM installation into a TNC2 clone is shown in fig. 4.

The conference node can be stand-alone or used within the AX.25 node stack either connecting to a multiple node stack through its RS-232 port, through its radio port, or both.

A system node operator (SNO) may attach a terminal directly to the RS-232 port instead of another TNC and communicate with other users who are connected to the conference node via the radio port.

The conference node is a terminal node only and does not itself do networking. The SNO can set the parameters to allow its use as a "digipeater." It sends periodic node update

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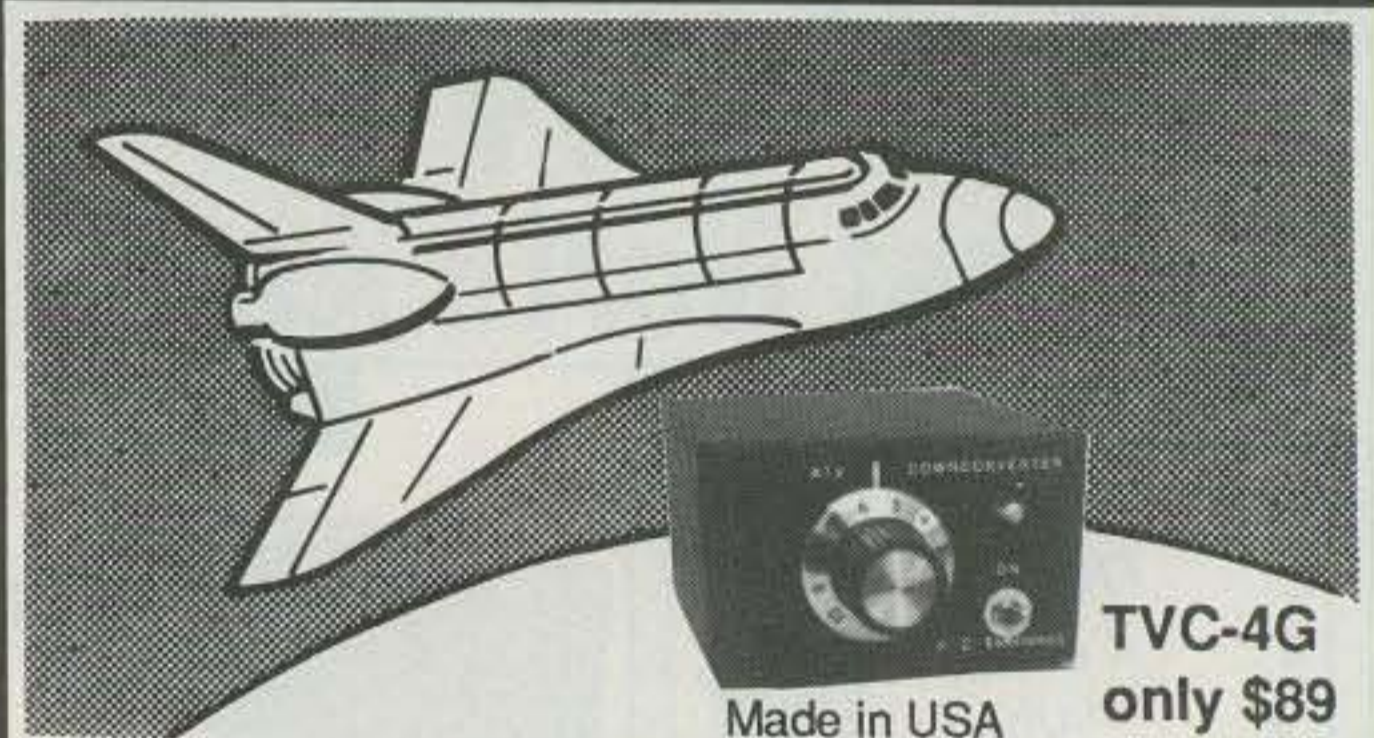
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Many ATV repeaters and individuals are retransmitting Space Shuttle Video & Audio from their TVRO's tuned to Spacenet 2 transponder 9 or weather radar during significant storms, as well as home camcorder video. If it's being done in your area on 420 - check page 538 in the 95-96 ARRL Repeater Directory or call us, ATV repeaters are springing up all over - all you need is one of the TVC-4G ATV 420-450 MHz downconverters, add any TV set to ch 2, 3 or 4 and a 70 CM antenna (you can use your 435 Oscar antenna). We also have ATV downconverters, antennas, transmitters and amplifiers for the 400, 900 and 1200 MHz bands. In fact we are your one stop for all your ATV needs and info. We ship most items within 24 hours after you call. Hams, call for our complete 10 page ATV catalogue.

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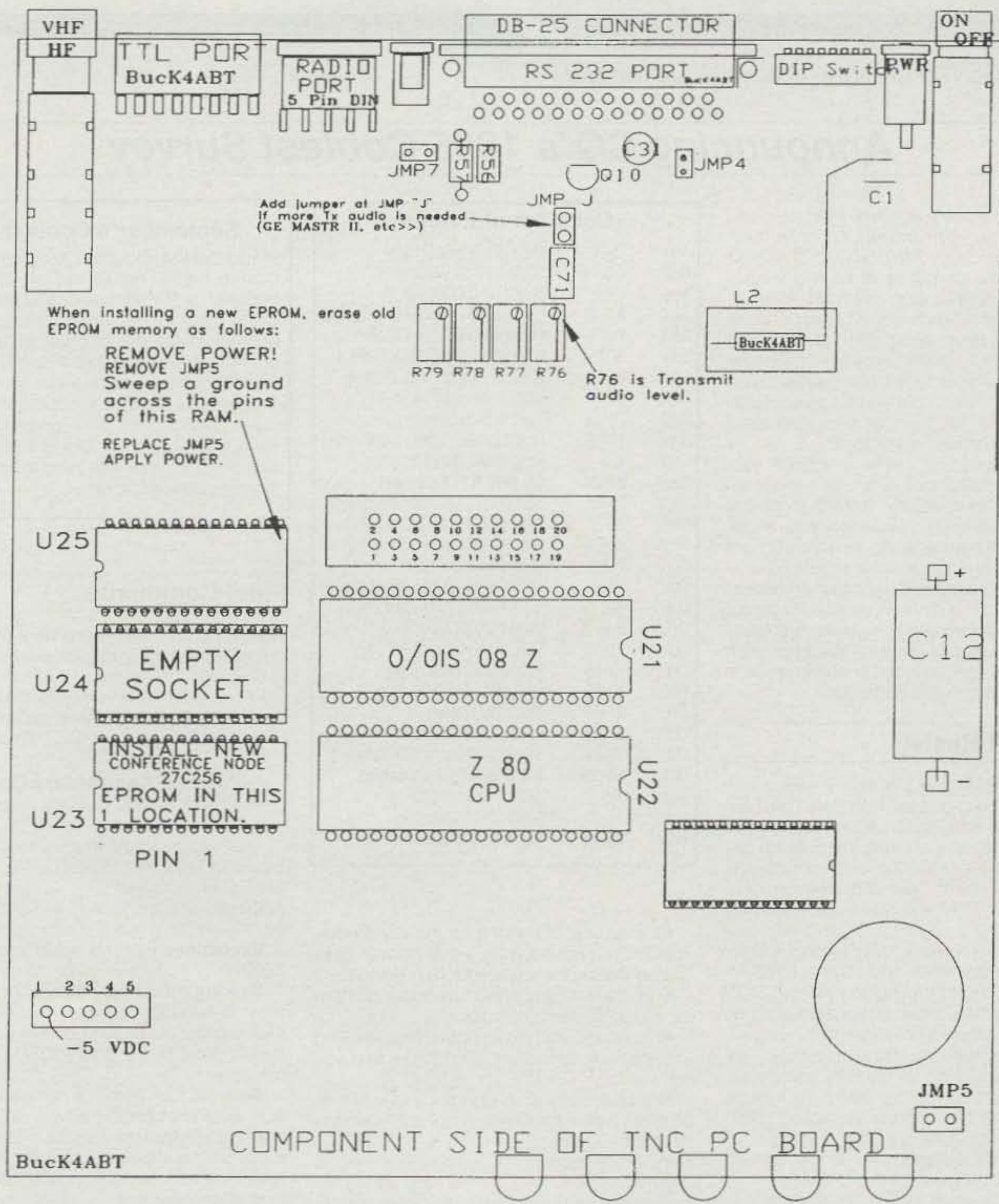


Fig. 4- This illustration defines the location and procedure for installation of the conference node EPROM. Erase memory of the old EPROM before applying power.

broadcasts to make itself known to area users and other local nodes. The operating parameters are set into the EPROM at the time it is burned and can be updated by the SNO using the **!SY** and the **!P** inputs after the node is in place and operating.

How To Obtain The Conference Node Code

A larger and detailed drawing (shown in this

column as fig. 4), along with handbooks, disks, and other information that will enable you to build and configure a node, is available from me. The disk contains the necessary EPROM image to build the node.

To obtain these items, send \$5.00 (check or money order; *NO credit cards and NO IRCs*) to cover shipping and handling. Be sure to include your return address, the disk type needed (3.5 or 5.25 inch), and byte size. (If 3.5 or 5.25 inch is not specified, you will receive a 3.5 inch, 1.44 Mb disk. Mail your

request to: Buck Rogers, K4ABT, 211 Luenburg Drive, Evington, VA 24550. The disk also contains a copy of **BUXTERM.EXE**, a packet terminal program, the X-1J4, and the conference node code.

There are several telephone bulletin boards that have the conference node code available for downloading. Consult your area BBS users for more information.

Have Fun Packeting!

de BucK4ABT @ WA4RTS.VA.USA

NEWS/VIEWS OF ON-THE-AIR COMPETITION

Announcing CQ's 1995 Contest Survey

The time has come again to hear from you as we launch our sixth annual CQ Contest Survey (see the last page of this column). This year I've avoided the temptation to be overly introspective, although it was very hard. After all, in just a few short days my All Asian contest exchange will become 59940 (that's age, not ITU zone). With that looming over my keyboard at this hour, it's easy to ask age-related questions such as: "When did you lose your operating edge?" or "Is it true that 4-hour competitions are the contests of choice?"

Over the past few weeks I've been successful, via E-mail and other sources, in obtaining a great deal of reader input that reflects many of contesting's issues on your mind. Surveys of this nature, while not scientific, are useful because they reflect a broad base of participants—young and old, new and experienced, contester and non-contester. All of your input is invaluable, and the results are fascinating in one way or another. We treat each response very seriously, so I encourage you to take a few minutes and participate.

I Couldn't Resist

Well, I avoided jading this year's survey with age-related questions, but I just can't help having a little fun this month. A few years ago I touched on the topic of being an "over the hill" contester. Take a look at the modified list below and make your own personal assessment. Are you over the hill? As a contester, you are truly over the hill if:

- You attempt to work *ANY* stations other than from Europe when operating at K1EA.
- You find yourself turning on your own SSTV signal during the contest rather than firing up 2 kHz below them (only kidding!).
- You read the fine print of contest announcements looking for the SWL categories.
- The objects on your operating desk begin moving before the contest starts (not afterwards, as it was in the old days).
- You're well on your way to completing Worked-All-Counties.
- You find yourself asking DX stations during the contest about their IOTA (Islands On The Air) number.
- You have begun collecting 10-10 numbers and wonder why they don't do it on the other bands.
- You raise your arms in disgust when you forget where the operating manual for your PL-259 connectors is.
- You fall into a state of total confusion even when no one is calling you during a 20 meter run.
- You've finished answering all of your incoming bureau SWL cards.
- You truly need to use your off-times as off-times during SS.

Internet: p00259@psilink.com
Compuserve ID: 71301,424

Calendar of Events

| | | |
|-------|-------|-----------------------------------|
| Aug. | 26-27 | West Virginia QSO Party |
| Sept. | 2-3 | All Asian SSB DX Contest |
| Sept. | 2-3 | Bulgarian DX Contest |
| Sept. | 3 | Panama XXIV Anniversary Contest |
| Sept. | 4 | Michigan QRP Club CW Sprint |
| Sept. | 9-10 | Worked All Europe SSB Contest |
| Sept. | 9-11 | ARRL September VHF Contest |
| Sept. | 10 | North American CW Sprint |
| Sept. | 13-15 | YLRL Howdy Days |
| Sept. | 16-17 | Scandinavian Activity CW Contest |
| Sept. | 17 | North American SSB Sprint |
| Sept. | 23-24 | CQ WW RTTY Contest |
| Sept. | 23-24 | Scandinavian Activity SSB Contest |
| Sept. | 23-24 | Washington State Salmon Run |
| Sept. | 23-24 | American/Canadian Island Contest |
| Oct. | 7-8 | California QSO Party |
| Oct. | 7-8 | XVIII Concurso Iberoamericano |
| Oct. | 7-8 | 1995 F9AA Cup Contest |
| Oct. | 8-9 | Tennessee QSO Party |
| Oct. | 11-13 | YLRL Anniversary CW Party |
| Oct. | 14-15 | Pennsylvania QSO Party |
| Oct. | 14-15 | QRP ARCI Fall QSO Party |
| Oct. | 21-22 | Texas QSO Party |
| Oct. | 22-23 | Illinois QSO Party |
| Oct. | 25-27 | YLRL Anniversary SSB Party |
| Oct. | 28-29 | CQ WW DX SSB Contest |
| Nov. | 4-6 | ARRL CW Sweepstakes |
| Nov. | 18-20 | ARRL SSB Sweepstakes |
| Nov. | 25-26 | CQ WW DX CW Contest |

- The appeal of fighting for the band edge has left you because you have to keep looking up the frequency in your *CQ Almanac*.
- You have a compelling desire to alphabetize your QSL card collection.
- You attend your local contest club meeting and the new contesters don't know who you are.
- You are ready to report your final score on 80 meters after the contest, but can't remember the frequency.
- You find yourself asking guys for their QSL information and filling out the card during the contest before moving on to the next guy.
- You've lost K1EA's home telephone number, which you scribbled across the back of your QCWA membership card.
- You even have trouble copying guys on 10 meters through the QRN.
- Your contest exchanges include phrases such as "when last heard" or "X-ray Baker, make your call."
- You start the contest late and can't remember whether it's the SSB or CW weekend. Worse, even after tuning the bands, you still can't tell!
- Novices QSY in the middle of your QSOs rather than taking the time to try to work you during the Novice Roundup.
- You fight with your operating team to get the 1296 MHz position at a K1TR/3 VHF Contest multi-multi.

September's Contest Tip

I don't know about you, but identifying the former USSR republics by prefix has become a formidable challenge for me. While most of the common logging programs provide the answers to "real-time" operating questions like this, there's nothing that can replace having it in your head. Studying current DXCC country charts and other sources to truly understand this week's version of our planet's prefix structure gives you one less thing to worry about when you're operating.

Final Comments

Thanks again for the hard work many of you put into your survey responses. I look forward to reading all of them!

As always, please remember that the deadline for the December issue is October 1st.
73, John, K1AR

Panama Anniversary Contest

0001-2359Z Sunday, Sept. 3

The Panama Radio Club invites all radio amateurs of the world to participate in the XXIV Anniversary Contest.

Class: Single operator, all band, SSB only, 40, 20, and 15 meters.

Exchange: RS and serial number (e.g., 59001).

Scoring: HP club members are 2 points; all other stations are 1 point. The multiplier is the total number of DXCC countries worked on all bands. Final score is total QSO points times multiplier.

Awards: Certificate of participation will be sent to all amateurs who work 10 or more HP stations. HP stations must operate for at least 6 hours to be eligible for awards. A plaque will be awarded to the station with the high score from each continent.

Logs must be postmarked by November 30th and sent with 3 IRCs to: Radio Club Panama, Anniversary Contest, P.O. Box 10745, Panama 4, Panama.

Bulgarian DX Contest

0000Z to 2400Z Sunday, Sept. 3

The Bulgarian Federation of Radio Amateur holds this activity the first Sunday in September each year. It's on CW only, all five bands, 10-80 meters, using the IARU Region 1 band plan.

Classes: "A"—single operator, all band; "B"—single operator, single band; "C"—multi-operator, all band, single transmitter; "D"—SWL.

Exchange: RST and ITU Zone.

Points: QSOs with LZ stations, 6 points.

With other stations in the same continent, 1 point. In other continents, 3 points. SWLs must show calls of both stations heard. Score 3 points if both exchange numbers are copied; 1 point if only one is copied.

Multiplier: Total ITU Zones worked on each band.

Final Score: Total QSO points from all bands times the sum of the multiplier from each band.

Awards: Classes "A" and "C"—Cups and medals to the three top world scorers and medals to the three continental leaders in each continent. Class "B"—Medals to the top three scorers on each band in the world. Class "D"—Medals to top three.

Logs: Use a separate sheet for each band, a summary sheet showing the scoring, and the usual signed declaration.

Mailing deadline is 30 days after the end of the contest: Central Radio Club, P.O. Box 830, 1000 Sofia, Bulgaria. Logs may also include applications for the many BFRA awards: NRB, W-100-LZ, 5 Bands LZ, W-28-Z, Black Sea, and Sofia awards.

Labor Day QRP CW Sprint

0000Z to 0400Z, Mon., Sept. 4

Sponsored by the Michigan QRP Club, this is a fun event to add to your Labor Day weekend activities.

Classes: A—250 milliwatts or less output. B—250 milliwatts to one watt. C—One watt to five watts. D—Over five watts output.

Exchange: RST, QTH (State/Province/Country) and MI-QRP membership number (non-members send power output).

Scoring: Stations may be worked once per band for QSO points. All member QSOs are 5 points. Non-member contacts in WVE are 1 point. Non-member QSOs outside of WVE are 4 points. Multiply total QSO points on all bands by the number of States/Provinces/Countries worked on all bands. USA and Canada do not count as countries. Total points may be multiplied by 1.25 for homebrew/commercial RX/TX combinations. Completely homebrew stations multiply their score by 1.5.

Awards: Certificates will be awarded by class for each QTH multiplier.

Logs must be received by October 6th and should be sent (including equipment description and power output per band) to: L. T. Switzer, N8CQA, 654 Georgia Ave., Marysville, MI 48040-1243. Logs and entry sheets are available by sending an SASE to N8CQA.

YLRL Howdy Days Contest

1400Z Wed., Sept. 13 to 0200Z Fri., Sept. 15

This annual event is sponsored by the Young Ladies Radio League (YLRL) and is open to all licensed women operators around the world. All amateur bands may be used. Any type of emission may be used (SSB, CW, etc.). A station may be worked only once on each band for contact points. No crossband, net, or repeater contacts allowed. Maximum allowable output power is 750 watts on CW and 1500 watts PEP on SSB.

Exchange: YLRL member or non-YLRL member. Be sure to show time breaks in your log.

Frequencies: CW—80 meters 3.540–3.725 MHz; 40 meters 7.040–7.070 MHz; 20 meters 14.040–14.070 MHz; 15 meters 21.120–21.150 MHz; 10 meters 28.150–28.200 MHz. SSB—80 meters 3.940–3.970 MHz; 40 meters

7.240–7.270 MHz; 20 meters 14.250–14.280 MHz; 15 meters 21.380–21.410 MHz; 10 meters 28.300–28.610 MHz.

Scoring: Score two points for each YLRL member contacted. Score one point for each non-YLRL member contacted. For each duplicate contact that is removed by the YLRL vice-president, a penalty of three additional and equal contacts will be exacted. There are no multipliers.

Awards: Top-scoring YLRL member will receive her choice of YLRL pin, charm, or stationery. In addition, the top-scoring non-YLRL member will receive a one-year YLRL membership certificate.

All log entries should be sent to: Carla Watson, WO6X, 473 Palo Verde Dr., Sunnyvale, CA 94086. Logs must be postmarked no later than October 16, 1995.

ARRL VHF QSO Party

1800Z Sat., to 0300Z Mon., Sept. 9–11

All bands 50 MHz and up can be used for this one. The August issue of *QST* should have all the details. It is recommended that you send for official summary and log sheets. A large SASE will get you a supply. Address your request to the ARRL VHF Party, 225 Main St., Newington, CT 06111.

North American "Sprint"

CW: Sept. 10 SSB: Sept. 17
Sunday, 0000Z to 0359Z (Sat. night)

This is the fall edition of the "Sprint" run by the *National Contest Journal*. As the name implies, it's a shorty, only four hours long.

North Americans will be contacting other North American stations as well as stations in other countries, single operator only. North American boundaries are as defined by the rules used in the CQ WW DX Contest. As a reminder about recent rule changes: (1) Simultaneous transmission on more than one band is no longer permitted, (2) automatic reception methods may not be used, (3) you can no longer standby on a frequency and work the station who answers the CQ of the station you just worked (e.g., round-robin QSOs).

Exchange: Call, QSO no., name, and QTH (state, Canadian area, or country).

Scoring: Multiply total QSOs by the sum of States, Canadian areas, and other North American countries worked for your final score. (U.S. and VE are not countries; KH6 is not considered a state.) There are eight Canadian multipliers: VE1/VO1/VO2, VE2–VE7, VY1/VE8. Non-North America countries do not count as a multiplier.

Frequencies: Three bands only: 80, 40, and 20 meters. CW—3540, 7040, 14040. SSB—3850, 7225, 14250. (Plus or minus QRM.)

Awards: A trophy to the highest scoring entrant. Certificates to the top scorer in each U.S. call area, Canada, and other North American country. Also to the ten top scores, each member of the winning team, and the highest scoring entrant on each team.

Team competition is limited to a maximum of 10 operators as a single unit. Pre-contest registration is required for each team before the start of the contest with N6TR for CW and K7GM for SSB.

There are other detailed rules, a special QSY rule, disqualifying penalties, etc. I suggest you write to N6TR or K7GM if you do not have a copy of the *NCJ*.

Entries must be received no later than 30

days after the end of each "Sprint." CW logs go to: Larry Tyree, N6TR, 15125 S.E. Bartell Road, Boring, OR 97009. SSB go to: Rick Niswander, K7GM, P.O. Box 3778, Greenville, NC 27386-1778.

Scandinavian Activity Contest

CW: Sept. 16–17 Phone: Sept. 23–24
1500Z Saturday to 1800Z Sunday

It's the world working in this 36th Scandinavian Activity Contest (SAC). The same station may be worked on each band for QSO and multiplier credit. The prefixes used in Scandinavia are: LA, LB, LG, LJ (Norway); JW (Svalbard & Bear Is); JX (Jan Mayen); OF, OG, OH, OI (Finland), OFØ, OGØ, OHØ (Åland Is.); OJØ (Market Reef); OX (Greenland); OY (Faroe Is.); OZ (Denmark); SJ, SK, SL, SM, 7S, 8S (Sweden); and TF (Iceland).

Bands: 3.5, 7, 14, 21, 28 MHz according to IARU band plans; 3560–3600, 3650–3700, 14060–14125, and 14300–14350 kHz should be kept free of contest activity.

Classes: Single operator and multi-operator single transmitter, all band only. Multi-operator must remain on the same band for at least 10 minutes (exception: A station may be worked on another band if it is a new multiplier, only). Also, QRP single operator (maximum of 10 watts output) and SWL (only SAC stations may be logged).

Exchange: RS(T) plus a QSO number starting with 001.

Scoring: European stations score 1 point for each SAC contact. Non-European score 1 point on 14, 21, and 28 MHz, and 3 points on 3.5 and 7 MHz.

Multiplier: Each call area in the above list of SAC countries worked on each band (call areas, not prefixes).

Final Score: The sum of QSO points from all bands times the sum of the multiplier from each band. Scoring for SWLs same as above.

Awards: Certificates to the winning station in each class, both CW and phone, in each country and each U.S.A. call area. QRP stations will be listed in one common list. The non-SAC SWL winner will be awarded. Plaques will be awarded to the top-scoring station in each continent.

The usual disqualification criteria will be observed. Include a summary sheet and a dupesheet for logs with more than 200 QSOs, and a signed declaration. Logs may also be submitted on MS-DOS diskettes in either ASCII format or the accepted ARRL contest log standard. Mailing deadline for all logs is no later than October 31st. Send all entries to: SRAL Contest Manager, Harri M. Mantila, OH6YF, P.O. Box 30, FIN-64701, Teuva, Finland.

CQ WW RTTY Contest

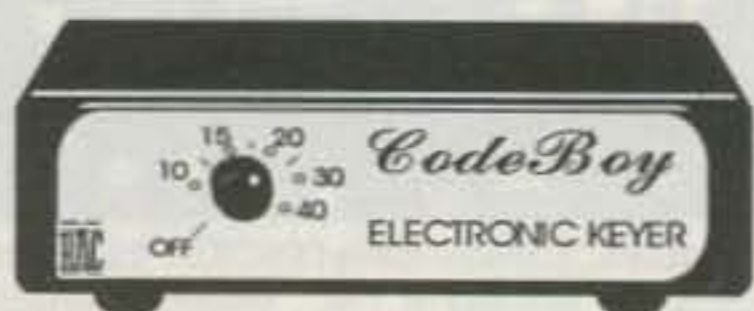
0000Z Sat. to 2400Z Sun., Sept. 23–24

This is the 7th running of the CQ WW RTTY Contest organized by *CQ* magazine, and it has become one of the major RTTY competitions.

Bands: All five bands, 10–80 meters.

Classes: Single operator, single and all band, and single-op assisted all band only. Multi-op single transmitter, all band only. Multi-op multi-transmitter all band only. There is a high power category (greater than 150 watts) and a low power category (less than 150 watts). Only single operator all band and multi-operator single transmitter entries are eligible to enter the high or low power category. Single band, single operator assisted, and multi-multi

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Bird Electronic's "Quest 43"

"Quest 43" has been launched by Bird Electronic Corporation to locate the oldest working Model 43 Thru-line wattmeter. Quest 43 will celebrate Bird's production of the 250,000th Model 43. Rewards will be offered to the owners of the ten lowest serial number Model 43's in working condition. The owner with the lowest serial number will receive a 24-karat gold-



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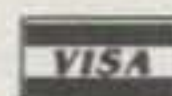


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plated Model 43 and a \$1,000 gift certificate that can be used to purchase items in the Bird catalog. Other prizes include \$250-500 gift certificates, and each of the ten owners will be sent a new Model 43. Winners will be announced at the International Wireless Communications Expo Spring 1996 Convention in April.

For an entry form to participate in "Quest 43" contact Bird Electronics Corp., 30303 Aurora Road, Solon, OH 44139 (or call 216-248-1200).

Philips' BLV910 UHF Power Transistor

Philips' 10 watt UHF power transistor for common emitter class AB operation in the 820-960 MHz range is now available from Richardson Electronics, Ltd. The BLV910 is intended for use in base stations. The device has a minimum gain of 11 dB and 55% efficiency at 10 watts. Other features include emitter ballasting resistors for optimum temperature profile, gold metallization, and internal input matching. The BLV910 has a 6-lead SOT171 flange envelope with a ceramic cap.

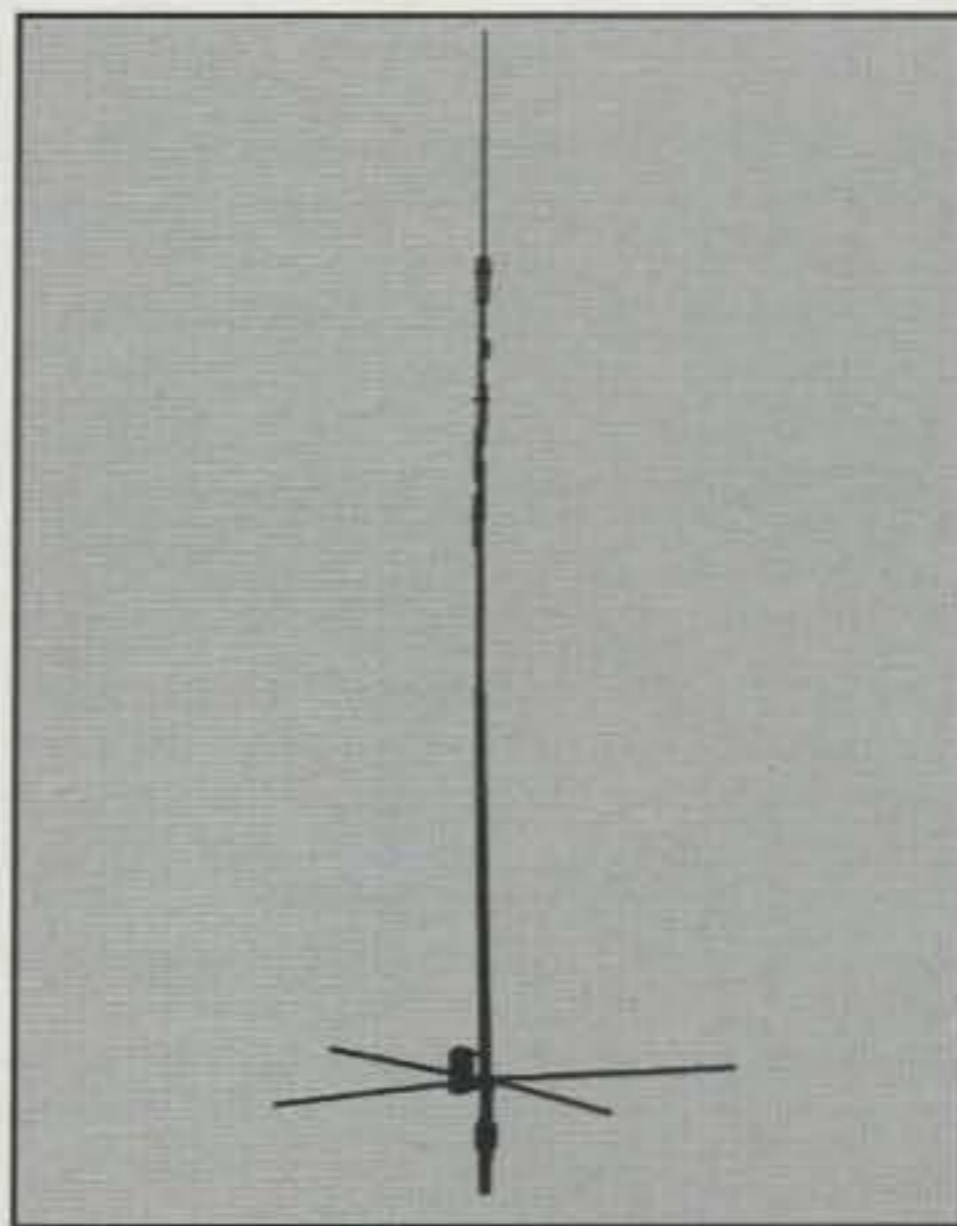
For more information, contact Richardson Electronics, Ltd., 40W267 Keslinger Road, La-Fox, IL 60147 (1-708-208-2200), or circle number 101 on the reader service card.

Telex/Hy-Gain DX77 Advanced Vertical Windom

Telex has introduced its new Hy-Gain DX77 Advanced Vertical Windom, which can handle 750 watts of continuous RF output, and allows coverage of 10 through 40 meters, including the WARC bands. Automatic band switching

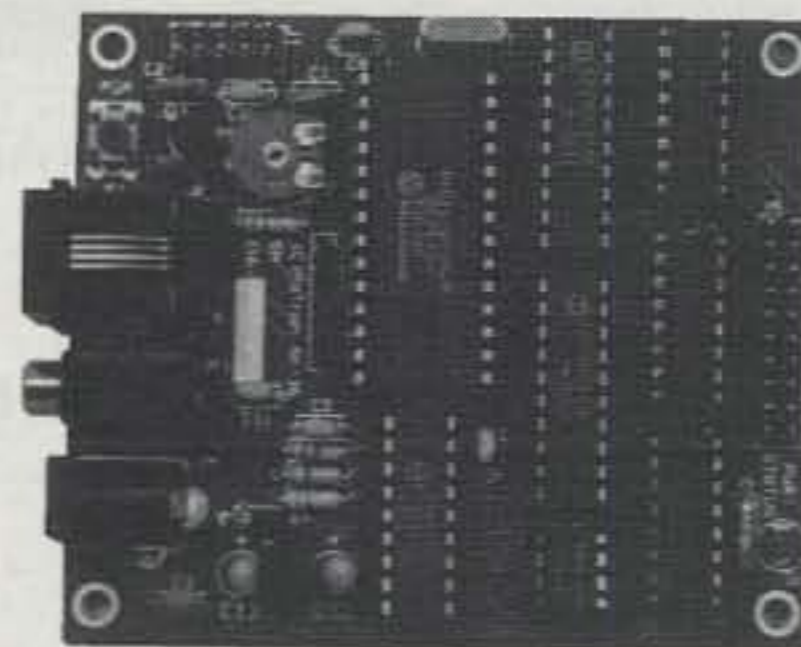
and low angle of radiation allow for enhanced DX capabilities. The DX77 features double-wall tubing, steel mast clamps, and all stainless steel hardware. The 29 foot vertical also features a new easy-tilt mount that makes lowering it for tuning a one-person job. It can be mounted on a pole, chimney, rooftop, or deck, and is suited for portable operation.

The DX77 comes with Telex's two-year limited antenna warranty. Suggested retail is \$419.95. For more information, contact Telex Communications, Inc., 8601 E. Cornhusker Highway, P.O. Box 5579, Lincoln, NE 68505 (phone 402-467-5321; fax 402-467-3279).



(Continued on page 146)

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ALL ABOUT THE WORLD ABOVE HF

Amateur Radio in War-Torn Bosnia

For almost a month I was out of the country on a mission trip with the United Methodist Committee on Relief (UMCOR). (Actually, this column was sent via E-mail to *CQ* just before this issue went to press.) Operating under the auspices of the United Nations High Commission on Refugees, UMCOR is one of many non-government organizations (NGOs) providing humanitarian relief in the war-torn country of Bosnia-Herzegovina.

There were 15 of us on the team in Zenica, Bosnia, all from various parts of the U.S. We were there performing tasks from teaching children in the collection centers to painting people's apartments and the Muslim in-country relief center. During my stay, I was working at the UMCOR Youth House, assisting the computer instructors. The Youth House is providing a place for young people to take classes in computers, English language, dance, video, and arts and crafts, as well as many other courses. It also is a place for young people to hang out in a protective and nurturing atmosphere.

My deep and profound thanks goes to Samir Lemess, one of the computer instructors at the Youth House, who arranged for me to have access to the Internet. Samir is a young metallurgical engineer who is now working at the Youth House. Because of the war, he, as well as 19,000 other Zenicanians, no longer have jobs at the steel plant.

Although not a ham, Samir is keenly interested in the hobby and was been the key person putting me in touch with and making arrangements for me to visit the various amateurs around town. Without his help, it would have been impossible for me to file this column and to accomplish as much as I did.

Not too many years ago it was no trouble to work a YU4 station and get a QSL card from the operator. Then war came to Bosnia-Herzegovina, as well as to several of the other emerging countries of the former Yugoslavia. Now the YU4 prefix is no more. It has been replaced by T9. If you are able to work someone from here, your chances of getting a QSL card in the near future are, at best, very difficult.

There is very little activity and virtually no mail service in and out of the country or within the country. Here in Zenica (pronounced *Zeni-sa*), the well-known club station, formerly YU4EZC (and contest station 4N4C), now T91EZC, is a shell of its former self. Shortly after the war broke out, the station was broken into and almost all of its equipment, plus its computer, was stolen. The only remaining equipment is an ICOM IC-745, plus the antennas.

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VHF PLUS CALENDAR

| | |
|-------------------|--|
| Aug. 25-27 | Eastern VHF/UHF Society VHF Conference. (Details in last month's column.) |
| Sept. 3 | Lowest Moon declination. Very poor EME conditions. |
| Sept. 7 | Canada Microwave Sprints, 1900-2300 local time. |
| Sept. 9 | Full moon. |
| Sept. 9-11 | ARRL VHF QSO Party, 1800 UTC 9 Sept. - 0300 UTC 11 Sept. |
| Sept. 10 | Good EME conditions. |
| Sept. 13 | Canada 432 MHz Sprint, 1900-2300 local time. |
| Sept. 16 | Highest Moon declination. |
| Sept. 16-17 | Second weekend, ARRL 10 GHz Cumulative Contest, 0800-2000 local time, both days. |
| Sept. 17 | Apogee. Very poor EME conditions. |
| Sept. 19 | Canada 220 MHz Sprint, 1900-2300 local time. |
| Sept. 23 | Northwest VHF/UHF Conference, Bend, Oregon. (See text for details.) |
| Sept. 24 | New Moon. Poor EME conditions. |
| Sept. 26 | Canada 144 MHz Sprint, 1900-2300 local time. |
| Sept. 29 | Perigee. |
| Sept. 29 - Oct. 1 | Gathering of West Coast Weak Signal Group at KC6WLC's QTH. |

EME conditions courtesy W5LUU.

Contest operations were often conducted from a hilltop villa. That villa is now being "used for other purposes," as the saying goes here. Among other items being used for other purposes are most of the radios owned by the members of the club, the club's repeater, and most importantly, many of the members themselves.

When the war broke out, Bosnia had virtually no army. The only people experienced in communications were the amateur radio operators. As happened to us in World War II, amateur radio operators became a valuable pool of trained operators for the army and quickly found themselves "used for other purposes."

Zenica is a steel-mill town with a prewar population of over 80,000. As the war has progressed, the population first dwindled as those who could flee did so. The population then swelled as refugees (actually, displaced persons, as refugees are defined as those who flee to another country) poured into Zenica. Now the population is estimated to be around 120,000, with 40 percent of them refugees.

There are now around 50 hams in Zenica. The locals advised me that there is no way of keeping track of the hams who formerly lived here, as some fled and some were drafted. Of those who were drafted, no one knows who among them are now silent keys. Amateur radio has played a vital role throughout the period of the war. During the first couple of years amateurs provided hundreds of humanitarian messages for victims of the war. Additionally, news reports of the war often relied upon amateur radio accounts. After the Bosnian government restricted this traffic for security reasons, amateurs were reduced to casual contacts that excluded any conversations about the war.

Nevertheless, amateur radio still provides valuable links today. Three towns—Bihac (pronounced *Bi-hatch*) to the northwest, and Gorazde and Srebrenica in the southeast—are surrounded by the Serbs (as this is being prepared, word has been received that Srebrenica has fallen to Serb control). Telephone communications into these towns have been cut. Therefore, the only communication in and out is via amateur radio.

(It is important to note that this is being written while the two remaining towns are still in the Bosnian government control. It is possible, considering time lag to publication, that one or the other of these towns could have fallen to the Serbs by the time you read this, or that Srebrenica could be back under Bosnian control.—ed.)

Additionally, throughout the country normal communications are non-existent. Again, amateur radio provides what little communications take place.

While these vital links exist, amateur radio contacts are still very scarce from this war-torn country. Those who still have amateur radio sets (as mentioned above, many have been "appropriated" and are now being used for other purposes) are sometimes reluctant to use them because they are old and replacement parts are next to impossible to get.

Nevertheless, a semblance of normalcy goes on. The amateur radio structure is clearly defined as five classes of licenses, A-E. Classes can be distinguished by callsigns. The first class, Class A, has one letter following the prefix; the second, two letters; and the third and subsequent classes, three letters. The fifth class is a code-free license which restricts the holder to VHF and above. Callsigns beginning with the "T91" prefix are reserved for clubs.



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| Current (cont.) | 9.2 | 12 | 24 | 32 | 4.2 |
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Apparent New 3456 DX Record Set

A major tropo opening, extending from Minnesota in the north to Texas, Oklahoma, and Arkansas in the south, occurred on 12 July. Lasting from around 0300 to 1300 UTC, the opening appears to have covered 144 MHz through 3456 MHz. Relayed reports indicate that Gary Mohrlant, WAØBWE (EN34), and Al Ward, WB5LUA (EM13), may have set a new 3456 MHz land tropo record. More details will be forthcoming in next month's column.

Callsigns beginning with the "T92-T90" prefixes are for all amateurs.

What about VHF and above activities? As mentioned above, the club's repeater is no longer being used for amateur radio purposes. I have been told that probably not one of the amateurs in town owns even a 2 meter handheld radio. So for the foreseeable future, no one is on VHF. Nevertheless, the interest is not dormant. Hopefully looking forward to a future after the war, these amateurs want to explore the world of VHF both by way of terrestrial contacts and via satellite. Plans are being discussed for resumption of amateur radio classes. Even with newly licensed amateurs, however, comes the problem of no equipment. Without equipment, one wonders how long the interest in the hobby will be sustained. One can only hope that peace will soon come to this part of the world. Perhaps amateur radio diplomacy can once again have a part to play in accomplishing this goal.

Indeed, amateur radio diplomacy is at work in the normal, day-to-day relationship between amateurs. Among the Zenica, Bosnia amateurs I have met are Luka, T94C, Mensur, T94M, and Miki, T94N. I believe that Luka is Croat, Mensur is Muslim, and Miki is a Bosnia Serb. Each is a member of the Zenica Amateur Radio Club and would not think of being at odds with each other, let alone go to war with one another. Additionally, Mensur told me that he will communicate with most of the Serbian amateurs. However, he says that he avoids the ones who are fanatically political. Sounds like amateurs anywhere! Luka is the longest licensed amateur in Zenica, having been first licensed in 1949. He is retired from the police force. Mensur is a retired lawyer.

Miki is a brilliant technician, and despite his lack of knowledge of the English language, he has already read most of my book, *The VHF How To Book*. I was particularly touched by him when, upon receiving the July issue of *CQ* magazine on behalf of the club, he said that this was the first time in five years that he had held an amateur radio magazine in his hands.

Incidentally, I did bring a 6 meter rig and asked for permission to operate during the CQ WW VHF Contest. However, I was politely refused because of the war, but was offered limited permission to operate the club station on HF. Because of my mission in Bosnia, I had little free time. Therefore, amateur radio took a distant second place in my schedule.

Tremendous 2 Meter Openings

A tremendous 2 meter opening occurred on 5 July. Covering southern California, stations in Colorado and Texas were worked by dozens of amateurs. The following three reports from

the Internet give some idea of the intensity of the opening. From Chip Angle, N6CA, is the first report:

"Just a quickie note about one of the longest 2 meter openings to southern California in the past 30 years. It was predicted accurately by W5SFW. At 2235 UTC on July 5, 1995, Phil announced on 50.125 that he was going up to 144.200 because he expected the band to open. Fifteen minutes later the band opened up and he was S9 at N6CA. The opening lasted over two and one half hours. Thanks, Phil!

"Stations worked from Southern California were: W5SFW (DM95), WS5R (DM95), NØIXR (DM76), NØIPL (DM76), W2CRS/Ø (DM78), W5RHR (DM65), NØLL (EM09), WG6K/Ø (DM67), KGØHS (DM79), WØETT, WØMOG, KBØLQZ, KB5RF. Lots of unusual QSOs were made: WA6TBO, San Diego worked W2CRS in Colorado with a 2 watt handheld while standing on his roof; WA6CGR worked his first New Mexico with a tri-band vertical and 10 watts; N6XQ and KB6KQ worked several while mobile in motion. Lots of fun and a great opening.—73's Chip N6CA"

From Doug Allen, W2CRS, comes a report from the opposite end: "For the second time in 5 days we had an excellent E opening on 144 MHz! Around 5 PM local time I notice the MUF was above 88 MHz and rising.

"I was hearing commercial FM stations from both the southeast U.S. and California. About 25 minutes later the MUF here had risen to at least 108 MHz with strong signals from east and west. I called CQ on 144.200 MHz and worked KJ6FP (DM13), the first of 30 contacts to California over a two hour period. The MUF was above 144 MHz here from about 1725 to 1813 local (2325-0013 UTC) and then again from about 1902 to 1919 (0102-0119 UTC). "Besides CA, I worked XE2EED (DM12), a new grid, and my second XE on 144 MHz. Other grids worked were DM03, DM13, DM14, and DM04. The strongest stations heard were KJØFP and WA6TBO, both 30 over 9. WA6TBO was also worked with his 200 mw handheld! "Other CO stations known to have been in on the opening were WØETT (DM79), WØMOG (DM78), WG6K (DM67) the only VHFer in that grid, and also KS station NØLL about 330 miles east of here. "It takes an MUF well above 144 MHz to support the approximately 1000 mile skip to coastal CA. I wonder if maybe Larry, NØLL, or others were able to work into CA from KS on 222. I have not yet checked E Prop software, but think it will show that 222 MHz was possibly open over a 1300+ mile path. My 222 rig was temporarily down, but I did—honest to God, I'm an optimist—check 432.100 MHz a few times.

"I also asked WA6TBO if the Hawaii beacon was still in. He was nice enough to turn his antenna toward Hawaii and check it for me. The answer was no. Nevertheless, I checked the 144.170 beacon frequency every couple of minutes since it was possible that the sporadic-E took my signal well out into the Pacific where possibly there was still ducting. I am not convinced you can work sporadic-E into a duct, but it doesn't hurt to try! "Hope others had as much fun and excitement as I did, and I am looking forward to reading your reports.—73 de Doug, W2CRS, DM78 at the base of Pikes Peak, 9000 ASL."

The third report is from Todd Evans, KB6IGC: "Hello to all. Yesterday at 2245 UTC I was driving home from work and decided to

take a scan of the FM radio band. There were medium to strong signals all over the top end of the dial. I know my local stations well, and I also know the local cable TV plant well, and I knew that I was not getting cable FM leakage or local stations! My drive home takes only 10 to 15 minutes, so I was home and on the air by 2300.

"As soon as my radio powered up I observed the S-meter up in the red! Grids worked: DM64, DM65, DM76, DM94, DM95, all Texas and New Mexico. I live in the northern Mojave Desert (near Death Valley) and never heard any Colorado, or Kansas at all.

"During the peak of conditions, I quickly put out the request for 222 MHz and got a response from K5RHR in DM65 via 2 meters. We went to 222 MHz and tried for about 3 minutes with nothing heard. Interesting to note, I was receiving TV channel video carrier (180-190 MHz) during this time, so my hopes were high! I also took short breaks from 144, to get on 6 meters and put out the QST. Most stations worked were on 144.205 MHz, and some on 144.200 MHz.

"Opening seemed to go away around 0000 UTC here. Hope everyone had fun.—73, de Todd, KB6IGC, DM15do."

From Tim Marek, NC7K, comes the following: "Wednesday evening while driving home from work I was QRV on 6 meters when I worked a station in DM49. That's real close! My neighbor NN7K said, 'I bet 2 meters is open.' I reached down, turned on the Kenwood 9130 and kept driving. Four minutes later the 2 meter receiver broke squelch with 'CQ, CQ. This is KN5S.' It startled me so much that I locked up the binders and slid off the road to work him. I called him barefoot using 25 watts

and a KB6KQ mini loop only to exchange 59 reports each way. Sporadic-E sure is a funny thing! I called CQ for a few minutes but found nothing else to work. One of the best mobile 2 meter QSOs I've ever made!"

I received the following two reports of 2 meter openings during the CQ WW VHF Contest. First, from Ron Klimas, WZ1V:

"During the CQ WW contest, on July 9, between 1545-1630 UTC, I worked WB2QLP (EL96), K2RTH (EL95), KE4NJM (EL94), N4YKM (EL96), W4ZD (EL97), AE4DP (EL96), WA4CHA (EL88), N0KBH (EL88), and KT4AL (EL88). Most signals were 59."

The second report was from Stan Horzepa, WA1LOU: "During a 2 meter sporadic-E opening between 1430 and 1630 UTC today (9 July) here in Connecticut to southern Florida, I made my day by working a new state on 2 meters (only 24 more to go!)."

New Trans-Pacific North American Tropo Record Set

Apparently, a new Trans-Pacific North American Tropo was set on 2 meters on 1 July. From my vantage point here in Bosnia, details are sketchy. I will have more information next month. However, I received the following report from Mike Cherry, VE7SKA, which states in part:

"On Friday evening (1 July UTC) I arrived home at 0330 and was informed by Rudy, VE7FEI, that the KH6 trans-Pacific tropo duct had worked its way north from W6—which we all knew had been working KH6HME and KH6FOO for the past 3 days. Via the VHF Reflector I was aware that Paul, KH6HME, was

heading up to the beacon site at Mauna Loa. We all started listening to 144.170 and I heard one of the Seattle (CN87) operators mention in a QST that Lew, N7AVK, in CN84, Dave, N7DB, in CN85, and others were working KH6HME on SSB! Word eventually came through that Paul had made it up to CN86, and at 0615 I heard Merle, W7YOZ, work Paul with a 57 signal report! Merle had him in for over an hour and assisted others in working him. Paul, K7CW, worked him, but KH6HME copied the call as 'W6CW' and K7CW wasn't able to resume the QSO to correct him. K7ND worked him and two or three others in the Seattle-Tacoma area. I could hear bits and pieces of Paul's voice here in CN88 and furiously sent CW, but did not work him or get an acknowledgement. Apparently a station 10 city blocks away from Merle couldn't even hear KH6HME, so the opening was quite selective."

JAs To The Northwest On 6 Meters

Mike Cherry, VE7SKA, reported to me the following concerning a huge JA opening to the northwest coast on Saturday (2 July UTC):

"After an incredible day—one of those days when you can point your 6 meter beam in any direction and find a sporadic-E cloud to work off—we had a long JA opening from 0535-0904 UTC. Jim, W7FI, in Seattle worked 120 JA's. Paul, K7CW (CN87), worked about 150, N7DB in CN85 worked 80+ plus JA's, and I worked about 45 of them in most call areas. I was concentrating on monitoring the PAL video on various 49.750 offsets, so I didn't pursue the JA's for the duration of the opening.

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| 1800FSX | 287 | 2150 | 36 | 2200 |

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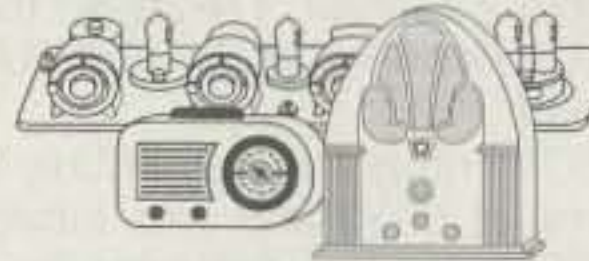
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The last one I worked was 0825, and they were in until just after 0900 UTC. At 0826 I had two different 48.250 TV signals with PAL video on a 280-degree beam heading which would suggest southeast Asia! Alas, no stations or beacons on 6 meters, however.—73's from CN88! Mike."

Massive European 6 Meter Opening to Midwest

Operators from Minnesota to Missouri experienced a 3+ hour opening to Europe on 7 July (to 8 July UTC). It began in the Maritimes a couple of hours earlier, spread to other parts of the east coast, and then suddenly opened into the midwest. Among the reports in the Internet is the following from Allen Schlaugat, N9ISM: "I haven't felt this way since my first 10 meter QSO with Europe as a Novice back in 1989!

"It began with Europe working the Maritimes. For 2 hours I was hearing VE9AA working Europe around 2000Z. Nothing special about that except HE was getting excited about working new countries in Eastern Europe! OK, SP, and YL—now that was something I have not heard before. But as always I was not hearing any Europe; just those VE1s and VE9s running huge piles. Oh well, at least the east coast was coming in, so I found a quiet frequency and ran my own pile to the east coast (still no Delaware!).

"Around 2130 UTC something weird happened. The east coast disappeared. I tuned the band below .125 and found WS1V running a nice European pile. But wait! G4IGO called him and he was S5! Moving just above him I called CQ.

"At 2149 UTC I worked him in IO80 for my first Europe 6 meter QSO! The DX Cluster lit up like a Christmas tree about that time; the 'Black Hole' was working England and Western Europe!! Tuning below .110 found the CW section sounding like 20 meters during a DX contest. No key wired up to the rig, so I moved up the band and searched and pounced on SSB. By the time I had to leave the radio at 2300 UTC I worked G, GM, and an SM and heard an OX, DL, OZ, among others. Most signals were 55 to 59 with rapid QSB.

"A local 6 meter guru told me about the 48.25 'video beacon' he uses. I never gave it much thought, since Europe on 6 wasn't a realistic goal from here.

"But listening on that frequency, I found a video carrier that was full scale on the TS60 from 2200 UTC when I first checked to very weak at 0100 UTC when I checked the band again.

"Kudos go out to G3IMW, who sought after 8's, 9's, and 0's only! For some it was probably their first European (it was my second!, Hi!). 'Cute' thing I heard during the opening was GM4WJA was working a huge pile right on 50.150 MHz.

"A KE4 came on frequency and called CQ while the GM was finishing a QSO. The KE4 and the GM called QRZ right at the same time. The roar on frequency was for the GM, but the KE4 came back and said, 'Holy Cow' and disappeared without saying another word.

"NØAKC told me about F2 openings to JA that will leave me breathless in three to four years. I should catch my breath from this afternoon by then.—73 de AI, N9ISM."

Another report, this one from Dave Quick,

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WDØEKL (EN35, MN): "Worked GØGKC (IO92), G3IWM, (IO80), and GQ3JXN (IO72) on 6 meters, around 2230Z, with signals just above the noise. Also heard the east coast. I never thought I'd see the day when I could work Europe on sporadic-E!"

Still another, this from Mike, KSØF: "From EM48 near St. Louis, MO on 6 meters, 7 July: 2019 UTC DL7AV (JN58); 2021 UTC PA2VST (JO21); 2024 G4UPS (IO80); 2024 ON4KST (JO20); 2025 GW4VEQ (IO73); 2026 GJ4ICD (IN89); 2029 G3NSM (IO91); 2030 G3WOS (IO91); 2031 G3IBI (IO90); 2032 SM7AED (JO66); 2035 G3TCT (IO91); 2037 DL7QY (JN59); 2041 GM4OBD (IO87); 2045 DK7ZB (JO51); 2048 G3IMW (IO80); 2054 PAØOOS (JO33); 2100 F6ANQ (IN94); 2108 PA3FYM (JO22); 2114 GW4LXO (IO71); 2124 OZ1BVW (JO45); 2128 G4MJS (IO91); 2131 OZ1ELF (JO45); 2134 SM7BAE (JO65); 2134 G4MKF (IO91).

"An F6 station kept calling me and I was really trying to pull him out but could not. Signals at times were S5 or S6 here. Got several 599 and 589 reports. My first ever really big opening on 6 meters of this type. It is important to note that I was hearing European stations until 2315 UTC, but had already worked them or was unable to crack pile-up. GM4OBD was the last European heard around 2315Z.—73 de Mike, KSØF."

Easter Island EME DXpedition Announced

The following announcement is from the Internet courtesy Enno Korma, PAØERA: "Easter Island (XRØY) on 6 Meters, September 4-21,

1995. The XRØY (Easter Island) DXpedition organized by Bob, KK6EK and Carlos, NP4IW, will be active on 6 meter EME. Bill, AA6TT, and myself will take care about this activity. Equipment will include a 1 kW solid-state amplifier and an M² beam with 15 meter boom (2.5 wavelength), sponsored by Mike Staal, K6MYC.

"Preliminary checks indicate that several EME windows exist with a reasonable chance for a successful QSO with most continents.

"The DXpedition starts 2 Sept. and finishes 23 Sept., so the effective operation period is likely to be 4-21 September. Stations who wish to make a sked should have appropriate hardware for EME. Minimum requirements are: antenna gain 12 dBd and 16 kW ERP. If you think you have a station qualified for EME contact PAØERA (before Aug. 25), preferably via Internet: c831623@nlmg02.serigate.philips.nl or by normal mail (with SASE or SAE and IRC): E. J. Korma, P.O. Box 6687, 6503 GD Nijmegen, The Netherlands.

"You can also try to contact by telephone at +31.80.442116 (1700-2200Z). Specify your station details (antenna gain dBi, power, elevation capabilities) and location (6 char. WW locator or lat./lon.).

"Skeds will be made based on the VK3UM program and by consulting Peter, PA2VST. Proposals are welcome.

"As local (inter-station) QRM situation is not known, there is no 100% guarantee that we will be QRV at sked time. We will try to distribute last-minute information and updates via Internet from Easter Island.

"Please read general XRØY publications in DX outlets for a list of liaison stations ("anchors") who will be kept up to date. Of course,

we will be looking for other propagation modes as well (E, TEP)." A beacon will most likely be operated (50.105 MHz).

DX Caribe Cruise '95

The following account of VHF activities on Yaesu's DX Caribe Cruise '95 (June 18-25) is courtesy Chip Margelli, K7JA.

Weather conditions in the Caribbean were generally poor, with much rain and wind and no stable air masses which would be favorable for tropo. As a result, no "water grid" 2 meter QSOs were accomplished during the cruise.

Six meter conditions were also rather poor, with one QSO made from Aruba and none from the other islands despite furious efforts at calling "CQ" while beaming both Europe and Stateside. One evening's worth of "water grid" QSOs (June 21) did provide some 6 meter excitement, though, as they worked for over 2 hours into the Washington, DC area on double-hop E.

The EME effort was more successful, as the first-ever EME QSOs were accomplished from Barbados (8P9EX) and Curacao (PJ9Y). Using two 10-element K5GW-design Yagis, an FT-736R, Timewave 59+ DSP filter, and a single 3CX800A7 amplifier loaned by WB5LBT, the EME QSO totals by island were:

Arube (P40Y): 9 QSOs (KB8RQ first).

Dominica (J70Y): 0 QSOs due to late arrival after moonset.

Barbados (8P9EX): 4 QSOs (W5UN first), poor EME conditions.

Martinique (TOØY): 2 QSOs (W5UN/K5GW) 150W only due to incompatible 220V power line wiring.



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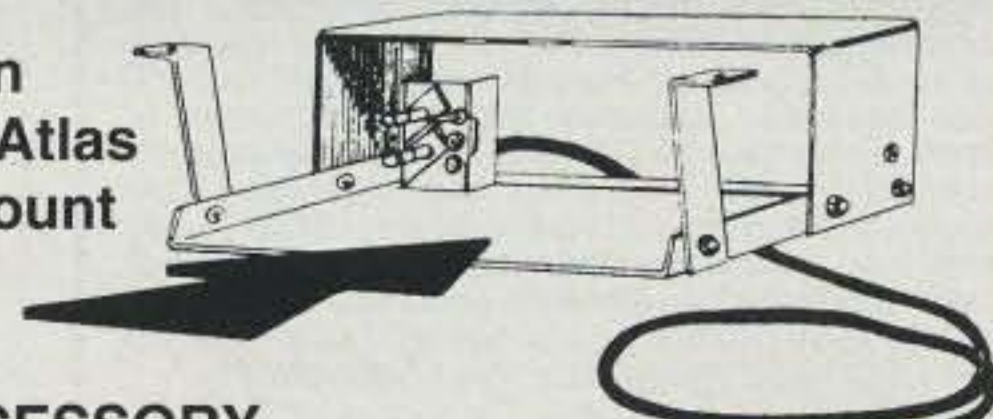
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Curacao (PJ9Y): 6 QSOs (KB8RQ first).

The final day from Curacao saw wild polarization swings, with it being necessary to call CQ horizontally, then run over to the antenna to rotate the individual Yagis to vertical, run back and copy call signs, then run back to the antennas to go horizontal for RX!

This was the first-ever multi-stop EME DX-pedition accomplished within one week. The fact that they were able to make this many QSOs with such modest equipment and negligible setup time (arrival at site at 9:30 AM, departure at 3:30 PM same day) should provide considerable encouragement for others to put on new countries via EME, especially if they can stay a few days to work through changing conditions.

Current Conferences

Eastern VHF/UHF Society Conference: The following speakers have been scheduled for the 21st Eastern VHF/UHF Society Conference: Frank Potts, NC1I, "Serious EME Mount"; Steve Powlishe, K1FO, "So You Want to Manufacture Ham Gear?"; Ken Neubeck, WB2AMU, "6M propagation"; Steve Kostro, N2CEI, "Better Construction Techniques"; Tom Williams, WA1MBA, "10 GHz in New England"; Mark Hoffman, KA2RDO, and Rus Healy, NJ2L, "Operating from N2WK"; N2MSS on 50 MHz; W1AIM on 144 MHz; AA2UK on 222 MHz; W3ZZ on 432 MHz; WA8WZG on 903 and 1296; and N1BWT on 2304 and up. Complete details of the conference, scheduled for 25-27 August, can be found in last month's column.

Northwest VHF/UHF Conference: The following is from the Internet by way of Tim Marek, NC7K.

By popular demand the Northwest VHF/UHF conference lives on. It will feature notable VHFers such as W7LHL, N7ART, NC7K, and NØXX, and will be held at the Central Oregon Environmental Center, 16 NW Kansas, Bend, Oregon, from 9 AM to 3 PM on Saturday, Sept. 23. Cost is \$15 payable to Don Krugi, K7HSJ, 1126 NE Burnside, Bend, OR 97701 (phone 503-382-7561 from 6-9 PM).

There will be a "No Host Breakfast" on Saturday at 8 AM at Tony's Restaurant, two blocks south of Franklin on Hwy. 97. For lunch a list of places to eat will be available at the Conference Center (3 blocks from downtown), and there will be a lunch break. Free coffee and pastries available at the center. For those who need housing, a lodging guide will be sent by return mail. They want you to "come early, get acquainted, exchange QSL cards, tell your contest exploits."

VHF Southern California Get-Together: Ron Hammel, KC6WLC, has opened his ranch in Ventura County, California, for a weekend get-together of the VHF-UHF operators of southern California (or anyone who wants to travel to southern California, for that matter). Beginning at 1 PM Saturday, September 30th and lasting through Sunday afternoon, Ron will host visitors to the ranch. Ron says that there are a number of beds available for those who wish to spend Saturday night. To get to his QTH, take the Frazier Park exit off Interstate 5. Go 15 miles west to the ranch. About halfway there you will enter the Lake of the Woods. At Lockwood Rd., turn left and follow it to the ranch. Talk-in for directions is 144.210 MHz USB, or 146.55 MHz FM. For more information,

contact Ron at 805-949-8219 evenings, or 805-245-1009 weekends.

Current Contests

Canadian Sprints: The following is unverified but is based on last year's information. Please check the VHF nets for up-to-date information.

The Radio Amateurs of Canada are sponsoring their annual Sprints beginning this month. All Sprints, except the 50 MHz Sprint, run from 1900 to 2300 local time. The 50 MHz Sprint runs from 1000 to 2400 UTC.

The first Sprint is the Microwave Sprint. It is set for 7 September and includes 902, 1296, and 2304 MHz. The second one is the 432 MHz Sprint, and it is scheduled for 14 September. The third one is the 220 MHz Sprint. It is scheduled for 20 September. Canadians will monitor 222.100 in an effort to work south into the States. The fourth one is the 144 MHz Sprint scheduled for 3 Oct. The last one, the 50 MHz Sprint, is scheduled for 8 Oct. Exchange is your grid square, and contacts are worth one point per QSO in each contest. Scoring for each Sprint is the grid squares multiplied by the total QSOs. *Note:* No FM contacts are allowed on 146.52 simplex or via any repeaters. Mail your logs to RAC Vice President and VHF column editor, Dana Shtun, VE3DSS, 500 Willard Ave., Toronto, Ontario, M6S 3R6, Canada.

September ARRL VHF Contest: The September VHF contest is similar to the June VHF QSO Party. It starts Saturday, 9 Sept. at 1800 UTC and ends Monday, 11 Sept. at 0300 UTC. Full rules can be found in Aug. QST.

ARRL 10 GHz Cumulative Contest: The second weekend of this contest is Sept. 17-18, from 8 AM local to 8 PM local. A summary of the rules were in last month's column. The San Bernardino Microwave Society is sponsoring a plaque for the winner of this contest.

Current Meteor Showers

Two minor showers, the *Aurigids* (1-2 Sept.) and the *Piscids* (two peaks, 8 and 21 Sept.) can be seen this month. However, their activity has not been much above what is considered sporadic activity.

And Finally . . .

You may have noticed some holes in my reports in this column. This is because some of the E-mail was almost a week in getting to me in Bosnia. Next month I will try to fill in the holes. It has been very interesting trying to write this column from Zenica, Bosnia. I dialed into a BBS in Tuzla, Bosnia and receive my E-mail from there. Thanks to my Bosnian friends, it all was free of charge.

If you have something to report from your part of the world, please be sure to send it to me at my address at the beginning of this column, or phone it to me at 405-528-6625, or fax it to me at 405-528-0746. Perhaps the best way to get your report to me is via the Internet to either one of my addresses (also shown at the beginning of this column). However you get it to me, I will do my best to work it into a future column. Until next month . . .

73, Joe, N6CL

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WHAT'S NEW AND HOW TO USE IT

The New 3.3 Volt Power Supply Standard

The well-known, 25-year-old, 5 volt standard power supply voltage, popularized by virtually all of the many TTL semiconductor manufacturers, seems to be on the way out. Anyone who has done any circuit design is well aware of 5 volt logic, and it is hard to believe that a new standard is in the wings. This certainly seems to be the case, though. The main proponents of the change are the portable PC and wireless equipment manufacturers, and the reason is power conservation. Since virtually all of this type of equipment is battery powered, operating life is one of the most important parameters.

The new standard is generically called "3.3 volts." When you consider that a circuit such as a lap-top computer, drawing 10 amperes at 5 volts, dissipates 50 watts, the same equipment with a 3.3 volt logic will only draw 33 watts. The 35%, 17 watt savings would result in a third more battery life. When you now consider a tiny, portable cellular telephone with its tiny companion battery pack, every ounce of power drawn is truly critical. As a result, 3.3 volt digital and analog circuitry is not only here, but is vital to the success of these products!

The 3.3 volt standard has a tolerance of ± 0.15 volts compared to the ± 0.25 volts of the 5 volt standard. This makes the choice of regulators a bit more critical.

Fortunately, a number of standard three terminal styles such as the LT1084CT-3.3 (5 amps maximum), LT-1086CT-3.3 (1.5 amps maximum), and LT-1121CZ-3.3 are currently on the market expressly for this purpose. The three just mentioned are from Linear Technologies. However, most large semiconductor manufacturers have their own versions. Application of these regulators is generally the same as for the older 7800 style, but the new regulators have one feature which is different. All are low dropout regulators, which allows them to operate with an input/output voltage differential that is less than the 2 to 2.5 volts required by the older 7800 varieties. This means that they can be used to convert 5 volt supplies to 3.3 volts as well. Fig. 1 shows how this is accomplished.

In addition to linear regulators, DC-to-DC converter techniques are used to provide the 3.3 volts. This enables one or two 1.5 volt AA batteries to easily be stepped up to provide the required voltage. Fig. 2 shows a common circuit for doing this using a MAX856. The chip here is from Maxim Integrated Circuits. Many semiconductor manufacturers have their own versions as well.

"But," you may ask, "why not just use a simple series resistor to drop 5 volts to 3.3 volts?" A simple calculation will show the problem with this approach. To produce 3.3 volts from 5 volts at a current of 2 amperes (not uncommon

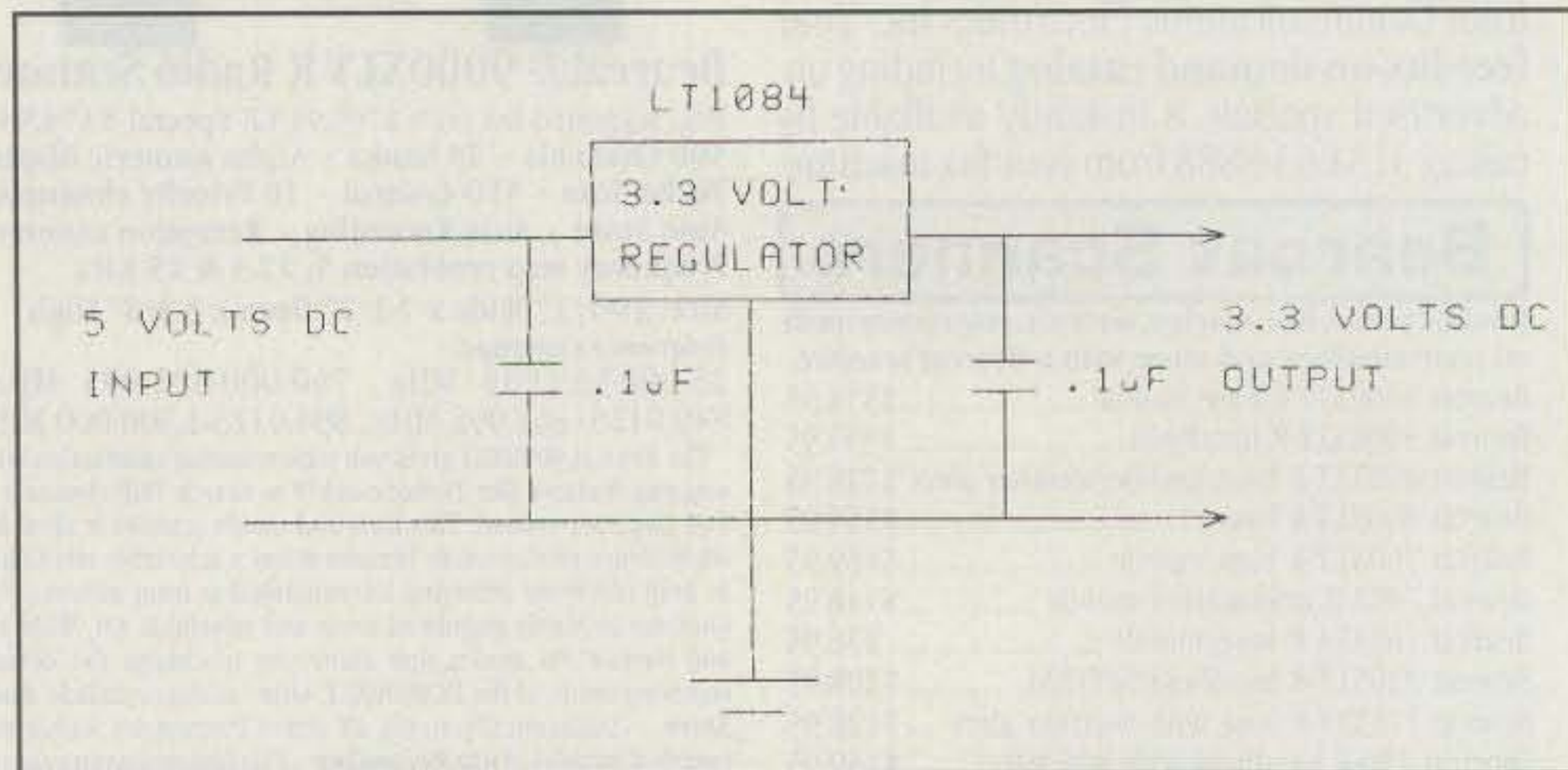


Fig. 1- Using a 3.3 volt linear regulator.

for a microprocessor, memory, and some logic chips) would require a dropping resistor of $1.7/2$, or 0.85 ohms. This resistor would then dissipate $(1.7 \times 1.7)/0.85$, or 3.4 watts. Unless you plan to use this power to warm up the unit in the winter, it is quite a loss! A DC-to-DC converter could reduce this loss to a few milliwatts.

The new 3.3 volt standard obviously requires a host of new products especially de-

signed to work from low voltages, and the semiconductor manufacturers have been quick to comply. Representative examples from just two semiconductor houses, Texas Instruments and Maxim Integrated Circuits, follow.

From Texas Instruments

TVL2262 series: A dual, low-noise FET input

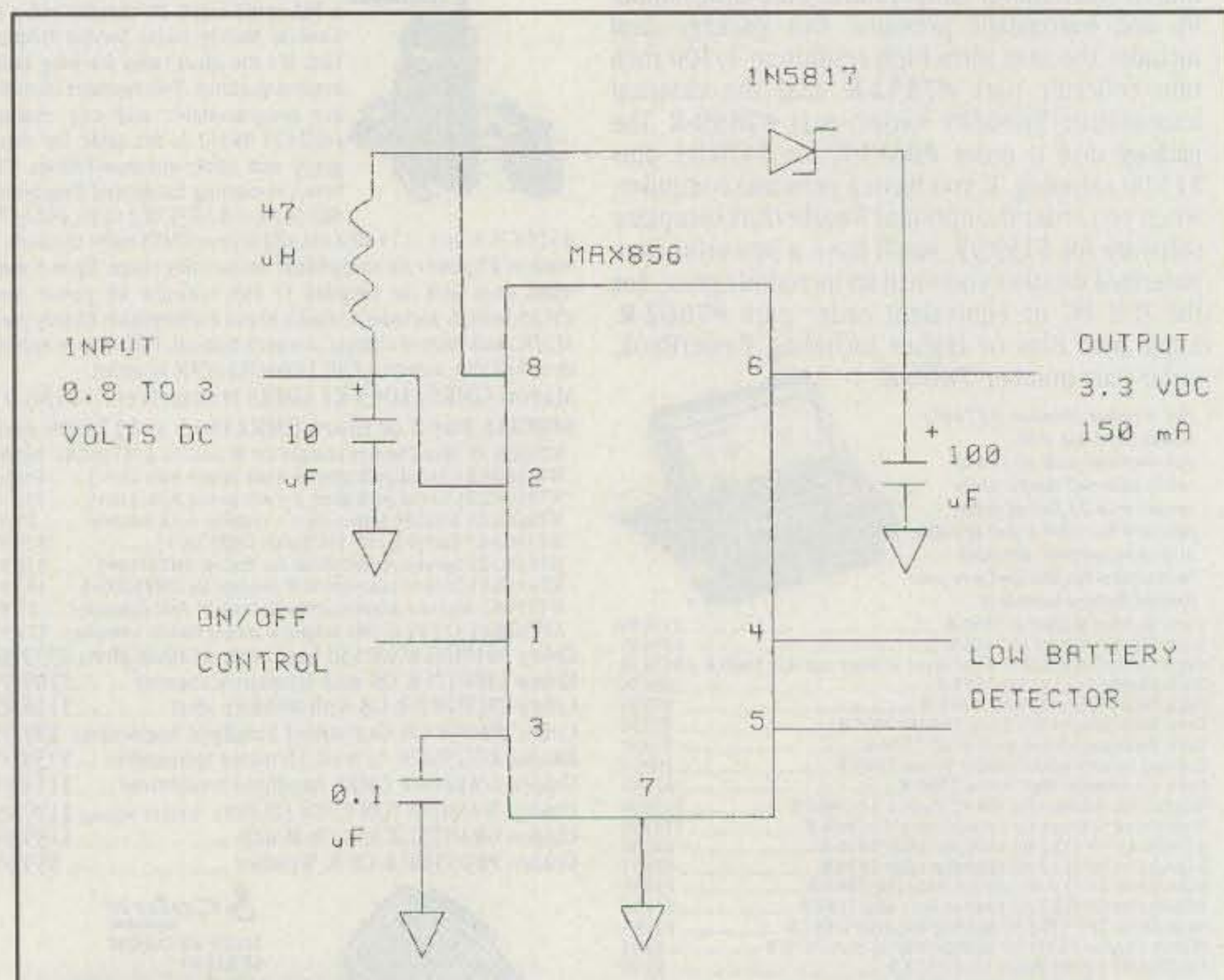


Fig. 2- Producing 3.3 volts from AA batteries.

c/o CQ magazine

op-amp with input bias current level of 1 pA typical and output voltage swings to the rails.

TVL2362 series: A dual, bi-polar input op-amp with a gain-bandwidth of 7 MHz capable of operating with a Vcc level as low as ±1 volt.

TLC371 series: A fast response differential voltage comparator with an input bias current of 1 pA and a switching speed of 200 ns.

TL16PC564A: A complete UART designed for use in personal-computer applications.

TSC235: An interesting light-to-frequency converter suitable for building an ultra-simple, inexpensive digital light meter. The application of this part is so simple that anyone with a frequency counter can now have an accurate light meter. Fig. 3 shows the details.

From Maxim

MAX866: A 0.9 volt DC to 3.3 or 5 volt DC step-up converter.

MAX3222 series: A dual RS-232 compatible driver/receiver with full RS-232 compatibility, including ±5 volt signal output voltage levels.

MAX513: A triple 8-bit digital-to-analog converter.

MAX3483 series: A true tri-state RS-485 interface chip.

Summary

The above examples are representative of what is becoming available for use with the new 3.3 volt standard. By no means are they the only offerings, as the literature is full of RF cir-

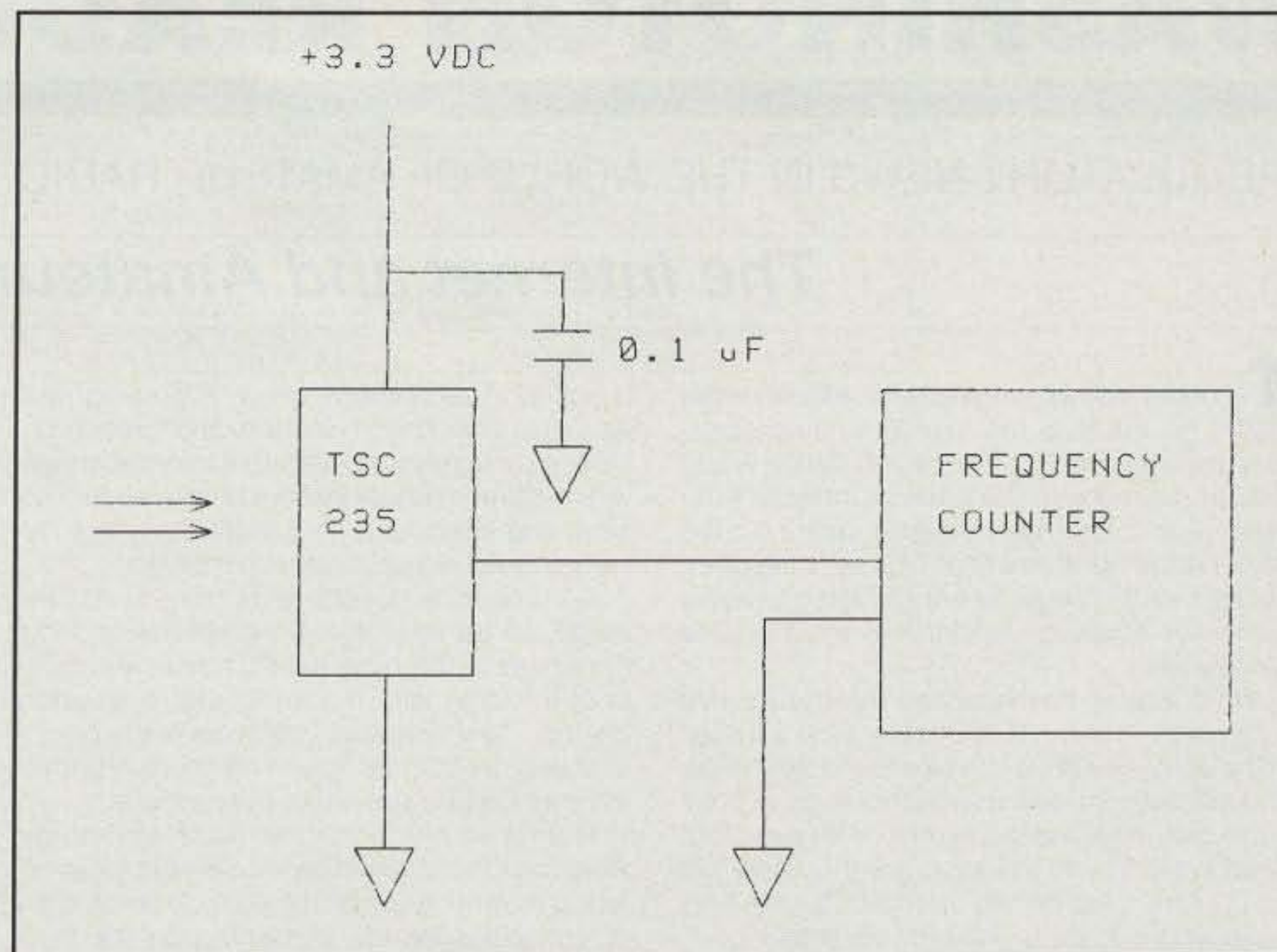


Fig. 3—Simple light to frequency converter.

uits, high- and low-speed op-amps, audio processor chips, and almost anything else you can imagine.

So when contemplating the design of a new

piece of equipment, consider "getting your feet wet" with the new standard. The components really work, and they work well!

73, Irwin, WA2NDM

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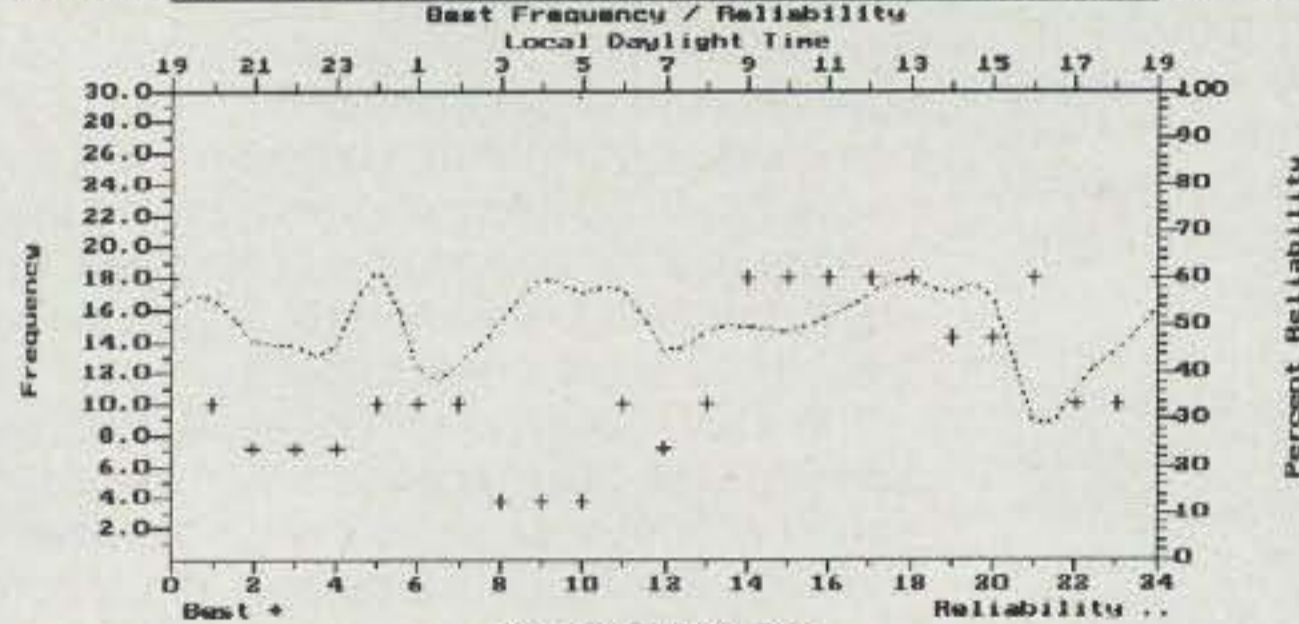
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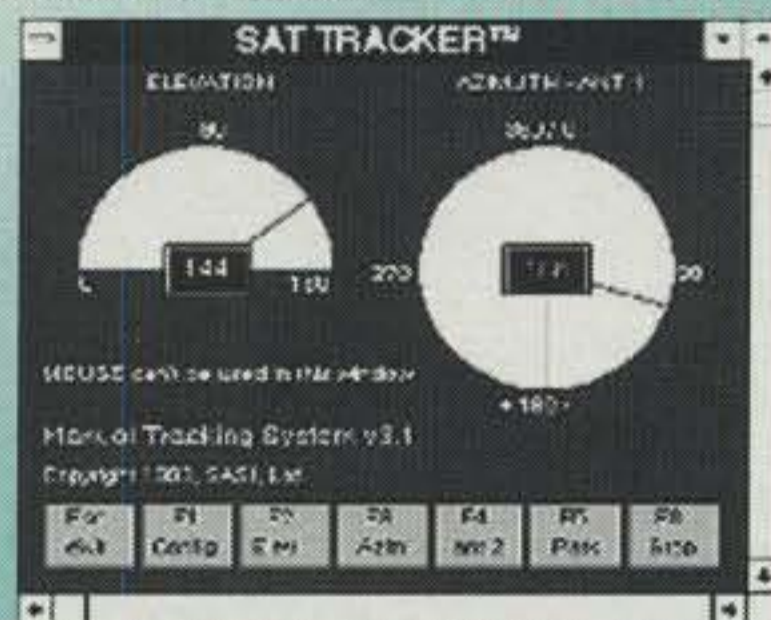


Select Parameter by Number, Band by Letter or press (Q) to Quit
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(5) Recv Ant Gain, (6) S-Meter, (7) dB MicroVolt, (8) dBu, (9) Best
(A) MUF, (B) 2.0 MHz, (C) 3.8 MHz, (D) 7.2 MHz, (E) 10.1 MHz, (F) 14.2 MHz
(G) 18.1 MHz (H) 21.2 MHz (I) 24.9 MHz (J) 28.5 MHz (K) 29.6 MHz
Select Output by Function key
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WASHINGTON READOUT

REGULATORY NEWS IN THE WORLD OF AMATEUR RADIO

BY FREDERICK O. MAIA, W5YI

The Internet and Amateur Radio

The internet network, originally developed in the 1960s for fail-safe military communications, was later (through the National Science Foundation) shared with the non-commercial educational and defense research sector for the interchange of information. Thanks to the deep pockets of the Department of Defense every computer science department went on-line nationwide.

What was a few hundred internetworked computers in the mid-1980s became a million in the early 1990s. It is now around 30 million, and the phenomenal growth continues. A computer gets added to the Internet every second! What is especially interesting is that there are no content rules on the Internet. Unlike ham radio, you can send and receive anything.

Although subsidized for years by the Government, the Federal Communications Commission has no jurisdiction of the Internet—at least not yet. (The politicians are working on it.) Although the non-profit Internet Society supports networking growth and standards, they don't supervise the net at all. It all seems to work. Unlike communicating via radio, interference to others is not a problem.

In principle, the Internet works similar to the human central nervous system. Nerves transfer information to the spinal column (backbone), which speeds it to other parts of the body. The net's staggering growth is both a curse and a monumental opportunity.

The Government subsidy has now been discontinued and the Internet is being colonized by individuals, information providers, and especially commercial users. It's like the early days of broadcast radio when broadcasters had to come up with a way to finance their operation. And like radio, it appears that business largely will foot the bill through sales promotion to the public.

The net benefits everyone and the Info-rush is on! Entire new businesses and services are emerging. People and businesses are connecting, communicating, sending mail, buying, selling, and delivering services to one another. Commercial use of the Internet is relatively new. It began in earnest only about a year ago.

The TCP/IP protocol is now an international language. Hundreds of thousands of servers around the world operate around the clock spewing gazilabytes of data to millions of hungry client PCs.

The Internet was never designed for any particular application. It is just a digital stream into which you throw a bottled message—and aim toward its destination. Even the U.S. Government has put its daily mountain of paper on the net.

There is still much room for growth! Less than 5% of the potential individual/commercial market has an Internet connection. The future

is linked to technology which is coming fast! As long as backbone capacity and faster computers continue to be available, Internet growth will mushroom unchecked. Luckily, so far network and integrated chip technology are developing as fast as Internet expansion.

A number of recent trends have fueled the surge in Internet usage. It indeed has become the craze of the nineties! PCs now are lower priced, come with modems, and are widely owned. "Web Browser" software is low priced and very frequently free! And there are local Internet service providers everywhere.

Consumer online services (such as Prodigy, America Online, and CompuServe) began offering Internet access last year. And the entry of computer literate students into the workforce with Internet experience has sparked interest in the community.

Even more expansion is coming. Microsoft is in the process of releasing its much heralded Windows-95, which has built-in Internet access. Tens of millions of this operating system software are expected to be sold!

Long range, the Internet will deliver all telecommunications services digitally, including voice messaging and dazzling multimedia audio/full-motion video/graphics. Electronic mail, "browsing," and interactive file transfer are the early uses. Real-time "IRC" (Internet Relay Chat) sessions with users typing messages back and forth is slowly evolving into an inexpensive voice telephone service.

Even digital Internet broadcast radio is on the way. And you don't need an FCC license to broadcast audio or video. The newspaper could become obsolete. I already have a daily interactive, customized version of the *Wall Street Journal* delivered to my PC before the paper hits the streets!

Video teleconferencing and movies piped to your PC are coming. New "just thought up" digital services appear regularly. The analog world should indeed be concerned. As I see it, unless the net bursts, traditional communications goes the way of the horse and buggy. The world is changing dramatically.

The fastest growing segment of the Internet is the World Wide Web. This global digital library with its embedded "Hypertext" reference links permit fast interactive location and information access. Hypermedia is an invention of CERN, a Swiss based physics laboratory. By using a screen-oriented viewer (called a "browser") and clicking on highlighted text, anyone can now scoot seamlessly from one U.S. or foreign information server to another in a flash.

USENET was started by college kids on the Internet as a way to send messages between Duke and the University of North Carolina. It later evolved into the "Newsgroups," the biggest computer bulletin board in the world.

Computer Enthusiasts

As a general rule, all ham operators are gad-

get freaks. Some 700,000 are already licensed and another 4000 newcomers are joining the amateur radio ranks monthly! Most have an IBM-compatible computer and are eager to try computer networking.

Morse code is the earliest form of electrical digital transmission. The wireline telegraph introduced high-speed message delivery 150 years ago and went wireless at the turn of the century. Morse Code is really not that much different from the digital Internet. It is just networked code that is read by a machine.

Amateurs got involved in two-way traffic and networking via computers and modems in the late 1970s when they developed error-correcting radio (Terminal Node Controller) modems. Actually, Canada was the first to authorize packet radio communications.

Packet radio caught on in the United States in the early 1980s when an amateur moved to Tucson, Arizona and formed the Tucson Amateur Packet Radio Corporation (TAPR). They designed and later sold thousands of TNCs. Gateways have now been built to the Internet from the amateur packet radio network.

Due to Government licensing and scarce spectrum, however, radio modems have yet to be discovered by the masses. They are coming, however! Right now, wireline Internet access is the universal approach.

The wired Internet has also attracted thousands of amateur radio operators since it permits similar activities and there are no content restrictions. Anything you can do on the amateur bands, you can also do on the Internet. "Chat" sessions are similar to calling CQ. Working DX is a snap. Message traffic can be handled by E-mail.

Internet Opportunities

Firms everywhere—from giant corporations to small "kitchen table" operations—are staking their claim to the Internet. It doesn't cost anything to fish in the information stream. It is there for all to use. All you need is fishing gear and way to get to the river. And the fishing pole is "free" if you know where to get it.

The U.S. Government-financed "Mosaic" software and other browsers can be downloaded without cost from various sites directly from the net. The public-domain Mosaic program was originally produced by NCSA, the National Center for Supercomputing Applications, a National Science Foundation organization, to assist universities and research centers connect to Internet. Many programmers have modified this complex program to their needs, and it is now universally available under various names.

Local telephone lines are inexpensive. Many individuals have formed small companies and set up shop as Internet service providers. Some local providers (such as Netcom, 1-800-353-6600) have gone national and have established a network of local access

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numbers. At present, unlimited Internet access averages around \$25 a month—less if you go through a consumer online service. But be careful, as most online services do not offer all of the Internet "tools."

No one anticipated the dramatic growth of the Internet, and no one knows what the future holds. One thing appears certain, however! The digital revolution and the Internet are here to stay. If you do not have a connection, you should get one as soon as possible. To do otherwise is to be left behind on the information highway.

Is Morse Code Necessary?

Since radio does not respect national borders, wireless communication is international in scope. The various nations of the world agree on the uses, requirements, and frequencies of the various radio services. These agreements are negotiated at World Radio Conferences, the next of which will be held a couple of months from now.

The international requirement that amateur radio operators be proficient in the international Morse Code dates back to the days when manual telegraphy was the primary means of transmitting maritime distress signals. Morse Code on the high seas is now fast becoming a relic of the past. Even the 500 kiloHertz telegraphy distress frequency is no longer monitored by the U.S. Coast Guard.

Better, more reliable distress communications systems now exist. The telegraphic SOS has given way to GMDSS, the Global Maritime Distress and Safety System. GMDSS is an automatic, satellite-based, high-technology ship-to-shore alerting system, which is now in the process of being phased in on large maritime vessels. It is certainly more dependable than ship-to-ship telegraphy, since it does not depend on human operators transmitting signals through the unpredictable ionosphere.

Large ships will now carry two GMDSS operators who need not be Morse Code proficient. Shipboard radio officers are certainly not happy about this turn of events! They could be replaced by shipboard workers who have passed new examinations on maritime law and GMDSS operations. Score 75% on a 100-question, multiple-choice examination and you are an FCC-licensed GMDSS operator.

We are very familiar with the GMDSS examinations, since our organization, The W5YI Group, Inc. not only coordinates amateur radio examinations for the FCC, but commercial radio tests as well. We have about 300 commercial radio test sites around the world.

The big question now is since the commercial world is discontinuing manual telegraphy as a requirement, why shouldn't the amateur service do likewise? What is the real need for Morse Code proficiency today when operating on the HF bands? Many existing operators have strong feelings about it.

The International Amateur Radio Union is made up of national amateur radio societies across the globe. The IARU's view is that discontinuing the telegraphy requirement would change the basic character of the service and result in excessive congestion. And well it could, since most amateur communications are still analog. It also appears that most amateur radio operators want the bands to remain analog. Understandably, the ARRL and the IARU, like the commercial radio officer unions,

are more in tune with the desires of existing operators rather than the current state of communications technology.

We mentioned in our May 1995 CQ column the effort being put forth by a New Zealand grass-roots organization which seeks to abolish the international Morse Code requirement for high-frequency amateur operation. International Radio Regulation 2735 says you must be proficient in Morse Code if you operate on the HF bands. There is no speed requirement, but you must be able to manually send and receive Morse signals by ear.

ORACLE, the New Zealand Organization Requesting Alternatives by Codeless License Examinations, believes the telegraphy "filter" requirement now exists only to restrict the number of amateur operators accessing the HF amateur bands. They are not opposed to CW communication, only to Morse Code knowledge being a licensing requirement for amateurs operating below 30 MHz.

ORACLE was formed by several New Zealand amateurs when they were unable to gain support for a change in the international telegraphy regulations from their national amateur society, NZART, the New Zealand Association of Radio Transmitters. It is ORACLE's position that there should be alternative ways to qualify for full amateur privileges. Some amateurs believe that Morse Code skill is an indication of motivation and dedication. The record shows, however, no relationship between being a conscientious, considerate operator and Morse Code proficiency.

Contrary to the desires of NZART, the government of New Zealand has now decided to seek the suppression of RR2735 as request-

ed by ORACLE. The Ministry of Communications has concluded that manual telegraphy knowledge is no longer appropriate as a Treaty obligation for the government of New Zealand. The MOC feels that the operator requirements specified in the next regulation, RR2736, are adequate.

RR2736 stipulates that "Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station." The New Zealand government believes "There is clearly, ample scope under this regulation for an administration to require competency in Morse or not as deemed appropriate. RR2735 adds a specific obligation in regard to Morse Code, and in so doing limits national freedom but without providing any greater benefits. The Ministry has therefore formed a view that it is appropriate to propose the deletion of RR2735 at the forthcoming WRC-95 and will now work to this end."

The MOC added "... the deletion of RR2735 will allow any future changes to be adopted by administrations as they see fit, and at an appropriate time, rather than awaiting for quite some years before the item is able to be placed on an ITU WRC conference agenda. The international regulations will thus be flexible to enable administrations to respond to the needs of their national circumstances, rather than having national requirements unnecessarily limited by the International regulations."

Needless to say, NZART is furious with ORACLE and the stage is now set for a showdown this October in Geneva. Strangely, the American Radio Relay League, which sides with the

IARU position, has not told their membership that the Morse Code requirement could indeed be dropped at WRC-95.

The following is the text of a position paper that is being distributed by ORACLE to the various ITU delegations at WRC-95.

THE CASE FOR SUPPRESSION OF RR 2735 (S25.5) AT WRC-95

Introductory Note: This paper is about international rather than national regulatory requirements. While it deals with Morse Code as an international regulatory issue, at no time does the paper oppose the use of Morse Code by amateur radio operators.

1.0 SUMMARY:

1.1 Many questions can be asked about the continuing need for a specific international radio regulation making Morse Code testing a mandatory part of qualifications for amateur radio operators to access certain bands. Amateur radio operators are able to communicate freely, using a variety of modes.

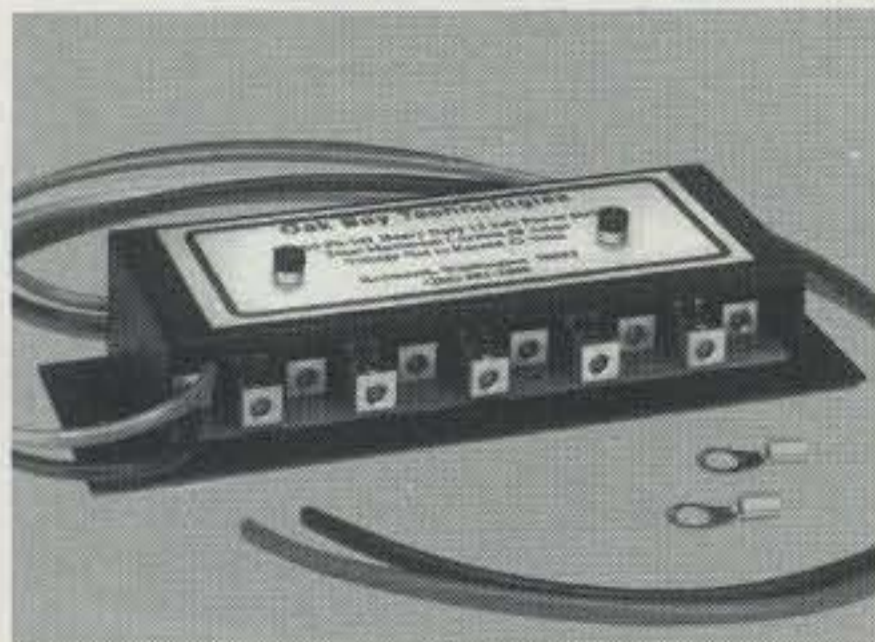
1.2 Proficiency in Morse Code is considered by many to no longer be an essential international requirement for the Amateur Service.

1.3 The Amateur Service is described in Article 32 of the International Radio Regulations (S27 of the simplified regulations). The specific international regulation on Morse Code testing in the Amateur Service is RR 2735 (S25.5) (the text is shown in 2.0 below).

1.4 It is suggested that in the future each ITU member should have the flexibility of choosing, by national rule-making, whether Morse Code testing is an essential element in

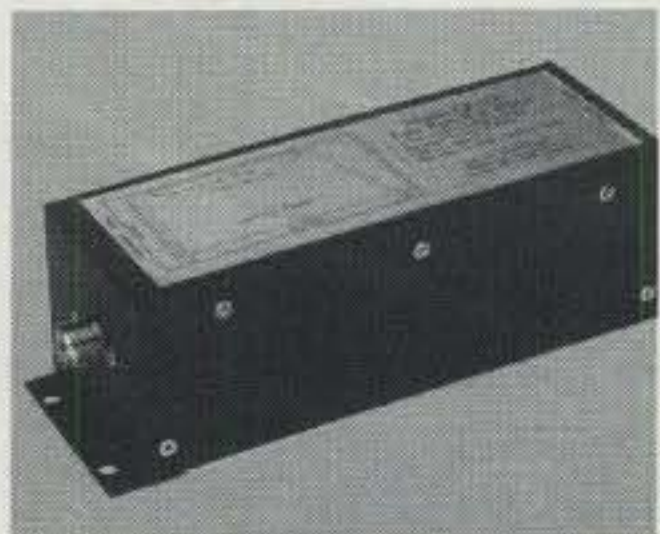
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amateur radio qualifications. This does not necessarily mean that administrations need to change national regulations, but if a change was wanted, and an international requirement was removed, then a path towards change would be available.

1.5 Regarding simplification of the international radio regulations (for which the VGE Report is agenda item 1 for the 1995 World Radiocommunications Conference), administrations can interpret the more general regulation RR 2736 (S25.6) to be inclusive of Morse Code testing.

1.6 The Voluntary Group of Experts (VGE) has already identified a parallel example of Morse Code testing in the Experimental Service, which is described in Article 34 (S27). There the VGE recommend suppression of RR 2800 as "the purpose is better covered by No. 2801." RR 2801 (S27.3) is the more general regulation on qualification requirements and is equivalent to RR 2736 (S25.6).

1.7 In summary, suitable simplification of the international regulations can be achieved by suppression of RR 2735 (S25.5). RR 2736 (S25.6) is sufficient.

2.0 SIMILARITY OF INTERNATIONAL REGULATIONS RR2735 AND RR2800

2.1 Some regulations in Article 32 for the Amateur Service have parallel similarities with regulations in Article 34 for the Experimental Service. In particular RR 2735 and RR2736 are similar to RR 2800 and RR 2801. The texts are:

RR2735: Any person seeking a license to operate the apparatus of an amateur station shall prove that he is able to send correctly by hand and to receive correctly by ear texts in Morse code signals. The administrations concerned may, however, waive this requirement in the case of stations making use exclusively of frequencies above 30 MHz.

RR2800: In experimental stations any person operating radiotelegraph apparatus, either on his own account or for another, shall have proved his ability to transmit by hand and to receive by ear, texts in Morse Code signals.

RR2736: Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an amateur station.

RR2801: Administrations shall take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate the apparatus of an experimental station.

3.0 SIMPLIFICATION OF THE INTERNATIONAL RADIO REGULATIONS

3.1 The Voluntary Group of Experts (VGE) undertook to study allocation and improved use of the radio frequency spectrum and simplification of the radio regulations. The VGE work has been reported in three parts.

3.2 Item 1 of the agenda for WRC-95 is: To review the final report of the VGE and to consider related proposals from administrations, in order to undertake as appropriate a revision of the Radio Regulations and to provide a timetable for the implementation of outstanding recommended actions.

4.0 VGE RECOMMENDATION FOR SUPPRESSION OF RR2800:

4.1 The VGE report includes a recommendation for suppression of RR2800, with the explanation that the "purpose is better covered by No. 2801" (refer to page 179 of Part B of the VGE Report). This is alternatively described as "should have one superfluous provision deleted" (refer to p. 36 of Part A of the VGE Report).

4.2 Similar consideration can be given to suppression of RR2735, that the purpose is

sufficiently covered by RR2736.

5.0 VIEWS ON MORSE CODE TESTING POLICIES

5.1 The history of RR2735 is that the formulation of having a frequency above which administrations may waive a Morse Code requirement was introduced in 1947, with a waiver frequency set at 1000 MHz. In 1959 the waiver frequency was modified to 144 MHz. The waiver frequency was further modified to 30 MHz in 1979, which was the last competent conference to address this regulation.

5.2 It is suggested that RR2735, and former versions of this regulation, have the appearance of being formulated to limit the number of participants accessing certain amateur radio bands. It is also suggested that this type of formulation is fundamentally a form of restrictive practice, and is a questionable basis for a treaty of international rule-making in a world where deregulation in telecommunications is the order of the day.

5.3 Use of Morse Code in the Amateur Service is a matter of personal preference. There are no known circumstances where Morse Code proficiency is an essential operational factor in the Amateur Service, on any band. There are many modes of communication used by amateurs and all add to the interest and appeal of amateur radio. Morse Code has a keen following and can exist for many years with interest group support.

5.4 Other forms of telecommunications are becoming increasingly available to the public. Use of personal computers with modems opens up national and international data communications with individuals. Exploring the Internet is an example. Increasing use of cellular telephones and the introduction of personal communications by way of radio is now a major objective for providers of mobile services. Amateur radio will likely have some difficulty keeping pace with modern developments when there are the likes of international regulatory requirements for Morse Code testing in the Amateur Service. The general public, from where new recruits to amateur radio are found, likely have more idea of what a fax message is than a telegram. Such is the way of progress. It is suggested that modernization of amateur radio rule-making starts from changing the international regulation on Morse Code testing.

5.5 It is suggested that RR2735 (S25.5) should be suppressed, under agenda item agenda 1 at WRC-95. This would not only simplify the radio regulations, but it would also reflect a realistic modernization of the international regulations regarding the Amateur Service.

5.6 Following suppression of RR2735 (S25.5), individual administrations can make their own choice in their own time as to whether or not other "code-less" ways of qualifying could be prescribed in their national regulations.

5.7 While suppression of RR 2735 (S25.5) is suggested, there should be no lowering of overall standards in national regulations and associated standards for amateur examinations. Should a Morse Code test no longer be a mandatory requirement, then an alternative test or examination offering equivalent challenge to existing Morse Code tests should be offered.

Thank you for considering this paper. (End excerpt—ed.) 73, Fred, W5YI

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| RM-50A | 37 | 50 | 5 1/4 x 19 x 12 1/2 | 50 |
| RM-60A | 50 | 55 | 7 x 19 x 12 1/2 | 60 |
| • Separate Volt and Amp Meters | | | | |
| RM-12M | 9 | 12 | 5 1/4 x 19 x 8 1/4 | 16 |
| RM-35M | 25 | 35 | 5 1/4 x 19 x 12 1/2 | 38 |
| RM-50M | 37 | 50 | 5 1/4 x 19 x 12 1/2 | 50 |
| RM-60M | 50 | 55 | 7 x 19 x 12 1/2 | 60 |

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| RS-3A | | • | 2.5 | 3 | 3 x 4 3/4 x 5 3/4 | 4 |
| RS-4A | • | • | 3 | 4 | 3 3/4 x 6 1/2 x 9 | 5 |
| RS-5A | | • | 4 | 5 | 3 1/2 x 6 1/8 x 7 1/4 | 7 |
| RS-7A | • | • | 5 | 7 | 3 3/4 x 6 1/2 x 9 | 9 |
| RS-7B | • | • | 5 | 7 | 4 x 7 1/2 x 10 3/4 | 10 |
| RS-10A | • | • | 7.5 | 10 | 4 x 7 1/2 x 10 3/4 | 11 |
| RS-12A | • | • | 9 | 12 | 4 1/2 x 8 x 9 | 13 |
| RS-12B | • | • | 9 | 12 | 4 x 7 1/2 x 10 3/4 | 13 |
| RS-20A | • | • | 16 | 20 | 5 x 9 x 10 1/2 | 18 |
| RS-35A | • | • | 25 | 35 | 5 x 11 x 11 | 27 |
| RS-50A | • | • | 37 | 50 | 6 x 13 3/4 x 11 | 46 |
| RS-70A | • | • | 57 | 70 | 6 x 13 3/4 x 12 1/8 | 48 |

RS-M SERIES



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| MODEL | Continuous Duty (Amps) | ICS* (Amps) | Size (IN) H x W x D | Shipping Wt. (lbs.) |
|---------------------------------|------------------------|-------------|---------------------|---------------------|
| • Switchable volt and Amp meter | | | | |
| RS-12M | 9 | 12 | 4 1/2 x 8 x 9 | 13 |
| • Separate volt and Amp meters | | | | |
| RS-20M | 16 | 20 | 5 x 9 x 10 1/2 | 18 |
| RS-35M | 25 | 35 | 5 x 11 x 11 | 27 |
| RS-50M | 37 | 50 | 6 x 13 3/4 x 11 | 46 |
| RS-70M | 57 | 70 | 6 x 13 3/4 x 12 1/8 | 48 |

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| | @13.8VDC | @10VDC | @5VDC | | | |
| VS-12M | 9 | 5 | 2 | 12 | 4 1/2 x 8 x 9 | 13 |
| VS-20M | 16 | 9 | 4 | 20 | 5 x 9 x 10 1/2 | 20 |
| VS-35M | 25 | 15 | 7 | 35 | 5 x 11 x 11 | 29 |
| VS-50M | 37 | 22 | 10 | 50 | 6 x 13 3/4 x 11 | 46 |
| • Variable rack mount power supplies | | | | | | |
| VRM-35M | 25 | 15 | 7 | 35 | 5 1/4 x 19 x 12 1/2 | 38 |
| VRM-50M | 37 | 22 | 10 | 50 | 5 1/4 x 19 x 12 1/2 | 50 |

RS-S SERIES



MODEL RS-12S

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| RS-7S | • | • | 5 | 7 | 4 x 7 1/2 x 10 3/4 | 10 |
| RS-10S | • | • | 7.5 | 10 | 4 x 7 1/2 x 10 3/4 | 12 |
| RS-12S | • | • | 9 | 12 | 4 1/2 x 8 x 9 | 13 |
| RS-20S | • | • | 16 | 20 | 5 x 9 x 10 1/2 | 18 |
| SL-11S | • | • | 7 | 11 | 2 3/4 x 7 5/8 x 9 3/4 | 12 |

NEWS OF COMMUNICATION AROUND THE WORLD

Chile's Off-Shore Islands

Three groups of islands dot the Pacific Ocean off the coast of Chile. All three are separate DXCC countries: Easter Island; Juan Fernandez Islands; and San Felix and San Ambrosio. During this month DXers will have excellent opportunities to work and confirm the first two of these. A major DXpedition is headed for Easter Island, and two highly experienced DXpeditioners have set their sights on Juan Fernandez.

San Felix

Before we review these DXpeditions, let's have a look at the third Chilean island DXCC country: San Felix and San Ambrosio. San Felix and neighboring San Ambrosio lie about 600 miles west of Chile. Together they boast an area of only about four square miles, mostly arid mountains. The islands were first sighted in 1574 by Juan Fernandez, and were a popular seal-hunting spot until the seal population was eliminated. Without a reliable source of fresh water, the islands are uninhabited.

The lobster fishing, however, is excellent in the surrounding waters. And those lobsters provided most current DXers with their San Felix QSL card—not directly, of course, but via XQ0X, a lobster fisherman who operated regularly from San Felix in the early 1990s. His operation cleared up an enormous portion of the demand for San Felix contacts, dropping the country from 18th on the 1990 *The DX Magazine's* Most Wanted survey to 70th position the next year.

San Felix became a separate DXCC country in 1965, when Ed Cushing, W4QVJ, put the island on the air for the first time as **CE0XA**, in April of that year.

While no DXer active in the early 1990s should lack a San Felix contact, DXers new to the game probably need the country, as there hasn't been any activity since.

Juan Fernandez

The Juan Fernandez islands have been a separate DXCC country since 1958, and have been the target of several DXpeditions. The country is composed of three separate islands, with Robinson Crusoe Island being the largest and only inhabited one. A small fishing village is the only human presence, and DXpeditioners report spotty electrical power. (While the largest island is named after Defoe's versatile castaway, the model for the character was actually Alexander Selkirk, who was stranded on nearby Mas a Tierra Island, now known as Alexander Selkirk Island, for five years in the early 18th century.)

A resident population and occasional DX-

P.O. Box 50, Fulton, CA 95439



Mike Manafo, K3UOC (right), is on an extended job in Saudi Arabia, where he is active as 7Z500; QSL via W1AF. Here he confers with Ahmed Nasser, ex-7O1AA, from Yemen. (Thanks, K4OD.)

peditions kept the demand for Juan Fernandez below that of San Felix, prior to XQ0X's extensive operation. However, since 1992, Juan Fernandez has ranked higher (in more demand) on the Most Wanted survey. Last year it was 81st, but 31st in Europe. That should change this year, thanks to Bob Allphin, K4UEE, and Randy Martin, K0EU. They plan to have two stations operating Sept. 13–21, concentrating on the low bands, the new bands, and RTTY. They will work Europe whenever possible.

These two experienced DXpeditioners have ambitious antenna plans, including full-sized delta loops on 80 and 160 meters, and a two-element Yagi on 40 meters. They have obtained special permission to operate 30 meters and will be in great demand on that band, as it is not allocated to amateur operation in Chile. Bob and Randy should have success handling the pile-ups, as both were team members of the Howland Island AH1A team, and have operated individually from Aruba (P40R) and Ghana (9G1XA), respectively.

For more details of this DXpedition, including the callsign to be used, operating frequencies, and QSL route, check your favorite DX newsletter.

Easter Island

Easter Island lies much farther west than do the other two island groups, some 1900 miles from Chile. Easter Island was one of the original 250+ countries on the very first DXCC coun-

try list, published in 1947. With a permanent population, and being a popular tourist destination, Easter Island has never been especially rare on the amateur bands.

For many years Father Dave Reddy, CE0AE, was a fixture on the bands and a reliable multiplier in contests. (Savvy contesters knew to work Father Dave on Saturday, as his church duties kept him off the air on Sundays.)

About 15 years ago I spent three weeks on Easter Island, doing salvage archeology for the Chilean government under the auspices of the EarthWatch program. Needless to say, I spent as much of my non-working hours as possible on the air as WB2CHO/CE0A. By a strange coincidence, my tour of duty just happened to coincide with the ARRL SSB contest and the CQ WPX SSB contest. We won top honors in Easter Island!

Father Dave was a wonderful host, cheerfully accepting my house gift of 10 pounds of chunky peanut butter and other goodies not available on the remote island. Together with other visiting amateurs, we put up a 60 foot tower at Father's Dave modest residence, behind the Catholic church. When Father Dave commented that the 10 meter signal from the beam, only a few feet from the church, came through the church's PA system, I volunteered to QSY for the duration of the Sunday services. Father Dave would have none of it, insisting that I stay on the productive band. "I'll just turn up the gain on my voice," he explained.

Father Dave passed away a few years ago, but there have been several resident amateurs

The WPX Program

SSB

2517 VE2NQB 2521 WM9U
 2518 EA3DVJ 2522 UT5-186-2
 2519 S50A 2523 IK5CMR
 2520 BZ4DJW 2524 LY3BA

CW

2877 S50A 2880 G3TVI
 2878 UT5-186-2 2881 LY3BA
 2879 LY3BY

MIXED

1706 UT5-186-2 1709 ZL2AL
 1707 JH1LPZ 1710 K16PG
 1708 LY3BA

Mixed: 450 S50A, UT5-186-2, JH1LPZ, LY3BA, K16PG. 500 S50A, UT5-186-2, JH1LPZ, LY3BA, K16PG. 550 S50A, UT5-186-2, JH1LPZ, LY3BA, K16PG. 600 S50A, UT5-186-2, JH1LPZ, LY3BA, K16PG. 650 S50A, UT5-186-2, JH1LPZ, LY3BA, K16PG. 700 UT5-186-2, JH1LPZ, LY3BA, K16PG. 750 UT5-186-2, JH1LPZ, LY3BA, K16PG. 800 UT5-186-2, JA3BKP, JH1LPZ, LY3BA, K16PG. 850 UT5-186-2, JH1LPZ, LY3BA. 900 UT5-186-2, JH1LPZ, LY3BA. 950 UT5-186-2, JH1LPZ, LY3BA. 1000 UT5-186-2, LY3BA. 1050 UT5-186-2, LY3BA. 1100 UT5-186-2, 1150 UT5-186-2, 1200 UT5-186-2, 1250 UT5-186-2, 1300 UT5-186-2, 1350 UT5-186-2, CE1YI, 1400 UT5-186-2, CE1YI, 1450 UT5-186-2, CE1YI, 1500 UT5-186-2, 1550 I2EAY, UT5-186-2, 1700 WB8ZRL, 1750 WB8ZRL, 1800 WB8ZRL, 2350 I2EOW, 2400 I2EOW, 2450 I2EOW, 3100 W1BWS, 3200 W1BWS, 3250 W1BWS, 3300 W1BWS, 3950 IT9TQH, 4000 IT9TQH, 4050 IT9TQH, 4100 IT9TQH, 4150 IT9TQH, 4200 IT9TQH, 4250 IT9TQH, 4300 IT9TQH, 4350 IT9TQH.

SSB: 350 UT5-186-2, IK5CMR, LY3BA. 400 UT5-186-2, LY3BA. 450 UT5-186-2, LY3BA, ZL2AL. 500 UT5-186-2, EA1AYN, LY3BA. 550 EA1AYN, UT5-186-2, IK4SWX, LY3BA. 600 EA1AYN, UT5-186-2, K4SWX, LY3BA. 650 UT5-186-2, 700 UT5-186-2, 750 EA1IF, UT5-186-2, 800 EA5DCL, EA1IF, 850 EA1IF, 900 EA1IF, 950 EA1IF, 1000 EA1IF, 1050 EA1IF, 1250 IK2AEQ, 1350 WB8ZRL, 1400 WB8ZRL, 1450 K2EEK, 2200 I2EOW, 2250 I2EOW, 2550 I2JSB, 2600 I2JSB, HA0HW, 2650 I2JSB, HA0HW, 2700 I2JSB, 4000 IT9TQH, 4050 IT9TQH, 4100 IT9TQH, 4150 IT9TQH, 4200 IT9TQH, 4250 IT9TQH, 4300 IT9TQH, 4350 IT9TQH.

CW: 350 S50A, UT5-186-2, LY3BY, IK4TVQ, LY3BA. 400 S50A, UT5-186-2, IK4TVQ, LY3BA. 450 S50A, UT5-186-2, IK4TVQ, G0KRL, LY3BA. 500 S50A, UT5-186-2, LY3BA. 550 S50A, UT5-186-2, LY3BA. 600 S50A, UT5-186-2, IK8TPJ, LY3BA. 650 UT5-186-2, LY3BA. 700 UT5-186-2, 750 JA9NPS, UT5-186-2, 800 I2EOW, 850 I2EOW, 900 VE5RD, 1050 WB8ZRL, 1100 WB8ZRL, 1150 EA6AA, 1350 I2EAY, 1700 VR2UW, 3950 IT9TQH, 4000 IT9TQH, 4050 IT9TQH, 4100 IT9TQH, 4150 IT9TQH, 4200 IT9TQH, 4250 IT9TQH, 4300 IT9TQH, 4350 IT9TQH.

160 Meters: S50A, LY3BA, UT5-186-2

Asia: S50A, LY3BA, UT5-186-2
 Africa: I2EAY, K9QVB, S50A, LY3BA, UT5-186-2
 No. Amer.: VE3NQB, K9QVB, EA1IF, S50A, LY3BA, UT5-186-2
 So. Amer.: IK2AEQ, EA1IF, S50A, KD6WW, LY3BA, UT5-186-2
 Europe: K9QVB, EA1IF, S50A, KD6WW, LY3BA, UT5-186-2
 Oceania: K9QVB, S50A, DJ1YH, KD6WW, LY3BA, UT5-186-2

Award of Excellence: S50A, UT5-186-2.

Award of Excellence with 160 Meter Endorsement: S50A, UT5-186-2.

Award of Excellence Plaque Holders: I8YRK, W4CRW, SM0AJU, K5UR, K6XP, N5TV, K2VV, VE3XN, W6OUL, DL1MD, DJ7CX, DL3RK, WB4SIJ, SM6DHU, N4KE, I2UIY, DL7AA, ON4QX, WA8YTM, YU2DX, OK3EA, I4EAT, OK1MP, N4NO, ZL3GQ, VK9NS, DE0DXM, DK4SY, UR2QD, AB9O, FM5WD, I2DMK, W4BQY, I0JX, SM6CST, VE1NG, I1JQJ, WA1JMP, PY2DBU, H18LC, KA5W, K0JN, 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, K00G, HB9CSA, F6BVB, W1BWS, YU7SF, G4BUE, N3ED, DF1SD, K7CU, I1POR, LU3YLW4, NN4Q, KA3A, YB0TK, VE7WJ, VE7IG, K9QRF, YU2NA, N2AC, W4UW, NX0I, W9NUF, N4NX, SM0DJZ, DK5AD, WB4RUA, DK5AD, WD9IC, W3ARK, I6DQE, LA7JO, VK4SS, K6JG, I1EEW, I8RFD, I3CRW, VEFXR, N4MM, KC7EM, ZS6BCR, CT1YH, IV3PVD, KA5RNH, ZP5JCY, F1HWW, KC8PG, NE4F, VE3MS, K9LJN, ZS6EZ, YU2AA, I1WXY, IK2ILH, DE0DAQ, LU1DOW, N1IR, IK4GME, WX3N, KC6X, N6IBP, W5ODD, I0RIZ, I2MQP, I5ZJK, JA0SU, S51NU, K9XR, W0ULU, HB9DDZ, F6HMJ, I2EOW, IK2MRZ, KS4S, KA1CLV, WZ1R, CT4UW, K0IFL, IN3NJB, WT3W, IN3NJB, S50A, UT5-186-2.

Award of Excellence Plaque Holders with 160 Meter Endorsement: CT1YH, IV3PVE, KA5RNH, ZP5JCY, AB9O, FM5WD, SM0DJZ, DK5AD, SM6CST, I1JQJ, PY2DBU, W3ARK, H18LC, KA5W, UR2QD, VE3XN, K6XP, LA7JO, W4VQ, K6JG, K3UA, HA8UB, W4CRW, N4MM, K7LJ, SM0AJU, KF2O, SM3EVR, K5UR, UP1BZZ, OK1MP, N5TV, K2POF, W8CNL, DJ4XA, IT9TQH, DL9RK, N6JV, ONL-4003, W1JR, W6OUL, W5AWT, K00G, F6BVB, W4BQY, YU7SF, W5UR, N4NO, DF1SD, K7CU, I1POR, W8RSW, N4KE, I2UIY, YB0TK, W8ILC, W1BWS, VE7WJ, K9QRF, NN4Q, W4UW, NX0I, G4BUE, LU3YLW4, I4EAT, WB4RUA, VE7WJ, N4NX, DE0DXM, VE7IG, K9BG, I1EEW, AB9O, CT1YH, IV3PVD, KA5RNH, ZP5JCY, I2MQP, I0RIZ, W5ODD, WX3N, IK4GME, HA8XX, YU1AB, F6HMJ, HB9DDZ, K9XR, K0JN, ZS6EZ, JA0SU, I5ZJK, I2EOW, KS4S, KA1CLV, K0IFL, K9LJN, WT3W, IN3NJB, S50A, UT5-186-2.

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

since on Easter Island, as well as several DXpeditions. DXers looking for an Easter Island contact today can tune to about 10 kHz up on 20 meter CW most evenings and find XQ0YAF belting out the QSOs.

For those DXers who have missed XQ0YAF, Easter Island will be on the air in a big way this month. A 30 member team will spend much of the month on the island, performing a series of scientific activities, and staffing four stations on the HF bands as XR0Y.

This will not be your run-of-the-mill DXpedition. It is planned as a test of several innovative techniques that may pull DXpeditioning into the 21st century by providing real-time confirmations and feedback.

Bob Schmieder, KK6EK, one of the Peter I Island 3Y0PI DXpeditioners, and author of the excellent book on the trip, conceived the idea of this trip while on Peter I. Bob noted that des-

pite all the technological advances in the past decades, DXpeditioning has been essentially unchanged since its beginnings 50 years ago. Operators still go to rare places, set up radios, work pile-ups without feedback, and then send out paper QSL cards months later. He noted that DXers wanted quick, positive assurance that they were "in the log," and further, knowledgeable DXers often wanted to share real-time propagation suggestions with remote DXpeditioners. Given the wealth of non-radio means of communication available today, Bob thought that it was time to try to use these desires to improve DXpeditioning. The XR0Y operation will be the first full-scale test of the concept.

Sept. 2-23 a multi-national team will fly from Santiago, Chile to Easter Island and set up four complete stations. Among the many scientific goals of the expedition is the study of world-

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20 Meter SSB

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971KEØRR

40 Meter SSB

82EA4KD

80 Meter SSB

67SM5GZ

40 Meter CW

182SM5JE

17 Mixed

30WA2UUK

160 Meters

79 DJ7RD31 Zones

All Phone

624AC4JO

All CW

72WA2UUK 74I3JTE
73JM1VKW

RTTY

94 MixedK6EID

All Band WAZ SSB

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4278DL3EAY 4282KM6HG
4279HB9DMQ 4283VK4SJ
4280YV3BAP 4284IK2GWY

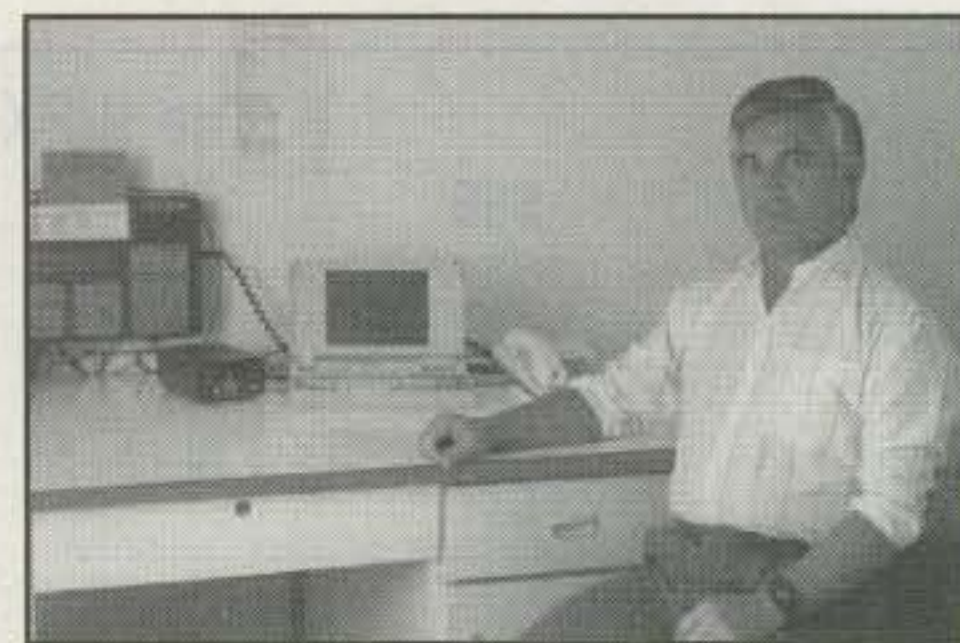
CW/Phone

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7588N4MHQ (CW) 7594W3GRW
7589IK8UDP 7595DK7LA
75904X6UU 7596HA8IB
7591IK2GWY 7597OH6NVC
7592I2JHF

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

wide propagation at the bottom of the sunspot cycle. Although propagation typically peaks in the spring and fall, the very low level of solar activity at this stage in the sunspot cycle will provide interesting data for propagation predictors. The team will compare computer-based predictions with actual openings, seeking to refine the predictions.

Easter Island's unique location will provide some interesting opportunities for this investigation. Easter Island lies due south of New Mexico, and thereby offers favorable north-south propagation to most of the United States. The west coast will have a slight advantage, but DXers throughout the country should have



Nicolai Shtcelokov, UAØFM, is active for the next six months from Vietnam as 3W5FM. QSL to him at P.O. Box 49, Yuzhno Sakhalinsk 693006, Russia.

a good shot at a contact. East coast stations should pay particular attention to the grayline openings on 20 meters and the lower bands at mutual nighttime.

The grayline openings are the enhanced propagation windows at sunrise and sunset. Sunrise at Easter Island is about 1320Z, and 20 meters will open at about that time. As the

5 Band WAZ

As of May 31, 1995, 421 stations have attained the 200 Zone level.

New recipients of 5 Band WAZ Award with all 200 Zones confirmed:

| | |
|--------|--------|
| JA1KQX | K6YRA |
| EA2KL | VE1AST |
| F5OHS | K2ENT |

The top contenders for 5 Band WAZ (zones needed, 80 meters):

| | |
|-----------------------|--------------------------|
| N4WW, 199 (26) | KL7Y, 199 (34) |
| AA4KT, 199 (26) | RA3AUU, 199 (1) |
| K7UR, 199 (34) | SM6AHS, 198 (12, 31) |
| NAØY, 199 (26) | UA3AGW, 198 (1, 12) |
| WØPGI, 199 (26) | VO1FB, 198 (19, 27) |
| W2YY, 199 (26) | EA5BCK, 198 (27, 39) |
| W9WAQ, 199 (26) | KZ4V, 198 (22, 26) |
| W1JR, 199 (23) | K4PI, 198 (23, 26) |
| VE7AHA, 199 (34) | G3KDB, 198 (1, 12) |
| W1FZ, 199 (26) | DK2GZ, 198 (1, 24) |
| IK2GNW, 199 (1) | UY5XE, 198 (24, 27) |
| W9CH, 199 (26) | N5FG, 198 (22, 34 on 40) |
| ACØM, 199 (34) | KG9N, 198 (18, 22) |
| IK8BQE, 199 (31) | KM2P, 198 (22, 26) |
| JA2IVK, 199 (34, 40m) | I1ZXT, 198 (1, 1 on 40) |
| KA5W, 199 (26) | GM3YOR, 198 (12, 31) |
| K1ST, 199 (26) | OE6MKG, 198 (12, 31) |
| ABØP, 199 (23) | |

The following have qualified for the basic 5 Band WAZ Award:

| | |
|-------------------|-------------------|
| JA1KQX, 200 Zones | W5CWQ, 194 Zones |
| RX4HW, 166 Zones | IK1AOD, 192 Zones |
| GM3WIL, 180 Zones | F5PY1, 197 Zones |
| F5OHS, 200 Zones | SM5JE, 181 Zones |

Endorsements:

| | |
|-------------------|-------------------|
| NT5C, 190 Zones | K6YRA, 200 Zones |
| RA3AUU, 199 Zones | VE1AST, 200 Zones |
| K6FG, 180 Zones | K2ENT, 200 Zones |
| EA2KL, 200 Zones | |

969 Stations have attained the 150 Zone level as of May 31, 1995.

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and \$1.00 to: WAZ Manager, Jim Dionne, K1MEM, 31 DeMarco Road, Sudbury, MA 01776. The processing fee for all CQ awards is \$4.00 for subscribers (please include your most recent CQ mailing label or a copy) and \$10.00 for nonsubscribers. Please make all checks payable to the Award Manager. Applicants sending QSL cards to a CQ checkpoint or the Award Manager must include return postage. Questions regarding the WAZ Award may be sent to K1MEM with an SASE.

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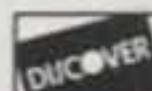
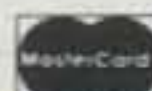
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CW

| | | | | | | | | |
|---------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|----------------|
| K2TQC.....326 | KD8V.....326 | F3TH.....326 | W0HZ.....324 | ON4QX.....321 | KA5TQF.....316 | K4CXY.....309 | HA5NK.....301 | KB3X.....289 |
| K1MEM.....326 | 9A2AA.....326 | IT9TQH.....326 | N7MC.....324 | K9QVB.....321 | VE7CNE.....316 | VE7DX.....309 | WG5G/QRPP.....301 | LA7JO.....289 |
| W9DWQ.....326 | N4KG.....326 | N5FW.....326 | W0JLC.....324 | W8XD.....321 | W3BBL.....315 | K4JLD.....309 | WB4DBB.....301 | KE5PO.....286 |
| N4MM.....326 | OK1MP.....326 | N6AR.....325 | N7RO.....324 | HA5DA.....321 | N4AH.....315 | G3KMQ.....309 | W6YQ.....301 | KH6CF.....284 |
| K2FL.....326 | W0IZ.....326 | K8NA.....325 | W7ULC.....323 | DJ2PJ.....320 | K2JF.....314 | I1EEW.....307 | KA2DIV.....300 | F6HMJ.....284 |
| DL1PM.....326 | PA0XPO.....326 | WA4IUM.....325 | W0SR.....323 | IT9ZGY.....320 | AA2X.....314 | N3DQN.....306 | YU1TR.....300 | KF5PE.....282 |
| K3UA.....326 | W2FXA.....326 | KZ4V.....325 | WA4JTJ.....322 | K1HDO.....320 | W5OG.....313 | N1HN.....306 | YU2TW.....299 | K7EHI.....280 |
| K9BWQ.....326 | SM6CST.....326 | KB8DB.....325 | W4OEL.....323 | KB4HU.....320 | N5FG.....313 | WB4UBD.....305 | YV5ANT.....299 | W2LZX.....279 |
| K9MM.....326 | N4JF.....326 | WA8DXA.....325 | AG9S.....322 | K4XO.....319 | K2JLA.....312 | I4LCK.....305 | WA8YTM.....299 | HB9AFJ.....278 |
| K2ENT.....326 | W2UE.....326 | EA2IA.....325 | W7CNL.....322 | VE3HO.....319 | K9DDO.....312 | N5HB.....304 | CT1YH.....298 | W3HQU.....276 |
| K2OWE.....326 | W9WAO.....326 | I1JQJ.....325 | K4IQJ.....322 | W5MTV.....318 | K1VHS.....311 | OZ5UR.....304 | HB9DDZ.....297 | WF9K.....276 |
| K4CEB.....326 | AA4KT.....326 | K8LJG.....324 | NC9T.....322 | N6AV.....318 | OH3NM.....310 | G2FFO.....303 | N4OT.....296 | G4MVA.....276 |
| I4EAT.....326 | K9IW.....326 | IT9QDS.....324 | DL3DXX.....322 | AA6AA.....317 | IK2ILH.....310 | VE9RJ.....303 | W7IIT.....296 | YU7FW.....275 |
| K6JG.....326 | YU1HA.....326 | W6DN.....324 | W1WAI.....321 | KU8S.....317 | KA7T.....310 | WB6OKK.....303 | K8HQW.....294 | W4UW.....275 |
| K6LEB.....326 | I5XIM.....326 | G4BWP.....324 | AA5NK.....321 | N6CW.....316 | 4N7ZZ.....310 | WA4DAN.....301 | K7JYE.....292 | |

SSB

| | | | | | | | | |
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RTTY

| | | | | | | | | |
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|---------------|----------------|---------------|--------------|---------------|--------------|---------------|---------------|---------------|

D layer of the ionosphere builds during the day, signal levels will drop. However, they will peak again as the sun sets on the east coast, around 2300Z. Then when it is dark at both Easter Island and the east coast, 40 and 80 meters should provide good opportunities for contacts. Sunset is at about 0100Z on Easter Island.

West coast DXers will have the same gray-line and nighttime openings as other US DXers, plus some additional high-band openings during the day. For example, there should be some good 15 meter openings in the local afternoon.

The most interesting aspect of this entire DXpedition is the non-radio connection between Easter Island and the rest of the world. The group plans to set up an Inmarsat connection from their operating site to the Internet

computer network. Using this connection, they will be able to generate QSL cards from another location on a same-day basis, using the FCC license database to address the QSL cards printed from the log data.

The log data, as well as other information about the DXpedition, will be available at a World Wide Web site on the Internet, and will be distributed by other anchor stations via alternate means, such as local computer bulletin boards, packet networks, etc. DXers will be able to determine that they are indeed "in the log," even including their received signal strength. They can compare the latter with that of their fellow DXers. They can even work the DXpedition on different days to check their own signal-strength variations.

The XR0Y DXpedition will also encode the QSO data on the QSL card in a bar code. With a simple bar-code scanner and appropriate software, the QSO data can be scanned directly into a computer record without manual entry. Wide-scale use of this process could greatly simplify DXCC and other award record-keeping chores.

Bob, KK6EK, also wants to hear from individual DXers about their personal experiences in working the DXpedition. As he did with his book on the Peter I operation, Bob will include these in his write-up on the DXpedition. Please send your personal experiences and comments to Bob Schmieder, KK6EK, 4295 Walnut Creek Blvd., Walnut Creek, CA 94596.

This expedition will engage in considerable



Fred, PY7ZZ, recently confirmed Zone 34 on 80 meters for his 200th for 5-Band WAZ. He has frequently operated from Fernando de Noronha as PYØFZ.

scientific work outside amateur radio. The sponsoring organization, Cordell Expeditions, has a 20-year track record of successful marine investigations. The scuba divers on the expedition team will investigate and document the marine environment, while archaeologists explore the fascinating history of the stone torsos that dot the island and have made it world famous.

As mentioned above, Easter Island is a popular tourist destination. Visitors fly from Chile via the twice-weekly flights, landing on a tilted runway that is one of the emergency landing sites of the US Space Shuttle. While most of the 400+ stone torsos lie face down in the rocky soil, a handful have been re-erected to give visitors an idea of how the island appeared at the peak of its culture, some 2-300 years ago.

You can even make your trip to Easter Island tax deductible through the EarthWatch program. They have a series of expeditions to Easter Island this fall, including one during the CQ WW DX SSB Contest at the end of October. For more information, contact EarthWatch at P. O. Box 403, Watertown, MA 02272.

For those DXers who somehow miss the

CQ DX Awards Program SSB

| | |
|------------------|------------------|
| 214311JQJ | 2147EA3ARJ |
| 2144WA3YGQ | 2148CT1YH |
| 2145BV5BG | 2149VE2AJT |
| 2146EA5CGU | |

CW

923EA2BNU

RTTY

2311JQJ

SSB Endorsements

| | |
|---------------------|---------------------|
| 32011JQJ/325 | 310WA2FKF/310 |
| 320OA4OS/324 | 300CT1AHU/308 |
| 320W7FP/324 | 300WA8YTM/306 |
| 320LU7HJM/323 | 275DJ2UU/291 |
| 320KA9I/323 | 275EA1AYN/285 |
| 320TI2JJP/322 | 275CT1YH/285 |
| 310EA5CGU/319 | 275KG6LF/288 |
| 310NI5D/318 | 275VE2AJT/275 |
| 310K7TCL/315 | 200WA3YGQ/220 |

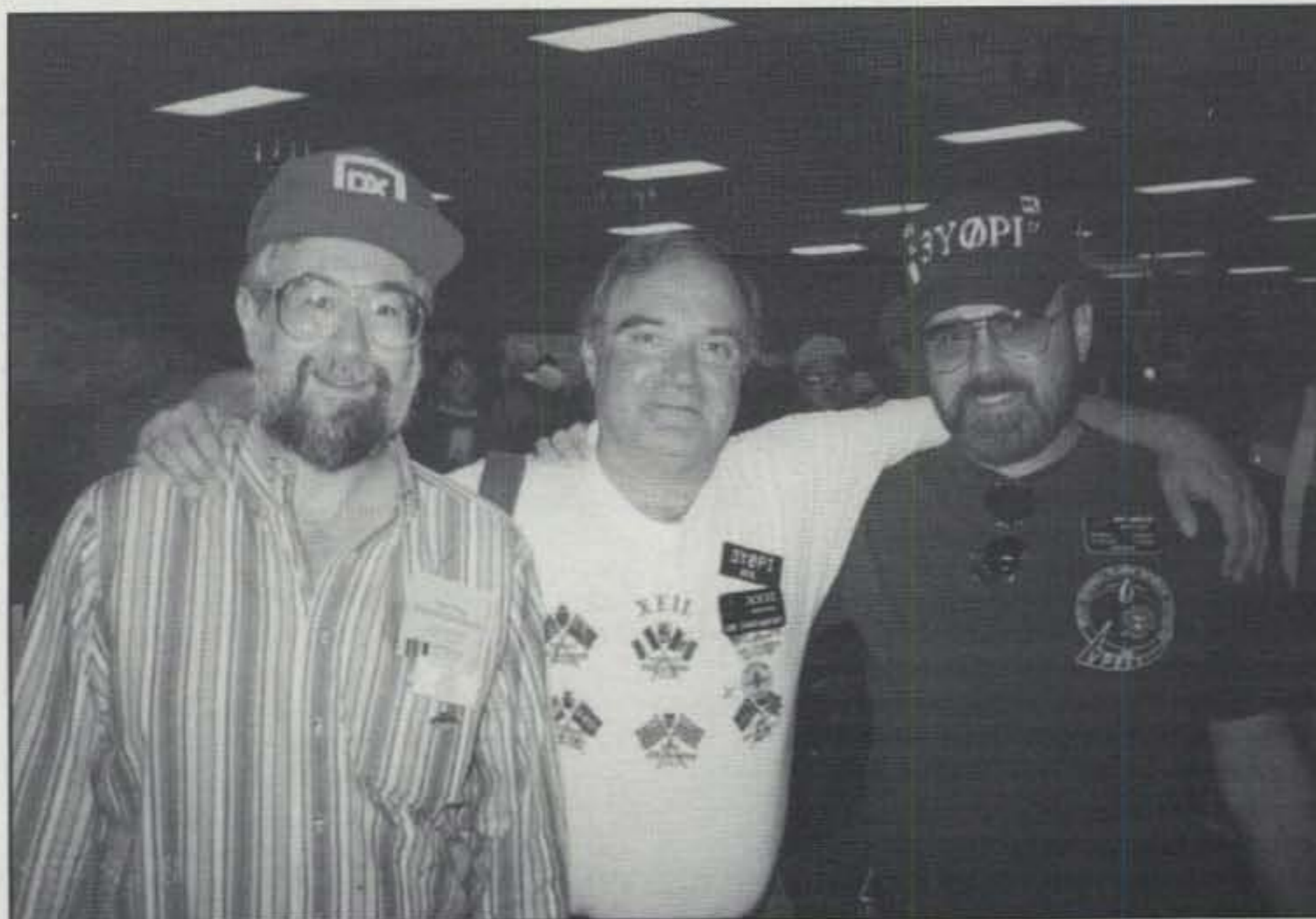
CW Endorsements

| | |
|---------------------|---------------------|
| 320W4OEL/323 | 150EA3BNU/152 |
| 320WA8YTM/298 | |

RTTY Endorsements

| | |
|--------------------|--------------------|
| 25011JQJ/273 | 200KB8DB/242 |
|--------------------|--------------------|

Total number of active countries is 326. The basic award fee for subscribers to CQ is \$4. For non-subscribers, it is \$10. In order to qualify for the reduced subscriber rate, please enclose your latest CQ mailing label with your application. Endorsement stickers are \$1.00. Updates not involving the issuance of a sticker are made free when an SASE is enclosed for confirmation of total. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10 envelope, self-addressed and stamped, to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. DX stations must include extra postage for airmail reply. Please make all checks payable to the awards manager.



Luis, XE1L (center), is part of the XRØY DXpedition team this month. He is flanked by bushy, bespeckled team of Tony DePrato, WA4JQS, on the right and Chod Harris, VP2ML, on the left.

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XRØY DXpedition, there will be another DXpedition in October to Salas y Gomez rock, which is part of the same DXCC country as Easter Island. Salas y Gomez lies about 200 miles northeast of Easter Island, and is seldom visited, much less the target of a DXpedition. The callsign to be used from this rock is XRØZ, and this will be a new counter for the Islands On The Air (IOTA) award program. The same Internet feedback system will be used at XRØZ, but only a single station will be operational. The leader of this DXpedition will be Carlos Nascimento, NP4IW, who, together with KK6EK, conceived the idea of the Internet-connected DXpedition.

Other DX News

In other DXpedition activity this month, watch for **PJ7/K6URI** from St. Maarten Sept. 9-23. QSL via home call. Also, Jean Pierre, F5XL, will operate **TKI** from Corsica for a couple of weeks this month. He will try to operate from some of the coastal islands off the Corsica coast that count separately for IOTA.

There are three up-coming DX gatherings this season. The 1995 **W9 DXCC Convention** is Saturday, Sept. 9, in Rolling Meadows, Illinois, northwest of Chicago. Further information is available from Chairman Michael Zeug, K9EC, 9N317 Corron Road, Elgin, IL 60123. The **Radio Society of Great Britain's International HF Convention** is Sept. 9-10, 1995 at the Beaumont Conference Centre, Windsor, Berkshire, England. Full details are available from Marcia Brimson at RSGB HQ, Lambda House, Cranborne Road, Potters Bar, Herts,

QSL Information

1PØP to DK8KW
3A1ØØGM to 3A2LF
3Ø2CT to G4WFZ
3Ø2EK to N6EK
3Ø2LF to AA6BB
4L5Ø to TA7A
4U/KCØPA to VE9RHS
5R8FA to JE8BKW
5T6E to F6FNU
5WØXC to JE1DXC
7J4ACF to DF1CZ
7Ø7SØ to AB4IQ
8P9GU to DL7VOG
8Ø7AI to DL1IAI
9H3JR to DJØQJ
9H3UD to DL8ØBC
9H5ØVE to 9H1ARC
9I3ØZIN to IN3VZE
9K2/N68FM to W8CNL
9M8RC to HL5AP
9N1MWU to JA8MWU
9Ø5JM to EA2URD
AA2JS/T19 to PIRATE
AHØT/KH2 to JA6BSM
AH8N to KH8BB
AX2ITU to VK2PS
AY1A to LU4AA
C37UA to C31UA
CNSI to I5JHW
CT7B to DJØMW
CX6VM to W3HNK
D2SA to F6FNU
ED1SLG to EA1CA
EG1RD to EA1NK
EK4JJ to GW3CDP
EN6Q to UA9AB
EØ5ØBA to RB5BA
EØ5ØII to RB4IWM
EØ5ØWL to SP5IUL
ER2GR to I8YGZ
EX7MM to DF8WS
EX8MD to IØWDX
EX8MF to IK2QPR
EY4AA to UA9AB
FH5CQ to F6ITD
FK/JE1SPY to JE1SPY
FM/F5PHW to F5PHW
FR5HG/E to F6FNU
FW/JA1WPX to JA1WPX
FY5FY to F6EZV

HG47VEK to HA3RG
HKØ/GØSHN to F6AJA
HK4/GØSHN to F6AJA
HP9I to HP2CWB
HS/WØ5W to W5BJ
HSØZBI to NW3Y
II4ARI to IK4QIB
IR8A to I8ACB
J2ØSF to F5LBM
J28JJ to F6HGO
KG4MN to WB2YQH
KG4ZE to K4SXT
KP4TQ to NP4QH
LN1V to LA4LN
LU9HVR to LU1HLH
LX95VEC to LX1NO
LX9UN to LX1NJ
P29SC to WB1GWB
PA3EVJ to VE3MR
PJ7/AI5P to AI5P
PJ7/K7CI to W7MAP
PJ8AA to N4XØ
PPØF to PP1CZ
PXØUP to PY1UP
R1FJC to RW6HS
R3/WØYR to AA9DX
RX1ØX/FJL to DL6YET
SØRASD to EA2JG
SVØHS/SV9 to DJ8MT
SV9/HAØET to HAØHW
SV9/HAØET/P to HAØHW
SV9/HAØHV to HAØHW
SV9/HAØHV/P to HAØHW
SV9/HAØHW to HAØHW
SV9/HAØHW/P to HAØHW
SV9/HGØØ to HAØHW
SV9/HGØØ/P to HAØHW
T94NF to N2AUK
TMØPR to F5JOT
TM5RE to F5JPA
TØ2DX to F5VU
TØ5ØRC to FM5CW
TZ5RS to AA8AD
UAØUBG/UA8V to UA9AB
UA98A to UA9AB
UA98A/5Ø to UA9AB
UD6ØFF to UA9AB
UD6ØFT to UA9AB
UD8F to UA9AB
UG/UV3ZZ to UA9AB
UK7R to UA9AB
UK8AWX to UA9AB
UK8AX to UA9AB

UL7VV to UA9AB
UN2L to UA9AB
UN7FW to KD7H
UN7JID to UA9XFY
UN7VV to UA9AB
UN9LX to SM3DBU
UR1ØØIM to RB4IRO
UT1ØØCW to UB5CDX
UT1ØØWL to UT1WL
UT7ØF to UA9AB
UU1ØØJWA to LY1DS
UW1ØØGA to AA4US
UW9AR to UA9AB
UX1ØØHX to UX3HX
UX5UØ to PA3BUD
UY1ØØBA to RB5BA
UZ1ØØXE to UY5XE
V21CW to KA2DIV
V31DX to AA6BB
V31MD to K2MDM
V31RD to G4SMC
V31VW to W7WY
V47KJI to W2BJI
V63BM to JA6BSM
VK6DX to AB4ZD
VP2E/AI5P to AI5P
VP2EN to AA4NC
VP2ENR to YU1NR
VP2V/WA6URY to WA6URY
VP2VI to AB1U
VP5/JA7XBG to JA7XBG
VP5/JH7MQD to JA7XBG
VP9DX to WB2YQH
VP9RD to WB2YQH
XE1/AA6RX to XE1MD
XFØC to XE1BEF
YS1ZV to KB5IPQ
Y25ØAA to YU1FD
ZA/Z32KV to Z32KV
ZA1AB to OH1MKT
ZA1AJ to OK2PSZ/OK2ZV
ZD8WD to G4RWD
ZF2CF to N6RPL
ZF2DC to AA9D
ZF2EW to W1XN
ZF2NE to W5ASP
ZF2PP to K9PW
ZF2RB to KG6ZQ
ZL8/G4MFV to KA1JC
ZV5LL to PP5LL
ZX3T/1 to PY3TD

EN6 3JE, UK. The fifth annual **W5 DX Bash** is Oct. 14-15 the W5KFT's ranch on Lake Buchanan, northwest of Austin, Texas. The program includes PacketCluster®, contest stations towers, antennas, and DX. Les Bannon, WF5E, W5 QSL bureau manager, will be on hand. Registration is \$20 to Bryan Edwards, W5KFT, 3801 68th St., Lubbock, TX 79413. For more information, contact W5KFT at 806-745-3692 (work) or 806-799-5783 (home).

In DXCC news, The ARRL DX Advisory Committee (DXAC) voted 15 to 1 to suspend further study of the status on Aruba until the Netherlands and Aruba have announced a change in the current move toward independence for Aruba originally slated for 1996.

In the same ballot, the DXAC voted 9 to 7 against recommending the addition of Scarborough Reef to the DXCC countries list. Those who voted against the recommendation cited membership opinion within their respective divisions. Some went on to state an opinion that the rocks that comprise the reef do not constitute islands, and for that reason no operation from the reef can be "land based." Those who voted in favor felt that Scarborough Reef meets the criteria that were in effect at the time the petition was received. Several cited membership opinion in their divisions. In membership correspondence to the entire DXAC, 157 persons (72%) were against adding Scarborough and 61 were in support of new country status. DXAC Chair Garth Hamilton, VE3HO, stat-

ed "The Minimum-Size Rule was not applied to this petition. DXAC members made a judgment in accordance with the DX communities they represent."

QSL Notes

QSL the Florida Keys (NA-062) operation of **YV5DTA/W4** via operator Steve Morao, 1920 NE First Terrace #104H, Fort Lauderdale, FL 33305.

QSL Yaesu cruise callsigns of **8P9FB** via AB6QM and **8P9FI** via KD6OHJ.

QSL **D2/YO3YX** via YO3YU, P.O. Box 55-36, Bucharest, Romania.

QSL **VU2PAI** direct to Ananth Pai, P.O. Box 730, Mangalore 575003, India.

QSL **UG7GWG** to Box 54, Yerevan 375010, Armenia.

QSL **UD85DBN** via UD6DBN.

QSL **UD85GF (UD6GF)** to Box 169, Baku City 370000, Azerbaijan.

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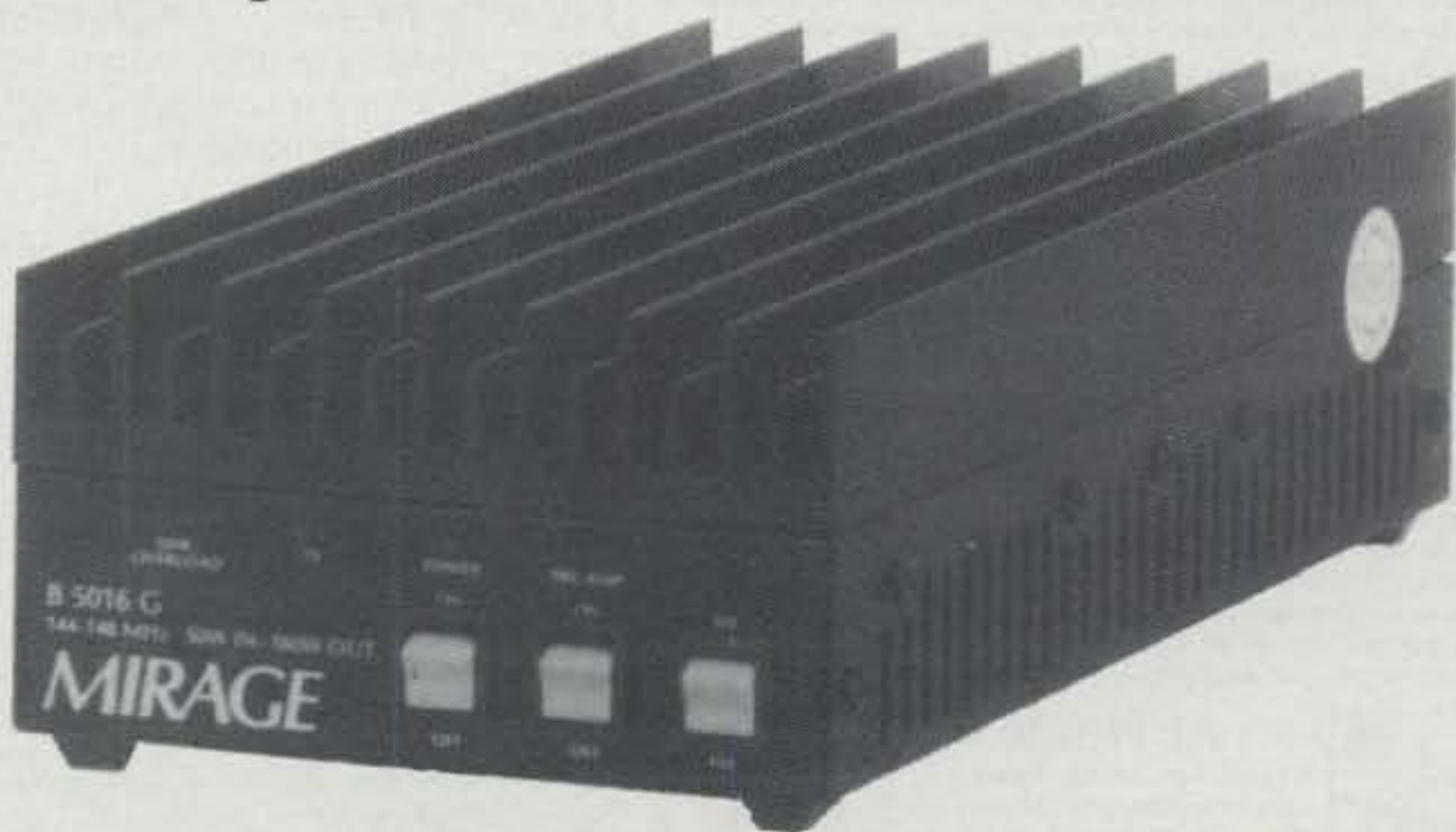
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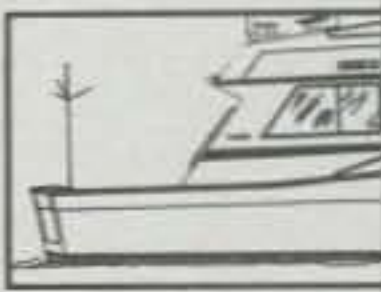


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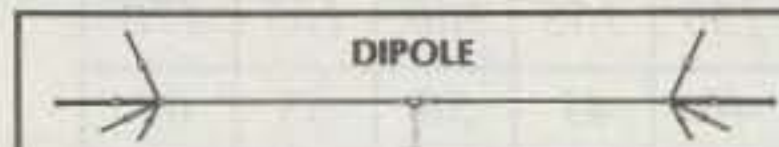
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OUR READERS SAY

The ARRL Replies

Editor, CQ:

In his June column, Fred Maia, W5YI, states that the ARRL played "absolutely no part in originating the vanity callsign program." This is completely false and absurd, as an objective review of the record will reveal to anyone not suffering from myopia.

Fred Maia's explanation of "how it all began" starts with June 1990. In fact, on June 17, 1986, I wrote to the FCC Secretary expressing the League's "interest in working with the Commission to find a way by which requests from Amateur Radio licensees, for specific unassigned station call signs to be assigned for their use, can be honored." My letter noted, "The Commission now receives many such requests, but is unable to honor them owing to its limited resources and its inability to charge a fee which could directly offset the cost of a special call sign program."

At the ARRL National Convention in San Diego in September 1986, FCC officials Michael Fitch and Ray Kowalski responded to the letter by outlining what they saw as possible features of such a program, including "a grace period at the beginning of the program where, for example, previously held call signs or call signs of deceased family members could be obtained by their previous owners or other licensed family members, respectively." At the time, Ray Kowalski stated: "I am optimistic that

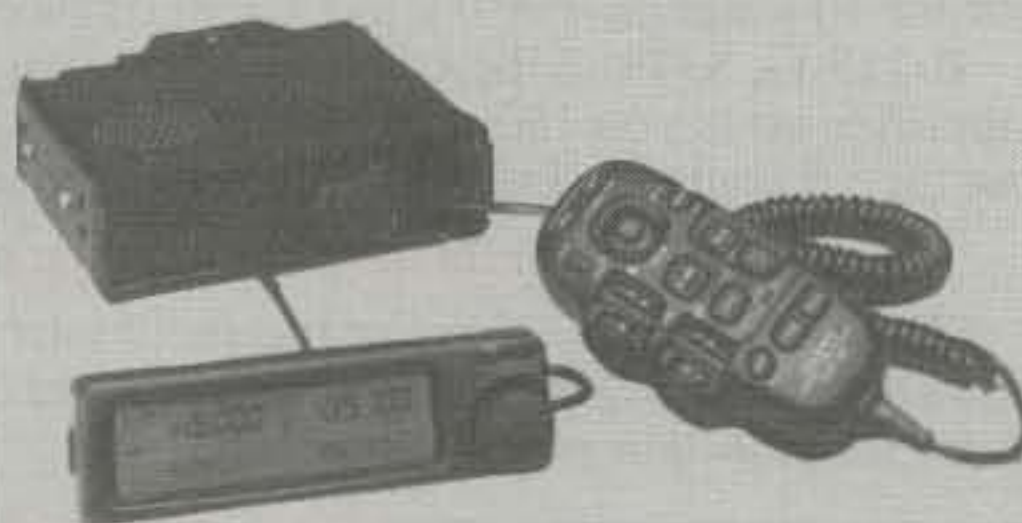
. . . we can go forward and give the amateurs the call sign program they desire." (QST, November 1986, p 47.) Mr. Kowalski is no longer with the FCC.

On February 3, 1987, the FCC issued a public notice (FCC 87-35) noting our letter and opening a pleading cycle called PRB-3 seeking the privatization of a special callsign system for amateur stations. The Commission expressed a preference for a system operated by a single organization, noting that "A single [Special Call Sign Coordinator] would minimize the number of points of contact between the SCSC and the FCC. As the number of SCSCs increased so would the administrative burden upon the FCC. This benefit is especially important considering the likelihood of limited agency resources in coming years."

The ARRL comments in PRB-3, filed July 31, 1987, stated that ". . . the League strongly believes that the assignment of call signs, and the issuance thereof, is a governmental function, which should not be relinquished, or contracted away, by the Commission. That the Commission has 'limited resources' to perform certain of its basic functions is understood, but that fact is not determinative of the matter. The Commission has re-established a fee program which could be modified to include the cost of processing special call sign requests so that those who seek to avail themselves of the ser-

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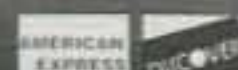


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vice could pay for it. It is also understood that the money from the existing fee program does not necessarily inure to the Commission, but rather to the U.S. Treasury. That too can be addressed by increased budget proposals to Congress, offset by user fees. . . . Accordingly, the League strongly recommends that the Commission itself develop a special call sign assignment system, the cost of which should be offset by a modification of the fee schedule presently in effect so that those who would like a specific call sign bear the cost thereof. . . . The League may be relied upon to assist in the development of a Commission program, including obtaining any statutory authority necessary to fund the program directly from user fees."

The League's comments went on to note that the FCC notice opening PRB-3 appeared to presuppose that the Commission was unwilling to consider such a program administered by the FCC itself. If there was to be a private system, the League agreed that a single administrator was "not only preferable but essential" and that "As the only national Amateur Radio organization which represents the entire spectrum of radio amateurs' interests and activities, the ARRL would be the logical choice to assume the exclusive role of fulfilling such requests for special call signs, and would be interested in doing so if its costs could be recovered from the licensees so served."

Unfortunately, the issues relating to privatization turned out to be more than the FCC was able to resolve, in large part because the League was but one of 13 persons and organizations seeking to provide this service. On June 1, 1989, the Commission announced that it would not initiate such a program because "a special call sign program—even one administered by the private sector—would require the diversion of significant agency resources that are essential to the timely and efficient processing of applications for new and upgraded amateur licenses."

Despite his apparent memory lapse, Mr. Maia is well aware of this history, having been one of the other 12 entities submitting a proposal in response to PRB-3.

As we entered the latter half of 1989, demand for specific call signs remained and amateurs clearly were willing to pay for them. However, a greater problem loomed: provisions in both the House and Senate Budget Reconciliation Bills, H.R. 3299 and S.1750, to impose an application fee (\$30 in the House version, \$35 in the Senate) on *all* amateur license applications. It took months of work by League representatives, particularly Perry Williams, W1UED, to eliminate these fees, in the process saving amateurs several million dollars per year. On November 21, 1989, the Conference Committee version of H.R. 3299 was adopted by the Senate and the House *without* the fees. It was for work like this that Perry, who is now retired, was honored as the 1994 Dayton HamVention Amateur of the Year.

H.R. 3299 is an important part of the story because the story was pretty much repeated in 1991 during consideration of the FCC Authorization Act, H.R. 1674, which included a \$30, 10-year user fee for amateurs, and in 1993 during consideration of the Omnibus Budget Reconciliation Act, a draft of which would have imposed an annual regulatory fee on every FCC-licensed amateur. In each case, the League worked actively and successfully to keep fees for simply holding an amateur li-

cence out of the final legislation. However, as reported in October 1993 *QST*, p. 81, in 1993 the final legislation *did* include "an ARRL-endorsed provision allowing the FCC to charge a special processing fee for 'amateur vanity call signs.'" Anyone who is familiar with Capitol Hill will appreciate the care that was required for the League to delete a kind of fee we didn't want, while adding a kind of fee we did want. Mr. Maia's column erroneously places this legislation in 1994, not 1993, and does not mention the League's involvement.

The June 12, 1992, letter to FCC Chairman Sikes from House Telecommunications Subcommittee Chairman Ed Markey and member Ralph Hall was helpful, and Jim Willis, N5HCT, undoubtedly deserves some credit for it. The League welcomed this development. On July 1, 1992, ARRL President George Wilson, W4OYI, wrote to Chairman Sikes: "We wish to endorse the creation of a system whereby the Commission could make specific unassigned Amateur Radio call signs available to its licensees, through a program that would be fully funded by applicants' fees. In our view, such a system should provide preference to the previous holders of specific call signs, many of whom were required, by FCC rules then extant but no longer in effect, to change call signs when they moved from one part of the country to another. While ARRL opposes the imposition of amateur license fees that would discourage individuals from obtaining an amateur license or from upgrading their skills, we do not oppose the funding of a call sign assignment program in the manner described by Messrs. Markey and Hall." President Wilson's letter was reported in September 1992 *QST*, p. 102, but is missing from Mr. Maia's recitation of events.

In short, it is ludicrous to suggest either that the vanity call sign program originated in June 1990, or that it could have come to pass without the active involvement of the League. I appreciate this opportunity to set the record straight.

David Sumner, K1ZZ
Executive Vice-President
ARRL

FAIRS Receives Grant

Editor, *CQ*:

I am very pleased to announce the \$24,873 grant that has been funded for the Foundation for Amateur International Radio Service (FAIRS).

The proposal was written by David Larsen, KK4WW, and Victor Gonsharsky, US5WE, and was funded by the United States Agency for International Development through the Eurasia Foundation.

The grant funds will allow the installation of the "Ukrainian Digital Amateur Radio Network." FAIRS will provide all the overhead and the administrative cost. The grant was specifically written for equipment only to make maximum use of the funds.

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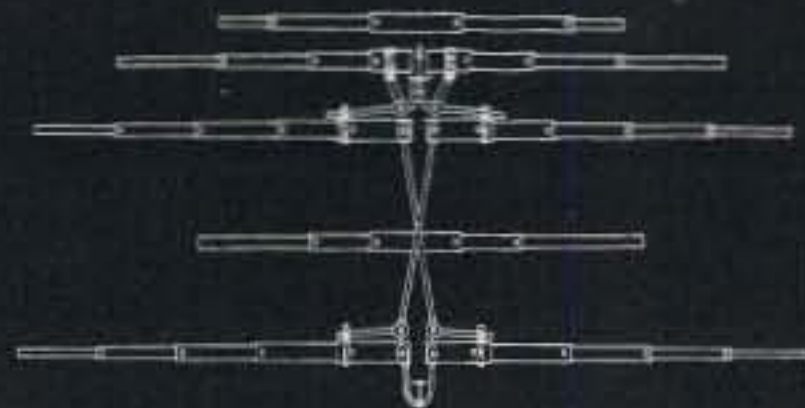
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see also "Lew McCoy on Antennas", pages 9 + 85

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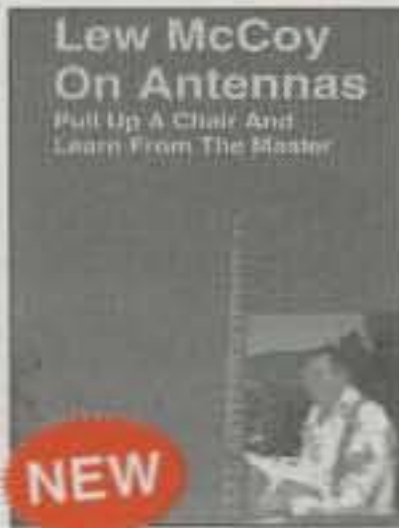
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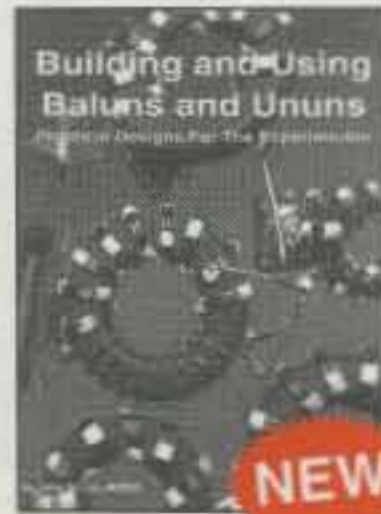
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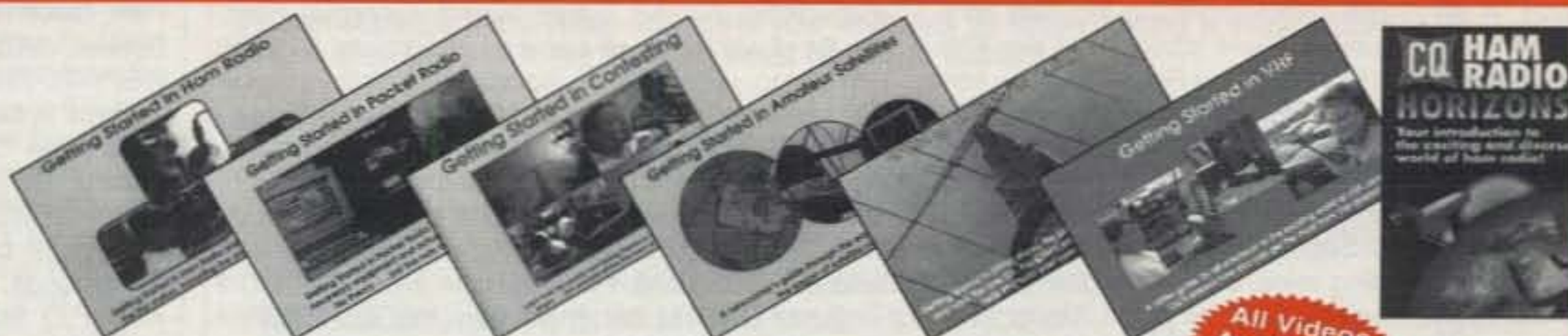
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Phone: October 28–29
Starts 0000 GMT Saturday

CW: November 25–26
Ends 2400 GMT Sunday

I. OBJECTIVE: For amateurs around the world to contact other amateurs in as many zones and countries as possible.

II. BANDS: All bands, 1.8 through 28 MHz, except for WARC bands.

III. TYPE OF COMPETITION (choose only one):

For all categories, transmitters and receivers must be located within a 500 meter diameter circle or within the property limits of the station licensee's address, whichever is greater. All antennas used by the entrant must be physically connected by wires to the transmitters and receivers used by the entrant. Only the entrant's callsign can be used to aid the entrant's score.

A. Single Operator Categories: Single band or all band; only one signal allowed at any one time; the operator can change bands at any time.

1. Single Operator High: Those stations at which one person performs all of the operating, logging, and spotting functions. The use of DX alerting assistance of any kind places the station in the Single Operator Assisted category.

2. Single Operator Low: Same as III A 1 except that the output power shall not exceed 100 watts (see rule XI. 11).

3. QRPp: Same as III A 1, except that the power output must not exceed 5 watts (see rule XI.11).

4. Single Operator Assisted: Same as III A 1 except the passive (self-spotting not allowed) use of DX spotting nets is allowed.

B. Multi-Operator (all band operation only):

1. Single Transmitter: Only one transmitter and one band permitted during any 10-minute period, defined as starting with the first logged QSO on a band. Exception: One—and only one—other band may be used during any 10-minute period if—and only if—the station worked is a new multiplier. Logs found in violation of the 10-minute rule will be automatically reclassified as multi-multi.

2. Multi-Transmitter: No limit to transmitters, but only one signal and running station allowed per band.

C. Team Contesting: A team consists of any five radio amateurs operating in the single operator category. A person can be on only one team per mode. Competing on a team will not prevent any team member from submitting his personal score for a radio club. A team score will be the sum of all the team member scores. SSB and CW teams are totally separate. That is, a member of an SSB team can be on a totally different CW team. A list of a team's members must be received at CQ Headquarters by the time the contest begins. Mail or FAX the list to CQ, Att: Team Contest, 76 North Broadway, Hicksville, NY 11801 U.S.A.; FAX 516-681-2926. Awards will be given to the top teams on each mode.

IV. NUMBER EXCHANGE: Phone: RS report plus zone (i.e., 5705), CW: RST report plus zone (i.e., 57905).

V. MULTIPLIER: Two types of multiplier will be used.

1. A multiplier of one (1) for each different zone contacted on each band.

2. A multiplier of one (1) for each different country contacted on each band.

Stations are permitted to contact their own country and zone for multiplier credit. The CQ Zone Map, DXCC country list, WAE country list, and WAC boundaries are standards. Maritime mobile stations count only for a zone multiplier.

VI. POINTS: 1. Contacts between stations on different continents are worth three (3) points.

2. Contacts between stations on the same continent but different countries, one (1) point. *Exception:* For North American stations *only*, contacts between stations within the North American boundaries count two (2) points.

3. Contacts between stations in the same country are permitted for zone or country multiplier credit but have zero (0) point value.

VII. SCORING: All stations; the final score is the result of the total QSO points multiplied by the sum of your zone and country multiplier.

Example: 1000 QSO points × 100 multiplier (30 Zones + 70 Countries) = 100,000 (final score).

VIII. AWARDS: First-place certificates will be awarded in each category listed under Sec.III in every participating country and in each call area of the United States, Canada, European Russia, and Japan.

All scores will be published. To be eligible for an award, a Single Operator station must show a minimum of 12 hours of operation. Multi-operator stations must operate a minimum of 24 hours. A single-band log is eligible for a single-band award *only*. If a log contains more than one band it will be judged as an all-band entry, unless specified otherwise.

In countries or sections where the returns justify, 2nd and 3rd place awards will be made.

All certificates and plaques will be issued to the licensee of the station used.

IX. TROPHIES & PLAQUES (Donors)

PHONE

Single Operator, All Band

World—Dave Rosen, K2GM (WA2RAU Memorial)
World—Low Power—Slovenia Contest Club
World—QRPp—Doc Sayre, N7AVK
World—Single Operator Assisted—Snake River Contest Club
U.S.A.—Potomac Valley R.C. (KC8C Memorial)
U.S.A.—Low Power—North Coast Contesters
U.S.A.—Zone 4—Dennis O'Connor, K8DO
U.S.A.—Zone 3—Bill Fisher, KM9P
Canada—Niagara Frontier Int'l DX Association (VE3WT Memorial)
Carib./C.A.—Alex M. Kasevich, VP2MM/W4
Europe—Potomac Valley R.C.—W4BVV Memorial
Europe—Low Power—Scott Jones, WR3G & Tim Duffy, K3LR
Africa—Gordon Marshall, W6RR
Asia—CQ Magazine
Japan—Japan Crazy Contesters Club
Oceania—Northern California DX Club
South America—Yankee Clipper Contest Club

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—French 21170 DX Net/LNDX (FY5AN Memorial)
World—14 MHz—North Jersey DX Assn. (K2HLB Memorial)
World—7 MHz—Fred Laun, K3ZO (K7ZZ Memorial)
World—3.8 MHz—Fred Capossela, K6SSS
World—1.8 MHz—Bob Wruble, AI7B
U.S.A.—28 MHz—Donald Thomas, N6DT
U.S.A.—21 MHz—David Hueben, KBØISS
U.S.A.—14 MHz—Southern California DX Club
U.S.A.—7 MHz—Stanley Cohen, WD8QDQ
U.S.A.—3.8 MHz—Arnold Tamchin, W2HCW
U.S.A.—1.8 MHz—J. Bruce Siff, W2GBX
Carib./C.A.—Snake River Contest Club
Europe—28 MHz—Chod Harris, VP2ML
Europe—21 MHz—Tine Brajnik, S5ØA
Europe—14 MHz—A.G. Anderson, GM3BCL
Europe—7 MHz—Roger Burt, N4ZC
Europe—3.8 MHz—CQ Magazine
Europe—1.8 MHz—Robert Kasca, S53R
Japan—28 MHz—Take Yokoyama, JL1BLW
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—Southern California DX Club (W6AM Memorial)
U.S.A.—Carolina DX Association
Europe—Bob Cox, K3EST
Carib./C.A.—Eric Scafe, K3NA
Oceania—Junichi Tanaka, JH4RHF
Africa—2 AM Dayton Pizza Gang

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A full-featured, high-performance transceiver for the radio connoisseur. Features include:

- Quadruple-conversion, general-coverage receiver (0.1—54 MHz) with 106 dB dynamic range and +20dBm 3rd Order Intercept Point.
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CIRCLE 125 ON READER SERVICE CARD

South America—Gerry Boyd, KG6LF
Asia—Pat Collins, NZ4K

Multi-Operator, Multi-Transmitter

World—Dave & Barbara Leeson, W6QHS & KK6QM
U.S.A.—Paul Hellenberg, KS9K
Europe—Finnish Amateur Radio League
Japan—Ryozo Goto, JH3JYS

Contest Expeditions

World—Single Opr.—National Capitol DX Association
(Stuart Meyer, W2GHK Memorial)
World—Multi-Opr.—The German CDXG & SDXG
(DJ3NG & DJ4EI Memorial)

Special—Single Operator Award

World—All Band Under 21 years old—Gene Zimmerman, W3ZZ
World—All Band High YL—Yutaka Tanaka, JH3DPB

CW

Single Operator, All Band

World—Albert Kahn, K4FW (W9IOP Memorial)
World—Single Operator Assisted—Snake River Contest Club
World—Low Power—Slovenia Contest Club
World—QRPp—Gene Walsh, N2AA
U.S.A.—Frankford Radio Club
U.S.A.—Low Power—North Coast Contesters
U.S.A.—Zone 4—Dennis O'Connor, K8DO
U.S.A.—Zone 3—Bill Fisher, KM9P
Canada—Canadian DX Association
Carib./C.A.—Chuck Shin, W7MAP
Europe—Edward Bissell, W3AU
Europe—Low Power—Scott Jones, WR3G & Tim Duffy, K3LR
Africa—Gordon Marshall, W6RR
Asia—Chuck Shin, W7MAP
Japan—Japan Crazy Contesters Club
Oceania—Maui Amateur Radio Club
So. Amer.—Venezuela DX Club

Single Operator, Single Band

World—28 MHz—Joel Chalmers, KG6DX
World—21 MHz—Don Busick, K5AAD (N5JJ Memorial)
World—14 MHz—North Jersey DX Assn. (W2JT Memorial)
World—7 MHz—Alex M. Kasevich, VP2MM/W4
World—3.5 MHz—Fred Capossela, K6SSS
World—1.8 MHz—Kenneth Byers, Jr., K4TEA
U.S.A.—28 MHz—Michael Conatore, AA7NX
U.S.A.—21 MHz—Wayne Carroll, W4MPY
U.S.A.—14 MHz—Northern Illinois DX Association
U.S.A.—7 MHz—Jan Perkins, N6AW (W6AM Memorial)
U.S.A.—3.5 MHz—Bill Feidt, NG3K
U.S.A.—1.8 MHz—Peter Hutter, WW2Y
Canada—Radio Amateurs of Canada
Carib./C.A.—Snake River Contest Club
Europe—28 MHz—John Pryor, K4OGG
Europe—21 MHz—Robert Naumann, KR2J
Europe—14 MHz—Maud Slater (G3FXB Memorial)
Europe—7 MHz—Ivo Pezer, 5B4ADA/T93A
Europe—3.5 MHz—Frankford Radio Club (K3VW Memorial)
Europe—1.8 MHz—Pat Barkey, WA8YVR & Terry Zivney, N4TZ
Japan—21 MHz—DX Family Foundation

Multi-Operator, Single Transmitter

World—Anthony Susen, W3AOH
U.S.A.—Douglas Zwiebel, KR2Q
Canada—Eastern Canadian DX Assn.
Carib./C.A.—North Nevada DX Contest Club
Europe—Friends of K3AO (K3AO Memorial)
Africa—CQ Magazine
Oceania—Junichi Tanaka, JH4RHF
South America—Tyler Stewart, KF3P
Asia—Steve Merchant, N4TQO

Multi-Operator, Multi-Transmitter

World—Hazard Reeves, K2GL Memorial
World—SSB/CW Combined—Ehrhorn Technological Operations
U.S.A.—Bob Ferrero, W6RJ (N6RJ Memorial)
Europe—Finnish Amateur Radio League
Japan—Ryozo Goto, JH3JYS

Contest Expeditions

World—Single-Opr.—Yankee Clipper Contest Club
World—Multi-Opr.—Bill Schneider, K2TT

Special—Single Operator Award

World—All Band—Under 21 years old—Bruce Sawyer, AA6KX

Club

World—SSB/CW—CQ Magazine, W1WY Memorial

Non-USA—SSB/CW—No. Calif. Contest Club—N6AUV Memorial
A station winning a World Trophy will not be considered for a sub-area award. That trophy will be awarded to the runner-up of that area.

X. CLUB COMPETITION:

1. The club must be a local group and not a national organization.
2. Participation is limited to members operating within a local geographic area defined as within a 275 km radius from center of club area (except for DXpeditions especially organized for operation in the contest; club contributions of DXpedition scores are percentaged to the number of club members on the DXpedition).
3. To be listed, a minimum of 3 logs must be received from a club and an officer of the club must submit a list of participating members and their scores, both on phone and CW.

XI. LOG INSTRUCTIONS:

1. All times must be in GMT.
2. All sent and received exchanges are to be logged.
3. Indicate zone and country multiplier only the FIRST TIME it is worked on each band.
4. Logs must be checked for duplicate contacts, correct QSO points and multipliers. Submitted logs must have duplicate contacts clearly shown.
5. DISKS: Please send us your computer disk. IBM, MS-DOS compatible disks are required: The format we prefer is your CT.Bin file, for example HS0AC.BIN or your N6TR.DAT file or your .DBF files. If you use a different program than mentioned above, the generic format we want is a separate file, for each band, containing a vertical single column of calls in chronological order. The committee **REQUIRES** a disk for any possible high score on request. The outside of the disk should be labeled clearly with the Call of the entrant, the files included, the mode (SSB or CW), and the category. Disks **MUST** be accompanied by a paper log satisfying all logging instructions.
6. Use a separate sheet for each band.
7. Each entry must be accompanied by a summary sheet showing all scoring information, category of competition, contestant's name and address in BLOCK LETTERS, and a signed declaration that all contest rules and regulations for amateur radio in the country of operation have been observed.
8. Sample log and summary sheets and zone maps are available from CQ. A large self-addressed envelope with sufficient postage or IRCs must accompany your request.
If official forms are not available, make up your own 80 contacts to the page on 8 1/2" x 11" paper.
9. All entrants are required to submit cross-check sheets (an alphabetical list of calls worked) for each band on which 200 or more QSOs were made. All other entrants are encouraged to submit cross-check sheets.
10. Duplicate contacts and broken calls penalty: up to 3%, three (3) additional contacts removed; over 3% is grounds for possible disqualification.
11. QRPp and low power stations must indicate same on their summary sheets and state the actual maximum power output used, with a signed declaration.

XII. DISQUALIFICATION: Violation of amateur radio regulations in the country of the contestant, or the rules of the contest; unsportsmanlike conduct; taking credit for excessive duplicate contacts; unverifiable QSOs; or unverifiable multipliers will be deemed sufficient cause for disqualification. Incorrectly logged calls will be counted as unverifiable contacts.

An entrant whose log is deemed by the Committee to contain a large number of discrepancies may be disqualified from eligibility for an award, both as a participant operator or station, for one year. If an operator is disqualified a second time within 5 years, he will be ineligible for any CQ contest awards for 3 years.

The use of non-amateur means such as telephones, telegrams, etc., to elicit contacts or multipliers **during** a contest is unsportsmanlike and the entry is subject to disqualification. Action and decisions of the CQ Contest Committee are official and final.

XIII. DEADLINE:

1. All entries must be postmarked NO LATER than December 1, 1995 for the Phone section and January 15, 1996 for the CW section. **Indicate phone or CW on the envelope.**

2. An extension of up to one month may be given if requested by letter or other means. The granted extension must be confirmed by letter sent to the contest director, must state a legitimate reason, and the request must be received before the log mailing deadline. Logs post-marked after the extension deadline may be listed in the results but will be declared ineligible for an award.

Both Phone and CW logs should be sent to CQ Magazine, 76 North Broadway, Hicksville, NY 11801.

Ameritron *no tune* Solid State FET Amplifier

No tuning, no fuss, no worries -- just turn on and operate . . . Incredibly low \$1299 includes AC power supply, 600 Watts output, continuous 1.5-22 MHz coverage, instant bandswitching, no warm up, no tubes to baby, fully SWR protected, extremely quiet, very compact

● Ameritron's revolutionary ALS-600 is amateur radio's only linear amplifier that uses four rugged TMOS RF power FETs -- gives unequaled *no tune* solid state performance

● **\$1299 includes** Ameritron's *no tune* FET Amplifier and a 120/220 VAC, 50/60 Hz AC power supply for home operation

● **Instant bandswitching, no tuning, no warm up** -- just turn on and operate

● **Output Power** -- 600 Watts PEP, 500 Watts CW

● **Continuous Coverage** -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit, \$29.95 plus s/h

● **SWR Protection** -- prevents amplifier damage if you switch to wrong band, use wrong antenna or have high SWR

● **Over Power Protection** -- if output forward power or reflected power exceeds safe level, output power is automatically reduced to prevent amplifier damage by controlling ALC to exciter

● **Extremely quiet** -- low speed, low volume fan is so quiet you'll hardly know it's there, unlike noisy blowers used in other amps

● **Very Compact** -- 6 x 9 1/2 x 12 inch amplifier takes up less desktop space than your transceiver and weighs about the same -- only 12 1/2 pounds

● **Illuminated Cross-Needle SWR/Wattmeter** -- lets you read SWR, forward and reflected *peak* power simultaneously

● **Operate/Standby Switch** -- lets you run "barefoot", but you can instantly switch to full power if you need it

● **Front Panel ALC Control** -- exclusive Ameritron feature -- convenient front panel control lets you adjust your output power

● **Transmit, ALC, SWR LED indicators** -- keeps you informed

● **12 VDC output jack** -- lets you power low current accessories

● **Separate ALS-600PS power supply** (included) can be placed conveniently out of the way and plugged into your nearest 120 VAC outlet -- no special wiring needed

● **Made in USA**

● **Enjoy 600 Watts of *no tune* solid state power.** Call your favorite dealer for your best price and order your ALS-600 with power supply today

ALS-600
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ALS-600PS Heavy Duty Power Supply

ALS-600PS power supply included with ALS-600 amplifier



- **Massive choke input filter** greatly improves voltage regulation and reduces peak AC line current
- **Ameritron's exclusive Multi-Voltage Power Transformer** lets you compensate for stressful high line voltage and performance robbing low line voltage
- **Step-Start Inrush Protection™**

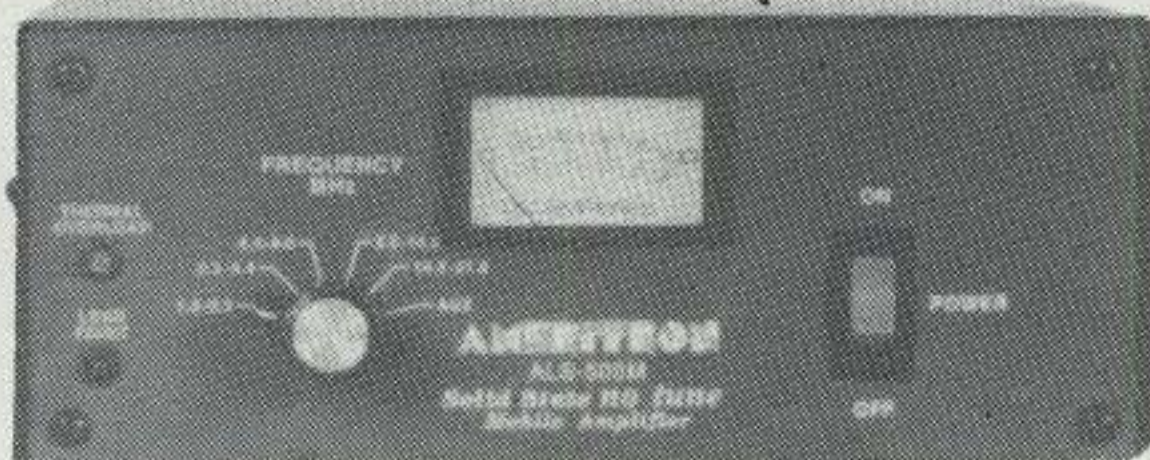
stops damaging inrush currents and extends life of power supply components

- **Illuminated Cross-Needle Meter** monitors voltage and current of 50 VDC line
- **Extremely quiet fan**
- **Very compact** 6 x 9 1/2 x 12 inches -- can be placed conveniently out-of-way
- **Wired for 120 VAC**, supplies 50 VDC at 25 amps to ALS-600 amplifier
- **Also use on 100-130 VAC and 220-250 VAC, 50/60 Hz**
- **Draws** less than 12 amps at 100 VAC and less than 6 amps at 230 VAC
- **Includes prewired cable** to plug into ALS-600 amplifier
- **Made in USA**

Ameritron *Mobile no tune* Solid State Amplifier

deal mobile amplifier -- uses 13.8 VDC mobile electrical system, very compact 3 1/2 x 9 x 15 inches, extremely quiet, 500 Watts output, continuous 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, SWR protected

ALS-500M
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Suggested Retail



Mobile *no tune* Solid State Amplifier -- uses four rugged 2SC2879 high power linear RF power transistors

● **Instant bandswitching, no tuning, no warm up** -- just turn on and operate -- makes mobile QSOs safer

● **Very Compact** -- just 3 1/2 x 9 x 15 inches -- fits in nearly any mobile installation; weighs only 7 pounds, that's less than some mobile HF transceivers

● **Extremely quiet** -- quiet low speed, low volume fan stays off and silent until temperature rises

● **Output Power** -- 500 Watts PEP, 400 Watts CW

● **Continuous Coverage** -- 1.5 to 22 MHz; 10/12 Meters with easy-to-install optional kit, \$29.95 plus s/h

● **Load Fault Protection** -- disables and bypasses amplifier if antenna has excessively high reflected power or if bandswitch is set lower than exciter frequency -- virtually eliminates damage because of operating error; has Load Fault LED indicator

● **Thermal Overload Protection** -- disables and bypasses

output of amplifiers may vary on each band.

amplifier if temperature is excessively high; automatically resets when temperature drops to safe level; has Thermal Overload LED indicator

- **Excellent harmonic suppression** -- multiple section output network and push-pull output circuit gives excellent harmonic suppression
- **DC current meter** lets you monitor collector current
- **ON/OFF Switch** -- bypasses amplifier for "barefoot" operation without having to disconnect high current power supply cables
- **Remote ON/OFF Control** -- lets you remotely control ON/OFF function for out-of-the-way mounting of amplifier
- **Exciter Drive** -- less than 100 watts input gives full output
- **Power Supply Requirements** -- requires 13.8 VDC at 80 amperes peak current for PA transistors and separate line for 12-15 VDC at 4 amperes for control and bias circuits
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CIRCLE 14 ON READER SERVICE CARD

THE SCIENCE OF PREDICTING RADIO CONDITIONS

Sunspot Cycle Plateau Continues

The plateau in solar activity reported last month continues. The Royal Observatory of Belgium reports a mean monthly sunspot number of 14.7 for May 1995. The highest daily level was reported on May 17, with a count of 43. The sun was absolutely spotless on May 2 and between May 23 and 27. The mean sunspot number for May results in a 12-month running smoothed sunspot number, upon which the sunspot cycle is based, of 26, centered on November 1994. This is the fourth month in a row in which the smoothed sunspot number has remained in the 26/27 level. Cycle 22 is expected to decline slowly, with a smoothed sunspot number of approximately 20 forecast for September 1995.

As expected, there was a corresponding decrease in 10.7 solar flux levels during May. According to daily observations made at Penticton, B.C. by the Dominion Radio Astrophysical Observatory, the mean monthly level of 10.7 cm solar flux was 76. This results in a smoothed level of 80 centered on November 1994. The smoothed level of 10.7 cm solar flux has changed little between August and November 1994, ranging between the 82/80 level. A smoothed solar flux level in the mid-70s is forecast for this month.

September Propagation

Mid-September to mid-October is generally a period of changing propagation conditions on the HF amateur bands. On some days conditions should continue to be much the same as they were earlier in the summer, but on other days the first signs of winter-time conditions should be noticeable. This month's DX Propagation Charts cover the period of variable conditions between September 15 and October 15, rather than the usual two-month span. A Short-Skip Propagation Chart for September and October is also included in this month's column.

Equinoctial Propagation

Mid-September through mid-October marks the fall equinoctial period. A similar period occurs in the spring, between mid-March and mid-April.

The fall equinoctial period marks the time that the sun crosses the equator on its apparent travel into souther skies. During this period the hours of daylight and darkness are just about equal in length throughout the world. Sunrise should take place at approximately 6 AM local time (7 AM daylight) and sunset at about 6 PM local time (7 PM daylight).

This results in an ionosphere of almost equal characteristics over large areas of the world, and is usually the best time of the year for long DX openings between the temperate regions of the northern and southern hemispheres, on

11307 Clara Street, Silver Spring, MD 20902

LAST MINUTE FORECAST

Day-to-Day Conditions Expected for September 1995

| Propagation Index..... | Expected Signal Quality | | | |
|--|-------------------------|-----|-----|-----|
| | (4) | (3) | (2) | (1) |
| Above Normal: 1, 12, 22, 27 | A | A | B | C |
| High Normal: 2, 10-11, 13, 16-17, 21, 28-29 | A | B | C | C-D |
| Low Normal: 3, 6-7, 9, 14-15, 20, 23, 26, 30 | B | C | D | D-E |
| Below Normal: 4, 8, 18-19, 24 | C | C-D | D-E | E |
| Disturbed: 5, 25 | 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 S9 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.

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 date of the month. For example, an opening shown in the charts with a propagation index of 3 will be excellent (A) on Sept. 1st, good (B) on the 2nd, fair (C) on the 3rd, fair-to-poor (C-D) on the 4th, and poor (D) on the 5th.

all HF bands. Look for more frequent openings between the USA and South America, South Pacific, South Asia and southern Africa, especially on 20 meters for a few hours after sunrise and again during the early evening hours.

Long-path and grayline propagation are also usually optimum during the equinoctial period. In western states look for long-path openings from Europe and Africa on 20 meters shortly after sunrise and again during the evening. Stations in eastern states can expect some long-path openings to the South Pacific during the late afternoon and early evening, and to parts of eastern Africa and Asia just after sunrise. Long-path openings may also be possible on 30 and 40 meters during the sunrise and sunset periods.

In general, during September, expect 20 meters to continue to be the best band for DX propagation. It should open in almost all directions for a few hours after sunrise, and remain open to several different areas of the world throughout most of the day and into the early evening. Signals should be a bit stronger than they were during July and August, but the band will close an hour or two earlier because of the shorter period of daylight.

A seasonal improvement is expected for DX

conditions on 15 and 17 meters, but solar activity is so low that considerably fewer openings are expected compared to the past several years. Best time to check for DX openings is from a few hours before noon through the afternoon hours. Best bet is for fairly good openings towards South America, but openings to Africa, the South Pacific, and Europe could occur from time to time.

Solar activity is much too low for any real 10 or 12 meter DX openings, but some may be possible towards South America and other southern areas during the afternoon hours, as well as an occasional opening to Europe and Africa earlier in the day.

Improved nighttime DX propagation conditions are expected on 30, 40, 80, and 160 meters as a result of increasing hours of darkness, and a seasonal decrease in static levels. Forty should provide the best change for DX from sunset through the sunrise period. Check 80 and 160 meters during the same time span, and especially an hour or so before sunrise.

From mid-September through mid-October, for short-skip openings less than 250 miles use 80 meters during the day and either 80 or 160 meters at night. For openings between 750 and 1300 miles the best bet should be 20 meters during the day, 30 and 40 meters from sundown to midnight, and 80 meters from midnight to sunrise. For openings beyond 1300 miles, try 17 and 20 meters during most of the daylight period, with 30 and 40 meters optimum during the hours of darkness. Check 12 and 15 meters for some good openings beyond 1300 miles during the afternoon hours.

VHF Ionospheric Openings

Although summertime sporadic-E ionization is expected to fall off considerably during September and early October, an occasional 6 meter short-skip opening may still be possible over distances ranging between approximately 1000 and 1300 miles. The best time to check is before noon and during the early evening.

There is usually an increase in auroral activity during an equinoctial period, so look for some fairly frequent 6 and 2 meter auroral-type openings. The best times for such openings are when conditions on the HF bands are Below Normal or Disturbed. Check the Last-Minute Forecast at the beginning of this column for those days that are likely to be in these categories during September.

No major meteor showers are expected during September, so few, if any, meteor-scatter-type openings are likely on the VHF bands this month.

Conditions for trans-equatorial (or TE) scatter propagation also usually peak during equinoctial periods. However, in the present period of low solar activity, TE openings are likely to be considerably less numerous than in pre-

vious years. Some 10, 12, and perhaps a rare 6 meter opening may be possible by this propagation mode between the southern tier states and deep South America. The best time to check for TE openings is between 8 and 11 PM local time. Openings are usually of fairly short duration, and signals can vary between very weak and watery to fairly strong, with some degree of flutter fading almost always present.

CQ WW DX Contest Special '95

The 1995 contest weekends will mark the 45th consecutive CQ WW DX Contest for which this column has contained special propagation forecasts. This year's contest weekends are:

October 28-29—SSB Section
November 25-26—CW Section

In the tradition of the past 44 years, there will appear in the next month's "Propagation" column a special, comprehensive forecast that will focus on both sections of the contest. Besides the latest updated propagation predictions to all areas of the world, the column will also contain pointers for scoring as many points as possible.

The NEW Shortwave Propagation Handbook

CQ has been a leader for nearly 50 years in providing timely and invaluable information on HF propagation. The original *Shortwave Propagation Handbook* written by the editor of this column (W3ASK) and Dr. Ted Cohen, N4XX, has been used by thousands of radio amateurs throughout the world. Now a completely updated and revised *New Shortwave Propagation Handbook* is available from CQ. A third author has been added, Robert Rose, K6GKU, to bring additional research and hands-on experience into the book.

Here are just some of the highlights that make this new book a must for every radio amateur's library:

- Principles of ionospheric propagation
- Solar cycle explanations and predictions
- A complete listing of sunspot numbers from the 18th century to the present
- "Do-it-yourself" propagation prediction/charts
- Ionospheric forecasting
- Analysis of HF propagation computer programs
- Unusual HF and VHF ionospheric propagation
- How to access geophysical databases
- Scores of charts, tables, photos, and summary information
- Complete overview of WWV and WWVH propagation services

The book is priced at \$19.95 plus \$4 for shipping and handling. (New York State residents must apply applicable sales tax.) It can be ordered by calling toll-free 1-800-853-9797, or from CQ Communications, Inc., 76 North Broadway, Hicksville, NY 11801 (FAX 1-516-681-2926). Also, check your local radio book dealer for availability.

There is still time to get a copy for use during the 1995 CQ WW DX Contest.

73, George, W3ASK

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in () after the time of each predicted opening. 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.

4. 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. Appropriate daylight time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength 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.

6. 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.

| | | | | |
|---|-----------|-----------|-----------|------------|
| Southern Africa | 11-14 (1) | 09-11 (1) | 08-10 (1) | 19-22 (1) |
| | | 11-13 (2) | 13-15 (1) | 22-00 (2) |
| | | 13-15 (3) | 15-18 (2) | 00-02 (1) |
| | | 15-16 (2) | 18-19 (3) | 23-01 (1)* |
| | | 16-17 (1) | 19-20 (2) | |
| | | | 20-21 (1) | |
| | | | 23-01 (1) | |
| Central & South Asia | Nil | 09-11 (1) | 07-08 (1) | 05-07 (1) |
| | | 18-20 (1) | 08-10 (2) | 20-23 (1) |
| | | | 10-12 (1) | |
| | | | 19-22 (1) | |
| Southeast Asia | Nil | 10-12 (1) | 07-08 (1) | 06-08 (1) |
| | | 14-16 (1) | 08-10 (2) | |
| | | 18-20 (1) | 10-12 (1) | |
| | | | 16-18 (1) | |
| | | | 20-22 (1) | |
| Far East | Nil | 09-11 (1) | 08-09 (1) | 06-08 (1) |
| | | 18-20 (1) | 09-10 (2) | |
| | | | 10-12 (1) | |
| | | | 17-19 (1) | |
| | | | 19-21 (2) | |
| | | | 21-23 (1) | |
| South Pacific & New Zealand | 15-18 (1) | 11-15 (1) | 07-08 (1) | 01-02 (1) |
| | | 15-17 (2) | 08-11 (2) | 02-03 (2) |
| | | 17-18 (3) | 11-14 (1) | 03-06 (3) |
| | | 18-19 (2) | 16-20 (1) | 06-09 (2) |
| | | 19-20 (1) | 20-00 (2) | 03-04 (1)* |
| | | | 00-04 (1) | 04-06 (2)* |
| | | | | 06-07 (1)* |
| Australasia | 17-19 (1) | 14-17 (1) | 07-08 (1) | 02-04 (1) |
| | | 17-19 (2) | 08-10 (2) | 04-06 (2) |
| | | 19-20 (1) | 10-12 (1) | 06-07 (3) |
| | | | 14-16 (1) | 07-08 (2) |
| | | | 16-18 (2) | 08-09 (1) |
| | | | 18-21 (1) | 04-05 (1)* |
| | | | 21-00 (2) | 05-06 (2)* |
| | | | 00-02 (1) | 06-07 (1)* |
| Caribbean, Central America, & Northern Countries of South America | 11-14 (1) | 09-10 (1) | 07-08 (1) | 19-20 (1) |
| | 14-17 (2) | 10-13 (2) | 08-09 (3) | 20-21 (2) |
| | 17-18 (1) | 13-15 (3) | 09-10 (4) | 21-04 (4) |
| | | 15-16 (4) | 10-15 (2) | 04-06 (3) |
| | | 16-17 (3) | 15-17 (3) | 06-07 (2) |
| | | 17-18 (2) | 17-19 (4) | 07-08 (1) |
| | | 18-19 (1) | 19-21 (3) | 21-23 (1)* |
| | | | 21-22 (2) | 23-04 (2)* |
| | | | 22-00 (1) | 04-06 (1)* |
| Peru, Bolivia, Paraguay, Brazil, Chile, Argentina and Uruguay | 14-15 (1) | 09-10 (1) | 07-08 (1) | 21-00 (1) |
| | 15-17 (2) | 10-11 (2) | 08-10 (2) | 00-05 (2) |
| | 17-18 (1) | 11-14 (1) | 10-11 (1) | 05-07 (1) |
| | | 14-16 (2) | 14-16 (1) | 01-06 (1)* |
| | | 16-18 (3) | 16-18 (2) | |
| | | 18-19 (1) | 18-19 (3) | |
| | | | 19-20 (4) | |
| | | | 20-21 (3) | |
| | | | 21-23 (2) | |
| | | | 23-00 (1) | |
| McMurdo Sound, Antarctica | Nil | 16-18 (1) | 18-20 (1) | 00-03 (1) |
| | | | 20-23 (2) | 03-05 (2) |
| | | | 23-01 (1) | 05-07 (1) |
| | | | 08-09 (1) | 04-06 (1)* |

September 15-October 15, 1995 Time Zone: EDT (24-Hour Time System) EASTERN USA TO:

| Reception Area | 10 Meters | 15 Meters | 20 Meters | 40/80* Meters |
|---|-----------|-----------|-----------|---------------|
| Western & Central Europe & North Africa | 11-14 (1) | 10-11 (1) | 07-08 (1) | 18-19 (1) |
| | | 11-15 (2) | 08-10 (3) | 19-21 (2) |
| | | 15-16 (1) | 10-12 (2) | 21-23 (3) |
| | | | 12-14 (3) | 23-02 (4) |
| | | | 14-16 (4) | 02-03 (3) |
| | | | 16-17 (3) | 03-04 (2) |
| | | | 17-18 (2) | 04-05 (1) |
| | | | 18-19 (1) | 20-22 (1)* |
| | | | | 22-01 (2)* |
| | | | | 01-04 (1)* |
| Northern Europe & European CIS | 10-12 (1) | 10-13 (1) | 07-08 (1) | 18-20 (1) |
| | | | 08-10 (3) | 20-04 (2) |
| | | | 10-12 (2) | 04-05 (1) |
| | | | 12-14 (1) | 21-04 (1)* |
| | | | 14-16 (2) | |
| | | | 16-18 (1) | |
| Eastern Mediterranean & Middle East | 11-13 (1) | 10-11 (1) | 07-08 (1) | 19-21 (1) |
| | | 11-13 (2) | 08-09 (2) | 21-00 (2) |
| | | 13-15 (1) | 09-14 (1) | 00-01 (1) |
| | | | 14-16 (2) | 22-00 (1)* |
| | | | 16-17 (3) | |
| | | | 17-18 (2) | |
| | | | 18-19 (1) | |
| | | | 22-00 (1) | |
| Western Africa | 14-16 (1) | 09-11 (1) | 08-10 (1) | 20-23 (1) |
| | | 11-13 (2) | 13-15 (1) | 23-02 (2) |
| | | 13-16 (3) | 15-16 (2) | 02-04 (1) |
| | | 16-17 (2) | 16-17 (3) | 01-03 (1)* |
| | | 17-18 (1) | 17-18 (4) | |
| | | | 18-20 (3) | |
| | | | 20-21 (2) | |
| | | | 21-23 (1) | |
| Eastern & Central Africa | 13-15 (1) | 11-13 (1) | 13-15 (1) | 21-02 (1) |
| | | 13-15 (2) | 15-17 (2) | |
| | | 15-16 (1) | 17-18 (3) | |
| | | | 18-19 (2) | |
| | | | 19-21 (1) | |

Time Zones: CDT and MDT (24-Hour Time System) CENTRAL USA TO:

| Reception Area | 10 Meters | 15 Meters | 20 Meters | 40/80* Meters |
|---|-----------|-----------|-----------|---------------|
| Western & Central Europe & North Africa | 10-14 (1) | 10-14 (1) | 07-08 (1) | 18-20 (1) |
| | | | 08-10 (2) | 20-23 (2) |
| | | | 10-13 (1) | 23-01 (3) |
| | | | 13-14 (2) | 01-02 (2) |
| | | | 14-16 (3) | 02-03 (1) |
| | | | 16-17 (2) | 21-23 (1)* |
| | | | 17-18 (1) | 23-01 (2)* |
| | | | | 01-02 (1)* |
| Northern Europe & European CIS | Nil | 10-13 (1) | 07-08 (1) | 20-23 (1) |
| | | | 08-10 (2) | 23-01 (2) |
| | | | 10-12 (1) | 01-02 (1) |
| | | | 12-15 (2) | 22-01 (1)* |
| | | | 15-17 (1) | |
| | | | 21-23 (1) | |
| Eastern Mediterranean & Middle East | 10-13 (1) | 10-13 (1) | 07-08 (1) | 20-23 (1) |
| | | | 08-09 (2) | 21-23 (1)* |
| | | | 09-15 (1) | |
| | | | 15-17 (2) | |
| | | | 17-18 (1) | |
| | | | 21-23 (1) | |

| | | | | |
|-----------------------------|-----------|---|---|---|
| Western Africa | 12-14 (1) | 09-11 (1) 11-13 (2) 13-15 (3) 15-16 (2) 16-17 (1) | 07-09 (1) 13-15 (1) 15-16 (2) 16-19 (3) 19-20 (2) 20-22 (1) | 20-23 (1) 23-01 (2) 01-02 (1) 23-01 (1)* |
| Eastern & Central Africa | Nil | 12-16 (1) | 07-09 (1) 13-16 (1) 16-19 (2) 19-20 (1) | 21-00 (1) |
| Southern Africa | 11-13 (1) | 09-10 (1) 10-12 (2) 12-14 (3) 14-15 (2) 15-16 (1) | 07-09 (1) 12-14 (1) 14-16 (2) 16-18 (3) 18-19 (2) 19-20 (1) 22-00 (1) | 20-21 (1) 21-23 (2) 23-01 (1) 21-23 (1)* |
| Central & South Asia | Nil | 18-21 (1) | 07-08 (1) 08-10 (2) 10-12 (1) 18-21 (1) | 06-08 (1) 19-21 (1) |
| Southeast Asia | Nil | 17-19 (1) | 07-08 (1) 08-10 (2) 10-13 (1) 18-22 (1) | 05-08 (1) |
| Far East | Nil | 15-17 (1) 17-19 (2) 19-20 (1) | 07-08 (1) 08-10 (3) 10-11 (2) 11-13 (1) 17-19 (1) 19-22 (2) 22-00 (1) | 03-05 (1) 05-07 (2) 07-09 (1) 06-08 (1)* |
| South Pacific & New Zealand | 14-18 (1) | 10-13 (1) 13-16 (2) 16-18 (3) 18-19 (2) 19-20 (1) | 06-08 (1) 08-10 (3) 10-12 (2) 12-18 (1) 18-20 (2) 20-22 (3) 22-00 (2) 00-02 (1) | 00-01 (1) 01-07 (3) 07-08 (2) 08-09 (1) 02-04 (1)* 04-07 (2)* 07-08 (1)* |
| Australasia | 16-18 (1) | 13-16 (1) 16-19 (2) 19-21 (1) | 05-07 (1) 07-08 (2) 08-10 (3) 10-13 (2) 13-17 (1) 17-18 (2) 18-20 (1) 20-23 (2) 23-01 (1) | 02-03 (1) 03-05 (2) 05-07 (3) 07-08 (2) 08-09 (1) 05-06 (1)* 06-07 (2)* 07-08 (1)* |

| | | | | |
|--|-------------------------------------|---|--|---|
| Caribbean, Central America & Northern Countries of South America | 11-13 (1) 13-16 (2) 16-18 (1) | 09-10 (1) 10-11 (2) 11-13 (3) 13-16 (4) 16-17 (3) 17-18 (2) 18-19 (1) | 06-07 (1) 07-08 (3) 08-10 (4) 10-12 (3) 12-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-00 (1) | 19-20 (1) 20-21 (2) 21-01 (3) 01-05 (4) 05-06 (3) 06-07 (2) 07-08 (1) 20-23 (1)* 23-05 (2)* 05-06 (1)* |
| Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay | 14-15 (1) 15-17 (2) 17-18 (1) | 09-10 (1) 10-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) | 07-08 (1) 08-09 (2) 09-11 (1) 13-16 (1) 16-18 (2) 18-19 (3) 19-20 (4) 20-22 (3) 22-23 (2) 23-00 (1) | 21-00 (1) 00-04 (2) 04-06 (1) 01-05 (1)* |
| McMurdo Sound, Antarctica | Nil | 16-18 (1) | 17-20 (1) 20-23 (2) 23-01 (1) 08-10 (1) | 00-03 (1) 03-05 (2) 05-07 (1) 04-06 (1)* |

| | | | | |
|--|-------------------------------------|---|--|---|
| Eastern Mediterranean & Middle East | Nil | 10-12 (1) | 08-12 (1) 12-14 (2) 14-16 (1) 20-22 (1) | 20-23 (1) |
| Western & Central Africa | 12-14 (1) | 10-13 (1) 13-15 (2) | 07-08 (1) 08-09 (2) 09-14 (1) 14-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) | 21-00 (1) |
| Eastern Africa | Nil | 13-15 (1) | 07-09 (1) 13-15 (1) 15-17 (2) 17-19 (1) 21-23 (1) | 20-22 (1) |
| Southern Africa | 11-15 (1) | 11-15 (1) | 07-09 (1) 12-14 (1) 14-18 (2) 18-19 (1) 22-00 (1) | 19-22 (1) |
| Central & South Asia | Nil | 17-19 (1) | 08-09 (1) 09-11 (2) 11-13 (1) 17-19 (1) 19-21 (2) 21-22 (1) | 06-08 (1) 19-21 (1) |
| Southeast Asia | Nil | 16-19 (1) | 07-08 (1) 08-10 (3) 10-11 (2) 11-12 (1) 21-22 (1) 22-00 (2) 00-01 (1) | 01-03 (1) 03-06 (2) 06-08 (1) 03-06 (1)* |
| Far East | 16-19 (1) | 14-16 (1) 16-19 (2) 19-20 (1) | 07-08 (1) 08-10 (3) 10-13 (2) 13-20 (1) 20-21 (2) 21-22 (3) 22-23 (2) 23-01 (1) | 01-03 (1) 03-08 (2) 08-09 (1) 03-07 (1)* |
| South Pacific & New Zealand | 13-15 (1) 15-17 (2) 17-18 (1) | 11-15 (1) 15-17 (2) 17-19 (3) 19-20 (2) 20-21 (1) | 14-18 (2) 18-20 (3) 20-22 (4) 22-23 (3) 23-01 (2) | 21-22 (1) 22-23 (2) 23-00 (3) 00-05 (4) 05-07 (3) |
| Australasia | 15-17 (1) | 13-16 (1) 16-17 (2) 17-19 (3) 19-20 (2) 20-21 (1) | 17-19 (1) 19-20 (2) 20-00 (3) 00-03 (2) 03-07 (1) 07-08 (2) 08-09 (1) 08-10 (3) 10-11 (2) 11-14 (1) | 01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 02-04 (1)* 04-06 (2)* 06-07 (1)* |
| Caribbean, Central America & Northern Countries of South America | 11-13 (1) 13-15 (2) 15-17 (1) | 08-09 (1) 09-12 (2) 12-14 (3) 14-15 (4) 15-16 (3) 16-17 (2) 17-18 (1) | 07-08 (1) 08-09 (2) 09-10 (3) 10-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-23 (2) 23-00 (1) | 19-21 (1) 21-02 (3) 02-04 (2) 04-07 (1) 20-22 (1)* 22-03 (2)* 03-05 (1)* |
| Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay | 13-14 (1) 14-16 (2) 16-17 (1) | 09-10 (1) 10-11 (2) 11-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-19 (1) | 08-10 (1) 13-15 (1) 15-17 (2) 17-20 (4) 20-21 (3) 21-22 (2) 22-00 (1) | 21-23 (1) 23-02 (2) 02-04 (1) 00-03 (1)* |
| McMurdo Sound, Antarctica | Nil | 16-19 (1) | 07-10 (1) 17-19 (1) 19-20 (2) 20-22 (3) 22-00 (2) 00-01 (1) | 01-03 (1) 03-05 (2) 03-05 (2) 03-06 (1)* |

**Time Zone: PDT
(24-Hour Time System)
WESTERN USA TO:**

| Reception Area | 10 Meters | 15 Meters | 20 Meters | 40/80* Meters |
|--|-----------|-----------|--|---|
| Western Europe & North Africa | Nil | 10-12 (1) | 07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-16 (1) 22-00 (1) | 20-21 (1) 21-23 (2) 23-00 (1) 21-23 (1)* |
| Central & Northern Europe & European CIS | Nil | 10-12 (1) | 08-09 (1) 09-10 (2) 10-12 (1) 12-14 (2) 14-16 (1) 22-00 (1) | 20-00 (1) |

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| 9913/PIN | N Male Pin for 9913, 9086, 8214 | |
| | Fits UG-21 D/U & UG-21 B/U's | 1.50 |
| UG-21D/9913 | N Male for RG-8 with 9913 Pin | 4.00 |
| UG-21B/9913 | N Male for RG-8 with 9913 Pin | 5.75 |
| UG-146A/U | N Male to SO-239, Teflon USA | 6.50 |
| UG-83B/U | N Female to PL-259, Teflon USA | 6.50 |

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* 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. For 12 meter openings interpolate between 10 and 15 meter openings. For 17 meter openings interpolate between 15 and 20 meter openings. For 30 meter openings interpolate between 40 and 20 meter openings.

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 160 meter openings. An ** indicates possible 10 meter openings.

2. The propagation index is the number that appears in () after the time of each predicted opening. In the Short-Skip Chart, where two numerals are shown within a single set of parentheses, the first applies to the shorter distance for which the forecast is made, and the second to the greater distance. The index indicates the number of days during the month on which the opening is expected to take place, as follows:

- (4) Opening should occur on more than 22 days
- (3) Opening should occur between 14 and 22 days
- (2) Opening should occur between 7 and 13 days
- (1) Opening should occur on less than 7 days

Refer to the "Last-Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

3. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 AM; 13 is 1 PM, etc. 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 New York and Texas, the time at the midpoint would be CDT, etc. Times shown in the Hawaii Chart are in HST. To convert to daylight time in other USA time zones add 3 hours in the PDT zone; 4 hours in the MDT zone; 5 hours in the CDT zone; and 6 hours in the EDT zone. Add 12 hours to convert from HST to GMT. For example, when it is 12 noon in Honolulu, it is 15 or 3 PM in Los Angeles; 18 or 6 PM in Washington, D.C.; and 22 GMT. Time shown in the Alaska Chart is given in GMT. To convert to *sdaylight* time in other areas of the USA subtract 7 hours in the PDT zone; 6 hours in the MDT zone; 5 hours in the CDT zone; and 4 hours in the EDT zone. For example, at 20 GMT it is 16 or 4 PM in New York City.

4. The Short-Skip Chart is based upon a transmitted power of 75 watts CW or 300 watts PEP on sideband; the Alaska and Hawaii Charts are based upon a transmitter power of 250 watts CW or 1 KW PEP on sideband. A dipole antenna a quarter-wavelength above ground is assumed for 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the propagation index will increase by one level; for each 10 dB loss, it will lower by one level.

5. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept. of Commerce, Boulder, Colorado 80302.

CQ Short-Skip Propagation Chart September & October 1995 Local Daylight Savings Time At Path Mid-Point

| Meter Band | Distance Between Stations (Miles) | | | |
|------------|-----------------------------------|--|--|--|
| | 50-250 | 250-750 | 750-1300 | 1300-2300 |
| 10 | Nil | 10-21 (0-1) | 08-10 (1) 10-15 (1-2) 15-22 (1) | 08-10 (1-0) 10-14 (2-0) 14-18 (1) 18-22 (1-0) |
| 15 | Nil | 08-10 (0-1) 10-14 (0-2) 14-22 (0-1) | 08-10 (1) 10-14 (2) 14-17 (1-3) 17-18 (1-2) 18-22 (1) 22-00 (0-1) | 08-10 (1) 10-14 (2) 14-17 (3) 17-18 (2-1) 18-20 (1) 20-00 (1-0) |
| 20 | 12-20 (0-1) | 08-10 (0-1) 10-12 (0-2) 12-15 (1-4) 15-17 (1-3) 17-20 (1-2) 20-07 (0-1) | 08-10 (1-2) 10-12 (2-4) 12-15 (4) 17-19 (2-4) 17-19 (2-4) 19-20 (2-3) 20-21 (1-3) 21-23 (2) 21-23 (1-2) 23-08 (1) | 08-09 (2-1) 09-10 (2) 10-14 (4-2) 14-16 (4-3) 16-19 (4) 19-21 (3) 21-23 (2) 23-01 (1) 01-06 (1-0) 06-08 (1) |

| | | | | |
|-----|--|--|--|---|
| 40 | 08-10 (0-2) 10-12 (2-4) 12-16 (3-4) 16-18 (2-3) 18-20 (1-2) 20-22 (0-1) | 08-10 (2-3) 10-12 (4-3) 12-16 (4-2) 16-18 (3) 18-20 (2-4) 20-22 (1-4) 22-00 (0-3) 00-03 (0-2) 03-06 (0-1) 06-08 (0-2) | 08-10 (3-2) 10-12 (3-1) 12-16 (2-1) 16-18 (3-2) 18-20 (4-3) 20-22 (4) 22-00 (3-4) 00-03 (2-3) 03-06 (1-2) 06-08 (2-4) | 08-10 (2-1) 10-16 (1-0) 16-18 (2-1) 18-20 (3-2) 20-21 (4-3) 21-00 (4) 00-03 (3-4) 03-06 (2-3) 06-08 (4-2) |
| 80 | 07-09 (3-4) 09-12 (4) 12-19 (4-3) 19-22 (4) 22-04 (3-4) 04-07 (2-3) | 07-09 (4-2) 09-12 (4) 12-17 (3-1) 17-19 (3-2) 19-21 (4-3) 21-04 (4) 04-06 (4-2) 06-07 (3) | 07-09 (2-1) 09-17 (1-0) 17-19 (2-1) 19-21 (3-2) 21-22 (4-3) 22-04 (4) 04-06 (4-2) 06-07 (3-2) | 07-09 (1) 09-17 (0) 17-19 (1) 19-21 (2) 21-22 (3-2) 22-04 (4-3) 04-06 (2) 06-07 (2-1) |
| 160 | 17-19 (1-0) 19-21 (2-1) 21-06 (4) 06-08 (3-2) 08-10 (2-1) 10-12 (1-0) | 18-20 (1-0) 20-21 (1) 21-03 (4-3) 03-06 (3-2) 06-08 (2-1) 08-10 (1-0) | 20-21 (1-0) 21-23 (3-1) 23-03 (3) 03-06 (2-1) 06-08 (1) | 21-23 (1-0) 23-03 (3-2) 03-06 (1) 06-08 (1-0) |

ALASKA September & October 1995 Openings Given in GMT

| Reception Area | 10 Meters | 15 Meters | 20 Meters | 40/80* Meters |
|----------------|-----------|-------------------------------------|---|---|
| Eastern States | Nil | 21-23 (1) | 12-14 (1) 18-21 (1) 21-00 (2) 00-02 (1) | 08-12 (1) |
| Central States | Nil | 21-01 (1) | 13-15 (1) 19-22 (1) 22-01 (2) 01-03 (1) | 08-13 (1) |
| Western States | Nil | 20-21 (1) 21-23 (2) 23-01 (1) | 17-18 (1) 18-22 (2) 22-01 (3) 01-03 (2) 03-05 (1) | 08-11 (1) 11-14 (2) 14-16 (1) 11-14 (1)* |

HAWAII September & October 1995 Openings Given In Hawaiian Standard Time

| Reception Area | 10 Meters | 15 Meters | 20 Meters | 40/80* Meters |
|----------------|-----------|---|--|---|
| Eastern States | Nil | 07-12 (1) 12-15 (2) 15-16 (1) | 11-13 (1) 13-14 (2) 14-16 (3) 16-17 (2) 17-19 (1) 03-05 (1) 05-07 (2) 07-08 (1) | 17-19 (1) 19-21 (2) 21-00 (3) 00-02 (2) 02-03 (1) 19-20 (1)* 20-23 (2)* 23-01 (1)* |
| Central States | 09-13 (1) | 07-11 (1) 11-12 (2) 12-14 (3) 14-15 (2) 15-17 (1) | 05-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-17 (4) 17-18 (2) 18-20 (1) | 17-19 (1) 19-21 (2) 21-02 (3) 02-04 (2) 04-05 (1) 19-20 (1)* 20-00 (2)* 00-02 (1)* |
| Western States | 10-15 (1) | 07-10 (1) 10-12 (2) 12-15 (3) 15-16 (2) 16-18 (1) | 06-07 (1) 07-10 (3) 10-12 (2) 12-14 (3) 14-16 (4) 16-18 (3) 18-19 (2) 19-21 (1) | 17-18 (1) 18-19 (2) 19-01 (4) 19-01 (4) 01-03 (3) 03-06 (2) 06-07 (1) 19-20 (1)* 20-22 (2)* 22-03 (3)* 03-04 (2)* 04-06 (1)* |

See explanation in "How To Use Short-Skip Charts" in box at the beginning of these charts.
Note: Alaska and Hawaii Propagation Charts are intended for distances greater than 1300 miles. For shorter distances, use the preceding Short-Skip Propagation Chart.



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Contest Results (from page 27)

Number groups after call letters denote following: Band (A = all), Final Score, Number of QSOs, Zones, and Countries. An asterisk before a call indicates low power. Certificate winners are listed in boldface. (All country terminology reflects the DXCC list at the time of the 1994 contest. The 1995 contest will reflect political changes since that time.)

**SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA**

UNITED STATES

| | | | | | |
|---------------|-----|-----------|------|-----|-----|
| K1AR | A | 3,400,317 | 1982 | 135 | 468 |
| K5ZD/1 | * | 3,254,700 | 2016 | 127 | 443 |
| N6BV/1 | * | 2,216,445 | 1636 | 107 | 398 |
| W2SC/1 | * | 1,779,152 | 1350 | 110 | 386 |
| K1KI | * | 1,125,774 | 961 | 110 | 332 |
| W1WEF | * | 827,970 | 814 | 93 | 293 |
| KA1DWB | * | 566,842 | 573 | 79 | 275 |
| K1EFL | * | 474,138 | 547 | 76 | 242 |
| W1KRS | * | 445,596 | 569 | 61 | 223 |
| AK1N | * | 358,020 | 388 | 89 | 251 |
| KB1GW | * | 260,253 | 404 | 64 | 179 |
| K2AJY/1 | * | 208,658 | 276 | 67 | 222 |
| KV1W | * | 158,389 | 310 | 45 | 142 |
| W1OP | * | 148,780 | 336 | 77 | 173 |
| (Opr. K1PLX) | | | | | |
| N01J | * | 73,950 | 182 | 46 | 104 |
| K1VSI | * | 59,856 | 174 | 33 | 96 |
| N1QMM | * | 52,528 | 147 | 42 | 92 |
| K1HMO | * | 30,030 | 111 | 36 | 69 |
| W1FJ | * | 26,100 | 115 | 30 | 70 |
| KM1H | 14 | 866,598 | 1663 | 39 | 155 |
| (Opr. KQ2M) | | | | | |
| WA1MKS | * | 722 | 18 | 8 | 11 |
| KT1T | * | 494 | 16 | 6 | 12 |
| KD1F | 3.7 | 111,090 | 445 | 23 | 82 |
| *WS1A | A | 414,990 | 564 | 71 | 219 |
| *WE6G/1 | * | 377,907 | 533 | 78 | 231 |
| *KA1ILG | * | 341,864 | 521 | 69 | 214 |
| *K5FUV/1 | * | 296,055 | 438 | 65 | 190 |
| *KB1KM | * | 271,422 | 348 | 69 | 237 |
| *W0MHK/1 | * | 189,429 | 319 | 60 | 173 |
| *AA1EY | * | 182,120 | 327 | 64 | 168 |
| *WV1C | * | 176,580 | 339 | 56 | 162 |
| *WA1S | * | 122,486 | 251 | 41 | 141 |
| *N3MLV/1 | * | 82,597 | 222 | 39 | 112 |
| *K1KJT | * | 75,411 | 200 | 42 | 105 |
| *KB1JL/1 | * | 71,360 | 179 | 50 | 110 |
| *KD1BM | * | 56,880 | 166 | 44 | 100 |
| *WA2SCA/1 | * | 32,890 | 142 | 36 | 79 |
| *KD1TM | * | 25,198 | 115 | 23 | 63 |
| *WF1H | * | 21,070 | 98 | 31 | 67 |
| *NZ1D | * | 7,410 | 56 | 16 | 41 |
| *WA1QXR | * | 5,848 | 50 | 15 | 28 |
| *N2LTK/1 | * | 882 | 16 | 8 | 13 |
| *N9LYE/1 | 28 | 880 | 18 | 6 | 14 |
| *W2IQL/1 | 21 | 26,412 | 143 | 19 | 52 |
| *AA1CB | * | 9,520 | 70 | 16 | 40 |
| *WF1L | 14 | 99,008 | 320 | 22 | 90 |
| *KA1GTR | * | 50,100 | 178 | 20 | 80 |
| *K2MN/1 | * | 1,127 | 18 | 8 | 15 |
| *N1XZ | 7 | 19,558 | 96 | 20 | 57 |
| *N1OEG | * | 2,442 | 30 | 12 | 21 |
| *W1MK | 3.7 | 13,664 | 101 | 16 | 45 |
| (Opr. KQ2M) | | | | | |
| N2LT | A | 1,809,370 | 1225 | 123 | 412 |
| N2BA | * | 1,794,180 | 1263 | 117 | 393 |
| AA2GQ | * | 849,816 | 781 | 90 | 317 |
| W2HPF | * | 762,615 | 726 | 101 | 304 |
| WA2VYA | * | 729,068 | 755 | 84 | 278 |
| WA2ASM | * | 564,318 | 666 | 76 | 245 |
| N2MR | * | 465,972 | 558 | 77 | 232 |
| KE2VB | * | 424,620 | 511 | 79 | 236 |
| N1CC/2 | * | 404,829 | 535 | 71 | 208 |
| WB2RAJ | * | 330,867 | 444 | 74 | 217 |
| KC2Q | * | 271,432 | 358 | 78 | 218 |
| KB2POP | * | 254,250 | 394 | 68 | 182 |
| KB2SE | * | 176,364 | 310 | 61 | 152 |
| WB2YQH | * | 170,464 | 300 | 64 | 160 |
| WB2MWW | * | 167,580 | 323 | 50 | 140 |
| K2DM | * | 160,071 | 267 | 66 | 163 |
| K2MP | * | 125,772 | 251 | 52 | 136 |
| AE2T | * | 125,518 | 647 | 56 | 138 |
| WA2ABN | * | 115,000 | 236 | 60 | 140 |
| WR2V | * | 101,898 | 235 | 45 | 117 |
| KE2WY | * | 74,724 | 085 | 47 | 109 |
| WA2UOT | * | 56,631 | 160 | 43 | 43 |
| W2FXA | * | 16,653 | 70 | 35 | 56 |
| N2VPI | * | 10,205 | 64 | 20 | 45 |
| N2LSK | * | 4,230 | 37 | 17 | 28 |
| W2XL | * | 3,330 | 31 | 17 | 28 |
| K2EEK | 28 | 17,520 | 113 | 13 | 47 |
| WA2QHW | 21 | 100,793 | 309 | 20 | 99 |
| W2HG | * | 18,796 | 101 | 20 | 54 |
| K2ZJ | 14 | 379,674 | 944 | 33 | 125 |
| (Opr. WA2LCC) | | | | | |
| K2MGA | * | 168,511 | 465 | 27 | 106 |
| WA2TVS | * | 10,980 | 69 | 16 | 44 |
| K2Z1 | 7 | 33,320 | 149 | 20 | 65 |

| | | | | | |
|-------------|-----|-----------|------|-----|-----|
| AA2LC | * | 28,056 | 125 | 21 | 63 |
| K1ZM/2 | 1.8 | 13,970 | 117 | 15 | 40 |
| W2VO | * | 5,160 | 60 | 14 | 29 |
| W2FCR | * | 3,159 | 38 | 12 | 27 |
| *K2SG | A | 921,714 | 835 | 107 | 340 |
| *KD2NT | * | 523,450 | 603 | 91 | 270 |
| *K2AZ | * | 383,152 | 492 | 74 | 234 |
| *WB2WPM | * | 186,222 | 301 | 73 | 173 |
| *K3FNW/2 | * | 181,280 | 330 | 54 | 152 |
| *N2PEB | * | 163,185 | 310 | 62 | 153 |
| *AA7QZ/2 | * | 109,470 | 236 | 55 | 150 |
| *NA2A | * | 81,829 | 193 | 49 | 124 |
| *W2KHQ | * | 76,309 | 202 | 33 | 104 |
| *K2BCW | * | 72,000 | 230 | 39 | 105 |
| *K2JF | * | 69,630 | 173 | 52 | 113 |
| *KA2CQJ | * | 68,208 | 176 | 55 | 119 |
| *NA2Q | * | 35,451 | 132 | 28 | 73 |
| *W2OMV | * | 27,132 | 115 | 30 | 72 |
| *N2NYR | * | 17,177 | 82 | 28 | 61 |
| *AA2TB | * | 15,130 | 94 | 29 | 60 |
| *KB2DQE | * | 13,044 | 134 | 40 | 84 |
| *W2ORA | * | 12,367 | 64 | 29 | 54 |
| *WA2RGK | * | 11,529 | 70 | 25 | 36 |
| *AA2NJ | * | 10,437 | 65 | 23 | 48 |
| *K2SWZ | * | 9,246 | 61 | 25 | 44 |
| *N2LDO | * | 8,556 | 62 | 23 | 39 |
| *KD2LJ | * | 8,040 | 53 | 21 | 39 |
| *K2RO | * | 7,535 | 47 | 19 | 36 |
| *AA2UA | * | 6,477 | 54 | 15 | 36 |
| *KB2QVJ | * | 5,763 | 47 | 19 | 32 |
| *W2LRD | * | 4,230 | 55 | 17 | 28 |
| *WB2JFP | * | 943 | 18 | 10 | 13 |
| *WB2DVU | * | 40 | 4 | 2 | 2 |
| *N2QWR | 28 | 8,651 | 81 | 12 | 29 |
| *N2DEM | * | 7,064 | 65 | 11 | 33 |
| *N2LDU | * | 6,880 | 67 | 11 | 32 |
| *W2KZE | * | 4,109 | 52 | 11 | 28 |
| *N2OO | * | 2,870 | 33 | 9 | 26 |
| *N2PAE | * | 2,627 | 37 | 12 | 25 |
| *N2YCD | * | 578 | 15 | 5 | 12 |
| *KE2WE | 21 | 46,269 | 182 | 20 | 77 |
| *K2MFY | * | 33,672 | 140 | 19 | 73 |
| *K2QMF | 14 | 129,066 | 360 | 29 | 118 |
| *WB2ABD | * | 13,312 | 78 | 17 | 47 |
| *KA2RGI | * | 9,460 | 67 | 16 | 39 |
| *KB2RAS | * | 5,458 | 55 | 13 | 28 |
| *W2FGY | 7 | 3,478 | 41 | 10 | 27 |
| *WA2ASQ | 3.7 | 5,040 | 55 | 12 | 28 |
| (Opr. KQ2M) | | | | | |
| K3ZO | A | 2,397,434 | 1617 | 122 | 411 |
| W3BGN | * | 1,569,355 | 1159 | 119 | 380 |
| K3MD | * | 682,941 | 707 | 88 | 269 |
| KB3TS | * | 573,447 | 644 | 73 | 256 |
| K4JLD/3 | * | 425,292 | 488 | 86 | 246 |
| NY3Y | * | 402,480 | 490 | 71 | 241 |
| K3IXD | * | 295,098 | 418 | 70 | 204 |
| K3TEJ | * | 269,340 | 380 | 66 | 202 |
| AD3Z | * | 224,064 | 292 | 75 | 213 |
| N3KR | * | 71,284 | 195 | 42 | 100 |
| KB3AGZ | * | 61,132 | 197 | 32 | 92 |
| N3QVD | * | 39,406 | 139 | 41 | 81 |
| NA3K | * | 36,733 | 135 | 28 | 81 |
| W3EVW | * | 28,696 | 225 | 47 | 120 |
| N3GBP | * | 18,444 | 81 | 27 | 60 |
| K3ATO | * | 16,767 | 69 | 30 | 51 |
| KE3FG | * | 14,450 | 76 | 33 | 52 |
| KM3D | * | 8,084 | 65 | 13 | 30 |
| N3MTU | * | 4,316 | 43 | 18 | 34 |
| K3NL | * | 2,405 | 27 | 16 | 21 |
| N3HBX | 14 | 232,842 | 559 | 28 | 123 |
| WA3DMH | * | 29,440 | 170 | 21 | 59 |
| N3I | * | 23,162 | 115 | 16 | 42 |
| W3FQE | * | 544 | 14 | 5 | 11 |
| W3GH | 7 | 147,015 | 420 | 28 | 107 |
| W3KHQ | * | 18,696 | 93 | 20 | 56 |
| N3EC | * | 9,462 | 61 | 13 | 44 |
| WE3C | 3.7 | 122,087 | 489 | 24 | 83 |
| KC3RN | * | 10,290 | 80 | 14 | 42 |
| *KQ3V | A | 459,680 | 533 | 87 | 251 |
| *WT3W | * | 318,378 | 478 | 77 | 205 |
| *K3KFD | * | 243,851 | 375 | 62 | 179 |
| *NY3C | * | 214,368 | 366 | 64 | 160 |
| *W7FKF/3 | * | 174,870 | 321 | 53 | 148 |
| *N3RW | * | 139,956 | 259 | 61 | 153 |
| *N3BDA | * | 119,040 | 252 | 60 | 132 |
| *KE3GE | * | 61,776 | 170 | 44 | 100 |
| *K3OX | * | 30,576 | 109 | 39 | 73 |
| *AA3FY | * | 25,938 | 101 | 28 | 71 |
| *KA3AVB | * | 14,798 | 78 | 30 | 68 |
| *N3EMA | * | 14,442 | 70 | 29 | 58 |
| *WJ3N | * | 9,360 | 55 | 21 | 39 |
| *W3TWI | * | 7,546 | 50 | 16 | 33 |
| *WA3YTI | * | 777 | 15 | 9 | 12 |
| *KC3PZ | 28 | 38,718 | 180 | 18 | 63 |
| *N5OKR/3 | * | 22,814 | 161 | 13 | 48 |
| *WB2BZ/3 | * | 20,069 | 139 | 16 | 46 |
| *AD3J/3 | 7 | 8,976 | 70 | 14 | 21 |
| *WW3S | * | 7,742 | 66 | 14 | 35 |
| *NV3V | * | 4,633 | 47 | 13 | 28 |
| *W3CPB | * | 1,586 | 25 | 10 | 16 |
| (Opr. KM9P) | | | | | |
| N4RJ | A | 2,671,885 | 1705 | 129 | 436 |
| N6AR/4 | * | 2,016,000 | 1300 | 134 | 442 |
| WZ4F | * | 1,295,448 | 1061 | 112 | 350 |

| | | | | | |
|-------------|-----|-----------|-----|-----|-----|
| AA4S | * | 1,077,668 | 942 | 101 | 318 |
| AB4RU | * | 1,068,616 | 954 | 111 | 335 |
| N4UH | * | 755,550 | 742 | 84 | 281 |
| K4LTA | * | 600,704 | 636 | 88 | 273 |
| W3VT/4 | * | 573,312 | 557 | 100 | 284 |
| W4WTO | * | 525,838 | 606 | 82 | 244 |
| WB4MAI | * | 436,971 | 477 | 97 | 242 |
| KE3KL/4 | * | 405,372 | 480 | 80 | 252 |
| N4XM | * | 374,842 | 429 | 93 | 245 |
| K7SV/4 | * | 188,190 | 270 | 76 | 194 |
| W4ETO | * | 180,605 | 321 | 69 | 136 |
| KD4HYT | * | 160,500 | 296 | 58 | 156 |
| WB8BMV/4 | * | 140,298 | 270 | 56 | 145 |
| KC4DWT | * | 118,080 | 264 | 43 | 121 |
| WB4VKW | * | 95,940 | 204 | 50 | 130 |
| W1ENZ/4 | * | 95,400 | 220 | 46 | 113 |
| *NA2Q | * | 93,019 | 210 | 51 | 116 |
| *W2OMV | * | 92,939 | 229 | 59 | 128 |
| AC4ZD | * | 79,061 | 190 | 58 | 115 |
| WF2G/4 | * | 58,830 | 157 | 47 | 68 |
| WB4UBD | * | 52,644 | 150 | 38 | 85 |
| N4MM | * | 39,861 | 142 | 32 | 71 |
| AC4PQ | * | 29,904 | 113 | 40 | 72 |
| AA4WX | * | 22,750 | 100 | 27 | 64 |
| KR4KL | * | 9,300 | 69 | 24 | 38 |
| KR4XM | * | 5,355 | 40 | 15 | 36 |
| WB4RDV | * | 2,706 | 30 | 20 | 21 |
| W4DGG | * | 2,365 | 53 | 25 | 33 |
| KC2X/4 | 28 | 83,167 | 336 | 23 | 86 |
| N4BP | * | 66,833 | 313 | 21 | 77 |
| W4YV | * | 60,120 | 275 | 21 | 69 |
| KC4YM | * | 21,808 | 151 | 14 | 44 |
| K4JPD | 21 | 368,596 | 809 | 29 | 143 |
| (Opr. AE6E) | | | | | |
| N4CT | * | 211,133 | 532 | 28 | 121 |
| KR4DL | * | 84,196 | 251 | 26 | 99 |
| WA4QMD | * | 45,920 | 206 | 27 | 82 |
| K4PIC | * | 37,976 | 151 | 22 | 72 |
| N4KW | 14 | 194,256 | 516 | 28 | 114 |
| K0RINZ/4 | * | 162,112 | 432 | 28 | 108 |
| K4RZ | * | 114,554 | 321 | 26 | 101 |
| AC4HB | 7 | 89,789 | 268 | 28 | 99 |
| K4VUD | * | 28,400 | 167 | 22 | 58 |
| KE4BM | * | 25,760 | 124 | 20 | 60 |
| W4PZV | 3.7 | 75,319</ | | | |

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- Remodulator for RTTY with optimum DSP detector and filter
- New improved Voice Noise Reduction software
- Variable Noise Reduction from the front panel
- SSTV and WEFAX Filters

Timewave has sold more DSP units through its worldwide distribution network than any other manufacturer in amateur radio. And we listen to the satisfied customers who own Timewave's proven products. Their suggestions and ideas to our customer service and support help us keep Timewave ahead in its quest for the best in DSP!

Call Timewave for information on \$10 updates for older DSP-9+ and DSP-59+ Noise Filters.



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St. Paul, MN 55120 USA
Phone: 612-452-5939 Fax: 612-452-4571

VERSION 3

Noise Killers+

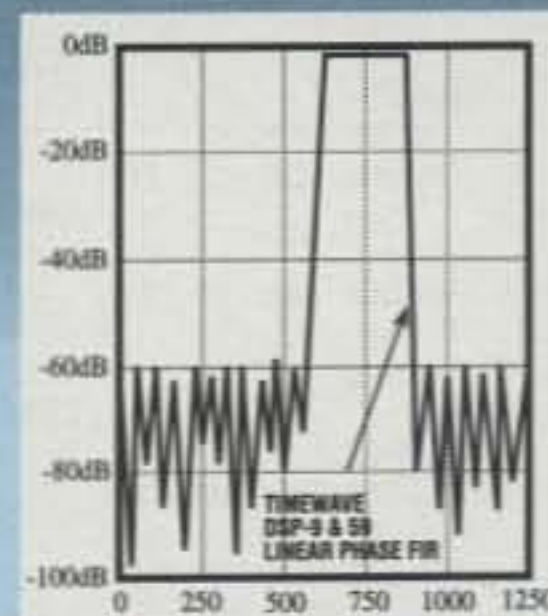
Advanced DSP Noise Filters For Voice, CW, and Data Modes

The TW DSP-9+ and DSP-59+ improve reception by simultaneously reducing random noise up to 20dB and heterodynes up to 50dB. TW DSP filters feature third generation 16 bit processing, providing razor sharp audio for SSB, CW and Data modes. Both have AGC for wider dynamic range and signal boosting/peaking, relay bypass and self test modes. A station requirement for weak signal, noisy band operation during the *LOW SUN SPOT CYCLE!*



NEW! DSP-59+ Multi-Mode Filter *New Reduced Price!*

Now hundreds of CW and Bandpass filters allow the operator to select almost any filter combination. The easy turning filter knobs allow continuous coverage. Includes all data filters in the DSP-9+ plus G-TOR[®], SSTV, EME and WEFAX. Voice filters cover 200Hz to 3.4kHz. 13 CW center frequencies, CW bandwidths from 25Hz to 600Hz and a CW marker to spot the center of narrow filters.



DSP-59+ & DSP-9+ give steep-skirt filtering!

NEW! DSP-9+ Multi-Mode Filter *New Reduced Price!*

Push button selectable bandpass and automatic notch filters. SSB filters 1.6, 2.0, 2.4kHz, CW 100, 200 and 500 Hz. Programmable CW center frequencies 400/500/600/800Hz. HF data filters, HF Packet, PACTOR, G-TOR[®], AMTOR, AM and RTTY with programmable center frequencies for North America and Europe.

G-TOR[®] is the registered Trademark of Kantronics.



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| | | | | | |
|----------|-----|---------|-----|----|-----|
| K9LA | 28 | 25,288 | 171 | 13 | 45 |
| KG9N | * | 6,384 | 68 | 11 | 27 |
| KD9ST | 21 | 78,624 | 264 | 22 | 90 |
| K9BG | * | 44,911 | 170 | 75 | 97 |
| K9UQN | * | 216 | 8 | 5 | 7 |
| KS9W | 14 | 168,428 | 396 | 32 | 126 |
| K9CAN | * | 140,898 | 364 | 33 | 105 |
| W9OF | * | 121,200 | 291 | 31 | 119 |
| W9H | * | 67,860 | 211 | 30 | 87 |
| K9RN | 7 | 145,676 | 335 | 36 | 122 |
| WA9TPQ | * | 15,960 | 90 | 21 | 49 |
| K9HMB | 3.7 | 34,265 | 151 | 23 | 66 |
| KK9V | * | 29,400 | 179 | 18 | 57 |
| KR9G | * | 8,949 | 65 | 18 | 39 |
| *N9AU | A | 209,271 | 342 | 73 | 164 |
| *K9MS | * | 35,516 | 188 | 20 | 48 |
| *K9JC | * | 27,861 | 110 | 38 | 73 |
| *K9SCH | * | 23,370 | 100 | 29 | 66 |
| *WA9CCQ | * | 21,230 | 144 | 35 | 75 |
| *K9GWW | * | 11,200 | 68 | 34 | 36 |
| *N9ENA | * | 6,656 | 52 | 19 | 53 |
| *N9IMD/9 | 28 | 3,052 | 45 | 9 | 19 |
| *N9QZM | * | 2,440 | 46 | 7 | 13 |
| *W9NWY | * | 1,102 | 23 | 5 | 14 |
| *N9THK | * | 448 | 12 | 6 | 8 |
| *N3LVD/9 | * | 280 | 11 | 4 | 6 |
| *K09Y | 21 | 100,894 | 305 | 24 | 98 |
| *W9J00 | 14 | 37,037 | 151 | 24 | 67 |
| *W9CH | 7 | 30,702 | 139 | 21 | 65 |
| *A9JK | 3.7 | 364 | 12 | 5 | 9 |

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|---------|-----|-----------|------|-----|-----|
| N2IC/B | A | 1,916,640 | 1450 | 134 | 350 |
| WX3N/B | A | 1,372,332 | 1095 | 129 | 365 |
| K8KX | * | 723,792 | 675 | 113 | 295 |
| K8TPF | * | 309,969 | 422 | 85 | 194 |
| WB8ISW | * | 276,149 | 402 | 80 | 191 |
| N8ZA | * | 222,640 | 373 | 72 | 158 |
| K8IFL | * | 200,880 | 348 | 61 | 155 |
| K8GAS | * | 160,590 | 307 | 65 | 137 |
| W3GRW/B | * | 118,664 | 270 | 52 | 111 |
| W8RSR | * | 117,808 | 222 | 59 | 140 |
| KE8RO | * | 94,518 | 209 | 60 | 117 |
| WA8CLR | * | 90,459 | 220 | 55 | 116 |
| NS8B | * | 68,623 | 170 | 51 | 112 |
| WA8DCB | * | 53,750 | 164 | 39 | 86 |
| W8YA | * | 51,186 | 176 | 35 | 79 |
| K8BJ | * | 48,068 | 151 | 38 | 84 |
| WW8Q | * | 31,790 | 121 | 37 | 73 |
| K8TLM | * | 28,987 | 109 | 38 | 63 |
| W8ML | * | 21,760 | 100 | 27 | 53 |
| W8PPF | * | 21,560 | 109 | 25 | 52 |
| W8RXL | * | 6,664 | 55 | 21 | 35 |
| W8ACT | 14 | 20,336 | 130 | 16 | 46 |
| KV8Q | 7 | 142,177 | 387 | 34 | 99 |
| K8GT | * | 41,302 | 145 | 29 | 78 |
| KJ1N/B | * | 3,220 | 39 | 14 | 21 |
| KM8J | 3.7 | 29,592 | 194 | 20 | 52 |

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|---------|-----|---------|-----|----|-----|
| WB8O | * | 8,556 | 87 | 12 | 34 |
| K8CS | 1.8 | 2,820 | 48 | 9 | 21 |
| KY8A | * | 2,624 | 46 | 10 | 22 |
| *AC8W | A | 235,248 | 398 | 64 | 168 |
| *AA8SQ | * | 87,856 | 227 | 51 | 101 |
| *K8COY | * | 56,704 | 173 | 39 | 89 |
| *K8GSV | * | 49,896 | 146 | 43 | 89 |
| *N8JHX | * | 48,321 | 156 | 47 | 70 |
| *WB8IEL | * | 45,457 | 133 | 41 | 90 |
| *KA8CKN | * | 8,088 | 59 | 22 | 34 |
| *KF8XV | * | 3,888 | 40 | 24 | 30 |
| *WB8GFV | 28 | 8,241 | 73 | 12 | 29 |
| *N8YYO | * | 7,421 | 67 | 12 | 29 |
| *NW7Q/B | 21 | 48,960 | 183 | 22 | 80 |
| *N8OY | 1.8 | 902 | 21 | 8 | 14 |

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|---------------|-----|--------|-----|----|----|
| ALASKA | | | | | |
| KL7IDA | 14 | 34,290 | 322 | 14 | 31 |
| WL7MA | 7 | 39,280 | 425 | 16 | 24 |
| AL7MX | 1.8 | 1,080 | 53 | 5 | 5 |
| *KL7 | * | | | | |
| *N7DF | 14 | 65,065 | 508 | 23 | 32 |
| *NL7DU | * | 3,400 | 79 | 9 | 8 |
| *KL7FAP | * | 209 | 7 | 5 | 6 |

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|-----------------|-----|-----------|------|----|-----|
| ANGUILLA | | | | | |
| VP2EC | 3.7 | 478,674 | 1766 | 23 | 103 |
| *VP2EJ | A | 3,358,929 | 3295 | 87 | 326 |

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|------------------------------|----|-----------|------|----|-----|
| ANTIGUA & BARBUDA | | | | | |
| V26AS | 14 | 1,589,650 | 3685 | 36 | 145 |

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|----------------|---|-----------|------|----|-----|
| BAHAMAS | | | | | |
| C6AFT | A | 1,647,135 | 2332 | 83 | 232 |
| *C6AFV | 7 | 44,660 | 489 | 11 | 34 |

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|-----------------|---|--------|-----|----|----|
| BARBADOS | | | | | |
| *8P6CV | A | 34,675 | 217 | 27 | 46 |

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|---------------|---|-----------|------|----|-----|
| BELIZE | | | | | |
| *V31JU | A | 1,453,576 | 2598 | 75 | 187 |

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|----------------|---|--------|-----|----|----|
| BERMUDA | | | | | |
| *VP9MZ | A | 29,088 | 133 | 33 | 68 |

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|-------------------------------|----|-----------|------|----|-----|
| BRITISH VIRGIN ISLANDS | | | | | |
| VP2VF | 28 | 409,360 | 2021 | 24 | 95 |
| *WA2VUY | | | | | |
| NP2V | A | 1,209,699 | 2172 | 68 | 189 |

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|---------------|----|-----------|------|----|-----|
| CANADA | | | | | |
| VO1MP | A | 867,900 | 1037 | 72 | 258 |
| VO1LT | * | 3,900 | 75 | 11 | 14 |
| VE1RAA | 28 | 28,672 | 174 | 15 | 49 |
| VE9ST | 14 | 688,688 | 1815 | 31 | 123 |
| VE1UK | * | 326,520 | 1153 | 23 | 97 |
| *X09SF | A | 184,982 | 501 | 37 | 109 |
| *VE9FF | * | 7,440 | 79 | 17 | 31 |
| VE2TJA | A | 1,392,960 | 1918 | 91 | 229 |

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|----------|----|---------|------|----|-----|
| VE2AYU | * | 521,360 | 784 | 74 | 206 |
| WJ2Q/VE2 | * | 436,371 | 1265 | 50 | 117 |
| VE2BXA | * | 20,580 | 127 | 31 | 53 |
| VG2DR | 7 | 189,678 | 872 | 22 | 79 |
| *VG2AWR | A | 68,072 | 221 | 40 | 94 |
| *VE2BOB | * | 45,313 | 199 | 38 | 75 |
| *VE2JDR | 14 | 10,600 | 82 | 14 | 39 |
| VX3N | A | 741,660 | 1223 | 83 | 199 |
| VE3PN | * | 148,944 | 413 | 56 | 118 |
| VE3ST | * | 105,616 | 244 | 42 | 119 |
| VE3RM | 14 | 389,991 | 1074 | 31 | 116 |
| VA3MM | * | 283,551 | 784 | 30 | 111 |
| VE30TL | * | 136,532 | 505 | 27 | 89 |

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|---------|----|---------|------|----|-----|
| *VA3TA | A | 194,038 | 376 | 61 | 160 |
| *VE3PRF | * | 40,000 | 159 | 29 | 71 |
| *VE3DSN | * | 22,278 | 111 | 37 | 57 |
| *VE3WUJ | * | 6,300 | 59 | 19 | 31 |
| *VE3HX | 28 | 7,760 | 79 | 10 | 30 |
| *VA3WTO | 14 | 100,366 | 397 | 23 | 84 |
| *VE3KUK | * | 88,692 | 300 | 26 | 88 |
| *VE3IGS | * | 18,326 | 106 | 21 | 56 |
| VE4RP | 14 | 25,365 | 175 | 23 | 34 |
| VE5CB | A | 138,598 | 518 | 46 | 85 |
| *VE5AED | A | 6,031 | 88 | 18 | 19 |
| VE6JY | A | 237,215 | 410 | 76 | 151 |
| VE6BMX | * | 101,310 | 454 | 47 | 63 |
| *VE6JAV | A | 135,880 | 344 | 65 | 107 |
| *VE6KRR | * | 7,791 | 92 | 26 | 23 |
| VE7IN | A | 674,289 | 1303 | 89 | 142 |
| VE7KD | * | 445,140 | 1207 | 66 | 114 |
| VE7BXG | * | 111,500 | 435 | 47 | 78 |
| VE7XD | * | 94,500 | 350 | 44 | 82 |
| VE7VR | * | 83,200 | 274 | 54 | 74 |
| VE7QO | * | 79,386 | 216 | 43 | 88 |
| VG7NTT | 14 | 677,856 | 2322 | 33 | 105 |
| VD7C | * | 538,272 | 1928 | 32 | 94 |

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|---------|-----|---------|------|----|----|
| VE7SZ | 3.7 | 150,088 | 1084 | 23 | 50 |
| VG7CC | * | 109,572 | 827 | 21 | 48 |
| *VG7CFD | A | 129,600 | 663 | 42 | 54 |
| XN9JA | A | 45,586 | 526 | 22 | 24 |
| VE8KM | 14 | 43,263 | 288 | 24 | 45 |

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|-------------------|----|-----------|------|----|-----|
| COSTA RICA | | | | | |
| TI7DBS | 21 | 137,280 | 546 | 26 | 78 |
| TI1C | 7 | 1,108,140 | 2882 | 31 | 134 |

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|-------------|-----|--------|-----|----|----|
| CUBA | | | | | |
| *CM3ZD | 3.7 | 91,212 | 672 | 16 | 50 |

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|-----------------|---|-----------|------|----|-----|
| DOMINICA | | | | | |
| J73WA | A | 1,522,434 | 2367 | 66 | 201 |

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|-------------------|----|---------|-----|----|----|
| DOMINICANA | | | | | |
| *HI8ROX | 21 | 106,881 | 717 | 19 | 50 |
| *HI8A | * | 82,151 | 277 | 25 | 88 |

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|--------------------------|-----|---------|-----|----|----|
| FRENCH ST. MARTIN | | | | | |
| FS/KH8AL | 3.7 | 200,788 | 935 | 19 | 82 |
| *FS/DJ2BW | 14 | 1,040 | 16 | 13 | 13 |

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|--------------|-----|---|---------|------|----|----|
| HAITI | | | | | | |
| *N2UUX | /H2 | A | 182,410 | 1045 | 36 | 49 |

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|-----------------|---|---------|-----|----|-----|
| HONDURAS | | | | | |
| *HR1ERL | A | 535,424 | 650 | 61 | 117 |

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|-------------------|---|-----------|------|-----|-----|
| MARTINIQUE | | | | | |
| FM5CO | A | 1,769,520 | 2559 | 67 | 225 |
| *FM5DN | A | 3,404,064 | 2847 | 107 | 365 |

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|---------------|----|-----------|------|----|-----|
| MEXICO | | | | | |
| 6E2Z | A | 1,140,269 | 2145 | 83 | 156 |
| XE1MD | * | 126,948 | 243 | 70 | 143 |
| *XE1L | A | 1,228,440 | 2108 | 84 | 196 |
| *XE1AAGR | * | 692,400 | 1358 | 76 | 164 |
| *XE2AC | 28 | 48,369 | 295 | 19 | 50 |
| *XE3RKK | 14 | 441,378 | 1817 | 25 | 88 |

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|---------|---|--------|-----|----|----|
| *XE1BEF | * | 26,650 | 245 | 19 | 38 |
| *XE3LMV | * | 7,752 | 159 | 11 | 13 |

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|------------------|---|-----------|------|----|-----|
| MONTERRAT | | | | | |
| *VP2MBA | A | 1,128,582 | 1777 | 71 | 202 |

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|---------------|----|---------|-----|----|----|
| PANAMA | | | | | |
| *HP3 | A | 164,448 | 533 | 51 | 93 |
| *K66UH | * | | | | |
| *HP1BTV | * | 4,186 | 115 | 16 | 20 |
| *HP18YS | 14 | 81,792 | 320 | 24 | 72 |

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|--------------------|---|-----------|------|-----|-----|
| PUERTO RICO | | | | | |
| KP4CZ | A | 24,115 | 211 | 21 | 32 |
| *NP4Z | A | 4,907,448 | 4240 | 109 | 395 |
| *KP4RV | * | 25,200 | 300 | 25 | 47 |

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|------------------------------|----|---------|------|----|-----|
| ST. KITTS & NEVIS | | | | | |
| V44NK | A | 271,663 | 1799 | 69 | 148 |
| V47NS | 14 | 906,066 | 2392 | 30 | 123 |

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|------------------|----|--------|----|----|----|
| ST. LUCIA | | | | | |
| J68AK | 21 | 12,296 | 90 | 17 | 36 |

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|--------------------|----|---------|------|----|-----|
| ST. MAARTEN | | | | | |
| PJ8AD | 21 | 409,372 | 1504 | 23 | 83 |
| *PJ8CW | A | 265,350 | 866 | 45 | 100 |

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|----------------------------|----|-----------|------|----|-----|
| U.S. VIRGIN ISLANDS | | | | | |
| KP2A | 14 | 2,255,250 | 4810 | 38 | 156 |

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|----------------------|--------|-----|---------|------|----|-----|
| AFRICA | | | | | | |
| AFRICAN ITALY | | | | | | |
| IG9 | /V3TAN | 3.7 | 320,235 | 1150 | 20 | 91 |
| *IG9 | /K6Z0 | A | 160,545 | 344 | 39 | 126 |

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|---------------|---|-----------|------|-----|-----|
| ANGOLA | | | | | |
| *D3X | A | 3,708,666 | 2679 | 120 | 366 |

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|----------------------|----|-----------|------|----|-----|
| ASCENSION IS. | | | | | |
| ZD8Z | 21 | 3,481,925 | 5535 | 36 | 179 |

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|-----------------|---|---------|------|----|----|
| BOTSWANA | | | | | |
| A22MN | 7 | 402,722 | 1172 | 34 | 88 |

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|-----------------------|-----|------------|------|-----|-----|
| CANARY ISLANDS | | | | | |
| EA8AH | A | 11,400,712 | 6048 | 141 | 484 |
| EA8AFJ | 14 | 987,714 | 2102 | 33 | 129 |
| EA8AM | * | 940,644 | 2042 | 31 | 128 |
| EA8BWW | * | 910,910 | 1988 | 33 | 121 |
| EA8ZS | 1.8 | 9,840 | 80 | 8 | 33 |
| *EA8BXQ | A | 209,898 | 424 | 41 | 128 |
| *EA8AHB | * | 54,252 | 153 | 27 | 105 |
| *EC8AAZ | * | 12,338 | 72 | 18 | 44 |
| *EA8AJ0 | * | 5,699 | 48 | 11 | 30 |
| *EA8AKN | 28 | 557,091 | 1342 | 29 | 112 |
| *EA8IN | * | 489,818 | 1407 | 26 | 92 |
| *EA8BGY | * | 409,323 | 989 | 31 | 110 |
| *EA8CAL | 21 | 464,942 | 1282 | 28 | 94 |

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|----------------------------|---|---------|-----|----|-----|
| CEUTA & MELILLA | | | | | |
| *EA9AR | A | 326,770 | 551 | 47 | 158 |

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|----------------|----|-------|----|---|----|
| COMOROS | | | | | |
| *D68TA | 28 | 4,296 | 66 | 7 | 17 |

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|-----------------|---|-----------|--|--|--|
| DJIBOUTI | | | | | |
| *J28BS | A | 364,514</ | | | |

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|---------|----|--------|-----|----|----|
| *JR3CVJ | * | 828 | 14 | 10 | 13 |
| *JR3KAH | * | 756 | 18 | 9 | 12 |
| *JN3ILI | * | 714 | 14 | 8 | 13 |
| *JH3FTZ | 14 | 20,618 | 140 | 24 | 37 |
| *JA3AYX | * | 15,753 | 110 | 24 | 35 |
| *JE3KGT | * | 1,100 | 18 | 10 | 15 |
| *JF3NLQ | 7 | 10,092 | 73 | 20 | 38 |
| *JA3BCT | * | 1,122 | 23 | 11 | 11 |

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|----------------|-----------|------------------|-------------|------------|------------|
| JH4UHW | A | 1,880,307 | 1562 | 134 | 295 |
| JA4ESR | * | 157,785 | 339 | 72 | 129 |
| JA4DHN | * | 15,957 | 71 | 37 | 44 |
| JH4UYB | 28 | 143,100 | 491 | 27 | 79 |
| JA4JJI | 21 | 476 | 12 | 7 | 7 |
| JG4AKL | 14 | 249,128 | 998 | 39 | 110 |
| JK4CZO | * | 990 | 26 | 6 | 12 |
| *JA4XRN | A | 220,864 | 350 | 79 | 159 |
| *JL4CMT | * | 114,304 | 300 | 53 | 99 |
| *JA1XCZ/4 | * | 54,384 | 165 | 48 | 84 |
| *JA4CZM | * | 50,874 | 140 | 59 | 80 |
| *JH4LPY | * | 24,104 | 137 | 37 | 55 |
| *JA4HIX | * | 18,330 | 88 | 40 | 54 |
| *JA4BAA | * | 17,513 | 103 | 35 | 48 |
| *JA4AQR | * | 4,141 | 39 | 16 | 25 |
| *JA4ETH | 28 | 7,800 | 76 | 15 | 25 |
| *JK4DBT | 21 | 35,112 | 146 | 28 | 60 |
| *JH4JNG | 14 | 58,504 | 217 | 31 | 72 |
| *JR4CAU | * | 34,400 | 166 | 30 | 56 |
| *JR4GPA | * | 32,339 | 186 | 26 | 47 |

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|---------------|-----------|----------------|-------------|-----------|------------|
| JA5IP | A | 130,935 | 254 | 84 | 131 |
| JA5CKD | 21 | 91,960 | 321 | 32 | 78 |
| JA5APU | * | 48,505 | 239 | 27 | 62 |
| JA5EXW | 14 | 739,428 | 1529 | 39 | 133 |
| JA5AF | * | 1,034 | 20 | 9 | 13 |
| JR5PWW | 7 | 7,840 | 68 | 23 | 33 |
| *JA5PEE | 28 | 5,184 | 55 | 14 | 22 |
| *JF5FGY | 14 | 4,800 | 38 | 19 | 29 |

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|----------------|-----------|----------------|------------|-----------|------------|
| JS6GIM | A | 252,705 | 375 | 79 | 176 |
| JH6AUS | * | 226,137 | 654 | 33 | 96 |
| JA6GCE | * | 191,374 | 349 | 81 | 125 |
| JA6WW | * | 168,064 | 308 | 74 | 134 |
| JA6YDH | * | 47,088 | 172 | 41 | 67 |
| JO6RLB | * | 36,924 | 149 | 38 | 64 |
| JF6QJX | 28 | 39,228 | 182 | 25 | 59 |
| *JA6SRB | A | 104,082 | 242 | 55 | 111 |
| *JA6QDU | * | 39,840 | 129 | 41 | 79 |
| *JF6WTY | * | 20,064 | 91 | 32 | 56 |
| *JA6BWH | * | 12,920 | 72 | 29 | 39 |
| *JL6ATQ | * | 10,944 | 84 | 19 | 38 |
| *JR7HOD/6 | * | 450 | 11 | 9 | 9 |
| *JH6SQI | 28 | 57,150 | 240 | 25 | 65 |
| *JA6WFM | * | 55,692 | 223 | 24 | 67 |
| *JH6FHJ | 21 | 36,348 | 181 | 20 | 58 |
| *7K3FZU/6 | * | 17,424 | 121 | 23 | 43 |
| *JK6ISK | * | 11,232 | 82 | 19 | 33 |
| *JM6EBU | * | 8,688 | 76 | 16 | 32 |
| *JH6EJG | 7 | 37,350 | 160 | 29 | 61 |
| *JJ6DGP | * | 6,370 | 52 | 22 | 27 |
| *JE6GIQ | * | 702 | 21 | 12 | 14 |

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|----------------|-----------|----------------|------------|-----------|------------|
| JA7BEW | A | 699,361 | 881 | 98 | 201 |
| JR7UOL | * | 51,393 | 179 | 43 | 68 |
| JA7FKF | * | 30,498 | 119 | 39 | 63 |
| JA7BO | * | 2,204 | 28 | 14 | 15 |
| JH7DNO | 21 | 413,695 | 972 | 36 | 119 |
| JA7FTR | * | 286,230 | 738 | 37 | 108 |
| JA7MSQ | * | 183,962 | 581 | 34 | 84 |
| JH7QXJ | 14 | 150,202 | 505 | 35 | 74 |
| JH7AFR | 7 | 82,012 | 299 | 32 | 69 |
| *JA7UAP | A | 73,353 | 197 | 57 | 90 |
| *JH7BMZ | * | 34,505 | 121 | 38 | 65 |
| *JG7AMD | * | 24,384 | 103 | 40 | 56 |
| *JH7CJM | * | 13,284 | 60 | 29 | 53 |
| *JH7FUJ | * | 12,972 | 80 | 28 | 41 |
| *JA7OWD | 28 | 66,155 | 248 | 29 | 72 |
| *JA7VEI | * | 7,024 | 61 | 15 | 29 |
| *JE7DOT | * | 5,280 | 53 | 16 | 24 |
| *JA7DOT | 21 | 21,824 | 140 | 21 | 41 |
| *JJ7SRA | * | 4,000 | 49 | 14 | 26 |
| *JA7DPT | 14 | 45,356 | 188 | 32 | 60 |
| *JA7AXP | * | 697 | 15 | 8 | 9 |
| *JA7FFN | 7 | 2,940 | 36 | 17 | 18 |

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|----------------|-----------|----------------|------------|-----------|------------|
| JA8SCD | 21 | 215,194 | 613 | 35 | 98 |
| JH8SLS | 14 | 151,984 | 477 | 34 | 78 |
| *JA8EJO | A | 178,400 | 330 | 94 | 129 |
| *JE8KGH | * | 28,100 | 111 | 37 | 63 |
| *JH8UQJ | 28 | 9,048 | 73 | 19 | 33 |
| *JR8JNT | 21 | 4,403 | 58 | 11 | 26 |

| | | | | | |
|----------------|-----------|----------------|------------|------------|------------|
| JA9JFO | A | 577,016 | 683 | 109 | 223 |
| JA9CCG | * | 105,534 | 281 | 52 | 91 |
| *JA9XBW | A | 226,233 | 375 | 83 | 160 |
| *JR9NVB | * | 196,168 | 359 | 76 | 141 |
| *JE9EMA | * | 156,420 | 321 | 72 | 126 |
| *JE9LLO | * | 34,884 | 127 | 41 | 67 |
| *JA9H0H | * | 25,714 | 111 | 35 | 51 |
| *JA9BLD | * | 16,380 | 79 | 33 | 51 |
| *JA9DDF | * | 14,800 | 69 | 31 | 49 |
| *JH9WSX | * | 11,524 | 74 | 26 | 41 |
| *JE9GWM | * | 7,830 | 57 | 24 | 34 |
| *JH9VSF | 28 | 52,752 | 240 | 24 | 60 |

| | | | | | |
|----------------|-----------|---------------|------------|-----------|-----------|
| *JE9HVF | 21 | 34,727 | 186 | 24 | 53 |
| *JH9VJW | * | 1,560 | 20 | 11 | 19 |
| *JA9KUG | 14 | 12,480 | 100 | 22 | 30 |
| *JA9XAT | * | 192 | 7 | 6 | 6 |

| | | | | | |
|----------------|------------|----------------|-------------|-----------|------------|
| JA0UMV | A | 422,508 | 562 | 90 | 184 |
| JA0DMV | * | 51,569 | 134 | 56 | 83 |
| JA0HYU | * | 40,764 | 129 | 46 | 83 |
| JA0QNJ | 21 | 467,019 | 1145 | 36 | 111 |
| JH0FUW | 7 | 57,816 | 226 | 31 | 68 |
| JA0JHA | 3.7 | 115,584 | 508 | 28 | 56 |
| *JF0SGW | A | 136,416 | 350 | 65 | 103 |
| *JH0HON | * | 73,130 | 194 | 49 | 93 |
| *JH1BXH/0 | 28 | 82,810 | 323 | 25 | 73 |
| *JA0GCI | * | 20,538 | 124 | 22 | 41 |
| *JR0BQT | * | 19,411 | 126 | 19 | 40 |
| *JH0EPI | 21 | 96,192 | 366 | 27 | 69 |
| *JA0BMS/1 | * | 82,269 | 323 | 27 | 72 |
| *JA0QWO | * | 27,740 | 143 | 22 | 51 |
| *JH0IKQ | * | 12,446 | 107 | 16 | 33 |
| *JA0CJJK | * | 4,940 | 54 | 14 | 24 |
| *JH0SGG | * | 3,496 | 32 | 14 | 24 |
| *JH0FWV | 14 | 15,168 | 73 | 26 | 53 |
| *JA0QZ | * | 459 | 13 | 6 | 11 |
| *JH0MXV | 7 | 28,126 | 140 | 28 | 54 |

| | | | | | |
|------------------|----------|----------------|-------------|-----------|--------------|
| KAMPUCHEA | | | | | |
| XU7VK | A | 601,506 | 1131 | 86 | 196 |
| | | | | | (Opr. HA7VK) |

| | | | | | |
|-------------------|------------|------------------|-------------|------------|--------------|
| KAZAKHSTAN | | | | | |
| UN20 | A | 1,819,033 | 1638 | 102 | 331 |
| UN7FBQ | 21 | 1,720 | 46 | 7 | 13 |
| UN9LX | 14 | 59,748 | 280 | 20 | 58 |
| UN2L | 3.7 | 189,699 | 640 | 27 | 84 |
| | | | | | (Opr. UA9BA) |
| *UN7FBH | 7 | 5,148 | 78 | 9 | 17 |
| *UN7EFF | 3.7 | 6,732 | 76 | 8 | 26 |

| | | | | | |
|------------------|---|-------|----|----|----|
| KIRGHIZIA | | | | | |
| *EX2T | 7 | 7,683 | 75 | 12 | 27 |

| | | | | | |
|--------------|-----------|----------------|------------|-----------|-----------|
| KOREA | | | | | |
| HL9FC | 14 | 117,480 | 482 | 32 | 78 |
| *HL5AP | A | 104,719 | 294 | 56 | 101 |
| *HL5YI | * | 12,060 | 71 | 28 | 39 |
| *HL5BXW | 21 | 20,522 | 112 | 18 | 44 |

| | | | | | |
|----------------|----------|----------------|------------|-----------|-----------|
| LEBANON | | | | | |
| OD5PL | A | 150,220 | 442 | 33 | 83 |
| OD5 | | | | | |
| /OH1NOA | 28 | 45,210 | 476 | 9 | 33 |

| | | | | | |
|--------------|----------|------------------|-------------|------------|--------------|
| MACAO | | | | | |
| XX9TZ | A | 4,049,082 | 4356 | 134 | 359 |
| | | | | | (Opr. OH2BH) |

| | | | | | |
|-----------------|---|-------|-----|----|----|
| MONGOLIA | | | | | |
| JT1BR | 7 | 6,912 | 240 | 10 | 14 |

| | | | | | |
|-----------------|---|---------|-----|----|-----|
| PAKISTAN | | | | | |
| *AP2MMN | A | 170,482 | 408 | 55 | 111 |

| | | | | | |
|--------------|----------|------------------|-------------|-----------|---------------|
| QATAR | | | | | |
| A71CW | A | 1,417,232 | 1266 | 93 | 311 |
| | | | | | (Opr. SP5EXA) |

| | | | | | |
|---------------------|------------|----------------|------------|-----------|--------------|
| SAUDI ARABIA | | | | | |
| 7Z500 | A | 53,928 | 240 | 24 | 60 |
| | | | | | (Opr. K3UOC) |
| HZ1AB | 3.7 | 112,012 | 496 | 19 | 63 |
| | | | | | (Opr. N4KT) |

| | | | | | |
|------------------|---|---------|-----|----|-----|
| SINGAPORE | | | | | |
| *9V1YC | A | 253,099 | 705 | 68 | 141 |

| | | | | | | |
|---------------|------------|----------|------------------|-------------|-----------|------------|
| SYRIA | | | | | | |
| VE3UWC | /AU | A | 1,374,312 | 1456 | 78 | 253 |

| | | | | | | |
|---------------|----------|----------------|-------------|-----------|------------|----|
| TAIWAN | | | | | | |
| BV2FI | A | 438,669 | 1387 | 72 | 139 | |
| *BV2CD | /I | 21 | 245,410 | 1343 | 30 | 80 |

| | | | | | |
|-----------------|----------|----------------|------------|-----------|------------|
| THAILAND | | | | | |
| HS0ZBI | A | 377,520 | 719 | 72 | 148 |

| | | | | | |
|----------------------|----------|------------------|-------------|------------|--------------|
| EUROPE | | | | | |
| ALAND ISLANDS | | | | | |
| OH0MM | A | 3,262,042 | 3666 | 118 | 456 |
| | | | | | (Opr. OH2MM) |
| OH0NJ | * | 91,960 | 239 | 49 | 141 |

| | | | | | |
|----------------|----------|----------------|------------|-----------|------------|
| ANDORRA | | | | | |
| C31LD | A | 146,142 | 312 | 58 | 149 |
| C31UA | * | 97,200 | 407 | 41 | 103 |

| | | | | | |
|----------------|------------|----------------|------------|-----------|---------------|
| AUSTRIA | | | | | |
| OE3DSA | 14 | 266,325 | 976 | 34 | 125 |
| OEBKFO | * | 64,600 | 451 | 22 | 78 |
| OE8Q | 3.7 | 90,048 | 931 | 16 | 68 |
| | | | | | (Opr. OE8SKQ) |

| | | | | | |
|----------------|----------|---------------|------------|-----------|------------|
| OE6CLD | * | 65,965 | 714 | 14 | 65 |
| *OE1BKA | A | 58,302 | 245 | 45 | 113 |

| | | | | | |
|-------------------------|-----------|----------------|-------------|-----------|------------|
| BALEARIC ISLANDS | | | | | |
| EAGZY | 28 | 56,034 | 416 | 20 | 79 |
| EAGPY | 21 | 96,509 | 609 | 23 | 96 |
| *EA6ZZ | A | 997,787 | 1491 | 75 | 268 |
| *EA6ZS | * | 28,034 | 179 | 26 | 81 |
| *EA6GP | * | 1,904 | 52 | 9 | 25 |
| *EA6ACX | 28 | 9,604 | 94 | 14 | 35 |
| *EA6WY | 21 | 4,888 | 56 | 12 | 40 |

| | | | | | |
|----------------|-----------|----------------|-------------|-----------|------------|
| BELGIUM | | | | | |
| OS6AA | 14 | 401,187 | 1351 | 36 | 137 |
| *OS6CQ | A | 140,400 | 587 | 39 | 169 |
| *OS9CCQ | * | 106,920 | 439 | 44 | 136 |

| | | | | | |
|----------|-----|---------|------|----|-----|
| DL2YAK | * | 60,840 | 253 | 47 | 109 |
| DL7ZR | * | 52,548 | 145 | 42 | 109 |
| DL8UED | * | 23,552 | 150 | 31 | 153 |
| DL3IV | * | 23,326 | 206 | 22 | 85 |
| DL9XW | * | 14,157 | 118 | 24 | 75 |
| DF6JC | * | 12,240 | 87 | 25 | 60 |
| DL1GGK | * | 10,626 | 77 | 18 | 59 |
| DL3DCY | * | 7,910 | 96 | 19 | 51 |
| DF9FS | * | 7,384 | 81 | 20 | 51 |
| DL7UHD | * | 6,063 | 105 | 22 | 43 |
| DL2ASK | * | 2,794 | 43 | 16 | 33 |
| DK3KD | 28 | 55,328 | 225 | 19 | 93 |
| DL7URH | * | 46,410 | 200 | 23 | 82 |
| DK1QH | 21 | 151,670 | 607 | 31 | 114 |
| DL3BRA | * | 63,240 | 285 | 27 | 93 |
| DJ5LA | 14 | 418,110 | 1415 | 34 | 120 |
| DK8FD | * | 338,832 | 1101 | 40 | 141 |
| DLUA2FM | * | 222,144 | 856 | 35 | 121 |
| DL80BQ | * | 199,169 | 774 | 33 | 118 |
| DL3KZA | * | 96,276 | 661 | 27 | 86 |
| DL4DXF | * | 21,321 | 102 | 20 | 83 |
| DL8OH | 7 | 226,738 | 966 | 34 | 112 |
| DL928G | * | 117,834 | 940 | 27 | 96 |
| DL8AR | * | 85,644 | 589 | 23 | 94 |
| DL4NAC | 3.7 | 140,184 | 1078 | 22 | 86 |
| DL3LAB | * | 107,304 | 897 | 19 | 83 |
| DK4QT | * | 87,032 | 820 | 15 | 73 |
| DL2DBH | * | 20,274 | 249 | 9 | 53 |
| DL1KZA | * | 12,650 | 189 | 9 | 46 |
| DL | | | | | |
| UA2FJ | 1.8 | 44,870 | 637 | 12 | 58 |
| DJ4PI | * | 21,576 | 383 | 9 | 53 |
| DL7MAE | * | 7,360 | 180 | 5 | 41 |
| DL5ZFG | * | 1,560 | 71 | 3 | 27 |
| DL1MGB | A | 658,050 | 946 | 87 | 323 |
| DL6CIA | * | 386,532 | 604 | 81 | 243 |
| DK7ZH | * | 368,368 | 634 | 69 | 253 |
| DL8HI | * | 337,134 | 804 | 64 | 258 |
| DL8SDC | * | 226,092 | 527 | 64 | 185 |
| DF6QC | * | 201,750 | 648 | 48 | 202 |
| DJ5AV | * | 186,615 | 375 | 85 | 176 |
| DK5DS | * | 169,323 | 464 | 60 | 171 |
| DK7LA | * | 154,462 | 325 | 58 | 180 |
| DL4JYT | * | 153,504 | 489 | 48 | 186 |
| DF2FM | * | 144,834 | 426 | 54 | 185 |
| DL8NBJ | * | 120,558 | 385 | 52 | 161 |
| DL2LSO/p | * | 103,740 | 380 | 47 | 163 |
| DK8TA | * | 69,762 | 400 | 49 | 105 |
| DL1ARK | * | 58,233 | 197 | 48 | 177 |
| DF5BM | * | 57,967 | 190 | 46 | 123 |
| DL8UUG | * | 56,610 | 258 | 43 | 110 |
| DL5PW | * | 55,296 | 198 | 40 | 104 |
| DL4GBA | * | 52,938 | 246 | 36 | 117 |
| DL2RUG | * | 51,339 | 278 | 29 | 128 |
| DL2RXB | * | 45,900 | 194 | 43 | 103 |
| DL3SDN | * | 44,020 | 204 | 35 | 107 |
| DL2HRA | * | 38,860 | 200 | 37 | 108 |
| DL2AMM | * | 37,240 | 215 | 29 | 104 |
| DL6GV | * | 31,222 | 96 | 49 | 85 |
| DL3DRN | * | 31,031 | 143 | 40 | 103 |
| DL1HSR | * | 25,419 | 191 | 25 | 86 |
| DL3ABL | * | 24,380 | 184 | 28 | 87 |
| DL3HWW | * | 21,800 | 156 | 28 | 72 |
| DJ3WE | * | 20,394 | 132 | 27 | 76 |
| DL3YEI | * | 17,200 | 142 | 19 | 81 |
| DL8UAT | * | 13,802 | 76 | 24 | 43 |
| DL3AWJ | * | 10,703 | 72 | 25 | 52 |
| DL2VLA | * | 9,204 | 108 | 15 | 63 |
| DJ6WC | * | 6,324 | 52 | 37 | 25 |
| DL2JRM | * | 4,466 | 50 | 23 | 35 |
| DL8DBA | * | 4,264 | 61 | 15 | 82 |
| DL5AUJ | * | 2,688 | 47 | 10 | 38 |
| DL1HSH | * | 330 | 22 | 5 | 11 |
| DL2AKH | * | 224 | 14 | 4 | 12 |
| DL8SG | 28 | 62,260 | 289 | 24 | 86 |
| DL3HRA | * | 28,391 | 131 | 26 | 63 |
| DJ9ZB | 21 | 74,254 | 285 | 18 | 54 |
| DL2SBY | * | 56,595 | 296 | 25 | 80 |
| DL3ME | * | 9,179 | 62 | 19 | 40 |
| DL7YS | * | 486 | 15 | 5 | 13 |
| DF7YU | 14 | 144,394 | 531 | 33 | 113 |
| DL7UBA | * | 88,960 | 454 | 28 | 100 |
| DL3AG | * | 49,894 | 285 | 26 | 75 |
| DJ4JF | * | 33,909 | 241 | 18 | 71 |
| DL2RTJ | * | 10,712 | 174 | 10 | 42 |
| DL9ZWG | * | 8,109 | 142 | 7 | 44 |
| DL1JCW | * | 774 | 44 | 4 | 14 |
| DK5VO | 7 | 25,174 | 244 | 16 | 66 |
| DJ8BX/p | * | 2,975 | 80 | 6 | 29 |
| DL8AKA | * | 2,220 | 54 | 6 | 31 |
| DH8DK | 3.7 | 1,050 | 55 | 4 | 21 |
| DL2DRM | * | 504 | 29 | 2 | 16 |
| DF9LJ | 1.8 | 12,818 | 210 | 7 | 51 |
| DL5MFL | * | 8,096 | 220 | 5 | 41 |
| DL2JDS | * | 144 | 16 | 2 | 12 |

| | | | | | |
|--------------------|-----|-----------|---------------|-----|-----|
| *SV2YC | * | 43,884 | 191 | 42 | 96 |
| *SV2AEL | 21 | 105,772 | 628 | 27 | 97 |
| *SV1DET | 14 | 93,100 | 716 | 21 | 79 |
| HUNGARY | | | | | |
| HA | | | | | |
| /DL1MAJ | A | 256,453 | 432 | 76 | 241 |
| HA8ZO | * | 85,007 | 242 | 47 | 122 |
| HG1S | 7 | 502,128 | 1801 | 36 | 140 |
| | | | (Opr. HA1TJ) | | |
| *HA8XX | A | 604,116 | 1200 | 86 | 260 |
| *HA8HW | * | 377,440 | 674 | 82 | 255 |
| *HA4GDO | * | 199,888 | 701 | 55 | 153 |
| *HA/DK5KJ | | | | | |
| /M | | 741 | 34 | 6 | 13 |
| *HA8UZ | 28 | 191,400 | 545 | 34 | 140 |
| *HG8QB | * | 45,120 | 292 | 27 | 67 |
| *HG8LVS | * | 36,400 | 305 | 23 | 57 |
| *HA3FT | * | 30,732 | 203 | 25 | 53 |
| *HA3MQ | 21 | 221,238 | 806 | 34 | 119 |
| *HA6NW | * | 49,042 | 211 | 27 | 86 |
| *HA7RC | 14 | 94,095 | 456 | 27 | 96 |
| *HA4FB | * | 69,696 | 507 | 24 | 75 |
| *HA4YV | * | 6,660 | 106 | 13 | 32 |
| *HA4XN | 3.7 | 20,502 | 398 | 7 | 44 |
| *HA8AT | * | 18,032 | 308 | 7 | 49 |
| *HA4XG | * | 13,992 | 253 | 6 | 47 |
| *HA7JGV | * | 1,632 | 72 | 4 | 20 |
| *HA8EK | 1.8 | 36,780 | 594 | 9 | 51 |
| IRELAND | | | | | |
| EI4DW | A | 544,320 | 997 | 70 | 266 |
| ISLE OF MAN | | | | | |
| GD4GWQ | 14 | 20,790 | 259 | 13 | 53 |
| ITALY | | | | | |
| IK2VUE | A | 1,177,470 | 1515 | 102 | 343 |
| IK8CHL | * | 318,304 | 624 | 84 | 259 |
| IK8ROB | * | 256,080 | 738 | 57 | 183 |
| IK4RVA | * | 225,148 | 392 | 74 | 234 |
| IK1L | * | 110,110 | 416 | 55 | 127 |
| IKCSP | * | 105,768 | 234 | 55 | 171 |
| IK3OGL | * | 76,479 | 289 | 44 | 115 |
| IK1TTD | * | 67,068 | 355 | 32 | 130 |
| IK4A | 28 | 235,790 | 797 | 32 | 138 |
| | | | (Opr. IK4GNH) | | |
| IK8RIZ | * | 222,456 | 804 | 31 | 125 |
| IK5A | * | 103,917 | 369 | 28 | 113 |
| | | | (Opr. IK5MDF) | | |
| IK3XUG | * | 47,151 | 177 | 30 | 87 |
| IK4C | 21 | 808,288 | 1833 | 38 | 170 |
| | | | (Opr. IK4UFH) | | |
| IK4ALY | * | 263,172 | 659 | 34 | 148 |
| IK8APR | * | 88,821 | 280 | 34 | 105 |
| IK1QBI | * | 29,072 | 170 | 27 | 65 |
| IK8OC | 14 | 605,556 | 1871 | 37 | 141 |
| | | | (Opr. IK8AZG) | | |
| IK6A | * | 575,165 | 1652 | 39 | 146 |
| | | | (Opr. IK6FLD) | | |
| IK2HVE | * | 331,240 | 1012 | 37 | 132 |
| IK8NHJ | * | 285,686 | 1034 | 35 | 131 |
| IK6QRH | * | 63,270 | 518 | 22 | 73 |
| IK7WUE | * | 17,219 | 187 | 15 | 52 |
| IK3YYK | 7 | 158,536 | 737 | 32 | 101 |
| IK4R | * | 138,084 | 883 | 26 | 85 |
| | | | (Opr. IK4ALM) | | |
| IK3SSJ | 3.7 | 92,115 | 894 | 17 | 72 |
| IK8UZA | * | 81,900 | 564 | 22 | 83 |
| IK4T | 1.8 | 67,811 | 716 | 14 | 69 |
| | | | (Opr. IK4JMY) | | |
| IK3UHL | A | 657,865 | 1097 | 73 | 304 |
| IK8X | * | 380,328 | 741 | 75 | 243 |
| IK2XYI | * | 273,360 | 691 | 56 | 216 |
| IK1RB | * | 232,832 | 487 | 62 | 210 |
| IK8KHP | * | 197,537 | 476 | 58 | 193 |
| IK3OYY | * | 193,550 | 397 | 60 | 185 |
| IK3KTT | * | 192,278 | 569 | 58 | 196 |
| IK7G | * | 189,060 | 410 | 63 | 211 |
| | | | (Opr. IK7NXU) | | |
| IK6RHT | * | 144,228 | 420 | 56 | 182 |
| IK7RVY | * | 137,925 | 507 | 65 | 160 |
| IK2ULV | * | 128,160 | 296 | 66 | 174 |
| IK8YQV | * | 112,662 | 262 | 60 | 138 |
| IK8LTX | * | 109,002 | 251 | 66 | 156 |
| IK2RPE | * | 102,212 | 343 | 49 | 153 |
| IK2WZV | * | 85,838 | 338 | 41 | 126 |
| IK5MEQ | * | 67,193 | 166 | 48 | 155 |
| IK8IFW | * | 64,902 | 252 | 46 | 128 |
| IK2REA | * | 61,650 | 305 | 37 | 113 |
| IK8WRB | * | 35,880 | 213 | 32 | 106 |
| IK3WHL | * | 34,749 | 102 | 45 | 98 |
| IK3XZX | * | 31,970 | 154 | 39 | 100 |
| IK1PMV | * | 17,978 | 113 | 32 | 69 |
| IK2UJU | * | 17,472 | 101 | 29 | 62 |
| IK5NXD | * | 15,838 | 108 | 31 | 67 |
| IK2OCF | * | 11,850 | 80 | 29 | 46 |
| IK4CBM | * | 6,204 | 136 | 16 | 17 |
| IK8VXX | * | 377 | 11 | 6 | 5 |
| IK6I | 21 | 355,586 | 1278 | 35 | 119 |
| | | | (Opr. IK6GZM) | | |
| IK2OLJ | * | 28,260 | 160 | 23 | 67 |
| IK6XGS | * | 6,732 | 75 | 13 | 38 |
| IK4RSK | * | 1,575 | 42 | 8 | 17 |
| IK4LZH | 14 | 186,202 | 728 | 34 | 123 |
| IK4AFQ | * | 123,352 | 516 | 32 | 104 |

| | | | | | |
|------------------|-----|-----------|---------------|-----|-----|
| *IK8WEL | * | 44,590 | 335 | 19 | 72 |
| *IK3IKF | * | 19,712 | 254 | 10 | 54 |
| *IK1DML | * | 15,050 | 157 | 19 | 51 |
| *IK5WWF | 7 | 44,897 | 323 | 45 | 94 |
| *IK1XHU | * | 8,848 | 135 | 9 | 47 |
| *IK5Q | 3.7 | 60,716 | 612 | 16 | 70 |
| | | | (Opr. IK5VXG) | | |
| LATVIA | | | | | |
| YL2LW | A | 243,846 | 620 | 61 | 218 |
| YL8A | * | 190,988 | 500 | 61 | 205 |
| | | | (Opr. YL2KL) | | |
| YL2PJ | * | 21,939 | 131 | 30 | 73 |
| YL3CW | 21 | 558,092 | 1778 | 33 | 133 |
| YL2GD | 14 | 71,158 | 545 | 22 | 72 |
| YL2JN | 3.7 | 10,094 | 196 | 8 | 41 |
| *YL2EC | A | 9,396 | 88 | 25 | 56 |
| *YL3GVW | 28 | 19,096 | 148 | 21 | 56 |
| *YL2KF | 21 | 774 | 29 | 5 | 13 |
| *YL2GOT | 1.8 | 4,092 | 138 | 3 | 28 |
| LITHUANIA | | | | | |
| LY2IJ | A | 1,485,348 | 1607 | 109 | 383 |
| LY3BH | * | 1,196,260 | 1503 | 100 | 330 |
| LY2OU | * | 912,912 | 1418 | 96 | 360 |
| LY2OX | * | 257,520 | 676 | 63 | 227 |
| LY2LA | * | 200,405 | 542 | 63 | 206 |
| LY1FW | * | 8,784 | 56 | 22 | 39 |
| LY2ZZ | 21 | 486,992 | 1377 | 34 | 142 |
| | | | (Opr. LY3MM) | | |
| LY1DS | * | 18,894 | 100 | 22 | 72 |
| LY1DI | 14 | 87,875 | 702 | 22 | 71 |
| LY2KM | * | 40,629 | 380 | 18 | 89 |
| LY3BX | 7 | 56,472 | 638 | 15 | 63 |
| LY6M | * | 45,448 | 400 | 17 | 75 |
| | | | (Opr. LY1DS) | | |
| LY2BUU | * | 27,288 | 331 | 12 | 60 |
| LY2PAQ | * | 3,276 | 86 | 6 | 30 |
| LY6K | 3.7 | 122,696 | 1111 | 17 | 81 |
| LY1DR | 1.8 | 56,644 | 744 | 11 | 57 |
| LY2BUG | * | 1,764 | 70 | 3 | 25 |
| *LY3BA | A | 639,711 | 1095 | 88 | 299 |
| *LY1DD | * | 122,816 | 415 | 49 | 153 |
| *LY3KB | * | 47,120 | 300 | 31 | 124 |
| *LY3BQ | * | 11,627 | 140 | 18 | 59 |
| *LY2OQ | * | 10,611 | 127 | 12 | 69 |
| *LY2HN | * | 4,611 | 80 | 12 | 41 |
| *LY2IC | 21 | 60,480 | 311 | 28 | 92 |
| *LY2DM | 14 | 87,668 | 608 | 25 | 76 |
| *LY2AE | * | 21,056 | 245 | 13 | 51 |
| *LY2BKT | * | 12,800 | 222 | 11 | |



Cut Your Own Deal

with these Smart Summer Savings!

KENWOOD

\$30 Smart Coupon **\$30**



TM-241A



**TH-79A(D)
TH-79A(D)H**

Name: _____

Call Sign: _____

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THIRTY DOLLARS

KENWOOD

\$50 Smart Coupon **\$50**



TS-50S



**TS-450S
TS-450S/AT**

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Call Sign: _____

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FIFTY DOLLARS

*Note: Save \$20 on TH-22AT. See Authorized Dealer for details.

KENWOOD

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TS-850S



TS-850S/AT

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OM5M 7 294,372 1405 31 117
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S53EA * 3,244,956 3110 130 442
S51AY 28 228,161 864 32 119

S59KW * 110,430 1004 16 74
S53DCM * 75,680 740 16 72
S57BZD * 47,710 724 10 55
S52CD 1.8 41,160 677 8 52

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EA4KD A 2,641,353 2343 132 479
EA7DHP * 943,164 1207 84 285
EA2KL * 513,890 743 74 261

*EA3GHZ * 357,200 680 76 228
*EA1JO * 353,400 620 70 230
*EA5CJO * 320,625 475 52 154

*EA1JAV * 71,898 333 34 102
*EA3DVJ * 70,493 299 36 121
*EA4CWN * 68,847 242 43 116

*EA3FCQ * 64,995 363 23 82
*EA1FFC * 31,772 184 19 75
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SM5AOE A 808,535 1069 100 355
SM6BJI * 489,346 757 87 290
SM3BIF * 440,340 746 76 282

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*SM5KNV * 155,477 804 28 105
*SK0HB 14 207,828 1139 37 101

SM8LPO * 184,500 1009 30 93
SM6DER * 105,138 651 26 92
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HB9KC A 132,252 295 54 152
HB9AAA * 120,872 286 65 167
HB9DX 21 25,956 99 27 99

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UR7E * 1,474,424 1923 109 357
UX4UM * 693,462 1076 94 324

EN6Q 7 209,040 1054 30 100
UT7ND * 47,167 371 20 81
UT1PD * 31,360 340 14 66
EM0F 3.7 146,202 1011 25 93

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GW4BLE A 3,677,808 2984 117 462
GW0ARK 21 318,400 1289 35 125
*GW4BVJ/P A 111,830 420 46 165

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YT7A 7 413,316 1469 38 140
404D * 203,060 1076 30 100

*YU180 * 75,856 370 34 142
*YU1RA * 17,199 114 28 63
*YU1PJ * 14,960 170 17 63

AUSTRALIA
VK5GN A 2,066,038 2067 110 237
VK3TZ * 1,133,328 1068 116 220
VK2XT * 123,414 295 46 88

BELAU
KC6SS A 1,358,006 1912 82 165
9M8R 7 1,077,440 2329 38 122

GUAM
NH2L 28 204 34 1 1
KH2V 14 913,017 2178 36 111

HAWAII
WR6R/KH6 A 3,832,300 3453 122 258
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YB6INU A 1,094,300 1216 99 211
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YC2EWZ 21 454,966 1411 29 80

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DU1SAN 14 239,772 807 31 75

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5W1MM A 2,065,661 2845 96 151
*5W1GC A 517,583 879 78 133

SOUTH AMERICA
ARGENTINA
LU8FDZ A 1,111,504 1503 81 171
LU8HFG * 1,017,870 1439 63 159
LU6ETB 281,537,008 3413 32 132

AMERICAN SAMOA
AH8A A 1,937,988 2213 97 206
AUSTRALIA
VK5GN A 2,066,038 2067 110 237

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PR2R A 1,172,888 1534 74 197
PY2XB * 528,878 710 69 190
PY1LI * 248,022 528 64 98

ARUBA
P40E A 15,048,757 7950 138 503
P43A 14 1,341,920 2841 32 128

NEW ZEALAND
ZL4NF A 620,379 900 89 154
ZL2CD * 176,540 487 57 83
ZL1AAS 7 83,068 376 29 47

CHILE
CE3F A 4,554,992 3277 128 360



Luis at the controls of XE2AC.

| ASIA | | | | |
|---------------------|------------|-------|-----|-----|
| JAPAN | | | | |
| JH5ZJS | 8,115,114 | 4443 | 166 | 492 |
| JA3ZOH | 5,737,950 | 3387 | 164 | 458 |
| JJ3YBB | 5,385,765 | 3147 | 163 | 465 |
| JA1YDU | 4,305,773 | 2713 | 157 | 436 |
| JA7YAA | 2,633,958 | 2100 | 134 | 324 |
| JA7YRR | 2,001,982 | 1745 | 128 | 291 |
| JR1ZTT | 1,641,780 | 1494 | 129 | 291 |
| JA3YKC | 1,537,603 | 1340 | 126 | 311 |
| JH1YHS | 495,405 | 628 | 92 | 211 |
| JK1ZHH | 129,564 | 309 | 66 | 111 |
| JF3ZAK | 18,334 | 105 | 39 | 50 |
| EUROPE | | | | |
| BELGIUM | | | | |
| OT4A | 9,378,342 | 6965 | 156 | 683 |
| OS4CLM | 129,689 | 528 | 43 | 148 |
| ENGLAND | | | | |
| GØKPW | 11,128,343 | 7340 | 174 | 769 |
| GB2AVC | 369,200 | 920 | 65 | 260 |
| GØNKL | 129,766 | 393 | 47 | 170 |
| EUROPEAN RUSSIA | | | | |
| RU6L | 7,084,700 | 5203 | 175 | 637 |
| FRANCE | | | | |
| F6BEE | 5,866,080 | 4175 | 140 | 586 |
| GERMANY | | | | |
| DK5EZ | 2,397,308 | 2321 | 116 | 471 |
| DF3QG | 1,105,081 | 1395 | 106 | 423 |
| HUNGARY | | | | |
| HG73DX | 10,594,944 | 7627 | 169 | 647 |
| ITALY | | | | |
| IR3R | 9,128,847 | 6209 | 168 | 678 |
| IØ2L | 1,382,080 | 1588 | 116 | 444 |
| LIECHTENSTEIN | | | | |
| HØØ | | | | |
| /HØ9AON | 3,056,592 | 3526 | 101 | 427 |
| LITHUANIA | | | | |
| LY7A | 2,932,704 | 3767 | 117 | 482 |
| NETHERLANDS | | | | |
| PI4COM | 5,921,162 | 4671 | 150 | 604 |
| POLAND | | | | |
| SN6Ø | 2,723,728 | 3431 | 128 | 453 |
| SN9T | 974,044 | 1392 | 86 | 318 |
| SPAIN | | | | |
| ED4RCT | 1,336,068 | 2180 | 79 | 277 |
| SWITZERLAND | | | | |
| HB4FG | 939,540 | 1400 | 89 | 331 |
| UKRAINE | | | | |
| EM2I | 11,631,675 | 8989 | 172 | 653 |
| UU5J | 9,979,003 | 7263 | 174 | 685 |
| YUGOSLAVIA | | | | |
| YU7ØL | 96,996 | 441 | 38 | 139 |
| OCEANIA | | | | |
| NEW ZEALAND | | | | |
| ZM2K | 6,229,258 | 4739 | 136 | 322 |
| SOUTH AMERICA | | | | |
| ARGENTINA | | | | |
| LU4FM | 15,128,576 | 7951 | 152 | 512 |
| LTØM | 484,603 | 1815 | 84 | 206 |
| ECUADOR | | | | |
| HCØE | 12,537,339 | 6841 | 138 | 493 |
| NETHERLAND ANTILLES | | | | |
| PJ1B | 40,278,000 | 15627 | 169 | 706 |
| PARAGUAY | | | | |
| ZP94B | 4,538,154 | 3545 | 112 | 341 |
| VENEZUELA | | | | |
| YY3A | 4,583,160 | 3360 | 106 | 355 |

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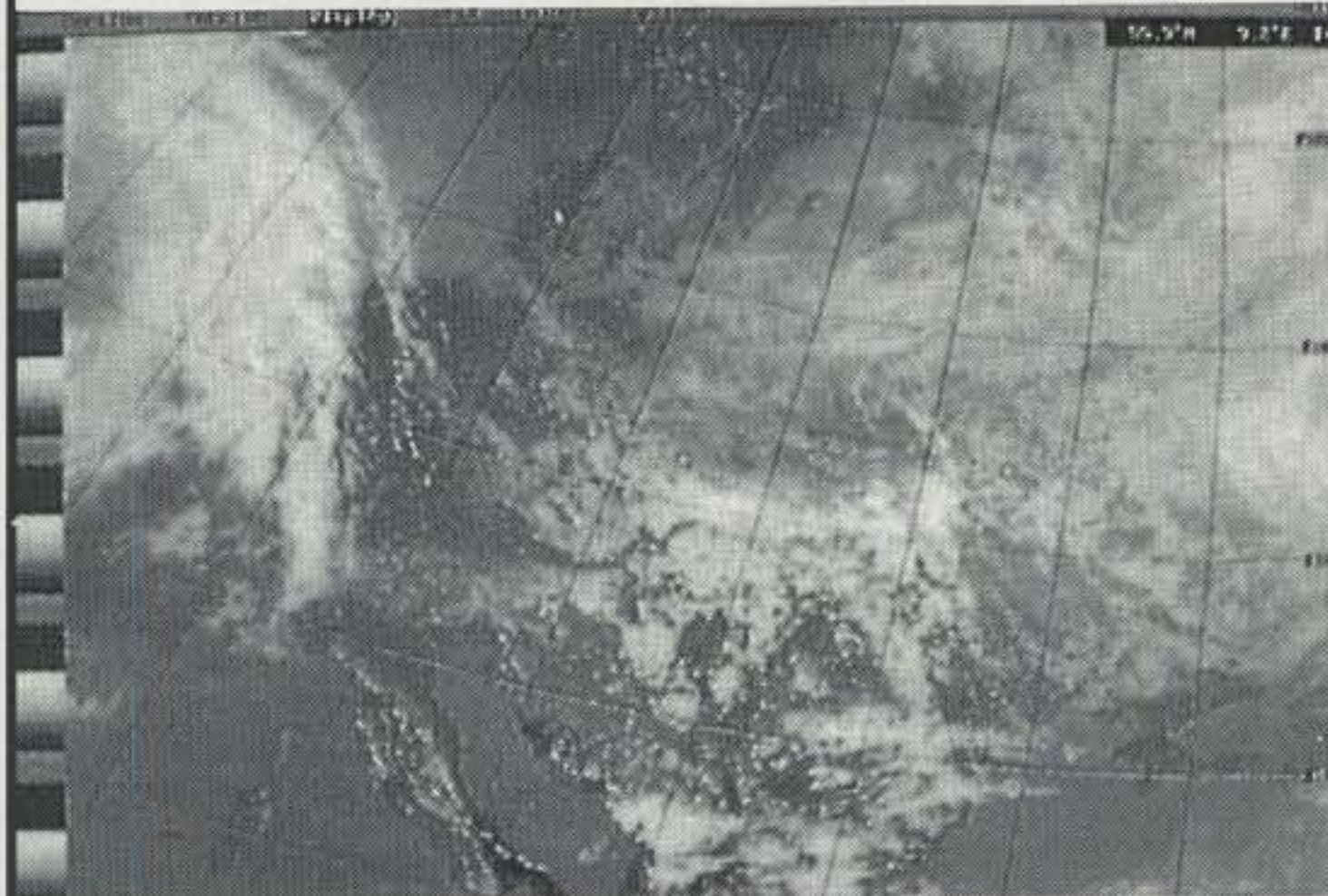
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9G1MR, 9Y4VU, AA6SF, CT1ECT, DF5WN, DHØDK, DL1ASF, DL1DWT, DL1JEI, DL2SBY, DL2VBL, DL3DW, DL3NEO, DL4AWJ, DL5AVJ, DL5DWW, DL5JRA, DL5SVB, DL5YWM, DL7UMS, DL8CGF, DL8DZL, EA/OE5BMO, EA1AAA, EA1AJC, EA1AJI, EA1CXY, EA1EBJ, EA1ETN, EA1FAE, EA1FFC, EA1FFN, EA1KW, EA2ABM, EA2AGB, EA2BSN, EA2CMY, EA3ACA, EA3AFJ, EA3AFR, EA3AM, EA3CZM, EA3DZG, EA3EJI, EA3FYD, EA3GDX, EA3KB, EA4BJD, EA4EER/1, EA5ACE, EA5AEI, EA5DWS, EA5EIL, EA5FXS, EA5GCX, EA5GKE, EA5GNX, EA5JC, EA7BA, EA7EFE, EA7EZK, EA7GHB, EA7GW, EA7HDQ, EA7JB, EA7VE, EA8AGG, EA9PD, EA9TQ, EC1AHH, EC1AIM, EC1AIW, EC1DLE, EC2AEB, EC3ABF, EC3ABO, EC3ADU, EC3CYT, EC5CXI, EW6TU, F5MVU, G4IUF, HA3GF, HA3GN, I1A/1PØ, IK3UMU, IT9ZGY, IV3PRK, JF1SQC, KBØØXN, KE4BM, KK4RV, KR4NY, KX7J, LA1NG, LA2IZ, LA2KD, LA2QM, LA3JT, LA4BN, LA4JHA, LA4OGA, LA6BBA/LA6ZFA, LA7CL, LA7U, LA8CD, LA8HGA, LA8KHA, LA8LA, LA8NHA, LA9FFA, LA9HF, LA9NM, LA9VGA, LU1HGN, LU7HLF, LY2BAG, LZ1CW, LZ1EV, LZ2LH, OE6CLD, OH1XX, OH2BO, OH2KQ, OH3BI, OH4L8X, OH6NVC, ØK2PJD, OS5FV, OZ1EUØ, OZ8DX, PAØASN, PAØTV, PAØUV, PA2SWL, RA3IG, RA3THN, RA4PKL, RA6YR, RA9FF, RK1NWO, RK3YXP, RK9AWQ, RV1AQ, RX9UTB, RZ6AXØ, SK6AG, SMØBXT, SMØCSX, SMØUGV, SM2KAL, SM3ETC, SM3GBA, SM3MHD, SM3MQF, SM3QJ, SM4AWC, SM5BBS, SM5BFJ, SM5CVC, SM6LJP, SM6OLL, SM6PVB, SM6SHF, SM7ABL, SM7NWH, SM7UFW, SM7UYS, SN7L, SPØ2ØØ3-ØP, SP1AEN, SP1AFU, SP1GZT, SP2DWA, SP2HHX, SP2IU, SP2LNN, SP2WEP, SP3LFV, SP4CMW, SP5ALV, SP5AY, SP5DIO, SP5DIR, SP5DXU, SP5GKN, SP5GRU, SP5JTM, SP5MBI, SP5MXY, SP6AUI, SP6BGZ, SP6CDP, SP6FIB, SP6JZB, SP6MLF, SP6RGB, SP7DRV, SP7GAQ, SP7SEG, SP7VCA, SP7VCK, SP8BJH, SP8FHM, SP8JMA, SP8ØØB, SP8UFB, SP8WJD, SP8WJG, SP9AVZ, SP9BBH, SP9CLO, SP9JCN, SP9LAS, SP9MQH, SP9XUJ, SP9XCN, UA1ABØ, UA6HPQ/EKØ, UN6T, UN9LX, UR3FD, UR5L8X, US7WW, UT2XX, UU9JCF, VE3/K4TC, VE3RM, VO1CA, VP8ON, W7KYT, WB4RUA, WB8GNX, WD4CNZ, WF5E, XE3RKK, YL2IP, YO3AS, YO3DCØ, YO5ØDE, YO8AI, YO8KØR, Z32JA.

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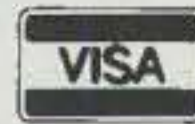
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CONSTRUCTION PROJECTS, TECHNIQUES, AND THEORY

The Mechanics of Coaxial Traps

I am frequently asked, "What's the best way to build an antenna trap?" Certainly, the art of building these components has been covered in the amateur literature by numerous authors in the past. Early-day homemade traps consisted of a suitable piece of B & W Miniductor stock and a parallel capacitor that could handle the RF current without overheating or changing value. Suitable capacitors were plentiful in the days when kW amplifiers were the exception rather than the rule. But now that linear amplifiers are plentiful, it becomes a challenge to build an antenna trap that won't overheat or become short-circuited. The outlook improved markedly when R. H. Johns described his coaxial traps in *QST* magazine.¹ These traps rely upon the inherent capacitance in coaxial cable, along with the inductance that results when the proper number of cable turns are wound on a coil form. Therefore, the number of turns required for a particular resonant frequency is a function of the capacitance per foot of the cable used for the trap.

Other authors have written articles about coaxial traps and their use.^{2,3} A computer program for accurately designing coaxial traps is one of the many contained on the VE3ERP 3.5 inch diskette for DOS, which is available for \$5.⁴ Therefore, I will not include the design procedures for coaxial traps in this article. Instead, let's discuss trap performance and the mechanical aspects of building these devices.

P.O. Box 250, Luther, MI 49656

Physical Characteristics

Coaxial traps that are wound with RG-58 cable will safely accommodate the full legal amateur power level. They may be made more compact and lightweight by using miniature RG-174 coax and smaller coil forms, but the maximum safe power level is 500 watts for the smaller coax. RG-174 coaxial traps are desirable for portable multiband antennas. Conversely, RG-58 cable requires a larger and heavier coil form, which must be a consideration if several traps are contained in one antenna.

It becomes obvious that strong, thin-wall coil forms are better for these larger traps. The weight of the coax for 160 and 75 meter traps, especially, is a tad on the hefty side to begin with. PVC plumbing pipe is readily available and works nicely as coil-form material. Try to select the thin-wall variety. The traps pictured in this article are wound on thick wall pipe ($\frac{3}{16}$ inch wall thickness) with a $2\frac{3}{8}$ inch OD, simply because that's what I had on hand. The 1.9 MHz trap weighs 14 ounces without the end caps and eye bolts installed. Fiberglass, or thin-wall cloth phenolic tubing, would reduce the weight substantially. The 3.85 MHz trap weighs 11 ounces with the $\frac{3}{8}$ inch Delrin end plugs and other hardware in place. Wooden end plugs, boiled in canning wax, would decrease the weight by a couple of ounces.

Trap Quality

Coaxial traps have a relatively high value of Q. I observed this when using a Kenwood DM-81

dip meter to check the trap resonance. Despite the small dipper coils, a sharp indication was obtained when the dipper probe was 8 inches away from the end of the traps. This indicated high Q (preferred). Owing to this characteristic, the impedance of coaxial traps is high. The effective operating bandwidth of the traps is on par with the 2:1 SWR bandwidth of most dipoles, despite the high Q.

The longevity of coaxial traps can be improved if you are lucky enough to find some Teflon-insulated RG-58 cable that has UV-resistant outer insulation. I don't know if cable of this type can be obtained, but Teflon coax is available. Some form of UV protection (to prevent degradation of the traps) is desirable. If $2\frac{3}{4}$ inch shrink tubing were available, it would be an ideal covering for the traps. I have had good results with tool-handle dip compound for protecting coaxial traps I built in the past. Two layers of the material were used. The traps held up well during an outdoor test period of five years. Once dried, the compound had no effect on the trap resonance or Q.

Mechanical Details

Figs. 1 and 2 show how my traps are constructed. A $\frac{1}{2}$ inch by 2 inch strip of double-sided PC board material is used at each end of the trap. Each strip is held in place by means of two 6-32 flathead screws. The strips serve as conductors between the antenna and the internal junctions of the trap. Lock washers are used at all screw points to ensure long-term electrical integrity.

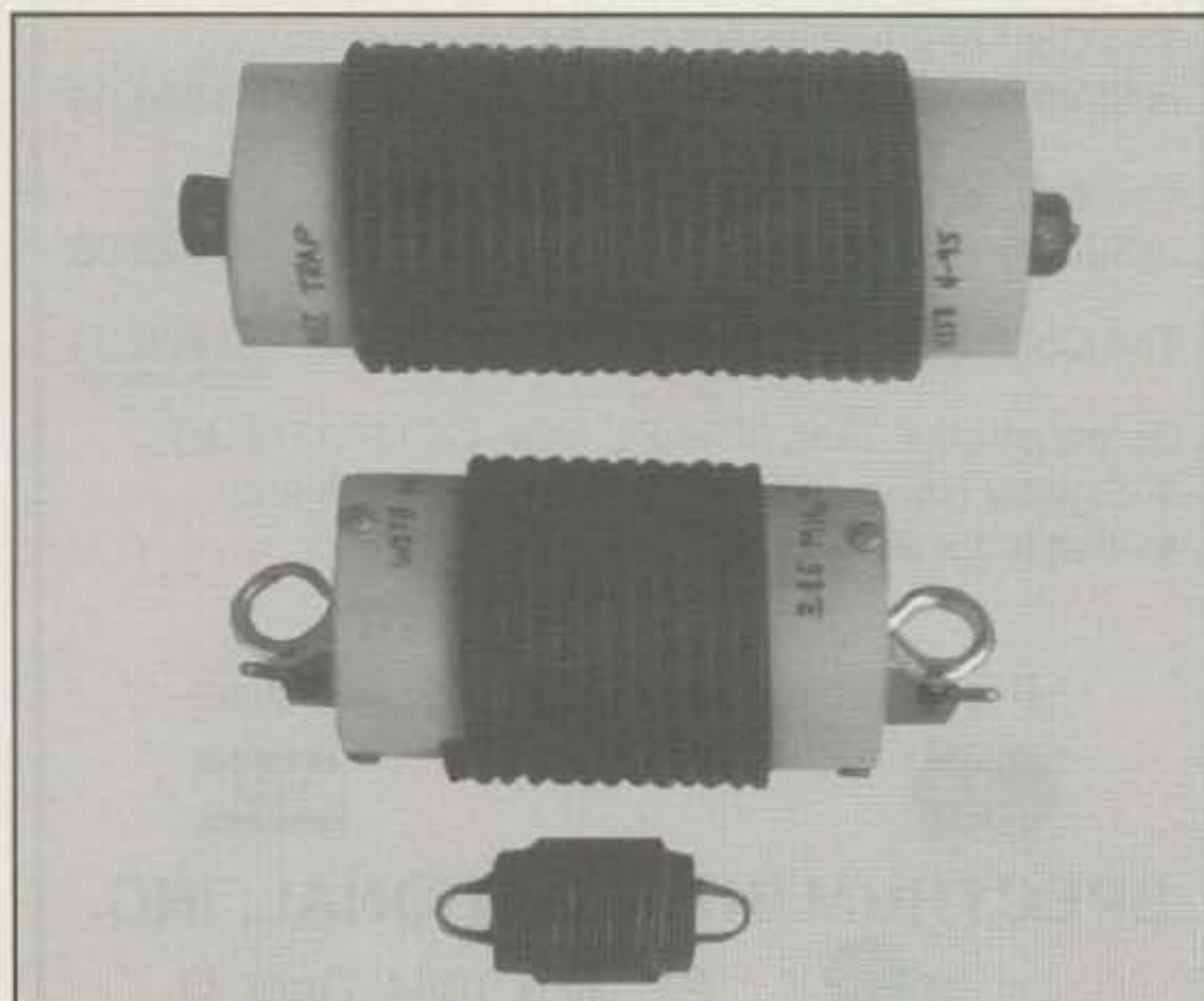


Fig. 1—Photograph of assembled coaxial traps for 160, 75, and 20 meters. The small unit weighs 1 ounce and is wound with RG-174 on a 1 inch OD form. The mini trap is coated with tool handle dip compound.

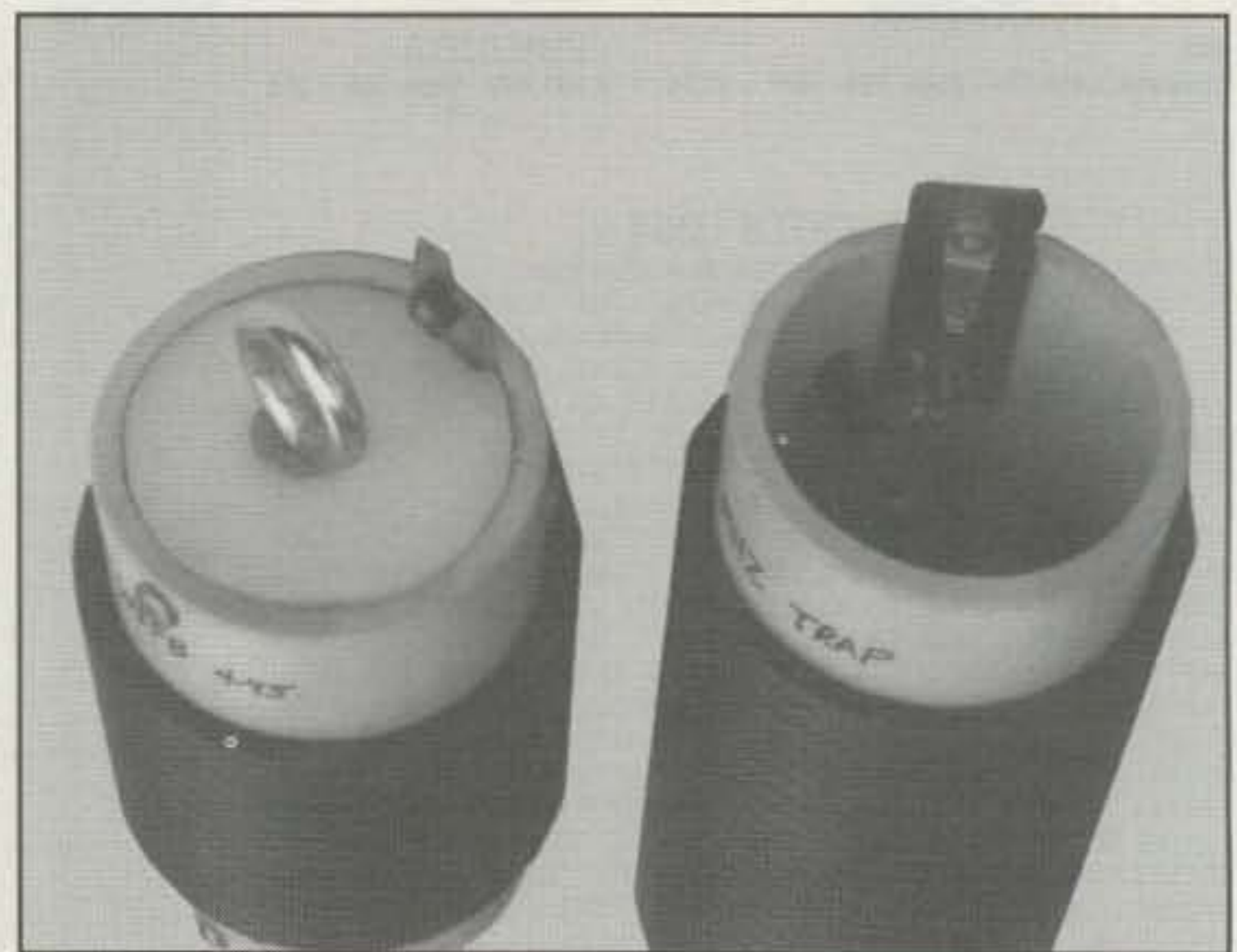


Fig. 2—End view of the 75 and 160 meter traps. The insert plug and eye bolt for the 160 meter unit has been omitted in order to show the interior construction of the traps. The smaller 75 meter assembly is seen in its completed form.

TREAT YOURSELF TO THE BEST ON HF

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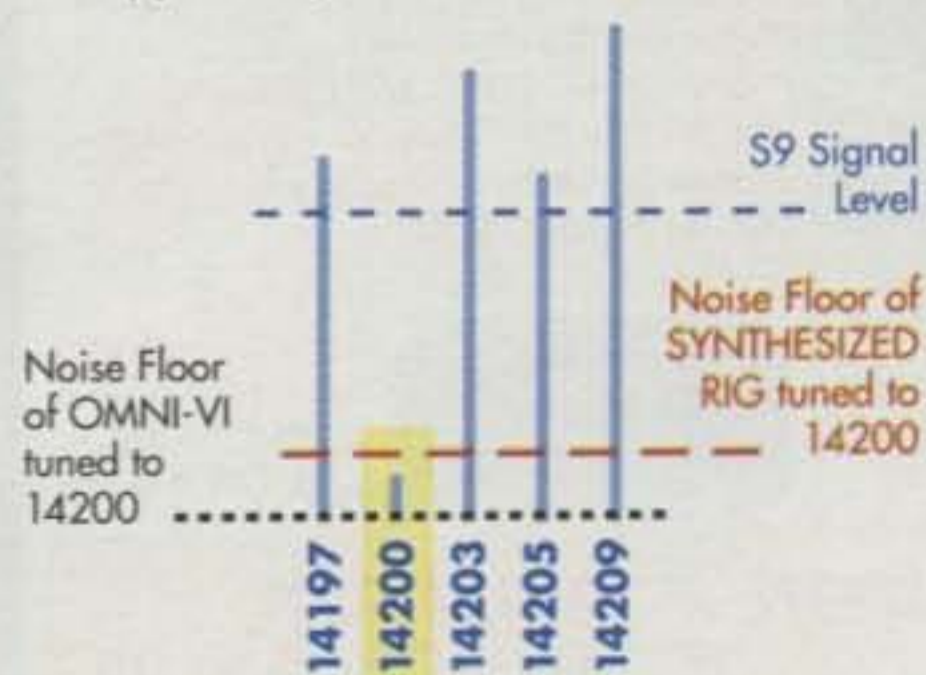
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The letter L in this table (other than the right-hand column) refers to length, which is given in inches before the shield braid is separated from the inner conductor. The braid at one end of the coil must be long enough to reach to the center conductor at the opposite end of the trap. The remaining shield braid and the two center-conductor stubs are approximately 1 inch long. Resonance of the completed traps may be checked with a dip meter while monitoring the dipper signal with a calibrated receiver.

Table 1—Coaxial trap constants.

The trap end plugs are optional. I prefer to use them because they deter wasps from building nests inside the tubing, and because they prevent internal build-up of ice or snow. The plugs are fitted with eye bolts to provide anchor points for the antenna wire. If you omit the plugs, you may drill a hole at each end of the trap for use as an antenna-wire anchor point. Two solder lugs are used on each PC-board strip. One is installed outside the trap for the antenna connection. The other one is used as a soldering terminal for the coaxial cable, inside the trap.

Each end plug is held in place by three 6-32 screws. The plastic plugs are drilled and tapped for 6-32 screws (three for each plug). If wooden plugs are used, you may use flat-head wood screws to affix them.

It is wise to seal the open ends of the trap cable with epoxy cement, GOOP brand sealant, or Coax Seal® putty. This will prevent moisture from migrating inside the shield braid and contaminating the RG-58 cable.

Electrical Considerations

The traps described in this article are wound with RG-58A/U. Other small 50 ohm coaxial cable is suitable. If you want to add a margin of safety for high power, you can use RG-8X coax. The Radio Works, Inc.⁵ catalog lists their

top-of-the-line RG-8X as CQ-8X M/M. It is a marine-grade cable that is high-temperature stable and contains solid dielectric crush-proof insulation. Since RG-8X has a greater OD than RG-58, a longer coil form would be required. Fig. 2 shows the assembled 160 and 75 meter traps. The medium-size unit with the end plugs is for 3.85 MHz. Included in the photo is a 1 inch OD mini trap for 20 meters that was built by my son, Dave DeMaw, N8HLE, for use in his QRP trap dipole. This tiny trap is wound with RG-174 and weighs one ounce. It is coated with tool-handle dip.

Some of you are probably wondering where an amateur might use a 160 meter trap. Traps for that frequency are useful in a 75 meter full-wave loop to permit 1.8 MHz operation. Half-frequency loops (e.g., a 75 meter loop on 160 meters) perform miserably. They provide substantially less gain than a full-size dipole. However, if the loop is opened electrically opposite the feed point by means of a 160 meter trap, the antenna performs as a 160 meter "scrunched" dipole and works quite well. The trap effectively opens the loop at 160 meters, but closes it for the bands below 160 meters. Multiband operation assumes that tuned feeders are used with the 75 meter loop.

Fig. 3 contains information about how the ends of the coaxial cable are joined to obtain the required capacitance and inductance for

trap resonance. Note that the center conductor at one end of the coil is connected to the shield braid at the opposite end of the coil. The trap turns are close-wound.

75 Meter Trap Constants

The following electrical constants are based on a coil-form diameter of 2.375 inches and RG-58A/U cable for the 3.85 MHz trap described here. An effective capacitance (28.5 pF/ft.) of 241 pF and an inductance of 7.14 μH ($X_C, X_L = 172$) results from using the required 104 inch length of coax cable. The coil length is 2.53 inches and the form factor is 0.98:1. There are 12.45 close-wound turns of cable wrapped around the 4 3/4 inch length of PVC tubing.

Table 1 lists winding information for a variety of coaxial traps. The referenced QST article by R. Sommer, N4UU, contains charts that can be used to design traps for any HF band when using various coil form diameters. If you have an IBM-compatible computer, you can utilize the aforementioned VE3ERP software to design these traps precisely.

The recommended form factor (diameter to length ratio) for these traps is from 1:1 to 2:1. This range ensures the high Q that makes the traps effective for divorcing the unwanted parts of an antenna.

Summary Comments

A variety of plastic tubing materials are available from supply houses that market those products. U.S. Plastics of Lima, Ohio lists all manner of plastic and phenolic tubing, rods, and sheeting in its catalog. Check your telephone Yellow Pages for the name of a supplier near you. An excellent lightweight tubing is high-impact polystyrene, which is white in color. The trap end plugs can be made from inexpensive PVC sheeting, which is also available from plastics distributors.

Footnotes

1. R. H. Johns, "Coaxial Cable Antenna Traps," *QST*, May 1981, pp. 15-17.
2. D. DeMaw, "Lightweight Trap Antennas, Some Thoughts," *QST*, June 1983, pp. 15-18.
3. R. Sommer, "Optimizing Coaxial-Cable Traps," *QST*, Dec. 1984, pp. 37-42.
4. HAMCALC 9.4/FOTOCALC 1.6. Send \$5 to Geo. Murphy, VE3ERP, 77 McKenzie St., Orillia, ON L3V 6A6, Canada.
5. The Radio Works, Inc., Box 6159, Portsmouth, VA 23703. Phone 800-280-8327 for catalog or orders.

73, Doug, W1FB

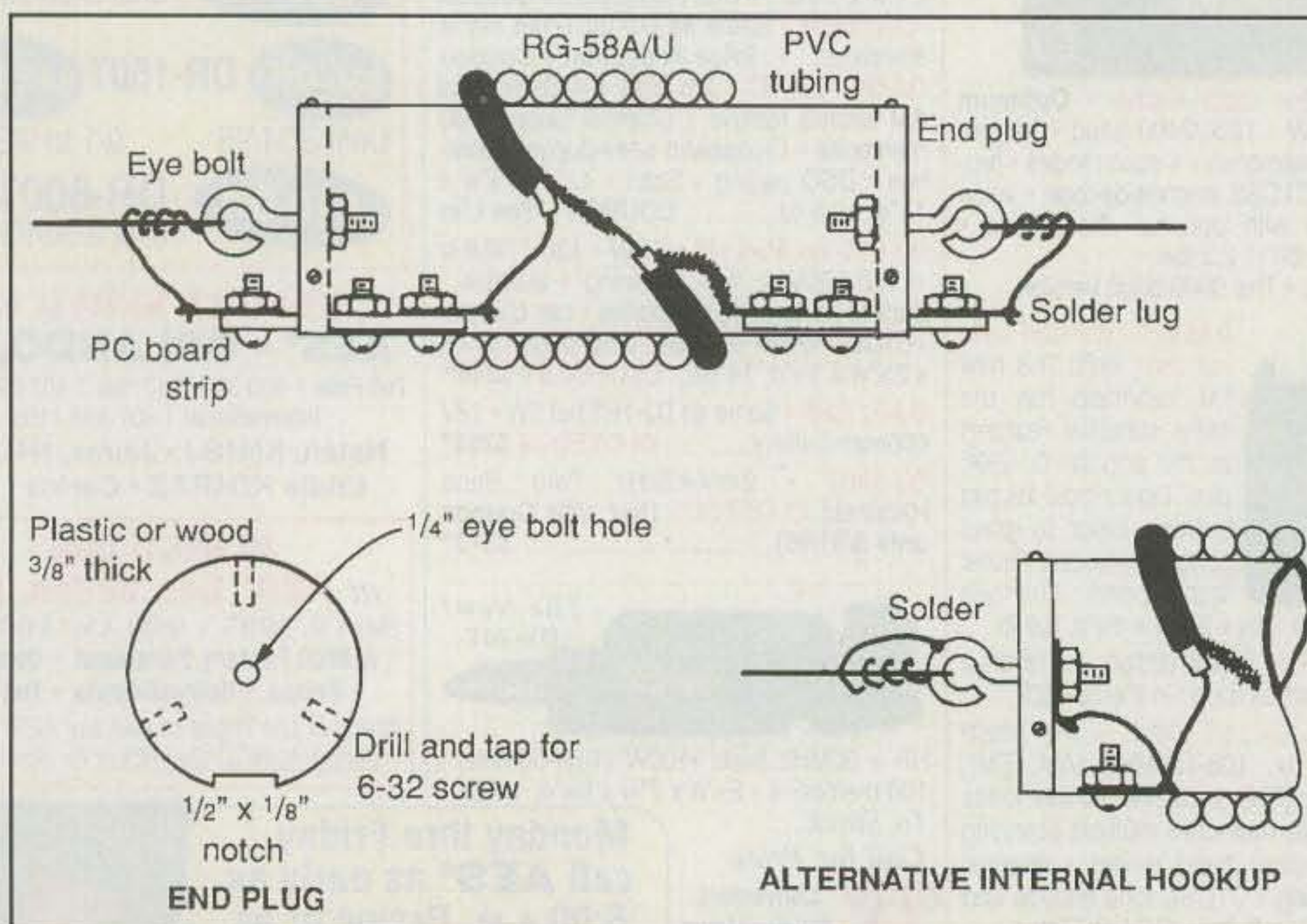


Fig. 3—Construction details and hookup information for the coaxial traps.

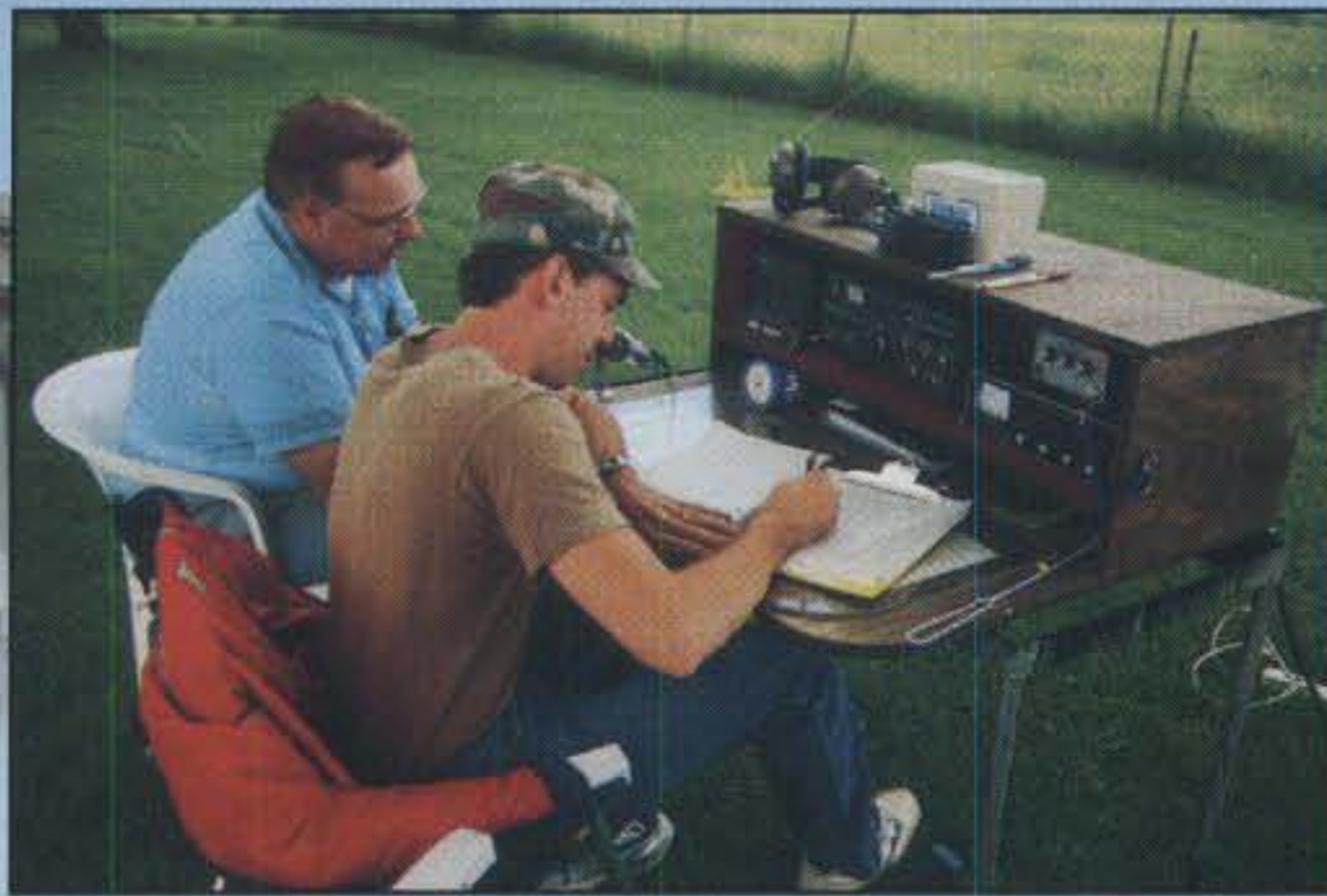
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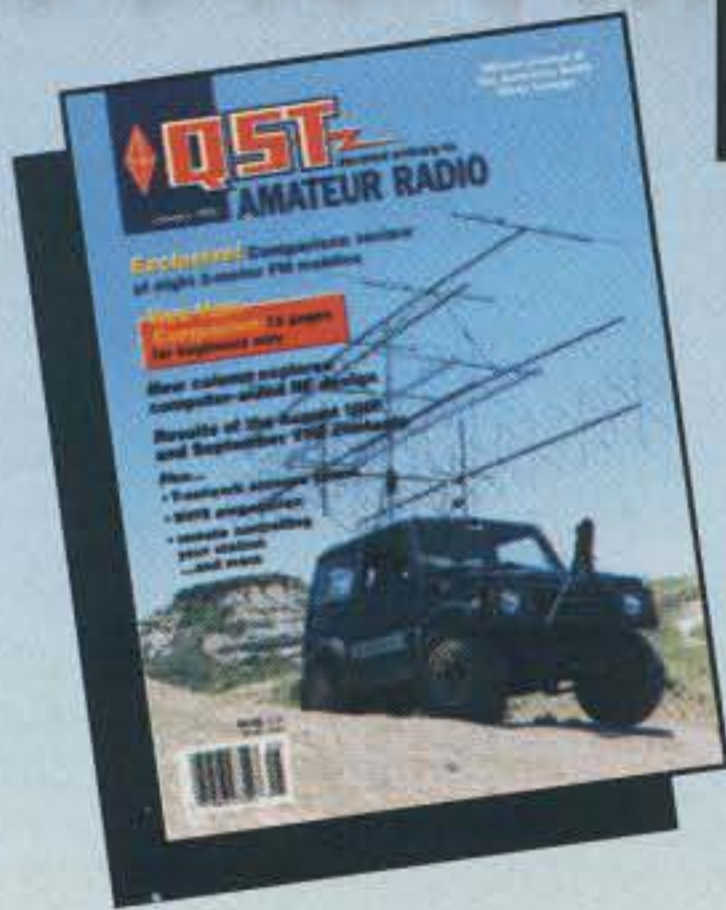
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Suite 240, Buffalo Grove, IL 60089.

Electronic Equipment Bank (EEB), 323 Mill Street N.E., Vienna, VA 22180.

Grove Enterprises, Inc., P.O. Box 98, 300 S. Highway 64 West, Brasstown, NC 28902-0098.

Ham Radio Outlet, 933 N. Euclid Street, Anaheim, CA 92801.

IIX Equipment, Ltd., P.O. Box 9, Oaklawn, IL 60454.

Building/Kits

All About Books, P.O. Box 22366, San Diego, CA 92192.

Electronics Now, P.O. Box 51866, Boulder, CO 80532-1866.

Hambrew, George DeGrazio, WFK, P.O. Box 200063, Lakewood, CO 80226-0063.

QEX (Monthly Experimenter's Manual), APRIL, 225 Main Street, Newington, CT 06111.

Ramsay Electronics, Inc., 793 Carnitig Parkway, Victor, NY 14561.

S&S Engineering, 14102 Brown Road, Smithsburg, MD 21783.

Catalogs

All Electronics Corporation, P.O. Box 557, Van Nuys, CA 91408-0557.

Amateur Electronic Supply (AES), 6710 West Good Hope Road, Milwaukee, WI 53223.

Burghardt Amateur Central, P.O. Box 73, 182 North Maple, Watertown, SD 57201.

Cable X-Perts, Inc., 113 McHenry Road,

Kreta, P.O. Box 3375, Torrance, CA 90510.

MFJ Enterprises, Inc., Box 491, Mississippi State, MS 39762.

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Polyphaser Corp. (Grounds), P.O. Box 9000, 2225 Park Place, Minden, NV 89423-9000.

Radio Shack, 501 One Tandy Center, Fort Worth, TX 76102.

Radloware Corporation, P.O. Box 1478, Westford, MA 01886.

Tucker Electronics, P.O. Box 551419, Dallas, TX 75355-1419.

Universal Radio, 6830 Americana Parkway, Reynoldsburg, OH 43068-4113.

Vibroplex Company, 11 Midtown Park East, Mobile, Alabama 36606-4141.

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AntennasWest, P.O. Box 50002, Provo, UT 84605.

Euro-Arn Electronics, P.O. Box 990, Meredith, NH 03253-0990.

K17NL DX Antenna Designs, Patrick Martini, Box 3350, West Sedona, AZ 86340.

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The Vail Correspondent (quarterly), Box 88, Maynard, MA 01754.

DX

Amateur Radio DX Blue Book, Jim Creevey, W4UYZ, J-C Enterprises, 4920 Mayflower Street, Cocoa, FL 32927.

Beam Headings, Alan Davis, KB7HM, 4204 Fox Point Drive, Las Vegas, NV 89108.

"KH6BZF Reports" (weekly), Lee Wical, 45-601 Luluki Road, CRT 44-25 Kaneohe, Oahu, HI 96744-1845.

"Long Island DX Bulletin," P.O. Box 173, Huntington, NY 11748-0173.

QRZ DX (weekly), P.O. Box 832205, Richardson, TX 75083.

"QSL Routes," Theuberger Verlag GmbH, P.O. Box 73, o-1020 Berlin, Germany.

Rose, P.O. Box 796, Mundelein, IL 60060-0796; *Speak to the World* (amateur radio language guide; 5 volumes, 25 languages).

The DX Magazine, *The DX Bulletin*, Box 50, Fulton, CA 95439.

History

Antique Radio Classified, Antique Radio Club, P.O. Box 802-C13, Carlisle, MA 01741.

Antique Radio Gazette, Antique Radio Club of America, c/o William Dawson, 300 Washington Trails, Washington, PA 15301.

Electric Radio, P.O. Box 57, Hesperus, CO 81326.

IEEE-PPL Department, IEEE Service Center, P.O. Box 1331, 445 Hoes Lane, Piscataway, NJ 08855-1331.

History of International Broadcasting, Marc Seifer, Box 32, Kingston, RI 02881. (Tesla.)

"Old Timer's Bulletin," Antique Wireless Association, c/o Joyce Peckham, Box E, Breesport, NY 14816.

QCWA Journal, 159 E. 16th Avenue, Eugene, OR 97401-4017.

Radio Bygones (bi-monthly), Owl Worldwide Publications, 4314 West 238th Street, Torrance, CA 90505-4509.

Wallace & Wallace, 11823 Slauson Avenue, Suite 38, Santa Fe Springs, CA 90670. (*The History of Amateur Wireless*.)

Magazines

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QST, 225 Main Street, Newington, CT 06111.

The Amateur Radio Communicator, National Amateur Radio Association, P.O. Box 598, Redmond, WA 98073-0598.

The AMSAT Journal, 850 Sligo Avenue, Suite 600, Silver Spring, MD 20910-4703.

Used Magazines, Bill Welsh, W6DDB, 45527 Third Street East, Lancaster, CA 93535-1802.

Manuals

Ardco Electronics, P.O. Box 95, Berwyn, IL 60402. (Hallicrafters service manuals.)

Hi-Manuals, Box R-802, Council Bluffs, IA 51502. (Amateur equipment manuals.)

Newsletters

"ARRL Newsletter," ARRL, 225 Main St., Newington, CT 06111.

"Clandestine Confidential Newsletter," RR-4, Box 110, Lake Geneva, WI 53147.

FAIRS, P.O. Box 341, Floyd, VA 24091.

"HamAdventures," Rusprint, 26037 West 220th Terrace, Spring Hill, KS 66083.

"ICOM" (bi-monthly), ICOM America, 2380 116th Avenue N.E., Bellevue, WA 98004.

"Kenwood" (bi-monthly), P.O. Box 22745, 2201 East Dominguez Street, Long Beach, CA 90801-5745.

"Key Note," FISTS Club, 5450 Diehl Road, Metamora, MI 48455.

"National Contest Journal" (bi-monthly), ARRL, 225 Main Street, Newington, CT 06111.

"OSCAR Satellite Report," P.O. Box 17108, Fountain Hills, AZ 85269-7108.

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"Spec-Com Journal" (bi-monthly), Membership Services, P.O. Box 1002, Dubuque, IA 52004-1002.

"Westlake Report" (weekly), Westlink International, 28221 Stanley Court, Canyon Country, CA 91351-3818.

"W5YI Newsletter" (bi-monthly), Box 10101, Dallas, TX 75207.

Other special interest groups which publish newsletters include local radio clubs, QRP (low power), OOTC (Old Old Timers Club), QCWA (Quarter Century Wireless Association), and various YL (female operator) groups.

Publishers/Distributors

Ameco Corporation, 224 E. Second Street, Mineola, NY 11501.

American Radio Relay League, 225 Main Street, Newington, CT 06111.

Artsci, Inc., P.O. Box 1428, Burbank, CA 91507.

Buckmaster Publishing, Route 4, Box 1630, Mineral, VA 23117.

CQ Communications, 76 N. Broadway, Hicksville, NY 11801. (*Amateur Radio Almanac; Equipment Buyer's Guide; Beginner's Guide; Ham Radio Horizons; Keys, Keys, Keys; The Packet Radio Operator's Manual; The Quad Antenna; The VHF "How To" Book; Lew McCoy, W1ICP on Antennas; The Shortwave Propagation Handbook; The Vertical Antenna Handbook; calendars; and more.* Orders 1-800-853-9797.)

CRB Research, P.O. Box 56, Commack, NY 11725.

Electronics Book Club, Blue Ridge Summit, PA 17294-0810.

FB Enterprises, 23801 N.W. First Avenue, Ridgefield, WA 98642-8830.

Gordon West Radio School, 2414 College Drive, Costa Mesa, CA 92026.

Grove Enterprises, P.O. Box 98, Brasstown, NC 28902-0098.

D. Heise, AA6EE, 16832 Whirlwind, Ramona, CA 92065.

Idiom Press, Box 583, Deerfield, IL 60015.

McGraw-Hill, Inc. (see TAB), 13311 Monterey Avenue, Blue Ridge Summit, PA 17294.

MFJ Enterprises, Inc., P.O. Box 494, Mississippi State, MS 39762.

Radio Amateur Callbook, P.O. Box 2013, 1695 Oak Street, Lakewood, NJ 08701.

Radio Bookstore, P.O. Box 209, Rindge, NH 03461-0209.

TAB (Division of McGraw-Hill), Blue Ridge Summit, PA 17294-0850.

The W5YI Group, P.O. Box 565101, Dallas, TX 75356.

Tiare Publications, P.O. Box 493, Lake Geneva, WI 53147.

WPT Publications, 7015 N.E. 61 Avenue, Vancouver, WA 98661.

Used

Amateur Radio Trader, P.O. Box 3729, Crossville, TN 38557.

Fair Radio Sales Company (Surplus), P.O. Box 1105, 1016 East Eureka Street, Lima, OH 45802.

Ham Trader Yellow Sheets, P.O. Box 2057, Glen Ellyn, IL 60138-2057.

Typical Reviews

The following descriptions provide typical reviews of a few amateur radio publications.

Amateur Radio Mail-Order Catalog and Resource Directory. This publication is not just a catalog; it is a very complete source of the information amateurs need. About 2000 listings exist, plus more than 200 categories. The old issue contains about 300 pages and is sold at \$17.95, including shipping and handling charges. John Hart, NØOCF, has been the editor and publisher of this extremely useful book. The address has been Hart Publishing, 767 South Xenon Court, Lakewood, CO 80228. It appears that the ARRL is taking over publication and sale of this book. The author of this column frequently refers to this book to obtain required data.

The DX Bulletin. This 4-page bulletin is published 50 times per year. It is an excellent source of news about amateur radio operation all around the world. Future DX operations are detailed in it as completely as possible, including call signs, DX locations, names, modes, frequencies, times, and QSL data. DX Islands On The Air (IOTA) coverage is very good. Propagation data is included in every issue. Lists show active DX stations by emission mode, frequency, day of the month when heard, state where heard, etc. A list of regularly active resident DX amateurs shows their call signs, frequencies, and typical operating times. DX gatherings and operating events are also covered in the *DX Bulletin*. The address is The DX Bulletin, P.O. Box 50, Fulton, CA 95439-0050. The yearly subscription rates are \$34 and \$44 for second- and first-class mailings, respectively.

The Radio Works. Catalog 951 has a cover price of \$4.00, but Jim Thompson (W4THU, President) will send it free to readers who request a copy. If you want to receive it faster than by bulk-mail, enclose \$2.00 to pay the cost of priority mailing. This 80-page catalog covers wire antenna systems in good detail. The antenna systems detailed in Catalog 951 include the Big Sig Loop, Carolina Beam, Carolina Windom, G5RV-Plus, In-Tree Vertical, Inverted-L, Loop, Microdipole, Mobile, Multi-band Trap, Shortened Dipole, Sloper, Super-Loop, SWL/Scanner, TunerLoop, Universal Dipole, Vertical, and Vertical Radiation Dipole.

CQ has been a leader for nearly 50 years in providing timely and invaluable information on HF propagation. Thousands of amateurs were helped by our first propagation handbook. Now, you can take advantage of the information and techniques presented in this completely updated and revised volume.

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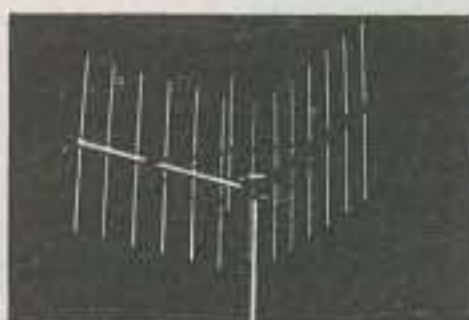
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In addition to the antenna systems, this catalog offers antenna insulators, antenna tuners, antenna wire, artificial ground, baluns, coaxial cables, coax sealant, coax switches, code "bugs," code keyboard, code keys, code paddles, code practice oscillator, dummy loads, filters (RFI/TVI), ground braid/strap, heatshrink tubing, jumper cables, ladder line, line isolators, mobile accessories, RF connectors, rotator cables, signal processors, support line, SWR analyzers, and SWR/ power meters. The Radio Works is an excellent source of all of one's wire antenna needs.

The 128-page "Radio Works Reference Catalog" is a bargain at just \$5. This is not a catalog in the normal fashion; it does not include prices or an order form. It is essentially an antenna text book, which is particularly valuable to new amateurs. It covers antenna and ground wire, antenna specifications, antenna support line, antenna trimming chart, artificial ground, baluns (all aspects), Carolina beams, Carolina Windoms, coax (coaxial cable), coax jackets, coax specifications, coax weatherproofing, connector adapters, connectors, conversion tables, copper wire, copper-wire insulation, counterpoise lengths, decibels, dipoles, ground-loop solutions, G5RV plus, hard-drawn copper, high-performance wire antennas, high RF voltages in stations, installing wire antennas in trees, and much more.

The Radio Works' address is P.O. Box 6159, Portsmouth, VA 23703.

Summary

The Bill's Basics column in the June 1995 issue of CQ lists books published/ sold by ten companies. Books are listed according to subject matter in that previous coverage. That brief list resulted in several requests for additional information, which prompted me to write this much more extensive article. I hope it provides most of the information readers desire.

Vibroplex Moved

The new address of the Vibroplex Company, Inc. is 11 Midtown Park East, Mobile, Alabama 36606-4141. Their voice and facsimile telephone numbers are 205-478-8873 and 205-476-0465, respectively. Their toll-free phone number is 1-800-840-8873. Vibroplex was recently purchased by Mitch Mitchell, WA4OSR, the first amateur to own this company. All the current products will continue to be produced, and new ones are expected to be marketed.

PJ7/K6URI From St. Maarten

Mike Zane will be operating from St. Maarten Island from September 9-23, 1995. He will use PJ7/K6URI as his callsign and will spend some time in the Novice bands, particularly on 40 meters. When operating in the Novice bands, he prefers contacting Novice and Technician-Plus operators. If you contact Mike, send your QSL request to P.O. Box 455, Lodi, CA 95241. An SASE helps expedite a reply.

73, Bill, W6DDB

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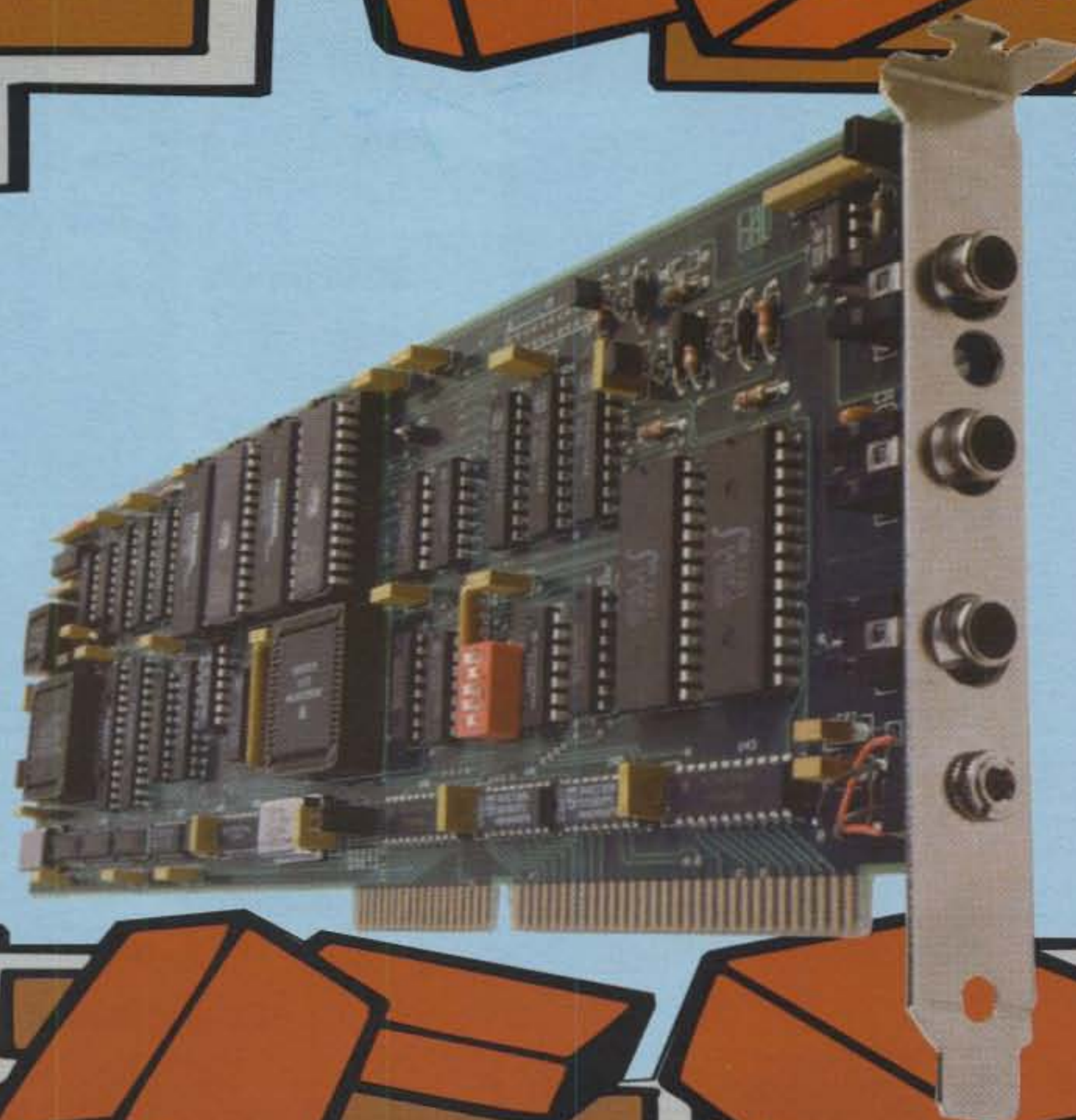


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IMRA-International Mission Radio Assn. helps missionaries—equipment loaned; weekday net, 14.280 MHz, 1:00-3:00 PM Eastern. Sr. Noreen Perelli, KE2LT, 2755 Woodhull Ave., Bronx, NY 10469.

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Travelling Ham Show Takes Amateur Radio on the Road

Ed Hammond, WN1I, is doing what so many of us have only dreamed of doing. He's hitting the road with Amateur Radio to spread the word that this is a great hobby. Beginning in September, Ed will visit fourteen cities presenting seminars and demonstrations of Amateur Radio. In cooperation with Ham dealers at each stop, Ed will demo how it all works, and tell what it takes to join the ranks of licensed Hams. The entire expense for the tour is being borne by Ed.

Formerly the North American Sales Manager for Cushcraft Corp., Ed is an accomplished professional public speaker who has had an unabashed love affair with Amateur Radio for 25 years. He is also the author of a new book on the hobby, "Ham Radio—Your Ticket To Worldwide Adventure." While the tour is aimed at spreading the word to folks



Ed Hammond, WN1I (center), talks to some future Hams at a warm-up seminar session.

who know nothing about Ham Radio, this might be the chance you've been looking for to get a non-Ham spouse or acquaintance in your hobby. Contact the dealer in your location for exact seminar sites and times. Here's the tour schedule:

Tour Schedule

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| Tues. Sept. 19 | Baltimore, MD | Maryland Radio Center | 301-725-1212 |
| Thurs. Sept. 21 | Washington, DC | Electronic Equipment Bank | 703-938-3350 |
| Tues. Sept. 26 | Cleveland, OH | Amateur Electronic Supply | 216-585-7388 |
| Wed. Sept. 27 | Grand Rapids, MI | H.R. Electronics | 816-722-2246 |
| Tues. Oct. 3 | Evansville, IN | The Ham Station | 812-422-0231 |
| Wed. Oct. 4 | Cincinnati, OH | R & L Electronics | 513-868-6399 |
| Thurs. Oct. 5 | Indianapolis, IN | R & L Electronics | 317-897-7362 |
| Tues. Oct. 10 | Minn./St. Paul, MN | Radio City | 612-786-4475 |
| | | | 1-800-426-2891 |
| Thurs. Oct. 12 | Kansas City, MO | Radio Center USA | 816-459-8832 |
| Tues. Oct. 17 | Dallas, TX | Texas Towers | 214-422-7306 |
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| Mon. Oct. 23 | Memphis, TN | Memphis Amateur Electronics | 800-238-6168 |
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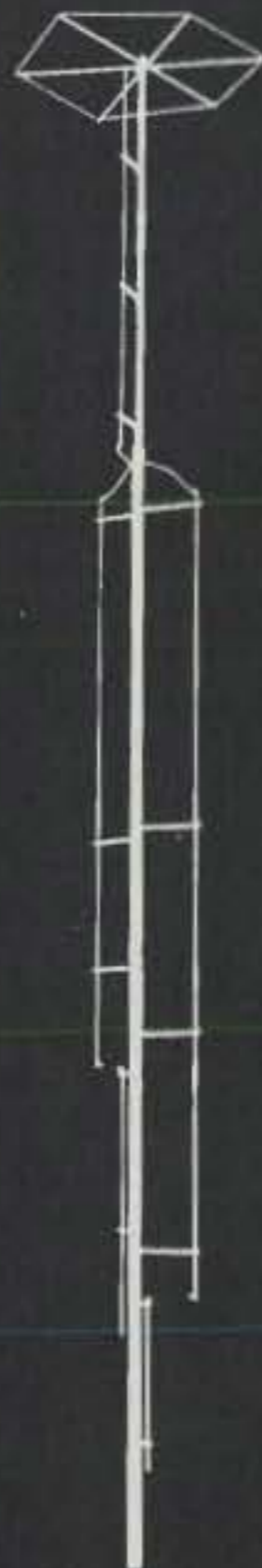
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Voyager DX



Challenger DX



Eagle DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the **ENTIRE BAND**.

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A GAP antenna has no traps, coils or transformers. This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

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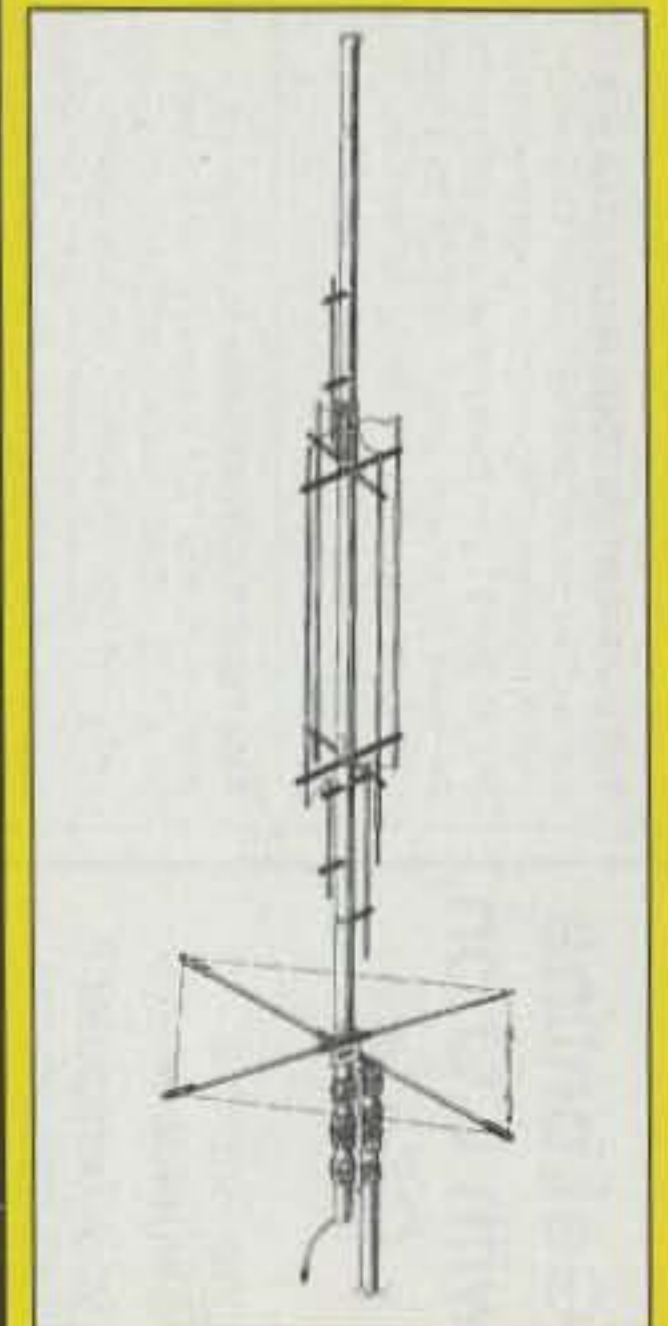
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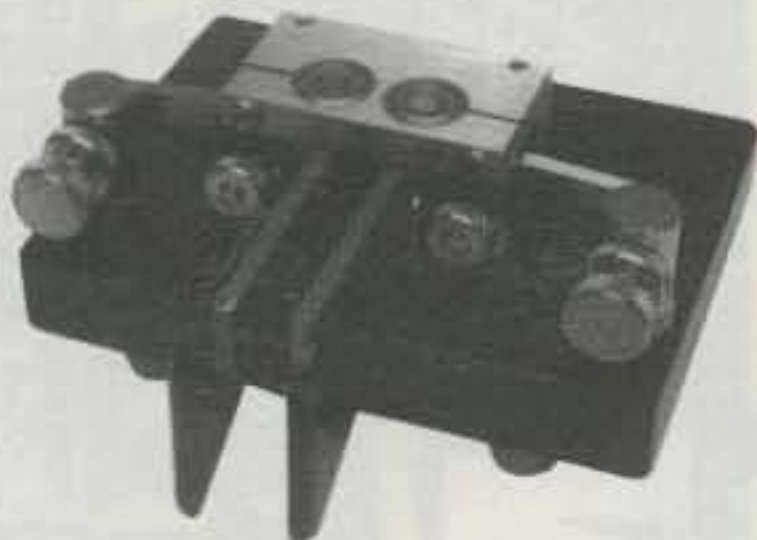
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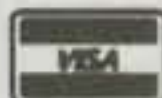
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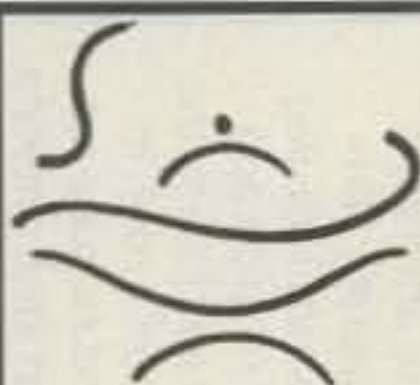
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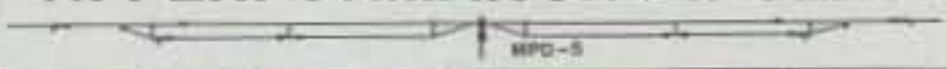


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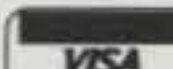
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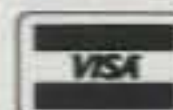
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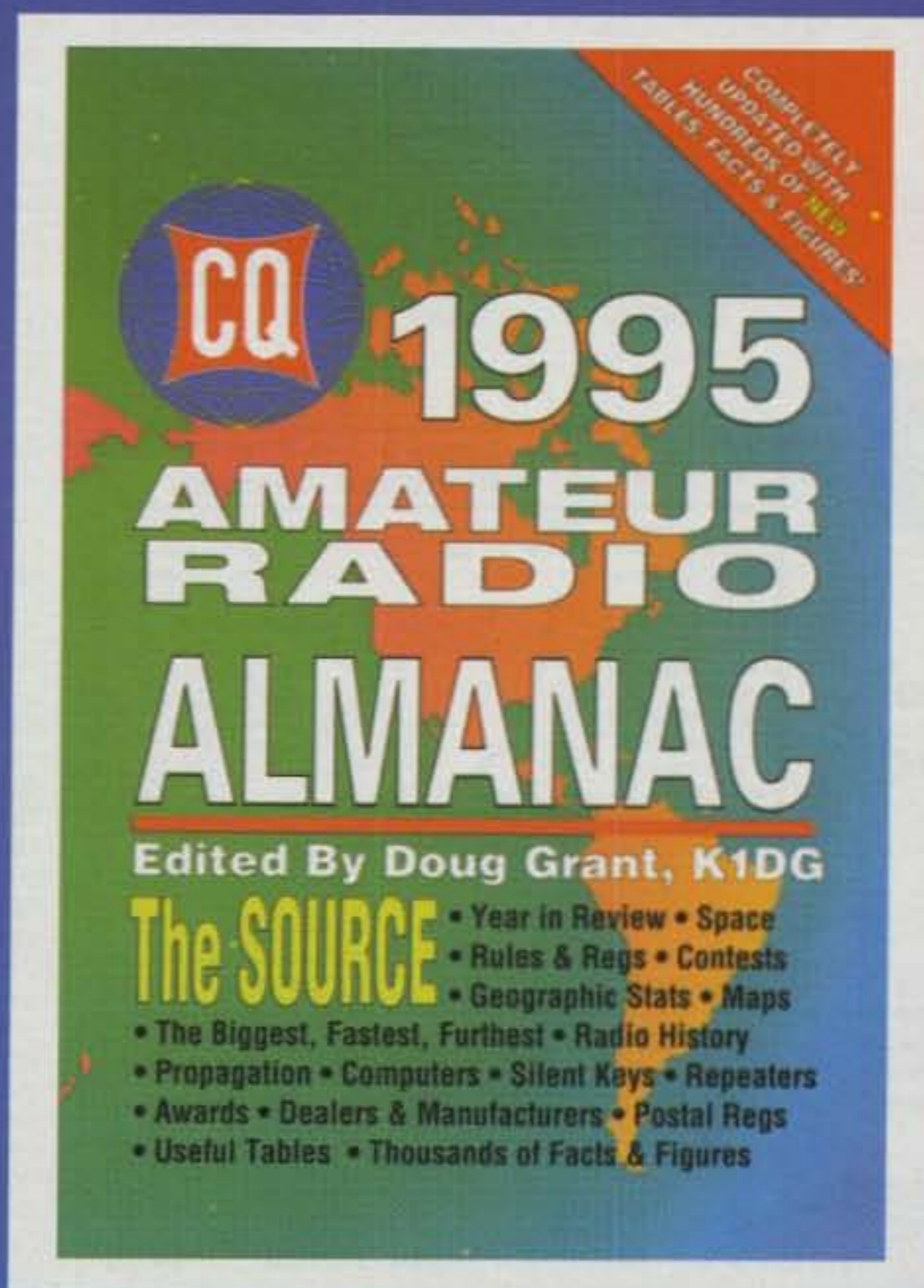
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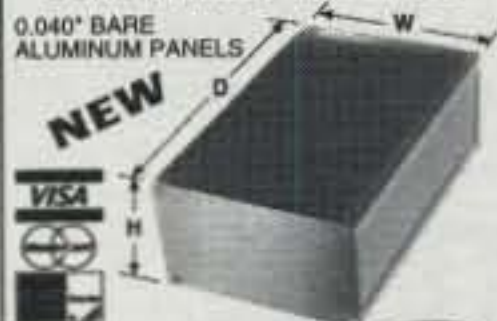
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CIRCLE 32 ON READER SERVICE CARD

Showcase (from page 73)

EZNEC From W7EL

EZNEC from Roy Lewallen, W7EL, is based on the NEC-2 code and works using the ELNEC user interface. EZNEC has all the features of ELNEC, including spreadsheet-style data entry; 3-D antenna view display, with currents and the antenna pattern superimposed; group editing features; the ability to rotate wires and change wire lengths or antenna height with a single entry; frequency sweep; multiple plots on the same screen for comparison; one-key

analysis to display gain, front/back ratio, beamwidth, and other information; and more.

EZNEC requires an 80386, 80486, or Pentium processor; coprocessor (built into 486DX and Pentium); and at least 2 megs of available extended memory. Required disk space depends on the amount of available RAM. The program requires less than 2 megs. If only 2 megs of RAM are available, EZNEC will require 9 megs of disk space to analyze a 500-segment antenna, or no additional space for up to about 200 segments. An EGA or VGA monitor is required. Supported printers are HP LaserJet, color and monochrome DeskJet, and Epson dot matrix, or compatible types.

EZNEC can send a setup string to the printer to put it into an emulation mode. It can be run under Windows as a DOS application.

EZNEC is \$89.00 ppd to the US and Canada. For more information, contact Roy Lewallen, W7EL, P.O. Box 6658, Beaverton, OR 97007 (503-646-2885; e-mail w7el@teleport.com), or circle number 102 on the reader service card.

FILTECH Software From Number One Systems

FILTECH Professional is a software package that allows users to obtain a finished filter design by specifying the required frequency response and terminating impedances. It does not eliminate the engineer entirely, as the designer is free to question and experiment while the repetitive calculations are taken over by the program. The program allows the user to see the effect of reducing or increasing filter order, changing the filter type, or altering the frequency limits or attenuation level. A circuit simulator is built into FILTECH, allowing both the filter specification and the synthesized circuit behavior to be seen together on the same frequency spot. Available for \$475, FILTECH Professional designs active and passive filters up to twelfth order and includes support for Bessel, Butterworth Chebyshev and Elliptic (Cauer) filters.

For more information, contact Number One Systems, Harding Way, Somersham Road, St. Ives, Huntingdon, Cambridgeshire, PE17 4WR, Great Britain (phone +44 1480 461778; FAX +44 1480 494042), or circle number 104 on the reader service card.

Allbander Doublet HF Antenna From S&S Cable

S&S Cable Company has introduced the Allbander Doublet, a wire antenna that has natural resonance on all even harmonics of 160 meters and provides a match to 50 ohm coaxial feed lines on all nine amateur HF bands without the use of traps or tuning components which might dissipate power or fail.

The Allbander Doublet is 170 feet long ($\frac{3}{8}$ wavelengths at 1.8 MHz) and tuned by a 450 ohm ladder line to create a conjugate match point at 1.8, 3.6, 7.2, 10.8, 14.4, 18.0, 21.6, 25.2, and 28.8 MHz. Its 2:1 VSWR bandwidth when installed 50 feet above normally conducting ground is 75 kHz on 160 meters, 150 kHz on 80, 1.5 MHz on 10, and "whole band" on 40, 30, 20, 17, 15, and 12 meters. The Doublet itself requires horizontal space of 180 feet if installed as a dipole, or 90 feet as an inverted Vee, and offers optimum performance at an installation height of 50 feet. It is factory preassembled and requires only support points and a 50 ohm coaxial feed-line for installation.

For more information, contact S&S Cable Company, 9010 Forbes Avenue, Northridge, CA 91343 (phone 818-895-0803; FAX 818-349-8264), or circle number 108 on the reader service card.

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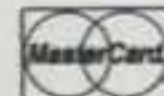
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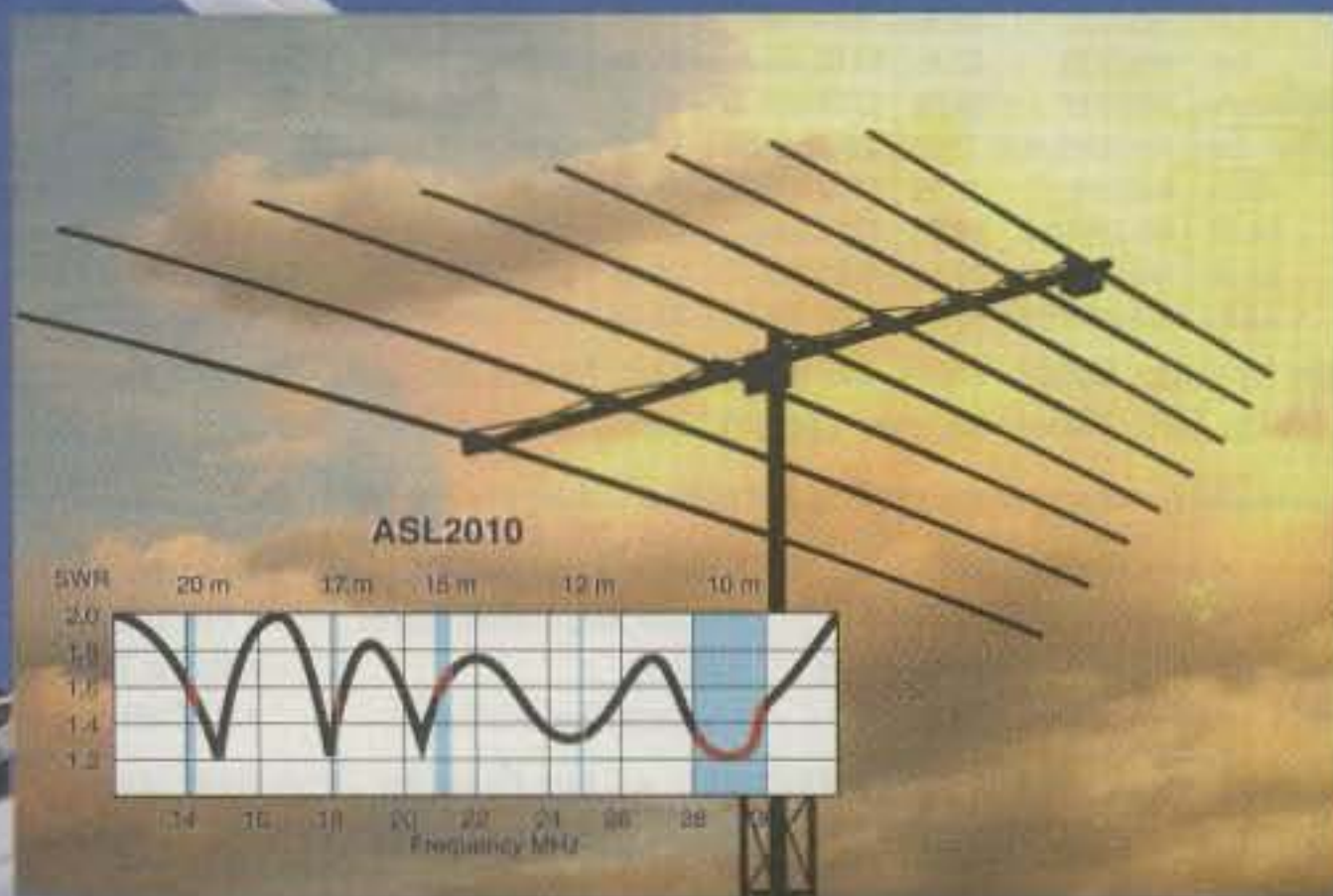
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- **Constant gain over entire frequency range**
- **6.4 dBd gain, 65 degree beamwidth**
- **20, 17, 15, 12 and 10 meters with one antenna**
- **18 foot boom and 19.25 foot turning radius**

| MODEL | ASL2010 |
|--|-------------------|
| Frequency, MHz | 13.5-32 |
| No. Elements | 8 |
| Forward Gain, dBd | 6.4 |
| Front to Back Ratio, dB | 15-20 |
| SWR 1.2:1 Typical | |
| 2:1 Bandwidth | 18.5 MHz |
| Power Rating, Watts | 2000 |
| 3 dB Beam Width, Deg. E Plane | 65 |
| Boom Length, ft (m) | 18 (5.48) |
| Boom Diameter, in (cm) | 2.0 (5.08) |
| Longest Element, ft (m) | 38 (11.58) |
| Element Center Dia, in (cm) | 1.25 (3.18) |
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Specifications

- EDSP (Enhanced Digital Signal Processing)
- Shuttle-jog Rapid Tuning Enhancement
- Directional Tuning Scale for CW/Digital mode and clarifier offset display
- Dual In-Band Receive w/ Separate S-Meters
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EDSP operates in both transmit and receive modes. On receive, the EDSP produces enhanced signal-to-noise ratio and significantly improved intelligence recovery during difficult situations involving noise and/or interference. The result of hundreds of hours of laboratory and real-world experimentation, EDSP's 4 preset random noise reduction protocols and 4 digital filtering selections are controlled by easy-to-use concentric controls on the front panel of the transceiver. High, low, and mid-range cuts for voice work are teamed with razor-sharp CW bandpass filters and an automatic notch filter which identifies and attenuates undesired carriers or heterodynes. Also operational in the transmit mode, EDSP provides 4 performance-enhancement pattern selections for different operating circumstances, ensuring best readability of your signal on the other end of the path.

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 - FT-41R 70 cm: RX:420-470 MHz TX: 430-450 MHz
- Selectable Alphanumeric Display
- Compact Battery Design
 - 4.8V produces 1.5 Watts
 - 9.6V produces full 5 Watts*
- 150 Memory Channels (75 w/Alphanumeric)
- AM Aircraft Receive (110-136 MHz)
- Small Size:
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- DTMF Paging/Coded Squelch
- Automatic Power Off (APO)

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The leader in Advance

"Computer programming my Yaesu HT is fast! Point...click. Point...click."

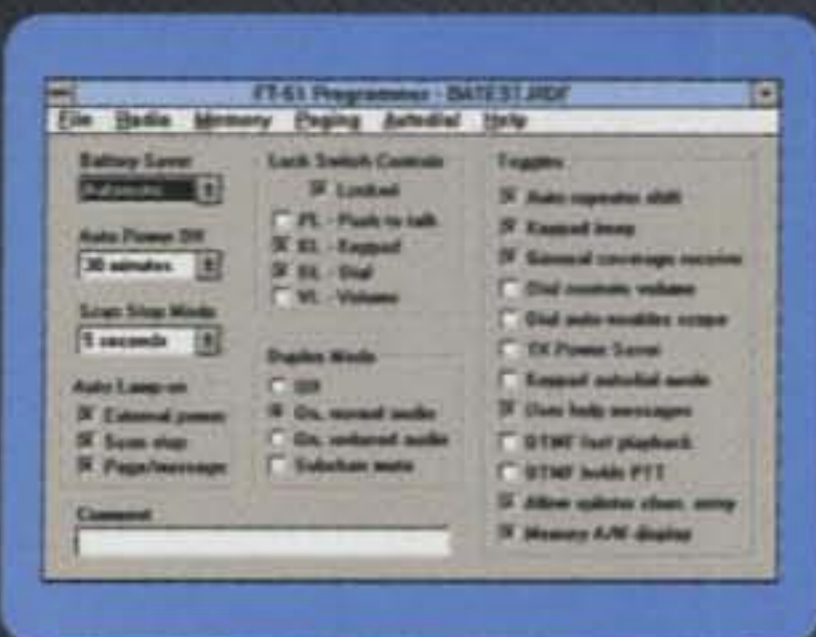


"I created a File with the frequencies, CTCSS tones and so forth for each city I visit. Also, with the E-DC-12 adapter I can operate mobile in just a few seconds."

"Yaesu did it again!"

E-DC-12 Mobile DC Adapter

The new optional E-DC-12 Mobile DC Adapter, slides onto the bottom of the FT-51R and FT-II/41R and provides direct 5 Watt power output, and trickle charges the battery simultaneously. Go mobile with this quick-mount, easy to use, Yaesu "exclusive", and flexible HT operation is complete!



Main Window – Use the Main Window to customize your handheld the way you like it. For example, the Auto Repeater Shift and Keypad Beep Tone can be selected "on" or "off". When you are scanning, the Display Lamp can be programmed to light up when a Busy Channel is found.



Auto Dialer Edit Window – Programming the Auto Dialer has never been easier. Just type in your names and phone numbers and in less than a minute, all of your DTMF Auto dial Slots are programmed.



Memory Listing Window – Memory Channels can be displayed independently. At a quick glance you can view up to 22 memory channels in a single window. Frequency, CTCSS, Encode/Decode, Scan Skips, and Alpha Names are all displayed for quick and easy changes.



Memory Channel Edit Window – Each Memory Channel has a detailed window. With a simple click of the mouse, you can program the following for each memory: Frequency, Alpha Name, Repeater Offset, CTCSS, Power Level, Channel Step Size and more!

Only Yaesu lets you program with the ADMS-1 Windows™ software or from the HT keypad.

Unlock all the features of your FT-51R and FT-II/41R HTs, with a simple "point and click!" Full programming, and all of the benefits of Yaesu's star performing dual band and 2-meter HTs are yours in minutes. Simple to use! Installation and operating instructions are on a single page. And there's a Programmer Help window for each radio. Use ADMS-1 to download from HT to PC, then clone the information to another FT-51R or FT-II/41R HT instantly! And, create memory Files for each city you visit. Add the frequencies

—including alpha names, CTCSS tones and so on for repeaters, then load and go! Affordable for everyone, ADMS-1 Windows™ software is a neat little package that will change your HT use forever.



ADMS-1 Windows™ Software Kit
3.5 Floppy Disc and Programming Cable with DB-25 Connector.

Conventional programming is always straightforward and practical with Yaesu radios. The FT-51R and FT-II/41R are no exceptions! You'll enjoy exploring each feature-packed HT from the keypad as you make your radio uniquely "yours".

5 Watt Version Available Now!

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. Windows is a registered trademark of Microsoft Corporation.

The New Leader In Satellite Communications!

and digital

SAVE \$100.00
When you purchase a new IC-820H.
Limited time offer. See your ICOM dealer for details.



"ONLY THE IC-820H showed both transmitter and receiver performance that will result in efficient packet operation at 9600 baud."— *QST*, May 1995

IC-820H FEATURES:

- Built-in Auto Satellite Functions
- All Modes in a Compact Case (9.5" W x 2.7" H x 10.0" D)
- "Plug and Play" 9600 bps Operations
- Built-in High Stability Crystal (± 3 ppm)
- Independent Controls with Sub Tuning
- New DDS for 1 Hz Resolution
- IF Shift (electronically shifts for effective interference reduction)
- Satellite Memory and Tracking Function (rev./normal tracking on main/subband)
- Doppler Compensation Function
- 10 designated Satellite Memories
- Data Jack for Packet Ops. (9600 bps)
- New Modulation Limiter Circuit
- 2 VFO's each for VHF and UHF Bands
- 50 Memory Channels
- Stereo Headphone Jacks
- 2 Antenna Connectors
- Noise Blanker
- RIT Function
- Memory Allocation Function
- Attenuator
- Programmed/Memory/Mode Select Scan
- CW Semi-Break In and Side Tone
- AF Speech Compressor (audio)
- Auto Repeater and One-Touch Functions
- Separate Main and CW Filters
- CW Narrow Filter (optional)
- Tone Scan (optional)
- 45 W (FM, CW), 35/6 W (SSB) VHF
- 40 W (FM, CW), 30/6 W (SSB) UHF
- Microphone Optional

IC-820H 2 M/440 MHz Dual Band All Mode Transceiver

The IC-820H isn't your typical base station transceiver. This all mode dual bander has compact and lightweight dimensions offering operating versatility other base stations just can't match. Mobile and field operations are ideal with this rig. But don't let its size fool you. This is a high performance transceiver with state-of-the-art construction, circuit design and cutting edge features.

ICOM's **Newly Designed I-loop DDS** (digital direct synthesizer) is employed in the PLL circuit of the IC-820H. Previous PLL circuits for 10 Hz resolution transceivers contained 2-loop circuits. The new I-loop has a single loop and **Generates a Signal with Superior 1 Hz Resolution.** ICOM's DDS PLL also contains a normal PLL as the main-loop and a DDS as the sub-loop.

Satellite operation with the IC-820H's **Built-In Satellite Functions** has never been this easy. These include **Normal and Reverse Tracking** for different modes of satellite communications; **Independent Uplink/Downlink Control** for Doppler shift compensation; **Separate Satellite VFO** and **10 Dedicated**

Satellite Memories provide quick switching from normal to satellite operation as well as easy recall of satellite and downlink frequencies.

With **Independent Controls and Indications for Both Bands**, this dual bander is as easy to operate as most single band transceivers – and exchanging the main and sub bands is just a switch away. **Separate S-Meters** simultaneously indicate each band's respective signal strengths.

The **Sub Tuning Function** can be assigned to the **RIT** or **SHIFT** control and allows you to tune automatically at variable tuning speeds. This is especially useful when searching for signals over a wide frequency range – eliminating the need for excessive rotations of the main dial.

The IC-820H's **Compact Size** enables easy installation in a shack as well as a vehicle. Overall dimensions may be small, but important points such as LCD size and space between switches are more than adequate.

An important consideration in all mode transceivers is the interference reduction circuit. The IC-820H's

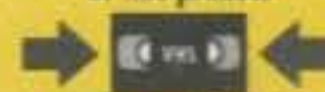
IF Shift Circuit electronically shifts the center frequency of the receiver passband to evade interfering signals.

The IC-820H's **DATA Terminal** (in ACC socket) is connected to its modulator circuit directly. This **Data Jack** supports **Packet Operation** at up to **9600 bps**. A newly designed **Modulation Limiter Circuit** prevents you from exceeding the maximum deviation – even with large amounts of data.

For more information about the IC-820H, visit your local ICOM dealer, contact ICOM Technical Support in the HamNet forum on CompuServe® @ 75540,525 (Internet: 75540.525 @ compuserve.com) or

call ICOM's brochure hotline:
(206) 450-6088.

View a video demonstration
of this product



at your participating
ICOM dealer today!

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Experience the Quality

CIRCLE 2 ON READER SERVICE CARD

ICOM